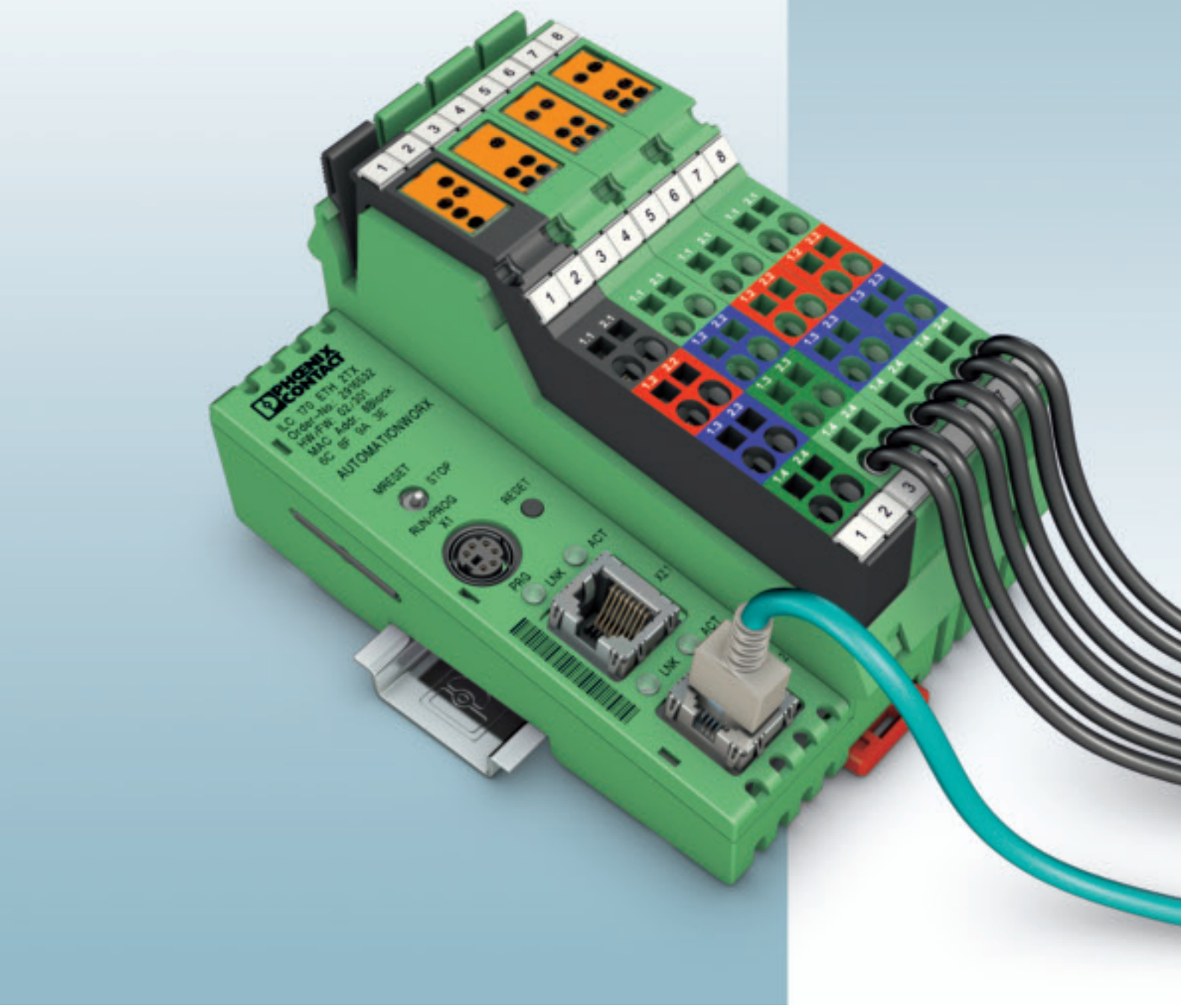
Components and Systems

AUTOMATION



PHOENIX CONTACT
INSPIRING INNOVATIONS

AUTOMATION | Components and Systems

AUTOMATION
offers everything that designates the innovative automation technology of Phoenix Contact, from the I/O systems for field buses and Ethernet to embedded and PC-based control technology up to the programming and visualization.

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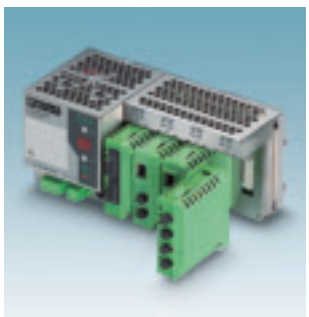

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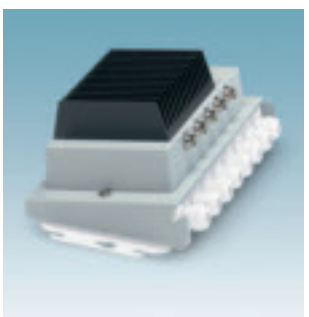

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Requirements for modern automation solutions

The requirements for the economic viability of machines and systems are continuously increasing. The modularization of mechanics, electronics and automation calls for high-performance, flexible and communicative automation solutions.

The communication and integration capability of the automation components in a system are increasingly becoming the key factors for tapping the potential of cost cutting.

Cutting costs through communication

Continuous and uniform communication between SAP and the field level makes it possible to make quick and well-founded decisions, which in turn reduce costs and provide competitive advantages. Phoenix Contact uses technologies from the IT environment for this.

These technologies are constantly developed further into industrial solutions. IT-powered automation from Phoenix Contact makes reliable technology industrially applicable, thus seamlessly connecting the Office world to production.

Cutting costs by analyzing energy data

The constant rise in the prices of raw materials calls for acquisition and analysis of the secondary production costs. This is especially true of energy costs.

A considerable increase in energy costs is now challenging industrial plants to develop energy-saving strategies and measures.

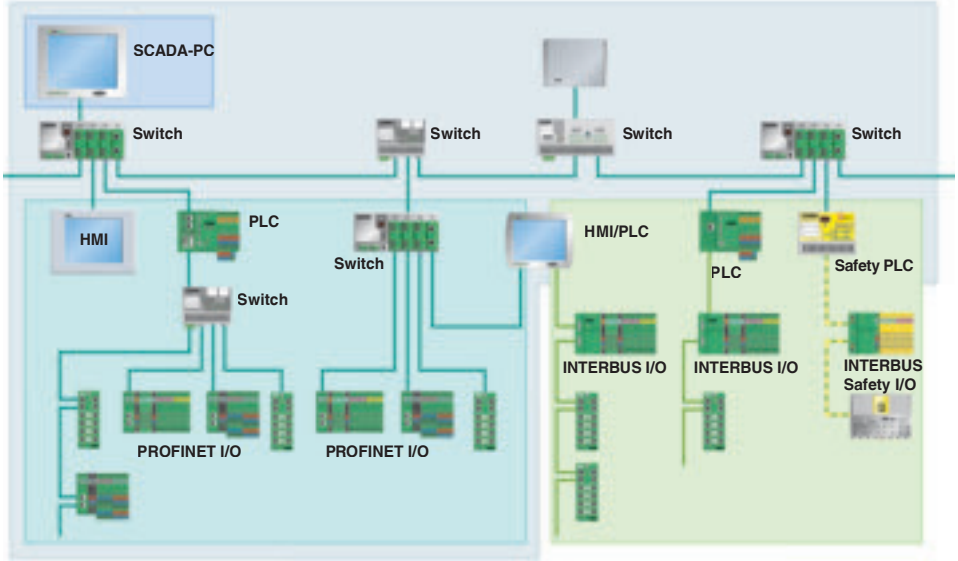
To do this, it is important to know the energy use and to analyze it in order to identify hidden loads or leaks in the system. Hardware and software products will have to support these requirements in future.

IT-powered automation – more communication for more productivity

Mainstream technologies from the IT field are used in many of our components and systems in order to avoid technology barriers and to ensure sustainability of the automation solution.

Standard Ethernet protocols such as TPC/IP, SNMP and FTP have been successfully used in a multitude of applications.

As a communication expert, PHOENIX CONTACT ensures that your investments are safeguarded and can be easily adapted to new developments.

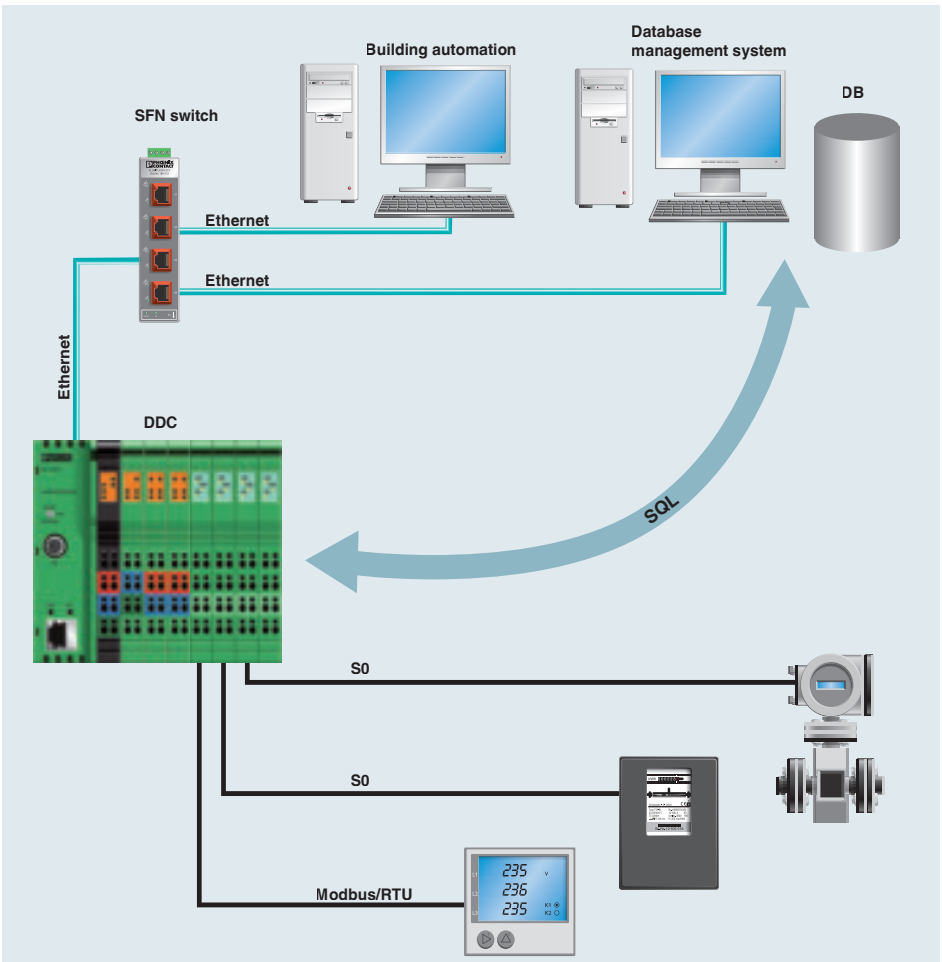


Acquisition and analysis of energy data leads to cost transparency

The first step towards saving energy is an analysis of the individual energy consumers in a system. For this, Inline controllers record consumption values via distributed media meters.

The acquired data is directly transmitted to a database management system and is available there for future evaluations.

Owners or users thus attain cost transparency and can assign energy consumption, credit it and react to it in line with the causation principle.



Smart entry into the field of automation

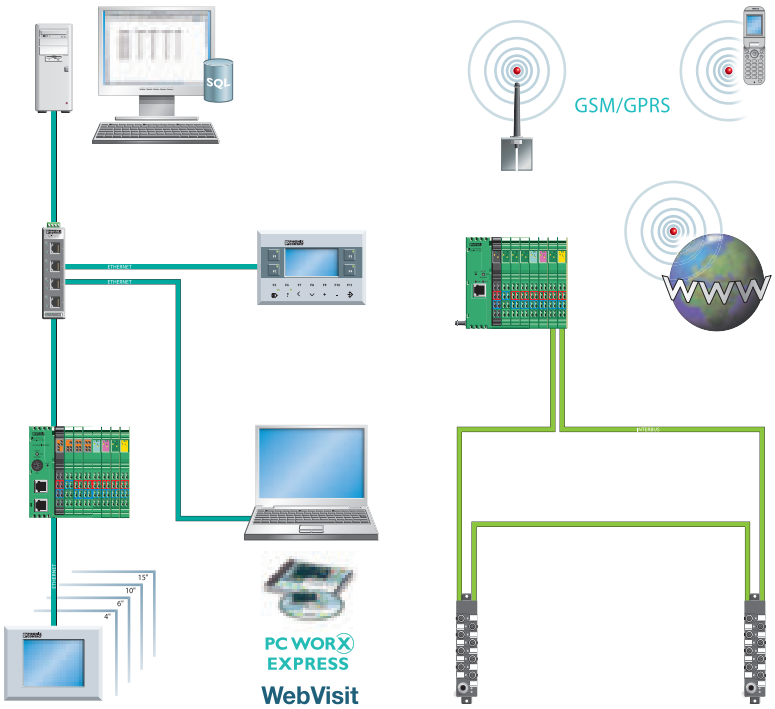
With our automation system for compact controllers of the 100 class, we enable economical and easy entry into the field of automation.

The smart controllers can be extended with numerous Inline I/O modules. A GSM/GPRS module enables communication even in the remotest of installation areas.

PC Worx Express makes controller programming effortless. Programs can therefore be created as ladder diagrams using easy-to-understand symbols within no time.

And if you integrate operation and monitoring devices, each HMI device comes with its own homepage thanks to the integrated web server. WebVisit generates detailed pages on machine operation for your use.

Ethernet infrastructure components that are suitable for industrial applications provide complete flexibility for your application. It does not matter whether the controller has to send e-mails, wants to get a new application program from a central server, has to log data in realtime or has to read and write databases without stress. All these functions can be realized quickly and easily.



High-performance automation with PROFINET

Competitive and future-oriented PROFINET solutions can be realized within the framework of the AUTOMATIONWORX system from Phoenix Contact.

Our network technology functions reliably and safely in any environment. It offers performance, smooth interaction of all components and protection against unauthorized access. Components that are movable or difficult to access can be integrated using wireless technologies such as Bluetooth.

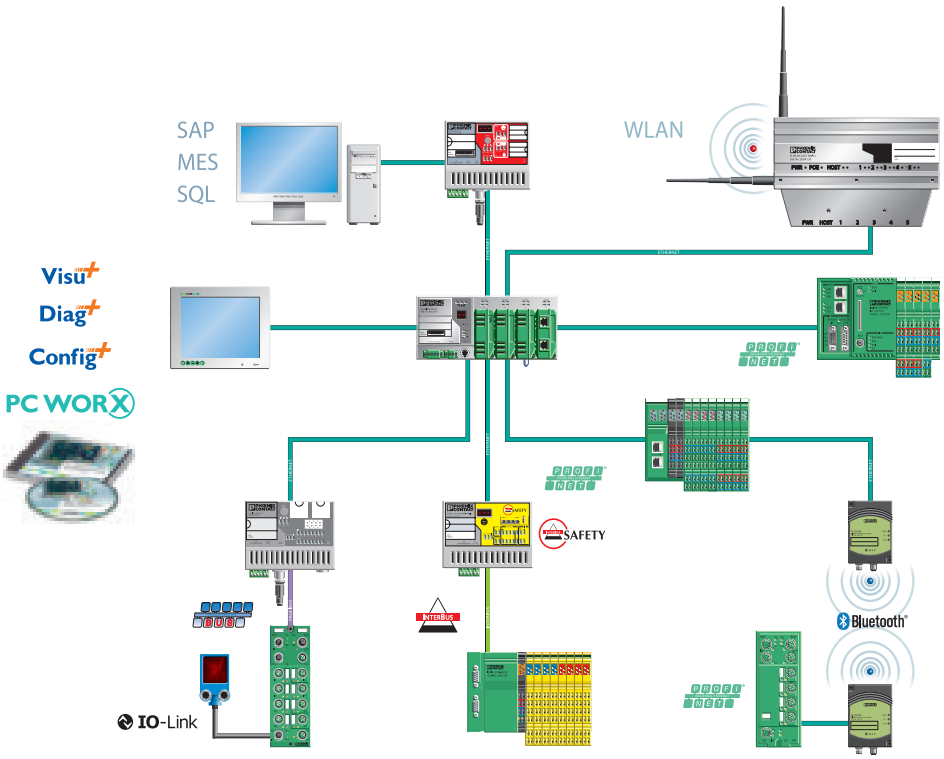
DIN rail mountable and PC-based controllers of different performance classes which can be uniformly programmed and parameterized with the PC Worx engineering software provide maximum performance and uniformity because of the standards used, such as PROFINET and INTERBUS.

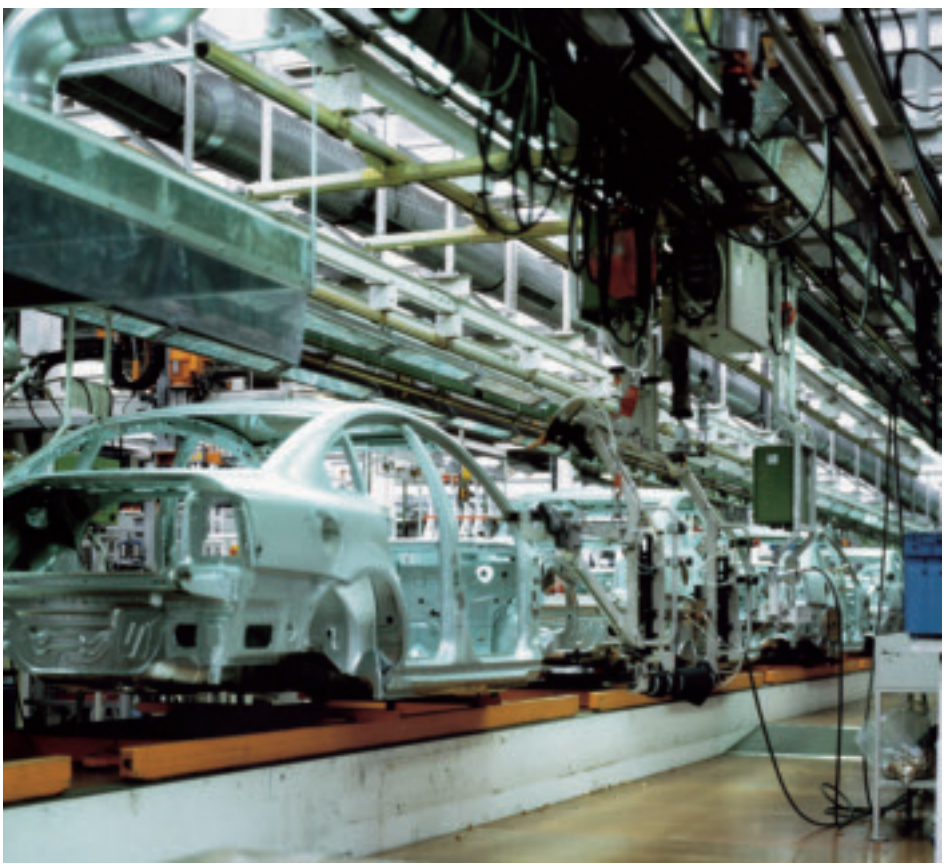
You can optimally operate and control your system with the help of compact operator terminals that are operated using keys and a touch panel with variable display sizes, as well as via fully developed industrial PCs of different performance classes.

For I/O communication in the control cabinet and in the field, you can safely rely on our comprehensive range of bus couplers as well as the compact, modular and expandable standard and special function modules with the IP20 and IP65/67 degrees of protection.

Safe and simple control technology including programming software as well as I/O components for INTERBUS Safety and PROFIsafe provide the protection that your system requires.

IO-Link modules for connecting sensors and actuators to higher-level communication systems such as PROFINET, INTERBUS or PROFIBUS ensure communication and parameterization of all sensors.





AUTOMATION – Components for modern automation solutions

Being one of the leading automation experts in the world, Phoenix Contact provides you with a complete range of hardware and software components and accessories for creating automation solutions.

The components, which have been optimally adapted to each other, are easy to operate and help to increase the economic viability of your machines and systems when used with other Phoenix Contact products.

Having a single supplier accelerates and simplifies the ordering process. Our comprehensive range of services for all project phases helps you save time and money!

You can find more detailed information about our products and services in this catalog as well as in the online catalog (www.phoenixcontact.net/catalog) or on our service website (www.phoenixcontact.net/service).

Services

Regardless of your immediate task or the reason for which you are looking for a technology solution, and no matter which products you want to use: Our specialists at the AUTOMATIONWORX Competence Center are always at your disposal to answer any questions that you may have.

Control technology

Regardless of whether you want central or distributed control over a small machine or a large system: We provide just the right device for your requirements.

You can choose between embedded controllers and PC-based solutions of different performance classes.

Industrial network solutions

Our network technology, which is suitable for industrial applications, enables seamless communication between all components and provides protection against unauthorized access.

Bluetooth and WLAN-based innovative wireless products provide additional flexibility and convenience.

I/O systems in the IP20 control cabinet

Due to their highly modular structure, the required automation functions can be developed into compact solutions for a wide range of applications when used in conjunction with the current standard fieldbus systems and industrial Ethernet networks.

Operation & monitoring

Operator terminals (OT) and touch panels (TP) from Phoenix Contact are extremely compact operation and monitoring devices and are easy to integrate into the AUTOMATIONWORX system via OPC.

Industrial PCs

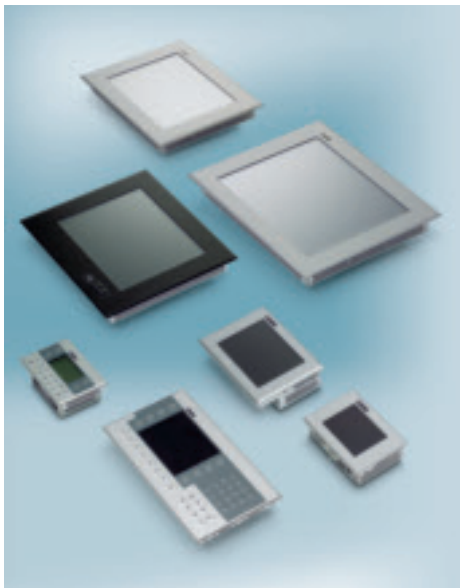
The industrial PC solutions from Phoenix Contact offer excellent performance for your automation solutions in industrial environments.

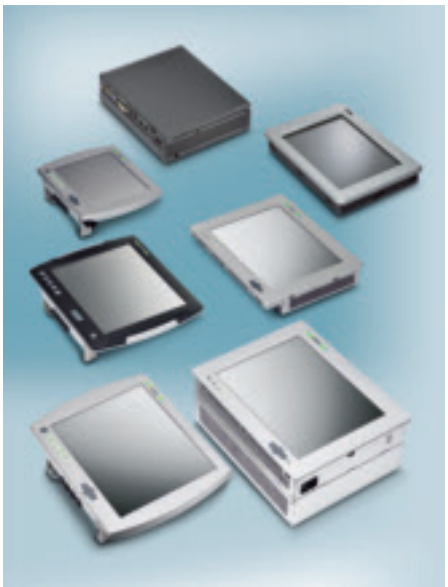
Innovative and sustainable products with the latest technology safeguard your productivity and investment.

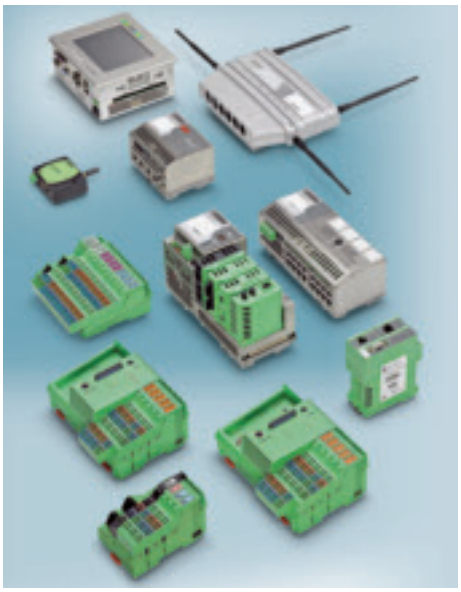
PROFINET

PROFINET from Phoenix Contact comes with all controller components, starting from the infrastructure right up to the I/O systems.

PROFINET is thus deeply integrated in the PC Worx engineering system and the controllers.







I/O systems in the IP65 field

Sensors and actuators can be directly connected on site with the M12 and M8 connection methods by simply mounting devices in the field. This makes it possible to minimize cable lengths, reduce the service time using integrated diagnostics, and to save on installation costs.

Drives

Programmable logic controllers (PLCs) are commonly used for controlling movements in machines or systems. PC Worx enables optimum and complete integration of motion functions into the PLC world.


SOLUTION
SERVICE
INSTALLATION
AUTOMOTIVE
PROFINET
PLASTICS
WIRELESS
WIND
PROJECT ENGINEERING
TRAINING
PLANNING
SHIPS
BUILDINGS
RETROFIT
CONTROL TECHNOLOGY
ETHERNET
WATER
WASTE WATER
STARTUP
OPERATION
ENGINEERING

Services | AUTOMATIONWORX Competence Center

Competence in solutions

Regardless of your immediate task or the reason for which you are looking for a technology solution, and no matter which products you want to use: Our specialists at the AUTOMATIONWORX Competence Center will be at your disposal to answer any questions that you may have.

Our flexible service concept allows an application at all conceivable levels.

Taking into account the particular requirements of various industries, our skilled professionals have comprehensive technological knowledge about the entire AUTOMATIONWORX product range. Our service portfolio is based on the phases of a typical project, starting from the initial system planning right up to retrofitting.

Regardless of whether you are looking for an industry-specific solution, for help in a certain project phase or for support with a particular technology: We have extensive experience in and in-depth knowledge of all these fields. We always have the right solution for you!

Classified and customized services

As a member of ZVEI, Phoenix Contact has classified all its services. All project-related, application-specific or system-related services can be found in one of the seven classes. Phoenix Contact's adherence to the agreed regulations helps to increase the economic viability and availability of your machines and systems.

Refer to the table on page 12 for the allocation of a particular class to our services.

Visit www.zvei.org/automation for more information on the classification of services.

Program overview

Competence in technology

PROFINET & INTERBUS	Planning	Project Engineering	Installation	Startup	Operation	Retrofit	ZVEI-Class*
Description							
Engineering							
Project Engineering	●	●	●	●			4, 5
System Retrofit & Upgrade						●	4, 5
Service							
Hotline			●	●	●	●	2
Local Service			●		●	●	2
Startup Support				●		●	2
System Check				●	●	●	3
Service Contracts					●		4
Training & Workshop							
Instruction & Profiworkshop	●	●	●	●	●	●	2, 3, 4
PROFINET Configuration & Startup	●	●		●	●	●	4
Certified PROFINET Engineer	●	●		●	●	●	4
Certified PROFINET Installer			●		●		4

Ethernet	Planning	Project Engineering	Installation	Startup	Operation	Retrofit	ZVEI-Class*
Description							
Project Engineering	●	●	●	●			4, 5
System Retrofit & Upgrade						●	4, 5
Hotline			●	●	●	●	2
Local Service			●		●	●	2
Startup Support				●		●	2
System Check				●	●	●	3
Service Contracts					●		4
Instruction & Profiworkshop	●	●	●	●	●	●	2, 3, 4
Industrial Ethernet Technology	●			●	●	●	4
Ethernet Security	●	●		●		●	4

* Visit www.zvei.org/automation for more information on the classification of services.

Many of our services are available worldwide. You can contact your sales company for more information.

For more detailed information about these and other services, visit our service website (www.service.phoenixcontact.com) or see the online catalog (www.phoenixcontact.net/eshop).

PROFINET

To be able to offer you services for the complete lifecycle of your PROFINET solution, Phoenix Contact, Phoenix Testlab and KW Software have combined their know-how in the PUO-accredited PROFINET Competence Center.

This makes it possible for us to support the development of individual components, starting from their use in applications to the modernization of systems.

Ethernet

We already support you during the stage of Ethernet planning and configuration. This ensures compliance with the project planning guidelines and rules out the possibility of avoidable errors right at the beginning. We determine the expected network capacity in order to plan the network topology. Redundancy concepts provide the necessary level of safety for your network. A security solution which is integrated into your application and adapted to it prevents undesired access.

Wireless	Planning	Project Engineering	Installation	Startup	Operation	Retrofit	ZVEI-Class*
Description							
Project Engineering	●	●	●	●			4, 5
System Retrofit & Upgrade						●	4, 5
Hotline			●	●	●	●	2
Local Service			●		●	●	2
Startup Support				●		●	2
System Check				●	●	●	3
Service Contracts					●		4
Instruction & Profiworkshop	●	●	●	●	●	●	2, 3, 4
Wireless LAN System Course	●	●		●	●	●	4
Bluetooth System Course	●	●		●	●	●	4

Control Technology	Planning	Project Engineering	Installation	Startup	Operation	Retrofit	ZVEI-Class*
Description							
Project Engineering	●	●	●	●			4, 5
System Retrofit & Upgrade						●	4, 5
Hotline			●	●	●	●	2
Local Service			●		●	●	2
Startup Support				●		●	2
System Check				●	●	●	3
Service Contracts					●		4
Instruction & Profiworkshop	●	●	●	●	●	●	2, 3, 4
PC WORX Starter Course	●	●		●	●	●	1
PC WORX IEC 61131-Programming	●	●		●	●	●	4
PC WORX Basic Communication	●	●		●	●	●	4
PC WORX PCP Communication	●	●		●	●	●	4
PC WORX Bus Control	●	●		●	●	●	4
SQL Database Communication	●	●		●	●	●	4
Visu+ User Course					●	●	1

Safety	Planning	Project Engineering	Installation	Startup	Operation	Retrofit	ZVEI-Class*
Description							
Safety Engineering	●	●					4, 5
Safety Service			●	●	●	●	2
Instruction & Profiworkshop	●	●	●	●	●	●	2, 3, 4
Safety Technology Basics	●	●				●	4
New Safety Standards	●	●				●	3, 4
Follow up Safety Standards	●	●				●	3, 4
INTERBUS Safety System Course	●	●	●			●	4
INTERBUS Safety Diagnostics				●	●	●	4

Wireless

Our first step will be to help you make the right choice of wireless technology and products. Be it Bluetooth or wireless LAN, transparent Ethernet protocols or quick I/O signal exchange – we provide a reliable wireless solution which is optimally customized for your application.

After a free pre-analysis, we measure the radio field of your system. Our startup support, which includes system testing, ensures a smooth production start.

Control technology

Our PC WORX starter course introduces you to the PC WORX configuration and programming software.

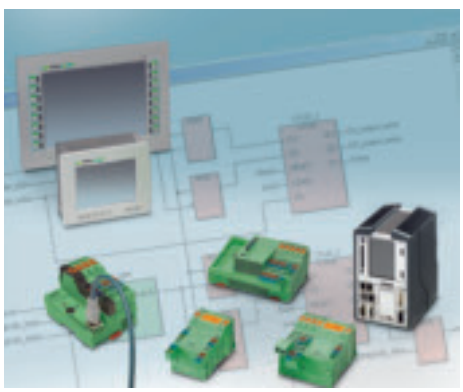
We will be at your disposal 24x7 through the 24h hotline to answer any special queries that you may have, e.g. in case of error messages during startup and operation.

We simplify the communication between I/O components and controllers by providing standard function blocks and industry-specific libraries.

Safety

Very specific technical know-how is required for the implementation of safety-related applications. As the machine and system manufacture you must consider the safety requirements for man, machine and environment in compliance with the relevant standards.

Our safety expert team develops and supports a concept that is individually adapted to your requirements during the entire lifecycle of your safety-related application.



Competence in industries

Based on the extensive industrial experience that we have accumulated in the past decades in numerous projects, we can implement solutions seamlessly, quickly and simply for your specific application.

Whether you are at home in the automotive industry, are an environmental technology expert or automate buildings, whether you plan and build high-quality machines for the world market or are a specialist for handling and transportation systems – we will support your application, practically and worldwide.

Our industry-specific automation solutions offer a reliable foundation for the complete lifecycle of your system – economically viable and future-oriented.

Building automation

Water management

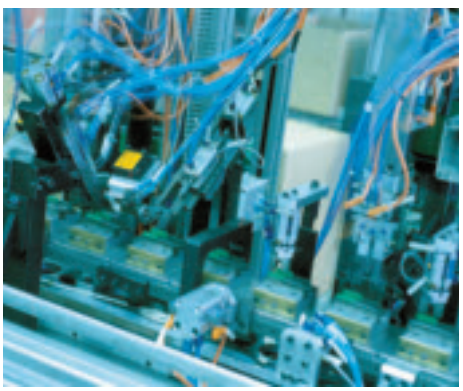
Automotive industry

Shipbuilding

Wind power technology

Waste water management

Plastics engineering



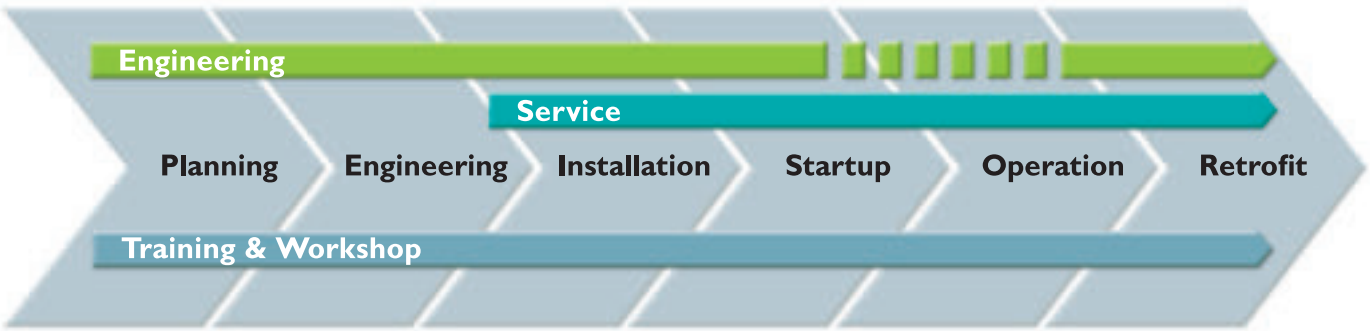
Mechanical engineering

Competence in projects

We will guide you through the entire lifecycle of your system - from the initial conceptualization through implementation and optimization. It is up to you to decide how you would like to make use of our comprehensive knowledge.

Take a look at our road map and decide where you want to start, switch or stop. Depending on your project phase and situation, you can decide whether you want to make use of the know-how of an engineering specialist during the planning, configuration and modernization phases, or whether you want assistance from a service team specialist during installation, startup and operation or whether you need to consult a hotline specialist.

You can naturally also qualify your own employees through training & workshops. The extensive practical experience of our trainers will ensure the necessary reference to your application during these sessions.



Engineering

Contact us right in the first phase of planning and configuration and profit from our technological know-how paired with extensive experience.

After we have solved your requirement, we will present to you a sophisticated hardware and software-based technical concept. We help you program applications based on tried and tested software blocks (e.g., PC WORX and high-level language). We provide on-site support in the vital startup phase to help you execute your plan up to the very last detail.

Your system is operating but does not have the latest technology? If the answer is yes, then you can simply extend the lifecycle with a retrofit. With a moderate investment in modernization, you will achieve increased system availability as well as simplified and inexpensive maintenance.

Service

Concentrated know-how, longstanding practical experience and maximum flexibility distinguish the service team of the AUTOMATIONWORX Competence Center.

A competent contact person will be available to you round the clock and on all days of the year through our hotline. You can also reserve a specialist hotline exclusively for yourself. This ensures optimum action in situations where quick handling is absolutely essential, e.g. during the startup of new systems. You can directly reach your personal contact person, who already has the necessary system information provided by you, through a separate telephone number.

System checks and service contracts are preventive measures that ensure maximum system availability.

Training & workshops

Since our qualification concept is divided into many levels, we can tailor your training package according to your individual requirements.

We offer a scheduled training program for system basics on the latest technologies at different locations in Germany.

For individual training courses, we coordinate the contents, time and the location of the training with you according to your requirements. It can be, for example, an industry-specific software training course.

We also provide on-site instructions and workshops for small groups in case you require project-oriented specific knowledge.

Control technology

Distributed intelligence – Local control power

The control technology from Phoenix Contact offers a wide range of networking options with INTERBUS and PROFINET. All controllers are suitable for centralized and distributed use. Modular compact controllers ensure that computing capacity is provided directly where it is needed. This means that even fast control processes using many local controllers on site can be implemented cost-effectively. With INTERBUS and PROFINET as connections to the I/O level and Ethernet, PROFINET or INTERBUS for networking with higher-level systems such as the control or operating level, the PC WorX automation software supports controller networking in a user-friendly manner.

The latest control solutions in automation technology make use of open, flexible and high-performance hardware platforms. PC-based solutions offer visualization and operation functions in addition to their control functions. Here, industrial PCs become an important link in the communication technology between Ethernet and fieldbus systems, connecting I/O systems with the control room. Once integrated into the communication network, they form a complete and networked automation solution. Embedded controllers integrated into the Inline automation kit are suitable for distributed and centralized use.

We also offer scalable control solutions based on Steeplechase VLC for users who program in the flow chart language.

Program overview

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).

Control technology | Controllers as per IEC 61131

Centralized or distributed

The right controller for every application: The product portfolio from Phoenix Contact ranges from monitors with integrated controllers, to modular control solutions up to compact high-end controllers. The devices are grouped into different performance classes.

Within the framework of modularization, the machine or system is made up of tested function modules that are suitable for different production steps such as filling, closing, labeling, grouping or packing. Customer requirements can thus be implemented quickly and cost-effectively. The control solution must now be adapted to the new mechanical structure. The user may require a different control capacity or screen size (12" to 17") for each module. A wide range of different controllers with different control capacities is essential for economic implementation of the distributed approach.

Each of the controllers is uniformly programmed and parameterized using the PC Worx software. The connectivity of controllers and the distributed approaches in automation technology play a very important role here. Thanks to the virtually limitless communication options provided by controllers, distributed automation solutions are easy to implement.

Program overview

Inline controller – Compact and modular

The right controller for every embedded application. An Inline controller transforms an Inline I/O station into a modular compact controller. A special feature of the Inline controller product range is the highly modular expandability of the I/O level. With the Inline installation system, Inline controllers can be used to set up high-performance controllers. All conceivable sensor and actuator interfaces, from digital and analog inputs and outputs to function terminals for open and closed-loop control, are available. If you want to integrate more distributed devices, an INTERBUS interface is available in addition to the Ethernet coupling. Inline controllers cover the performance range from smaller controllers, which are preferably used for distributed tasks, to medium-sized applications as centralized control solutions.

Remote Field Controller – Communicative and high-performance

Remote Field Controllers are high-performance compact controllers. They are suitable for the medium to high-end application range in automation technology. INTERBUS and Ethernet are used as fieldbus interfaces. More often than not, Remote Field Controllers are used as centralized controllers because of their high performance. As centralized controllers, they often take care of the entire communication with individual fieldbus modules and the communication with other controllers and higher-level operating and control systems.

S-MAX – combines high-performance PC platform, PLC, visualization, and fieldbus master in the high-end class

S-MAX offers PC-based solutions when a controller is required to perform more specialized high-end class functions, e.g. visualization, in addition to its traditional tasks.

The all-in-one S-MAX machine controller belongs to the new controller generation with the highest level of performance.

The 12", 15" and 17" devices of the S-MAX product range use the Pentium M-technology and can be easily integrated into system concepts based on centralized or distributed controllers. The devices thus need very little configuration and also provide a high level of transparency and comprehensive functionality at the same time.

Communication with higher levels, other distributed controllers and I/O components is carried out using international standards such as Ethernet TCP/IP and PROFINET.

S-MAX 412 CE PN/M fulfills the requirements of classification societies for the maritime field. You can visit the Phoenix Contact website for more information on the latest approvals.

The S-MAX 400 CE PN series is a series of devices without screens, but with otherwise identical technical data.

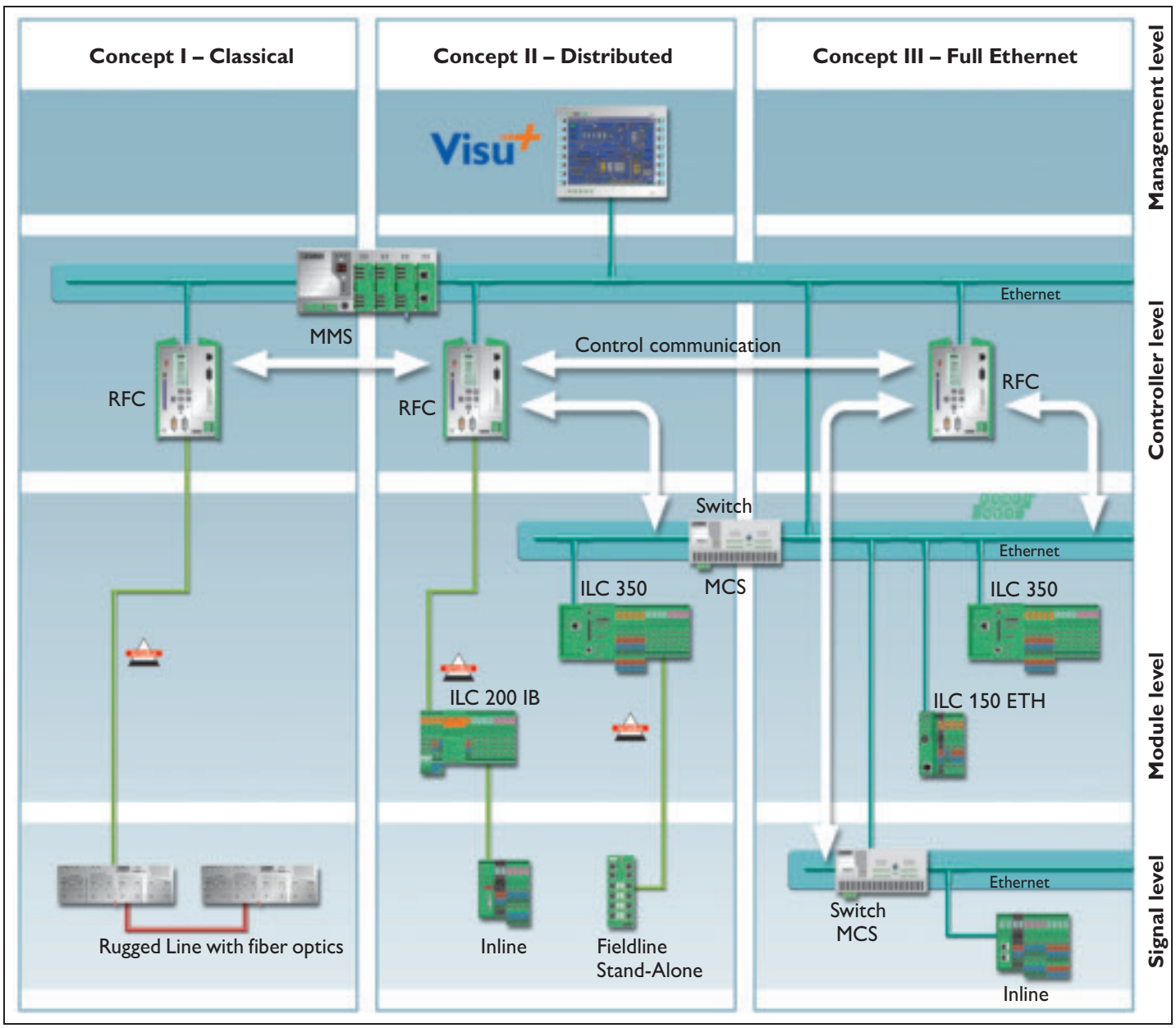
Visualization connection

Machines and systems can be operated and monitored cost-effectively if high-performance Inline or PC-based controllers are used in combination with our operator panels or touch panels that function as the OPC client. The easy-to-operate VISU+ software is used for visualization.

Furthermore, system visualization with the web server that is integrated by default is cost-effective when the WebVisit configuration software is used. Pages that are created this way can be accessed by any standard browser.

Uniform programming software

The integrated PC WorX automation software transforms embedded controllers into high-performance IEC 61131 controllers. The software not only allows an absolute switch-over among embedded controllers, but also to PC-based controllers. User-friendly wizards help you in your work, thus increasing the operating convenience and preventing data loss.



Performance class	100		200	
				
Description	The 100 series performance class offers the best performance among mini controllers at a low price. Last but not least, the seamless PC WORX programming environment with its free assistant PC WORX EXPRESS, which has been especially designed for controllers of the 100 series performance class, makes this class very attractive for small to medium-sized applications. In addition to the integrated web and FTP server, controllers of the 100 series performance class provide all protocols and transmission standards from IT technology without requiring expensive additional modules.		The 200 series performance class rounds off the controller hardware within the mini controller class with integrated special functions, tailored to mechanical applications. These include integrated, quick counters and pulse width modulated outputs as well as a floating point unit for control applications.	
Type **Order No.**	**ILC 130 ETH** **2988803**	**Page 24**	**ILC 200 UNI-PAC** **2862291**	**Page 27**
Type **Order No.**	**ILC 150 ETH** **2985330**	**Page 24**	**ILC 200 IB-PAC** **2862288**	**Page 27**
Type **Order No.**	**ILC 155 ETH** **2988188**	**Page 25**		
Type **Order No.**	**ILC 150 GSM/GPRS** **2916545**	**Page 25**		
Type **Order No.**	**ILC 170 ETH 2TX** **2916532**	**Page 25**		

	ILC 130 starter kit	
		
Description	The ILC 130 starter kit offers you a quick entry into the field of automation and guides you when you use control technology from Phoenix for the first time. The ILC 130 starter kit available pre-assembled. All components required for operation are available on a DIN rail. These components include the smart ILC 130 ETH mini controller, an analog input module, a power supply unit, a potentiometer and a switch panel for entering operating states. A CD containing the demo version of the automation software suite also contains the free PC WORX EXPRESS development environment.	
Type **Order No.**	**ILC 130 STARTER KIT** **2988515**	**Page 26**

300

The 300 series performance class offers considerably more performance due to more powerful hardware.

In addition to the Ethernet functionality, controllers of this performance class also offer PROFINET as a fieldbus. These controllers can be PROFINET masters as well as PROFINET devices.

400

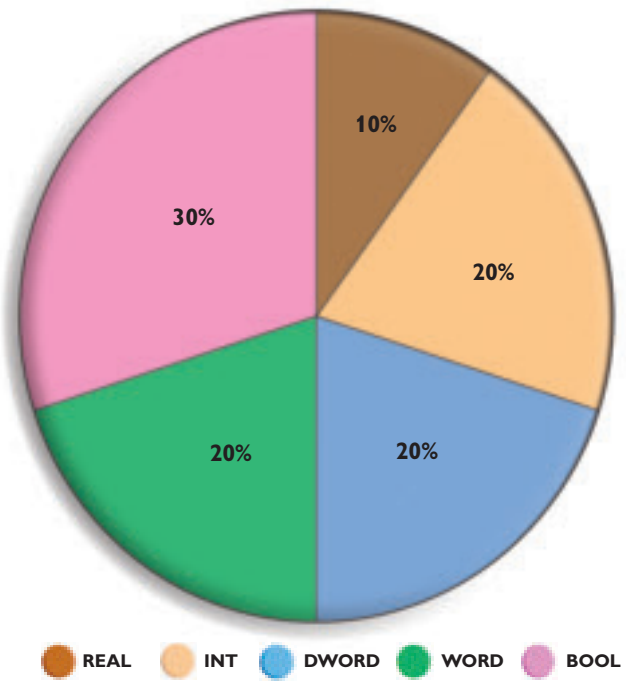
The 400 series performance class offers maximum performance and functionality.

These high-end controllers make use of the centralized approach in their automation network. Controllers of the 400 series performance class are the right choice even when high computing capacity is required for highly dynamic control applications or when a high data throughput is required.

ILC 330 ETH 2737193	Page 28	RFC 430 ETH-IB 2730190	Page 30
ILC 330 PN 2988191	Page 28	RFC 450 ETH-IB 2730200	Page 31
ILC 350 ETH 2737203	Page 29	RFC 470 PN 3TX 2916600	Page 31
ILC 350 PN 2876928	Page 29	S-MAX 400 CE PN 2700706	Page 32
ILC 350 ETH/M 2985819	Page 29	S-MAX 400 CE PN II 2700829	Page 32
ILC 370 ETH 2TX-IB 2876999	Page 29	S-MAX 400 CE PN MC 2700609	Page 425
ILC 370 PN 2TX-IB 2876915	Page 29	S-MAX 412 CE PN 2700586	Page 33
ILC 370 ETH 2TX-IB/M 2985327	Page 29	S-MAX 412 CE PN/M 2700816	Page 33
ILC 370 PN 2TX-IB/M 2985576	Page 29	S-MAX 415 CE PN 2700573	Page 33
ILC 390 PN 2TX-IB 2985314	Page 29	S-MAX 417 CE PN 2700803	Page 33

Processing speed – The small difference

The processing speed of the controllers from Phoenix Contact is specified in computing time per 1024 commands. This is determined using a test program, which comprises commands and data types similar to typical applications. The processing time value is used for the relative classification of controllers into the various performance classes.



Performance class 100

In the following, you will find the highly communicative Phoenix Contact controllers of the performance class 100.

The integrated Ethernet interface, via which the integrated web server and FTP server can be accessed, is a common feature of all these devices. Communication with SQL databases or other controllers from the application is naturally also possible. The differences lie in the memory size and performance.

Ethernet

ILC 130 ETH

Inline controller with integrated Ethernet interface and Inline connection

Ethernet

ILC 150 ETH

Inline controller with integrated Ethernet interface and Inline connection

Applied for: UL-EX LIS / CUL-EX LIS / NV

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Inline controllers, complete with accessories (connector and labeling field)	**ILC 130 ETH**	**2988803**	1	**ILC 150 ETH**	**2985330**	1
User manual, for project planning and installation of INTERBUS, with collection of data sheets						
- German	**IBS SYS PRO INST UM**	**2743792**	1	**IBS SYS PRO INST UM**	**2743792**	1
- English	**IBS SYS PRO INST UM E**	**2743802**	1	**IBS SYS PRO INST UM E**	**2743802**	1
User manual, for configuring and installing the INTERBUS Inline product range						
- German	**IB IL SYS PRO UM**	**2745554**	1	**IB IL SYS PRO UM**	**2745554**	1
- English	**IB IL SYS PRO UM E**	**2743048**	1	**IB IL SYS PRO UM E**	**2743048**	1
Programming cable	**PRG CAB MINI DIN**	**2730611**	1	**PRG CAB MINI DIN**	**2730611**	1
Parameterization memory - 256 MB						
AX-OPC-SERVER, communication interface for OPC-capable visualization with PC WORX-based controls	**AX OPC SERVER**	**2985945**	1	**AX OPC SERVER**	**2985945**	1
WebVisit, development software for web-based visualization	**WEBVISIT... (see software)**			**WEBVISIT... (see software)**		
Automation software	**PC WORX ... (see software)**			**PC WORX ... (see software)**		

Technical data		
Interfaces		
INTERBUS local bus (master)	Inline data jumper	Inline data jumper
Ethernet	RJ45 female connector	RJ45 female connector
Parameterization/operation/diagnostics	RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
INTERBUS master		
Number of possible parameter channels	Max. 8	Max. 16
Number of I/O nodes	Max. 4096	Max. 4096
Number of supported devices	Max. 63	Max. 128
Direct inputs/outputs		
Number of inputs	8	8
Number of outputs	4	4
IEC-61131 runtime system		
Programmable under	PC WorX in IEC 61131	PC WorX in IEC 61131
Processing speed	1.7 ms (1 K instructions in mix, 90 µs for 1 K bit instructions)	1.5 ms (1 K instructions in mix, 90 µs for 1 K bit instructions)
Program memory	192 kByte (16 K instructions (IL))	256 kByte (21 K instructions (IL))
Data memory	192 kByte	256 kByte
Retentive data memory	8 kByte (NVRAM)	8 kByte (NVRAM)
Number of data blocks	(depending on data memory)	(depending on data memory)
Number of timers, counters	(depending on data memory)	(depending on data memory)
Number of control tasks	8	8
Realtime clock	Yes	Yes
Power supply		
Supply voltage	24 V DC	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
Typical current consumption	210 mA (no local bus device connected during idling, bus inactive)	210 mA (no local bus device connected during idling, bus inactive)
General data		
Width	80 mm	80 mm
Height	119.8 mm	119.8 mm
Depth	71.5 mm	71.5 mm
Degree of protection	IP20	IP20
Ambient temperature (operation)	-25°C ... 60°C	-25°C ... 60°C

Ethernet

ILC 155 ETH

Inline controller with integrated Ethernet interface and Inline connection

Type	Order No.	Pcs. / Pkt.
ILC 155 ETH	**2988188**	1
IBS SYS PRO INST UM	**2743792**	1
IBS SYS PRO INST UM E	**2743802**	1
IB IL SYS PRO UM	**2745554**	1
IB IL SYS PRO UM E	**2743048**	1
PRG CAB MINI DIN	**2730611**	1
AX OPC SERVER	**2985945**	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

Inline data jumper
RJ45 female connector
RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
Max. 16
Max. 4096
Max. 128
8
4
PC WorX in IEC 61131
1.5 ms (1 K instructions in mix, 90 µs for 1 K bit instructions)
512 kByte (43 K instructions (IL))
512 kByte
48 kByte (NVRAM)
(depending on data memory)
(depending on data memory)
8
Yes
24 V DC
19.2 V DC ... 30 V DC
210 mA (no local bus device connected during idling, bus inactive)
80 mm
119.8 mm
71.5 mm
IP20
-25°C ... 60°C

Ethernet

GSM

ILC 150 GSM/GPRS

Inline controller with integrated Ethernet interface, Inline connection and GSM modem

Type	Order No.	Pcs. / Pkt.
ILC 150 GSM/GPRS	**2916545**	1
IBS SYS PRO INST UM	**2743792**	1
IBS SYS PRO INST UM E	**2743802**	1
IB IL SYS PRO UM	**2745554**	1
IB IL SYS PRO UM E	**2743048**	1
PRG CAB MINI DIN	**2730611**	1
AX OPC SERVER	**2985945**	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

Inline data jumper
RJ45 female connector
Ethernet 10/100 (RJ45)
Max. 16
Max. 4096
Max. 128
16
4
PC WorX in IEC 61131
1.5 ms (1 K instructions in mix, 90 µs for 1 K bit instructions)
512 kByte (43 K instructions (IL))
512 kByte
48 kByte (NVRAM)
(depending on data memory)
(depending on data memory)
8
Yes
24 V DC
19.2 V DC ... 30 V DC
210 mA (no local bus device connected during idling, bus inactive)
85 mm
119.8 mm
71.5 mm
IP20
-25°C ... 60°C

Ethernet

ILC 170 ETH 2TX

Inline controller with two integrated Ethernet interfaces and one Inline connection

Type	Order No.	Pcs. / Pkt.
ILC 170 ETH 2TX	**2916532**	1
IBS SYS PRO INST UM	**2743792**	1
IBS SYS PRO INST UM E	**2743802**	1
IB IL SYS PRO UM	**2745554**	1
IB IL SYS PRO UM E	**2743048**	1
PRG CAB MINI DIN	**2730611**	1
SD FLASH 256MB	**2988120**	1
AX OPC SERVER	**2985945**	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

Inline data jumper
RJ45 female connector
RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
Max. 16
Max. 4096
Max. 128
8
4
PC WorX in IEC 61131
1.3 ms (1 K instructions in mix, 90 µs for 1 K bit instructions)
512 kByte (43 K instructions (IL))
512 kByte
48 kByte (NVRAM)
(depending on data memory)
(depending on data memory)
8
Yes
24 V DC
19.2 V DC ... 30 V DC
210 mA (no local bus device connected during idling, bus inactive)
80 mm
119.8 mm
71.5 mm
IP20
-25°C ... 60°C

ILC 130 starter kit – Your entry into Phoenix Contact control technology

The **ILC 130 starter kit** provides you the option of easy entry into automation. Experience the control technology from Phoenix Contact for yourself and learn to automate small and medium-scale applications economically and independently with our smart ILC 130 ETH compact controller.

Basic programming knowledge is not required for commissioning the starter kit. Knowledge about handling the PC WORX Express software will be imparted to you in a user-friendly manner with the help of an example program so that you will subsequently be able to carry out the expansions on your own.

Start by commissioning the controller, configure it and parameterize the bus structure. The test structure introduces you to the world of IEC 61131-3-compliant programming.

Performance data of the compact controller at a glance:

– Supply voltage: 24 V DC
– Integrated inputs /outputs: 8 / 4
– Processing time per 1000 instructions: 90 µs (bit data types), 1.7 ms (mixed data types)
– Program / data memory: 192 kB / 192 kB
– Remanent data memory: 8 kB

Ethernet

ILC 130 STARTERKIT

Pre-assembled test structure comprising compact controller and the required components for Quick Start

Description	Type	Order No.	Pcs. / Pkt.
ILC 130 starter kit, incl. ILC 130 ETH, analog input module, control panel, power supply as well as accessories and cables for setting up a test application	**ILC 130 STARTERKIT**	**2988515**	1
User manual, for project planning and installation of INTERBUS, with collection of data sheets			
- German	**IBS SYS PRO INST UM**	**2743792**	1
- English	**IBS SYS PRO INST UM E**	**2743802**	1
User manual, for configuring and installing the INTERBUS Inline product range			
- German	**IB IL SYS PRO UM**	**2745554**	1
- English	**IB IL SYS PRO UM E**	**2743048**	1
Programming cable	**PRG CAB MINI DIN**	**2730611**	1
AX-OPC-SERVER, communication interface for OPC-capable visualization with PC WORX-based controls	**AX OPC SERVER**	**2985945**	1
WebVisit, development software for web-based visualization	**WEBVISIT... (see software)**		
Automation software	**PC WORX ... (see software)**		

Technical data

See ILC 130 ETH on page 24

Performance class 200

The controllers of the performance class 200 are specially designed for mechanical engineering applications. These controllers therefore have fast counters and PWM outputs.

ILC 200 ...

Inline controller with an INTERBUS local bus interface

Applied for: UL-EX / CUL-EX

Description	Type	Order No.	Pcs. / Pkt.
Inline controllers, complete with accessories (connector and labeling field)			
	ILC 200 UNI-PAC	**2862291**	1
	ILC 200 IB-PAC	**2862288**	1
User manual			
- German	**ILC 200 UNI UM**	**2698630**	1
	ILC 200 IB UM	**2729716**	1
	ILC 200 UNI UM E	**2698643**	1
- English	**ILC 200 IB UM E**	**2729729**	1
User manual, for project planning and installation of INTERBUS, with collection of data sheets			
- German	**IBS SYS PRO INST UM**	**2743792**	1
- English	**IBS SYS PRO INST UM E**	**2743802**	1
User manual, for configuring and installing the INTERBUS Inline product range			
- German	**IB IL SYS PRO UM**	**2745554**	1
- English	**IB IL SYS PRO UM E**	**2743048**	1
Programming cable			
	PRG CAB MINI DIN	**2730611**	1
Connector set			
	ILC UNI-PLSET	**2737083**	1
	ILC IB-PLSET	**2729622**	1
INTERBUS OPC server, data interface between distributed INTERBUS and Ethernet networks and visualization systems			
	IBS OPC SERVER	**2729127**	1
Automation software	**PC WORX ... (see software)**		

Technical data	ILC 200 UNI-PAC	ILC 200 IB-PAC
Interfaces		
INTERBUS local bus (master)	Inline data jumper	
Higher-level INTERBUS (slave)	Inline data jumper	Inline shield connector
Parameterization/operation/diagnostics	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	
INTERBUS master		
Number of possible parameter channels	Max. 62	
Number of I/O nodes	Max. 4096	
Number of supported devices	Max. 512	
INTERBUS slave		
Amount of process data	0 ... 12 words (configurable)	0 ... 10 words (configurable)
Direct inputs/outputs		
Number of inputs	4	
Description of the input	Interrupt input, fast counter, pulse generator	Interrupt input, event counting, pulse generation
Number of outputs	2	
IEC-61131 runtime system		
Programmable under	PC WorX in IEC 61131	
Processing speed	1.3 ms (1 K bit instruction)	
Program memory	Typ. 380 kByte (32 K instructions (IL))	
Data memory	330 kByte	
Retentive data memory	8 kByte (NVRAM)	
Number of data blocks	(depending on data memory)	
Number of timers, counters	(depending on data memory)	
Number of control tasks	8	
Realtime clock	Yes	-
General data		
Width	73 mm	109.8 mm
Height	140.5 mm	
Depth	71.5 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C ... 55°C	

Performance class 300

The performance class 300 offers higher performance for complex applications. This control class also includes versions with PROFINET as a BUS system for the highest data transmission requirements.

PROFINET

Ethernet

ILC 330 ...

Inline controller with integrated Ethernet interface and Inline connection

Description	Type	Order No.	Pcs. / Pkt.
Inline controllers, complete with accessories (connector and labeling field) and PROFINET IO controllers			
- PROFINET IO controller	**ILC 330 PN**	**2988191**	1
- PROFINET IO controller, GL rating			
- Ethernet interface	**ILC 330 ETH**	**2737193**	1
- Ethernet interface, GL approval			
User manual			
- German	**UM DE ILC 330/350**	**2699367**	1
- English	**UM EN ILC 330/350**	**2699370**	1
Parameterization memory			
- 256 MB	**CF FLASH 256MB**	**2988780**	1
Programming cable	**PRG CAB MINI DIN**	**2730611**	1
AX-OPC-SERVER, communication interface for OPC-capable visualization with PC WORX-based controls	**AX OPC SERVER**	**2985945**	1
WebVisit, development software for web-based visualization	**WEBVISIT... (see software)**		
Automation software	**PC WORX ... (see software)**		

Technical data	
Interfaces	
INTERBUS (master)	Inline data jumper
Higher-level INTERBUS (slave)	-
Ethernet	RJ45 female connector
Parameterization/programming/diagnostics	RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
INTERBUS master	
Number of possible parameter channels	Max. 62
Number of I/O nodes	Max. 8192
Number of supported devices	Max. 512 (in total, of which 254 are remote bus devices/bus segments)
INTERBUS slave	
Amount of process data	-
Direct inputs/outputs	
Number of inputs	12
Description of the input	Eight fast inputs, interrupt input
Number of outputs	4
IEC-61131 runtime system	
Processing speed	0.7 ms (1 K bit instruction)
Program memory	Typ. 750 kByte (64 K instructions (IL))
Data memory	1.5 Mbyte
Retentive data memory	64 kByte (NVRAM)
Number of data blocks	(depending on data memory)
Number of timers, counters	(depending on data memory)
Number of control tasks	16
Realtime clock	Integrated (battery-backed)
Power supply	
Supply voltage	24 V DC ±5%
Range of supply voltages	20.4 V DC ... 30 V DC
Typical current consumption	250 mA (no local bus device connected during idling, bus inactive)
General data	
Width	182 mm
Height	140.5 mm
Depth	71.5 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 55°C

PROFINET Ethernet

ILC 350 ...

Inline controller with integrated Ethernet interface and Inline connection

Type	Order No.	Ex: / Pcs. / Pkt.
ILC 350 PN	2876928	1
ILC 350 ETH	2737203	1
ILC 350 ETH/M	2985819	1
UM DE ILC 330/350	2699367	1
UM EN ILC 330/350	2699370	1
CF FLASH 256MB	2988780	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

Inline data jumper
-
RJ45 female connector
RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
Max. 62
Max. 8192
Max. 512 (in total, of which 254 are remote bus devices/bus segments)
-
12
Eight fast inputs, interrupt input
4
0.5 ms (1 K bit instruction)
Typ. 1 Mbyte (85 K instructions (IL))
2 Mbyte
64 kByte (NVRAM)
(depending on data memory)
(depending on data memory)
16
Integrated (battery-backed)
24 V DC ±5%
20.4 V DC ... 30 V DC
250 mA (no local bus device connected during idling, bus inactive)
182 mm
140.5 mm
71.5 mm
IP20
-25°C ... 55°C

PROFINET Ethernet

ILC 370 ... 2TX-IB...

Inline controller with integrated Ethernet interfaces, INTERBUS slave interface and Inline connection

Type	Order No.	Pcs. / Pkt.
ILC 370 PN 2TX-IB	2876915	1
ILC 370 PN 2TX-IB/M	2985576	1
ILC 370 ETH 2TX-IB	2876999	1
ILC 370 ETH 2TX-IB/M	2985327	1
UM DE ILC 370/390	2884020	1
UM EN ILC 370/390	2884017	1
CF FLASH 256MB	2988780	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

Inline data jumper
D-SUB-9 female/D-SUB-9 male
RJ45 female connector
RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
Max. 62
Max. 8192
Max. 512 (in total, of which 254 are remote bus devices/bus segments)
0...32 words (configurable)
12
Eight fast inputs, interrupt input
4
0.3 ms (1 K bit instruction)
Typ. 2 Mbyte (170 K instructions (IL))
4 Mbyte
96 kByte (NVRAM)
(depending on data memory)
(depending on data memory)
16
Integrated (battery-backed)
24 V DC ±5%
20.4 V DC ... 30 V DC
250 mA (no local bus device connected during idling, bus inactive)
182 mm
140.5 mm
71.5 mm
IP20
-25°C ... 55°C

PROFINET Ethernet

ILC 390 PN 2TX-IB

Inline controller with integrated Ethernet interfaces, INTERBUS slave interface, Inline connection and PROFINET IO controller

Type	Order No.	Pcs. / Pkt.
ILC 390 PN 2TX-IB	2985314	1
UM DE ILC 370/390	2884020	1
UM EN ILC 370/390	2884017	1
CF FLASH 256MB	2988780	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

Inline data jumper
D-SUB-9 female/D-SUB-9 male
RJ45 female connector
RS-232-C, 6-pos. MINI-DIN female connector (PS/2), Ethernet 10/100 (RJ45)
Max. 62
Max. 8192
Max. 512 (in total, of which 254 are remote bus devices/bus segments)
0...32 words (configurable)
12
Eight fast inputs, interrupt input
4
0.2 ms (1 K bit instruction)
Typ. 2 Mbyte (170 K instructions (IL)
4 Mbyte
96 kByte (NVRAM)
(depending on data memory)
(depending on data memory)
16
Integrated (battery-backed)
24 V DC ±5%
20.4 V DC ... 30 V DC
250 mA (no local bus device connected during idling, bus inactive)
182 mm
140.5 mm
71.5 mm
IP20
-25°C ... 55°C

Performance class 400

The performance class 400 offers high-end controllers in different versions, with and without a screen unit. These controllers are especially suitable for complex closed-loop controls or as data concentrators in large systems and processes.

Ethernet as well as PROFINET devices are available.

Ethernet

RFC 430 ETH-IB

Remote field controllers for Ethernet

Description	Type	Order No.	Pcs. / Pkt.
Remote field controller for Ethernet, with electrical isolation, IP20 degree of protection - 1x10/100 Ethernet - 1x10/100 Ethernet - 3 x 10/100 Ethernet, PROFINET IO controller	**RFC 430 ETH-IB**	**2730190**	1
User manual, for remote field controller for Ethernet			
- German	**RFC 430/450 ETH IB UM**	**2730912**	1
- English	**RFC 430/450 ETH IB UM E**	**2730721**	1
Program and configuration memory			
- 2 MB	**IBS MC FLASH 2MB**	**2729389**	1
- 4 MB	**IBS MC FLASH 4MB**	**2729392**	1
Parameterization memory - 256 MB			
Programming cable, to connect the controller boards to the PC (RS-232-C), length 3 m	**IBS PRG CAB**	**2806862**	1
RS-232 zero modem connector - 9-pos. female connector on 9-pos. male connector			
Fan module for remote field controller	**RFC DUAL-FAN**	**2730239**	1
AX-OPC-SERVER, communication interface for OPC-capable visualization with PC WORX-based controls	**AX OPC SERVER**	**2985945**	1
WebVisit, development software for web-based visualization	**WEBVISIT... (see software)**		
Automation software	**PC WORX ... (see software)**		

Technical data	
Interfaces	
INTERBUS 2-wire remote bus	D-SUB-9 female connector
Ethernet	RJ45 female connector
Parameterization/operation/diagnostics	RS-232-C, D-SUB connector, Ethernet 10/100 (RJ45)
INTERBUS master	
Number of possible parameter channels	Max. 126
Number of I/O nodes	Max. 8192
Number of supported devices	512 (of which 254 are remote bus devices/bus segments)
Direct inputs/outputs	
Number of inputs	5
Number of outputs	3
IEC-61131 runtime system	
Processing speed	0.1 ms
Program memory	Typ. 2 Mbyte (170 K instructions (IL))
Data memory	4 Mbyte
Retentive data memory	96 kByte (NVRAM)
Number of data blocks	(depending on data memory)
Number of timers, counters	(depending on data memory)
Number of control tasks	16
Realtime clock	Integrated (battery-backed)
Power supply	
Supply voltage	24 V DC
Range of supply voltages	20 V DC ... 30 V DC (including ripple)
Typical current consumption	1.5 A
General data	
Width	122 mm
Height	181 mm
Depth	182 mm
Degree of protection	IP20
Ambient temperature (operation)	0°C ... 55°C (from 45°C only with fan module)

Ethernet

RFC 450 ETH-IB

Remote field controllers for Ethernet

RFC 470 PN 3TX

Remote Field Controller and PROFINET IO controller

Type	Order No.	Pcs. / Pkt.
RFC 450 ETH-IB	**2730200**	1
RFC 430/450 ETH IB UM	**2730912**	1
RFC 430/450 ETH IB UM E	**2730721**	1
IBS MC FLASH 2MB	**2729389**	1
IBS MC FLASH 4MB	**2729392**	1
IBS PRG CAB	**2806862**	1
RFC DUAL-FAN	**2730239**	1
AX OPC SERVER	**2985945**	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

D-SUB-9 female connector RJ45 female connector RS-232-C, D-SUB connector, Ethernet 10/100 (RJ45)
Max. 126 Max. 8192 512 (of which 254 are remote bus devices/bus segments)
5 3
0.05 ms Typ. 8 Mbyte (680 K instructions (IL)) 16 Mbyte 96 kByte (NVRAM) (depending on data memory) (depending on data memory) 16 Integrated (battery-backed)
24 V DC 20 V DC ... 30 V DC (including ripple) 1.5 A
122 mm 181 mm 182 mm IP20 0°C ... 55°C (from 45°C only with fan module)

Applied for:
UL Listed / CUL Listed

Type	Order No.	Pcs. / Pkt.
RFC 470 PN 3TX	**2916600**	1
CF FLASH 256MB	**2988780**	1
IBS PRG CAB	**2806862**	1
PSM-AD-D9-NULLMODEM	**2708753**	1
RFC DUAL-FAN	**2730239**	1
AX OPC SERVER	**2985945**	1
WEBVISIT... (see software)		
PC WORX ... (see software)		

D-SUB-9 female connector 3x RJ45 female connector RS-232-C, D-SUB connector, Ethernet 10/100 (RJ45), 2xUSB
Max. 62 Max. 8192 512 (of which 254 are remote bus devices/bus segments)
5 3
0.005 ms Typ. 8 Mbyte (680 K instructions (IL)) 16 Mbyte 240 kByte (NVRAM) (depending on data memory) (depending on data memory) 16 Integrated (battery-backed)
24 V DC 19.2 V DC ... 30 V DC (including ripple) 1 A
122 mm 181 mm 182 mm IP20 0°C ... 55°C (from 45°C only with fan module)

Multifunctional controller S-MAX 4xx CE PN

The S-MAX controller, a high-availability combination of industrial PC, PLC, INTERBUS fieldbus master and PROFINET I/O controller, rounds off the controller portfolio of Phoenix Contact.

The devices behave like conventional PLCs with integrated HMI. The standard devices are available in the screen diagonal sizes 12.1", 15" and 17" with uniform processor performance.

In conjunction with the functionalities of the industrial PC, all communication options are available via standard interfaces as well as via the integrated fieldbus systems INTERBUS and PROFINET.

The S-MAX 400 CE PN can be used for applications that require a control cabinet assembly. Its technical data corresponds to the other devices of the S-MAX family; it does not, however, have a screen.

The S-MAX 412 CE PN/M meets the requirements of the classification companies for the maritime field. The current approvals can be found on the Phoenix Contact website.

S-MAX 400 CE PN ...

Combination of PLC, PC platform and fieldbus master, without display

Description	Type	Order No.	Pcs. / Pkt.
S-MAX, control system with INTERBUS master and PROFINET IO controller			
- Without display	**S-MAX 400 CE PN**	**2700706**	1
- Without display	**S-MAX 400 CE PN II**	**2700829**	1
- 12.1" display			
- 15" display			
- 17" display			
WebVisit, development software for web-based visualization	**WEBVISIT... (see software)**		
Visu+, SCADA visualization	**VISU+ 2 ... (see software)**		
Automation software	**PC WORX ... (see software)**		

Technical data	S-MAX 400 CE PN	S-MAX 400 CE PN II
Display data		
Display	-	
Monitor resolution	-	
Display lighting	-	
Touch screen	-	
Computer data		
Operating systems	Windows CE 5.0	
Processor	Celeron M 800 MHz	Pentium M 1.4 GHz
Main memory	256 MB (DDR RAM)	
Compact flash	256 MB	
Interfaces	COM 1 (RS 232, MINI DIN), 3xUSB 2.0	
Graphics card	On-board graphics chip (AGP)	
Monitor output		
Network	1xEthernet (10/100/1000 Mbit), RJ45, 2xEthernet (10/100 Mbit)	
Status display	LEDs (PLC status: PLC, PC status: SYS, fieldbus diagnostics)	
PLC switch	RUN/STOP/RESET switch	
IEC-61131 runtime system		
Processing speed	Typ. 0.05 ms (1 K bit instruction)	Typ. 0.01 ms (1 K bit instruction)
Program memory	8 Mbyte (680 K instructions (IL))	
Data memory	16 Mbyte	
Retentive data memory	120 kByte (NVRAM)	
Number of data blocks	(depending on data memory)	
Number of timers, counters	(depending on data memory)	
Number of control tasks	16	
Direct inputs/outputs		
Number of inputs	12	
Number of outputs	4	
Power supply		
Supply voltage	24 V DC	
Range of supply voltages	19 V DC ... 29 V DC (including ripple)	
Max. current consumption	2 A	
General data		
Width	72 mm	
Height	240 mm	
Depth	178 mm	
Degree of protection	IP20	
Ambient temperature (operation)	0°C ... 55°C	
Mounting type	Panel PC for installation in the control cabinet (mounting plate)	
Vibration (operation)	DIN EN 60068-2-6	
Shock	DIN EN 60068-2-29	

S-MAX 412 CE PN

Combination of PLC, PC platform, visualization and fieldbus master

Type	Order No.	Pcs. / Pkt.
S-MAX 412 CE PN	**2700586**	1
WEBVISIT... (see software)		
VISU+ 2 ... (see software)		
PC WORX ... (see software)		
12.1" TFT active		
800 x 600		
250 cd/m² typ., (adjustable)		
Resistive industrial touch screen		
Windows CE 5.0		
Celeron M 800 MHz		
256 MB		
256 MB		
COM 1 (RS-232), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB		
On-board graphics chip (AGP)		
DVI		
3x Ethernet (10/100 Mbit), RJ45		
LEDs (PLC status: PLC, PC status: SYS, fieldbus diagnostics)		
RUN/STOP/RESET switch		
Typ. 0.05 ms (1 K bit instruction)		
8 Mbyte (680 K instructions (IL))		
16 Mbyte		
120 kByte (NVRAM)		
(depending on data memory)		
(depending on data memory)		
16		
12		
4		
24 V DC		
19 V DC ... 29 V DC (including ripple)		
2 A		
330 mm		
268 mm		
74 mm		
IP65 (front), IP20 (back)		
5°C ... 40°C		
Panel PC for mounting in the front panel		
DIN EN 60068-2-6		
DIN EN 60068-2-29		

S-MAX 412 CE PN/M

Combination of PLC, PC platform, visualization and fieldbus master

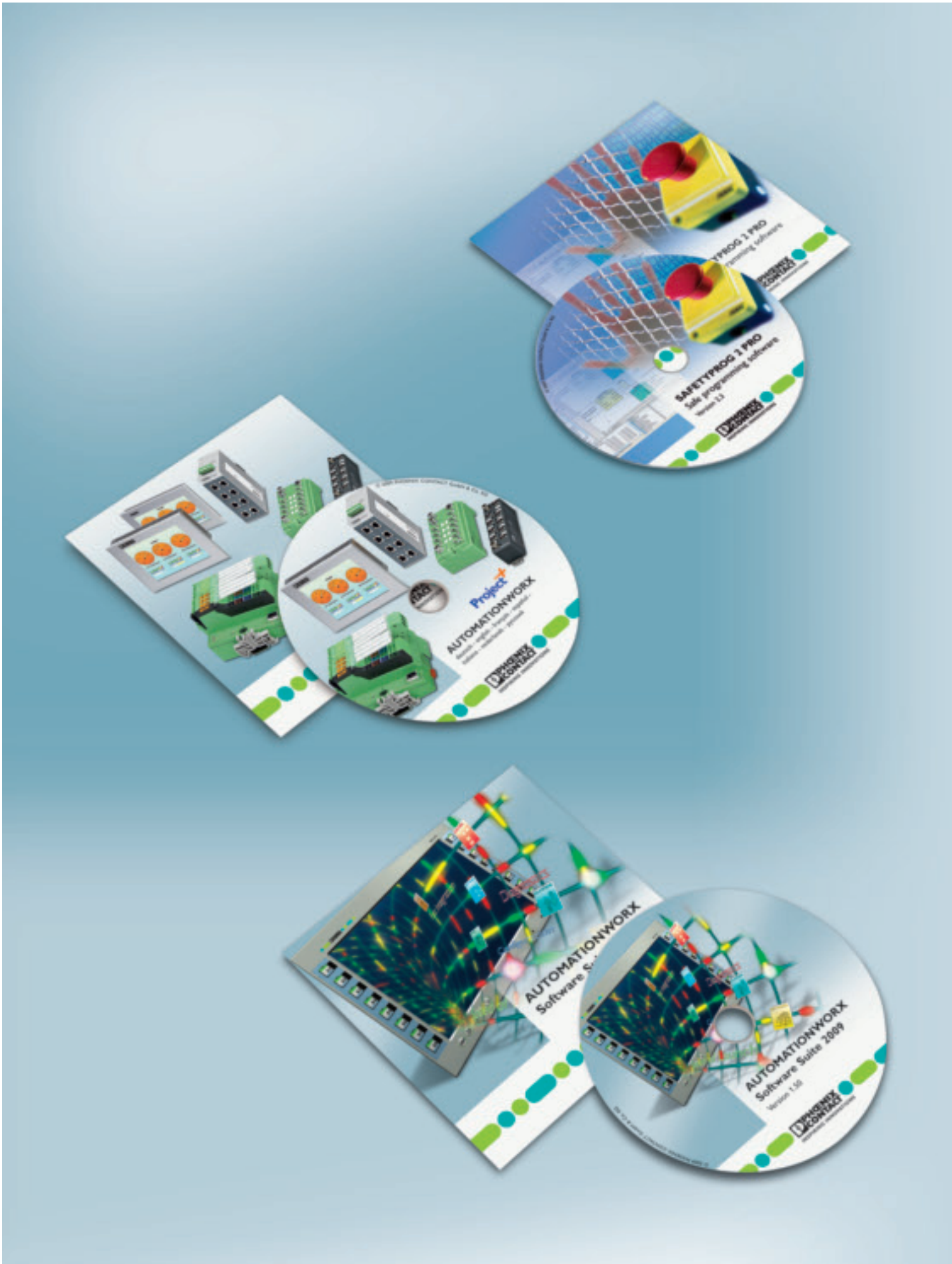
Type	Order No.	Pcs. / Pkt.
S-MAX 412 CE PN/M	**2700816**	1
WEBVISIT... (see software)		
VISU+ 2 ... (see software)		
PC WORX ... (see software)		
12.1" TFT active		
800 x 600		
250 cd/m² typ., (adjustable)		
Resistive industrial touch screen		
Windows CE 5.0		
Celeron M 800 MHz		
256 MB		
256 MB		
COM 1 (RS-232), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB		
On-board graphics chip (AGP)		
DVI		
3x Ethernet (10/100 Mbit), RJ45		
LEDs (PLC status: PLC, PC status: SYS, fieldbus diagnostics)		
RUN/STOP/RESET switch		
Typ. 0.05 ms (1 K bit instruction)		
8 Mbyte (680 K instructions (IL))		
16 Mbyte		
120 kByte (NVRAM)		
(depending on data memory)		
(depending on data memory)		
16		
12		
4		
24 V DC		
19 V DC ... 29 V DC (including ripple)		
2 A		
330 mm		
268 mm		
74 mm		
IP65 (front), IP20 (back)		
5°C ... 40°C		
Panel PC for mounting in the front panel		
DIN EN 60068-2-6		
DIN EN 60068-2-29		

S-MAX 41... CE PN

Combination of PLC, PC platform, visualization and fieldbus master

Type	Order No.	Pcs. / Pkt.
S-MAX 415 CE PN	**2700573**	1
S-MAX 417 CE PN	**2700803**	1
WEBVISIT... (see software)		
VISU+ 2 ... (see software)		
PC WORX ... (see software)		

	S-MAX 415 CE PN	S-MAX 417 CE PN
	15" TFT active	17" TFT active
	1024 x 768	1280 x 1024
	250 cd/m² typ., (adjustable)	
	Resistive industrial touch screen	
	Windows CE 5.0	
	Celeron M 800 MHz	
	256 MB	
	256 MB	
	COM 1 (RS-232), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB	
	On-board graphics chip (AGP)	
	DVI	
	3x Ethernet (10/100 Mbit), RJ45	
	LEDs (PLC status: PLC, PC status: SYS, fieldbus diagnostics)	
	RUN/STOP/RESET switch	
	Typ. 0.05 ms (1 K bit instruction)	
	8 Mbyte (680 K instructions (IL))	
	16 Mbyte	
	120 kByte (NVRAM)	
	(depending on data memory)	
	(depending on data memory)	
	16	
	12	
	4	
	24 V DC	
	19 V DC ... 29 V DC (including ripple)	
	2 A	
	390 mm	417 mm
	312 mm	350 mm
	75 mm	79 mm
	IP65 (front), IP20 (back)	
	5°C ... 40°C	
	Panel PC for mounting in the front panel	
	DIN EN 60068-2-6	
	DIN EN 60068-2-29	


SAFETYPROG 1 PRO
Safe programming software
Version 1.3
Project+
AUTOMATIONWORX
AUTOMATIONWORX
Software Suite 2009
Version 1.50

The value of software

The performance of automation systems has been constantly improving over the years. Today, the software handles many functions which were previously implemented in the hardware. The user's task is shifting from programming to configuring software modules. At the same time, software is created with reproducible quality and a growing number of functions.

Software products can be used to standardize partial tasks and prevent redundant work. Complex processes can only be operated by software. Software diagnostic tools reduce startup times and costly production downtimes.

Because the reusability of the software does not end when a system is scrapped, it offers a value added bonus as compared with hardware.

When creating software, we tailor solutions to the individual requirements of our users, whether they be planners, electrical engineers, programmers or service personnel.

Program overview

AutomationXplorer +
IBS CMD SWT G4

Config+

Project+

FL WST Basic

PC

Planning/
Simulation

Parameterization/
Configuration

Programming

PC WORX EXPRESS

PC WORX

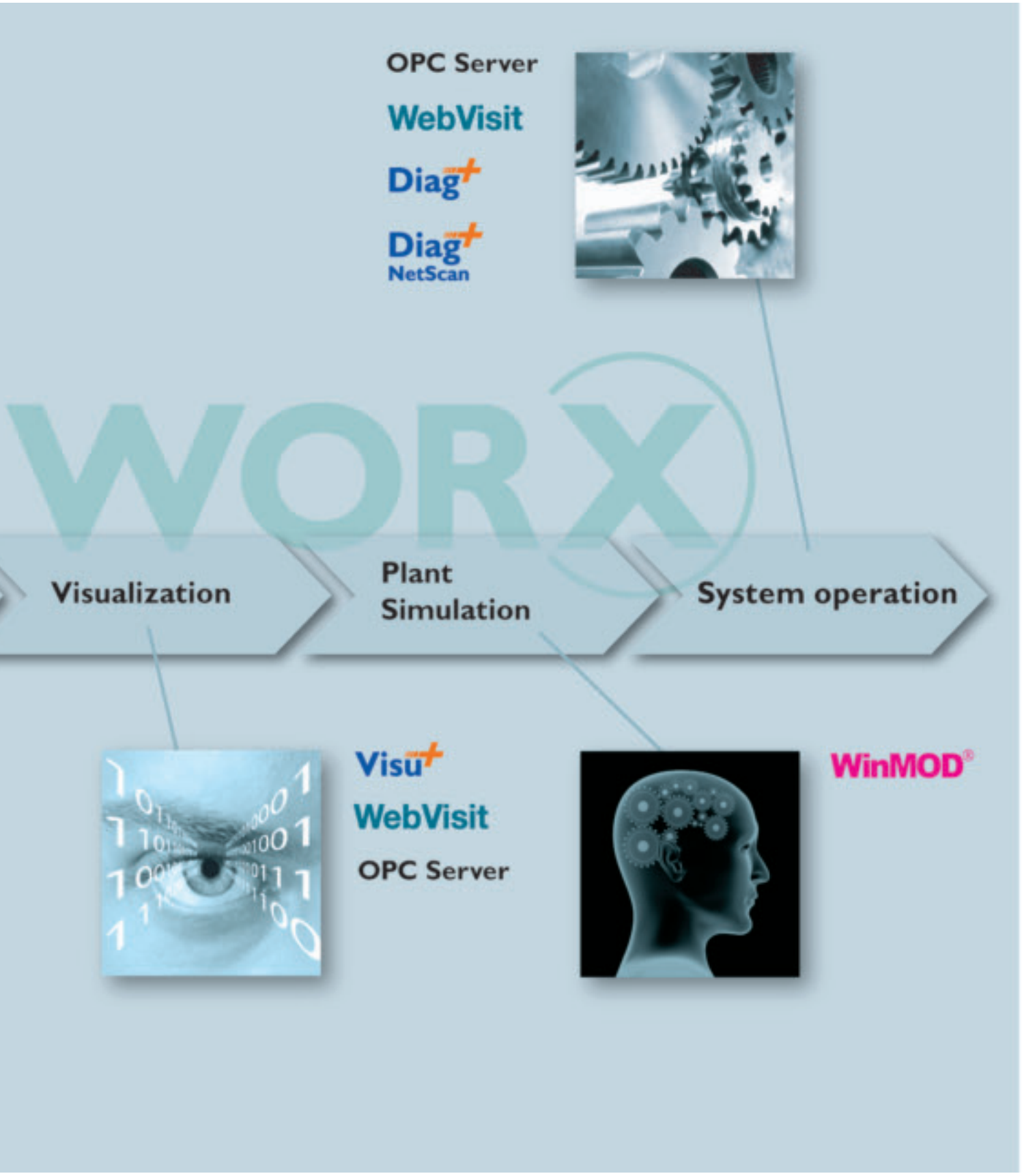
Resy+

Steeplechase VLC

Nano Navigator

Safety Prog

Software libraries


OPC Server
WebVisit
Diag+
Diag+ NetScan
WORX
Visualization
Plant Simulation
System operation
Visu+
WebVisit
OPC Server
WinMOD®

	Planning and simulation		Parameterization and configuration		
					
Type **Order No.**	**PROJECT+** **2988667**	**FL WST BASIC** **2692254**	**CONFIG+** **2868059**	**AX+ BASIC** **2985068**	**IBS CMD SWT G4 ...** **27214..**
Description	Software for planning the I/O configuration	Simulation software to support the planning of wireless systems in industrial environments	Software for configuration and diagnostics of networks	FDT container for integration of DTM devices	Software for configuration of the fieldbus
Page	**40**	**41**	**47**	**44**	**45**

	Programming				
					
Type **Order No.**	**PC WORX ...** **2985...**	**PC WORX EXPRESS** **2988670**	**VLC-...** **56...**	**NLC-NAV-01** **2701221**	**SAFETYPROG 2 PRO** **2985835**
Description	Software for programming as per IEC 61131	Free development environment for the 100 series controller class	Development environment with flow chart programming and hardware key for parallel interface or USB	Software for flow chart programming for the nanoLine controller range	Programming software for INTERBUS Safety systems
Page	**43**	**43**	**65**	**92**	**111**

	Programming				
					
Type **Order No.**	**RESY-DATA-A LIC** **2876847**	**SAFETYPROG 2.x ...** **...**	**PC WORX 3.0X CONTROL ...** **2739405**	**UM DE BACL** **2910686**	**APPLICATION SOFTWARE LICENCE** **2988625**
Description	Remote control technology license	Function block library for INTERBUS Safety systems	License for control function blocks	Function block library for building automation	License for SQL/MySQL communication with databases
Page	**49**	**111**	**49**	**49**	**49**

Visualization

				
Type **Order No.**	**VISU+ 2** **2988544**	**WEBVISIT ...** **298...**	**AX OPC SERVER** **2985945**	**IBS OPC SERVER** **2729127**
Description	SCADA visualization	Development software for web-based visualization	Communication interface for OPC-compatible visualization with PC WORX-based controllers	Communication interface between distributed INTERBUS and Ethernet networks and visualization
Page	**51**	**51**	**53**	**53**

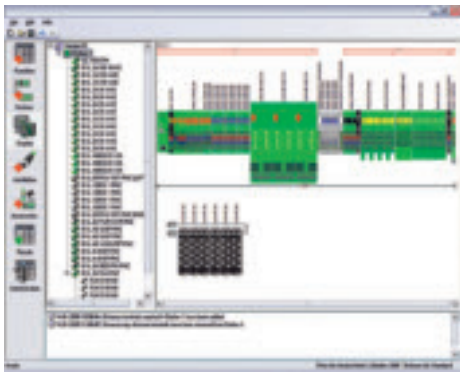
		
Type **Order No.**	**FL SNMP OPC SERVER** **2832166**	**FL OPC SNMP AGENT** **2832179**
Description	Software for monitoring and configuration of SNMP-compatible devices in HMI and SCADA systems	Integration of OPC-based automation solutions in company-wide network management systems
Page	**53**	**53**

System simulation

System operation

				
Type **Order No.**	**WINMOD AX ...** **29884...**	**IB EMULATOR** **2988638**	**DIAG+** **2730307**	**DIAG+ NETSCAN** **2868075**
Description	WinMOD system software including INTERBUS / PROFINET IO configuration software	INTERBUS simulation hardware	Diagnostics software for INTERBUS, PROFINET and Ethernet networks	Software for cyclical diagnostics of INTERBUS networks
Page	**55**	**55**	**57**	**57**

Project+ – I/O configurator



PROJECT+

Software for planning Inline and Fieldline I/O stations

Planning a project with systematic products often requires extensive knowledge of the specific configuration rules which must be learned and then applied to every individual application. Project+ is a configuration tool that supports you in building your Inline and Fieldline stations.

Thanks to automatic product selection and product composition mechanisms as well as the intuitive user interface, Project+ reduces the configuration effort for I/O stations significantly.

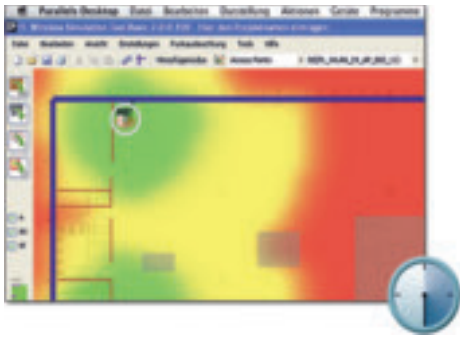
In order to build an I/O station, only the desired input and output functions must be entered. Project+ automatically generates an economical and technically optimum solution on the basis of this data. All programming guidelines are taken into account, currents are calculated and the necessary infrastructure elements such as power terminals and system cables are automatically added to the system structure. The stations can also be manually processed. Inline controllers are also included in Project+. You can thus plan entire control systems along with their I/Os in Project+.

The stations created in Project+ are technically correct and can therefore be used directly in the further engineering process. The results can be copied to the E-CAD tools parts lists. Data export into the Clip Project software enables completion and labeling of complete DIN rails.

The graphics created in Project+ can be added to the project documentation and used a structuring help for the real station.

Description	Type	Order No.	Pcs. / Pkt.
Software for planning the I/O configuration	**PROJECT+**	**2988667**	1
Technical data			
Hardware requirements			
CPU	Pentium 4/Celeron, 1 GHz		
Main memory	512 Mbyte (1 GB for Windows Vista)		
Hard disk memory	Min. 200 Mbyte		
Optical drive	CD-ROM		
Operating equipment	Keyboard, mouse		
Software requirements			
Operating systems	MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business		
Software requirements	MS WORD 2003 or a higher version		
Basic functionality			
	Automatic selection and composition of Inline and Fieldline modules		
	Automatic selection of the required accessories		
	Graphical presentation of Inline and Fieldline stations		
	Manual product selection with program support		
	Manual selection of accessories		
	Automatic creation of parts lists		
	Automatic calculation of currents and consideration of system guidelines		
	Consideration of release lists		
Languages supported			
	German, English, Spanish, French, Italian, Dutch, Russian		

FL WST Basic –
Wireless simulation software



FL WST BASIC

Simulation software

The wireless simulation tool helps to determining the information required for an optimal wireless coverage. Even a layman in the field of wireless transmission can do the wireless planning in just a few steps.

A typical WLAN installation in a factory hall often requires less than 30 minutes. As compared to the usual trial and error methods, you save considerable time and nerves. Just one access Point less and the purchase costs for the software are amortized.

Integrated library and various views of the result

In the library, the user can find the elements required to quickly create the environment:

– Walls of various materials
– Filled with machines, high-bay warehouse, etc.
– Access points and wireless modules in a product list

Different simulation modes indicate the wireless coverage:

– Signal display: good, sufficient, weak or the exact signal strength in dBm
– Color display of the individual radio cells

Factory Line WST
Position - simulate - optimize

Wireless planning in a few steps that provides important information about the material requirements and later installation:

– How many access points are required to provide wireless coverage for the area?
– Where is the best installation position from the wireless perspective?
– What are the benefits of using special antennas?

Description	Type	Order No.	Pcs. / Pkt.
Demo version of simulation software to support the planning of wireless systems in industrial environments (limited memory options, no print function)	**FL WST BASIC DEMO CD**	**2692377**	1
Simulation software to support the planning of wireless systems in industrial environments	**FL WST BASIC**	**2692254**	1

Technical data

Hardware requirements	
CPU	Min. Pentium 4 / Celeron 1 GHz
Main memory	512 MB (RAM)
Hard disk memory	500 MB
Optical drive	CD-ROM
Operating equipment	Mouse recommended
Software requirements	
Operating systems	MS Windows XP (SP2), MS Windows Vista
Browser	Internet Explorer starting from 5.5
Software driver	DirectX 9.0c
Basic functionality	
	Wireless system planning for WLAN and Bluetooth Various graphical formats as background image for building plans Simulation of the radio coverage to be expected Color display of the redundancy in the case of overlapping radio cells Automatic calculation of the emitted power including all accessories Zoom properties, graphical support when drawing the environmental model Printing mode provides an option of creating a report on the entire project (not for the demo version).
Languages supported	
	German, English

PC Worx & PC Worx Express – IEC 61131 programming

IEC 61131 programming with PC Worx

PC Worx is the uniform automation software as per IEC 61131 for all Phoenix Contact controllers.

This engineering tool that been continuously developed further with numerous users and different partners for over ten years and is now used in all industrial fields. From the very beginning, Phoenix Contact has focused on a uniform engineering environment for all control classes. User friendliness in regard to reusable programs and functions is also taken into account in PC Worx.

The interface provides a quick and simple project overview. Windows, which are designed as folders, simplify operation. Dock-on and dock-off work spaces and configurable tool bars that can be adapted easily to the user's requirements increase programming efficiency.

The software contains the following programming languages defined in the IEC 1131-3 standard:

– Instruction list (IL)
– Function block diagram
– Ladder diagram (LD)
– Fixed format ladder editor
– Sequential function chart
– Structured text

The basic IEC 61131 languages (LD, FBD and IL) can be compiled directly or cross-compiled as required. The program code, which is written in structured text, can be translated into any of the three basic languages as prescribed by IEC conventions. To increase the speed and convenience of editing, all editors feature selection tools that support and monitor the insertion of data types, function blocks, operators and variable declarations. The text editors have an additional assistant for key words and their command structures.

PC Worx has an integrated bus configurator for project planning of network structures. It supports INTERBUS and PROFINET IO networks. Other fieldbus systems can be configured via proxies in connection with a device description file. The configurator device catalog lists all the necessary components in easy-to-understand groupings. The components can be selected for the hardware configuration using drag & drop operations.

The program variables are also connected with the inputs and outputs of the components by means of drag & drop operations in the Connection view.

Connection errors are displayed in the message window in plain text. The addressing of variables in the control memory is automatic.

The interface can be selected in any of the installed languages. Program comments can be exported for translation and reimported as required. This means that projects, including the programmer and user comments, can be viewed in various languages.

The integrated password handling supports different protection types, such as saving the entire project, read/write protection for a single POU (expertise protection) or disabling actions such as PLC start/stop.

A simulation that can be used for advance testing of the programs on the PC is available for all INTEL®-compatible controllers, in order to make it possible to test the program code as early as possible. This shortens the startup times for the real system.

The logic analyzer offers realtime data acquisition for all variables, including structural and array elements, that are added directly from the worksheet. A long-term recording on a hard disk is also possible.

All data planned in PC Worx can be reused for visualization purposes in an easy manner. The INTERBUS OPC server and a web server can be used to connect to the visualization and control level. The OPC and WebServer variables are selected with a mouse click.

The diagnosis of all system components in the INTERBUS and PROFINET network is handled through the integrated diagnosis tool Diag+. Diag+ enables precise error localization in the system. The diagnostics can be stored in the parameterization memory of the controllers as an option and read out as required.

Programming environment for 100 control class PC Worx Express

With PC Worx Express, Phoenix Contact offers an engineering tool which makes it easy to program the new compact controllers up to the performance class 200.

This is achieved by a clearly arranged user interface as well as the reduction of expert functions, among other things. PC Worx Express still offers many of the proven PC Worx functions such as project creation, quick application development as well as easy downloading, monitoring and startup of the PLC program. Intelligent automated processes like automatic insertion of program instances into the task or simplified variable handling accelerate the programming process.

PC Worx Express can be downloaded free of charge at www.phoenixcontact.com. If the application requires the extended functions of PC Worx, the project created with PC Worx Express can be opened with the standard programming environment in order to transfer the created data into PC Worx. Your know-how is retained.

PC WORX EXPRESS

PC WORX EXPRESS

Free programming environment for the 100 series controller class

PC WORX

PC WORX ...

Software package for Phoenix Contact controllers programmed as per IEC 61131

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Free programming version without a license mechanism **for the 100 control class**, 64 kByte input data and 64 kByte output data	**PC WORX EXPRESS**	**2988670**	1			
Demo software with quick start guide, 16 byte input/output data, Diag+ limited to 5 devices				**PC WORX DEMO**	**2985725**	1
Basic license with 256 byte input/output data, without MSFC compiler				**PC WORX BASIC LIC**	**2985275**	1
Full license with 128 KByte input/output data, **with MSFC compiler included**				**PC WORX PRO LIC**	**2985385**	1
Low-cost upgrade of existing basic license to a full license				**PC WORX BASIC-PRO LIC**	**2985259**	1
Technical data						
Hardware requirements						
CPU	Min. Pentium 4 / Celeron 1 GHz			Min. Pentium 4 / Celeron 1 GHz		
Main memory	Min. 512 Mbyte (1 GB for Windows Vista)			Min. 512 Mbyte (1 GB for Windows Vista)		
Hard disk memory	Min. 2048 Mbyte			Min. 2048 Mbyte		
Optical drive	DVD-ROM			DVD-ROM		
Operating equipment	Keyboard, mouse			Keyboard, mouse		
Monitor resolution	XGA (1024 x 768)			XGA (1024 x 768)		
Software requirements						
Operating systems	MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business			MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business		
Supported browsers	Internet Explorer 5.5 or higher			Internet Explorer 5.5 or higher		
Basic functionality						
	Planning an automation system, parameterizing INTERBUS and PROFINET devices, operating INTERBUS and PROFINET, programming an automation system with a contact plan (KOP/LD) and structured text (ST), communication as per IEC 61131-5			Planning an automation system, parameterizing the INTERBUS and PROFINET devices, operating INTERBUS and PROFINET, programming an automation system in acc. with IEC 61131-3, communication in acc. with IEC 61131-5		
	Network configuration (functionality of Config+)			IEC 61131 includes the following programming languages: -Instruction list (IL), -Function block diagram (FBD), -Ladder diagram (LD), -Structured text (ST), -Symbolic flowchart (SFC)		
	Network diagnostics (functionality of Diag+)			Add-on to IEC 61131: Fixed Format Ladder Editor (FFLD) and Machine Sequential Function Chart language MSFC (from the license PC WORX PRO LIC onwards)		
	-			Network configuration (functionality of Config+)		
	-			Network diagnostics (functionality of Diag+)		
	Diagnostics software Diag+ integrated (see Diag+)			Diagnostics software Diag+ integrated (see Diag+)		
	128 kbyte input and output data			128 kbyte input and output data (full license)		
Languages supported						
	German, English, French, Italian, Spanish, Chinese			German, English, French, Italian, Spanish, Chinese		

AutomationXplorer+ – Device configurator

FDT/DTM technology, which was developed under the umbrella of the PROFIBUS user organization (PNO) and the ZVEI, specifies a uniform, standardized interface, not only among software interfaces, but also among communication drivers for various netwoks. FDT stands for a control or engineering system that integrates device operating interfaces – so-called DTMs (device type managers).

The AutomationXplorer+ is such an FDT frame application, which can be integrated in any DTMs of various manufacturers. In point-to-point communication, even beyond the limits of the network, devices and sensors/actuators can be conveniently parameterized, e.g. via the Ethernet, INTERBUS and HART protocol.

The AutomationXplorer+ can be called up via the TCI (tool calling interface) for connecting device type managers (DTMs) to the Siemens engineering system. The AutomationXplorer+ takes care of the DTM integration instead of the engineering system. Device-specific operating interfaces as DTMs can be started directly from the engineering system via the tool calling interface (TCI).

Note:
AutomationXplorer+ can be downloaded free of charge, including a selection of different communication DTMs for Ethernet and INTERBUS (PROFINET IO on request) from the Phoenix Contact homepage at www.phoenixcontact.com.

AX+ BASIC

FDT container

Description	Type	Order No.	Pcs. / Pkt.
FDT container for integrating DTM devices	**AX+ BASIC**	**2985068**	1

Technical data

Hardware requirements	
CPU	Pentium 4/Celeron, 1 GHz
Main memory	512 Mbyte
Hard disk memory	50 Mbyte (Without DTM)
Optical drive	CD-ROM
Operating equipment	Keyboard, mouse
Monitor resolution	1024x768
Software requirements	
Operating systems	Windows XP SP2
Basic functionality	
	Integration and call up of DTM Can be called up via TC interface with assistant support for automatic creation of projects
Languages supported	
	German, English, French, Spanish, Italian

IBS CMD SWT G4 – Fieldbus configurator

CMD is a tool which can be used throughout the entire lifecycle of a system, from planning and configuration, to system startup and operation monitoring, and through to diagnostics in the event of maintenance.

Using CMD software, the user can specify the INTERBUS system configuration. CMD uses all the popular interfaces to communicate with the controller board plugged into the relevant control system. CMD supports the user through the use of monitors when testing functions and setting up the system step-by-step. The integrated diagnostic function enables fast and clear troubleshooting in the event of a fault.

Suitable configuration tools are integrated in CMD for the INTERBUS OPC server and the high-level-language interface HLI.

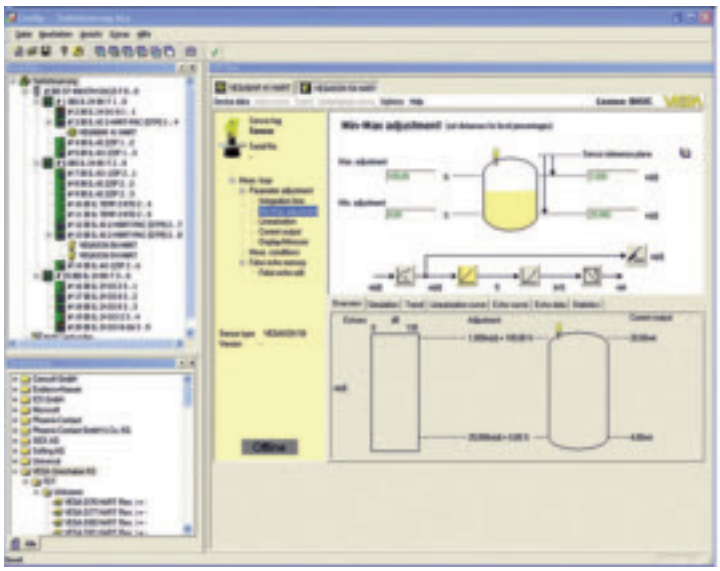
IBS CMD SWT G4 ...

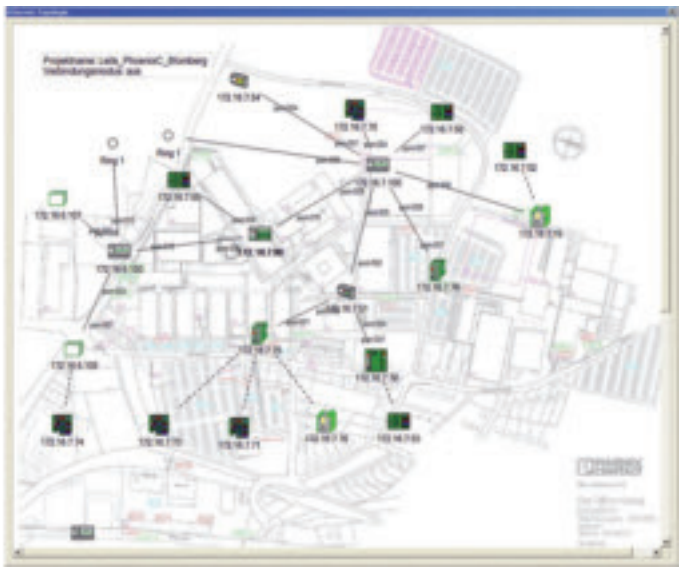
Software for INTERBUS Generation 4

Description	Type	Order No.	Pcs. / Pkt.
IBS-CMD software, for configuration, diagnostics, German	**IBS CMD SWT G4**	**2721439**	1
IBS-CMD software, for configuration, diagnostics, English	**IBS CMD SWT G4 E**	**2721442**	1

Technical data	
Hardware requirements	
CPU	Min. 80486/ 33 MHz
Main memory	> 10 Mbyte
Hard disk memory	62 Mbyte
Optical drive	CD-ROM
Interfaces	Free serial interface for online connection
Operating equipment	Keyboard, mouse
Monitor resolution	SVGA with min. 800 x 600
Supported interface connections	INTERBUS Generation 4 controller board
Software requirements	
Operating systems	Windows 98, Windows NT 4.0 SP6, Windows 2000, Windows XP
Basic functionality	
	Planning of the INTERBUS structure Planning of the address assignment Writing the parameterization memory Parameterizing the INTERBUS devices Operation and display of current status Mouse or keyboard operation
Languages supported	
	German, English, French, Spanish

Config+ –
Fieldbus / network configurator





Config+ is a software tool for simple project planning, startup and maintenance of INTERBUS and Ethernet networks.

The INTERBUS configuration can be done manually or read in from the system.

Config+ allows the connection of external software via FDT interface.

This means that special device user interfaces for internal or external devices (DTM) can be directly integrated in Config+ and the relevant devices can be parameterized.

When the INTERBUS Safety system is used, the network topology created in Config+ can be directly transferred to the safe SafetyProg programming tool (called up from Config+).

In the event of an error, the integrated Diag+ diagnostic functions ensure fast and clear error localization through graphical displays and plain text messages.

Multiple devices, e. g. network components such as managed switches or various IO link sensors/actuators, can be parameterized together with a single command using the Multiple Device Configuration wizard (MDC wizard).

Redundancy mechanisms such as Rapid-Spanning Tree (RSTP as per IEEE 802.1w), MRP (as per IEC 62439) can thus be switched on simultaneously and parameterized for several selectable devices. Functions such as Trap-Receiver, LLDP, VLANs, etc. can also be parameterized in this manner using the MDC wizard. Device functions do not have to be changed via the WEB management.

Factory Line products that are supported by the MDC wizard:

– FL SWITCH MM HS
(Order No. 2832328)
– FL SWITCH MM HS/M
(Order No. 2832522)
– FL SWITCH MCS 16TX
(Order No. 2832700)
– FL SWITCH MCS 14TX/2FX
(Order No. 2832713)
– FL SWITCH SMCS 8GT
(Order No. 2891123)
– FL SWITCH SMCS 6GT/2SFP
(Order No. 2891479)
– FL SWITCH SMCS 6TX/2SFP
(Order No. 2989323)
– FL SWITCH SMCS 8TX PN
(Order No. 2989103)
– FL SWITCH SMCS 4TX PN
(Order No. 2989093)
– FL SWITCH LM 5TX
(Order No. 2989527)
– FL SWITCH LM 8TX
(Order No. 2832632)
– FL SWITCH LM 4TX/2FX
(Order No. 2832658)
– FL SWITCH LM 4TX/2FX ST
(Order No. 2989132)
– FL SWITCH LM 4TX/2FX SM
(Order No. 2891916)

Function overview for network configuration

– Configuring INTERBUS and Ethernet networks
– Reading and comparing real and planned topology
– Automatic address allocation or via "drag & drop"
– Parameterization of the master boards or controller boards, even several boards in one project
– IP address allocation via BootP server
– Device parameterization through FDT via DTM that can be integrated
– Parameterization of several devices with assistant support (MDC wizard)
– Monitor function to check the wiring

INTERBUS diagnostics (Diag+)

– Graphical display of error location in network topology
– Clear text messages with suggested remedies
– Online display of device statuses
– Statistics functions for transmission qualities
– Saving comments about error messages on the PC or master

Ethernet diagnostics

– Trap receiver functionality in integrated diagnostics view (Diag+)
– Graphical Ethernet topology (2D view) with display of the accessibility of devices
– Display of redundancy paths, port statistics, virtual LANs as well as other properties that can be read out via SNMP
– Calling up device websites (if available)

Config+

CONFIG+

Fieldbus / network configurator

Description	Type	Order No.	Pcs. / Pkt.
Config+ demo version with restricted range of function (it is not possible to save projects)	**CONFIG+ DEMO**	**2868046**	1
Config+ full version for configuration and diagnosis of networks	**CONFIG+**	**2868059**	1
Config+ copy license makes it possible to install the Config+ software several times. A Config+ full version is necessary as well. When ordering, please state the number of licenses you need.	**CONFIG+ CPY**	**2868062**	1

Technical data

Hardware requirements	
CPU	Pentium 4/Celeron, 1 GHz
Main memory	Min. 512 Mbyte (1 GB for Windows Vista)
Hard disk memory	Min. 2048 Mbyte
Optical drive	DVD-ROM
Interfaces	COM port, Ethernet, (ISA or PCI with INTERBUS master card in the PC)
Operating equipment	Keyboard, mouse
Monitor resolution	XGA (1024 x 768)
Software requirements	
Operating systems	MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business
Supported browsers	Internet Explorer 5.5 or higher
Termination boards supported	
	IBS S7 400 ETH SDSC/I-T 2819558 IBS S7 400 ETH DSC/I-T 2731102 IBS S7 400 DSC/I-T 2719962 IBS S7 300 DSC-T 2719975 IBS PCI SC/RI/I-T 2730637 IBS PCI SC/RI/I-T 2730080 IBS PCI SC/RI-LK 2730640 IBS PCI SC/RI-LK 2730187 IBS PCI SC/I-T 2725260 FL IL 24 BK-B-PAC 2862327 FL IL 24 BK-PAC 2862314 FL NP PND-4TX IB 2985974 FL NP PND-4TX IB-LK 2985929 FLM BK ETH M12 DI 8 M12-2TX 2736916 IL ETH BK DI8 DO4 2TX-PAC 2703981
Basic functionality	
	Project transfer to SafetyProg (software tool for programming INTERBUS Safety) Project planning of Ethernet configurations Planning of the address assignment Transfer of the address settings (address ranges, assignment list) from Step 7® Project planning of multimaster projects (several bus configurations in one project) Comparison between real and planned bus configuration Online display of device data sheets Comprehensive diagnostic functions, including optical diagnostics with Diag+ Network diagnostics (functionality of Diag+)
Languages supported	
	German, English, French, Italian, Spanish, Chinese

Functional and branch-specific software and driver

Driver functional blocks

A variety of specialized peripheral modules and modules with directly integrated functionalities are offered along with easy-to-use I/O modules especially for automation of production machines for PC Worx controllers. Free and easy-to-use driver function blocks are also available to integrate these complex modules conveniently into the PLC programs.

For the operation of specialized peripheral modules: modules for temperature recording, analog input/output modules, motor starters, position recording terminals for incremental encoders, absolute encoders or magnetostrictive encoders, power and weighing sensors, modules with counter functions, modules for pulse width generation, modules for controlling servo valves, modules with I/O Link connections, modules for serial communication (RS-232 / RS-485) or for Modbus communication (client and server).

For the operation of distributed functional modules: low-power servo amplifiers, F/Us and servo amplifiers, distributed positioning terminals, distributed temperature controllers, and step motor control.

You can get the driver function blocks free of cost on the product page of the relevant module at http://www.phoenixcontact.net under the Download item.

Software for building automation

With PC Worx, the project engineers have an easy-to-use automation software at their disposal for all Phoenix Contact controllers that are used in building automation as DDC controllers.

Your building software can be optimally adapted to your requirements on the basis of the worldwide standard IEC 611313 with the help of pre-assembled, tested and documented function blocks. The programming effort is thereby reduced to a minimum, and a high level of standardization is achieved.

The "Building Automation Control Library" (BACL) function block library also supports you in the programming of heating, ventilation and climate control as well as in single room control or lighting control.

In addition, all function blocks of the BACL offer a communication interface as well as visualization software.

Software for PC Worx for building automation is available as freeware on CD-ROM:
German manual incl. CD-ROM: UM DE BACL (Order No. 2910686). Further language variants on request.

ReSy+ – Software for remote control technology

Measurement, control and regulation are the basic functions in the supply and discharge fields. Phoenix Contact offers you suitable software for smooth system operation: ReSy+.

Thanks to the ReSy+ function block library, remote system parts can be linked comfortably and integrated into your control system. ReSy+ allows uniform control of all processes and also gives an overview of the entire system. Linking existing systems is also an easy task for the open ReSy+. Our ReSy+ software communicates on the basis of international remote control standards (IEC 60870-5-101/104) using our proven control and I/O components.

RESY+-DATA-A LIC (order no. 2876847)

PID controller for general process control applications

This function block library offers basic control functions that can implement a variety of control tasks in industrial and process automation.

In all applications in which compact controllers have been used so far, control tasks can now be carried out economically by PC Worx controllers with the help of these function blocks.

The blocks contain a full-fledged PIDTz controller (PID controller with delay time constant in the D part). Two-position, three-position or motor step closed-loop controls can also be implemented.

PC WORX 3.0X CONTROL TECHNOLOGY (order no. 2739405)

Economical data acquisition with SQL

The volume of data involved in industrial processes is increasing continuously and can only be managed by using databases. While cyclical protocols such as OPC or BACnet are normally used to save data within machines and systems, the IT world uses SQL for databases.

The function block library from Phoenix Contact carries out this SQL communication, thus facilitating direct data transfer between the controller and the database for the first time. Other server-side software or additional drivers are no longer required for data traffic.

Thanks to the option of sending SQL commands to a database directly from the controller, all the properties of the Data Manipulation Language (DML) are directly available to PLC programmers for the first time ever.

The system allows you to read and write any tables of your database directly from the PLC program, thus in an event-controlled manner. The network load can thus be drastically reduced by eliminating cyclical protocols.

APPLICATION SOFTWARE LICENCE (order no. 2988625)

Software for machine automation

The performance of machines is determined by control functions that are nowadays created using IEC 611313-compatible application software. These are based on specifically developed software algorithms for high-performance platforms.

Phoenix Contact offers the Plast-Max software library for a special application area; it provides regulation know-how for plastic machines. It represents a flexible automation solution for plastic machines, together with the distributed I/O systems Inline and Fieldline.

Plast-Max is an extensive application software comprising a status machine with integrated diagnostics and regulation functions for hydraulic and electrical axes adapted to the respectively required performance of the controller.
Plast-Max function block library and the relevant user interface based on Visu+

Software for automobile production

– Car body shops

The time factor plays an important role during the creation and conversion of automobile production systems. In series production, this also applies to the diagnostics and service times.

In order to minimize both of these, Phoenix Contact offers a uniform engineering concept based on PC Worx for controller programming as well as for visualization. The libraries with pre-assembled function blocks for the body shop and the conveying technology simplify the startup and also serve to standardize of the application programs. Error localization and elimination thus become much easier as do system extensions.

– Conveying technology

The same applies to conveyor equipment such as skid systems, ground conveyors or electric overhead conveyor systems that transport the vehicle parts between the individual plants and act as a parts buffer. The function block library reduces the engineering and diagnostics times considerably.

Function block library for body shops, function block library for conveying technology, and the relevant libraries for Graph Worx.

Note:
No software is delivered when the license keys are ordered. Please use the Internet download service at www.phoenixcontact.net/download.

RESY-DATA-A LIC

License for remote systems (ReSy)

Description	Type	Order No.	Pcs. / Pkt.
License key, function block library for **remote control technology**	**RESY-DATA-A LIC**	**2876847**	1
License key for **control function blocks**, CLC library	**PC WORX 3.0X CONTROL TECHNOLOGY**	**2739405**	1
German manual incl. free **functional block library for building automation**	**UM DE BACL**	**2910686**	1
License key, function block library for **SQL-/MySQL communication** with databases	**APPLICATION SOFTWARE LICENCE**	**2988625**	1

Visu+ and WebVisit for SCADA or web-based visualization

SCADA visualization Visu+

The Visu+ software tool is a full SCADA visualization with a data link to the controller. Visu+ makes it possible to create graphical user interfaces for PC or HMI devices and connect them to the control systems.

With Visu+, trends (y-t diagrams) can be displayed in graphical visualization and alarms can also be processed. The optional multimedia expansions allow alarms to be set off and acknowledged through modem and web connections, as well as text, voice and fax messages. Optional web clients enable access to the operation via Internet or Intranet.

Visualization projects that have been created with Visu+ can be used on all PCs with a Windows operating system as well as on Windows CE-based HMI devices of the TP and OT line for operation and monitoring. A runtime license is required for Windows 2000/XP/Vista. Phoenix Contact HMI devices already have a Visu+ runtime license.

The visualization images are vector-based and are stored in the XML format. During runtime, only the displayed file is locked; all other screen pages can be exchanged during the project runtime. Online adjustments of the project are thus possible to a large extent. Due to its Unicode-capability, Visu+ can also display foreign character sets such as Asian fonts. This is advantageous, for instance, for machines that are to be exported worldwide. Online language selection is also possible for multilingual projects.

Scripting similar to VBA is available for individual adjustments. Another version of the scripting allows creation of a PLC-like instruction list (IL).

Licenses

You need an engineering license in order to use Visu+. This license enables generation of projects for HMI devices as well as for PCs. Projects can also be created on the basis of a demo license; this however has usage restrictions. Unlike the PC runtime licenses, the runtime licenses for HMI devices have limited functions.

The runtime licenses for PCs (Windows) can be requested individually. Two basic variants, Visu+ RT and Visu+ RT-D, are available, with which an unlimited number of I/O bytes can be selected in steps 128, 256, 512, 1024, 2048, 4096, 8192 and unlimited. These basic licenses can be individually supplemented with options such as networking, web clients or redundancy functions. In addition to the OPC interface, the Visu+ RT-D licenses also have a direct driver connection to specific controllers such as Siemens S7.

Web-based visualization WebVisit

Java Applet-based user interfaces are created with the WebVisit editor. The finished user interfaces are directly saved on the controller and can then be used with a web browser for operating a machine or a system.

Problems with Java code when preparing the user interface are now a thing of the past. WebVisit is thus optimally customized to the needs of a controller user.

WebVisit supplies you with compact solutions which run directly on the controller. The control program is generated in the usual manner with PC Worx. All variables required for operation and monitoring must be marked only in PC Worx. WebVisit then adds it automatically to the variable list and the visualization pages can be easily edited. After you have created the pages, WebVisit automatically generates the files for the web server of the controller. These files are then loaded to the controller from WebVisit via FTP. After the files have arrived at the controller, the web-based visualization is ready for use.

Since the visualization is directly displayed by the integrated web server of the controller with a web browser, no additional software is necessary on the PC. No runtime licenses are required. Together with the low price of the editor, WebVisit also offers a previously unheard-of flexibility and cost efficiency – from programming to operation.

Description
Development license for **Visu+** projects
WebVisit, development software for web-based visualization
WebVisit, development software for web-based visualisation, with alarming, trending and language selection
Runtime license for **Visu+,** limited to 128 bytes for I/O data and variables in scripting
Runtime license for **Visu+,** limited to 512 bytes for I/O data and variables in scripting
Runtime license for **Visu+**, without limitation for I/O data and variables in scripting
Technical data
Hardware requirements
CPU
Main memory
Hard disk memory
Optical drive
Operating equipment
Monitor resolution
Software requirements
Operating systems
Supported browsers
Basic functionality
Options
Languages supported

VISU+ 2 ...

SCADA visualization, development license
Runtime licenses for Visu+ (without drivers)

Type	Order No.	Pcs. / Pkt.
VISU+ 2	2988544	1
VISU+ 2 RT 128	2988586	1
VISU+ 2 RT 512	2988612	1
VISU+ 2 RT UNLIMITED	2988654	1

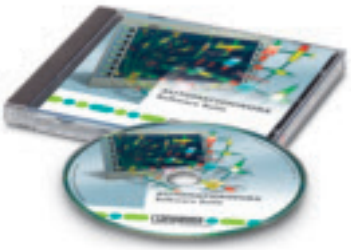
Pentium 4/Celeron, 1 GHz 512 Mbyte (1 GB for Windows Vista) Min. 2048 Mbyte (1 GByte recommended) DVD-ROM Keyboard, mouse XGA (1024 x 768)	
MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business, MS Windows CE	
Internet Explorer 5.5 or higher	
Full SCADA (Supervisory Control And Data Acquisition) functionality with visualization, trending and alarm management	
Multilingualism of software and projects (incl. Unicode support and online toggling)	
Know-how protection and safety through encoding of projects	
Control coupling with OPC	
Access protection with user management	
Fully scalable process diagrams for using one design on different devices and monitor sizes	
Realtime database coupling with ODBC to MS ACCESS, MS EXCEL and SQL server	
Automatic data recording and recipe management	
Scripts can be created in VBA and IL	
FDA CRF 22 Part 11 compatible	
Statistical alarm function	
Web client capability	
Redundancy function	
Advanced alarm management with SMS, FAX, e-mail and voice mail function	
Networking	
German, English, French, Italian	

VISU+ 2 RT-D ...

Runtime licenses for Visu+
with 2 direct drivers

Type	Order No.	Pcs. / Pkt.
VISU+ 2 RT-D 128	2988696	1
VISU+ 2 RT-D 512	2988722	1
VISU+ 2 RT-D UNLIMITED	2988748	1

Pentium 4/Celeron, 1 GHz 512 Mbyte (1 GB for Windows Vista) Min. 2048 Mbyte (1 GByte recommended) DVD-ROM Keyboard, mouse XGA (1024 x 768)	
MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business, MS Windows CE	
Internet Explorer 5.5 or higher	
Full SCADA (Supervisory Control And Data Acquisition) functionality with visualization, trending and alarm management	
Multilingualism of software and projects (incl. Unicode support and online toggling)	
Know-how protection and safety through encoding of projects	
Control coupling with OPC and 2 direct drivers	
Access protection with user management	
Fully scalable process diagrams for using one design on different devices and monitor sizes	
Realtime database coupling with ODBC to MS ACCESS, MS EXCEL and SQL server	
Automatic data recording and recipe management	
Scripts can be created in VBA and IL	
FDA CRF 22 Part 11 compatible	
Statistical alarm function	
Web client capability	
Redundancy function	
Advanced alarm management with SMS, FAX, e-mail and voice mail function	
Networking	
German, English, French, Italian	



WEBVISIT ...

Development software for web-based visualization

Type	Order No.	Pcs. / Pkt.
WEBVISIT BASIC	2985990	1
WEBVISIT PRO	2988890	1

Pentium 4/Celeron, 1 GHz Min. 512 Mbyte (1 GB for Windows Vista) 2048 Mbyte DVD-ROM Keyboard, mouse XGA (1024 x 768)	
MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business	
Internet Explorer 5.5 or higher	
Visualization system of control variables	
Visualization system with web technologies	
Java-Applet-based user interface	
Visualization system can be viewed using a web browser	
-	
-	
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-	
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-	
-	
English	

Software for OPC servers

OPC servers facilitate the data exchange between:
– Controllers programmable with PC Worx
– INTERBUS controller boards
– SNMP-compatible devices

The control hardware and visualization software can be simply combined on the basis of this Windows®-based, worldwide standardized technology and interface, without requiring any special drivers. Visualization software can thus read or write data from a PLC and display it graphically without programming.

Which OPC server can be used with which module can be found in the technical description or the data sheets of the respective controller, controller board or SNMP-compatible device.

OPC servers support the OPC DA specification of the version 2.04/2.05.

OPC servers also contain the browser interface, so that the client can simply read in the names of the variables. The variable name space is directly transferred from the engineering tool.

AX OPC SERVER

The AX OPC server can be used for all PC Worx-programmable controllers.

Thanks to the "remote configuration mechanism", the OPC configuration files are loaded by the controller when the server starts, and project consistency is thereby ensured all the time. Moreover, program changes are immediately detected and accepted by the AX OPC SERVER.

The correct functioning of the server can be easily tested using the test client that is delivered along with the AX OPC SERVER software. As a diagnostics interface, the AX OPC SERVER offers a simple user interface so that configuration errors can be detected and eliminated quickly.

Please use the IBS OPC SERVER to support the ILC 200 IB and ILC 200 UNI controllers.

FL SNMP OPC SERVER

The FL SNMP OPC SERVER allows the integration of SNMP-compatible (Simple Network Management Protocol) devices in every OPC-based HMI/SCADA system, thus turning it into a full-fledged and inexpensive industrial network management system.

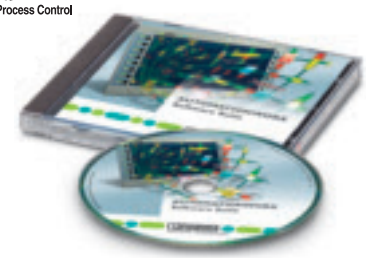
Practically all intelligent Ethernet devices have an SNMP agent. The task of the agent is to collect important information about the device and the connected network.

The IT world and automation world grow together – FL OPC SNMP AGENT

The seamless vertical integration of OPC-based/connected automation systems in existing SNMP management structures can be achieved using the FL OPC SNMP AGENT. The FL OPC SNMP AGENT can be used, for example, to monitor operating states of field controllers in central network management systems (e.g. HPOpenView, IBM Tivoli, etc.).

Description
AX-OPC-SERVER, communication interface for OPC-capable visualization with PC WORX-based controls
INTERBUS OPC server, data interface between distributed INTERBUS and Ethernet networks and visualization systems
SNMP-OPC server, German and English, for monitoring and configuration of SNMP-capable equipment in HMI and SCADA systems
SNMP-OPC agent, German and English, for integrating OPC-based automation solutions in company-wide network management systems

Technical data
Hardware requirements
CPU
Main memory
Hard disk memory
Optical drive
Operating equipment
Supported interface connections
Software requirements
Operating systems
Basic functionality
Configuration
Diagnostics
Languages supported



... OPC SERVER

Communication interface for OPC-capable visualization

Type	Order No.	Pcs. / Pkt.
AX OPC SERVER	**2985945**	1
IBS OPC SERVER	**2729127**	1

Pentium 4/Celeron, 1 GHz 512 Mbyte (1 GB for Windows Vista) 2048 Mbyte (1 GByte recommended) DVD-ROM Keyboard, mouse Embedded controller (INTERBUS controller boards are supported only by the IBS OPC SERVER.)
MS Windows XP, MS Windows 2000 (MS Windows Vista Business only for AX OPC SERVER, MS Windows NT 4.0 SP6 only for IBS OPC SERVER)
Supports OPC standard functions and all the optional interfaces (as per OPC spec. DA 1.0a and DA 2.04/2.05) Simultaneous support of several controllers Integrated OPC testing and diagnostics client -
-
German, English (French, Spanish only IBS OPC SERVER)

FL SNMP OPC SERVER

Software for monitoring and configuration of SNMP-capable devices in HMI and SCADA systems

Type	Order No.	Pcs. / Pkt.
FL SNMP OPC SERVER	**2832166**	1

PC Pentium > 266 MHz Min. 32 Mbyte Min. 20 Mbyte CD-ROM Keyboard, mouse recommended -
Windows 2000, Windows NT, Windows XP, TCP/IP stack, SNMP agent
- - - Network monitoring with HMI/SCADA systems
Monitoring and configuration of SNMP-capable devices in HMI and SCADA systems, support of SNMP version v1 and v2c; support of the OPC Client OPC Data Access 1.0A/2.0 or OPC Alarm and Events, integrated MIB browser, support of device profiles, (import/export and creation of device profiles), online and remote configuration possible via remote PCs
German, English

FL OPC SNMP AGENT

Integration of OPC-based automation solutions in company-wide network management systems

Type	Order No.	Pcs. / Pkt.
FL OPC SNMP AGENT	**2832179**	1

PC Pentium > 266 MHz Min. 32 Mbyte Min. 20 Mbyte CD-ROM Keyboard, mouse recommended -
Windows 2000, Windows NT, Windows XP, TCP/IP stack, SNMP agent
- - - SNMP agent for the integration of OPC-based automation solutions in company-wide network management systems
Monitoring of OPC server, access to OPC server, SNMP proxy agent, support of SNMP version v1 and v2c
German, English

WinMOD –
Software for virtual system operation

WinMOD enables software startup and software testing without the real machine or system.

For this, the real controller is connected with the WinMOD simulation PC via the configured fieldbus system or an equivalent. The control behavior of the real system is simulated in realtime by a WinMOD project. The network configuration behavior can also be simulated and can be exposed to error states for testing purposes.

The advance startup that is possible using WinMOD saves a considerable amount of time during the actual startup, since the application programs can be created parallel to the system configuration and can be tested thoroughly in advance.

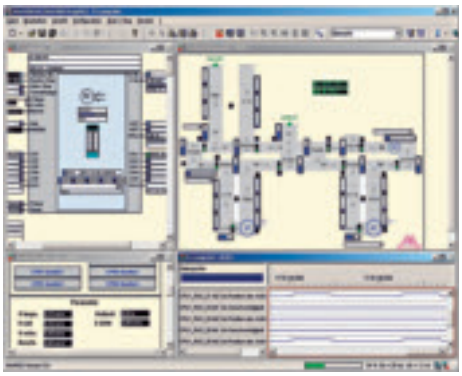
The IB Emulator hardware (Order No. 2988638) is required for the simulation of INTERBUS configurations. The IB Emulator can simulate up to 112 INTERBUS devices in a system (subsystems are also supported).

A network configuration created in PC WORX or Config+ including the agreed variables/symbols can be directly transferred to the WinMOD simulation software via a data interface.

WinMOD already has various simulation blocks for frequently used process blocks, e. g. drives. These are supplemented with the user's own blocks and are connected to create a complete system simulation. Here, the variables/operands from PC WORX are linked with the inputs/outputs of the simulation blocks.

Examples of the areas of application:
- Validation of control programs and function blocks
- Safe simulation of extreme operating conditions (crash tests without the risk of personal injury, loss of time and material costs)
- Illustration of motion sequences in 3D visualization with a link to the controller (add-on is required)
- Allows training courses on virtual systems incl. simulation of malfunction scenarios
- Virtual commissioning
- Factory acceptance test (FAT)
- Realtime-compatible simulation of any processes/applications

Simulation software



WinMOD is a Mewes & Partner product.
Other WinMOD add-ons, e. g. the WinMOD Recorder for convenient, integrated signal recording or WinMOD-3DView for 3D visualization during simulations are available on request.

[1]) IB Emulator also required!

WinMOD®

WINMOD AX ...

Description	Type	Order No.	Pcs. / Pkt.
WinMOD system software incl. INTERBUS configuration software[1])	**WINMOD AX IB**	**2988418**	1
WinMOD system software incl. PROFINET IO configuration software	**WINMOD AX PNIO**	**2988421**	1
WinMOD system software incl. INTERBUS and PROFINET IO configuration software	**WINMOD AX IB-PNIO**	**2988434**	1

Technical data	
Hardware requirements	
CPU	Pentium 4/Celeron, 1 GHz
Main memory	Min. 512 Mbyte
Hard disk memory	Min. 1 GByte
Optical drive	DVD-ROM
Interfaces	Ethernet port, additional Ethernet network card for PNIO simulation
Software requirements	
Operating systems	Windows 2000, Windows XP (recommended)
Languages supported	
	German, English

INTERBUS simulation hardware

The IB Emulator hardware is required for the simulation of INTERBUS configurations.

The IB Emulator can simulate up to 112 INTERBUS devices in a system. Subsystems are also supported.

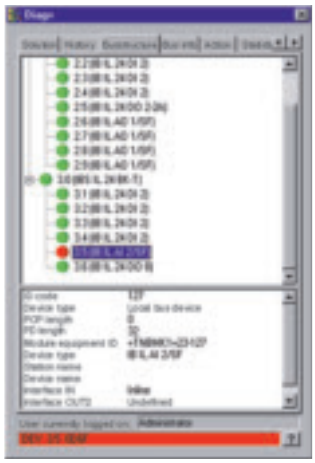
WinMOD®

IB EMULATOR

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS simulation hardware	**IB EMULATOR**	**2988638**	1

Technical data	
Interface	
Fieldbus system	INTERBUS
Name	INTERBUS remote bus
General data	
Weight	820 g
Width	75 mm
Height	185 mm
Depth	190 mm

Diag+ and Diag+ Netscan – Network diagnostics



Diag+ diagnostics tool for INTERBUS, PROFINET and Ethernet networks

Diag+ is a special diagnostics tool adapted to PROFINET IO and INTERBUS that signals both network errors and the current states of controllers and devices. Preventive diagnostic functions such as the monitoring of transmission quality of FO paths (INTERBUS) increase the plant availability. The tool can be operated independently or integrated as an ActiveX control directly in other Windows applications (e.g. visualization systems). Via a programming interface, the diagnostics data can be further processed in the visualization.

Familiar functionalities for INTERBUS systems, such as the display of status information, operating functions, plain language error messages with debugging tips or detailed information about device types and states have been added with PROFINET I/O-specific diagnostic functions. The PROFINET topology is represented analogous to the INTERBUS structure. Color symbols on the devices, modules and submodules indicate the current status or certain errors of the devices/modules. All state and error messages are read out from the retentive diagnostic messages archive of the controller. With the help of filter functions, certain message types can be simply determined in the archive view of the software. In a graphical view of the Ethernet device topology, the differences between the set and actual configuration are also displayed.

The network configuration data created with CMD, Config+ or PC WorX during the configuration, e.g. your own comments, equipment identification codes or station names, are read and displayed with Diag+ from the parameterization memory of the controller board. This greatly simplifies orientation within the plant.

Fast startup

During startup, installed buses can be tested very easily: Commands are available to start the bus, to acknowledge error messages, to switch INTERBUS devices on and off, to bridge the devices and to stop the bus using an alarm stop. The bus cabling can therefore be checked very quickly. Access to lower-level subordinate bus systems, using system couplers for example, is also possible using Diag+.

Diag+ Netscan Software for cyclical diagnostics of INTERBUS networks

Diag+ NetScan enables simultaneous monitoring of INTERBUS networks with several controller boards/controllers. The transmission quality of all FO paths in an entire system is thus monitored permanently. Even lower-level buses connected using system couplers can be included in monitoring.

Ordering example 1:

Diag+ software is to be installed on 10 different PCs in a system for INTERBUS network diagnostics and linked from each one to the existing visualization system as an ActiveX control. The diagnostic data delivered by Diag+ will be processed further in the visualization system itself.
– 1x DIAG+
– 9x DIAG+ CPY

Ordering example 2:

From a control room, INTERBUS controller boards (x 60) with lower level subnetworks connected via INTERBUS system couplers (only possible with PCP ID code) are to be monitored via Ethernet. When a fault occurs, the detailed diagnostic data will be read out and displayed manually.
– 1 x DIAG+ NETSCAN

DIAG+

Diagnostics software for INTERBUS, PROFINET and Ethernet networks

DIAG+ NETSCAN

Diagnostics software for cyclical diagnostics of INTERBUS networks

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Diag+ demo, limited scope of functions (only valid for the first five stations)	**DIAG+ DEMO**	**2730734**	1			
Diag+ full version, for INTERBUS diagnostics (ActiveX control with programming interface)	**IBS DIAG+ SWT**	**2730307**	1			
Diag+ copy license, allows you to install Diag+ software more than once. A Diag+ full version is necessary as well. When ordering, please state the number of licenses you need.	**DIAG+ CPY**	**2730404**	1			
Diag+ NetScan-Demo, limited scope of functions (cannot open or save projects)				**DIAG+ NETSCAN DEMO**	**2868091**	1
Diag+ NetScan full version, for cyclic and simultaneous network diagnostics (ActiveX control)				**DIAG+ NETSCAN**	**2868075**	1
Diag+ NetScan copy license, allows you to install Diag+ NetScan software more than once. A Diag+ NetScan full version is necessary as well. When ordering, please state the number of licenses you need.				**DIAG+ NETSCAN CPY**	**2868088**	1
Technical data						
Hardware requirements						
CPU	Pentium 4/Celeron, 1 GHz			Pentium 4/Celeron, 1 GHz		
Main memory	Min. 512 Mbyte (1 GB for Windows Vista)			Min. 512 Mbyte (1 GB for Windows Vista)		
Hard disk memory	Min. 2048 Mbyte			Min. 2048 Mbyte		
Optical drive	DVD-ROM			DVD-ROM		
Interfaces	Serial interface, Ethernet, ISA bus, PCI			Serial interface, Ethernet connection or ISA bus, parallel interface (LPT1...LPT2)		
Supported interface connections	INTERBUS controller board of the 4th generation, PROFINET I/O Controller (Phoenix Contact only)			INTERBUS Generation 4 controller board		
Software requirements						
Operating systems	MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business			MS Windows 2000 SP4, MS Windows XP SP2 (recommended), MS Windows Vista Business		
Basic functionality						
	Executing important commands (start/stop/...)			Executing important commands (start/stop/...)		
	Reading in the installed bus structure			Reading in the installed bus structure		
	Detecting/representing error states (plain text from knowledge database)			Detecting/representing error states (plain text from knowledge database)		
	Saving diagnostics data in flash memory or parameterization memory of the controller board			Saving diagnostics data in flash memory or parameterization memory of the controller board		
	Diagnostics of INTERBUS FO paths (transmission quality)			Diagnostics of FO paths (transmission quality)		
	Can be integrated into other 32-bit applications as ActiveX control including programming interface for further processing of all diagnostic data			Can be integrated into other 32-bit applications as ActiveX control		
	Configuration comparison of Ethernet topologies (parameterized with real topology)			-		
	Reading out the controller diagnose archive			-		
Expanded functionality						
	-			Cyclical readout of diagnostic data from all INTERBUS controller boards/controllers in the network overview (the number of controller boards is not limited)		
	-			Network overview: All INTERBUS controller boards/controllers in a system are clearly shown in a tree view; detailed diagnostics can be called up by clicking on the corresponding item		
	-			Monitoring function: Simultaneous monitoring of up to max. 10 INTERBUS controller boards/controllers is possible		
Languages supported						
	German, English, French, Spanish, Portuguese (Brazilian), Italian, Chinese			German, English, French, Spanish		

**Steeplechase VLC –
The leading PC-based control software with flow chart programming**

Steeplechase VLC uses intuitive flow chart programming that accelerates design cycles, installation and system launch. Integrated diagnostics improve troubleshooting and decrease downtime. With Steeplechase VLC, you can easily scale your applications - for operation on low-end controllers such as the ILC series to PC-based control with ultra-fast scan rates.

