Leader in Electrics & Automation

XGT Series

Programmable Logic Controller

Fast, Compact, Open Network Solution
Next Generation Technology

Automation Equipment

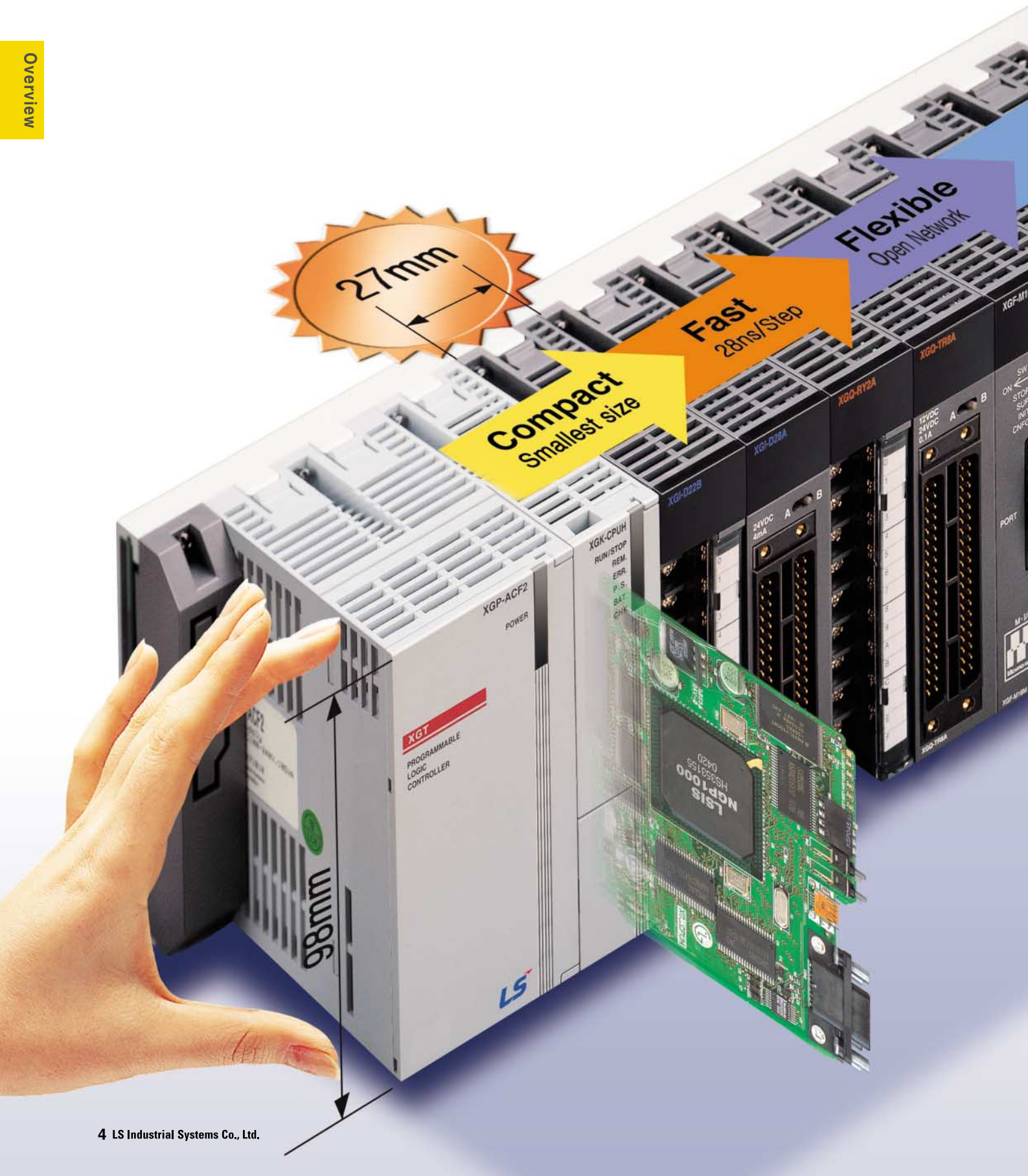
LS Industrial Systems
www.lsis.biz