Steeplechase VLC supports complete programming capability using simple commands embedded in flow charts, a common tag database for motion and HMI functions. Steeplechase VLC supports PID control with up to 128 loops and the most complete motion control available on the market.

Steeplechase VLC's open architecture includes over 25 drivers with support for all major fieldbus systems. Steeplechase VLC works seamlessly with Phoenix Contact controls, industrial PCs, and embedded controllers. It also provides an open platform for any environment with any mix of fieldbus systems including Modbus TCP/IP and EtherNet/IP.

Steeplechase VLC works seamlessly with OPC clients and servers for two-way communication to any HMI or application. Steeplechase Transaction Express provides an HMI-independent environment to facilitate data transfer between Steeplechase VLC runtime and an SQL database or any OPC server. The integration of Steeplechase Transaction Express via Microsoft Message Queuing (MSMQ) guarantees delivery of data even through power and network outages.

Program overview

Steeplechase VLC: powerful and intuitive PC-based control

Steeplechase VLC lets users create control projects faster and easier than ever. The unique flow chart logic scan enables sub-millisecond logic solve times on PCs. The intuitive flow chart programming tools accelerate design cycles, installation and system launch. To ease transition from traditional PLCs, Steeplechase VLC provides RLL programming based on IEC 61131 with flow charting enhancements.

Advanced programming tools

Steeplechase VLC incorporates an integrated programming environment for discrete control, servo motion control and up to 128 PID loops. The VLC programming tools are the most advanced on the market and include a rich set of math, string, conversion, boolean, trigonometric and iterative functions as well as instructions from the world of high-level languages, such as while-do and if-then-else. The patented exception handler function greatly reduces development time and makes flow charts more readable.

Fast, deterministic, reliable runtime

Steeplechase VLC provides the fastest deterministic PC-based control solution currently available on the market. The ability to set scan rates as low as 200 µs on PCs allows Steeplechase VLC to handle the most demanding applications.

The Steeplechase VLC runtime engine is powered by a proven real-time operating system.

Powerful runtime debugging maintenance tools

Execution tails for viewing current and historical logic solve paths, a watch window for monitoring and forcing I/O points, an instant watch window to view tag values and associated code of a specific flow chart block, online cross-referencing and online programming for both flowcharts and RLL programs.

Unparalleled support for fieldbus systems

Steeplechase VLC's open architecture provides unparalleled support for fieldbus systems that includes over 25 drivers with support for all major fieldbus systems. It also provides an open platform for any environment with any combination of fieldbus systems.

Enhanced development environment

The connection tree and connection editor – new in version 7.0 and improving with each release – are an entirely new method for programming I/O modules. These tools simplify I/O module and I/O point programming. The tree structure provides a better view of the physical layout of your fieldbus system. You can convert projects developed using older versions of Steeplechase VLC to Version 7 to take advantage of these new features.

The new target manager enables upload and download of VLC projects of the new embedded control systems, such as ILC 350 VLC, ILC 350 and S-MAX VLC. The remote function enables easy remote programming. VLC automatically coordinates the development environment with the runtime environment of the embedded controllers, and ensures that the runtime target always gets updated with the latest driver versions.

Scalable control

Steeplechase VLC is now available on the ILC 150, ILC 350, and S-MAX series of embedded controllers from Phoenix Contact. You now have complete scalability under one development environment — from simple ILC 150 VLC controllers, to ILC 350 VLC blind nodes, to blind and integrated panel S-MAX VLC controllers that support both Citect HMI and Iconics MachineWorx, to a full PC-based control environment using the latest industrial PCs. With Steeplechase VLC, you have the ability to develop a single control scheme and target it to different runtime platforms.

HMI options

Steeplechase VLC offers two HMI software choices — Citect HMI or Iconics MachineWorX. Both offer the ability to create sophisticated animations and screens that display control system operating status as well as trending and alarming data. Steeplechase VLC also has an integrated OPC server to provide runtime information to any HMI or OPC client application.

Total enterprise connectivity

In addition to OPC, Steeplechase Transaction Express provides HMI-independent access to Steeplechase VLC runtime data. You can use Transaction Express to move data to and from an enterprise SQL database for error proofing, recipe management, fault logging, birth history, build instructions and asset utilization. The integration of Microsoft Message Queuing (MSMQ) guarantees data delivery.

Runtime

- Scan-based architecture; repeatable performance
- User-selectable scan rate
- Fast execution with scan rates as low as 200 µs
- Automatic watchdog timer
- Watch window and instant watch
- Data tips
- Execution tails – current and historical
- Remote and RAS programming
- Online cross-referencing
- Online programming

Flow chart and RLL editors

- Direct tag names editor
- 63 character tag names, 1024 character descriptions
- Drag-and-drop support
- Cut-copy-paste support
- Library and template support through subprograms
- Grid, snap-to, and auto-alignment of logic blocks
- User-defined preferences
- Floating, dockable toolbars
- Built-in version control for projects
- Autolaunch of VLC, HMI, and Windows® programs

Flow chart programming

- Action block
- Decision block
- Branch/merge block
- Exception blocks (begin and end)
- Start and stop blocks
- Subroutine/subprogram call, including parameters passed by reference, value and as read-only
- Diagnostic decision wizard
- Special I/O function block, diagnostics, motion control, PID, etc.
- Comment blocks

Ladder diagram programming

- Flow chart enhanced
- Contacts – NO, NC, rising edge, falling edge
- Coils – output, inverted, latch, unlatch
- Branch capability
- Counter block
- Timer on delay, timer off delay and retentive timers
- Action blocks
- Decision blocks
- Special I/O function, diagnostics, motion control and PID

Boolean and bit operators

+, ++, <, >, <<, >>, <=, >=, NOT, AND, OR, XOR, MOD, ON, OFF, TRUE, FALSE, COMMENT, <>, +, –, /, bit, set, bit pick, bit rotate

Mathematical functions:

A total of 38 functions, including trigonometric, hyperbolic, exponentiation, array processing and conversion functions.

String functions

Compare, left, right, mid, set, case, no case.

Berkley sockets

Over TCP/IP in real-time Berkley sockets send and receive TCP/IP packets using the socket interface directly from flow chart or RLL programs.

Integrated motion

VLC supports MEI and Galil motion cards to provide integrated motion system support up to 64 axes. Motion, logic, and HMI are combined into one PC platform. The motion system includes the following:

- Absolute moves
- Incremental moves
- Homing functions
- Blended moves
- Master/slave moves
- Position-triggered moves
- Stop, e-stop
- Up to four--axes coordinated moves
- Two-axes arc coordinated moves
- Velocity change on the fly
- Simultaneous multi-axis coordinate
- Camming
- SERCOS

Communications

OPC server, DDE server, DDL interface, Ethernet, peer-to-peer.

Drivers

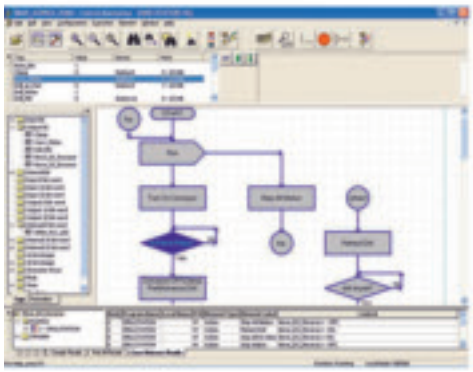
Steeplechase VLC supports all popular fieldbus networks.

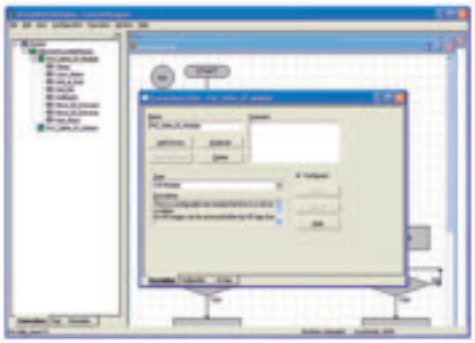
For more detailed information, visit www.phoenixcontact.net/software.

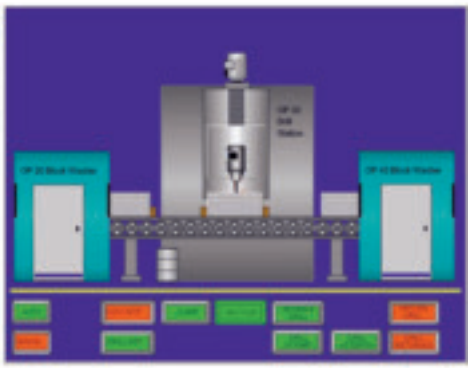
	Software		Inline controllers with VLC Runtime	
				
Type **Order No.**	**VLC-...-P** **560...**	**VLC-...-USB** **560...**	**ILC 150 VLC** **2985783**	**ILC 350 VLC** **2985013**
Description	Development environment with flow chart programming and hardware key for parallel interface	Development environment with flow chart programming and hardware key for USB	Inline controllers	Inline controllers
Page	**65**	**65**	**66**	**66**

	S-MAX with VLC Runtime and Iconics MachineWorX Runtime		S-MAX with VLC Runtime and Citect HMI Runtime	
				
Type Order No.	S-MAX 5012 VLC MWX ETH 2895653	S-MAX 5015 VLC MWX ETH 2895802	S-MAX 5012 VLC CIT ETH 2895695	S-MAX 5015 VLC CIT ETH 2895844
Type Order No.	S-MAX 5012 VLC MWX IB 2895682	S-MAX 5015 VLC MWX IB 2895831	S-MAX 5012 VLC CIT IB 2895792	S-MAX 5015 VLC CIT IB 2895873
Type Order No.	S-MAX 5012 VLC MWX PB 2895679	S-MAX 5015 VLC MWX PB 2895828	S-MAX 5012 VLC CIT PB 2895763	S-MAX 5015 VLC CIT PB 2895860
Type Order No.	S-MAX 5012 VLC MWX DN 2895666	S-MAX 5015 VLC MWX DN 2895815	S-MAX 5012 VLC CIT DN 2895750	S-MAX 5015 VLC CIT DN 2895857
Description	Combination of PLC, PC platform, visualization and fieldbus master, 12.1" display	Combination of PLC, PC platform, visualization and fieldbus master, 15" display	Combination of PLC, PC platform, visualization and fieldbus master, 12.1" display	Combination of PLC, PC platform, visualization and fieldbus master, 15" display
Page	67	67	67	67

Flow chart programming with Steeplechase VLC







Steeplechase VLC™: powerful and intuitive PC-based control software

Steeplechase VLC is the leading control software in the field of the flowchart programming language. The new Version 7 speeds up and simplifies the development of control programs. The efficient runtime system from Steeplechase VLC enables scan times of less than 1 ms on suitable PCs. The intuitive programming tools speed up the design cycle and reduce the installation and start up duration. To simplify the switch to conventional PLCs, Steeplechase VLC also supports the ladder diagram programming language.

Versatile program options

In addition to the programming environment for normal control tasks, Steeplechase VLC also supports more complex devices such as Servo-drives or up to 128 PID controllers. The VLC programming tools are the most progressive in the market and include a variety of mathematical, string and trigonometric functions as well as instructions from the world of high-level languages, such as While-Do and If-Then-Else.

Unparalleled I/O support

Steeplechase VLC supports over 25 drivers for all common fieldbus systems.

Fast, deterministic, reliable

Steeplechase VLC offers one of the fastest and most deterministic PC-based control solutions. Cycle times of up to 200 µs allow you to process of sophisticated applications. The Steeplechase VLC runtime system is based on a realtime operating system that is immune to Windows crashes. Other functions include:

– Monitoring of current and historic steps
– Display of forced variables and I/O nodes
– Instant Tag Watch Window
– Online cross-referencing
– Online programming of flow chart diagram and ladder diagram programs

Extended development environment

The new Connection Tree and Connection Editor simplify the definition of I/O modules. The new tree structure offers an improved overview of the layout of the connected I/O system. Projects that were created with older versions of Steeplechase VLC, can easily be converted for you to enjoy the new benefits.

The new Target Manager makes it possible to upload and download VLC projects of the new embedded control systems, such as ILC 150 VLC, ILC 350 VLC and S-MAX VLC The remote function enables easy remote programming. Another advantage of Steeplechase VLC is the automatic download of new drivers from the development environment to the runtime system. This ensures that the latest drivers are available on the runtime system.

Scalable control platform

Steeplechase VLC was developed together with the ILC 150 VLC, the ILC 350 VLC and the S-MAX VLC product range. The new Embedded Controllers from Phoenix Contact offer users a complete and scalable control family with a seamless programming software solution – from the compact ILC 150 VLC to the S-MAX VLC family right up to high-end control solutions with industrial PCs.

Visualization options

With the Steeplechase VLC, you can choose from two optional visualization packages – Citect HMI or the new Iconics MachineWorX. Both packages offer the user sophisticated possibilities for graphical presentation of machine information as well as trend and alarm messages. Moreover, Steeplechase VLC offers an integrated OPC server for each data exchange with all OPC client-capable software packages.

Company-wide networking

In addition to supporting OPC data, the Steeplechase Transaction Express gives you easy HMI-independent access to runtime data. Transaction Express makes loading and saving in an SQL database possible for error detection, recipe management etc. Secure data exchange is guaranteed through the integration of Microsoft Message Queuing (MSMQ).

VLC-...-P

Development environment with flowchart programming and hardware key for parallel interface

VLC-...-USB

Development environment with flowchart programming and hardware key for USB

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Professional developers kit: **VLC control development environment and Citect HMI** with one runtime and one hardware key each for parallel interface	**VLC-PDK-CIT-P**	**5603718**	1			
Professional developers kit: **VLC control development environment and Citect HMI** with one runtime and one hardware key each for USB				**VLC-PDK-CIT-USB**	**5605992**	1
Professional developers kit: **VLC control development environment and Iconics MachineWorX HMI** with one runtime and one hardware key each for parallel interface	**VLC-PDK-MWX-P**	**5605993**	1			
Professional developers kit: **VLC control development environment and Iconics MachineWorX HMI** with one runtime and one hardware key each for USB				**VLC-PDK-MWX-USB**	**5605994**	1
Designer package: **VLC control development environment** with runtime and hardware key for parallel interface	**VLC-DES-P**	**5603719**	1			
Designer package: **VLC control development environment** with runtime and hardware key for USB				**VLC-DES-USB**	**5605646**	1
VLC runtime with hardware key for parallel interface	**VLC-RTM-P**	**5603720**	1			
VLC Runtime with hardware key for USB				**VLC-RTM-USB**	**5606001**	1
VLC and Citect HMI runtime with hardware key for parallel interface	**VLC-RTM-MVW-P**	**5603721**	1			
VLC and Citect HMI Runtime with hardware key for USB				**VLC-RTM-MVW-USB**	**5606002**	1
VLC and Iconics MachineWorX HMI Runtime with hardware key for parallel interface	**VLC-RTM-MWR-P**	**5606004**	1			
VLC and Iconics MachineWorX HMI Runtime with hardware key for USB				**VLC-RTM-MWR-USB**	**5606005**	1
VLC Maintainer with hardware key for parallel interface	**VLC-MNT-P**	**5606006**	1			
VLC Maintainer with hardware key for USB				**VLC-MNT-USB**	**5606007**	1

Technical data		
Hardware requirements		
CPU	Min. Pentium 4 / Celeron 1 GHz	Min. Pentium 4 / Celeron 1 GHz
Main memory	500 Mbyte	500 Mbyte
Hard disk memory	Min. 100 Mbyte (for complete installation)	Min. 100 Mbyte (for complete installation)
Optical drive	CD-ROM	CD-ROM
Interfaces	Parallel interface or USB port for license key	Parallel interface or USB port for license key
Operating equipment	Keyboard, mouse	Keyboard, mouse
Monitor resolution	800 x 600 (1024 x 768 recommended)	800 x 600 (1024 x 768 recommended)
Software requirements		
Operating systems	Windows 2000 Pro / Windows XP Pro	Windows 2000 Pro / Windows XP Pro
Basic functionality		
	Programming with flowchart and RLL editors	Programming with flowchart and RLL editors
	Relay Ladder Logic Programming, IEC-61131-3-based, flow chart enhanced	Relay Ladder Logic Programming, IEC-61131-3-based, flow chart enhanced
	Boolean and bit operations	Boolean and bit operations
	Mathematical functions	Mathematical functions
	String functions	String functions
	Berkeley sockets via TCP/IP in realtime.	Berkeley sockets via TCP/IP in realtime.
	Integrated motion	Integrated motion
	Communication via OPC server, DDE server and Ethernet peer-to-peer	Communication via OPC server, DDE server and Ethernet peer-to-peer
	Broad I/O driver support	Broad I/O driver support
	HMI features and options	HMI features and options
Languages supported		
	English	English

Steeplechase VLC and Inline controller

Steeplechase VLC offers a scalable solution for controlling your applications. ILC 150 VLC and ILC 350 VLC are cost-effective controllers with integrated VLC runtime, easy-to-operate onboard I/Os for continuity and integrated networking.

You use the same development environment for Inline controller applications and PC-based high-end systems.

ILC 150 VLC

Inline controller with Steeplechase VLC runtime and Inline connection

ILC 350 VLC

Inline controller with Steeplechase VLC runtime and Inline connection

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Inline controllers, complete with accessories (connector and labeling field)						
- Steeplechase VLC Runtime	**ILC 150 VLC**	**2985783**	1			
Inline controller, complete with accessories (connector and labeling field) and 64 MB Compact Flash card						
- Steeplechase VLC Runtime				**ILC 350 VLC**	**2985013**	1
Parameterization memory						
- 256 MB				**CF FLASH 256MB**	**2988780**	1
Technical data						
Interfaces						
INTERBUS local bus (master)	Inline data jumper			Inline data jumper		
Ethernet	RJ45 female connector			RJ45 female connector		
Parameterization/operation/diagnostics	6-pos. MINI DIN female connector(PS/2)			6-pos. MINI DIN female connector(PS/2)		
Inline system data						
Number of supported devices	Max. 63			Max. 512 (in total, of which 254 are remote bus devices/bus segments)		
Direct inputs/outputs						
Number of inputs	8			12		
Number of outputs	4			4		
VLC runtime system						
Programming tool	Steeplechase VLC 7.2 (or higher) Control Designer			Steeplechase VLC 7.x Control Designer		
Program memory	256 kB (Including the data memory)			1 Mbyte (Including the data memory)		
Retentive data memory	8 kByte (NVRAM)			64 kByte (NVRAM)		
Number of data blocks	(depending on data memory)			(depending on data memory)		
Number of timers, counters	(depending on data memory)			(depending on data memory)		
Number of control tasks	1			1		
Realtime clock	Integrated (battery-backed)			Integrated (battery-backed)		
Power supply						
Supply voltage	24 V DC			24 V DC		
Range of supply voltages	19.2 V DC ... 30 V DC			19.2 V DC ... 30 V DC		
Residual ripple	± 5%			± 5%		
Typical current consumption	200 A (no local bus device connected during idling, bus inactive)			250 mA (no local bus device connected during idling, bus inactive)		
General data						
Weight	285 g			440 g		
Width	80 mm			182 mm		
Height	119.8 mm			140.5 mm		
Depth	71.5 mm			71.5 mm		
Degree of protection	IP20			IP20		
Ambient temperature (operation)	-25°C ... 55°C			-25°C ... 55°C		
Permissible humidity (operation)	5% ... 90% (no condensation)			5% ... 90% (no condensation)		
Air pressure (operation)	70 kPa ... 106 kPa (up to 3000 m above mean sea level)			70 kPa ... 106 kPa (up to 3000 m above mean sea level)		
Vibration resistance in acc. with IEC 60068-2-6	5 g			DIN EN 60068-2-6		
Shock in acc. with IEC 60068-2-27:1997	-			DIN EN 60068-2-29		

S-MAX 50xx VLC ...
The all-in-one control system

The **S-MAX 50xx VLC...** with a built-in VLC runtime and a choice of either Citect HMI or Iconics MachineWorX visualization software is available in two display sizes.

The fully integrated control and visualization software provides the reliability and simplicity of a conventional PLC with the power and functionality of a PC-based platform.

S-MAX 5012 VLC ...

Combination of PLC, PC platform, visualization and fieldbus master, 12.1" display

S-MAX 5015 VLC ...

Combination of PLC, PC platform, visualization and fieldbus master, 15" display

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
S-MAX, with Steeplechase VLC and Iconics MachineWorX Runtime						
- MODBUS/TCP-, EtherNet/IP master	**S-MAX 5012 VLC MWX ETH**	**2895653**	1	**S-MAX 5015 VLC MWX ETH**	**2895802**	1
- INTERBUS master	**S-MAX 5012 VLC MWX IB**	**2895682**	1	**S-MAX 5015 VLC MWX IB**	**2895831**	1
- PROFIBUS master	**S-MAX 5012 VLC MWX PB**	**2895679**	1	**S-MAX 5015 VLC MWX PB**	**2895828**	1
- DeviceNet™ master	**S-MAX 5012 VLC MWX DN**	**2895666**	1	**S-MAX 5015 VLC MWX DN**	**2895815**	1
S-MAX, with Steeplechase VLC and Citect HMI Runtime						
- MODBUS/TCP-, EtherNet/IP master	**S-MAX 5012 VLC CIT ETH**	**2895695**	1	**S-MAX 5015 VLC CIT ETH**	**2895844**	1
- INTERBUS master	**S-MAX 5012 VLC CIT IB**	**2895792**	1	**S-MAX 5015 VLC CIT IB**	**2895873**	1
- PROFIBUS master	**S-MAX 5012 VLC CIT PB**	**2895763**	1	**S-MAX 5015 VLC CIT PB**	**2895860**	1
- DeviceNet™ master	**S-MAX 5012 VLC CIT DN**	**2895750**	1	**S-MAX 5015 VLC CIT DN**	**2895857**	1
Technical data						
Display data						
Display	12.1" TFT active			15" TFT active		
Monitor resolution	800 x 600			1024 x 768		
Display lighting	Max. 250 cd/m² typical (adjustable)			Max. 250 cd/m² typical (adjustable)		
Touch screen	Resistive industrial touch screen			Resistive industrial touch screen		
PLC Data						
Main memory	256 MB DDR SODIMM			256 MB DDR SODIMM		
Compact flash	512 MB			512 MB		
Interfaces	COM 1 (RS232), 1xDVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB			COM 1 (RS232), 1xDVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB		
Graphics card	On-board graphics chip (AGP)			On-board graphics chip (AGP)		
Monitor output	PnD			PnD		
Network	3x Ethernet (10/100 Mbps), RJ45, X11: programming and maintenance, X10.1 and X10.2: industrial Ethernet control			3x Ethernet (10/100 Mbps), RJ45, X11: programming and maintenance, X10.1 and X10.2: industrial Ethernet control		
Status display	LEDs (PLC status: PLC, PC status: SYS, fieldbus diagnostics)			LEDs (PLC status: PLC, PC status: SYS, fieldbus diagnostics)		
PLC switch	RUN/STOP/RESET switch			RUN/STOP/RESET switch		
VLC runtime system						
Programming tool	Steeplechase VLC 7.x Control Designer			Steeplechase VLC 7.x Control Designer		
Processing speed	Typ. 0.05 ms			Typ. 0.05 ms		
Program memory	8 Mbyte (Including the data memory)			8 Mbyte (Including the data memory)		
Retentive data memory	128 kByte (NVRAM)			128 kByte (NVRAM)		
Number of data blocks	(depending on data memory)			(depending on data memory)		
Number of timers, counters	(depending on data memory)			(depending on data memory)		
Number of control tasks	1			1		
Realtime clock	Integrated (battery-backed)			Integrated (battery-backed)		
Direct inputs/outputs						
Number of inputs	12			12		
Number of outputs	4			4		
Power supply						
Supply voltage	24 V DC			24 V DC		
Range of supply voltages	19 V DC ... 29 V DC			19 V DC ... 29 V DC		
Max. current consumption	2.5 A			2.5 A		
General data						
Weight	4 kg			5.5 kg		
Width	330 mm			390 mm		
Height	268 mm			314 mm		
Depth	75 mm			75 mm		
Degree of protection	IP65 (front), IP20 (back)			IP65 (front), IP20 (back)		
Ambient temperature (operation)	5°C ... 40°C			5°C ... 40°C		
Permissible humidity (operation)	10% ... 85% (non-condensing)			10% ... 85% (non-condensing)		
Mounting type	Installation in front plate			Installation in front plate		
Vibration (operation)	DIN EN 60068-2-6			DIN EN 60068-2-6		
Shock	DIN EN 60068-2-29			DIN EN 60068-2-29		

Flexible and inexpensive automation

The programming tools and operating systems from Microsoft are popular and have been tried and tested a million times over. Based on the new .NET technology and Windows XP or Windows CE, the HLC product range and the HFI application interface offer a significantly scalable and compatible high-level language solution for the integration of I/O systems into a series system or machine.

This solution flexibly packs control functions and integrates them into any existing higher-level structures such as control systems and databases via Ethernet. The required user interface of the series system or machine is integrated free of licensing costs.

Program overview

Controlling with the Windows technology

Today, controlling and visualizing with the Windows and PC technologies has already become standard in many varied applications. At present, the field of programming is undergoing a change; the old interface-based programming is changing into service-oriented .NET programming. This change is also affecting the world of automation. Windows XP and Windows CE are two compatible operating systems that support this .NET-technology.

Advantages of high-level language programming

The Microsoft .NET development environment has been tried and tested a million times over and many programmers are well-versed with it. The programmer enjoys complete control and almost unlimited flexibility in his solution.

The development environment can be applied to realistic conditions and is supported worldwide. No other licensing costs apart from those for the operating system have to be paid.

Wide propagation of this programming automatically ensures future production security. This makes the approach useful for almost all markets and applications.

Functions such as database connection and web server as well as a TCP/IP stack are available by default. Sample source codes for many other functions and protocols are available for free on the Internet.

Solutions under Windows CE and Windows XP are compatible. A higher-performance device can be selected or an XP platform can be used if the performance of a CE platform is not adequate.

The Windows platform provides an ideal basis for the integration of one´s own remote maintenance concept. Standardized and customer-specific protocols can be independently expanded.

In addition to control function programming, it is also possible to integrate an operating function economically.

Due to the .NET technology and the underlying event-oriented programming, the application can use the CPU power economically.

The object-oriented view offers a number of implementation advantages even when there are many recurring elements and their reusability is given.

Two compatible solutions

Two different solutions are available for high-level language applications:

– Open PC platform with Windows XP

  or

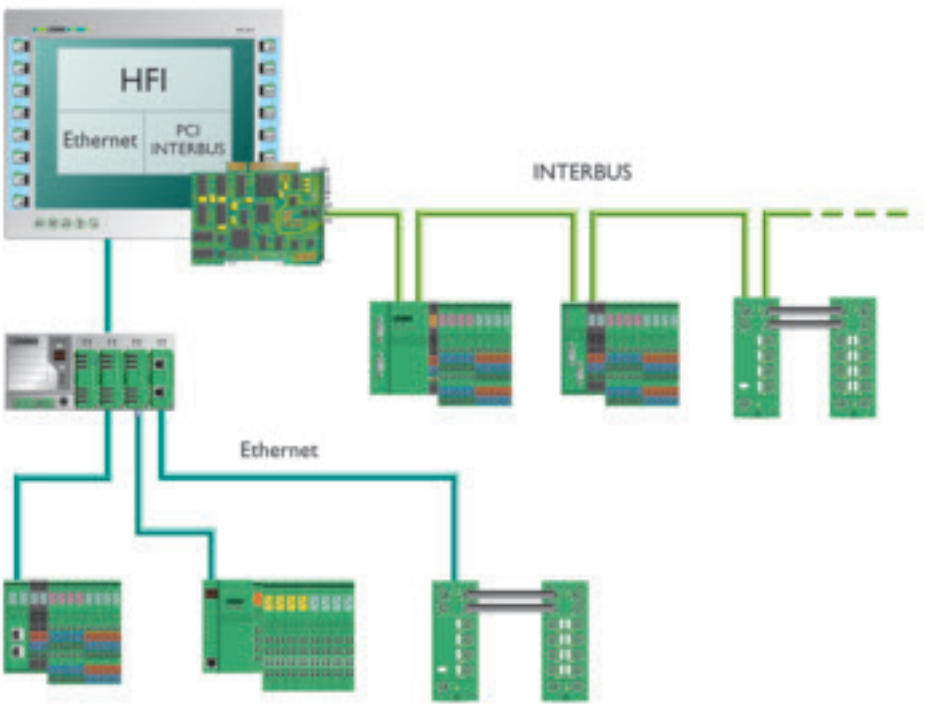
– Embedded Controller (CP ... HLC ...) with Windows CE

HFI on a PC with Windows XP

Should the performance of a PC and its scalability be used, the High-level Language Fieldbus Interface (HFI) comes into use first. This .NET-compatible class library enables easy access to I/O signals. These signals can be connected using Ethernet-compatible I/O modules or INTERBUS PCI controller boards. I/O signals are accessed through registered variables, the diagnostics is uniformly displayed and the configuration of the network is imported from a configurator.

The PC platform provides almost unlimited performance. Such a solution can be flexibly expanded with other plug-in boards, for example for image processing.

Thus, an I/O connection from any .NET-compatible development environment is only a triviality, since it does not require any special knowledge about networks.



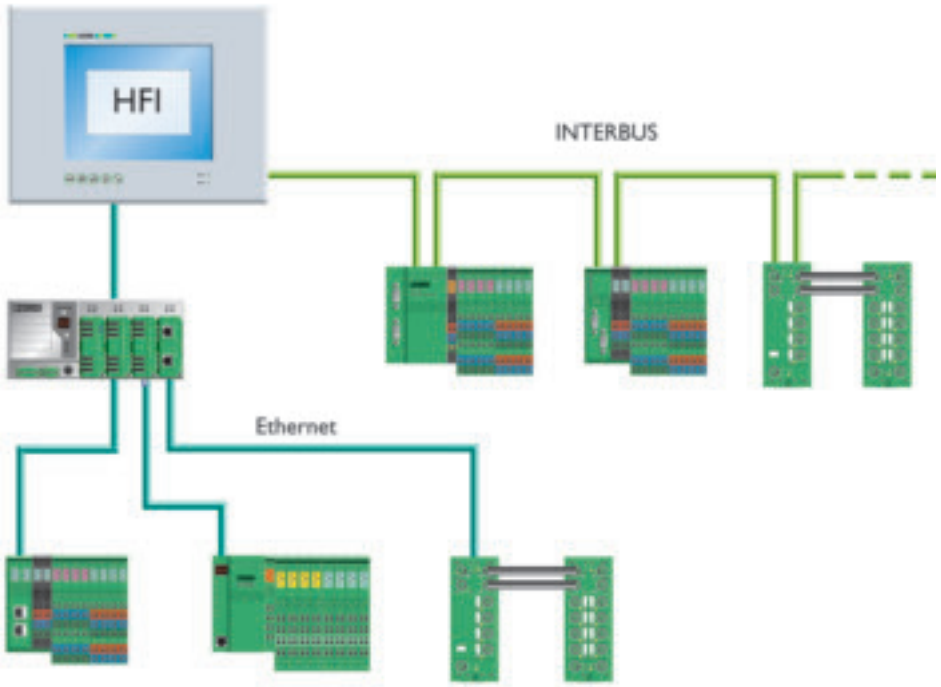
HFI on control panels with Windows CE

As against the open PC solution under Windows XP, control panels with high-level language for Fieldbus Interface provide a well-designed control platform with an integrated touch display. Devices work with Windows CE, so that applications for Windows XP can also easily switch to the control panel. The hardware is available with two different processors and in different display sizes. The platform works neither with a fan, nor with any other rotary components. Long-term availability of this platform is guaranteed. A tested and well-designed hardware is made available to the user. Like in the Windows XP solution, I/O signals can be connected through INTERBUS or Ethernet even here. The network startup, addressing of the I/O points and the diagnostics are as simple as in the Windows XP variant. The programmer can thus completely concentrate on his solution.

The application is debugged via Ethernet using the standard debugging mechanisms of the Microsoft Visual Studio 2005 programming environment.

This interface aims at making the I/O system as easily available to the programmer as possible. In-depth fieldbus know-how is not required.

Due to the object-oriented structure under Windows XP and Windows CE, the application is easily portable over all scenarios, product ranges and over both the operating systems used. The programmer can always switch to the platform that is next in size if the performance of a solution is not adequate.



HFI with industrial PCs

Industrial PCs

		
Type **Order No.**	**PPC 5315** **2887441**	**VL INDUSTRIAL PC** **2913108**
Type **Order No.**	**PPC 5317** **2887454**	
Type **Order No.**	**PPC 5319** **2887467**	
Type **Order No.**	**PPC 5515** **2887470**	
Description	Industrial PC with display	Configurable industrial PC
Page	**151**	**149**

	PCI	PCI/104	Ethernet	
				
Type **Order No.**	**IBS PCI SC/I-T** **2725260**	**IBS PCI 104 SC-T** **2737494**	**FL NP PND-4TX IB** **2985974**	**FL NP PND-4TX IB-LK** **2985929**
Description	INTERBUS master for PCI interface	INTERBUS master for PCI/104	PROFINET proxy and Ethernet gateway for INTERBUS	PROFINET proxy and Ethernet gateway for INTERBUS
Page	**www.phoenixcontact.net/catalog**	**www.phoenixcontact.net/catalog**	**160**	**161**

	Inline Modular		Inline Block IO	Fieldline Modular
				
Type **Order No.**	**FL IL 24 BK-PAC** **2862314**	**IL ETH BK DI8 DO4 2TX-PAC** **2703981**	**ILB ETH 24 DI16 DIO16-2TX** **2832962**	**FLM BK ETH M12 DI 8 M12-2TX** **2736916**
Type **Order No.**	**FL IL 24 BK-B-PAC** **2862327**			
Description	Inline Modular bus coupler	Inline Modular bus coupler	Inline Block IO station	Fieldline Modular bus coupler
Page	**251**	**250**	**319**	**369**

HFI on embedded control panel

Control panel

					
Type **Order No.**	**CP 204M HLC ETH** **2916150**	**CP 206M HLC ETH** **2916260**	**CP 206S HLC ETH** **2988340**	**CP 310T HLC ETH** **2916480**	**CP 310T HLC ETH IB** **2916370**
Description	High-level language control panel with 4" gray scale display	High-level language control panel with 6" gray scale display	High-level language control panel with 6" color display	High-level language control panel with 10" color display	High-level language control panel with 10" color display and INTERBUS master
Page	**76**	**77**	**77**	**77**	**77**

Controlling with the PC and Microsoft .NET technology

An industrial PC with Windows XP / Vista for various tasks is often used during application. The computer processor still has enough scope for development when it comes to performance. A connection to higher-level systems or special plug-in boards has to be programmed in any case. The integration of a control task with user interface should be cost-effective. Why shouldn't a PC be directly used in a high-level language for the control function as well?

One big advantage of doing this is the cost involved. No additional costs are incurred for a runtime environment or visualization. Any .NET-compatible compiler can be selected as the programming environment. Tens of thousands of programming environments are being used in the IT world. Functions such as remote debugging via Ethernet have become standard here.

The .NET technology is the future standard for Windows as well as non-Windows programming. Its advantage is the completely object-oriented approach, which stands out against the standard object classes for Windows programs, especially due to its good communication properties. Visualizing, controlling and connection to the higher-level system can thus from an application. External programs or other interfaces are not required. According to the definition, the reusability of the objects is given. Virtually unlimited sample source codes are available for download on the Internet.

HFI – An interface for I/O access

Everything is standard up to this point. In order to integrate I/O signals in an application program, low-level drivers must be integrated in the application. A high level of network expertise is usually required to address the I/O signals in the coupling memories of the I/O system. This is where the HFI class library comes in. The aim is to relieve the programmer of precisely these network-dependent issues. I/O devices should be integrated like an object for sending an e-mail. Address information should be hidden as best as possible or automatically integrated.

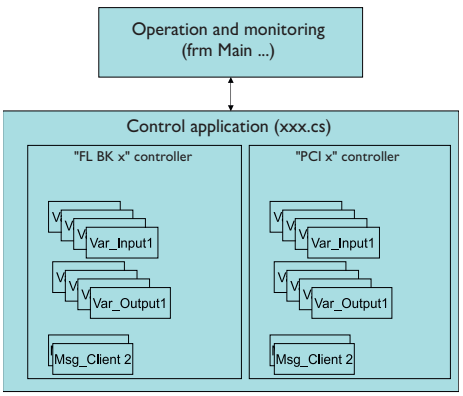
The HFI class library

For this, the HFI defines a simple class library for different device types. Firstly, very simple Ethernet I/O modules with fixed I/O space, such as devices in the Inline Block I/O product range, can be addressed using one device class. Ethernet bus heads are the next device class, which can be extended "module by module" with I/O modules from the Inline Modular product range . Entire INTERBUSsystems with up to 8192 I/O signals are integrated using one device class for the gateways or the PCI controller boards. All classes have virtually identical basic properties. Special functions of different devices (Watchdog, ...) are encapsulated in the class in the best possible manner. This means that quality porting of the application to other I/O systems, e.g., for IP67 I/O systems, is also possible.

In addition to classes for devices, there are also classes for data access to input and output data.

This means that the physical address of the I/O signal is transferred to this object once during startup. In addition, this position specification is not defined as a simple bit address, but is based on device numbers. This means that the respective object instance is always used in the program. If devices are inserted in the system, the parameterization has to be modified only once.

If it is necessary to communicate with intelligent devices, there are additional communication classes that are installed directly on devices. These automatically process connection establishment and monitoring, only the actual parameter record or command set still requires attention.



Controls and other additional modules

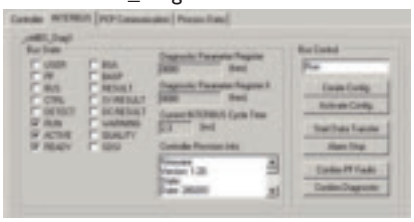
.NET controls, which present parameters of device classes, the registered data instances, and grant read and write access to the actual I/O point, are provided in order to start up an I/O system consisting of different modules via different networks. Thus, programmers can start up networks that are unknown to them without any problem.

The controls have a structure that is similar to the HFI class structure. There is a control for device classes ("ctrlController"), one for inputs ("ctrlVarInput"), one for outputs ("ctrlVarOutput") and one for incoming and outgoing messages ("ctrlMessageClient"). Devices with an INTERBUS master of the fourth generation can also be diagnosed using a diagnostic control ("ctrlIBS_Diag").

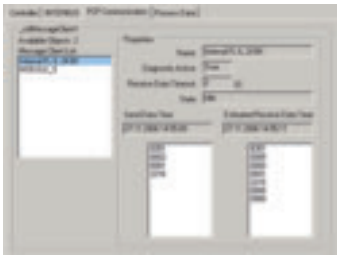
Sample programs in C# are available for all devices, since many sample programs are being used in PC programming. Other programming languages such as VB.NET are available on request.

ctrlController

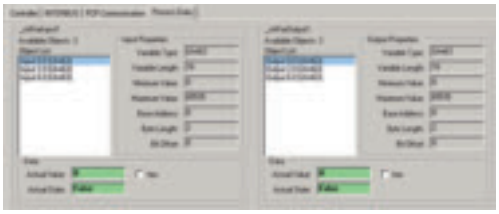
ctrlIBS_Diag



ctrlMessageClient



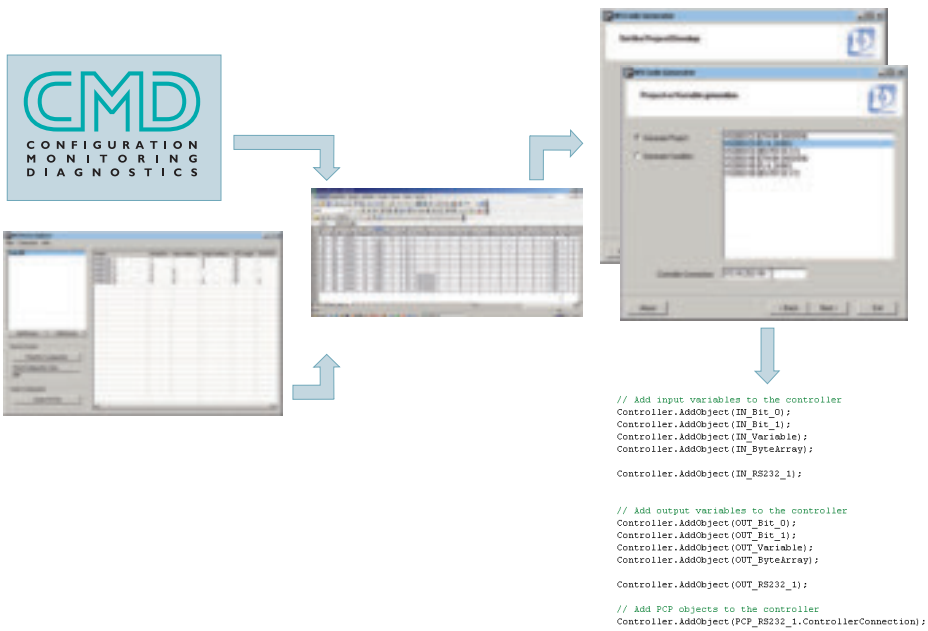
ctrlVarInput/ctrlVarOutput



The automatic addressing comfort is also unparalleled. A simple station configurator is called up in bus terminal modules. This configurator can read out the station and it displays and exports address information.

The popular CMD tool is used in plug-in boards and gateways.

All export information can be converted into C# or VB using one more automated step, which is the HFI code generator in source code, for object instances. On request, this HFI code generator can also generate a complete application project with all class instances, which can be directly compiled.



Scalable solution from PC to embedded control panel

In addition to open high-performance PC platforms, HFI is also used in dedicated embedded controllers with integrated display (see the following pages).
Easy porting of a PC application under Windows XP / Vista to the Compact Framework under Windows CE used there, facilitates high scalability of the application from the PC to the smallest CP with almost 100% compatibility of the application program.

The prerequisites:

- PC with the Windows XP (SP2) / Windows Vista operating system
- .NET Framework 1.1 / 2.0 / 3.0 / 3.5
- I/O devices with direct Ethernet connection from the Inline Modular, Inline Block IO or Fieldline Modular product range (see product overview)

  or
- I/O devices for INTERBUS that can be addressed using PCI cards or gateways
- HFI setup (free download on the Internet for devices)
- hardware drivers for PCI cards, if required (free download on the Internet for controller boards)
- Quick Start with basic information with the help of examples (free download on the Internet)

You will also find all drivers, HFI, tools and examples on the driver CD for PC controller boards.

Control panels – Freely programmable

In series and special engineering, control programs have to incorporate know-how in the best possible manner and adapt flexibly to applications. For this reason, many applications are written in high-level languages, such as C, C++, C# or Visual Basic.

The new, freely programmable control panel with integrated operating function accommodates this development.

Based on thoroughly tested hardware and an open operating system used worldwide (Windows CE), Phoenix Contact is extending its product range by controllers which can be programmed in high-level languages in various performance classes and display sizes.

The program and visualization are created with one tool. With the controller's integrated touchscreen, the machine can be operated cost-effectively.

The most important functions and protocols (web server, TCP/IP) are integrated in the operating system image, and other modules can be added easily later.

The devices are programmed with Microsoft Visual Studio 2005. Remote debugging and many other functions are provided automatically with the programming environment. On all devices, the object-oriented HFI interface allows access to the hardware resources, as well as input and output signals. The input and output signals can either be read in via the Ethernet or the integrated INTERBUS master.

Ethernet

CP 204M HLC ETH

High-level language control panel with 4" grayscale display

Description	Type	Order No.	Pcs. / Pkt.
Control panel with touch screen - 4" grayscale display - 6" grayscale display - 6" color display - 10" color display	**CP 204M HLC ETH**	**2916150**	1
Control panel with touch screen and INTERBUS master - 10" color display			
Parameterization memory - 256 MB			

Technical data	
Display data	
Display	4" Touch, FSTN
Monitor resolution	320 x 240
Color spectrum	5 grayscales
Ethernet interface	
No.	1
Type of connection	RJ45 female connector
Transmission speed	10/100 Mbpss
USB interface	
No.	2
Type of connection	USB type A, female connector
INTERBUS interface	
No.	-
Type of connection	-
Number of I/O nodes	-
Control system	
Operating systems	Windows CE 5.0 (including web server, Compact Framework 2.0,…)
Data memory	32 Mbyte (SDRAM)
Retentive data memory	512 kByte (SRAM)
Processor	ARM9 - 200 MHz
Realtime clock	Yes (battery-backed)
Flash memory	32 Mbyte (Flash)
Software requirements	Visual Studio 2005 Standard or larger
General data	
Supply voltage	24 V DC ±5% (SELV as per DIN EN 61131)
Height	96 mm
Width	134 mm
Depth	40 mm
Ambient temperature (operation)	0°C ... 50°C (Relative humidity 10% to 95%, non-condensing)
Ambient temperature (storage/transport)	-25°C ... 70°C (Relative humidity 10% to 95%, non-condensing)
Degree of protection	IP65 (front), IP20 (back)

Ethernet

CP 206... HLC ETH

High-level language control panel with 6" grayscale display

Ethernet

CP 310T HLC ETH

High-level language control panel with 10" color display

INTERBUS

CP 310T HLC ETH IB

High-level language control panel with 10" color display and INTERBUS master

Type	Order No.	Pcs. / Pkt.
CP 206M HLC ETH	2916260	1
CP 206S HLC ETH	2988340	1
CF FLASH 256MB	2988780	1

CP 206M HLC ETH	CP 206S HLC ETH
6" Touch, FSTN 320 x 240 5 grayscales	125 colors
1 RJ45 female connector 10/100 Mbps	
2 USB type A, female connector	
- - -	
Windows CE 5.0 (including web server, Compact Framework 2.0,…)	
32 Mbyte (SDRAM) 512 kByte (SRAM) ARM9 - 200 MHz Yes (battery-backed) 32 Mbyte (Internal flash)	32 Mbyte (Flash) Visual Studio 2005 Standard or larger
24 V DC ±5% (SELV as per DIN EN 61131) 147 mm 203 mm 60 mm 0°C ... 50°C (Relative humidity 10% to 95%, non-condensing) -25°C ... 70°C (Relative humidity 10% to 95%, non-condensing) IP65 (front), IP20 (back)	

Type	Order No.	Pcs. / Pkt.
CP 310T HLC ETH	2916480	1
CF FLASH 256MB	2988780	1

10.4" active TFT 640 x 480 65536 colors
1 RJ45 female connector 10/100 Mbps
2 USB type A, female connector
- - -
Windows CE 5.0 (including web server, Compact Framework 2.0,…)
64 Mbyte (SDRAM) 1 Mbyte (SRAM) Xscale PXA255, 400 MHz Yes (battery-backed) 32 Mbyte (Pluggable) Visual Studio 2005 Standard or larger
24 V DC ±5% (SELV as per DIN EN 61131) 340 mm 270 mm 60 mm 0°C ... 50°C (Relative humidity 10% to 95%, non-condensing) -25°C ... 70°C (Relative humidity 10% to 95%, non-condensing) IP65 (front), IP20 (back)

Type	Order No.	Pcs. / Pkt.
CP 310T HLC ETH IB	2916370	1
CF FLASH 256MB	2988780	1

10.4" active TFT 640 x 480 65536 colors
1 RJ45 female connector 10/100 Mbps
2 USB type A, female connector
1 9-pos. D-SUB female 8192 (max.)
Windows CE 5.0 (including web server, Compact Framework 2.0,…)
64 Mbyte (SDRAM) 1 Mbyte (SRAM) Xscale PXA255, 400 MHz Yes (battery-backed) 32 Mbyte (Pluggable) Visual Studio 2005 Standard or larger
24 V DC ±5% (SELV as per DIN EN 61131) 340 mm 270 mm 60 mm 0°C ... 50°C (Relative humidity 10% to 95%, non-condensing) -25°C ... 70°C (Relative humidity 10% to 95%, non-condensing) IP65 (front), IP20 (back)


nanoNavigator

Control Technology | nanoLine® family of controllers

nanoLine® is a small programmable controller/relay with Ethernet connectivity, a removable operator display and easy flow chart programming. nanoLine is designed to control small to midsize machines that require few I/O points.

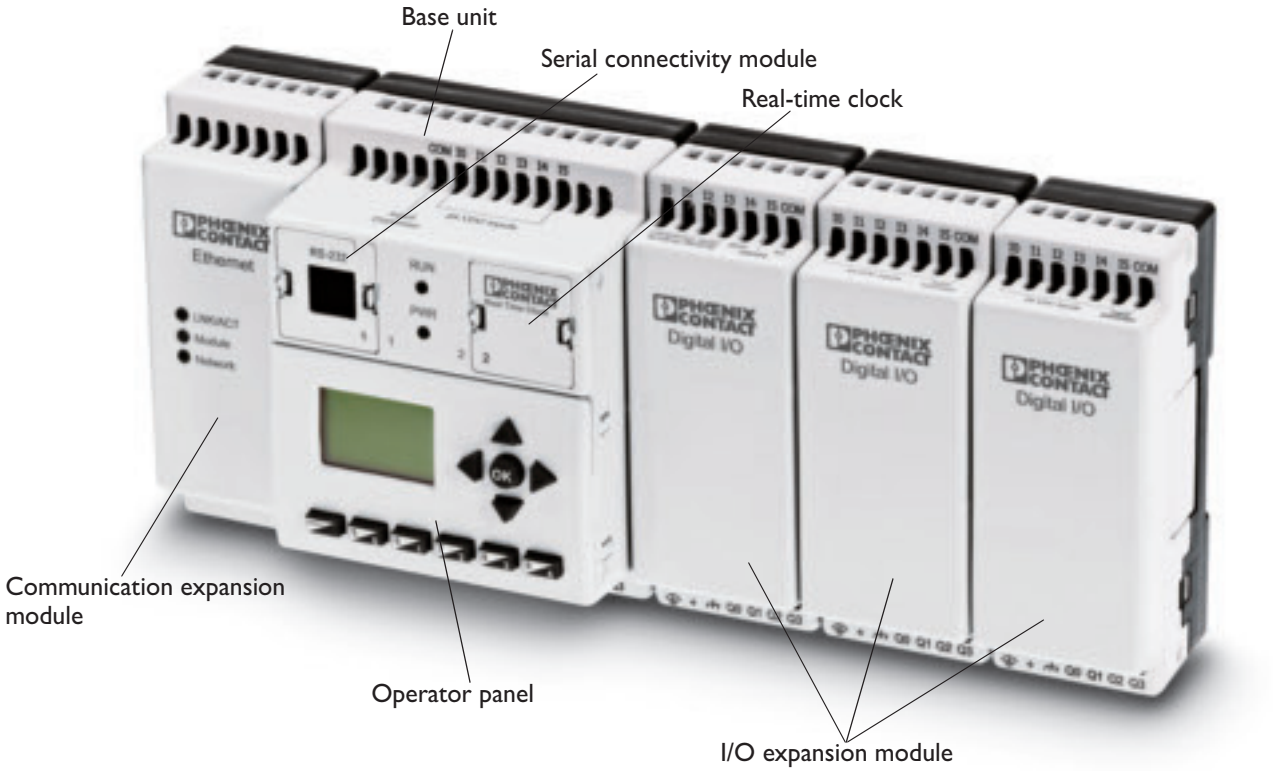
Base controller stations are available in 24 V DC, 24 V AC/DC and 100 ... 240 V AC versions. The on-board I/O consists of digital inputs and outputs. The nanoLine accommodates up to three I/O expansion modules, bringing the total possible I/O count to 24 digital inputs and 16 digital outputs. A four-channel analog input module is also available.

The nanoLine offers a variety of optional expansion modules for increased flexibility. Communication modules for Ethernet, RS-232, RS-485 and USB allow easy data exchange with Modbus TCP and RTU clients. The optional operator panel can be mounted on the base unit, through a control cabinet or used as a simple hand-held device. Pluggable memory and real-time clock modules are also available.

The nanoLine controller uses nanoNavigator software, an intuitive flow chart language that allows for easy programming and hardware configuration. The user can create the control logic with just six simple instructions. Most programs can execute under one millisecond.

Program overview

Smart, simple, connected and flexible



The nanoLine is a new control platform targeted at basic applications in competitive markets that demand easy application programming, flexible modular configurations, increasingly required connectivity and need virtually no support.

Smart

The nanoLine is a smart, compact control system designed to automatically perform many tasks, saving time and preventing errors. A few examples include:

– Automatic hardware configuration
– Modbus communications independent of the programming
– One operator panel, three mounting options and no program changes
– The programming language is so smart and intuitive that untrained operators can understand finished projects immediately, or even create new projects upon opening the box. But, there is no need to wait for the box to arrive - nanoNavigator is a free download from the Web, so projects can be written and simulated by the time the hardware arrives.

Simple

nanoLine controllers are programmed using an intuitive flow chart programming language that offers several major benefits. No programming background is required to produce a working program. Programs can be produced in minutes, with little help from manuals or training. Those with programming experience will find virtually no learning curve with this intuitive language. Once created, flow chart programs are easy to understand and maintain by almost anyone, even without any special training or special documentation.

Connected

The nanoLine family supports a new level of connectivity in its product class. This connectivity enables customers to embed the nanoLine into systems, monitor these systems at a distance or remotely control the nanoLine system. With the installation of the Ethernet expansion module or a serial option module (RS-232 or RS-485), the nanoLine controller can function as a Modbus TCP or RTU server. This enables all I/O points, registers, timers, counters, program flags and system flags to be read and written remotely, and independently of the program.

Flexible

The nanoLine family is a tightly integrated but modular system, enabling selection of only the necessary project components without sacrificing the system's ease-of-use. The operator panel is a perfect example of this functionality.

– The same base unit is used with or without an operator panel
– The same program can be used with or without an operator panel
– The same operator panel can be mounted on the base, mounted through a control cabinet for an IP67 operator panel or used as a simple hand-held device for setup or maintenance

The major components of the nanoLine system include the base unit, operator panel, base unit option modules, communications expansion modules, I/O expansion modules and nanoNavigator software.

nanoNavigator - Programming made fast and easy

nanoNavigator is a free software package that makes setup, programming and maintenance fast and easy. Once a PC is connected to the nanoLine base unit through one of the serial connectivity option modules, the user has complete control. It takes only four simple steps to create a control flow chart using nanoNavigator. Once the project is loaded, nanoNavigator can start and stop the program, monitor the progress through the flow chart and monitor data (inputs, outputs, registers, flags, timers and counter). nanoNavigator is not limited to just monitoring - it can change data items, monitor or simulate execution, making development tasks fast and easy.

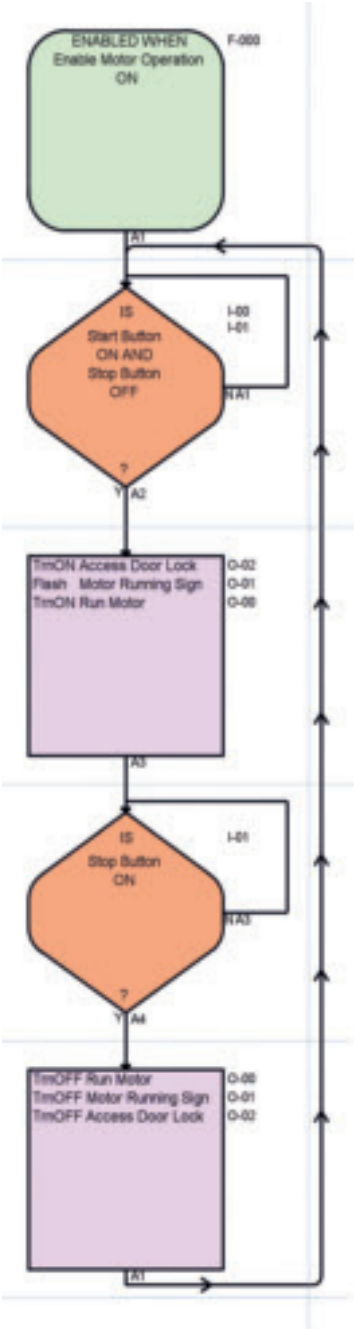
Four quick steps

1. Select configuration:
   Begin by selecting which hardware options are required for the project.

2. Drop the flow chart blocks:
   Develop the program by dropping standard flow chart blocks onto the palette.

3. Configure the blocks:
   Double-click on the blocks and fill in the drop-down menus. Choices are limited to the hardware selected in Step 1.

4. Connect the flow:
   Finish the program by connecting the flow chart blocks together.



Six fast and easy instructions

Compare
Compare inputs, outputs, program flags and system flags

Move
Move values between registers, timers, counters and analog inputs

Decide
Decide based on values in registers, timer, counters or analog inputs

Message
Send a message to the Operator Panel

Control
Control outputs, flags, timers, and counters

Wait
Wait for a time between milliseconds to hours

Base units

					
Type **Order No.**	**NLC-050-024D-06I-04QTN-00A** **2701030**	**NLC-050-024D-06I-04QTP-00A** **2701027**	**NLC-050-024D-06I-04QRD-05A** **2701043**	**NLC-050-024X-08I-04QRX-05A** **2701056**	**NLC-050-100A-08I-04QRA-05A** **2701069**
Description	24 V DC, 6 digital inputs and 4 NPN outputs	24 V DC, 6 digital inputs and 4 PNP outputs	24 V DC, 6 digital inputs and 4 relay (5 A) outputs	24 V AC/DC, 8 digital inputs and 4 relay (5 A) outputs	100 - 240 V AC, 8 digital inputs and 4 relay (5 A) outputs
Page	**84**	**84**	**85**	**85**	**85**

I/O expansion units

	Digital			Analog
				
Type **Order No.**	**NLC-IO-06I-04QTP-01A** **2701072**	**NLC-IO-06I-04QTN-01A** **2701085**	**NLC-IO-03I-04QRD-5A** **2701328**	**NLC-IO-4AI** **2701098**
Description	6 digital inputs, 4 PNP digital outputs	6 digital inputs, 4 NPN digital outputs	24 V DC, 3 digital inputs, 4 relay outputs (5 A)	4 analog inputs
Page	**86**	**86**	**86**	**87**

	Communication expansion module	Serial connection		
	Ethernet	USB	RS-232	RS-485
				
Type **Order No.**	**NLC-COM-ENET-MB1** **2701124**	**NLC-MOD-USB** **2701195**	**NLC-MOD-RS232** **2701179**	**NLC-MOD-RS485** **2701182**
Description	Ethernet module for Modbus® TCP Server functionality	Slot 1 option module, RS-232 layer, USB Type B connector	Slot 1 option module, RS-232 layer, RJ11 connector	Slot 1 option module, RS-485 layer, RJ11 connector
Page	**88**	**89**	**89**	**89**

	Operator panel		Real-time clock	Memory module
				
Type **Order No.**	**NLC-OP1-LCD-032-4X20** **2701137**	**NLC-OP1-MKT** **2701140**	**NLC-MOD-RTC** **2701153**	**NLC-MOD-MEM 032K** **2701166**
Description	User interface for nanoLine controllers	Remote mounting kit for operator panel	Slot 2 option module, real-time clock for nanoLine controllers	Slot 2 option module, memory module for data transfer
Page	90	90	91	91

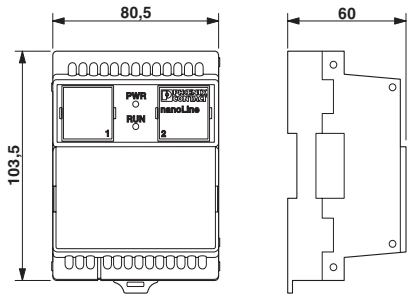
	nanoNavigator	Starter kits			
					
Type **Order No.**	**NLC-NAV-01** **2701221**	**NLC-START-01** **2701399**	**NLC-START-02** **2701425**	**NLC-START-03** **2701467**	**NLC-START-04** **2701483**
Description	Flow chart programming software for the nanoLine family of controllers	Starter kit, includes nanoNavigator, base unit with NPN outputs, operator panel, input and output simulators and cables	Starter kit, includes nanoNavigator, base unit with PNP outputs, operator panel, input and output simulators and cables	Starter kit, includes nanoNavigator, base unit with relay outputs, operator panel, input and output simulators and cables	Deluxe starter kit, includes nanoNavigator, base unit with NPN digital outputs, operator panel, power supply, input and output simulators and cables
Page	92	93	93	93	93

Base unit

The nanoLine family base unit is a small controller with digital inputs and outputs. The base unit is available with a variety of power supply options, including 24 V DC, 24 V DC/AC and 110-240 V AC. The base unit provides connections for a wide variety of options, including additional I/O, communications, operator panel and a real time clock.

The face of the base unit connects to the operator panel and has two option slots. These option slots have connections for a real-time clock and a serial port module. The operator panel can be placed directly into the base, or connected via a remote mounting kit. The left side of the base connects to the Ethernet communications module, while the right side of the base accommodates three expansion I/O modules.

The nanoLine controllers are configured and programmed entirely with nanoNavigator, a free, integrated development environment. The configuration and control flow charts download to the base unit via one of the serial port options. nanoNavigator can monitor real-time execution, as well as simulate the application before downloading.



NLC-050-024D-06I-04QT...

Base unit, 24 V DC with 6 digital inputs and 4 NPN outputs

Description	Type	Order No.	Pcs. / Pkt.
nanoLine controllers, base unit			
6 digital inputs, 4 NPN outputs	**NLC-050-024D-06I-04QTN-00A**	**2701030**	1
6 digital inputs, 4 PNP outputs	**NLC-050-024D-06I-04QTP-00A**	**2701027**	1
6 digital inputs, 4 DC relay outputs			
8 digital inputs, 4 AC/DC relay outputs			
Cover, replacement			
Operator panel	**NLC-OP1-COVER**	**2701276**	1
Cap, replacement			
Slot 1	**NLC-MOD-CAP**	**2701289**	1
Cap, replacement			
Slot 2	**NLC-MOD-CAP-PXC**	**2701292**	1

Technical data	NLC-050-024D-06I-04QTN-00A	NLC-050-024D-06I-04QTP-00A
Interfaces		
RS-232	Slot 1	
USB	Slot 1	
Real-Time Clock	Slot 2	
Power supply		
Connection supply	Screw connection	
Supply voltage	24 V DC (Power available to the I/O and Communications modules)	
Range of supply voltages	19 V DC ... 30 V DC	
Typical current consumption	92 mA	
Max. current consumption	250 mA	
Digital inputs		
Type of connection	Screw connection	
Number of inputs	6	
Description of the inputs	NPN/PNP	
Typical response time	on 60 µs	
Digital outputs		
Type of connection	Screw connection	
Number of outputs	4	
Description of the outputs	NPN outputs	PNP outputs
Maximum output current per channel	500 mA	
Maximum output current per module / terminal block	2 A	
Protective circuitry	Short circuit and overload protection	
Software interfaces		
Programming tool	nanoNavigator	
General data		
Width	80.5 mm	
Height	103.5 mm	
Depth	60 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C ... 60°C	
Ambient temperature (storage/transport)	-25°C ... 85°C	

NLC-050-024D-06I-04QRD-05A

Base unit, 24 V DC with 6 digital inputs and 4 relay (5 A) outputs

NLC-050-024X-08I-04QRX-05A

Base unit, 24 V AC/DC with 8 digital inputs and 4 relay (5 A) outputs

NLC-050-100A-08I-04QRA-05A

Base unit, 100-240 V AC with 8 digital inputs and 4 relay (5 A) outputs

Type	Order No.	Pcs. / Pkt.
NLC-050-024D-06I-04QRD-05A	**2701043**	1

Slot 1 Slot 1 Slot 2
Screw connection 24 V DC (Power available to the I/O and Communications modules) 19 V DC ... 30 V DC 96 mA 250 mA
Screw connection 6 NPN/PNP on 60 µs
Screw connection 4 Relay output 5 A 20 A Short circuit and overload protection
nanoNavigator
80.5 mm 103.5 mm 60 mm IP20 -25°C ... 60°C -25°C ... 85°C

Type	Order No.	Pcs. / Pkt.
NLC-050-024X-08I-04QRX-05A	**2701056**	1

Slot 1 Slot 1 Slot 2
Screw connection 24 V AC/DC (Power available to the I/O and Communications modules) 19 V AC/DC ... 30 V DC (26 V AC) 280 mA (@ 24 V AC/DC) -
Screw connection 8 DC-NPN/PNP; AC 20 ms
Screw connection 4 Relay output 5 A 20 A Short circuit and overload protection
nanoNavigator
80.5 mm 103.5 mm 60 mm IP20 -25°C ... 60°C -25°C ... 85°C

Type	Order No.	Pcs. / Pkt.
NLC-050-100A-08I-04QRA-05A	**2701069**	1

Slot 1 Slot 1 Slot 2
Screw connection 100 V AC ... 240 V AC (Power available to the I/O and Communications modules) 100 V AC ... 240 V AC 55 mA (@ 230 V AC) -
Screw connection 8 AC 20 ms
Screw connection 4 Relay output 5 A 20 A Short circuit and overload protection
nanoNavigator
80.5 mm 103.5 mm 60 mm IP20 -25°C ... 60°C -25°C ... 85°C

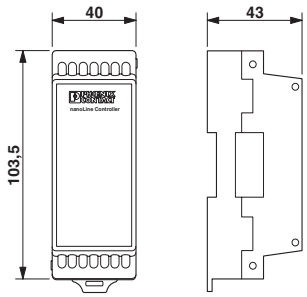
Digital I/O expansion units

nanoLine base units are available with a variety of input and output combinations. However, if the I/O provided on the base unit is not sufficient for the application, up to three expansion I/O modules, in any combination, can be added to the right side of the base unit. Once I/O modules are connected, they are automatically available to monitor on the operator panel, via Modbus TCP/RTU, and for inclusion in flow charts.

nanoLine digital I/O modules have galvanic isolation. They can be powered from a secondary power supply, enabling power to be removed from the sensor and actuators while it is maintained on the controller.

Supported digital options:

– 6 input, 4 PNP transistor output (24 V DC)
– 6 input, 4 NPN transistor output (24 V DC)
– 3 input, 4 relay outputs (5 A)



NLC-IO-06(3)I-04Q...

I/O expansion module, 3 or 6 digital inputs, 4 PNP digital outputs

Description	Type	Order No.	Pcs. / Pkt.
nanoLine controllers, I/O expansion module			
6 digital inputs, 4 PNP outputs	**NLC-IO-06I-04QTP-01A**	**2701072**	1
6 digital inputs, 4 NPN outputs	**NLC-IO-06I-04QTN-01A**	**2701085**	1
3 digital inputs, 4 DC relay outputs	**NLC-IO-03I-04QRD-5A**	**2701328**	1

Technical data	NLC-IO-06I-04QTP-01A	NLC-IO-03I-04QRD-5A
Power supply for module electronics		
Supply voltage	24 V DC	
Type of connection	Screw connection	
Supply current	Typ. 50 mA Max. 90 mA	Typ. 300 mA Max. 500 mA
Digital inputs		
Type of connection	Screw connection	
Number of inputs	6	3
Description of the inputs	PNP/NPN	
Typical response time	60 µs (on)	
Digital outputs		
Type of connection	Screw connection	
Number of outputs	4	
Description of the outputs	PNP outputs	Relay output
Maximum output current per channel	500 mA	5 A
Maximum output current per module / terminal block	2 A	20 A
Protective circuitry	Short circuit and overload protection	-
General data		
Width	40 mm	
Height	103.5 mm	
Depth	43 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C ... 60°C	
Ambient temperature (storage/transport)	-25°C ... 85°C	

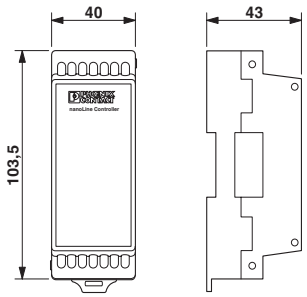
Analog I/O expansion module

nanoLine base units are available with a variety of input and output combinations. However, if the I/O provided on the base unit is not sufficient for the application, up to three expansion I/O modules, in any combination, can be added to the right side of the base unit. Once I/O modules are connected, they are automatically available to monitor on the operator panel, via Modbus TCP/RTU, and for inclusion in flow charts.

nanoLine digital I/O modules have galvanic isolation. They can be powered from a secondary power supply, enabling power to be removed from the sensor and actuators while it is maintained on the controller.

Supported analog options:

– 4 independently configurable analog inputs



NLC-IO-4AI

I/O expansion module, 4 analog inputs

Description	Type	Order No.	Pcs. / Pkt.
nanoLine controllers, I/O expansion module 4 analog inputs	**NLC-IO-4AI**	**2701098**	1
Technical data			
Power supply for module electronics			
Supply voltage	24 V		
Supply current	50 mA		
Analog inputs			
Type of connection	2-wire		
Connection method	Screw connection		
Number of inputs	4		
Description of the inputs	single ended		
Voltage input signal	0 V ... 10 V		
Current input signal	4 mA ... 20 mA		
Basic error limit	1%		
Measured value resolution	12 bits		
General data			
Width	40 mm		
Height	103.5 mm		
Depth	43 mm		
Degree of protection	IP20		
Ambient temperature (operation)	-25°C ... 60°C		
Ambient temperature (storage/transport)	-25°C ... 85°C		

Communication expansion module

Ethernet connectivity

The nanoLine family supports a new level of connectivity in its product class. This connectivity enables customers to embed the nanoLine into systems, monitor these systems at a distance, or remotely control the nanoLine system.

With the installation of the Ethernet expansion module, the nanoLine control can function as a Modbus TCP Server. This enables all I/O points, registers, timers, counters, program flags and system flags to be read and written remotely and independently of the program. Password control to limit this capability is also available.

Using nanoNavigator, a communications watchdog timer can be configured to generate either a warning or a fault if communications are lost.

– If a warning is announced, a system flag is set and a message is displayed on the operator panel (if present), but the flow chart continues to execute.
– If a fault is announced, a system flag is set and a message is displayed on the operator panel (if present), and the program stops.

Note: One of the serial connectivity option modules is required to configure and program the nanoLine controller.

NLC-COM-ENET-MB1

Ethernet Communication Expansion Module, 10/100 Mbps, Autonegotiation, Modbus TCP Server

Description	Type	Order No.	Pcs. / Pkt.
nanoLine controllers, communication module Ethernet module for Modbus® TCP Server functionality	**NLC-COM-ENET-MB1**	**2701124**	1

Technical data	
Interface	
Interface	Ethernet 10/100 Base T
Type of connection	RJ45
Transmission speed	10/100 Mbps (autonegotiation)
Transmission length	100 m
Signal LEDs	LNK/ACT; Module; Network
Connection data	
Name	Expansion module
Type of connection	Installs left side of base unit
Power supply for module electronics	
Supply voltage	24 V DC (Power available via base unit)
Type of connection	Screw connection
Typical current consumption	110 mA
Max. current consumption	180 mA (at 18 V DC)
General data	
Degree of protection	IP20
Width	40 mm
Height	103.5 mm
Depth	43 mm
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-25°C ... 85°C

Serial connection modules

The nanoLine family supports a new level of connectivity in its product class. This connectivity enables customers to embed the nanoLine into systems, monitor these systems at a distance, or remotely control the nanoLine system.

With the installation of either the RS-232 or RS-485 option modules, the nanoLine controller can function as a Modbus RTU Server. This enables all I/O points, registers, flags, timers, counters, and system flags to be read and written remotely and independently of the program. Password control to limit this capability is also available.

Using nanoNavigator, a communications watchdog timer can be configured to generate either a warning or a fault if communications are lost.

– If a warning is announced, a system flag is set and a message is displayed on the operator panel (if present), but the flow chart continues to execute.
– If a warning is announced, a system flag is set and a message is displayed on the operator panel (if present), but the flow chart continues to execute.

NLC-MOD…

Slot 1 option module
Serial connection for data transfer or software configuration

Description	Type	Order No.	Pcs. / Pkt.
Serial connection module, for data transfer			
RS-232 layer, USB Type B connector	**NLC-MOD-USB**	**2701195**	1
RS-232 layer, RJ11 connector	**NLC-MOD-RS232**	**2701179**	1
RS-485 layer, RJ11 connector	**NLC-MOD-RS485**	**2701182**	1

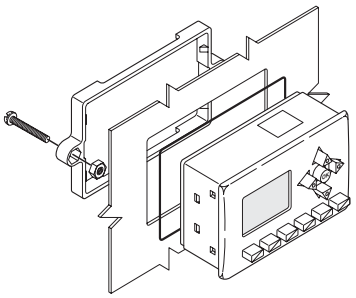
Technical data	
Connection data	
Name	Slot 1
Type of connection	Installs in slot 1 of base unit
Power supply for module electronics	
Supply voltage	24 V DC (Power available via base unit)
Type of connection	-
Typical current consumption	10 mA
Max. current consumption	18 mA
General data	
Degree of protection	IP20
Width	24.5 mm
Height	25.5 mm
Depth	49 mm
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-25°C ... 85°C

Flexible operator panel

The operator panel on the nanoLine is an operator interface, permitting the program to interact with the operator. Using the operator panel, the operator can view the state of all I/O points, registers, timers, counters, program flags and system flags. The program also sends messages to the display to provide directions or ask for information. For easy parameter entry, nanoLine operator panel has numeric keys (0-9), which is unique to this product. Each of the 11 keys on the operator panel can also used within a flow chart for custom menu creation to control projects.

To enhance this unique capability, the backlit nanoLine operator panel may be installed directly into the base unit, used as a simple hot-swappable, hand-held device, or mounted through a panel creating an inexpensive IP67 operator panel.

When used as a simple hand-held device a single operator panel can be used with any number of nanoLine controllers. The hot-swappable display also offers additional security. The operator panel can be connected so project parameters can be set and then removed, preventing any further changes.

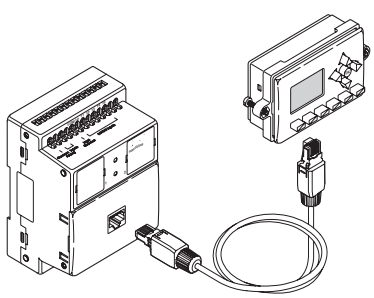


NLC-OP1-LCD-032-4X20

User interface for nanoLine controllers

Description	Type	Order No.	Pcs. / Pkt.
Operator panel	**NLC-OP1-LCD-032-4X20**	**2701137**	1
Remote mounting kit, for operator panel	**NLC-OP1-MKT**	**2701140**	1
Base module for remote mounting operator panel (included in nLC-OP1-MKT)	**NLC-OP1-MKT-BASE**	**2701250**	1
Bracket for remote mounting operator panel (included in nLC-OP1-MKT)	**NLC-OP1-MKT-BRACKET**	**2701263**	1

Technical data		
Display data		
Display		Backlit LC display, monochrome, 8 lines with 21 characters, 128 x 64 pixels, display area 66 x 34 mm
Monitor resolution		128 x 64 pixels
Display area	Width	66 mm
	Height	34 mm
Interfaces		
Operator panel		RJ45
Transmission length		Max. 92 cm
Power supply for module electronics		
Supply voltage		(Power available via base unit)
Type of connection		RJ45
Typical current consumption		32 mA
Max. current consumption		50 mA
General data		
Programming tool		nanoNavigator
Mounting type		In base unit or with remote mounting kit
Keys		11
Height		31.5 mm
Width		76 mm
Depth		46 mm
Degree of protection		IP67/IP20
Ambient temperature (operation)		0°C ... 50°C
Ambient temperature (storage/transport)		0°C ... 60°C



Real-time clock

A real-time clock option module can be added to the nanoLine controller for projects requiring time or date functions. Once the clock is configured, flow charts can compare time and dates to control execution. Time and dates can be checked to see if they are equal to, less than, or greater than another time or date. Day-of-week, day-of-month and day-of-year also can be tested to determine if they are even or odd, a feature often required in residential lawn irrigation systems.

The date and time can be set using nanoNavigator or the operator panel.

Date formats supported:
– North American (month-day-year)
– European (day-month-year)
– International (year-month-day)

NLC-MOD-RTC

Description	Type	Order No.	Pcs. / Pkt.
Real-time clock			
	NLC-MOD-RTC	**2701153**	1

Technical data	
Power supply	
Supply voltage	24 V DC (Power available via base unit)
Typical current consumption	4 mA
Max. current consumption	10 mA
Realtime clock	
Realtime clock	Yes (battery-backed)
Precision	5 s/year at 25°C 11 s/year overall (25ºC to 55ºC)
Battery	Life 5 years
General data	
Width	24.5 mm
Height	25.5 mm
Depth	49 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-25°C ... 85°C

Memory module

A memory transfer module is a powerful tool that can be added to any nanoLine system to aid in project development and deployment. A memory transfer module is a portable container used for moving projects back and forth between nanoNavigator and nanoLine controllers. It can also be used to move projects between two nanoLine controllers.
– Transfer nanoLine projects from the office to the factory floor
– Transfer nanoLine projects between nanoLine controllers
– Transfer nanoLine projects into a replacement controller
– Distribute new nanoLine projects to an existing installation

NLC-MOD-MEM 032K

Description	Type	Order No.	Pcs. / Pkt.
Memory module, for data transfer			
	NLC-MOD-MEM 032K	**2701166**	1

Technical data	
Power supply	
Supply voltage	-
Typical current consumption	15 mA
Max. current consumption	20 mA
General data	
Width	24.5 mm
Height	25.5 mm
Depth	49 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-25°C ... 85°C

nanoNavigator

nanoNavigator is a free software package that makes setup, programming and maintenance fast and easy. Once a PC is connected to the nanoLine base unit through one of the serial connectivity option modules, the user has complete control. It takes only four simple steps to create a control flow chart using nanoNavigator. After the project is loaded, nanoNavigator can start and stop the program, monitor the progress through the flow chart, and monitor data (inputs, outputs, registers, flags, timers and counter.) nanoNavigator is not limited to just monitoring – it can change data items and monitor execution, making development tasks fast and easy.

nanoLine controllers are programmed using an intuitive flow chart programming language that offers several major benefits. No programming background is required to produce a working program. Programs can be produced in minutes, with little help from manuals or training. Those with programming experience will find virtually no learning curve with this intuitive language, nor will they have to learn new ladder language idiosyncrasies. Once created, flow chart programs are easy to understand and maintain by almost anyone, even without any special training.

To simplify project testing, nanoNavigator can simulate projects so the program can be developed, simulated, and perfected without any hardware.

NLC-NAV-01

Flow chart programming software for the nanoLine family of controllers

Description	Type	Order No.	Pcs. / Pkt.
Programming software	**NLC-NAV-01**	**2701221**	1
Technical data			
Hardware requirements			
CPU	Pentium > 400 MHz		
Main memory	512 Mbyte (1 GB for Windows Vista)		
Hard disk memory	128 Mbyte		
Optical drive	CD-ROM		
Interfaces	COM port or USB port		
Operating equipment	Keyboard, mouse		
Monitor resolution	SVGA (800 x 600)		
Software requirements			
Operating systems	MS Windows 2000, MS Windows XP, MS Windows Vista		
Basic functionality			
	Programming with flow chart – without RLL editors Compare - Compare inputs, outputs, program flags and system flags Decide - Decide based on values in registers, timer, counters or analog inputs Control - Control outputs, flags, timers, and counters Move - Move values between registers, timers, counters and analog inputs Message - Send a message to the operator panel Wait - Wait for a time between milliseconds to hours		
Languages supported			
	German, English		

nanoLine starter kits

Get started today with a nanoLine starter kit. It's easy-to-use and includes everything needed to create a first flow chart. Use the starter kit to evaluate the power of the nanoLine family and begin a project. Each starter kit contains:

– Base unit
– Operator panel
– Input simulator (24 V AC or 24 V DC versions available)
– Output simulator (24 V AC or 24 V DC versions available)
– USB cable
– nanoNavigator

Everything in the starter kit is standard product so any optional components, such as Ethernet communications, can be added to this unit as evaluation deepens.

NLC-START-...

nanoLine Starter Kit

Description	Type	Order No.	Pcs. / Pkt.
Starter kit, consisting of: - Base unit with 6 digital inputs and 4 NPN digital outputs - Operator panel - USB serial module and USB cable - nanoNavigator software - Input and output simulators	**NLC-START-01**	**2701399**	1
Starter kit, consisting of: - Base unit with 6 digital inputs and 4 PNP digital outputs - Operator panel - USB serial module and USB cable - nanoNavigator software - Input and output simulators	**NLC-START-02**	**2701425**	1
Starter kit, consisting of: - Base unit with 6 digital inputs and 4 relay outputs - Operator panel - USB serial module and USB cable - nanoNavigator software - Input and output simulators	**NLC-START-03**	**2701467**	1
Deluxe starter kit, consisting of: - Base unit with 6 digital inputs and 4 PNP digital outputs - Operator panel - USB serial module and USB cable - nanoNavigator software - Input and output simulators - PNP digital expansion I/O module - Ethernet module - Step Power Supply	**NLC-START-04**	**2701483**	1

Control technology | Automation system of the 100 series performance class

For the automation of machines and systems, Phoenix Contact offers a wide range of controllers, which can be programmed with a uniform software tool, despite their scaled performance. All these controllers are supplemented with a multitude of components and systems. All tasks related to industrial automation technology can be implemented with the highest efficiency because of this.

Be it I/O systems with an IP20 or IP65/67 degree of protection, networking tasks or the integration into the IT world, devices and software for operation and monitoring, processes that are difficult to control, or drive and motion control applications: The graded control systems fulfill all requirements.

You have the automation system of the 100 series control class at your disposal for a quick and easy entry into the automation world of Phoenix Contact. Easy startup and smooth interaction of all components were the main points of focus when setting up this system.

Program overview

Smart automation with the automation system of the 100 series class

With our automation system built around the compact control systems of the 100 series class, we enable an economical and easy entry into automation.

This enables automatic control of simple processes in a cost-effective manner and economical automation of small systems as well. Naturally, devices of the 100 series performance class also support all communication paths possible via Ethernet in addition to the control function.

Web-based visualizations, which can be easily and cost-effectively presented on a PC or a small web panel, are thus available for price-sensitive applications.

Since the controller can be expanded with a multitude of Inline I/O modules and connected to devices for operation and monitoring as well as infrastructure components, the 100 series performance class offers a flexible solution for your application.

Cost-effective controllers for smart automation

Our cost-effective compact controllers are the key elements of the system. All controllers of the 100 series class of Phoenix Contact come with eight digital inputs and four digital outputs. By simply mounting Inline I/O modules, more digital and analog input and output modules can be added as usual to compact controllers as well.

Thanks to an extensive range of I/O functions, all industry-relevant sensors and actuators can be integrated in the system. You can also reduce the configuration and startup times with our ILC 130 STARTER KIT.

Free software for smart automation

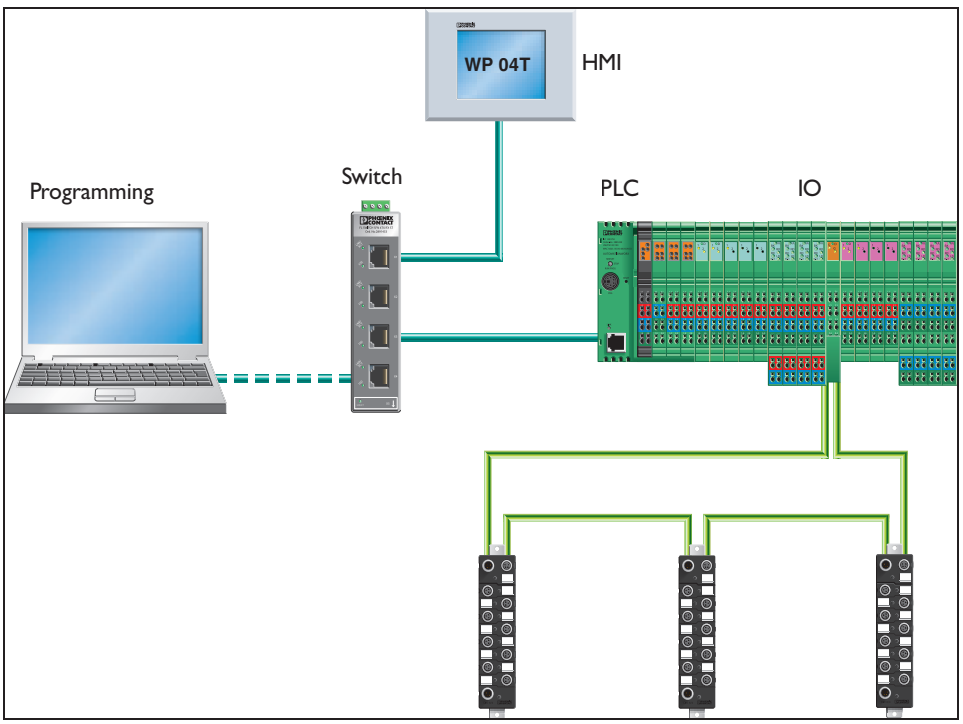
PC Worx Express is a user-friendly software that facilitates your entry into IEC 61131 programming – even without in-depth programming knowledge. The programs can be drawn up as ladder diagrams using easy-to-understand symbols within no time. Should you require a special input function, for example position detection by an encoder for your application, a function block provided with the software immediately gives you the position value.

Operation and monitoring for your automation solution

The graphical interface forms the business card of an automated application and gives you an overview of all processes. Our wide range of devices for operation and monitoring facilitates the cost-effective integration of an attractive yet affordable user interface in your solution.

Each controller is equipped with an integrated web server. Using WebVisit, you can add your visualization application to the pages of this web server and implement your visualization in a cost-effective way. The visualization pages required for operating your machine or system are simply stored in the file system of the controller.

With a standard browser, every PC can be used for machine and system monitoring or for remote control. And our cost-effective graphic panels with touch-control and an integrated browser (WebPanel) directly operate the machine with their detailed and brilliant display.



IT-powered automation – Full Ethernet and IT connectivity

In addition to control and operation tasks, controllers of the 100 series class also undertake all communication tasks for which Ethernet is now widely used and preferred in industrial applications.

An FTP server thus enables exchange of files with any data and the open TCP/IP or UDP/IP blocks further round off the Ethernet and IT compatibility. Regardless of whether the controller sends e-mails, loads a new application program from a central server, logs data in realtime, or reads and writes databases – all functions can be performed quickly and easily.

Play it safe!

It goes without saying that all components of the system are optimally adapted to each other. The following catalog page gives you an overview of all products that can be perfectly integrated in the automation system of the 100 series control class. Our comprehensive interoperability tests guarantee smooth functioning.

Our solutions make use of technologies from the IT field in order to avoid technology barriers and to ensure sustainability of the automation solution. In addition to the Windows operating system, standard Ethernet protocols have also been used successfully. As a manufacturer, we ensure that your investments are safeguarded and that it is possible to adapt your system to new developments even in the future.

Compact controllers from Phoenix Contact offer various IT-powered features via the Ethernet interface:

OPC:	The OPC server provides data from the PLC program for visualization programs such as VISU+, or transports the data in the opposite direction. The OPC server runs in the control panel or on a PC.
Web server:	Provides a homepage on controllers. Its pages can be designed using the WEBVISIT software and linked to the PLC program via data. Browsers can display these pages via HTTP access.
TCP/IP:	Makes it possible to establish connections between the PLC program and programs on other Ethernet devices. Function blocks such as IP-Connect, IP-send, etc., are available to the PLC programmer for this.
UDP:	Wireless messages can be received/sent from/to other Ethernet devices in the PLC program with UDP. This is done with the same function blocks as in case of TCP/IP.
FTP:	Controllers are equipped with an FTP server. Hence, any file can be stored in or uploaded to the Flash file system of the controller, for example for exchanging parameterization and log files or for storing the current source code of the PLC program for servicing.
SNTP:	To synchronize the realtime clock of the controller with a time server.
SMTP:	To send e-mails directly from the PLC program.
SQL:	For data exchange between the PLC program and an MS-SQL-/mySQL database (special PC WORX block library).
SNMP:	For file exchange with the network management software

Highly communicative compact controllers of the 100 series class





Type **Order No.**	**ILC 130 ETH** **2988803**	**ILC 150 ETH** **2985330**	**ILC 155 ETH** **2988188**	**ILC 150 GSM/GPRS** **2916545**	**ILC 170 ETH 2TX** **2916532**
Description	Entry level model, without the remote bus option	Standard controller of the 100 series class	Controller with integrated block license	Controller with GSM/GPRS modem	Controller with 2x Ethernet and pluggable memory
Page	**24**	**24**	**25**	**25**	**25**

Software


Starter kit

Type **Order No.**	**PC WORX EXPRESS** **2988670**	**PROJECT+** **2988667**	**RESY-DATA-A LIC** **2876847**	**AX OPC-SERVER** **2985945**	**ILC 130 STARTER KIT** **2988515**
Type **Order No.**	**PC WORX PRO LIC** **2985385**			**WEBVISIT BASIC** **2985990**	
Type **Order No.**				**VISU+** **2985770**	
Description	Programming as per IEC 61131	Configuring I/Os	Remote control	Visualization	Pre-assembled test structure
Page	**43**	**40**	**49**	**53**	**26**

Operation and monitoring



Industrial modems


Type **Order No.**	**WP 04T** **2913632**	**TP 10T** **2985181**	**TP 12T/M 201** **2913250**	**FL COM Server RS232** **2744490**	**PSI modem/ETH** **2313300**
Type **Order No.**	**WP 06T** **2913645**	**TP 15T** **2985204**		**PSI-GPRS/GSM modem/RS232-QB** **2313106**	
Description	Web panel 4"/6" display	Touch panel 10"/15" display	Touch panel, 12" display Maritime approval	Connection via mobile phone network	Connection via telephone line
Page	**138**	**135**	**137**	**see INTERFACE catalog**	

Infrastructure components




Accessories

Type **Order No.**	**FL SWITCH SFN 5TX** **2891152**	**FL SWITCH LM 8TX** **2832632**	**FL SWITCH SMCS 8GT** **2891123**	**FL SWITCH MCS 16TX** **2832700**	**...-CABLE-...** **...**
Type **Order No.**	**FL SWITCH SFN 8TX** **2891929**		**FL SWITCH SMCS 6GT/2SFP** **2891479**	**FL SWITCH MM HS** **2832328**	**...**
Description	Standard switches	Lean managed switch	Gigabit switches	Managed switches	You will find suitable cables and connectors in our online catalog
Page	**194**	**181**	**184**	**186**	**www.phoenixcontact.net/catalog**

IP20 I/O system for use in the control cabinet

	Analog input		Analog output	
	2 channels	8 channels	1 channel	4 or 8 channels
	IB IL AI 2/SF-PAC * 2861302	IB IL AI 8/SF-PAC * 2861412	IB IL AO 1/SF-PAC 2861315	IB IL AO 4/8/U/BP-PAC * 2878036
	IB IL AI 2/SF-ME 2863944	IB IL AI 8/IS-PAC 2861661	IB IL AO 1/U/SF-PAC 2861399	
	IB IL AI 2/SF-230-PAC 2861577			
	IB IL AI 2/4-20-PAC 2862217			
from page	280	281	290	291

	Digital input					
	1 channel	2 channels	4 channels	8 channels	16 channels	32 channels
	IB IL 120 DI 1-PAC 2861917	IB IL 24 DI 2-PAC * 2861221	IB IL 24 DI 4-PAC 2861234	IB IL 24 DI 8-PAC * 2861247	IB IL 24 DI 16-PAC * 2861250	IB IL 24 DI 32/HD-PAC 2862835
	IB IL 230 DI 1-PAC 2861548	IB IL 24 DI 2-NPN-PAC 2861483	IB IL 24 DI 4-ME 2863928	IB IL 24 DI 8/T2-PAC 2862204	IB IL 24 DI 16-NPN-PAC 2863520	IB IL 24 DI 32/HD-NPN-PAC 2878243
		IB IL 24 EDI 2-PAC 2861629			IB IL 24 DI 16-ME 2897156	
from page	273	270	271	271	271	271

	Digital output					
	1 channel	2 channels	4 channels	84 channels	16 channels	32 channels
	IB IL DO 1 AC-PAC 2861920	IB IL 24 DO 2-PAC * 2861276	IB IL 24 DO 4-PAC * 2861276	IB IL 24 DO 8-PAC * 2861289	IB IL 24 DO 16-PAC * 2861292	IB IL 24 DO 32/HD-PAC 2862822
	IB IL 24/230 DOR1/W-PAC * 2861881	IB IL 24 DO 2-2A-PAC 2861263	IB IL 24 DO 4-ME 2863931	IB IL 24 DO 8-2A-PAC 2861603	IB IL 24 DO 16-ME 2897253	IB IL 24 DO 32/HD-NPN-PAC 2878340
	IB IL 24/230 DOR1/W-PC-PAC 2862178	IB IL 24 DO 2-NPN-PAC 2861496	IB IL DO 4-AC-1A-PAC 2861658	IB IL 24 DO 8-NPN-PAC 2863546		
		IB IL 24 EDO 2-PAC 2861616	IB IL 24/230 DOR4/W-PAC * 2861878			
		IB IL 24/48 DOR 2/W-PAC 2863119	IB IL 24/230 DOR4/W-PC-PAC 2862181			
			IB IL 24/230 DOR4/HC-PAC 2897716			
from page	278	274	275	274	275	275

	Temperature recording					
	1 channel	2 channels	4/8 channels	4 channels	6 channels	8 channels
	IB IL 24 TC-PAC * 2861360	IB IL TEMP 2 RTD-PAC 2861328	IB IL TEMP 4/8 RTD/EF-PAC * 2897402	IB IL TEMP 4 UTH HEI 1 DO4-PAC * 2819707	IB IL TEMP 6 RTD HEI 1 DO 6-PAC * 2819684	IB IL TEMP 8 UTH HEI 1 DO8-PAC * 2819697
			IB IL TEMP 4/8 RTDPAC * 2863915			
from page	285	285	285	289	289	289

	Strain gauges	Communication	Position detection	Function	Motor starters	Security
	IB IL SGI 2/F-PAC 2878638	IB IL RS 232-PAC 2861357	IB IL INC-IN-PAC 2861755	IB IL PWM/2-PAC 2861632	IB IL 400 ELR 1-3A * 2727352	IB IL 24 SAFE 1-PAC 2861564
	IB IL SGI 2/P-PAC 2884907	IB IL RS 232-PRO-PAC 2878722	IB IL SSI-IN-PAC 2819574	IB IL CNT-PAC 2861852	IB IL 400 MLR 1-8A * 2727365	
					IB IL 400 ELR R-3A * 2727378	
from page	283	296	303	300	309	310

I/O system for use in the IP65/67 field

	Digital input		Digital input/output			Digital output terminals	
	8 channels	16 channels	4(8)/4 channels	8/8 channels	16/16 channels	4 channels	8 channels
	FLM DI 8 M12 * 2736288	FLM DI 16 M12 * 2736835	FLM DIO 4/4 M12-2A * 2736369	FLM DIO 8/8 M12 * 2736848	FLM DIO 16/16 M12/8-DIAG * 2736738		FLM DO 8 M12 * 2736291
	FLM DI 8 M8 * 2773348		FLM DIO 8/4 M8 * 2773351			FLM DO 4 M8-2A * 2736932	FLM DO 8 M8 * 2736893
from page	372	372	373	373	373	377	373

* These terminals/modules are also available for the fast INTERBUS variant with a transmission speed of 2 MBd.


SAFETY
PC WORX
PLC SYSTEMS
HIGH LEVEL
LANGUAGE
Software Library
CD AX SOFTWARE LIB
SAFETYPROG 2 PRO
Safe programming software

Networking safety functions safely

The EC Machine Directive 2006/42/EC will come into effect at the end of 2009 and will put forth new requirements for system sellers and system operators.

In order to fulfill these regulations, PHOENIX CONTACT provides a universal product range for the safety technology.

Our INTERBUS Safety and PROFIsafe automation solutions completely support these user requirements:

- Safe and non-safe devices can be operated on the same fieldbus system
- Easy operation from planning to maintenance
- Increased availability of the entire system
- Use of existing sensors and actuators
- Max. safety category 4 in acc. with EN 945-1, PL e in acc. with EN ISO 13849-1 and SIL CL 3 in acc. with IEC 61508 (EN IEC 62061)

Program overview

Our safety relays, speed monitors and configurable safety modules easily carry out complex safety functions. You will find the relevant products in the INTERFACE catalog.

Safe system solutions with INTERBUS Safety and PROFIsafe

The demand for cost-cutting applications and increased flexibility is growing fast and that includes safety applications. With INTERBUS Safety and PROFIsafe, machine and system engineers have two systems dedicated to these and other requirements. The main feature of the system is its simplicity: In order to be able to transmit safe and standard data via a bus cable, the safety protocol is exchanged between the safe controller and the safe I/O components. Here, the safety information along with its independent safety mechanisms is embedded in the standard data transmission of the relevant bus system and unpacked only in the safe I/O module.

Short startup times, high availability and maximum safety complete the scope of service.

Open safety system for all applications

As machine and system engineers, you require in-depth knowledge about the components and systems used in order to be able to fulfill the requirements put forth by the current changes in the standards and regulations as well as the requirements of the new machine directive.

The PROFIsafe application I/O components (PSDI 8-PAC, PSDO 8-PAC, PSDOR 4-PAC, PSDO 4/4-PAC) in INTERBUS Safety as well as PROFIsafe systems (PROFINET and PROFIBUS) are only one point that supports you during the implementation of the new requirements of your safety applications.

A well-developed control system and software range, as well as a comprehensive training and qualification offer support you during the implementation of current projects as well as in the training of your personnel involved in safety projects.

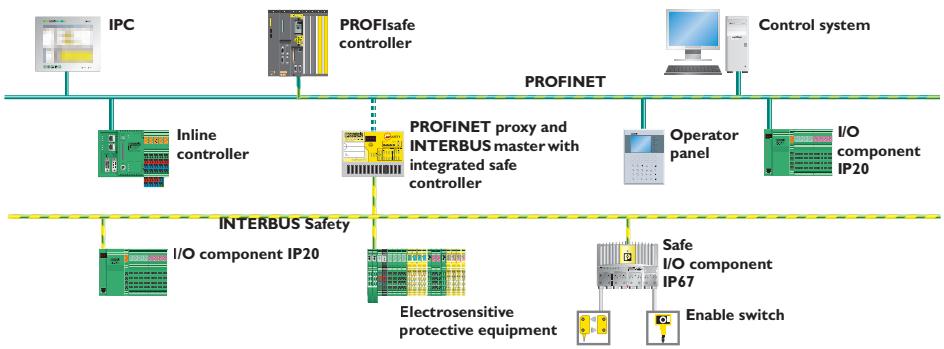
INTERBUS Safety – High-performance control technology

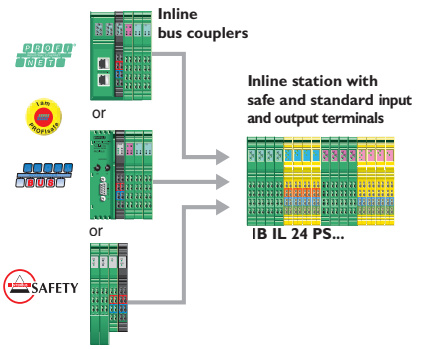
Integration of the INTERBUS Safety system into the PC Worx automation software simplifies the project-related programming of the relevant PROFINET controller.

The PROFINET Proxy and INTERBUS Master with an integrated safe controller, for instance, act as a link between the safe and the non-safe applications. The safe and standard components are uniformly integrated into the turn-key solution by universal engineering.

Easy project planning of the system, uniform diagnostics and intuitive programming using PC Worx and SafetyProg simplify the handling and minimize the creation period.

Simple integration





The safe PROFIsafe modules can be integrated anywhere on the Inline station, whereby mixed operation of standard and safety terminals is possible.

The safe controller in the PROFINET or PROFIBUS network is connected with an appropriate bus coupler. In addition to the INTERBUS-Safety functions, the modules can also be used in the PROFIsafe systems via the address switches.

Sensors and actuators are conveniently integrated in the respective safe bus system via the inputs and outputs of the PROFIsafe modules. The settings can be parameterized flexibly for single or two-channel I/O wiring as well as for diagnostics.

Comprehensive PLCopen block libraries

As a manufacturer and product-independent association, the PLCopen specifies function modules for functional safety together with its members and its external certification centers.

The PLCopen specification is an international software standard that defines the important user requirements as regards functional safety for applications.

Phoenix Contact provides you with function blocks in the form of various libraries.

Using them enables shorter startup times as well as a higher availability of the safety application.

Certified function blocks

Certified function blocks that we provide to you – the user – as the basic blocks as per the PLCopen specification:

- Emergency stop
- Safety door monitoring
- Feedback monitoring
- Reset block
- Electrosensitive protective equipment
- Enable switch
- Operating mode selector switch
- Safety door extension
- Two-hand control device

Already created program components can be merged and declared as a single block to avoid repeated acceptance procedures for the same safety functions. You then only need to check the block wiring.

Comprehensive range of services

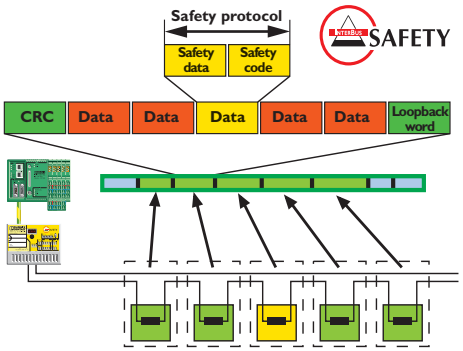
Due to the current change in the standards and regulations, implementation of safety applications now also necessitates specific technical know-how. In addition to observing the relevant standards, mechanical and plant engineers have to take the future use of the machine and developments in safety technology into account.

We therefore support you in planning and programming, in commissioning and in after-sales-service over the entire lifecycle of the your safety application.

Speak to our specialists and develop the technically and economically best possible solution with the versatility to adapt to new operating conditions and technologies flexibly.

You can take advantage of the comprehensive training and qualification offering from our company, which will provide you with the above-mentioned knowledge and the required qualifications at your company in the future.

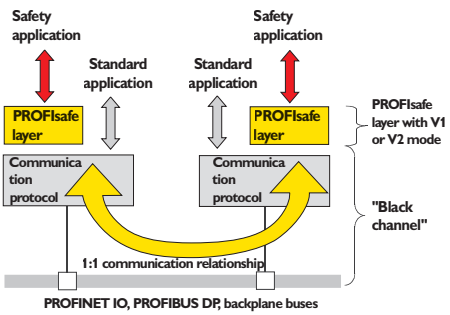
The Interbus Safety protocol



Communication between the safe controller and the safe devices takes place via the INTERBUS Safety protocol.

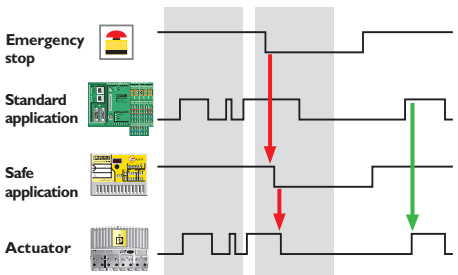
The safe protocol data is integrated into the data flow of the standard INTERBUS system just like normal device data. The integrated safety protocol can only be evaluated by the safe components.

Black channel mechanism



In order to be able to transmit safe and standard data via a bus line, the PROFIsafe protocol is exchanged between the safe controller and the safe I/O components via a "black channel". Here, the safety telegrams with their independent safety mechanisms are embedded in a standard telegram of the PROFINET system and are only extracted in the respective safety terminal.

Enable principle



If the emergency stop button is actuated, the safety controller switches off the output via the safe output module. Only when all input conditions have been met again does the safe controller allow the output to be switched on via the standard controller.

INTERBUS Safety – Control technology

				
Type **Order No.**	**SAFETY SLC 400 PND-4TX-IB** **2985563**	**ILC 350 PN IB-SAFETY KIT** **2916451**	**ILC 370 PN IB-SAFETY KIT** **2916561**	**ILC 390 PN IB-SAFETY KIT** **2916671**
Description	PROFINET proxy and INTERBUS master with integrated safe controller	System package, contains the following orders: ILC 350 PN (Order No. 2876928) SAFETY SLC 400 PND-4TX-IB (Order No.2985563)	System package, contains the following orders: ILC 370 PN (Order No. 2876915) SAFETY SLC 400 PND-4TX-IB (Order No. 2985563)	System package, contains the following orders: ILC 390 PN (Order No. 2985314) SAFETY SLC 400 PND-4TX-IB (Order No. 2985563)
Page	**109**	**110**	**110**	**110**

Safety digital input terminals

		
Type **Order No.**	**IB IL 24 SDI 8-PAC** **2985657**	**IB IL 24 PSDI 8-PAC** **2985688**
Description	8 safety digital inputs for the INTERBUS Safety system	8 safety digital inputs for the INTERBUS Safety and PROFIsafe system
Page	**106**	**106**

Safety digital input/output modules

		
Type **Order No.**	**IBS RL 24 SDIO 4/4/8-LK** **2737520**	**IB IL 24 SDIO 4/4/1** **2863740**
Description	8 safety digital inputs, 6 safety digital outputs for the INTERBUS Safety system	8 safety digital inputs, 6 safety digital outputs, 1 safety relay output for the INTERBUS Safety system
Page	**108**	**108**

Safety digital output terminals

					
Type **Order No.**	**IB IL 24 SDO 8-PAC** **2985754**	**IB IL 24 PSDO 8-PAC** **2985631**	**IB IL 24 SDOR 4-PAC** **2985851**	**IB IL 24 PSDOR 4-PAC** **2985864**	**IB IL 24 PSDO 4/4-PAC** **2916493**
Description	8 safety digital outputs for the INTERBUS Safety system	8 safety digital outputs for the INTERBUS Safety and PROFIsafe system	4 safety relay outputs for the INTERBUS Safety system	4 safety relay outputs for the INTERBUS Safety and PROFIsafe system	4 safety digital +/- switching outputs for the INTERBUS Safety and PROFIsafe system
Page	**107**	**107**	**107**	**107**	**107**

Bus coupler

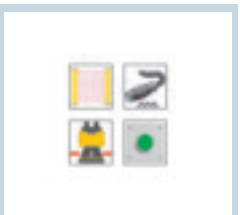
Type Order No.	IL PB BK DI8 DO4/EF-PAC 2692322	IL PN BK DI8 DO4 2TX-PAC 2703994
Description	PROFIBUS D-SUB-9 female connector	PROFINET RJ45 female connector
Page	254	242

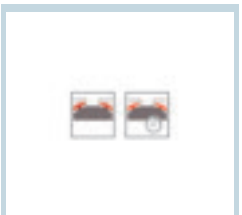
INTERBUS Safety – Safety programming

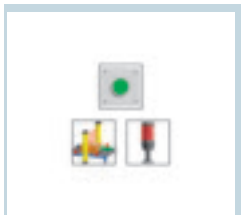
Type Order No.	SAFETYPROG 2 PRO 2985835
Description	Programming software for INTERBUS Safety systems, Graphical interface as per IEC 61131-3 in the languages Ladder diagrams (LD) and function block diagrams (FBS)
Page	111

INTERBUS-Safety – Safe PLCopen function blocks

These libraries help you when realizing safe functions in your application.







Type Order No.	SAFETYPROG2.X PLCOPEN BASIC 2876067	SAFETYPROG2.X PLCOPEN OSSD 2916859	SAFETYPROG2.X PLCOPEN TWOHAND 2916846	SAFETYPROG2.X PLCOPEN MUTING 2916862	SAFETYPROG2.X PLCOPEN SAFEMODE 2916875
Description	**BASIC_SF**	**OSSD**	**TwoHand**	**Muting**	**SafeMode**
	– SF_EmergencyStop – SF_GuardMonitoring – SF_GuardLocking – SF_EDM – SF_OutControl – SF_Equivalent – SF_Antivalent	– SF_Espe – SF_TestableSafetySensor	– SF_TwoHandControl TypII – SF_TwoHandControl TypIII	– SF_MutingPar_2Sensor – SF_MutingSeq – SF_MutingPar	– SF_ModeSelector – SF-SafetyRequest – SF_EnableSwitch
Page	111	111	111	111	111

Fail-safe digital input/output terminals

Depending on the bus coupler used, the PROFIsafe modules of the Inline installation system can be operated in PROFIBUS-DP and PROFINET solutions so that these networks also benefit from the advantages of the safe Inline modules.

Within the PROFIsafe system, safety functions with the following requirements can be realized this way:
– Up to category 4 as per EN 954-1
– Up to SIL3 as per EN 61508 and EN IEC 62061
– Up to PL e as per EN ISO 13849-1

An Inline station can be made up of safe and standard modules here, whereby a variety of function terminals are available to the user. The station is configured with high granularity with digital and analog inputs or outputs.

IB IL 24 ...SDI 8-PAC

Fail-safe digital input module

Applied for: UL / CUL

Description	Type	Order No.	Pcs. / Pkt.
Fail-safe digital input module			
- for INTERBUS Safety	**IB IL 24 SDI 8-PAC**	**2985657**	1
- for INTERBUS Safety and PROFIsafe	**IB IL 24 PSDI 8-PAC**	**2985688**	1
Fail-safe digital output module			
- for INTERBUS Safety			
- for INTERBUS Safety and PROFIsafe			
Fail-safe relay output module			
- for INTERBUS Safety			
- for INTERBUS Safety and PROFIsafe			
Safety digital output module, +/- switching			
- for INTERBUS Safety and PROFIsafe			
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Fieldbus system	INTERBUS
Type of connection	Inline data jumper
Transmission rate	500 kBaud/ 2 MBaud, switchable
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Range of supply voltages	19.2 V DC ... 30 V DC
Digital inputs	
Connection method	2, 3, 4-wire
Number of inputs	8
Digital outputs	
Connection method	-
Number of outputs	-
Description of the outputs	-
Maximum output current per channel	-
Protective circuitry	-
General data	
Weight	200 g
Width	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C

IB IL 24 ...SDO 8-PAC

Fail-safe digital output module

Applied for: UL / CUL

Type	Order No.	Pcs. / Pkt.
IB IL 24 SDO 8-PAC	**2985754**	1
IB IL 24 PSDO 8-PAC	**2985631**	1
ZBF...		

INTERBUS Inline data jumper 500 kBaud/ 2 MBaud, switchable
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC
- -
2, 3, 4-wire 8 - 2 A Overload protection, short circuit protection of outputs
200 g 48.8 mm -25°C ... 55°C

IB IL 24 ...SDOR 4-PAC

Fail-safe relay output module

Type	Order No.	Pcs. / Pkt.
IB IL 24 SDOR 4-PAC	**2985851**	1
IB IL 24 PSDOR 4-PAC	**2985864**	1
ZBF...		

INTERBUS Inline data jumper 500 kBaud/ 2 MBaud, switchable
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC
- -
2, 3, 4-wire 4 - 4 A -
310 g 73.2 mm -25°C ... 55°C

IB IL 24 PSDO 4/4-PAC

Fail-safe digital output module

Type	Order No.	Pcs. / Pkt.
IB IL 24 PSDO 4/4-PAC	**2916493**	1
ZBF...		

INTERBUS Inline data jumper 500 kBaud/ 2 MBaud, switchable
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC
- -
2, 3, 4-wire 4 +/- switching 2 A Overload protection, short circuit protection of outputs
200 g 48.8 mm -25°C ... 55°C

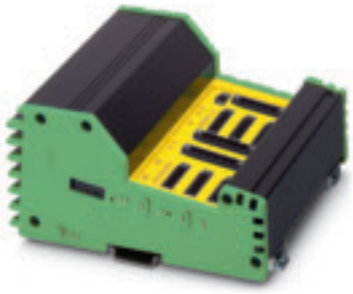
Fail-safe digital input/output modules

The inputs and outputs of the safe I/O modules integrated in the application in IP20 and IP67 degree of protection are parameterized in accordance with the application.

The following output components are safely switched off via the safe segment switch-off.

IBS RL 24 SDIO 4/4/8-LK

Digital input/output module, IP67 degree of protection



IB IL 24 SDIO 4/4/1

Digital input/output module, IP20 degree of protection

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Digital input/output module, IP67 degree of protection 4 fail-safe digital inputs, 4 fail-safe digital outputs	**IBS RL 24 SDIO 4/4/8-LK**	**2737520**	1			
Digital input/output module, IP20 degree of protection 4 fail-safe digital inputs, 4 fail-safe digital outputs, 1 fail-safe relay output or 1 fail-safe output for the segment circuit				**IB IL 24 SDIO 4/4/1**	**2863740**	1

Technical data		
Interface		
Fieldbus system	INTERBUS	-
Name	Remote bus	-
Type of connection	Optic fiber (polymer fiber 980/1000 µm)	-
Local bus interface		
Fieldbus system	-	INTERBUS
Type of connection	-	Inline data jumper
Power supply for module electronics		
Supply voltage	24 V	24 V DC (via voltage jumper)
Range of supply voltages	19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
Digital inputs		
Connection method	M12 connector	2, 3, 4-wire
Number of inputs	8	8
Name of protection	Short circuit and overload protection	-
Digital outputs		
Connection method	M12 connector	2, 3, 4-wire
Number of outputs	6	8
Maximum output current per channel	1 A	1 A
Protective circuitry	Overload protection, short circuit protection of outputs	Overload protection, short circuit protection of outputs
General data		
Weight	1600 g	1380 g
Width	-	183.5 mm
Height	-	120 mm
Depth	-	72 mm
Ambient temperature (operation)	0°C ... 55°C	-25°C ... 55°C

Safety controller

The PROFINET proxy SLC 400 PND-4TX-IB mainly comprises three components.
The proxy uses the PROFINET IO device interface to exchange standard I/O data and exchange variables of the integrated safe controller with a higher-level standard controller. The INTERBUS master serves for safe and standard I/O data communication in the field. The integrated safe controller processes the safe inputs and outputs.

The high performance of the safety controller and its synchronization with reference to INTERBUS cycles contribute a lot to the fast response time of the entire system and allow it to be monitored.

The following features affect the performance positively:
- Clear separation of the safe controller from the standard controller to rule out mutual interference.
- Two-channel parallel execution of the safety program
- Synchronization with the INTERBUS cycles in order to avoid loss of time due to scanning
- No additional load due to device or channel drivers, since signal diagnostics takes place on the components.

SAFETY SLC 400 PND-4TX-IB

Safety controller, as a link between the higher-level PROFINET IO system and the lower-level INTERBUS Safety system

Description	Type	Order No.	Pcs. / Pkt.
Safety controller	**SAFETY SLC 400 PND-4TX-IB**	**2985563**	1
Parameterization memory - 256 MB	**CF FLASH 256MB**	**2988780**	1
Technical data			
INTERBUS master			
Number of I/O nodes	8192		
Number of supported devices	Max. 512 (Out of those, 126 are safe devices)		
Power supply			
Connection supply	Via COMBICON, max. conductor cross section 2.5 mm²		
Supply voltage	24 V DC		
Range of supply voltages	18 V DC ... 32 V DC		
Typical current consumption	450 mA		
General data			
Weight	700 g		
Width	128 mm		
Height	100 mm		
Depth	69 mm		
Ambient temperature (operation)	-20°C ... 55°C		

System packages

The safety system packages enable an economical entry into the functional safety technology with INTERBUS-Safety and the Inline controllers of the 300 series performance class of our control technology.

The system packages consist of a PROFINET controller of the 300 series performance class, an Ethernet cable and the PROFINET-Proxy SLC 400 PND-4TX-IB with integrated safety controller.

With their computing capacity, expandability and their interfaces, the PROFINET controllers provide future-oriented automation solutions.

In combination with the PROFINET-Proxy SLC 400 PND-4TX-IB, applications of up to category 4, as per EN 954-1, to SIL 3 as per EN IEC 62061 and up to PL e as per EN ISO 13849-1 can be realized.

ILC 3... PN IB-SAFETY KIT

System package

Description	Type	Order No.	Pcs. / Pkt.
Safety system package comprising: - Inline controller ILC 350 PN - Safety controller SLC 400 PND-4TX-IB - Ethernet cable	**ILC 350 PN IB-SAFETY KIT**	**2916451**	1
Safety system package comprising: - Inline controller ILC 370 PN 2TX-IB - Safety controller SLC 400 PND-4TX-IB - Ethernet cable	**ILC 370 PN IB-SAFETY KIT**	**2916561**	1
Safety system package comprising: - Inline controller ILC 390 PN 2TX-IB - Safety controller SLC 400 PND-4TX-IB - Ethernet cable	**ILC 390 PN IB-SAFETY KIT**	**2916671**	1
Technical data	See SAFETY SLC 400 PND-4TX-IB on page 109		

SafetyProg – Programming tool for safety components

INTERBUS Safety
Easy programming of safety-oriented networks

The faster the project planning, programming and startup and the more detailed the display of the diagnostics information, the higher the machine or system availability. For this reason, we have developed a software solution with SafetyProg that will support you with a large number of user-friendly functions, easy handling and clear structuring when installing your safe application.

The safe interface is supplemented with the software tools of the AUTOMATIONWORX software suite.

INTERBUS Safety
Safe PLCopen function blocks for SafetyProg

Use of the PLCopen function block library considerably simplifies the implementation of your safety functions in the INTERBUS Safety system. Safety functions can be planned and programmed quickly and safely with the help of the standardized and certified blocks. The validation of your application becomes faster, as separate blocks need not be created.

The function blocks automatically give diagnostics information such as the status of the connected safety equipment, error messages, acknowledgement signals or active startup inhibits in plain text using the Diag+ diagnostics tool. The status of the safe application is thus indicated clearly.

SAFETYPROG 2...

Programming software for INTERBUS Safety systems

Description	Type	Order No.	Pcs. / Pkt.
Programming software for INTERBUS safety systems, with graphical interface in acc. with IEC 61131-3 in the languages - Function block diagram (FBD) - Ladder diagram (LD)	**SAFETYPROG 2 PRO**	**2985835**	1
Software library system, function blocks for diagnostics and handling of the INTERBUS Safety system	**SAFETYPROG 2.X SYSTEM**	**2985741**	1
Basic software library, function blocks for basic functions of the INTERBUS Safety system	**SAFETYPROG 2.X BASIC**	**2876038**	1
PLCopen Basic software library, PLCopen-compliant function block library to support the basic functionalities of the safety technology	**SAFETYPROG2.X PLCOPEN BASIC**	**2876067**	1
PLCopen TwoHand software library, PLCopen-compliant function block library that supports two-hand application in the safety technology	**SAFETYPROG2.X PLCOPEN TWOHAND**	**2916846**	1
Mathandling SF software library, function blocks for conveying technology with the INTERBUS Safety system	**SAFETYPROG 2.X MATHANDLING SF**	**2985932**	1
PLCopen Muting software library, PLCopen-compliant function block library to support the muting functionality of the safety technology	**SAFETYPROG2.X PLCOPEN MUTING**	**2916862**	1
PLCopen OSSD software library, PLCopen-compliant function block library that supports electrosensitive protective equipment in the safety technology	**SAFETYPROG2.X PLCOPEN OSSD**	**2916859**	1
PLCopen SafeMode software library, PLCopen-compliant function block library to support the SafeMode functionality of the safety technology	**SAFETYPROG2.X PLCOPEN SAFEMODE**	**2916875**	1

I/O signals can integrated via the INTERBUS fieldbus system in PLC systems or PC platforms with network interfaces. In addition to the established PLC controller boards, integration into PC-based automation platforms via plug-in boards in various types is becoming increasingly important.

The drivers for the PC-platform also provide optional integration of Ethernet I/O modules and Ethernet/INTERBUS gateways via an identical application interface.

Program overview

INTERBUS controller boards

The INTERBUS controller boards are used for integrating distributed I/O nodes into a PLC or PC control platform. The diagnostic concepts of the INTERBUS are therefore easy to use. The 2 MBaud support enables an extremely effective integration of large applications with up to 8192 I/O signals.

PLC controller boards

The PLC controller boards are available for the SIMATIC S7® series.

The PLC will continue to dominate the automation world by its type; however, it will naturally better integrate the new options of the Ethernet technologies.

S7-300 / S7-400 or INTERBUS controller boards have established themselves worldwide in thousands of applications.

Driver blocks are available for all systems; these driver blocks simply copy the INTERBUS into the I/O address area of the controller. Special communication and diagnostics blocks provide complete control of the INTERBUS system.

Integration into Ethernet

For direct communication into lower-level systems in case of PLCs via Ethernet without loading the PLC program, a module with an Ethernet connection is available for the S7-400. You thus have the option of remotely using tools for parameterization of intelligent field devices or the Diag+ diagnostics tool via Ethernet.

PLC connection via PROFINET

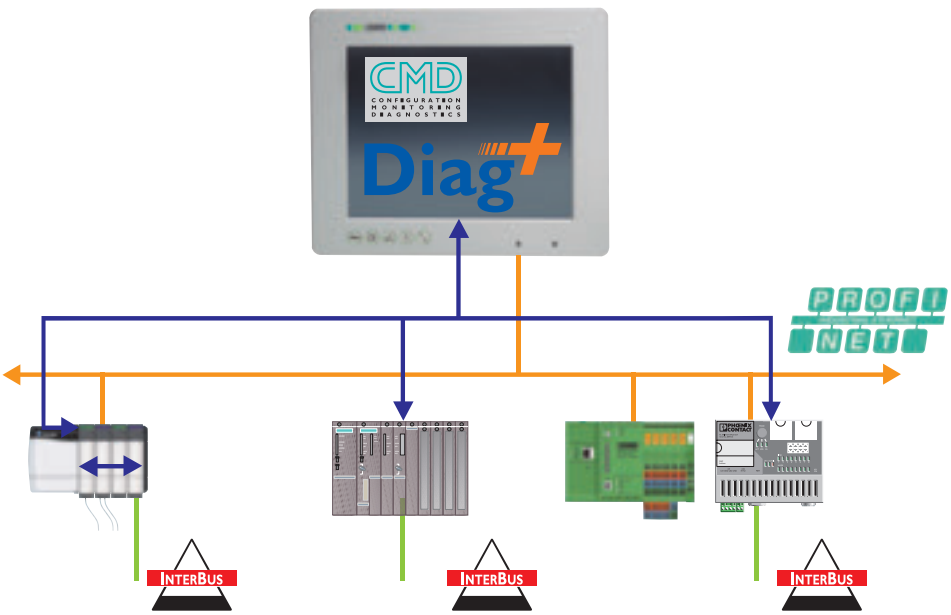
If the PLC has a PROFINET controller, use of a PROFINET proxy is also an alternative to INTERBUS integration. Configuration, addressing and diagnostics are covered by the system. More information can be found in the chapter PROFINET.

PC controller boards

The PC technology is flexible with high-performance. Due to its openness, it is the ideal platform for system suppliers who want to incorporate their own know-how and technology as best as possible. The PC platform has been a good option for high-availability and high-performance applications for quite some time.

Hardware for direct PC integration

Intelligent plug-in cards continue to be used for I/O connections in the PC-based controller world for reasons of flexibility. PCI and PCI/104 are modern interfaces that are here to stay. Even the old types such as PC-Card as well as ISA and PC/104 are still supported today.



S7-400 **PROFINET-compatible controller**

PC driver

In a PC environment, the driver is the interface that the programmer sees. Integration in its control system solution must be very easily possible. All important drivers are compatible with the Windows environment. The input and output signals are presented via linear address areas. Mailboxes are available for communication with the modules.

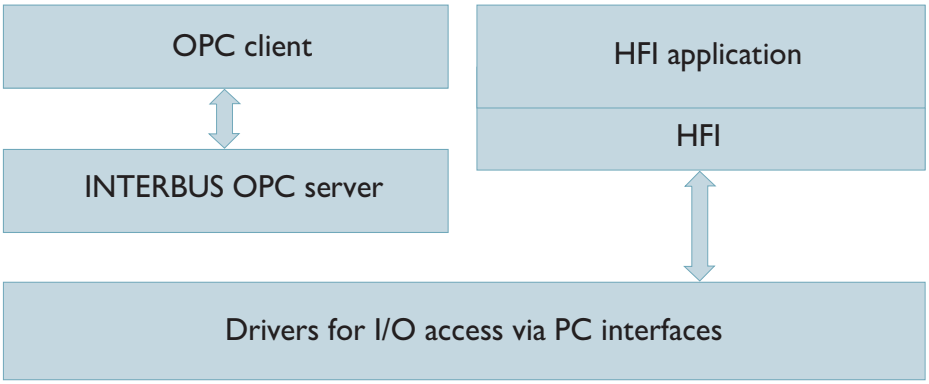
If the operating system is not supported, the driver can be moved to a separate platform with the help of a device driver development kit (DDK).

Application interfaces under Windows

Applications are run either directly on the driver or via the application interfaces developed for various applications.

OPC has become the standard for visualization. If I/O signals are directly processed there, the INTERBUS OPC server can be used without separate programming.

The new object-oriented high-level language fieldbus interface (HFI) is available for when the latest Windows technologies, based on .NET programming in C# and Visual Basic, have to be used. More information can be found in the section on high-level language control.



ISA / PCI / PCI/104 /...

Ethernet TCP/IP

The system can be put into operation with HFI within just a few minutes, even without any INTERBUS or network expertise, and attention can subsequently be paid to the specific application. The most important features are device-integrated system diagnostics, data access via variable names and easy bus configuration.

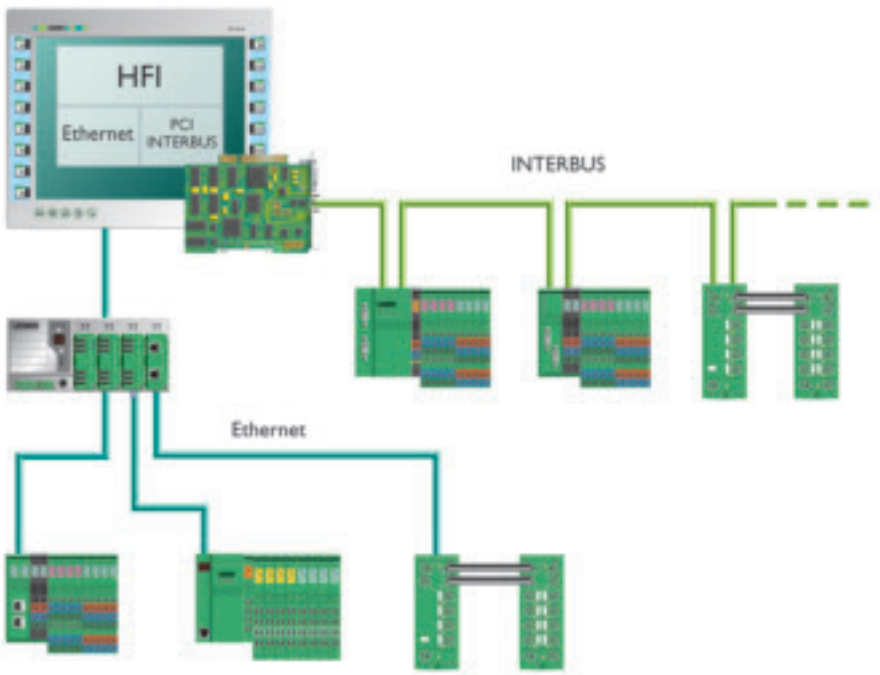
Easy integration via Ethernet

If a PC plug-in board is not desired or possible, all Windows application interfaces (OPC, HFI) provide the option of accessing Ethernet-based I/O signals. Both I/O groups – the one via the INTERBUS controller board and the one via Ethernet – can be used simultaneously.

The gateways comprising the complete INTERBUS master are the most high-performance devices. Here, the backplane bus has basically been replaced with Ethernet (TCP/IP). Even the latest product range of gateways, the proxies for PROFINET, support this data access mechanism.

Various Ethernet bus terminals for Inline Modular as well as the compact Ethernet client devices from the Inline Block IO range can be selected for IP20.

An Ethernet client head station from the Fieldline Modular product range is available for IP67.



PLC controller boards

SIEMENS

					
Type **Order No.**	**IBS S5 DSC/I-T** **2752000**	**IBS S7 300 BC-T** **2721947**	**IBS S7 300 DSC-T** **2719975**	**IBS S7 400 DSC/I-T** **2719962**	**IBS S7 400 ETH DSC/I-T** **2731102**
Interface type	SIMATIC® S5 master	SIMATIC® S7-300 master	SIMATIC® S7-300 master	SIMATIC® S7-400 master	SIMATIC® S7-400 master
Page	**www.phoenixcontact.net/eshop**	**118**	**119**	**119**	**119**

PC controller boards

PCI

					
Type **Order No.**	**IBS PCI SC/I-T** **2725260**	**IBS PCI RI/I-T** **2730129**	**IBS PCI RI-LK** **2704045**	**IBS PCI SC/RI/I-T** **2730080**	**IBS PCI SC/RI-LK** **2730187**
Interface type	PCI master	PCI slave	PCI slave	PCI system coupler	PCI system coupler
Page	**122**	**121**	**121**	**www.phoenixcontact.net/eshop**	

	PCI/104	PC/104	ISA
			
Type **Order No.**	**IBS PCI 104 SC-T** **2737494**	**IBS PC 104 SC-T** **2721701**	**IBS PC ISA SC/I-T** **2719234**
Interface type	PCI/104 master	PC/104 master	ISA master
Page	**123**	**123**	**123**

Ethernet controllers and I/O modules

Gateways/proxies

Fieldline Modular

Ethernet




Type Order No.	FL IBS SC/I-T 2831060	FL NP PND-4TX IB 2985974	FL NP PND-4TX IB-LK 2985929	FLM BK ETH M12 DI 8 M12-2TX 2736916
Interface type	Ethernet gateway	PROFINET proxy and Ethernet gateway	PROFINET proxy and Ethernet gateway	Fieldline Modular bus coupler
Page	120	160	161	369

Inline Modular

Inline Block IO

Ethernet




Type Order No.	FL IL 24 BK-B 2862314	FL IL 24 BK-B-PAC 2862327	IL ETH BK DI8 DO4 2TX-PAC 2703981	ILB ETH 24 DI16 DIO16-2TX 2832962
Interface type	Ethernet bus terminal	Ethernet bus terminal	Ethernet bus terminal	Ethernet IO
Page	251	251	250	319

Software

Accessories





Type Order No.	IBS CMD SWT G4 2721439	CONFIG+ 2868059	IBS DIAG+ SWT 2730307	DIAG+ NETSCAN 2868075	...-CABLE-... ...
Type **Order No.**	**IBS CMD SWT G4 E** **2721442**				...
Interface type	Configuration and diagnostics software	Network configuration software	Diagnostic software	Diagnostic software	You can find the suitable cables and connectors in our online catalog
Page	45	47	57	57	www.phoenixcontact.net/catalog

Master controller boards for SIMATIC® S7-300/400-based control solutions

You do your programming in the Step7® environment. Well-developed blocks enable easy data exchange and the integration of excellent diagnostic features in the application program. The addressing and configuration of the controller board is performed via CMD/Config+.

With up to 8192 I/O points per bus system, the system can be extended almost infinitely.

In the case of S7 400, one version with a built-in Ethernet interface allows direct communication with the INTERBUS network without having to pass the information through the control program. This means that the familiar configuration and diagnostics tools CMD, Config+ and Diag+ can be used remotely via Ethernet.

For positioning modules, drives and other tasks, a Step 7® module library is available on the software library CD "CD AX SOFTWARE LIB". More information is provided in the e-shop under www.phoenixcontact.net/eshop.

IBS S7 300 BC-T

Controller board for Siemens SIMATIC® S7-300 controllers, Without diagnostics display

Description	Type	Order No.	Pcs. / Pkt.
System package, with controller board, user manual, connection cable for coupling PC and controller board, parameterization memory (pluggable) and configuration software CMD			
- German	**IBS S7 300 B SYSKIT**	**2721921**	1
- English	**IBS S7 300 B SYSKIT E**	**2721934**	1
Controller board for Siemens SIMATIC® controllers			
- S7-300 - S7-400	**IBS S7 300 BC-T**	**2721947**	1
Driver and documentation CD	**CD IBS S7 300 400**	**2704032**	1
IBS-CMD software, for configuration, diagnostics, German	**IBS CMD SWT G4**	**2721439**	1
IBS-CMD software, for configuration, diagnostics, English	**IBS CMD SWT G4 E**	**2721442**	1
Config + full version for configuration and diagnosis of networks	**CONFIG+**	**2868059**	1
Diag+ full version, for INTERBUS diagnostics (ActiveX Control with programming interface)	**IBS DIAG+ SWT**	**2730307**	1
Programming cable, to connect the controller boards to the PC (RS-232-C), length 3 m	**IBS PRG CAB**	**2806862**	1
Program and configuration memory - 2 MB			

Technical data	
Interfaces	
Control system	SIMATIC® S7-300 I/O bus
INTERBUS remote bus	9-pos. D-SUB female connector
Ethernet	-
Parameterization/operation/diagnostics	RS-232-C, D-SUB male connector
INTERBUS master	
Number of possible parameter channels	-
Number of I/O nodes	1920
Number of supported devices	128
Supported transmission speed	500 kbps/ 2 Mbps
Software interfaces	
Application interface	S7 I/O driver
Programming tool	STEP 7 from version 5.x
Power supply	
Connection supply	Via SIMATIC I/O bus
Supply voltage	24 V DC
Typical current consumption	415 mA
General data	
Weight	500 g
Format	1 slot
Width	80 mm
Height	125 mm
Depth	110 mm
Ambient temperature (operation)	0°C ... 60°C (0°C to 40°C (vertical installation))
Ambient temperature (storage/transport)	-25°C ... 65°C

IBS S7 300 DSC-T

Controller board for Siemens SIMATIC® S7-300 controllers

Type	Order No.	Pcs. / Pkt.
IBS S7 300 SYSKIT	2721303	1
IBS S7 300 SYSKIT E	2721316	1
IBS S7 300 DSC-T	2719975	1
CD IBS S7 300 400	2704032	1
IBS CMD SWT G4	2721439	1
IBS CMD SWT G4 E	2721442	1
CONFIG+	2868059	1
IBS DIAG+ SWT	2730307	1
IBS PRG CAB	2806862	1
IBS MC FLASH 2MB	2729389	1

SIMATIC® S7-300 I/O bus
9-pos. D-SUB female connector
-
RS-232-C, D-SUB male connector
Max. 126
Max. 8192
Max. 512 (of which 254 are remote bus devices/bus segments)
500 kbps / 2 Mbps
S7 I/O driver
S7 function blocks
STEP 7 from version 5.x
External power supply
24 V DC
-
500 g
1 slot
80 mm
125 mm
110 mm
0°C ... 60°C (0°C to 40°C (vertical installation))
-25°C ... 65°C

IBS S7 400 DSC/I-T

Controller board for Siemens SIMATIC® S7-400 controllers

Type	Order No.	Pcs. / Pkt.
IBS S7 400 SYSKIT	2721374	1
IBS S7 400 SYSKIT E	2721361	1
IBS S7 400 DSC/I-T	2719962	1
CD IBS S7 300 400	2704032	1
IBS CMD SWT G4	2721439	1
IBS CMD SWT G4 E	2721442	1
CONFIG+	2868059	1
IBS DIAG+ SWT	2730307	1
IBS PRG CAB	2806862	1
IBS MC FLASH 2MB	2729389	1

SIMATIC® S7-400 P bus
9-pos. D-SUB female connector
-
RS-232-C, D-SUB male connector
Max. 126
Max. 8192
Max. 512 (of which 254 are remote bus devices/bus segments)
500 kbps / 2 Mbps
S7 I/O driver
S7 function blocks
STEP 7 from version 5.x
Via SIMATIC I/O bus
5 V DC
0.9 A
800 g
2 slots
50 mm
290 mm
210 mm
0°C ... 60°C
-25°C ... 65°C

IBS S7 400 ETH DSC/I-T

Controller board for Siemens SIMATIC® S7-400 controllers, with Ethernet port

Type	Order No.	Pcs. / Pkt.
IBS S7 400 ETH SYSKIT	2740067	1
IBS S7 400 ETH SYSKIT E	2740070	1
IBS S7 400 ETH DSC/I-T	2731102	1
CD IBS S7 300 400	2704032	1
IBS CMD SWT G4	2721439	1
IBS CMD SWT G4 E	2721442	1
CONFIG+	2868059	1
IBS DIAG+ SWT	2730307	1
IBS PRG CAB	2806862	1
IBS MC FLASH 2MB	2729389	1

SIMATIC® S7-400 P bus
9-pos. D-SUB female connector
10/100Base-T via RJ45
RS-232-C, D-SUB male connector
Max. 126
Max. 8192
Max. 512 (of which 254 are remote bus devices/bus segments)
500 kbps / 2 Mbps
S7 I/O driver
S7 function blocks
STEP 7 from version 5.x
Via SIMATIC I/O bus
5 V DC
2.5 A
1200 g
2 slots
50 mm
290 mm
210 mm
0°C ... 60°C
-25°C ... 65°C

Factory Line I/O server INTERBUS connection

The Factory Line I/O server FL IBS SC/I-T enables drives, operating and visualization equipment, sensors and actuators to be integrated via Ethernet.

The industrial standard INTERBUS couples I/Os and field devices flexibly, easily and inexpensively to the ETHERNET network. Controllers and computers with Ethernet TCP/IP access detect and control the I/O peripherals directly. The high efficiency of INTERBUS in the transfer of small data packets improves time behavior and reduces total reaction time.

In order to maintain the advantages of the INTERBUS system across Ethernet, the gateway supports the full duplex mode with 100 Mbps. The INTERBUS system opens up advantages for installation, startup and maintenance, since INTERBUS devices do not require any time-consuming address settings. Only the gateway requires a network-specific IP address. Using Web Based Management (WBM), you can access the gateway's web sites at any time with the conventional web browsers. Here you can store or call up up-to-date user-specific information about the gateway such as the physical location, the contact person, the IP parameters or the Trap Receiver. You will find technical data, connection diagrams and further information on our web site. You can also make configuration settings or changes conveniently and easily. Password protection is of course provided.

The universally applicable Device Driver Interface (DDI) is available as a software interface for access via TCP/IP. Furthermore, data can be exchanged with the INTERBUS-OPC server using the OPC standard. As OPC clients, the visualization and SCADA tools can use the flexible access to I/O data via the network.

FL IBS SC/I-T

INTERBUS Ethernet gateway, Generation 4

Ex: II

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS Ethernet gateway	**FL IBS SC/I-T**	**2831060**	1
CD-ROM, with user documentation in PDF format, driver software and sample programs	**CD FL IBS SC**	**2832056**	1
Factory Manager, multilingual configuration and diagnostics software for ETHERNET networks in automation	**FL SWT**	**2831044**	1
Diag+ full version, for INTERBUS diagnostics (ActiveX Control with programming interface)	**IBS DIAG+ SWT**	**2730307**	1
INTERBUS OPC server, data interface between distributed INTERBUS and Ethernet networks and visualization systems	**IBS OPC SERVER**	**2729127**	1
IBS-CMD software, for configuration, diagnostics, German	**IBS CMD SWT G4**	**2721439**	1
IBS-CMD software, for configuration, diagnostics, English	**IBS CMD SWT G4 E**	**2721442**	1
Programming cable	**PRG CAB MINI DIN**	**2730611**	1

Technical data	
Ethernet interface	
Interface	Ethernet
Type of connection	1 port 10/100Base-T(X), autonegotiation
INTERBUS interface	
INTERBUS master interface	9-pos. D-SUB female connector
Other connections	
Diagnostics INTERBUS	6-pos. MINI-DIN female connector
Power supply	
Supply voltage	24 V DC (via COMBICON; max. conductor cross section 2.5 mm²)
Residual ripple	3.6 V_{PP} (within the permitted voltage range)
Range of supply voltages	18.5 V DC ... 30.2 V DC
Typical current consumption	200 mA (to U_S)
Weight	240 g
Width	45 mm
Height	99 mm
Depth	117 mm
Ambient temperature (operation)	0°C ... 55°C
Ambient temperature (storage/transport)	-20°C ... 70°C

Slave controller board for the PCI bus

The slave controller boards are intelligent PC boards that link the PC to an INTERBUS system as a remote bus device. For example, powerful visualization stations can be created, which access INTERBUS system and control system data close to the application.

Several cards can be installed simultaneously in one PC, which means that several INTERBUS lines can be visualized or monitored on a single PC.

The number of data words that the slave controller boards occupy in the INTERBUS system can be set between 1 and 24. The interface cards provide a freely configurable, fast I/O channel for time-critical data and also support the INTERBUS parameter channel (PCP). The parameter channel provides access to larger data blocks to match the demand.

As an option, the controller board can also be externally supplied with 24 V DC to increase the availability of the system.

IBS PCI RI...