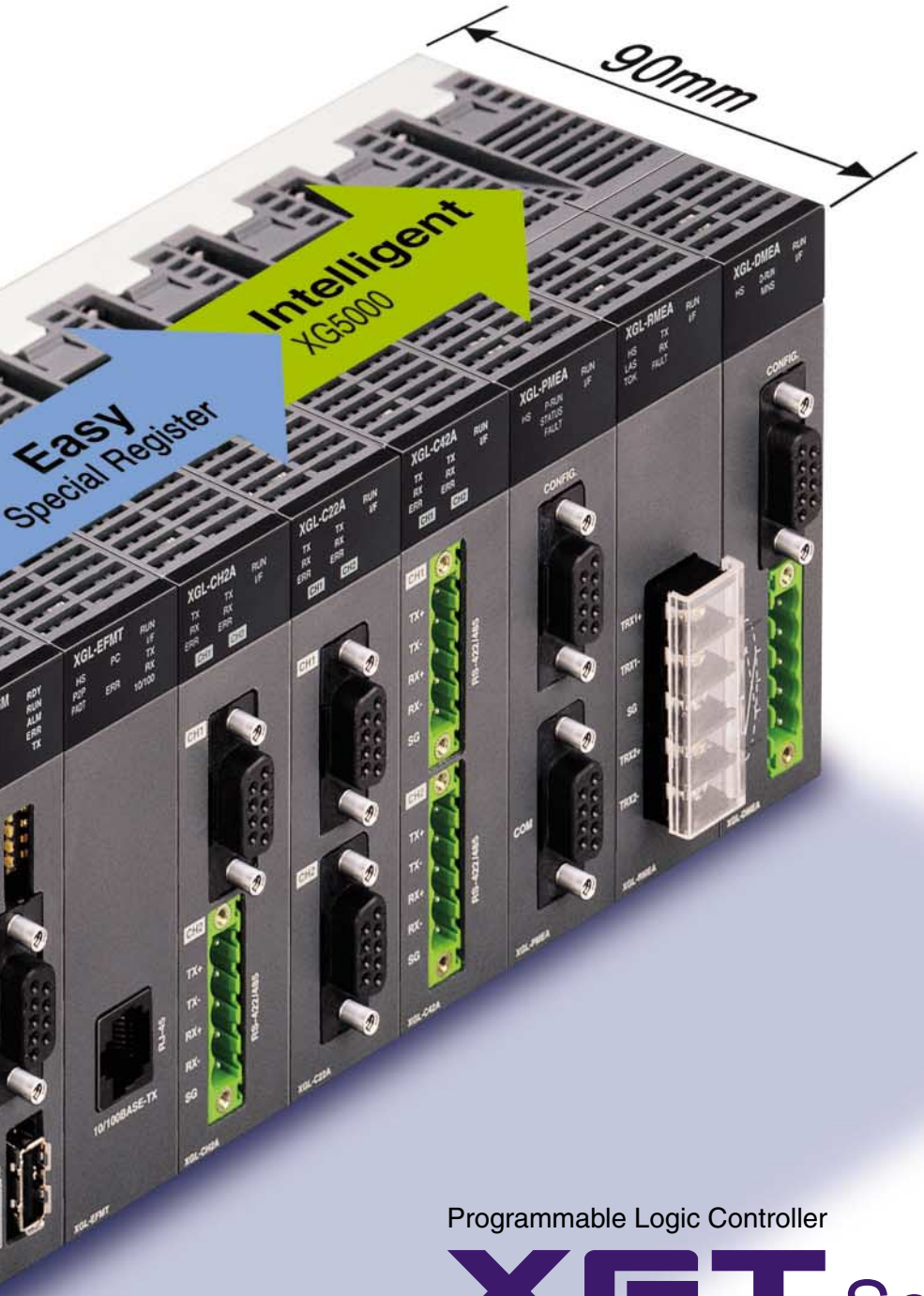
Programmable Logic Controller

XGT Series

XGT series incorporate the latest technological achievements in Programmable Logic Controller, made possible by experience and dedication to quality in design and manufacturing.

Contents


27mm
Compact
Smallest size
Fast
28ns/Step
Flexible
Open Network
98mm
XGP-ACF2
POWER
XGK-CPUH
RUN/STOP
REM.
ERR.
P.S.
BAT.
CHK
XGI-D22B
XGI-D28A
XGQ-RY2A
XGQ-TR8A
XGF-M1
PROGRAMMABLE
LOGIC
CONTROLLER
LS



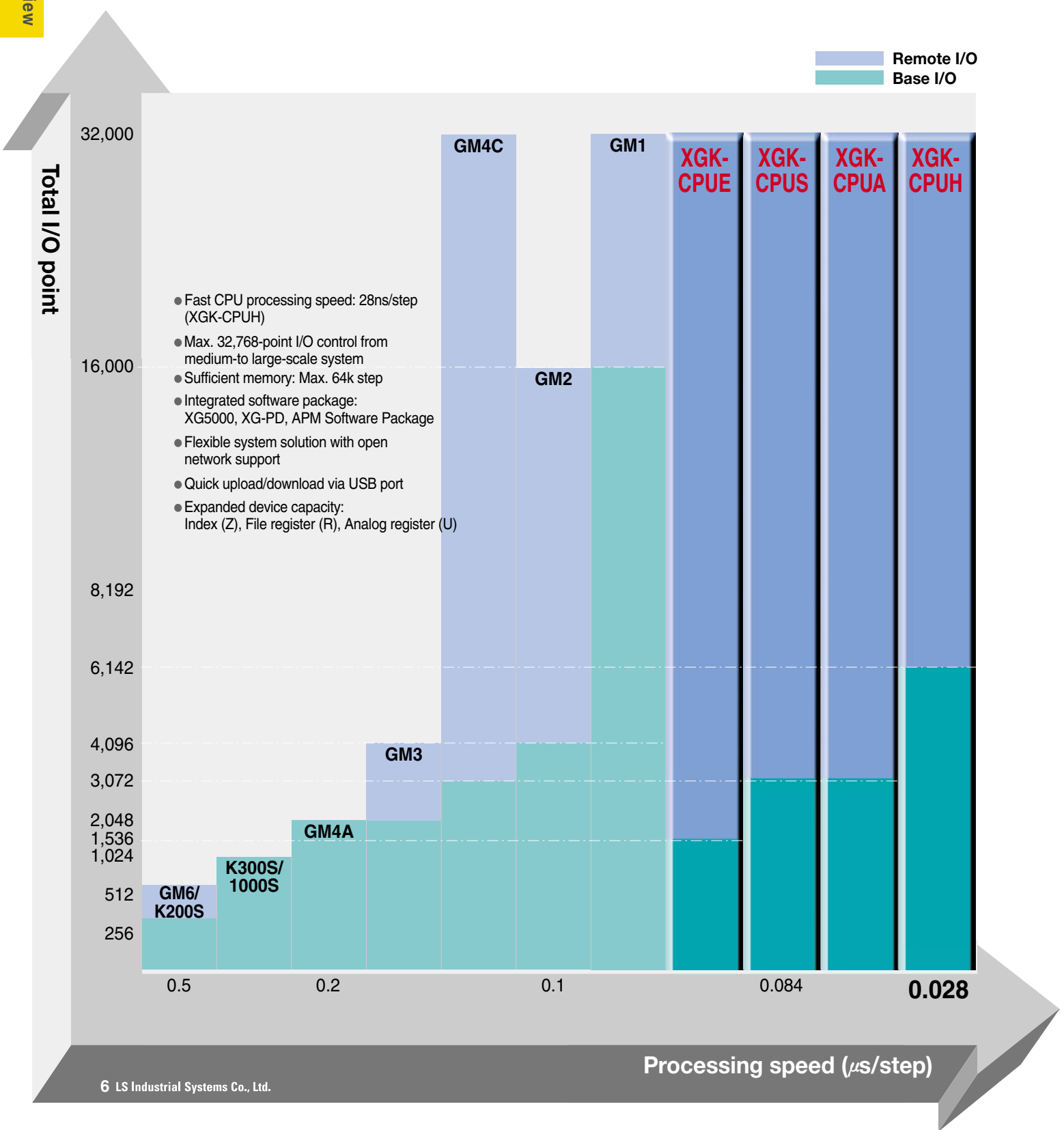
Programmable Logic Controller