Slave controller board for the PCI bus

Description	Type	Order No.	Pcs. / Pkt.
Slave controller board, with external voltage supply			
- Copper connection	**IBS PCI RI/I-T**	**2730129**	1
- Fiber optics connection	**IBS PCI RI-LK**	**2704045**	1
Driver software and sample programs, incl. user manual (German/English), on CD-ROM	**CD PC DRIVER**	**2985589**	1
INTERBUS OPC server, data interface between distributed INTERBUS and Ethernet networks and visualization systems	**IBS OPC SERVER**	**2729127**	1

Technical data	
Interfaces	
Host system	PCI slot in acc. with PCI specification 2.1 or higher, PCI bus, 32 bits, 33 MHz, 3.3/5 V
INTERBUS remote bus, outgoing	9-pos. D-SUB female connector
INTERBUS remote bus, incoming	9-pos. D-SUB male connector
External power supply	2-pos. MINI PCB terminal block
INTERBUS slave	
Amount of process data	Max. 24 data words
Supported transmission speed	500 kbps / 2 Mbps (can be switched)
Software interfaces	
Software driver	Windows NT / Windows 2000 / Windows XP
Application interface	DDI OPC-DA server
Power supply	
Connection supply	Via PCI bus or 2-pos. MINI PCB terminal block
Supply voltage	3.3 V DC (internal) 5 V DC (internal) 24 V DC (external)
Range of supply voltages	18 V DC ... 30 V DC
Typical current consumption	1 A
General data	
Weight	130 g
Format	Short plug-in card, 1-slot
Width	134 mm
Height	107 mm
Depth	20 mm
Ambient temperature (operation)	0°C ... 55°C
Ambient temperature (storage/transport)	-20°C ... 70°C

Master controller boards for PCI and ISA bus

All Generation 4 master controller boards are compatible in design. The drivers are fully compatible and the CMD configuration tool as well as the Diag+ diagnostics tool offer comprehensive parameterization and diagnostics.

The user-friendly HFI interface allows an extremely effective and easy access to the memory image for applications programmed in high-level languages (e. g. Microsoft Visual Basic, C++, C, Borland Delphi).

In addition, the INTERBUS OPC server offers an internationally standardized interface for direct integration into OPC-based visualization systems.

The latest drivers and documentation are readily available in the Internet download section at www.phoenixcontact.net/download, which is updated daily. Alternatively, the drivers and documentation can also be ordered on CD.

Convenient driver development packages are available in case drivers are required for other operating systems.

IBS PCI SC/I-T

PC controller board in PCI format

Description	Type	Order No.	Pcs. / Pkt.
System package, with PC controller board, user manual, driver software and configuration software CMD			
- German	**IBS PCI SC SYSKIT**	**2732981**	1
- English	**IBS PCI SC SYSKIT E**	**2732994**	1
PC controller board	**IBS PCI SC/I-T**	**2725260**	1
Driver software and sample programs, incl. user manual (German/English), on CD-ROM	**CD PC DRIVER**	**2985589**	1
IBS-CMD software, for configuration, diagnostics, German	**IBS CMD SWT G4**	**2721439**	1
IBS-CMD software, for configuration, diagnostics, English	**IBS CMD SWT G4 E**	**2721442**	1
Diag+ full version, for INTERBUS diagnostics (ActiveX Control with programming interface)	**IBS DIAG+ SWT**	**2730307**	1
INTERBUS OPC server, data interface between distributed INTERBUS and Ethernet networks and visualization systems	**IBS OPC SERVER**	**2729127**	1
Device driver development kit, for developing one's own device drivers for individual operating systems (German, English)	**IBS PCI DDK**	**2730271**	1
Programming cable	**PRG CAB MINI DIN**	**2730611**	1
Cable set for COM1, COM2, for PC controller board in PC/104 format			

Technical data	
Interfaces	
Host system	PCI bus, 32 bit, 33 MHz, 5 V
INTERBUS remote bus	9-pos. D-SUB female connector, with electrical isolation
Parameterization/operation/diagnostics	RS-232-C, Mini-DIN female connector
Direct I/Os	14-pos. FLK male connector
INTERBUS master	
Number of possible parameter channels	Max. 126
Number of I/O nodes	Max. 8192
Number of supported devices	Max. 512 (of which 254 are remote bus devices/bus segments)
Direct inputs/outputs	
Number of inputs	6
Number of outputs	2
Software interfaces	
Software driver	Windows NT / Windows 2000 / Windows XP / Venturcom RTX 5.x / Further types on request
Application interface	HFI OPC DDI
Power supply	
Connection supply	Via PCI bus
Supply voltage	5 V DC
Range of supply voltages	± 5% (including ripple)
Typical current consumption	0.7 A
General data	
Weight	150 g
Format	Short plug-in card, 1-slot
Ambient temperature (operation)	0°C ... 55°C (in acc. with EN 60204-1)
Ambient temperature (storage/transport)	-25°C ... 75°C (in acc. with EN 60204-1)

IBS PC ISA SC/I-T

PC controller board in ISA format

Type	Order No.	Pcs. / Pkt.
IBS PC ISA SC SYSKIT	2721905	1
IBS PC ISA SC SYSKIT E	2721918	1
IBS PC ISA SC/I-T	2719234	1
CD PC DRIVER	2985589	1
IBS CMD SWT G4	2721439	1
IBS CMD SWT G4 E	2721442	1
IBS DIAG+ SWT	2730307	1
IBS OPC SERVER	2729127	1
IBS PRG CAB	2806862	1

ISA bus
9-pos. D-SUB female connector, with electrical isolation

RS-232-C, D-SUB 9-pos. male connector
-

Max. 126
Max. 8192
Max. 512 (of which 254 are remote bus devices/bus segments)

-
-

Windows NT / Windows 2000 / Windows 95/98 / DOS /
Further types on request
OPC
DDI

Via ISA bus
5 V DC
± 5% (including ripple)
0.5 A

140 g
Short plug-in card, 1-slot
-25°C ... 75°C (in acc. with EN 60204-1)
0°C ... 75°C (in acc. with EN 60204-1)

IBS PCI 104 SC-T

Termination board in PCI-104 format

Type	Order No.	Pcs. / Pkt.
IBS PCI 104 SC-T	2737494	1
CD PC DRIVER	2985589	1
IBS CMD SWT G4	2721439	1
IBS CMD SWT G4 E	2721442	1
IBS DIAG+ SWT	2730307	1
IBS OPC SERVER	2729127	1
IBS PCI DDK	2730271	1
IBS PRG CAB	2806862	1
IBS PC 104 SC CAB	2724436	1

PCI-104 bus, 32 bits, 33 MHz, 5 V
10-pos. DIL male connector

RS-232-C, 10-pos. DIL male connector
-

Max. 128
Max. 8192
512 (of which 254 are remote bus devices/bus segments)

-
-

Windows NT / Windows 2000 / Windows XP / Venturcom RTX 5.x /
Further types on request
HFI
OPC
DDI

Via PCI-104 bus
5 V DC
± 5% (including ripple)
0.7 A

80 g
PCI-104
0°C ... 55°C (in acc. with EN 60204-1)
-25°C ... 75°C (in acc. with EN 60204-1)

IBS PC 104 SC-T

Controller board in PC/104 format

Type	Order No.	Pcs. / Pkt.
IBS PC 104 SC SYSKIT	2724397	1
IBS PC 104 SC SYSKIT E	2724407	1
IBS PC 104 SC-T	2721701	1
CD PC DRIVER	2985589	1
IBS CMD SWT G4	2721439	1
IBS CMD SWT G4 E	2721442	1
IBS DIAG+ SWT	2730307	1
IBS OPC SERVER	2729127	1
IBS PRG CAB	2806862	1
IBS PC 104 SC CAB	2724436	1

PC-104 bus
10-pos. DIL male connector

RS-232-C, 10-pos. DIL male connector
-

Max. 62
Max. 8192
512 (of which 254 are remote bus devices/bus segments)

-
-

Windows NT / Windows 2000 / Windows 95/98 / DOS /
Further types on request
OPC
DDI

Via PC/104 bus
5 V DC
± 5% (including ripple)
0.4 A

80 g
PC/104
0°C ... 55°C (in acc. with EN 60204-1)
-25°C ... 75°C (in acc. with EN 60204-1)

Operating and monitoring

Operator terminals (OT) and touch panels (TP) from Phoenix Contact are very compact operation and monitoring devices and are easy to integrate into the AUTOMATIONWORX system via OPC.

For small systems that are to be operated automatically, Phoenix Contact also provides new web panels (WP) that enable an easy and cost-effective web-based entry into visualization.

One Ethernet and two USB ports ensure fast and seamless communication. Due to the different display sizes, a variable number of keys and a scalable processor capacity, these devices can be flexibly adapted to the relevant application requirements.

Visualization is carried out via the Visu+ software in the case of OTs and TPs and via WebVisit in the case of WPs.

Basic settings, such as the assignment of IP addresses, are easily made on the device using an integrated service tool.

Program overview

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).

High-performance visualization

For process visualization, all OTs and TPs use the high-performance software Visu+, which is an integral part of the AUTOMATIONWORX software suite. Besides SCADA functions, such as operation & monitoring, trend display and alarm handling functions, the tool also offers functions for production data acquisition, logging and connection to database and ERP systems.

Data processing and visualization at the OTs or TPs is carried out via the integrated OPC server that obtains data from the controller connected via Ethernet.

Operator terminals OT

The operator terminals have an intuitive operating concept with fixed and freely configurable keys. The compact FSTN displays with white LED backlighting, as well as five grey scales, vary in terms of display size and the number of system and function keys.

Visu+ is integrated on all machines as a standard runtime for Windows CE.

Touch panels TP

The touch panels have an industrial, resistive touch display. They are characterized by their compact shape and provide a complete product portfolio. This includes touch panels with an FSTN display and white LED backlighting, as well as CSTN displays with CCFL backlighting and TFT LC displays. The displays are available in sizes from 3.8" to 15".

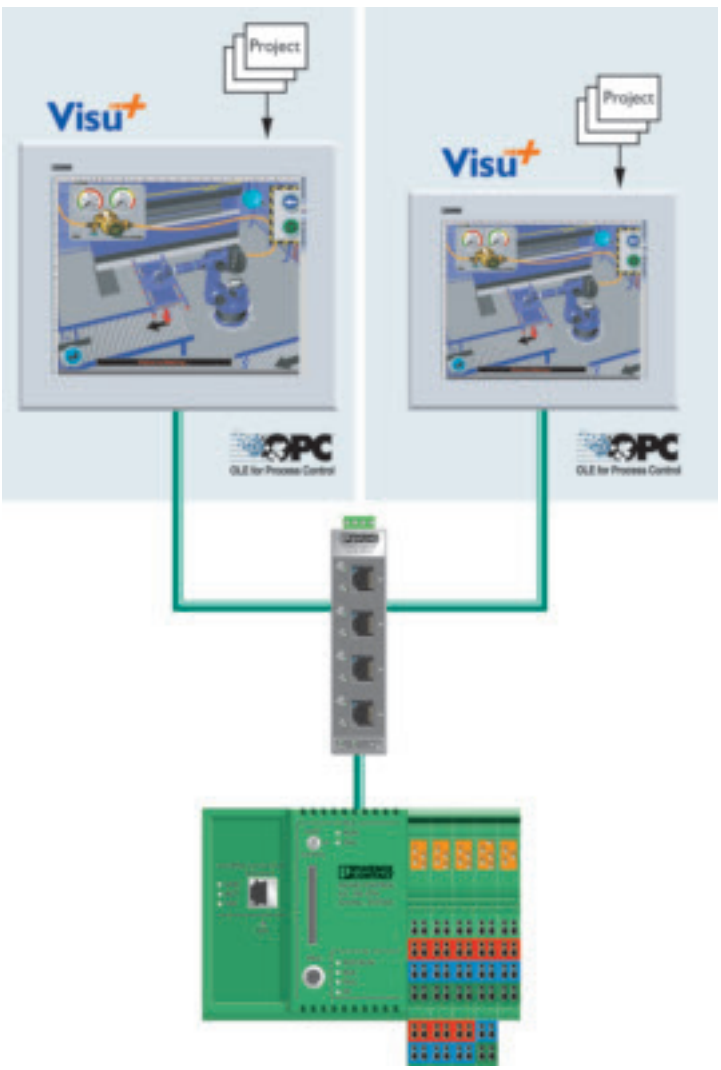
Visu+ is integrated on all machines as a standard runtime for Windows CE.

Maritime touch panels TPM

Shipbuilding applications place special requirements on operation and monitoring devices. For this purpose, Phoenix Contact offers a range of devices that fulfill these requirements. In addition to approvals such as GL, LR, BV, DVN and ABS, which are required for the shipbuilding industry, these devices are characterized by the following features.

The displays are available in sizes from 3.8" to 15".

Visu+ is integrated on all machines as a standard runtime for Windows CE.



Easy and cost-effective visualization

For process visualization, all WPs use the high-performance software WebVisit, which is an integral part of the AUTOMATIONWORX software suite. Here, the controller connected to the web panel acts as web server for data processing and visualization. The display of the data on the web panel connected via Ethernet is enabled via the micro browser integrated into the panel.

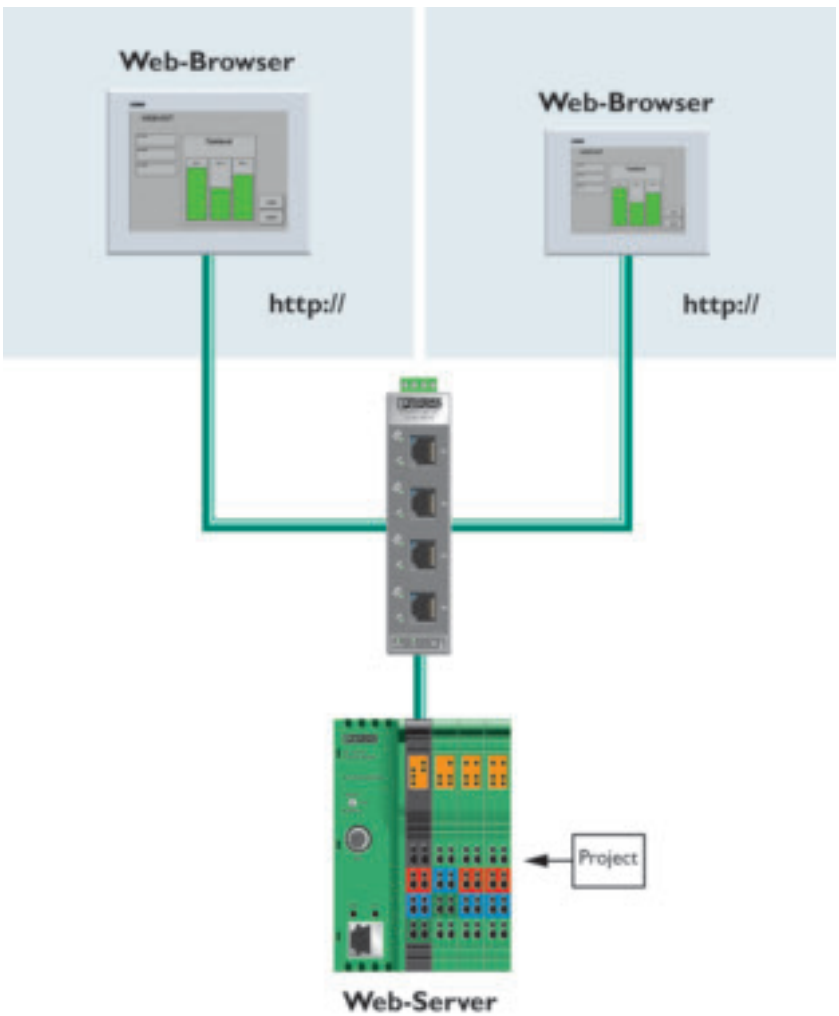
Simple control panels can be effectively realized due to the low requirement for processor resources.

WEB panels WP

The WEB panels have an industrial, resistive touch display. The use of web technology makes important process resources redundant and guarantees high dynamics during image transmission with the help of http.

The displays are available in sizes from 4" to 6".

The micro browser is integrated on all machines as a standard runtime for Windows CE.



Operator terminal OT



Type Order No.	OT 3M 2985123	OT 4M 2985136	OT 6M 2985149
Display			
Type	3" FSTN	3.8" FSTN	5.7" FSTN
Resolution	160 x 80	320 x 240	320 x 240
Processor	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz
Page	130	131	131

Touch panels TP




Type Order No.	TP 04M 2985152	TP 06M 2985165	TP 06S 2985178	TP 07T 2913085
Display				
Type	3.8" FSTN	5.7" FSTN	5.7" C-STN	7" TFT active
Resolution	320 x 240	320 x 240	320 x 240	800 x 480
Processor	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz
Page	132	133	133	133




Type Order No.	TP 06T 2913658	TP 10T 2985181	TP 12T 2985194	TP 15T 2985204
Display				
Type	6.5" TFT active	10.4"-TFT active	12.1"-TFT active	15" TFT active
Resolution	640 x 480	640 x 480	800 x 600	1024 x 768
Processor	Xscale PXA 320; 806 MHZ	Xscale PXA 320; 806 MHZ	Xscale PXA 320; 806 MHZ	Xscale PXA 320; 806 MHZ
Page	134	135	135	135

Touch panels – Shipbuilding solutions




Type Order No.	TP 04M/M 201 2913205	TP 06M/M 201 2913218	TP 06S/M 201 2913221	TP 07T/M 201 2913234
Display				
Type	3.8" FSTN	5.7" FSTN	5.7" C-STN	7" TFT active
Resolution	320 x 240	320 x 240	320 x 240	800 x 480
Processor	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz
Page	136	136	137	137



Type Order No.	TP 10T/M 201 2913247	TP 12T/M 201 2913250	TP 15T/M 201 2913263
Display			
Type	10.4"-TFT active	12.1"-TFT active	15" TFT active
Resolution	640 x 480	800 x 600	1024 x 768
Processor	Xscale PXA 320; 806 MHZ	Xscale PXA 320; 806 MHZ	Xscale PXA 320; 806 MHZ
Page	137	137	137

Web panels WP

Software




Type Order No.	WP 04T 2913632	WP 06T 2913645	VISU+ 2 2988544	WebVisit Pro 2988890
Display				
Type	3.5" TFT active	5.7" TFT active	Development software for all OTs and TPs	Development software for all WPs
Resolution	320 x 240	321 x 240		
Processor	RISC ARM9 CPU; 200 MHz	RISC ARM9 CPU; 200 MHz		
Page	138	139	51	51

OT operator terminals

The OT operator terminals have an intuitive operating concept with keys with fixed and freely configurable keys.

The compact FSTN displays with white LED backlighting, as well as five grayscales, only with respect to the display size and the number of system and function keys.

Visu+ as runtime and the AX OPC server for Windows CE are integrated in all devices as a standard feature.

For process visualization, all HMI devices use the powerful software Visu+, which is an integral part of the AUTOMATIONWORX software suite. See page 51.

OT 3M

Operator terminal with 3.0" graphic-capable FSTN display

Description	Type	Order No.	Pcs. / Pkt.
Operator terminal with 3.0" graphic-capable FSTN display, 7 system keys and 11 function keys.	**OT 3M**	**2985123**	1
Operator terminal with 3.8" graphic-capable FSTN display, 22 system keys and 17 function keys.			
Operator terminal with 5.7" graphic-capable FSTN display, 22 system keys and 18 function keys.			

Technical data	
Display data	
Display	3.0" FSTN
Monitor resolution	160 x 80 pixel
Color spectrum	5 grayscales
Computer data	
Operating systems	Windows CE 5.0
Processor	RISC ARM9 CPU; 200 MHz
Main memory	64 MByte SDRAM
Data memory	32 Mbyte Flash, with 8 Mbyte free for application
Interfaces	10/100 MBit Ethernet; 2 x USB Host 2.0
External dimensions	
Width	144 mm
Height	96 mm
Depth	5 mm
Installation dimensions	
Width	136 mm
Height	82 mm
Installation depth	46 mm
General data	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	0°C ... 50°C
Permissible humidity (operation)	20% ... 85% (non-condensing)
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

OT 4M

Operator terminal with 3.8" graphic-capable FSTN display

OT 6M

Operator terminal with 5.7" graphic-capable FSTN display

Type	Order No.	Pcs. / Pkt.
OT 4M	**2985136**	1

Type	Order No.	Pcs. / Pkt.
OT 6M	**2985149**	1

3.8" FSTN 320 x 240 pixel 5 grayscales	5.7" FSTN 320 x 240 pixel 5 grayscales
Windows CE 5.0 RISC ARM9 CPU; 200 MHz 64 MByte SDRAM 32 Mbyte Flash, with 8 Mbyte free for application 10/100 MBit Ethernet; 2 x USB Host 2.0	Windows CE 5.0 RISC ARM9 CPU; 200 MHz 64 MByte SDRAM 32 Mbyte Flash, with 8 Mbyte free for application 10/100 MBit Ethernet; 2 x USB Host 2.0
155 mm 205 mm 5 mm	300 mm 160 mm 5 mm
139 mm 199 mm 43 mm	292 mm 152 mm 43 mm
IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27

TP touch panels

The TP touch panels have an industrial, resistive touch display. They are distinguished by their compact shape and provide a complete product portfolio.

This includes touch panels with an FSTN display and white LED backlighting, as well as CSTN displays with CCFL backlighting and TFT LC displays. The displays are available in sizes from 3.8" to 15".

Visu+ as runtime and the AX OPC server for Windows CE are integrated in all devices as a standard feature.

For process visualization, all HMI devices use the powerful software Visu+, which is an integral part of the AUTOMATIONWORX software suite. See page 51.

TP 04M

Touch panel with 3.8" graphic-capable FSTN display

Description	Type	Order No.	Pcs. / Pkt.
Touch panel with 3.8" graphic-capable FSTN display	**TP 04M**	**2985152**	1
Touch panel with 5.7" graphic-capable FSTN display			
Touch panel with 5.7" graphic-capable C-STN display, 125 colors			
Touch panel with 7" graphic-capable TFT display			

Technical data	
Display data	
Display	3.8" FSTN
Monitor resolution	320 x 240 pixel
Color spectrum	5 grayscales
Computer data	
Operating systems	Windows CE 5.0
Processor	RISC ARM9 CPU; 200 MHz
Main memory	64 MByte SDRAM
Data memory	32 Mbyte Flash, with 8 Mbyte free for application
Interfaces	10/100 MBit Ethernet; 2 x USB Host 2.0
External dimensions	
Width	130 mm
Height	96 mm
Depth	5 mm
Installation dimensions	
Width	122 mm
Height	88 mm
Installation depth	33 mm
General data	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	0°C ... 50°C
Permissible humidity (operation)	20% ... 85% (non-condensing)
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

TP 06M

Touch panel with 5.7" graphic-capable FSTN display

Type	Order No.	Pcs. / Pkt.
TP 06M	**2985165**	1

5.7" FSTN
320 x 240 pixel
5 grayscales

Windows CE 5.0
RISC ARM9 CPU; 200 MHz
64 MByte SDRAM
32 Mbyte Flash, with 8 Mbyte free for application

10/100 MBit Ethernet; 2 x USB Host 2.0

203 mm
147 mm
5 mm

195 mm
139 mm
54 mm

IP65 (front), IP20 (back)
0°C ... 50°C
20% ... 85% (non-condensing)
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

TP 06S

Touch panel with 5.7" graphic-capable C-STN display

Type	Order No.	Pcs. / Pkt.
TP 06S	**2985178**	1

5.7" C-STN
320 x 240 pixel
125 colors

Windows CE 5.0
RISC ARM9 CPU; 200 MHz
64 MByte SDRAM
32 Mbyte Flash, with 8 Mbyte free for application

10/100 MBit Ethernet; 2 x USB Host 2.0

203 mm
147 mm
5 mm

195 mm
139 mm
54 mm

IP65 (front), IP20 (back)
0°C ... 50°C
20% ... 85% (non-condensing)
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

TP 07T

Touch panel with 7" graphic-capable TFT display

Type	Order No.	Pcs. / Pkt.
TP 07T	**2913085**	1

7" TFT active
800 x 480 pixel
65536 colors

Windows CE 5.0
RISC ARM9 CPU; 200 MHz
64 MByte SDRAM
32 Mbyte Flash, with 8 Mbyte free for application

10/100 MBit Ethernet; 2 x USB Host 2.0

203 mm
147 mm
5 mm

195 mm
139 mm
54 mm

IP65 (front), IP20 (back)
0°C ... 50°C
20% ... 85% (non-condensing)
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

TP touch panels

The TP touch panels have an industrial, resistive touch display. They are distinguished by their compact shape and provide a complete product portfolio.

This includes touch panels with an FSTN display and white LED backlighting, as well as CSTN displays with CCFL backlighting and TFT LC displays. The displays are available in sizes from 3.8" to 15".

Visu+ as runtime and the AX OPC server for Windows CE are integrated in all devices as a standard feature.

For process visualization, all HMI devices use the powerful software Visu+, which is an integral part of the AUTOMATIONWORX software suite. See page 51.

TP 06T

Touch panel with 6.5" graphics-capable TFT display

Description	Type	Order No.	Pcs. / Pkt.
Touch panel with 6.5" graphic-capable TFT display	**TP 06T**	**2913658**	1
Touch panel with 10.4" graphic-capable TFT display			
Touch panel with 12.1" graphic-capable TFT display			
Touch panel with 15.1" graphic-capable TFT display			

Technical data	
Display data	
Display	6.5" TFT active
Monitor resolution	640 x 480 pixel
Color spectrum	65536 colors
Touch screen	Resistive industrial touch screen
Computer data	
Operating systems	Windows CE 5.0
Processor	Xscale PXA320, 806 MHz
Main memory	128 MByte SDRAM
Data memory	256 Mbyte external Compact Flash card for applications
Interfaces	10/100 MBit Ethernet; 2 x USB Host 1.1
External dimensions	
Width	210 mm
Height	158 mm
Depth	5 mm
Installation dimensions	
Width	202 mm
Height	150 mm
Installation depth	55 mm
General data	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	0°C ... 50°C
Permissible humidity (operation)	20% ... 85% (non-condensing)
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

TP 10T

Touch panel with 10.4" graphic-capable TFT display

Type	Order No.	Pcs. / Pkt.
TP 10T	**2985181**	1

10.4" active TFT 640 x 480 pixel 65536 colors Resistive industrial touch screen
Windows CE 5.0 Xscale PXA320, 806 MHz 128 MByte SDRAM 256 Mbyte external Compact Flash card for applications 10/100 MBit Ethernet; 2 x USB Host 1.1
328 mm 249 mm 5 mm
303 mm 222 mm 60 mm
IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27

TP 12T

Touch panel with 12.1" graphic-capable TFT display

Type	Order No.	Pcs. / Pkt.
TP 12T	**2985194**	1

12.1" TFT active 800 x 600 pixel 65536 colors Resistive industrial touch screen
Windows CE 5.0 Xscale PXA320, 806 MHz 128 MByte SDRAM 256 Mbyte external Compact Flash card for applications 10/100 MBit Ethernet; 2 x USB Host 1.1
340 mm 270 mm 5 mm
315 mm 243.5 mm 65 mm
IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27

TP 15T

Touch panel with 15.1" graphic-capable TFT display

Type	Order No.	Pcs. / Pkt.
TP 15T	**2985204**	1

15" TFT active 1024 x 768 pixel 256 colors Resistive industrial touch screen
Windows CE 5.0 Xscale PXA320, 806 MHz 128 MByte SDRAM 256 Mbyte external Compact Flash card for applications 10/100 MBit Ethernet; 2 x USB Host 1.1
400 mm 329 mm 5 mm
373 mm 302 mm 70 mm
IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27

Touch panel – solutions for shipbuilding

Shipbuilding applications put forth special requirements on operation and monitoring devices. Phoenix Contact thus offers a new range of devices that fulfill these requirements. Apart from approvals like GL, LR, BV, DNV and ABS that are necessary for shipbuilding, these devices are characterized by other features as well.

For use on ships and especially on the bridge, the dimming of the display, the integrated horn and the black front are also part of the scope of functions. The two buttons on the front can be used to dim the display by increasing the darkness, during a night journey for example. Messages of different types can, for instance, be signaled using a horn. Since this is available in every touch panel and has a sufficiently high volume, an external horn is not required.

The touch panels with 3.8" and 5.7" display are especially suitable for installation in cabins due to their small dimensions.

Touch panels with a 7" to 15" display size are particularly suitable for comprehensive visualization tasks, since they have a higher resolution as well as a large display area.

The touch panels have an industrial, resistive touch display. They are distinguished by their compact design and provide a complete product portfolio. Touch panels with an FSTN display and white LED backlighting as well as TFT-LC displays are a part of this.

Displays are available in sizes ranging from 3.8" to 15".

Visu+ as runtime and the AX OPC server for Windows CE are integrated in all devices as a standard feature.

For process visualization, all HMI devices use the powerful software Visu+, which is an integral part of the AUTOMATIONWORX software suite. See page 51.

TP 0...M/M 201

Touch panel with graphic-capable FSTN display

Description	Type	Order No.	Pcs. / Pkt.
Touch panel with graphic-capable display			
- 3.8" FSTN display	**TP 04M/M 201**	**2913205**	1
- 5.7" FSTN display	**TP 06M/M 201**	**2913218**	1
Touch panel with graphic-capable display - 5.7" C-STN display			
Touch panel with graphic-capable display - 7" TFT display - 10.4" TFT display			
Touch panel with graphic-capable display - 12.1" TFT display - 15.1" TFT display			

Technical data	TP 04M/M 201	TP 06M/M 201
Display data		
Display	3.8" FSTN	5.7" FSTN
Monitor resolution	320 x 240 pixel	
Color spectrum	5 grayscales	
Touch screen	Resistive industrial touch screen	
Computer data		
Operating systems	Windows CE 5.0	
Processor	RISC ARM9 CPU; 200 MHz	
Main memory	64 MByte SDRAM	
Data memory	32 Mbyte Flash, with 8 Mbyte free for application	
Interfaces	10/100 MBit Ethernet; 2 x USB Host 2.0	
External dimensions		
Width	155 mm	203 mm
Height	96 mm	165 mm
Depth	5 mm	
Installation dimensions		
Width	147 mm	195 mm
Height	88 mm	157 mm
Installation depth	35 mm	56 mm
General data		
Degree of protection	IP65 (front), IP20 (back)	
Ambient temperature (operation)	0°C ... 50°C	
Permissible humidity (operation)	20% ... 85% (non-condensing)	
Mounting type	Installation in front plate	
Vibration (operation)	DIN EN 60068-2-6	
Shock	DIN EN 60068-2-27	

TP 06S/M 201

Touch panel with graphic-capable C-STN display

TP ...M/M 201

Touch panel with graphic-capable TFT display

TP 1...T/M 201

Touch panel with graphic-capable TFT display

Type	Order No.	Pcs. / Pkt.
TP 06S/M 201	**2913221**	1

Type	Order No.	Pcs. / Pkt.
TP 07T/M 201	**2913234**	1
TP 10T/M 201	**2913247**	1

Type	Order No.	Pcs. / Pkt.
TP 12T/M 201	**2913250**	1
TP 15T/M 201	**2913263**	1

	TP 06S/M 201	TP 07T/M 201	TP 10T/M 201	TP 12T/M 201	TP 15T/M 201
	5.7" C-STN 320 x 240 pixel 125 colors Resistive industrial touch screen	7" TFT active 800 x 480 pixel 65536 colors Resistive industrial touch screen	10.4" active TFT 640 x 480 pixel	12.1" TFT active 800 x 600 pixel 65536 colors Resistive industrial touch screen	15" TFT active 1024 x 768 pixel 256 colors
	Windows CE 5.0 RISC ARM9 CPU; 200 MHz 64 MByte SDRAM 32 Mbyte Flash, with 8 Mbyte free for application	Windows CE 5.0 RISC ARM9 CPU; 200 MHz 64 MByte SDRAM 32 Mbyte Flash, with 8 Mbyte free for application	Xscale PXA320, 806 MHz 128 MByte SDRAM 256 Mbyte external Compact Flash card for applications	Windows CE 5.0 Xscale PXA320, 806 MHz 128 MByte SDRAM 256 Mbyte external Compact Flash card for applications	
	10/100 MBit Ethernet; 2 x USB Host 2.0	10/100 MBit Ethernet; 2 x USB Host 2.0	10/100 MBit Ethernet; 2 x USB Host 1.1	10/100 MBit Ethernet; 2 x USB Host 1.1	
	203 mm 165 mm 5 mm	203 mm 165 mm 5 mm	328 mm 265 mm	340 mm 285 mm 5 mm	400 mm 338 mm
	195 mm 157 mm 56 mm	195 mm 157 mm 56 mm	303 mm 238 mm 57 mm	315 mm 259 mm 62 mm	373 mm 312 mm
	IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27		IP65 (front), IP20 (back) 0°C ... 50°C 20% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	

Web panels WP

Automated operation of machines and systems usually requires simple and cost-effective solutions. With the web panels based on web technology, Phoenix Contact offers a simple and cost-effective solution for the entry into process visualization for small systems.

All WPs use the latest web technology for process visualization. Here, the compact controller of the 100 series class connected to the web panel acts as web server for data processing and visualization. The display of the data on the web panel connected via Ethernet is enabled via the micro browser integrated into the panel.

The new web panels WP 04T with a 3.5" TFT touch display and WP 06T with a 5.7" TFT touch display add the option of cost-effective visualization to the automation system of the 100 series class. These devices can also be combined with other controllers of the automation system.

The micro browser is integrated on all machines as a standard runtime for Windows CE.

For process visualization, all web panels use the powerful software WebVisit, which is an integral part of the AUTOMATIONWORX software suite. See page 51.

WP 04T

Web panel with graphics-capable 3.5" TFT display

Description	Type	Order No.	Pcs. / Pkt.
Web panel with 3.5" graphic-capable TFT display	**WP 04T**	**2913632**	1
Web panel with 5.7" graphic-capable TFT display			

Technical data	
Display data	
Display	3.5" TFT
Monitor resolution	320 x 240 pixel
Color spectrum	65536 colors
Touch screen	Resistive industrial touch screen
Computer data	
Operating systems	Windows CE 5.0
Processor	RISC ARM9 CPU; 200 MHz
Main memory	32 MByte SDRAM
Data memory	16 MB flash
Interfaces	10/100 MBit Ethernet; 2 x USB Host 2.0
External dimensions	
Width	120 mm
Height	90 mm
Depth	5 mm
Installation dimensions	
Width	112 mm
Height	82 mm
Installation depth	35 mm
General data	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	0°C ... 50°C
Permissible humidity (operation)	20% ... 85% (non-condensing)
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

WP 06T

Web panel with graphics-capable 5.7" TFT display

Type	Order No.	Pcs. / Pkt.
WP 06T	**2913645**	1

5.7" TFT
320 x 240 pixel
65536 colors
Resistive industrial touch screen
Windows CE 5.0
RISC ARM9 CPU; 200 MHz
32 MByte SDRAM
16 MB flash
10/100 MBit Ethernet; 2 x USB Host 2.0
168 mm
126 mm
5 mm
160 mm
118 mm
42 mm
IP65 (front), IP20 (back)
0°C ... 50°C
20% ... 85% (non-condensing)
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

Industrial PCs

Industrial PCs for the control cabinet

The industrial PC solutions from Phoenix Contact offer top performance for your automation solutions in an industrial environment. Innovative products with the latest technology with a long-term availability ensure your productivity and investment.

You can choose from various versions in a modern industrial design customized to your requirements:

– Industrial PCs for the control cabinet
– Thin clients as input and output termination device
– Panel PCs for front panel installation

Irrespective of whether you create your own industrial PC solution using our extensive online configuration or opt for a pre-configured device - different processor versions, operating systems, screen diagonals and various numbers of slots allow optimal adaptation to your application.

Industrial PCs in the IP65 field

Control and monitoring close to the machine are becoming more and more important in modern systems. Industrial PCs without fans in a compact and light-weight IP65 aluminum die-cast housing are the ideal devices for this purpose. Thanks to various installation options, these can be used in any application irrespective of the machine control cabinets and thus enable ergonomic operation at different points of the systems or production lines.

The industrial PCs in IP65 also offer an optional WLAN interface as per IEEE 802.11 b/g for quick and easy network integration for those who wish for a future-oriented wireless network integration.

Program overview

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).

Variety of versions for all applications

The requirements for a PC in an industrial environment are based on factors such as vibrations, cold, heat, electromagnetic radiation and dust. The increasing need for processor capacity due to more complex software solutions and the optimal equipment for every application are important requirements for every modern industrial PC.

Phoenix Contact industrial PCs have been designed for use in an industrial environment. We always offer you the optimal equipment for your application with the modular structure of the PCs and a choice of different display variants, processor capacities, main and data memories, operating systems and numbers of slots.

When developing the IPC range, Phoenix Contact only uses durable and high-quality components, thus guaranteeing high availability in order to secure your investment and to increase your productivity.

Individual customer requirements

Customer-specific requirements play an important role when it comes to product positioning. Starting with easy labeling of devices with the customer-specific logo up to a complete redesigning of the device, a wide range of equipment can be implemented. Simply contact us to increase your competitive edge.

Flexibility thanks to selection options

The uniform industrial PC platforms from Phoenix Contact offer high flexibility thanks to individual selection options. Simply create your own IPC in our online configurator. The automatic plausibility check rules out configuration errors.

Always the ideal operating system for you

As a certified Gold Partner of Microsoft, we provide you with the operating system that is best suitable for your application.

Choose between Windows CE as a thin client system with low memory requirements and high performance, Windows XP embedded as a protected system for a minimized operating system size or Windows XP as an open and extensive operating system and make use of our know-how.

Intel® Core™ 2 Duo technology

The Intel Core 2 Duo processors are characterized by high performance with low power consumption. The dual core processors with the latest 64 bit technology are manufactured in 45 nm and have up to 4 MB L2 cache that can be dynamically assigned to the two cores as required. Thus, a single process can also use the entire cache.

The power-saving techniques have also been optimized further in comparison with the predecessors and allow flexible switching on and off of individual processor parts. This minimizes the power dissipation of the processors and guarantees an improved performance per cycle.

Control cabinet PC – Maximum performance with minimum space requirements

Phoenix Contact's compact control cabinet PCs are especially reliable and rugged PCs for machine and control cabinet installation.

The high performance with low space requirements leaves no wish unfulfilled. Furthermore, the advanced cooling concept based on fanless technology reduces maintenance cycles to a minimum.

The control cabinet PC can be fitted in a narrow as well as a flat design. This is applicable for DIN rail as well as panel mounting.

Should your application require more slots, an extension module with two PCI slots can be configured when selecting the computing unit, thus providing equipment suitable for your application.

Thin client – Less is more

Not every system or production line requires a full-fledged panel PC at every operator terminal.

Inexpensive thin client devices from Phoenix Contact with the Windows CE or Windows XP embedded operating system as pure operator interfaces are a good alternative in such cases.

These offer several clear advantages: There are no rotating parts thanks to the fanless design and the use of Compact Flash cards. This makes the device extremely robust. Maintenance work such as regular air filter replacement is no longer necessary.

NetCap – Being everywhere at the same time

Phoenix Contact has developed the NetCap remote protocol for the operation of linked systems and processes.

NetCap uses the master/slave principle to make the screen information, keyboard and mouse available in the network via TCP/IP, thus allowing remote operation through thin client devices that does not depend on the distance.

Panel PCs – A variety of versions

Rugged panel PCs with touchscreen and minimum installation depth are optimally suitable for operation and monitoring close to the machine, and their powerful processors offer a high performance for other tasks.

The panel PCs with IP65 front are especially characterized by their rugged, powerful and brilliant displays. Different display diagonals ranging between 12" and 19" allow the optimal solution for every customer-specific visualization, depending on the requirement. Front USB interfaces simplify startup and service.

The panel PCs are also equipped for future requirements thanks to the variable number of PCI slots.

The operating housing solution

Rittal, one of the world's leading solution providers for housing and control cabinet technology, system air conditioning and IT solutions, offers a comfort panel configurator. This also contains panel systems from Phoenix Contact.

This tool helps in creating optimally tailored solutions for the man/machine interface. An intelligent consistency check has been integrated so that the configuration can be completed without any errors. At the end of the configuration, you can request a quotation and can see a visualized presentation of your individual operating housing solution. This can be directly incorporated into your machine and system configuration and thus saves extremely valuable engineering time. Additional information can be found at: http://www.rittal.com/services_support/engineering/configurators/cp.html.

Space and cost reduction

Space requirements and cost reduction are becoming more and more important when it comes to investing in modern industrial systems. Phoenix Contact's fanless industrial PCs in a compact and lightweight IP65 aluminum die-cast housing thereby offer an optimal solution for direct machine installation. A modern industrial design combined with high-performance technology as well as ruggedness and long-term availability thus make the control cabinet redundant.

The industrial PCs in IP65 also offer an optional WLAN interface as per IEEE 802.11 b/g for quick and easy network integration for those who wish for a future-oriented wireless network integration.

Maintenance-free thanks to the fanless cooling concept

Modern industrial PCs in the sealed IP65 housing require an advanced cooling concept. Phoenix Contact uses a fanless technology that allows maintenance-free use of the devices for the customer.

The devices can also be equipped with Compact Flash cards as a storage medium for the operating system. These replace portable hard disks and further increase the device availability.

Energy efficiency due to low power dissipation

Thanks to the fanless structure and the possible avoidance of a conventional hard disk, this slim computer not only saves space but also scores more in the field of energy consumption. In particular, the new Atom processor is convincing due to its extremely low energy consumption of approx 4 watts, thus making an important contribution to Green IT.

Ergonomic and flexible

The direct and easy installation of the IP65 industrial PCs in the machine guarantees operation at different points of the systems or production lines, and the flexible arrangement allows an especially ergonomic operation of the devices by the user.

Intel® Atom™ technology

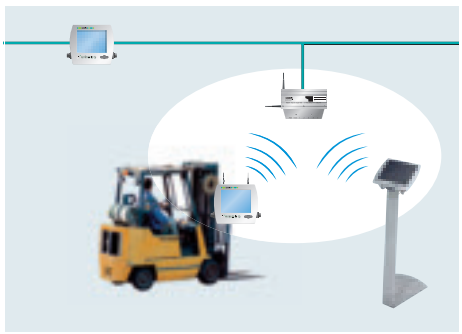
The use of a compact and energy-saving Intel Atom processor extends the range of IP65 industrial PCs towards the low end.

This smallest Intel processor, designed as a 32 bit micro-processor, is especially suitable for mobile and stationary industrial PCs. These processors based on the 45 nm Intel Atom architecture have been designed as particularly energy-saving and thus especially powerful processors.

Wireless – fast network integration

The flexible conditioning of the IP65 industrial PCs enables a wide range of applications.

For instance, an integrated WLAN interface allows fast and reliable connection to the existing infrastructure. The wide-range power supply unit with 10-35 V DC and the transmission/reception frequency of 2.4 GHz and 5 GHz can, for instance, be advantageous for mobile use on forklifts or for decentral "stand-alone" solutions.



Different display diagonals

Rugged industrial PCs also require rugged and powerful displays.

The IP65 industrial PCs are characterized by brilliant displays. Different display diagonals ranging between 10" and 15" allow the optimal solution for every customer-specific visualization according to the requirements.

Brackets

The flexible installation opens up various installation options for the IP65 industrial PCs. Depending on your requirements, you can choose between mounting brackets, table stands, VESA or a bracket adapters. A suitable keyboard support is also available if you wish to connect an external keyboard.

Control cabinet PC

Type **Order No.**	**VL IPC** **2913108**	**VL IPC** **2913108**
Description	Configurable control cabinet PC, without display	Configurable control cabinet PC, 15" or 17" display
Page	**149**	**149**

Thin client

Type **Order No.**	**PPC 5015** **2887991**	**PPC 5015 PM 1,1** **2900661**
Type **Order No.**		**PPC 5015 PM 1,1 DE** **2900674**
Type **Order No.**		**PPC 5015 PM 1,1 EN** **2900687**
Description	Configurable panel PC, 15" display, no slot	Panel PC, 15" display, no slot, optional operating system
Page	**150**	**150**

Panel PC

Type **Order No.**	**PPC 5115** **2887425**	**PPC 5115 PM 1,1** **2895530**	**PPC 5315** **2887441**	**PPC 5315 PM** **2893901**
Type **Order No.**		**PPC 5115 PM 1,1 DE** **2893969**		**PPC 5315 PM DE** **2893914**
Type **Order No.**		**PPC 5115 PM 1,1 EN** **2893972**		**PPC 5315 PM EN** **2893927**
Description	Configurable panel PC, 15" display, 1 slot	Panel PC, 15" display, 1 slot, optional operating system	Configurable panel PC, 15" display, 3 slots	Panel PC, 15" display, 3 slots, optional operating system
Page	**151**	**151**	**151**	**151**

Industrial PC with IP65

				
Type **Order No.**	**VMT 3015** **2913674**	**VMT 5015** **2887603**	**VMT 5015 SM** **2900632**	**VMT 5015 PM 1,1** **2900603**
Type **Order No.**			**VMT 5015 SM DE** **2900645**	**VMT 5015 PM 1,1 DE** **2900616**
Type **Order No.**			**VMT 5015 SM EN** **2900658**	**VMT 5015 PM 1,1 EN** **2900629**
Description	Configurable IP65 IPC with touchscreen, 15" display, Atom inside	Configurable IP65 IPC with touchscreen, 15" display	IP65 IPC with touchscreen, 15" display, optional operating system	IP65 IPC with touchscreen, 15" display, optional operating system
Page	**152**	**153**	**153**	**153**

Accessories

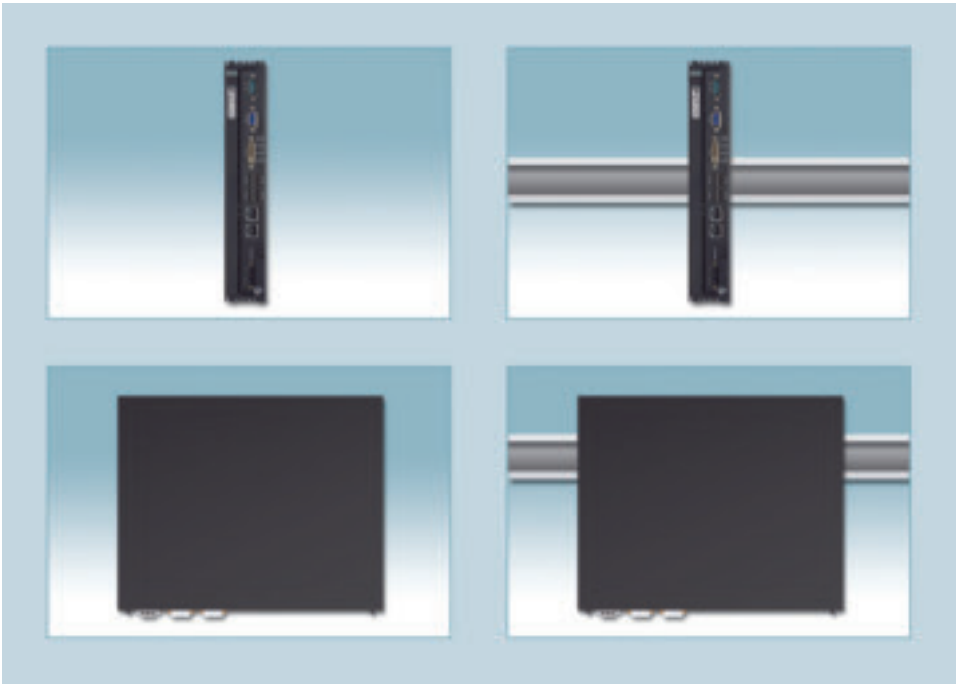
					
Type **Order No.**	**VMT HALTERUNG VESA** **2900959**	**VMT GALGENANSCHLUSS-ADAPTER** **2900962**	**VMT TISCHFUSS** **2900946**	**VMT TASTATURABLAGE 420MM** **2913331**	**VMT EXT PS** **2900904**
Type **Order No.**	**VMT HALTEWINKEL LI/RE** **2900933**				
Description	Bracket for a monitor / industrial PC in IP65 housing	Bracket connection adapter for a monitor / industrial PC in IP65 housing	Table stand for a monitor / industrial PC in IP65 housing	Keyboard support	External power supply unit
Page	**152**	**152**	**152**	**152**	**152**

Software

Security

			
Type **Order No.**	**NETCAP MASTER ... SLAVE** **2739...**	**VISU+ 2** **2988544**	**FL MGUARD PCI/533 VPN** **2989417**
Description	Industrial remote control software for PCs	Development license for Visu+ projects	Firewall/router in PCI format, VPN support, processor cycle frequency 533 MHz
Page	**www.phoenixcontact.net/eshop**	**51**	**179**

Industrial PC in the control cabinet



The new generation of industrial PCs from Phoenix Contact allows configuration of all components. This configuration is based on a modern control cabinet PC.

A scalable computing capacity with Celeron M or Core 2 Duo processors guarantees powerful and energy-saving operation.

Further configuration options such as the selection of main memory, data memory and operating system allow optimum adaptation to your requirements. The fully developed cooling concept based on fanless technology and optional use of an SSD as storage medium minimizes the maintenance cycles.

These can be used at ambient temperatures of up to 55 °C, thus facilitating the use in especially harsh industrial environments.

Two Gigabit Ethernet connections are provided for a quick and reliable connection to the available infrastructure. Further interfaces enhance the flexibility and adaptability to peripheral devices.

The individual components such as the battery, hard disk or compact flash card can be replaced after being installed, thus allowing easy maintenance and increasing the system availability.

Operating states are displayed using integrated LEDs and thus allow efficient self-diagnosis.

Thanks to the compact, reliable and rugged design, the control cabinet PCs are especially suitable for installation in machines and control cabinets. There are numerous installation options. The control cabinet PC can be fitted in a narrow as well as a flat design. This is applicable for DIN rail assembly as well as panel assembly.

Should your application require more slots, an extension module with two PCI slots can be configured when selecting the computing unit; this provides equipment to suit your application.

The compact control cabinet PC can naturally also be configured as a panel PC with a brilliant 15" and 17" display.

The rugged panel PCs with touch screen and low installation depth are perfectly suited for operation and monitoring in the vicinity of the machine. The powerful processors allow challenging visualization tasks or the processing of large data quantities.

Even with the panel PC version, it is possible to configure an extension module with two PCI slots when selecting the computing unit.

The new industrial PC generation from Phoenix Contact is being constantly extended. You can find the latest products in the e-shop.

VALUELINE IPC

Industrial computer, configurable

Description	Type	Order No.	Pcs. / Pkt.
Industrial computer	**VALUELINE IPC**	**2913108**	1

Technical data	
Display data	
Display (configuration option)	none 15 in. color touchscreen 17 in. color touchscreen
Computer data	
Processor (configuration option)	Celeron® M 1.01 GHz Core2™ Duo 1.5 GHz
Main memory (configuration option)	1 GB DDR SODIMM 2 GB DDR SODIMM 4 GB DDR SODIMM
Data memory (configuration option)	2.5" HDD, 120 GB (SATA) 2.5" HDD, 160 GB (SATA) 2.5" HDD, 120 GB High Temperature (SATA) 2.5" HDD, 160 GB High Temperature (SATA) Solid State Drive, 64 GB (SATA)
Optical drive	DVD-RW
Interfaces	COM 1 (RS-232), 1x DVI-D, 1x VGA, 4x USB, 2x CompactFlash
Monitor output	VGA, DVI-D
Network	2x Ethernet (10/100/1000 Mbps), RJ45
Power supply unit	24 V DC
General data	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	5°C ... 55°C (Configuration options can affect the operating temperature. See user manual for details)
Permissible humidity (operation)	5% ... 95% (non-condensing)
Mounting type	Panel mount for control cabinet, wall mount, or bookshelf mount
Vibration (operation)	DIN EN 60068-2-6
Shock	15g, 11 ms as per IEC 60068-2-27

Thin client and panel PC

Phoenix Contact offers the right solution for every application. The especially narrow and inexpensive thin client devices without fans are, as a pure operator interface, an alternative for the complete panel PC. However, if your application requires a complete panel PC, the panel PCs from Phoenix Contact are the best solution for the future as well, thanks to the variable number of PCI slots.

Thin clients and panel PCs are available with different display variants, processor capacities, main and data memories as well as operating systems.

The display size and the number of slots can be detected from the order no. Thus, a PPC 5315 has three slots and a 15" display.

The seamless thin client or panel PC platforms from Phoenix Contact provide increased flexibility through individual selection options. Simply assemble your individual thin client or panel PC using our online configurator or select one of our configured devices.

PPC 5015 ...

Panel PC with touch screen and software keyboard, 15" display, no slot

Description	Type	Order No.	Pcs. / Pkt.
Panel PC with touch screen and software keyboard, **15" display**			
- Configurable	**PPC 5015**	**2887991**	1
Panel PC with touch screen and software keyboard, **15" display**			
- No operating system	**PPC 5015 PM 1,1**	**2900661**	1
- Windows XP German	**PPC 5015 PM 1,1 DE**	**2900674**	1
- Windows XP English	**PPC 5015 PM 1,1 EN**	**2900687**	1
Panel PC with touch screen and software keyboard, **15" display**, 1 slot - Configurable			
Panel PC with touch screen and software keyboard, **15" display**, 1 slot - No operating system - Windows XP German - Windows XP English			
Panel PC with touch screen and software keyboard, **15" display**, 3 slots - Configurable			
Panel PC with touch screen and software keyboard, **15" display**, 3 slots - No operating system - Windows XP German - Windows XP English			

Technical data	PPC 5015	PPC 5015 PM 1,1
Display data		
Display	15" TFT active	
Monitor resolution	1024 x 768	
Display lighting	250 cd/m² typ., (adjustable)	
Touch screen	Resistive industrial touch screen	
Computer data		
Processor (configuration option)	Celeron M 800 MHz Celeron M 1 GHz Pentium M 1,1 GHz	Pentium M 1,1 GHz
Main memory (configuration option)	256 MB DDR RAM 512 MB DDR RAM 1 GB DDR RAM 2 GB DDR RAM	1 GB DDR RAM
Compact flash (configuration option)	128 MB 256 MB 512 MB 1 GB	
Data memory (configuration option)	2.5" HDD min. 60 GB (UDMA)	
Optical drive (configuration option)	No CD-ROM	
Interfaces	COM 1 (RS232), 1xDVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB Optional 1x USB on front	COM 1 (RS232), 1xDVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB 1x USB on front
Slots		
Network	1x Ethernet (10/100 Mbit), RJ45	
Power supply unit	24 V DC +/- 20%	
General data		
Degree of protection	IP65 (front), IP20 (back)	
Ambient temperature (operation)	5°C ... 40°C	
Permissible humidity (operation)	10% ... 85% (non-condensing)	
Mounting type	Installation in front plate	
Vibration (operation)	DIN EN 60068-2-6	
Shock	DIN EN 60068-2-27	

PPC 5115 ...

Panel PC with touch screen and software keyboard, 15" display, 1 slot

PPC 5315 ...

Panel PC with touch screen and software keyboard, 15" display, 3 slots

Type	Order No.	Pcs. / Pkt.
PPC 5115	**2887425**	1
PPC 5115 PM 1,1	**2895530**	1
PPC 5115 PM 1,1 DE	**2893969**	1
PPC 5115 PM 1,1 EN	**2893972**	1

Type	Order No.	Pcs. / Pkt.
PPC 5315	**2887441**	1
PPC 5315 PM	**2893901**	1
PPC 5315 PM DE	**2893914**	1
PPC 5315 PM EN	**2893927**	1

PPC 5115	PPC 5115 PM 1,1
15" TFT active 1024 x 768 250 cd/m² typ., (adjustable) Resistive industrial touch screen	
Celeron M 800 MHz Celeron M 1 GHz Pentium M 1,1 GHz Pentium M 1.6 GHz Pentium M 1.8 GHz	Pentium M 1,1 GHz
256 MB DDR RAM 512 MB DDR RAM 1 GB DDR RAM 2 GB DDR RAM	1 GB DDR RAM
512 MB 1 GB	
2.5" HDD min. 60 GB (UDMA)	
No CD-ROM	
COM 1, COM 2, COM 3 (RS-232), 1x LPT, 1x DVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 3x USB	COM 1, COM 2, COM 3 (RS-232), 1x LPT, 1x DVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 3x USB 1x USB on front
1x PCI/ISA shared	
2x Ethernet (10/100 Mbit), RJ45	
100 ... 240 V AC, 50/60 Hz 24 V DC +/- 20%	100 ... 240 V AC, 50/60 Hz
IP65 (front), IP20 (back) 5°C ... 45°C 10% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	

PPC 5315	PPC 5315 PM
15" TFT active 1024 x 768 250 cd/m² typ., (adjustable) Resistive industrial touch screen	
Celeron M 800 MHz Celeron M 1 GHz Pentium M 1.6 GHz Pentium M 1.8 GHz	Pentium M 1.6 GHz
256 MB DDR RAM 512 MB DDR RAM 1 GB DDR RAM 2 GB DDR RAM	1 GB DDR RAM
3.5" HDD min. 160 GB (UDMA)	
DVD burner DVD-ROM No CD-ROM	DVD burner
COM 1, COM 2, COM 3 (RS-232), 1x LPT, 1x DVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 3x USB Optional 1x USB on front	COM 1, COM 2, COM 3 (RS-232), 1x LPT, 1x DVI (VGA), 1x PS/2 mouse, 1x PS/2 keyboard, 3x USB
2x PCI/ISA shared, 1x PCI	
2x Ethernet (10/100 Mbit), RJ45	
100 ... 240 V AC, 50/60 Hz 24 V DC +/- 20%	100 ... 240 V AC, 50/60 Hz
IP65 (front), IP20 (back) 5°C ... 45°C 10% ... 85% (non-condensing) Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	

Industrial PCs in IP65

The industrial PCs in IP65 have a modern industrial design along with powerful technology, thus making installation in the control cabinet redundant.
Thanks to the various installation options, the devices in the light and narrow IP65 aluminum die-cast housing are an optimal solution for direct installation in the machine.

If you also wish to have future-oriented wireless network integration, the industrial PCs in IP65 provide an optional WLAN interface as per IEEE 802.11 b/g for fast and easy network integration.

Simply assemble your individual industrial PC in IP65 using our online configurator or select one of our ready-to-use devices.

VMT 3015

Configurable IPC in IP65 with touch screen, 15" display, enclosed housing

Description	Type	Order No.	Pcs. / Pkt.
IPC in IP65 with touch screen, **15" display** - Configurable	**VMT 3015**	**2913674**	1
IPC in IP65 with touch screen, **15" display** - No operating system - Windows XP German - Windows XP English			
Bracket as per VESA standard for a monitor / IPC in a IP65 housing	**VMT HALTERUNG VESA**	**2900959**	1
Support bracket left/right for a monitor / IPC in an IP65 housing	**VMT HALTEWINKEL LI/RE**	**2900933**	1
Table stand for a monitor / IPC in the IP65 housing	**VMT TISCHFUSS**	**2900946**	1
Bracket connection adapter for a monitor / IPC in the IP65 housing	**VMT GALGENANSCHLUSSADAPTER**	**2900962**	1
Keyboard storage for an IPC in the IP65 housing	**VMT TASTATURABLAGE 420MM**	**2913331**	1
External power supply unit for an IPC in the IP65 housing	**VMT EXT PS**	**2900904**	1

Technical data	
Display data	
Display	15" TFT active
Monitor resolution	1024 x 768
Display lighting	250 cd/m² typ., (adjustable)
Touch screen	Resistive industrial touch screen
Computer data	
Processor (configuration option)	Atom 1.1 GHz Atom 1.6 GHz
Main memory (configuration option)	1 GB DDR2 RAM 2 GB DDR2 RAM
Compact flash (configuration option)	-
Data memory (configuration option)	Flash SSD 1 GB Flash SSD 2 GB Flash SSD 4 GB 2.5" HDD, min 40 GB , 24x7 Automotive
Interfaces	COM 1 (RS-232), 1x PS/2 (mouse/keyboard), 2x USB, 2x Mini PCI Express
Optional interfaces	Wireless LAN
Graphics card	On-board graphics chip (AGP)
Network	2x Ethernet (10/100/1000 MBit), RJ45
Power supply unit	24 V DC +/- 20%
External dimensions	
Width	400 mm
Height	305 mm
Depth	65 mm
General data	
Degree of protection	IP65
Ambient temperature (operation)	-20°C ... 50°C
Permissible humidity (operation)	10% ... 85% (non-condensing)
Mounting type	Depending on the configuration
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

VMT 5015

Configurable IPC in IP65 with touch screen, 15" display, enclosed housing

VMT 5015 SM ...

IPC in IP65 with touch screen, 15" display, enclosed housing

VMT 5015 PM 1,1 ...

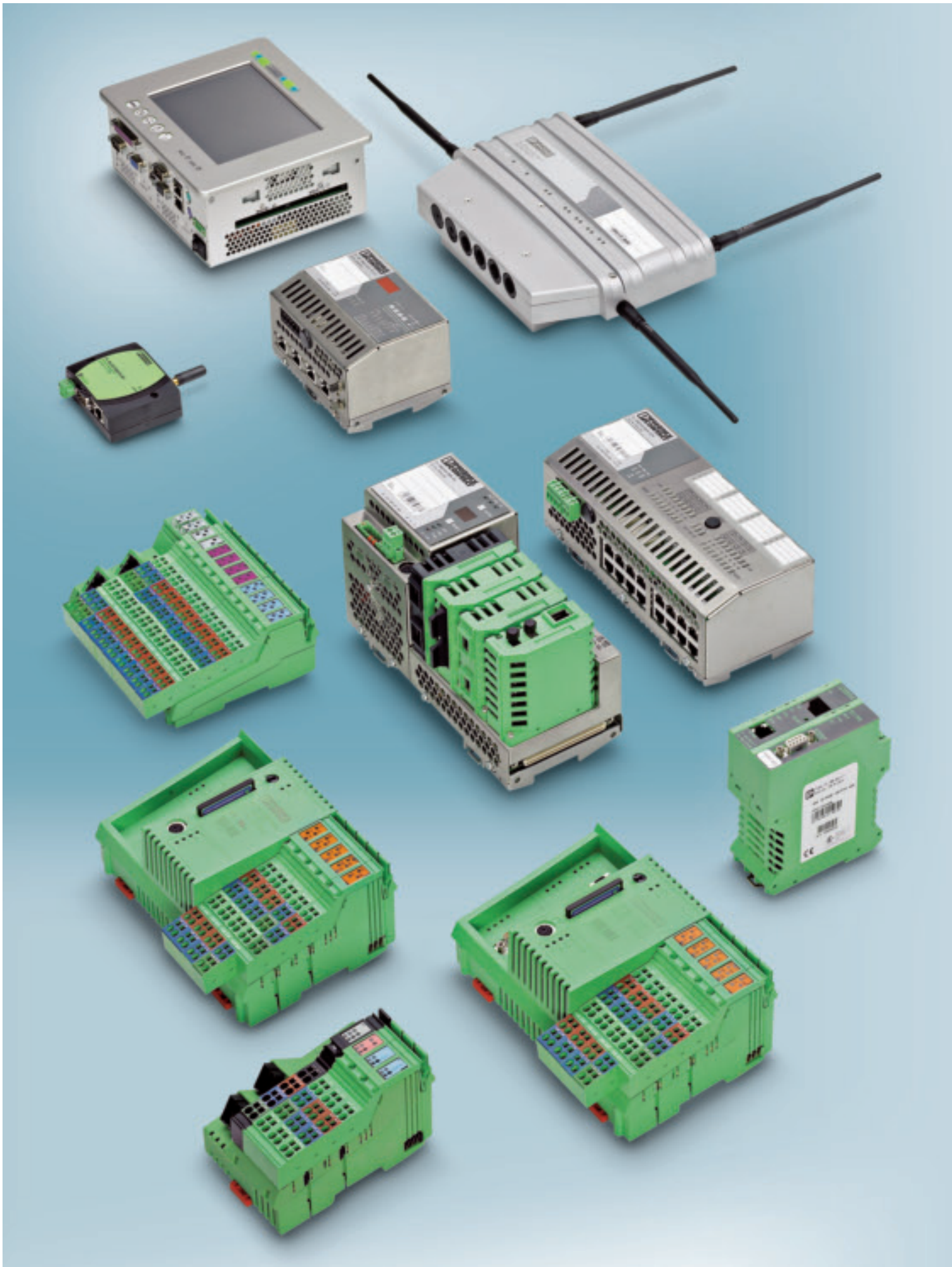
IPC in IP65 with touch screen, 15" display, enclosed housing

Type	Order No.	Pcs. / Pkt.
VMT 5015	**2887603**	1
VMT HALTERUNG VESA	**2900959**	1
VMT HALTEWINKEL LI/RE	**2900933**	1
VMT TISCHFUSS	**2900946**	1
VMT GALGENANSCHLUSSADAPTER	**2900962**	1
VMT TASTATURABLAGE 420MM	**2913331**	1
VMT EXT PS	**2900904**	1

Type	Order No.	Pcs. / Pkt.
VMT 5015 SM	**2900632**	1
VMT 5015 SM DE	**2900645**	1
VMT 5015 SM EN	**2900658**	1
VMT HALTERUNG VESA	**2900959**	1
VMT HALTEWINKEL LI/RE	**2900933**	1
VMT TISCHFUSS	**2900946**	1
VMT GALGENANSCHLUSSADAPTER	**2900962**	1
VMT TASTATURABLAGE 420MM	**2913331**	1
VMT EXT PS	**2900904**	1

Type	Order No.	Pcs. / Pkt.
VMT 5015 PM 1,1	**2900603**	1
VMT 5015 PM 1,1 DE	**2900616**	1
VMT 5015 PM 1,1 EN	**2900629**	1
VMT HALTERUNG VESA	**2900959**	1
VMT HALTEWINKEL LI/RE	**2900933**	1
VMT TISCHFUSS	**2900946**	1
VMT GALGENANSCHLUSSADAPTER	**2900962**	1
VMT TASTATURABLAGE 420MM	**2913331**	1
VMT EXT PS	**2900904**	1

15" TFT active 1024 x 768 250 cd/m² typ., (adjustable) Resistive industrial touch screen	15" TFT active 1024 x 768 250 cd/m² typ., (adjustable) Resistive industrial touch screen	15" TFT active 1024 x 768 250 cd/m² typ., (adjustable) Resistive industrial touch screen
Celeron M 800 MHz Celeron M 1 GHz Pentium M 1,1 GHz Pentium M 1.4 GHz	Celeron M 800 MHz	Pentium M 1,1 GHz
256 MB DDR RAM 512 MB DDR RAM 1 GB DDR RAM 2 GB DDR RAM	1 GB DDR RAM	1 GB DDR RAM
128 MB 256 MB 512 MB 1 GB	-	-
2.5" HDD, min 40 GB , 24x7 Automotive	2.5" HDD, min 40 GB , 24x7 Automotive	2.5" HDD, min 40 GB , 24x7 Automotive
COM 1 (RS-232), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB, line out Wireless LAN On-board graphics chip (AGP) 1x Ethernet (10/100 Mbit), RJ45 24 V DC +/- 20%	COM 1 (RS-232), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB, line out - On-board graphics chip (AGP) 1x Ethernet (10/100 Mbit), RJ45 24 V DC +/- 20%	COM 1 (RS-232), 1x PS/2 mouse, 1x PS/2 keyboard, 2x USB, line out - On-board graphics chip (AGP) 1x Ethernet (10/100 Mbit), RJ45 24 V DC +/- 20%
395 mm 292 mm 65 mm	395 mm 292 mm 65 mm	395 mm 292 mm 65 mm
IP65 -20°C ... 45°C 10% ... 85% (non-condensing) Depending on the configuration DIN EN 60068-2-6 DIN EN 60068-2-27	IP65 -20°C ... 45°C 10% ... 85% (non-condensing) Depending on accessories DIN EN 60068-2-6 DIN EN 60068-2-27	IP65 -20°C ... 45°C 10% ... 85% (non-condensing) Depending on accessories DIN EN 60068-2-6 DIN EN 60068-2-27



PROFINET automation solution

PROFINET – The future-oriented system solution

PROFINET is the realtime Ethernet approach that can be used in all industrial motion control fields - from factory automation to process engineering. PROFINET technology provides all relevant functions and the required flexibility for this.

In addition to the cyclical data exchange, PROFINET IO also includes many other important basic features. One of its most outstanding features is its detailed and topology-based diagnostics. Even the integration of fieldbuses is uniformly done. The TCP/IP communication can always be simultaneously used in a PROFINET network. PCs, cameras and other devices are thus perfectly integrated. Wireless paths with PROFINET via WLAN or Bluetooth open up entirely new avenues.

PROFINET from Phoenix Contact comprises all components, from the controller to the infrastructure to I/O systems. PROFINET has been perfectly integrated into the PC Worx engineering system and the controllers. All applications that are currently structured with INTERBUS or PROFIBUS can thus be switched over to PROFINET.

Our products and services such as training and support can help you find the ideal solution for your automation task.

Program overview

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).

Automation solution with PROFINET

All automation components from Phoenix Contact are based on the IT-powered automation concept.

This means that in addition to PROFINET, international IT standards such as TCP/IP, FTP, HTTP or SNMP have also been integrated into the devices.

This simplifies the integration of modules into the network as well as making data exchange seamless and fast across all company levels.

As a result, the machine and system productivity increases.

Reasons to use PROFINET

PROFINET is a system and not just a fieldbus replacement. It enables uniformity over the value added chain and a good integration into the higher-level control systems.

The point-to-point cabling and the detailed diagnostics descriptions in the devices ensure automatic, precise and detailed diagnostics in the system.

At the telegram level, PROFINET has adhered to the Ethernet specifications. This enables the proper integration of IT technologies for network diagnostics, web-based solutions and other TCP/IP-based protocols.

Standards such as SNMP (Simple Network Management Protocol) for diagnostics tasks or LLDP (Link Layer Discovery Protocol) for topology detection have been adopted here.

PROFINET provides future security by means of the integration of all applications from the INTERBUS and PROFIBUS environments via the proxy technology.

PROFINET thus forms the backbone of the solution. Subsystems are uniformly embedded.

In PROFINET, compatibility and interoperability is ensured by means of a worldwide standardized certification system. The basis for the certification of PROFINET devices is the three successive conformance classes A, B and C. This specification of the conformance classes ensures that all the devices used in your application have the approved basic functions.

With its properties, PROFINET perfectly supplements the trend towards Ethernet-based automation solutions or IT-powered automation. Realtime data exchange, safe communication and Ethernet-based communication take place via one medium. These excellent properties are reflected in the AUTOMATIONWORX system products as well.

PROFINET competence

The last few years have seen the development of a PROFINET portfolio with well thought through hardware and software solutions as well as a range of services covering the complete value added chain, from the product conception to system support.

Application know-how from various industries and the variety of products leads to new solutions.

An important prerequisite for the success of the PROFINET system, however, is the wide use of the technology. Phoenix Contact thus decided early on to provide all services that have been available for the INTERBUS system for several years for PROFINET as well. The Phoenix Contact Competence Center (PCCC) acts as the help center for device manufacturers and users and combines the PROFINET activities of the Phoenix Contact Group. The PCCC has been certified as a PROFINET Competence Center by Profibus International (PI) since 2005.

Class C:

- Certified devices and network components with hardware support
- Deterministic data transmission
- Best performance and synchronism

Class B:

- Certified devices and network components
- Topology detection and upload
- Easy diagnostics, redundancy

Class A:

- Standard Ethernet network components
- Certified devices and controllers
- Cyclical/acyclical data exchange
- Basic diagnostics mechanisms

PROFINET controllers

The control platforms of the performance class 300 and 400 have automatically integrated INTERBUS, Ethernet and PROFINET. The network is configured and programmed throughout all platforms with the PC Worx software tool. The Diag+ diagnostics tool automatically provides perfect device and network diagnostics.

PROFINET infrastructure

In the PROFINET system, the Ethernet infrastructure plays an important role in ensuring a uniform structure.

Factory Line products make Ethernet fit for industrial applications. The MMS, MCS and SMCS switch ranges are an integral part of the PROFINET network. Bluetooth and WLAN components enable cyclical wireless communication as well.

PROFINET I/O systems

The I/O systems for IP20 and IP67 installations adapt to meet your requirements and reduce expenditures due to innovative installation systems.

In the control cabinet or in the field, our I/O systems support all standard sensor and actuator signals through to power linking. Communication via PROFINET is available for every I/O system.

PROFINET proxy

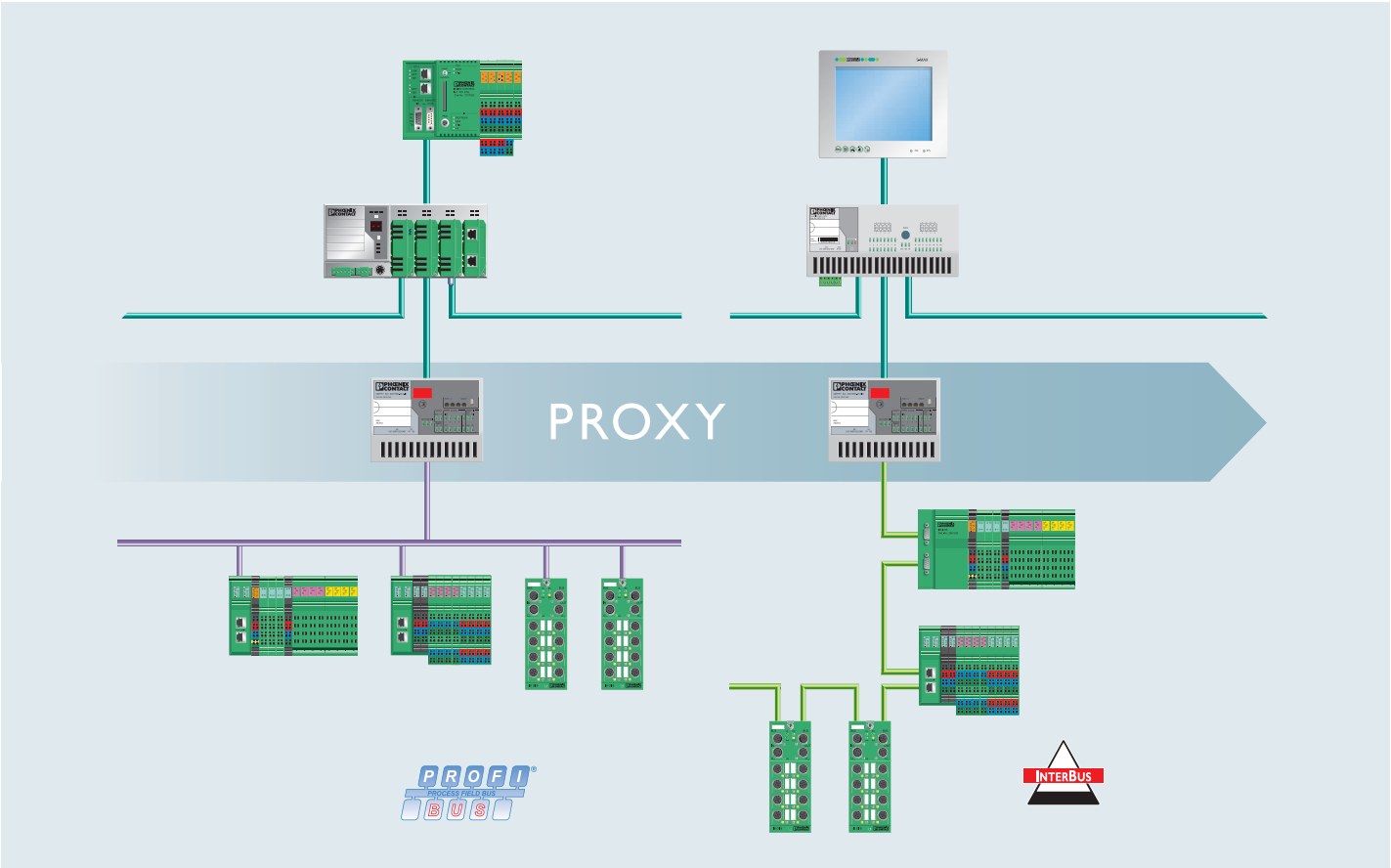
The PROFINET proxies combine the advantages of the fieldbus system with the world of PROFINET.

Thanks to transparent access to the data and the uniform diagnostics, existing installations can be easily integrated into the entire solution, thus safeguarding the investments already made in hardware or engineering.

PROFINET devices as components

In addition to the system approach in the AUTOMATIONWORX solution, PROFINET devices and the infrastructure can also be perfectly integrated into external systems.

The relevant GSD files for the products are the key to good integration. They describe a device in detail from the parameterization to the diagnostics.



PROFINET IO controllers

Embedded controllers

					
Type **Order No.**	**ILC 330 PN** **2988191**	**ILC 350 PN** **2876928**	**ILC 370 PN 2TX-IB** **2876915**	**ILC 390 PN 2TX-IB** **2985314**	**RFC 470 PN 3TX** **2916600**
Type **Order No.**			**ILC 370 PN 2TX-IB/M** **2985576**		
Description	Inline controllers	Inline controllers	Inline controllers	Inline controllers	Remote field controller
Page	**28**	**29**	**29**	**29**	**31**

PC-based controllers

					
Type **Order No.**	**S-MAX 400 CE PN** **2700706**	**S-MAX 412 CE PN** **2700586**	**S-MAX 412 CE PN/M** **2700816**	**S-MAX 415 CE PN** **2700573**	**S-MAX 417 CE PN** **2700803**
Type **Order No.**	**S-MAX 400 CE PN II** **2700829**				
Description	Combination of PLC, PC platform and fieldbus master, without display	Combination of PLC, PC platform, visualization and fieldbus master	Combination of PLC, PC platform, visualization and fieldbus master	Combination of PLC, PC platform, visualization and fieldbus master	Combination of PLC, PC platform, visualization and fieldbus master
Page	**32**	**33**	**33**	**33**	**33**

PROFINET IO devices

	Inline Modular		Inline Block IO	INTERBUS ST	Fieldline Modular	Rugged Line
						
Type **Order No.**	**FL IL 24 BK-PN-PAC** **2878816**	**IL PN BK DI8 DO4 2TX-PAC** **2703994**	**ILB PN 24 DI16 DIO16-2TX** **2878146**	**ST PN 24 BK-2TX** **2897059**	**FLM BK PN M12 DI 8 M12-2TX** **2736741**	**RL PN 24-2 DI 16 2TX** **2773665**
Type **Order No.**						**RL PN 24-1 DIO 16/8 2TX** **2773500**
Type **Order No.**						**RL PN 24-2 DIO 16/8 2TX** **2773652**
Description	Inline Modular bus coupler	Inline Modular bus coupler	Inline Block IO digital input/output module	INTERBUS ST bus coupler	Fieldline Modular bus coupler	Rugged Line digital input device, Rugged Line digital input/output device
Page	**243**	**242**	**318**	**334**	**370**	**408**

Network infrastructure

Managed switches

Lean managed switches





Type **Order No.**	**FL SWITCH MM HS** **2832328**	**FL SWITCH MCS 16TX** **2832700**	**FL SWITCH SMCS 8TX** **2989226**	**FL SWITCH SMCS 6TX/2SFP** **2989323**	**FL SWITCH LM ...X** **2989...**
Type **Order No.**	**FL SWITCH MM HS/M** **2832522**	**FL SWITCH MCS 14TX/2FX** **2832713**	**FL SWITCH SMCS 8GT** **2891123**	**FL SWITCH SMCS 6GT/2SFP** **2891479**	
Description	Modular managed switch	Managed compact switch	Smart managed compact switch with RJ45 ports	Smart managed compact switch with RJ45 ports and Gigabit glass fiber interfaces	Lean managed switch
Page	**187**	**186**	**184**	**185**	**180**

Unmanaged switches

Wireless




Type **Order No.**	**FL SWITCH SF...** **2832...**	**FL SWITCH SFN ...** **2891...**	**FL WLAN 24 AP 802-11** **2884075**	**FL BLUETOOTH AP** **2737999**
Type **Order No.**			**FL WLAN 24 DAP 802-11** **2884279**	**FL BT EPA** **2692788**
Type **Order No.**			**FL WLAN 230 AP 802-11** **2884444**	
Description	Standard switch	Standard switch in narrow type	Wireless LAN access point	Bluetooth access point
Page	**198**	**194**	**216**	**214**

PROFINET proxies

Starter kit

Software





Type **Order No.**	**FL NP PND-4TX IB** **2985974**	**FL NP PND-4TX PB** **2985071**	**PROFINET STARTERKIT 3.0** **2988395**	**PC WORX...** **2985...**	**IBS Diag+ SWT** **2730307**
Type **Order No.**	**FL NP PND-4TX IB-LK** **2985929**				
Description	INTERBUS proxy with integrated 4 port switch	PROFIBUS proxy with integrated 4 port switch	Starter kit, including PROFINET IO controller, bus terminal modules, I/O modules, managed switch, power supply unit as well as accessories and cables for setting up a PROFINET test application	IEC 61131 programming environment	Diagnostic software
Page	**160**	**161**	**www.phoenixcontact.net/eshop**	**43**	**57**

Proxies form a link between PROFINET and other systems.

These products allow universal access to field devices via the standardized PROFINET proxy specification. Double addressing on the controller and proxy side is not necessary. The data exchange, diagnostics and parameterization take place completely via the PROFINET protocol. The proxy can thus be integrated in every control with PROFINET functionality and parameterized via the respective programming tool. Only the PROFIBUS proxy FL NP PND-4TX PB is exclusively operated with PC WorX.

The controller boards of the series FL NP... combine a 4-port control cabinet switch with a fieldbus master. These proxies support the realtime class PROFINET IO RT. The integrated switch offers the option of versatile topologies – It can take over the uplink to the control system as a control cabinet switch or be connected in series in distributed applications in the field.

FL NP PND-4TX IB

INTERBUS proxy with integrated 4-port switch

Description	Type	Order No.	Pcs. / Pkt.
Proxy for PROFINET IO - INTERBUS - INTERBUS FO - PROFIBUS	**FL NP PND-4TX IB**	**2985974**	1
Parameterization memory - 256 MB	**CF FLASH 256MB**	**2988780**	1
F-SMA connector set for HCS fiber (diameter of the individual elements 2.9 mm), for self-assembly consisting of four quick mounting connectors with bend protection			
F-SMA connector set for polymer fiber (diameter of the individual elements 2.2 mm), for self-assembly consisting of four quick mounting connectors with bend protection			

Technical data	
PROFINET IO	
Specification	PROFINET-IO RT, spec. 2.x
Conformance class	B
Update rate	Min. 1 ms
Software	
	Diagnostics software: DIAG+, version 2.0 or higher Configuration software: using the GSDML file or PC WORX version 5.0 or higher
Ethernet	
Type of connection	RJ45 female connector
No.	4
Transmission speed	10/100 Mbps
INTERBUS	
Interface	INTERBUS (Master)
Type of connection	9-pos. D-SUB female
No.	1
Number of I/O nodes	8192
Number of devices with parameter channel (PCP)	Max. 126
Transmission rate	500 kBaud/ 2 MBaud, switchable
PROFIBUS	
Interface	-
Type of connection	-
No.	-
Transmission speed	-
Number of supported devices	
Number of supported devices	Max. 512 (depending on the control class and data direction)
Power supply	
Supply voltage	24 V DC
Range of supply voltages	18.5 V DC ... 30.2 V DC
Typical current consumption	Typ. 350 mA
General data	
Width	128 mm
Height	95 mm
Depth	69 mm
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-25°C ... 70°C

FL NP PND-4TX IB-LK

INTERBUS proxy for fiber optics with integrated 4-port switch

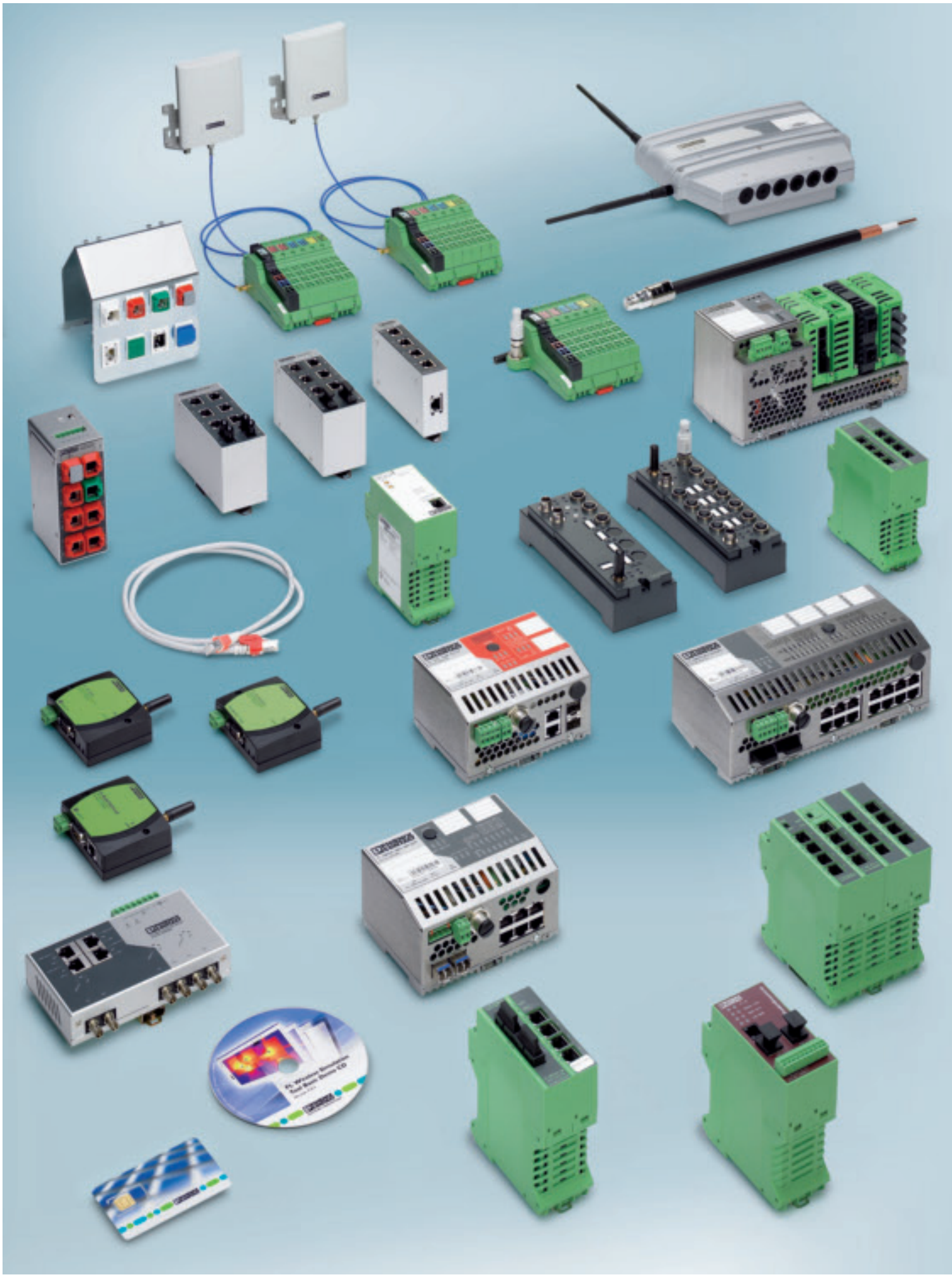
FL NP PND-4TX PB

PROFIBUS proxy with integrated 4-port switch

Type	Order No.	Pcs. / Pkt.
FL NP PND-4TX IB-LK	**2985929**	1
CF FLASH 256MB	**2988780**	1
PSM-SET-FSMA/4-HCS	**2799487**	1
PSM-SET-FSMA/4-KT	**2799720**	1

Type	Order No.	Pcs. / Pkt.
FL NP PND-4TX PB	**2985071**	1
CF FLASH 256MB	**2988780**	1

PROFINET-IO RT, spec. 2.x B Min. 1 ms	PROFINET-IO RT, Spec. 2.1 B Min. 1 ms
Diagnostics software: DIAG+, version 2.0 or higher Configuration software: using the GSDML file or PC WORX version 5.0 or higher	Diagnostics software: DIAG+, version 2.0 or higher Configuration software PC WORX starting from Version 5.20, Service Pack 3
RJ45 female connector 4 10/100 Mbps	RJ45 female connector 4 10/100 Mbps
INTERBUS (Master) F-SMA connector 1 8192 Max. 126 500 kBaud/ 2 MBaud, switchable	- - - - - -
- - - -	PROFIBUS-DP V1 master 9-pos. D-SUB female 1 Up to 12 Mbps
Max. 512 (depending on the control class and data direction)	125
24 V DC 18.5 V DC ... 30.2 V DC Typ. 350 mA	24 V DC 18.5 V DC ... 30.2 V DC 350 mA
128 mm 95 mm 69 mm -25°C ... 60°C -25°C ... 70°C	128 mm 95 mm 69 mm -25°C ... 55°C -25°C ... 70°C



Industrial network solutions | Factory Line

Security, Wired and Wireless

A complete offer of industrial Ethernet solutions

Factory Line, the comprehensive range of industrial Ethernet products and services, provides solutions for all configuration levels of an Ethernet-based automation solution.

The range of Factory Line products goes from passive components (such as cables and patch fields) and active infrastructure (media converters, hubs, switches) to proxy and gateway solutions for automation networks. The automator has complete control over his/her automation network at all times via the user-friendly network management tools.

The security concept

If Ethernet-based production systems are directly coupled to the company network, they must be protected from unauthorized access and malware.

Phoenix Contact has therefore developed a three-stage security concept for safe encryption (remote access) for industrial automation:

- Simple access locking for mechanical protection,
- Managed switches with integrated IEEE security functions,
- Security devices with firewall and router function suitable for industrial applications.

We provide you with the optimum security solution for every requirement!

Industrial Wireless in automation

Modern wireless transmission systems simplify installation, reduce maintenance and downtimes, increase system availability, and thus result in increased productivity.

Phoenix Contact offers the ideal industrial wireless solution for your requirements. The wireless products have been specially designed for use in harsh industrial environments and offer a high degree of reliability and data integrity, whilst still being easy to handle.

Program overview

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).

The international consulting company Frost & Sullivan has presented Phoenix Contact with the "2008 European Industrial Wireless Marketing Strategy Leadership of the Year Award".

Security in automation

The introduction of Ethernet-based communication solutions in many industrial production sectors is one of the driving forces for open and flexible automation systems. The production level, however, is oriented to the Ethernet standards used in the office environment. A switch-over from fieldbus to Ethernet communication not only brings about significant changes and adaptations, but also opens up new automation options, e.g. security and routing functions.

Advantageous layer 3 functions

The use of Ethernet with layer 3 functions offers the following advantages:

- Reduction in complexity thanks to a non-variable part strategy for the automation components
- Time and cost saving due to avoidance of individual configuration along with the corresponding testing efforts
- Easier troubleshooting as devices of various machines can be interchanged
- No loss of guarantee even if changes are made to the machine
- Restrictive use of IP addresses
- Conscious use of security devices and functions for the protection of properties as well as for access control.

Factory Line security

The Factory Line products help in implementing a three-stage concept that offers four devices for safe remote access/ teleservice.

This concept is integrated into the entire production network in stages depending on the risk potential. It fulfills the high automation technology requirements, thereby offering extensive protection.

Fast Ring Detection/Large Ring Support

Unlike the RSTP standard, redundant networks can now be connected under the root with up to 28 devices, instead of seven devices as before, thanks to the Fast Ring Detection procedure supported in the managed switches. Here, unlike other redundancy procedures, the ring can be integrated into a higher-level RSTP network. The recovery time of Fast Ring Detection is just 100 ms which allows isolated switch-over to PROFINET networks.

Ethernet IO and automation protocols

Automation protocols such as PROFINET IO and EtherNet/IP play an important role in the transmission of time-critical IO data. The switch infrastructure must thus be designed accordingly.

For PROFINET IO, the managed switches support priority-controlled forwarding of Ethernet frames. For this, priority-related information in the VLAN (Virtual Local Area Network) tag is evaluated as per IEEE 802.1Q standard. Prioritization of data packets ensures that higher-priority data traffic, such as time-sensitive process data, is not disturbed by low-priority data traffic, such as non-time-critical parameterizations, in the case of a large traffic load. Time-critical IO data can thus be given higher priority and can reach the destination faster.

In EtherNet/IP applications, the use of multicast data streams for IO data transmission results in further requirements for the Ethernet infrastructure. For this purpose, the modular managed switches and managed compact switches have intelligent multicast filtering and support the IGMP snooping mechanism. Multicast groups can thus be created dynamically and automatically in the switch, in addition to static entries. This stops uncontrolled spreading of multicast data streams in the network, thus preventing them from consuming bandwidth unnecessarily and affecting the network performance.

Switch with standard functions

The SF and SFN switch series have been developed for the control cabinet or bus housing requirements.

The SF switch series is characterized by the flat structure of just 30 mm and optionally has 8 or 16 ports, of which 0, 1 or 2 ports are available as glass fiber interfaces.

The SFN switches are designed for use in the control cabinet and have a design width of 30 mm in the five-port versions and 53 mm in the eight-port versions. Here too, up to 2 ports are available in glass fiber connection method.

If required, the SFN switches can be equipped with security accessories in order to prevent unauthorized connections and disconnections efficiently.

High network availability through fiber optics diagnostics

The unique fiber optics diagnostics with polymer fibers (POF) and HCS fibers (Hard Clad Silica) enables continuous monitoring also for the Ethernet-fiber optics paths. The modules with SCRJ connector technology constantly monitor practical transmission parameters. Critical changes in the transmission path are detected and can be eliminated before they result in a breakdown.

Clear presentation of topology

For a diagnostics and network topology presentation in the engineering tool (e. g. PC Worx or STEP7), the Link Layer Discovery Protocol (LLDP) has been integrated into the Smart Managed Switches which leads the user accurately to the error location in the event of an error.

Gigabit Ethernet

The standard switches (SFN) as well as the managed switches have uniform gigabit-compatible twisted-pair ports. Optionally, the gigabit glass fiber technology IEEE 802.3z can also be used here. This technology enables up to 20 km transmission depending on the type.

The Factory Line Smart Managed Switches allow the configuration of redundant gigabit networks. They are therefore suitable when a redundant and high-performance coupling is required between the automation network and the higher-level company network. For this, SX and LX fiber optics transceivers are available for ranges of up to 80 km.

Configuration with plug-in module

Memory modules are available for easy device configuration during start-up as well as when replacing the device.

During replacement as well as during the initial startup, the memory module is simply plugged in, the switch is started and the module thus gets configured automatically.






	MMS/ MCS	SMCS	LMS	SF	SFN	ME	SFN Gigabit	HUB
Redundancy								
RSTP	x	x	x					
Fast Ring Detection	x	x	x					
MRP	x	x						
PROFINET RTsupport	x	x	x					
PROFINET IO device	x	x						
EtherNet/IP support	x	x	x					
Powerlink / FL Net								x
Gigabitsupport		x					x	
POU	x							
Flat design	x	x		x				
Slim design			x		x	x	x	x
Maritime approval	x		x			x		

We convert your requirements into highly efficient radio solutions

Modern wireless transmission systems simplify installation, reduce maintenance and downtimes, increase system availability, and thus result in increased productivity. Phoenix Contact offers the ideal industrial wireless solution for your requirements. The wireless products have been specially designed for use in harsh industrial environments and offer a high degree of reliability and data integrity, whilst still being easy to handle. Irrespective of whether you want to transfer a few IO signals or large volumes of data; whether the communication is to take place in realtime over short distances or over several hundred meters; whether the production hall has a metallic environment or is an outdoor area, the product range provides the ideal solution and the required accessories for every requirement.

Bluetooth

Bluetooth (IEEE 802.15.1) is a standardized wireless technology that enables extremely rugged and reliable data transmission in metallic environments as well as in environments with high levels of interference. Bluetooth has become established as a standard for wireless transmission of control data in automation networks and has, among other things, been included in the Profinet standard.

Additional features include:
- Several Bluetooth systems can be operated simultaneously
- Tap-proof and manipulation-proof
- High range in industrial halls

Factory Line Bluetooth is the standard-compliant optimization for industrial factory automation. Advantages:
- Interference-free operation parallel to WLAN
- Higher performance
- Effective integration into automation systems

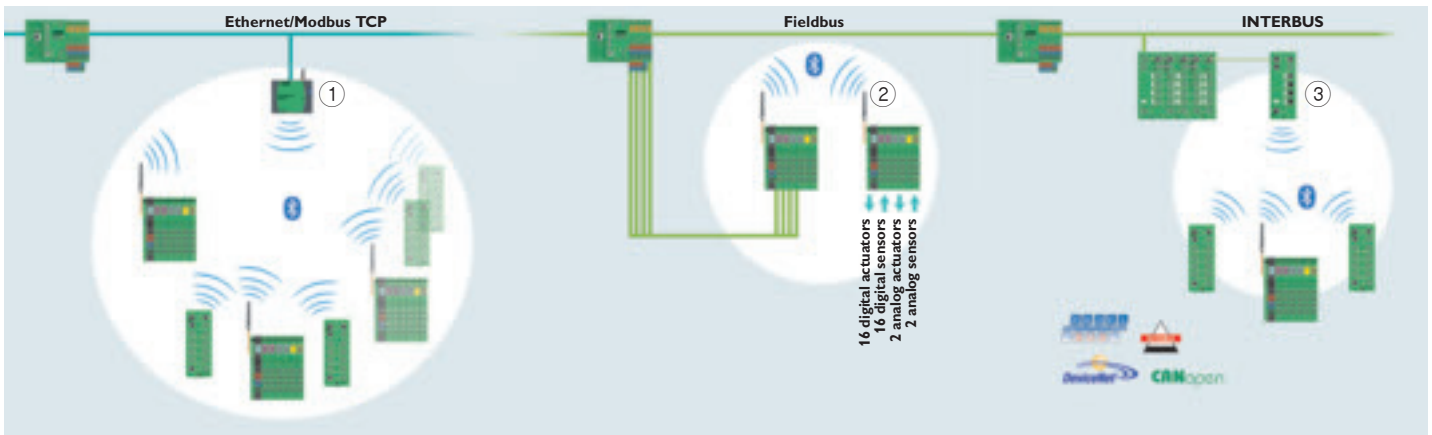
WLAN

WLAN (IEEE 802.11) is the standardized wireless technology for high-performance, system-wide wireless networks with many mobile devices. It can be effectively integrated into the IT and system network. WLAN has proved its worth in industry as a wireless network infrastructure as well as in the area of controlling mobile transport systems.

Additional features include:
- High data rates of up to 54 Mbps gross
- Wide networks can be implemented
- Mobility of network devices through automatic roaming.

Factory Line WLAN is the standard-compliant optimization for industrial automation. The advantages are:
- Greater reliability
- High performance and wide range
- Extremely fast roaming in a few milliseconds.

Wireless IO



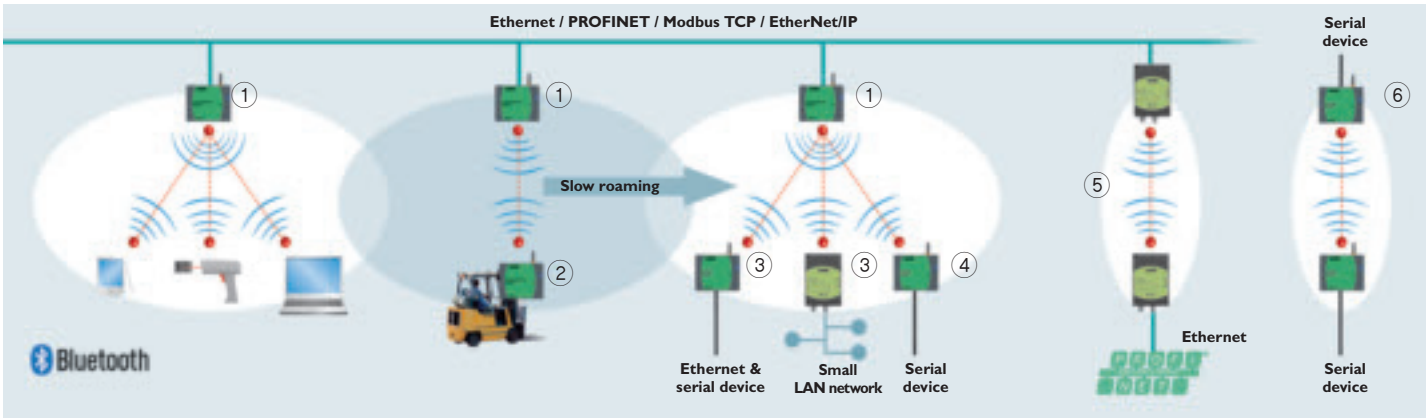
Wireless IO is the solution for wireless transmission of time-critical digital and analog control signals in an automation network. Speed, reliability and ease of handling are the features of this solution.

① Up to seven wireless IO modules can be integrated into an Ethernet / Modbus-TCP network in a wireless manner via the FL BT MOD IO AP.

② The Wireless MUX allows easy and quick wireless connection of a few digital and analog signals to the controller via the available input and output channels.

③ Up to three wireless IO modules can be connected with the most important fieldbuses in a wireless manner via the FL BT BS3 base station.

Factory Line Bluetooth



Factory Line Bluetooth allows reliable and easy wireless integration of automation components in the automation network.

① The Bluetooth access point can be used to integrate up to seven devices with the SPP (Serial Port Profile) or PAN (Personal Area Network) Bluetooth profiles in the network.

② Automatic roaming between different access points is possible.

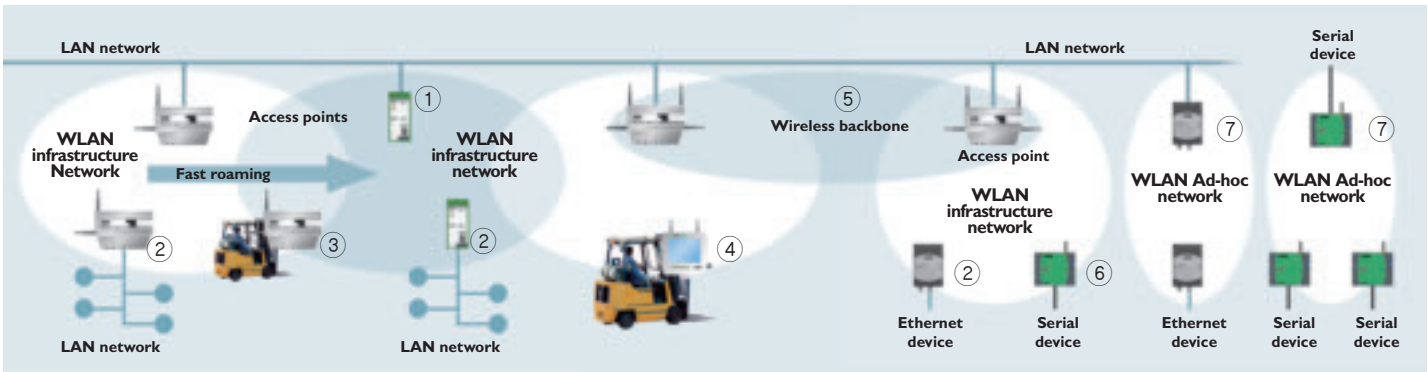
③ Field devices with Ethernet connection are integrated in the network via Bluetooth client modules.

④ Devices with serial connection (RS-232, RS-422, RS-485) are integrated in the Ethernet network via the serial port adapter and the COM server integrated in the BLUETOOTH AP.

⑤ The data transmission is protocol-transparent, thus enabling easy integration into industrial Ethernet networks such as PROFINET, Modbus/TCP or EtherNet/IP.

⑥ Serial point to point connections are also possible.

Factory Line WLAN



Factory Line WLAN is a full coverage high-speed wireless access to your Ethernet network.

① The Factory Line WLAN access points are reliable, safe and high-performance wireless access points for the network.

② Ethernet-compatible devices can be integrated quickly and easily in the WLAN network via WLAN client adapters.

③ Special fast roaming functions allow fast roaming between the radio cells.

④ Panel PCs with IP65 allow wireless operation and monitoring of systems.

⑤ High-performance wireless backbone connections can be easily implemented with dual access points.

⑥ Devices with RS-232, RS-422 or RS-485 connection can also be integrated into the WLAN network via serial port adapters.

⑦ Smaller networks can also be implemented as ad-hoc networks without access points.

Security solutions




Type Order No.	FL MGUARD RS 2989310	FL SEC SGW GT/GT 2892009	FL MGUARD RS-B 2989899	FL MGUARD PCI/266 2989019
Type Order No.	FL MGUARD RS VPN 2989611			FL MGUARD PCI/533 2989213
Type Order No.	FL MGUARD RS VPN ANALOG 2989718			FL MGUARD PCI/266 VPN 2989514
Type Order No.	FL MGUARD RS VPN ISDN 2989815			FL MGUARD PCI/533 VPN 2989417
Description	Firewall/router in ME45 format	Firewall/router/gateway	Router in ME45 format	Firewall/router in PCI format
from page	174	176	177	178

Lean Managed Switches

Smart Managed Compact Switches





Type Order No.	FL SWITCH LM 5TX 2989527	FL SWITCH LM 4TX/1FX 2989624	FL SWITCH LM 4TX/1FX ST 2989721	FL SWITCH SMCS 8TX 2989226	FL SWITCH SMCS 6TX/2SFP 2989323
Type Order No.	FL SWITCH LM 8TX 2832632	FL SWITCH LM 4TX/1FX SM 2989828	FL SWITCH LM 4TX/1FX SM ST 2989925	FL SWITCH SMCS 8GT 2891123	FL SWITCH SMCS 6GT/2SFP 2891479
Type Order No.	FL SWITCH LM 8TX-E 2891466	FL SWITCH LM 4TX/2FX... 28...	FL SWITCH LM 4TX/2FX ST 2989132		
Type Order No.		FL SWITCH LM 4TX/2FX SM... 2891...	FL SWITCH LM 4TX/2FX SM ST 2989239		
Description	Lean Managed Switch with RJ45 ports	Lean Managed Switch with RJ45 ports and SC fiber optics ports	Lean Managed Switch with RJ45 ports and ST fiber optics ports	Smart Managed Compact Switch with RJ45 ports	Smart Managed Compact Switch with RJ45 ports and gigabit glass fiber interfaces
from page	180	181	181	184	185

Managed Compact Switches

Modular Managed Switches




Type Order No.	FL SWITCH MCS 16TX 2832700	FL SWITCH MCS 14TX/2FX 2832713	FL SWITCH MM HS 2832328	FL MXT 2832331
Type Order No.			FL SWITCH MM HS/M 2832522	FL MXT/M 2832535
Description	Managed Switch, 16 twisted pair ports 10/100Base-T(X)	Managed Switch, 14 twisted pair ports 10/100Base-T(X) two 100Base-FX multi-mode glass fiber interfaces	Modular Managed Switch (MMS), head station with 4 integrated slots (8 ports), 10/100 Mbps	Extension module with 4 slots (8 ports)
Page	186	187	187	187

Accessories – Configuration memory and interface modules

					
Type **Order No.**	**FL IF MEM 2TX-D** **2832483**	**FL MEM PLUG** **2891259**	**FL IF 2TX VS-RJ-F** **2832344**	**FL IF 2FX SC-F** **2832412**	**FL IF 2FX SM SC-D** **2832205**
Type **Order No.**	**FL IF MEM 2TX-D/MRM** **2891770**	**FL MEM PLUG/MRM** **2891275**	**FL IF 2TX VS-RJ-D** **2832357**	**FL IF 2FX SC-D** **2832425**	
Type **Order No.**			**FL IF 2PSE-F** **2832904**	**FL IF 2FX ST-D** **2884033**	
Description	Configuration memory, 2 twisted pair 10/100Base-T(X) ports	Configuration memory, replaceable, for easy device replacement and start-up	2 twisted pair 10/100Base-T(X) ports, 2 x RJ45 connection from below or from front	2 100Base-FX multi-mode glass fiber ports, 2 x SC connection from below or from front	2 100Base-FX single-mode glass fiber ports, 2 x SC connection from below, max. 36000 m range
Page	**188**	**189**	**189**	**189**	**190**

			
Type **Order No.**	**FL IF 2HCS 100-D** **2832742**	**FL IF TX/POF 10/100-D** **2832807**	**FL IF 2POF SCRJ-D** **2891084**
Type **Order No.**	**FL IF 2POF 10/100-D** **2832852**	**FL IF TX/HCS 100-D** **2832739**	
Description	2 HCS/polymer fiber ports, 2 x F-SMA connection from below	One twisted pair and HCS/polymer fiber port each, 1 x RJ45 and 1 x F-SMA connection from below	2 POF/HCS fiber ports, connection from below, diagnostics-compatible
Page	**191**	**191**	**191**

Standard Function Switches Narrow with gigabit

				
Type **Order No.**	**FL SWITCH SFN 8GT** **2891673**	**FL SWITCH SFN 7GT/SX** **2891518**	**FL SWITCH SFN 6GT/2SX** **2891398**	**FL SWITCH SFN 6GT/2LX** **2891987**
Type **Order No.**				**FL SWITCH SFN 6GT/2LX-20** **2891563**
Description	8 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	7 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing; 1 fiber optics port (SC-D, full duplex mode, 1000 Mbps), floating alarm contact, redundant 24 V DC supply	6 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing; 2 fiber optics ports (SC-D, full duplex mode, 1000 Mbps), floating alarm contact, redundant 24 V DC supply	6 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing, 2 fiber optics ports (SC-D, full duplex mode, 1000 Mbps), floating alarm contact, redundant 24 V DC supply
Page	**192**	**193**	**193**	**193**

Standard function switches narrow






Type Order No.	FL SWITCH SFN 5TX 2891152	FL SWITCH SFN 4TX/FX... 2891...	FL SWITCH SFN 6TX/2FX 2891314	FL SWITCH SFNB 5TX 2891001	FL SWITCH SFNT 5TX 2891003	FL SWITCH SFNT 7TX/FX 2891006
Type Order No.	FL SWITCH SFN 8TX 2891929	FL SWITCH SFN 7TX/FX... 2891...	FL SWITCH SFN 6TX/2FX ST	FL SWITCH SFNB 8TX 2891002	FL SWITCH SFNT 8TX 2891005	FL SWITCH SFNT 7TX/FX ST 2891007
Type Order No.					FL SWITCH SFNT 4TX/FX 2891004	
Description	5(8) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing	4(7) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D or ST, full duplex mode, 100 Mbps)	6 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 2 fiber optics ports (SC-D or ST, full duplex mode, 100 Mbps)	5(8) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, Basic version	5 (8/4) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D full duplex mode, 100 Mbps), Wide temperature range	7 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D or ST, full duplex mode, 100 Mbps, Wide temperature range
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Standard function switches





Type Order No.	FL SWITCH SF 8TX 2832771	FL SWITCH SF 7TX/FX 2832726	FL SWITCH SF 6TX/2FX 2832933	FL SWITCH SF 6TX/2FX ST 2832674	FL SWITCH SF 4TX/3FX ST 2832603
Type Order No.	FL SWITCH SF 16TX 2832849	FL SWITCH SF 15TX/FX 2832661	FL SWITCH SF 14TX/2FX 2832593	FL SWITCH SF 7TX/FX ST 2832577	
Description	8(16) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	7(15) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply	6(14) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing; 2 fiber optics ports (SC-D, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply	6(7) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 2(1) fiber optics ports (ST, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply	4 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 3 fiber optics ports (ST, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply
Page	198	199	199	199	199

Unmanaged switches / Hubs / Power over Ethernet





Type Order No.	FL SWITCH 5TX 2832085	FL SWITCH 8TX 2832218	FL HUB 8TX-ZF 2832551	FL HUB 16TX-ZF 2832564	FL IF 2PSE-F 2832904
Description	5 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	8 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	8 TP-RJ45 ports 10/100 Mbps	16 TP-RJ45 ports 10/100 Mbps	Power over Ethernet interface module for the Modular Managed Switch, 2 x RJ45 connection from the front
Page	201	201	201	201	189

Patch cable, patch fields and accessories

					
Type **Order No.**	**FL MM PATCH ...** **2989...**	**FL CAT5 PATCH...** **2832...**	**FL PF 2TX CAT...** **2891...**	**FL RA SF8** **2832519**	**FL RJ45 PROTECT CAP** **2832991**
Type **Order No.**	**FL SM PATCH ...** **2989...**	**FL CAT6 PATCH...** **2891...**	**FL PF 8TX CAT...** **2891...**		
Description	Fiber optics patch cable, pre-assembled, cable length 1 m or 2 m	Patch cable, CAT5/CAT6, pre-assembled, cable length 0.3 m to 10 m	Patch field, 2(8) RJ45 ports CAT5e(CAT6)	Rail adapter, for vertical mounting position	Dust protection cap for RJ45 female connentor
Page	202	203	208	209	209

Accessories for Factory Line patch cables

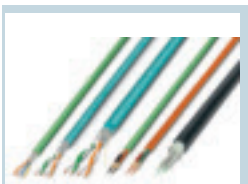
					
Type **Order No.**	**FL DUST CVR ...** **2891...**	**FL PATCH CCODE ...** **2891...**	**FL IP 54 FLANGE ...** **2891...**	**FL IP 54 SPOUT** **2891440**	**FL IP 54 ASSEMBLY TOOL** **2891547**
Description	Dust protection elements with color marking, for SFN switch and an angled patch connector	Color marking for FL CAT...Patch…	IP54 protection with color marking, for SFN switch and an angled patch connector	IP54 protection for patch cable, used with FL IP 54 FLANGE ...	Assembly tool for FL IP 54 SPOUT
Page	204	205	205	205	205

Security with Factory Line patch cables

					
Type **Order No.**	**FL PATCH SAFE CLIP** **2891246**	**FL PLUG GUARD ...** **2891...**	**FL PORT GUARD** **2891220**	**FL PATCH GUARD** **2891424**	**FL PATCH GUARD CCODE** **2891...**
Type **Order No.**			**FL PLUG GUARD KEY** **2891327**	**FL PATCH GUARD KEY** **2891521**	
Description	Security element for FL CAT...Patch...	Security frame for SFN switch and patch fields	Locking element and key for security frame FL PLUG GUARD...	Lockable security element and key for FL PATCH...	Color marking for FL PATCH GUARD
Page	206	207	207	207	207

Software

Accessories

			
Type **Order No.**	**FL SNMP OPC SERVER** **2832166**	**FL OPC SNMP AGENT** **2832179**	**...-CABLE-...** **...**
Description	For monitoring and configuration of SNMP-compatible devices in HMI and SCADA systems	Integration of OPC-based automation solutions in company-wide network management systems	Suitable cables and connectors can be found in our online catalog
Page	53	53	www.phoenixcontact.net/catalog

Wireless MUX IO

Bluetooth

Type Order No.	ILB BT ADIO MUX-OMNI... 2884...	ILB BT ADIO MUX-PANEL... 28845...	ILB BT ADIO MUX-OMNI 8/M 2693185	IL MODULAR MUX SD 2700047
Description	Wireless MUX set, two modules with 16 digital inputs and outputs each and 2 analog inputs and outputs each 2 OMNI antennas	Wireless MUX set, two modules with 16 digital inputs and outputs each and 2 analog inputs and outputs each 2 PANEL antennas	Wireless MUX set, with maritime approval	SD memory card with special modular MUX firmware
Page	210	211	211	211

Wireless IO

Bluetooth

Type Order No.	FLM BT BS 3... 2...	FL BT MOD IO AP 2884758	FLM BT DIO 8/8 M12... 2...	ILB BT ADIO 2/2/16/16... 2884282
Description	Fieldline Modular Wireless IO base station for up to three wireless IO devices	Bluetooth Modbus IO access point	Fieldline Modular Wireless IO device, 8 digital inputs, 8 digital outputs, M12	Inline Block Wireless IO device, 16 digital inputs, 16 digital outputs, 2 analog inputs, 2 analog outputs
Page	212	213	213	213

Factory Line Bluetooth

Bluetooth

Type Order No.	FL BLUETOOTH AP 2737999	FL BT EPA 2692788	FL BT EPA AIR SET 2693091	FL BT SPA 2884952
Description	Bluetooth access point	Bluetooth Ethernet port adapter	Installation set comprising two FL BT EPAs and connecting cables	Bluetooth serial port adapter
Page	214	215	215	215

Wireless LAN access point

WLAN

Type Order No.	FL WLAN 24 AP 802-11 2884075	FL WLAN 24 DAP 802-11 2884279	FL WLAN 230 AP 802-11 2884444	FL WLAN 24 AP 802-11 XDB 2990037
Description	Wireless LAN access point,1 wireless interface, 2 antennas	Wireless LAN access point,2 wireless interfaces, 4 antennas	Wireless LAN access point,1 wireless interface, 2 antennas	Wireless LAN access point or client
Page	216	216	216	217

Wireless Ethernet

Software

WLAN

Type Order No.	FL WLAN 24 EC 802-11 2884130	FL WLAN EPA 2692791	FL WLAN SPA 2884761	FL WST BASIC 2692254
Description	Wireless LAN Ethernet client	Wireless LAN Ethernet port adapter	Wireless LAN serial port adapter	Simulation software
Page	219	219	219	41

Antennas 2.4 GHz and 5 GHz

Type Order No.	RAD-ISM-2400-ANT-PAN-8-0 2867610	RAD-ISM-2400-ANT-CIR-8-0 2884936	RAD-ISM-2400-ANT-OMNI-5-0 2884923	RAD-ISM-2400-ANT-VAN-3-0-SMA 2885867	RAD-ISM-5000-ANT-PAR-18-N 5606613
Type Order No.			RAD-ISM-2400-ANT-OMNI-6-0 2885919	RAD-ISM-2400-ANT-VAN-3-1-MCX 2885702	RAD-ISM-5000-ANT-PAR-22-N 5606174
Description	PANEL directional wireless antenna, incl. assembly material	PANEL directional wireless antenna, incl. assembly material,	OMNI omnidirectional antenna, incl. assembly material	OMNI omnidirectional antenna with protection against vandalism	Parabolic directional wireless antenna (5 GHz), incl. assembly material
Page	220	220	220	220	221

Antenna cable, adapter and surge protection

Type Order No.	RAD-CAB-EF142-... 28845...	RAD-CAB-EF393-... 28676...	RAD-PIG-EF316-...-SMA 286...	RAD-ADP-...SMA/F... 28...	CN-LAMBDA/4-... 28188...
Description	Antenna extension cable Type EF 142, SMA (male) connection on both ends	Antenna extension cable Type EF 393, N (male) connection on both ends	Adapter cable (pigtails) type EF 316	Adapter for adaptation between devices and cables or for adaptation among cables,	Surge protection
Page	222	222	222	222	222

Leaky wave conductors and accessories

Type Order No.	FL LCX CABLE METER 2884774	FL LCX CON-N/F 2884965	FL LCX 50-OHM 2884978	FL LCX TOOL 2884981	FL LCX CLAMP 2884994
Description	Leaky wave conductors	Connectors	Termination resistors	Alignment tool	Cable tie
Page	223	223	223	223	223

Security solutions for Ethernet-based production networks

Companies are successful only when the operation of their production systems is safe and trouble-free. Since accidents, sabotage or data loss can cause large-scale economic damage, Phoenix Contact offers FL MGUARD RS … an industrial Firewall/router solution that can be used to secure decentrally distributed automation systems individually. The devices have been specially designed for use in a rough industrial environment and unlike the security solutions from the Office field, they fulfill the high automation requirements for data transmission and mechanical ruggedness.

Increased safety through decentral protection concepts

A central Firewall that secures the entire company network does not provide protection against mostly internal destructive actions. Production cells can be protected only using a decentrally effective concept that is based on a solution for the safety of termination devices. With FL MGUARD..., Phoenix Contact provides a product range that completely protects your automation system against unauthorized access.

The devices can be mounted on DIN rails and are integrated into the network as independent systems. There, they protect a part of the system network or an individual automation component without having a negative effect on the system to be secured.

Virtual addressing/NAT

If machines with similar structures are operated simultaneously in one network, each machine must be individually configured so that it is possible to integrate it into the higher-level communication system. Our FL MGUARD components support the 1:1-NAT function, so that production cells occupying identical IP addressing space can be used in a higher-level network. Individual configuration of serial machines is no longer required.

FL MGUARD RS

Firewall/Router in the ME45 format

Description	Type	Order No.	Pcs. / Pkt.
Firewall/Router in the ME45 format	**FL MGUARD RS**	**2989310**	1
Firewall/Router in the ME45 format, VPN support - Integrated analog modem - Integrated ISDN terminal adapter			

Technical data	
Ethernet interface	
Number of ports	2
Transmission speed	10/100 Mbps
Type of connection	RJ45
Other connections	
Potential-free signaling contact	Plug-in/screw connection via COMBICON
VPN - release button	-
Function	
Basic functionality	Router with intelligent Firewall
Supported browsers	HTTPS support required
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3
VLAN – Virtual Local Area Network	As per 802.1Q
Status and diagnostics displays	LEDs: P1, P2, Fault, State, Error, LAN, WAN
Security functions	
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent
Network time protocol (NTP) client	Client
Link layer discovery protocol (LLDP)	As per protocol 802.2
Remote syslog logging	On externals server
VPN throughput	-
Number of VPN tunnels	-
Encryption methods	-
Internet protocol security (IPsec) mode	-
Authentication	-
Data integrity	-
1:1 Network address translation (NAT) in the VPN	-
Firewall data throughput	Up to 99 Mbps
Firewall rules	Configurable stateful inspection firewall
Filtering	MAC and IP addresses, ports, protocols
Protection against	IP spoofing, DoS and SYN flood protection
Routing	Standard routing, NAT, 1:1-NAT, port forwarding
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V_{PP} (within the permitted voltage range)
Range of supply voltages	9 V DC ... 36 V DC
Typical current consumption	170 mA
General data	
Weight	250 g
Width	45 mm
Height	99 mm
Depth	112 mm
Degree of protection	IP20
Ambient temperature (operation)	0°C ... 55°C
Permissible humidity (operation)	10% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-4
Immunity to interference	EN 61000-6-2

FL MGUARD RS VPN

Firewall/Router in the ME45 format, VPN support

Type	Order No.	Pcs. / Pkt.
FL MGUARD RS VPN	2989611	1

2
10/100 Mbps
RJ45

Plug-in/screw connection via COMBICON
Connectable and optional LED

Router with intelligent Firewall and VPN

HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
LEDs: P1, P2, Fault, State, Error, LAN, WAN

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 70 Mbps
10 (Up to 250 with license possible)
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

24 V DC
3.6 V_{PP} (within the permitted voltage range)

9 V DC ... 36 V DC
170 mA

250 g
45 mm
99 mm
112 mm
IP20
0°C ... 55°C
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

FL MGUARD RS VPN ANALOG

Firewall/Router in the ME45 format, VPN support and an integrated analog modem

Type	Order No.	Pcs. / Pkt.
FL MGUARD RS VPN ANALOG	2989718	1

2
10/100 Mbps
RJ45

Plug-in/screw connection via COMBICON
Connectable and optional LED

Router with intelligent Firewall, VPN and integrated analog modem

HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
LEDs: P1, P2, Fault, State, Error, LAN, WAN

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 70 Mbps
10 (Up to 250 with license possible)
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

24 V DC
3.6 V_{PP} (within the permitted voltage range)

9 V DC ... 36 V DC
170 mA

250 g
45 mm
99 mm
112 mm
IP20
0°C ... 55°C
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

FL MGUARD RS VPN ISDN

Firewall/Router in the ME45 format, VPN support and an integrated ISDN terminal adapter

Type	Order No.	Pcs. / Pkt.
FL MGUARD RS VPN ISDN	2989815	1

2
10/100 Mbps
RJ45

Plug-in/screw connection via COMBICON
Connectable and optional LED

Router with intelligent Firewall, VPN and an integrated ISDN terminal adapter
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
LEDs: P1, P2, Fault, State, Error, LAN, WAN

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 70 Mbps
10 (Up to 250 with license possible)
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

24 V DC
3.6 V_{PP} (within the permitted voltage range)

9 V DC ... 36 V DC
170 mA

250 g
45 mm
99 mm
112 mm
IP20
0°C ... 55°C
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

Security Gateway

FL SEC SGW GT/GT

Firewall/router/gateway

The FL SEC SGW GT/GT Security Gateway is an ideal distributed Firewall modules for use in the control cabinet wherever access to automation networks is controlled and/or limited.

With data rates of up to 1000 Mbps at the RJ45 and SFP port, the Security Gateway offers maximum performance in automation applications.

A web server and an SNMP agent are provided for diagnostics, maintenance, and configuration via the network. A remote access point via the RS232 interface can be used for local operation.

A part of the comprehensive safety concept is the easy configuration of the Firewall thanks to the pre-defined smart rules. The filter rules required for this have already been pre-configured in FL SEC SGW GT/GT and can be easily selected via the web interface and the relevant device menus. Automation-typical applications such as PROFINET communication or Modbus/TCP can usually be released. Experts also have the option of editing filter functions.

The FL SEC SGW GT/GT can be flexibly used in networks using copper lines or pluggable glass fiber modules FL SFP... for multimode or single mode with transmission ranges of up to 80 km.

Description	Type	Order No.	Pcs. / Pkt.
Router, 1:1 NAT, pre-configured Firewall			
	FL SEC SGW GT/GT	**2892009**	1

Technical data	
Ethernet interface	
Number of ports	1
Transmission speed	10/100/1000 Mbps
Type of connection	RJ45
Fiber optic interface	
Transmission speed	1000 Mbps (full duplex)
Type of connection	SFP ports
Other connections	
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)
Function	
Basic functionality	Router with intelligent Firewall
Management	Web based management, SNMP or over V.24 (RS232)
Supported browsers	HTTPS support required
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3
VLAN – Virtual Local Area Network	-
Redundancy	-
Security functions	
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent
Network time protocol (NTP) client	Client
Link layer discovery protocol (LLDP)	As per protocol 802.2
Firewall rules	Configurable stateful-inspection-firewall preconfigured
Filtering	MAC and IP addresses, ports, protocols
Protection against	-
Routing	NAT, 1:1-NAT, Port Forwarding
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V_{PP} (within the permitted voltage range)
Range of supply voltages	18 V DC ... 32 V DC
Typical current consumption	-
General data	
Weight	660 g
Width	128 mm
Height	110 mm
Depth	69 mm
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 60°C
Permissible humidity (operation)	5% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-4
Immunity to interference	EN 61000-6-2

Economical configuration and addressing

The introduction of Ethernet-based communication solutions in various industrial manufacturing fields is one of the driving forces for open and flexible automation systems. Here, the production level is oriented towards the standards used in office environments. With the IT-powered automation, Phoenix Contact provides devices that have been specially designed for use in a rough industrial environment and unlike the security solutions from the office field, they fulfill the high automation requirements for data transmission and mechanical ruggedness.

Increased safety through decentral protection concepts

Production cells can be protected only using a decentrally effective concept that is based on a solution for the safety of termination devices. With FL MGUARD …, Phoenix Contact provides a product range that completely protects your automation system against unauthorized access.

The devices can be mounted on DIN rails and are integrated into the network as independent systems. There, they protect a part of the system network or an individual automation component without having a negative effect on the system to be secured.

Virtual addressing/NAT

If machines with similar structures are operated simultaneously in one network, each machine must be individually configured so that it is possible to integrate it into the higher-level communication system. Our FL MGUARD components support the 1:1-NAT function, so that production cells occupying identical IP addressing space can be used in a higher-level network. Individual configuration of serial machines is no longer required.

FL MGUARD RS-B

Router in ME45 format

Description	Type	Order No.	Pcs. / Pkt.
Router in the ME45 format	FL MGUARD RS-B	2989899	1

Technical data	
Ethernet interface	
Number of ports	2
Transmission speed	10/100 Mbps
Type of connection	RJ45
Other connections	
Potential-free signaling contact	Plug-in/screw connection via COMBICON
Function	
Basic functionality	Router for standard routing, NAT, 1:1-NAT and port forwarding
Supported browsers	HTTPS support required
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3
VLAN – Virtual Local Area Network	-
Status and diagnostics displays	LEDs: P1, P2, Fault, State, Error, LAN, WAN
Security functions	
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent
Network time protocol (NTP) client	Client
Link layer discovery protocol (LLDP)	As per protocol 802.2
Remote syslog logging	On externals server
VPN throughput	-
Number of VPN tunnels	-
Encryption methods	-
Internet protocol security (IPsec) mode	-
Authentication	-
Data integrity	-
1:1 Network address translation (NAT) in the VPN	-
Firewall data throughput	-
Firewall rules	-
Filtering	-
Protection against	-
Routing	Standard routing, NAT, 1:1-NAT, port forwarding
GRP_Routing data throughput	Up to 2 x 85.00 Mbps
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V_{PP} (within the permitted voltage range)
Range of supply voltages	9 V DC ... 36 V DC
Typical current consumption	170 mA
General data	
Weight	250 g
Width	45 mm
Height	99 mm
Depth	112 mm
Degree of protection	IP20
Ambient temperature (operation)	0°C ... 55°C
Permissible humidity (operation)	10% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-4
Immunity to interference	EN 61000-6-2

Security solutions in the PCI format for Ethernet-based production networks

Companies are successful only when the operation of their production systems is safe and trouble-free. Since accidents, sabotage or data loss can cause large-scale economic damage, Phoenix Contact offers FL MGUARD PCI … an industrial Firewall/router solution in the PCI format that can be used to secure decentrally distributed automation systems individually. The devices have been specially designed for use in industrial PCs without driver and independent from the operating system.

Increased safety through decentral protection concepts

A central Firewall that secures the entire company network does not provide protection against mostly internal destructive actions. Production cells can be protected only using a decentrally effective concept that is based on a solution for the safety of termination devices. With FL MGUARD..., Phoenix Contact provides a product range that completely protects your automation system against unauthorized access.

The FL MGUARD devices in the PCI format are integrated into IPCs and there, they protect a part of the system network or an individual automation component – without affecting the system to be secured. All incoming and outgoing data packets are monitored in accordance with prescribed rules.

Virtual addressing/NAT

If machines with similar structures are operated simultaneously in one network, each machine must be individually configured so that it is possible to integrate it into the higher-level communication system. Our FL MGUARD components support the 1:1-NAT function, so that production cells occupying identical IP addressing space can be used in a higher-level network. Individual configuration of serial machines is no longer required.

FL MGUARD PCI/266

Firewall/router in the PCI format,
processor cycle frequency 266 MHz

Description	Type	Order No.	Pcs. / Pkt.
Firewall/router in the PCI format - 266 MHz processor clock frequency - 533 MHz processor clock frequency	**FL MGUARD PCI/266**	**2989019**	1
Firewall/router in the PCI format, VPN support - 266 MHz processor clock frequency - 533 MHz processor clock frequency			

Technical data	
Ethernet interface	
Number of ports	2
Transmission speed	10/100 Mbps
Type of connection	RJ45
Function	
Basic functionality	Firewall/router
Supported browsers	HTTPS support required
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3
VLAN – Virtual Local Area Network	As per 802.1Q
Status and diagnostics displays	Link/activity per port
Security functions	
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent
Network time protocol (NTP) client	Client
Link layer discovery protocol (LLDP)	As per protocol 802.2
Remote syslog logging	On externals server
VPN throughput	-
Number of VPN tunnels	-
Encryption methods	-
Internet protocol security (IPsec) mode	-
Authentication	-
Data integrity	-
1:1 Network address translation (NAT) in the VPN	-
Firewall data throughput	Up to 90 Mbps
Firewall rules	Configurable stateful inspection firewall
Filtering	MAC and IP addresses, ports, protocols
Protection against	IP spoofing, DoS and SYN flood protection
Routing	NAT, 1:1-NAT, Port Forwarding
Power supply	
Connection supply	Via PCI bus
General data	
Weight	200 g
Format	PCI
Degree of protection	IP00
Ambient temperature (operation)	0°C ... 70°C
Permissible humidity (operation)	20% ... 90% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC

FL MGUARD PCI/533

Firewall/router in the PCI format,
processor cycle frequency 533 MHz

Type	Order No.	Pcs. / Pkt.
FL MGUARD PCI/533	**2989213**	1

2
10/100 Mbps
RJ45

Firewall/router
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
Link/activity per port

Server or Relay Agent

Client
As per protocol 802.2
On externals server
-
-
-
-
-
-
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

Via PCI bus

200 g
PCI
IP00
0°C ... 70°C
20% ... 90% (non-condensing)
Conformance with EMC directive 89/336/EEC

FL MGUARD PCI/266 VPN

Firewall/router in the PCI format, VPN support,
processor cycle frequency 266 MHz

Type	Order No.	Pcs. / Pkt.
FL MGUARD PCI/266 VPN	**2989514**	1

2
10/100 Mbps
RJ45

Firewall/router
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
Link/activity per port

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 30 Mbps
10
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 90 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

Via PCI bus

200 g
PCI
IP00
0°C ... 70°C
20% ... 90% (non-condensing)
Conformance with EMC directive 89/336/EEC

FL MGUARD PCI/533 VPN

Firewall/router in the PCI format, VPN support,
processor cycle frequency 533 MHz

Type	Order No.	Pcs. / Pkt.
FL MGUARD PCI/533 VPN	**2989417**	1

2
10/100 Mbps
RJ45

Firewall/router
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
Link/activity per port

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 70 Mbps
10
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

Via PCI bus

200 g
PCI
IP00
0°C ... 70°C
20% ... 90% (non-condensing)
Conformance with EMC directive 89/336/EEC

Lean Managed Switch

As much diagnostics as possible – as little space as necessary! The new compact fiber optics compatible and managed Ethernet switches (Factory Line Lean Managed range) connect copper-based Ethernet devices or network segments to any fiber optics Ethernet networks. The connection can be established either directly or via redundant lines in any topology forms. With the help of integrated software functions, data streams and connected automation equipment can be comprehensively diagnosed and analyzed.

The compact Lean Managed Switches are available as pure RJ45 10/100 Twisted Pair design with five or eight ports or in variants with four RJ45 ports and one or two glass fiber interfaces, 100BASE-FX as multimode or single mode. The glass fiber interfaces are available in SC or ST connection methods.

All twisted-pair ports have autonegotiation and autocrossing functions, thus providing the best conditions for "Plug and Work". The lean managed switches support redundant non-proprietary network structures via the IEEE 802.1w rapid spanning tree protocol and network management via SNMP. Furthermore, you have an integrated web server for extensive configuration and diagnostic options.

The lean managed switches are also suitable for the extended temperature range from -40°C to +70°C.

FL SWITCH LM 5TX

Lean managed switch with RJ45 ports

Description	Type	Order No.	Pcs. / Pkt.
Lean Managed Switch - 5 RJ45 ports - 8 RJ45 ports - 8 RJ45 ports, pre-configured for Ethernet/IP - 4 RJ45 ports, 1 SC fiber optics port (multi-mode) - 4 RJ45 ports, 1 ST fiber optics port (multi-mode) - 4 RJ45 ports, 1 SC fiber optics port (single mode) - 4 RJ45 ports, 1 ST fiber optics port (single mode)	**FL SWITCH LM 5TX**	**2989527**	1

Technical data	
Ethernet interface	
Number of ports	5 RJ45 ports
Transmission speed	10/100 Mbps
Type of connection	RJ45 female connector, autonegotiation
Fiber optic interface	
Number of ports	-
Type of connection	-
Wave length	-
Transmission length	-
	-
	-
	-
Other connections	
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)
Function	
Basic functionality	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)
Supported browsers	Internet Explorer 5.5 or higher
SNMP – Simple Network Management Protocol	Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Redundancy	Rapid Spanning Tree 802.1w, Fast Ring Detection
Status and diagnostics displays	Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)
Network extension parameters	
Cascading depth	Network, line and star structure: any
Maximum conductor length ((twisted pair)	100 m
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V_{PP}
Range of supply voltages	18.5 V DC ... 30.5 V DC
Typical current consumption	250 mA (at U_S = 24 V DC)
General data	
Weight	230 g
Width	45 mm
Height	99 mm
Depth	112 mm
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529
Ambient temperature (operation)	-40°C ... 70°C
Permissible humidity (operation)	30% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-3/-4
Immunity to interference	EN 61000-6-2

FL SWITCH LM 8TX...

Lean managed switch with RJ45 ports

FL SWITCH LM 4TX/1FX...

Lean managed switch with RJ45 ports and SC multimode ports

FL SWITCH LM 4TX/1FX SM...

Lean managed switch with RJ45 ports and SC single mode ports

Applied for: UL-EX / CUL-EX

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 8TX	**2832632**	1
FL SWITCH LM 8TX-E	**2891466**	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/1FX	**2989624**	1
FL SWITCH LM 4TX/1FX ST	**2989721**	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/1FX SM	**2989828**	1
FL SWITCH LM 4TX/1FX SM ST	**2989925**	1

8 RJ45 ports 10/100 Mbps RJ45 female connector, autonegotiation	4 RJ45 ports 10/100 Mbps RJ45 female connector, autonegotiation	4 RJ45 ports 10/100 Mbps RJ45 female connector, autonegotiation
- - - - - - -	1 SC multimode SC-DUPLEX 1300 nm 11000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000) 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200) 3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600) 2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)	1 SC single-mode SC-DUPLEX 1300 nm 36000 m (glass fiber with F-G 9/125 0.36 dB/km) 32000 m (glass fiber with F-G 9/125 0.4 dB/km) 26000 m (glass fiber with F-G 9/125 0.5 dB/km) -
6-pos. MINI DIN female connector (PS/2)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)
Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)
Internet Explorer 5.5 or higher Supported SNMP MIBs: Enterprise, MIB II, Bridge	Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge	Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection	Rapid Spanning Tree 802.1w, Fast Ring Detection	Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)	Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)	Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)
Network, line and star structure: any 100 m	Network, line and star structure: any 100 m	Network, line and star structure: any 100 m
24 V DC 3.6 V_{PP} 18.5 V DC ... 30.5 V DC 250 mA (at U_S = 24 V DC)	24 V DC 3.6 V_{PP} 18.5 V DC ... 30.5 V DC 400 mA (at U_S = 24 V DC)	24 V DC 3.6 V_{PP} 18.5 V DC ... 30.5 V DC 400 mA (at U_S = 24 V DC)
230 g 45 mm 99 mm 112 mm IP20 in acc. with DIN 40050/IEC 60529 -40°C ... 70°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2	230 g 45 mm 99 mm 112 mm IP20 in acc. with DIN 40050/IEC 60529 -40°C ... 70°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2	230 g 45 mm 99 mm 112 mm IP20 in acc. with DIN 40050/IEC 60529 -40°C ... 70°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2

Lean Managed Switch

The Lean Managed Switches have the most important management functions that are required for automation in Ethernet networks:

– RSTP is the standard IT protocol for the resolution of redundant network structures (meshed, ring). Redundant data paths are manufacturer-independent and thus possible for higher level 19" switches of the IT level as well
– Some unintentionally plugged loops are automatically suppressed (increase in the network ruggedness)
– The fast redundancy switchover using the Fast Ring Detection function prevents interruption of the process or communication failure in the case of redundancy.
– Port Mirroring reflects the data on a freely selectable diagnostics port of the switch. Recording data traffic for service purposes is thus possible
– Flexible and easy configuration is possible via Web-based Management using the automator
– SNMP – Simple Network Management Protocol – the standard for network management in IT enables integration into seamless company-wide network diagnostics concepts
– A configurable alarm contact serves as an alarm output (integration into alarming strategy of the PLC via digital inputs)
– Expanded operating temperature range from -40°C to +70°C enables universal applications

FL SWITCH LM 4TX/2FX...

Lean Managed Switch with RJ45 ports and SC multimode ports

Applied for: UL-EX / CUL-EX

Description	Type	Order No.	Pcs. / Pkt.
Lean Managed Switch - 4 RJ45 ports, 2 SC fiber optics ports (multi-mode)	**FL SWITCH LM 4TX/2FX**	**2832658**	1
- 4 RJ45 ports, 2 SC fiber optics ports (multi-mode), preconfigured for Ethernet/IP - 4 RJ45 ports, 2 SC fiber optics ports (single mode)	**FL SWITCH LM 4TX/2FX-E**	**2891660**	1
- 4 RJ45 ports, 2 SC fiber optics ports (single mode), preconfigured for Ethernet/IP - 4 RJ45 ports, 2 ST fiber optics ports (multi-mode)			
- 4 RJ45 ports, 2 ST fiber optics ports (single mode)			

Technical data

Ethernet interface	
Number of ports	4 RJ45 ports
Transmission speed	10/100 Mbps
Type of connection	RJ45 female connector, autonegotiation
Fiber optic interface	
Number of ports	2 SC multimode
Type of connection	SC-DUPLEX
Wave length	1300 nm
Transmission length	11000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000) 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200) 3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600) 2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)
Other connections	
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)
Function	
Basic functionality	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)
Supported browsers	Internet Explorer 5.5 or higher
SNMP – Simple Network Management Protocol	Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Redundancy	Rapid Spanning Tree 802.1w, Fast Ring Detection
Status and diagnostics displays	Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)
Network extension parameters	
Cascading depth	Network, line and star structure: any
Maximum conductor length ((twisted pair)	100 m
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V_{PP}
Range of supply voltages	18.5 V DC ... 30.5 V DC
Typical current consumption	400 mA (at U_S = 24 V DC)
General data	
Weight	230 g
Width	45 mm
Height	99 mm
Depth	112 mm
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529
Ambient temperature (operation)	-40°C ... 70°C
Permissible humidity (operation)	30% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-3/-4
Immunity to interference	EN 61000-6-2

FL SWITCH LM 4TX/2FX SM...