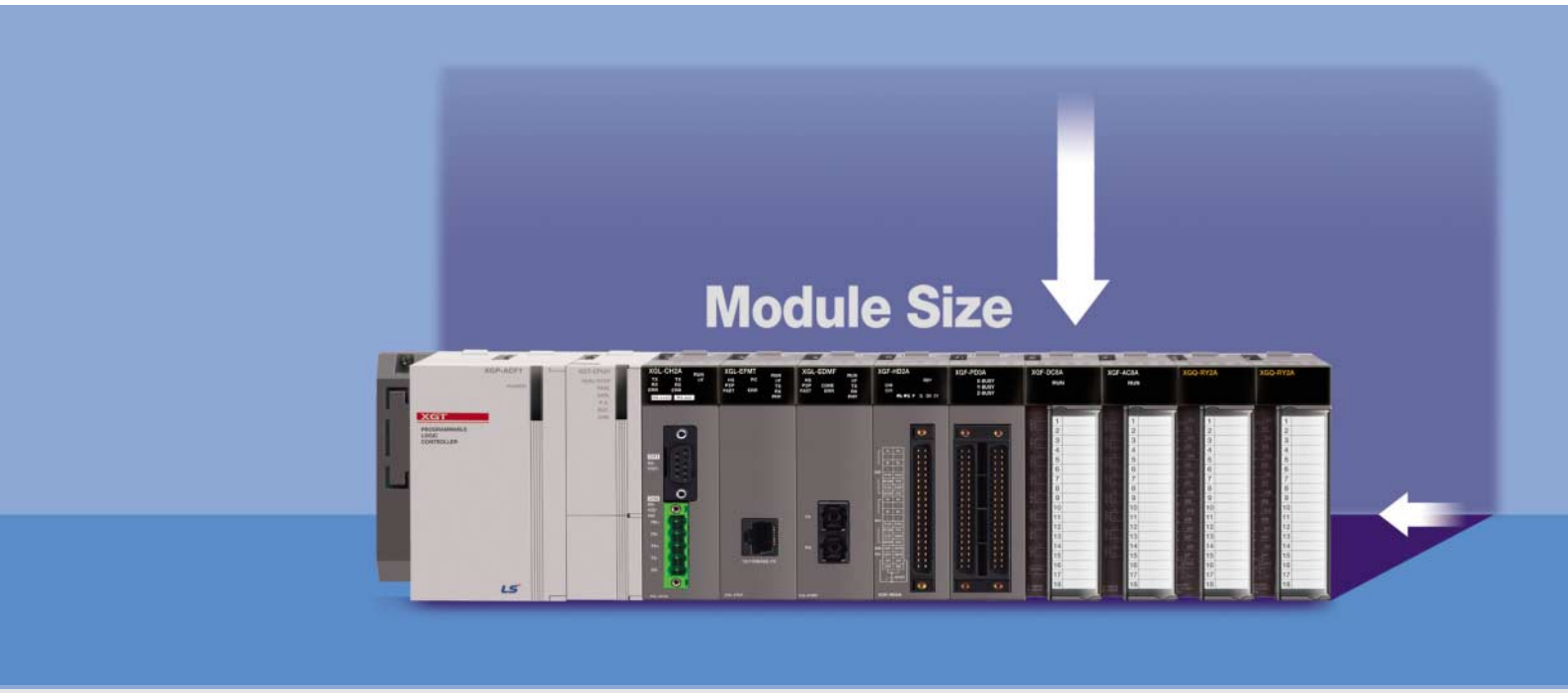
XGT Series

neXt Generation Technology

XGT series is the next-generation solution with a new concept providing advanced engineering environment based on open network, fastest processing speed, compact size and user-friendly software.

XGT series is the Industrial Workhorse that can support various applications within the typical industrial plant.





Size Innovation. . . Compact

The smallest size

The smallest size **(Dimensions 27 × 98 × 90)** achieves cost-efficiency and various applications.

Item	Power Supply	CPU	8-slot Base
Size (W × H × D)	55 × 98 × 90	27 × 98 × 90	318 × 98 × 15

Speed Innovation. . . Fast

The Fastest CPU Processing

MPU (NGP 1000) developed by LSIS accomplishes the fastest CPU processing speed. (0.028㎲/step)

High-speed Interface (Base)

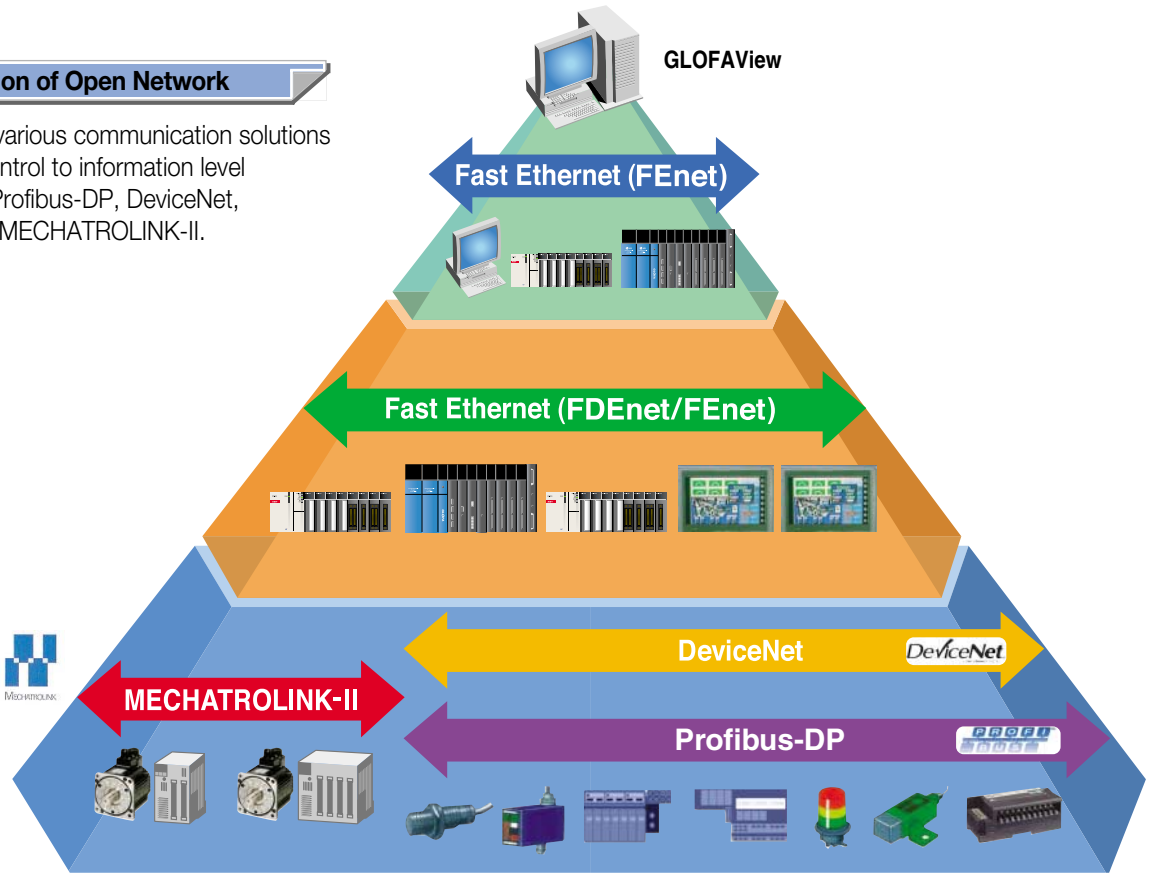
Dedicated bus controller and High-speed transmission algorithm achieve high performance of internal interface.