Lean Managed Switch with RJ45 ports and SC single mode ports

Applied for: UL-EX / CUL-EX

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX SM	**2891916**	1
FL SWITCH LM 4TX/2FX SM-E	**2891864**	1

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

2 SC single-mode
SC-DUPLEX
1300 nm
36000 m (glass fiber with F-G 9/125 0.36 dB/km)
32000 m (glass fiber with F-G 9/125 0.4 dB/km)
26000 m (glass fiber with F-G 9/125 0.5 dB/km)
-

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store-and-forward switch, complies with IEEE 802.3, two priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, integrated web server function, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at U_S = 24 V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

FL SWITCH LM 4TX/2FX ST

Lean Managed Switch with RJ45 ports and ST multi-mode ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX ST	**2989132**	1

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

2 ST multi mode
ST Simpex
1300 nm
11000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000)
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)
3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP-MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at U_S = 24 V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

FL SWITCH LM 4TX/2FX SM ST

Lean Managed Switch with RJ45 ports and ST single mode ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX SM ST	**2989239**	1

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

2 ST single mode
ST Simpex
-
36000 m (glass fiber with F-G 9/125 0.36 dB/km)
32000 m (glass fiber with F-G 9/125 0.4 dB/km)
26000 m (glass fiber with F-G 9/125 0.5 dB/km)
2800 m

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP-MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at U_S = 24 V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

Smart Managed Compact Switch

Ethernet

FL SWITCH SMCS 8...

Smart Managed Compact Switch with RJ45 ports

Gigabit switches offer excellent realtime properties with high data throughput at the same time. Not only does the network backbone profit from this, but also the powerful termination devices, such as data servers or camera applications.

The Smart Managed Switches FL SWITCH SMCS 8GT and FL SWITCH SMCS 6GT/2SFP are the first industrial DIN switch switches that are supported on all Gigabit Ethernet ports. "Smart" stands for Switches with Management for Automation and Real-Time.

The switches offer the realtime properties required by PROFINET-RT and open up the bandwidth for integrating IT realtime services, such as video and voice-over-IP in automation networks, at the same time.

The two optical interfaces of the FL SWITCH SMCS 6.../2SFP enable flexible use of various glass fiber modules. Distances of up to 80 km can thus be bridged.

A user can switch between operating modes, e.g. from Ethernet to PROFINET or Ethernet/IP without using the WEB interfaces. Thus, the switch is also equipped with a "SMART Mode" from which the desired operating state can be selected using the Mode button.

A pluggable configuration memory with an industrial M12 connection method allows easy device exchange.

Description	Type	Order No.	Pcs. / Pkt.
Smart Managed Compact Switch			
- 8 RJ45 ports	**FL SWITCH SMCS 8TX**	**2989226**	1
- 8 RJ45 ports, 1000 Mbps	**FL SWITCH SMCS 8GT**	**2891123**	1
Smart Managed Compact Switch			
- 6 RJ45 ports, 2 SFP fiber optics ports			
- 6 RJ45 ports, 2 SFP fiber optics ports, 1000 Mbps			
Pluggable input/output module for fiber optics			
- Wavelength 850 nm (short)			
- Wavelength 1300 nm (long)			
- Wavelength 1550 nm (longhaul)			
Configuration memory, replaceable	**FL MEM PLUG**	**2891259**	1
- MRM function	**FL MEM PLUG/MRM**	**2891275**	1

Technical data	FL SWITCH SMCS 8TX	FL SWITCH SMCS 8GT
Ethernet interface		
Number of ports	8	
Transmission speed	10/100 Mbps	10/100/1000 Mbps
Type of connection	RJ45	
Fiber optic interface		
Number of ports	-	
Type of connection	-	
Wave length	-	
Transmission length	-	
	-	
Other connections		
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	
Function		
Basic functionality	Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), Profinet IO Device, media redundancy protocol (MRP).	
Redundancy	Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439	
Status and diagnostics displays	Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL	
Network extension parameters		
Cascading depth	Network, line and star structure: any	
Maximum conductor length ((twisted pair)	100 m	
Power supply		
Supply voltage	24 V DC	
Residual ripple	3.6 V_{PP}	
Range of supply voltages	18 V DC ... 32 V DC	
Typical current consumption	600 mA (at U_S = 24 V DC)	
General data		
Weight	650 g	
Width	128 mm	
Height	100 mm	
Depth	69 mm	
Degree of protection	IP20	
Ambient temperature (operation)	0°C ... 55°C	
Permissible humidity (operation)	5% ... 95% (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC	
Emitted interference	EN 61000-6-3/-4	
Immunity to interference	EN 61000-6-2	

Ethernet

FL SWITCH SMCS 6.../2SFP

Smart Managed Compact Switch with RJ45 ports and Gigabit glass fiber interfaces

FL SFP ...X

Pluggable input/output module for fiber optics

FL SFP LH

Pluggable input/output module for fiber optics

Type	Order No.	Pcs. / Pkt.
FL SWITCH SMCS 6TX/2SFP	**2989323**	1
FL SWITCH SMCS 6GT/2SFP	**2891479**	1
FL MEM PLUG	**2891259**	1
FL MEM PLUG/MRM	**2891275**	1

Type	Order No.	Pcs. / Pkt.
FL SFP SX	**2891754**	1
FL SFP LX	**2891767**	1

Type	Order No.	Pcs. / Pkt.
FL SFP LH	**2989912**	1

FL SWITCH SMCS 6TX/2SFP	FL SWITCH SMCS 6GT/2SFP	FL SFP SX	FL SFP LX
6		-	
10/100 Mbps	10/100/1000 Mbps	-	
RJ45		-	
2		1	
SFP ports		1 LC female connector at the SFP module, 1000 mbps	
-		850 nm	1310 nm
Up to 80 km (depending on the fiber/SFP module used)		550 m (glass fiber 50/125)	30 km (glass fiber 9/125)
-		300 m (glass fiber 62.5/125)	250 m (glass fiber 62.5/125)
RS-232-C, 6-pos. MINI-DIN female connector (PS/2)		-	
Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), Profinet IO Device, media redundancy protocol (MRP).		SFP module as FO port	
Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, MRP		-	
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL		via a Factory-Line device	
Network, line and star structure: any		-	
100 m		-	
24 V DC		-	
3.6 V_{PP}		-	
18 V DC ... 32 V DC		-	
650 mA (at U_S = 24 V DC)		-	
650 g			
128 mm			
100 mm			
69 mm			
IP20			
0°C ... 55°C		-40°C ... 85°C (non-condensing)	
5% ... 95% (non-condensing)		30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC		-	
EN 61000-6-3/-4		-	
EN 61000-6-2		-	

FL SFP LH	
-	
-	
-	
1	
1 LC female connector at the SFP module, 1000 mbps	
1550 nm	
80 km (glass fiber 9/125)	
-	
-	
SFP module as FO port	
-	
via a Factory-Line device	
-	
-	
-	
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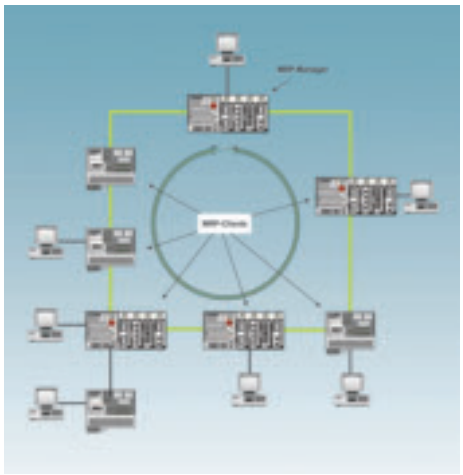
Managed Compact Switches and Modular Managed Switches



FL SWITCH MCS 16TX

Managed switch, 16 twisted pair ports

Always the right solution: compact and modular managed Factory Line switches

The Factory Line switches solve every Ethernet installation tasks in the industrial environment: The Factory Line Modular Managed Switch is the first industrial switch that can be expanded from 8 ports to 24 ports all the way through.

For applications in automation requiring a compact block switch, the managed compact switches with 16 TX or 14 TX and 2 glass ports are the right choice.

The switches are ideal for PROFINET realtime and EtherNet/IP applications and support the management functions required for this. Powerful full wire speed switching fabric provides high data throughput and top time response.

A part of the PROFINET standard IEC 61158 is the Media Redundancy Protocol MRP, which is based on a ring topology and ensures switchover times of 200 ms. A switch is defined as an MRP manager and the remaining as an MRP client. The MRP manager logically opens a port so that the ring is interrupted only logically (physically it is still a ring). A mains error is identified by the MRP manager and the open line is switched as the data line.

The redundancy manager function can be integrated into MCS and SMCS with the help of the MRM MEM plug (Order No.: 2891275) into MMS with the help of MRM module (Order No.: 2891770).

The modular managed switches are also available as a maritime version with GL and LR rating.

Ex:

Description	Type	Order No.	Pcs. / Pkt.
Managed switch - 16 RJ45 ports - 14 RJ45 ports, 2 SC fiber optics ports (multi-mode)	**FL SWITCH MCS 16TX**	**2832700**	1
Modular switch system, head station can be expanded to 24 Ethernet ports - GL rating			
Expansion, 8 Ethernet ports - GL rating			
Configuration memory, replaceable - MRM function	**FL MEM PLUG** **FL MEM PLUG/MRM**	**2891259** **2891275**	1 1
Programming cable	**PRG CAB MINI DIN**	**2730611**	1
Labeling field			

Technical data	
Ethernet interface	
Number of ports	16
Transmission speed	10/100 Mbps
Type of connection	RJ45
Fiber optic interface	
Number of ports	-
Type of connection	-
Wave length	-
Transmission length	-
Other connections	
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)
Function	
Basic functionality	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), port security, PROFINET-IO-device, DHCP option 82 relay agent
VLAN – Virtual Local Area Network	32 port-based, dynamic via GVRP
Redundancy	Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439
Status and diagnostics displays	Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL
Network extension parameters	
Cascading depth	Network, line and star structure: any
Maximum conductor length ((twisted pair)	100 m
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V_{PP}
Range of supply voltages	18.5 V DC ... 30.5 V DC
Typical current consumption	600 mA (at U_S = 24 V DC)
General data	
Weight	1000 g
Width	214 mm
Height	95 mm
Depth	69 mm
Degree of protection	IP20
Ambient temperature (operation)	0°C ... 55°C (non-condensing)
Permissible humidity (operation)	10% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-3/-4
Immunity to interference	EN 61000-6-2

Ethernet

FL SWITCH MCS 14TX/2FX

Managed switch, 14 twisted pair ports, 2 glass fiber interfaces

FL SWITCH MM HS...

Modular managed switch, head station

FL MXT...

Expansion

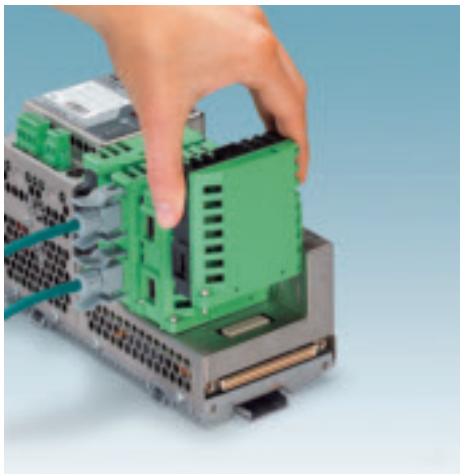
Type	Order No.	Pcs. / Pkt.
FL SWITCH MCS 14TX/2FX	**2832713**	1
FL MEM PLUG	**2891259**	1
FL MEM PLUG/MRM	**2891275**	1
PRG CAB MINI DIN	**2730611**	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH MM HS	**2832328**	1
FL SWITCH MM HS/M	**2832522**	1
FL IF MEM 2TX-D	**2832483**	1
PRG CAB MINI DIN	**2730611**	1
FL M LABEL	**2891055**	1

Type	Order No.	Pcs. / Pkt.
FL MXT	**2832331**	1
FL MXT/M	**2832535**	1
FL M LABEL	**2891055**	1

14	8 can be expanded to a maximum of 24 ports	-
10/100 Mbps	10/100 Mbps	10/100 Mbps
RJ45	8 ports via FL IF (interface) modules	8 ports via FL IF (interface) modules
2 SC multimode	8 can be expanded to a maximum of 24 ports	-
SC-DUPLEX	Via interface modules	Via interface modules
1300 nm	-	-
Up to 10000 m (depending on the fiber used)	Up to 10000 m (depending on the fiber used)	Up to 10000 m (depending on the fiber used)
RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	-
Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), port security, PROFINET-IO-device, DHCP option 82 relay agent	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), port security, PROFINET-IO-device, DHCP option 82 relay agent	Expansion module for modular managed switch
32 port-based, dynamic via GVRP	32 port-based, dynamic via GVRP	-
Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439	Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439	-
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL	Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage) and FAIL, two-digit 7-segment display	LEDs for media modules
Network, line and star structure: any	Network, line and star structure: any	-
100 m	100 m	-
24 V DC	24 V DC	-
3.6 V_{PP}	3.6 V_{PP}	-
18.5 V DC ... 30.5 V DC	18.5 V DC ... 30.2 V DC	-
800 mA (at U_S = 24 V DC)	350 mA (Up to 3500 mA, depending on the configuration)	(via head station)
1000 g	1350 g	550 g
214 mm	214 mm	127 mm
95 mm	95 mm	95 mm
69 mm	115 mm	115 mm
IP20	IP20	IP20
0°C ... 55°C (non-condensing)	0°C ... 55°C (non-condensing)	0°C ... 55°C (non-condensing)
10% ... 95% (non-condensing)	10% ... 95% (non-condensing)	10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4	EN 61000-6-3/-4	EN 61000-6-3/-4
EN 61000-6-2	EN 61000-6-2	EN 61000-6-2

Configuration memory and interface modules



Memory Plug – replaceable configuration memory

A Modular Managed Switch can guarantee switch-over times of 200 ms in a redundant network with medium redundancy protocol (MRP) and ring structure if the FL IF MEM 2TX-D/MRM has the MRP manager function integrated.

Once the module has been installed, the MRP redundancy mechanism must be configured in the web interfaces of the SWITCHES and the redundant ring with MRP is now at your disposal.

In addition to the MRP functionality, complete switch configurations including the management IP-address and all switch settings (port configuration, trap receiver, etc.) can also be saved (also refer to FL IF MEM 2TX-D, order no. 2892483).

The FL IF MEM 2TX-D/MRM has also been equipped with two RJ45 ports (TX) and thus guarantees a sufficient number of free ports for MMS SWITCH.

Ethernet

FL IF MEM 2TX-D...

Configuration memory, twisted pair

Applied for: BV

Description	Type	Order No.	Pcs. / Pkt.
Configuration memory,for saving the switch configuration			
- MRM function	**FL IF MEM 2TX-D** **FL IF MEM 2TX-D/MRM**	**2832483** **2891770**	1 1
Configuration memory, replaceable - MRM function			
Interface module for Modular Managed Switch system - Exit to the front - Exit downward - Power-over-Ethernet, exit to the front			
Fiber optics media module for connecting 100Base FX multimode glass fiber (1300 nm) - Exit to the front - Exit downward - Exit downward			
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	FL IF MEM 2TX-D	FL IF MEM 2TX-D/MRM
Ethernet interface		
Number of ports	2	
Transmission speed	10/100 Mbps	
Type of connection	RJ45 female connector	
Fiber optic interface		
Number of ports	-	
Type of connection	-	
Wave length	-	
Transmission length	-	
	-	
	-	
	-	
Function		
Basic functionality	Configuration memory (plug-in)	Configuration memory and manager for the media redundancy protocol (MRP)
Power supply		
Connection supply	From FL SWITCH MM HS or MXT	
Supply voltage	(via head station)	
Typical current consumption	10 mA	
General data		
Weight	70 g	
Width	31 mm	
Height	78 mm	
Depth	72.5 mm	
Degree of protection	IP20	
Ambient temperature (operation)	0°C ... 55°C (non-condensing)	
Permissible humidity (operation)	10% ... 95% (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC	
Emitted interference	EN 61000-6-3/-4	
Immunity to interference	EN 61000-6-2	

FL MEM PLUG...

Replaceable configuration memory

Type	Order No.	Pcs. / Pkt.
FL MEM PLUG	**2891259**	1
FL MEM PLUG/MRM	**2891275**	1
ZBF...		

FL MEM PLUG	FL MEM PLUG/MRM
-	
-	
-	
-	
-	
-	
-	
-	
Configuration memory (plug-in)	Configuration memory and manager for the media redundancy protocol (MRP)
from FL SWITCH MCS/SMCS	
-	
-	
25 g	
16 mm	
57 mm	
IP20	
0°C ... 55°C (non-condensing)	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-3/-4	
EN 61000-6-2	

Ethernet

FL IF 2TX VS-RJ-...

Interface module twisted pair

Ex: // Applied for: BV

Type	Order No.	Pcs. / Pkt.
FL IF 2TX VS-RJ-F	**2832344**	1
FL IF 2TX VS-RJ-D	**2832357**	1
FL IF 2PSE-F	**2832904**	1
ZBF...		

FL IF 2TX VS-RJ-F	FL IF 2PSE-F
2	2 PoE ports
10/100 Mbps (connection direction forwards)	
RJ45 female connector	
-	
-	
-	
-	
-	
-	
Media module for modular managed switch	Media module for Modular Managed Switch with Power over Ethernet IEEE802.3af, Power Source Equipment (PSE)
From FL SWITCH MM HS or MXT	Via head station
(via head station)	(Internal / 48 V DC for PoE)
10 mA	10 mA (Max. 900 mA)
70 g	
31 mm	
75.7 mm	84.7 mm
75.5 mm	
IP20	
0°C ... 55°C (non-condensing)	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-3/-4	
EN 61000-6-2	

Ethernet

FL IF 2FX S...

Interface module, glass fiber

Ex:

Type	Order No.	Pcs. / Pkt.
FL IF 2FX SC-F	**2832412**	1
FL IF 2FX SC-D	**2832425**	1
FL IF 2FX ST-D	**2884033**	1

FL IF 2FX SC-F	FL IF 2FX ST-D
2	-
100 Mbps	
SC connector	-
2	
SC connector	ST BFOC
1300 nm	
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)	10000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000)
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	
3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)	
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)	
Media module for modular managed switch	
From FL SWITCH MM HS or MXT	
(via head station)	
200 mA	
80 g	
31 mm	
75.7 mm	83 mm
72.5 m	
IP20	
0°C ... 55°C (non-condensing)	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-3/-4	
EN 61000-6-2	

POF and HCS module for the modular managed switch

The Modular Managed Switch (MMS) adapts to the particular connection requirements via the 2-port interface modules.

The polymer fiber and HCS interface modules provide the favorable option of allowing Ethernet transmissions at 10 Mbps or alternatively 100 Mbps in environments with strong electromagnetic interference.

A simple electrical isolation of potentials can be attained with these modules, between two buildings or plants, for example.

In order to achieve maximum port scalability, interface modules with 2 polymer/HCS fiber interfaces or with a twisted pair and a polymer and HCS fiber interface are available.

The Factory Line modular managed switch adapts to the respective requirements. It can also be combined with other interface modules of different connection methods.

The 2-port glass fiber module for the modular managed switch offers maximum flexibility when it comes to connecting switches over long distances. Variants are available for multimode and single-mode fibers and can bridge over distances of up to 36 km. The multimode variants have either an SC or an ST connector for connection to all conventional conductors and testers.

Ethernet

FL IF 2FX SM SC-D

Interface module, glass fiber

Ex: // Applied for: NV / BV

Description	Type	Order No.	Pcs. / Pkt.
FO media module for connecting single-mode (mono-mode) glass fibers (1300 nm), downward exit	**FL IF 2FX SM SC-D**	**2832205**	1
Interface module for Modular Managed Switch system, exit downward - HCS fibers - POF fibers			
Combined Interface module, exit downward - 1 RJ45 port, 1 POF port - 1 RJ45 port, 1 HCS port			
Interface modules, 2 ports, SCRJ for POF/HCS, diagnosis-capable			
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data

Ethernet interface	
Number of ports	2
Transmission speed	100 Mbps
Type of connection	SC connector
Fiber optic interface	
Number of ports	2
Type of connection	SC connector
Wave length	-
Transmission length	36000 m (glass fiber with F-G 9/125 0.36 dB/km)
Function	
Basic functionality	Media module for modular managed switch
Power supply	
Supply voltage	(via head station)
Typical current consumption	200 mA
General data	
Weight	80 g
Width	31 mm
Height	85 mm
Depth	72.5 mm
Degree of protection	IP20
Ambient temperature (operation)	0°C ... 55°C (non-condensing)
Permissible humidity (operation)	10% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-3/-4
Immunity to interference	EN 61000-6-2

Ethernet

FL IF 2... 100-D

Interface module HCS fiber

Type	Order No.	Pcs. / Pkt.
FL IF 2HCS 100-D	**2832742**	1
FL IF 2POF 10/100-D	**2832852**	1
ZBF...		

FL IF 2HCS 100-D	FL IF 2POF 10/100-D
2	
100 Mbps (connection direction downwards)	10/100 Mbps (connection direction downwards)
FSMA connectors	2 ports, 10/100 Mbp/s, autonegotiation
2	
F-SMA connector	
650 nm	
100 m (HCS fiber with F-S 200/230 10 dB/km)	50 m (including 3 dB system reserve, polymer fiber with 980/1000 230 dB/km)
Media module for modular managed switch	
(via head station)	
100 mA	
80 g	
31 mm	
75.7 mm	80.3 mm
72.5 mm	
IP20	
0°C ... 55°C (non-condensing)	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-3/-4	
EN 61000-6-2	

Ethernet

FL IF TX/... 100-D

Interface module, combined TX/POF

Type	Order No.	Pcs. / Pkt.
FL IF TX/POF 10/100-D	**2832807**	1
FL IF TX/HCS 100-D	**2832739**	1
ZBF...		

FL IF TX/POF 10/100-D	FL IF TX/HCS 100-D
1	
10/100 Mbps	100 Mbps
RJ45 female connectors	
1	
FSMA connector	
650 nm	
50 m (including 3 dB system reserve, polymer fiber with F-K 980/1000 230 dB/km)	100 m (HCS fiber with F-S 200/230 10 dB/km)
Media module for modular managed switch	
(via head station)	
60 mA	
70 g	
31 mm	
80.3 mm	75.7 mm
72.5 mm	
IP20	
0°C ... 55°C (non-condensing)	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-3/-4	
EN 61000-6-2	

Ethernet

FL IF 2POF SCRJ-D

Interface modules, SCRJ for POF/HCS, diagnosis-capable

Type	Order No.	Pcs. / Pkt.
FL IF 2POF SCRJ-D	**2891084**	1
ZBF...		

-
-
-
2
SCRJ
650 nm
50 m (including 3 dB system reserve, polymer fiber with F-K 980/1000 230 dB/km)
Media module for Modular Managed Switch with FO diagnosis
(via head station)
200 mA
80 g
31 mm
73.5 mm
72.5 mm
IP20
0°C ... 55°C (non-condensing)
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

SFN switch with gigabit support

The FL SWITCH SFN ... range of Factory Line switches with standard functions in their versions can be used for quick and cost-effective Ethernet network expansion. The switches have 8 ports, up to two of which are multimode/single-mode glass fiber ports.

The switches support transmission rates of 10/100/1000 Mbps at the twisted-pair ports, and 1000 Mbps at the glass fiber ports.

Ethernet

FL SWITCH SFN 8GT

Ethernet switch with RJ45 ports

Ex:

Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch, eight RJ45 ports - 8 RJ45 ports - 7 RJ45 ports, 1 SC FO port (multi-mode) - 6 RJ45 ports, 2 SC FO ports (multi-mode) - 6 RJ45 ports, 2 SC FO ports (single-mode) with high range - 6 RJ45 ports, 2 SC FO ports (single-mode) with especially high range	**FL SWITCH SFN 8GT**	**2891673**	1
Layer-1 security elements	**FL PLUG GUARD...**		

Technical data	
Ethernet interface	
Number of ports	8 RJ45 ports
Transmission speed	10/100/1000 Mbps (RJ45)
Type of connection	RJ45 female connector, autonegotiation and autocrossing
Fiber optic interface	
Number of ports	-
Type of connection	-
Wave length	-
Transmission length	-
Other connections	
Potential-free signaling contact	Plug-in/screw connection via COMBICON
Function	
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode
Status and diagnostics displays	LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port
Network extension parameters	
Cascading depth	Network, line and star structure: any
Maximum conductor length ((twisted pair)	100 m
Power supply	
Supply voltage	24 V DC (redundant)
Residual ripple	3.6 V_{PP}
Range of supply voltages	9 V DC ... 30.2 V DC
Typical current consumption	Typ. 430 mA
General data	
Weight	395 g
Width	50 mm
Height	120 mm
Depth	70 mm
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529
Ambient temperature (operation)	-25°C ... 60°C (75°C in preparation)
Permissible humidity (operation)	10% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-4
Immunity to interference	EN 61000-6-2

Ethernet

FL SWITCH SFN 7GT/SX

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 7GT/SX	**2891518**	1
FL PLUG GUARD...		

7 RJ45 ports
10/100/1000 Mbps (RJ45)
RJ45 female connector, autonegotiation and autocrossing

1 FO port
SC duplex
850 nm
220 m (glass fiber 62.5/125)

Plug-in/screw connection via COMBICON

Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode

LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port

Network, line and star structure: any
100 m

24 V DC (redundant)
3.6 V_{PP}
9 V DC ... 30.2 V DC
Typ. 320 mA

415 g
50 mm
120 mm
70 mm
IP20 in acc. with DIN 40050/IEC 60529
-25°C ... 60°C (75°C in preparation)
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

Ethernet

FL SWITCH SFN 6GT/2SX

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6GT/2SX	**2891398**	1
FL PLUG GUARD...		

6 RJ45 ports
10/100/1000 Mbps (RJ45)
RJ45 female connector, autonegotiation and autocrossing

2 FO ports
SC duplex
850 nm
220 m (glass fiber 62.5/125)

Plug-in/screw connection via COMBICON

Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode

LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port

Network, line and star structure: any
100 m

24 V DC (redundant)
3.6 V_{PP}
9 V DC ... 30.2 V DC
Typ. 350 mA

425 g
50 mm
120 mm
70 mm
IP20 in acc. with DIN 40050/IEC 60529
-25°C ... 60°C (75°C in preparation)
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

Ethernet

FL SWITCH SFN 6GT/2LX...

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6GT/2LX	**2891987**	1
FL SWITCH SFN 6GT/2LX-20	**2891563**	1
FL PLUG GUARD...		

6 RJ45 ports
10/100/1000 Mbps (RJ45)
RJ45 female connector, autonegotiation and autocrossing

2 FO ports
SC duplex
1310 nm
10000 m (glass fiber 9/125)

Plug-in/screw connection via COMBICON

Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode

LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port

Network, line and star structure: any
100 m

24 V DC (redundant)
3.6 V_{PP}
9 V DC ... 30.2 V DC
Typ. 360 mA

435 g
50 mm
120 mm
70 mm
IP20 in acc. with DIN 40050/IEC 60529
-25°C ... 60°C (75°C in preparation)
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

SFN switch

Ethernet

FL SWITCH SFN ...TX

Ethernet switch with RJ45 ports

Factory Line switches with standard functions in slim housing design

The FL SWITCH SFN ... range of Factory Line switches with standard functions in numerous versions can be used for quick and cost-effective Ethernet network expansion. The switches have 5 or 8 ports, up to two of which are designed in multimode/single-mode glass fiber ports in SC or ST format. The switches support transmission rates of 10 and 100 Mbps at the Twisted-Pair-Ports. The glass fiber ports exclusively support 100 Mbps.

The switches regenerate received data telegrams and send them to the port to which the device is connected with the corresponding target address.

Unassigned ports of the FL SWITCH SFN can be locked mechanically for protection against unauthorized use. Assigned ports meet the requirements of LAN security level 1, as they can be locked against unauthorized removal of the network connection.

Features and fields of application

– Increased network performance by filtering the data traffic.
  - Local data traffic remains local.
  - Amount of data in the network segments is reduced.
– Simple network extension without configuration of the switches.
– Coupling of copper network segments with different transmission rates with automatic detection of data transmission rate of 10 or 100 Mbps.
– Auto negotiation: Each copper port establishes a half or full duplex connection with 10 or 100 Mbps.
– Auto crossing: It is not necessary to make a distinction between 1:1 or crossover Ethernet copper cables.
– Electrical isolation of network segments using up to two fiber optic ports.
– Option to attach layer 1 security elements to the RJ45 ports.

Ex:

Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch			
- 5 RJ45 ports	**FL SWITCH SFN 5TX**	**2891152**	1
- 8 RJ45 ports	**FL SWITCH SFN 8TX**	**2891929**	1
- 4 RJ45 ports, 1 SC FO port			
- 7 RJ45 ports, 1 SC FO port			
- 4 RJ45 ports, 1 ST FO port			
- 7 RJ45 ports, 1 ST FO port			
- 6 RJ45 ports, 2 SC FO ports			
- 6 RJ45 ports, 2 ST FO ports			
Layer-1 security elements	**FL PLUG GUARD...**		

Technical data	FL SWITCH SFN 5TX	FL SWITCH SFN 8TX
Ethernet interface		
Number of ports	5 RJ45 ports	8 RJ45 ports
Transmission speed	10/100 Mbps (RJ45)	
Type of connection	RJ45 female connector, autonegotiation and autocrossing	
Fiber optic interface		
Number of ports	-	
Type of connection	-	
Wave length	-	
Transmission length	-	
	-	
Function		
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
Status and diagnostics displays	LEDs: U_S, link and activity per port	LEDs: U_{S1}, link and activity per port
Network extension parameters		
Cascading depth	Network, line and star structure: any	
Maximum conductor length ((twisted pair)	100 m	
Power supply		
Supply voltage	24 V DC	
Residual ripple	3.6 V_{PP}	
Range of supply voltages	18.5 V DC ... 30.2 V DC	
Typical current consumption	Typ. 90 mA	Typ. 140 mA
General data		
Weight	265 g	365 g
Width	30 mm	50 mm
Height	120 mm	
Depth	70 mm	
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529	
Ambient temperature (operation)	0°C ... 60°C	
Permissible humidity (operation)	10% ... 95% (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC	
Emitted interference	EN 61000-6-4	
Immunity to interference	EN 61000-6-2	

Ethernet

FL SWITCH SFN ...TX/FX

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 4TX/FX	**2891851**	1
FL SWITCH SFN 7TX/FX	**2891097**	1
FL PLUG GUARD...		

FL SWITCH SFN 4TX/FX	FL SWITCH SFN 7TX/FX
4 RJ45 ports	7 RJ45 ports
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
1 FO port	
SC-DUPLEX	
1300 nm/1310 nm	
2000 m (glass fiber 50/125)	
2000 m (glass fiber 62.5/125)	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_S, link and activity per port	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
18.5 V DC ... 30.2 V DC	
Typ. 140 mA	Typ. 190 mA
265 g	365 g
30 mm	50 mm
120 mm	
70 mm	
IP20 in acc. with DIN 40050/IEC 60529	
0°C ... 60°C	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Ethernet

FL SWITCH SFN ...TX/FX ST

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 4TX/FX ST	**2891453**	1
FL SWITCH SFN 7TX/FX ST	**2891110**	1
FL PLUG GUARD...		

FL SWITCH SFN 4TX/FX ST	FL SWITCH SFN 7TX/FX ST
4 RJ45 ports	7 RJ45 ports
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
1 FO port	
ST format	
1300 nm/1310 nm	
2000 m (glass fiber 50/125)	
2000 m (glass fiber 62.5/125)	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_S, link and activity per port	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
18.5 V DC ... 30.2 V DC	
140 mA	Typ. 190 mA
265 g	365 g
30 mm	50 mm
131 mm	120 mm
70 mm	
IP20 in acc. with DIN 40050/IEC 60529	
0°C ... 60°C	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Ethernet

FL SWITCH SFN 6TX/2FX...

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6TX/2FX	**2891314**	1
FL SWITCH SFN 6TX/2FX ST	**2891411**	1
FL PLUG GUARD...		

FL SWITCH SFN 6TX/2FX	FL SWITCH SFN 6TX/2FX ST
6 RJ45 ports	
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
2 FO ports	
SC-DUPLEX	ST format
1300 nm	
2000 m (glass fiber 50/125)	
2000 m (glass fiber 62.5/125)	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_S, link and activity per port	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
18.5 V DC ... 30.2 V DC	
Typ. 230 mA	
365 g	
50 mm	
120 mm	
70 mm	
IP20 in acc. with DIN 40050/IEC 60529	
0°C ... 60°C	
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

SFN switch

Factory Line switches with standard functions for basic and extreme environment 10/100 Mbps applications

The **FL SWITCH SFNB...** range of Factory Line switches extend the SFN range of switches for basic, entry level applications. They are ideal for applications that require only basic Ethernet switching functions such as small scale machines and monitoring applications. The FL SWITCH SFNB switches have 5 or 8 ports. While they provide low installed cost Ethernet connections, they are fully industrialized with rugged metal housings, a -10°C to +60°C temperature range and complete IEC 61000-4 electrical noise ratings.

FL SWITCH SFNT... standard function unmanaged switches extend the SFN range to meet the demands of extreme environment, wide temperature applications. The SFNT switches come in 5 and 8 port sizes, and optionally include a multimode glass fiber optic cable (SC connector) interface. The 8 port switch also has an ST connector option. The demanding requirements found in oil/gas, process, city infrastructure, marine and other outdoor related industry locations require constant operation in -40°C to +75°C temperature conditions.

In critical applications it is important to include diagnostics to maintain high network uptimes. The SFNT switches have an alarm contact that can be triggered if one or both of the redundant power supplies is lost, or if the communications link to a critical port is cut or powered down. Critical applications also require some measure of network access security. The optional plug-in security frames allow unassigned ports to be physically blocked, or existing cables locked in place, to reduce the possibility of unauthorized or accidental tampering.

FL SWITCH SFNB ...TX

Ethernet switch with RJ45 ports

Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch			
- 5 RJ45 ports	**FL SWITCH SFNB 5TX**	**2891001**	1
- 8 RJ45 ports	**FL SWITCH SFNB 8TX**	**2891002**	1
Wide temperature Ethernet switch			
- 5 RJ45 ports			
- 8 RJ45 ports			
- 4 RJ45 ports, 1 SC FO port			
- 7 RJ45 ports, 1 SC FO port			
- 7 RJ45 ports, 1 ST FO port			
Layer-1 security elements			

Technical data	FL SWITCH SFNB 5TX	FL SWITCH SFNB 8TX
Ethernet interface		
Number of ports	5 RJ45 ports	8 RJ45 ports
Transmission speed	10/100 MbpsMbps (RJ45)	
Type of connection	RJ45 female connector, autonegotiation and autocrossing	
Fiber optic interface		
Number of ports	-	
Transmission speed	-	
Type of connection	-	
Transmission length	-	
Function		
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
Status and diagnostics displays	LEDs: U_S, link and activity per port	
Network extension parameters		
Cascading depth	Network, line and star structure: any	
Maximum conductor length ((twisted pair)	100 m	
Power supply		
Supply voltage	24 V DC	
Residual ripple	3.6 V_{PP}	
Range of supply voltages	12 V DC ... 48 V DC	9 V DC ... 32 V DC
Typical current consumption	185 mA (@24 V DC)	140 mA (@24 V DC)
General data		
Weight	205 g	320 g
Width	28 mm	50 mm
Height	110 mm	
Depth	70 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-10°C ... 60°C	
Permissible humidity (operation)	10% ... 95% (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC	
Emitted interference	EN 61000-6-4	
Immunity to interference	EN 61000-6-2	

FL SWITCH SFNT ...TX

Wide temperature Ethernet switch with RJ45 ports

FL SWITCH SFNT 4TX/FX

Wide temperature Ethernet switch with RJ45 ports and one FO port in SC format

FL SWITCH SFNT 7TX/FX...

Wide temperature Ethernet switch with RJ45 ports and one FO port in SC format

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 5TX	**2891003**	1
FL SWITCH SFNT 8TX	**2891005**	1
FL PLUG GUARD...		

FL SWITCH SFNT 5TX	FL SWITCH SFNT 8TX
5 RJ45 ports	8 RJ45 ports
10/100 MbpsMbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
-	
-	
-	
-	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact	
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
9 V DC ... 32 V DC	
125 mA (@24 V DC)	155 mA (@24 V DC)
275 g	460 g
30 mm	50 mm
130 mm	
100 mm	
IP20	
-40°C ... 75°C	
10% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 4TX/FX	**2891004**	1
FL PLUG GUARD...		

4 RJ45 ports
10/100 Mbps (RJ45)
RJ45 female connector, autonegotiation and autocrossing
1 FO port
100 Mbps (SC-D, full duplex)
SC-DUPLEX
2000 m (typ.)
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)
Network, line and star structure: any
100 m
24 V DC
3.6 V_{PP}
9 V DC ... 32 V DC
180 mA (@24 V DC)
280 g
30 mm
130 mm
100 mm
IP20
-40°C ... 75°C
10% ... 95% (non-condensing)
-
-
-

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 7TX/FX	**2891006**	1
FL SWITCH SFNT 7TX/FX ST	**2891007**	1
FL PLUG GUARD...		

FL SWITCH SFNT 7TX/FX	FL SWITCH SFNT 7TX/FX ST
7 RJ45 ports	
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
1 FO port	
100 Mbps (SC-D, full duplex)	100 Mbps (ST, full duplex)
SC-DUPLEX	ST format
2000 m (typ.)	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact	
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
9 V DC ... 32 V DC	
180 mA (@24 V DC)	
470 g	
50 mm	
130 mm	
100 mm	
IP20	
-40°C ... 75°C	
10% ... 95% (non-condensing)	
-	
-	
-	

SF switches

Ethernet

FL SWITCH SF ...TX

Ethernet switch with RJ45 ports

The Factory Line standard range of switches FL SWITCH SF makes it possible to expand networks quickly and inexpensively, in terminal boxes and on the plant floor level as well. Their low-profile housing design and high port densities means they can be used in universal, distributed applications in control cabinets and flat terminal boxes.

The FL SWITCH SF series supports the autonegotiation function for transmission rates of 10/100 Mbps in mixed mode. This takes care of the coupling of network segments or terminal devices with the same or different data transmission rates. It is no longer necessary to differentiate between the 1:1 or crossover cables due to the autocrossing function. The switches automatically detect whether Ethernet cables are occupied and set themselves accordingly. The segment length of the network can be increased to up to 10 km thanks to the FO ports, especially for bridging over rough surroundings.

The switches have redundant electrical power supply and an electrically isolated alarm contact. With full suitability for industrial applications, the FL SWITCH SF series with TX variants makes it extremely economical to set up Ethernet networks in the industrial environment.

Wide choice of connection options

Select the connection variant to exactly suit your applications from the SF switch range. While the copper cables are connected to the twisted pair ports with standard RJ45 connectors, the fiber optic cables are connected via SC or ST connectors.

Ex:

Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch			
- 8 RJ45 ports	**FL SWITCH SF 8TX**	**2832771**	1
- 16 RJ45 ports	**FL SWITCH SF 16TX**	**2832849**	1
- 7 RJ45 ports, 1 SC FO port			
- 15 RJ45 ports, 1 SC FO port			
- 6 RJ45 ports, 2 SC FO ports			
- 14 RJ45 ports, 2 SC FO ports			
- 6 RJ45 ports, 2 ST FO ports			
- 7 RJ45 ports, 1 ST FO port			
- 4 RJ45 ports, 3 ST FO ports			

Technical data	FL SWITCH SF 8TX	FL SWITCH SF 16TX
Ethernet interface		
Number of ports	8 RJ45 ports	16 RJ45 ports
Transmission speed	10/100 Mbps (RJ45)	
Type of connection	RJ45 female connector, autonegotiation and autocrossing	
Fiber optic interface		
Number of ports	-	
Type of connection	-	
Wave length	-	
Transmission length	-	
Other connections		
Potential-free signaling contact	Plug-in/screw connection via COMBICON	
Function		
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
Status and diagnostics displays	LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port	
Network extension parameters		
Cascading depth	Network, line and star structure: any	
Maximum conductor length ((twisted pair)	100 m	
Power supply		
Supply voltage	24 V DC	
Residual ripple	3.6 V_{PP}	
Range of supply voltages	18.5 V DC ... 30.2 V DC	
Typical current consumption	Typ. 200 mA	Typ. 300 mA
General data		
Weight	260 g	380 g
Width	135 mm	205 mm
Height	94.3 mm	
Depth	30 mm	
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529	
Ambient temperature (operation)	0°C ... 55°C	
Permissible humidity (operation)	30% ... 95% (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC	
Emitted interference	EN 61000-6-4	
Immunity to interference	EN 61000-6-2	

Ethernet

FL SWITCH SF ...TX/FX

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 7TX/FX	**2832726**	1
FL SWITCH SF 15TX/FX	**2832661**	1

FL SWITCH SF 7TX/FX	FL SWITCH SF 15TX/FX
7 RJ45 ports	15 RJ45 ports
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
1 FO port	
SC-DUPLEX	
1300 nm	
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
18.5 V DC ... 30.2 V DC	
Typ. 220 mA	Typ. 330 mA
260 g	380 g
135 mm	205 mm
115.3 mm	
30 mm	
IP20 in acc. with DIN 40050/IEC 60529	
0°C ... 55°C	
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Ethernet

FL SWITCH SF ...TX/2FX

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 6TX/2FX	**2832933**	1
FL SWITCH SF 14TX/2FX	**2832593**	1

FL SWITCH SF 6TX/2FX	FL SWITCH SF 14TX/2FX
6 RJ45 ports	14 RJ45 ports
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
2 FO ports	
SC duplex	
1300 nm	
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
18.5 V DC ... 30.2 V DC	
Typ. 240 mA	Typ. 360 mA
260 g	380 g
135 mm	205 mm
115.3 mm	
30 mm	
IP20 in acc. with DIN 40050/IEC 60529	
0°C ... 55°C	
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Ethernet

FL SWITCH SF ...TX/...FX ST

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 6TX/2FX ST	**2832674**	1
FL SWITCH SF 7TX/FX ST	**2832577**	1
FL SWITCH SF 4TX/3FX ST	**2832603**	1

FL SWITCH SF 6TX/2FX ST	FL SWITCH SF 7TX/FX ST
6 RJ45 ports	7 RJ45 ports
10/100 Mbps (RJ45)	
RJ45 female connector, autonegotiation and autocrossing	
2 FO ports	1 FO port
ST format	
1300 nm	
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	2000 m (glass fiber 50/125)
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port	
Network, line and star structure: any	
100 m	
24 V DC	
3.6 V_{PP}	
18.5 V DC ... 30.2 V DC	
Typ. 240 mA	Typ. 220 mA
140 g	
135 mm	
115.3 mm	
30 mm	
IP20 in acc. with DIN 40050/IEC 60529	
0°C ... 55°C	
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Unmanaged switches, hubs, PSE

Unmanaged switch with 5/8 TP RJ45 ports

The FL SWITCH 5TX and FL SWITCH 8TX Ethernet switches allow the network to be expanded fast and cost-effectively.

They have a redundant power supply and a floating alarm contact. The devices are particularly suitable for distributed network solutions.

With a width of just 45 mm, and simple, configuration-free assembly, they are the Ethernet connections of choice for the control cabinet. Further net segments can be connected to the 5 or 8 ports.

The switch supports 10 Mbps and 100 Mbps even when operated together.

Ethernet hub with 8/16 RJ45 ports

The hub is used for quick and cost-effective Ethernet network expansion. It has eight/sixteen twisted pair ports, which can be connected to additional network segments or termination devices. It is especially suited for special automation protocols, such as the FL Net.

The FL HUB 8/16 TX-ZF supports both Ethernet with 10 Mbps and with 100 Mbps. The hub regenerates the received data telegrams and sends them to the remaining ports.

For port 5, a port assignment switch is located on the hub. The transmit and receive cables are exchanged at port 5 by actuating the switch, while polarity is maintained. Cross-over cables for connecting network nodes can thus be omitted.

Power over Ethernet solutions

For the first time, the Power Source Equipment FL PSE 2TX enables the common transmission of power and data in the industrial environment via an Ethernet connection (LAN).

The Power over Ethernet standard IEEE 802.3af is used. This means that end devices such as WLAN access points, Bluetooth access points, IP telephones and IP cameras, which are being increasingly used in industrial areas, can be connected quickly and economically.

In the case of installation in difficult-to-reach places such as walls or ceilings, a separate supply connection can be dispensed with – power and data are made available through the LAN connection. The investment costs for any power supply units and the associated installation costs for the power supply to termination devices can be eliminated entirely. Even the fault tolerance of the termination devices can be increased by using a central uninterrupted power supply (UPS).

The FL PSE 2TX allows existing Ethernet networks to be extended by 2 PoE ports. The FL PSE 2TX is also operated by the 24 V supply voltage here, so that other power supply units are not necessary.

Description
Ethernet switch
- 5 RJ45 ports
- 8 RJ45 ports
Ethernet hub
- 8 RJ45 ports
- 16 RJ45 ports
Power-over-Ethernet module (PSE)

Technical data	
Ethernet interface	
Number of ports	
Transmission speed	
Type of connection	
Other connections	
Potential-free signaling contact	
Function	
Basic functionality	
Status and diagnostics displays	
Network extension parameters	
Cascading depth	
Maximum conductor length ((twisted pair)	
Power supply	
Supply voltage	
Residual ripple	
Range of supply voltages	
Typical current consumption	
General data	
Weight	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	
Permissible humidity (operation)	
Electromagnetic compatibility	
Emitted interference	
Immunity to interference	

Ethernet

FL SWITCH ...TX

Ethernet switch with RJ45 ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH 5TX	**2832085**	1
FL SWITCH 8TX	**2832218**	1

FL SWITCH 5TX	FL SWITCH 8TX
5	8
10/100 Mbps RJ45	
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U_{S1}, U_{S2} (redundant voltage supply), link and activity per port	
Network, line and star structure: any 100 m	
24 V DC 3.6 V_{PP} 18.5 V DC ... 30.2 V DC 125 mA (to US)	
225 g 45 mm 99 mm 112 mm IP20 0°C ... 55°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	

Ethernet

FL HUB ...TX-ZF

Ethernet hub with RJ45 ports

Type	Order No.	Pcs. / Pkt.
FL HUB 8TX-ZF	**2832551**	1
FL HUB 16TX-ZF	**2832564**	1

FL HUB 8TX-ZF	FL HUB 16TX-ZF
8	16
10/100 Mbps RJ45 female connector	
-	
Hub/repeater, compliance with IEEE 802.3	
LEDs: UL (communications voltage), COL (collision) link and receive LED per port	
4 hubs 10 Mbps / 2 hubs 100 Mbps 100 m	
24 V DC (via COMBICON; max. conductor cross section 2.5 mm²) 3.6 V_{PP} 18.5 V DC ... 30.5 V DC Typ. 144 mA (to US)	
140 g 45 mm 99 mm 112 mm IP20 0°C ... 60°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	280 g 90 mm 0°C ... 55°C

Ethernet

FL PSE 2TX

Power-over-Ethernet modules (midspan)

Type	Order No.	Pcs. / Pkt.
FL PSE 2TX	**2891013**	1

2 PoE ports 10/100 Mbps 8-pos. RJ45 female connector
-
PSE/midspan, complies with IEEE 802.3af
LEDs: US, PoE detection per port
- 100 m
24 V DC (via COMBICON; max. conductor cross section 2.5 mm²) 3.6 V_{PP} 18.5 V DC ... 30.5 V DC Typ. 100 mA (During no load; approx. 1800 mA at 24 V at the input with maximum load and 25°C ambient temperature)
320 g 45 mm 99 mm 112 mm IP20 0°C ... 55°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2

Fiber optics patch cables

The pre-assembled fiber optics patch cables have been specially developed for industrial use.

They are ideal for fast integration of Ethernet fiber optics components with LC connection (SFP modules) in the existing single mode or multimode fiber optics networks.

For the SC and ST connector formats that are practical for industrial use, patch cables are available in lengths of one and two meters as single mode and multimode variants.

FL MM PATCH ... LC-...

Fiber optics patch cable, pre-assembled

Description	Length of cable	Type	Order No.	Pcs. / Pkt.
Assembled fiber optics cable (multi-mode)				
- LC/IP20 on LC/IP20	1 m	**FL MM PATCH 1,0 LC-LC**	**2989158**	1
- LC/IP20 on LC/IP20	2 m	**FL MM PATCH 2,0 LC-LC**	**2989255**	1
Assembled fiber optics cable (multi-mode)				
- LC/IP20 on SC/IP20	1 m	**FL MM PATCH 1,0 LC-SC**	**2989161**	1
- LC/IP20 on SC/IP20	2 m	**FL MM PATCH 2,0 LC-SC**	**2989268**	1
Assembled fiber optics cable (multi-mode)				
- LC/IP20 on ST/IP20	1 m	**FL MM PATCH 1,0 LC-ST**	**2989174**	1
- LC/IP20 on ST/IP20	2 m	**FL MM PATCH 2,0 LC-ST**	**2989271**	1
Assembled fiber optics cable (single mode)				
- LC/IP20 on LC/IP20	1 m	**FL SM PATCH 1,0 LC-LC**	**2989187**	1
- LC/IP20 on LC/IP20	2 m	**FL SM PATCH 2,0 LC-LC**	**2989284**	1
Assembled fiber optics cable (single mode)				
- LC/IP20 on SC/IP20	1 m	**FL SM PATCH 1,0 LC-SC**	**2989190**	1
- LC/IP20 on SC/IP20	2 m	**FL SM PATCH 2,0 LC-SC**	**2989297**	1
Assembled fiber optics cable (single mode)				
- LC/IP20 on ST/IP20	1 m	**FL SM PATCH 1,0 LC-ST**	**2989242**	1
- LC/IP20 on ST/IP20	2 m	**FL SM PATCH 2,0 LC-ST**	**2989349**	1

Technical data	
Cable, properties	
Individual wire diameter	2.8 mm
Outer sheath, material	LSZH
External sheath, color	orange
General data	
Ambient temperature (operation)	-5°C ... 70°C

Patch cable

The preassembled patch cables have been specially developed for industrial use.

They are suitable for the quick installation of Ethernet components and patch fields or termination devices within a control cabinet. They form the link to a seamless high quality Ethernet system.

The patch cables are characterized by a new bend protection and are available in graded lengths from 0.3 to 20 m.

All patch cables are designed as 1:1 cable. They come with four pairs of conductors and are assembled with RJ45 male connectors as per IEC 603-7/class A. Each cable is tested separately for its transmission properties.

With their high, universal wiring quality across the active and passive infrastructure, the patch cables fulfill the requirements of the standards for CAT5/CAT6.

FL CAT... PATCH ...

Patch cable, CAT5/CAT6, pre-assembled

Description	Length of cable	Type	Order No.	Pcs. / Pkt.
Patch cable, CAT5, preassembled				
	0.3 m	**FL CAT5 PATCH 0,3**	**2832250**	10
	0.5 m	**FL CAT5 PATCH 0,5**	**2832263**	10
	1 m	**FL CAT5 PATCH 1,0**	**2832276**	10
	1.5 m	**FL CAT5 PATCH 1,5**	**2832221**	10
	2 m	**FL CAT5 PATCH 2,0**	**2832289**	10
	3 m	**FL CAT5 PATCH 3,0**	**2832292**	10
	5 m	**FL CAT5 PATCH 5,0**	**2832580**	10
	7.5 m	**FL CAT5 PATCH 7,5**	**2832616**	10
	10 m	**FL CAT5 PATCH 10,0**	**2832629**	10
Patch cable, CAT6, preassembled				
	0.3 m	**FL CAT6 PATCH 0,3**	**2891181**	10
	0.5 m	**FL CAT6 PATCH 0,5**	**2891288**	10
	1 m	**FL CAT6 PATCH 1,0**	**2891385**	10
	1.5 m	**FL CAT6 PATCH 1,5**	**2891482**	10
	2 m	**FL CAT6 PATCH 2,0**	**2891589**	10
	3 m	**FL CAT6 PATCH 3,0**	**2891686**	10
	5 m	**FL CAT6 PATCH 5,0**	**2891783**	10
	7.5 m	**FL CAT6 PATCH 7,5**	**2891880**	10
	10 m	**FL CAT6 PATCH 10**	**2891877**	10
	12.5 m	**FL CAT6 PATCH 12,5**	**2891369**	5
	15 m	**FL CAT6 PATCH 15,0**	**2891372**	5
	20 m	**FL CAT6 PATCH 20,0**	**2891576**	5

Technical data	FL CAT5 PATCH 0,3	FL CAT6 PATCH 0,3
Cable, properties		
External diameter	5.5 mm	5.5 mm
Single wire, material	Cu litz wire	Cu litz wire
Individual wires per module	8	8
Single wire, cross section	0.14 mm²	0.14 mm²
Outer sheath, material	LSFROH	LSFROH
Smallest bending radius, fixed installation	30 mm	30 mm
Shielding	SF/UTP	S/FTP
Connector		
Volume resistance	≤ 0.003 Ω (IEC 60603-7)	≤ 0.003 Ω (IEC 60603-7)
General data		
Ambient temperature (operation)	-10°C ... 60°C	-10°C ... 60°C

Accessories for Factory Line patch cables

The unique and innovative accessories of the Factory Line patch cables are characterized by the fact that they can be installed later without tools and can be combined with each other.

Dust protection

The dust protection elements protect the unused connections from dust and mechanical damage at the connection points provided for them, such as SFN switches and patch fields. At the same time, they allow the ports to be color-coded.

Thanks to color-coding, the various network services can be better visualized, such as automation, voice-over-IP and video-over-IP, which makes it easy to see what's what in the control cabinet.

Color-coding

The optical color coding supports the correct connection of the patch cables for the respective application. The color coding is especially easy to apply to the connection cables. Installation can be done without tools and can be done at a later time, as well. Thanks to color-coding, the user does not have to keep the otherwise required cable color variety in stock.

IP54 accessories

The IP54 accessories provide protection against environmental influences, such as dust, steam/hot water and oils. Like the color-coding, it can be retrofitted later and achieves the IP54 degree of protection when both plugged in as well as unplugged. By combining with color codes, the visualization of the network services is also possible in rough conditions. Only a 3-pronged pair of pliers is required for installing the FL IP 54 SPOUT, such as the FL IP 54 ASSEMBLY TOOL.

FL DUST CVR ...

Dust protection elements

Description	Type	Order No.	Pcs. / Pkt.
Dust protection with color marking, for SFN switch and angled patch connector			
- Black	**FL DUST CVR BK**	**2891107**	10
- Blue	**FL DUST CVR BU**	**2891204**	10
- Brown	**FL DUST CVR BN**	**2891301**	10
- Yellow	**FL DUST CVR YE**	**2891408**	10
- Gray	**FL DUST CVR GY**	**2891505**	10
- Green	**FL DUST CVR GN**	**2891602**	10
- Red	**FL DUST CVR RD**	**2891709**	10
- Violet	**FL DUST CVR VT**	**2891806**	10
- White	**FL DUST CVR WH**	**2891903**	10
Color marking for FL CAT ...patch...			
- Black			
- Blue			
- Brown			
- Yellow			
- Gray			
- Green			
- Red			
- Violet			
IP54 protection with color marking, for SFN switch and angled patch connector			
- Blue			
- Yellow			
- Green			
- Red			
- White			
IP54 protection for patch cables, for use with FL IP 54 FLANGE ...			
Assembly tool for FL IP 54 SPOUT			

FL PATCH CCODE ...

Color marking for FL CAT ...patch...

FL IP 54 FLANGE ...

IP54 protection with color marking, for SFN switch and angled patch connector

FL IP 54 ...

IP54 accessories

Type	Order No.	Pcs. / Pkt.
FL PATCH CCODE BK	2891194	20
FL PATCH CCODE BU	2891291	20
FL PATCH CCODE BN	2891495	20
FL PATCH CCODE YE	2891592	20
FL PATCH CCODE GY	2891699	20
FL PATCH CCODE GN	2891796	20
FL PATCH CCODE RD	2891893	20
FL PATCH CCODE VT	2891990	20

Type	Order No.	Pcs. / Pkt.
FL IP 54 FLANGE BU	2891628	10
FL IP 54 FLANGE YE	2891725	10
FL IP 54 FLANGE GN	2891822	10
FL IP 54 FLANGE RD	2891932	10
FL IP 54 FLANGE WH	2891961	10

Type	Order No.	Pcs. / Pkt.
FL IP 54 SPOUT	2891440	10
FL IP 54 ASSEMBLY TOOL	2891547	1

Reliability with Factory Line patch cables

The safety of networks is becoming more and more important and is a decisive factor for the future of entire companies. Independent studies show that over 70% of network errors and crashes are due to faulty cabling infrastructure and manipulation of the connection cables.

Starting with the choice of a passive cabling system, strict attention must be paid to ensuring that the reliability aspects are supported and implemented. With the new accessories for Factory Line patch cables, the different safety requirements in automation are fulfilled in detail.

Safe clip

The FL PATCH SAFE CLIP securing element can be mounted without tools and prevents Ethernet connections from being disconnected unintentionally. The protected connections can only be disconnected if conscious action is taken. By means of this simple and quick-to-install solution, unintentional disconnection is reliably prevented.

Plug guard

The FL PLUG GUARD... concept goes a step further. With these products, network connections will really be safe in the future. Connections can only be severed by authorized personnel.

If the FL PLUG GUARD... is used in conjunction with the Port Guard, it is even possible to authorize access to unused terminal points, since these ports can simply be sealed.

Patch guard

In connection with the Factory Line patch cables, the FL PATCH GUARD provides the only way to secure ports which cannot accept security frames. In this way, it is possible for the first time to secure ports on any Ethernet components, e.g. controllers.

Thanks to the slender design, it is even possible to connect patch guard elements directly to switches with high port densities, such as the FL SWITCH MCS...

As with the plug guard, it is only possible to release connections with a special key.

FL PATCH SAFE CLIP

Security element for FL CAT ...patch...

Description	Type	Order No.	Pcs. / Pkt.
Security element for FL CAT ...patch...	**FL PATCH SAFE CLIP**	**2891246**	20
Security frame for SFN switch and patch fields - Green - Red - White			
Locking element for security frame FL PLUG GUARD... - Locking element - Key			
Lockable security element for FL PATCH... - Security element - Key			
Color marking for FL PATCH GUARD - Black - Blue - Orange - Yellow - Turquoise - Green - Red - Violet			

FL PLUG GUARD ...

Security frame for SFN switch and patch fields

FL PATCH GUARD ...

Lockable security element for FL PATCH...

FL PATCH GUARD CCODE ...

Color marking for FL PATCH GUARD

Type	Order No.	Pcs. / Pkt.
FL PLUG GUARD GN	2891615	20
FL PLUG GUARD RD	2891712	20
FL PLUG GUARD WH	2891819	20
FL PORT GUARD	2891220	20
FL PLUG GUARD KEY	2891327	1

Type	Order No.	Pcs. / Pkt.
FL PATCH GUARD	2891424	20
FL PATCH GUARD KEY	2891521	1

Type	Order No.	Pcs. / Pkt.
FL PATCH GUARD CCODE BK	2891136	12
FL PATCH GUARD CCODE BU	2891233	12
FL PATCH GUARD CCODE OG	2891330	12
FL PATCH GUARD CCODE YE	2891437	12
FL PATCH GUARD CCODE TQ	2891534	12
FL PATCH GUARD CCODE GN	2891631	12
FL PATCH GUARD CCODE RD	2891738	12
FL PATCH GUARD CCODE VT	2891835	12

Patch fields

The seamless installation solution for industrial networks

The Factory Line patch fields enable long-term, high-quality on-site assembling of networks in industrial automation with security and flexibility options.

The dimensions of the patch fields are optimized, with 8 connections for use with the Managed Switches from the Factory Line range.

Security

In order to be able to guarantee reliability in your data network, even at level 1, versatile accessories for securing and coding the data lines are available.

Flexibility

The completely modular approach makes it possible to fit the patch fields with connection elements for various types of transmission media. If needed, any ports can be converted to glass fiber or can be retrofitted with color-coded markers and security elements. All modifications can be installed during operation without affecting other ports. This means maximum flexibility due to the option of individual configuration.

Investment protection

The patch cables are available in CAT5 and CAT6 so that standardized installation is possible, which allows gigabit transmission today. This guarantees investment protection for the passive infrastructure.

Ethernet

FL PF...TX CAT...

Patch field with two RJ45 CAT5e network connections

Description	Type	Order No.	Pcs. / Pkt.
Patch field, 2 RJ45 CAT5e network connections			
- CAT5e	**FL PF 2TX CAT5E**	**2891165**	1
- CAT6	**FL PF 2TX CAT 6**	**2891068**	1
- CAT5e	**FL PF 8TX CAT5E**	**2891178**	1
- CAT6	**FL PF 8TX CAT 6**	**2891071**	1

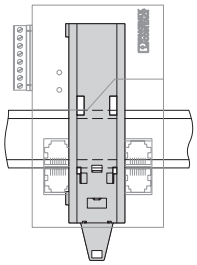
Technical data	FL PF 2TX CAT5E	FL PF 8TX CAT5E
Ethernet interface		
Interface	Ethernet (RJ45)	
Number of ports	2	8
Weight	125 g	260 g
Width	38 mm	124 mm
Height	112 mm	135 mm
Depth	88 mm	140 mm
Degree of protection	IP20	
Ambient temperature (operation)	0°C ... 55°C (non-condensing)	
Housing material	Metal	

Rail adapter

The Factory Line Rail Adapter makes it possible to place devices in narrow terminal boxes on a DIN rail rotated by 90° in order to save valuable installation space.

The design has been optimized for the assembly of SF switches with eight ports, so that these can be mounted using little space in control cabinets and terminal boxes where space is restricted.

Thanks to its useful width of 93 mm, the rail adapter offers universal application options to mount broad devices on a DIN rail within a minimum of space.



FL RA SF8

Description	Type	Order No.	Pcs. / Pkt.
Rail adapter for vertical mounting position	**FL RA SF8**	**2832519**	1

Technical data	
General data	
Width	37 mm
Height	144 mm
Depth	14 mm
Material	Chrome-plated steel
Mounting type	DIN rail 35 mm

Protect Cap

Unused Ethernet ports in an industrial environment can be reliably protected against dangerous influences such as dust using the Factory Line Protect Cap.

The Protect Cap can be mounted on all RJ45 ports on infrastructure elements or on automation components and can again be removed without using any tool. It thus reliably protects the unused ports against dust or mechanical influences, so that they can be used for a long time.

The Factory Line Protect Cap is a practical supplement for every Ethernet device that has unoccupied RJ45 ports.

FL RJ45 PROTECT CAP

Description	Type	Order No.	Pcs. / Pkt.
Dust protection cap for RJ45 female connector	**FL RJ45 PROTECT CAP**	**2832991**	10

Technical data	
General data	
Color	black
Material	-
Mounting type	-

Wireless MUX IO

Wireless transmission of control signals

The Wireless MUX is sold as a "Ready to use" package: Unpack – connect – switch on – and the wireless link is working.

Two packages are available:
- Standard package with OMNI antenna, an omnidirectional antenna. Ranges* of between 50 m and 100 m in the hall and over 200 m outdoors are thus possible.
- Package with PANEL antenna, a directional antenna. Outdoors, with no obstacles, distances* of over 400 m can be bridged.

The principle is simple. The signal connected at the input of the wireless MUX can be output at the corresponding output of the other Wireless MUX in a typical time of less than 10 ms.

Omni wireless set maritime

The Wireless MUX IO is also available with maritime approval: GL, LR and DNV.

Modular MUX

Two ILC 170 ETH 2TX are suitable for transmitting a greater number of digital and analog I/O signals. These are equipped with the required software via IL MODULAR MUX SD cards. The individual selection of Inline I/O terminals can be aligned with the ILC 170 ETH 2 TX.

The IO data is transmitted from one controller to another via the Ethernet interface. This can be done via an Ethernet cable or Wireless via Bluetooth or WLAN access points as well. Additional configuration software is not required.

The digital and analog Inline I/O terminals that can be used on the field multiplexer are marked in this catalog with the adjacent logo.

* The range can be considerably exceeded or fallen below and depends on the environment, antenna technology and the product used.

Please visit www.phoenixcontact.com for more information on the prevailing country-specific approvals for the relevant product.

ILB BT ADIO MUX-OMNI...

Wireless set with OMNI omnidirectional antenna

Description	Type	Order No.	Pcs. / Pkt.
Wireless MUX set, consisting of two modules with 16 digital inputs and outputs each and two analog inputs and outputs each, two OMNI antennas			
- Transmission capacity 16 dBm, antenna gain 2 dBi	**ILB BT ADIO MUX-OMNI**	**2884208**	1
- Transmission capacity 8 dBm, antenna gain 2 dBi	**ILB BT ADIO MUX-OMNI 8**	**2884554**	1
- Transmission capacity 4 dBm, antenna gain 2 dBi	**ILB BT ADIO MUX-OMNI 4**	**2692270**	1
Wireless MUX set, consisting of two modules with 16 digital inputs and outputs each and two analog inputs and outputs each, two PANEL antennas			
- Transmission capacity 12 dBm, antenna gain 8 dBi			
- Transmission capacity 0 dBm, antenna gain 8 dBi			
- Transmission capacity 8 dBm, antenna gain 8 dBi			
Modular MUX for ILC 170 ETH 2TX			

Technical data	
Wireless interface	
Wireless standard	Bluetooth 1.2
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Transmission capacity	16 dBm (40 mW, controlled automatically)
Antenna connection method	MCX (female)
Antenna	
Assembly instructions	OMNI omnidirectional antenna, 2 dBi, Lambda/2, with fixing bracket, 1.5 m cable
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Supply current	< 100 mA
Digital inputs	
Connection method	1-wire
Number of inputs	16
Digital outputs	
Connection method	1-wire
Number of outputs	16
Maximum output current per channel	500 mA
Protective circuitry	Short circuit protection, overload protection, protected against reverse voltages
Analog inputs	
Number of inputs	2
Voltage input signal	0 V ... 10 V
Current input signal	0 mA ... 20 mA
Measured value resolution	12 bits
Analog outputs	
Number of outputs	2
Voltage output signal	0 V ... 10 V
Current output signal	0 mA ... 20 mA
DAC resolution	12 bits
General data	
Weight	1200 g
Width	95 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 60°C
Shock as per IEC 60068-2-29	25g
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g
Mounting type	DIN rail mounting

ILB BT ADIO MUX-PANEL ...

Wireless set with PANEL directional antenna

ILB BT ADIO MUX-OMNI/M

Wireless set with OMNI omnidirectional antenna and maritime approval

IL MODULAR MUX SD

SD memory card with MODULAR MUX software

Type	Order No.	Pcs. / Pkt.
ILB BT ADIO MUX-PANEL	**2884509**	1
ILB BT ADIO MUX-PANEL 8	**2884567**	1

Type	Order No.	Pcs. / Pkt.
ILB BT ADIO MUX-OMNI 8/M	**2693185**	1

Applied for: GL / LR / NV

Type	Order No.	Pcs. / Pkt.
IL MODULAR MUX SD	**2700047**	1

Bluetooth 1.2	Bluetooth 1.2	-
2.402 GHz ... 2.48 GHz (ISM bandwidth)	2.402 GHz ... 2.48 GHz (ISM bandwidth)	-
12 dBm (16 mW, controlled automatically)	8 dBm (6.3 mW, controlled automatically)	-
MCX (female)	MCX (female)	-
PANEL radio link antenna, 8 dBi, with fixing bracket, 1 m cable	OMNI omnidirectional antenna, 2 dBi, Lambda/2, with fixing bracket, 1.5 m cable	-
24 V DC	24 V DC	-
19.2 V DC ... 30 V DC (including ripple)	19.2 V DC ... 30 V DC (including ripple)	-
< 100 mA	< 100 mA	-
1-wire	1-wire	-
16	16	-
1-wire	1-wire	-
16	16	-
500 mA	500 mA	-
Short circuit protection, overload protection, protected against reverse voltages	Short circuit protection, overload protection, protected against reverse voltages	-
2	2	-
0 V ... 10 V	0 V ... 10 V	-
0 mA ... 20 mA	0 mA ... 20 mA	-
12 bits	12 bits	-
2	2	-
0 V ... 10 V	0 V ... 10 V	-
0 mA ... 20 mA	0 mA ... 20 mA	-
12 bits	12 bits	-
1300 g	1200 g	-
95 mm	95 mm	-
IP20	IP20	-
-25°C ... 60°C	-25°C ... 60°C	-
25g	25g	-
5g	5g	-
DIN rail mounting	DIN rail mounting	-

Wireless-IO

Factory Line Bluetooth for wireless signal transmission

The Fieldline installation system from Phoenix Contact can have up to three Fieldline Modular Wireless IO modules distributed in the field added to it via a Bluetooth-based local bus.

There is a choice of Inline Block modules with IP20 protection and Fieldline devices with IP65 as IO devices.

Configuration of the devices is a simple matter: The base station writes the connection data to an ID connector that is then plugged onto the wireless modules. The basic station can be integrated in all common fieldbus networks, such as INTERBUS and PROFIBUS, using the various Fieldline bus couplers.

Factory Line Modbus IO access point

The FL BT MOD IO AP allows automation sensors and actuators to be wirelessly integrated in an Ethernet network.

The communication with the controller takes place over the industrial Ethernet protocol Modbus/TCP. The sensors and actuators are connected to wireless IO modules which are available in IP65 or IP20 degree of protection.

The FL BT MOD IO AP can communicate with up to seven Wireless IO modules at the same time.

Factory Line Bluetooth

Factory Line Bluetooth is the industrial Bluetooth technology for transmission of control data in factory automation.

– Extremely rugged and reliable
– Simple and fast commissioning
– Can be operated together with WLAN without any interruptions due to the Black-Channel-Listing, Low Emission Mode and AFH
– Parallel operation of several Bluetooth systems
– Manipulation-proof and tap-proof

FLM BT BS 3...

Fieldline Modular Wireless IO base station for up to three Wireless IO devices

Description	Type	Order No.	Pcs. / Pkt.
Fieldline Modular Wireless IO base station for up to three Wireless IO devices			
- Adjustable transmission power	**FLM BT BS 3**	**2736770**	1
- 4 dBm transmission power	**FLM BT BS3-4**	**2692681**	1
Bluetooth Modbus IO access point			
Fieldline Modular Wireless IO device			
- Adjustable transmission power			
- 4 dBm transmission power			
Inline Block Wireless IO device			
- Adjustable transmission power			
- 4 dBm transmission power			
Configuration connector ID-PLUG, necessary to configure the Wireless-IO devices (need for replacement)			
DIN rail adapter			

Technical data	
Wireless interface	
Wireless standard	Bluetooth 1.2
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Transmission capacity	8 dBm (6.3 mW, controlled automatically)
Wireless modules that can be connected	Up to 3
Antenna connection method	SMA (female)
Antenna	
Type of connection	SMA (male)
Assembly instructions	OMNI antenna is included
Fieldbus interface	
Name	Fieldline Modular local bus
Transmission speed	500 kBaud / 2 MBaud (data rate can be changed via pin 5 (voltage supply ULS))
Ethernet interfaces	
Type of connection	-
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Digital inputs	
Connection method	-
Number of inputs	-
Digital outputs	
Connection method	-
Number of outputs	-
Maximum output current per channel	-
Protective circuitry	-
Analog inputs	
Number of inputs	-
Voltage input signal	-
Current input signal	-
Measured value resolution	-
Analog outputs	
Number of outputs	-
Voltage output signal	-
Current output signal	-
DAC resolution	-
General data	
Weight	255 g
Width	70.5 mm
Degree of protection	IP65
Ambient temperature (operation)	-25°C ... 60°C
Mounting type	Wall mounting, optionally on mounting plate

FL BT MOD IO AP

Bluetooth Modbus IO access point,
as a wireless access point for Wireless IO devices

Type	Order No.	Pcs. / Pkt.
FL BT MOD IO AP	2884758	1
FL BT ADAPTER	2884949	1

Bluetooth 2.0
ISM 2.4 GHz
Max. 14 dBm (with automatic control)
7 (FLM BT DIO 8/8 M12, ILB BT ADIO 2/2/16/16)
SMA (female)
SMA (male)
External OMNI omnidirectional antenna, antennas can be exchanged
-
-
RJ45 female connector
24 V DC
9 V DC ... 30 V DC
-
-
-
-
-
-
-
-
-
-
-
95 g
80 mm
IP20
-25°C ... 55°C
Wall mounting, DIN rail mounting optional

FLM BT DIO 8/8 M12...

Fieldline Modular Wireless IO device for connection with
FLM BT BS 3 and FL BT MOD IO AP

Type	Order No.	Pcs. / Pkt.
FLM BT DIO 8/8 M12	2736767	1
FLM BT DIO 8/8-M12-4	2692694	1
FLM BT ID-PLUG M12	2736783	1

Bluetooth 1.2
2.402 GHz ... 2.48 GHz (ISM bandwidth)
8 dBm (6.3 mW, controlled automatically)
1 (FLM BT BS 3, FL BT MOD IO AP)
SMA (female)
SMA (male)
OMNI antenna is included
-
-
-
24 V DC
19.2 V DC ... 30 V DC (including ripple)
2, 3-wire
8
2, 3-wire
8
500 mA
Short circuit protection, overload protection, protected against reverse voltages
-
-
-
-
-
-
-
-
310 g
70.5 mm
IP65
-25°C ... 60°C
Wall mounting, optionally on mounting plate

ILB BT ADIO 2/2/16/16...

Inline Block Wireless IO device for connection with FLM BT BS 3
and FL BT MOD IO AP

Type	Order No.	Pcs. / Pkt.
ILB BT ADIO 2/2/16/16	2884282	1
ILB BT ADIO 2/2/16/16-4	2692704	1
FLM BT ID-PLUG M12	2736783	1

Bluetooth 1.2
2.402 GHz ... 2.48 GHz (ISM bandwidth)
8 dBm (6.3 mW, controlled automatically)
1 (FLM BT BS 3, FL BT MOD IO AP)
SMA (female)
SMA (male)
OMNI antenna is included
-
-
-
24 V DC
19.2 V DC ... 30 V DC (including ripple)
1-wire
16
1-wire
16
500 mA
Short circuit protection, overload protection, protected against reverse voltages
2
0 V ... 10 V
0 mA ... 20 mA
12 bits
2
0 V ... 10 V
0 mA ... 20 mA
12 bits
305 g
117 mm
IP20
-25°C ... 60°C
DIN rail mounting

Factory Line Bluetooth

Factory Line Bluetooth for wireless transmission of control data

For wireless integration of Ethernet-compatible automation components in the network, the Factory Line module offer FL BLUETOOTH AP and FL BT EPA. The data is transferred transparently according to the protocol. This allows industrial Ethernet protocols, such as Modbus/TCP, Ethernet/IP and PROFINET to be reliably transmitted.

The FL BLUETOOTH AP can be used as an access point for up to seven devices, as an Ethernet client adapter and as a serial Bluetooth COM server.

The FL BT SPA is a Bluetooth serial adapter with which serial devices can be wirelessly integrated in an Ethernet network via the FL BLUETOOTH AP and its integrated COM server.

FL BT EPA

The new concept of "intelligent antenna" combines all functions in one extremely compact and rugged IP65 housing: an industrial Bluetooth wireless module, circular special antenna for reliable wireless connections in metallic environments and control electronics that provides the PLC with complete control over all functions.

Thanks to this concept, a better, more high-performance and considerably economically installation can be automatically attained.

With the new "Lean-Stacks", the FL BT EPA speed is more than double as compared to the previous solutions. The FL BT EPA fulfills the PROFINET requirements of Conformance Class A.

The FL BT EPA AIR SET is a "Ready to use" package: Unpack, connect, press the Mode button and the wireless path is ready to work in just a few seconds!

Factory Line Bluetooth

Factory Line Bluetooth is the industrial Bluetooth technology from Phoenix Contact for transmission of control data in factory automation.

– Extremely rugged and reliable
– Simple and fast commissioning
– Can be operated together with WLAN without any interruptions due to the Black-Channel-Listing, Low Emission Mode and AFH
– Parallel operation of several Bluetooth systems
– Manipulation-proof and tap-proof

* The range can be considerably exceeded or fallen below and depends on the environment, antenna technology and the product used.

Please visit www.phoenixcontact.com for more information on the prevailing country-specific approvals for the relevant product.

FL BLUETOOTH AP

Bluetooth access point,
can be used as an access point or a client

Ex:

Description	Type	Order No.	Pcs. / Pkt.
Bluetooth access point	**FL BLUETOOTH AP**	**2737999**	1
Bluetooth Ethernet client adapter			
Protocol-transparent **Ethernet wireless path**			
Bluetooth serial port adapter			
DIN rail adapter	**FL BT ADAPTER**	**2884949**	1

Technical data	
Wireless interface	
Wireless standard	Bluetooth 2.0
Frequency range	ISM 2.4 GHz
Transmission capacity	Max. 14 dBm (with automatic control)
Wireless modules that can be connected	7
Profiles supported	LAP, PAN, SPP
Antenna connection method	SMA (female)
Antenna	
Type of connection	SMA (male)
Assembly instructions	External OMNI omnidirectional antenna, antennas can be exchanged
Ethernet interfaces	
Type of connection	RJ45 female connector
Serial port	
Type of connection	D-SUB-9 connector
Protocols supported	RS-232
Power supply for module electronics	
Supply voltage	24 V DC
Type of connection	Via COMBICON
Range of supply voltages	9 V DC ... 30 V DC
Supply current	200 mA
Security	
	128 bit data encoding MAC filter Authentication PIN Non-discoverable
Function	
Operating modes	Access point / Ethernet client adapter / (COM server)
Function	Bridge, P2P, MP, COM server
Configuration	Web-based management
General data	
Radio (wireless) certifications	Europe, more countries in e-shop
Weight	95 g
Width	80 mm
Height	65 mm
Depth	25 mm
Degree of protection	IP20
Class of protection	III
Ambient temperature (operation)	-30°C ... 65°C
Permissible humidity (operation)	5% ... 90% (non-condensing)
Air pressure (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Mounting type	Wall mounting, DIN rail mounting optional

FL BT EPA

Bluetooth Ethernet client adapter for wireless connection of Ethernet termination devices to an FL BLUETOOTH AP

Type	Order No.	Pcs. / Pkt.
FL BT EPA	**2692788**	1
FL BT ADAPTER	**2884949**	1

Bluetooth 2.0
ISM 2.4 GHz
Max. 20 dBm (with automatic control)
1
PAN
-
Permanently installed
Internal circularly polarized panel antenna
M 12 connectors (D-coded, female)
-
-
24 V DC
M12 connector (A-coded, male)
9 V DC ... 30 V DC
-
128 bit data encoding
Authentication
PIN
Non-discoverable
Ethernet client adapter
Client, bridge, P2P
Web-based management
Europe, more countries in e-shop
120 g
66 mm
91 mm
34 mm
IP65
III
-30°C ... 65°C
5% ... 90% (non-condensing)
795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Wall mounting

FL BT EPA AIR SET

Protocol-transparent Ethernet spark gap, e.g. for PROFINET, Modbus/TCP etc.

Type	Order No.	Pcs. / Pkt.
FL BT EPA AIR SET	**2693091**	1
FL BT ADAPTER	**2884949**	1

Bluetooth 2.0
ISM 2.4 GHz
Max. 20 dBm (with automatic control)
1
PAN
-
Permanently installed
Internal circularly polarized panel antenna
M 12 connectors (D-coded, female)
-
-
24 V DC
M12 connector (A-coded, male)
9 V DC ... 30 V DC
-
128 bit data encoding
Authentication
PIN
Non-discoverable
Ethernet client adapter
Client, bridge, P2P
Web-based management
Europe, more countries in e-shop
500 g
66 mm
91 mm
34 mm
IP65
III
-30°C ... 65°C
5% ... 90% (non-condensing)
795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Wall mounting

FL BT SPA

Bluetooth serial port adapter, as a wireless connection for a serial interface to FL BLUETOOTH AP

Type	Order No.	Pcs. / Pkt.
FL BT SPA	**2884952**	1
FL BT ADAPTER	**2884949**	1

Bluetooth 2.0
ISM 2.4 GHz
Max. 14 dBm (with automatic control)
1
SPP
SMA (female)
SMA (male)
External OMNI omnidirectional antenna, antennas can be exchanged
-
D-SUB-9 connector
RS-232, RS-485, RS-422
24 V DC
Via COMBICON
9 V DC ... 30 V DC
200 mA
128 bit data encoding
MAC filter
Authentication
PIN
Non-discoverable
Serial client adapters
Serial port adapter
By means of AT commands
Europe, more countries in e-shop
95 g
80 mm
65 mm
25 mm
IP20
III
-25°C ... 55°C
5% ... 90% (non-condensing)
795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Wall mounting, DIN rail mounting optional

Factory Line WLAN

Reliable, rugged and safe. Factory Line WLAN access points have been specially designed for use in harsh industrial environments. By supporting the currently highest safety standard in acc. with IEEE 802.11i with AES encoding, the data are protected as best possible from unauthorized access or manipulation.

The Factory Line access points thus enable mobile applications to have reliable and safe wireless network access, or guarantee stable connections to outlying stations over several hundred meters.

The Factory Line access points fulfill the PROFINET requirements of Conformance Class A.

* The range can be considerably exceeded or fallen below and depends on the environment, antenna technology and the product used.

Please visit www.phoenixcontact.com for more information on the prevailing country-specific approvals for the relevant product.

WLAN

FL WLAN ... AP 802-11

Wireless LAN access point
for the b, g, a and h wireless standards

Description	Type	Order No.	Pcs. / Pkt.
Wireless LAN access point			
- One wireless interface, two antennas	**FL WLAN 24 AP 802-11**	**2884075**	1
- Two wireless interfaces, four antennas	**FL WLAN 24 DAP 802-11**	**2884279**	1
- Supply voltage 230 V AC	**FL WLAN 230 AP 802-11**	**2884444**	1
Replaceable configuration memory for WLAN modules	**FL WLAN SIM**	**2692539**	1

Technical data	FL WLAN 24 AP 802-11	FL WLAN 230 AP 802-11
Wireless interface		
Wireless standard	IEEE 802.11 b/g/a/h	
Frequency band	ISM 2.4 GHz / 5 GHz	
Transmission capacity	20 dBm (EIRP)	
Antenna connection method	R-SMA (male)	
Antenna		
Type of connection	R-SMA (female)	
Assembly instructions	External OMNI omnidirectional antenna, the antennas can be exchanged	
Ethernet interfaces		
Type of connection	RJ45 female connector	
Power supply for module electronics		
Supply voltage	24 V DC (PoE)	230 V AC (PoE)
Type of connection	Via COMBICON	
Range of supply voltages	18.5 V DC ... 30.5 V DC	110 V AC ... 230 V AC
Supply current	400 mA (recommended protection 2AT)	
Security		
	WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (preshared key) WPA group & master rekeying	
Function		
Operating modes	Access point	
Configuration	Multilingual web-based interface (German/English) under http or https, with password protection	
Automatic channel selection	Yes	
Quality of service (QoS)	Yes	
Virtual LAN (VLAN) support 802.1Q	Yes	
General data		
Radio (wireless) certifications	Europe, more countries in e-shop	
Weight	1300 g	
Width	159 mm	
Height	250 mm	
Depth	65 mm	
Degree of protection	IP65	
Ambient temperature (operation)	-20°C ... 55°C	
Permissible humidity (operation)	10% ... 85% (non-condensing)	
Air pressure (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)	
Shock in acc. with IEC 60068-2-27:1997	25g	
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g	
Mounting type	Adapter plate	

Factory Line WLAN

The FL WLAN 24 AP 802-11 XDB is suitable for control cabinet assembly due to its compact design. It supports the Access Point, Multipoint Bridge and Client Adapter operating modes. A Repeater Mode for range expansion is also available.

Factory Line WLAN is the industrial WLAN technology from Phoenix Contactor for high-performance infrastructure networks and for control of mobile transport systems

– High performance and reliability
– Long range
– Good integration in automation systems
– Manipulation-proof and tap-proof

WLAN

... 802-11 XDB

Wireless LAN access point
For the a, b and g wireless standards

Ex:

Description	Type	Order No.	Pcs. / Pkt.
Wireless LAN access point - One wireless interface approved for Europe, antennas as accessories	**FL WLAN 24 AP 802-11 XDB**	**2990037**	1
Wireless LAN access point - One wireless interface approved for USA, antennas as accessories	**RAD-80211-XDB**	**2990011**	1

Technical data	FL WLAN 24 AP 802-11 XDB	RAD-80211-XDB
Wireless interface		
Wireless standard	IEEE 802.11 a/b/g	
Frequency band	ISM 2.4 GHz / 5 GHz	
Transmission capacity	20 dBm (EIRP)	
Antenna connection method	2x MCX (female)	
Antenna		
Assembly instructions	Antenna not included	
Ethernet interfaces		
Type of connection	RJ45 female connector	
Power supply for module electronics		
Supply voltage	24 V DC	
Type of connection	Via COMBICON	
Range of supply voltages	9 V DC ... 30 V DC	
Supply current	215 mA (24 V DC)	
Security		
	WEP 64 bit/128 bit WPA TKIP 802.11i WPA2 (AES) WPA PSK (preshared key)	
Function		
Operating modes	access point, client, bridge	
Configuration	Web-based management	
Automatic channel selection	Yes	
General data		
Radio (wireless) certifications	Europe, more countries in e-shop	Americas, more countries in e-shop
Weight	250 g	
Width	45 mm	
Height	99 mm	
Depth	113 mm	
Degree of protection	IP20	
Ambient temperature (operation)	0°C ... 65°C	
Permissible humidity (operation)	5% ... 90% (non-condensing)	
Air pressure (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)	
Shock in acc. with IEC 60068-2-27:1997	25g	
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g	
Mounting type	DIN rail mounting	

Factory Line WLAN client for network integration and fast roaming

Reliable, rugged and safe. The Factory Line Ethernet and Serial Port adapters have been specially designed for use in harsh industrial environments.

They allow integration of automation devices and PLCs to serial or Ethernet connection to a WLAN network. By supporting the currently highest safety standard in acc. with IEEE 802.11i with AES encoding, the data are protected as best possible from unauthorized access or manipulation.

Bridge mode and fast roaming in automation networks

With its high performance and fully transparent bridge operating mode, the WLAN client FL WLAN 24 EC 802-11 in combination with a suitable access point is ideal for a powerful and inexpensive connection of two networks (Layer 2 transparent) over several hundred meters.

Factory Line WLAN client FL WLAN 24 EC 802-11 implements various standard-compliant functions that enable extremely fast and reliable roaming.

– Standard roaming:
  Fastest possible roaming through unlimited channel lists and configurable signal threshold values (RSSI)
– Table roaming:
  Configurable fixed sequence of access points e.g. for linear vehicle systems and Modbus/TCP API for controlled access point change

The FL WLAN EPA/SPA module stands out with the following features:

– Protocol-transparent data transmission
– Brief delay time (Latent)
– Fast setting up of the connection
– Configuration, diagnostics and connection control via SNMP (only FL WLAN EPA) and AT commands
– DHCP server and client
– Operating modes: Infrastructure and Ad-hoc
– Ad-hoc networks with seven devices can be realized

The "intelligent antenna" concept

The new concept of "intelligent antenna" for FL WLAN EPA combines all functions in one extremely compact and rugged IP65 housing: industrial WLAN wireless module, circular special antenna for reliable wireless connections in metallic environments and control electronics that provides the PLC with complete control over all functions.

Thanks to this concept, a better, more high-performance and considerably economically installation can be automatically attained.

Factory Line WLAN is the industrial WLAN technology from Phoenix Contactor for high-performance infrastructure networks and for control of mobile transport systems

– High performance and reliability
– Long range
– Good integration in automation systems
– Manipulation-proof and tap-proof

Description
Wireless LAN Ethernet client
Wireless LAN Ethernet port adapter
Wireless LAN serial port adapter,
Replaceable configuration memory for WLAN modules

Technical data
Wireless interface
Wireless standard
Frequency band
Transmission capacity
Antenna connection method
Antenna
Type of connection
Assembly instructions
Ethernet interfaces
Type of connection
Serial port
Type of connection
Protocols supported
Power supply for module electronics
Supply voltage
Type of connection
Range of supply voltages
Supply current
Security
Function
Operating modes
Configuration
Automatic channel selection
Quality of service (QoS)
Virtual LAN (VLAN) support 802.1Q
General data
Radio (wireless) certifications
Weight
Width
Height
Depth
Degree of protection
Ambient temperature (operation)
Permissible humidity (operation)
Air pressure (operation)
Shock in acc. with IEC 60068-2-27:1997
Vibration (operation) in acc. with IEC 60068-2-6:1982
Mounting type

WLAN

FL WLAN 24 EC 802-11

Ethernet client adapter
for the b, g, a and h wireless standards

FL WLAN EPA

Wireless LAN Ethernet port adapter,
as a wireless connection for an Ethernet interface to a WLAN access point

WLAN

FL WLAN SPA

Wireless LAN serial port adapter,
as a wireless connection for a serial interface to a WLAN access point

Type	Order No.	Pcs. / Pkt.
FL WLAN 24 EC 802-11	**2884130**	1
FL WLAN SIM	**2692539**	1

Type	Order No.	Pcs. / Pkt.
FL WLAN EPA	**2692791**	1

Type	Order No.	Pcs. / Pkt.
FL WLAN SPA	**2884761**	1

IEEE 802.11 b/g/a/h ISM 2.4 GHz / 5 GHz 20 dBm (EIRP) R-SMA (male)	IEEE 802.11 b/g ISM 2.4 GHz Max. 20 dBm (EIRP) -	IEEE 802.11 b/g ISM 2.4 GHz 14 dBm (EIRP) SMA (male)
R-SMA (female) External OMNI omnidirectional antenna, the antennas can be exchanged	Permanently installed Internal circularly polarized panel antenna	SMA (female) Exchangeable
RJ45 female connector	M 12 connectors (D-coded, female)	-
- -	- -	D-SUB-9 connector RS-232, RS-485, RS-422
24 V DC (PoE) Via COMBICON 18.5 V DC ... 30.5 V DC 400 mA (recommended protection 2AT)	24 V DC M12 connector (A-coded, male) 9 V DC ... 30 V DC -	24 V DC Via COMBICON 9 V DC ... 30 V DC 200 mA
WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (preshared key) WPA group & master rekeying	802.11i WPA PSK (preshared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP	802.11i WPA PSK (preshared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP
Ethernet client adapter Multilingual web-based interface (German/English) under http or https, with password protection Yes Yes Yes	Ethernet client adapter Web-based management Yes - -	Client adapters By means of AT commands Yes - -
Europe, more countries in e-shop 1300 g 159 mm 250 mm 65 mm IP65 -20°C ... 55°C 10% ... 85% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Adapter plate	Europe, more countries in e-shop 120 g 66 mm 91 mm 34 mm IP65 -30°C ... 65°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) - - Wall mounting	Europe, more countries in e-shop 95 g 80 mm 65 mm 25 mm IP65 -25°C ... 55°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Wall mounting, DIN rail mounting optional

2.4 GHz accessories

RAD-ISM-2400-ANT-PAN-8-0

Radio link antenna with high gain (+8 dBi) for transmitting over long distances.

RAD-ISM-2400-ANT-CIR-8-0

Circularly polarized panel directional antenna especially for use in industrial halls with a very high reflection component due to metal.

PANEL directional antenna

PANEL directional antenna, circular

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
PANEL directional wireless antenna (without cable)						
8 dBi, linearly polarized	**RAD-ISM-2400-ANT-PAN- 8-0**	**2867610**	1			
8 dBi, circularly polarized, clockwise				**RAD-ISM-2400-ANT-CIR-8-0**	**2884936**	1
Technical data						
Ambient temperature (operation)	-40°C ... 75°C			-40°C ... 80°C		
Degree of protection	IP55			IP55		
Gain	8 dBi			8 dBi		
Impedance	50 Ω			50 Ω		
Type of connection	SMA (female)			SMA (female)		
Horizontal / vertical apex angle	75 ° / 70 °			70 ° / 65 °		
Dimensions W / H	80 mm / 100 mm			95 mm / 101 mm		
Frequency range	2.3 GHz ... 2.8 GHz			2.4 GHz		
Scope of delivery	Incl. mounting material			Incl. mounting material		

RAD-ISM-2400-ANT-OMNI-5-0

Omnidirectional antenna with high gain for use in buildings.

RAD-ISM-2400-ANT-OMNI-6-0

Omnidirectional antenna with high gain for outdoors.

RAD-ISM-2400-ANT-VAN-3-...

Robust omnidirectional antenna in an inconspicuous design with vandalism protection.

OMNI omnidirectional antenna

OMNI omnidirectional antenna

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
OMNI omnidirectional antenna						
2.4 Ghz, 5 dBi gain	**RAD-ISM-2400-ANT-OMNI-5-0**	**2884923**	1			
2.4 Ghz, 6 dBi gain	**RAD-ISM-2400-ANT-OMNI-6-0**	**2885919**	1			
OMNI omnidirectional antenna with vandal protection						
With SMA connection (male)				**RAD-ISM-2400-ANT-VAN- 3-0-SMA**	**2885867**	1
With connection MCX (male)				**RAD-ISM-2400-ANT-VAN- 3-1-MCX**	**2885702**	1
Mounting material				**RAD-ANT-VAN-MKT**	**2885870**	1

Technical data	RAD-ISM-2400-ANT-OMNI-5-0	RAD-ISM-2400-ANT-OMNI-6-0	RAD-ISM-2400-ANT-VAN- 3-0-SMA	RAD-ISM-2400-ANT-VAN- 3-1-MCX
Ambient temperature (operation)	-20°C ... 65°C	-40°C ... 75°C	-40°C ... 80°C	-40°C ... 80°C
Degree of protection	IP55	IP55	IP55	IP55
Gain	5 dBi	6 dBi	3 dBi	3 dBi
Impedance	50 Ω	50 Ω	50 Ω	50 Ω
Type of connection	SMA (male)	N (female)	SMA (male) with cable (1.5 m)	MCX (male) with cable (1.5 m)
Horizontal / vertical apex angle	360 ° / 45 °	360 ° / 30 °	360 ° / 85 °	360 ° / 85 °
Dimensions W / H	13 mm / 187 mm	22 mm / 250 mm	86 mm / 43 mm	86 mm / 43 mm
Frequency range	2.4 GHz	2.4 GHz ... 2.5 GHz	2.4 GHz	2.4 GHz
Scope of delivery	-	Incl. mounting material	-	-

5 GHz accessories

RAD-ISM-5000-ANT-PAR-18-N
RAD-ISM-5000-ANT-PAR-22-N

Directional wireless antennas for WLAN 802.11a (5 GHz) with high profits for larger distances.

Parabolic antenna

Parabolic antenna

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Parabolic antenna						
Gain 18 dBi	**RAD-ISM-5000-ANT-PAR-18-N**	**5606613**	1			
Gain 22 dBi				**RAD-ISM-5000-ANT-PAR-22-N**	**5606174**	1
Technical data						
Ambient temperature (operation)	-40°C ... 70°C			-40°C ... 70°C		
Degree of protection	IP55			IP55		
Gain	18 dBi			22 dBi		
Impedance	50 Ω			50 Ω		
Type of connection	N (female)			N (female)		
Horizontal / vertical apex angle	18 ° / 18 °			12 ° / 12 °		
Dimensions W / H	152.4 mm / 152.4 mm			- / -		
Frequency range	5.25 GHz ... 5.85 GHz			5.25 GHz ... 5.85 GHz		
Scope of delivery	Incl. mounting material			Incl. mounting material		

Omnidirectional antenna for 5 GHz for direct assembly on WLAN devices with R-SMA connection (replacement part).

OMNI omnidirectional antenna

Description	Type	Order No.	Pcs. / Pkt.
Omnidirectional antenna			
5 GHz, 5 dBi gain	**RAD-ISM-5200-ANT-OMNI-5-0**	**2692034**	2
Technical data			
Ambient temperature (operation)	-40°C ... 80°C		
Degree of protection	IP65		
Gain	5 dBi		
Impedance	50 Ω		
Type of connection	RSMA (female)		
Horizontal / vertical apex angle	360 ° / 17 °		
Dimensions W / H	- / 176 mm		
Frequency range	5.2 GHz ... 5.8 GHz		
Scope of delivery	-		

Antenna cables, adapters and surge protection

RAD-CAB-EF142-...

Extension cable for positioning antennas at a distance: leading out of the control cabinet, connection to an antenna mounted somewhere else.

RAD-CAB-EF393-...

When using surge protection or for adapting an antenna with N connection

Antenna cable type EF 142

Antenna cable type EF 393

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Antenna extension cable, SMA connection at both ends (male)						
3 m	**RAD-CAB-EF142-3M**	**2884512**	1			
5 m	**RAD-CAB-EF142-5M**	**2884525**	1			
Antenna extension cable						
3 m				**RAD-CAB-EF393- 3M**	**2867649**	1
5 m				**RAD-CAB-EF393- 5M**	**2867652**	1
10 m				**RAD-CAB-EF393-10M**	**2867665**	1
Technical data						
Ambient temperature (operation)	-40°C ... 105°C			-40°C ... 105°C		
Impedance	50 Ω			50 Ω		
Cable, attenuation	Approx. 0.93 dB/m			approx. 0.45 dB/m		

RAD-PIG-EF316...

For converting connector standards or leading out from the control cabinet.

RAD-ADP-...

As an adapter between devices and cables.

CN-LAMBDA/4-…

Surge protection outdoors. For details, see the TRABTECH catalog.

Adapter cable, type EF 316

Adapter

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Adapter cables (pigtails)						
0.3 m, N (female) -> SMA (male)	**RAD-PIG-EF316-N-SMA**	**2867694**	1			
0.5 m, SMA (male) -> SMA (male)	**RAD-PIG-EF316-SMA-SMA**	**2885618**	1			
1 m, MCX (male) -> SMA (male)	**RAD-PIG-EF316-MCX-SMA**	**2867678**	1			
Adapter						
SMA (female) -> SMA (female)				**RAD-ADP-SMA/F-SMA/F**	**2884541**	1
RSMA (female) > SMA (female)				**RAD-ADP-RSMA/F-SMA/F**	**2884538**	1
SMA (female) -> SMA (female), perpendicular				**RAD-ADP-SMA/F-SMA/M-90**	**2917324**	1
COAXTRAB, protective adapter for antenna connections						
N (female) -> N (female)				**CN-LAMBDA/4-2.0-BB**	**2818863**	1
N(male) -> N(female)				**CN-LAMBDA/4-2.0-SB**	**2818876**	1
Female-female				**CN-LAMBDA/4-5.9-BB**	**2838490**	1
Further information on surge protection can be found in the TRABTECH catalog.						
Technical data						
Ambient temperature (operation)	-40°C ... 70°C			-65°C ... 165°C		
Impedance	50 Ω			50 Ω		
Cable, attenuation	approx. 1.5 dB/m			-		
Attenuation	-			0.3 dB		

Leaky waveguide and accessories

FL LCX CABLE METER

The leaky waveguide is a cable that acts as an antenna which constantly radiates over its length. It ensures a continuous wireless connection when using tracked systems, even in remote or difficult to access areas. The cable is individually configured during assembly and is provided with connectors.

Leaky wave conductors

Connectors

Description	Type	Order No.	Pcs. / Pkt.
Leaky wave conductors	**FL LCX CABLE METER**	**2884774**	1
Connectors for leaky wave conductor			
Termination resistors for leaky wave conductor			

Type	Order No.	Pcs. / Pkt.
FL LCX CON-N/F	**2884965**	1
FL LCX 50-OHM	**2884978**	1

Technical data		
Ambient temperature (operation)	-40°C ... 85°C	-
Degree of protection	-	-
Impedance	50 Ω	50 Ω
Type of connection	-	N (female)
Frequency range	2.4 GHz ... 6 GHz	2.4 GHz ... 6 GHz

Accessories for leaky waveguide

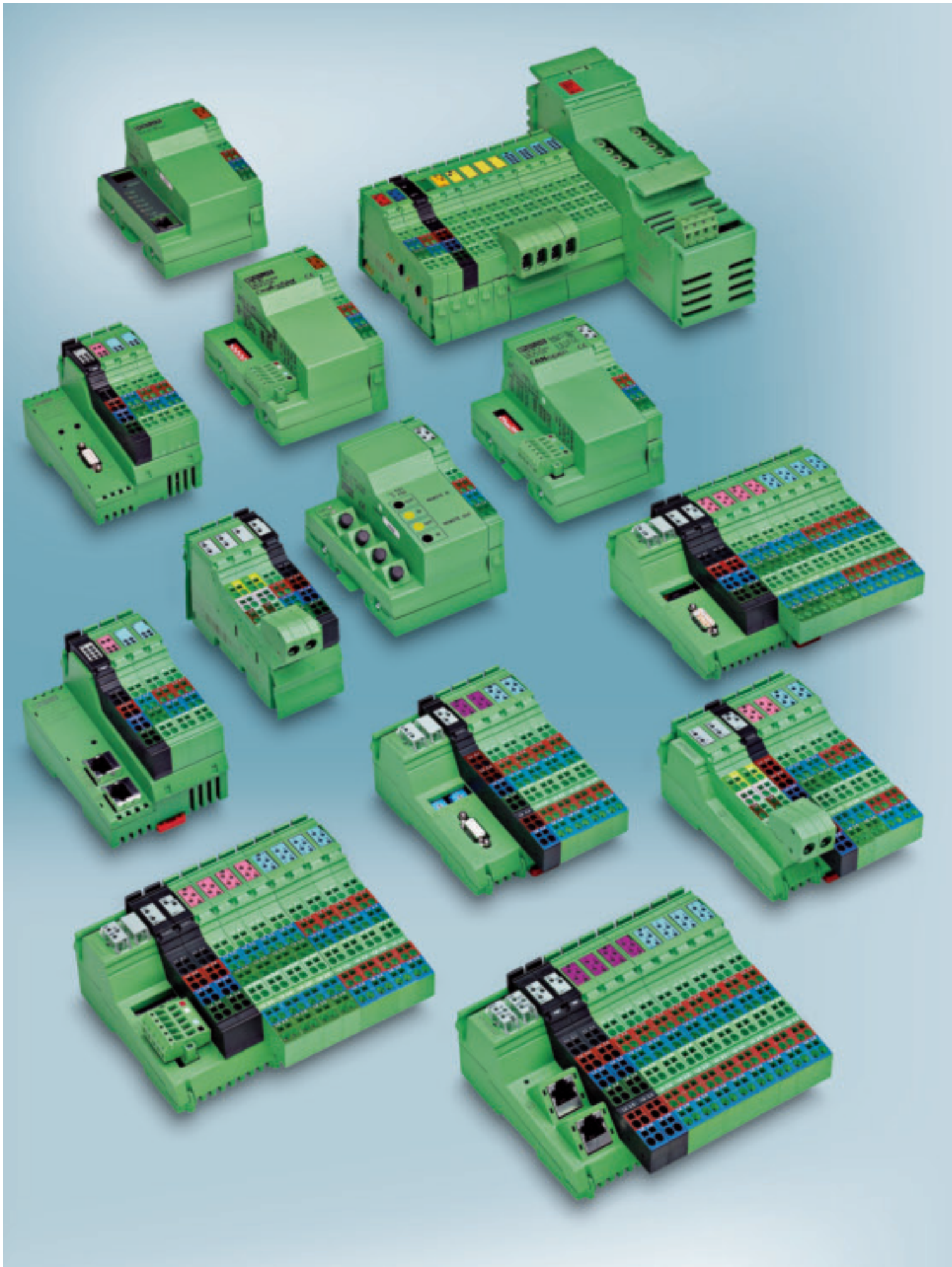
Cable fastenings are required for mounting the leaky waveguide and an alignment tool is required for mounting the connector for connecting the wireless unit.

Alignment tool

Cable tie

Description	Type	Order No.	Pcs. / Pkt.
Alignment tool for leaky wave conductor	**FL LCX TOOL**	**2884981**	1
Cable tie for leaky wave conductor			

Type	Order No.	Pcs. / Pkt.
FL LCX CLAMP	**2884994**	100



I/O systems in the IP20 control cabinet

More flexible – smaller – faster – better value

Phoenix Contact is actively pursuing these trends with innovative I/O systems for perfect solutions in control cabinet construction and field wiring.

Inline Modular

The Inline Modular automation kit stands for "plugging instead of wiring" and connects sensors and actuators with a minimum of wiring and a maximum range of functions.

Inline Block IO

Inline Block IO is a compact and extremely flat addition to the Inline automation kit, combining the advantages of Inline Modular for fitting a large number of channels into a very small space.

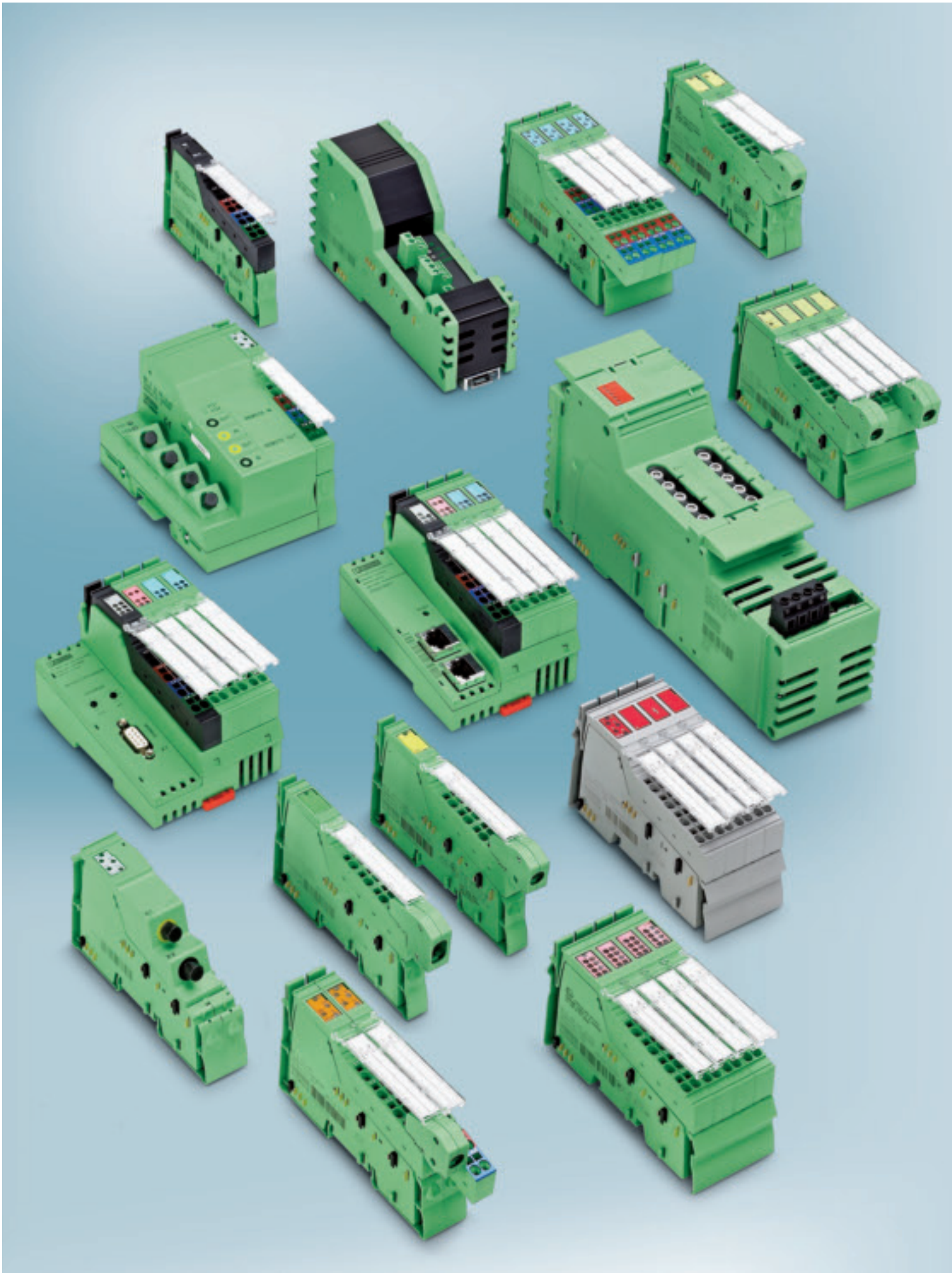
INTERBUS-ST

INTERBUS-ST, installed in the control cabinet or the terminal box, optimally connects sensors and actuators with a medium to large number of channels with INTERBUS and PROFINET.

Program overview

I/O systems in the IP20 control cabinet

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).



I/O systems in the IP20 control cabinet | Inline Modular

The Inline automation kit provides bus couplers and function terminals for all common networks and functions.

Inline Modular enables a flexible and application-specific configuration of digital and analog I/O channels including the most common standard functions:

- Counter modules
- Circuit breakers
- Safety functions
- Positioning and temperature regulation functions
- Communication modules
- Controlling of pneumatic components

The Inline Modular I/O channels expand the embedded controllers of the ILC device range for creating distributed automation solutions.

The Inline bus couplers are available for

- PROFINET IO
- INTERBUS
- PROFIBUS
- DeviceNet™
- Ethernet TCP/IP
- CANopen
- Modbus/TCP
- Modbus/RTU (ASCII)
- Sercos III
- Sercos II
- Mechatrolink I and II

Program overview

High degree of flexibility

The Inline Modular I/O system offers great advantages due to its optimum adaptation to automation requirements.

A station is configured with high granularity in the case of digital and analog inputs or outputs with 1, 2, 4, 8, 16 and up to 32 channels. The necessary functions are easily compiled.

Open fieldbus communication

The Inline Modular system is an I/O system suitable for all buses. The use of network-specific bus couplers enables a network-independent station structure.

The following bus couplers are available for the Inline Modular system:

- PROFINET
- INTERBUS
- PROFIBUS
- DeviceNet™
- Ethernet IP
- CANopen
- Modbus/TCP(UDP)
- Modbus/RTU(ASCII)
- Sercos III
- Sercos II
- Mechatrolink I and II

Fast and easy mounting

All Inline Modular terminals can be easily snapped onto the DIN rails. The reciprocal snapping and potential routing of the logic and I/O supply takes place automatically when the terminals are aligned on the DIN rails. The maximum potential routing of the I/O supply is 8 A.

Simple I/O connection

Sensors and actuators are connected using COMBICON I/O connectors with the spring-cage connection method. One, two, three and four-wire connection method is possible.

Snapping on of connectors

Snapping the connectors onto the modules creates fixed wiring and saves additional wiring costs when the modules are replaced.

Supply of main and segment circuits

The voltage supply for the main circuit U_M is fed in with the aid of the Inline power terminals. This means that electrically isolated I/O circuits can be configured within an Inline station.

The Inline segment terminal makes it possible to structure several segment circuits within one I/O circuit. Various segment terminals are available for creating different protected circuits within a station.

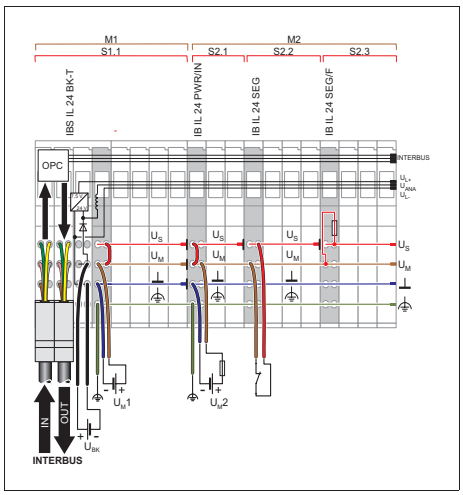
The signal and initiator voltages for digital input/output terminals are picked up from the segment circuit. Only the segment circuit supplies the sensors and actuators in the case of digital and analog inputs.

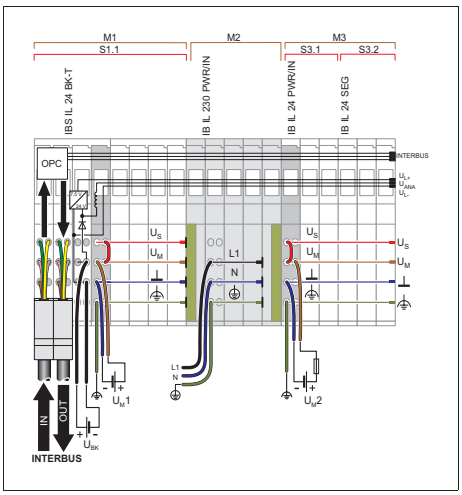
Structure of an AC area

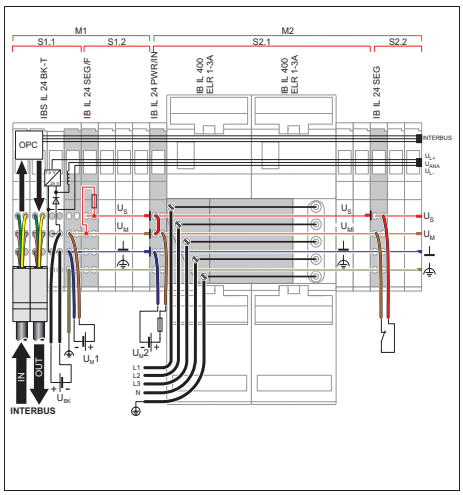
A 120 V AC or 230 V AC range must be restricted by a 230 V AC power terminal and an AC end terminal. The I/O terminals required for this range can be inserted between these two terminals. For relay terminals that switch without a separate supply of 120 V AC or 230 V AC, a delimitation to a 24 V environment can be carried out with distance terminals. A 120 V AC / 230 V AC range must always be grounded with a separate PE protective earth.

Integration of power-level terminals

The Inline power-level terminals can be aligned like analog and digital I/O terminals. A power bus is opened via the power connector on the motor starter device. The 400 V AC mains voltage for other power-level terminals can be jumpered with plug-in technology using a power bridge. The maximum routing current is 20 A.





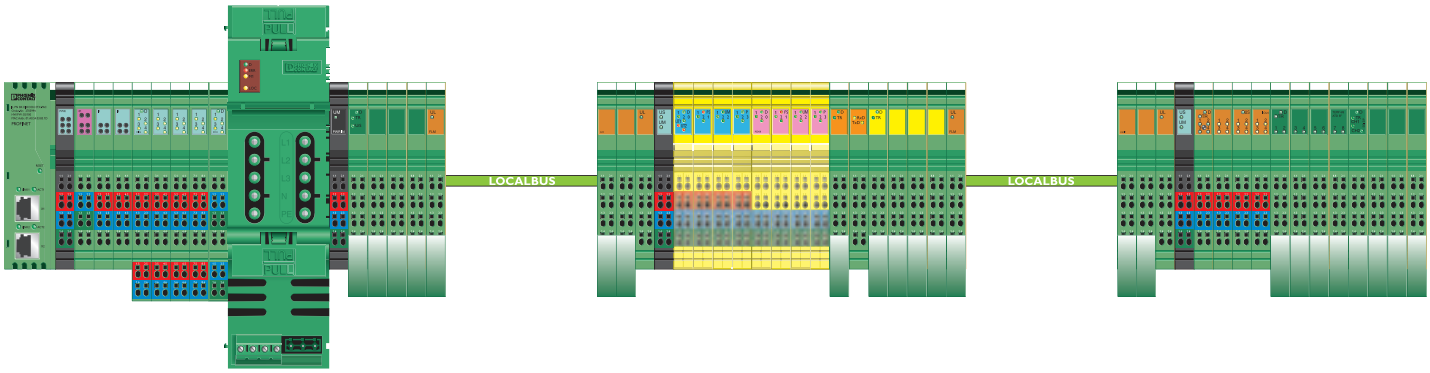


U_{M1} : Main circuit M1
U_{M2} : Main circuit M2
$S_{X,Y}$: Segment circuit Y in main circuit X

Station expansion

The Inline Modular system can be flexibly adapted to an application via IB IL 24 LSKIP-PAC.

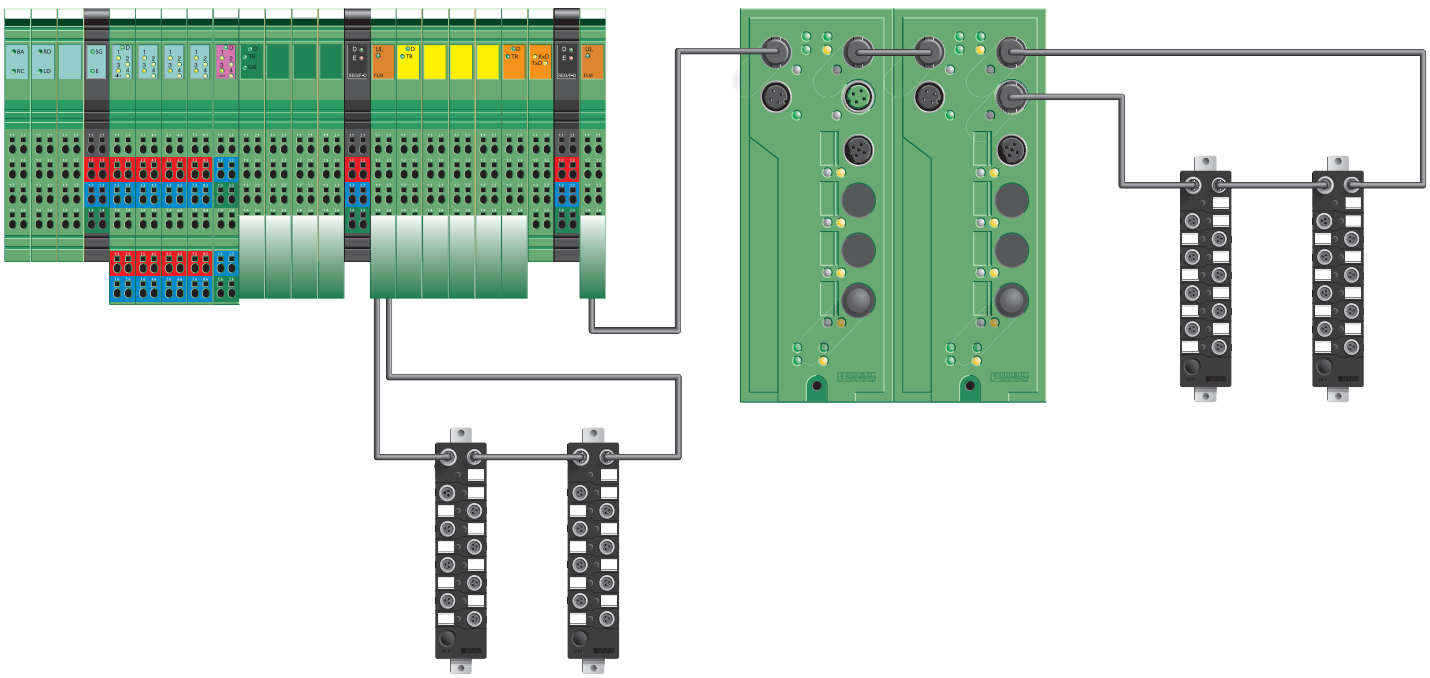
Example: Restricted control cabinet width (no need for a bus coupler or an address e.g. for PROFIBUS).



The maximum configuration is specified by the number of devices that can be connected to the bus coupler or the maximum expansion of 20 m.

Integration of Fieldline Modular M12 or Fieldline Modular M8 modules

Fieldline Modular M12 or Fieldline Modular M8 modules can be directly connected to Inline Modular via IB IL 24 FLM-PAC or IB IL 24 FLM MULTI-PAC. The Inline branch terminal adapts the transmission physics to Fieldline Modular. Sensors and actuators can thus be connected to Fieldline devices close to the station.



Labeling

The functional marking for Inline Modular uses hinged labeling fields which are snapped onto the connectors. These come in two sizes:

– IB IL FIELD 2 for one Inline connector, incl. labeling field
– IB IL FIELD 8 for four Inline connectors, incl. labeling field

The fields can be printed professionally and individually with the labeling software CMS-MARK-WIN from Phoenix Contact (see CLIPLINE catalog). This requires the labeling sheets:

– ESL 62 x 10 (for IB IL FIELD 2)
– ESL 62 x 46 (for IB IL FIELD 8)

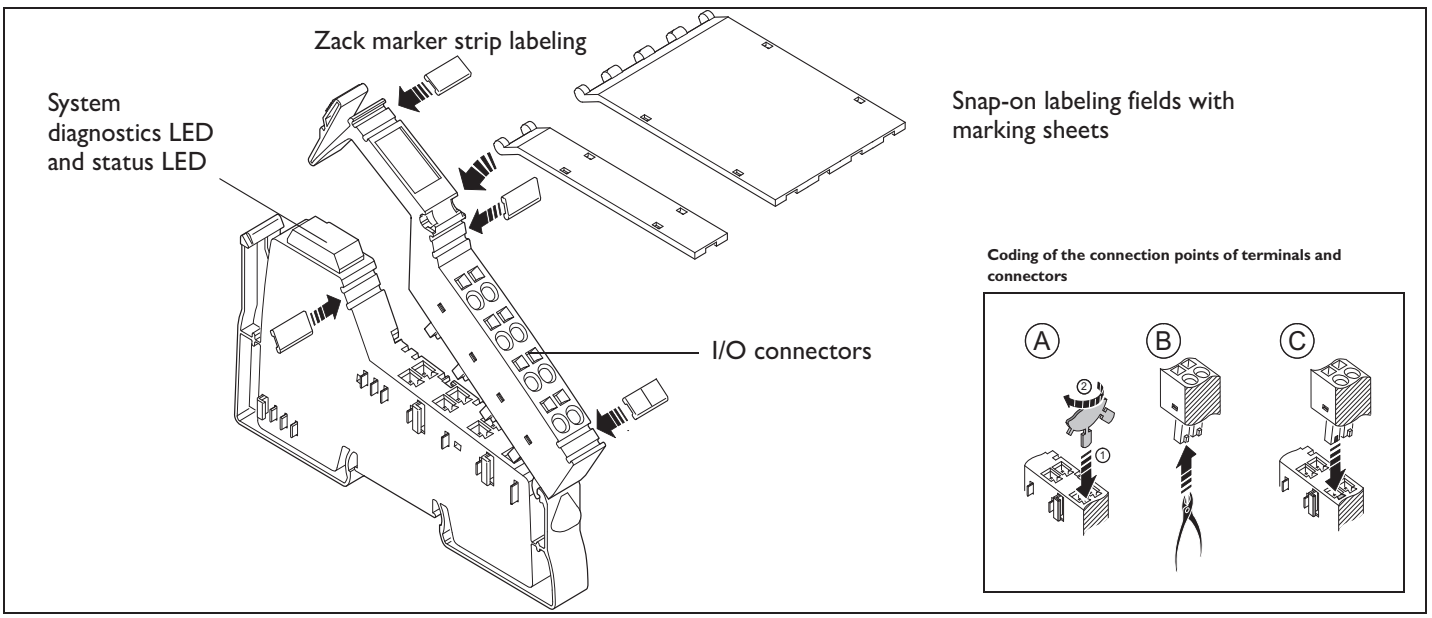
Marking and encoding

The ZBFM 6 Zack marker sheets can also be labeled with the CMS-MARK-WIN software. This helps in numbering the terminals and the connectors so that fast assignment is possible during servicing.

Flat-ribbon Zack strip (e.g. ZBF 6) can also be used for standard labeling (e.g. consecutive numbering) (see also CLIPLINE catalog).

The encoding (keying) of the connection points of terminals and connectors provides further security. The IL CP keying profile should be used.

Structure of an Inline terminal



General technical data

Ambient conditions	
Operating temperature range	-25°C ... +55°C
Storage temperature	-25°C ... +85°C
Relative humidity (operation)	5% to 95% (no condensation)
Relative humidity (storage)	5% to 95% (no condensation)
Vibration	5 g, 2 h in all directions as per IEC 60068-2-6
Shock	25g, over 11 ms as perIEC 60068-2-6
Degree of protection	IP20 (as per IEC 60529)

Electromagnetic compatibility	
Noise emission	EN 61000-6-3
Noise emission of housing	EN 55011, class A
Immunity to interference	EN 61000-6-2

Supply voltage	
Nominal value	24 V DC
Ripple	±5%
Permissible range	19.2 V ... 30.0 V

Certificates

The Inline system naturally has international approvals and licenses. You can therefore always be sure that the use of our I/O terminals in your applications will fulfill your requirements reliably.

Our Inline range of products is continuously extended by new approvals.

Bus couplers

					
Bus system	PROFINET	PROFINET	PROFIBUS	PROFIBUS	PROFIBUS
Type **Order No.**	**IL PN BK DI8 DO4 2TX-PAC** **2703994**	**FL IL 24 BK-PN-PAC** **2878816**	**IL PB BK DI8 DO4-PAC** **2878926**	**IL PB DP/V1-PAC** **2862246**	**PB IL 24 BK-DIO 16/16** **2742638**
Type **Order No.**			**IL PB BK DI8 DO4/EF-PAC** **2692322**		
Fieldbus system Fieldbus connection	PROFINET RJ45 female connector	PROFINET RJ45 female connector	PROFIBUS D-SUB-9 female connector	PROFIBUS D-SUB-9 female connector	PROFIBUS D-SUB-9 female connector
Page	**242**	**243**	**254**	**255**	**255**

					
Bus system	INTERBUS	INTERBUS	INTERBUS	INTERBUS	INTERBUS
Type **Order No.**	**IL IB BK-PAC** **2863070**	**IBS IL 24 BK-T/U-PAC** **2861580**	**IBS IL 24 BK-DIO 16/16** **2742586**	**IBS IL 24 BK-DSUB-PAC** **2861593**	**IBS IL 24 BK-LK-PAC** **2861218**
Fieldbus system Fieldbus connection	INTERBUS Inline connector	INTERBUS Inline connector	INTERBUS Inline connector	INTERBUS D-SUB connector	INTERBUS F-SMA connectors
Page	**244**	**245**	**245**	**245**	**246**

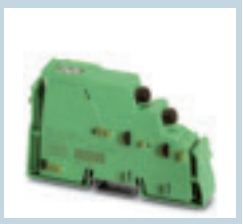
					
Bus system	INTERBUS	INTERBUS	DeviceNet™	DeviceNet™	Modbus/RTU
Type **Order No.**	**IBS IL 24 BK-LK/45-PAC** **2862165**	**IBS IL 24 BK RB-LK-PAC** **2861506**	**IL DN BK DI8 DO4-PAC** **2897211**	**IL DN BK3-PAC** **2718785**	**IL MOD BK DI8 DO4-PAC** **2878696**
Fieldbus system Fieldbus connection	INTERBUS F-SMA connectors	INTERBUS F-SMA connectors	DeviceNet™ TWIN-COMBICON	DeviceNet™ TWIN-COMBICON	Modbus/RTU D-SUB-9 female connector
Page	**247**	**247**	**256**	**257**	**258**

					
Bus system	CANopen	MECHATROLINK	SERCOS interface	SERCOS interface	MUX
Type **Order No.**	**IL CAN BK-TC-PAC** **2718701**	**IL MII BK DI8 DO4-PAC** **2884619**	**IL S3 BK DI8 DO4 2TX-PAC** **2692380**	**IL SC BK-PAC** **2878719**	**IB IL 24 MUX MA-PAC** **2861205**
Fieldbus system Fieldbus connection	CANopen TWIN-COMBICON	Mechatrolink USB type A, female connector	Sercos III RJ45 female connector	Sercos II F-SMA connectors	Field multiplexer Inline connector
Page	**259**	**262**	**260**	**261**	**265**

Bus coupler

					
Bus system	**Modbus/TCP(UDP)**	**Modbus/TCP**	**Modbus/TCP**	EtherNet/IP	EtherNet/IP
Type **Order No.**	**IL ETH BK DI8 DO4 2TX-PAC** **2703981**	**FL IL 24 BK-B-PAC** **2862327**	**FL IL 24 BK-PAC** **2862314**	**IL EIP BK DI8 DO4 2TX-PAC** **2897758**	**FL IL 24 BK ETH/IP-PAC** **2863986**
Fieldbus system Fieldbus connection	Ethernet RJ45 female connector	Ethernet RJ45 female connector	Ethernet RJ45 female connector	Ethernet/IP RJ45 female connector	Ethernet/IP RJ45 female connector
Page	**250**	**251**	**251**	**252**	**253**

Branch terminals

					
Type **Order No.**	**IBS IL 24 RB-T-PAC** **2861441**	**IBS IL 24 RB-LK** **2878117**	**IB IL 24 FLM-PAC** **2736903**	**IB IL 24 FLM MULTI-PAC** **2737009**	**IB IL 24 LSKIP-PAC** **2897457**
Description	Branch terminal With remote bus branch	Fiber optics branch terminal with remote bus branch	Branch terminal for connecting a Fieldline Modular local bus	Branch terminal for connecting a Fieldline Modular local bus	Local bus extension terminal for connecting an Inline Modular local bus
Page	**248**	**249**	**249**	**249**	**249**

Power, segment, and accessory terminals

						
Type **Order No.**	**IB IL 24 PWR IN/R-PAC** **2861674**	**IB IL 24 PWR IN-PAC** **2861331**	**IB IL 120 PWR IN-PAC** **2861454**	**IB IL 24 SEG-PAC** **2861344**	**IB IL DOR LV-SET-PAC** **2861645**	**IB IL PD 24V-PAC** **2862987**
Description	Power or boost terminal, 24 V DC	Power terminal, 24 V DC	Power terminal, 120 V AC	Segment terminal, 24 V DC	Distance terminal	Potential distributor terminal, 24 V
Page	**267**	**266**	**267**	**268**	**269**	**269**
Type **Order No.**		**IB IL 24 PWR IN/2-F-PAC** **2862136**	**IB IL 230 PWR IN-PAC** **2861535**	**IB IL 24 SEG/F-PAC** **2861373**		**IB IL PD GND-PAC** **2862990**
Description		Power terminal, 24 V DC, with fuse	Power terminal, 230 V AC	Segment terminal, 24 V DC, with fuse		Potential distributor terminal, GND
Page		**266**	**267**	**268**		**269**
Type **Order No.**		**IB IL 24 PWR IN/2-F-D-PAC** **2862152**	**IB IL 230 PWR IN/F-D-PAC** **2878971**	**IB IL 24 SEG/F-D-PAC** **2861904**		
Description		Power terminal, 24 V DC, with fuse and diagnostics	Power terminal, 230 V AC, with fuse and diagnostics	Segment terminal, 24 V DC, with fuse and diagnostics		
Page		**267**	**267**	**268**		
Type **Order No.**		**IB IL 24 PWR IN/2F-DF-PAC** **2863779**		**IB IL 24 SEG-ELF-PAC** **2861409**		
Description		Power terminal, 24 V DC, with fuse and diagnostics		Segment terminal, 24 V DC, electronic fuse		
Page		**267**		**269**		

Digital input terminals

	1 channel	2 channels	4 channels	8 channels	16 channels	32 channels
						
Type **Order No.**	**IB IL 120 DI 1-PAC** **2861917**	**IB IL 24 DI 2-PAC** **2861221**	**IB IL 24 DI 4-PAC** **2861234**	**IB IL 24 DI 8-PAC** **2861247**	**IB IL 24 DI 16-PAC** **2861250**	**IB IL 24 DI 32/HD-PAC** **2862835**
Description	1 input, 120 V AC, 3-wire connection	2 inputs, 24 V DC, 4-wire connection,	4 inputs, 24 V DC, 3-wire connection	8 inputs, 24 V DC, 4-wire connection	16 inputs, 24 V DC, 3-wire connection	32 inputs, 24 V DC, 1-wire connection
Page	273	270	271	271	271	271
Type **Order No.**	**IB IL 230 DI 1-PAC** **2861548**	**IB IL 24 DI 2-NPN-PAC** **2861483**		**IB IL 24 DI 8/T2-PAC** **2862204**	**IB IL 24 DI 16-NPN-PAC** **2863520**	**IB IL 24 DI 32/HD-NPN-PAC** **2878243**
Description	1 input, 230 V AC 3-wire connection	2 inputs, 24 V DC, negative switching (NPN)		8 inputs, 24 V DC, Input as per EN 61131-2/type 2, 4-wire connection	16 inputs, 24 V DC, negative switching (NPN), 3-wire connection	32 inputs, 24 V DC, negative switching (NPN), 1-wire connection
Page	273	270		271	271	271
Type **Order No.**		**IB IL 24 EDI 2-PAC** **2861629**		**IB IL 24 DI 8-PAC/SN** **2862932**	**IB IL 24 DI16-PAC/SN** **2862958**	
Description		2 inputs, 24 V DC, short-circuit-proof initiator supply		8 inputs, 24 V DC, 4-wire connection, single numbered	16 inputs, 24 V DC, 4-wire connection, single numbered	
Page		272		271	271	
Type **Order No.**				**IB IL DI 8/S0-PAC** **2897020**		
Description				8 inputs, 24 V DC, S0 counter		
Page				271		

Digital output terminals

	1 channel	2 channels	4 channels	8 channels	16 channels	32 channels
						
Type **Order No.**	**IB IL DO 1 AC-PAC** **2861920**	**IB IL 24 DO 2-PAC** **2861470**	**IB IL 24 DO 4-PAC** **2861276**	**IB IL 24 DO 8-PAC** **2861289**	**IB IL 24 DO 16-PAC** **2861292**	**IB IL 24 DO 32/HD-PAC** **2862822**
Description	1 output, 12 to 253 V AC, 500 mA, 3-wire connection	2 outputs, 24 V DC, 500 mA, 4-wire connection,	4 outputs, 24 V DC, 500 mA, 3-wire connection	8 outputs, 24 V DC, 500 mA, 4-wire connection	16 outputs, 24 V DC, 500 mA, 3-wire connection	32 outputs, 24 V DC, 500 mA, 1-wire connection
Page	278	274	275	274	275	275
Type **Order No.**		**IB IL 24 DO 2-2A-PAC** **2861263**	**IB IL DO 4 AC-1A-PAC** **2861658**	**IB IL 24 DO 8-2A-PAC** **2861603**	**IB IL 24 DO 16-PAC/SN** **2862961**	**IB IL 24 DO 32/HD-NPN-PAC** **2878340**
Description		2 outputs, 24 V DC, 2 A, 4-wire connection	4 outputs, 12 to 253 V AC, 1 A, 3-wire connection	8 outputs, 24 VDC, 2 A, 4-wire connection	16 outputs, 24 V DC, 500 mA, 4-wire connection, single-numbered	32 outputs, 24 V DC, 500 mA, negative switching (NPN), 1-wire connection
Page		275	278	275	275	277
Type **Order No.**		**IB IL 24 DO 2-NPN-PAC** **2861496**		**IB IL 24 DO 8-NPN-PAC** **2863546**		
Description		2 outputs, 24 V DC, 500 mA, negative switching (NPN), 4-wire connection		8 outputs, 24 VDC, 2 A, negative switching (NPN), 4-wire connection		
Page		277		277		
Type **Order No.**		**IB IL 24 EDO 2-PAC** **2861616**		**IB IL 24 DO 8-PAC/SN** **2862945**		
Description		2 outputs, 24 V DC, 500 mA, parameterized outputs		8 outputs, 24 VDC, 500 mA, 4-wire connection, single-numbered		
Page		276		274		

Relay terminals

	1 PDT contact		2 PDTs	4 PDTs		
						
Type **Order No.**	**IB IL 24/230 DOR1/W-PAC** **2861881**	**IB IL 24/230 DOR1/W-PC-PAC** **2862178**	**IB IL 24/48 DOR 2/W-PAC** **2863119**	**IB IL 24/230 DOR4/W-PAC** **2861878**	**IB IL 24/230 DOR4/W-PC-PAC** **2862181**	**IB IL 24/230 DOR4/HC-PAC** **2897716**
Description	1 SPDT relay contact, 5 to 253 V AC, gold plated	1 SPDT relay contact for inductive and capacitive loads, 5 to 253 V AC	2 SPDT relay contacts, 5 to 50 V AC, 5-120 V DC, max. 2 A	4 SPDT relay contacts, 5 to 253 V AC, gold plated	4 SPDT relay contacts for inductive and capacitive loads, 5 to 253 V AC	4 SPDT relay contacts, 5 to 253 V AC, max. 10 A inrush current
Page	**279**	**279**	**279**	**279**	**279**	**279**

Analog input terminals

Analog output terminals

	2 channels		4/8 channels	1 channel	2 channels	8 channels
						
Type **Order No.**	**IB IL AI 2/SF-PAC** **2861302**	**IB IL AI 2-HART-PAC** **2862149**	**IB IL AI 4/EF-PAC** **2878447**	**IB IL AO 1/SF-PAC** **2861315**	**IB IL AO 2/SF-PAC** **2863083**	**IB IL AO 4/8/U/BP-PAC** **2878036**
Description	2 inputs, 0 to 20 mA, 4 to 20 mA, ±20 mA, 0 to 10 V, ±10 V	2 inputs for the connection of max. 5 HART-capable sensors per input	4 differential inputs, 0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V, 0-5 V, ±5 V	1 output, 0 to 20 mA, 4 to 20 mA, 0 to 10 V	2 outputs, 0 to 20 mA, 4 to 20 mA, 0 to 10 V	8 outputs, 0 to 5 V, ±5 V, 0 to 10 V, ±10 V
Page	**280**	**281**	**282**	**290**	**291**	**291**
Type **Order No.**	**IB IL 24 AI 2/SF-230-PAC** **2861577**	**IB IL SGI 2/F-PAC** **2878638**	**IB IL AI 8/SF-PAC** **2861412**	**IB IL AO 1/U/SF-PAC** **2861399**	**IB IL AO 2/U/BP-PAC** **2861467**	
Description	2 inputs with higher 3-dB base frequency at 230 Hz	Two inputs for strain gauges	8 inputs, 0-20 mA, 4-20 mA, ±20 mA, 0-40 mA, ±40 mA, 0-5 V, ±5 V, 0-10 V, ±10 V, 0-25 V, ±25 V, 0-50	1 output, 0 to 10 V	2 outputs, 0 to 10 V, ±10 V	
Page	**280**	**283**	**281**	**290**	**291**	
Type **Order No.**	**IB IL AI 2/4-20-PAC** **2862217**	**IB IL SGI 2/P-PAC** **2884907**	**IB IL AI 8/IS-PAC** **2861661**			
Description	2 inputs, preset to 4-20 mA (default)	Two precise inputs for strain gauges	8 inputs with initiator supply , 0-20 mA, 4-20 mA, 0-40 mA, ±20 mA, ±40 mA			
Page	www.phoenixcontact.com	**283**	**281**			

Temperature measurement terminals

	1 channel	2 channels	4/8 channels	4 channels	6 channels	8 channels
						
Type **Order No.**	**IB IL 24 TC-PAC** **2861360**	**IB IL TEMP 2 UTH-PAC** **2861386**	**IB IL TEMP 4/8 RTD-PAC** **2863915**	**IB IL TEMP 4 UTH HEI 1 DO4-PAC** **2819707**	**IB IL TEMP 6 RTD HEI 1 DO6-PAC** **2819684**	**IB IL TEMP 8 UTH HEI 1 DO8-PAC** **2819697**
Description	Thermistor terminal, 1 input for PTC thermistor	2 inputs for thermocouples	4/8 inputs for RTD resistance thermometer	Temperature recording 4 thermocouples, 4 binary outputs	Temperature recording 6 resistance thermometers, 6 binary outputs	Temperature recording 8 thermocouples, 8 binary outputs
Page	**285**	**284**	**285**	**289**	**289**	**289**
Type **Order No.**		**IB IL TEMP 2 RTD-PAC** **2861328**	**IB IL TEMP 4/8 RTD/EF-PAC** **2897402**			
Description		2 inputs for RTD resistance thermometer	4/8 precise inputs for RTD resistance thermometer			
Page		**285**	**285**			

Machine edition variants

Building automation

	DI	DO	AI	AO	DALI terminals		
							
Type **Order No.**	**IB IL 24 DI 4-ME** **2863928**	**IB IL 24 DO 4-ME** **2863931**	**IB IL AI 2/SF-ME** **2863944**	**IB IL AO 2/U/BP-ME** **2863957**	**IB IL DALI/PWR-PAC** **2897813**	**IB IL DALI-PAC** **2897910**	**SRC-RS485 EVC** **2897237**
Description	4 inputs, 24 V DC, 3-wire connection	4 outputs, 24 V DC, 500 mA, 3-wire connection	2 inputs, 0 to 20 mA, 4 to 20 mA, ±20 mA, 0 to 10 V, ±10 V	2 outputs, 0 to 10 V, ±10 V	DALI master, with integrated DALI power supply unit	Extension to IB IL DALI/PWR-PAC	Wireless receiver for connection with IB IL RS 485/422-PRO-PAC
Page	**292**	**292**	**293**	**293**	**295**	**295**	**295**
Type **Order No.**	**IB IL 24 DI 16-ME** **2897156**	**IB IL 24 DO 16-ME** **2897253**					
Description	16 inputs, 24 V DC, 3-wire connection	16 outputs, 24 V DC, 500 mA, 3-wire connection					
Page	**292**	**292**					

Control and regulation

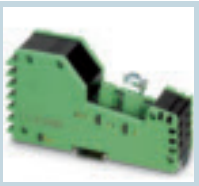
	Function terminals		Positioning terminals		Temperature control terminals	
						
Type **Order No.**	**IB IL PWM/2-PAC** **2861632**	**IB IL CNT-PAC** **2861852**	**IB IL SSI-PAC** **2861865**	**IB IL INC-PAC** **2861849**	**IB IL TEMPCON 300 RTD-PAC** **2819668**	**IB IL TEMPCON 300 UTH-PAC** **2819671**
Description	Pulse width and frequency modulation or step motor control, 2 outputs	1 counter input, 1 control input, 1 output	With an input for single-turn/multiturn absolute encoder	With one input for symmetrical/ asymmetrical incremental encoder	6 (to 30) closed-loop control circuits, temperature recording with resistancethermometers	6 (to 30) closed-loop control circuits, temperature recording with thermocouples
Page	**301**	**300**	**305**	**304**	**286**	**287**
Type **Order No.**					**IB IL TEMPCON 300 RTD-B-PAC** **2819590**	**IB IL TEMPCON 300 UTH-B-PAC** **2819613**
Description					4 closed-loop control circuits, temperature recording with resistance thermometers	4 closed-loop control circuits, temperature recording with thermocouples
Page					**286**	**287**

Communication terminals

Measurement terminals

	Communication terminal		Inline/AS-i master	IO-Link	Position measurement terminal		
							
Type **Order No.**	**IB IL RS 232-PAC** **2861357**	**IB IL RS 485/422-PAC** **2861933**	**ASI MA IL UNI** **2736628**	**IB IL 24 IOL 4 DI 12-PAC** **2692717**	**IB IL INC-IN-PAC** **2861755**	**IB IL IMPULSE IN-PAC** **2861768**	**IB IL SSI-IN-PAC** **2819574**
Description	1 serial input and output channel in RS-232 version	1 serial input and output channel in RS-485/422 version	For AS-interface device rev. 2.1	12 inputs, 24 V DC, 4 IO-Link channels	Reads in symmetrical and asymmetrical incremental encoders	With an interface for reading out a position from scales of length	Reads in absolute rotation and position measuring systems with SSI interface
Page	**296**	**297**	**395**	**298**	**303**	**303**	**303**
Type **Order No.**	**IB IL RS 232-PRO-PAC** **2878722**	**IB IL RS 485/422-PRO-PAC** **2863627**	**ASI MA IB IL** **2741228**				
Description	Pure process data communication	Pure process data communication	For AS-interface device rev. 2.1				
Page	**297**	**297**	www.phoenixcontact.net/catalog				

Power-level terminals

	Servo amplifier		Direct starters	Reversing load starter
				
Type **Order No.**	**IB IL EC AR 48/10A-PAC** **2819587**	**IB IL DC AR 48/10A** **2819286**	**IB IL 400 ELR 1-3A** **2727352**	**IB IL 400 ELR R-3A** **2727378**
Description	Servo amplifier for EC motor without brushgear	Servo amplifier for a DC motor with brushgear	Electronic, up to 1.5 KW / 400 V AC	Electronic, up to 1.5 KW / 400 V AC
Page	**306**	**307**	**309**	**309**
Type **Order No.**			**IB IL 400 MLR 1-8A** **2727365**	
Description			Electro-mechanical, up to 3.7 KW / 400 V AC	
Page			**309**	

Safety terminal

	Safety terminal
	
Type **Order No.**	**IB IL 24 SAFE 1-PAC** **2861564**
Description	Fail-safe disconnection of 24 V U_s up to cat. 4 as per EN 954
Page	**310**

Programmable terminals - Inline controller

Performance class	**100**				**200**	
						
Type **Order No.**	**ILC 130 ETH** **2988803**	**ILC 150 ETH** **2985330**	**ILC 150 GSM/GPRS** **2916545**	**ILC 170 ETH 2TX** **2916532**	**ILC 200 UNI-PAC** **2862291**	**ILC 200 IB-PAC** **2862288**
Type **Order No.**		**ILC 155 ETH** **2988188**				
Description	PC Worx-programmable control module	PC Worx-programmable control module	PC Worx-programmable control module	PC Worx-programmable control module	PC Worx-programmable control module	PC Worx-programmable control module
Page	**24**	**24**	**25**	**25**	**27**	**27**

CPU

Performance class	**300**			
				
Type **Order No.**	**ILC 330 ETH** **2737193**	**ILC 350 ETH** **2737203**	**ILC 370 ETH 2TX-IB** **2876999**	**ILC 390 PN 2TX-IB** **2985314**
Type **Order No.**	**ILC 330 PN** **2988191**	**ILC 350 PN** **2876928**	**ILC 370 PN 2TX-IB** **2876915**	
Type **Order No.**		**ILC 350 ETH/M** **2985819**	**ILC 370 ETH 2TX-IB/M** **2985327**	
Type **Order No.**			**ILC 370 PN 2TX-IB/M** **2985576**	
Description	PC Worx-programmable control module	PC Worx-programmable control module	PC Worx-programmable control module	PC Worx-programmable control module
Page	**28**	**29**	**29**	**29**

	
Type **Order No.**	**IB IL 332-128-PAC** **2861739**
Type **Order No.**	**IB IL 332-256-PAC** **2861810**
Type **Order No.**	
Type **Order No.**	
Description	for modular microcontroller systems
Page	www.phoenixcontact.net/catalog

Bus coupler

					
Bus system	PROFINET	PROFINET	PROFIBUS	Modbus/TCP(UDP)	EtherNet/IP
Type **Order No.**	**IL PN BK DI8 DO4 2TX-PAC** **2703994**	**FL IL 24 BK-PN-PAC** **2878816**	**IL PB BK DI8 DO4-PAC** **2878926**	**IL ETH BK DI8 DO4 2TX-PAC** **2703981**	**IL EIP BK DI8 DO4 2TX-PAC** **2897758**
Type **Order No.**			**IL PB BK DI8 DO4/EF-PAC** **2692332**		
Fieldbus system Fieldbus connection	PROFINET RJ45 female connector	PROFINET RJ45 female connector	PROFIBUS D-SUB-9 female connector	Ethernet RJ45 female connector	Ethernet/IP RJ45 female connector
Page	**242**	**243**	**254**	**250**	**252**

					
Bus system	INTERBUS	INTERBUS	INTERBUS	INTERBUS	INTERBUS
Type **Order No.**	**IBS IL 24 BK-T/U-2MBD-PAC** **2862000**	**IBS IL 24 BK-DSUB-2MBD-PAC** **2862123**	**IBS IL 24 BK-LK-2MBD-PAC** **2862068**	**IBS IL 24 BK-LK/45-2MBD-PAC** **2862220**	**IBS IL 24 BK RB LK-2MBD-PAC** **2862026**
Fieldbus system Fieldbus connection	INTERBUS Inline connector	INTERBUS D-SUB connector	INTERBUS F-SMA connectors	INTERBUS F-SMA connectors	INTERBUS F-SMA connectors
Page	**245**	**245**	**246**	**247**	**247**

			
Bus system	DeviceNet™	Modbus/RTU	SERCOS interface
Type **Order No.**	**IL DN BK DI8 DO4-PAC** **2897211**	**IL MOD BK DI8 DO4-PAC** **2878696**	**IL S3 BK DI8 DO4 2TX-PAC** **2692380**
Fieldbus system Fieldbus connection	DeviceNet™ TWIN-COMBICON	Modbus/RTU D-SUB-9 female connector	Sercos III RJ45 female connector
Page	**256**	**258**	**260**

Note:

A 2 Mbps Inline Modular system can only be configured with the terminals documented here.