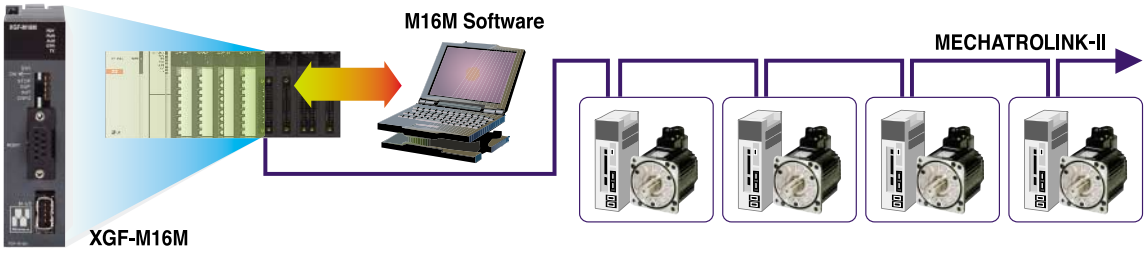
Main Base	Expansion Base
20Mbyte/sec	5Mbyte/sec

Network Innovation. . . Flexible

System Integration of Open Network

XGT series support various communication solutions ranging from field control to information level with Fast Ethernet, Profibus-DP, DeviceNet, MODBUS and even MECHATROLINK-II.





Item		Fast Ethernet		Cnet	Profibus-DP	DeviceNet	MECHATROLINK-II
		FEnet	FDEnet				
Transmission speed		100 / 10Mbps		300 ~ 115,200bps	Max. 12Mbps	Max. 500Kbps	10Mbps
Transmission distance		100m (Node to Node, UTP/ STP) 2Km (Node to Node, Fiber Optic)		Max 500m (422 / 485)	Max. 1.2Km	Max 500m	Max 50m
Max. number of station		64 (HS link)		32	126	64	16 (# of axis)
Service	HS link	●	●	-	●	●	-
	XG protocol	●	-	●	-	-	-
	General Protocol	● (MODBUS)	-	● (MODBUS)	-	-	-
	P2P	●	●	●	-	-	-
	XG5000 I/F	●	●	●	-	-	-
	E-Mail	●	-	-	-	-	-
Configuration software		XG-PD			XG-PD & SyCon		-
Number of installation		24 (HS link Service: 12, P2P Service: 8)					No limit

Engineering & Programming Innovation. . . Easy

Special Register

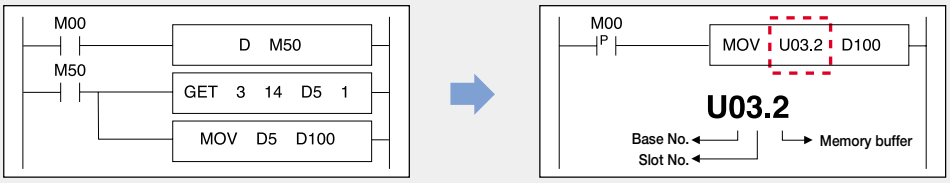
XGT series expand device memory and support advanced programming environment with Index register (Z), File register (U), and Analog register (U).

R **File register**
As a non-volatile memory type, data are secured even in times of blackout or CPU reset.

U **Analog register**
Assigning base, slot and memory buffer of an analog module to device, A/D conversion data can be accessed without analog commands.

Z **Index register**
Index register is used in the sequence program for array operation.

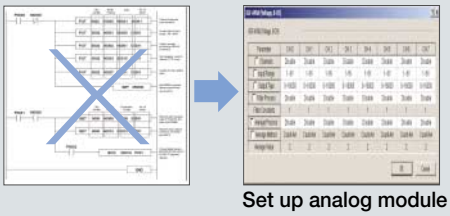
Example of Analog Register



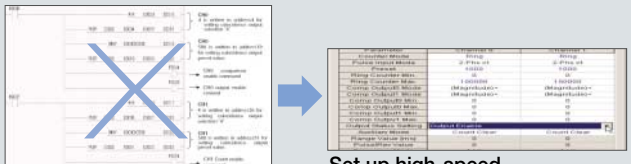
<KGLWIN> <XG5000>

Analog Operation without Programming

Special module setup and operation is achieved by just parameter setting without additional program.