Branch terminals

Power and segment terminals

			Power terminals		Segment terminals
					
Type **Order No.**	**IBS IL 24 RB-T-2MBD-PAC** **2861962**	**IBS IL 24 RB-LK-2MBD** **2878159**	**IB IL 24 PWR IN/2F-2MBD-PAC** **2863821**	**IB IL 24 PWR IN/2F-DF-2MBD-PAC** **2863834**	**IB IL 24 SEG-ELF-2MBD-PAC** **2863847**
Description	Branch terminal with remote bus branch	Fiber optics branch terminal with remote bus branch	Power terminal, 24 V DC, with fuse	Power terminal, 24 V DC, with fuse diagnostics only	Segment terminal, 24 V DC, electronic fuse
Page	**248**	**249**	**267**	**267**	**269**

Digital input terminals

Digital output terminals

	2 / 4 channels	8 channels	16 / 32 channels	2 / 4 channels	8 channels	16 / 32 channels
						
Type **Order No.**	**IB IL 24 DI 2-2MBD-PAC** **2861713**	**IB IL 24 DI 8-2MBD-PAC** **2861690**	**IB IL 24 DI16-2MBD-PAC** **2861959**	**IB IL 24 DO 2-2A-2MBD-PAC** **2861700**	**IB IL 24 DO 8-2MBD-PAC** **2861687**	**IB IL 24 DO16-2MBD-PAC** **2862013**
Description	2 inputs, 24 V DC, 4-wire connection	8 inputs, 24 V DC, 4-wire connection	16 inputs, 24 V DC, 3-wire connection	2 outputs, 24 V DC, 2A, 4-wire connection	8 outputs, 24 V DC, 500 mA, 4-wire connection	16 outputs, 24 V DC, 500 mA, 3-wire connection
Page	**270**	**271**	**271**	**274**	**274**	**275**
Type **Order No.**	**IB IL 24 DI 4-2MBD-PAC** **2692306**	**IB IL 24 DI 8-2MBD-PAC/SN** **2878913**	**IB IL 24 DI16-2MBD-PAC/SN** **2878120**	**IB IL 24 DO 4-2MBD-PAC** **2861988**	**IB IL 24 DO8-2MBD-PAC/SN** **2878227**	**IB IL 24 DO 32/HD-2MBD-PAC** **2692898**
Description	4 inputs, 24 V DC, 4-wire connection	8 inputs, 24 V DC, 4-wire connection, single numbered	16 inputs, 24 V DC, 3-wire connection, single numbered	4 outputs, 24 V DC, 500 mA, 3-wire connection	8 outputs, 24 V DC, 500 mA, 4-wire connection	32 outputs, 24 V DC, 500 mA, 1-wire connection
Page	**271**	**271**	**271**	**275**	**274**	**275**
Type **Order No.**			**IB IL 24 DI 32/HD-2MBD-PAC** **2692885**			
Description			32 channels, 24 V DC, 1-wire connection			
Page			**271**			

Relay terminals

Temperature measurement terminals

	1 PDT	4 PDTs	1 channel	4 channels	4/8 channels	6 / 8 channels
						
Type **Order No.**	**IB IL 24/230 DOR1/W-2MBD-PAC** **2862110**	**IB IL 24/230 DOR4/W-2MBD-PAC** **2862039**	**IB IL 24 TC-2MBD-PAC** **2861991**	**IB IL TEMP 4 UTH HEI DO-2M-PAC** **2692267**	**IB IL TEMP 4/8 RTD-2MBD-PAC** **2878612**	**IB IL TEMP 6 RTD HEI DO-2M-PAC** **2897075**
Description	1 SPDT relay contact, 5 - 253 V AC, gold plated	4 SPDT relay contacts, 5 - 253 V AC, gold plated	Thermistor terminal, 1 input for PTC thermistor	Temperature recording, 4 resistance thermometers, 4 binary outputs	4/8 inputs for RTD resistance thermometer	Temperature recording, 6 resistance thermometers, 6 binary outputs
Page	**279**	**279**	**285**	**289**	**285**	**289**
Type **Order No.**					**IB IL TEMP 4/8 RTD/EF-2MBD-PAC** **2897606**	**IB IL TEMP 8 UTH HEI DO-2M-PAC** **2897062**
Description					4/8 precise inputs for RTD resistance thermometers	Temperature recording, 8 resistance thermometers, 8 binary outputs
Page					**285**	**289**

Analog input terminals

Analog output terminal

	2 channels	4 channels	8 channels	2 channels	8 channels
					
Type **Order No.**	**IB IL SGI 2/F-2MBD-PAC** **2878735**	**IB IL AI 4/EF-2MBD-PAC** **2878641**	**IB IL AI 8/SF-2MBD-PAC** **2862042**	**IB IL AO 2/SF-2MBD-PAC** **2862194**	**IB IL AO 4/8/U/BP-2MBD-PAC** **2878052**
Description	2 inputs for strain gauges	4 differential inputs, 0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V, 0-5 V, ±5 V	8 inputs, 0 to 20 mA, 4 to 20 mA, ±20 mA, 0 to 40 mA, ± 40 mA, 0 to 5 V, ±5 V, 0 to 10 V, ±10 V, 0 to 25 V, ± 25 V, 0 to 50 V	2 outputs, 0 to 20 mA, 4 to 20 mA, 0 to 10 V,	8 outputs, 0 to 5 V, ±5 V, 0 to 10 V, ±10 V
Page	**283**	**282**	**281**	**291**	**291**

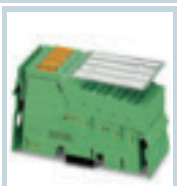
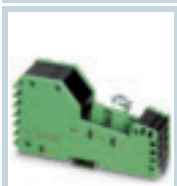
Communication terminals

Measurement terminals

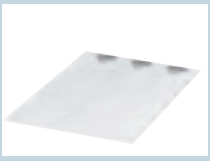
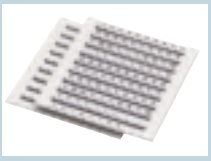
	Serial			IO-Link	Position measurement terminal	
						
Type **Order No.**	**IB IL RS 232-2MBD-PAC** **2862084**	**IB IL RS 485/422-2MBD-PAC** **2862097**	**IB IL RS 485/422-PRO-2MBD-PAC** **2878887**	**IB IL 24 IOL 4 DI 12-2MBD-PAC** **2692733**	**IB IL INC-IN-2MBD-PAC** **2819765**	**IB IL IMPULSE-IN-2MBD-PAC** **2819804**
Description	1 serial input and output channel in RS-232 version	1 serial input and output channel in RS-485/422 version	Pure process data communication	12 inputs, 24 V DC, 4 IO-Link channels	reads in symmetrical and asymmetrical incremental encoders	with an interface for reading out a position from scales of length
Page	**296**	**297**	**297**	**298**	**303**	**303**

Control and regulation

Power-level terminals and accessories

	Function terminal	Positioning terminal	Temperature control terminals		Servo amplifier	Direct starters	Reversing load starter
							
Type **Order No.**	**IB IL CNT-2MBD-PAC** **2862071**	**IB IL SSI-2MBD-PAC** **2862055**	**IB IL TEMPCON 300 RTD-2MBD-PAC** **2819820**	**IB IL TEMPCON 300 UTH-2MBD-PAC** **2819833**	**IB IL DC AR 48/10A-2MBD-PAC** **2897677**	**IB IL 400 MLR 1-8A-2MBD** **2855428**	**IB IL 400 ELR R-3A-2MBD** **2855130**
Description	1 counter input, 1 control input, 1 output	with an input for single-turn/multiturn absolute encoder	6 (to 30) closed-loop control circuits, temperature recording with resistance thermometers	6 (to 30) closed-loop control circuits, temperature recording with thermocouples	Servo amplifier for DC motor with brushgear	Electro-mechanical up to 3.7 kW / 400 V AC	Electronic up to 1.5 kW / 400 V AC
Page	**300**	**305**	**286**	**287**	**307**	**309**	**309**
Type **Order No.**			**IB IL TEMPCON 300 RTD-B-2M-PAC** **2819859**	**IB IL TEMPCON 300 UTH-B-2M-PAC** **2819846**		**IB IL 400 ELR 1-3A-2MBD** **2855525**	
Description			4 closed-loop control circuits, temperature recording with resistance thermometers	4 closed-loop control circuits, temperature recording with thermocouples		Electronic, up to 1.5 kW / 400 V AC	
Page			**286**	**287**		**309**	

General accessories

					
Type **Order No.**	**IB IL FIELD 2** **2727501**	**ESL 62X10** **0809492**	**ZBF 6-...**	**IL CP** **2742683**	**...-CABLE-...** **...**
Type **Order No.**	**IB IL FIELD 8** **2727515**	**ESL 62X46** **0809502**			**...**
Description	Labeling fields	Labeling sheets	Zack marker strip labeling	Keying profile	You can find the suitable cables and connectors in our online catalog
Page	**See the CLIPLINE catalog**				**www.phoenixcontact.net/catalog**
					
Type **Order No.**	**CLIPFIX 35-5** **3022276**	**CLIPFIX 35** **3022218**	**E/AL-NS 35** **1201662**	**FLKM 14-PA-INLINE/IN16** **2302751**	**FLKM 14-PA-INLINE/32** **2302777**
Type **Order No.**				**FLKM 14-PA-INLINE/OUT16** **2302764**	
Description	Standard end clamp	End clamp for CANopen and DeviceNet™ bus couplers	End clamp for use in the case of vibrations	VARIOFACE front adapter, for 16-channel Inline modules	VARIOFACE front adapter, for 32-channel Inline modules
Page	**See the CLIPLINE catalog**			**see INTERFACE catalog**	
					
Type **Order No.**	**PSM-SET-FSMA/4-KT** **2799720**	**IBS DSUB 9/L** **2758473**	**SUBCON 9/F-SH** **2761499**	**SUBCON-PLUS-PROFIB** **2744348**	**I-L ATP GN** **2740850**
Type **Order No.**	**PSM-SET-FSMA/4-HCS** **2799487**	**IBS DSUB 9/C** **2758486**	**SUBCON 9/M-SH** **2761509**		
Description	F-SMA connectors for INTERBUS FO	D-SUB-9 connector	SUBCON-D-SUB connector for INTERBUS	SUBCON connector for PROFIBUS and CANopen, 6 variants	End cover plate
Page	**see INTERFACE catalog**				

Accessories, power-level terminals

					
Type **Order No.**	**IBS HVO** **2836052**	**IB IL 24 BR/DC** **2742036**	**IB IL 400 CN-PWR-IN** **2836078**	**IB IL 400 CN-BRG** **2836081**	**GMVSTBW 2,5 HV/4-ST-7,62 NZIL** **1893957**
Type **Order No.**		**IB IL 400 BR** **2727394**			
Description	Manual on-site operator panel	Brake modules	Power connector	Power bridge	Motor circuit connector
Page	**309**	**309**	**309**	**309**	**309**

PROFINET bus coupler with I/Os on board

The Inline Modular bus coupler for PROFINET with additional integrated digital inputs and outputs is provided for space-saving and economical use, e. g. in mechanical engineering.

8 digital inputs and 4 digital outputs are an integral part of the new Inline bus coupler for PROFINET. The narrow shape of only 80 mm gives you space on the top hat rail, which can then can be filled by other functions from the Inline automation modular system.

The PROFINET bus coupler forms the central link between an I/O station and the Ethernet.

For this bus coupler, the integrated automatic 500 kBd or 2 MBd detection enables an alignment of the entire Inline portfolio, including the integration of up to 16 PCP devices.

Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

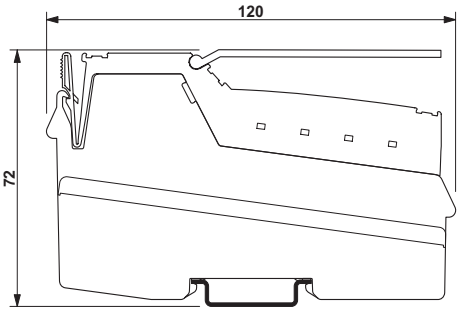
The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system.

In addition to the standard functions of all "Conformance Class B" PROFINET devices, the bus coupler has the dynamic configuration known from PROFIBUS and the "applicative system redundancy" integrated in it. Thanks to these properties, it can also be used in areas where redundancy is very important.

The new generation of Inline bus couplers can be used in many applications due to their shipping industry and UL approvals and the additional EX Zone manufacturer´s declaration.

The maximum configuration is 61 stations for the bus coupler, whereby the inputs and outputs of the bus coupler are considered to be the first and second local bus stations.

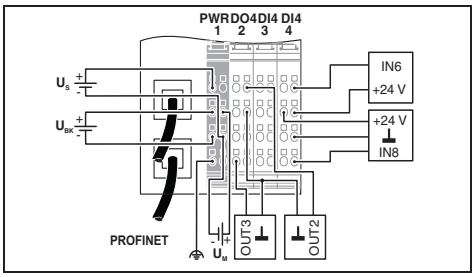
For the bus coupler, the bus-specific device master data file required for the project planning (e.g. GSDML file for PROFINET) can be downloaded from www.phoenixcontact.net/download.



IL PN BK DI8 DO4 2TX-...

Inline Modular PROFINET bus coupler, Inputs: 24 V DC, outputs 24 V DC, 500 mA

Applied for: NV



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
PROFINET bus coupler, complete with accessories (connector and labeling field)	**IL PN BK DI8 DO4 2TX-PAC**	**2703994**	1
Connector set for bus coupler	**IL BKDIO-PLSET**	**2878599**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	PROFINET
Type of connection	RJ45 female connector, autonegotiation
No.	2
Transmission speed	100 Mbps
PROFINET IO	
Device function	PROFINET-IO device
Specification	Version 2.2
Update rate	Max. 1 ms
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 0.91 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	Approx. 500 µs
Name of protection	Polarity protection
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	61 (On board I/Os are two devices)
General data	
Weight	375 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C

PROFINET bus coupler without I/Os on board

The Factory Line PROFINET bus coupler is the link between the PROFINET and I/O level. With this complete PROFINET I/O device, up to 62 functional units, such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc., can be combined.

For this bus coupler, the integrated automatic 500 kBd or 2 MBd detection must enable an arrangement of the complete Inline portfolios.

The FL IL 24 BK-PN-PAC bus coupler provides complete Inline functionality in process data and PCP mode. It allows the operation of up to 8 PSP modules.

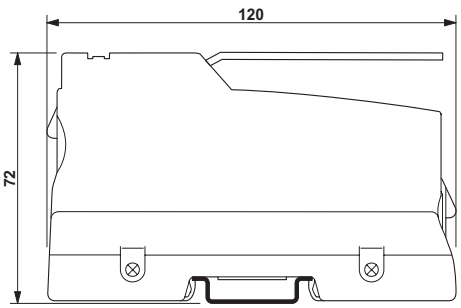
The bus coupler works with a transmission rate of 100 Mbps and detects mixed up receiving cables (RD+/RD-) and corrects them using the auto polarity correction function. The PROFINET update rate is 4 ms or faster.

The bus coupler allows the firmware to be updated on site via the control system.

The quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs. They support the user in the event of servicing and guarantee high system availability.

The 7-segment display simply and quickly displays the current bus coupler status and helps to localize any errors. It identifies the device number of the failed module.

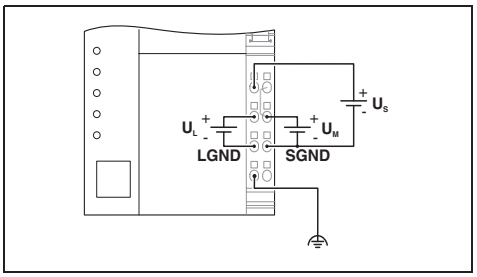
For the bus coupler, the bus-specific device master data file required for the project planning (e.g. GSDML file for PROFINET) can be downloaded from www.phoenixcontact.net/download.



FL IL 24 BK-PN-PAC

Inline Modular PROFINET bus coupler

Ex: // Applied for: BV



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Ethernet bus coupler, PROFINET-capable, complete with accessories (plug connector and labeling field)	**FL IL 24 BK-PN-PAC**	**2878816**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	PROFINET
Type of connection	RJ45 socket, autonegotiation
No.	1
Transmission speed	100 Mbps
PROFINET IO	
Device function	PROFINET-IO device
Specification	Version 1.1
Update rate	Min. 4 ms
Local bus interface	
Type of connection	Inline data jumper
Transmission speed	500 kbps, 2 Mbps (automatic detection, no combined system)
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 1.5 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	63 (max., Inline terminals - observe permitted total current consumption of logics: 2 A at 7.5 V, and of analog supply: 0.5 A at 24 V)
General data	
Weight	270 g
Width	85 mm
Ambient temperature (operation)	0°C ... 55°C

INTERBUS bus coupler for copper cables

The INTERBUS bus coupler connects the terminals of an Inline station with the INTERBUS network.

Various bus couplers can be selected for the copper connection to the INTERBUS remote bus. The connection to the INTERBUS remote bus is made using an Inline shield connector (copper) or a D-SUB connector as appropriate.

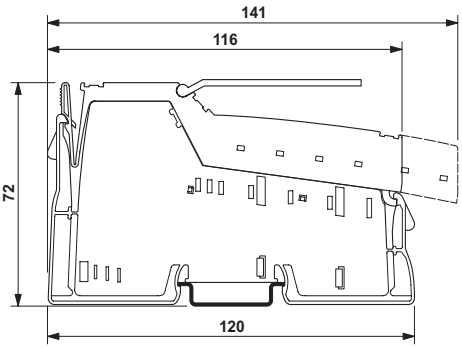
The bus coupler takes on the following functions within an Inline station:

– Refreshing the INTERBUS remote bus signals
– Decoupling the outgoing remote bus or the connected input/output terminal blocks via software commands
– Supplying the connected input/output modules using an integrated power supply unit

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

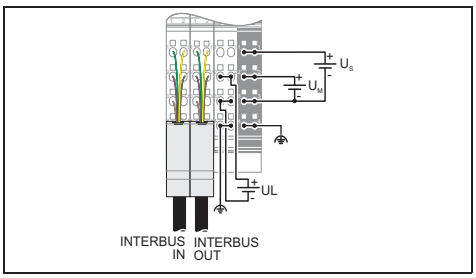
Please note the following when you configure the system:

The total logic current of all the terminals connected to an Inline bus coupler must not exceed the maximum permissible total current of the bus coupler. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices.



IL IB BK-PAC

Inline Modular INTERBUS bus coupler, copper connection, 24 V DC



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.09-1.5	0.09-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Interbus bus coupler, complete with accessories (connector and labeling field) - Transmission rate 2 Mbps	**IL IB BK-PAC**	**2863070**	1
INTERBUS bus coupler with DI 16 and DO 16 terminal block, extendable - Connectors with consecutive numbering - Connection without consecutive numbering			
Connector set for bus terminal, copper, color-coded	**IB IL BK-PLSET/CP**	**2860374**	1
Inline connector			
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Name	INTERBUS remote bus
Type of connection	2x 6-pos. Inline shield connectors
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via Inline connector)
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Typical current consumption	Typ. 100 mA (without connected Inline I/O terminals)
Power supply for U_L	Max. 0.7 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Number of inputs	-
Digital outputs	
Number of outputs	-
INTERBUS data	
Number of connectable local bus devices	63
Maximum distance to the next remote bus device	400 m
Programmable functions	
	Local bus reset Local bus disable Remote bus disable Remote bus reset
General data	
Weight	142 g
Width	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C

IBS IL 24 BK-T/U...-PAC

Inline Modular INTERBUS bus coupler, copper connection, 24 V DC

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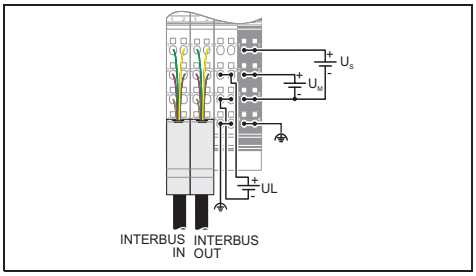


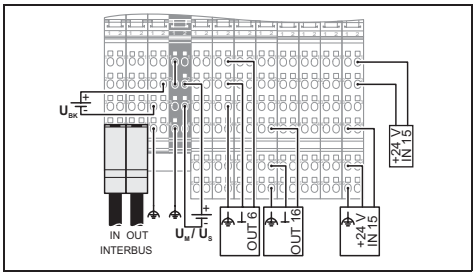
Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK-T/U-PAC	2861580	1
IBS IL 24 BK-T/U-2MBD-PAC	2862000	1
IB IL BK-PLSET/CP	2860374	1
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

INTERBUS remote bus	
2x 6-pos. Inline shield connectors	
Inline data jumper	
24 V DC (via Inline connector)	
19.2 V DC ... 30 V DC (including ripple)	
Typ. 100 mA (without connected Inline I/O terminals)	
Max. 2 A DC (observe derating)	
Max. 0.5 A DC (observe derating)	
-	
-	
63 (without additional power terminal block, observe allowable total current consumption)	
400 m	
Local bus branch disable	
Local bus reset	
Local bus disable	
Remote bus disable	
Remote bus reset	
142 g	
48.8 mm	
-25°C ... 55°C	

IBS IL 24 BK DIO 16/16...

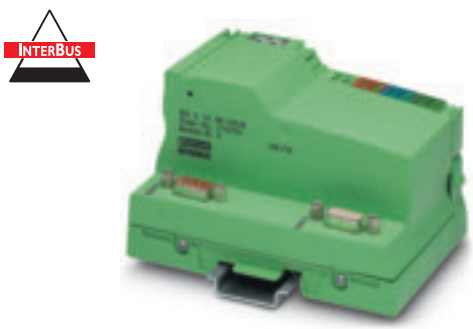
Inline Modular INTERBUS bus coupler with extended functionality, copper connection, 24 V DC

cULus



Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK DIO 16/16	2742586	1
IBS IL 24 BK DIO 16/16/SN	2863669	1
IB IL BK-PLSET/CP	2860374	1
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

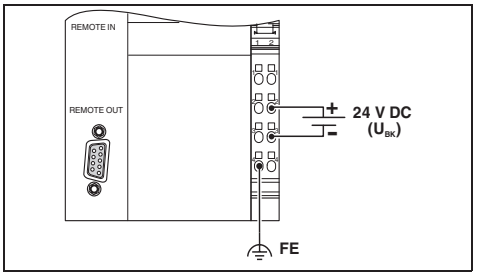
INTERBUS remote bus	
2x 6-pos. Inline shield connectors	
Inline data jumper	
24 V DC (via Inline connector)	
19.2 V DC ... 30 V DC (including ripple)	
Typ. 100 mA (No local bus devices connected)	
Max. 2 A DC	
Max. 0.5 A DC (observe derating)	
16	
16	
63 (observe total permissible current consumption)	
400 m	
Local bus branch disable	
Local bus reset	
Local bus disable	
Remote bus disable	
Remote bus reset	
394 g	
146.4 mm	
-25°C ... 55°C	



IBS IL 24 BK-DSUB...-PAC

Inline Modular INTERBUS bus coupler, D-SUB connection, 24 V DC

Ex: UL us // Applied for: BV



Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK-DSUB-PAC	2861593	1
IBS IL 24 BK-DSUB-2MBD-PAC	2862123	1
IB IL SCN-8-CP	2727608	10
IB IL FIELD 2	2727501	10
ZBF...		

INTERBUS remote bus	
D-SUB-9 female/D-SUB-9 male	
Inline data jumper	
24 V DC (via Inline connector)	
19.2 V DC ... 30 V DC (including ripple)	
Typ. 100 mA (without connected Inline I/O terminals)	
Max. 2 A DC (observe derating)	
Max. 0.5 A DC (observe derating)	
-	
-	
63	
400 m	
Local bus branch disable	
Local bus reset	
Local bus disable	
Remote bus disable	
Remote bus reset	
210 g	
85 mm	
-25°C ... 55°C	

INTERBUS bus coupler for fiber optic cable

The INTERBUS bus coupler connects the terminals of an Inline station with the INTERBUS network.

Various bus couplers can be selected for the FO connection to the INTERBUS remote bus. The connection is always made using an Inline F-SMA connector (optical fiber).

IBS IL 24 BK-LK/45 is a bus coupler for INTERBUS with a fiber optic connection angled at 45°. This angling means that the bus coupler and the Inline station can also be mounted in very shallow 80-type terminal boxes without violating the specified minimum bending radii for fiber optic cables.

Bus coupler IBS IL 24 BK RB-LK offers the additional option of configuring a (fiber optic) remote bus branch.

A power terminal (e.g. IB IL 24 PWR IN-PAC) must always be inserted downstream of all INTERBUS fiber optic bus couplers to supply both main and segment circuits.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

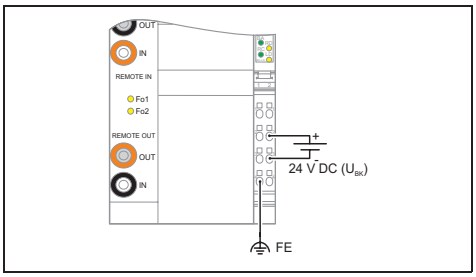
Please note the following when you configure the system:

The total logic current of all the terminals connected to an Inline bus coupler must not exceed the maximum permissible total current of the bus coupler. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices.

IBS IL 24 BK-LK...-PAC

Inline Modular INTERBUS bus coupler, FO connection, 24 V DC

Ex:



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Interbus bus coupler, complete with accessories (connector and labeling field)			
	IBS IL 24 BK-LK-PAC	**2861218**	1
- Transmission rate 2 Mbps	**IBS IL 24 BK-LK-2MBD-PAC**	**2862068**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

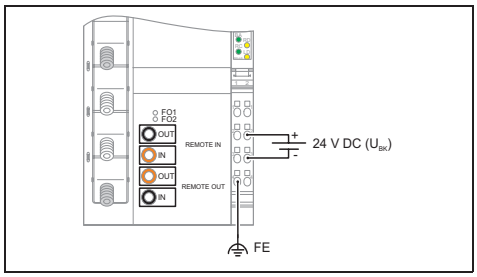
Technical data	
Interface	
Name	INTERBUS remote bus
Type of connection	4x F-SMA connector
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via Inline connector)
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Typical current consumption	Typ. 90 mA (without connected Inline I/O terminals)
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	63
Maximum distance to the next remote bus device	400 m
Programmable functions	
	Local bus branch disable Local bus reset Local bus disable Remote bus disable Remote bus reset
General data	
Weight	220 g
Width	85 mm
Ambient temperature (operation)	-25°C ... 55°C

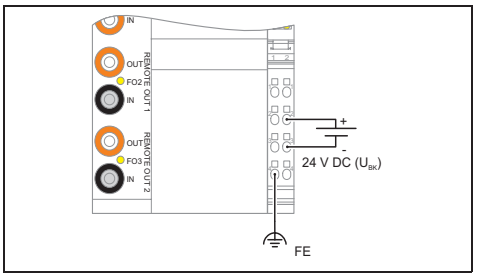
IBS IL 24 BK-LK/45...-PAC

Inline Modular INTERBUS bus coupler, 45° angled FO connection, 24 V DC

IBS IL 24 BK RB-LK...-PAC

Inline Modular INTERBUS bus coupler, FO connection and FO remote bus branch, 24 V DC





Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK-LK/45-PAC	**2862165**	1
IBS IL 24 BK-LK/45-2MBD-PAC	**2862220**	1
IB IL SCN-8-CP	**2727608**	10
ZBF...		

Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK RB-LK-PAC	**2861506**	1
IBS IL 24 BK RB LK-2MBD-PAC	**2862026**	1
IB IL SCN-8-CP	**2727608**	10
ZBF...		

INTERBUS remote bus 4 x F-SMA angled connectors	INTERBUS remote bus 6 x F-SMA connector
Inline data jumper	Inline data jumper
24 V DC (via Inline connector) 19.2 V DC ... 30 V DC (including ripple) Typ. 90 mA (without connected Inline I/O terminals) Max. 2 A DC (observe derating) Max. 0.5 A DC (observe derating)	24 V DC (via Inline connector) 19.2 V DC ... 30 V DC (including ripple) Typ. 120 mA (without connected Inline I/O terminals) Max. 2 A DC (observe derating) Max. 0.5 A DC (observe derating)
63 400 m	63 400 m
Local bus branch disable Local bus reset Local bus disable Remote bus disable Remote bus reset	Local bus branch disable Local bus reset Local bus disable Remote bus disable Remote bus reset
210 g 85 mm -25°C ... 55°C	235 g 85 mm -25°C ... 55°C

Branch terminals

The branch terminals are designed for use within an Inline station.

The IBS IL 24 RB-T-PAC branch terminal makes it possible to add more system levels to an INTERBUS network. A total of up to 15 levels can be operated in the network.

The branch terminals IBS IL 24 RB-LK and IBS IL 24 RB-LK-2MBD only differ in their transmission speeds. They have an outgoing FO remote bus interface and a combined remote bus branch / local bus interface (Inline data jumpers). The IBS IL 24 RB-LK branch terminal can be placed directly after a bus coupler or a control terminal.

A power terminal (e.g. IB IL 24 PWR IN-PAC) must always be inserted downstream from all INTERBUS fiber optic bus couplers to supply both main and segment circuits.

The Inline branch terminal IB IL 24 FLM-PAC enables a Fieldline Modular M8 local bus device to be connected to an Inline Modular station or a Fieldline Modular M12 station. With the IB IL 24 FLM-PAC branch terminal, the transmission physics of the Inline local bus is converted into the transmission physics of the Fieldline Modular local bus. This makes it possible to integrate sensors and actuators that are connected in close proximity to the station to Fieldline Modular devices of the IP65/67 degree of protection in an Inline Modular system.

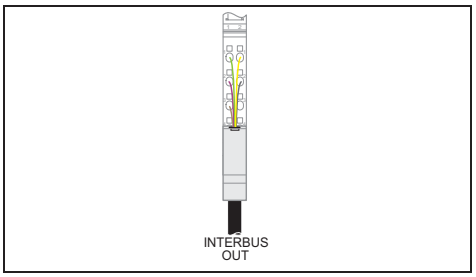
Moreover, the IB IL 24 FLM-PAC branch terminal in combination with the IB IL 24 LSKIP-PAC line skipping terminal also enables a so-called "Line skip" within an Inline station, i.e. the Inline station can be continued on another DIN rail without using a new bus coupler.

The IB IL 24 FLM MULTI-PAC branch terminal enables integration of several Fieldline Modular M8 local busses in one Inline station, unlike IB IL 24 FLM-PAC.

IBS IL 24 RB-T...-PAC

Inline Modular branch terminal, with remote bus stub line, 24 V DC

Ex: // Applied for: BV



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.09-1.5	0.09-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline branch terminal, complete with accessories (connector and labeling field)			
	IBS IL 24 RB-T-PAC	**2861441**	1
- Transmission rate 2 Mbps	**IBS IL 24 RB-T-2MBD-PAC**	**2861962**	1
Inline segment terminal, complete with accessories (connector and labeling field) - With fuse			
Shield connector for analog Inline terminal blocks	**IB IL SCN-6 SHIELD**	**2726353**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Type of connection	Inline shield connector
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	-
Range of supply voltages	-
Max. current consumption	-
Current consumption from U_L	-
Current consumption from U_{ANA}	Typ. 29 mA
Power supply for U_L	-
Power supply for U_{ANA}	-
General data	
Weight	46 g
Width	12.2 mm
Ambient temperature (operation)	-25°C ... 55°C

IBS IL 24 RB...-LK

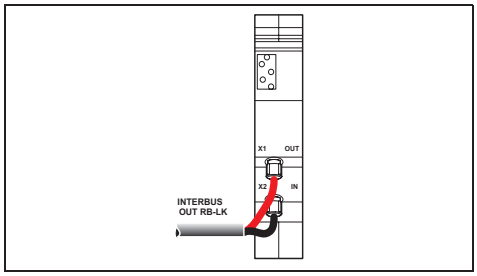
Inline Modular FO branch terminal, with remote bus stub line, 24 V DC

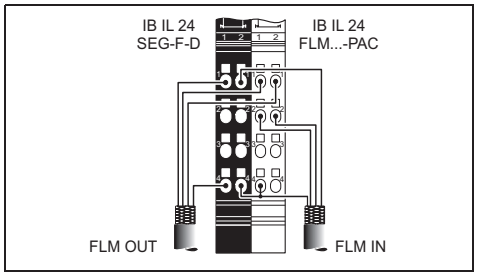
IB IL 24 FLM...-PAC

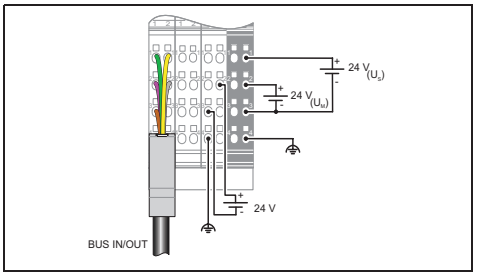
Inline Modular branch terminal for coupling a Fieldline Modular local bus

IB IL 24 LSKIP-PAC

Inline Modular local bus extension terminal for coupling a Inline Modular local bus (branch terminal IB IL 24 FLM-PAC)







Type	Order No.	Pcs. / Pkt.
IBS IL 24 RB-LK	**2878117**	1
IBS IL 24 RB-LK-2MBD	**2878159**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL 24 FLM-PAC	**2736903**	1
IB IL 24 FLM MULTI-PAC	**2737009**	1
IB IL 24 SEG/F-PAC	**2861373**	1
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL 24 LSKIP-PAC	**2897457**	1
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

	IB IL 24 FLM-PAC	IB IL 24 FLM MULTI-PAC
FSMA male connectors	Inline shield connector	Inline shield connector
Inline data jumper	Inline data jumper	Inline data jumper
-		
-		
-		
-	110 mA	50 mA
Typ. 42 mA		
-		
-		
89 g	43 g	43 g
24.4 mm	12.2 mm	12.2 mm
-25°C ... 55°C	-25°C ... 55°C	-25°C ... 55°C

Inline shield connector
Inline data jumper
24 V DC
19.2 V DC ... 30 V DC
Max. 1.25 A (with max. number of connected I/O terminal blocks)
-
-
Max. 2 A DC (observe derating)
Max. 0.5 A DC (observe derating)
207 g
48.8 mm
-25°C ... 55°C

Modbus/TCP(UDP) bus coupler with I/Os on board

The Inline Modular bus coupler for Modbus/TCP(UDP) with additional integrated digital inputs and outputs is designed for space-saving and economical use, e.g. in mechanical engineering.

8 digital inputs and 4 digital outputs are an integral part of the new Inline bus coupler for Modbus/TCP(UDP).

The narrow shape of only 80 mm gives you space on the DIN rail and can then be filled with other functions from the Inline automation kit.

The Modbus/TCP(UDP) bus coupler forms the central link between an I/O station and the Ethernet. The IP address of the bus coupler can be set with the BootP protocol that can be deactivated by with the Factory Managers or any BootP manager. The bus coupler supports communication via the Modbus/TCP(UDP) protocol and thereby uses the dynamic tables.

The universal device driver interface (DDI) and the high-level language fieldbus interface (HFI) can be used as software interfaces for access via TCP/IP.

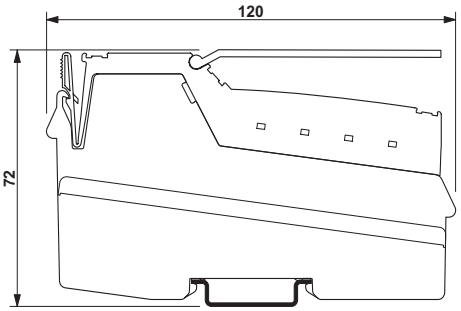
Users can develop programs in C, C++, C#, Visual Basic or other high-level languages. Additionally, data can be exchanged via an OPC server.

For all bus couplers, the integrated automatic 500 kBd or 2 MBd detection must enable an arrangement of the complete Inline portfolios, including integration of up to 8 PCP devices.

Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

The new generation of Inline bus couplers can be used in many applications, due to their its UL approvals and the additional EX-Zone2 manufacturer's declaration.

The maximum configuration is 63 stations for the bus coupler, whereby the inputs and outputs of the bus coupler are considered to be the first and second local bus stations.

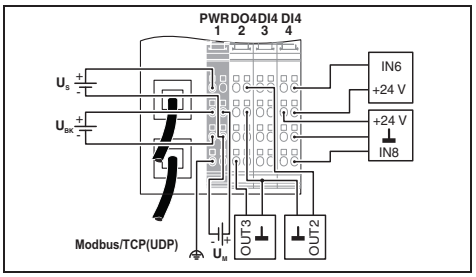


Modbus/TCP (UDP)

IL ETH BK DI8 DO4 2TX-PAC

Inline modular Modbus/TCP(UDP) bus coupler, Inputs: 24 V DC, outputs: 24 V DC 500 mA

Applied for: UL-EX LIS / CUL-EX LIS



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Modbus/TCP(UDP) bus coupler - Complete with accessories (connector and labeling field)	**IL ETH BK DI8 DO4 2TX-PAC**	**2703981**	1
Connector set for bus coupler	**IL BKDIO-PLSET**	**2878599**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	Modbus/TCP (UDP)
Type of connection	RJ45 female connector, autonegotiation
No.	2
Transmission speed	10/100 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 0.98 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	-
Name of protection	Polarity protection
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	61 (On board I/Os are two devices)
General data	
Weight	375 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C

Modbus/TCP bus coupler without I/Os on board

The Factory Line Ethernet bus couplers are the links between the Ethernet and the I/O level. With the Ethernet-compatible bus couplers up to 63 functional units such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc. can be combined.

Both the standard coupler FL IL 24 BK-B and its extended version FL IL 24 BK provide full Inline functionality in process data mode and can be easily configured with the aid of the web based management.

In addition to the standard coupler, the FL IL 24 BK allows operation with up to 8 Inline terminals with PCP communication and on-site firmware updates. The bus couplers work with all current operating systems and support communication via the Modbus/TCP protocol. They support the use of static and dynamic Modbus tables here.

The universal device driver interface (DDI) and the high-level language fieldbus interface (HFI) can be used as software interfaces for access via TCP/IP.

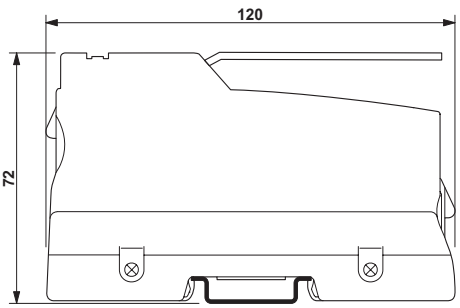
This integration enables the user to create convenient and easy-to-handle applications. This interface forms the link between the Factory Line Ethernet bus couplers and the programming languages. Users can develop programs in C, C++, C#, Visual Basic or other high-level languages.

Additionally, data can be exchanged via an OPC server.

In order to read data through many security mechanisms, e.g. firewalls, communication via XML is possible.

Due to the convenient terminal detection with the aid of the "plug & play" mode integrated in both bus couplers, it is easily possible to complete the terminal configuration within a few minutes.

The Factory Manager and the Factory Line IO configurator make it possible to assign the IP address to the bus couplers as well as to configure the network and terminals quickly.

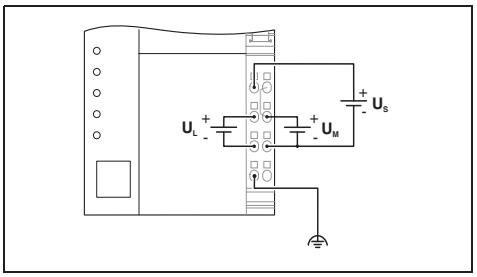


Ethernet

FL IL 24 BK...-PAC

Inline Modular Ethernet bus coupler

Ex:



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Ethernet bus coupler, MODBUS/TCP, OPC, DDI and XML, complete with accessories (connectors and labeling field)			
- Basic	**FL IL 24 BK-B-PAC**	**2862327**	1
- With extended functions	**FL IL 24 BK-PAC**	**2862314**	1
CD-ROM with user documentation in PDF format, driver software and sample programs, IO configurator	**CD FL IL 24 BK**	**2832069**	1
Factory Manager, multilingual configuration and diagnostics software for ETHERNET networks in automation	**FL SWT**	**2831044**	1
INTERBUS OPC server, data interface between distributed INTERBUS and Ethernet networks and visualization systems	**IBS OPC SERVER**	**2729127**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	Ethernet
Type of connection	RJ45 female connector, autonegotiation
No.	1
Transmission speed	10/100 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 1.5 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	63
General data	
Weight	270 g
Width	90 mm
Ambient temperature (operation)	0°C ... 55°C

EtherNet/IP bus coupler with I/Os on board

The Inline-EtherNet/IP bus coupler is the link between the EtherNet/IP host and the I/O level. With the Ethernet/IP-compatible bus coupler, up to 61 functional units such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc. can be combined.

The EtherNet/IP bus coupler offers the full Inline functionality in process data operation and can be easily configured using web-based management. With eight additionally integrated digital inputs and four outputs, they save space as well as costs. This way, not only is fieldbus communication guaranteed, but some automation tasks are also taken care of at the same time.

A width of only 80 mm saves a lot of space on the DIN rail which can be used for other Inline system functions. In addition, the bus coupler can be operated without additional terminals for simpler applications in "stand alone" mode.

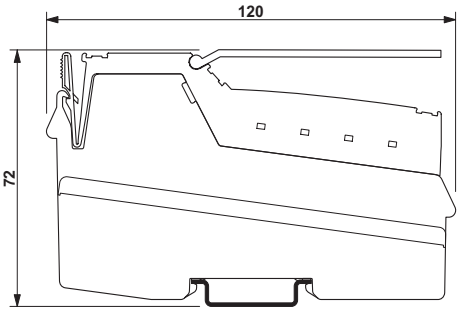
The newest addition to the EtherNet/IP bus coupler family has a 3-port switch for simplifying the line structure, which supports autodetection and autocrossover in full duplex 10/100 Mbit operation.

For the bus coupler, the integrated automatic 500 kBd or 2 MBd detection must enable adaptation to the complete Inline portfolios, including integration of up to 8 PCP devices.

Phoenix Contact provides an EDS file on the Internet with product-specific device data for project planning with EtherNet/IP.

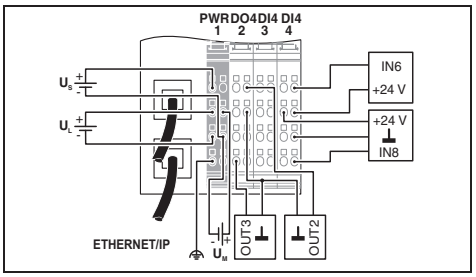
Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system.



IL EIP BK DI8 DO4 2TX-PAC

Inline Modular Ethernet/IP bus coupler
Inputs: 24 V DC, outputs: 24 V DC, 500 mA



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Ethernet bus coupler, Ethernet/IP-capable, complete with accessories (connector and labeling field)	**IL EIP BK DI8 DO4 2TX-PAC**	**2897758**	1
Connector set for bus coupler	**IL BKDIO-PLSET**	**2878599**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	Ethernet/IP
Type of connection	RJ45 female connector, autonegotiation
No.	2
Transmission speed	10/100 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 0.98 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	Approx. 500 µs
Name of protection	Polarity protection
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	61 (On board I/Os are two devices)
General data	
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C

Ethernet/IP bus coupler without I/Os on board

The Factory Line Ethernet bus coupler FL IL 24 BK-ETH/IP is the link between the Ethernet/IP and the Inline automation kit.

With the EtherNet/IP-compatible bus couplers, up to 63 functional units such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc. can be combined.

The bus coupler FL IL 24 BK-ETH/IP offers the full Inline functionality in the process data operation and can be easily configured using the web-based management.

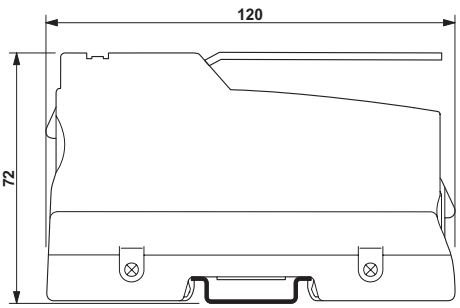
As a supplement to standard communication, the FL IL 24 BK-ETH/IP allows operation with up to 8 Inline terminals with PCP communication and allows firmware updates to be carried out on site.

Thanks to the convenient station detection using the integrated "plug & play" mode and the Inline-specific LEDs, the station set-up is completed after a few minutes. The 2-digit 7-segment display and the supplementary LEDs allow for quick set-up and easy maintenance, even when access via PC, laptop or web sites isn't possible.

The graphics and figures on the web sites allow a point-exact diagnosis, such as the bus coupler status, the status of the individual station modules and the display of application errors, e.g. excessive traffic load. The integrated error log saves the last 10 status changes of recently occurring errors.

The XML interface allows the user to create and reuse his own web pages without having to buy expensive HMI software packages.

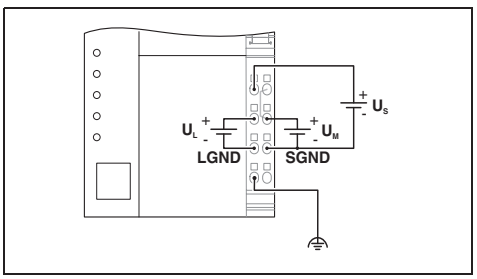
Unique COS masks and input lock mechanisms maximize the system throughput for high-performance applications. In keeping with Phoenix Contact's commitment to quality, the Ethernet/IP bus coupler was tested and certified by ODVA after the last Ethernet/IP conformance test.



FL IL 24 BK ETH/IP-PAC

Inline modular Ethernet/IP bus coupler

Ex: [UL]



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Ethernet bus coupler, Ethernet/IP-capable, complete with accessories (connector and labeling field)	**FL IL 24 BK ETH/IP-PAC**	**2863986**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	Ethernet/IP
Type of connection	RJ45 female connector, autonegotiation
No.	1
Transmission speed	10/100 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 1.5 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	63
General data	
Weight	270 g
Width	85 mm
Ambient temperature (operation)	0°C ... 55°C

PROFIBUS bus coupler with I/Os on board

The Inline Modular bus couplers with additional integrated digital inputs and outputs are designed for space-saving and economical use, e.g. in mechanical engineering.

8 digital inputs and 4 digital outputs are a integral part of the new Inline bus coupler for PROFIBUS DP. This not only assures the fieldbus communication but simultaneously performs part of the automation task.

The low width of only 80 mm saves space on the top hat rail, which can then be filled with other functions from the Inline automation modular system.

The bus coupler for PROFIBUS/DP can insert an Inline station at any position in the PROFIBUS/DP network. The address is easy to set with two rotary switches from outside. The fieldbus is connected via a 9-pos. D-SUB connector.

For this bus coupler, the integrated automatic 500 kBd or 2 MBd detection must enable an arrangement of the complete Inline portfolios, including integration of up to 16 PCP devices.

The maximum configuration for these bus couplers is 61 devices. The total logic current of all connected terminals must not exceed the maximum permissible total current of 0.8 A. If necessary, a IB IL 24 PWR IN/R boost terminal must be set.

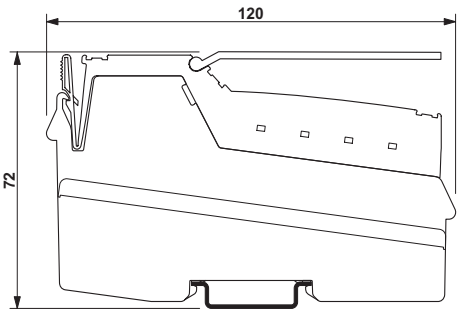
Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

The new generation of Inline bus couplers can be used in many applications due to their shipping industry and UL approvals and the additional EX Zone manufacturer´s declaration.

The EF variant enables operation of PROFIsafe devices in local bus.

In addition, integrated asset-management functions make the bus coupler more valuable.

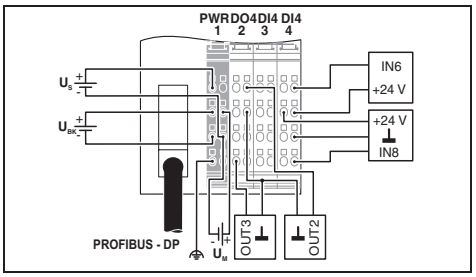
The master data file required for project planning (GSD file) is available for downloading from www.phoenixcontact.net/download



IL PB BK DI8 DO4...-PAC

Inline Modular PROFIBUS bus coupler DP/V1, Inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex: // Applied for: UL-EX LIS / CUL-EX LIS / NV / BV



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
PROFIBUS bus coupler, DP/V1, complete with accessories (connector and labeling field)			
- Standard	**IL PB BK DI8 DO4-PAC**	**2878926**	1
- with advanced functions, PROFIsafe	**IL PB BK DI8 DO4/EF-PAC**	**2692322**	1
Connector set for bus coupler	**IL BKDIO-PLSET**	**2878599**	1
PROFIBUS connector (D-SUB)	**SUBCON-PLUS-PROFIB**	**2744348**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	PROFIBUS DP
Type of connection	D-SUB-9 female connector
Transmission speed	9,6 kbpskbps to 12 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via Inline connector)
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Max. current consumption	Max. 0.98 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	Approx. 500 µs
Name of protection	Polarity reversal
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	62 (On board I/Os are one device)
General data	
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C
Permissible humidity (operation)	95% (no condensation)

PROFIBUS bus coupler without I/Os on board

The PROFIBUS DP bus coupler enables the flexible Inline automation kit to be operated with PROFIBUS as well.

An Inline station can be inserted at any point in a PROFIBUS DP network using the bus coupler. The device acts as a slave in PROFIBUS and a master in the lower-level Inline local bus.

The address of the PROFIBUS slave can easily be set via DIP switches from outside. The PROFIBUS is connected via a 9-pos. D-SUB connector (e.g.: SUBCON-PLUS-PROFIB from Phoenix Contact). The operating voltage for the bus coupler and the electronics of the connected automation terminals can be supplied using a separate power connector. Furthermore, this connector is used for supplying the I/O voltage.

The corresponding device master data file for PROFIBUS project planning can be downloaded from www.phoenixcontact.net/download. The PROFIBUS DP bus coupler supports the proven Inline diagnostics as well as the typical PROFIBUS DP diagnostic frames. Local LEDs enable precise diagnostics on the spot.

In addition to the standard PROFIBUS DP, the PROFIBUS DP/V1 fieldbus coupler also supports the DP/V1 extension.

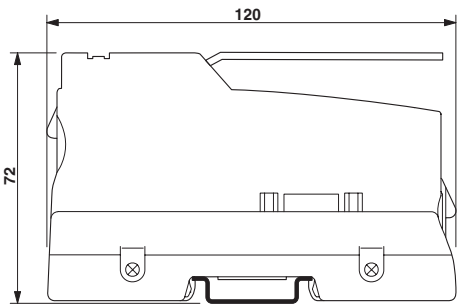
In addition to the bus coupler, the PROFIBUS bundles contain a DI 16 and a DO 16.

It goes without saying that they can be expanded and, in addition to being attractively priced, they provide a good access point to the Inline automation toolkit.

The product range from Phoenix Contact comprises further, supplementary PROFIBUS components, such as fiber optic interface converters from the PSM range.

Please note the following when you configure the system:

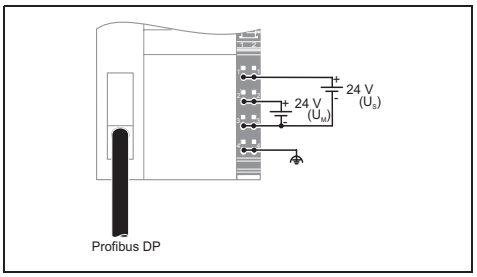
The total logic current of all the terminal blocks connected to a PROFIBUS DP bus coupler must not exceed the maximum permissible total current of 2 A. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices (incl. 16 PCP devices).



IL PB BK DP/V1-PAC

Inline Modular PROFIBUS bus coupler, DP/V1 bus coupler, D-Sub connection, 24 V DC

Ex:



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
PROFIBUS bus coupler, DP/V1, complete with accessories (connector and labeling field)	**IL PB BK DP/V1-PAC**	**2862246**	1
PROFIBUS bundle, PROFIBUS DP/V1 bus coupler (with aligned IL DO16 and IL DI16 terminals, extendable)			
- Connectors with consecutive numbering	**PB IL 24 BK DIO 16/16**	**2742638**	1
- Connection without consecutive numbering	**PB IL 24 BK DIO 16/16/SN**	**2863672**	1
Connector for power and segment terminals	**IB IL SCN-PWR IN-CP**	**2727637**	10
PROFIBUS connector (D-SUB)	**SUBCON-PLUS-PROFIB**	**2744348**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	PROFIBUS DP
Type of connection	D-SUB-9 female connector
Transmission speed	9,6 kbps to 12 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via Inline connector)
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Max. current consumption	Max. 1.25 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC
INTERBUS data	
Number of connectable local bus devices	63
General data	
Weight	240 g
Width	85 mm
Ambient temperature (operation)	0°C ... 55°C

DeviceNet™ bus coupler with I/Os on board

The DeviceNet™ bus coupler enables the flexible Inline automation kit to be operated with DeviceNet™ as well.

An Inline station can be inserted at any point in a DeviceNet™ network using the bus coupler. The bus coupler acts as a slave in the DeviceNet™ and a master in the lower-level Inline local bus.

With the DeviceNet™ bus couplers up to 63 functional units (62 for bus couplers with integrated I/Os) such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc. can be combined.

The address and the transmission rate of the DeviceNet™ slave can be set either from outside by means of a DIP switch or via software.

DeviceNet™ is connected via an Inline connector. The operating voltage for the bus coupler and the electronics of the connected automation terminals is supplied using separate power connectors.

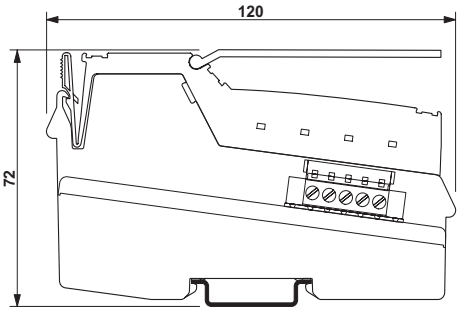
The compact, 80-mm thin Inline Modular bus coupler with eight integrated digital inputs and four outputs saves space as well as costs. This way, not only is fieldbus communication guaranteed, but some automation tasks are also taken care of at the same time. It can be operated without additional terminals for simpler applications in "stand alone" mode.

For the bus coupler, the integrated automatic 500 kBd or 2 MBd detection must enable adaptation to the complete Inline portfolios, including integration of up to 8 PCP devices.

Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system.

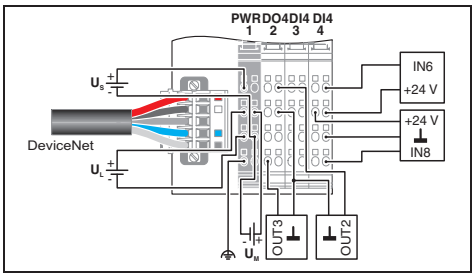
For DeviceNet™ project planning, an EDS file with product-specific device data is available for downloading at www.phoenixcontact.net/download.



IL DN BK DI8 DO4-PAC

Inline Modular DeviceNet™ bus coupler, inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex: // Applied for: UL-EX



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
DeviceNet™ bus coupler, complete with accessories (connector and labeling field)	**IL DN BK DI8 DO4-PAC**	**2897211**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	DeviceNet™
Type of connection	2x 5-pos. TWIN-COMBICON connectors
Transmission speed	500 kBaud, 250 kBaud, 125 kBaud (Can be set via DIP switch or programmed)
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 0.9 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	Approx. 500 µs
Name of protection	Polarity protection
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	61 (On board I/Os are two devices)
General data	
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C

DeviceNet™ bus coupler without I/Os on board

The DeviceNet™ bus coupler enables the flexible Inline automation kit to be operated with DeviceNet™ as well.

An Inline station can be inserted at any point in a DeviceNet™ network using the bus coupler. The bus coupler acts as a slave in the DeviceNet™ and a master in the lower-level Inline local bus.

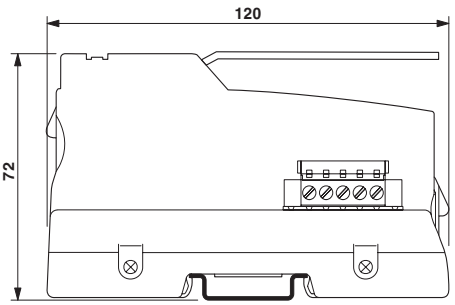
The address and the transmission rate of the DeviceNet™ slave can be set either from outside by means of a DIP switch or via software.

DeviceNet™ is connected via an Inline connector. The operating voltage for the bus coupler and the electronics of the connected automation terminals is supplied using separate power connectors.

For DeviceNet™ project planning, an EDS file with product-specific device data is available for downloading at www.phoenixcontact.net/download.

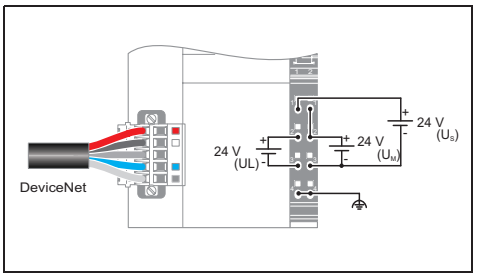
Please note the following when you configure the system:

The total logic current of all the terminals connected to a DeviceNet™ bus coupler must not exceed the maximum permissible total current. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices.



IL DN BK3-PAC

Inline Modular DeviceNet™ bus coupler



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
DeviceNet™ bus coupler, complete with accessories (connector and labeling field)	**IL DN BK3-PAC**	**2718785**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	DeviceNet™
Type of connection	2x 5-pos. TWIN-COMBICON connectors
Transmission speed	500 kBaud, 250 kBaud, 125 kBaud (Can be set via DIP switch or programmed)
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 1.25 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	63
General data	
Weight	240 g
Width	85 mm
Ambient temperature (operation)	-25°C ... 55°C

Modbus/RTU(ASCII)) bus coupler with I/Os on board

The Inline Modular bus couplers with additional integrated digital inputs and outputs are designed for space-saving and economical use, e.g. in mechanical engineering.

8 digital inputs and 4 digital outputs are fixed component of the new Inline bus couplers for Modbus/RTU(ASCII). Thus, not only is the fieldbus communication assured, rather a part of the automation task is also tackled simultaneously.

The low width of only 80 mm saves space on the top hat rail, which can then be filled with other functions from the Inline automation modular system.

The bus coupler for Modbus/RTU(ASCII) can insert an Inline station at any position in the Modbus/RTU network. The address is easy to set with two rotary switches from outside. The fieldbus is connected via a 9-pos. D-SUB connector.

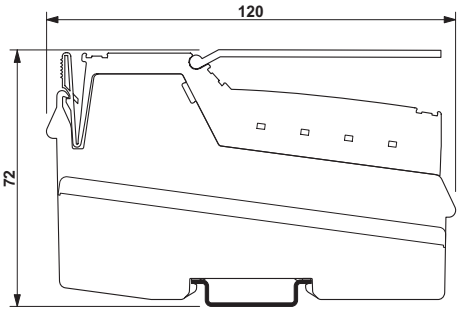
For this bus coupler, the integrated automatic 500 kBd or 2 MBd detection must enable an arrangement of the complete Inline portfolios, including integration of up to 8 PCP devices.

The maximum configuration for these bus couplers is 61 devices. The total logic current of all connected terminals must not exceed the maximum permissible total current of 0.8 A. If necessary, a IB IL 24 PWR IN/R boost terminal must be set.

Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system.

The new generation of Inline bus couplers can be used in many applications due to their shipping industry and UL approvals.

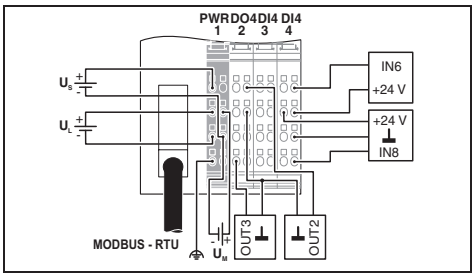


Modbus/RTU

IL MOD BK DI8 DO4-PAC

Inline Modular Modbus RTU/ASCII bus coupler, Inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex: // Applied for: UL-EX LIS / CUL-EX LIS / NV / BV



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.09-1.5	0.09-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Modbus/RTU(ASCII) bus coupler, complete with accessories (connector and labeling field)	**IL MOD BK DI8 DO4-PAC**	**2878696**	1
Connector set for bus coupler	**IL BKDIO-PLSET**	**2878599**	1
SUB-D male connector, 9-pos with two cable infeeds, **for Inline Modular-Modbus RTU/ASCII bus couplers** (termination resistance can be connected via slide switch)	**SUBCON-PLUS-MODBUS/IL/BK**	**2310808**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	Modbus RTU
Type of connection	D-SUB-9 female connector
Transmission speed	1,2 kbps to 115,2 kbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Max. current consumption	Max. 0.98 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	Approx. 500 µs
Name of protection	Polarity reversal
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	61 (On board I/Os are two devices)
General data	
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 60°C

CANopen bus coupler

The CANopen bus coupler enables the flexible Inline automation kit to be operated with CANopen as well.

An Inline station can be inserted at any point in a CANopen network using the bus coupler. The device acts as a slave in the CANopen bus and a master in the lower-level Inline local bus. The address of the CANopen slave can easily be set via DIP switches from outside.

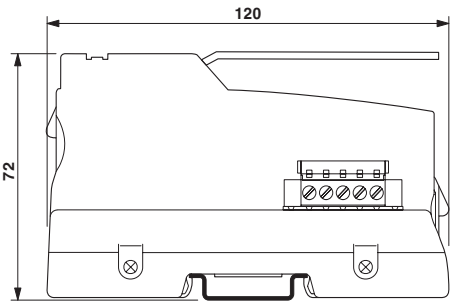
The CANopen bus is connected using a TWIN-COMBICON connector (e.g. TWIN-COMBICON connector from Phoenix Contact).

The operating voltage for the bus coupler and the electronics of the connected automation terminals can be supplied using a separate power connector.

For project planning with CANopen, Phoenix Contact provides an EDS file with product-specific device data that can be downloaded from the Internet. The CANopen bus coupler supports the proven Inline diagnostics as well as the typical CANopen standards. Local LEDs enable precise diagnostics.

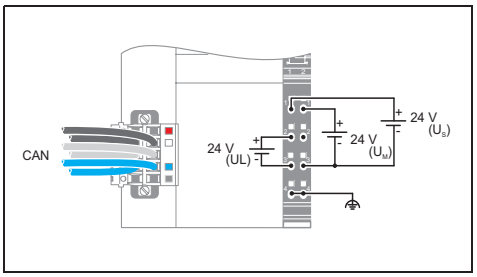
Please note the following when you configure the system:

The total logic current of all the terminals connected to a CANopen bus coupler must not exceed the maximum permissible total current. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices.



IL CAN BK-TC-PAC

Inline Modular CANopen bus coupler



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
CANopen bus coupler, complete with accessories (connector and labeling field)	**IL CAN BK-TC-PAC**	**2718701**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	CANopen
Type of connection	2x 5-pos. TWIN-COMBICON connectors
Transmission speed	1 MBaud, 500 kBaud, 250 kBaud, 125 kBaud, 50 kBaud, 20 kBaud, 10 kBaud (Can be set via DIP switch or programmed)
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 1.25 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	63
General data	
Weight	240 g
Width	85 mm
Ambient temperature (operation)	-25°C ... 55°C

SERCOS III bus coupler with I/Os on board

The Inline Modular bus coupler for SERCOS III allows integration of flexible Inline automation kit into SERCOS III networks.

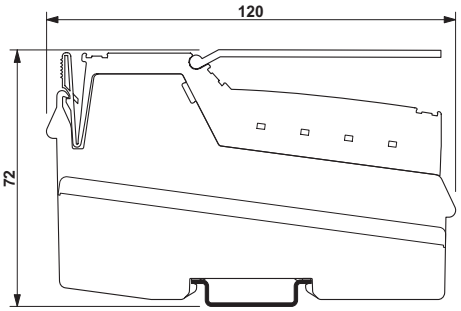
Therefore, I/Os whose drives are networked via SERCOS III can be integrated in Motion Control applications without having to use another bus system for the I/Os. Here, the input and output data is displayed in the input and output data container defined in FSP IO (**F**unction **S**pecific **P**rofile IO).

Allocation of the SERCOS address is easy via the automatic address allocation mechanism defined in the SERCOS III specifications.

The SERCOS III bus coupler has a width of 80 mm via 8 digital inputs and 4 digital outputs. Up to 61 Inline terminals can be aligned at them out of which up to 16 terminals can be PCP devices. The automatic baud rate detection also allows alignment of 2MBD Inline terminals.

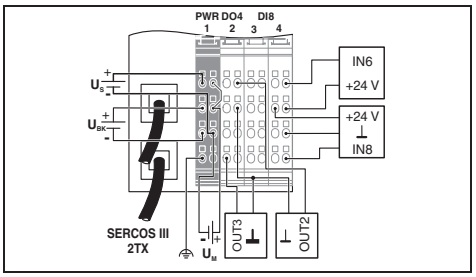
The SERCOS III bus coupler supports the proven Inline diagnostics as well as the diagnostic messages defined for SERCOS III.

For the bus coupler, the device description file (SDDML) required for project planning is provided under www.phoenixcontact.net for download.



IL S3 BK DI8 DO4 2TX-PAC

Inline Modular SERCOS bus coupler, inputs: 24 V DC, outputs: 24 V DC, 500 mA



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
SERCOS bus coupler, complete with accessories (connector and labeling field) - SERCOS III	**IL S3 BK DI8 DO4 2TX-PAC**	**2692380**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	SERCOS III
Type of connection	RJ45 female connector, autonegotiation
No.	2
Transmission speed	100 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 0.98 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	-
Name of protection	Polarity protection
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	63
General data	
Weight	375 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C

SERCOS bus couplers

The SERCOS bus coupler enables the flexible Inline automation kit to be operated with SERCOS as well.

An Inline station can be inserted at any point in a SERCOS network using the bus coupler. The device acts as a slave in the SERCOS bus and a master in the lower-level Inline local bus. The address of the SERCOS slave can easily be set via DIP switches from outside.

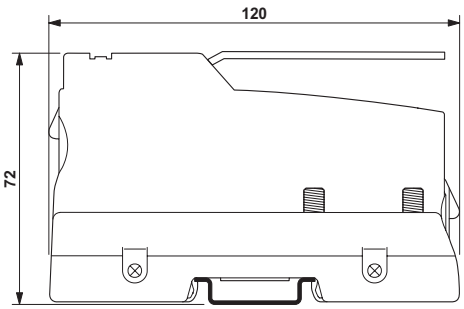
The SERCOS bus is connected via two F-SMA connectors.

The operating voltage for the bus coupler and the electronics of the connected automation terminals can be supplied using a separate power connector.

The SERCOS bus coupler supports the proven Inline diagnostics as well as the typical SERCOS standards. Local LEDs and an LCD display enable precise diagnostics.

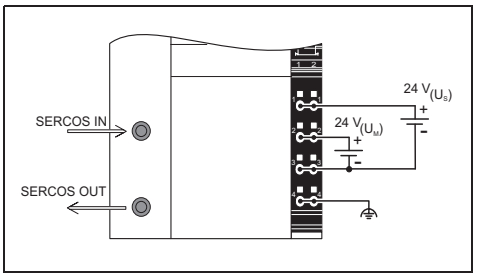
Please note the following when you configure the system:

The total logic current of all the terminals connected to a SERCOS bus coupler must not exceed the maximum permissible total current. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 40 devices.



IL SC BK-PAC

Inline Modular SERCOS bus coupler with FO connection



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.09-1.5	0.09-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
SERCOS bus coupler, complete with accessories (connector and labeling field)			
- SERCOS III	**IL SC BK-PAC**	**2878719**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	SERCOS II
Type of connection	F-SMA connector
No.	2
Transmission speed	16 Mbps, 8 Mbps, 4 Mbps, 2 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	18.5 V DC ... 30 V DC
Max. current consumption	Max. 1.25 A
Power supply for U_L	Max. 2 A DC (observe derating)
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
INTERBUS data	
Number of connectable local bus devices	40
General data	
Weight	200 g
Width	85 mm
Ambient temperature (operation)	5°C ... 55°C

Mechatrolink bus coupler with I/Os on board

The Mechatrolink bus coupler (M-Link BK) represents the link between the Mechatrolink networks I and II and the wide product range of Inline modules.

Mechatrolink is an open field network optimized for Motion Control. In motion field networks, the focus is on precise, synchronous controls and fast responses between servos and other devices in the network. Mechatrolink and Sercos are typical examples for motion field networks. In the case of I/O field networks, the focus is more on the connection of various I/O devices than on synchronization. DeviceNet™, PROFIBUS-DP and INTERBUS are typical examples for I/O field networks.

Together, the Inline system and the M-Link BK provide solutions for the following Motion Control network requirements:

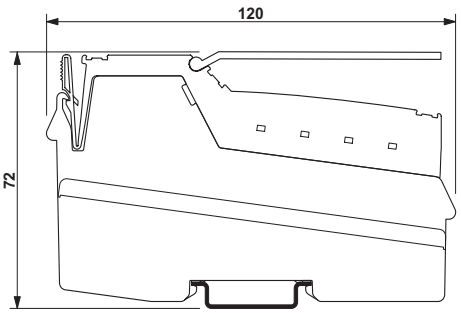
– Turn-key solution for simpler installation, flexible system configuration and simple I/O mapping
– Overall cost reduction with clear savings per node, low installation and startup costs
– High-speed, high-performance control
– Precise, synchronous DIP switches on the M-Link BK allow the slave addresses, baud rate and the Mechatrolink data width to be easily set.

The Mechatrolink bus coupler with eight integrated digital inputs and four outputs save space as well as costs. This way, not only is fieldbus communication guaranteed, but some automation tasks are also taken care of at the same time.

A width of only 80 mm saves a lot of space on the DIN rail which can be used for other Inline system functions. In addition, the bus coupler can be operated without additional terminals for simpler applications in "stand alone" mode.

Quick start up and easy maintenance are guaranteed through clearly arranged diagnosis LEDs.

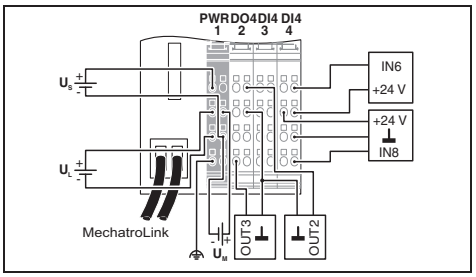
The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system.



IL MII BK DI8 DO4-PAC

Inline Modular Mechatrolink bus coupler, inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex:

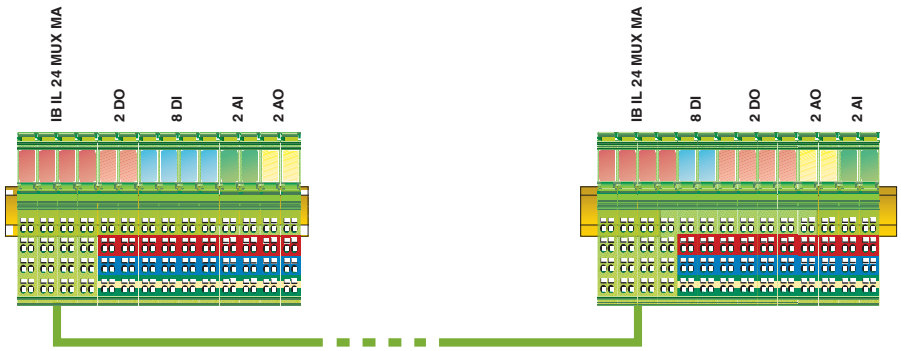


	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.09-1.5	0.09-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Mechatrolink bus coupler, complete with accessories (connector and labeling field)	**IL MII BK DI8 DO4-PAC**	**2884619**	1
Connector set for bus coupler	**IL BKDIO-PLSET**	**2878599**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interface	
Fieldbus system	Mechatrolink
Type of connection	USB type A, female connector
No.	2
Transmission speed	Max. 10 Mbps
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Max. current consumption	Max. 0.9 A
Power supply for U_L	Max. 0.8 A DC
Power supply for U_{ANA}	Max. 0.5 A DC (observe derating)
Digital inputs	
Connection method	2, 3-wire
Number of inputs	8
Typical response time	Approx. 500 µs
Name of protection	Polarity protection
Digital outputs	
Connection method	2, 3-wire
Number of outputs	4
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
INTERBUS data	
Number of connectable local bus devices	61 (On board I/Os are two devices)
General data	
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25°C ... 55°C
Permissible humidity (operation)	95% (no condensation)

Cost-effective transmission of remote I/O signals



Digital and analog input and output signals often have to be routed over great distances to central switchboards or controllers and vice versa. The conventional method with multiposition copper cable is very complex and expensive with regard to material and cabling. There is a simple and inexpensive solution.

The IB IL 24 MUX MA Inline field multiplexer saves just these costs by transmitting the signals in series via just one single 2-wire cable. Further cost-savings can also be achieved by using cables that have already been laid, but are not being used.

There is no need for the user to be concerned with the method of transmission. The field multiplexer takes care of this.

The simple principle

– Take sensors and actuators in the field,
– Wire them using spring-cage terminal blocks from the Inline I/O terminal blocks,
– Align the terminal blocks together with the field multiplexer,
– Connect the field multiplexer to the remote station using a 2-wire cable,
– Apply 24 V voltage and... ready !

The Inline field multiplexers transmit the parallel data from the I/O terminal blocks in series along the cable. At the opposite end of the conductor, the data are immediately converted to parallel signals and output via the I/O terminal blocks.

Logical design

The field multiplexer, together with the connected I/O terminal blocks forms one station. The system consists of two such stations. It must be designed in such a way that one particular output terminal at the other end is assigned to each input terminal and vice versa. There is one output per input and one input per output (so-called "complementary arrangement", see graphics).

Apart from the complementary design of the I/O terminal blocks in the station and the remote station, no form of configuration is necessary. Configuration software is not necessary.

Intelligent system

The field multiplexer allows the serial transmission of data via a two-wire conductor over a maximum distance of 12 km. Signals can be alternatively transmitted along optic fibers, the telephone line or wirelessly using electrical optical interface converters.

System diagnostics is carried out with informative LEDs. An integrated alarm relay may be used to enable alarm sirens or warning lamps.

The numerous I/O terminal blocks enable a high degree of flexibility with respect to planning and extension. The low number of channels per terminal provides a further cost benefit: It is only necessary to purchase as many terminal blocks as there are channels.

A further advantage is obvious: The field multiplexers are very small. That saves money when choosing the control cabinet.

The matching components

All I/O terminal blocks have connectors with spring-cage terminal blocks for the wiring on the field side. The power supply for the I/O terminals and their communication with the field multiplexer is provided with the aid of integrated power rails.

Up to 63 I/O terminals can be connected to one field multiplexer. A maximum of 512 I/O data can be transmitted. This is the equivalent of a maximum of 512 digital or 32 analog inputs and outputs. Digital and analog I/Os can naturally be mixed.

The field multiplexer system is supplemented by further standard components from the Phoenix Contact product range – all from one supplier:

– Surge protection integrated
– Interface converter (INTERFACE / PSM)
– Temperature transducer (INTERFACE / MCR)
– Power supply (INTERFACE / Quint Power)
– End clamp, ground and shield clamps (CLIPLINE)
– Cables (copper, optical fiber)

For detailed ordering information, please refer to the catalogs of the aforementioned product families or the user manual of the field multiplexer.

Range of applications

The areas of application for the field multiplexer are numerous. Wherever greater distances have to be bridged, the field multiplexer comes into use.

Whether in purification plants, for mineral springs, in other areas of water management, in tunnel construction or opencast mining, integration it into existing telecontrol, or simply for use on expansive company premises – the field multiplexer is the solution.

Fast planning

In addition to the aforementioned complementary arrangement of I/O terminal blocks, it is necessary to ascertain the total max. current consumption of all I/O terminal blocks of a station. This is achieved by simply adding together the current consumption of the individual I/O terminal blocks. The data required for this calculation can be found in the technical data of the field multiplexer and the selected I/O terminal blocks.

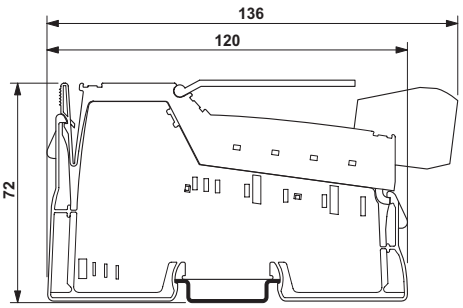
You can find a continuously updated list (AH BK IO LIST) with all usable field multiplexer modules at www.phoenixcontact.net/download.

The data transmission time for copper-based and optical fiber transmission can be ascertained as follows in advance:

t_{Cu}= n * 6.8 ms/byte + 78 ms
t_{FO}= n * 1.37 ms/byte + 10 ms
n = 1 ... 64 bytes

1, 2, 4 and 8-channel digital terminals need 1 byte, 16-channel digital terminal blocks need 2 bytes, 1-channel analog terminal blocks need 2 bytes, 2-channel analog terminal blocks need 4 bytes and 32-channel digital terminal blocks need 4 bytes. For calculation, only the I/O terminal blocks of one of the two stations need to be taken into account.

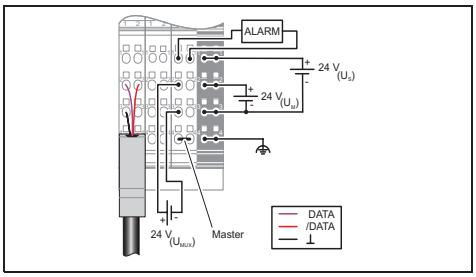
The digital and analog Inline I/O terminals that can be used on the field multiplexer are marked in this catalog with the adjacent logo.



IB IL 24 MUX MA-PAC

Inline Modular field multiplexer, configuration-free signal transmission of distant signals

Ex:



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline field multiplexer, complete with accessories (connector and labeling field)	**IB IL 24 MUX MA-PAC**	**2861205**	1
Connector set for Inline field multiplexer	**IB IL MUX-PLSET**	**2836036**	1
Adapter cable, Inline field multiplexer on PSI-MOS module	**IB IL MUX-CAB PSI**	**2878476**	1
Labeling area, width: 48.8 mm	**IB IL FIELD 8**	**2727515**	10
Marking sheet	**ESL 62X46**	**0809502**	5
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Interfaces	
Fieldbus system	Inline remote bus
Type of connection	Inline shield connector
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Typical current consumption	< 60 mA (without connected I/O terminal blocks (24 V DC supply)) 1.25 A (with max. number of connected I/O terminal blocks (24 V DC supply)) 8 A (If this value is exceeded, further power or segment terminals must be used!)
Field multiplexer system data	
Remote bus	
Remote bus length	Max. 12 km via 2-wire copper cable (depending on the type of cable and the environmental conditions with regard to EMC); max. 3.8 km via optical fiber converter with glass fiber cable
Interface	RS-485, modified
Transmission protocol	Special telecontrol protocol
Local bus	
Maximum number of inputs and outputs	512 digital or 32 analog I/Os, can be mixed
Number of INTERBUS Inline I/O terminals that can be connected	63
Update time of all input and output data	1 s
Transmission protocol	INTERBUS
General data	
Weight	212 g
Width	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C

Power terminals

The voltage supply for the main circuit U_M is fed in with the aid of the Inline power terminals. This means that electrically isolated I/O circuits can be configured within an Inline station. Various types of power terminals are available.

Power and boost terminal IB IL 24 PWR IN/R is the only terminal which also boosts the logic current for the I/Os in addition to the main and segment circuit. This also enables large Inline stations with up to 63 active devices to be configured.

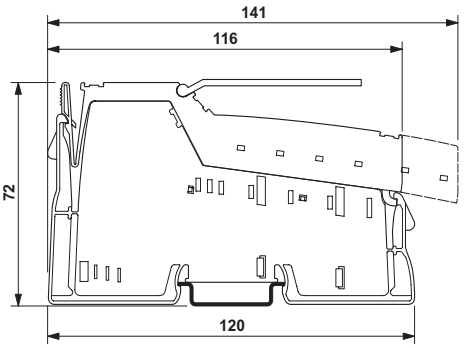
IB IL 24 PWR IN is the standard Inline power terminal and can also be selected with fusing (...-F) and diagnostics (...-F-D) as options. Fuses should not be cascaded within an Inline station. The use of segment terminals with fusing (...SEG-F, SEG-F-D, ...SEG-ELF) is therefore recommended in conjunction with IB IL 24 PWR IN. The maximum routing current within an Inline station is 8 A.

If AC voltage ranges are used within the Inline station (120/230 V), the station must always be grounded by its own PE (Protective Earth).

You can find more details in the technical description of Inline Modular.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

[1]) **Note:** The 2MBD versions are not intended for operation on the field multiplexer.

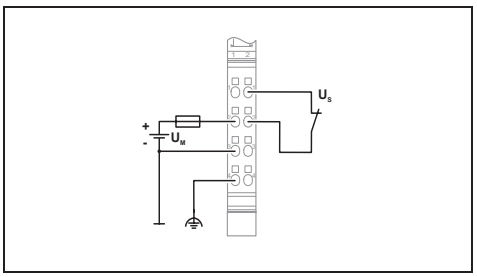


MUX

IB IL 24 PWR IN...-PAC

Inline Modular power terminal, 24 V DC

Ex: // Applied for: BV



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

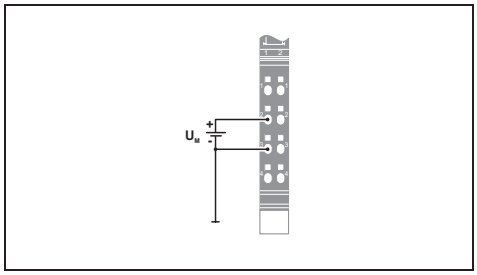
Description	Type	Order No.	Pcs. / Pkt.
Inline power terminal, complete with accessories (connector and labeling field)			
- With fuse	**IB IL 24 PWR IN-PAC**	**2861331**	1
- With fuse and diagnostics - With fuse and fuse diagnostics - With fuse and fuse diagnostics, transmission speed 2 Mbps	**IB IL 24 PWR IN/2-F-PAC**	**2862136**	1
- With fuse and fuse diagnostics, transmission speed 2 Mbps			
- 120 V AC - 230 V AC - 230 V AC, with fuse and diagnostics			

Technical data	IB IL 24 PWR IN-PAC	IB IL 24 PWR IN/2-F-PAC
Local bus interface		
Inline local bus	Inline data jumper	
Power supply for module electronics		
Type of connection	8-pos. Inline power connector	
Supply for main circuit U_M	24 V DC	
Power supply for U_M	8 A	6 A
Communications voltage U_L	7.5 V DC ±5% (via voltage jumper)	-
Power supply for U_L	-	
Current consumption from U_L	-	
I/O supply voltage U_{ANA}	-	
Power supply for U_{ANA}	-	
Segment power supply voltage U_S	24 V DC	
Power supply for U_S	8 A	6 A
Fuse	-	SI 5 x 20 6, 300 AT (in scope of delivery)
General data		
Protective circuitry	Polarity protection, surge protection	
Weight	44 g	
Width	12.2 mm	
Ambient temperature (operation)	-25°C ... 55°C	

IB IL 24 PWR IN/2...-PAC

Inline modular power terminal with fuse and diagnostics, 24 V DC

Ex: // Applied for: UL

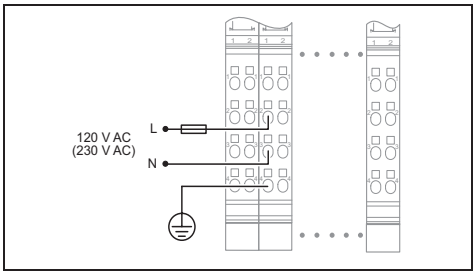


Type	Order No.	Pcs. / Pkt.
IB IL 24 PWR IN/2-F-D-PAC	**2862152**	1
IB IL 24 PWR IN/2F-DF-PAC	**2863779**	1
IB IL 24 PWR IN/2F-D-2MBD-PAC[1])	**2863821**	1
IB IL 24 PWR IN/2F-DF-2MBD-PAC[1])	**2863834**	1

Inline data jumper	
8-pos. Inline power connector	
24 V DC	
4 A	
7.5 V DC (via voltage jumper)	
-	
25 mA	
-	
-	
24 V DC	
4 A	
SI 5 x 20 6, 300 AT (in scope of delivery)	
Polarity protection, surge protection	
44 g	
12.2 mm	
-25°C ... 55°C	

IB IL ... PWR IN...-PAC

Inline Modular power terminal

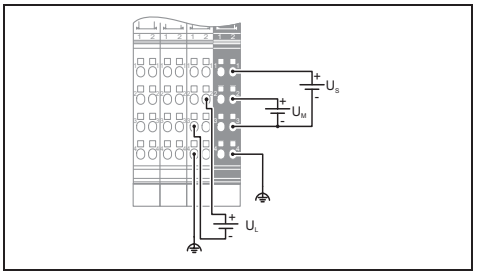


Type	Order No.	Pcs. / Pkt.
IB IL 120 PWR IN-PAC	**2861454**	1
IB IL 230 PWR IN-PAC	**2861535**	1
IB IL 230 PWR IN/F-D-PAC	**2878971**	1

	IB IL 120 PWR IN-PAC	IB IL 230 PWR IN-PAC
Inline data jumper		
8-pos. Inline power connector		
24 V DC	120 V AC	230 V AC
4 A	8 A	
7.5 V DC (via voltage jumper)	-	
-	-	
25 mA	-	
-	-	
-	-	
24 V DC	-	
4 A	-	
SI 5 x 20 6, 300 AT (in scope of delivery)	-	
Surge protection		
80 g		
36.6 mm		
-25°C ... 55°C		

IB IL 24 PWR IN/R-PAC

Inline modular boost terminal, 24 V DC



Type	Order No.	Pcs. / Pkt.
IB IL 24 PWR IN/R-PAC	**2861674**	1

Inline data jumper	
8-pos. Inline power connector	
24 V DC	
8 A	
7.5 V DC ±5% (via voltage jumper)	
2 A DC (observe derating)	
-	
24 V DC	
0.5 A DC	
24 V DC	
8 A	
(electrical/thermal overload protection, included in scope of delivery)	
Polarity reversal protection, surge protection, overload protection, (with fuse)	
132 g	
48.8 mm	
-25°C ... 55°C	

Segment and accessory terminals

The Inline segment terminals allow several U_S segment circuits to be created within a U_M I/O circuit. Various segment terminals are available for creating different protected circuits or safety circuits within a station.

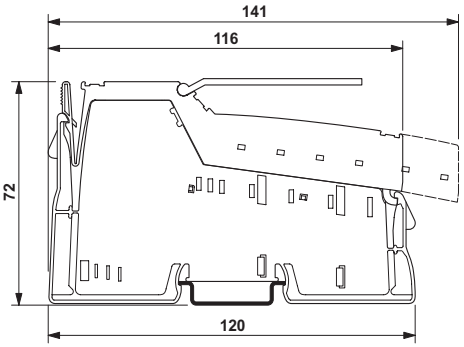
The signal and initiator voltages for digital I/Os are always picked up from the segment circuit U_S.

The segment terminal IB IL 24 SEG-ELF automatically creates a segment circuit within a main circuit. The segment circuit is protected by an internal electronic fuse with short-circuit current limitation. The status of the fuse is forwarded via the input data, in addition to the local diagnostic displays. The fuse can either be reset via the remote bus or locally with the aid of an external pushbutton.

24 V power supplies with electronic fusing and remote diagnostics can therefore be made available in the field, for example, when combined with the potential distributor terminal IB IL PD 24V. However, the potential distributor terminals are also suitable for use as economical return wiring for sensor and actuator lines when using 1-wire Inline terminals, such as IB IL 24 DI 32/HD or IB IL 24 DO 32/HD.

The distance terminal set IB IL DOR LV-SET generates the prescribed creepage distance when AC terminals are used (gray housing). The two end terminals interrupt, for example, all the 24 V circuits as well as GND and functional earth ground when relay terminals IB IL 24/230 DOR 4/W are used. AC power terminals for 120 V or 230 V AC are already fitted with distance terminals.

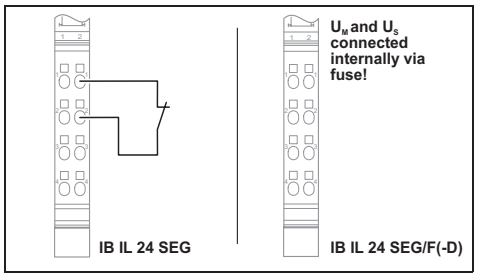
The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.



IB IL 24 SEG...-PAC

Inline Modular segment terminal, 24 V DC

Ex:



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline segment terminal, complete with accessories (connector and labeling field)			
- With fuse	**IB IL 24 SEG-PAC**	**2861344**	1
- With fuse and diagnostics	**IB IL 24 SEG/F-PAC**	**2861373**	1
- Transmission rate 2 Mbps	**IB IL 24 SEG/F-D-PAC**	**2861904**	1
Inline distance terminal			
- Complete with accessories (connector and labeling field)			
Inline potential distributor terminal, complete with accessories (connector and labeling field)			
- 24 V			
- GND			

Technical data	IB IL 24 SEG-PAC	IB IL 24 SEG/F-D-PAC
Local bus interface		
Inline local bus	Inline data jumper	
Power supply for module electronics		
Type of connection	Inline potential distributor	
Communications voltage U_L	-	7.5 V DC (via voltage jumper)
Current consumption from U_L	-	25 mA
Segment power supply voltage U_S	24 V DC	
Power supply for U_S	8 A	4 A
Fuse	-	SI 5 x 20 6, 300 AT (in scope of delivery)
General data		
Protective circuitry	Overload protection Fuse	
Weight	42 g	
Width	12.2 mm	
Ambient temperature (operation)	-25°C ... 55°C	

IB IL 24 SEG-ELF...-PAC

Inline Modular segment terminal, 24 V DC, electronic fuse

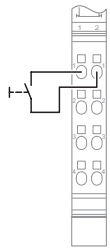
IB IL DOR LV-SET-PAC

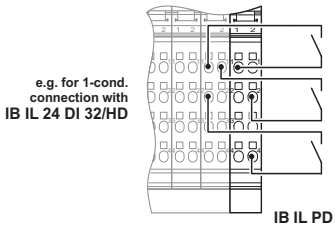
Inline Modular distance terminal

IB IL PD ...-PAC

Inline Modular potential distributor terminal

Ex:





Type	Order No.	Pcs. / Pkt.
IB IL 24 SEG-ELF-PAC	**2861409**	1
IB IL 24 SEG-ELF-2MBD-PAC	**2863847**	1

Type	Order No.	Pcs. / Pkt.
IB IL DOR LV-SET-PAC	**2861645**	1

Type	Order No.	Pcs. / Pkt.
IB IL PD 24V-PAC	**2862987**	1
IB IL PD GND-PAC	**2862990**	1

	IB IL 24 SEG-ELF-PAC	IB IL 24 SEG-ELF-2MBD-PAC	IB IL DOR LV-SET-PAC	IB IL PD 24V-PAC	IB IL PD GND-PAC
Inline data jumper					
Inline data jumper					
Inline potential distributor			-		
7.5 V DC (via voltage jumper)			-		
Inline data jumper					
30 mA			-		
24 V DC			-	24 V DC	-
2.5 A			-		
2.5 A (electronic)			-		
Overload protection			-		
44 g			32 g		
12.2 mm			24.4 mm		
-25°C ... 55°C			-25°C ... 55°C		

Digital input terminals

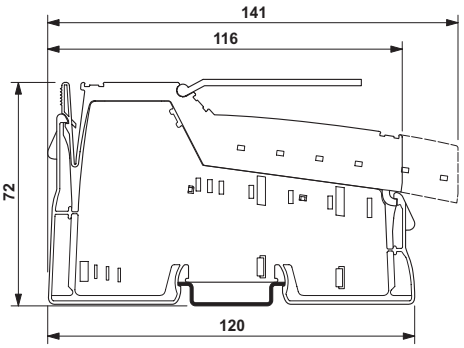
Digital Inline input terminals are designed for the connection of digital signals, such as those emitted from control switches, limit switches or proximity switches. The digital input terminal IB IL DI 8/T2 supports type 2 input signals as per the standard EN 61131-2 of type 2.

The "high-density" terminal IB IL 24 DI 32/HD offers 32 input channels, the return wiring of which can be economically implemented via potential distributor terminals IB IL PD GND as an option.

All the typical applications are covered by the standard automation terminals.

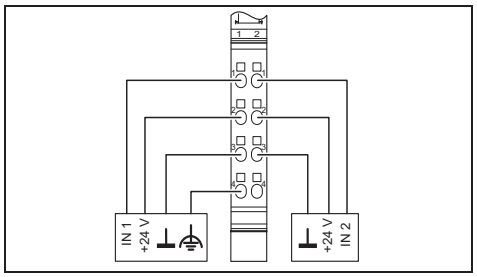
The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

[1]) **Note:** The 2MBD versions are not intended for operation on the field multiplexer.



IB IL 24 DI 2...-PAC

Inline Modular digital input terminal,
inputs: 24 V DC, 4-wire connection method



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

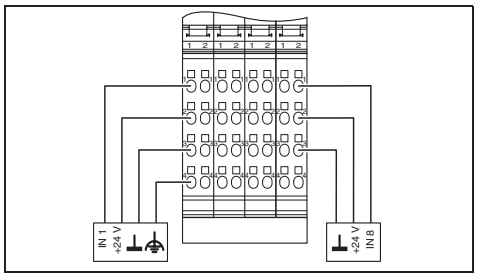
Description	Type	Order No.	Pcs. / Pkt.
Inline digital input terminal, complete with accessories (connector and labeling field)			
	IB IL 24 DI 2-PAC	**2861221**	1
- Transmission rate 2 Mbps - Transmission rate 2 Mbps - Connectors without consecutive numbering	**IB IL 24 DI 2-2MBD-PAC[1])**	**2861713**	1
- Connectors without consecutive numbering, transmission rate 2 Mbps - NPN-wired - Input in acc. with EN 61131-2/Type 2 - S0 counter	**IB IL 24 DI 2-NPN-PAC**	**2861483**	1
Connector set for IB IL DI/DO 8 **Connector set** for IB IL DI 16, color-coded			
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Labeling area, width: 48.8 mm **Marking sheet**	**ESL 62X10**	**0809492**	1
Marking sheet			
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Range of supply voltages	19.2 V DC ... 30 V DC
Current consumption from U_L	Max. 35 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3, 4-wire
Number of inputs	2
Description of the inputs	EN 61131-2 type 1
Typical response time	< 1 ms
General data	
Weight	38 g
Width	12.2 mm
Ambient temperature (operation)	-25°C ... 55°C

IB IL 24 DI 8...-PAC

Inline Modular digital input terminal,
inputs: 24 V DC, 4-wire connection method

Ex: // Applied for: BV



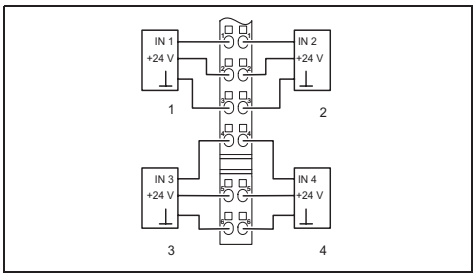
Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 8-PAC	2861247	1
IB IL 24 DI 8-2MBD-PAC[1])	2861690	1
IB IL 24 DI 8-PAC/SN	2862932	1
IB IL 24 DI 8-2MBD-PAC/SN[1])	2878913	1
IB IL 24 DI 8/T2-PAC	2862204	1
IB IL DI 8/S0-PAC	2897020	1
IB IL DI/DO 8-PLSET/CP	2860963	1
IB IL SCN-8-CP	2727608	10
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

Inline data jumper	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC	
Max. 50 mA	
Spring-cage connection	
2, 3, 4-wire	
8	
EN 61131-2 type 1	
< 1 ms	
118 g	
48.8 mm	
-25°C ... 55°C	

IB IL 24 DI 4(16)...-PAC...

Inline Modular digital input terminal,
inputs: 24 V DC, 2 and 3-wire connection method

Ex:



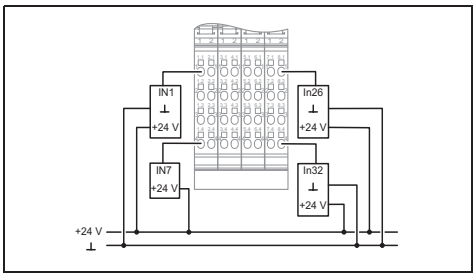
Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 4-PAC	2861234	1
IB IL 24 DI 16-PAC	2861250	1
IB IL 24 DI 4-2MBD-PAC[1])	2692306	1
IB IL 24 DI16-2MBD-PAC[1])	2861959	1
IB IL 24 DI 16-PAC/SN	2862958	1
IB IL 24 DI16-2MBD-PAC/SN[1])	2878120	1
IB IL 24 DI 16-NPN-PAC	2863520	1
IB IL DI16-PLSET/ICP	2860989	1
IB IL SCN-12-ICP	2727611	10
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

	IB IL 24 DI 4-PAC	IB IL 24 DI 16-PAC
Inline data jumper		
24 V DC (via voltage jumper)		
19.2 V DC ... 30 V DC		
Max. 40 mA	Max. 40 mA	Max. 60 mA
Spring-cage connection		
2, 3-wire		
4	4	16
EN 61131-2 type 1		
< 1 ms	< 1 ms	
44 g	44 g	122 g
12.2 mm	12.2 mm	48.8 mm
-25°C ... 55°C	-25°C ... 55°C	

IB IL 24 DI 32/HD...-PAC

Inline Modular digital input terminal,
inputs: 24 V DC, 1-wire connection method

Ex: // Applied for: UL-EX LIS / CUL-EX LIS / BV



Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 32/HD-PAC	2862835	1
IB IL 24 DI 32/HD-2MBD-PAC[1])	2692885	1
IB IL 24 DI 32/HD-NPN-PAC	2878243	1
IB IL DI/DO 8-PLSET	2860950	1
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

	IB IL 24 DI 32/HD-PAC	IB IL 24 DI 32/HD-NPN-PAC
Inline data jumper		
24 V DC (via voltage jumper)		
19.2 V DC ... 30 V DC		
Max. 90 mA	Max. 90 mA	
Spring-cage connection		
1-wire		
32	32	
EN 61131-2 type 1		
2 ms	2 ms	< 1 ms
185 g	185 g	125 g
48.8 mm	48.8 mm	
-25°C ... 55°C	-25°C ... 55°C	

Digital input terminals

Digital Inline input terminals are designed for the connection of digital signals, such as are emitted from control switches, limit switches or proximity switches.

The digital input terminal IB IL 24 EDI 2-PAC has two overload-protected and short-circuit-proof initiator power supplies which are powered by the segment circuit. In the event of an overload or short circuit in one of the initiator supplies, this is switched off and an error message is generated for the master. The channel-specific error message is also indicated by a red LED on the module.

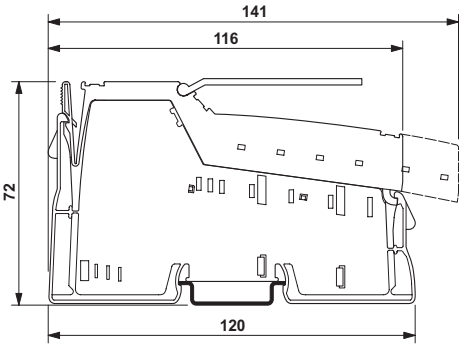
IB IL 24 EDI 2-DESINA-PAC features two additional diagnostic inputs as per the DESINA specification.

Variants are also available for digital input signals with up to a maximum of 250 V.

All the typical applications are covered by the standard automation terminals.

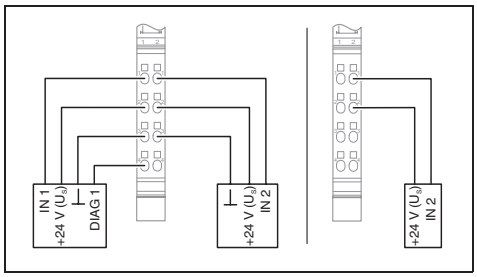
The peripheral equipment is connected with a simple Inline connector. The multiconductor connection system is available for this purpose.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.



IB IL 24 EDI 2-PAC

Inline Modular digital input terminal,
inputs: 24 V DC, 2, 3, 4-wire connection method,
extended diagnostics, short-circuit proof initiator supply



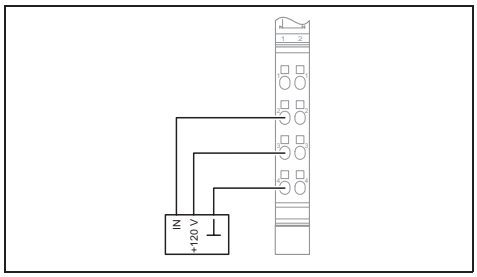
	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline digital input terminal, complete with accessories (connector and labeling field) - Extended diagnostics - 120 V AC - 230 V AC	**IB IL 24 EDI 2-PAC**	**2861629**	1
Inline connector **Connector** for Inline input terminals with AC voltage, color-coded	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Range of supply voltages	19.2 V DC ... 30 V DC
Current consumption from U_L	Max. 31 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3, 4-wire
Number of inputs	2
Description of the inputs	EN 61131-2 type 1
General data	
Weight	43 g
Width	12.2 mm
Ambient temperature (operation)	-25°C ... 55°C

IB IL 120 DI 1-PAC

Inline Modular digital input terminal,
input: 120 V AC, 3-wire connection method

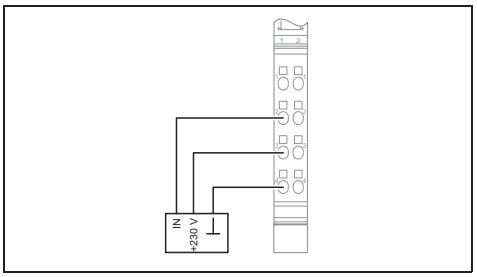


Type	Order No.	Pcs. / Pkt.
IB IL 120 DI 1-PAC	**2861917**	1
IB IL SCN-8-AC-ICP	**2740261**	10
IB IL SCN-8-AC-ICP	**2740261**	10
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper
120 V AC (via voltage jumper) 108 V AC ... 135 V AC Max. 30 mA
Spring-cage connection 2, 3-wire 1 EN 61131-2 type 1
39 g 12.2 mm -25°C ... 55°C

IB IL 230 DI 1-PAC

Inline Modular digital input terminal,
input: 230 V AC, 3-wire connection method



Type	Order No.	Pcs. / Pkt.
IB IL 230 DI 1-PAC	**2861548**	1
IB IL SCN-8-AC-ICP	**2740261**	10
IB IL SCN-8-AC-ICP	**2740261**	10
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper
230 V AC (via voltage jumper) 12 V AC ... 253 V AC Max. 30 mA
Spring-cage connection 2, 3-wire 1 EN 61131-2 type 1
39 g 12.2 mm -25°C ... 55°C

Digital output terminals

Digital Inline output terminal blocks are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

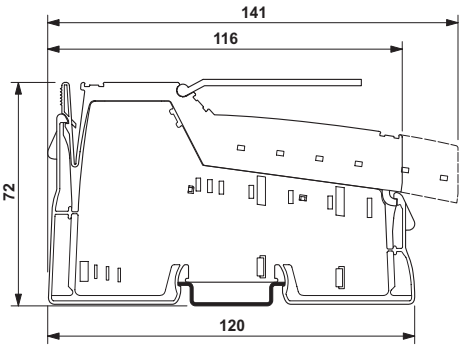
The "high-density" terminal IB IL 24 DO 32/HD offers 32 output channels, the return wiring of which can be economically implemented via potential distributor terminals IB IL PD 24 V as an option.

All the typical applications are covered by the standard automation terminals.

The I/O equipment is connected either by a simple or an expanded Inline connector, depending on the number of channels. The multi-wire connection method is used in both cases.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

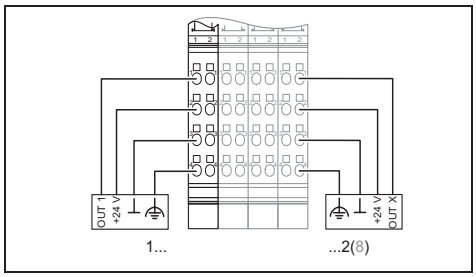
1) Note: The 2MBD versions are not intended for operation on the field multiplexer.



IB IL 24 DO 2(8)...-PAC...

Inline Modular digital output terminal,
outputs: 24 V DC, 500 mA, 4-wire connection method

Ex: // Applied for: NV



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

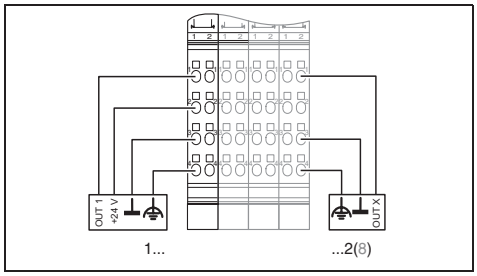
Description	Type	Order No.	Pcs. / Pkt.
Inline digital output terminal, complete with accessories (connector and labeling field)			
	IB IL 24 DO 2-PAC	**2861470**	1
	IB IL 24 DO 8-PAC	**2861289**	1
- Transmission rate 2 Mbps - Transmission rate 2 Mbps	**IB IL 24 DO 8-2MBD-PAC1)**	**2861687**	1
- Connectors without consecutive numbering	**IB IL 24 DO 8-PAC/SN**	**2862945**	1
- Outputs 2 A - Outputs 2 A - Transmission speed 2 Mbps, outputs 2 A			
Connector set for IB IL DI/DO 8 **Connector set** for IB IL DO 16, color-coded	**IB IL DI/DO 8-PLSET/CP**	**2860963**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Labeling area, width: 48.8 mm	**IB IL FIELD 8**	**2727515**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Marking sheet	**ESL 62X46**	**0809502**	5
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	IB IL 24 DO 2-PAC	IB IL 24 DO 8-PAC
Local bus interface		
Type of connection	Inline data jumper	
Power supply for module electronics		
Supply voltage	24 V DC (via voltage jumper)	
Range of supply voltages	19.2 V DC ... 30 V DC	
Current consumption from U_L	Max. 33 mA	Max. 60 mA
Digital outputs		
Connection method	2, 3, 4-wire	
Number of outputs	2	8
Maximum output current per channel	500 mA	
Protective circuitry	Overload protection, short circuit protection of outputs	
General data		
Weight	41 g	130 g
Width	12.2 mm	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C	

IB IL 24 DO 2(8)-2A...-PAC

Inline Modular digital output terminal,
outputs: 24 V DC, 2 A, 4-wire connection method

Ex:



Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 2-2A-PAC	**2861263**	1
IB IL 24 DO 8-2A-PAC	**2861603**	1
IB IL 24 DO 2-2A-2MBD-PAC[1])	**2861700**	1
IB IL DI/DO 8-PLSET/CP	**2860963**	1
IB IL SCN-8-CP	**2727608**	10
IB IL FIELD 2	**2727501**	10
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ESL 62X46	**0809502**	5
ZBF...		

IB IL 24 DO 2-2A-PAC	IB IL 24 DO 8-2A-PAC
Inline data jumper	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC	
Max. 35 mA	Max. 60 mA
2, 3, 4-wire	
2	8
2 A	
Overload protection, short circuit protection of outputs	
46 g	130 g
12.2 mm	48.8 mm
-25°C ... 55°C	

IB IL 24 DO 4(16)...-PAC...

Inline Modular digital output terminal,
outputs: 24 V DC, 500 mA, 3-wire connection method

Ex:

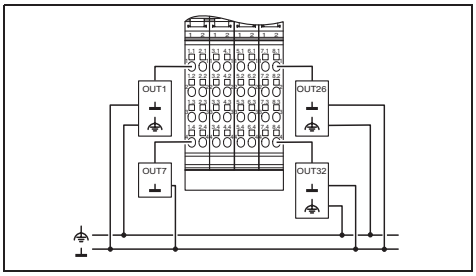
Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 4-PAC	**2861276**	1
IB IL 24 DO 16-PAC	**2861292**	1
IB IL 24 DO 4-2MBD-PAC[1])	**2861988**	1
IB IL 24 DO16-2MBD-PAC[1])	**2862013**	1
IB IL 24 DO 16-PAC/SN	**2862961**	1
IB IL DO16-PLSET/OCP	**2860992**	1
IB IL SCN-12-OCP	**2727624**	10
IB IL FIELD 2	**2727501**	10
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ESL 62X46	**0809502**	5
ZBF...		

IB IL 24 DO 4-PAC	IB IL 24 DO 16-PAC
Inline data jumper	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC	
Max. 44 mA	Max. 90 mA
2, 3-wire	
4	16
500 mA	
Overload protection, short circuit protection of outputs	
44 g	130 g
12.2 mm	48.8 mm
-25°C ... 55°C	

IB IL 24 DO 32/HD...-PAC

Inline Modular digital output terminal,
outputs:24 V DC, 500 mA, single wire connection method

Ex: // Applied for: UL-EX LIS / CUL-EX LIS / BV



Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 32/HD-PAC	**2862822**	1
IB IL 24 DO 32/HD-2MBD-PAC[1])	**2692898**	1
IB IL DI/DO 8-PLSET	**2860950**	1
IB IL FIELD 2	**2727501**	10
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ESL 62X46	**0809502**	5
ZBF...		

Inline data jumper
24 V DC (via voltage jumper)
-
Max. 140 mA
1-wire
32
500 mA
Overload protection, short circuit protection of outputs
195 g
48.8 mm
-25°C ... 55°C

Digital output terminals

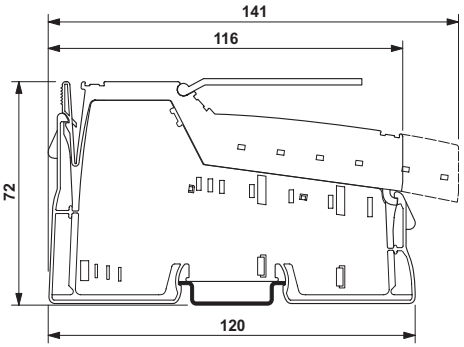
Digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

The extended variants IB IL 24 EDO 2 offer short-circuit-proof, overload-protected outputs, channel-specific diagnostics and a parameterized output response in the event of a bus reset.

All the typical applications are covered by the standard automation terminals.

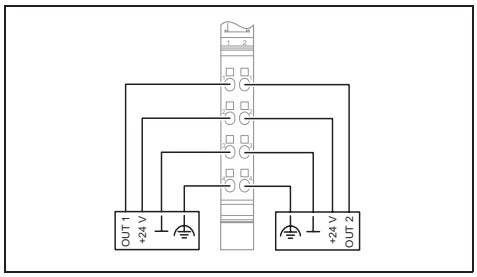
The peripheral equipment is connected with a simple Inline connector. The multiconductor connection system is available for this purpose.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.



IB IL 24 EDO 2-PAC

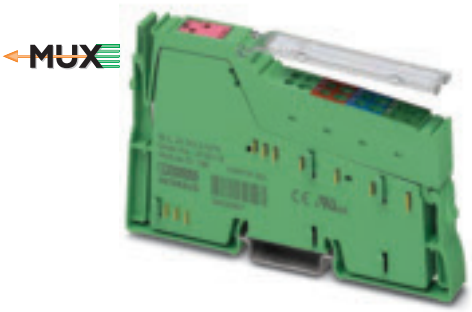
Inline Modular digital output terminal, outputs: 24 V DC, 500 mA, 4-wire connection method, extended diagnosis



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline digital output terminal, complete with accessories (connector and labeling field) - Extended diagnostics - NPN-wired	**IB IL 24 EDO 2-PAC**	**2861616**	1
Inline connector	**IB IL SCN-8-CP**	**2727608**	10
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Labeling area, width: 48.8 mm			
Marking sheet	**ESL 62X10**	**0809492**	1
Marking sheet			
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

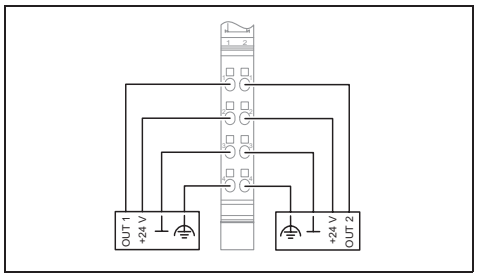
Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Range of supply voltages	19.2 V DC ... 30 V DC
Current consumption from U_L	Max. 40 mA
Digital outputs	
Type of connection	Spring-cage connection
Connection method	2, 3, 4-wire
Number of outputs	2
Description of the outputs	Extended diagnostics, parameterizable outputs
Maximum output current per channel	500 mA
Protective circuitry	Overload protection, short circuit protection of outputs
General data	
Weight	41 g
Width	12.2 mm
Ambient temperature (operation)	-25°C ... 55°C



IB IL 24 DO 2-NPN-PAC

Inline Modular digital output terminal,
outputs: 24 V DC, 500 mA, 2, 3 and 4-wire connection method, NPN-wired

Ex:



Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 2-NPN-PAC	**2861496**	1
IB IL SCN-8-CP	**2727608**	10
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper

24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC
Max. 32 mA

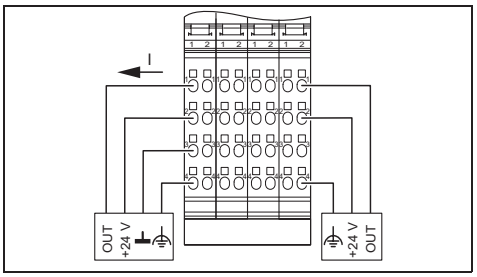
Spring-cage connection
2, 3, 4-wire
2
With negative logic
500 mA
Overload protection, short circuit protection of outputs

42 g
12.2 mm
-25°C ... 55°C

IB IL 24 DO 8-NPN-PAC

Inline Modular digital output terminal,
outputs: 24 V DC, 500 mA, 2 and 3-wire connection method, NPN-wired

Ex:



Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 8-NPN-PAC	**2863546**	1
IB IL SCN-8-CP	**2727608**	10
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper

24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC
Max. 60 mA

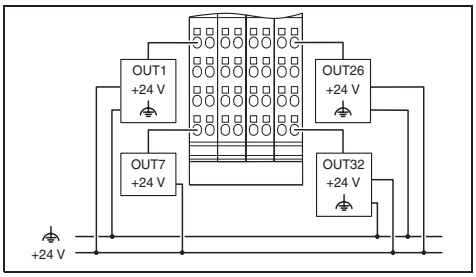
Spring-cage connection
2, 3, 4-wire
8
With negative logic
500 mA
Overload protection, short circuit protection of outputs

130 g
48.8 mm
-25°C ... 55°C

IB IL 24 DO 32/HD-NPN-PAC

Inline Modular digital output terminal,
Outputs: 24 V DC, 500 mA, 1-wire connection method, NPN-wired

Ex:
Applied for: UL / CUL / UL-EX LIS / CUL-EX LIS



Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 32/HD-NPN-PAC	**2878340**	1
IB IL DI/DO 8-PLSET	**2860950**	1
IB IL FIELD 2	**2727501**	10
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ESL 62X46	**0809502**	5
ZBF...		

Inline data jumper

24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC
Max. 140 mA

Spring-cage connection
1-wire
32
With negative logic
500 mA
Overload protection, short circuit protection of outputs

135 g
48.8 mm
-25°C ... 55°C

Digital output terminals

Digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

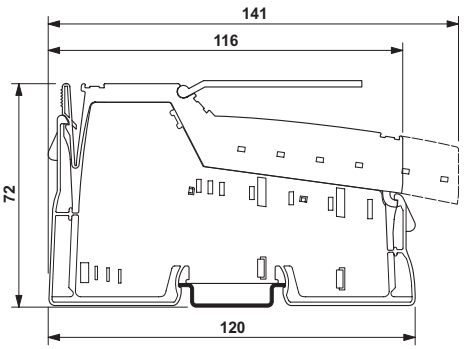
All the typical applications are covered by the standard automation terminals.

The Inline relay terminals make it possible to switch any I/O voltage up to a maximum of 230 V AC. For this reason, a relay with a floating PDT contact is integrated in the terminal. Whereas the various relay contact materials in the ...W variants ensure low contact resistances for small loads and lamp loads, the ...W/PC variants are designed for inductive/capacitive loads. The IB IL 24/48 DOR 2/W-PAC module is a relay module for small signals.

The I/O equipment is connected either by a simple or an expanded Inline connector, depending on the number of channels. The multi-wire connection method is used in both cases.

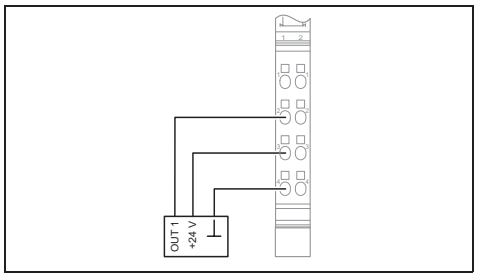
The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

[1]) **Note:** The 2MBD versions are not intended for operation on the field multiplexer.



IB IL DO ... AC...-PAC

Inline Modular digital output terminal,
outputs: 12 to 253 V AC, 500 mA, 3-wire connection method



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

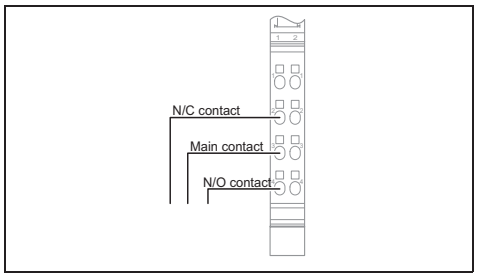
Description	Type	Order No.	Pcs. / Pkt.
Inline digital output terminal, complete with accessories (connector and labeling field)			
- 1 output	**IB IL DO 1 AC-PAC**	**2861920**	1
- 4 outputs 1 A	**IB IL DO 4 AC-1A-PAC**	**2861658**	1
- 1 SPDT relay contact			
- 2 SPDT relay contacts,			
- 4 SPDT relay contacts			
- 1 SPDT relay contact, transmission speed 2 Mbps			
- 4 SPDT relay contacts, transmission speed 2 Mbps			
- 4 SPDT relay contacts, 10 A, high inrush current			
Inline distance terminal			
- Complete with accessories (connector and labeling field)	**IB IL DOR LV-SET-PAC**	**2861645**	1
Connector for digital Inline output terminals, color-coded	**IB IL SCN-8-AC-OCP**	**2740274**	10
Connector for digital Inline terminals with AC voltage			
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Labeling area, width: 48.8 mm	**IB IL FIELD 8**	**2727515**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Marking sheet	**ESL 62X46**	**0809502**	5
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	IB IL DO 1 AC-PAC	IB IL DO 4 AC-1A-PAC
Local bus interface		
Type of connection	Inline data jumper	
Power supply for module electronics		
Supply voltage	24 V DC (nominal value)	
Range of supply voltages	19.2 V DC ... 30 V DC	
Current consumption from U_L	Max. 35 mA	Max. 45 mA
Digital outputs		
Type of connection	Spring-cage connection	
Connection method	3-wire	
Number of outputs	1	4
Maximum output current per channel	500 mA	1 A
General data		
Weight	45 g	130 g
Width	12.2 mm	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C	

IB IL 24/230 DOR.../W...-PAC

Inline Modular digital output terminal,
SPDT relay contact 5 - 253 V AC, 3 A

Ex:

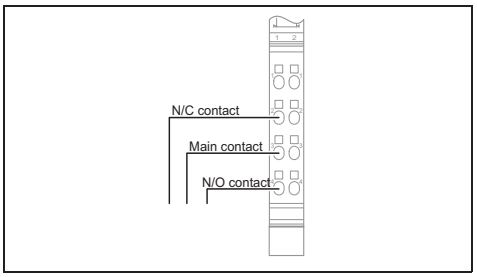


Type	Order No.	Pcs. / Pkt.
IB IL 24/230 DOR1/W-PAC	2861881	1
IB IL 24/230 DOR4/W-PAC	2861878	1
IB IL 24/230 DOR1/W-2MBD-PAC[1])	2862110	1
IB IL 24/230 DOR4/W-2MBD-PAC[1])	2862039	1
IB IL 24/230 DOR4/HC-PAC	2897716	1
IB IL DOR LV-SET-PAC	2861645	1
IB IL SCN-8-AC-REL	2740290	10
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

IB IL 24/230 DOR1/W-PAC	IB IL 24/230 DOR4/W-PAC
Inline data jumper	
24 V DC (nominal value) 19.2 V DC ... 30 V DC	
Max. 60 mA	Max. 187 mA
Spring-cage connection Floating SPDT relay contact	
1	4
3 A	
46 g	138 g
12.2 mm	48.8 mm
-25°C ... 55°C	

IB IL 24/230 DOR.../W-PC-PAC

Inline Modular digital output terminal block,
SPDT relay contacts for capacitive loads, 5 to 253 V AC, 3 A

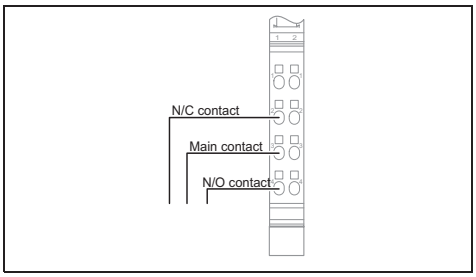


Type	Order No.	Pcs. / Pkt.
IB IL 24/230 DOR1/W-PC-PAC	2862178	1
IB IL 24/230 DOR4/W-PC-PAC	2862181	1
IB IL DOR LV-SET-PAC	2861645	1
IB IL SCN-8-AC-REL	2740290	10
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

IB IL 24/230 DOR1/W-PC-PAC	IB IL 24/230 DOR4/W-PC-PAC
Inline data jumper	Via data marshalling
24 V DC (nominal value) 19.2 V DC ... 30 V DC	
Max. 60 mA	Max. 187 mA
Spring-cage connection Floating SPDT relay contact	
1	4
2.6 A	3 A
46 g	138 g
12.2 mm	48.8 mm
-25°C ... 55°C	

IB IL 24/48 DOR 2/W-PAC

Inline Modular digital output terminal,
SPDT relay contacts, 5 to 50 V AC, 5 to 120 V DC, max 2 A



Type	Order No.	Pcs. / Pkt.
IB IL 24/48 DOR 2/W-PAC	2863119	1
IB IL DOR LV-SET-PAC	2861645	1
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

Inline data jumper
24 V DC (nominal value) 19.2 V DC ... 30 V DC Max. 30 mA
Spring-cage connection Floating SPDT relay contact
2
2 A
48 g
12.2 mm
-25°C ... 55°C

Analog input terminals

Measured value acquisition with 16-bit resolution combined with excellent interference suppression and common mode rejection is characteristic of Inline analog terminals. The ability to connect the shield directly on the terminal offers maximum protection even in EMC-critical environments.

The analog Inline input terminals are suited for connecting conventional sensors for the acquisition of current and voltage signals.

The extended variant IB IL AI 2/SF-230 is characterized by a 3 dB base frequency at 230 Hz.

The additional initiator supply outputs on IB IL AI 8/IS (as compared with the current and voltage inputs of ...AI 8/SF) mean that it can support the connection of passive sensors in 2 and 3-wire technology.

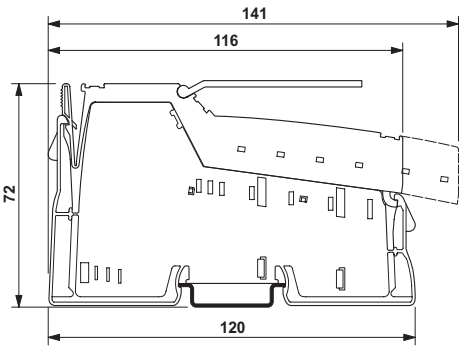
The ...AI 8/SF and ...AI 8/IS modules operate in process data multiplex mode. The supply voltage for the initiators is also short-circuit-proof.

Particular features of the terminals are:

– High level of measuring accuracy
– Excellent interference suppression and common mode rejection
– Measured value acquisition with 16-bit resolution

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

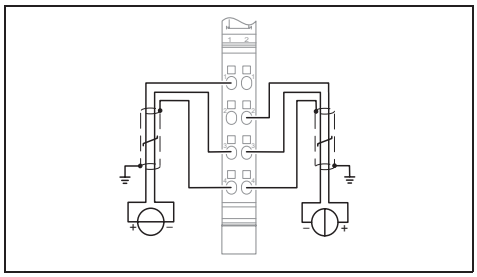
[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.



IB IL AI 2/SF...-PAC

Inline Modular analog input terminal,
inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V,
2-wire connection method

Ex: // Applied for: NV



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline analog input terminal, complete with accessories (connector and labeling field)			
	IB IL AI 2/SF-PAC[1])	**2861302**	1
- 3 dB base frequency at 230 Hz - Transmission rate 2 Mbps - Initiator supply outputs - HART functionality	**IB IL AI 2/SF-230-PAC[1])**	**2861577**	1
Shield connector	**IB IL SCN 6-SHIELD-TWIN**	**2740245**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Labeling area, width: 48.8 mm			
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	IB IL AI 2/SF-PAC[1])	IB IL AI 2/SF-230-PAC[1])
Local bus interface		
Type of connection	Inline data jumper	
Power supply for module electronics		
I/O supply voltage U_{ANA}	24 V DC	
Current consumption from U_{ANA}	Max. 18 mA	
Communications voltage U_L	7.5 V DC	
Current consumption from U_L	Max. 60 mA	
Analog inputs		
Connection method	2-wire (shielded)	
Number of inputs	2	
Voltage input signal	0 V ... 10 V / -10 V ... 10 V	0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA	0 mA ... 20 mA / 4 mA ... 20 mA (±20 mA) / -20 mA ... 20 mA (±20 mA) / 0 mA ... 40 mA (± 40 mA)
Process data		
Measured value resolution	16 bits (15 bits + sign)	
Process data update	Typ. 1.5 ms	
Data formats	IL, IB ST, IB RT, standardized display	
General data		
Weight	47 g	
Width	12.2 mm	
Ambient temperature (operation)	-25°C ... 55°C	

IB IL AI 8/SF...-PAC

Inline Modular analog input terminal,
inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-40 mA, ±40 mA,
0-5 V, ±5 V, 0-10 V, ±10 V, 0-25 V, ±25 V, 0-50 V,
2-wire connection method

Ex:

IB IL AI 8/IS-PAC

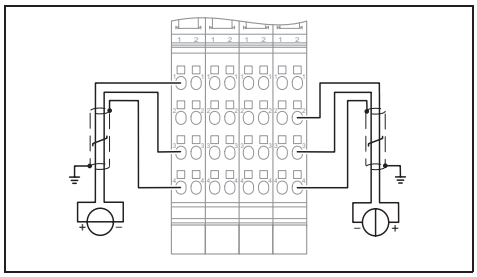
Inline Modular analog input terminal,
inputs: 0-20 mA, 4-20 mA, 0-40 mA, ±20 mA, ±40 mA,
2-wire connection method

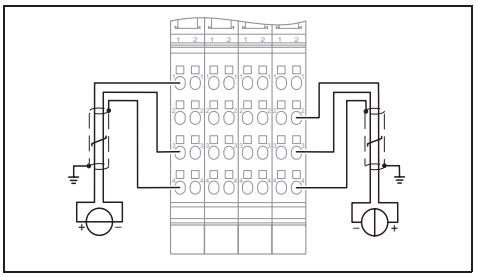
Ex:

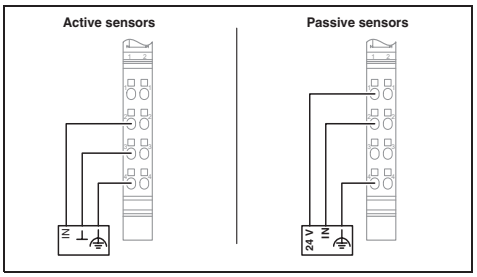
IB IL AI 2-HART-PAC

Inline Modular analog input terminal,
inputs: 0-25 mA, 4-20 mA, HART functionality and protocol
transmission, 2-wire connection method

Ex:







Type	Order No.	Pcs. / Pkt.
IB IL AI 8/SF-PAC[1])	**2861412**	1
IB IL AI 8/SF-2MBD-PAC[1])	**2862042**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL AI 8/IS-PAC[1])	**2861661**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL AI 2-HART-PAC[1])	**2862149**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL FIELD 8	**2727515**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper		
24 V DC Max. 35 mA 7.5 V DC Max. 50 mA	24 V DC Max. 40 mA 7.5 V DC Max. 65 mA	24 V DC Max. 150 mA 7.5 V DC Max. 110 mA
2-wire (shielded) 8 0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V / 0 V ... 25 V / -25 V ... 25 V / 0 V ... 50 V 0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA / 0 mA ... 40 mA / -40 mA ... 40 mA	2-wire (shielded) 8 - 0 mA ... 20 mA / 4 mA ... 20 mA (±20 mA) / 0 mA ... 40 mA (± 40 mA)	2-wire (shielded) 2 - 0 mA ... 25 mA / 4 mA ... 20 mA
16 bits (15 bits + sign) < 20 ms IL, IB ST, IB RT, standardized representation, PIO format	16 bits (15 bits + sign) < 20 ms IL, IB ST, IB RT, standardized representation, PIO format	16 bits (15 bits + sign) Typ. 1 ms (bus-synchronous) IL, standardized display
213 g 48.8 mm -25°C ... 55°C	125 g 48.8 mm -25°C ... 55°C	134 g 48.8 mm -25°C ... 55°C

Analog input terminals

The analog Inline input terminal IB IL AI 4/EF is suited for connecting conventional sensors for the acquisition of current and voltage signals. The four differential signal inputs support the sensor connection in 2, 3 and 4-wire technology.

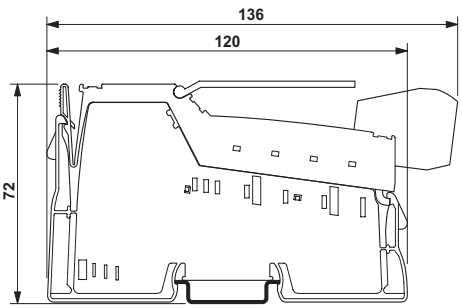
For each channel, the module has connections for the sensor supply, with integrated short-circuit and surge protection for each channel. With the bus, the channels can be configured independently of one another and used with different signals.

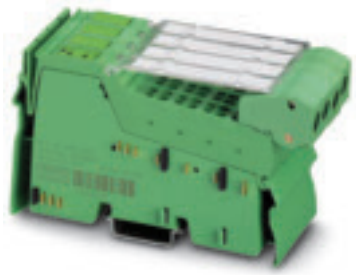
Four different formats are available to present measured values (e.g. SIMATIC® S7).

Due to the particularly short update time of max. 1 ms for all channels, the module can be used well for control engineering requirements. In addition, the automation terminal enables bus-synchronous preparation of input values with very low jitter (< 10 µs).

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.

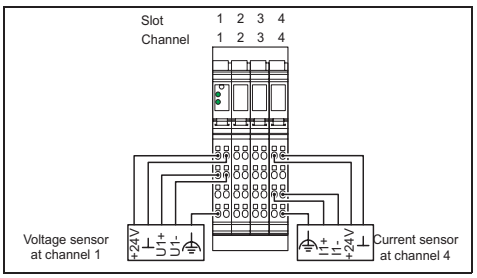




IB IL AI 4/EF...-PAC

Inline Modular analog input terminal,
inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V, 0-5 V, ±5 V,
2, 3 or 4-wire connection method

Applied for: NV



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline analog input terminal, complete with accessories (connector and labeling field)			
	IB IL AI 4/EF-PAC[1])	**2878447**	1
- Transmission rate 2 Mbps	**IB IL AI 4/EF-2MBD-PAC[1])**	**2878641**	1
Shield connector	**IB IL SCN 6-SHIELD-TWIN**	**2740245**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
I/O supply voltage U_{ANA}	24 V DC
Current consumption from U_{ANA}	Max. 20 mA
Communications voltage U_L	7.5 V DC
Current consumption from U_L	Max. 100 mA
Analog inputs	
Type of connection	Inline shield connector
Connection method	2, 3-wire
Number of inputs	4
Description of the inputs	Differential input, incl. sensor supply (24 V DC)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 A ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Process data	
Measured value resolution	16 bits (15 bits + sign)
Process data update	Typ. 1 ms (bus-synchronous)
Data formats	IL, IB ST, standardized display, S7 compatible
General data	
Weight	150 g
Width	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C

Inline strain gauge detection terminal

The strain gauge measurement terminal enables the connection of weighing cells, force transducers, mass force transducers and similar instruments, based on strain gauges.

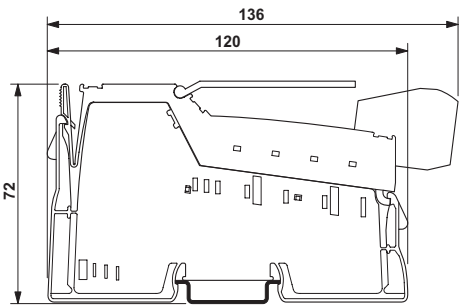
The strain gauge connection is possible in both 6 and 4-wire technology. The output signals of the strain gauges are measured in each bus cycle and updated in the process data (bus-synchronous process data update). Terminal IB IL SGI 2/F is thus also suited for control engineering applications with increased speed requirements.

The module offers a choice of 3.3 V or 5 V as the supply voltage (bridge voltage) for the sensors. The terminal IB IL SGI 2/F can measure both unipolar and bipolar bridge differences (configurable). In this way, channels can be configured independently of each other and work with different bridge voltages, for example.

One diagnostics LED per channel indicates faults such as an open circuit or missing sensor supply. Another module diagnosis LED displays the correct supply of the module and the bus status. All diagnoses can be read out and monitored via the bus.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. Additionally, there is the proven ZBFM-6... Zack marker strip for labeling the terminal points.

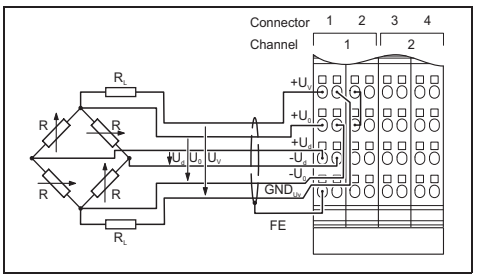
1) Note: The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.



IB IL SGI 2/F(P)...-PAC

Inline Modular analog strain gauge input terminal, 2 fast inputs, 4, 6-wire connection method

Ex:



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline analog strain gauge input terminal, complete with accessories (connector and labeling field)			
	IB IL SGI 2/F-PAC[1]	**2878638**	1
- Transmission rate 2 Mbps	**IB IL SGI 2/F-2MBD-PAC**[1]	**2878735**	1
- Precise inputs	**IB IL SGI 2/P-PAC**[1]	**2884907**	1
Shield connector	**IB IL SCN 6-SHIELD-TWIN**	**2740245**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1

Technical data	IB IL SGI 2/F-PAC[1]	IB IL SGI 2/P-PAC[1]
Local bus interface		
Type of connection	Inline data jumper	
Power supply for module electronics		
I/O supply voltage U_{ANA}	24 V DC	
Current consumption from U_{ANA}	Typ. 32 mA (With maximum load 60 Ω at U_V = 5 V)	Max. 100 mA
Communications voltage U_L	7.5 V DC	
Current consumption from U_L	Max. 85 mA	Max. 100 mA
Analog inputs		
Connection method	6 or 4-wire, twisted pair shielded cable	
Number of inputs	2	
Description of the inputs	Input channels for strain gauge	
Bridge difference U_d	Two, configurable by selecting the characteristic and the bridge supply	Configurable
Bridge voltage U_0	3.3 V / 5 V	5 V
Analog outputs		
Description of the outputs	Voltage output	
Number of outputs	2	
Impedance	> 59 Ω (typical)	> 55 Ω (Min.)
Maximum output current	Typ. 55 mA (With U_V = 3.3 V) / Typ. 85 mA (With U_V = 5 V)	Max. 90 mA (With U_V = 5 V)
Characteristics		
Unipolar	+1 mV/V, +2 mV/V, +3 mV/V, +4 mV/V	-
Bipolar	±1 mV/V, ±2 mV/V, ±3 mV/V, ±4 mV/V	±1 mV/V, ±2 mV/V, ±3 mV/V, ±3.33 mV/V, ±4 mV/V, ±5 mV/V
Representation of measured value	15 bit + sign bit	
Process data update	Once per local bus cycle	Typ. 100 ms (12.5 ms, depending on the configuration)
General data		
Weight	190 g	220 g
Width	48.8 mm	
Ambient temperature (operation)	-25°C ... 55°C	

Analog input terminals

Measured value acquisition with a 16-bit resolution combined with excellent interference suppression and common mode rejection are characteristic of Inline analog modules. The ability to connect the shield directly on the terminal offers maximum protection even in EMC-critical environments.

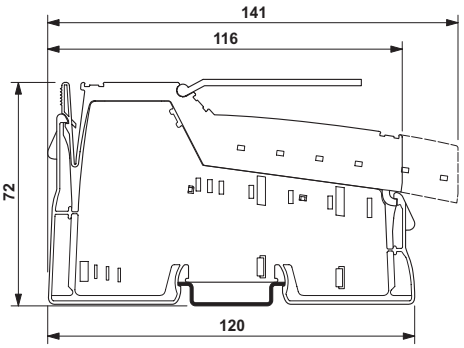
Thermocouple measurement terminals (UTH) can also be optimally adapted in line with the given operating conditions using IB UTH CAL SWT calibration software for path alignment.

The outstanding feature of the IB IL TEMP 4/8 RTD is that it is a temperature measuring module which allows up to 8 resistance thermometers (2 x 4 channels process data multiplex) to be connected or can measure 4 channels with up to a 3-wire system. Supported by PT-1000 sensors, for example, the high channel terminal is predestined for use in building automation, for example, and applications in which it is necessary to collect the data from many temperature probes at low cost.

The Inline thermistor terminal IB IL 24 TC is used for the evaluation of PTC thermistors. It makes it possible to monitor the temperature of motors and can be used in conjunction with Inline motor starters.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

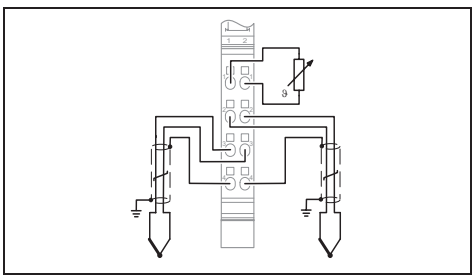
[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.



IB IL TEMP 2 UTH-PAC

Inline Modular analog input terminal,
inputs: TC (thermocouple), 2-wire connection method

Ex:



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

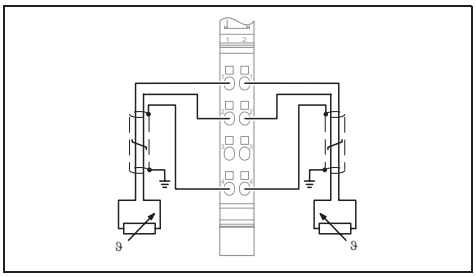
Description	Type	Order No.	Pcs. / Pkt.
Inline analog input terminal, complete with accessories (connector and labeling field) - Transmission rate 2 Mbps - With extended functions - with advanced functions, transmission speed 2 Mbps	**IB IL TEMP 2 UTH-PAC**	**2861386**	1
Shield connector	**IB IL SCN 6-SHIELD-TWIN**	**2740245**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Labeling area, width: 48.8 mm **Marking sheet**	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Inline local bus	Inline data jumper
Power supply for module electronics	
I/O supply voltage U_{ANA}	24 V DC
Current consumption from U_{ANA}	Max. 18 mA
Communications voltage U_L	7.5 V DC
Current consumption from U_L	Max. 60 mA
Analog inputs	
Connection method	2-wire (shielded)
Number of inputs	2
Description of the input	
Linear resistance measuring range	
Sensor types that can be used	J,K,L,U,B,E,N,R,S,T,C,W,HK
Measuring principle	Successive approximation
Measured value resolution	16 bits (including sign)
Process data update	20 ms
Data formats	
Tolerance	Typ. ± 0.60°C
Thermistor input	
Connection method	-
Number of inputs	-
Sensor types that can be used (TC)	-
Digital outputs	
Number of outputs	-
General data	
Weight	46 g
Width	12.2 mm
Ambient temperature (operation)	-25°C ... 55°C

IB IL TEMP 2 RTD-PAC

Inline Modular analog input terminal;
inputs: RTD (resistance sensor); 2, 3, 4-wire connection method

Ex:



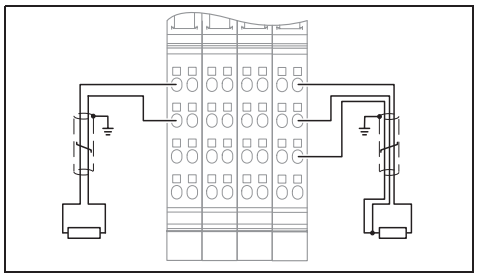
Type	Order No.	Pcs. / Pkt.
IB IL TEMP 2 RTD-PAC[1])	**2861328**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper	
24 V DC	
Max. 18 mA	
7.5 V DC	
Max. 60 mA	
2, 3-wire	
2	
0 Ω ... 400 Ω / 0 Ω ... 4000 Ω	
Pt, Ni (DIN/SAMA/500/1000), Cu10/50/53, KTY81-110/81-210/84, Linear R	
Successive approximation	
16 bits (15 bits + sign)	
30 ms	
Typ. ± 0.26°C	
-	
-	
-	
-	
46 g	
12.2 mm	
-25°C ... 55°C	

IB IL TEMP 4/8 RTD...-PAC

Inline Modular analog input terminal;
inputs: RTD (resistance sensor); 2, 3-wire connection method

Ex: // Applied for: BV

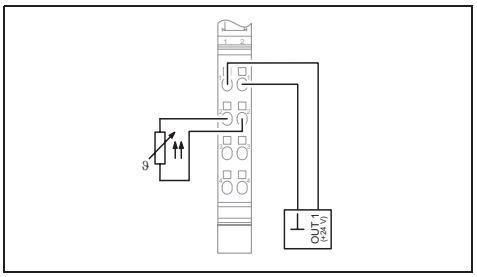


Type	Order No.	Pcs. / Pkt.
IB IL TEMP 4/8 RTD-PAC[1])	**2863915**	1
IB IL TEMP 4/8 RTD-2MBD-PAC[1])	**2878612**	1
IB IL TEMP 4/8 RTD/EF-PAC[1])	**2897402**	1
IB IL TEMP 4/8 RTD/EF-2MBD-PAC[1])	**2897606**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL FIELD 8	**2727515**	10
ESL 62X46	**0809502**	5
ZBF...		

	IB IL TEMP 4/8 RTD-PAC[1])	IB IL TEMP 4/8 RTD/EF-PAC[1])
Inline data jumper		
24 V DC		
Max. 18 mA	Typ. 28 mA	Typ. 6 mA
7.5 V DC		
Max. 60 mA	Typ. 75 mA	Typ. 95 mA
2, 3-wire	2, 3-wire	4-wire
2	2	8
	2 x 4 channels multiplex, 8 PCP channels or 4 channels without multiplex	
0 Ω ... 400 Ω / 0 Ω ... 4000 Ω	0 Ω ... 400 Ω / 0 Ω ... 20000 Ω	0 Ω ... 500 Ω / 0 Ω ... 5000 Ω
Pt, Ni (DIN/SAMA/500/1000), Cu10/50/53, KTY81-110/81-210/84, Linear R		
Successive approximation	Successive approximation	Sigma/Delta process
16 bits (15 bits + sign)		
30 ms	6 ms (Up to 230 ms possible depending on operating mode)	1.8 s (Up to 3.3 s possible depending on operating mode)
Typ. ± 0.26°C	IB IL TEMP, S7, S5 Typ. ± 0.50°C	IB IL, S7 compatible Typ. ± 0.05°C
-	-	
-	-	
-	-	
-	-	
46 g	190 g	
12.2 mm	48.8 mm	
-25°C ... 55°C	-25°C ... 55°C	

IB IL 24 TC...-PAC

Inline Modular thermistor terminal, 2-wire connection method



Type	Order No.	Pcs. / Pkt.
IB IL 24 TC-PAC	**2861360**	1
IB IL 24 TC-2MBD-PAC	**2861991**	1
IB IL SCN-6 SHIELD	**2726353**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper	
24 V DC	
-	
7.5 V DC	
Max. 60 mA	
-	
-	
-	
2-wire	
1	
DIN 44 081 / DIN 44 082	
1	
50 g	
12.2 mm	
-25°C ... 55°C	

Modular multi-controller systems

The TEMPCON multi-controllers are precise and inexpensive multi-channel controllers based on microcontrollers for all industrial control tasks with process time constants as low as a few tenths of a second. The majority of applications therefore lie in the area of heating and cooling. They allow you to select simple on/off closed-loop control here, with a threshold value switch, digital PID closed-loop control or motor step closed-loop control for each channel.

With practical functions, such as the specific removal of moisture from heating cartridges, removing material residue from hot runner molds or for preventing thermal stress when heating up, they are especially suited for temperature regulation in plastic processing machines, packaging machines, tempering devices and similar machines.

The TEMPCON 300 modules are already equipped with the I/Os for some control circuits, which either directly control the solid-state relays of electrical heating systems or motor-driven valves.

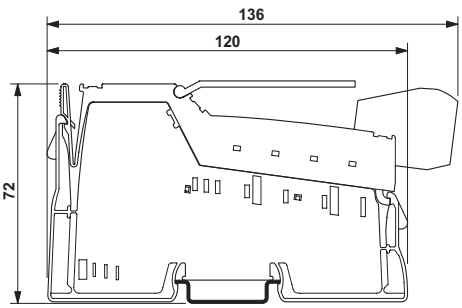
The multi-controllers can be expanded to 30 control circuits by connecting Inline terminals in series. The large range of Inline terminals thus allows all industrial control signals to be coupled. In addition to the expandable multi-channel controllers, the inexpensive controllers are available for a maximum of 4 control circuits ("B" variants).

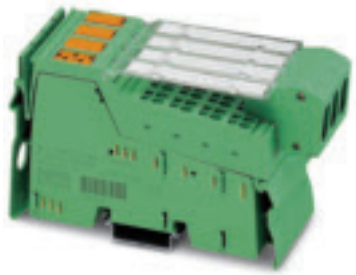
With a number of features, the multi-controllers help to considerably increase the control quality, cost-effectiveness, and operational reliability of processes. The automatic self-optimization function ensures optimal control behavior, even for minimum start-up times.

In addition to the variety of functions, the main advantages of the multi-controller are the higher operational reliability and relieving the central control system.

The graphic startup software Tempcontrol simplifies the configuration, operation, visualisation and diagnosis of the multi-channel controllers.

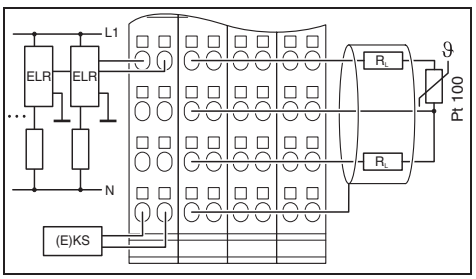
[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.





IB IL TEMPCON 300 RTD...-PAC

Inline Modular temperature controller, resistance thermometer inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements



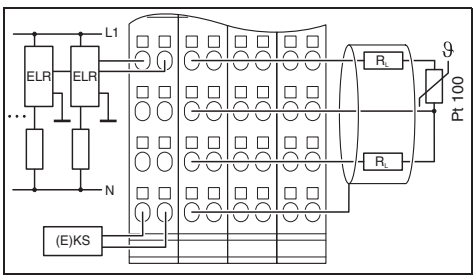
	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline temperature controller, complete with accessories (connector and labeling field) - 6 resistance thermometer inputs, extendable to 30 control circuits	**IB IL TEMPCON 300 RTD-PAC[1])**	**2819668**	1
- 6 resistance thermometer inputs, can be extended to 30 control circuits, transmission speed 2 Mbps	**IB IL TEMPCON 300 RTD-2MBD-PAC[1])**	**2819820**	1
- Compact, 4 resistance thermometer inputs			
- compact, 4 resistance thermometer inputs, transmission speed 2 Mbps			
Inline temperature controller, complete with accessories (connector and labeling field) - 8 thermocouple inputs, extendable to 30 closed-loop control circuits - 8 thermocouple inputs, can be extended to 30 control circuits, transmission speed 2 Mbps - Compact, 4 thermocouple inputs - compact, 4 thermocouple inputs, transmission speed 2 Mbps			
Configuration software, incl. interface cable	**IB IL TEMPCONTROL**	**2819370**	1
Interface cable	**TEMPCON CAB-V24**	**2819419**	1
Shield connector	**IB IL SCN 6-SHIELD-TWIN**	**2740245**	5
Connectors	**IB IL SCN-8**	**2726337**	10
Labeling area, width: 48.8 mm	**IB IL FIELD 8**	**2727515**	10
Marking sheet	**ESL 62X46**	**0809502**	5

Technical data	
Local bus interface	
Inline local bus	Inline data jumper
Configuration interface	V.24
Power supply for module electronics	
I/O supply voltage U_{ANA}	24 V DC (via voltage jumper)
Current consumption from U_{ANA}	Typ. 30 mA
Communications voltage U_L	7.5 V DC (via voltage jumper)
Current consumption from U_L	150 mA (maximum)
Analog inputs	
Connection method	3-wire (shielded)
Sensor types that can be used	PT 100
Representation of measured value	-200°C ... 850°C
Measured value resolution	0.1 K
A/D conversion time	175 ms
Digital outputs	
Number of outputs	6
Output voltage	24 V DC
Output current	70 mA (short circuit resistant)
General data	
Weight	122 g
Width	48.8 mm

IB IL TEMPCON 300 RTD-B...-PAC

Inline Modular temperature controller, resistance thermometer inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements

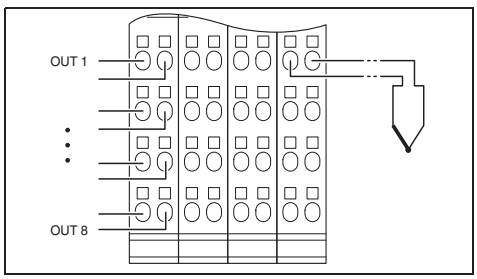


Type	Order No.	Pcs. / Pkt.
IB IL TEMPCON 300 RTD-B-PAC[1])	2819590	1
IB IL TEMPCON 300 RTD-B-2M-PAC[1])	2819859	1
IB IL TEMPCONTROL	2819370	1
TEMPCON CAB-V24	2819419	1
IB IL SCN 6-SHIELD-TWIN	2740245	5
IB IL SCN-8	2726337	10
IB IL FIELD 8	2727515	10
ESL 62X46	0809502	5

Inline data jumper V.24
24 V DC (via voltage jumper) Typ. 30 mA 7.5 V DC (via voltage jumper) 150 mA (maximum)
3-wire (shielded) PT 100 -200°C ... 850°C 0.1 K 125 ms
6 24 V DC 70 mA (short circuit resistant)
122 g 48.8 mm

IB IL TEMPCON 300 UTH...-PAC

Inline Modular temperature controller, thermocouple inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements

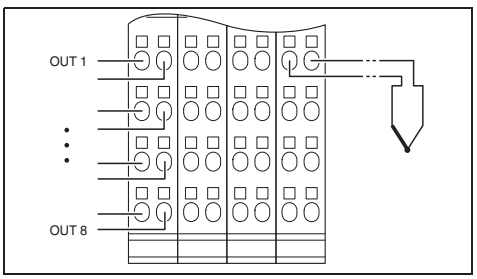


Type	Order No.	Pcs. / Pkt.
IB IL TEMPCON 300 UTH-PAC[1])	2819671	1
IB IL TEMPCON 300 UTH-2MBD-PAC[1])	2819833	1
IB IL TEMPCONTROL	2819370	1
TEMPCON CAB-V24	2819419	1
IB IL SCN-8	2726337	10
IB IL FIELD 8	2727515	10
ESL 62X46	0809502	5

Inline data jumper V.24
24 V DC (via voltage jumper) Typ. 30 mA 7.5 V DC (via voltage jumper) 150 mA (maximum)
2-wire (floating) L, J, K, N, S, R, T, C, D, E, B Depends on thermocouple 0.1 K 225 ms
8 24 V DC 70 mA (short circuit resistant)
122 g 48.8 mm

B IL TEMPCON 300 UTH-B...-PAC

Inline Modular temperature controller, compact thermocouple inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements



Type	Order No.	Pcs. / Pkt.
IB IL TEMPCON 300 UTH-B-PAC[1])	2819613	1
IB IL TEMPCON 300 UTH-B-2M-PAC[1])	2819846	1
IB IL TEMPCONTROL	2819370	1
TEMPCON CAB-V24	2819419	1
IB IL SCN-8	2726337	10
IB IL FIELD 8	2727515	10
ESL 62X46	0809502	5

Inline data jumper V.24
24 V DC (via voltage jumper) Typ. 30 mA 7.5 V DC (via voltage jumper) 150 mA (maximum)
2-wire (floating) L, J, K, N, S, R, T, C, D, E, B Depends on thermocouple 0.1 K 125 ms
8 24 V DC 70 mA (short circuit resistant)
122 g 48.8 mm

Terminals for temperature control circuits

The Inline terminals for temperature control circuits are designed as extension modules for multi-channel controllers of type Tempcon 300. They can also be directly operated at any higher-level controller (or PC).

Since the terminal blocks of the hardware correspond to the modular multi controllers of the Tempcon 300 range, they provide identical peripheral functions. This means that the terminal blocks provide the peripherals for a closed temperature circuit. Here, thermocouples or PT 100 resistance thermometers are supported on the recording side. On the actuator side, the terminal blocks are adapted to the control of electrical heating units (cooling units) using solid state relays or to motor-driven valves.

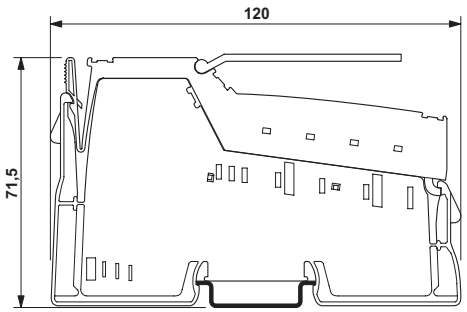
In the first case, an analog value is allocated to the digital output provided for this which converts the terminal block automatically into a pulse/pause ratio so that the heating unit can be controlled between 0 and 100 % of their power. In the second case, two digital outputs are compiled that automatically generate opening or closing signals for a motor-driven valve when the analog value is changed.

Moreover, one input is provided for every terminal block for heating current recording that can be used only in applications in which heating units switched via solid state relays are used. This current input can measure 0 to 50 mA AC that are recorded in the supply line of the connected solid state relays using a current transformer. In order to be able to select individual currents of heating circuits from this total current, the terminal block always switches on only one solid state relay briefly for the duration of current measurement.

With the UTH terminal blocks, you can record signals of commercial thermocouples. 11 different thermocouple types as per DIN EN 60584-1 and DIN 43710 and a linear voltage input of 0 mV to +70 mV are supported.

With the RTD terminal blocks, you can record signals of commercial resistance thermometer of type PT 100 as per DIN EN 60751.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.



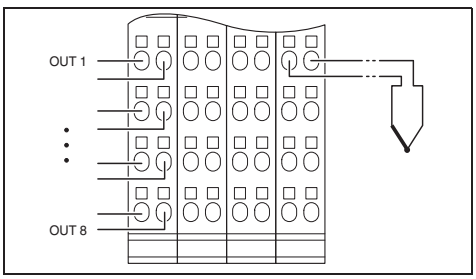
	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description
Inline temperature measurement terminal, complete with accessories (connector and labeling field) - 4 thermocouple inputs - 4 thermocouple inputs, 2 Mbps transmission speed - 8 thermocouple inputs - 8 thermocouple inputs, 2 Mbps transmission speed
Inline temperature measurement terminal, complete with accessories (connector and labeling field) - 6 resistance thermometer inputs - 6 resistance thermometer inputs, 2 Mbps transmission speed
Shield connector
Connectors
Labeling area, width: 48.8 mm
Marking sheet

Technical data
Local bus interface
Inline local bus
Power supply for module electronics
I/O supply voltage U_{ANA}
Current consumption from U_{ANA}
Communications voltage U_L
Current consumption from U_L
Analog inputs
Connection method
Sensor types that can be used
Representation of measured value
Measured value resolution
A/D conversion time
Digital outputs
Number of outputs
Output voltage
Output current
General data
Weight
Width
Ambient temperature (operation)

IB IL TEMP 4 UTH HEI 1 DO...-PAC

Inline Modular temperature recording terminal, process data multiplex, thermocouple inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements

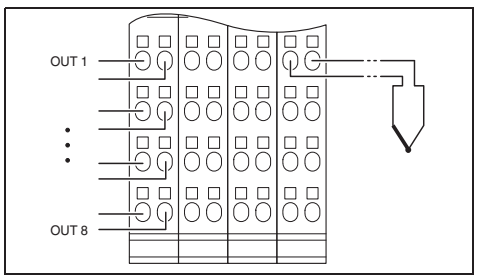


Type	Order No.	Pcs. / Pkt.
IB IL TEMP 4 UTH HEI 1 DO4-PAC[1])	**2819707**	1
IB IL TEMP 4 UTH HEI DO-2M-PAC	**2692267**	1
IB IL SCN-8	**2726337**	10
IB IL FIELD 8	**2727515**	10
ESL 62X46	**0809502**	5

Inline data jumper
24 V DC (via voltage jumper) 30 mA (maximum) 7.5 V DC (via voltage jumper) 150 mA (maximum)
2-wire (floating) L, J, K, N, S, R, T, C, D, E, B Depends on thermocouple 0.1 K 125 ms
8 24 V DC 70 mA (short circuit resistant)
122 g 48.8 mm 0°C ... 55°C

IB IL TEMP 8 UTH HEI 1 DO...-PAC

Inline Modular temperature recording terminal, process data multiplex, thermocouple inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements

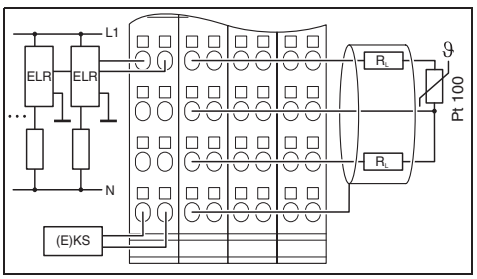


Type	Order No.	Pcs. / Pkt.
IB IL TEMP 8 UTH HEI 1 DO8-PAC[1])	**2819697**	1
IB IL TEMP 8 UTH HEI DO-2M-PAC	**2897062**	1
IB IL SCN-8	**2726337**	10
IB IL FIELD 8	**2727515**	10
ESL 62X46	**0809502**	5

Inline data jumper
24 V DC (via voltage jumper) 30 mA (maximum) 7.5 V DC (via voltage jumper) 150 mA (maximum)
2-wire (floating) L, J, K, N, S, R, T, C, D, E, B Depends on thermocouple 0.1 K 225 ms
8 24 V DC 70 mA (short circuit resistant)
122 g 48.8 mm 0°C ... 55°C

IB IL TEMP 6 RTD HEI 1 DO...-PAC

Inline Modular temperature recording terminal, process data multiplex, resistance thermometer inputs, binary outputs (24 V, 70 mA), 1 input for recording the total current of heating elements



Type	Order No.	Pcs. / Pkt.
IB IL TEMP 6 RTD HEI 1 DO6-PAC[1])	**2819684**	1
IB IL TEMP 6 RTD HEI DO-2M-PAC	**2897075**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL SCN-8	**2726337**	10
IB IL FIELD 8	**2727515**	10
ESL 62X46	**0809502**	5

Inline data jumper
24 V DC (via voltage jumper) 30 mA (maximum) 7.5 V DC (via voltage jumper) 150 mA (maximum)
3-wire (shielded) PT100 -200°C ... 850°C 0.1 K 175 ms
6 24 V DC 70 mA (short circuit resistant)
122 g 48.8 mm 0°C ... 55°C

Analog output terminals

These output terminals are used in applications in which analog actuators are to be addressed.

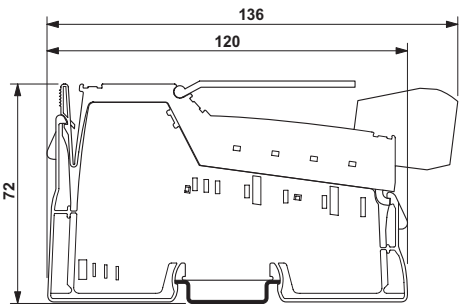
With these terminals, common current and voltage output ranges can be configured individually and channel-specifically. The analog signals are made available with a resolution of 16 bits. Each module is galvanically isolated from the supply voltage and the bus interface connection.

With Inline, all the analog current outputs are short-circuit proof.

The analog Inline output terminal IB IL AO 2/SF offers handling advantages such as "genuine" 4...20 mA outputs, which guarantee safe switch-on behavior. Separate contacts are available for 0...20 mA and the voltage output. Furthermore, the output behavior of this terminal can be parameterized, i.e. the output behavior in the event of a fault on the bus or in the control system can be predefined. The universal application capability is perfected by the fast reaction speed combined with a high degree of accuracy.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

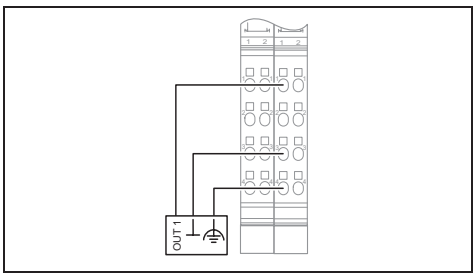
1) Note: The driver function blocks can be found on the Internet under www.phoenixcontact.de/eshop on the product site of the relevant module under the Download tab.



IB IL AO 1/...SF-PAC

Inline Modular analog output terminal,
output: 0-20 mA, 4-20 mA, 0-10 V, 2-wire connection method

Ex:



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline analog output terminal, complete with accessories (connector and labeling field)			
	IB IL AO 1/SF-PAC[1])	**2861315**	1
	IB IL AO 1/U/SF-PAC	**2861399**	1
- Transmission rate 2 Mbps			
Connector set	**IB IL AO/CNT-PLSET**	**2732664**	1
Shield connector for analog Inline terminal blocks			
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	IB IL AO 1/SF-PAC[1])	IB IL AO 1/U/SF-PAC
Local bus interface		
Type of connection	Inline data jumper	
Power supply for module electronics		
I/O supply voltage U_{ANA}	24 V DC	
Current consumption from U_{ANA}	Max. 65 mA	Max. 20 mA
Communications voltage U_L	7.5 V DC	
Current consumption from U_L	Max. 40 mA	
Analog outputs		
Connection method	2-wire (shielded)	
Number of outputs	1	
Voltage output signal	0 V ... 10 V	
Load/output load voltage output	> 2 kΩ	
Voltage output quantization	0.15 mV	
Current output signal	4 mA ... 20 mA / 0 A ... 20 mA	-
Load/output load current output	< 500 Ω	-
Quantization current output	0.24 µA	-
Characteristics		
Representation of output values	16 bits	
DAC resolution	16 bits	
Process data update	< 1 ms	
General data		
Weight	90 g	46 g
Width	24.4 mm	12.2 mm
Ambient temperature (operation)	-25°C ... 55°C	

IB IL AO 2/SF...-PAC

Inline Modular analog output terminal,
output: 0-20 mA, 4-20 mA, 0-10 V, 2-wire connection method

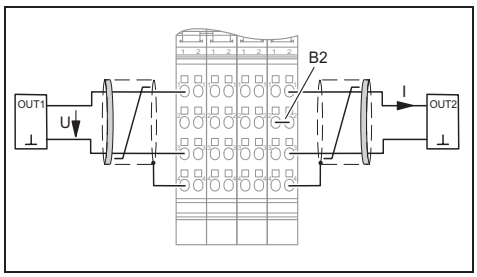
IB IL AO 2/U/BP-PAC

Inline Modular analog output terminal,
output: 0-10 V, ±10 V, 2-wire connection method

IB IL AO 4/8/U/BP...-PAC

Inline Modular analog output terminal,
output: 0-10 V, ±10 V, 2-wire connection method

Ex:



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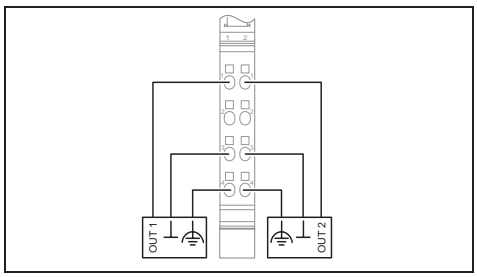

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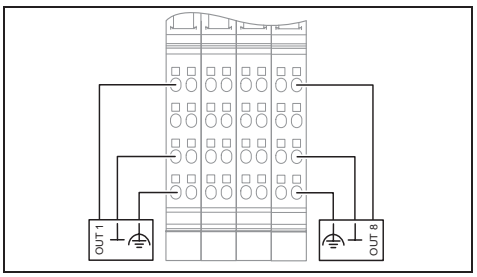


Type	Order No.	Pcs. / Pkt.
IB IL AO 2/SF-PAC[1])	**2863083**	1
IB IL AO 2/SF-2MBD-PAC[1])	**2862194**	1
IB IL SCN-6 SHIELD	**2726353**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL AO 2/U/BP-PAC[1])	**2861467**	1
IB IL SCN 6-SHIELD-TWIN	**2740245**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL AO 4/8/U/BP-PAC[1])	**2878036**	1
IB IL AO 4/8/U/BP-2MBD-PAC[1])	**2878052**	1
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper		
24 V DC Max. 95 mA 7.5 V DC Max. 45 mA		
2-wire (shielded) 2 0 V ... 10 V		
> 2 kΩ 2.441 mV 4 mA ... 20 mA / 0 A ... 20 mA < 500 Ω 0.53 µA		
16 bits 16 bits < 1 ms		
125 g 48.8 mm -25°C ... 55°C		

Inline data jumper		
24 V DC Max. 35 mA 7.5 V DC Max. 40 mA		
2-wire (shielded) 2 0 V ... 10 V / -10 V ... 10 V		
> 2 kΩ 0.33 mV - > 2 kΩ -		
16 bits 13 bits < 2 ms		
46 g 12.2 mm -25°C ... 55°C		

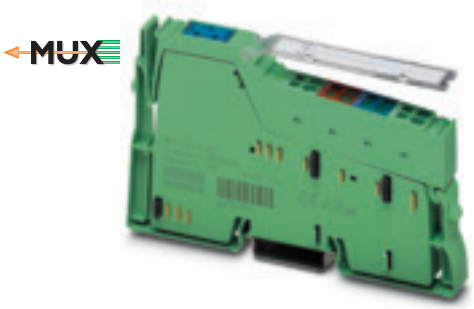
Inline data jumper		
24 V DC Typ. 72 mA 7.5 V DC Typ. 80 mA		
2-wire (shielded) 8 0 V ... 10 V / -10 V ... 10 V / 0 V ... 5 V / -5 V ... 5 V		
- 0.33 mV - > 2 kΩ -		
- - < 2 ms (depends on operating mode)		
215 g 48.8 mm -25°C ... 55°C		

Digital input terminals Machine Edition (ME)

The Inline ME versions (Machine Edition) are designed to be used in a space-saving and inexpensive way for example with machine applications if minimum connection technology is possible.

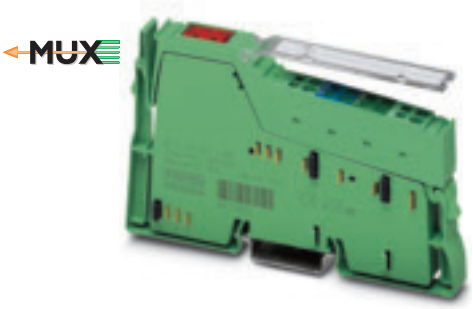
The digital Inline input terminal is designed for the connection of digital signals, such as are emitted from control switches, limit switches or proximity switches, and the digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

The digital ME variants are only available in packages of 4.



IB IL 24 DI ...-ME

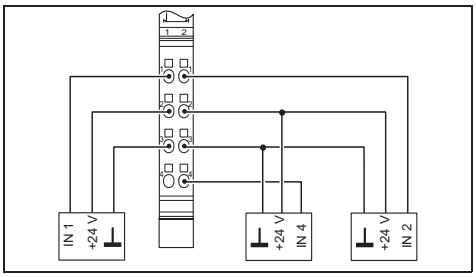
Inline Modular digital input terminal (Machine Edition), inputs: 24 V DC, 3-wire connection method



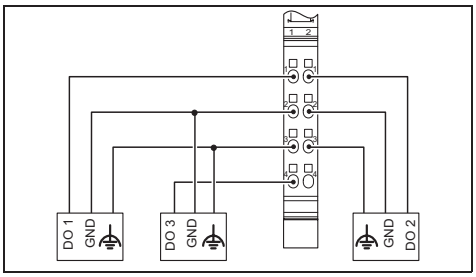
IB IL 24 DO ...-ME

Inline Modular digital output terminal (Machine Edition), outputs: 24 V DC, 3-wire connection method

Ex:



Ex:



Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Inline digital input terminal, Machine Edition variant, complete with accessories (connector and labeling field)						
- 4 inputs	**IB IL 24 DI 4-ME**	**2863928**	4			
- 16 inputs	**IB IL 24 DI 16-ME**	**2897156**	4			
Inline digital output terminal, Machine Edition variant, complete with accessories (connector and labeling field)						
- 4 outputs				**IB IL 24 DO 4-ME**	**2863931**	4
- 16 outputs				**IB IL 24 DO 16-ME**	**2897253**	4
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**			**ZBF...**		

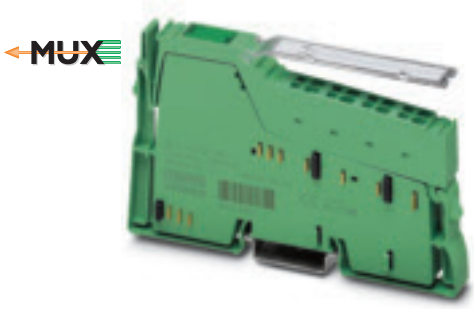
Technical data	IB IL 24 DI 4-ME	IB IL 24 DI 16-ME	IB IL 24 DO 4-ME	IB IL 24 DO 16-ME
Local bus interface				
Type of connection	Inline data jumper		Inline data jumper	
Power supply for module electronics				
Supply voltage	24 V DC (via voltage jumper)		24 V DC (nominal value)	
Range of supply voltages	19.2 V DC ... 30 V DC		19.2 V DC ... 30 V DC	
Supply current	40 mA		44 mA	90 mA
Digital inputs				
Type of connection	Spring-cage connection		-	
Connection method	3-wire		-	
Number of inputs	4	16	-	
Description of the inputs	EN 61131-2 type 1		-	
Typical response time	< 1 ms		-	
Digital outputs				
Type of connection	-		Spring-cage connection	
Connection method	-		2, 3-wire	
Number of outputs	-		4	16
Maximum output current per channel	-		500 mA	
General data				
Weight	44 g	122 g	44 g	130 g
Width	12.2 mm	48.8 mm	12.2 mm	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C		-25°C ... 55°C	

Analog input terminals Machine Edition (ME)

The IB IL AI 2/SF-ME analog input terminal provides, all common signals for current and voltage sensors, with a 12-bit resolution.

The IB IL AO 2/U/BP-ME analog output terminal provides the typical voltage signals 0 up to 10 V and ±10 V, also with a 12- or 13-bit resolution.

The analog ME variants can be individually ordered, unlike the digital ME variants.



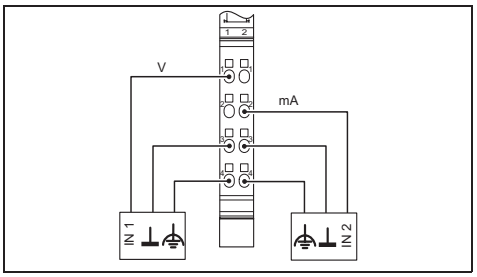
IB IL AI 2/SF-ME

Inline Modular analog input terminal (Machine Edition), inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V, 2-wire connection method

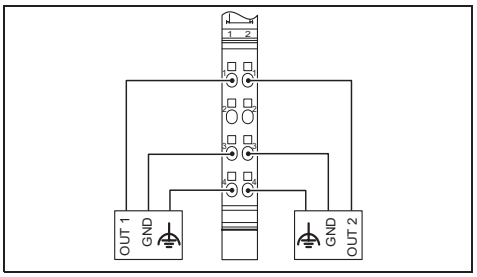
IB IL AO 2/U/BP-ME

Inline Modular analog output terminal (Machine Edition), outputs: 0-10 V, ±10 V, 2-wire connection method

Ex:



Ex:



Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Inline analog input terminal, Machine Edition variant, complete with accessories (connector and labeling field)	**IB IL AI 2/SF-ME**	**2863944**	1			
Inline analog output terminal, Machine Edition variant, complete with accessories (connector and labeling field)				**IB IL AO 2/U/BP-ME**	**2863957**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**			**ZBF...**		
Technical data						
Local bus interface						
Type of connection	Inline data jumper			Inline data jumper		
Power supply for module electronics						
I/O supply voltage U_{ANA}	24 V DC			24 V DC		
Current consumption from U_{ANA}	Max. 18 mA			Max. 35 mA		
Analog inputs						
Connection method	2, 3-wire			-		
Number of inputs	2			-		
Voltage input signal	-10 V ... 10 V (± 10 V) / 0 V ... 10 V			-		
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA			-		
Measured value resolution	13 bits (12 bits + sign)			-		
Process data update	< 1.5 ms			-		
Data formats	IL, IB ST, IBS RT, standardized display			-		
Analog outputs						
Connection method	-			2-wire		
Number of outputs	-			2		
Voltage output signal	-			-10 V ... 10 V / 0 V ... 10 V		
Measured value resolution	-			13 bits (12 bits + sign)		
Process data update	-			< 1 ms		
Data formats	-			IL, IB ST		
General data						
Weight	47 g			48 g		
Width	12.2 mm			12.2 mm		
Ambient temperature (operation)	-25°C ... 55°C			-25°C ... 55°C		

DALI master

In modern building projects, DALI is being used tendered more and more often for lighting controls.

Compared to the still widespread 1...10-V dimming interface, the user gets highly flexible light management that is configured via software. Functions such as "switch" and "dim" and status information are transmitted via DALI. This makes things very interesting for operators and maintenance technicians.

The DALI bus can be connected to Inline Modular via two communication terminals. The IB IL DALI/PWR-PAC terminal represents a DALI master, which provides both the DALI communication as well as the DALI bus supply without having to connect an external DALI power supply. This terminal can be easily expanded with up to three IB IL DALI-PACs, which each represent a different DALI master.

The PC WorX automation software contains a function block library (BACL_Light) for connecting to the DALI bus, which simplifies the programming and parameterization of the application program.

By combining hardware and software all DALI-specific functions can be addressed and called up.

Features:

– Up to 64 DALI devices per master terminal
– Safe electrical isolation of the DALI bus
– Protection of the DALI bus against unintentional mains voltage (up to 250 V AC) connection
– Communication via process data
– Diagnosis, transmitting and receiving display

EnOcean wireless receiver

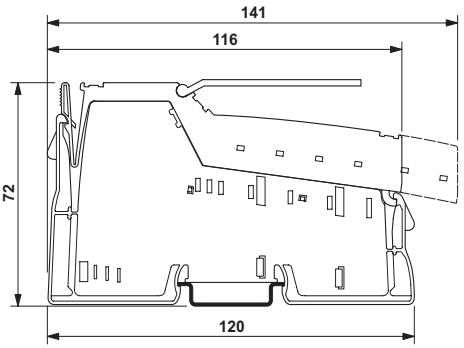
In modern applications, building work and building planning has to be implemented and completed in the shortest time possible. Due to the pressures of time and costs, new innovative solutions and products are gaining in popularity.

One of these innovations is battery-free wireless technology from EnOcean. Using this technology reduces building time and costs. The cables which can be omitted thanks to the wireless technology additionally minimize the fire load in the projects being realized.

The connection to EnOcean technology is realized with the wireless receiver SRC RS485 EVC. It receives wireless signals from the various sensors and transfers these to the control system.

The I/O station is connected using an RS-485 communication module (IB IL RS485/422-PRO; Order No. 2863627).

The PC WorX automation software contains a function block library (BACL_Light) for using this technology, which simplifies the programming and parameterization of the application program.



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description
1-channel DALI-master, complete with accessories (connector and labeling field) - Integrated DALI power supply unit - Extension for IB IL DALI/PWR-PAC
EnOcean wireless receiver for connection with IB IL RS 485/422-PRO-PAC

Technical data
Local bus interface
Type of connection
Power supply for module electronics
Supply voltage
Range of supply voltages
Current consumption from U_L
General data
Weight
Width
Ambient temperature (operation)

IB IL DALI/PWR-PAC

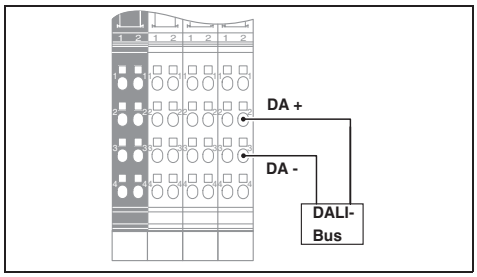
Inline Modular DALI master, with integrated DALI power supply unit, reliable electrical isolation

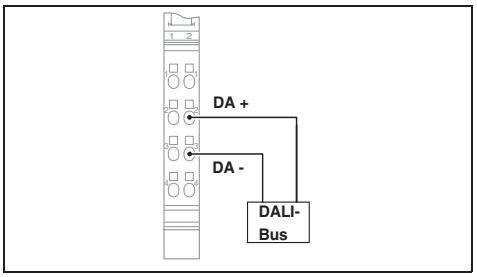
IB IL DALI-PAC

Inline Modular DALI master; extension for IB IL DALI/PWR-PAC

SRC-RS485 EVC

EnOcean wireless receiver for connection with IB IL RS 485/422-PRO-PAC





Type	Order No.	Pcs. / Pkt.
IB IL DALI/PWR-PAC	**2897813**	1

Type	Order No.	Pcs. / Pkt.
IB IL DALI-PAC	**2897910**	1

Type	Order No.	Pcs. / Pkt.
SRC-RS485 EVC	**2897237**	1

Inline data jumper	Inline data jumper	Screw connection
24 V DC (nominal value) 19.2 V DC ... 30 V DC ≤ 38 mA	24 V DC (nominal value) 19.2 V DC ... 30 V DC ≤ 38 mA	24 V DC (nominal value) 15 V DC ... 24 V DC -
194 g 48.8 mm -25°C ... 55°C	57 g 12.2 mm -25°C ... 55°C	- 70 mm -20°C ... 60°C

Communication terminals

An automation task involves a wide range of functions which must be integrated to form a solution. Inline function terminals make this extremely simple.

The serial Inline communication terminals IB IL RS 232 and IB IL RS 485/422 permit the fast and easy integration of scanners, barcode reading devices, scales and printers in production processes.

Data can be transmitted via the following protocols with the Inline communication terminals:

– Transparent protocol
– End-end protocol
– Dual-buffer protocol
– 3964R protocol
– XON/XOFF protocol
– Modbus/RTU(ASCII)
– MOVILINK® protocol

In this way, for example, parameterization records or text strings can be transmitted over the fieldbus without difficulty. Two words are available for each input and output data item in the PCP channel.

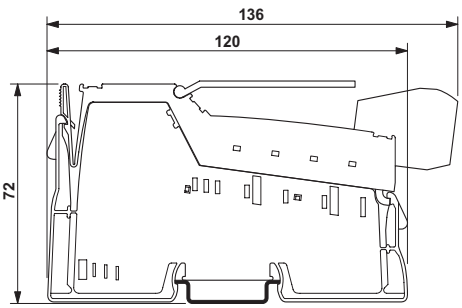
In the case of the IB IL RS 485/422 communication terminal, it is possible to select among two different operating modes for data transmission. If only one I/O device is connected, the full duplex mode (RS-422) must be set. An RS-485 network can be set up in half-duplex mode.

IB IL RS232-PRO and IB IL RS 485/422-PRO terminals represent special variants. The user data is communicated here solely over the process data channel. In this way, considerably faster transfer times can be attained even with smaller volumes of data.

The terminal is configured via the fieldbus. Parameters such as parity, data bits and stop bits can be set, as can the transmission speeds.

All communication terminals also have a 1 kB transmit buffer and a 4 kB receive buffer in which data is stored temporarily.

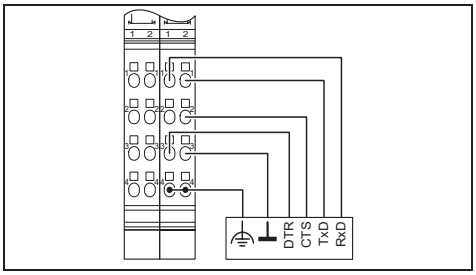
[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.



IB IL RS 232...-PAC

Inline Modular communication terminal, serial RS-232 input and output channel

Applied for: NV / BV



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline communication channel,, complete with accessories (connector and labeling field)			
	IB IL RS 232-PAC[1])	**2861357**	1
- Transmission rate 2 Mbps	**IB IL RS 232-2MBD-PAC[1])**	**2862084**	1
Connector set	**IB IL AO/CNT-PLSET**	**2732664**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Serial port	
Interface	Serial RS-232
Type of connection	Spring-cage connection
Power supply for module electronics	
I/O voltage	24 V DC (via voltage jumper)
Peripherals voltage range	19.2 V DC ... 30 V DC
Communications voltage U_L	7.5 V (via voltage jumper)
Current consumption from U_L	Typ. 155 mA
Serial input/output channel	
Input buffer	4 kByte
Output buffer	1 kByte
Transmission speed	110 bps ... 38400 bps (configurable)
Data bits	7 or 8
Stop bits	1 or 2
Parity	Even, odd or no parity
Transmission type	Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF
General data	
Weight	135 g
Width	24.4 mm
Ambient temperature (operation)	-25°C ... 55°C

IB IL RS 232-PRO-PAC

Inline Modular communication terminal,
serial RS-232 input and output channel
Straightforward process data communication

IB IL RS 485/422...-PAC

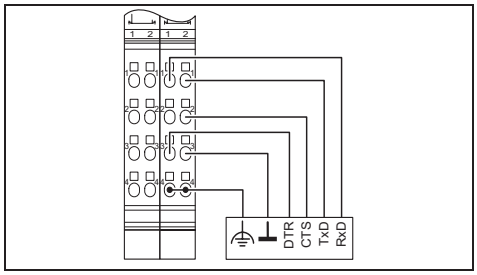
Inline Modular communication terminal,
serial RS-485/422 input and output channel

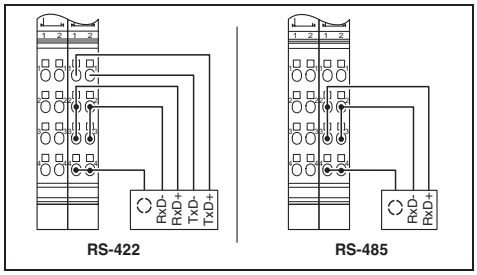
IB IL RS 485/422-PRO...-PAC

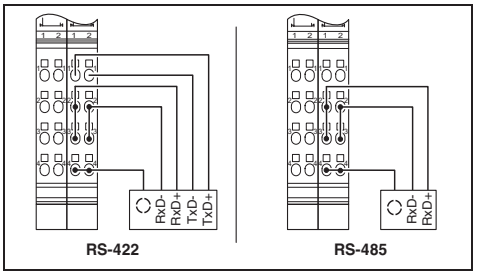
Inline Modular communication terminal,
serial RS-485/422 input and output channel
Straightforward process data communication

Applied for: BV

Applied for: NV / BV







Type	Order No.	Pcs. / Pkt.
IB IL RS 232-PRO-PAC[1])	**2878722**	1
IB IL AO/CNT-PLSET	**2732664**	1
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL RS 485/422-PAC[1])	**2861933**	1
IB IL RS 485/422-2MBD-PAC[1])	**2862097**	1
IB IL AO/CNT-PLSET	**2732664**	1
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL RS 485/422-PRO-PAC[1])	**2863627**	1
IB IL RS 485/422-PRO-2MBD-PAC[1])	**2878887**	1
IB IL AO/CNT-PLSET	**2732664**	1
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper	Inline data jumper	Inline data jumper
Serial RS-232	Either RS-485 half duplex or RS-422 full duplex (as alternative only)	Either RS-485 half duplex or RS-422 full duplex (as alternative only)
Spring-cage connection	Spring-cage connection	Spring-cage connection
24 V DC (via voltage jumper) -	24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC (including ripple)	24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC (including ripple)
7.5 V Typ. 155 mA	7.5 V (via voltage jumper) Typ. 170 mA	7.5 V (via voltage jumper) Typ. 170 mA
4 kByte 1 kByte 110 bps ... 38400 bps (configurable) 7 or 8 1 or 2 Even, odd or no parity Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF	4 kByte 1 kByte 110 bps ... 38400 bps (configurable) 7 or 8 1 or 2 Even, odd or no parity Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF, Modbus RTU / ASCII	4 kByte 1 kByte 110 bps ... 38400 bps (configurable) 7 or 8 1 or 2 Even, odd or no parity Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF, MOVILINK protocol
135 g 24.4 mm -25°C ... 55°C	135 g 24.4 mm -25°C ... 55°C	135 g 24.4 mm -25°C ... 55°C

IO-Link master

Sensors and actuators of the lowermost level are intelligent and capable of delivering a wide variety of information. What the various versions and interface technologies lacked so far was an economical solution for seamless communication with the lowermost field level.

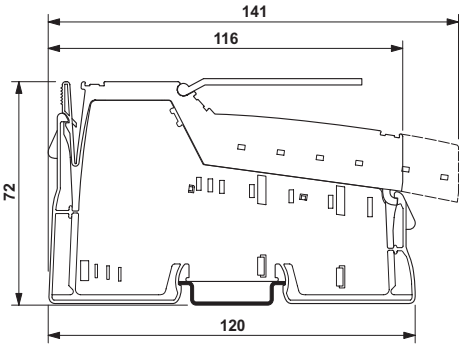
IO-Link is the new standard for communication with the lowermost field level and thus solves the "Problem of the last meter".

It is an economical solution for seamless communication with the lowermost field level, a fieldbus-independent communication interface for intelligent sensors and actuators.

The Inline Modular IO-Link Master enables the operation of IO-Link-compatible sensors and actuators (devices). It has four IO-Link ports of type A that can be operated with transmission rates COM1 (4.8 kBaud), COM2 (38.4 kBaud) and COM3 (230.4 kBaud). The IO-Link ports can also be used as standard inputs or standard outputs in the SIO mode.

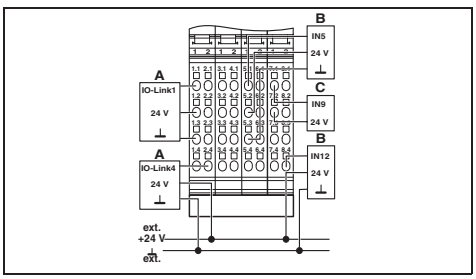
Moreover, 12 digital sensors with 2 or 3-wire connection method can be connected to the terminal block. Short connectors ensure less space requirement.

Diagnostics LEDs for the status of the sensor supply, the IO-Link ports and the digital inputs provide optimum on-site diagnostics.



IB IL 24 IOL 4 DI 12...-PAC

Inline Modular IO-Link master with four 4 IO-Link ports, inputs: 24 V DC, 2 and 3-wire connection method



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline IO-Link Master, complete with accessories (connector and labeling field)			
	IB IL 24 IOL 4 DI 12-PAC	**2692717**	1
- Transmission rate 2 Mbps	**IB IL 24 IOL 4 DI 12-2MBD-PAC**	**2692733**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Communications voltage U_L	7.5 V (via voltage jumper)
Current consumption from U_L	Max. 100 mA
Digital inputs	
Type of connection	Inline connectors
Connection method	2, 3-wire
Number of inputs	12
Description of the inputs	-
IO-Link ports	
Type of connection	Inline connectors
Connection method	2, 3-wire
Number of ports	4
IO-Link port supply	
Sensor supply voltage	min U_S -1 V
Nominal current for every IO-Link port	Max. 200 mA
Nominal current per device	Max. 800 mA
Digital inputs in the SIO mode	
Number of inputs	Max. 4
Input voltage	24 V DC
Input voltage range	0 V DC ... 30 V DC
Nominal input current	5.5 mA (for 24 V DC)
Current flow	Linear in the range of 0 V ...7 V, constant in the range of 7 V ...30 V
Signal delay	3 ms
Digital outputs in the SIO mode	
Number of outputs	Max. 4
Nominal output voltage	U_S -3 V (U_{OUT} at $I_{CQ} \leq 200$ mA)
Nominal current per channel	Max. 200 mA
Maximum total current consumption	Max. 800 mA
Protective circuitry	Short circuit protection Free-wheeling diode, integrated per channel
General data	
Weight	200 g
Width	48.8 mm
Ambient temperature (operation)	-25°C ... 55°C

Function terminals

An automation task involves a wide range of functions which must be integrated to form a solution. Inline function terminals make this extremely simple. Standard functions, such as counting, pulse width and frequency modulation as well as impulse-driven motor control, are available.

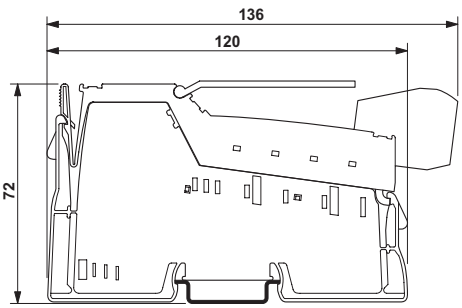
The Inline counter terminal IB IL CNT registers and processes quick pulse trains from sensors. It is fitted with a counter input, a control input, and a freely programmable switching output, which is set independently of the module. Fast response times can thus be attained, which are independent of the bus and control system.

The terminal can be operated in the modes for event counting, frequency measurement (time- or state-controlled), time measurement and pulse generation. Counter and control input signals can be selected to be either 5 V or 24 V. The switching output supplies a maximum current of 500 mA.

Function blocks are available for integrating the function terminals in PC Worx and STEP 7®. Detailed information can be found at: www.phoenixcontact.net/automation.

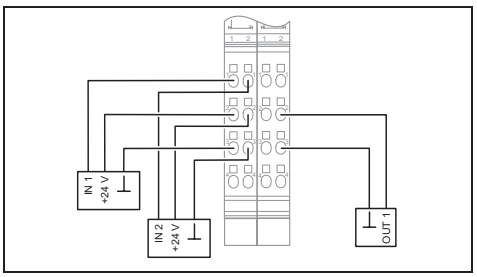
The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.



IB IL CNT...-PAC

Inline Modular counter terminal, counter input, control input, output: 24 V DC, 500 mA, 3-wire connection method



	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline counter terminal, complete with accessories (connector and labeling field)			
	IB IL CNT-PAC[1])	**2861852**	1
- Transmission rate 2 Mbps	**IB IL CNT-2MBD-PAC[1])**	**2862071**	1
Connector set	**IB IL AO/CNT-PLSET**	**2732664**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
I/O voltage	24 V DC (via voltage jumper)
Peripherals voltage range	19.2 V DC ... 30 V DC
Communications voltage U_L	7.5 V DC
Current consumption from U_L	Max. 50 mA
Counter input	
Operating modes	Event counting, frequency/time measuring, pulse generation
Input frequency	100 kHz
Input voltage	24 V DC / 5 V DC
Input current	5 mA (typical)
Control input	
Connection method	2, 3-wire
Input voltage	24 V DC / 5 V DC
Input current	5 mA (typical)
Digital outputs	
Number of outputs	1
Connection method	2-wire
Output voltage	24 V
Output current	500 mA
General data	
Weight	130 g
Width	24.4 mm
Ambient temperature (operation)	-25°C ... 55°C

Function terminals

An automation task involves a wide range of functions which must be integrated to form a solution. Inline function terminals make this extremely simple. Standard functions, such as counting, pulse width and frequency modulation as well as impulse-driven motor control, are available.

The Inline terminal IB IL PWM/2 offers, among other things, the capability of pulse width modulation (PWM) of the output signals. It features two independently operating channels. Each of the two output signals is available as a 5 V and as a 24 V signal.

Depending on the operating mode, either the pulse duration, the period duration, or the frequency can be set.

The following four operating modes are supported:

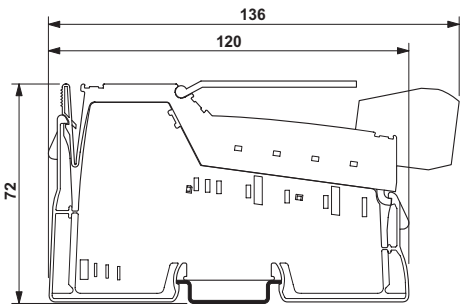
– Pulse width modulation (period duration adjustable from 100 µs to 10 s)
– Frequency outputs (frequency adjustable between 0 and 50 kHz)
– Single shot (pulse adjustable from 10 µs to 25.5 s)
– Pulse/direction signal output (without ramp functionality).

In the pulse/direction signal output operating mode, the terminal controls impulse-drive motors as well as all other drives that need this signal. The pulse frequency can be graded between 0 and 25.5 kHz.

Function blocks are available for integrating the function terminals in PC Worx and STEP 7®. Detailed information can be found at: www.phoenixcontact.net/automation.

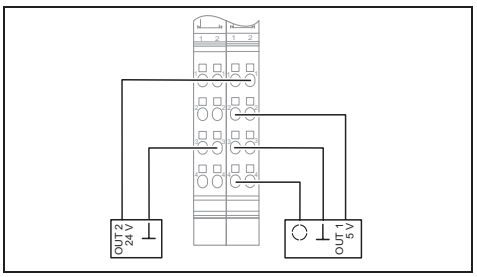
The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.



IB IL PWM/2-PAC

Inline Modular function terminal, pulse width and frequency modulation or impulse-driven motor control, output: 5 V or 24 V



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline function terminal, complete with accessories (connector and labeling field)			
	IB IL PWM/2-PAC[1])	**2861632**	1
Connectors	**IB IL SCN-8**	**2726337**	10
Shield connector	**IB IL SCN 6-SHIELD-TWIN**	**2740245**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
I/O voltage	24 V DC (via voltage jumper)
Peripherals voltage range	19.2 V DC ... 30 V DC
Communications voltage U_L	7.5 V (via voltage jumper)
Current consumption from U_L	Max. 130 mA
Digital outputs	
Number of outputs	2
Connection method	2-wire (shielded)
Output voltage	24 V / 5 V
Output current	10 mA (5 V); 500 mA (24 V)
General data	
Weight	130 g
Width	24.4 mm
Ambient temperature (operation)	-25°C ... 55°C

Position measurement terminals

Position measurement terminals are used for measuring positions (lengths) or angular positions in relative or absolute encoder systems, i.e. they read in position or angle information from incremental encoders with a rectangular signal or from absolute encoders with the SSI interface.

The IB IL INC-IN position measurement terminal is used to determine positions (lengths) or angular positions with relatively operating encoder systems, i.e., it reads position or angular information from incremental encoders with square-wave signals.

Incremental encoders with symmetrical (RS-422) or asymmetrical (4.5 - 30 V) square-wave signals (A, B, Z) can be connected to the terminal. Rotary transducers or linear measuring systems with or without a Z pulse can be read in.

In addition to the encoder interface, the terminal also features three digital 24 V inputs, one input for a reference switch and two inputs for limit position switches.

The IB IL INC-IN terminal measures the position values using a counter which counts upwards or downwards depending on the phase position of the A and B signals. If useful information is to be read out of the position counter after power-up, it must be set to zero at a particular point of the axis. The terminal requires a reference signal for this homing process. This signal can either be set via the bus or it can be supplied over one of the digital inputs. The signal on the reference switch input or one of the two limit position signals can be used for this purpose.

The accuracy of the homing function can be increased by selecting "Homing on edge at Z pulse input" on the terminal in addition to the function "Homing on switch edge". In the case of homing with a Z signal, it is important that a minimum distance be maintained between the position of the reference switch edge and the position of the edge at the Z input. The terminal outputs this distance at the end of homing.

The IB IL SSI-IN terminal reads the position values from the single-turn encoders exactly as it does from multi-turn encoders with an SSI interface. It supports both the Gray code as well as binary code, and it offers parity checks to check the received data as an option.

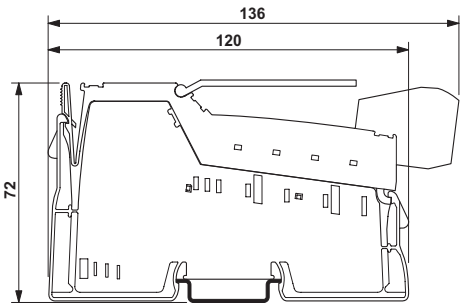
The resolution of the measurement and the transmission frequency can be adjusted and the terminal can therefore be perfectly adapted to different encoders.

Position recording with magnetostrictive encoders

The length measurement systems equipped with the start/stop interface that work as per the magnetostrictive path measurement procedure without contact (so-called micropulse/Temposonic® path recorder) provide information about the position by providing an echo on a trigger pulse of the terminal blocks whose runtime is proportional to the distance of the magnets from the system start. The terminal calculates the absolute position from the beginning of the scale with a resolution of 5 µm based on this information and the defined waveguide speed.

Scales of length with start/stop interface, e. g. from Balluff or MTS can be connected to the IB IL IMPULSE-IN terminal.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description
Inline position measurement terminal, complete with accessories (connector and labeling field)
- Transmission rate 2 Mbps
Connecting
Shield connector for analog Inline terminal blocks
Labeling area, width: 12.2 mm
Marking sheet
Flat-ribbon labeling (see CLIPLINE catalog)

Technical data
Local bus interface
Type of connection
Power supply for module electronics
Communications voltage U_L
Current consumption from U_L
Encoder supply voltage
Encoder supply current
Drawing encoder supply voltage
Drawing initiator supply
Absolute position encoder input
Number of inputs
Transmission frequency
Adjustable resolution
Incremental encoder input
Number of inputs
Description of the input
Input frequency (24 V)
Input for magnetostrictive encoders
Length measuring range
Ultra-sound speed (gradient)
Digital inputs
Number of inputs
Input voltage range "0" signal
Input voltage range "1" signal
General data
Weight
Width
Ambient temperature (operation)

IB IL INC-IN...-PAC

Inline Modular position measurement terminal,
Input for incremental encoder with rectangular signal (symmetrical or asymmetrical), digital inputs 24 V DC

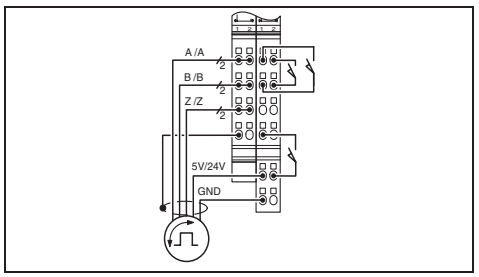
IB IL SSI-IN-PAC

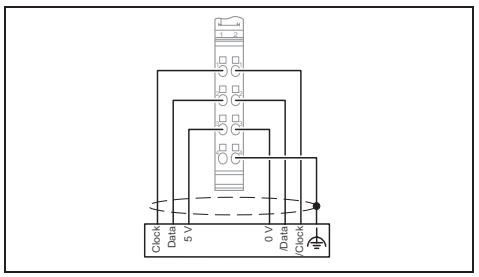
Inline Modular position detection terminal for absolute encoder,
Input for absolute rotation or travel measurement systems with SSI interface

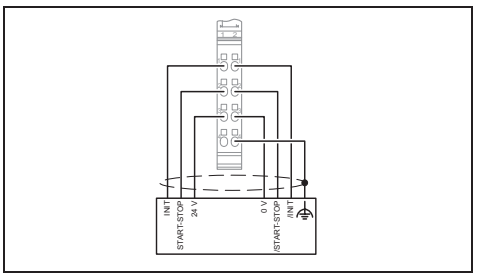
IB IL IMPULSE-IN...-PAC

Inline Modular position measurement terminal,
Input for magnetostrictive encoder with start/stop interface

Applied for: UL / CUL / UL-EX LIS / CUL-EX LIS







Type	Order No.	Pcs. / Pkt.
IB IL INC-IN-PAC[1])	**2861755**	1
IB IL INC-IN-2MBD-PAC[1])	**2819765**	1
IB IL SCN-12-ICP	**2727611**	10
IB IL SCN-6 SHIELD	**2726353**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		
Inline data jumper		
7.5 V (via voltage jumper)		
Max. 70 mA		
5 V DC / 24 V DC		
Max. 250 mA		
Main circuit U_M		
Main circuit U_M		
-		
-		
-		
1		
Symmetrical (RS-422) or asymmetrical (3.5 V to -27 V)		
0 Hz ... 300 kHz		
-		
-		
3		
-30 V DC ... 5 V DC		
15 V DC ... 30 V DC		
143 g		
24.4 mm		
-25°C ... 55°C		

Type	Order No.	Pcs. / Pkt.
IB IL SSI-IN-PAC[1])	**2819574**	1
IB IL SCN-6 SHIELD	**2726353**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		
Inline data jumper		
7.5 V (via voltage jumper)		
Max. 28 mA		
5 V DC		
Max. 250 mA		
Main circuit U_M		
-		
1		
100 kHz / 200 kHz / 400 kHz / 800 kHz / 1 MHz		
25 Bit (maximum)		
-		
-		
-		
-		
-		
-		
-		
-		
-		
71 g		
12.2 mm		
-25°C ... 55°C		

Type	Order No.	Pcs. / Pkt.
IB IL IMPULSE-IN-PAC[1])	**2861768**	1
IB IL IMPULSE-IN-2MBD-PAC[1])	**2819804**	1
IB IL SCN-6 SHIELD	**2726353**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		
Inline data jumper		
7.5 V		
Max. 70 mA		
24 V		
Max. 250 mA		
Main circuit U_M		
-		
1		
-		
-		
-		
-		
-		
> 0 mm ... 3850 mm (resolution: 5 µm)		
2500.00 m/s ... 2999.99 m/s (firmware 1.22 and higher)		
2750.00 m/s ... 2898.00 m/s (firmware 1.21 and higher)		
-		
-		
-		
71 g		
12.2 mm		
-25°C ... 55°C		

Positioning controllers

The IB IL INC and IB IL SSI positioning control systems are suitable for the point-to-point positioning method of binary-controlled drives (rapid/creeping speed), e.g. pole-changing AC motors, and support the positioning of rotary and linear axes.

Simple position tasks can be realized with this, such as the positioning of
– Transportation equipment
– Format adjustments (adjustable axes)
– Tools

It is not necessary to set control parameters here, which makes startup a lot easier and faster. After specifiying a target position, the terminal automatically (independently of the bus) takes over the drive control by specifying both the traversing rate (rapid/creeping speed) as well as the traversing direction via four binary outputs and signalizing when the target point has been reached.

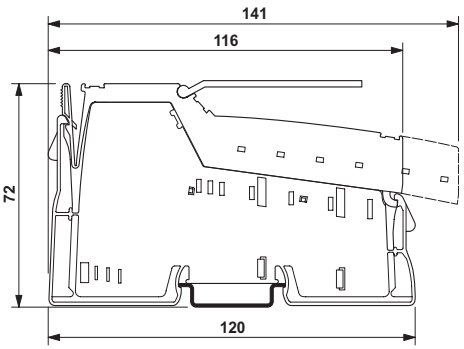
The position is measured at the IB IL INC terminal via symmetrical or asymmetrical incremental encoders with or without a Z track, and at the IB IL SSI terminal via absolute encoders with an SSI interface. The target position is either directly specified by the higher-level control system or up to two target positions are stored in the terminal which the module independently approaches after being called.

Three digital inputs are also available, which can be configured according to the application (e.g., for signaling a limit or reference point).

Integrated monitoring functions, both of the connected encoder as well as of the motion sequence, guarantee reliable operation. In addition, functions such as backlash and friction compensation ensure lasting positioning and repeat accuracy.

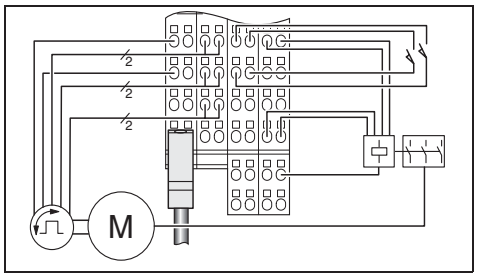
To assist startup, the hand-held operator panel mode can be used, which is activated via a special fourth digital input.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.



IB IL INC-PAC

Inline Modular positioning terminal, incremental encoder input, digital inputs 24 V DC, digital outputs 24 V DC, 500 mA



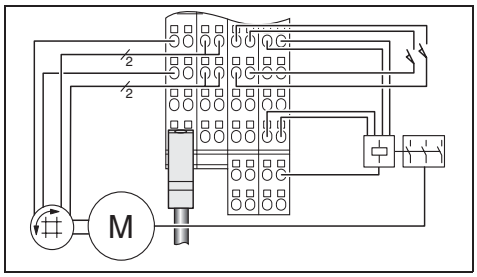
	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline positioning terminal, complete with accessories (connector and labeling field)	**IB IL INC-PAC**[1])	**2861849**	1
Inline positioning terminal, without accessories - Transmission rate 2 Mbps			
Connecting	**IB IL SCN-12-ICP**	**2727611**	10
Shield connector for analog Inline terminal blocks	**IB IL SCN-6 SHIELD**	**2726353**	5
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Communications voltage U_L	7.5 V (via voltage jumper)
Current consumption from U_L	Max. 110 mA
Encoder supply voltage	5 V DC (sym. / asym.) / 24 V DC (Only asymmetrical encoders)
Encoder supply current	500 mA
Drawing encoder supply voltage	Main circuit U_M
Drawing initiator supply	Main circuit U_M
Absolute position encoder input	
Number of inputs	-
Transmission frequency	-
Adjustable resolution	-
Incremental encoder input	
Number of inputs	1
Description of the input	Symmetrical (RS-422) or asymmetrical (4.5 V - 30 V)
Input frequency (24 V)	0 Hz ... 50 kHz (asymmetrical)
Input frequency (5 V)	0 kHz ... 500 kHz (symmetrical)
Digital inputs	
Number of inputs	4
Input voltage range "0" signal	-30 V DC ... 5 V DC
Input voltage range "1" signal	13 V DC ... 30 V DC
General data	
Weight	210 g
Width	48.8 mm

IB IL SSI...-PAC

Inline Modular positioning terminal, absolute encoder input, digital inputs 24 V DC, digital outputs 24 V DC, 500 mA



Type	Order No.	Pcs. / Pkt.
IB IL SSI-PAC[1])	**2861865**	1
IB IL SSI-2MBD	**2855729**	1
IB IL SCN-6 SHIELD	**2726353**	5
IB IL FIELD 2	**2727501**	10
ESL 62X10	**0809492**	1
ZBF...		

Inline data jumper
7.5 V (via voltage jumper) Max. 60 mA 5 V DC / 24 V DC
500 mA Main circuit U_M Main circuit U_M
1 400 kHz 26 Bit (maximum)
- - - -
4 -30 V DC ... 5 V DC 13 V DC ... 30 V DC
210 g 48.8 mm

Servo-amplifier for DC and EC motors

The Inline servo amplifier IB IL EC AR 48/10A is a universal power output stage for continuously excited DC motors with brushgears or electronic commutated up to 450 W power output.

The following operating modes have been integrated:

– Point-to-point positioning with position controller
– Speed setting
– Current control (torque control)

In point-to-point positioning mode, the servo amplifier operates with a position controller that has a cycle time of 1 ms.

The Inline servo amplifier is completely designed as a digital controller and has a switched-mode output stage with a 4-quadrant function.

The Inline servo amplifier operates completely digitally, so that all drive parameters and functions can be configured and checked via INTERBUS. As a result, there is no longer a need to operate any rheostats. The "DRIVECOM" communications protocol is used for selecting the operating mode and for parameterization.

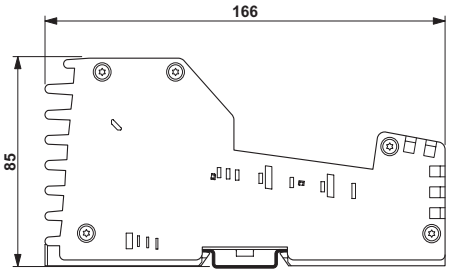
One feature of the Inline servo amplifier is that it enables simply controlled drives to be set up using inexpensive DC motors with and without brushgear. The features of the servo amplifier include simple handling without tools and reliable Inline connection technology.

The IB IL EC AR 48/10A can be operated on any controller as an independent servo amplifier for low-power drives. By simply aligning a positioning CPU, position measurement terminals and other digital and analog output terminals from the Inline kit, it can easily be expanded to form a modular positioning control system.

Visual status and diagnostic indicators make fast local fault diagnostic possible.

The IB IL EC AR 48/10A provides protection mechanisms against overload current, over and undervoltage and excessive temperature, as well as against short circuits occurring between motor cables or between motor cables and the voltage supply.

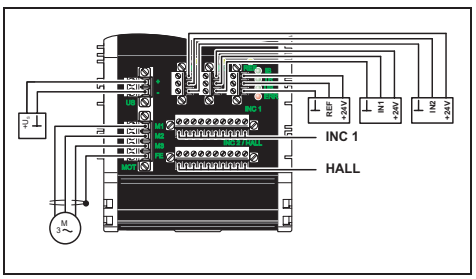
[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.



IB IL EC AR 48/10A-PAC

Servo modular amplifier for DC motors with brushgear and EC motors (without brushgear)

Applied for:
UL / CUL



	solid	stranded [mm²]	AWG
Connection data Front MSTB			
Screw connection	0.2-2.5	0.2-2.5	24-12
Connection data Front MC			
Screw connection	0.14-2.5	0.2-2.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline servo amplifier, incl. connector			
- For DC motors with brushgear and EC motors (without brushgear)	**IB IL EC AR 48/10A-PAC**[1])	**2819587**	1
Startup and diagnostic software, including cable for connecting to the RS-232 interface of a PC	**EC AR CAB SW TOOL**	**2819545**	1
Connector set, including shield connection clamps	**IB IL ECAR-PLSET**	**2819561**	1

Technical data	
Interface	
Inline local bus	Inline data jumper
Startup and diagnostics	RS-232
Power supply for module electronics	
Communications voltage U_L	7.5 V DC (via voltage jumper)
Current consumption from U_L	Typ. 30 mA
Power supply	
Type of connection	2-pos. COMBICON connector
Range of supply voltages	U_S 12 V DC ... 48 V DC ±15% (Surge voltage shutdown U_S > 60 V DC)
Motor output	
Output name	1 permanently excited DC motor with or without brushgear
Type of connection	4-pos. COMBICON connector with shield connection clamp
Nominal current range	Max. 10 A (Starting/continuous current)
Nominal motor power	450 W (Power consumption)
Function	4 quadrant servo controller
Incremental encoder input	
Symmetrical incremental encoders	
Input frequency (5 V)	Max. 1 MHz
Asymmetrical incremental encoders	
Input frequency (5 V) / Input frequency (24 V)	Max. 500 kHz (At 4 V voltage level) / Max. 100 kHz (At 20 V voltage level)
Digital inputs	
Number of inputs	3
Type of connection	MINI COMBICON
Connection method	3-wire (Signal, Us, GND)
General data	
Weight	880 g
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529
Width	97.6 mm
Ambient temperature (operation)	-25°C ... 55°C

Servo amplifier for DC motors

Inline servo amplifier IB IL DC AR 48/10A is a universal speed or torque controller with a power output stage for permanently-excited DC motors with brushes and a power output up to 450 W.

The following operating modes have been integrated:
– Speed control with IxR compensation
– Current control (torque control)

The Inline servo amplifier is fully designed to the full as a digital controller and offers a switched-mode output stage with a 4-quadrant function.

The Inline servo amplifier operates completely digitally, so that all drive parameters and functions can be configured and checked via INTERBUS. As a result, there is no longer a need to operate any rheostats. The "DRIVECOM" communications protocol is used for selecting the operating mode and for parameterization.

One feature of the Inline servo amplifier is that it enables simply controlled drives to be set up using inexpensive DC motors with brushgear. The features of the servo amplifier include simple handling without tools and reliable Inline connection technology.

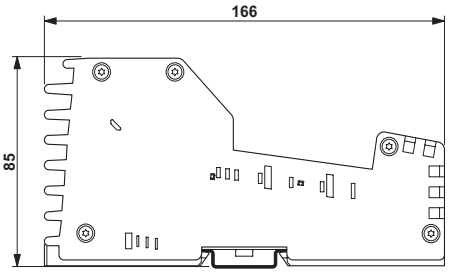
The IB IL DC AR 48/10A can be operated on any controller as an independent servo amplifier.

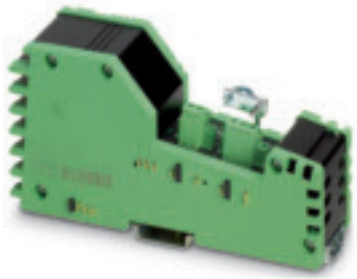
The IB IL DC AR 48/10A can easily be extended to create a modular positioning system by simply aligning a positioning CPU, position measurement terminals and other digital and analog output terminals.

Visual status and diagnostic indicators make fast local fault diagnostic possible.

The IB IL DC AR 48/10A provides protection mechanisms against overload current, over and undervoltage and excessive temperature, as well as against short circuits occurring between motor cables or between motor cables and the voltage supply.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.

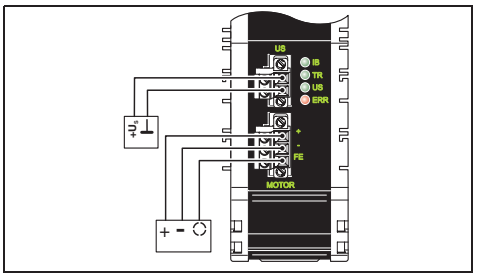




IB IL DC AR 48/10A

Inline Modular servo amplifiers with brushgear for DC motors

Applied for: UL / CUL



	solid [mm²]	stranded [mm²]	AWG
Connection data Front MSTB			
Screw connection	0.2-2.5	0.2-2.5	24-12

Description	Type	Order No.	Pcs. / Pkt.
Inline servo amplifier, incl. connector			
- For DC motor with brushgear	**IB IL DC AR 48/10A[1])**	**2819286**	1
- For DC motors with brushgear, 2 Mbps transmission speed	**IB IL DC AR 48/10A-2MBD-PAC[1])**	**2897677**	1
COMBICON connectors with screw flange and front connection method	**FRONT-MSTB 2,5/ 2-STF**	**1779644**	50
COMBICON connectors with screw flange and front connection method	**FRONT-MSTB 2,5/ 3-STF**	**1779657**	50
Shield connection clamp for IB IL DC AR 48/10A	**IBS IL AR MOTOR SHIELD**	**2819480**	10

Technical data	
Interface	
Inline local bus	Inline data jumper
Power supply for module electronics	
Communications voltage U_L	7.5 V DC (via voltage jumper)
Current consumption from U_L	Typ. 45 mA
Power supply	
Type of connection	2-pos. COMBICON connector
Range of supply voltages	U_S 12 V DC ... 48 V DC ±15% (Surge voltage shutdown U_S > 60 V DC)
Motor output	
Output name	1 permanently excited DC motor with brushgear
Type of connection	3-pos. COMBICON connector with shield connection clamp
Nominal current range	Max. 10 A (Starting/continuous current)
Nominal motor power	450 W (Power consumption)
Function	4 quadrant servo controller
General data	
Weight	460 g
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529
Width	48.6 mm
Ambient temperature (operation)	-25°C ... 55°C

Power-level terminals

Asynchronous motors with outputs up to 1.5 kW are usually adequate for conveyor systems in factory automation. The Inline system even offers motor starters as powerful as 4 kW for these applications.

Inline power-level terminals are compact control devices for the direct switching, protection and monitoring of standard three-phase motors via the fieldbus.

The features of these power-level terminals are simple, tool-free handling and power routing, coupled with the tried and tested pluggable connection method.

The terminal product range includes electronic direct and reversing starters, as well as an electromechanical direct starter version.

All the power-level terminals offer monitoring of mechanical functions based on motor current monitoring in addition to protection through overspeed tripping.

The motor current parameters are set in the nominal current ranges from 0.1 A to 3 A or 0.1 A to 8 A via the fieldbus.

Additional features include:

– Mains voltage up to 600 V AC 3~ with the mechanical variant
– Nominal output capacity: electronic variant 0.1 kW to 1.5 kW, electromechanical variant 0.1 kW to 3.7 kW
– Manual on-site operation via operator panel (without bus) to "run in" sensors during subsystem construction is possible
– Brake function can be added as an option; can be plugged as a module onto any motor starter
– Thermal motor monitoring using alignable Inline thermistor terminal.

Function blocks are available for integrating the above-mentioned power-level terminals in PC Worx and Step7®. Detailed information can be found at: www.phoenixcontact.net/automation.

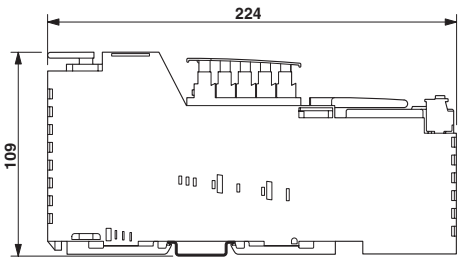
Inline brake modules

The Inline brake modules extend the functionality of the Inline power-level terminals by the ability to control motor brakes. There are two variants available for this.

The IB IL 24 BR/DC with a polarized semiconductor output up to 30 V DC and a maximum switching current of 3 A controls 24 V DC brakes.

The IB IL 400 BR is equipped with a non-polarized semiconductor output and is used to control AC or DC brakes. In this case, the module is either connected to the AC circuit (before the brake rectifier) or to the DC circuit (after the brake rectifier) for fast braking.

Both modules are simply snapped onto the Inline power-level terminals in order to connect them to the Inline station.



	solid	stranded	
	[mm²]		AWG
Connection data Motor circuit connector			
Screw connection	0.2-1.5	0.2-1.5	24-16

Description
Inline power-level terminal blocks, incl. motor circuit connector
- Electronic direct starter
- Electronic reversing load starter
- Electromechanical direct starter
Inline power-level terminal, incl. motor-circuit connector, transmission rate 2 Mbps
- Electronic direct starter
- Electronic reversing load starter
- Electromechanical direct starter
Inline brake module, for brake control in connection with Inline power-level terminals
- For 24 V DC brakes
- For 440 V AC/DC brakes
Hand-held operator panel, for motor starters and variable frequency drives
Power connector
Power bridge
Motor circuit connector
Labeling area, width: 48.8 mm
Marking sheet
Flat-ribbon labeling (see CLIPLINE catalog)

Technical data
Interface
Inline local bus
Power supply for module electronics
Communications voltage U_L
Current consumption from U_L
Motor starter, output
Type of connection
Output voltage range
Nominal current range
Phase angle
Switching rate
Motor monitoring
Parameterization range
Tripping class
Overspeed tripping
Output
Maximum switching voltage
Max. switching current
Switch-off delay
Switch-on delay
General data
Weight
Degree of protection
Width

IB IL 400 ELR ...-3A...

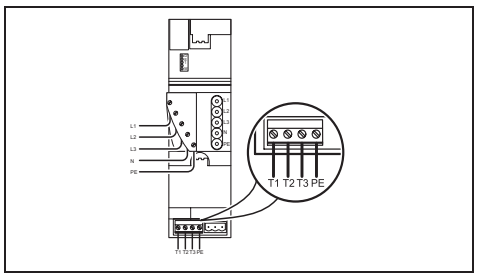
Inline Modular power-level terminal, electronic direct or reversing starter, up to 1.5 kW/400 V AC

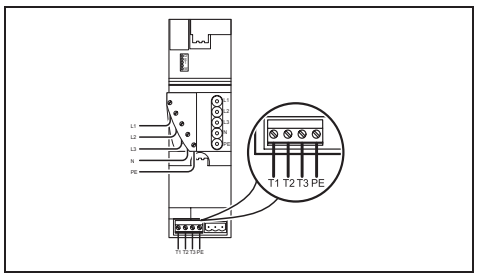
IB IL 400 MLR 1-8A...

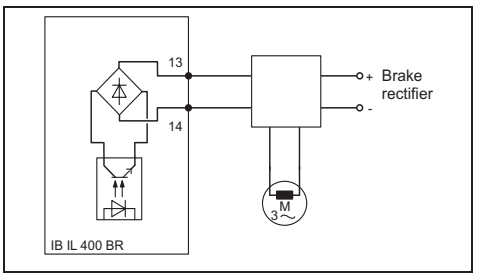
Inline Modular power-level terminal, electronic direct starter, up to 3.7 kW / 400 V AC

IB IL ... BR...

Extension module, for brake control in connection with Inline Modular power-level terminals







Type	Order No.	Pcs. / Pkt.
IB IL 400 ELR 1-3A	**2727352**	1
IB IL 400 ELR R-3A	**2727378**	1
IB IL 400 ELR 1-3A-2MBD	**2855525**	1
IB IL 400 ELR R-3A-2MBD	**2855130**	1
IBS HVO	**2836052**	1
IB IL 400 CN-PWR-IN	**2836078**	1
IB IL 400 CN-BRG	**2836081**	1
GMVSTBW 2,5 HV/ 4-ST-7,62 NZIL	**1893957**	10
IB IL FIELD 8	**2727515**	10
ESL 62X46	**0809502**	5
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL 400 MLR 1-8A	**2727365**	1
IB IL 400 MLR 1-8A-2MBD	**2855428**	1
IBS HVO	**2836052**	1
IB IL 400 CN-PWR-IN	**2836078**	1
IB IL 400 CN-BRG	**2836081**	1
GMVSTBW 2,5 HV/ 4-ST-7,62 NZIL	**1893957**	10
IB IL FIELD 8	**2727515**	10
ESL 62X46	**0809502**	5
ZBF...		

Type	Order No.	Pcs. / Pkt.
IB IL 24 BR/DC	**2742036**	1
IB IL 400 BR	**2727394**	1

			IB IL 24 BR/DC	IB IL 400 BR
Inline data jumper	Inline data jumper		-	-
7.5 V	7.5 V		-	-
Max. 45 mA	Max. 45 mA		-	-
(3-phase), via COMBICON	(3-phase), via COMBICON		-	-
200 V AC ... 400 V AC (50 Hz ... 60 Hz)	200 V AC ... 600 V AC (50 Hz ... 60 Hz)		-	-
0.2 A ... 3.6 A	0.2 A ... 8 A		-	-
cos φ ≥ 0.3	cos φ ≥ 0.3		-	-
Max. 30 per minute (observe derating)	Max. 5 cycles per minute		-	-
0.2 A ... 3.6 A (steps of 50/100/200 mA, via fieldbus)	0.2 A ... 8 A (steps of 50/100/200 mA, via fieldbus)		-	-
Based on class 10 A of IEC 60947-4: 1990	Based on class 10 A of IEC 60947-4: 1990		-	-
≥ 20 A (after 0.3 seconds)	≥ 40 A (after 0.3 seconds)		-	-
-	-		31 V DC	440 V AC/DC
-	-		3 A DC	300 mA AC/DC
-	-		< 15 ms	< 1 ms
-	-		< 2 ms	< 4 ms
450 g	550 g		-	-
IP20 in acc. with IEC 60529	IP20 in acc. with IEC 60529		-	-
63 mm	63 mm		55 mm	55 mm

Safety terminal

Operational safety of machinery and systems is becoming increasingly important. The safety terminals in the Inline system are integrate conventional safety engineering in a modular automation system.

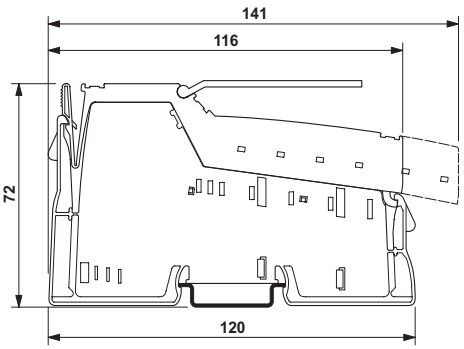
Inline safety terminals fulfill the requirements for protection according to category 4 (as per EN954-1) or PLe (as per ISO 13849) and enable the direct connection of EMERGENCY STOP, safety door and switching mat. They are responsible for fail-safe isolation of the downcircuit 24 V Inline system segment circuit and send a status message regarding the EMERGENCY STOP inputs to the control system.

The fail-safe segment circuit starts at terminal IB IL SAFE 1 and ends at the final terminal before a new line entry or at the end of the station. The respective wiring of the Inline SAFE 1 determines which safety category is attained by the module.

The principle of the safety switch-off is as follows: When the input circuit opens, the safety contacts also open and there is a fail-safe switch off of the following segment circuit of the Inline system. Only Inline terminals, which are specifically approved for this safety-related segment circuit, are to be used. A current list of the enabled terminals can be found on the data sheet for the IB IL 24 SAFE 1.

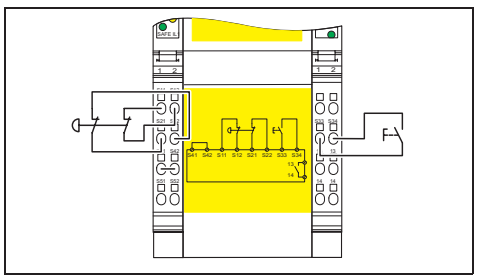
Standards and approvals

The relevant approvals can be viewed on the Internet at www.phoenixcontact.com. Nationally valid and non-harmonized standards are available on request.



IB IL 24 SAFE 1-PAC

Inline Modular safety terminal,
2 N/O contacts, 24 V DC



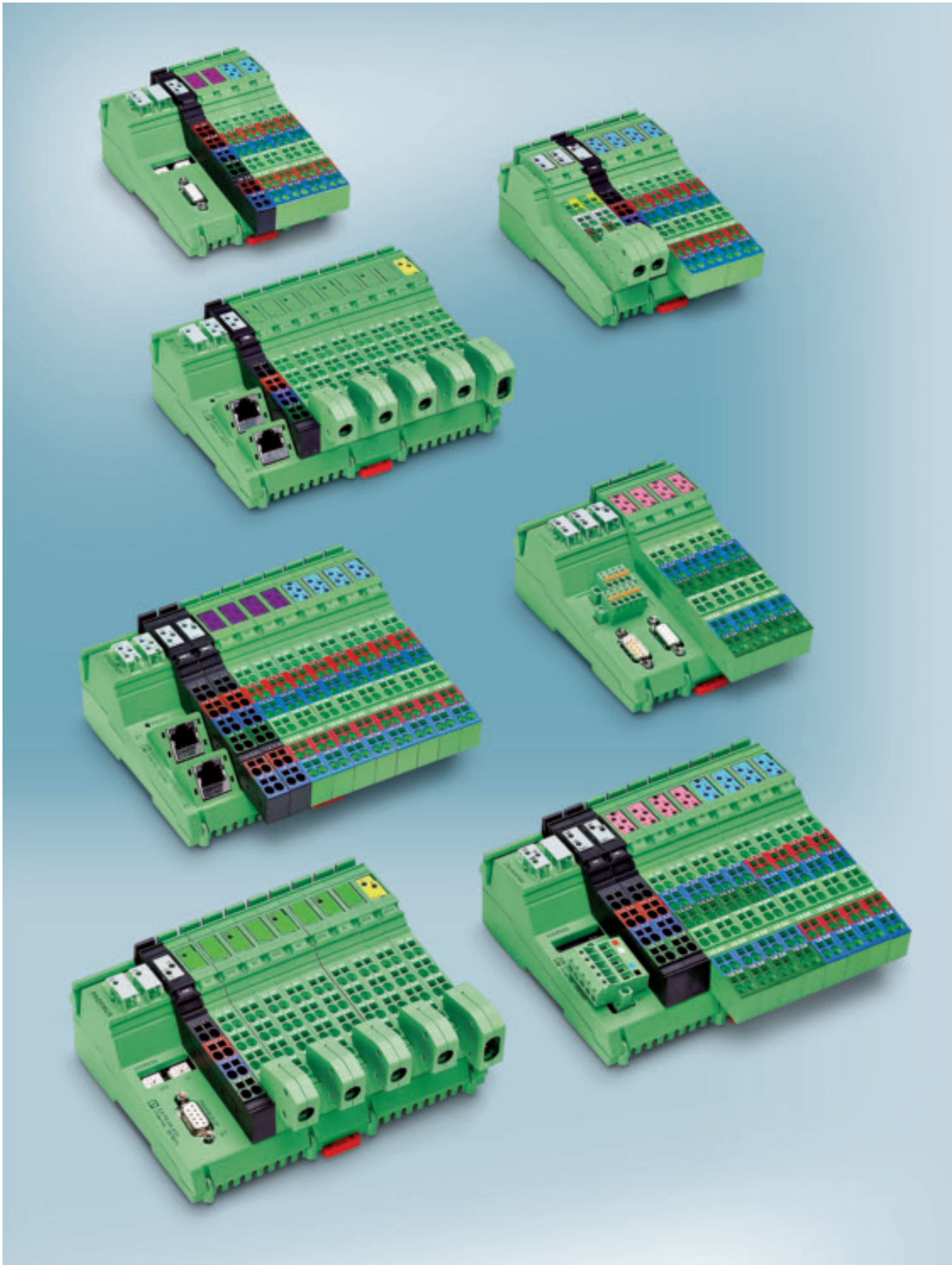
	solid [mm²]	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline safety terminal, complete with accessories (connector and labeling field)	**IB IL 24 SAFE 1-PAC**	**2861564**	1
Connector set	**IB IL SAFE1-PLSET**	**2740805**	1
Labeling area, width: 12.2 mm	**IB IL FIELD 2**	**2727501**	10
Marking sheet	**ESL 62X10**	**0809492**	1
Flat-ribbon labeling (see CLIPLINE catalog)	**ZBF...**		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Supply	
I/O voltage U_M	24 V DC (on S11, S21, S41; supply from: main circuit)
Type of connection	Through the potential jumper
Peripherals voltage range	20.4 V DC ... 27.6 V DC (including ripple)
I/O current	Max. 75 mA (HW 01)
Communications voltage U_L	7.5 V (via voltage jumper)
Current consumption from U_L	Max. 35 mA
Relay contact data	
Contact type	2 N/O contacts
Type of contact	Positively driven
Switching voltage	24 V DC
Switching current	4 A (for 24 V DC)
Switching capacity	120 W
Min. switching current	100 mA
Release time	< 20 ms
General data	
Weight	250 g
Width	73 mm
Ambient temperature (operation)	-25°C ... 55°C

Safety note

The user documentation applicable to the product in question, particularly with respect to the safety instructions listed, is binding for project planning and designated use of Phoenix Contact safety products.



I/O systems in the IP20 control cabinet | Inline Block IO

Compact for high number of channels in minimum space

Inline Block IO comprises compact I/O components. The product range provides digital and analog inputs and outputs. A variation of channel types is possible using different modules. 16 or 32 channel modules are available. The function of channels is freely selectable in the case of some modules.

Connection to international standards

Inline Block IO can be connected to internationally standardized fieldbus systems and industrial Ethernet protocols:

- PROFINET IO
- Ethernet TCP/IP
- INTERBUS
- PROFIBUS
- DeviceNet™
- CANopen
- Sercos III

There is also an option of wireless transmission via Bluetooth.

Program overview

Compact design

Inline Block IO is characterized by its compact and 55 mm flat design that is ideal for use in terminal boxes.

The two different housing types come in two design widths: 95 mm for 16 channels and 156 mm for 32 channels.

Comprehensive functions

Specific digital input and output modules as well as different input and output combinations are available in one device. The analog I/O modules complete the range.

The channel functions can even be freely selected in some devices. And this all by simply connecting the sensor or actuator.

Quick and easy installation

The spring-cage type design of terminal points allows easy and quick installation since the connection level is easily accessible and not covered by housing parts.

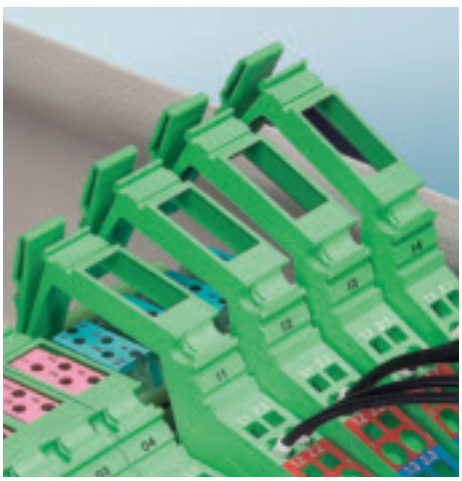
Connection using 2 and 3-wire technology

The sensors and actuators can be connected with 2 and 3-wire technology, which means that further jumpering levels are not required.

There is also an option of connecting sensors with 4-wire technology in analog modules.

Easy-to-maintain wiring

The Inline Block IO modules are wired using the proven Inline connectors. The connectors can be disconnected from the modules without the wiring having to be removed. This increases the servicing convenience and reduces downtimes.



PROFINET Ethernet

PROFIBUS PROCESS FIELD BUS

INTERBUS

DeviceNet™

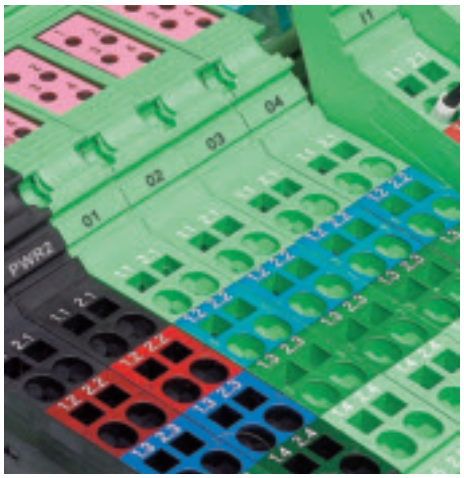
CANopen

Bluetooth™

SERCOS interface

Clear connection levels

With Inline Block IO, the different potential ranges are visually separated from one another by clear color-coding. This thus makes it possible for the user to detect where minus and plus potentials are connected and where the I/O signals are during the installation. This increases clarity and minimizes wiring errors.



Separate module, sensor and actuator supply

Voltages for logic as well as sensor and actuator systems can be connected using separate contacts. This makes it possible, for example, to switch off the power supply of the actuator system without affecting the sensor supply.

Moreover, the sensor supply is protected against short circuit and overload with the help of internal preventive measures. The same holds true for the outputs with all Inline Block IOs.

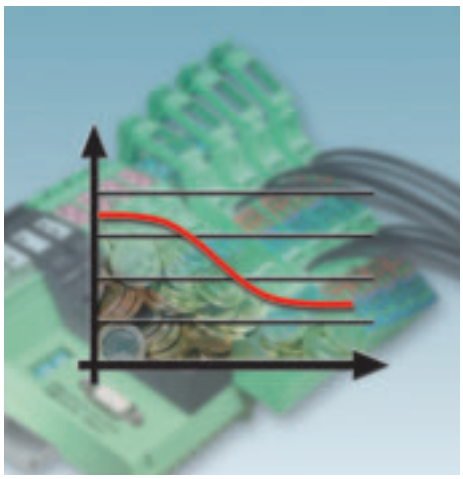
Optical diagnostics on site

Further support is provided by the color-coded LED fields. The observer on site can see at a glance which input/output functions the module provides via the individual connectors.

During maintenance, easy to read display elements help to locate and eliminate a malfunction quickly.

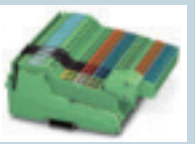
Saving costs

Inline Block IO has been tailored for standard I/O signals. In system parts with a low number of I/Os, the Inline Block IO provides a good price/performance ratio and is cost-effective.



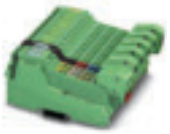
General technical data

Ambient conditions	
Ambient temperature (operation)	-25°C to +60°C
Ambient temperature (storage/transport)	-25°C to +85°C
Humidity (operation)	85% (no condensation)
Humidity (storage/transport)	95%
Vibration as per IEC 60068-2-29	5g
Shock as per IEC 60068-2-27	25g
Electromagnetic compatibility	
Immunity to interference	EN 61000-6-2
Noise emission	EN 61000-6-4
Supply voltage	
Nominal value	24 V DC
Permissible range	19.2 V to 30.0 V
Ripple	±5% as per EN 61131-2

	Digital input		Digital output		Digital input and output	
	16 channels	32 channels	16 channels	32 channels	8/8 channels	16/16 channels
Bus connection with Inline -connector						
Type **Order No.**	**ILB IB 24 DI16** **2862330**	**ILB IB 24 DI32** **2862343**	**ILB IB 24 DO16** **2862356**	**ILB IB 24 DO32** **2862369**	**ILB IB 24 DI 8 DO 8** **2862372**	**ILB IB 24 DI16 DO16** **2862385**
Description	16 inputs, 24 V DC, 2 and 3-wire connection	32 inputs, 24 V DC, 2 and 3-wire connection	16 outputs, 24 V DC, 500 mA, 2 and 3-wire connection	32 outputs, 24 V DC, 500 mA, 2 and 3-wire connection	8 inputs and 8 outputs, 500 mA, 24 V DC, 2 and 3-wire connection	16 inputs and 16 outputs, 500 mA, 24 V DC, 2 and 3-wire connection
Page	322	322	323	323	323	323
Bus connection via D-SUB-connector						
Type **Order No.**	**ILB IB 24 DI16-DSUB** **2878421**		**ILB IB 24 DO16-DSUB** **2878528**			**ILB IB 24 DI16 DO16-DSUB** **2878625**
Description	16 inputs, 24 V DC, 2 and 3-wire connection		16 outputs, 24 V DC, 500 mA, 2 and 3-wire connection			16 inputs and 16 outputs, 500 mA, 24 V DC, 2 and 3-wire connection
Page	322		323			323
Bus connection via D-SUB connector						
Type **Order No.**		**ILB PB 24 DI32** **2862398**		**ILB PB 24 DO32** **2862408**	**ILB PB 24 DI8 DIO8** **2863562**	**ILB PB 24 DI16 DO16** **2862411**
Description		32 inputs, 24 V DC, 2 and 3-wire connection		32 outputs, 24 V DC, 500 mA, 2 and 3-wire connection	8 inputs and 8 inputs or outputs (as required), 500 mA, 24 V DC, 2 and 3-wire connection	16 inputs and 16 outputs, 500 mA, 24 V DC, 2 and 3-wire connection
Page		324		325	325	325

	Digital input and output		Digital input and output		Digital input and output	
		16/16 channels		16/16 channels		16/16 channels
Ethernet connection via RJ45 connector			Bus connection with TWIN COMBICON connector		Bus connection via D-SUB connector	
Type **Order No.**		**ILB PN 24 DI16 DIO16-2TX** **2878146**		**ILB DN 24 DI16 DO16** **2862602**		**ILB CO 24 DI16 DO16** **2862592**
Description		16 inputs and 16 inputs or outputs (as required), 500 mA, 24 V DC, 2 and 3-wire connection		16 inputs and 16 outputs, 500 mA, 24 V DC, 2 and 3-wire connection		16 inputs and 16 outputs, 500 mA, 24 V DC, 2 and 3-wire connection
Page		318		325		321
Ethernet Ethernet connection via RJ45 connector			SERCOS interface Ethernet connection via RJ45 connector			
Type **Order No.**		**ILB ETH 24 DI16 DIO16-2TX** **2832962**		**ILB S3 24 DI16 DIO16-2TX** **2897570**		
		16 inputs and 16 inputs or outputs (as required), 500 mA, 24 V DC, 2 and 3-wire connection		16 inputs and 16 inputs or outputs (as required), 500 mA, 24 V DC, 2 and 3-wire connection		
Page		319		320		

Analog input and output

	4/2 channels
Bus connection with Inline -connector	
Type **Order No.**	**ILB IB AI4 AO2** **2878777**
Description	4 inputs, 2, 3 and 4-wire connection, 2 outputs, 2-conductor connection, 0 to 5 V, 0 to 10 V, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA, ±20 mA
Page	**326**

Bus connection via D-SUB connector	
Type **Order No.**	**ILB PB AI4 AO2** **2878874**
Description	4 inputs, 2, 3 and 4-wire connection, 2 outputs, 2-conductor connection, 0 to 5 V, 0 to 10 V, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA, ±20 mA
Page	**327**

Ethernet connection via RJ45 connector	
Type **Order No.**	**ILB S3 AI4 AO2-2TX** **2692076**
Description	4 inputs, 2, 3 and 4-wire connection, 2 outputs, 2-conductor connection, 0 to 5 V, 0 to 10 V, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA, ±20 mA
Page	**327**

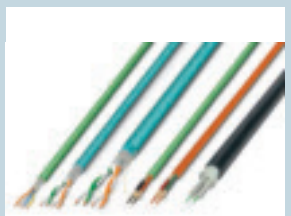
Wireless MUX IO

		
Type **Order No.**	**ILB BT ADIO MUX-OMNI...** **2884...**	**ILB BT ADIO MUX-PANEL...** **28845...**
Description	Wireless MUX set, two modules with 16 digital inputs and outputs each and 2 analog inputs and outputs, 2 OMNI antennas	Wireless MUX set, two modules with 16 digital inputs and outputs each and 2 analog inputs and outputs, 2 PANEL antennas
Page	**210**	**211**

Wireless IO

	
Type **Order No.**	**ILB BT ADIO 2/2/16/16...** **2...**
Description	Inline Block Wireless IO device, 16 digital inputs, 16 digital outputs, 2 analog inputs, 2 analog outputs
Page	**213**

Accessories

	
...-CABLE-... **...**	
You can find the suitable cables and connectors in our online catalog	
www.phoenixcontact.net/catalog	

Inline Block IO PROFINET

This Inline Block IO module can be operated directly in a PROFINET network. It provides 16 inputs and 16 channels that can be used as inputs or outputs. Connection takes place by simply selecting the connection for an actuator or sensor. The connection to the Ethernet is established with RJ45 connectors. Two ports are found on the module. Due to the integrated switch, it is possible to connect an additional module and thus to implement a line structure.

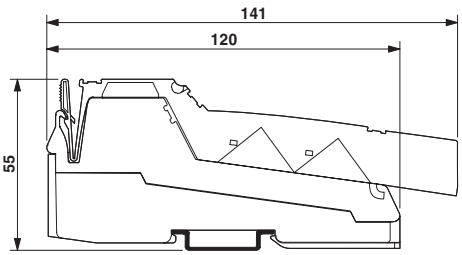
The transmission rate is 10 or 100 Mbps and is automatically selected by the module (autonegotiation).

The various supply voltages and the I/Os are connected with supplied and assembled Inline connectors. The connectors can be coded to prevent them from being accidentally mismated. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-wire system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the Ethernet provide support if service becomes necessary and guarantee a high degree of system availability.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module, and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.

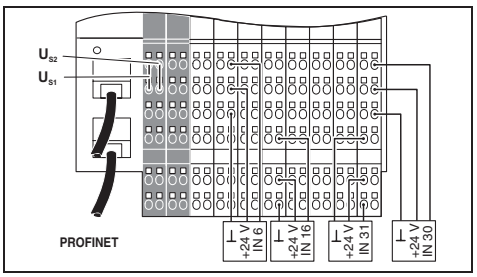
Matching accessories, such as dust protection covers and safety systems for RJ45 connectors, are found in our Factory Line range.



ILB PN 24 DI16 DIO16-2TX

Inline Block IO digital input/output module, PROFINET, inputs: 24 V DC, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

Ex:



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO digital input/output module for PROFINET			
- 16 fixed inputs, 16 freely selectable inputs/outputs	**ILB PN 24 DI16 DIO16-2TX**	**2878146**	1

Technical data	
Interface	
Fieldbus system	PROFINET
Type of connection	RJ45 female connector
No.	2
Transmission speed	10/100 Mbps (with autonegotiation)
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	60 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3-wire
Number of inputs	32
Description of the input	16 fixed and 16 freely selectable
Typical response time	Approx. 500 µs
Protective circuitry	Short circuit protection, overload protection of the sensor supply
Digital outputs	
Type of connection	Spring-cage connection
Connection method	2-wire
Number of outputs	16
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	500 g
Degree of protection	IP20
Width	156 mm

Inline Block IO Ethernet

This Inline Block IO module can be operated directly in an Ethernet network. It provides 16 inputs and 16 channels that can be used as inputs or outputs. Connection takes place by simply selecting the connection for an actuator or sensor. The connection to the Ethernet is established with RJ45 connectors. Two ports are found on the module. Due to the integrated switch, it is possible to connect an additional module and thus to implement a line structure.

The modules support the network/application protocols:
– BootP
– http (Web server)
– SNMP
– Modbus/TCP
– DDI

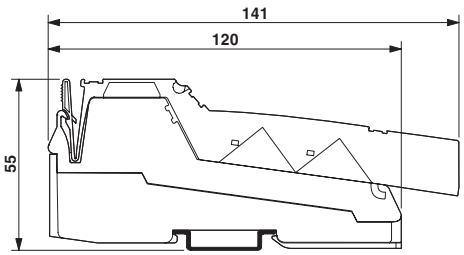
The transmission rate is 10 or 100 Mbps and is automatically selected by the module (autonegotiation).

The various supply voltages and the I/Os are connected with supplied and assembled Inline connectors. The connectors can be coded to prevent them from being accidentally mismated. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-wire system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

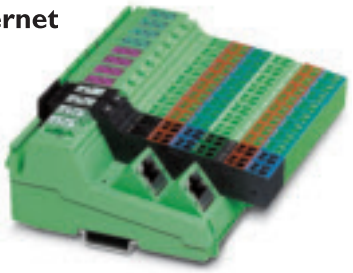
Diagnostic LEDs on the module and comprehensive diagnostic messages via the Ethernet provide support if service becomes necessary and guarantee a high degree of system availability.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the modules and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.

Matching accessories, such as dust protection covers and safety systems for RJ45 connectors, are found in our Factory Line range.



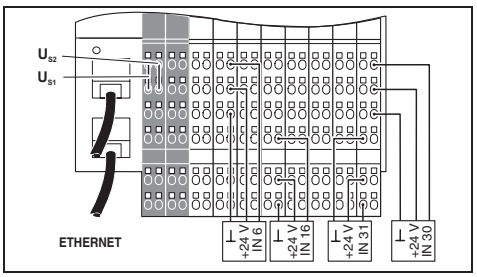
Ethernet



ILB ETH 24 DI16 DIO16-2TX

Inline Block IO digital input/output module, Modbus TCP/IP, inputs: 24 V DC, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

c UL us
Ex: c UL us



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO digital input/output module			
- 16 fixed inputs, 16 freely selectable inputs/outputs	**ILB ETH 24 DI16 DIO16-2TX**	**2832962**	1

Technical data	
Interface	
Fieldbus system	Modbus TCP/IP
Type of connection	RJ45 female connector
No.	2
Transmission speed	10/100 Mbps (with autonegotiation)
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	60 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3-wire
Number of inputs	32
Description of the input	16 fixed and 16 freely selectable
Typical response time	Approx. 500 µs
Protective circuitry	Short circuit protection, overload protection of the sensor supply
Digital outputs	
Type of connection	Spring-cage connection
Connection method	2-wire
Number of outputs	16
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	500 g
Degree of protection	IP20
Width	156 mm

Inline block IO Sercos III

The Inline Block IO module can be directly operated in a SERCOS III network as a slave. The compact unit enables easy and fast integration of digital machine I/Os into the motion control solution. It provides 16 digital inputs and 16 channels that can be used as digital inputs or outputs. The configuration is carried out merely by deciding to connect an actuator or a sensor. The inputs and outputs are characterized by extremely short delay times in this case.

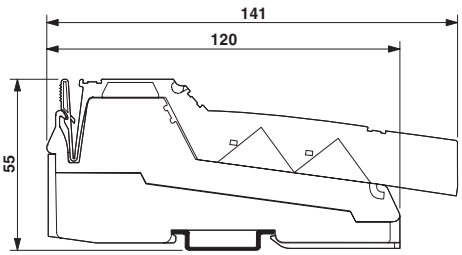
The connection to the SERCOS III network is established with RJ45 connectors.

Matching accessories, such as dust protection covers and safety systems for RJ45 connectors, are found in our Factory Line range.

The supplied and assembled Inline connectors are used to connect the various supply voltages and the I/Os. The connectors can be coded to prevent them from being accidentally mismated. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-wire system.

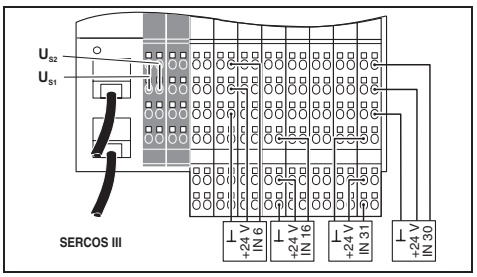
Diagnostic LEDs on the module and comprehensive diagnostic messages via the network provide support if service becomes necessary and guarantee a high degree of system availability.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the modules and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.



ILB S3 24 DI16 DIO16-2TX

Inline Block IO digital input/output module, SERCOS III, inputs: 24 V DC, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO digital input/output module			
- 16 fixed inputs, 16 freely selectable inputs/outputs	**ILB S3 24 DI16 DIO16-2TX**	**2897570**	1

Technical data	
Interface	
Fieldbus system	SERCOS III
Type of connection	RJ45 female connector
No.	2
Transmission speed	100 Mbps
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	70 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3-wire
Number of inputs	32
Description of the input	16 fixed and 16 freely selectable
Typical response time	200 µs
Protective circuitry	Short circuit protection, overload protection of the sensor supply
Digital outputs	
Type of connection	Spring-cage connection
Connection method	2-wire
Number of outputs	16
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	500 g
Degree of protection	IP20
Width	156 mm

Inline Block IO CANopen

This Inline Block IO module can be coupled directly to the CANopen network as a slave. It provides inputs and outputs on 16 channels.

The remote bus is connected via a 9-pos. D-Sub connector, e.g. the SUBCON-PLUS-CAN from Phoenix Contact.

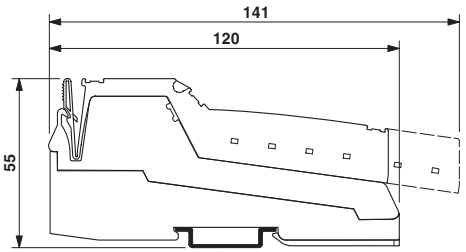
The supplied and mounted Inline connectors are used to connect the various supply voltages and the I/Os. The connectors can be coded to prevent them from being accidentally mismated. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-wire system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

The bus address is easy to set using DIP switches on the module. Data transmission rates are automatically detected and set.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the fieldbus support the user if service becomes necessary and guarantee a high degree of system availability.

The required device master data EDS file can be downloaded from the Internet (www.phoenixcontact.net/download) for configuration purposes.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.

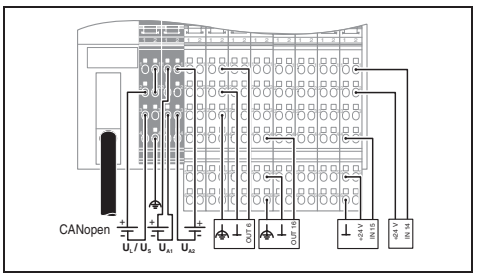


CANopen

ILB CO 24 DI16 DO16

Inline Block IO digital input/output module, CANopen, 1inputs: 24 V DC, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

c UL us
Ex: c UL us



	solid	stranded	
	[mm²]		AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO digital input/output module			
- 16 inputs, 16 outputs	**ILB CO 24 DI16 DO16**	**2862592**	1

Technical data	
Interface	
Fieldbus system	CANopen
Type of connection	D-SUB-9 female connector
Transmission speed	10 kbps ... 1 Mbps
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	25 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3-wire
Number of inputs	16
Description of the input	EN 61131-2 type 1
Typical response time	Approx. 500 µs
Protective circuitry	Short circuit protection, overload protection of the sensor supply
Digital outputs	
Type of connection	Spring-cage connection
Connection method	2, 3-wire
Number of outputs	16
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	500 g
Degree of protection	IP20
Width	156 mm

Inline Block IO INTERBUS

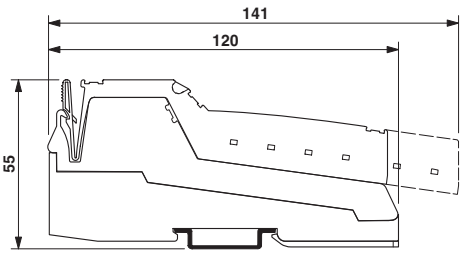
These Inline Block IO modules can be coupled to the INTERBUS fieldbus system. Depending on the version of the module, they offer various combinations of inputs and outputs with 16 or 32 channels.

The remote bus is connected via the familiar Inline connectors using the spring-cage terminal method or the U-SUB connectors. The various supply voltages and the I/Os are connected with Inline connectors. All Inline connectors are included in the scope of supply. The connectors can be coded to prevent them from being accidentally mismatched.

The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system. The Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the INTERBUS remote bus.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the fieldbus support the user if service becomes necessary and guarantee a high degree of system availability.

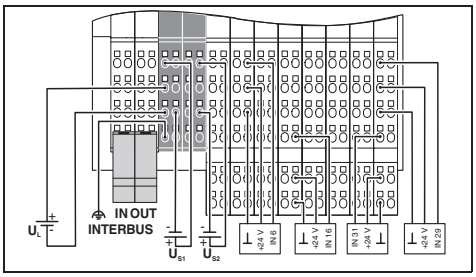
The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.



ILB IB 24 DI...

Inline Block IO digital input module, INTERBUS, inputs: 24 V DC, 2 and 3-wire connection method

Ex:



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

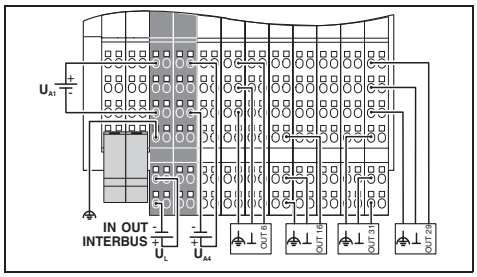
Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO digital input module			
- 16 inputs	**ILB IB 24 DI16**	**2862330**	1
- 32 inputs	**ILB IB 24 DI32**	**2862343**	1
- 16 inputs, D-SUB bus connection	**ILB IB 24 DI16-DSUB**	**2878421**	1
Inline Block IO digital output module			
- 16 outputs			
- 32 outputs			
- 16 outputs, D-SUB bus connection			
Inline Block IO digital input/output module			
- Eight inputs, eight outputs			
- 16 inputs, 16 outputs			
- 16 inputs, 16 outputs, D-SUB bus connection			

Technical data	ILB IB 24 DI16	ILB IB 24 DI32
Interface		
Fieldbus system	INTERBUS	
Type of connection	Inline connectors	
Transmission speed	500 kbps	
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	19.2 V DC ... 30 V DC	
Supply current	80 mA	60 mA
Digital inputs		
Type of connection	Spring-cage connection	
Connection method	2, 3-wire	
Description of the input	EN 61131-2 type 1	
Typical response time	Approx. 500 µs	
Protective circuitry	Short circuit protection, overload protection of the sensor supply	
Digital outputs		
Type of connection	-	
Connection method	-	
Maximum output current per channel	-	
Protective circuitry	-	
General data		
Weight	300 g	405 g
Degree of protection	IP20	
Width	95 mm	156 mm

ILB IB 24 DO...

Inline Block IO digital output module, INTERBUS, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

Ex:



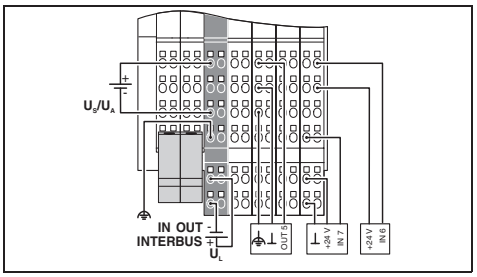
Type	Order No.	Pcs. / Pkt.
ILB IB 24 DO16	**2862356**	1
ILB IB 24 DO32	**2862369**	1
ILB IB 24 DO16-DSUB	**2878528**	1

ILB IB 24 DO16	ILB IB 24 DO32
INTERBUS	
Inline connectors	
500 kbps	
24 V DC	
19.2 V DC ... 30 V DC	
80 mA	85 mA
-	
-	-
-	
-	
-	
Spring-cage connection	
2, 3-wire	
500 mA	
Short circuit and overload protection	
300 g	510 g
IP20	
95 mm	156 mm

ILB IB 24 DI 8 DO 8

Inline Block IO digital input/output module, INTERBUS, inputs: 24 V DC, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

Ex:



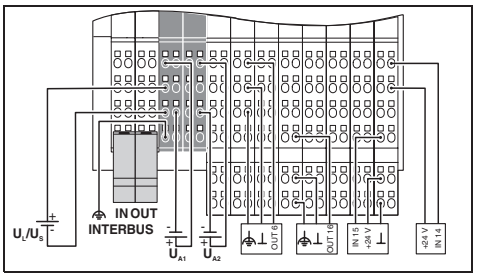
Type	Order No.	Pcs. / Pkt.
ILB IB 24 DI 8 DO 8	**2862372**	1

INTERBUS
Inline connectors
500 kbps
24 V DC
19.2 V DC ... 30 V DC
60 mA
Spring-cage connection
2, 3-wire
EN 61131-2 type 1
Approx. 500 µs
Short circuit protection, overload protection of the sensor supply
Spring-cage connection
2, 3-wire
500 mA
Short circuit and overload protection
350 g
IP20
95 mm

ILB IB 24 DI16 DO16...

Inline Block IO digital input/output module, INTERBUS, inputs: 24 V DC, outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

Ex:



Type	Order No.	Pcs. / Pkt.
ILB IB 24 DI16 DO16	**2862385**	1
ILB IB 24 DI16 DO16-DSUB	**2878625**	1

INTERBUS
Inline connectors
500 kbps
24 V DC
19.2 V DC ... 30 V DC
80 mA
Spring-cage connection
2, 3-wire
EN 61131-2 type 1
Approx. 500 µs
Short circuit protection, overload protection of the sensor supply
Spring-cage connection
2, 3-wire
500 mA
Short circuit and overload protection
500 g
IP20
156 mm

Inline Block IO
PROFIBUS/DeviceNet™

These Inline Block IO modules can be directly connected to the respective fieldbus system as slaves. They offer various combinations of inputs and outputs with 16 or 32 channels depending on the version of the module.

In the PROFIBUS variant, the remote bus is connected via a 9-pos. D-Sub connector, e.g. the SUBCON-PLUS-PROFIB from Phoenix Contact. In the case of the DeviceNet™ version, the remote bus is connected with the TWIN-COMBICON connector supplied.

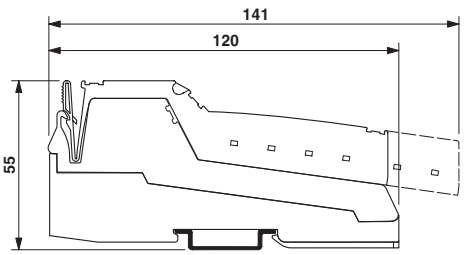
The various supply voltages and the I/Os are connected with supplied and assembled Inline connectors. The connectors can be coded to prevent them from being accidentally mismated. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-wire system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

The bus address is easily set using DIP switches on the module or, in case of DeviceNet™, using the software. Data transmission rates are automatically detected and set.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the fieldbus support the user if service becomes necessary and guarantee a high degree of system availability.

The required device master data or EDS file can be downloaded from the Internet (www.phoenixcontact.net/download) for configuration purposes.

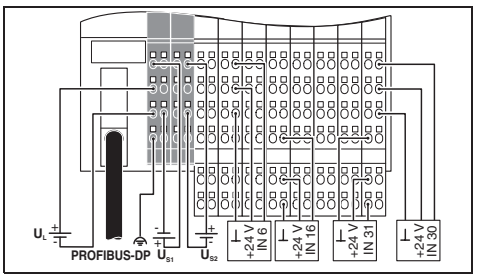
The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.



ILB PB 24 DI32

Inline Block IO digital input module, PROFIBUS, inputs: 24 V DC, 2 and 3-wire connection method

Ex:



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

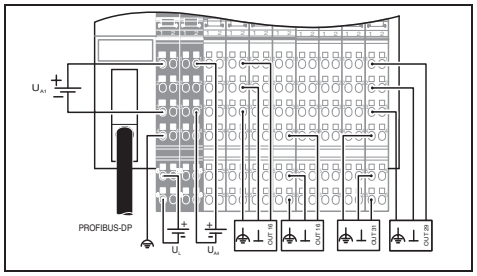
Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO digital input module - 32 inputs	**ILB PB 24 DI32**	**2862398**	1
Inline Block IO digital output module - 32 outputs			
Inline Block IO digital input/output module - 16 inputs, 16 outputs - Eight inputs, eight inputs or outputs			

Technical data	
Interface	
Fieldbus system	PROFIBUS DP
Type of connection	D-SUB-9 female connector
Transmission speed	9.6 kbps ... 12 Mbps
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	50 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection method	2, 3-wire
Number of inputs	32
Description of the input	EN 61131-2 type 1
Typical response time	Approx. 500 µs
Protective circuitry	Short circuit protection, overload protection of the sensor supply
Digital outputs	
Type of connection	-
Connection method	-
Number of outputs	-
Output description	-
Maximum output current per channel	-
Protective circuitry	-
General data	
Weight	510 g
Degree of protection	IP20
Width	156 mm

ILB PB 24 DO32

Inline Block IO digital output module, PROFIBUS,
outputs: 24 V DC, 500 mA, 2 and 3-wire connection method

Ex:



Type	Order No.	Pcs. / Pkt.
ILB PB 24 DO32	**2862408**	1

PROFIBUS DP
D-SUB-9 female connector
9,6 kbps ... 12 Mbps

24 V DC
19.2 V DC ... 30 V DC
70 mA

-
-
-
-

-
-

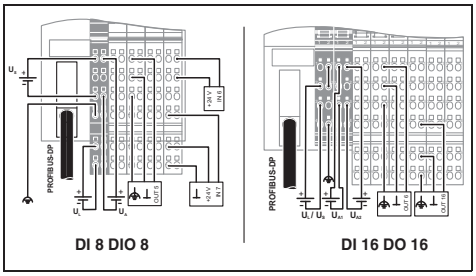
Spring-cage connection
2, 3-wire
32
-
500 mA
Short circuit and overload protection

510 g
IP20
156 mm

ILB PB 24 DI... D(I)O...

Inline Block IO digital input/output module, PROFIBUS,
inputs: 24 V DC, outputs: 24 V DC, 500 mA,
2 and 3-wire connection method

Ex:



DI 8 DIO 8 | DI 16 DO 16

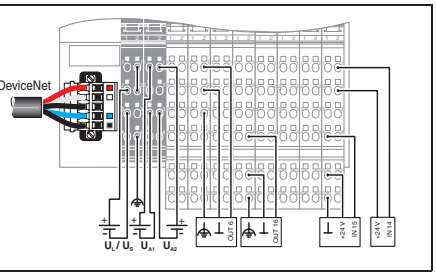
Type	Order No.	Pcs. / Pkt.
ILB PB 24 DI16 DO16	**2862411**	1
ILB PB 24 DI 8 DIO8	**2863562**	1

	ILB PB 24 DI16 DO16	ILB PB 24 DI 8 DIO8
	PROFIBUS DP D-SUB-9 female connector 9,6 kbps .... 12 Mbps	
	24 V DC 19.2 V DC ... 30 V DC	
	70 mA	60 mA
	Spring-cage connection 2, 3-wire 16	
	EN 61131-2 type 1	8 fixed and 8 freely selectable
	Approx. 500 µs Short circuit protection, overload protection of the sensor supply	
	Spring-cage connection 2, 3-wire	
	16	8
	-	Freely selectable
	500 mA Short circuit and overload protection	
	500 g	350 g
	IP20	
	156 mm	95 mm

ILB DN 24 DI16 DO16

Inline Block IO digital input/output module, DeviceNet™,
inputs: 24 V DC, outputs: 24 V DC, 500 mA,
2 and 3-wire connection method

Ex:



Type	Order No.	Pcs. / Pkt.
ILB DN 24 DI16 DO16	**2862602**	1

DeviceNet™
2x 5-pos. TWIN-COMBICON connectors
125 kbps ... 500 kbps

24 V DC
19.2 V DC ... 30 V DC
70 mA

Spring-cage connection
2, 3-wire
16
EN 61131-2 type 1

Approx. 500 µs
Short circuit protection, overload protection of the sensor supply

Spring-cage connection
2, 3-wire
16
-
500 mA
Short circuit and overload protection

500 g
IP20
156 mm

Analog Inline Block IO

These Inline Block IO modules can be coupled to INTERBUS, PROFIBUS or SERCOS III. Four analog inputs and two analog outputs are available on the module. The inputs either offer the option of difference measurement from analog current or voltage signals or the option of connecting resistance thermometers (RTDs).

In order to prevent the adverse effects of interference due to compensating currents, the inputs are galvanically decoupled and have adjustable filter times. The current inputs are overload-protected in these devices and the integrated sensor supply provides short-circuit protection.

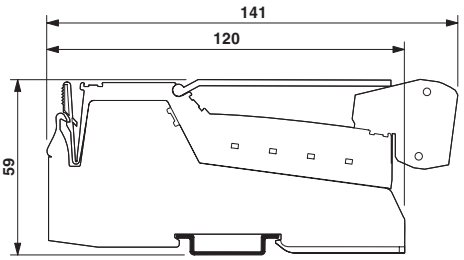
Current or voltage actuators can be connected at the two outputs. Output behavior can be also set for a bus reset and thus provides safety for the machine. All channels are also provided with shield connections by default. This immediately increases immunity against electromagnetic interferences in the system.

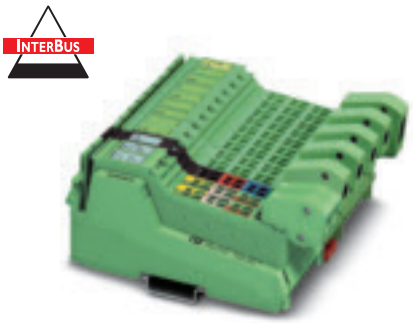
The connection to the Fieldbus or the network is established via the typical connection methods. The supply and I/Os are connected to the Inline connector. All Inline connectors are included in the scope of supply. The connectors can be coded to prevent them from being accidentally mismatched.

The different jumpering levels on the module can be used to connect sensors and actuators using 2, 3 or 4-wire technology. The Inline Block IO modules thus form a compact unit for the direct connection of analog inputs/outputs.

Diagnostics LEDs on the module and comprehensive diagnostics messages via the fieldbus or the network support the user if service becomes necessary and guarantee a high degree of system availability.

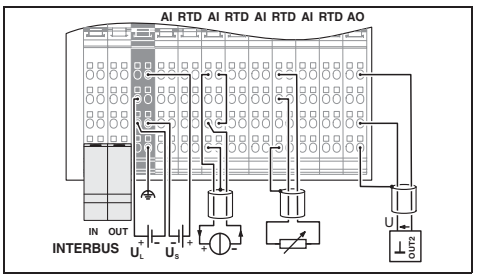
The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module, and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.





ILB IB AI4 AO2

Inline Block IO analog input/output module, INTERBUS, inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-5 V, ±5 V, 0-10 V, ±10 V, Pt100, Pt1000, Ni1000..., outputs: 0-20 mA, 4-20 mA, ±20 mA, 0-5 V, ±5 V, 0-10 V, ±10 V



	solid	stranded [mm²]	AWG
Connection data Inline connectors			
Spring-cage connection	0.08-1.5	0.08-1.5	28-16

Description	Type	Order No.	Pcs. / Pkt.
Inline Block IO analog input/output module For INTERBUS For PROFIBUS For SERCOS III	**ILB IB AI4 AO2**	**2878777**	1

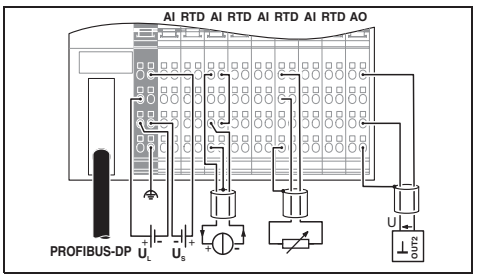
Technical data	
Interface	
Fieldbus system	INTERBUS
Type of connection	Inline connectors
Transmission speed	500 kbps
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	Typ. 95 mA
Analog inputs	
Type of connection	Spring-cage connection
Connection method	2, 3, 4-wire (shielded)
Number of inputs	4
Description of the input	Differential input
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Sensor types (RTD) that can be used	Pt100,Pt500,Pt1000,Nl100,Ni1000,Ni1000 L&G
Linear resistance measuring range	0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω
Protective circuitry	Overload protection, short circuit protection of sensor supply
Analog outputs	
Type of connection	Spring-cage connection
Connection method	2-wire (shielded)
Number of outputs	2
Voltage output signal	0 V ... 10 V / -10 V ... 10 V / 0 V ... 5 V / -5 V ... 5 V
Current output signal	4 mA ... 20 mA / 0 A ... 20 mA / -20 mA ... 20 mA
Protective circuitry	Short circuit protection of outputs
Process data	
Measured value resolution	16 bits (15 bits + sign)
Input filter time	1.1 ms (Or 4.5 ms per channel)
Data formats	IB IL
General data	
Weight	465 g
Degree of protection	IP20 in acc. with IEC 60529
Width	156 mm

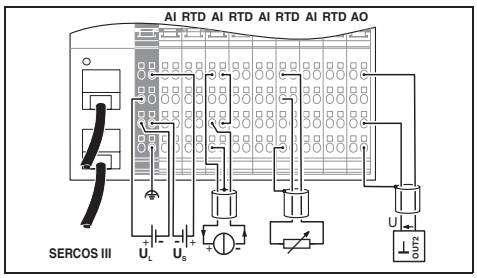
ILB PB AI4 AO2

Inline Block IO analog input/output module, PROFIBUS, inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-5 V, ±5 V, 0-10 V, ±10 V, Pt100, Pt1000, Ni1000..., outputs: 0-20 mA, 4-20 mA, ±20 mA, 0-5 V, ±5 V, 0-10 V, ±10 V

ILB S3 AI4 AO2-2TX

Inline Block IO analog input/output module, SERCOS III, inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-5 V, ±5 V,0-10 V, ±10 V, Pt100, Pt1000, Ni1000..., outputs: 0-20 mA, 4-20 mA, ±20 mA, 0-5 V, ±5 V,0-10 V, ±10 V





Type	Order No.	Pcs. / Pkt.
ILB PB AI4 AO2	**2878874**	1

Type	Order No.	Pcs. / Pkt.
ILB S3 AI4 AO2-2TX	**2692076**	1

PROFIBUS DP D-SUB-9 female connector 9.6 kbps ... 12 Mbps	SERCOS III RJ45 female connector, shielded 100 Mbps
24 V DC 19.2 V DC ... 30 V DC Typ. 95 mA	24 V DC 19.2 V DC ... 30 V DC Typ. 160 mA
Spring-cage connection 2, 3, 4-wire (shielded) 4 Differential input 0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V 0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA Pt100,Pt500,Pt1000,NI100,Ni1000,Ni1000 L&G 0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω Overload protection, short circuit protection of sensor supply	Spring-cage connection 2, 3, 4-wire (shielded) 4 Differential input 0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V 0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA Pt100,Pt500,Pt1000,NI100,Ni1000,Ni1000 L&G 0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω Overload protection, short circuit protection of sensor supply
Spring-cage connection 2-wire (shielded) 2 0 V ... 10 V / -10 V ... 10 V / 0 V ... 5 V / -5 V ... 5 V 4 mA ... 20 mA / 0 A ... 20 mA / -20 mA ... 20 mA Short circuit protection of outputs	Spring-cage connection 2-wire (shielded) 2 0 V ... 10 V / -10 V ... 10 V / 0 V ... 5 V / -5 V ... 5 V 4 mA ... 20 mA / 0 A ... 20 mA / -20 mA ... 20 mA Short circuit protection of outputs
16 bits (15 bits + sign) 1.1 ms (Or 4.5 ms per channel) IB IL	16 bits (15 bits + sign) 1.1 ms (Or 4.5 ms per channel) IB IL, S7 compatible
465 g IP20 in acc. with IEC 60529 156 mm	465 g IP20 in acc. with IEC 60529 156 mm

INTERBUS ST – The "smart" fieldbus terminal range

INTERBUS-ST modules are used in all applications with a medium to high number of I/O signals, whether distributed in terminal boxes or central in the control cabinet.