Set up analog module



Set up high-speed counter module

Program Modularization and Task Operation

Available to run multiful programs through modulization of scan programs based on functions and author, and to operate task programs triggered by specific conditions.

Program type		Description	Number
Scan program	Scan	Executed in every scan	256-task
Task program	Initialization task	Executed only one time when power turns on	1
	Time driven task	Executed with a constant time interval specified in parameter setting	32
	Internal task	Executed by internal condition	32
	External interrupt task	Executed by external interrupt input	32

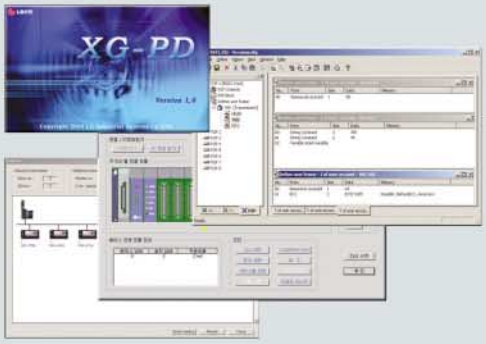
Software Innovation. . . Intelligent

Integrated Programming & Engineering

XG5000 Software Package provides integrated engineering environment from basic programming to different special module setting as well as diagnosis. This package consists of XG5000 (PLC programming), XG-PD (Communication programming) and APM Software Package (Positioning programming).

XG5000

Program Editing & Engineering Software
Windows-based Easy Operation
Multi-PLC Multi-Programming Support
Various Monitoring & Diagnosis Functions