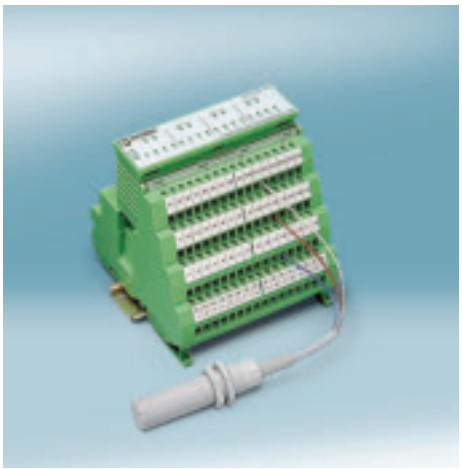
INTERBUS-ST modules are modular and can be freely aligned. Modularity makes it possible to individually adjust the required functions according to the application. The product range comprises digital and analog input/output modules for numerous signal forms and different functions. The pluggable module electronics allows fast and easy replacement of a defective module without having to disconnect the terminal points.

INTERBUS-ST bus terminal modules are connected to the fieldbus via D-SUB (copper cable) or via F-SMA (fiber optics).

A variant with RJ45 connection is also available for PROFINET IO.

Program overview

In the case of applications with a medium to large number of I/Os in the control cabinet or terminal box, the sensors and actuators are connected to the fieldbus by the smart terminals. INTERBUS and now even PROFINET can be selected as fieldbuses.



Modularity leads to flexibility

The modularity of INTERBUS-ST makes it possible for the user to select the sequence and granularity of various I/O functions. In addition to digital and analog input and output functions, several special functions such as counter inputs are also available.

User convenience and flexibility are important factors with INTERBUS-ST. The installation of an INTERBUS-ST terminal strip always starts with a bus terminal module, which connects the decentrally installed INTERBUS-ST modules to the fieldbus. The module electronics of the bus terminal module can naturally also be plugged.

Convenient connections make installation and servicing easier

When the terminal bases (terminal boards) are snapped on, a metal spring is used to automatically establish a protective conductor connection between the ST modules and the DIN rail.

The INTERBUS-ST fieldbus terminals are available in two design widths. The digital I/O modules have a granularity of 8, 16 and 32 channels, and the analog modules have a granularity of 2, 4 and 8 channels. Two, three and four-wire sensors and actuators can be connected using either screw terminals or spring-cage terminals.
This eliminates the need for time-consuming intermediate terminal points.

Replaceable module electronics guarantee reliable operation.

The module electronics can be replaced without any mixup, without having to disconnect a conductor from the terminal strip. No further manual settings are required. Just install the new electronics, and you're up and running.

Different connection methods provide bus openness

With ST, the flexibility in selecting the transmission medium and the bus protocol is supported by various bus connection methods.

The following connection methods are available for INTERBUS:

- D-SUB connector
- MINI COMBICON connectors
- F-SMA connector (for fiber optics)

The following connection method is available for PROFINET:

- RJ45

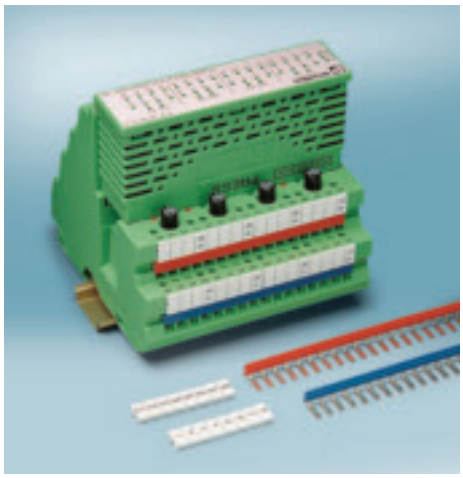
RJ45

D-SUB

F-SMA

Potential routing and labeling options result in clarity

Sensors and actuators can be at various ground levels within a module. If required, these ground levels can be easily connected with one another using insertion bridges.



Every terminal point can be individually labeled with the standard material.

The folding labeling field also ensures the required clarity when working on the system.

Here, a terminal point can also be assigned longer and more informative signal names. Labeling fields can also be produced via printers using the CMS MARK WIN labeling software.

Colored LEDs on the upper side of the module electronics provide information about the system status at all times. System malfunctions are detected safely and in time, and then selectively forwarded.

A wide scope of functions leads to solution competence

INTERBUS-ST covers the basic I/O functions:

- Digital inputs (24 V DC)
- Digital outputs (24 V DC, 250 mA, 500 mA, 2 A)
- Relay N/O contact and PDT outputs (up to 250 V AC, 3 A)
- Analog inputs (0-10 V, ±10 V, 0-20 mA, ±20 mA, 4-20 mA)
- Analog outputs (0-5 V, 0-10 V, ±10 V, 0-25 V, 0-50 V, 0-20 mA, 4-20 mA, 0-40 mA, 0-60 mA)
- Temperature recording (RTD and UTH)
- Counter inputs
- Incremental encoder inputs
- Serial communication (RS-232, RS-485, RS-422)

Depending on the module, variants with expanded functionality supplement the standard range with service features such as:

- Arrangement of input or output channels into electrically isolated groups
- Electronic short-circuit protection for each channel
- Large input filter
- Increased current carrying capacity

General technical data

Ambient conditions	
Ambient temperature (operation)	0°C to +55°C
Ambient temperature (storage/transport)	-25°C to +75°C
Relative humidity (operation)	30% to 75% (no condensation)
Relative humidity (storage/transport)	30% to 95% (no condensation)
Degree of protection	IP20 as per IEC 60529
Vibration as per IEC 60068-2-6	2g
Shock as per IEC 60068-2-27	15g
Air and creepage distances	IEC 60664/IEC 60664A/ DIN VDE 0110:1989-01 and DIN VDE 0160:1988-05
Electromagnetic compatibility	
Noise emission	DIN EN 55022 Class A (industrial)
Supply voltage	
Nominal value	24 V DC
Permissible range	18.5 V DC to 30.5 V DC (including ripple)

Bus terminal modules

						
Bus system						
Type **Order No.**	**ST PN 24 BK-2TX** **2897059**	**IBS ST 24 BK-T** **2754341**	**IBS ST 24 BK-LK** **2754435**	**IBS ST 24 BKM-T** **2750154**	**IBS ST 24 BKM-LK-OPC** **2728665**	**IBS ST 24 BK RB-T** **2753504**
Description	PROFINET bus terminal module, RJ45-connection	Bus connection 9-pos., D-SUB	Bus connection F-SMA	Bus connection 8-pos. MINI-COMBICON	Bus connection F-SMA	With additional remote bus branch, 9-pos., D-SUB
Page	334	335	335	336	336	337

					
Bus system					
Type **Order No.**	**IBS ST 24 BK LB-T** **2753232**	**IBS ST 24 BK DIO 8/8/3-T** **2752411**	**IBS ST 24 BK DIO 8/8/3-LK** **2751218**	**IBS ST 24 BK-RB-T DIO 8/8/3-LK** **2723453**	**IBS ST 24 BK RB-LK DIO8/8/3-LK** **2721662**
Description	with additional local bus -branch, 15-pos., D-SUB	Bus connection 9-pos., D-SUB, 8 inputs / 8 outputs 500 mA, 3-wire connection method	Bus connection F-SMA, 8 inputs / 8 outputs 500 mA, 3-wire connection method	Bus connection F-SMA, 8 inputs / 8 outputs 500 mA, 3-wire connection method, remote bus branch, 9-pos., D-SUB	Bus connection F-SMA, 8 inputs / 8 outputs 500 mA, 3-wire connection method, remote bus branch, F-SMA
Page	337	337	337	337	337

Digital I/O terminals

	16 inputs	32 inputs	8 outputs	16 outputs	32 outputs	8/8 inputs/outputs
						
Type **Order No.**	**IB ST 24 BDI 16/4** **2750170**	**IB ST 24 DI32/2** **2754927**	**IB ST 24 BDO 8/3** **2750811**	**IB ST 24 DO16/3** **2754914**	**IB ST 24 BDO 32/2** **2750824**	**IB ST 24 DIO 8/8/3-2A** **2753708**
Description	16 inputs, 24 V DC, 4-wire connection	32 inputs, 24 V DC, 2-wire connection	8 outputs, 24 V DC, 250 mA, 3-wire connection	16 outputs, 24 V DC, 500 mA, 3-wire connection,	32 outputs, 24 V DC, 250 mA, 2-wire connection	8 inputs, 24 V DC, 3-wire connection and 8 outputs, 24 V DC, 2 A
Page	338	338	339	339	339	339
Type **Order No.**	**IB ST 24 DI 16/4** **2754338**		**IB ST 24 DO 8/3-2A** **2754891**	**IB ST 24 DO16R/S** **2721112**	**IB ST 24 DO32/2** **2754325**	**IB ST 24 DIO 8/8R/3** **2751849**
Description	16 inputs, 24 V DC, 4-wire connection		8 outputs, 24 V DC, 2 A, 3-wire connection	16 relay N/O contact outputs,	32 outputs, 24 V DC, 500 mA, 2-wire connection	8 inputs, 24 V DC, 3-wire connection and 8 SPDT relay outputs
Page	338		339	339	339	339

Analog I/O terminals

	2 inputs	4 inputs	8 inputs	4 outputs	8 outputs
					
Type **Order No.**	**IB ST 24 BAI 2/SF** **2722771**	**IB ST 24 AI 4/SF** **2754309**	**IB ST 24 BAI 8/U** **2721015**	**IB ST 24 AO 4/SF** **2754312**	**IB ST 24 BAO 8/U** **2721044**
Description	2 inputs, 0 to 10 V, 0 to 20 mA, 4 to 20 mA, 2 and 3-wire connection	4 inputs, 0-10 V, 0 to 20 mA, 2, 3, 4-wire connection	8 inputs, 0 to 5 V, 0 to 10 V, 0 to 25 V, 0-50 V, 2-wire connection	4 outputs, 0 to 10 V, 0 to 20 mA	8 outputs, ±10 V, 12 V
Page	**340**	**340**	**341**	**341**	**341**
Type **Order No.**	**IB ST 24 BAI 2/BP** **2725888**	**IB ST 24 AI 4/SF4** **2750565**	**IB ST 24 BAI 8/I** **2721028**	**IB ST 24 AO 4/SF4** **2750578**	
Description	2 inputs, -10 V to +10 V, -20 mA to +20 mA, 2 and 3-wire connection	4 inputs, 0-10 V, 4-20 mA, 2 and 3-wire connection	8 inputs, 0 to 20 mA, 4 to 20 mA, 0 to 40 mA, 0 to 60 mA, 2-wire connection	4 outputs, 0 to 10 V, 4 to 20 mA	
Page	**340**	**340**	**341**	**341**	
Type **Order No.**		**IB ST 24 AI 4/BP** **2751564**	**IB ST 24 UTH 8** **2724902**	**IB ST 24 AO 4/BP** **2752521**	
Description		4 inputs, -10 V ... +10 V, 4 to 20 mA, 2, 3 and 4-wire connection	8 inputs, UTH, 2-wire connection	4 outputs, -10 V to +10 V	
Page		**340**	**341**	**341**	
Type **Order No.**		**IB ST 24 AI 4/I** **2719629**			
Description		4 inputs, 0-10 V, 0 to 20 mA, 4-20 mA, 2-wire connection, electrically isolated			
Page		**341**			
Type **Order No.**		**IB ST 24 PT100 4/4** **2752767**			
Description		4 inputs, RTD, 2, 3 and 4-wire connection			
Page		**341**			

Function terminals

	Counter module	Positioning module	Communication module
			
Type **Order No.**	**IB ST 24 CNT** **2750400**	**IB ST 24 INC/2** **2751975**	**IB ST 24 V.24** **2725480**
Description	4 counter inputs	2 incremental encoder inputs	RS-232, RS-485 and RS-422 interface
Page	**www.phoenixcontact.net/catalog**		

Accessories


...-CABLE-... **...**
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www.phoenixcontact.net/catalog

PROFINET bus terminal module

The ST PN 24 BK-2TX PROFINET bus terminal module connects the input/output modules of an ST station to the PROFINET network.

The bus terminal module has two RJ45 ports through which the connection to the PROFINET network is established. Due to the integrated switch, it is possible to connect an additional ST-PROFINET station and thus to implement a line structure.

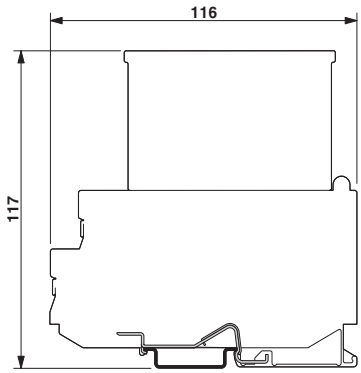
Up to 8 input/output modules of the INTERBUS ST product range can be connected to the bus terminal module.

Clear diagnostic and status displays for the user-friendly local diagnostics typical of INTERBUS ST as well as comprehensive diagnostic data about the fieldbus make the bus terminal module reliable for every situation.

ST PN 24 BK-2TX has the following functions:

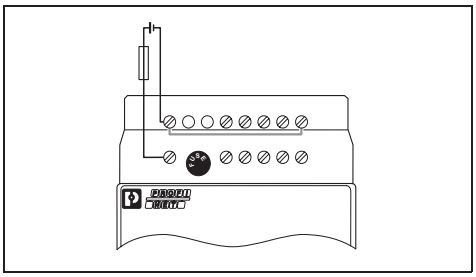
– **Failsafe**
  In the case of a network failure, the output is the preset I/O values.
– **LLDP**
  With the help of LLDP, the bus terminal modules can be changed in the event of module failure in the PROFINET network without having to reconfigure them. The station name/station address is assigned by the control unit using the neighborhood detection function of the new bus terminal module.
– **Media redundancy**
  Media redundancy can be established due to the physical ring structure of PROFINET. This means that if the Ethernet cable is faulty at a point or is removed, a new connection is established within the shortest possible time.
– **I&M functions**
  In addition to the standard ST diagnostic data, the new bus terminal module also provides "identification & maintenance functions".

Thanks to these functions, the reliable INTERBUS-ST family can be connected to PROFINET as a complete device.



ST PN 24 BK-2TX

ST-PROFINET bus terminal module, 24 V DC



	solid	stranded [mm²]	AWG
Connection data Termination block			
Screw connection	0.2-2.5	0.2-2.5	24-12

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS-ST bus terminal module, consisting of: terminal part with screw connection and module electronics	**ST PN 24 BK-2TX**	**2897059**	1
Replacement local bus cable	**IB ST LBC**	**2836492**	10
Insertion bridges, divisible, insulated spine, blue, 84-pos.	**EB 84 IB ST BU**	**2836269**	5
Insertion bridges, divisible, insulated spine, red, 84-pos.	**EB 84 IB ST RD**	**2836272**	5

Technical data	
Interface	
Name	PROFINET
Type of connection	RJ45
Transmission speed	100 Mbps
Power supply for module electronics	
Supply voltage	24 V DC
Type of connection	Screw connection
Range of supply voltages	18.5 V DC ... 30.5 V DC (including ripple)
General data	
Weight	470 g
Width	81 mm
Ambient temperature (operation)	0°C ... 55°C
Permissible humidity (operation)	30% ... 75% (no condensation)
Air pressure (operation)	86 hPa ... 108 kPa (up to 1500 m above mean sea level)

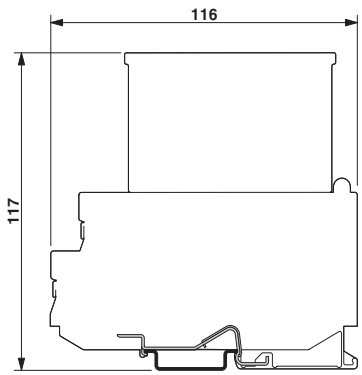
INTERBUS bus terminal modules

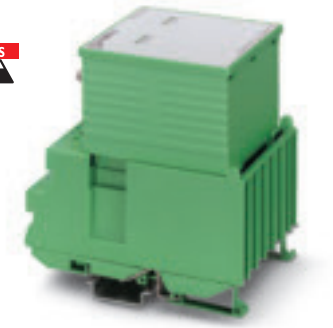
The INTERBUS bus terminal modules connect the input/output modules of an ST station with the INTERBUS network. Depending on the transmission medium used, the bus terminal modules are either equipped with D-SUB or MINI-COMBICON connectors for copper wires or with F-SMA connectors for fiber optics as a bus connection.

Bus terminal modules are available in two different performance classes, i.e. for operation of a maximum of either 4 or 8 input/output modules.

The bus terminal module performs the following functions within an INTERBUS-ST station:

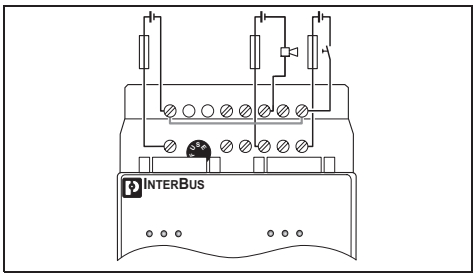
– Refreshing the INTERBUS remote bus signals
– Electrical isolation of remote bus segments
– Decoupling of the outgoing remote bus or of the connected input/output modules from the INTERBUS network by software command
– Providing the connected input/output modules with an electrically isolated voltage supply from an integrated power supply unit





IBS ST 24 BK-...

INTERBUS-ST bus terminal module, 24 V DC



	solid	stranded	
	[mm²]		AWG
Connection data Termination block			
Screw connection	0.2-2.5	0.2-2.5	24-12

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS-ST bus terminal module, consisting of: terminal part with screw connection and module electronics			
- D-SUB connector, 9-pos.	**IBS ST 24 BK-T**	**2754341**	1
- Fiber optics F-SMA connector	**IBS ST 24 BK-LK**	**2754435**	1
Replacement local bus cable	**IB ST LBC**	**2836492**	10
Insertion bridges, divisible, insulated spine, blue, 84-pos.	**EB 84 IB ST BU**	**2836269**	5
Insertion bridges, divisible, insulated spine, red, 84-pos.	**EB 84 IB ST RD**	**2836272**	5

Technical data	IBS ST 24 BK-T	IBS ST 24 BK-LK
Interface		
Fieldbus system	INTERBUS	
Name	INTERBUS remote bus	
Type of connection	9-pos. D-SUB male/female	F-SMA connector
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	18.5 V DC ... 30.5 V DC (including ripple)	20 V DC ... 30 V DC (including ripple)
General data		
Weight	470 g	
Width	81 mm	
Ambient temperature (operation)	0°C ... 55°C	
Permissible humidity (operation)	30% ... 75% (On average, no condensation)	30% ... 75% (no condensation)
Air pressure (operation)	86 kPa ... 108 kPa (up to 1500 m above mean sea level)	

INTERBUS bus terminal modules

The INTERBUS bus terminal modules connect the input/output modules of an ST station with the INTERBUS network. Depending on the transmission medium used, the bus terminal modules are either equipped with D-SUB or MINI-COMBICON connectors for copper wires or with F-SMA connectors for fiber optics as a bus connection.

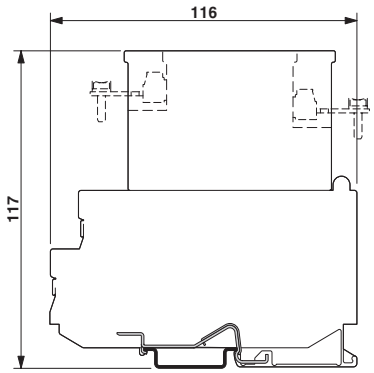
Bus terminal modules are available in two different performance classes, i.e. for operation of a maximum of either 4 or 8 input/output modules.

The bus terminal module performs the following functions within an INTERBUS-ST station:

– Refreshing the INTERBUS remote bus signals
– Electrical isolation of remote bus segments
– Decoupling of the outgoing remote bus or of the connected input/output modules from the INTERBUS network by software command
– Providing the connected input/output modules with an electrically isolated voltage supply from an integrated power supply unit

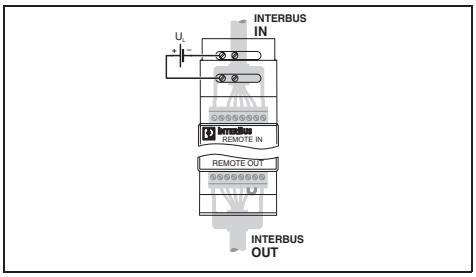
As well as providing the option of configuring an input/output station with ST modules, the bus terminal modules with additional INTERBUS interfaces also make it possible to connect further INTERBUS network devices. The bus terminal module IBS ST 24 BK LB-T is equipped with an additional local bus interface. The bus terminal module IBS ST 24 RB-T is equipped with an additional remote bus interface.

In addition to the actual bus terminal functions, eight digital inputs and eight digital outputs are integrated into INTERBUS input/output bus terminal modules IBS ST 24 BK DIO.... On top of this, the modules can be extended by up to four INTERBUS ST input or output modules. These bus terminal modules are particularly suitable for use in applications where very little space is available, or where only a few I/O points are to be processed.



IBS ST 24 BKM-...

INTERBUS-ST bus terminal module, 24 V DC



	solid [mm²]	stranded [mm²]	AWG
Connection data Termination block			
Screw connection	0.2-2.5	0.2-2.5	24-12

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS-ST bus terminal module, consisting of: terminal part with screw connection and module electronics			
- MINI-COMBICON connector, 8-pos.	**IBS ST 24 BKM-T**	**2750154**	1
- Fiber optics F-SMA connector, optical path diagnostics	**IBS ST 24 BKM-LK-OPC**	**2728665**	1
- Additional remote bus branch, D-SUB connector			
- Additional local bus branch - D-SUB connector, 9-pos. - Fiber optics F-SMA connector - Additional remote bus branch, F-SMA connector			
Replacement shield point, for INTERBUS-ST bus terminal block BKM-...	**IBS RB-SHIELD**	**2722742**	1
Replacement remote bus connector set, for INTERBUS-ST bus terminal block BKM-...	**IBS RB PLSET/MC 1,5/8**	**2722755**	1
Replacement local bus cable	**IB ST LBC**	**2836492**	10
Insertion bridges, divisible, insulated spine, blue, 84-pos.	**EB 84 IB ST BU**	**2836269**	5
Insertion bridges, divisible, insulated spine, red, 84-pos.	**EB 84 IB ST RD**	**2836272**	5

Technical data	IBS ST 24 BKM-T	IBS ST 24 BKM-LK-OPC
Interface		
Name	INTERBUS remote bus	
Type of connection	8-pos. mini Combicon connector	F-SMA connector
Number of positions	8	
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	20 V DC ... 30 V DC (including ripple)	
Digital inputs		
Type of connection	-	
Connection method	-	
Number of inputs	-	
Name of protection	-	
Digital outputs		
Type of connection	-	
Connection method	-	
Number of outputs	-	
Maximum output current per channel	-	
Maximum output current per module / terminal block	-	
Protective circuitry	-	
General data		
Weight	200 g	

IBS ST 24 BK ...-T

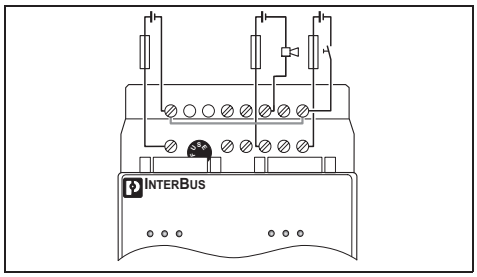
INTERBUS-ST bus terminal module, 24 V DC, D-SUB connector 9-pos., additional bus branch

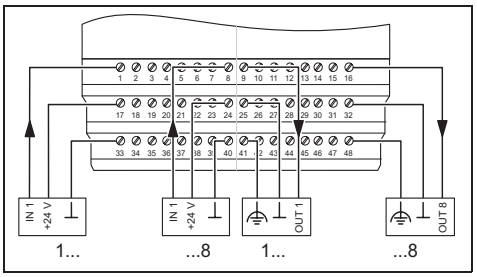
IBS ST 24 BK DIO 8/8/3-...

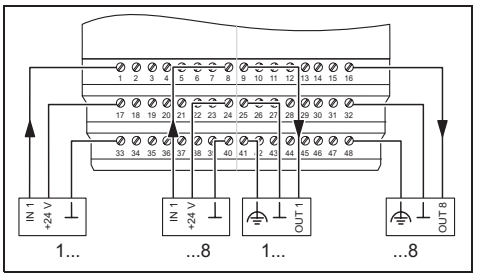
INTERBUS-ST bus terminal module, 24 V DC, eight digital inputs, eight digital outputs, 500 mA, I/Os also available through FLK connector

IBS ST 24 BK-RB-... DIO 8/8/3-LK

INTERBUS-ST bus terminal module, 24 V DC, eight digital inputs, eight digital outputs, 500 mA, additional remote bus branch







Type	Order No.	Pcs. / Pkt.
IBS ST 24 BK RB-T	**2753504**	1
IBS ST 24 BK LB-T	**2753232**	1
IB ST LBC	**2836492**	10
EB 84 IB ST BU	**2836269**	5
EB 84 IB ST RD	**2836272**	5

Type	Order No.	Pcs. / Pkt.
IBS ST 24 BK DIO 8/8/3-T	**2752411**	1
IBS ST 24 BK DIO 8/8/3-LK	**2751218**	1
IB ST LBC	**2836492**	10
EB 84 IB ST BU	**2836269**	5
EB 84 IB ST RD	**2836272**	5

Type	Order No.	Pcs. / Pkt.
IBS ST 24 BK-RB-T DIO 8/8/3-LK	**2723453**	1
IBS ST 24 BK RB-LK DIO8/8/3-LK	**2721662**	1
IB ST LBC	**2836492**	10
EB 84 IB ST BU	**2836269**	5
EB 84 IB ST RD	**2836272**	5

IBS ST 24 BK RB-T	IBS ST 24 BK LB-T	
INTERBUS remote bus 9-pos. D-SUB male/female		
9		
24 V DC 20 V DC ... 30 V DC (including ripple)		
-		
-		
-		
-		
-		
-		
-		
-		
-		
470 g		

IBS ST 24 BK DIO 8/8/3-T	IBS ST 24 BK DIO 8/8/3-LK	
INTERBUS remote bus 9-pos. D-SUB male/female	FSMA male	
9		
24 V DC 18.5 V DC ... 30.5 V DC (including ripple)		
Screw-cage terminal blocks or FLK connectors		
3-wire		
8		
Overload protection		
Screw-cage terminal blocks or FLK connectors		
3-wire		
8		
500 mA		
4 A		
Short circuit protection		
690 g		

IBS ST 24 BK-RB-T DIO 8/8/3-LK	IBS ST 24 BK RB-LK DIO8/8/3-LK	
INTERBUS remote bus FSMA male connectors		
24 V DC 18.5 V DC ... 30.5 V DC (including ripple)		
Screw connection	Screw-cage terminal blocks or FLK connectors	
3-wire		
8		
Overload protection		
Screw connection	Screw-cage terminal blocks or FLK connectors	
3-wire		
8		
500 mA		
4 A		
Short circuit protection		
710 g		

Digital input and output modules

Digital ST input modules are designed for the connection of 24 V DC control signals, such as those generated by buttons, limit switches or electronic proximity switches.

In addition to the IB ST 24 BDI... standard modules, the range is completed by IB ST 24 DI... modules with extended functionality, such as:

– Input channels electrically isolated in groups of four
– Separate electronic short circuit protection of the initiator supply for each channel
– 3 ms input filter for the connection of bouncing mechanical switches.

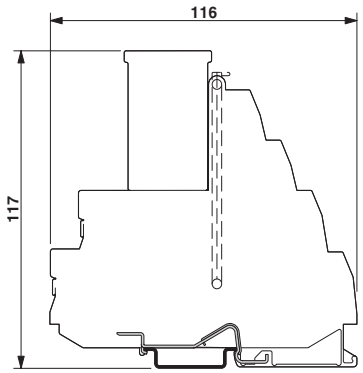
Digital ST output modules are designed for the connection of digital actuators, such as electromechanical valves, contactors or indicator lights. The scope of functions provided by the IB ST 24 BDO... standard modules covers the majority of applications. On top of this, IB ST 24 DO... modules provide additional electronic functions, such as:

– Output channels in up to four electrically isolated groups
– Separate electronic short-circuit protection for each output channel
– Higher output currents for special applications.

Digital ST input/output modules provide the aforementioned properties for the combined connection of eight sensors and eight actuators in a 3-wire system.

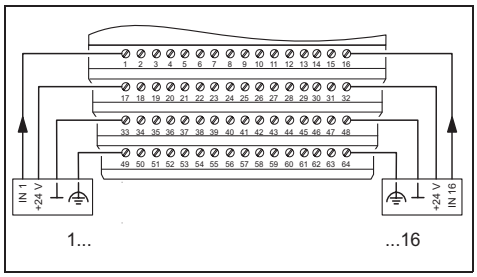
All modules are protected against polarity reversal and the outputs are also fused for protection against short-cercuiting. The status of the fuses is monitored and any errors that may occur, are forwarded to the control system.

Input/output status LEDs and bus diagnostic displays on the top side of the electronic module provide information on the condition of the module at any time.



IB ST 24 ...DI...

INTERBUS-ST digital input module, inputs: 24 V DC



	solid	stranded [mm²]	AWG
Connection data Termination block			
Screw connection	0.2-2.5	0.2-2.5	24-12

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS-ST digital input module, consisting of: terminal part with screw connection and module electronics			
- 16 inputs	**IB ST 24 BDI 16/4**	**2750170**	1
- 16 inputs	**IB ST 24 DI 16/4**	**2754338**	1
- 32 inputs	**IB ST 24 DI32/2**	**2754927**	1
INTERBUS-ST digital output module, consisting of: terminal part with screw connection and module electronics			
- Eight outputs, 250 mA			
- Eight outputs, 2 A			
- 16 outputs, 500 mA			
- 32 outputs			
- 32 outputs			
- 16 relay N/O contact outputs			
INTERBUS-ST digital input/output module, consisting of: terminal part with screw connection and module electronics			
- Eight inputs, eight relay PDT outputs			
- Eight inputs, eight outputs, 2 A			

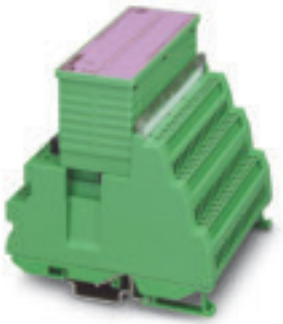
Technical data	IB ST 24 BDI 16/4	IB ST 24 DI32/2
Local bus interface		
Name	ST local bus	
Type of connection	ST local bus connector	
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	20 V DC ... 30 V DC (including ripple)	
Digital inputs		
Connection method	4-wire	2-wire
Number of inputs	16	32
Typical response time	50 µs	3 ms (typical)
Name of protection	-	
Digital outputs		
Connection method	-	
Number of outputs	-	
Maximum output current per channel	-	
Maximum output current per module / terminal block	-	
Protective circuitry	-	
General data		
Weight	755 g	740 g
Width	118 mm	

IB ST 24 ...DO...

INTERBUS-ST digital output module,
outputs: 24 V DC, 3-wire connection method,

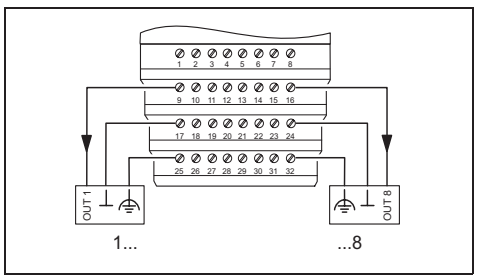
IB ST 24 ...DO...

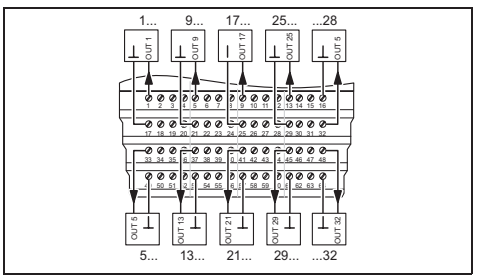
INTERBUS-ST digital output module,
outputs: 24 V DC, 500 mA

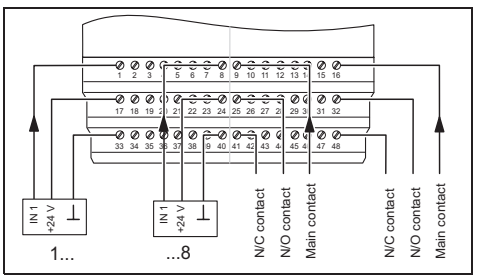


IB ST 24 DIO 8/8(R)/3...

INTERBUS-ST digital input/output module,
inputs: 24 V DC







Type	Order No.	Pcs. / Pkt.
IB ST 24 BDO 8/3	**2750811**	1
IB ST 24 DO 8/3-2A	**2754891**	1
IB ST 24 DO16/3	**2754914**	1

Type	Order No.	Pcs. / Pkt.
IB ST 24 BDO 32/2	**2750824**	1
IB ST 24 DO32/2	**2754325**	1
IB ST 24 DO16R/S	**2721112**	1

Type	Order No.	Pcs. / Pkt.
IB ST 24 DIO 8/8R/3	**2751849**	1
IB ST 24 DIO 8/8/3-2A	**2753708**	1

	IB ST 24 BDO 8/3	IB ST 24 DO16/3
	ST local bus ST local bus connector	
	24 V DC 20 V DC ... 30 V DC (including ripple)	
	- - - -	
	3-wire	
	8	16
	250 mA	500 mA
	2 A	8 A
	Short circuit protection	
	770 g 81 mm	760 g 118 mm

	IB ST 24 BDO 32/2	IB ST 24 DO16R/S
	ST local bus ST local bus connector	
	24 V DC 20 V DC ... 30 V DC (including ripple)	
	- - - -	
	2-wire	3-wire
	32	16
	500 mA	3 A
	16 A	-
	Short circuit protection	
	770 g 118 mm	

	IB ST 24 DIO 8/8R/3	IB ST 24 DIO 8/8/3-2A
	ST local bus ST local bus connector	
	24 V DC 20 V DC ... 30 V DC (including ripple)	
	3-wire 8 3 ms (typ.) Overload protection	
	3-wire	
	8	
	3 A	2 A
	-	16 A
	Short circuit protection	
	770 g 118 mm	

Analog input and output modules

The wide product range of **ST analog input modules** makes it possible to choose the ideal product for a variety of applications. All off-the-shelf analog standard sensors with voltage, current or temperature signals can be acquired.

Particular features of the ST analog input modules are:

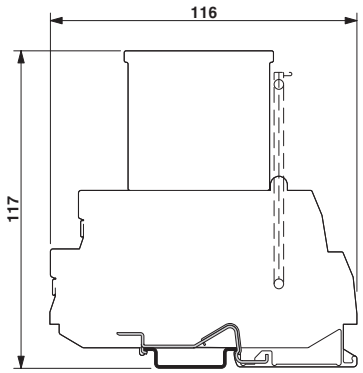
– High level of measuring accuracy
– Extremely fast measured value acquisition
– Very good interference and common mode suppression
– A constant voltage source for the connection of passive sensors.

Analog **ST input modules for temperature measurement** are suitable for the connection of commercial temperature measuring resistors or thermocouples. In addition to the various sensor types, different characteristic curves can be programmed as well.

A new shielding concept for sensors makes it possible to meet more stringent EMC requirements. There is a separate shield connection option for each input, for example, without the need for any external wiring.

ST analog output modules are suitable to connect all actuators operating with the standardized voltage or current ranges between 0 and 10 V or 0(4) and 20 mA or -10 V and +10 V.

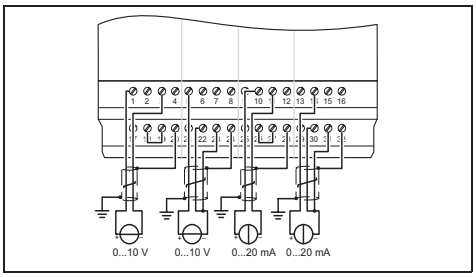
Both signals are made available simultaneously for all channels, which means that current and voltage actuators can be mixed. All off-the-shelf actuators can be connected without additional routing terminals.



IB ST 24 ...AI ...

INTERBUS-ST analog input module

	solid [mm²]	stranded [mm²]	AWG
Connection data Termination block			
Screw connection	0.2-2.5	0.2-2.5	24-12



Description	Type	Order No.	Pcs. / Pkt.
INTERBUS-ST analog input module, consisting of: terminal part with screw connection and module electronics			
- Two inputs, 0 - 20 mA, 4 - 20 mA, 0 - 10 V	**IB ST 24 BAI 2/SF**	**2722771**	1
- Two inputs, ±20 mA, ±10 V	**IB ST 24 BAI 2/BP**	**2725888**	1
- Four inputs, 0 - 20 mA, 0 - 10 V	**IB ST 24 AI 4/SF**	**2754309**	1
- Four inputs, 4 - 20 mA, 0 - 10 V	**IB ST 24 AI 4/SF4**	**2750565**	1
- Four inputs, 4 - 20 mA, ±10 V	**IB ST 24 AI 4/BP**	**2751564**	1
- Four inputs, 0 - 20 mA, 4 - 20 mA, 0 - 10 V			
- Eight inputs, 0 -5 V, 0 -10 V, 0 -25 V, 0 -50 V			
- Eight inputs, 0 - 20 mA, 4 - 20 mA, 0 - 40 mA, 0 - 60 mA			
INTERBUS-ST analog output module, consisting of: terminal part with screw connection and module electronics			
- Four outputs, 0 - 20 mA, 0 - 10 V			
- Four outputs, 4 - 20 mA, 0 - 10 V			
- Four outputs, 0 - 10 V			
- Eight outputs, 0 - 10 V, ±10 V, ±12 V			
INTERBUS-ST analog input module for temperature and resistance measurement, consisting of: terminal part with screw connection and module electronics			
- Four inputs, RTD			
- Eight inputs, TC			

Technical data	IB ST 24 BAI 2/SF	IB ST 24 AI 4/SF
Interface		
Name	ST local bus	
Type of connection	ST local bus connector	
Power supply for module electronics		
Supply voltage	± 24 V DC 5% (ripple)	
Range of supply voltages	20 V DC ... 30 V DC	
Analog inputs		
Connection method	2, 3-wire	2, 3, 4-wire
Number of inputs	2	4
Description of the inputs	-	
Analog outputs		
Connection method	-	
Number of outputs	-	
General data		
Weight	370 g	600 g
Width	81 mm	118 mm

IB ST 24 ...AI ...

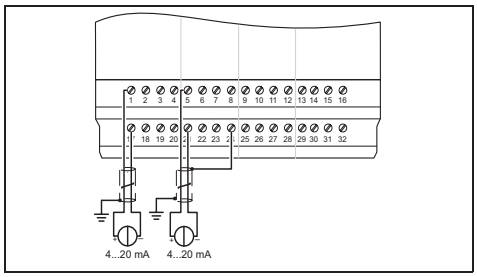
INTERBUS-ST analog input module

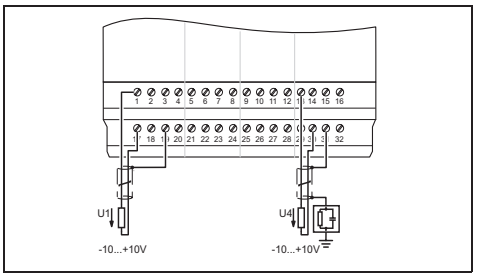
IB ST 24 ...AO ...

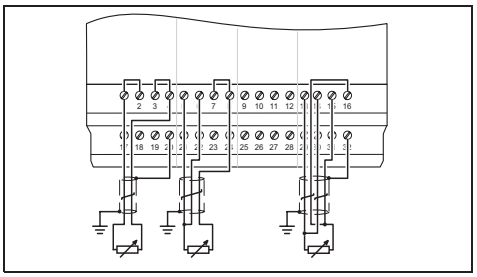
INTERBUS-ST analog output module

IB ST 24 ...

INTERBUS-ST analog input module for temperature recording







Type	Order No.	Pcs. / Pkt.
IB ST 24 AI 4/I	**2719629**	1
IB ST 24 BAI 8/U	**2721015**	1
IB ST 24 BAI 8/I	**2721028**	1

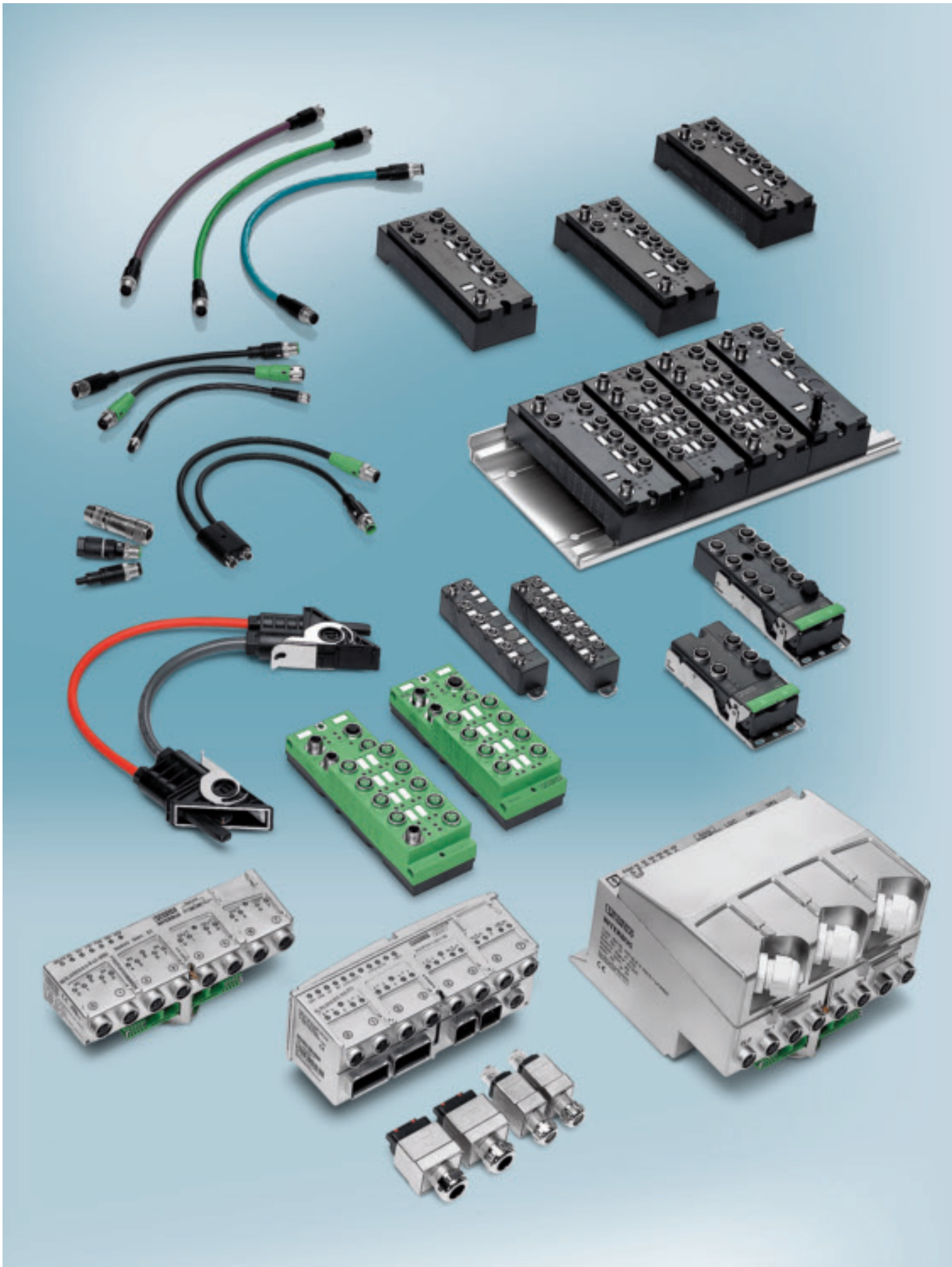
Type	Order No.	Pcs. / Pkt.
IB ST 24 AO 4/SF	**2754312**	1
IB ST 24 AO 4/SF4	**2750578**	1
IB ST 24 AO 4/BP	**2752521**	1
IB ST 24 BAO 8/U	**2721044**	1

Type	Order No.	Pcs. / Pkt.
IB ST 24 PT100 4/4	**2752767**	1
IB ST 24 UTH 8	**2724902**	1

	IB ST 24 AI 4/I	IB ST 24 BAI 8/U
	ST local bus ST local bus connector	
	± 24 V DC 5% (ripple) 18.5 V DC ... 30.2 V DC	
	2-wire	
	4	8
	Differential input	-
	-	
	-	
	465 g	600 g
	118 mm	

	IB ST 24 AO 4/SF	IB ST 24 BAO 8/U
	ST local bus ST local bus connector	
	24 V DC 18.5 V DC ... 30.5 V DC	± 24 V DC 5% (ripple) 18.5 V DC ... 30.2 V DC
	-	
	-	
	-	
	2-wire	
	4	8
	600 g	
	118 mm	

	IB ST 24 PT100 4/4	IB ST 24 UTH 8
	ST local bus ST local bus connector	
	24 V DC 18.5 V DC ... 30.2 V DC	
	2, 3, 4-wire	2-wire
	4	8
	-	
	-	
	-	
	540 g	465 g
	118 mm	



I/O systems in the IP65/67 field

More flexible – smaller – faster – better value

Phoenix Contact is actively pursuing these trends with innovative I/O systems for perfect solutions in field wiring and control cabinet construction.

Fieldline Stand-Alone

Fieldline Stand-Alone is optimally suitable for recording digital inputs and outputs in harsh ambient conditions in machine and system engineering. Fieldline Stand-Alone is the compact design of the Fieldline I/O system. The combination of input/output modules makes a simple connection of commonly used sensors and actuators possible.

A Fieldline Stand-Alone IO-Link master has been added to the Fieldline Stand-Alone product range. Use of the IO-Link technology enables seamless communication from the controller to the sensor/actuator level.

Fieldline Modular

Fieldline Modular offers a cost-effective and high-performance modular solution for complex I/O functions of field wiring.

A Fieldline Modular IO-Link master is now available in the Fieldline Modular product range as well.

Fieldline Extension AS-interface

The AS interface devices of the Fieldline Extension product range are characterized by their ease of operation during mounting and handling.

Rugged Line

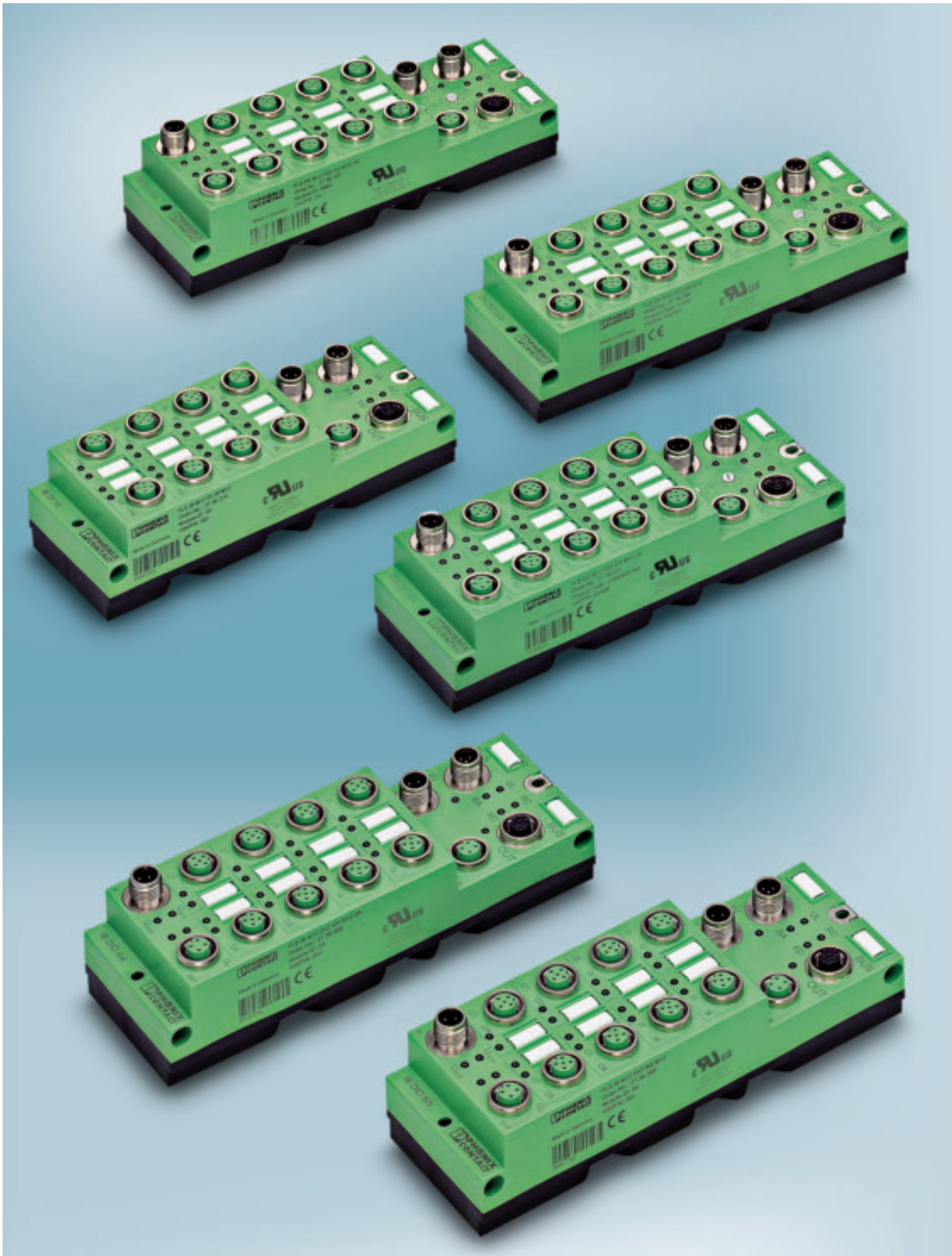
Thanks to their design, the Rugged Line devices enable high availability even in rough industrial environments, e.g. in the automobile industry.

A PROFINET IO device has been added to the existing range of Rugged Line devices. Users thus have the future-oriented PROFINET technology at their disposal even in rough industrial environments.

Program overview

Manuals, data sheets, application notes and **configuration files** can be found in the download area at www.phoenixcontact.net/download.

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).



I/O systems in the IP65/67 field | Fieldline Stand-Alone

Fieldline Stand-Alone is the solution for the decentralization of small numbers of I/Os. Fieldline Stand-Alone can accommodate all commercially available sensors and actuators in a standardized connection method.

The Fieldline Stand-Alone can be connected to the following fieldbus systems:

– INTERBUS
– PROFIBUS
– DeviceNet™
– CANopen

Whether installed on profiles, level surfaces, or under difficult conditions, the Fieldline Stand-Alone mounting concept means flexibility of assembly, reduction in installation costs, and a robust installation that reduces machine downtime.

The two mounting directions provided by Fieldline Stand-Alone devices meet the requirements of every application. Connectors are always positioned so that installation times are kept to a minimum even in difficult mounting conditions.

The revolutionary SPEEDCON fast connection technology from Phoenix Contact is ideal for this. The classic M12 connections can continue to be used with full compatibility.

Program overview

Fieldbus connection

The Fieldline system is an I/O system suitable for all buses. Every Fieldline Stand-Alone device is an independent bus device. The devices are available for the following bus systems:

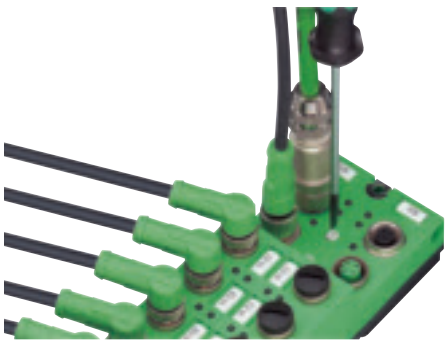
– INTERBUS
– PROFIBUS
– DeviceNet™
– CANopen

The Fieldline Stand-Alone devices can be easily integrated into these networks.

Addressing

For the allocation of device addresses, the Fieldline Stand-Alone devices have a rotary encoding switch to set the address and, if required, the transmission speed for the PROFIBUS-DP, DeviceNet™ and CANopen bus systems. The rotary encoding switch X10 is used to specify the tens, and the switch X1 is used to specify the units of the device ID (module ID).

The rotary encoding switches can be accessed from outside and can be easily operated using a screwdriver.



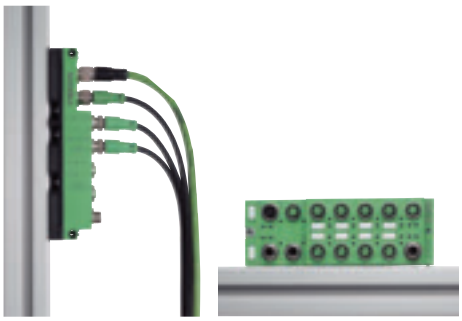
Flexible mounting

Fieldline Stand-Alone devices can be installed on an even mounting surface as follows:

– Directly from the front
  or
– Directly from the side

For direct mounting on the front on a grounded mounting surface, the devices are grounded using the upper mounting screw.

For side mounting and for front mounting on an ungrounded mounting surface, the devices are grounded using cable lugs (2.8 mm) via the external grounding connection.



Simple handling

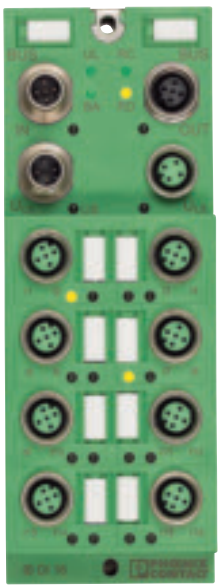
Two housing versions for the Fieldline Stand-Alone devices are available for all bus systems. The digital input devices convince with their compact housing. The devices with a separate actuator supply are only extended by these connections.

The slots of the Fieldline Stand-Alone devices are positioned such that every M12 connector on the device is easy to access and mount.

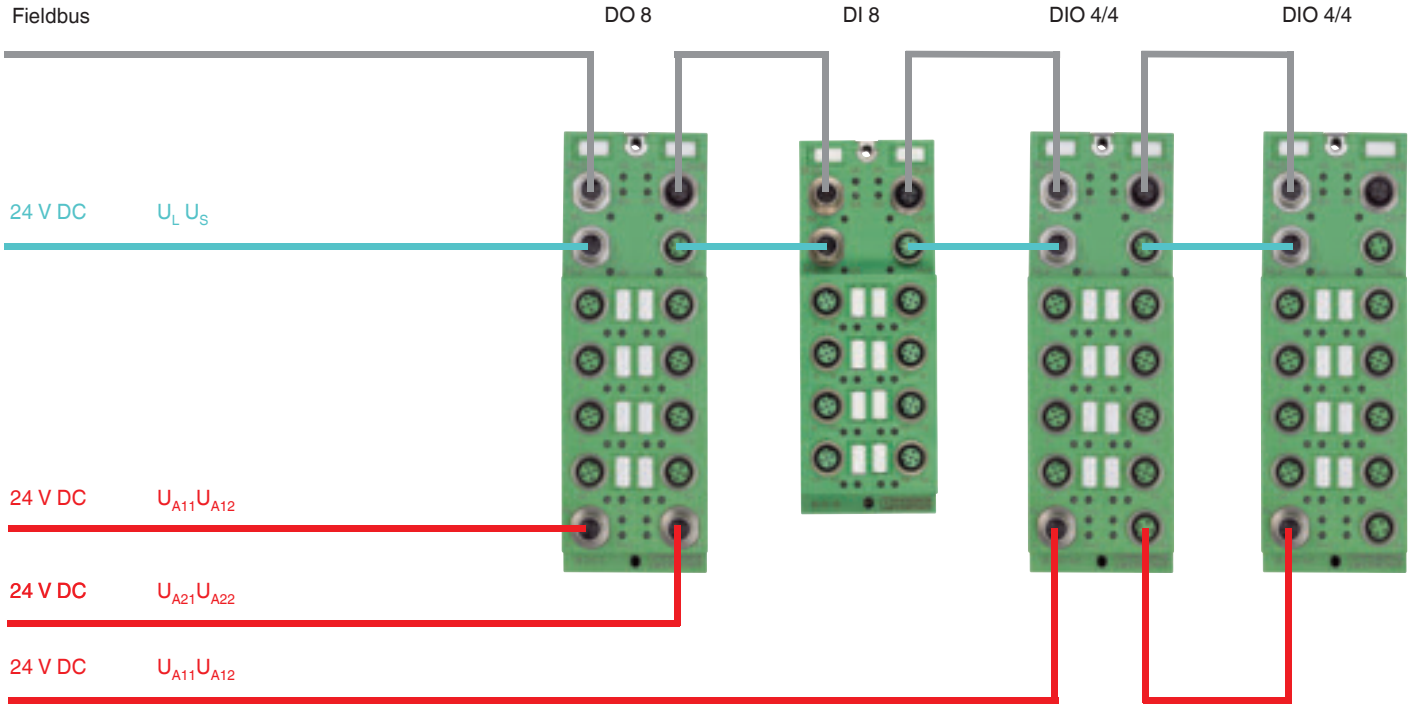
All M12 connections of a Fieldline Stand-Alone device have the SPEEDCON fast connection technology. The "Plug and Turn" method – similar to a bayonet lock – reduces the connection time of M12 connectors by over 90%.

Precise diagnostics

The diagnostic indicators (green/red) indicate whether an error is present or not. In the event of an error, they indicate the error type and location. A Fieldline Stand-Alone device is functioning perfectly if all indicators are green.



The status indicators (yellow) indicate the signal status of the corresponding input/output. If the yellow status indicators are on, this indicates the signal state "1" of the input/output signal.



Device power supply

With INTERBUS and PROFIBUS-DP, the logic voltage U_L and the sensor voltage U_S are supplied via the U_{LS} IN connection. Both voltages are forwarded to the U_{LS} OUT connection.

For DeviceNet™, the voltage U_L is always transferred via the bus cable and supplied at the BUS IN connection via V+/V- and then forwarded via BUS OUT.

For CANopen, the voltage CAN U_L is always transferred via the bus cable and supplied at the BUS IN connection via V+/V- and then forwarded via BUS OUT.

Sensor/actuator power supply

The sensors are supplied from the sensor voltage U_S.

The voltage supply U_A to the actuators is only necessary for the devices that have digital outputs.

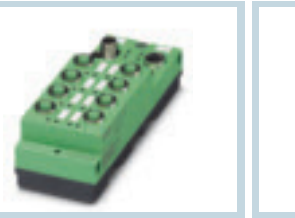
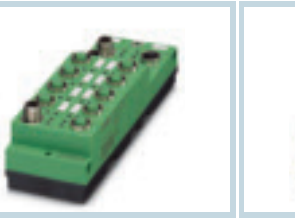
The different functions of the connections - supply for DO devices and supply and forwarding for DIO devices - are due to the different number of outputs and their nominal current. Two voltages are connected to each connection for supplying U_A, e.g. the voltages U_{A11} and U_{A12} at U_{A1}.

Each of these supply voltages supplies a group of outputs. The advantage of this structure is that the outputs can be switched off in groups. The current carrying capacity of the M12 connectors is 4 A per contact. The outputs are protected against short circuits and overloads.

IO-Link

The new standard in the lowermost field level is called IO-Link. With the PROFIBUS slave FLS PB M12 IOL 4 M12, Phoenix Contact provides a device that enables the use of the IO-Link technology with PROFIBUS.

The use of the IO-Link technology enables seamless communication from the controller to the sensor/actuator level. The use of the Fieldline IO-Link master for PROFIBUS can help significantly reduce downtimes and maintenance costs, since it enables the transfer of parameter, diagnostics and service data in addition to process data.

	Digital input		Digital input and output	
	8 channels	16 channels	4 / 4 channels	8/8 channels
				
Type **Order No.**	**FLS IB M12 DI 8 M12** **2736013**	**FLS IB M12 DI 16 M12** **2736314**	**FLS IB M12 DIO 4/4 M12-2A** **2736026**	**FLS IB M12 DIO 8/8 M12** **2736385**
INTERBUS	8 digital inputs, IP65/67 degree of protection	16 digital inputs, IP65/67 degree of protection	4 digital inputs, 4 digital outputs, 2 A, IP65/67 degree of protection	8 digital inputs, 8 digital outputs, 500 mA, IP65/67 degree of protection
Page	**350**	**350**	**351**	**351**
Type **Order No.**	**FLS PB M12 DI 8 M12** **2736123**	**FLS PB M12 DI 16 M12** **2736220**	**FLS PB M12 DIO 4/4 M12-2A** **2736107**	**FLS PB M12 DIO 8/8 M12** **2736372**
PROFIBUS	8 digital inputs, IP65/67 degree of protection	16 digital inputs, IP65/67 degree of protection	4 digital inputs, 4 digital outputs, 2 A, IP65/67 degree of protection	8 digital inputs, 8 digital outputs, 500 mA, IP65/67 degree of protection
Page	**352**	**352**	**353**	**353**
Type **Order No.**	**FLS DN M12 DI 8 M12** **2736068**	**FLS DN M12 DI 16 M12** **2736327**	**FLS DN M12 DIO 4/4 M12-2A** **2736042**	**FLS DN M12 DIO 8/8 M12** **2736398**
DeviceNet	8 digital inputs, IP65/67 degree of protection	16 digital inputs, IP65/67 degree of protection	4 digital inputs, 4 digital outputs, 2 A, IP65/67 degree of protection	8 digital inputs, 8 digital outputs, 500 mA, IP65/67 degree of protection
Page	**354**	**354**	**355**	**355**
Type **Order No.**	**FLS CO M12 DI 8 M12** **2736097**	**FLS CO M12 DI 16 M12** **2736479**	**FLS CO M12 DIO 4/4 M12-2A** **2736071**	**FLS CO M12 DIO 8/8 M12** **2736482**
CANopen	8 digital inputs, IP65/67 degree of protection	16 digital inputs, IP65/67 degree of protection	4 digital inputs, 4 digital outputs, 2 A, IP65/67 degree of protection	8 digital inputs, 8 digital outputs, 500 mA, IP65/67 degree of protection
Page	**356**	**356**	**357**	**357**

	Digital output	IO-Link
	8 channels	8 channels
		
Type Order No.	FLS IB M12 DO 8 M12-2A 2736039	
INTERBUS	8 digital outputs, 2 A, IP65/67 degree of protection	
Page	351	
Type Order No.	FLS PB M12 DO 8 M12-2A 2736110	FLS PB M12 IOL 4 M12 2736987
PROFIBUS	8 digital outputs, 2 A, IP65/67 degree of protection	4 IO-Link ports, IP65/67 degree of protection
Page	353	358
Type Order No.	FLS DN M12 DO 8 M12-2A 2736055	
DeviceNet	8 digital outputs, 2 A, IP65/67 degree of protection	
Page	355	
Type Order No.	FLS CO M12 DO 8 M12-2A 2736084	
CANopen	8 digital outputs, 2 A, IP65/67 degree of protection	
Page	357	

INTERBUS M12

INTERBUS has been designed as a fast sensor/actuator bus for the transmission of process data in an industrial environment.

Because of its transmission method and ring topology, INTERBUS offers outstanding performance features such as fast, cyclic and equidistant transmission of process data, optimum diagnostics to minimize downtimes as well as the easiest handling and installation ("Plug & Play").

The bus is connected using two M12 plug connectors, which supply the remote bus and forward INTERBUS signals.

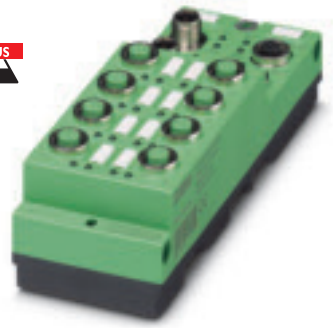
Fieldline M12 stand-alone devices enable the connection of sensors and actuators using standard M12 connectors.

Inputs, outputs, and combinations of the two are implemented as functions that enable the flexible and high-performance connection of popular sensors and actuators.

In order to be able to use Fieldline devices in INTERBUS systems with all functionalities, it is necessary to use controller boards with firmware 4.4x or later.

The high-performance SPEEDCON technology used allows connection times to be reduced by up to 90%.
The classic M12 connections can continue to be used with full compatibility.

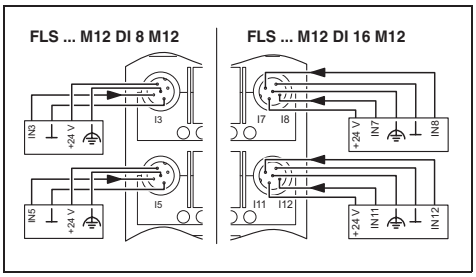
Refer to the Fieldline Accessories pages in this catalog for accessories and infrastructure components for the system cabling, installation and power supply.



FLS IB M12 DI ... M12

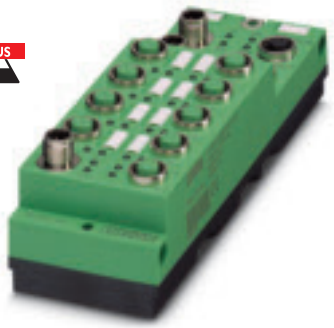
Fieldline stand-alone digital input device,
INTERBUS M12,
inputs: 24 V DC

Ex:



Description	Type	Order No.	Pcs. / Pkt.
Fieldline stand-alone digital input device, INTERBUS M12			
- 8 inputs	**FLS IB M12 DI 8 M12**	**2736013**	1
- 16 inputs	**FLS IB M12 DI 16 M12**	**2736314**	1
Fieldline stand-alone digital I/O device, INTERBUS M12			
- 4 inputs, 4 outputs			
- Eight inputs, eight outputs			
Fieldline stand-alone digital output device, INTERBUS M12			
- 8 outputs			
Screw plug	**PROT-M12**	**1680539**	5
Marking labels, unprinted	**ZBF 12:UNBEDRUCKT**	**0809735**	10

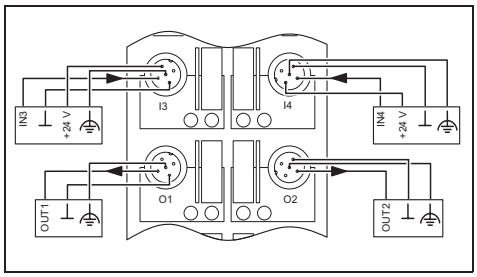
Technical data	FLS IB M12 DI 8 M12	FLS IB M12 DI 16 M12
Interface		
Fieldbus system	INTERBUS	
Name	Remote bus	
Type of connection	2 M12 connectors, B-coded	
Transmission rate	500 kBaud	
Power supply for module electronics		
Supply voltage	24 V DC	
Type of connection	M12 connectors, (A-coded)	
Range of supply voltages	18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
Digital inputs		
Type of connection	M12 connector	M12 connectors, double occupancy
Connection method	2, 3, 4-wire	
Number of inputs	8	16
Filter time	3 ms	1 ms
Input characteristic curve	IEC 61131-2 type 1	
Protective circuitry	Polarity protection	
Digital outputs		
Type of connection	-	
Connection method	-	
Number of outputs	-	
Maximum output current per channel	-	
Protective circuitry	-	
General data		
Weight	310 g	
Bore hole spacing	151 mm	
Width	60 mm	
Height	161 mm	
Depth	44.5 mm	
Degree of protection	IP65/67	



FLS IB M12 DIO 4/4 M12-2A

Fieldline stand-alone digital I/O device,
INTERBUS M12,
inputs: 24 V DC, outputs: 24 V DC, 2 A

Ex:



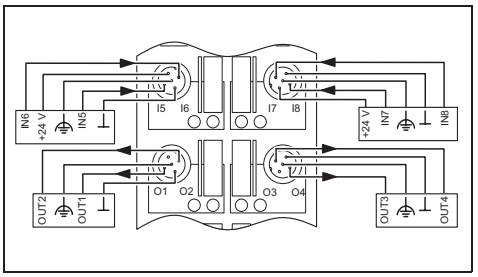
Type	Order No.	Pcs. / Pkt.
FLS IB M12 DIO 4/4 M12-2A	2736026	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

INTERBUS Remote bus 2 M12 connectors, B-coded 500 kBaud	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 connector 2, 3, 4-wire 4 3 ms IEC 61131-2 type 1 Polarity protection	
M12 connector 2, 3-wire 4 2 A Short circuit protection	
340 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

FLS IB M12 DIO 8/8 M12

Fieldline stand-alone digital I/O device,
INTERBUS M12 ,
inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex:



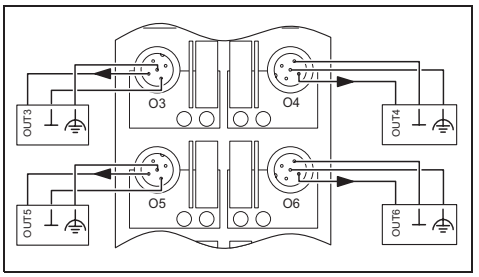
Type	Order No.	Pcs. / Pkt.
FLS IB M12 DIO 8/8 M12	2736385	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

INTERBUS Remote bus 2 M12 connectors, B-coded 500 kBaud	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 connectors, double occupancy 2, 3, 4-wire 8 3 ms IEC 61131-2 type 1 Polarity protection	
M12 connector 2, 3-wire 8 500 mA Short circuit protection	
340 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

FLS IB M12 DO 8 M12-2A

Fieldline stand-alone digital output device,
INTERBUS M12,
outputs: 24 V DC, 2 A

Ex:



Type	Order No.	Pcs. / Pkt.
FLS IB M12 DO 8 M12-2A	2736039	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

INTERBUS Remote bus 2 M12 connectors, B-coded 500 kBaud	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
-	
-	
-	
-	
-	
M12 connector 2, 3-wire 8 2 A Short circuit protection	
350 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

PROFIBUS M12

PROFIBUS DP is an open bus system in automation engineering and is standardized through international norms.

Cyclic or acyclical communication takes place via a shielded two-wire line.

The transmission rate is up to 12 Mbaud and thus meets the requirements for short system response times. The baud rate is automatically selected in case of Fieldline PROFIBUS devices.

The module address is simply set using rotary coded switches that are accessible from the outside.

User-friendly device master files (GSD) allow the system to be configured simply and reliably.

Indicators and the bus provide comprehensive diagnostic messages, which enable quick and easy error localization.

The bus can be optionally connected using two M12 connections or T-pieces.

Fieldline M12 stand-alone devices enable the connection of sensors and actuators using standard M12 connectors.

Inputs, outputs, and combinations of the two are implemented as functions that enable the flexible and high-performance connection of popular sensors and actuators.

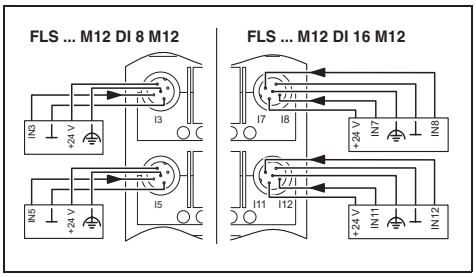
The high-performance SPEEDCON technology used allows connection times to be reduced by up to 90%.
The classic M12 connections can continue to be used with full compatibility.

Refer to the Fieldline Accessories pages in this catalog for accessories and infrastructure components for the system cabling, installation and power supply.

FLS PB M12 DI ... M12

Fieldline stand-alone digital input device,
PROFIBUS M12,
inputs: 24 V DC

Ex:



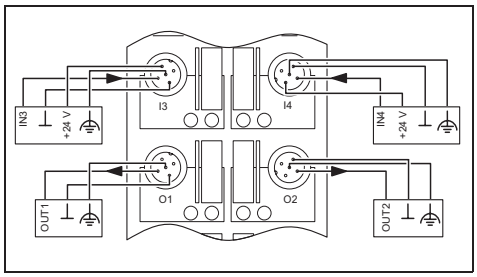
Description	Type	Order No.	Pcs. / Pkt.
Fieldline stand-alone digital input device, PROFIBUS M12			
- 8 inputs	**FLS PB M12 DI 8 M12**	**2736123**	1
- 16 inputs	**FLS PB M12 DI 16 M12**	**2736220**	1
Fieldline stand-alone digital I/O device, PROFIBUS M12			
- 4 inputs, 4 outputs - Eight inputs, eight outputs			
Fieldline stand-alone digital output device, PROFIBUS M12			
- 8 outputs			
Screw plug	**PROT-M12**	**1680539**	5
Marking labels, unprinted	**ZBF 12:UNBEDRUCKT**	**0809735**	10

Technical data	FLS PB M12 DI 8 M12	FLS PB M12 DI 16 M12
Interface		
Fieldbus system	PROFIBUS DP	
Name	PROFIBUS-DP	
Type of connection	2 M12 connectors, B-coded	
Transmission rate	9.64 Kbaud to 12 Mbaud automatic detection	
Address space assignment	1 ... 99, can be set	
Power supply for module electronics		
Supply voltage	24 V DC	
Type of connection	M12 connectors, (A-coded)	
Range of supply voltages	18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
Digital inputs		
Type of connection	M12 connector	M12 connectors, double occupancy
Connection method	2, 3, 4-wire	
Number of inputs	8	16
Filter time	3 ms	1 ms
Input characteristic curve	IEC 61131-2 type 1	
Protective circuitry	Polarity protection	
Digital outputs		
Type of connection	-	
Connection method	-	
Number of outputs	-	
Maximum output current per channel	-	
Protective circuitry	-	
General data		
Weight	310 g	
Bore hole spacing	151 mm	
Width	60 mm	
Height	161 mm	
Depth	44.5 mm	
Degree of protection	IP65/67	

FLS PB M12 DIO 4/4 M12-2A

Fieldline stand-alone digital I/O device,
PROFIBUS M12,
inputs: 24 V DC, outputs: 24 V DC, 2 A

Ex:



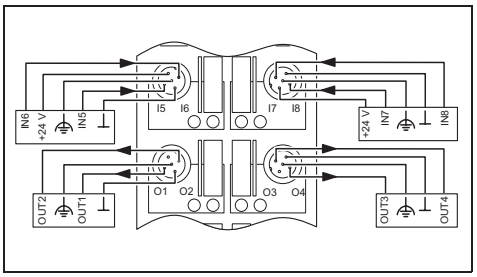
Type	Order No.	Pcs. / Pkt.
FLS PB M12 DIO 4/4 M12-2A	2736107	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

PROFIBUS DP PROFIBUS-DP 2 M12 connectors, B-coded 9.64 Kbaud to 12 Mbaud automatic detection 1 ... 99, can be set	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 connector 2, 3, 4-wire 4 3 ms IEC 61131-2 type 1 Polarity protection	
M12 connector 2, 3-wire 4 2 A Short circuit protection	
340 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

FLS PB M12 DIO 8/8 M12

Fieldline stand-alone digital I/O device,
PROFIBUS M12,
inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex:



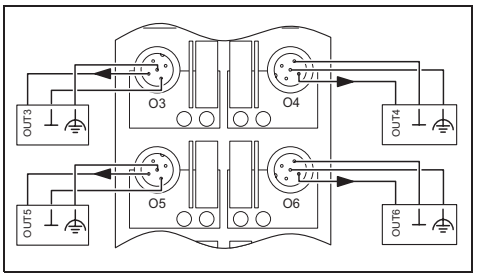
Type	Order No.	Pcs. / Pkt.
FLS PB M12 DIO 8/8 M12	2736372	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

PROFIBUS DP PROFIBUS-DP 2 M12 connectors, B-coded 9.64 Kbaud to 12 Mbaud automatic detection 1 ... 99, can be set	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 connectors, double occupancy 2, 3, 4-wire 8 3 ms IEC 61131-2 type 1 Polarity protection	
M12 connector 2, 3-wire 8 500 mA Short circuit protection	
340 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

FLS PB M12 DO 8 M12-2A

Fieldline stand-alone digital output device,
PROFIBUS M12,
outputs: 24 V DC, 2 A

Ex:



Type	Order No.	Pcs. / Pkt.
FLS PB M12 DO 8 M12-2A	2736110	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

PROFIBUS DP PROFIBUS-DP 2 M12 connectors, B-coded 9.64 Kbaud to 12 Mbaud automatic detection 1 ... 99, can be set	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
- - - - - -	
M12 connector 2, 3-wire 8 2 A Short circuit protection	
350 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

DeviceNet™ M12

DeviceNet™is a sensor/actuator bus system based on CAN. Various types of communication (polling, change of state, cyclic, strobed) are used to achieve optimum transmission times with the particular data types.

Fieldline-DeviceNet™ devices automatically adapt to the system baud rate. The communication address is set using rotary encoding switches that are easily accessible from the outside.

User-friendly "electronic data sheets" (EDS) help in configuring the DeviceNet™ system.

Indicators and the bus provide comprehensive diagnostic messages, which enable quick and easy error localization.

The bus can be optionally connected using two M12 connections or T-pieces.

Fieldline M12 stand-alone devices enable the connection of sensors and actuators using standard M12 connectors.

Inputs, outputs, and combinations of the two are implemented as functions that enable the flexible and high-performance connection of popular sensors and actuators.

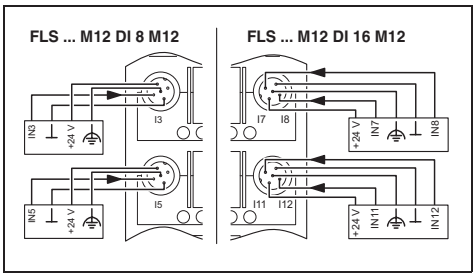
The high-performance SPEEDCON technology used allows connection times to be reduced by up to 90%.
The classic M12 connections can continue to be used with full compatibility.

Refer to the Fieldline Accessories pages in this catalog for accessories and infrastructure components for the system cabling, installation and power supply.

FLS DN M12 DI ... M12

Fieldline stand-alone digital input device,
DeviceNet™ M12,
inputs: 24 V DC

Ex:



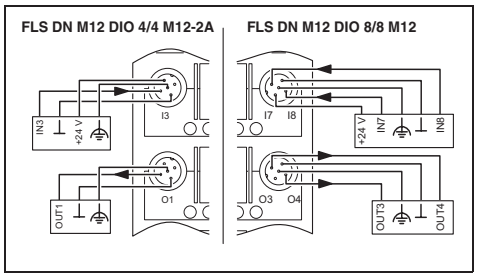
Description	Type	Order No.	Pcs. / Pkt.
Fieldline stand-alone digital input device, DeviceNet™ M12			
- 8 inputs	**FLS DN M12 DI 8 M12**	**2736068**	1
- 16 inputs	**FLS DN M12 DI 16 M12**	**2736327**	1
Fieldline stand-alone digital I/O device, DeviceNet™ M12			
- 4 inputs, 4 outputs			
- Eight inputs, eight outputs			
Fieldline stand-alone digital output device, DeviceNet™ M12			
- 8 outputs			
Screw plug	**PROT-M12**	**1680539**	5
Marking labels, unprinted	**ZBF 12:UNBEDRUCKT**	**0809735**	10

Technical data	FLS DN M12 DI 8 M12	FLS DN M12 DI 16 M12
Interface		
Fieldbus system	DeviceNet™	
Type of connection	2 M12 connectors, A-coded	
Transmission rate	125 kBaud, 250 kBaud, 500 kBaud automatic detection	
Address space assignment	0 ... 63, can be set	
Power supply for module electronics		
Supply voltage	24 V DC	
Type of connection	M12 connectors, (A-coded)	
Range of supply voltages	18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
Digital inputs		
Type of connection	M12 connector	M12 connectors, double occupancy
Connection method	2, 3, 4-wire	
Number of inputs	8	16
Filter time	3 ms	1 ms
Input characteristic curve	IEC 61131-2 type 1	
Protective circuitry	Polarity protection	
Digital outputs		
Type of connection	-	
Connection method	-	
Number of outputs	-	
Maximum output current per channel	-	
Protective circuitry	-	
General data		
Weight	310 g	
Bore hole spacing	151 mm	
Width	60 mm	
Height	161 mm	
Depth	44.5 mm	
Degree of protection	IP65/67	

FLS DN M12 DIO ... M12...

Fieldline stand-alone digital I/O device,
DeviceNet™ M12,
inputs: 24 V DC, outputs: 24 V DC

Ex:



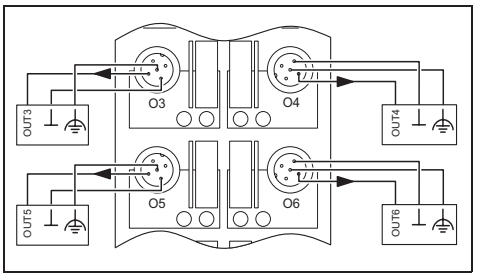
Type	Order No.	Pcs. / Pkt.
FLS DN M12 DIO 4/4 M12-2A	2736042	1
FLS DN M12 DIO 8/8 M12	2736398	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

	FLS DN M12 DIO 4/4 M12-2A	FLS DN M12 DIO 8/8 M12
	DeviceNet™ 2 M12 connectors, A-coded 125 kBaud, 250 kBaud, 500 kBaud automatic detection	
	0 ... 63, can be set	
	24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
	M12 connector	M12 connectors, double occupancy
	2, 3, 4-wire	
	4	8
	3 ms	
	IEC 61131-2 type 1	
	Polarity protection	
	M12 connector 2, 3-wire	
	4	8
	2 A	500 mA
	Short circuit protection	
	340 g	
	168 mm	
	60 mm	
	178 mm	
	49.3 mm	
	IP65/67	

FLS DN M12 DO 8 M12-2A

Fieldline stand-alone digital output device,
DeviceNet™ M12,
outputs: 24 V DC, 2 A

Ex:



Type	Order No.	Pcs. / Pkt.
FLS DN M12 DO 8 M12-2A	2736055	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

DeviceNet™ 2 M12 connectors, A-coded 125 kBaud, 250 kBaud, 500 kBaud automatic detection
0 ... 63, can be set
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)
-
-
-
-
-
-
M12 connector 2, 3-wire
8
2 A
Short circuit protection
350 g
168 mm
60 mm
178 mm
49.3 mm
IP65/67

CANopen M12

CANopen is a sensor/actuator bus system based on CAN. The various types of communication supported by CANopen are used to achieve optimum transmission times with the accrued data types.

Fieldline CANopen devices automatically adapt to the system baud rate. The communication address is set using rotary encoding switches that are easily accessible from the outside.

User-friendly "electronic data sheets" (EDS) help in configuring the CANopen system.

Indicators and the bus provide comprehensive diagnostic messages, which enable quick and easy error localization.

The bus can be optionally connected using two M12 connections or T-pieces.

Fieldline M12 stand-alone devices enable the connection of sensors and actuators using standard M12 connectors.

Inputs, outputs, and combinations of the two are implemented as functions that enable the flexible and high-performance connection of popular sensors and actuators.

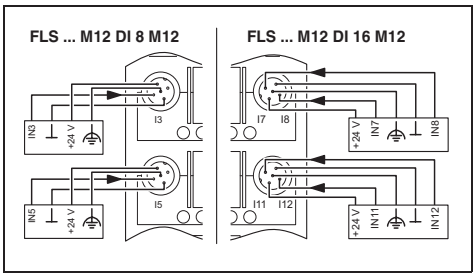
The high-performance SPEEDCON technology used allows connection times to be reduced by up to 90%.
The classic M12 connections can continue to be used with full compatibility.

Refer to the Fieldline Accessories pages in this catalog for accessories and infrastructure components for the system cabling, installation and power supply.

FLS CO M12 DI ... M12

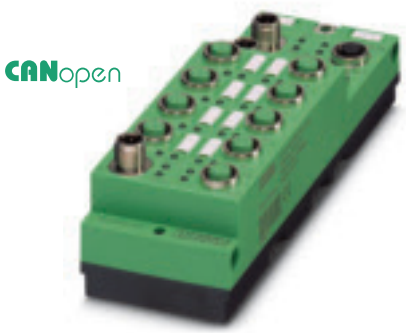
Fieldline stand-alone digital input device, CANopen M12, inputs: 24 V DC

Ex:



Description	Type	Order No.	Pcs. / Pkt.
Fieldline stand-alone digital input device, CANopen M12			
- 8 inputs	**FLS CO M12 DI 8 M12**	**2736097**	1
- 16 inputs	**FLS CO M12 DI 16 M12**	**2736479**	1
Fieldline stand-alone digital I/O device, CANopen M12			
- 4 inputs, 4 outputs - Eight inputs, eight outputs			
Fieldline stand-alone digital output device, CANopen M12			
- 8 outputs			
Screw plug	**PROT-M12**	**1680539**	5
Marking labels, unprinted	**ZBF 12:UNBEDRUCKT**	**0809735**	10

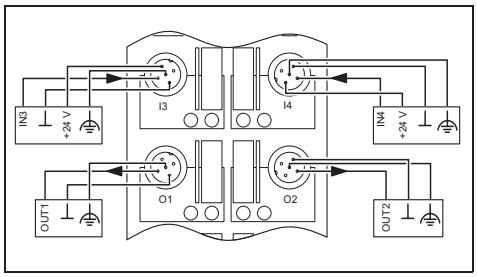
Technical data	FLS CO M12 DI 8 M12	FLS CO M12 DI 16 M12
Interface		
Fieldbus system	CANopen	
Type of connection	2 M12 connectors, A-coded	
Transmission rate	Maximum 1 Mbaud automatic detection	
Address space assignment	1 ... 126, adjustable	
Power supply for module electronics		
Supply voltage	24 V DC	
Type of connection	M12 connectors, (A-coded)	
Range of supply voltages	18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
Digital inputs		
Type of connection	M12 connector	M12 connectors, double occupancy
Connection method	2, 3, 4-wire	
Number of inputs	8	16
Filter time	3 ms	1 ms
Input characteristic curve	IEC 61131-2 type 1	
Protective circuitry	Polarity protection	
Digital outputs		
Type of connection	-	
Connection method	-	
Number of outputs	-	
Maximum output current per channel	-	
Protective circuitry	-	
General data		
Weight	310 g	
Bore hole spacing	151 mm	
Width	60 mm	
Height	161 mm	
Depth	44.5 mm	
Degree of protection	IP65/67	



FLS CO M12 DIO 4/4 M12-2A

Fieldline stand-alone digital I/O device,
CANopen M12,
inputs: 24 V DC, outputs: 24 V DC, 2 A

Ex:



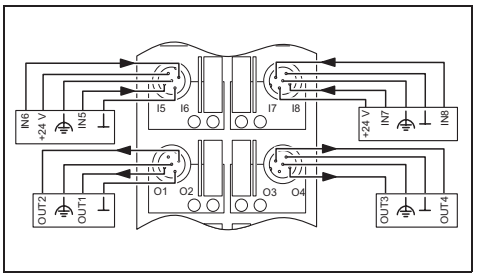
Type	Order No.	Pcs. / Pkt.
FLS CO M12 DIO 4/4 M12-2A	2736071	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

CANopen 2 M12 connectors, A-coded Maximum 1 Mbaud automatic detection 1 ... 126, adjustable	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 connector 2, 3, 4-wire 4 3 ms IEC 61131-2 type 1 Polarity protection	
M12 connector 2, 3-wire 4 2 A Short circuit protection	
340 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

FLS CO M12 DIO 8/8 M12

Fieldline stand-alone digital I/O device,
CANopen M12
inputs: 24 V DC, outputs: 24 V DC, 500 mA

Ex:



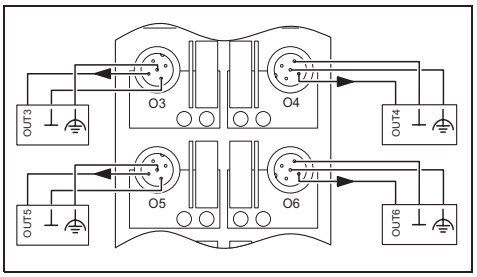
Type	Order No.	Pcs. / Pkt.
FLS CO M12 DIO 8/8 M12	2736482	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

CANopen 2 M12 connectors, A-coded Maximum 1 Mbaud automatic detection 1 ... 126, adjustable	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 connectors, double occupancy 2, 3, 4-wire 8 3 ms IEC 61131-2 type 1 Polarity protection	
M12 connector 2, 3-wire 8 500 mA Short circuit protection	
350 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

FLS CO M12 DO 8 M12-2A

Fieldline stand-alone digital output device,
CANopen M12,
outputs: 24 V DC, 2 A

Ex:



Type	Order No.	Pcs. / Pkt.
FLS CO M12 DO 8 M12-2A	2736084	1
PROT-M12	1680539	5
ZBF 12:UNBEDRUCKT	0809735	10

CANopen 2 M12 connectors, A-coded Maximum 1 Mbaud automatic detection 1 ... 126, adjustable	
24 V DC M12 connectors, (A-coded) 18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
-	
-	
-	
-	
-	
M12 connector 2, 3-wire 8 2 A Short circuit protection	
350 g 168 mm 60 mm 178 mm 49.3 mm IP65/67	

PROFIBUS IO-Link master

IO-link is the new standard for continuous communication from the control system to the lowest field level. Within the scope of IO-link communication, the process data is forwarded during parallel service data transfer.

With the PROFIBUS slave FLS PB M12 IOL 4 M12, Phoenix Contact provides a device that makes it possible to operate up to four IO-link sensors.

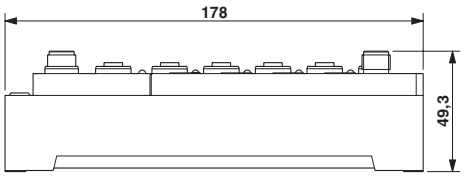
The service channel of these sensors is completely supported via PROFIBUS-DP/V1. Moreover, the device also provides a process data channel that provides the same options for accessing an IO-link sensor as the acyclical PROFIBUS-DP/V1 channel. Integration into any PROFIBUS-DP environments is thus ensured.

The connection to PROFIBUS is established using two B-encoded M12 connectors. The device address is set using rotary encoding switches. The transmission speed is up to 12 MBaud and is set via an automatic Baud rate detection unit.

The connection of the four IO-Link ports is established using 5-pos. A-coded M12 connectors.

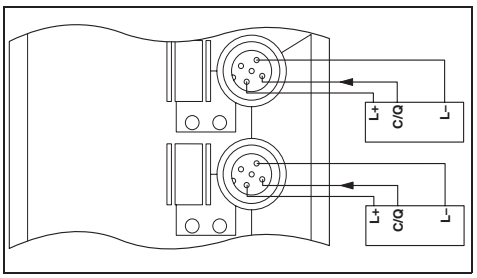
The IO-link port power supply unit is protected against short-circuits and overload. An integrated short-circuit contactor is provided for the digital outputs in the SIO mode.

The diagnostic and status indicators for voltage supply, bus connection and IO-link ports with the corresponding monitoring functions reduce bus downtime and provide support if service becomes necessary.



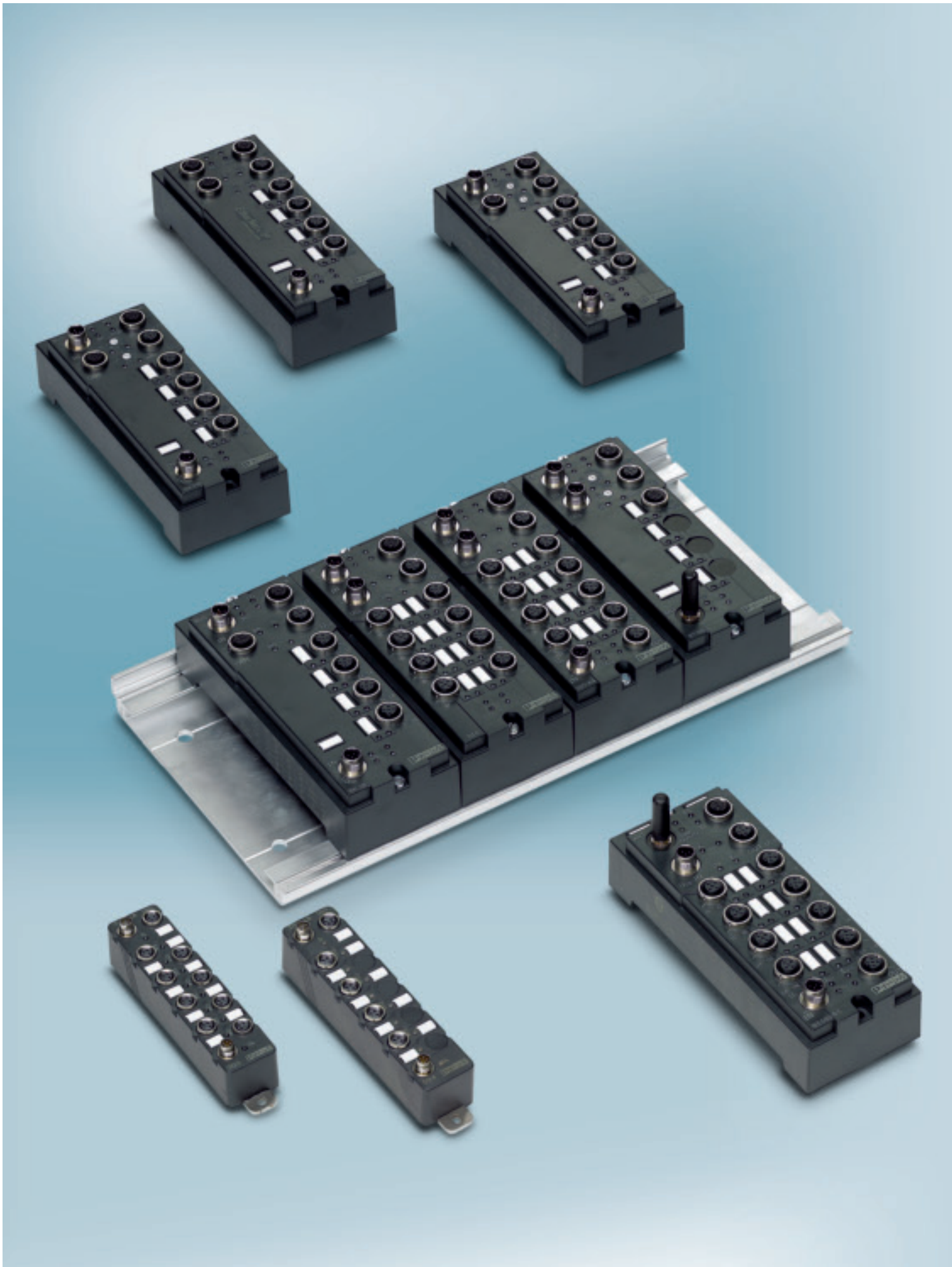
FLS PB M12 IOL 4 M12

Fieldline stand-alone device, PROFIBUS M12, IO-Link master with four 4 IO-Link ports, 24 V DC



Description	Type	Order No.	Pcs. / Pkt.
Fieldline stand-alone device, PROFIBUS M12			
- IO-Link master with four 4 IO-Link ports	**FLS PB M12 IOL 4 M12**	**2736987**	1
Screw plug	**PROT-M12**	**1680539**	5
Marking labels, unprinted	**ZBF 12:UNBEDRUCKT**	**0809735**	10

Technical data	
Interface	
Name	PROFIBUS-DP
Type of connection	2 M12 connectors, B-coded
Transmission rate	9.64 Kbaud to 12 Mbaud automatic detection
Power supply for module electronics	
Supply voltage	24 V DC
Type of connection	M12 connector
Range of supply voltages	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
IO-Link ports	
Type of connection	M12 connector
Connection method	3-wire
Number of ports	4
IO-Link port supply	
Sensor supply voltage	min U_S -1 V
Nominal current for every IO-Link port	200 mA
Nominal current per device	800 mA
Protective circuitry	Overload protection Electronics in the device Short circuit protection Electronics in the device
General data	
Weight	280 g
Bore hole spacing	168 mm
Width	60 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-25°C ... 85°C



FLM DIO 8/4 M8...

Fieldline Modular M8 local bus device,
inputs: 24 V DC, inputs/outputs: 24 V DC, 500 mA

FLM DO 4 M8-2A...

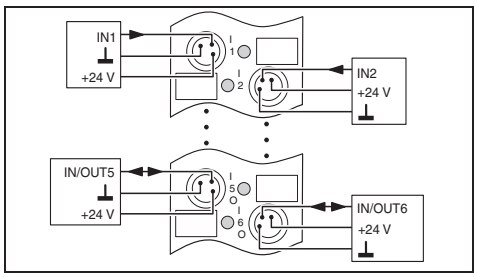
Fieldline Modular M8 local bus device,
outputs: 24 V DC, 2 A

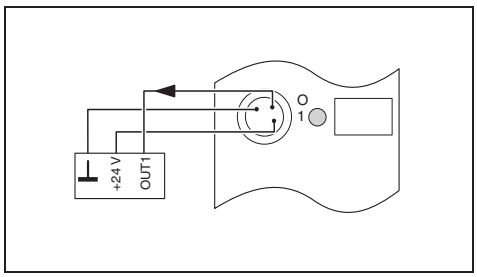
FLM DO 8 M8...

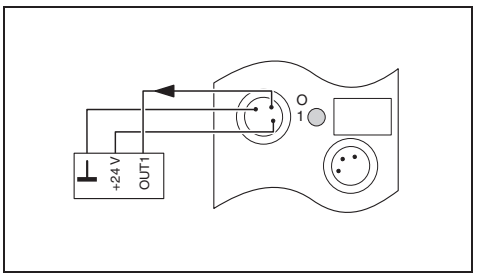
Fieldline Modular M8 local bus device,
outputs: 24 V DC, 500 mA

Ex:

Applied for: UL / CUL / UL-EX / CUL-EX







Type	Order No.	Pcs. / Pkt.
FLM DIO 8/4 M8	**2773351**	1
FLM DIO 8/4 M8-2MBD	**2773568**	1
PROT-M8	**1682540**	5
ZBF 8:UNBEDRUCKT	**0808781**	10

Type	Order No.	Pcs. / Pkt.
FLM DO 4 M8-2A	**2736932**	1
FLM DO 4 M8-2A-2MBD	**2773584**	1
PROT-M8	**1682540**	5
ZBF 8:UNBEDRUCKT	**0808781**	10

Type	Order No.	Pcs. / Pkt.
FLM DO 8 M8	**2736893**	1
FLM DO 8 M8-2MBD	**2773571**	1
PROT-M8	**1682540**	5
ZBF 8:UNBEDRUCKT	**0808781**	10

Local bus	Local bus	Local bus
2 M8 connectors	2 M8 connectors	2 M8 connectors
24 V DC	24 V DC	24 V DC
M8 connector	M8 connector	M8 connector
18 V DC ... 30 V DC IEC 61131-2 (including ripple)	18 V DC ... 30 V DC IEC 61131-2 (including ripple)	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
M8 connector	-	-
2, 3-wire	-	-
8	-	-
4 fixed, 4 freely selectable	-	-
3 ms	-	-
IEC 61131-2 type 1	-	-
Polarity protection	-	-
M8 connector	M8 connector	M8 connector
2, 3-wire	2, 3-wire	2, 3-wire
4	4	8
Can also be used as inputs	-	-
500 mA	2 A	500 mA
Short circuit protection	Short circuit protection	Short circuit protection
144 g	137 g	137 g
133 mm	133 mm	133 mm
29.8 mm	29.8 mm	29.8 mm
IP65/67	IP65/67	IP65/67

Accessories

With the FLM ADAP M12/M8 adapter, the new Fieldline Modular M8 devices are connected to a bus coupler or an I/O device of the Fieldline Modular M12 system.

The local bus as well as the logic and sensor voltage are supplied to the adapter using M12 connectors and converted for the M8 system cable to 4-pos. M8 female and male connectors for the incoming and outgoing M8 local bus. The FLM ADAP M12/M8 adapter is simply fixed centered with an M4 screw.

The IB IL 24 FLM-PAC Inline branch terminal makes it possible to connect a Fieldline Modular M8 and an M12 local bus at the end of an Inline modular station. Several M8 local bus branches can be created anywhere in the Inline local bus using IB IL 24 FLM MULTI-PAC.

FLM ADAP M12/M8

Description	Type	Order No.	Pcs. / Pkt.
Adapter piece for coupling Fieldline Modular M8 local bus devices to a Fieldline Modular M12 local bus	**FLM ADAP M12/M8**	**2736961**	1
Inline Modular branch terminal for coupling one Fieldline Modular M8 local bus at the end of an Inline station	**IB IL 24 FLM-PAC**	**2736903**	1
Inline Modular branch terminal for coupling one Fieldline Modular M8 local bus to any location on each Inline station	**IB IL 24 FLM MULTI-PAC**	**2737009**	1

Technical data	
Local bus interface	
Interface	Fieldline Modular M12 local bus
Type of connection	M12 connectors, B-coded
Number of positions	5
Local bus interface	
Interface	Fieldline Modular M8 local bus
Type of connection	2 M8 connectors
Number of positions	4

Accessories

Fieldline Modular mounting plates FLM MP 5 and FLM MP 7 make it possible to install up to 5 or 7 Fieldline Modular devices on any surface easily.

The devices are attached to the mounting plate using standard M4x40 screws (not included in the scope of supply). These screws are screwed into an integrated threaded channel.

FLM MP ...

Description	Type	Order No.	Pcs. / Pkt.
Fieldline Modular mounting plate			
- For five Fieldline Modular M12 devices	**FLM MP 5**	**2736660**	1
- For seven Fieldline Modular M12 devices	**FLM MP 7**	**2736673**	1

Technical data	FLM MP 5	FLM MP 7
General data		
Width	360 mm	502 mm
Depth	11 mm	
Height	185 mm	
Hole diameter	8.50 mm	
Note on dimensions	For fastening the mounting plate	
Assembly instructions	For mounting 5 Fieldline modular devices	For mounting 7 Fieldline modular devices
Material	Chromated aluminum	
Weight	650 g	900 g

Accessories

Infrastructure components such as T-pieces or terminating resistors are available for optimal integration of Fieldline components into PROFIBUS, DeviceNet™ or CANopen networks.

The M12 Y SAC-3P-M12Y/2XM12FS PE distributor helps in using double-occupied I/O connections.

SAC-...

Description	Type	Order No.	Pcs. / Pkt.
Bus system T-connector, 5-pos., M12			
- PROFIBUS	**SAC-M12T/2XM12 PB DP**	**1507780**	1
- DeviceNet™/CANopen	**SAC-5P-M12T/2XM12 VP**	**1541186**	1
Termination resistor, M12			
- PROFIBUS	**SAC-5P-M12MS PB TR**	**1507803**	5
- DeviceNet™/CANopen	**SAC-5P-M12MS CAN TR**	**1507816**	5
Power cable, 4-pos., PUR/PVC black, straight Y connector M12 on 2x straight female connector M12, length: 0.3 m	**SAC-4P-M12Y/2X0,3-PUR/M12FS VP**	**1510722**	1
Y-distributor/connector M12, with M12 female connector, 3-pos. distributor + PE	**SAC-3P-M12Y/2XM12FS PE**	**1683455**	5

Accessories

Fieldline devices are best identified with the help of the flat Zack marker strip (ZBF).

The flat Zack marker strip is available in two sizes. ZBF 12 to identify all Fieldline devices with M12 connectors and ZBF 8 to identify all Fieldline devices with M8 connectors.

Both sizes are available in the unprinted version or in the specifically printed version.

Protective caps for M8 and M12 connections complete the Fieldline accessory range.

ZBF ... / PROT-M...

Description	Type	Order No.	Pcs. / Pkt.
Screw plug			
For non-assigned M12 sensor/actuator connections	**PROT-M12**	**1680539**	5
For unoccupied M12 connectors of the sensor/actuator cable, flush-type connectors and I/O devices in the field	**PROT-M12 FS**	**1560251**	5
Screw plug			
For unoccupied M8 female connector of the sensor/actuator cable, boxes and flush-type connectors	**PROT-M8**	**1682540**	5
Marking labels, unprinted			
5-section	**ZBF 12:UNBEDRUCKT**	**0809735**	10
10-section	**ZBF 8:UNBEDRUCKT**	**0808781**	10
Marking labels, printed acc. to customer requirements			
5-section	**ZBF 12:SO/CMS**	**0810038**	1
10-section	**ZBF 8:SO/CMS**	**0808817**	1

Bus and power cable

Phoenix Contact offers a complete range of bus and power cables for the Fieldline range. The SPEEDCON fast locking system, a further development in the long accepted M12 connector system, reduces installation time by 90%.

INTERBUS bus cable 5-pos., B-coded, M12-SPEEDCON

PROFINET bus cable 4-pos., D-coded, M12-SPEEDCON

PROFIBUS bus cable 2-pos., B-coded, M12-SPEEDCON

Bus cable DeviceNet™ / CANopen 5-pos., A-coded, M12-SPEEDCON

Description	Length of cable	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.
Pre-assembled bus cable M12 male connector, straight, shielded, free									
	2 m	**1517877**	1	**1524307**	1	**1518025**	1	**1518177**	1
	5 m	**1517880**	1	**1524310**	1	**1518038**	1	**1518180**	1
	10 m	**1517893**	1	**1524323**	1	**1518041**	1	**1518193**	1
	15 m	**1517903**	1	**1524336**	1	**1518054**	1	**1518203**	1
Pre-assembled bus cable M12 female connector, straight, shielded, free conductor end									
	2 m	**1517916**	1			**1518067**	1	**1518216**	1
	5 m	**1517929**	1			**1518070**	1	**1518229**	1
	10 m	**1517932**	1			**1518083**	1	**1518232**	1
	15 m	**1517945**	1			**1518096**	1	**1518245**	1
Pre-assembled bus cable M12 male connector, straight, shielded, M12 socket, straight, shielded									
	0.3 m	**1517958**	1			**1518106**	1	**1518258**	1
	0.5 m	**1517961**	1			**1518119**	1	**1518261**	1
	1 m	**1517974**	1			**1518122**	1	**1518274**	1
	2 m	**1517987**	1			**1518135**	1	**1518287**	1
	5 m	**1517990**	1			**1518148**	1	**1518290**	1
	10 m	**1518009**	1			**1518151**	1	**1518300**	1
	15 m	**1518012**	1			**1518164**	1	**1518313**	1
Pre-assembled bus cable M12 male connector, straight, shielded, M12 pin, straight, shielded									
	0.3 m			**1524349**	1				
	0.5 m			**1524352**	1				
	1 m			**1524365**	1				
	2 m			**1524378**	1				
	5 m			**1524381**	1				
	10 m			**1524394**	1				
	15 m			**1524404**	1				

Ethernet bus cable
4-pos., D-coded

Bus cable local bus FLM M12
5-pos., B-coded,
M12-SPEEDCON

FLM power cable
5 x 0.75 mm², A-coded,
M12-SPEEDCON

FLS power cable
4 x 0.75 mm², A-coded,
M12-SPEEDCON

Description	Length of cable	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.
Pre-assembled bus cable M12 male connector, straight, shielded, free									
	2 m	**1569391**	1	**1517877**	1				
	5 m	**1569401**	1	**1517880**	1				
	10 m	**1569414**	1	**1517893**	1				
	15 m	**1569427**	1	**1517903**	1				
Pre-assembled bus cable M12 female connector, straight, shielded, free conductor end									
	2 m			**1517916**	1				
	5 m			**1517929**	1				
	10 m			**1517932**	1				
	15 m			**1517945**	1				
Pre-assembled bus cable M12 male connector, straight, shielded, M12 female connector, straight, shielded									
	0.13 m			**1518478**	1				
	0.3 m			**1517958**	1				
	0.5 m			**1517961**	1				
	1 m			**1517974**	1				
	2 m			**1517987**	1				
	5 m			**1517990**	1				
	10 m			**1518009**	1				
	15 m			**1518012**	1				
Pre-assembled bus cable M12 male connector, straight, shielded, M12 male connector, straight, shielded									
	0.3 m	**1569430**	1						
	0.5 m	**1569443**	1						
	1 m	**1569456**	1						
	2 m	**1521533**	1						
	5 m	**1569472**	1						
	10 m	**1569485**	1						
	15 m	**1569498**	1						
Pre-assembled power cable M12 male connector, straight, free conductor end									
	2 m					**1518326**	1	**1555606**	1
	5 m					**1518339**	1	**1555619**	1
	10 m					**1518342**	1	**1555622**	1
	15 m					**1518355**	1	**1555635**	1
Pre-assembled power cable M12 female connector, straight, free conductor end									
	2 m					**1518368**	1	**1555648**	1
	5 m					**1518371**	1	**1555651**	1
	10 m					**1518384**	1	**1555664**	1
	15 m					**1518397**	1	**1555677**	1
Pre-assembled power cable M12 male connector, straight, M12 female connector, straight									
	0.13 m					**1518481**	1		
	0.3 m					**1518407**	1	**1555680**	1
	0.5 m					**1518410**	1	**1555693**	1
	1 m					**1518423**	1	**1555703**	1
	2 m					**1518436**	1	**1555716**	1
	5 m					**1518449**	1	**1555729**	1
	10 m					**1518452**	1	**1555732**	1
	15 m					**1518465**	1	**1555745**	1

Fieldline cable M8

The Fieldline Modular M8 system cables transmit the supply voltage and the bus signal for the Fieldline Modular M8 local bus in one cable.

The 4-pos. cable is available in pre-assembled versions with straight and angled M8 connectors.

Voltage supply cables for the Fieldline Modular M8 system are distinguished by their conductor cross section of 0.34 mm², wich enables a distributed supply to the actuator system.

SAC-4P-...

Fieldline Modular M8 system cable
4-pos., straight M8 connector

SAC-4P-...

Fieldline Modular M8 system cable
4-pos., angled M8 connector

Description	Length of cable	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Pre-assembled system cable M8 male connector, straight, shielded, free conductor end							
	2 m	**SAC-4P-M 8MS/ 2,0-950**	**1543249**	1			
	5 m	**SAC-4P-M 8MS/ 5,0-950**	**1543252**	1			
	10 m	**SAC-4P-M 8MS/10,0-950**	**1543265**	1			
	20 m	**SAC-4P-M 8MS/20,0-950**	**1543281**	1			
Pre-assembled system cable M8 male connector, angled, shielded, free conductor end							
	2 m				**SAC-4P-M 8MR/ 2,0-950**	**1550850**	1
	5 m				**SAC-4P-M 8MR/ 5,0-950**	**1550863**	1
	10 m				**SAC-4P-M 8MR/10,0-950**	**1550876**	1
	20 m				**SAC-4P-M 8MR/20,0-950**	**1550892**	1
Pre-assembled system cable M8 female connector, straight, shielded, free conductor end							
	2 m	**SAC-4P- 2,0-950/M 8FS**	**1543294**	1			
	5 m	**SAC-4P- 5,0-950/M 8FS**	**1543304**	1			
	10 m	**SAC-4P-10,0-950/M 8FS**	**1543317**	1			
	20 m	**SAC-4P-20,0-950/M 8FS**	**1543333**	1			
Pre-assembled system cable M8 female connector, angled, shielded, free conductor end							
	2 m				**SAC-4P- 2,0-950/M 8FR**	**1550902**	1
	5 m				**SAC-4P- 5,0-950/M 8FR**	**1550915**	1
	10 m				**SAC-4P-10,0-950/M 8FR**	**1550928**	1
	20 m				**SAC-4P-20,0-950/M 8FR**	**1550944**	1
Pre-assembled system cable M8 male connector, straight, shielded, M8 female connector, straight, shielded							
	0.13 m	**SAC-4P-M 8MS/ 0,13-950/M 8FS**	**1543346**	1			
	0.3 m	**SAC-4P-M 8MS/ 0,3-950/M 8FS**	**1543511**	1			
	0.5 m	**SAC-4P-M 8MS/ 0,5-950/M 8FS**	**1543524**	1			
	1 m	**SAC-4P-M 8MS/ 1,0-950/M 8FS**	**1543537**	1			
	2 m	**SAC-4P-M 8MS/ 2,0-950/M 8FS**	**1543359**	1			
	5 m	**SAC-4P-M 8MS/ 5,0-950/M 8FS**	**1543362**	1			
	10 m	**SAC-4P-M 8MS/10,0-950/M 8FS**	**1543375**	1			
	20 m	**SAC-4P-M 8MS/20,0-950/M 8FS**	**1543391**	1			
Pre-assembled system cable M8 male connector, angled, shielded, M8 female connector, angled, shielded							
	0.13 m				**SAC-4P-M 8MR/ 0,13-950/M 8FR**	**1550957**	1
	0.3 m				**SAC-4P-M 8MR/ 0,3-950/M 8FR**	**1550960**	1
	0.5 m				**SAC-4P-M 8MR/ 0,5-950/M 8FR**	**1550973**	1
	1 m				**SAC-4P-M 8MR/ 1,0-950/M 8FR**	**1550986**	1
	2 m				**SAC-4P-M 8MR/ 2,0-950/M 8FR**	**1550999**	1
	5 m				**SAC-4P-M 8MR/ 5,0-950/M 8FR**	**1551008**	1
	10 m				**SAC-4P-M 8MR/10,0-950/M 8FR**	**1551011**	1
	20 m				**SAC-4P-M 8MR/20,0-950/M 8FR**	**1551037**	1
Pre-assembled power cable M8 female connector, straight, free conductor end, 4 x 0.34 mm²							
	2 m	**SAC-4P- 2,0-PUR/M 8FS 0,34**	**1543582**	1			
	5 m	**SAC-4P- 5,0-PUR/M 8FS 0,34**	**1534818**	5			
	10 m	**SAC-4P-10,0-PUR/M 8FS 0,34**	**1543595**	1			
	20 m	**SAC-4P-20,0-PUR/M 8FS 0,34**	**1543618**	1			
Pre-assembled power cable M8 female connector, angled, free conductor end, 4 x 0.34 mm²							
	2 m				**SAC-4P- 2,0-PUR/M 8FR 0,34**	**1553077**	1
	5 m				**SAC-4P- 5,0-PUR/M 8FR 0,34**	**1553080**	1
	10 m				**SAC-4P-10,0-PUR/M 8FR 0,34**	**1553093**	1
	20 m				**SAC-4P-20,0-PUR/M 8FR 0,34**	**1553116**	1

Mountable connectors

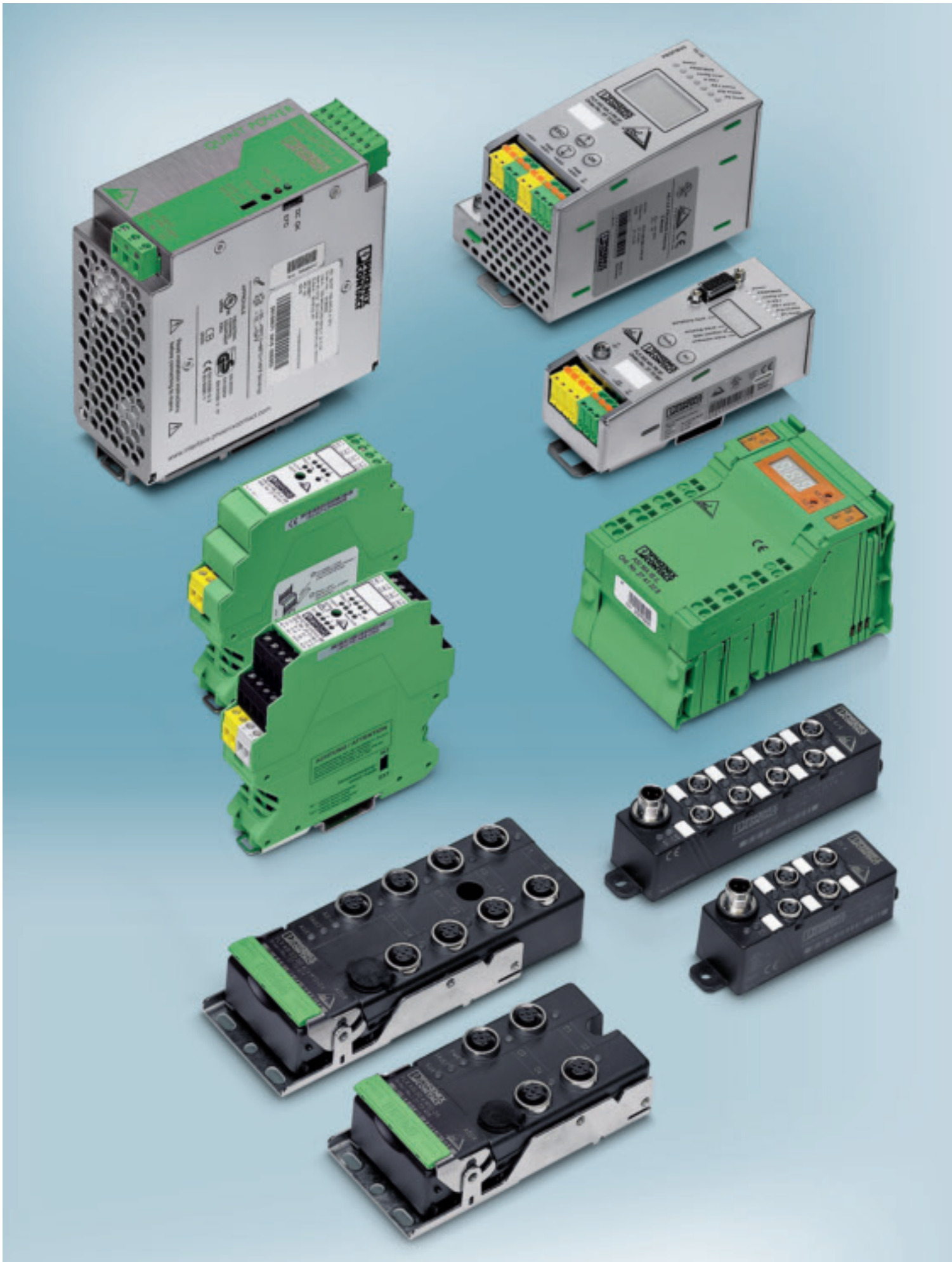
Mountable connectors enable flexible cabling of the Fieldline devices. Different connectors with M12 and M8 connection methods are available in shielded and unshielded designs.

Innovative connection methods such as QUICKON fast connection method or SPEEDCON fast locking system reduce installation time considerably.

M12 connector

M 8 connectors

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
M12 connector, shielded						
M12 male connector, 5-pos., A-coded, spring-cage connection	**SACC-M12MS-5SC SH**	**1512555**	1			
M12 male connector, 5-pos., B-coded, spring-cage connection	**SACC-M12MSB-5SC SH**	**1513570**	1			
M12 male connector, 4-pos., D-coded, QUICKON connection	**SACC-M12MSD-4Q SH**	**1543223**	1			
M12 female connector, 5-pos., A-coded, spring-cage connection	**SACC-M12FS-5SC SH**	**1512571**	1			
M12 female connector, 5-pos., B-coded, spring-cage connection	**SACC-M12FSB-5SC SH**	**1513596**	1			
M8 connector, shielded						
M8 male connector, 4-pos., screw connection				**SACC-M 8MS-4CON-M-0,34-SH**	**1542897**	1
M8 female connector, 4-pos., screw connection				**SACC-M 8FS-4CON-M-0,34-SH**	**1542910**	1
M12 connector, unshielded						
M12 male connector, 4-pos., A-coded, QUICKON connection method, cross section 0.14 - 0.34 mm², SPEEDCON quick locking system	**SACC-MS-4QO-0,34-M SCO**	**1521575**	1			
M12 female connector, 4-pos., A-coded, QUICKON connection method, cross section 0.14 - 0.34 mm², SPEEDCON quick locking system	**SACC-FS-4QO-0,34-M SCO**	**1521588**	1			
M12 male connector, 4-pos., A-coded, QUICKON connection method, cross section 0.34 - 0.75 mm², SPEEDCON quick locking system	**SACC-MS-4QO-0,75-M SCO**	**1521591**	1			
M12 female connector, 4-pos., A-coded, QUICKON connection method, cross section 0.34 - 0.75 mm², SPEEDCON quick locking system	**SACC-FS-4QO-0,75-M SCO**	**1521601**	1			
M12 male connector, 5-pos., A-coded, spring-cage connection	**SACC-M12MS-5SC M**	**1508187**	1			
M12 female connector, 5-pos., A-coded, spring-cage connection	**SACC-M12FS-5SC M**	**1508200**	1			
M8 connector, unshielded						
M8 male connector, 3-pos., Piercecon® connection				**SACC-M 8MS-3PCON**	**1506752**	1
M8 female connector, 4-pos., Piercecon® connection				**SACC-M 8FS-4PCON**	**1506781**	1



Fieldline Extension AS-Interface

The AS-Interface sets new standards in the automation of future-oriented system concepts. AS-Interface allows drastic reductions in costs during the installation, project planning, and maintenance of machines and systems.

Field installation

Fieldline Extension AS-Interface I/O devices are installed directly in the field with the IP67 degree of protection.

Digital input/output modules with M12 or M8 I/O connections allow a tailor-made adaptation of the number of I/O channels to suit the application.

Control cabinet installation

ME-Line devices with IP20 degree of protection enable signal acquisition in the control cabinet and complete the range of AS-Interface I/O devices.

System components

Gateways for integration in higher-level networks, AS-Interface power supply units and numerous accessories complete the AS-Interface range from Phoenix Contact.

AS-Interface specification 3.0

The AS-Interface gateways FLX ASI MA PB SF and FLX ASI MA 2 PB EF support the AS-Interface specification 3.0 in the PROFIBUS DP network.

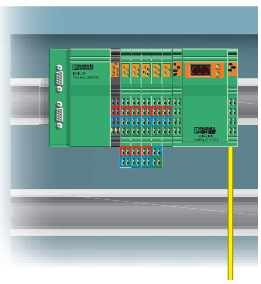
Together with various I/O devices (slaves) with IP20 or IP65/67 degree of protection, networks with maximum 248 inputs and 248 outputs can be realized.

Slaves of AS-Interface specification 2.0 or 2.1 can also be operated in combination with the backward compatible AS-Interface gateways as per the AS-Interface specification 3.0.

Program overview

Integration in networks

The Fieldline Extension AS-Interface system is an I/O system suitable for all buses. With AS-Interface, gateways are used for integration in various networks. Integration in an Inline Modular system provides various coupling options for all common networks.

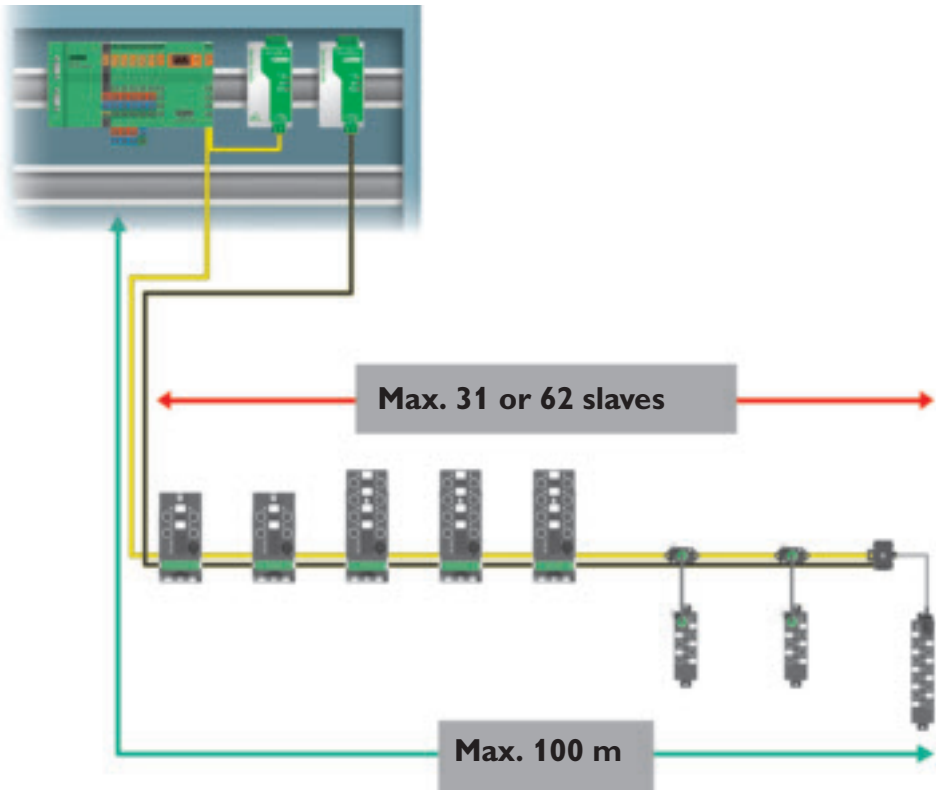


Manner of application

The AS-Interface is a single-master system for easy coupling of binary sensors and actuators to a controller.

A bus access method which ensures a defined and quick response time is used for communication in the AS-Interface system. The master constantly diagnoses the system by comparing the current status of all slaves with the desired status. Every slave has a programmed and unique communication address.

System restrictions



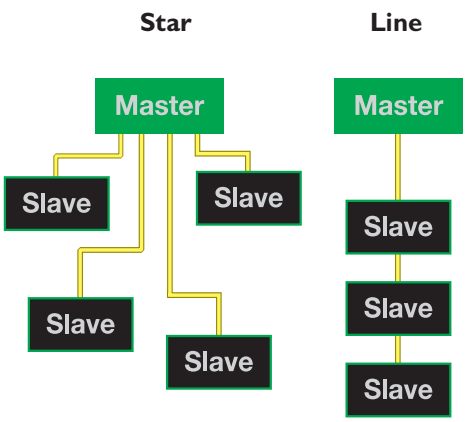
In an AS-Interface system as per the AS-Interface specification 3.0, a maximum of 62 slaves can be operated with four digital inputs and four digital outputs each. That yields the number of 248 inputs and 248 outputs for one system. AS-Interface slaves as per specification 3.0 require the use of an AS-Interface master as per the master profile M4.

For AS-Interface installations with fewer channels, the use of single slaves of AS-Interface specification 2.0 is recommended. These single slaves do not support the expanded addressing option of AS-Interface specifications 2.1 and 3.0; they can, however, be operated with slaves of specifications 2.1 and 3.0.

The total extension of an AS-Interface network can be up to 100 m.

System topology

The topology of an AS-Interface can be selected freely. The star or line conductor routing can be adapted to the local requirements.



Branch lines and tree structures are also permissible. Termination resistors are not required for AS-Interface. The devices can be connected at any point on the cable.

System components

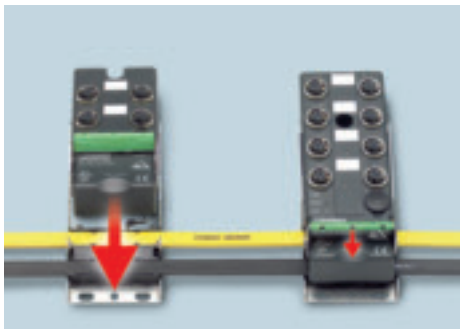
In addition to the AS-Interface gateways for connecting higher-level networks, an AS-Interface network also consists of other system components such as I/O slaves, an AS-i power supply unit and AS-Interface conductors.

I/O slaves

I/O devices in an AS-Interface network are defined as AS-i slaves.

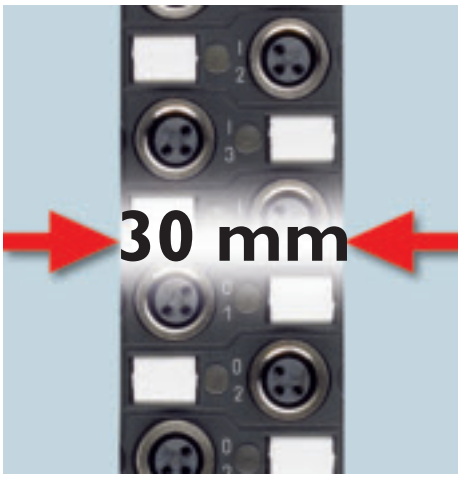
The Fieldline Extension AS-Interface M12 devices with IP67 degree of protection are meant for using directly in the field. An innovative and tool-free connection method for the AS-Interface system makes handling easy and reduces the connection times.

The AS-Interface flat-ribbon conductors are pressed into the guide aids and the electronics module is pushed forward. When the latch is snapped into place, the Fieldline Extension AS-i-M12 devices are connected to the AS-Interface flat-ribbon conductors by means of cable penetration technology.



The inputs and outputs of these devices are provided with M12 connectors that have the SPEEDCON connection method.

Fieldline Extension AS-Interface M8 devices are characterized by their compact structure.



The devices are perfect for mounting on profiles or directly in a machine where space is tight.

The inputs and outputs of these devices are provided with M8 connectors. A connection to the AS-Interface system is established using an M12 connector with SPEEDCON connection method.

The Fieldline Extension AS-Interface-ME devices complete the AS-i-Extension-I/O range from Phoenix Contact. These I/O devices with IP20 degree of protection and digital inputs and outputs are meant for installation in the control cabinet. The connection to the AS-Interface system is easily established using COMBICON connectors.

Power supply units

AS-Interface networks are supplied by special AS-Interface power supply units. These power supply units supply a DC voltage of 29.5 V ... 31.6 V on the output side. This is necessary in order to ensure that all sensors and actuators in the AS-Interface system can be safely operated with a nominal voltage of 24 V.

The power supply unit, together with an integrated data decoupling network, also ensures that a communication signal from the supply voltage can be sent to a higher level.

The AS-i-QUINT power supply units comply with the requirements for SELV.

This ensures that, in the event of a device fault, the AS-Interface system cannot give out any hazardous voltage.

The special characteristic of the AS-i-QUINT power supply units is the integrated automatic earth fault detection.

AS-Interface lines

There is no need for any conventional parallel cabling, including all jumpering levels and terminal points. It is replaced by a single AS-Interface cable with the fast connection technology, the penetration technique. A typical AS-Interface flat-ribbon cable is used for this. However, AS-Interface can be also operated using conventional round cables.

Input and output devices

		M12	M8	ME-Line
				
Digital input	Type Order No.	FLX ASI DI 4 M12 2773429	FLX ASI DI 4 M8 2773403	ASI IO ME DI 4 AB 2741671
	Description	4 inputs, 24 V DC, AB slave, IP67 degree of protection	4 inputs, 24 V DC, single slave, IP67 degree of protection	4 inputs, 24 V DC, AB slave, IP20 degree of protection
	Page	390	392	393
Digital input and output	Type Order No.	FLX ASI DIO 2/2 M12-2A 2773432		
	Description	2 inputs, 24 V DC, 2 outputs, 24 V DC, 2 A, AB slave, IP67 degree of protection		
	Page	391		
	Type Order No.	FLX ASI DIO 4/3 M12-2A 2773445		ASI IO ME DIO 4/3 AB 2741668
	Description	4 inputs, 24 V DC, 3 outputs, 24 V DC, 2 A, AB slave, IP67 degree of protection		4 inputs, 24 V DC, 3 outputs, 24 V DC, 1.5 A, AB slave, IP20 degree of protection
	Page	391		393
	Type Order No.	FLX ASI 3.0 DIO 4/4 M12-2A 2773474	FLX ASI DIO 4/4 M8-1A 2773416	ASI IO ME DIO 4/4 AB 2773542
	Description	4 inputs, 24 V DC, 4 outputs, 24 V DC, 2 A, AB slave, IP67 degree of protection	4 inputs, 24 V DC, 4 outputs, 24 V DC, 1 A, single slave, IP67 degree of protection	4 inputs, 24 V DC, 4 outputs, 24 V DC, 0.7 A, AB slave, IP20 degree of protection
	Page	391	392	393
Digital output	Type Order No.	FLX ASI DO 4 M12-2A 2773458		
	Description	4 outputs, 24 V DC, 2 A, single slave, IP67 degree of protection		
	Page	391		

Gateways

Power supply units




Type Order No.	ASI MA IB IL 2741228	FLX ASI MA PB SF 2773597	FLX ASI MA 2 PB EF 2773607	ASI QUINT 100-240/2.4 EFD 2736686
Description	Gateway for Inline Modular, 62 AB slaves, degree of protection IP20	Gateway for PROFIBUS DP, standard function, 62 A/B slaves, IP20 degree of protection	Gateway for PROFIBUS DP, extended function, 62 A/B slaves, IP20 degree of protection	AS-Interface power supply unit, 2.4 A, primary switched-mode, with integrated harmonic filter and automatic earth fault detection
Page	www.phoenixcontact.net/catalog	394	394	396

Type Order No.	ASI MA IL UNI 2736628			ASI QUINT 100-240/4.8 EFD 2736699
Description	Gateway for Inline Modular, 62 AB slaves, IP20 degree of protection			AS-Interface power supply unit, 4.8 A, primary switched-mode, with integrated harmonic filter and automatic earth fault detection
Page	395			396

Accessories




Type Order No.	VS-ASI-FC-... 100M 140...	VS-ASI-J-Y-N-PUR-1,0-M12FS SCO 1404430	ASI CC DIST FCAB 5M12 2741477	ASI CC ADR 2741338
Description	AS-i flat-ribbon conductor, 2 x 1.5 mm², 100 m ring	AS-Interface distributors for 1 flat-ribbon conductor with 1.0 m round conductor, IP65/67/69k degree of protection	Passive signal distributor, from the flat-ribbon cable to 5 M12 connectors	Manual addressing device for AS-Interface modules
Page	397	399	398	390

Type Order No.	SAC-4P-...SCO 1555...	VS-ASI-J-Y-Y-N 1404508	ASI CC BP FL 4 2741134	PB ECO LINK 2741480
Description	AS-i round connector, 4-pos., 4 x 0.75 mm², A-coded, M12-SPEEDCON	AS-Interface H distributors, IP65/67/69k degree of protection	Mounting plate for 5-way distributor	RS-232 (V.24) PROFIBUS converter, degree of protection IP20
Page	399	399	398	394

Type Order No.		VS-ASI-J-Y-B-FFKDS 1404498		
Description		AS-Interface distributors for 2 flat-ribbon conductors, with spring-cage terminals, IP20 degree of protection		
Page		399		

M12 devices

Fieldline Extension AS-Interface M12 devices are especially compact devices with IP65/67 protection for connecting digital sensors and actuators.

The AS-i flat-ribbon conductor is connected in 2 steps. First the base plate is fastened and the flat-ribbon conductors inserted with the guiding aid. Then the device is pushed over the flat-ribbon conductors and is contacted without tools using an innovative locking mechanism to avoid connection faults.

The mounted devices are addressed via the integrated interface via special addressing devices or online by the master of the AS-Interface systems.

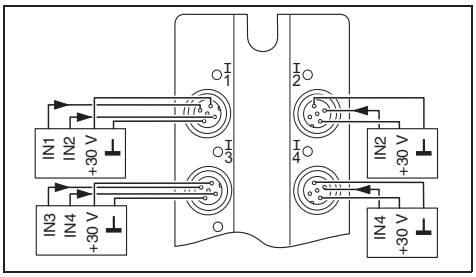
Status displays directly on the devices constantly provide information about the switching state of the connected sensors and actuators as well as via the data exchange with the higher-level master, thus reducing the time for startup and for preventive maintenance.

The communication monitoring by the integrated watchdog function increases machine and plant safety in the event of a fault.

The sensors and actuators are connected to M12 connectors with the SPEEDCON connection method. Thanks to SPEEDCON technology, connection times are reduced by up to 90% as compared with classic M12 connections.

FLX ASI DI 4 M12

Fieldline Extension AS-i digital input device, M12, inputs: 24 V DC

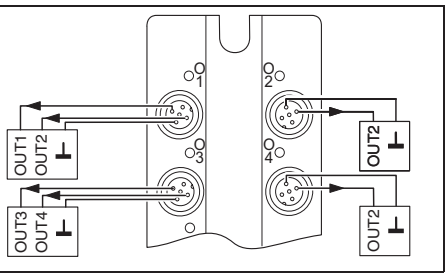


Description	Type	Order No.	Pcs. / Pkt.
Fieldline Extension AS-i digital input device - 4 inputs	**FLX ASI DI 4 M12**	**2773429**	1
Fieldline Extension AS-i digital output device - Four outputs, 2 A			
Fieldline Extension AS-i digital input/output device - Two inputs, two outputs, 2 A - Four inputs, three outputs, 2 A - Four inputs, four outputs, 2 A			
Screw plug	**PROT-M12**	**1680539**	5
Label sheet for laser printers, 64 x 16 mm, color: white	**BMKL 64X16 WH**	**0821807**	2
Label sheet for laser printers, 108 x 16 mm, color: white			
Manual addressing device, for AS-Interface devices	**ASI CC ADR**	**2741338**	1
Programming cable, for addressing the AS-i devices	**ASI CC ADR CAB CINCH**	**2741341**	1
Security against undesired unlocking of the FLX ASI M12 devices	**FLX ASI M12 FS**	**2773539**	5

Technical data	
Interface	
Fieldbus system	AS-i
Type of connection	Flat-ribbon cable penetration technique
AS-Interface	
Slave type	A/B slave
AS-i specification	2.1
Required master specification	>= 2.0
AS-i profile	S-0.A.2
IO code	0
ID code (hex) / ID1 code / ID2 code	A / 7 / 2
Digital inputs	
Type of connection	M12 connector
Connection method	2, 3-wire
Number of inputs	4
Input characteristic curve	IEC 61131-2 type 2
Digital outputs	
Type of connection	-
Connection method	-
Number of outputs	-
Maximum output current per channel	-
Maximum output current per module / terminal block	-
General data	
Weight	195 g
Width	58 mm
Height	118 mm
Depth	35 mm
Degree of protection	IP67 in acc. with IEC 60529
Ambient temperature (operation)	-25°C ... 70°C

FLX ASI DO 4 M12-2A

Fieldline Extension AS-i digital output device, M12, outputs: 24 V DC, 2 A

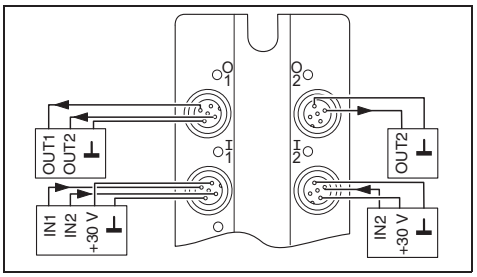


Type	Order No.	Pcs. / Pkt.
FLX ASI DO 4 M12-2A	**2773458**	1
PROT-M12	**1680539**	5
BMKL 64X16 WH	**0821807**	2
ASI CC ADR	**2741338**	1
ASI CC ADR CAB CINCH	**2741341**	1
FLX ASI M12 FS	**2773539**	5

AS-i	
Flat-ribbon cable penetration technique	
Single slave	
2.0	
>= 2.0	
S-8.1	
8	
1 / - / -	
-	
-	
-	
-	
M12 connector	
2-wire	
4	
2 A	
4 A	
195 g	
58 mm	
118 mm	
35 mm	
IP67 in acc. with IEC 60529	
-25°C ... 70°C	

FLX ASI DIO 2/2 M12-2A

Fieldline Extension AS-i digital input/output device, M12, inputs: 24 V DC, outputs: 24 V DC, 2 A

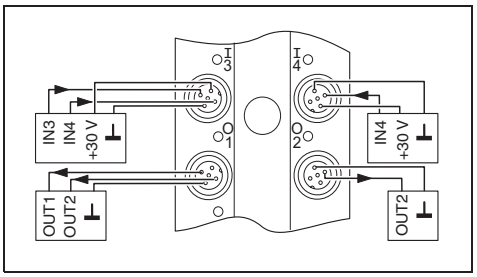


Type	Order No.	Pcs. / Pkt.
FLX ASI DIO 2/2 M12-2A	**2773432**	1
PROT-M12	**1680539**	5
BMKL 64X16 WH	**0821807**	2
ASI CC ADR	**2741338**	1
ASI CC ADR CAB CINCH	**2741341**	1
FLX ASI M12 FS	**2773539**	5

AS-i	
Flat-ribbon cable penetration technique	
A/B slave	
2.1	
>= 2.0	
S-B.A.2	
B	
A / 7 / 2	
M12 connector	
2, 3-wire	
2	
IEC 61131-2 type 2	
M12 connector	
2-wire	
2	
2 A	
4 A	
195 g	
58 mm	
118 mm	
35 mm	
IP67 in acc. with IEC 60529	
-25°C ... 70°C	

FLX ASI ... DIO 4/... M12-2A

Fieldline Extension AS-i digital input/output device, M12, inputs: 24 V DC, outputs: 24 V DC, 2 A



Type	Order No.	Pcs. / Pkt.
FLX ASI DIO 4/3 M12-2A	**2773445**	1
FLX ASI 3.0 DIO 4/4 M12-2A	**2773474**	1
PROT-M12	**1680539**	5
BMKL 11,5 (108X16) WH	**0821797**	2
ASI CC ADR	**2741338**	1
ASI CC ADR CAB CINCH	**2741341**	1
FLX ASI M12 FS	**2773539**	5

	FLX ASI DIO 4/3 M12-2A	FLX ASI 3.0 DIO 4/4 M12-2A
AS-i		
Flat-ribbon cable penetration technique		
A/B slave		
2.1	2.1	3.0
>= 2.0	>= 2.0	>= 3.0
S-7.A.2	S-7.A.2	S-7.A.7
7		
A / 7 / 2	A / 7 / 2	A / 7 / 7
M12 connector		
2, 3-wire		
4		
IEC 61131-2 type 2		
M12 connector		
2-wire		
3		4
2 A		
4 A		
245 g		
58 mm		
150 mm		
35 mm		
IP67 in acc. with IEC 60529		
-25°C ... 70°C		

M8 devices

Fieldline Extension AS-Interface M8 devices are especially developed for applications in handling machines and in robot technology.

IP65/67 protection and sealed-in device electronics guarantee perfect operation even under the harshest industrial conditions.

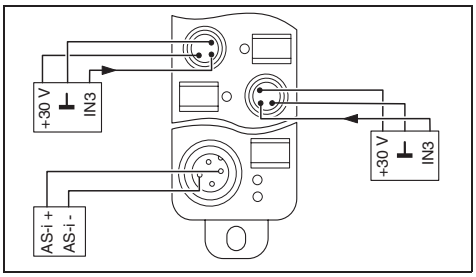
The sensors and actuators are connected via M8 connectors. The AS-Interface network is connected to a SPEEDCON-capable M12 connector.

The devices can be mounted via an AS-i round conductor directly near the sensors and actuators, and the flat-ribbon cable does not have to be installed in inaccessible places.

The devices are addressed via the M12 connector of the bus connection.

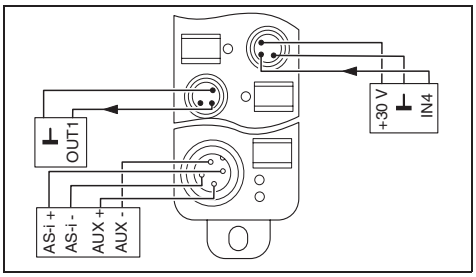
FLX ASI DI 4 M8

Fieldline Extension AS-i digital input device, M8, inputs: 24 V DC



FLX ASI DIO 4/4 M8-1A

Fieldline Extension AS-i digital input/output device, M8, inputs: 24 V DC, outputs: 24 V DC, 1 A



Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Fieldline Extension AS-i digital input device						
- 4 inputs	**FLX ASI DI 4 M8**	**2773403**	1			
Fieldline Extension AS-i digital input/output device						
- Four inputs, four outputs, 1 A				**FLX ASI DIO 4/4 M8-1A**	**2773416**	1
Screw plug	**PROT-M8**	**1682540**	5	**PROT-M8**	**1682540**	5
Zack flat marker strip, 10-section, unprinted: for individual labeling with TML (101X4.2)R TR, X-PEN or CMS-P1-PLOTTER	**ZBF 8:UNBEDRUCKT**	**0808781**	10	**ZBF 8:UNBEDRUCKT**	**0808781**	10
Manual addressing device, for AS-Interface devices	**ASI CC ADR**	**2741338**	1	**ASI CC ADR**	**2741338**	1

Technical data		
Interface		
Fieldbus system	AS-i	AS-i
Type of connection	M12 connectors, (A-coded)	M12 connectors, (A-coded)
AS-Interface		
Slave type	Single slave	Single slave
AS-i specification	2.0	2.0
Required master specification	>= 2.0	>= 2.0
AS-i profile	S-0.0	S-7.0
IO code	0	7
ID code (hex) / ID1 code / ID2 code	0 / - / -	0 / - / -
Digital inputs		
Type of connection	M8 connector	M8 connector
Connection method	2, 3-wire	2, 3-wire
Number of inputs	4	4
Input characteristic curve	IEC 61131-2 type 2	IEC 61131-2 type 2
Digital outputs		
Type of connection	-	M8 connector
Connection method	-	2-wire
Number of outputs	-	4
Maximum output current per channel	-	1 A
Maximum output current per module / terminal block	-	4 A
General data		
Weight	85 g	125 g
Width	30 mm	30 mm
Height	26 mm	26 mm
Depth	103 mm	143 mm
Degree of protection	IP67 in acc. with IEC 60529	IP67 in acc. with IEC 60529
Ambient temperature (operation)	-25°C ... 70°C	-25°C ... 70°C
Ambient temperature (storage/transport)	-25°C ... 85°C	-25°C ... 85°C

ME-Line devices

Fieldline Extension AS-Interface ME-Line devices connect digital termination devices with the AS-Interface in the control cabinet.

The modules are mounted directly on the DIN rail. The design width is only 22.5 mm for all versions. The entire connection method of the AS-Interface bus and of the inputs/outputs is designed with pluggable COMBICON connectors.

The sensor inputs can either be supplied via the AS-Interface voltage or via an external voltage.

ASI IO ME DI 4 AB

Fieldline Extension AS-i digital input device, inputs: 24 V DC, COMBICON connector

ASI IO ME DIO 4/... AB

Fieldline Extension AS-i digital input/output device, inputs: 24 V DC, outputs: 24 V DC, 0.7 A, COMBICON connectors

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Fieldline Extension AS-i digital input device, including COMBICON connector - 4 inputs	**ASI IO ME DI 4 AB**	**2741671**	1			
Fieldline Extension AS-i digital input/output device, including COMBICON connector - 4 inputs, 4 outputs - 4 inputs, 3 outputs				**ASI IO ME DIO 4/4 AB** **ASI IO ME DIO 4/3 AB**	**2773542** **2741668**	1 1
Manual addressing device, for AS-Interface devices	**ASI CC ADR**	**2741338**	1	**ASI CC ADR**	**2741338**	1
Programming cable, for addressing the AS-i devices	**ASI CC ADR CAB CINCH**	**2741341**	1	**ASI CC ADR CAB CINCH**	**2741341**	1

Technical data		ASI IO ME DIO 4/4 AB	ASI IO ME DIO 4/3 AB
Interface			
Fieldbus system	AS-i	AS-i	
Type of connection	COMBICON connectors	COMBICON connectors	
AS-Interface			
Slave type	A/B slave	A/B slave	
AS-i specification	2.1	3.0	2.1
Required master specification	>= 2.0	>= 3.0	>= 2.0
AS-i profile	S-0.A.0	S-7.A.7	S-7.A.0
IO code	0	7	
ID code (hex) / ID1 code / ID2 code	A / 7 / 0	A / 7 / 7	A / 7 / 0
Digital inputs			
Type of connection	COMBICON connectors	COMBICON connectors	
Connection method	2, 3-wire	2, 3-wire	
Number of inputs	4	4	
Digital outputs			
Type of connection	-	COMBICON connectors	
Connection method	-	2-wire	2, 3-wire
Number of outputs	-	4	3
Maximum output current per channel	-	0.7 A	1.5 A
Maximum output current per module / terminal block	-	2.8 A	6 A
General data			
Weight	150 g	150 g	
Width	22.5 mm	22.5 mm	
Height	102 mm	102 mm	
Depth	105 mm	105 mm	
Degree of protection	IP20 in acc. with IEC 60529	IP20 in acc. with IEC 60529	
Ambient temperature (operation)	-25°C ... 60°C	-25°C ... 60°C	
Ambient temperature (storage/transport)	-25°C ... 85°C	-25°C ... 85°C	

Gateways for PROFIBUS DP

The Fieldline Extension AS interface gateways for PROFIBUS FLX ASI MA PB SF and FLX ASI MA 2 PB EF allow easy integration of one or two AS interface networks into a PROFIBUS DP system.

The device has a rugged, stainless steel housing with the IP20 degree of protection and is intended for use in the control cabinet. The gateways enable the operation of AS interface slaves with extended addressing and have been specified as per the AS interface specification 3.0. The downward compatibility with AS-i slaves of older specifications is also given.

The AS interface gateway FLX ASI MA 2 PB EF has an extended scope of functions and has been designed as a double master for two AS-i circuits.

FLX ASI MA PB SF

Fieldline Extension AS-i-Gateway for PROFIBUS DP, standard function, IP20 degree of protection

FLX ASI MA 2 PB EF

Fieldline Extension AS-i-gateway for PROFIBUS-DP, extended function, IP20 degree of protection

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Fieldline Extension AS-i gateway for PROFIBUS DP						
- With standard function	**FLX ASI MA PB SF**	**2773597**	1			
- With extended function, double master				**FLX ASI MA 2 PB EF**	**2773607**	1
Profibus ECO Link, RS-232 (V.24) Profibus converter, incl. software for PC	**PB ECO LINK**	**2741480**	1	**PB ECO LINK**	**2741480**	1
Technical data						
Interfaces						
PROFIBUS DP remote bus	1 x D-SUB-9 connector			1 x D-SUB-9 connector		
AS-Interface	2-pos. COMBICON connector			2 x 2-pos. COMBICON connector		
Power supply						
Typical current consumption	Approx. 200 mA (from the AS-i network)			Approx. 200 mA (from AS-i circuit 1)		
Indicators						
Operating voltage, electronics module (UL)	LED green			LED green		
Operating voltage AS-i (U ASI)	LED green			LED green		
AS-i transmission (ASI ACTIVE)	LED green			LED green		
Programming mode active, automatic slave programming possible	LED green			LED green		
Project planning mode active (PRJ Enable)	Yellow LED			Yellow LED		
AS-i configure error (CONFIG ERR)	LED red			LED red		
AS-Interface						
Number of AS-i slaves	62			62		
AS-i specification	3.0			3.0		
Operating elements						
Keys	2 buttons (Mode/Set) for configuring the AS-i network			4 Buttons (Mode/Set/ESC/OK) for configuring the AS-i network		
General data						
Weight	300 g			460 g		
Width	45 mm			75 mm		
Height	120 mm			120 mm		
Depth	44 mm			83 mm		
Degree of protection	IP20			IP20		
Ambient temperature (operation)	0°C ... 55°C			0°C ... 55°C		
Ambient temperature (storage/transport)	-25°C ... 85°C			-25°C ... 85°C		

Gateway for Inline Modular

AS-Interface and Inline Modular complement each other perfectly. While AS-Interface registers distributed binary sensor and actuator signals, the more complex parameter, program and I/O data can be transmitted via the Inline modular local bus and the used bus coupler over long distances.

Bus openness guarantees the large selection of Inline Modular bus couplers for nearly every network. In this way, the AS-Interface can be combined flexibly with all common networks.

The Fieldline Extension AS-Interface gateway for Inline gives you access to the complete system startup and diagnostics of the AS-Interface system – regardless of the application program and without additional tools.

From the point of view of the application program, the AS-Interface gateway is a simple I/O device. It maps the I/O information transparently in the other system. In addition, it enables the exchange of parameters and diagnostic data in both directions.

The AS-Interface gateway enables the operation of AS-Interface slaves with expanded addressing. This allows up to 62 slaves to be addressed.

[1]) **Note:** The driver function blocks can be found on the Internet under www.phoenixcontact.net/eshop on the product site of the relevant module under the Download tab.

ASI MA IL UNI

Fieldline Extension AS-i gateway for Inline Modular, IP20 protection

Description	Type	Order No.	Pcs. / Pkt.
Fieldline Extension AS-i gateway for Inline Modular			
	ASI MA IL UNI[1])	**2736628**	1

Technical data	
Interfaces	
Inline local bus	Inline data jumper
AS-Interface	Inline connectors
Power supply	
Typical current consumption	200 mA (from the AS-i network)
Indicators	
Local bus diagnostics	LED green
Operating voltage AS-i (U ASI)	LED green
PCP communication	LED green
Automatic address programming active	LED green
Project planning mode active (PRJ Enable)	Yellow LED
AS-i configure error (CONFIG ERR)	LED red
AS-Interface	
Number of AS-i slaves	62
AS-i specification	2.1
Operating elements	
Keys	2 buttons (Mode/Set) for configuring the AS-i network
General data	
Number of PCP data	1 word
Weight	210 g
Width	73.2 mm
Height	119.8 mm
Depth	71.5 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 55°C
Ambient temperature (storage/transport)	-25°C ... 85°C

Power supply units

To minimize the connection points, information and the power supply is transmitted simultaneously along a two-wire cable. The integrated filter of the AS-Interface power supplies ensures that the modulated data stream is not affected.

Undesired operating states can result if two earth faults occur in an AS-Interface system. To prevent this, the AS-Interface power supplies from Phoenix Contact report the very first earth fault. The message is output both optically and via a floating contact.

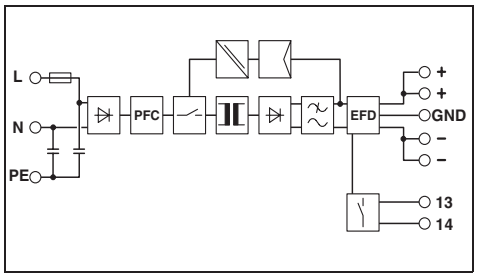
ASI QUINT 30 V DC/2.4 A

1 AC

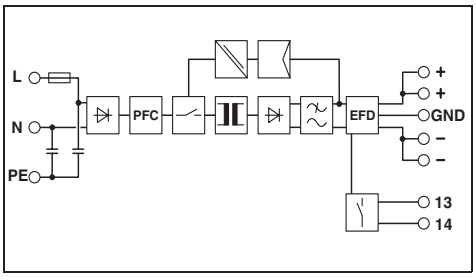
ASI QUINT 30 V DC/4.8 A

1 AC

Width 55 mm



Width 70 mm



Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Power supply unit, primary switched-mode	**ASI QUINT 100-240/2.4 EFD**	**2736686**	1	**ASI QUINT 100-240/4.8 EFD**	**2736699**	1

Technical data		
Input data		
Input nominal voltage range	100 V AC ... 240 V AC	100 V AC ... 240 V AC
Frequency range	45 Hz ... 65 Hz / 0 Hz	45 Hz ... 65 Hz / 0 Hz
Current consumption (nominal load)	Approx. 1 A (120 V AC) / 0.5 A (230 V AC)	Approx. 1.8 A (120 V AC) / 1 A (230 V AC)
Inrush current limitation at 25°C (typ.) / I^2t	< 15 A / 2.2 A^2s	< 15 A / 2.2 A^2s
Mains buffering (I_N, typ.)	> 20 ms (120 V AC) / > 80 ms (230 V AC)	> 60 ms (120 V AC) / > 100 ms (230 V AC)
Switch-on time after applying the mains voltage	< 0.5 s	< 0.5 s
Input fuse	5 A (slow-blow, internal)	5 A (slow-blow, internal)
Output data		
Nominal output voltage	30.1 V DC ± 1.5%	30.1 V DC ± 1.5%
Output current	2.4 A / 3 A	4.8 A / 6 A
Output current / Max. output current	2.4 A / - 3 A	4.8 A / - 6 A
Max. power dissipation (idling/nominal load)	3 W / 11 W	4 W / 16 W
Residual ripple	< 30 mV_{PP}	< 30 mV_{PP}
Signaling		
Signaling DC OK	LED	LED
Signaling EFD	LED, relay contact	LED, relay contact
General data		
Weight / Dimensions W x H x D	0.75 kg / 55 x 145 x 125 mm	0.9 kg / 70 x 145 x 125 mm
Installation position	Horizontal DIN rail NS 35, EN 60715	Horizontal DIN rail NS 35, EN 60715
Distance during assembly	Can be aligned: horizontally 0 cm, vertically 5 cm	Can be aligned: horizontally 0 cm, vertically 5 cm
Type of connection	Pluggable spring-cage connection	Pluggable spring-cage connection
Degree of protection / Class of protection	IP20 / I, with PE connection	IP20 / I, with PE connection
MTBF (at nominal load, 40°C)	> 500 000 h in acc. with IEC 61709 (SN 29500)	> 500 000 h in acc. with IEC 61709 (SN 29500)
Type of housing	AluNox (AlMg1)	AluNox (AlMg1)
Ambient temperature (operation)	-25°C ... 70°C (> 60°C derating)	-25°C ... 70°C (> 60°C derating)
Ambient temperature (storage/transport)	-40°C ... 85°C	-40°C ... 85°C
UL approvals	UL/C-UL listed UL 508 , UL/C-UL Recognized UL 60950	UL/C-UL listed UL 508 , UL/C-UL Recognized UL 60950

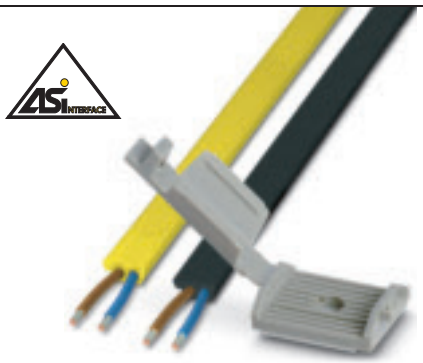
Flat-ribbon conductors, flat-ribbon conductor connectors and panel feed-throughs

Thanks to the four flat-ribbon conductor materials, applications in various fields are possible.

Connectors with QUICKON fast connection technology are available for connecting or laying these flat-ribbon conductors. The only preparation of the lines is easy and fast removal of the sheath using the WIREFOX ASI stripping tool.

Note:

For further technical data, see:
www.phoenixcontact.net/catalog



VS-ASI-FC-...

AS interface flat-ribbon conductors and accessories

Q 1,5/4...KU-...ASI...

Flat-ribbon conductors and panel feed-throughs with QUICKON fast connection technology

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
AS Interface EPDM flat-ribbon conductor, 2 x 1.5 mm², 100 m Ring						
Yellow	**VS-ASI-FC-EPDM-YE 100M**	**1432402**	1			
Black	**VS-ASI-FC-EPDM-BK 100M**	**1432415**	1			
AS Interface PVC flat-ribbon conductor with UL, 2 x 1.5 mm², 100 m Ring						
Yellow	**VS-ASI-FC-PVC-UL-YE 100M**	**1404906**	1			
Black	**VS-ASI-FC-PVC-UL-BK 100M**	**1404919**	1			
AS Interface TPE flat-ribbon conductor with UL, 2 x 1.5 mm², 100 m Ring						
Yellow	**VS-ASI-FC-TPE-UL-YE 100M**	**1404922**	1			
Black	**VS-ASI-FC-TPE-UL-BK 100M**	**1404935**	1			
AS Interface PUR flat-ribbon conductor, 2 x 1.5 mm², 100 m Ring						
Yellow	**VS-ASI-FC-PUR-YE 100M**	**1404883**	1			
Black	**VS-ASI-FC-PUR-BK 100M**	**1404896**	1			
Flat connector, 4-pos., for connecting one or two AS-i flat-ribbon conductors				**Q 1,5/4IDC/24-24KU-KU-ASI-BK**	**1585058**	1
Panel feed-through, for accommodating one or two AS-i flat-ribbon conductors, on the rear side with manual solder/slip-on connection 4.8 x 0.8 mm				**Q 1,5/4FL/24-M20KU-ESA-ASI BK**	**1437261**	1
Panel feed-through, for accommodating one or two AS-i flat-ribbon conductors, on the rear side with four 0.5 m long individual wires 1.5 mm²				**Q 1,5/4A50/24-M20KU-ESA-ASI BK**	**1437274**	1
Metal screw connection for an AS-Interface flat-ribbon conductor						
Thread type: M20				**HC-M-KV-M20(1ASI)**	**1584017**	10
Thread type: M25				**HC-M-KV-M25(1ASI)**	**1584020**	10
Fastening clip for two AS-Interface flat-ribbon conductors, self-adhesive and with a 3 mm hole for additional fastening, plastic, gray	**VS-ASI-2FC-FIX**	**1404757**	20			
Fixing clip for an AS Interface flat-ribbon conductor, self-adhesive	**ASI CC FIX FCAB**	**2741354**	500			
End sealing for AS-Interface flat-ribbon conductor, can be used on both sides, color: Black	**ASI SACB KABEL-ENDDICHTUNG**	**1692336**	100			
Stripping pliers, for AS interface flat wires, any desired stripping length	**WIREFOX ASI**	**1212154**	1			

Technical data	VS-ASI-FC-PVC...	VS-ASI-FC-PUR...	Q 1,5/4IDC	Q 1,5/4M20
Electrical data				
Rated current	-	-	16 A	16 A
Material data				
Contact carrier material	-	-	PA	PA
Mechanical data				
No. of pos.	-	-	4	4
Degree of protection	-	-	IP65/67	IP65/67
Cable data				
Material of outer sheath	PVC	PUR	-	-
Conductor cross-section	1.5 mm²	1.5 mm²	-	-
Connector data QUICKON connection				
Conductor cross section [mm²]	- ... -	- ... -	0.75 mm² ... 1.5 mm²	0.75 mm² ... 1.5 mm²
Conductor cross section [AWG]	- ... -	- ... -	18 ... 16	18 ... 16
Temperature data				
Ambient temperature (operation)	-	-	-25°C ... 80°C	-25°C ... 80°C
Cable, fixed installation [°C]	-30 ... 90	-40 ... 85	-	-
Cable, flexible installation [°C]	-20 ... 90	-30 ... 85	-	-

Distributor with spring-cage connection and with round conductors

The distributor with spring-cage terminal blocks enables easy transition from round conductors to flat-ribbon conductors.

Thanks to the H-distributor, assembly of various topologies is extremely simple.

For cabling between a flat-ribbon conductor and an I/O device, the distributors with pre-assembled round conductors provide a quick and economical solution. Thanks to the various connectors and line lengths, a wide range of applications can be easily implemented.

Note:

For further technical data, see:
www.phoenixcontact.net/catalog

VS-ASI-J-Y-...

AS-Interface distributor with COMBICON spring-cage terminal block and flat-ribbon conductor distributor

VS-ASI-J-Y-...-PUR-...

AS-Interface distributor with round cable and molded M12 connector with SPEEDCON

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
AS-Interface distributor with IP20 degree of protection for **two flat-ribbon conductors**, 4-pos., with **spring-cage terminal blocks**	**VS-ASI-J-Y-B-FFKDS**	**1404498**	1			
AS-Interface H distributor with IP67 degree of protection, for distribution from one to two flat-ribbon conductors	**VS-ASI-J-Y-Y-N**	**1404508**	1			
AS-Interface distributors with IP67 degree of protection for **one flat-ribbon conductor**, with **PUR** round cable and molded, **straight**, A-coded, **2-pos.** M12 female connector with SPEEDCON						
Length: 1.0 m				**VS-ASI-J-Y-N-PUR-1,0-M12FS SCO**	**1404430**	1
Length: 2.0 m				**VS-ASI-J-Y-N-PUR-2,0-M12FS SCO**	**1404443**	1
AS-Interface distributors with IP67 degree of protection for **two flat connectors**, with **PUR** round cable and molded, **straight**, A-coded, **4-pos.** M12 female connector with SPEEDCON						
Length: 1.0 m				**VS-ASI-J-Y-B-PUR-1,0-M12FS SCO**	**1404456**	1
Length: 2.0 m				**VS-ASI-J-Y-B-PUR-2,0-M12FS SCO**	**1404472**	1
AS-Interface distributors with IP67 degree of protection for **two flat connectors**, with **PUR** round cable and molded, **angled**, A-coded, **4-pos.** M12 female connector with SPEEDCON						
Length: 1.0 m				**VS-ASI-J-Y-B-PUR-1,0-M12FR SCO**	**1404469**	1
Length: 2.0 m				**VS-ASI-J-Y-B-PUR-2,0-M12FR SCO**	**1404485**	1

Technical data		VS-ASI-J-Y-B...	VS-ASI-J-Y-Y-N	VS-ASI-J-Y-N...	VS-ASI-J-Y-B...
Electrical data					
Rated voltage		≤ 35 V	≤ 35 V	≤ 35 V	≤ 35 V
Rated current		≤ 6 A	≤ 8 A	≤ 4 A	≤ 4 A
Material specifications for exit					
Material of grip body		-	-	TPU	TPU
Material specifications for distributor					
Housing material		PA-GF	PA-GF	PA-GF	PA-GF
Mechanical data					
No. of pos.		4	4	2	4
Degree of protection		IP20	IP65/IP67/IP69K	IP65/IP67/IP69K	IP65/IP67/IP69K
Connection data for spring-cage terminal blocks					
Conductor cross section		0.2 mm² ... 1.5 mm²	-	-	-
Connection cross section AWG		24 ... 16	-	-	-
Cable data					
Material of outer sheath		-	-	PUR	PUR
External cable diameter		-	-	4.70 mm	4.70 mm
Conductor cross-section		-	-	0.34 mm²	0.34 mm²
Temperature data					
Male/female connector	[°C]	-25 ... 75	-25 ... 75	-25 ... 75	-25 ... 75
Cable, fixed installation	[°C]	-	-	-25 ... 75	-25 ... 75
Cable, flexible installation	[°C]	-	-	-5 ... 75	-5 ... 75

Distributors with M12 female connectors, with screw connection, pre-assembled round conductors

Distributors with M12 female connectors are suitable for connection that is pluggable on both sides between a flat-ribbon conductor and an I/O device. Thanks to the pre-configured round conductors in different lengths, a wide range of applications can be realized easily and safely.

If a pluggable connection is required only on the I/O side, the distributor with screw connection provides a favorable alternative.

Note:

For further technical data, see:
www.phoenixcontact.net/catalog

VS-ASI-J-Y-...

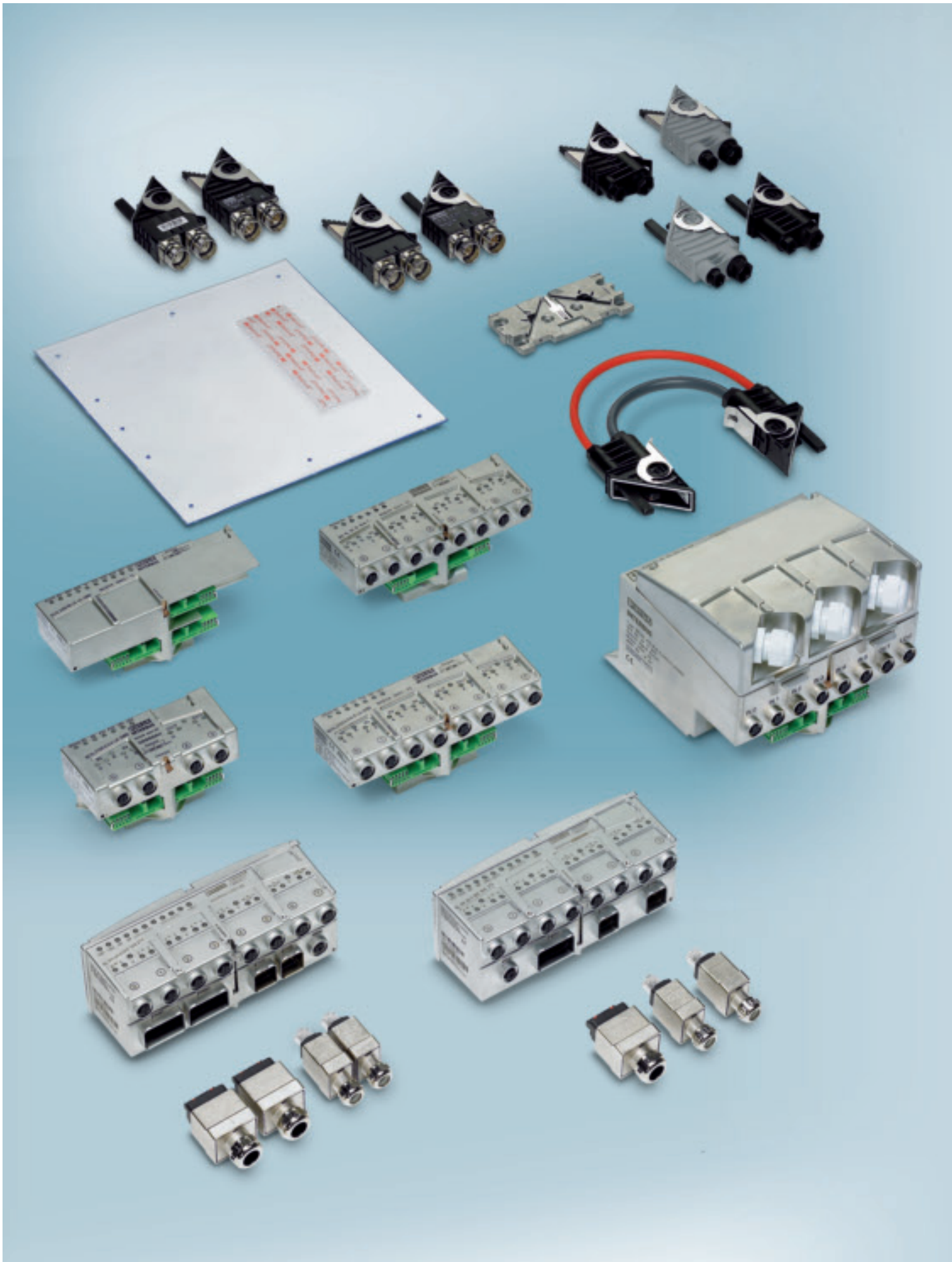
AS Interface distributor with M12 slots and with screw connection

SAC-4P-...-186...SCO

PUR round conductors with molded M12-SPEEDCON connectors

Description	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
AS-Interface distributor with IP65/IP67/IP69k degree of protection for flat-ribbon conductors, with straight, A-coded M12 female connector							
one flat-ribbon conductor, 2-pos.		**VS-ASI-J-Y-N-M12FS**	**1404414**	1			
Two flat-ribbon conductors, 4-pos.		**VS-ASI-J-Y-B-M12FS**	**1404427**	1			
AS-Interface distributor with IP67 degree of protection, with straight, A-coded M12 female connector							
one flat-ribbon conductor, 2-pos.		**VS-ASI-J-Y-N-M12FS-LC**	**1433155**	1			
AS Interface distributor with IP67 degree of protection, with screw connection, angled							
one flat-ribbon conductor, 2-pos.		**VS-ASI-J-Y-N-SWA-LC**	**1433168**	1			
AS-Interface distributor, 5x (without mounting plate)							
5 x M12 connector		**ASI CC DIST FCAB 5M12**	**2741477**	1			
Mounting plate for 5-way distributor		**ASI CC BP FL 4**	**2741134**	10			
Screw plug							
For unoccupied M12 female connector of the sensor/actuator cable, boxes and flush-type connectors		**PROT-M12**	**1680539**	5			
Labeling material							
Zack marker strip, unprinted		**ZBN 18:UNBEDRUCKT**	**2809128**	10			
Pre-assembled round conductor							
M12 male connector, straight, free conductor end							
	2 m				**SAC-4P-MS/ 2,0-186 SCO**	**1555606**	1
	5 m				**SAC-4P-MS/ 5,0-186 SCO**	**1555619**	1
	10 m				**SAC-4P-MS/10,0-186 SCO**	**1555622**	1
	15 m				**SAC-4P-MS/15,0-186 SCO**	**1555635**	1
Pre-assembled round conductor							
M12 female connector, straight, free conductor end							
	2 m				**SAC-4P- 2,0-186/FS SCO**	**1555648**	1
	5 m				**SAC-4P- 5,0-186/FS SCO**	**1555651**	1
	10 m				**SAC-4P-10,0-186/FS SCO**	**1555664**	1
	15 m				**SAC-4P-15,0-186/FS SCO**	**1555677**	1
Pre-assembled round conductor							
M12 male connector, straight, M12 female connector, straight							
	0.3 m				**SAC-4P-MS/ 0,3-186/FS SCO**	**1555680**	1
	0.5 m				**SAC-4P-MS/ 0,5-186/FS SCO**	**1555693**	1
	1 m				**SAC-4P-MS/ 1,0-186/FS SCO**	**1555703**	1
	2 m				**SAC-4P-MS/ 2,0-186/FS SCO**	**1555716**	1
	5 m				**SAC-4P-MS/ 5,0-186/FS SCO**	**1555729**	1
	10 m				**SAC-4P-MS/10,0-186/FS SCO**	**1555732**	1
	15 m				**SAC-4P-MS/15,0-186/FS SCO**	**1555745**	1

Technical data		VS-ASI-J-Y-N-M12FS	VS-ASI-J-Y-N-SWA-LC	
Housing material		PA-GF	PA	-
Material of grip body		-	-	TPU, hardly inflammable, self-extinguishing
No. of pos.		2	2	4
Degree of protection		IP65/IP67/IP69K	IP67	IP65/IP68/IP69K
Connection data for screw connection				
Conductor cross section		-	0.14 mm² ... 1 mm² (solid)	-
Connection cross section AWG		-	26 ... 17 (solid)	-
Conductor cross section		-	0.14 mm² ... 0.75 mm² (With ferrules)	-
Connection cross section AWG		-	26 ... 18 (With ferrules)	-
Cable data				
Conductor cross-section		-	-	0.75 mm²
Temperature data				
Ambient temperature (operation)		-25°C ... 75°C	-25°C ... 70°C	-25°C ... 90°C (male/female connector)
Cable, fixed installation	[°C]	-	-	-25 ... 80
Cable, flexible installation	[°C]	-	-	-5 ... 80



I/O systems in the IP65/67 field | Rugged Line

Rugged Line P65/67 input and output devices are installed where their functionality is required. The Rugged Line devices are equipped with a fieldbus interface for INTERBUS.

Fiber optics (polymer fibers) and twisted pair cables can be combined as transmission mediums. Adapters are provided for changing the medium.

The fiber optics technology and the zinc die-cast housing allow installation in electromagnetically strongly disturbed environments and even in the immediate vicinity of electrode holders and grippers.

Products from other manufacturers are also available for the Rugged Line installation concept. The catalog of the available devices includes absolute encoders, valve islands, large-format displays, slip ring transmitters and tool change systems.

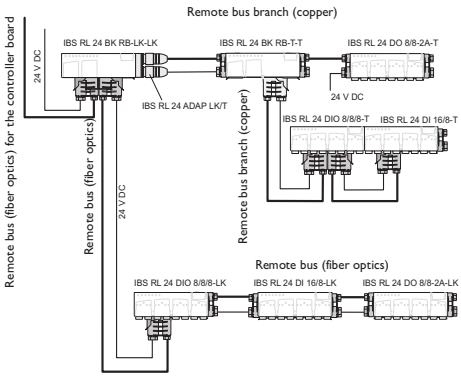
Program overview

Manner of application

The Rugged Line installation concept is characterized by decisive features that enable application under rough industrial conditions. Rugged Line is an open system, for which various manufacturers provide uniform solutions. Features such as proactive fiber optics diagnostics and field-mountable Rugged Line IP67 connectors are clear advantages of this integrated system solution. Complex and distributed systems can therefore be easily realized. Here, angles can be recorded and valves can be activated, for example, in addition to the processing of digital input and output signals.

Open bus topology

If the Rugged Line bus terminal module (IBS RL 24 BK RB-..) is used, topologies can be freely set up in tree, bus or star structures.



An optical control device (IBS RL 24 OC-LK…) can also be used to divide fiber optics paths into individual segments.

Fiber optics diagnostics

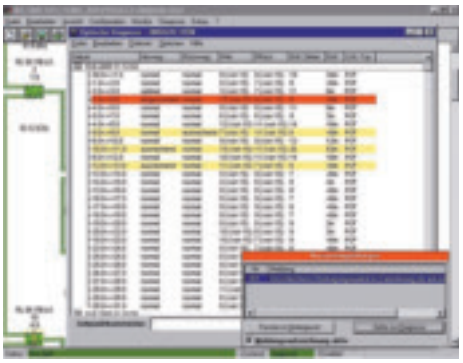
If the fiber optics are subjected to particular mechanical stress, any change in the fiber optics transmission is precisely located and the affected segment can be precisely replaced.

Regardless of the application, the optical control device can be used to increase the length of a fiber optics transmission path by a further 50 m (with Rugged Line devices with fiber optics polymer fibers, it is limited to 50 m).

Maximum system availability

The Rugged Line devices offer a high level of system availability through quick device replacement without using tools in the case of a malfunction and detailed diagnostics of the connected sensors/ actuators. Errors in the sensor and actuator system, such as short-circuits or power failure are detected, displayed directly on site on an LED on the device, and transmitted to the controller board via INTERBUS.

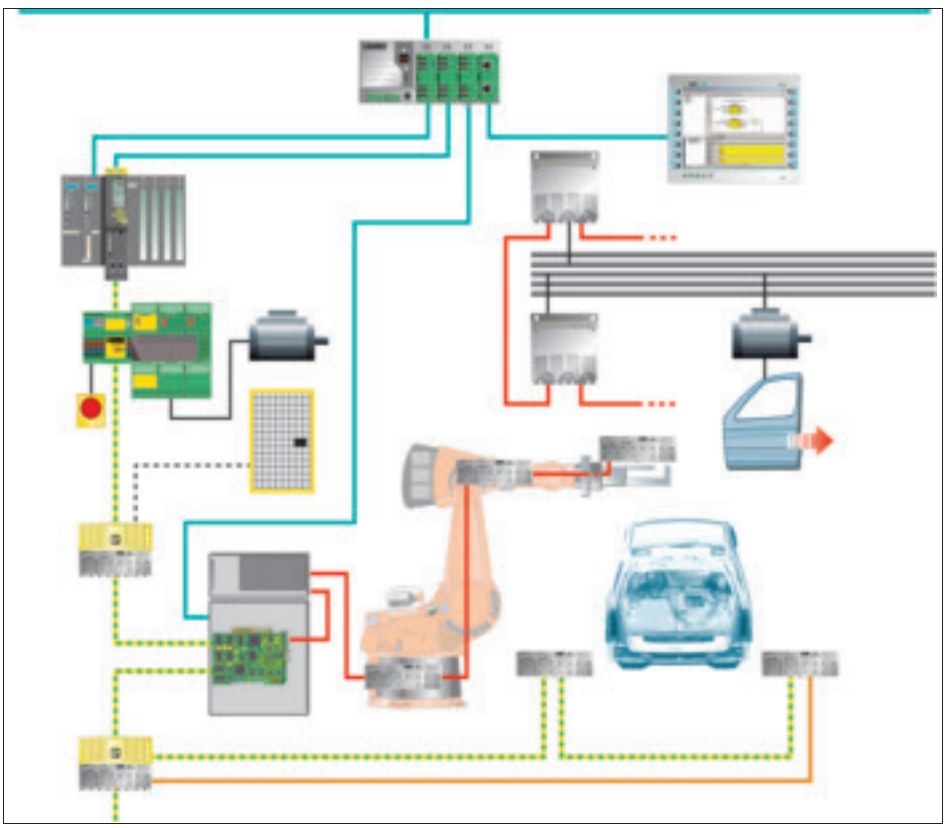
Single/group channel diagnostic messages are displayed on the diagnostics display of the controller board or via CMD.



In combination with the expanded function of the CMD software, the optical diagnostics of the Rugged Line devices make it possible to create an acceptance report on the quality of the installed fiber optic cables. If this check is repeated at regular intervals, gradual changes in the fiber optics installation can be detected early on.

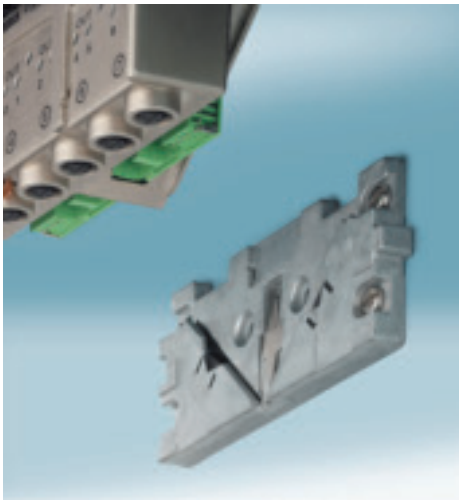
Easy configuration

The Rugged Line devices are mounted directly on site, thus considerably simplifying the planning and project planning. The various jumpering levels in control cabinets and terminal boxes are not required and the related complicated planning, wiring and documentation is therefore also unnecessary. The space required by the system is reduced due to control cabinets being eliminated.



Effective installation

The patented field-mountable hybrid connector combines the connection for data and power in the IP67 housing.



In combination with the snap-on device electronics, this system allows convenient and effective installation on site, keeping wiring faults to a minimum. The comprehensive diagnostics functions in connection with the CMD or Diag+ software tools ensure fast commissioning.

Connection method

The bus is connected by means of IP67 Rugged Line connectors, which transport both the bus signal and the power supply to the modules. While the bus lines of a twisted-pair solution are connected using spring-cage terminal blocks, the fiber optics connection is established using the IBS RL FOC fiber cutter, without having to polish the polymer fibers later.

The key element at the end of the fiber cutter serves to tighten or release the QUICKON connections of the Rugged Line connector. Power to the device is supplied via the QUICKON connection method.

Accessories

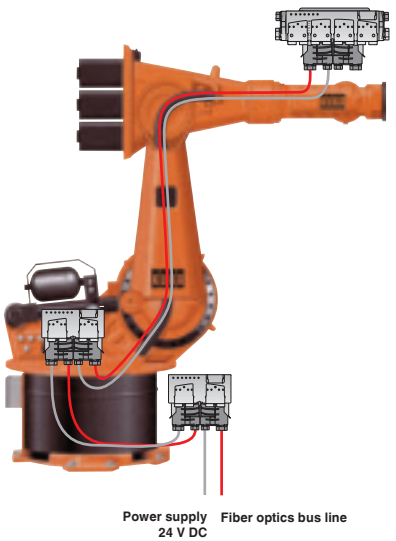
A comprehensive range of accessories is available for the Rugged Line devices. In addition to the Rugged Line connectors, pre-assembled bridges are therefore also available for the connection of two adjacent Rugged Line copper or fiber optics devices. If a copper bus segment is to be created within a fiber optics installation, the IBS RL 24 ADAP... plug-in adapters are used.

A wide catalog of available components

Further products are constantly added to the range. You thus have a seamless network of high-performance special function modules that enables fast, easy project planning, installation and commissioning of your application.

For example, car body shops in automobile manufacturing

Solutions for applications in car body shops in the automobile industry are a good example for the universality of the Rugged Line system. The Rugged Line I/O devices can be mounted directly on the robot.

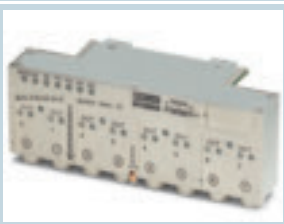


Tool change systems with integrated Rugged Line technology guarantee the universality of the system.

System components

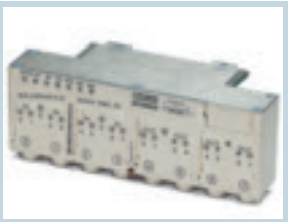
		INTERBUS bus terminal module	INTERBUS monitoring device
			
Fiber optics connection	Type Order No.	IBS RL 24 BK RB-LK-LK 2725024	IBS RL 24 OC-LK 2819972
Fiber optics connection, 2 MBd	Type Order No.	IBS RL 24 BK RB-LK-LK-2MBD 2731597	IBS RL 24 OC-LK-2MBD 2732499
Twisted pair connection	Type Order No.	IBS RL 24 BK RB-T-T 2731063	
	Description	Enables isolated disconnection of a bus segment, electrical isolation of the bus segments from each other	Segmentation of connectors, refreshing of the data signal
Page		410	411

Digital input devices / Digital output devices

		Digital input devices	Digital output devices	
		16 channels	16 channels	8 channels
				
Fiber optics connection	Type Order No.	IBS RL 24 DI 16/8-LK 2724850	IBS RL 24 DO 16/8-R-LK 2734170	IBS RL 24 DO 8/8-2A-LK 2731034
Fiber optics connection, 2 MBd	Type Order No.	IBS RL 24 DI 16/8-LK-2MBD 2731584	IBS RL 24 DO 16/8-R-LK-2MBD 2734507	IBS RL 24 DO 8/8-2A-LK-2MBD 2731827
Twisted pair connection	Type Order No.	IBS RL 24 DI 16/8-T 2836463		IBS RL 24 DO 8/8-2A-T 2731856
	Description	INTERBUS digital input device, 16 inputs, 4-wire connection	INTERBUS digital output device, 16 readback outputs (readback via the input register), 500 m A, 3-wire connection	INTERBUS digital output device, 8 outputs, 2 A, 3-wire connection
Page		411	411	412

		
Push-pull connection	Type Order No.	RL PN 24-2 DI 16 2TX 2773665
	Description	PROFINET digital input device, 16 inputs, 4-wire connection, 2 power connectors
Page		408

Digital input and output devices

		4/2 channels	8/8 channels	8/8 channels
				
Fiber optics connection	Type Order No.	IBS RL 24 DIO 4/2/4-LK 2819985	IBS RL 24 DIO 8/8/8-R-LK 2734167	IBS RL 24 DIO 8/8/8-LK 2724847
Fiber optics connection, 2 MBd	Type Order No.	IBS RL 24 DIO 4/2/4-LK-2MBD 2732486	IBS RL 24 DIO 8/8/8-R-LK-2MBD 2734510	IBS RL 24 DIO 8/8/8-LK-2MBD 2731571
Twisted pair connection	Type Order No.			IBS RL 24 DIO 8/8/8-T 2836476
	Description	INTERBUS digital input/output device, 4 inputs, 4-wire connection, 2 outputs, 500 mA, 3-wire connection	INTERBUS digital input/output device, 8 inputs, 4-wire connection, 8 readback outputs, 500 mA, 3-wire connection	INTERBUS digital input/output device, 8 inputs, 4-wire connection, 8 outputs, 500 mA, 3-wire connection
Page		413	413	413

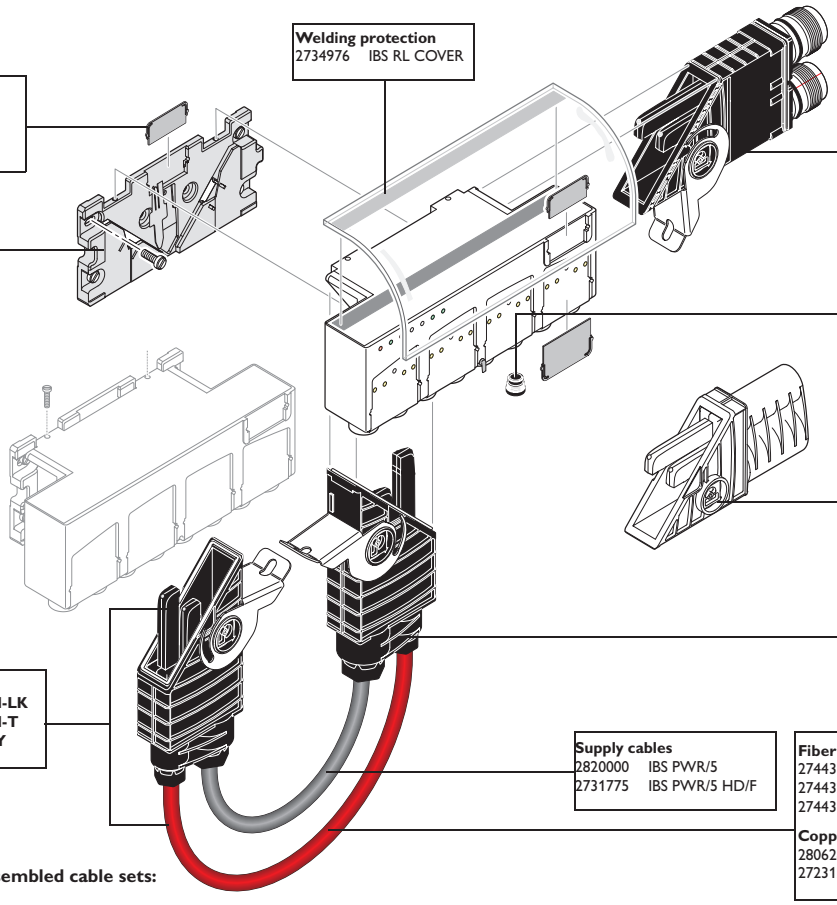
		16/8 channels	16/8 channels
			
Push-pull connection	Type Order No.	RL PN 24-1 DIO 16/8 2TX 2773500	RL PN 24-2 DIO 16/8 2TX 2773652
	Description	PROFINET digital input/output device, 8 inputs, 4-wire connection, 8 configurable inputs/outputs, 4-wire connection, 500 mA, 1 power connector	PROFINET digital input/output device, 8 inputs, 4-wire connection, 8 configurable inputs/outputs, 4-wire connection, 500 mA, 2 power connectors
Page		409	409

Relay devices

Motor starters

					
Fiber optics connection	Type Order No.	IBS RL 24 DIO 8/8/8-RS-LK 2734044	IBS RL 24 DIO 8/5-RS-LK 2734918	IBS RL 400 MLR R DIO 6/1 LK 2734769	IBS RL 480 MLR R DIO 6/1 LK 2737384
Fiber optics connection, 2 MBd	Type Order No.	IBS RL 24 DIO 8/8/8-RS-LK-2MBD 2731733	IBS RL 24 DIO 8/5-RS-LK-2MBD 2734905	IBS RL 400 MLR R DIO 6/1 LK-2MBD 2731830	IBS RL 480 MLR R DIO 6/1 LK-2MBD 2734497
	Description	INTERBUS digital input/output device, 8 inputs, 24 V DC, 4-wire connection, 8 relay N/O outputs, 230 V DC	INTERBUS digital input/output device, 6 inputs, 24 V DC, 4-wire connection, 2 inputs, 400 V DC 2 relay N/O outputs, 230 V AC, 3 relay N/O outputs, 400 V AC	INTERBUS motor starter, 6 inputs, 24 V DC, 4-wire connection, 1 output, 1 contactor, 400 V, 1 temperature sensor input for motor protection, manual on site operation, relay contact for brake	INTERBUS motor starter, 6 inputs, 24 V DC, 4-wire connection, 1 output, 1 contactor, 480 V, 1 temperature sensor input for motor protection, manual on site operation, relay contact for brake
Page		414	414	415	415

INTERBUS accessories



Welding protection
2734976 IBS RL COVER

Marking labels
2732729 IBS RL MARKER-SET
2734727 IBS RL MARKER-G-SET
2734730 IBS RL MARKER-K-SET

Mounting plate
2731128 IBS RL AP

Plug-in adapters
2725037 IBS RL 24 ADAP-T/LK
2725040 IBS RL 24 ADAP-LK/T
2734109 IBS RL 24 ADAP-M23/T
2734112 IBS RL 24 ADAP-T/M23

M12 filler plug
1680539 PROT-M12

Rugged Line dust protection connector
2819969 IBS RL PROT LK
(Not an IP67 connector)

Connector for fiber optics bus
2731076 IBS RL PLUG-LK/POF
2734183 IBS RL PLUG-LK/POF-F

Connector for copper bus
2731898 IBS RL PLUG-T
2734196 IBS RL PLUG-T-F

Pre-assembled cables
2733029 IBS RL CONNECTION-LK
2733061 IBS RL CONNECTION-T
2819956 IBS RL CABLE POF/1/Y

Supply cables
2820000 IBS PWR/5
2731775 IBS PWR/5 HD/F

Fiber optics bus line:
2744319 PSM-LWL/KDHEAVY-980/1000
2744322 PSM-LWL/RUGGED-980/1000
2744335 PSM-LWL/RUGGED-FLEX-980/1000

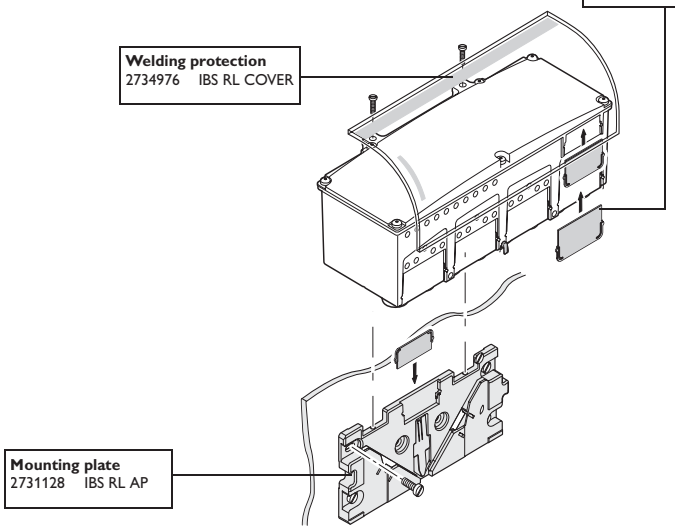
Copper bus line:
2806286 IBS RBC METER-T
2723123 IBS RBC METER/F-T

Ordering example for pre-assembled cable sets:

Quantity	Order No.		Cable type	Length [m]
1	2819956	/	C78	1,1
1 connector, 2 cables	Standard		C78=RL quantity/end open, fiber optics+voltage	1 m - 1.5 m
	Stranded		C79=RL quantity/end open, fiber optics+voltage, stranded	(in 0.1 m steps)
2 connectors, 2 cables	Standard		C80=RL quantity/RL conn., fiber optics+voltage	
	Stranded		C81=RL quantity/RL conn., fiber optics+voltage, stranded	2 m - 50 m
1 connector, 1 cable	Standard		C82=RL quantity/end open, fiber optics+voltage	(in 1 m steps)
(Voltage)	Stranded		C83=RL quantity/end open, only voltage, stranded	
2 connectors, 1 cable	Standard		C84=RL quantity/RL connector, only voltage	
(Voltage)	Stranded		C85=RL quantity/RL connector, only voltage, stranded	

Fiber cutter for the fiber optics connector assembly
2725147 IBS RL FOC

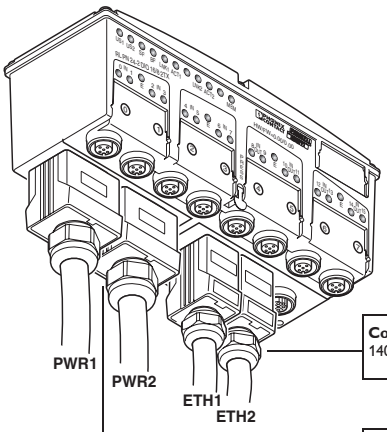
PROFINET accessories



Marking labels
2732729 IBS RL MARKER-SET
2734727 IBS RL MARKER-G-SET
2734730 IBS RL MARKER-K-SET

Welding protection
2734976 IBS RL COVER

Mounting plate
2731128 IBS RL AP



Connectors for PROFINET
1405141 VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B

Connectors for supply voltage
1608074 VS-PPC-C2-MSTB-P13-A5-SP

Assembled PROFINET cables
RJ45 push-pull connector, metal housing

1 m, stranded	1608333
2 m, stranded	1608346
5 m, stranded	1608359
Variable, stranded	1608362
1 m, highly flexible	1608579
2 m, highly flexible	1608582
5 m, highly flexible	1608595
Variable, highly flexible	1608605

Assembled supply voltage cables
Push-pull connectors, metal housing

1 m, 5 x 2.5 mm²	1609170
2 m, 5 x 2.5 mm²	1609183
5 m, 5 x 2.5 mm²	1609196
Variable, 5 x 2.5 mm²	1609206
1 m, 5 x 1.5 mm²	1609219
2 m, 5 x 1.5 mm²	1609222
5 m, 5 x 1.5 mm²	1609235
Variable, 5 x 1.5 mm²	1609248

PROFINET IO device

PROFINET IO devices have been added to the range of Rugged Line devices. Users thus have the future-oriented PROFINET technology at their disposal even in harsh industrial environments.

The rugged housing, the detailed diagnostics of the connected sensors/actuators as well as the toolless device replacement in the event of errors serve for high system availability.

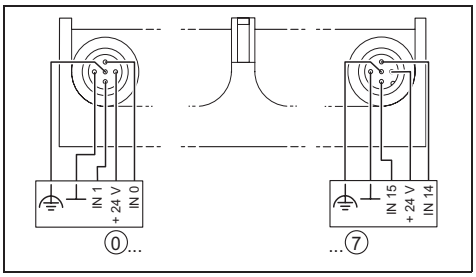
The integrated switch allows cost-effective creation of line structures, while the use of freely configurable channels restricts the number of device types, thereby reducing replacement part costs.

Connectors with push-pull locking for PROFINET and supply voltage, M12 connections for the periphery and the snap-on equipment electronics simplify on-site installation and startup. Wiring errors are thus reduced to a minimum.

Extensive diagnostics functions serve for quick startup and error detection in the event of an error. Thanks to strict separation of diagnostics displays and connections, all status and diagnostics LEDs are always properly legible and the cable outlets are installed in a slip-proof manner.

RL PN 24-2 DI 16 2TX

Rugged Line digital input device,
inputs: 24 V DC, 4-wire connection method



Description	Type	Order No.	Pcs. / Pkt.
Rugged Line digital input device			
- 2 power connectors	**RL PN 24-2 DI 16 2TX**	**2773665**	1
Rugged Line digital input/output device			
- 1 power connector			
- 2 power connectors			
Connector			
- PROFINET, RJ45	**VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B**	**1405141**	1
- Supply voltage, MSTB	**VS-PPC-C2-MSTB-MNNA-P13-A5-SP**	**1608074**	1
Rugged Line mounting plate	**IBS RL AP**	**2731128**	10

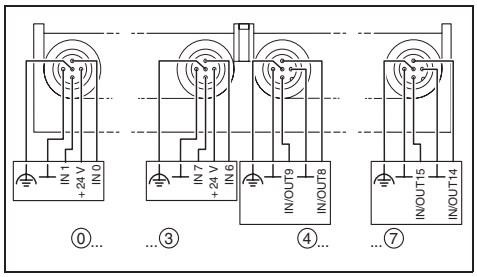
Technical data	
Interface	
Fieldbus system	PROFINET
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	18.5 V DC ... 30 V DC (including ripple)
Ripple	Max 3.6 V_{pk-pk} within the permissible voltage range
Digital inputs	
Connection method	2, 3, 4-wire
Number of inputs	16
Name of protection	Electronic short circuit/overload protection for each group
Digital outputs	
Connection method	-
Number of outputs	-
Maximum output current per channel	-
Protective circuitry	-
General data	
Weight	1180 g
Width	182.5 mm
Height	71.5 mm
Depth	79.8 mm
Degree of protection	IP67, when screwed together
Ambient temperature (operation)	-20°C ... 55°C
Permissible humidity (operation)	100%

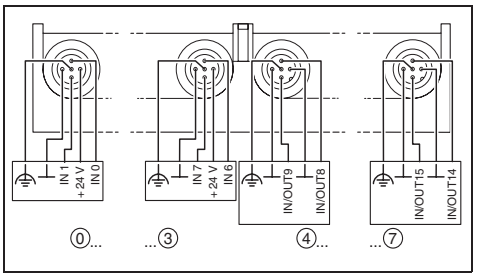
RL PN 24-1 DIO 16/8 2TX

Rugged Line digital input/output device,
inputs: 24 V DC, 4-wire connection method,
outputs: 24 V DC, 500 mA, 3-wire connection method

RL PN 24-2 DIO 16/8 2TX

Rugged Line digital input/output device,
inputs: 24 V DC, 4-wire connection method,
outputs: 24 V DC, 500 mA, 3-wire connection method





Type	Order No.	Pcs. / Pkt.
RL PN 24-1 DIO 16/8 2TX	**2773500**	1
VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B	**1405141**	1
VS-PPC-C2-MSTB-MNNA-P13-A5-SP	**1608074**	1
IBS RL AP	**2731128**	10

Type	Order No.	Pcs. / Pkt.
RL PN 24-2 DIO 16/8 2TX	**2773652**	1
VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B	**1405141**	1
VS-PPC-C2-MSTB-MNNA-P13-A5-SP	**1608074**	1
IBS RL AP	**2731128**	10

PROFINET	PROFINET
24 V DC 18.5 V DC ... 30 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range	24 V DC 18.5 V DC ... 30 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range
2, 3, 4-wire 16 Electronic short circuit/overload protection for each group	2, 3, 4-wire 16 Electronic short circuit/overload protection for each group
2, 3-wire 8 500 mA Electronic short circuit/overload protection for each channel	2, 3-wire 8 500 mA Electronic short circuit/overload protection for each channel
1180 g 182.5 mm 71.5 mm 79.8 mm IP67, when screwed together -20°C ... 55°C 100%	1180 g 182.5 mm 71.5 mm 79.8 mm IP67, when screwed together -20°C ... 55°C 100%

INTERBUS bus terminal modules
Monitoring device
Digital input devices

The Rugged Line product range with its various devices covers a variety of functions in an application.

The Rugged Line bus terminal module makes it possible to set up individual INTERBUS segments.

On the one hand, the Rugged Line monitoring device monitors the transmission quality of the fiber optic path, and on the other hand, the monitoring device makes it possible to extend the transmission path of the fiber optic conductor further.

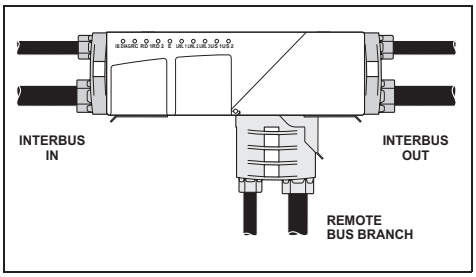
With Rugged Line, digital input is possible with a pure input device with 16 channels and also with different versions of input/output combinations.

Digital output devices that also detect the status of individual outputs and report them back to the control unit are a particular feature. These devices with outputs that can be read back are available as pure output devices with eight outputs and also as a combination of inputs and outputs.

Sensors and actuators are connected to the Rugged Line devices using M12 connectors. The outputs of the relay device are connected using a COMBICON connector. The INTERBUS can be connected to a Rugged Line Station using a twisted-pair cable and a fiber optic connection. Devices with 500 kBd and 2 MBd transmission speed are provided for fiber optic transmission.

IBS RL 24 BK RB-...

Rugged Line bus terminal module, INTERBUS, 24 V DC



Description	Type	Order No.	Pcs. / Pkt.
Rugged Line bus terminal module			
- Fiber optics connection	**IBS RL 24 BK RB-LK-LK**	**2725024**	1
- Fiber optics connection, transmission speed 2 Mbps	**IBS RL 24 BK RB-LK-LK-2MBD**	**2731597**	1
- Twisted pair connection	**IBS RL 24 BK RB-T-T**	**2731063**	1
Rugged Line monitoring device for path monitoring			
- Fiber optics connection			
- Fiber optics connection, transmission speed 2 Mbps			
Rugged Line digital input/output device			
- Fiber optics connection			
- Fiber optics connection, transmission speed 2 Mbps			
- Twisted pair connection			
Bus connector (QUICKON connection method)			
- Fiber optics connection	**IBS RL PLUG-LK/POF**	**2731076**	1
- Twisted pair connection	**IBS RL PLUG-T**	**2731898**	1
Rugged Line mounting plate	**IBS RL AP**	**2731128**	10

Technical data	
Interface	
Fieldbus system	INTERBUS
Name	Remote bus
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	18.5 V DC ... 32 V DC (including ripple)
Ripple	Max 3.6 V_{pk-pk} within the permissible voltage range
Digital inputs	
Connection method	-
Number of inputs	-
Name of protection	-
Digital outputs	
Connection method	-
Number of outputs	-
Maximum output current per channel	-
Protective circuitry	-
General data	
Weight	610 g
Width	179 mm
Height	67 mm
Depth	71 mm
Degree of protection	IP67, when screwed together
Ambient temperature (operation)	0°C ... 55°C
Permissible humidity (operation)	100%

IBS RL 24 OC-LK...

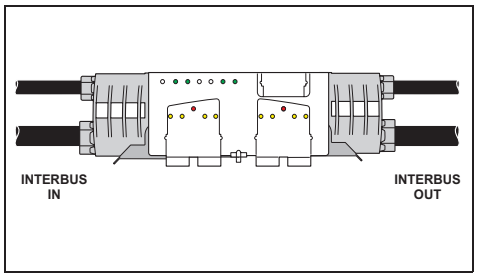
Rugged Line monitoring device, 24 V DC

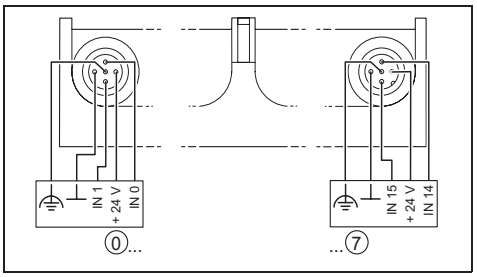
IBS RL 24 DI 16/8-...

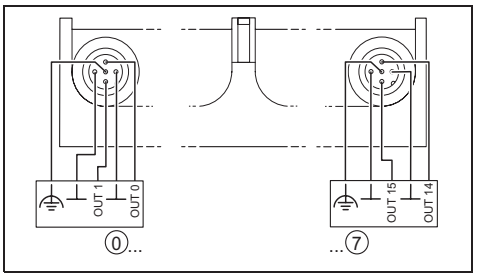
Rugged Line digital input device,
inputs: 24 V DC, 4-wire connection method

IBS RL 24 DO 16/8-R-LK...

Rugged Line digital output device,
outputs: 24 V DC, 500 mA, can be read back
3-wire connection method







Type	Order No.	Pcs. / Pkt.
IBS RL 24 OC-LK	**2819972**	1
IBS RL 24 OC-LK-2MBD	**2732499**	1
IBS RL PLUG-LK/POF	**2731076**	1
IBS RL PLUG-T	**2731898**	1
IBS RL AP	**2731128**	10

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DI 16/8-LK	**2724850**	1
IBS RL 24 DI 16/8-LK-2MBD	**2731584**	1
IBS RL 24 DI 16/8-T	**2836463**	1
IBS RL PLUG-LK/POF	**2731076**	1
IBS RL PLUG-T	**2731898**	1
IBS RL AP	**2731128**	10

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DO 16/8-R-LK	**2734170**	1
IBS RL 24 DO 16/8-R-LK-2MBD	**2734507**	1
IBS RL PLUG-LK/POF	**2731076**	1
IBS RL AP	**2731128**	10

INTERBUS Remote bus	INTERBUS Remote bus	INTERBUS Remote bus
24 V DC 18.5 V DC ... 32 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range	24 V DC 18.5 V ... 32 V (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range	24 V DC 18.5 V DC ... 32 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range
- - -	2, 3, 4-wire 16 Electronic short circuit/overload protection for each group	- - -
- - - -	- - - -	2, 3-wire 16 500 mA Electronic short circuit/overload protection for each channel
640 g 127 mm 67 mm 71 mm IP67, when screwed together 0°C ... 55°C 100%	720 g 179 mm 67 mm 71 mm IP67, when screwed together 0°C ... 55°C 100%	810 g 179 mm 67 mm 71 mm IP67, when screwed together -20°C ... 55°C 100%

Digital input and output devices

The Rugged Line product range with its various devices covers a variety of functions in an application.

Digital signals can be sent using 0.5 A, 2 A outputs as well as relay devices.

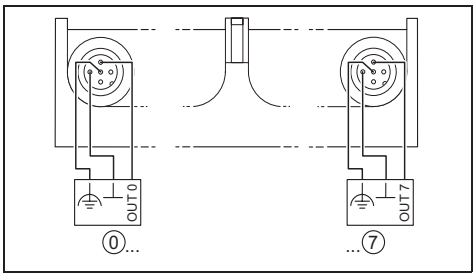
With Rugged Line, digital input is possible with a pure input device with 16 channels and also with different versions of input/output combinations.

Digital output devices that also detect the status of individual outputs and report them back to the control unit are a particular feature. These devices with outputs that can be read back are available as pure output devices with eight outputs and also as a combination of inputs and outputs.

Sensors and actuators are connected to the Rugged Line devices using M12 connectors. The outputs of the relay device are connected using a COMBICON connector. The INTERBUS can be connected to a Rugged Line Station using a twisted-pair cable and a fiber optic connection. Devices with 500 kBd and 2 MBd transmission speed are provided for fiber optic transmission.

IBS RL 24 DO 8/8-2A-...

Rugged Line digital output device,
outputs: 24 V DC, 2 A, 3-wire connection method



Description	Type	Order No.	Pcs. / Pkt.
Rugged Line digital output device			
- Fiber optics connection	**IBS RL 24 DO 8/8-2A-LK**	**2731034**	1
- Fiber optics connection, transmission speed 2 Mbps	**IBS RL 24 DO 8/8-2A-LK-2MBD**	**2731827**	1
- Twisted pair connection	**IBS RL 24 DO 8/8-2A-T**	**2731856**	1
Rugged Line digital input/output device			
- Fiber optics connection			
- Fiber optics connection, transmission speed 2 Mbps			
- Twisted pair connection			
Bus connector (QUICKON connection method)			
- Fiber optics connection	**IBS RL PLUG-LK/POF**	**2731076**	1
- Twisted pair connection	**IBS RL PLUG-T**	**2731898**	1
Rugged Line mounting plate	**IBS RL AP**	**2731128**	10

Technical data	
Interface	
Fieldbus system	INTERBUS
Name	Remote bus
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	18.5 V DC ... 32 V DC (including ripple)
Ripple	Max 3.6 V_{pk-pk} within the permissible voltage range
Digital inputs	
Connection method	-
Number of inputs	-
Name of protection	-
Digital outputs	
Connection method	2, 3-wire
Number of outputs	8
Maximum output current per channel	2 A
Protective circuitry	Electronic short circuit/overload protection for each channel
General data	
Weight	720 g
Width	179 mm
Height	67 mm
Depth	71 mm
Degree of protection	IP67, when screwed together
Ambient temperature (operation)	-20°C ... 55°C
Permissible humidity (operation)	100%

IBS RL 24 DIO 4/2/4-LK...

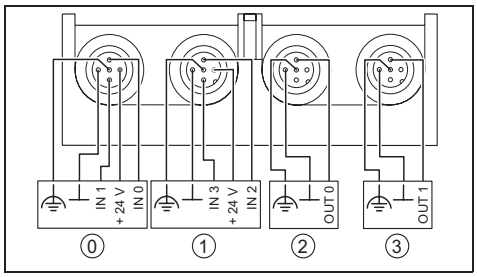
Rugged Line digital input/output device,
inputs: 24 V DC, 4-wire connection method,
outputs: 24 V DC, 500 mA, 3-wire connection method

IBS RL 24 DIO 8/8/8-...

Rugged Line digital input/output device,
inputs: 24 V DC, 4-wire connection method,
outputs: 24 V DC, 500 mA, 3-wire connection method

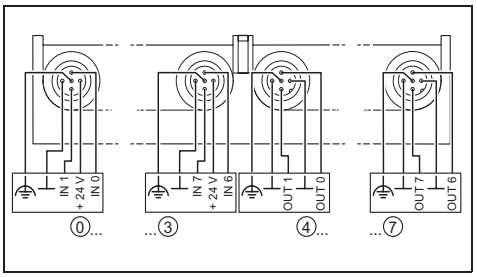
IBS RL 24 DIO 8/8/8-R-LK...

Rugged Line digital input/output device,
inputs: 24 V DC, 4-wire connection method,
outputs: 24 V DC, 500 mA, 3-wire connection method,
can be read back



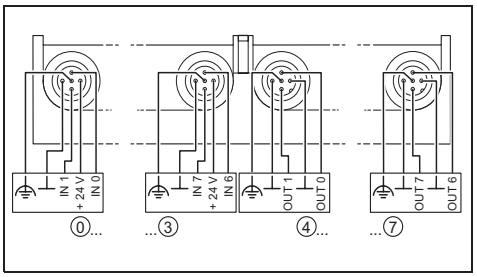
Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 4/2/4-LK	**2819985**	1
IBS RL 24 DIO 4/2/4-LK-2MBD	**2732486**	1
IBS RL PLUG-LK/POF	**2731076**	1
IBS RL PLUG-T	**2731898**	1
IBS RL AP	**2731128**	10

INTERBUS Remote bus
24 V DC 18.5 V DC ... 32 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range
2, 3, 4-wire 4 Electronic short circuit/overload protection for each group
2, 3-wire 2 500 mA Electronic short circuit/overload protection for each channel
650 g 127 mm 67 mm 71 mm IP67, when screwed together 0°C ... 55°C 100%



Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 8/8/8-LK	**2724847**	1
IBS RL 24 DIO 8/8/8-LK-2MBD	**2731571**	1
IBS RL 24 DIO 8/8/8-T	**2836476**	1
IBS RL PLUG-LK/POF	**2731076**	1
IBS RL PLUG-T	**2731898**	1
IBS RL AP	**2731128**	10

INTERBUS Remote bus
24 V DC 18.5 V DC ... 32 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range
2, 3, 4-wire 8 Electronic short circuit/overload protection for each group
2, 3-wire 8 500 mA Electronic short circuit/overload protection for each channel
720 g 179 mm 67 mm 71 mm IP67, when screwed together 0°C ... 55°C 100%



Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 8/8/8-R-LK	**2734167**	1
IBS RL 24 DIO 8/8/8-R-LK-2MBD	**2734510**	1
IBS RL PLUG-LK/POF	**2731076**	1
IBS RL AP	**2731128**	10

INTERBUS Remote bus
24 V DC 18.5 V DC ... 32 V DC (including ripple) Max 3.6 V_{pk-pk} within the permissible voltage range
2, 3, 4-wire 8 Electronic short circuit/overload protection for each group
2, 3-wire 8 500 mA Electronic short circuit/overload protection for each channel
790 g 179 mm 67 mm 71 mm IP67, when screwed together -20°C ... 55°C 100%

Relay device

The Rugged Line IP67 relay devices are suitable for use without control cabinets under rough industrial ambient conditions, such as are encountered in the automobile body shop. The areas of application are particularly in handling technology or tool platforms.

For example, the IBS RL 24 DIO 8/5 RS... relay device can be used in electric overhead conveyor systems to monitor and disconnect block sections or corner blocks. Five relays can be switched separately to control the power rails. The signals from the signaling bar are evaluated using two configurable 400 V AC inputs. Two of the 400 V AC outputs can be operated with interlocking. It is then possible, for example, to control two block sections with one device.

All connections are pluggable, like the device electronics themselves. The incoming conductors leading to the internal POWER-COMBICON connectors are sealed with PG screw connections in the installation cover. If replacement is necessary, the installation cover with the assembled conductors can be simply removed from the device electronics without having to reassemble the conductors again.

The two Rugged Line INTERBUS devices with a transmission rate of 500 kBaud or 2 Mbaud are a further addition for the distributed construction of production systems in body shops and wherever distributed, electrically isolated switching is required.

Features:

– INTERBUS protocol
– IP67 degree of protection
– Fiber optic bus connection
– Supply voltage connection with QUICKON connection method on a Rugged Line connector
– Mounting options on aluminum sections, four-point mounting, direct mounting
– Six digital inputs 24 V DC
– Two digital inputs 400 V AC
– Five relay outputs 400 V AC, of which two are for configurable and mutually interlockable outputs

IBS RL 24 DIO 8/...-RS-LK...

Rugged Line digital input/output device, inputs: 24 V DC, 4-wire connection method, outputs: relay N/O contact outputs

Description	Type	Order No.	Pcs. / Pkt.
Rugged Line relay device, with fiber optics connection			
- Five relay N/O contact outputs	**IBS RL 24 DIO 8/5-RS-LK**	**2734918**	1
- Eight relay N/O contact outputs	**IBS RL 24 DIO 8/8/8 RS-LK**	**2734044**	1
- Five relay N/O contact outputs, transmission speed 2 Mbps	**IBS RL 24 DIO 8/5-RS-LK-2MBD**	**2734905**	1
- Eight relay N/O contact outputs, transmission speed 2 Mbps	**IBS RL 24 DIO 8/8/8 RS-LK-2MBD**	**2731733**	1
Rugged Line mounting plate	**IBS RL AP**	**2731128**	10
Connector set, connector and PG screw connection for Rugged Line relay device IBS RL 24 DIO 8/5-RS-LK...	**IBS RL PLSET DIO 8/5-RS-LK**	**2737452**	1
Connector set, connector and PG screw connection for Rugged Line relay device IBS RL 24 DIO 8/8/8-RS-LK...	**IBS RL PLSET DIO 8/8/8-RS-LK**	**2740465**	1
Bus connector (QUICKON connection method)	**IBS RL PLUG-LK/POF**	**2731076**	1
Bus connector (spring-cage connection method)	**IBS RL PLUG-LK/POF-F**	**2734183**	1

Technical data	IBS RL 24 DIO 8/5-RS-LK	IBS RL 24 DIO 8/8/8 RS-LK
Interface		
Fieldbus system	INTERBUS	
Name	Remote bus	
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	18.5 V DC ... 32 V DC (including ripple)	
Ripple	Max 3.6 V_{pk-pk} within the permissible voltage range	
Digital inputs		
Connection method	2, 3, 4-wire	
Number of inputs 24 V DC	6	8
Number of inputs 400 V AC	2	-
Name of protection	Electronic short circuit/overload protection	
Digital outputs		
Number of outputs	5	8
Output name	Relay output	
Maximum output current per channel	2 A	0.5 A
Maximum switching voltage	440 V AC	250 V AC
Minimum switching voltage	12 V AC	
General data		
Weight	3.5 kg	
Width	185 mm	
Height	193 mm	
Depth	138 mm	
Degree of protection	IP67, when screwed together	
Ambient temperature (operation)	0°C ... 55°C	-20°C ... 55°C
Permissible humidity (operation)	100%	
Air pressure (operation)	860 hPa ... 1080 hPa (up to 1500 m above mean sea level)	

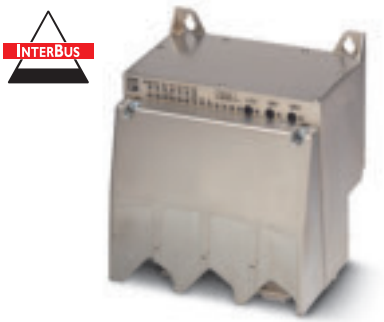
Motor starter

The motor starter is designed for use in systems engineering. The IP67 degree of protection means, it is suitable for use outside control cabinets in rough industrial environmental conditions – e.g. on tool platforms or in handling technology.

Bus and power supply can be connected to the motor starter from two directions, depending on the application. Bus connectors with the QUICKON connection method are used to connect the motor starter with the supply voltage for the bus logic/sensors (24 V DC) and actuators (24 V DC).

Features:

- INTERBUS protocol
- Reversing-load operation
- Fiber optic bus connection
- Supply voltage connection with QUICKON connection method on a Rugged Line connector
- Connection for external emergency actuation through a 5-pos. M12 female connector
- Power connections through POWER-COMBICON
- Blowout fuses
- Base-mounted contactors
- Motor current monitoring
- Motor control using digital inputs
- Electronic motor protection
- Relay contact for an external braking device
- Safety shutdown can be implemented using a separate actuator supply
- Emergency operation using internal and external controls
- Safe isolation between mains voltage and 24 V supply voltage as per EN 50178:1997
- Diagnostics and status displays
- Mounting options on aluminum sections, four-point mounting, direct mounting



IBS RL ... MLR R DIO6/1 LK...

Rugged Line motor starter, INTERBUS,
inputs: 24 V DC, 4-wire connection,
outputs: 24 V DC, motor output, brake output

Description	Type	Order No.	Pcs. / Pkt.
Rugged Line motor starter, with fiber optics connection			
- 400 V	**IBS RL 400 MLR R DIO6/1 LK**	**2734769**	1
- 400 V, transmission speed 2 Mbps	**IBS RL 400 MLR R DIO6/1 LK2MBD**	**2731830**	1
Rugged Line motor starter, with fiber optics connection			
- 480 V	**IBS RL 480 MLR R DIO6/1-LK**	**2737384**	1
- 480 V, transmission speed 2 Mbps	**IBS RL 480 MLR R DIO6/1-LK2MBD**	**2734497**	1
Rugged Line mounting plate	**IBS RL AP**	**2731128**	10
Set of accessories (connector and PG screw connections)	**IBS RL MLR PLSET R-8A**	**2740504**	1
Bus connector (QUICKON connection method)	**IBS RL PLUG-LK/POF**	**2731076**	1
Bus connector (spring-cage connection method)	**IBS RL PLUG-LK/POF-F**	**2734183**	1
Hand-held operator panel, for motor starters and variable frequency drives	**IBS HVO/M12**	**2837006**	1

Technical data	IBS RL 400 MLR R DIO6/1 LK	IBS RL 480 MLR R DIO6/1-LK
Interface		
Fieldbus system	INTERBUS	
Name	Remote bus	
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	18.5 V DC ... 32 V DC (including ripple)	
Range of supply voltages	18.5 V DC ... 32 V DC (including ripple)	
Power supply for sensors		
Minimum voltage	$U_{INI} = U_{S1}$ minus 1 V	
Nominal current per sensor	50 mA	
Digital inputs		
Number of inputs	6	
Type of connection	M12 connector	
Typical input current per channel	5 mA (for U_{S1} = 24 V)	
Digital outputs		
Number of outputs	1	
Type of connection	M12 connector	
Minimum output voltage with nominal current	U_{S1} minus 2 V	
Output current	0.5 A	
Name of protection	Electronic short-circuit/overload protection	
Motor starter, output		
No.	1	
Type of connection	POWER-COMBICON	
Operating voltage	200 V AC ... 440 V AC	230 V AC ... 480 V AC
Nominal current range	Parameterizable 0.2 A ... 8 A (observe derating)	
Frequency range	50 Hz ... 60 kHz	
Phase angle	cos φ ≥ 0.3	
Nominal motor power	-	
Switching rate	Max. 5 cycles per minute	
Motor starter, brake		
Type of contact	Mechanical relay contact	
Continuous load current	Max. 1 A	
Connection voltage	12 V AC/DC ... 440 V AC/DC	12 V AC/DC ... 480 V AC/DC
General data		
Weight	3.8 kg	
Degree of protection	IP67, when screwed together	
Width	185.1 mm	
Height	193 mm	
Depth	138 mm	

Connectors

The Rugged Line plug connection system is an IP67 solution with fieldbus communication and supply voltage being connected separately.

If plastic optic fibers are used, the fiber optics are assembled with the aid of the IBS RL FOC fiber cutter. This on-site assembly does not require subsequent polishing of polymer fibers.

There are two versions of the Rugged Line connector, which differ in their connection method. Both versions are available for copper and fiber optics installation.

The QUICKON version is characterized by its fast and simple assembly. This supply voltage connection method requires specially approved cables! In addition, Rugged Line connectors with the spring-cage connection method for specific cables are made available.

IBS RL PLUG-...

Description	Type	Order No.	Pcs. / Pkt.
Bus connector (QUICKON connection method)			
- Fiber optics connection	**IBS RL PLUG-LK/POF**	**2731076**	1
- Twisted pair connection	**IBS RL PLUG-T**	**2731898**	1
Bus connector (spring-cage connection method)			
- Fiber optics connection	**IBS RL PLUG-LK/POF-F**	**2734183**	1
- Twisted pair connection	**IBS RL PLUG-T-F**	**2734196**	1
Sensor connector, 4-pos. with QUICKON connection for M12 female connectors	**SACC-M12MS-4QO-0,75**	**1641769**	1
Y-distributor/connector M12, with M12 female connectors, 3-pos. distributor + PE	**SAC-3P-M12Y/2XM12FS PE**	**1683455**	5
For distributors and cables, see the PLUSCON catalog			

Adapter

The IBS RL 24 ADAP... plug-in adapters are provided to swap between optic fibers and copper cables as transmission media if necessary and to switch to an assembly with M23 connectors.

You thus have the absolute freedom necessary to set up your application as you like.

IBS RL 24 ADAP-...

Description	Type	Order No.	Pcs. / Pkt.
Converter of the remote bus connection, from circular connector to fiber optics			
	IBS RL 24 ADAP-T/LK	**2725037**	1
	IBS RL 24 ADAP-LK/T	**2725040**	1
Copper bus connector with M23 circular connector, connection of incoming remote bus and supply voltage			
	IBS RL 24 ADAP-M23/T	**2734109**	1
	IBS RL 24 ADAP-T/M23	**2734112**	1
Solder connection for bus connector set (male/female) M23	**IBS CCO-R/L**	**2759883**	1
Power supply connectors (female/solder connection) M23	**IBS CCO-PSF/L**	**2780878**	1
Power supply connectors (male/solder connection) M23	**IBS CCO-PSM/L**	**2759906**	1
For distributors and cables, see the PLUSCON catalog			

Accessories

A variety of preassembled cables is available for fast installation. Here, you can select the cable length and type. The range includes preassembled versions with a connector on one end only, or with only the voltage line connected.

Note: Self-assembled FO bus cables must be at least 1 m long. For shorter distances, please only use cable bridges by Phoenix Contact (IBS RL CONNECTION ...).

IBS RL CONNECTION-...

Rugged Line accessories

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Assembled cable bridge, as a short connection between two Rugged Line devices, 30 cm						
- Fiber optics bus connector	**IBS RL CONNECTION-LK**	**2733029**	1			
- Copper bus connector	**IBS RL CONNECTION-T**	**2733061**	1			
Pre-assembled cable sets with fiber optics bus connectors, by the meter	**IBS RL CABLE POF/**	**2819956**	1			
Remote bus cable, by the meter,						
- Fixed installation	**IBS RBC METER-T**	**2806286**	1			
- Flexible application	**IBS RBC METER/F-T**	**2723123**	1			
Polymer fiber cable POF, duplex, 980/1000 µm, medium-weight standard version, for permanent indoor installation						
- By the meter **w/o** connector	**PSM-LWL-KDHEAVY-980/1000**	**2744319**	1			
Polymer fiber cable POF, duplex, 980/1000 µm, heavy-weight standard version, for permanent indoor installation						
- By the meter **w/o** connector	**PSM-LWL-RUGGED-980/1000**	**2744322**	1			
Polymer fiber cable POF, duplex 980/1000 µm, heavy-weight, highly flexible standard version for flexible power conduit applications						
- By the meter **w/o** connector	**PSM-LWL-RUGGED-FLEX-980/1000**	**2744335**	1			
Supply cable, gray, welding-splash-resistant in standard applications, 5 x 1.5 mm², by the meter						
- Standard	**IBS PWR/5**	**2820000**	1			
- Highly flexible	**IBS PWR/5HD/F**	**2731775**	1			
INTERBUS/fiber optic converter, for converting the remote OUT interface to fiber optic cables				**IBS OPTOSUB-MA/M/R-LK-OPC**	**2732635**	1
Transport protection for fiber optics bus connection				**IBS RL PROT-LK**	**2819969**	50
Screw plug				**PROT-M12**	**1680539**	5
Marking labels, set of 50 small and 50 large labels				**IBS RL MARKER-SET**	**2732729**	1
Marking labels, set of 100 large labels				**IBS RL MARKER-G-SET**	**2734727**	1
Marking labels, set of 100 small labels				**IBS RL MARKER-K-SET**	**2734730**	1
Fiber cutter, for quick and easy mounting of fiber optic cables with the Rugged Line connector				**IBS RL FOC**	**2725147**	1
Stripping tool for FO cables				**KAMES LWL**	**1206146**	1
Fiber optic measuring case, consisting of an optical power meter, F-SMA, B-FOC adapters, reference fibers and operating instructions				**PSM-FO-POWERMETER**	**2799539**	1
Measuring device adapter, for INTERBUS-RL modules				**IBS RL ADAP FO**	**2725121**	1
Polymer fiber DIY Case, consisting of: stripping knife, stripping pliers, polishing wheel for F-SMA and SCRJ quick mounting connectors, polishing pad and emery paper				**PSM-POF-KONFTOOL**	**2744131**	1

Motion control

There are two main options for motion control in machines or systems. If the mechanical processing of workpieces is the primary objective and if the workpiece geometries have been designed with CAD systems, the machines are mostly based on CNC controllers. The use of programmable logic controllers (PLC), however, is common in all other processing machines.

With PC Worx, Phoenix Contact enables motion functions (without CNC functions) to be optimally and completely integrated into precisely this PLC world.

For this purpose, Phoenix Contact provides motion control function blocks in accordance the motor functions as defined in IEC 61131-3 in the high-end S-MAX 400 CE PN MC controller. Thanks to the function blocks, axes can be controlled and synchronized from PC Worx with extremely high dynamics and precision. The library for dynamic and high precision one-axis or multi-axis motions requires electrical servo drives to be networked with Sercos.

The motion control solutions thus reliably fulfill requirements such as fast point-to-point positioning, pick&place functions, electronic cam discs or gears.

Distributed drives

Various distributed drives such as motor starters and frequency inverters with IP54 and IP67 degrees of protection in sheet-steel and high-grade steel are available for conveying technology.

Phoenix Contact provides variants with INTERBUS, INTERBUS-LWL and PROFIBUS for establishing connections to various controllers.

Numerous motor starters that are directly integrated into the system can be used for direct implementation with the Inline I/O system.

Program overview

You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).

Motion control function blocks

All motion functions are available as function blocks in all IEC 61131 programming languages. Corresponding variables are used to access the axes.

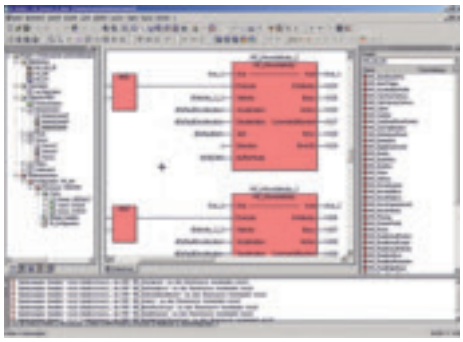
The function blocks available for the motion functions comply with the descriptions in the PLCopen specifications "Function Blocks for Motion Control 1 and 2".

Here, all function blocks are implemented with the maximum described scope of functions for maximum functionality. All motion data is processed as 64-bit floating points, in order to guarantee maximum possible accuracy even in fast applications.

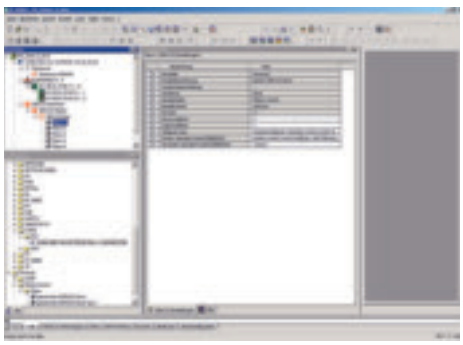
The scope of functions comprises:

- MC_MoveAbsolute
- MC_MoveRelative
- MC_MoveAdditive
- MC_MoveSuperimposed
- MC_MoveVelocity
- MC_Home
- MC_Stop
- MC_Power
- MC_ReadStatus
- MC_ReadAxisError
- MC_Reset
- MC_ReadParameter
- MC_ReadBoolParameter
- MC_WriteParameter
- MC_WriteBoolParameter
- MC_ReadActualPosition
- MC_ReadActualVelocity
- MC_SetPosition
- MC_SetOverride
- MC_PositionProfile
- MC_VelocityProfile
- MC_AccelerationProfile
- MC_CamTableSelect
- MC_CamIn
- MC_CamOut
- MC_GearIn
- MC_GearOut
- MC_Phasing
- MC_GearInPos

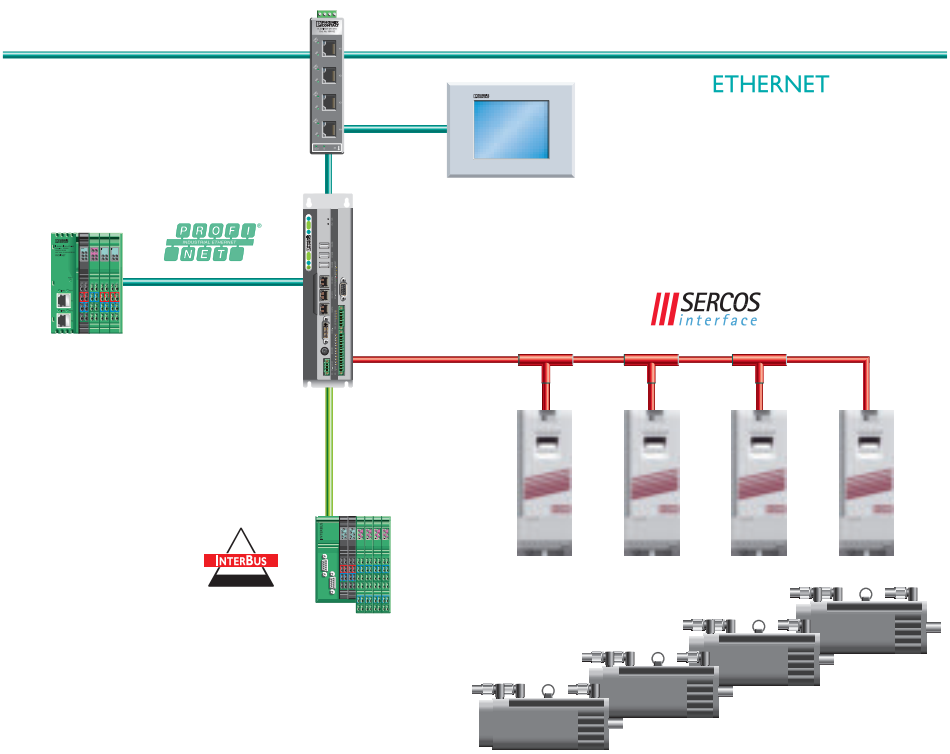
The Motion Control function blocks provide the basic functions required within an application in a uniform and standardized manner.



Programming motions directly from the PLC range with the help of standardized function blocks



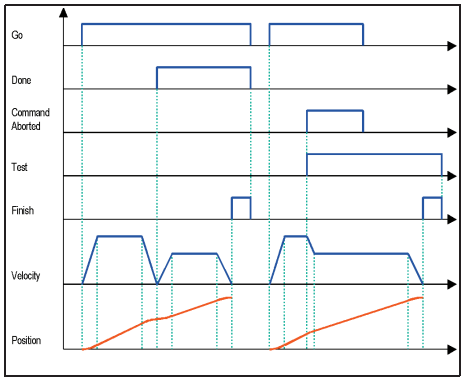
Seamless integration of bus configuration for all integrated communication systems.



Optimum drive solution

The servo drives are interconnected via the open and high-performance Sercos fieldbus system. This means that devices from various manufacturers can be used without having to make complex adaptations to the relevant programs.

An optimum automation solution is thus available in combination with the INTERBUS system for networking sensors and actuators, and PROFINET for establishing connections to higher-level systems.



All parameters of the motion functions are processed in the runtime system of the controller. They are thus activated when the relevant function block is called up; a transfer of the corresponding parameters to the appropriate axis is omitted. Therefore, several motion functions with different parameters can be executed by the connected drives in a very short period, and all functions are available for every connected drive at all times.

Motions within a cam disc function, for example, are also coupled within the controller. As a result, axes can be flexibly assigned to the respective motions at all times.

Therefore, all drive and motion data can be accessed using the function blocks within a control program. This solution also enables the use of machine-oriented data.

SERCOS

The drives are connected with the SERCOS drive bus, with which a data transmission rate of 16 MBaud or a cycle time of 1 ms is possible.

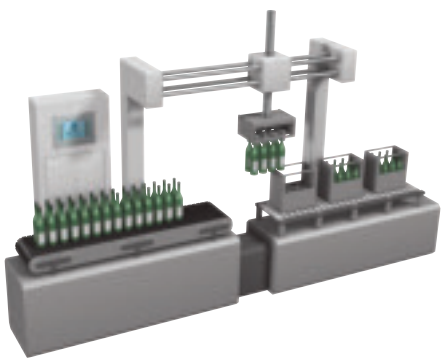
SERCOS interface

In addition to the Motion Control function blocks for controlling the drives, function blocks for controlling SERCOS, as well as for reading and writing the parameter data of the SERCOS devices are also available.

Applications

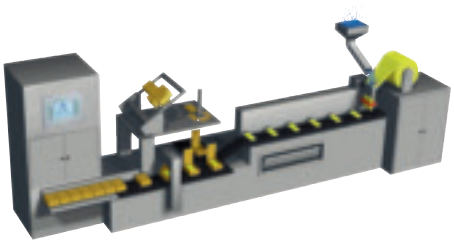
Handling

In automated handling systems, the point-to-point motions must attain higher and higher speeds when transporting products, in order to meet the increasing time requirements of the users. Here, the positioning functions enable easy integration.



Packing

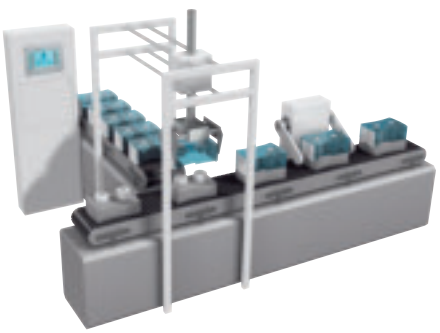
Motion control systems with many axes and various performance classes are used in packaging machines. Motion Control function blocks support coordinated and synchronized movements in the master-slave principle with the virtual master axis.



Mounting

The PC-WORX controller with integrated Motion Control gives a new dimension to assembly machines.

The motions of the assembly machines are becoming increasingly complex, in order to guarantee high-quality assemblies.

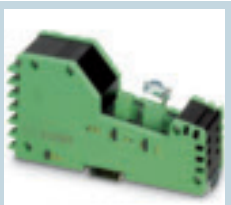


	One-channel reversing starter	Two-channel direct starter		Variable frequency drive
In a sheet-steel housing (copper connection)				
				
Type **Order No.**	**IBS IP 400 ME-ELR R-3A DI4** **2732884**	**IBS IP 400 ME-MLR 2-8A** **2884295**	**IBS IP 400 ME-ELR 2-3A DI4** **2732907**	**IBS IP 400 ME-VFD 1-3A DI4** **2836939**
Description	With 4 digital inputs and 2 digital outputs, IP54 degree of protection	With 4 digital inputs, IP54 degree of protection	With 4 digital inputs and 2 digital outputs, IP54 degree of protection	With 4 digital inputs, IP54 degree of protection
Page	**426**	**426**	**426**	**427**
In sheet-steel housing (FO connection)				
				
Type **Order No.**	**IBS IP 400 ME-ELR R-3A FO** **2734549**	**IBS IP 400 ME-ELR 2-3A FO** **2734536**		**IBS IP 400 ME-VFD 3A FO** **2734523**
Description	With 4 digital inputs and 2 digital outputs, IP54 degree of protection	With 4 digital inputs and 2 digital outputs, IP54 degree of protection		With 4 digital inputs and 2 digital outputs, IP54 degree of protection
Page	**428**	**428**		**429**
In high-grade steel housing (copper connection)				
				
Type **Order No.**	**IBS IP 400 ME-MLR R-8A DI4F** **2732949**	**IBS IP 400 ME-MLR 2-8A DI4F** **2732965**		**IBS IP 400 ME-VFD 1-3A DI4F** **2836955**
Description	With 4 digital inputs and 2 digital outputs, IP65/67 degree of protection	With 4 digital inputs and 2 digital outputs, IP65/67 degree of protection		With four digital inputs IP65/67 degree of protection
Page	**430**	**430**		**431**
In sheet-steel housing (copper connection)				
				
Type **Order No.**	**PB IP 400 ME-ELR R-3A** **2734840**	**PB IP 400 ME-ELR 2-3A** **2734772**		**PB IP 400 ME-VFD 3A DI4** **2734785**
Description	With 4 digital inputs and 2 digital outputs, IP54 degree of protection	With 4 digital inputs and 2 digital outputs, IP54 degree of protection		With 4 digital inputs and 2 digital outputs, IP54 degree of protection
Page	**432**	**432**		**433**

Motion control

	
Type Order No.	S-MAX 400 CE PN MC 2700609
Description	High-End PLC with motion control function, PC-based with full Ethernet and IT connectivity
Page	425

Inline Modular power-level terminals and accessories

					
Type Order No.	IB IL 400 MLR 1-8A 2727365	IB IL 400 ELR 1-3A 2727352	IB IL 400 ELR R-3A 2727378	IB IL DC AR 48/10A 2819286	IB IL EC AR 48/10A-PAC 2819587
Description	Electromechanical direct starter, up to 3.7 KW / 400 V AC	Electronic direct starter, up to 1.5 KW / 400 V AC	Electronic reversing load starter, up to 1.5 KW / 400 V AC	Servo amplifier for DC motors with brushgears	Servo amplifier for EC-motors without brushgears
Page	309	309	309	307	306
Type Order No.	IBS HVO 2836052	IB IL 400 BR 2727394	IB IL 400 CN-PWR-IN 2836078	IB IL 400 CN-BRG 2836081	GMVSTBW 2,5 HV/4-ST-7,62 NZIL 1893957
Type Order No.		IB IL 24 BR/DC 2742036			
Description	Manual on-site operator panel	Brake modules	Power connector	Power bridge	Motor circuit connector
Page	309	309	309	309	309

Lower housing parts and accessories

				
Type Order No.	IBS IP 400 MBH 2732871	IBS IP 400 MBH/MS 2734125	IBS IP 400 FO-MBH 2734345	IBS IP 400 FO-MBH/MS 2734581
Description	Lower sheet-steel part, IP54 degree of protection	Lower sheet-steel part, IP54 degree of protection, with switch-disconnector, fuse holder and power distribution	Lower sheet-steel part, IP54 degree of protection, FO guide plate, jumpering for 24 V (U_{S1} and U_{S2})	Lower sheet-steel part, IP54 degree of protection, Switch-disconnector, fuse holder, FO guide plate, power distribution and jumpering for 24 V (U_{S1} and U_{S2})
Page	427	427	429	429
				
Type Order No.	IBS IP 400 MBH-F 2732868	IBS IP 400 MBH/MS-F 2734031	MBH/INST 2734947	MBH/FUSE 2734264
Description	High-grade steel lower part, IP67 degree of protection	High-grade steel lower part, IP65 degree of protection, with switch-disconnector, fuse holder and power distribution	Lower housing part for DIN rail mounting, IP54 degree of protection	Lower housing part with fuse holders, IP54 degree of protection
Page	431	431	On request	On request

Motion control with PC Worx
Motion functions for numerous areas of application

The high-end PLC SMAX 400 CE PN MC provides an integrated motion control function and full Ethernet- and IT-connectivity, whereby the PLC periphery is coupled via INTERBUS or PROFINET and the distributed axes via Sercos II. The SMAX 400 CE PN MC is thus a high-performance motion control device for up to 20 axes in combination with a powerful controller (PLC) based on PC WorX.

Just like all other Phoenix Contact controllers: in addition to the usual control and motion tasks, the SMAX 400 CE PN MC also carries out all communication tasks for which Ethernet has become established today in industrial applications. An integrated web server makes it possible to store machine-specific pages in the controller for remote machine control, and an FTP server allows data exchange. Open TCP/IP or UDP/IP blocks further round off the Ethernet- and IT-compatibility.

It does not matter whether the controller has to send e-mails, wants to get a new application program from a central server, has to log data in realtime or has to read and write databases without stress. All these functions can be implemented quickly and easily.

Unlike its sister model, the SMAX, with an "MC" added to its name, offers the motion control functions as per the PLCopen standard part 1, version 1.1 and part 2, version 1.0 (FB MC.LIB).
This so called motion core runs on the SMAX with a high level of time synchronism with the SERCOS II cycle.

Internally, the motion core provides a setpoint generator function for position setpoints that are transported to the drives in realtime through Sercos. All Sercos drives have a position controller so that the lower-level drives can process the position setpoints.

The advantage for fast machines

In order to combine the advantages of electronic motion control with easy programming and start-up of machines, these two features have been integrated into a common platform. In other words, the motion function has been integrated directly into the process-managing controller in SMAX 400 CE PN MC. The controller thus has significant saving potential. Phoenix Contact has therefore combined all the required PLC and motion functions in the SMAX 400 CE PN MC on the basis of the PLCopen description such that they are available in the PC Worx engineering software in the IEC 611313 languages.

Due to its high performance, the SMAX 400 CE PN MC can process comprehensive motion control and automation tasks quickly and reliably.

The flexibility of the servo technology is thus combined with the easy and economical programming in the classic PLC languages. The integration of motion calculation into the process-managing controller is also advantageous because different motion functions can be carried out with individual values without any delay.

PLC with motion control function

The SMAX 400 CE PN MC is a high-end controller with full Ethernet and IT compatibility and also has an integrated motion control functionality. Like all other Phoenix Contact controllers, this device is also programmed using the PC Worx software and thus conforms to the IEC 611313 standard. INTERBUS master, PROFINET and an optional Modbus/TCP have been integrated in order to bring medium and large numbers of I/Os into the PLC controller as well.

The motion control functionality in the SMAX 400 CE PN MC is provided by additional IEC 61131 function blocks that have been certified according to PLCopen Function Blocks for Motion Control Part 1 + 2.

The motion functions can thus be simply added to the PLC program, increasing the clarity of the overall machine programming.

The drives for motion control are networked via SERCOS II. Since SERCOS and the motion control evaluation work parallel, this enables very short cycles. The motion control cycle time depends on the number of axes connected and starts at 500 µs. Depending on the system configuration, this can be set between 0.5 and 16 ms. Here, the SERCOS cycle acts as the system clock for the motion control core as well as for all drives and is always precisely maintained.

S-MAX 400 CE PN MC

High-performance combination of PC platform and PLC with the Motion Control functionality

Description	Type	Order No.	Pcs. / Pkt.
High-end PLC - Motion Control functionality	**S-MAX 400 CE PN MC**	**2700609**	1

Technical data	
Controller data	
Network	1xEthernet (10/100/1000 MBIT), RJ45, 2xEthernet (10/100 Mbit)
Fieldbus master	INTERBUS master
Power supply for module electronics	
Supply voltage	24 V DC ± 10%
Range of supply voltages	21.6 V DC ... 26.4 V DC (including ripple)
Max. current consumption	2 A
Basic functionality	
	PLC with integrated Motion Control function
Ethernet and IT compatibility	
Variable access	Via special OPC server (AX-OPC server)
http - Hypertext Transfer Protocol	Web server on-board, web pages stored in the file system (created with WebVisit for example) can be called up via the network
TCP/IP - Transmission Control Protocol/Internet Protocol	TCP/IP (and UDP) communication via integrated function blocks (IP-Connect, IP-Send, etc.) from PC to PLC or from PLC to PLC
FTP - File Transfer Protocol	Via an integrated FTP server
SNTP - Simple Network Time Protocol	(Synchronizing the time) can be synchronized via SNTP with time server
SQL - Structured Query Language	(Database access) chargeable SW provides access to MS-SQL and mySQL databases
SNMP – Simple Network Management Protocol	(Network management) via SNMP services
SERCOS interface	
Interface	SERCOS II
Type of connection	FSMA connectors
Transmission speed	Max. 16 MBaud (with Sercos)
IEC-61131 runtime system	
Processing speed	Typ. 0.05 ms (1 K bit instruction)
Program memory	8 Mbyte (680 K instructions (IL))
Data memory	16 Mbyte
Retentive data memory	96 kByte (NVRAM)
Programming tool	PC WORX
Motion Control	
Number of axes	Max. 20
Axis types	Corresponding Sercos specification for drives
Axis functions	Standard functions as per PLCopen section 1 and 2: start/stop/reset/homing, speed presetting, point-to-point positioning with various speed profiles, higher-level movements, synchronized movement, (virtual) electronic shaft, electronic gear.
Cycle time	> 500 µs (adjustable) Min. 1 ms (Up to five axes) Min. 2 ms (Up to ten axes) Min. 4 ms (Up to 20 axes)
Direct inputs/outputs	
Number of inputs	12
Number of outputs	4
General data	
Width	72 mm
Height	240 mm
Depth	174 mm
Ambient temperature (operation)	0°C ... 55°C
Permissible humidity (operation)	10% ... 85% (non-condensing)
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-29

INTERBUS motor starters and variable frequency drives in sheet-steel housing (IP54)

The motor starters and variable frequency drives in a sheet-steel housing with IP54 degree of protection can be used directly on machines and plants in conveyor systems.

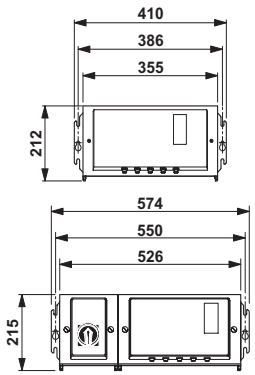
Since they are available in different versions, INTERBUS motor starters cover many important applications.

The 1 and 2-channel motor starters allow direct drives to be controlled. There is a reversing load version for applications involving different drive directions.

A variable frequency drive offers suitable control for applications that require different speeds and starting times.

Additional features include:

- Simple assembly
- Pluggable connection system
- Exchangeable module electronics
- Power networking 400 V AC/ 20 A
- Power networking with an extended lower part and 10 mm² conductor
- Extended lower part with integrated maintenance switch
- Comprehensive status and diagnostics display on the module
- Startup without bus possible with manual operating function
- Four initiator inputs for sensor connections
- Two digital outputs for actuator connections
- Sheet-steel housing suitable for plant engineering
- Nominal output power of 1.5 kW (ELR, VFD) / 3.7 kW (MLR)
- Slot-in Pg screw connections for use with preassembled cable sets

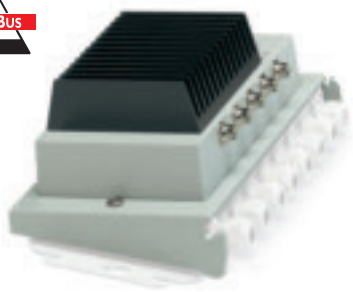


IBS IP 400 ME-ELR (MLR)...

Electronic motor starter with four digital inputs and two digital outputs, sheet-steel housing, IP54 degree of protection

Description	Type	Order No.	Pcs. / Pkt.
Electronic motor starter, electronics module without lower part of the housing			
- 1-channel reversing starter, 1.5 kW	**IBS IP 400 ME-ELR R-3A DI4**	**2732884**	1
- 2-channel direct starter, 1.5 kW	**IBS IP 400 ME-ELR 2-3A DI4**	**2732907**	1
Electromechanical motor starter, electronics module without lower part of the housing			
- 2-channel direct starter, 3.7 kW	**IBS IP 400 ME-MLR 2-8A**	**2884295**	1
Variable frequency drive, electronics module without lower part of the housing			
- 1-channel, 1.5 kW			
Lower part of the housing, sheet-steel			
- Standard version	**IBS IP 400 MBH**	**2732871**	1
- With an integrated maintenance switch	**IBS IP 400 MBH/MS**	**2734125**	1
Connector set for sheet steel versions, consisting of: connectors, Pg cable gland inputs, shield brackets and filler plugs	**IBS ELR PLSET 2-3A**	**2836816**	1
Hand-held operator panel, for motor starters and variable frequency drives	**IBS HVO/M12**	**2837006**	1
Fuses ME-ELR (Midget/ 10.3 x 38)			
Fuses ME-VFD (Midget/ 10.3 x 38)			
Fuses for motor ME-MLR (Midget/ 10.3 x 38)			

Technical data	
Interface	
Name	INTERBUS remote bus
Type of connection	MINI COMBICON
Power supply for module electronics	
Supply voltage	24 V DC (U_{S1})
Range of supply voltages	20 V DC ... 30 V DC (including ripple)
Power supply for sensors	
Minimum voltage	$U_{INI} = U_{S1}$ minus 2 V DC
Nominal current per sensor	50 mA
Name of protection	Against inductive reverse voltages, polarity reversal and short circuits
Digital inputs	
Number of inputs	4
Type of connection	M12 connector
Connection method	3, 4-wire
Digital outputs	
Type of connection	M12 connectors, (A-coded)
Connection method	2-wire
Output current	Max. 500 mA (per channel)
Thermistor input	
Type of connection	POWER-COMBICON terminal strips X10
Connection method	2-wire
Motor starter, output	
Type of connection	POWER-COMBICON
Operating voltage	360 V AC ... 440 V AC (line voltage 50/60 Hz)
Nominal current range	0.2 A ... 3.6 A
Frequency range	50 Hz ... 60 Hz (mains frequency)
Nominal motor power	1.5 kW (2-pos. at U_{mains} = 400 V AC)
Motor monitoring	
Parameterization range	0.2 A ... 3.6 A
Tripping class	Based on class 10 A of IEC 60947-4: 1990
Motor starter, brake	
Type of contact	Polarized solid-state contact
Connection method	With POWER-COMBICON terminal strip of the motor connection (X10)
Continuous load current	Max. 0.3 A
General data	
Weight	3 kg
Degree of protection	IP54 in acc. with IEC 60529:1989



IBS IP 400 ME-VFD 1-3A DI4

Variable frequency drive with four digital inputs, sheet-steel housing, IP54 degree of protection

IBS IP 400 MBH

Sheet-steel lower part, IP54 degree of protection

IBS IP 400 MBH/MS

Sheet-steel lower part, IP54 degree of protection, with switch-disconnector, fuse holder and power distribution

Type	Order No.	Pcs. / Pkt.
IBS IP 400 ME-VFD 1-3A DI4	**2836939**	1
IBS IP 400 MBH	**2732871**	1
IBS IP 400 MBH/MS	**2734125**	1
IBS VFD PLSET 1-3A	**2836942**	1
IBS HVO/M12	**2837006**	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH	**2732871**	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH/MS	**2734125**	1
IBS FUSE 10X38/16AGR	**2734073**	10
IBS FUSE 10X38/10AGL	**2704090**	10
IBS FUSE 10X38/16AGL	**2734316**	10

INTERBUS remote bus	-	-
MINI COMBICON	-	-
24 V DC (U_{S1})	-	-
20 V DC ... 30 V DC (including ripple)	-	-
U_{INI} = U_{S1} minus 2 V DC	-	-
50 mA	-	-
Against inductive reverse voltages, polarity reversal and short circuits	-	-
4	-	-
M12 connector	-	-
3, 4-wire	-	-
-	-	-
-	-	-
-	-	-
POWER-COMBICON terminal strips X10	-	-
2-wire	-	-
POWER-COMBICON	-	-
340 V AC ... 550 V AC (line voltage 50/60 Hz)	-	-
Max. 4 A	-	-
2 Hz ... 100 Hz	-	-
1.5 kW (At U_{mains} = 400 V AC)	-	-
Max. 4 A	-	-
-	-	-
Solid-state contact	-	-
With POWER-COMBICON terminal strip of the motor connection (X10)	-	-
Max. 0.5 A	-	-
6.1 kg	-	-
IP54 in acc. with IEC 60529:1989	-	-

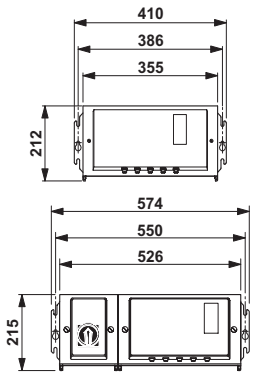
INTERBUS motor starters and variable frequency drives in sheet-steel housing (IP54) with fiber optic connection

Motor starters and variable frequency drives with fiber optic connectors are suitable for use in environments with high levels of electromagnetic interference. When this transmission method is used, the device is completely insensitive to electromagnetic interference. In addition, complete electrical isolation ensures that there are no more problems relating to potential.

Two-channel motor starters and one-channel reversing motor starters are available for different applications. Variable frequency drives make it possible to implement freely definable speed and acceleration times.

Additional features include:

- Simple assembly
- Pluggable connection system
- Fiber optic connection via F-SMA connectors
- Two digital outputs for actuator connections
- Exchangeable module electronics
- Power networking 400 V AC/ 20 A
- Power networking with an extended lower part and 10 mm² conductor
- Extended lower part with integrated maintenance switch
- Comprehensive status and diagnostics display on the module
- Startup without bus possible with manual operating function
- Four initiator inputs for sensor connections
- Sheet-steel housing suitable for plant engineering
- Nominal output capacity 1.5 kW
- Slot-in Pg screw connections for use with preassembled cable sets

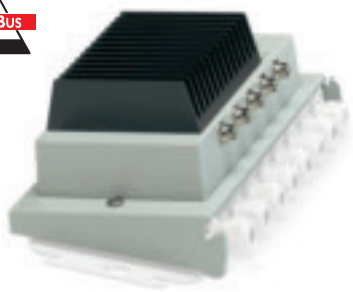


IBS IP 400 ME-ELR ... FO

Electronic motor starter with four digital inputs and two digital outputs, sheet-steel housing, IP54 degree of protection, fiber optics connection

Description	Type	Order No.	Pcs. / Pkt.
Electronic motor starter, electronics module without lower part of the housing			
- 1-channel reversing starter, 1.5 kW	**IBS IP 400 ME-ELR R-3A FO**	**2734549**	1
- 2-channel direct starter, 1.5 kW	**IBS IP 400 ME-ELR 2-3A FO**	**2734536**	1
Variable frequency drive, electronics module without lower part of the housing			
- 1-channel, 1.5 kW			
Lower part of the housing, sheet-steel			
- Standard version	**IBS IP 400 FO-MBH**	**2734345**	1
- With an integrated maintenance switch	**IBS IP 400 FO-MBH/MS**	**2734581**	1
Connector set for sheet steel version, consisting of: connectors, PG cable gland inputs and filler plugs, FSMA connectors	**IBS FO ELR 2 PLSET**	**2734662**	1
Hand-held operator panel, for motor starters and variable frequency drives	**IBS HVO/M12**	**2837006**	1
Fuses ME-ELR (Midget/ 10.3 x 38) **Fuses** ME-VFD (Midget/ 10.3 x 38)			

Technical data	
Interface	
Name	INTERBUS remote bus (FO)
Type of connection	F-SMA connector
Power supply for module electronics	
Supply voltage	24 V DC (U_{S1})
Range of supply voltages	20 V DC ... 30 V DC (including ripple)
Power supply for sensors	
Minimum voltage	$U_{INI} = U_{S1}$ minus 2 V DC
Nominal current per sensor	50 mA
Name of protection	Against inductive reverse voltages, polarity reversal and short circuits
Digital inputs	
Number of inputs	4
Type of connection	M12 connectors, (A-coded)
Connection method	3, 4-wire
Digital outputs	
Type of connection	M12 connectors, (A-coded)
Connection method	2-wire
Output current	Max. 500 mA (per channel)
Thermistor input	
Number of inputs	1
Type of connection	POWER-COMBICON terminal strips X10
Connection method	2-wire
Motor starter, output	
Type of connection	POWER-COMBICON
Operating voltage	360 V AC ... 440 V AC (line voltage 50/60 Hz)
Nominal current range	0.2 A ... 3.6 A
Frequency range	50 Hz ... 60 Hz (mains frequency)
Nominal motor power	1.5 kW (2-pos. at U_{mains} = 400 V AC)
Motor monitoring	
Parameterization range	0.2 A ... 3.6 A
Tripping class	Based on class 10 A of IEC 60947-4: 1990
Motor starter, brake	
Type of contact	Polarized solid-state contact
Connection method	With POWER-COMBICON terminal strip of the motor connection (X10)
Continuous load current	Max. 0.3 A
General data	
Weight	3 kg
Degree of protection	IP54 in acc. with IEC 60529:1989



IBS IP 400 ME-VFD 3A FO

Variable frequency drive with four digital inputs and two digital outputs, sheet-steel housing, IP54 degree of protection, fiber optics connection

IBS IP 400 FO-MBH

Sheet-steel lower part, IP54 degree of protection, Fiber optics guide plate, jumpering for 24 V (U_{S1} and U_{S2})

IBS IP 400 FO-MBH/MS

Sheet-steel lower part, IP54 degree of protection, Switch-disconnector, fuse holder, fiber optics guide plate, power distribution and jumpering for 24 V (U_{S1} and U_{S2})

Type	Order No.	Pcs. / Pkt.
IBS IP 400 ME-VFD 3A FO	**2734523**	1
IBS IP 400 FO-MBH	**2734345**	1
IBS IP 400 FO-MBH/MS	**2734581**	1
IBS FO VFD PLSET	**2734659**	1
IBS HVO/M12	**2837006**	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 FO-MBH	**2734345**	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 FO-MBH/MS	**2734581**	1
IBS FUSE 10X38/16AGR	**2734073**	10
IBS FUSE 10X38/10AGL	**2704090**	10

INTERBUS remote bus (FO)	-	-
F-SMA connector	-	-
24 V DC (U_{S1})	-	-
20 V DC ... 30 V DC (including ripple)	-	-
U_{INI} = U_{S1} minus 2 V DC	-	-
50 mA	-	-
Against inductive reverse voltages, polarity reversal and short circuits	-	-
4	-	-
M12 connectors, (A-coded)	-	-
3, 4-wire	-	-
M12 connectors, (A-coded)	-	-
2-wire	-	-
Max. 500 mA (per channel)	-	-
2	-	-
POWER-COMBICON terminal strips X10	-	-
2-wire	-	-
POWER-COMBICON	-	-
340 V AC ... 550 V AC (line voltage 50/60 Hz)	-	-
Max. 4 A	-	-
2 Hz ... 100 Hz	-	-
-	-	-
Max. 4 A	-	-
-	-	-
Solid-state contact	-	-
With POWER-COMBICON terminal strip of the motor connection (X10)	-	-
Max. 0.5 A	-	-
6.1 kg	-	-
IP54 in acc. with IEC 60529:1989	-	-

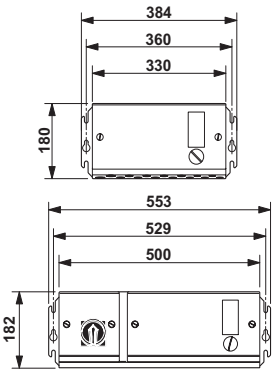
INTERBUS motor starters and variable frequency drives in stainless steel housing (IP65/67)

The motor starters and variable frequency drives in a stainless-steel housing with IP65/67 degree of protection were developed for use directly on machines and plants in the beverage and foods industry. The IP65/67 family of devices is available in different versions and performance levels for a wide variety of applications.

The two-channel motor starters allow direct drives to be controlled. There is a reversing load version for applications involving different drive directions. A variable frequency drive offers suitable control for applications that require different speeds and starting times.

Additional features include:

- Simple assembly
- Pluggable connection system
- Exchangeable module electronics
- Power networking 400 V AC/ 20 A
- Power networking with an extended lower part and 10 mm² conductor
- Extended lower part with integrated maintenance switch
- Comprehensive status and diagnostics display on the module
- Startup without bus possible with manual operating function
- Initiator inputs for sensor connections
- Nominal output power of 1.5 kW (VFD) / 3.7 kW (MLR)



IBS IP 400 ME-MLR ... DI4F

Electromechanical motor starter with four digital inputs and two digital outputs, high-grade steel housing, IP65/67 degree of protection

Description	Type	Order No.	Pcs. / Pkt.
Electromechanical motor starter, electronics module without lower part of the housing			
- 1-channel reversing starter, 3.7 kW	**IBS IP 400 ME-MLR R-8A DI4F**	**2732949**	1
- 2-channel direct starter, 3.7 kW	**IBS IP 400 ME-MLR 2-8A DI4F**	**2732965**	1
Variable frequency drive, electronics module without lower part of the housing			
- 1-channel, 1.5 kW			
Lower part of the housing, high-grade steel			
- Standard version	**IBS IP 400 MBH -F**	**2732868**	1
- With an integrated maintenance switch	**IBS IP 400 MBH/MS-F**	**2734031**	1
Connector set for high-grade steel versions, consisting of: connectors, shield brackets and filler plugs	**IBS MLR PLSET 2-8A-F**	**2836557**	1
Hand-held operator panel, for motor starters and variable frequency drives	**IBS HVO**	**2836052**	1
Pg screw connection, plastic (IP67), for INTERBUS motor starter and variable frequency drive	**IBS PG SET**	**2836599**	1
Fuses ME-VFD (Midget/ 10.3 x 38)			
Fuses for motor ME-MLR (Midget/ 10.3 x 38)			

Technical data	
Interface	
Name	INTERBUS remote bus
Type of connection	MINI COMBICON
Power supply for module electronics	
Supply voltage	24 V DC (U_{S1} / U_{S2})
Range of supply voltages	20 V DC ... 30 V DC (including ripple)
Power supply for sensors	
Minimum voltage	U_{INI} = U_{S1} minus 2 V DC
Nominal current per sensor	50 mA
Name of protection	Against inductive reverse voltages, polarity reversal and short circuits
Digital inputs	
Number of inputs	4
Type of connection	MINI COMBICON
Connection method	3, 4-wire
Digital outputs	
Type of connection	MINI COMBICON
Connection method	2-wire
Output current	Max. 500 mA (per channel)
Thermistor input	
Type of connection	POWER-COMBICON terminal strips X10
Connection method	2-wire
Motor starter, output	
Type of connection	POWER-COMBICON
Operating voltage	360 V AC ... 440 V AC (line voltage 50/60 Hz)
Nominal current range	0.2 A ... 8 A
Frequency range	50 Hz ... 60 Hz (mains frequency)
Nominal motor power	3.7 kW (2-pos. at U_{mains} = 400 V AC)
Motor monitoring	
Parameterization range	0.2 A ... 8 A
Tripping class	Based on class 10 A of IEC 60947-4: 1990
Motor starter, brake	
Type of contact	Mechanical relay contact
Connection method	With POWER-COMBICON terminal strip of the motor connection (X10)
Continuous load current	Max. 1 A
General data	
Weight	3.3 kg
Degree of protection	IP67 in acc. with IEC 60529

IBS IP 400 ME-VFD 1-3A DI4F

Variable frequency drive with four digital inputs, high-grade steel housing, IP65/67 degree of protection

IBS IP 400 MBH -F

High-grade steel lower part, IP67 degree of protection

IBS IP 400 MBH/MS-F

High-grade steel lower part, IP65 degree of protection, with switch-disconnector, fuse holder and power distribution

Type	Order No.	Pcs. / Pkt.
IBS IP 400 ME-VFD 1-3A DI4F	2836955	1
IBS IP 400 MBH -F	2732868	1
IBS IP 400 MBH/MS-F	2734031	1
IBS VFD PLSET 1-3A-F	2836968	1
IBS HVO	2836052	1
IBS PG SET	2836599	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH -F	2732868	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH/MS-F	2734031	1
IBS FUSE 10X38/10AGL	2704090	10
IBS FUSE 10X38/16AGL	2734316	10

INTERBUS remote bus	-	-
MINI COMBICON	-	-
24 V DC (U_{S1})	-	-
20 V DC ... 30 V DC (including ripple)	-	-
U_{INI} = U_{S1} minus 2 V DC	-	-
50 mA	-	-
Against inductive reverse voltages, polarity reversal and short circuits	-	-
4	-	-
MINI COMBICON	-	-
3, 4-wire	-	-
-	-	-
-	-	-
-	-	-
POWER-COMBICON terminal strips X10	-	-
2-wire	-	-
POWER-COMBICON	-	-
340 V AC ... 550 V AC (line voltage 50/60 Hz)	-	-
Max. 4 A	-	-
2 Hz ... 100 Hz	-	-
1.5 kW (At U_{mains} = 400 V AC)	-	-
Max. 4 A	-	-
-	-	-
Solid-state contact	-	-
With POWER-COMBICON terminal strip of the motor connection (X10)	-	-
Max. 0.5 A	-	-
5.1 kg	-	-
IP67 in acc. with IEC 60529	-	-

PROFIBUS motor starters and variable frequency drives in sheet-steel housing (IP54)

Distributed installation of the PROFIBUS motor control switches close to the motors seamlessly integrates the numerous drives in a plant into a universal system using a combined data and power bus.

In this way, the sensors and actuators distributed throughout the machinery and plants can be directly connected to PROFIBUS without the need for many intermediate stations or additional cabling.

PROFIBUS motor control switches in sheet-steel housings with IP54 degree of protection are available in different versions.

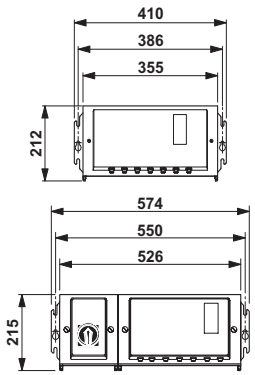
The two-channel motor control switch allows direct drives to be controlled. There is a reversing load motor control switch for applications involving different drive directions. If different speeds, startup and braking times are required, a variable frequency drive provides the required control.

Additional features include:

- Simple assembly
- Pluggable connection system
- Exchangeable module electronics
- Power networking 400/500 V AC / 20 A
- Expanded lower part with integrated maintenance switch and fuse holder for 10 mm² cable
- Comprehensive status and diagnostics display on the module
- Startup without bus possible with manual operating function
- Four digital inputs for sensor connections
- Two digital outputs for actuator connections
- Sheet-steel housing suitable for plant engineering
- Nominal output capacity 1.5 kW
- Slot-in Pg screw connections for use with preassembled cable sets

Device master data files

The latest versions of the device master data files needed for startup can be found on the Internet at www.phoenixcontact.net/download in the download section.



PB IP 400 ME-ELR ...-3A

Electronic motor starter with four digital inputs and two digital outputs, sheet-steel housing, IP54 degree of protection

Description	Type	Order No.	Pcs. / Pkt.
Electronic motor starter, electronics module without lower part of the housing			
- 1-channel reversing starter, 1.5 kW	**PB IP 400 ME-ELR R-3A**	**2734840**	1
- 2-channel direct starter, 1.5 kW	**PB IP 400 ME-ELR 2-3A**	**2734772**	1
Variable frequency drive, electronics module without lower part of the housing			
- 1-channel, 1.5 kW			
Lower part of the housing, sheet-steel			
- Standard version	**IBS IP 400 MBH**	**2732871**	1
- With an integrated maintenance switch	**IBS IP 400 MBH/MS**	**2734125**	1
Connector set for sheet steel versions, consisting of: connectors, Pg cable gland inputs, shield brackets and filler plugs	**IBS ELR PLSET 2-3A**	**2836816**	1
Hand-held operator panel, for motor starters and variable frequency drives	**IBS HVO/M12**	**2837006**	1
Fieldbus connector, female, straight, 5-pos., M12, shielded, B-coded, for incoming PROFIBUS	**SACC-M12FSB-5CON-PG9 SH AU**	**1507777**	1
	SACC-M12MSB-5CON-PG9 SH AU	**1507764**	1
Termination resistor, M12	**SAC-5P-M12MS PB TR**	**1507803**	5
Fuses ME-ELR (Midget/ 10.3 x 38)			
Fuses ME-VFD (Midget/ 10.3 x 38)			

Technical data	
Interface	
Name	PROFIBUS interface
Type of connection	M12 connectors, B-coded
Power supply for module electronics	
Supply voltage	24 V DC (U_{S1})
Range of supply voltages	20 V DC ... 30 V DC (including ripple)
Power supply for sensors	
Minimum voltage	$U_{INI} = U_{S1}$ minus 2 V DC
Nominal current per sensor	50 mA
Name of protection	Against inductive reverse voltages, polarity reversal and short circuits
Digital inputs	
Number of inputs	4
Connection method	3, 4-wire
Typical input current per channel	Approx. 5 mA (for U_{S1} = 24 V)
Digital outputs	
Type of connection	M12 connectors, (A-coded)
Connection method	2-wire
Minimum output voltage with nominal current	U_{S1} minus 2 V
Thermistor input	
Type of connection	POWER-COMBICON terminal strips X10
Connection method	2-wire
Motor starter, output	
Type of connection	POWER-COMBICON
Operating voltage	360 V AC ... 440 V AC (line voltage 50/60 Hz)
Nominal current range	0.2 A ... 3.6 A
Frequency range	50 Hz ... 60 Hz (mains frequency)
Motor monitoring	
Parameterization range	0.2 A ... 3.6 A
Tripping class	Based on class 10 A of IEC 60947-4: 1990
Motor starter, brake	
Type of contact	Polarized solid-state contact
Connection method	With POWER-COMBICON terminal strip of the motor connection (X10)
Continuous load current	Max. 0.3 A

PB IP 400 ME-VFD-3A

Variable frequency drive with four digital inputs and two digital outputs, sheet-steel housing, IP54 degree of protection, fiber optics connection

IBS IP 400 MBH

Sheet-steel lower part, IP54 degree of protection

IBS IP 400 MBH/MS

Sheet-steel lower part, IP54 degree of protection, with switch-disconnector, fuse holder and power distribution

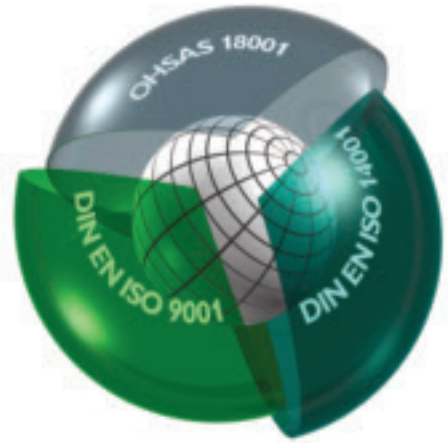
Type	Order No.	Pcs. / Pkt.
PB IP 400 ME-VFD-3A	2734785	1
IBS IP 400 MBH	2732871	1
IBS IP 400 MBH/MS	2734125	1
IBS VFD PLSET 1-3A	2836942	1
SACC-M12FSB-5CON-PG9 SH AU	1507777	1
SACC-M12MSB-5CON-PG9 SH AU	1507764	1
SAC-5P-M12MS PB TR	1507803	5

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH	2732871	1
SACC-M12FSB-5CON-PG9 SH AU	1507777	1
SACC-M12MSB-5CON-PG9 SH AU	1507764	1

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH/MS	2734125	1
SACC-M12FSB-5CON-PG9 SH AU	1507777	1
SACC-M12MSB-5CON-PG9 SH AU	1507764	1
IBS FUSE 10X38/16AGR	2734073	10
IBS FUSE 10X38/10AGL	2704090	10

PROFIBUS interface	-	-
M12 connectors, B-coded	-	-
24 V DC (U_{S1})	-	-
20 V DC ... 30 V DC (including ripple)	-	-
U_{INI} = U_{S1} minus 2 V DC	-	-
50 mA	-	-
Against inductive reverse voltages, polarity reversal and short circuits	-	-
4	-	-
3, 4-wire	-	-
Approx. 5 mA (for U_{S1} = 24 V)	-	-
M12 connectors, (A-coded)	-	-
2-wire	-	-
U_{S1} minus 2 V	-	-
POWER-COMBICON terminal strips X10	-	-
2-wire	-	-
POWER-COMBICON	-	-
340 V AC ... 550 V AC (line voltage 50/60 Hz)	-	-
Max. 4 A	-	-
2 Hz ... 100 Hz	-	-
Max. 4 A	-	-
-	-	-
Solid-state contact	-	-
With POWER-COMBICON terminal strip of the motor connection (X10)	-	-
Max. 0.5 A	-	-

Quality in Quantity



Integrated management system

The objective of the Phoenix Contact integrated management system is to coordinate all the requirements regarding products, processes and organization.

The legal and regulatory requirements, as well as those of international standards and our customers, are fulfilled and even in some cases exceeded in all phases of the product life cycle.

The integration of quality, environmental protection and safety at work in the Phoenix Contact management system is monitored each year for conformance by independent bodies with worldwide recognition. The certifications as per the international standards ISO 9001, ISO 14001 and BS OHSAS 18001 are the result of our corporate philosophy of meeting the needs of our customers, staff, and the environment as best as possible. They serve as the basis for innovative products with the familiar high Phoenix quality standard, environmental protection consciousness in active practice and responsibility in the field of work safety. Of course, we also integrate all additional requirements of standards, international approvals or special customer demands into the company processes.

The result of this system is a building block for the success of the Phoenix Contact Group and our products and services.

CE marking

The CE marking was introduced as an important instrument for the free movement of goods and services within the European domestic market. By attaching the marking to a product, the manufacturer confirms that it complies with all applicable European Union (EU) directives that apply to this product. EC directives describe the product properties with respect to device safety and avoidance of dangers.

These are **legally binding regulations of the European Union (EU).** In other words, compliance with the requirements is a statutory condition for marketing the article within the EU.

Where applicable, the products that our company currently manufactures fall within the scope of the following directives:

- 2006/95/EC Electrical equipment for application within specific voltage limits (low-voltage directive),
- 2004/108/EC Electromagnetic compatibility (EMC directive),
- 98/37/EC or 2006/42/EC Safety of machinery (machinery directive),
- 94/9/EC Devices and protective systems for use in potentially explosive areas ATEX 100a directive,
- 1999/5/EC Radio systems and telecommunications termination equipment (R&TTE).

The standards upon which the specified directives are based have long been a constituent part of our standards for development. This guarantees conformance with European directives. Our products are inspected in conformance with the standards at a test laboratory accredited as per DIN EN ISO/IEC 17025. The inspection reports are recognized Europe-wide as part of an accreditation procedure.

The EMC directive occupies a special place among the named European directives. It defines electromagnetic compatibility for the first time as a fundamental property of devices based on legally binding guidelines. European jurisprudence therefore acknowledges the significance of the electromagnetic compatibility of devices and systems as an important condition for the trouble-free operation of machinery and systems. As one of the leading international companies in the industrial surge-protection market, Phoenix Contact has broad expertise in EMC matters. This expertise and experience, gained over years of developing and applying industrial interface and communications technology, have led to our products having an extremely high quality standard with respect to their electromagnetic compatibility. In order to provide other companies with this expertise as well, the associate company Phoenix Testlab was founded. Phoenix Testlab GmbH is an independent, accredited service company offering EMC testing in conformity with the European standards. At Phoenix Testlab, devices are also tested for their electrical safety, mechanical influences and their behavior with environmental influences. Furthermore, Phoenix Testlab is a "Notified Body" as per the EMC directive 2004/108/EC and as per the R&TTE directive 1999/5/EC for radio systems and telecommunications termination equipment. As a "Telecom Certification Body" (TCB), Phoenix Testlab is allowed to release these products for the markets in the USA, Canada and Japan as well.

Standards and regulations

All relevant standards and regulations are used as a basis for the development and improvement of our products.

International standards are subject to continuous changes as a result of harmonization and new developments. To do justice to this process, the current state of all standards relevant to our products is documented on the Internet at **www.phoenixcontact.com**.

Online product information service in the World Wide Web

The product range of Phoenix Contact is continuously being expanded.

Due to our commitment to product monitoring, all products are subject to improvements.

The Internet is an ideal platform to quickly communicate innovations and product improvements to the market.

At www.phoenixcontact.com you will find quick access to the various country websites of Phoenix Contact. There, you can always get an current overview of the products, solutions and services from Phoenix Contact. This includes technical documents such as data sheets and manuals, current driver and demo software as well as direct contact with the relevant contact person.

Note:

Subject to modifications in the interest of technical progress.

Overview of approvals boards and safety marks

National approvals boards and certification procedures		Country code
CB scheme	IECEE-CB scheme	inter-national
CCA	CENELEC certification agreement	EU
	Canadian Standards Association (CSA)	CA
	Underwriters Laboratories Inc. (UL)	US
	Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA
	Underwriters Laboratories Inc. (UL) combination logo - UL approval for USA and Canada -	US CA
	Elektromontaz	PL
	INSIEME PER LA QUALITA'E LA SICUREZZA	IT
	Gosudarstvenne Komitet Standartov (GOST)	RU
KEMA KEUR	KEMA Nederland B.V.	NL
ÖVE	Österreichischer Verband für Elektrotechnik	AT
SANS	South African Bureau of Standards	ZA
SEV	Eidgenössisches Starkstrominspektorat (ESTI) electrosuisse, SEV Verband für Elektro-, Energie- und Informationstechnik	CH
VDE	Verband Deutscher Elektrotechniker e.V. (VDE) – Approval of drawings – Reports with production monitoring	DE
LGA Konformitäts-Zertifikat	Landesgewerbeanstalt Bayern	DE
GS	Berufsgenossenschaft (BG) GS tested safety	DE
TÜV	TÜV Rheinland	DE
TÜV NORD	TÜV Nord	DE

Approvals boards for explosion protection		Country code
FM APPROVED	FM approvals	US
KEMA	KEMA Quality B.V.	NL
PTB	Physikalisch-Technische Bundesanstalt (PTB – National Metrology Institute)	DE
	Société Nationale de Certification et d'Homologation	LU
VTT	VTT Technical Research Centre of Finland	FI
	Nemko AS	NO
TÜV	TÜV Rheinland do Brasil Ltda.	BR
	Underwriters Laboratories Inc. (UL)	US
FTZU	FTZU - Fyzikalne technicky zkusebni ustav (CZ)	CZ

Ship classification bodies		Country code
	Bureau Veritas	FR
GL	Germanischer Lloyd AG	DE
Lloyd's Register	Lloyd's Register of Shipping	GB
ClassNK	Nippon Kaiji Kyokai	JP
DNV	Det Norske Veritas	NO
	Polski Rejestr Statków	PL
	Russian Maritime Register of Shipping	RU
KR	Korean Register of Shipping	CR
ABS	American Bureau of Shipping	US

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