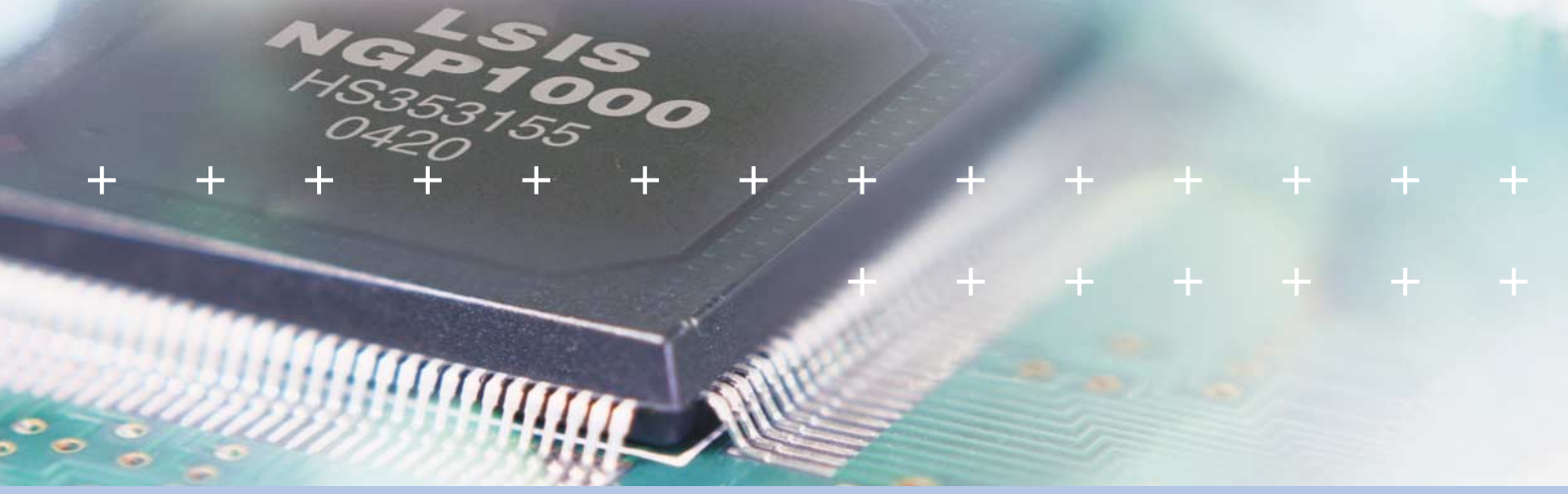


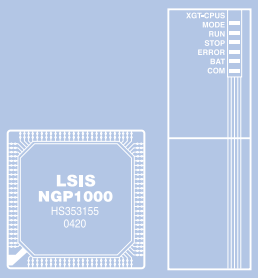
XG-PD

Comm. & Network Parameter Setting
Protocol Editing / Network Diagnosis
Frame Monitoring / Protocol Analysis

APM S/W package

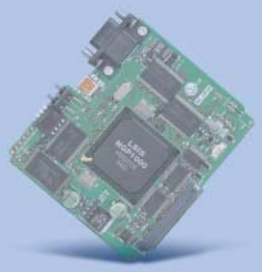
Positioning Parameter Setting
Data Editing in EXCEL
Various Monitoring & Diagnosis
Tracking Function





CPU & System configuration

XGT series contain XGK-CPUS and XGK-CPUH for customized solutions which support wide coverage from small/middle- to large size-system control.



Premium CPU for high-speed and large scale application

XGK-CPUH (High Speed)

- Program capacity: 64K steps
- I/O points: 6,144
- I/O device point: 32,000 (Remote I/O)
- Processing speed: 28ns/step

XGK-CPUA (Advanced)

- Program capacity: 32K step
- I/O point: 3,072
- I/O device point: 32,000 (Remote I/O)
- Processing speed: 28ns/step

General sequence controller PLC CPU

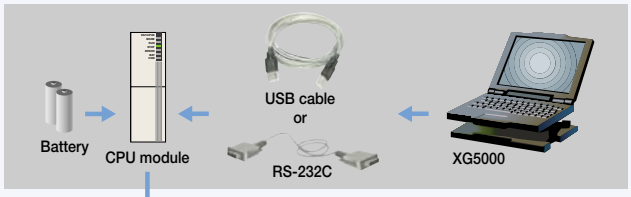
XGK-CPUS (Standard)

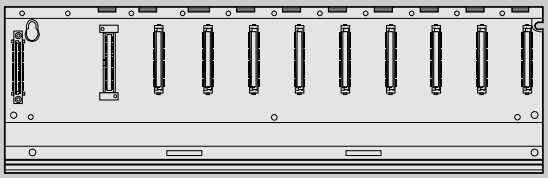
- Program capacity: 32K steps
- I/O points: 3,072
- I/O device point: 32,000 (Remote I/O)
- Processing speed: 84ns/step

XGK-CPUE (Economic)

- Program capacity: 16K step
- I/O point: 1,536
- I/O device point: 32,000 (Remote I/O)
- Processing speed: 84ns/step

System composition

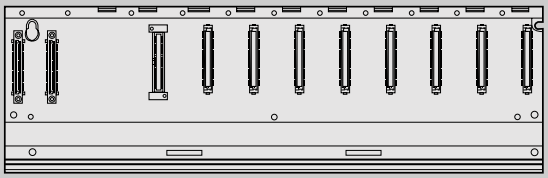




Main Base (XGB-M□□A)

Expansion cable
(XGC-E□□□)

Item	Type	Description
Expansion cable	XGC-E041	Expansion cable 0.4m
	XGC-E061	Expansion cable 0.6m
	XGC-E121	Expansion cable 1.2m
	XGC-E301	Expansion cable 3.0m
	XGC-E501	Expansion cable 5.0m
	XGC-E102	Expansion cable 10m
	XGC-E152	Expansion cable 15m
Expansion terminator	XGT-TERA	Expansion terminator



Expansion base (XGB-E□□A)

Item	Main base	Expansion base
4 Slot	XGB-M04A	XGB-E04A
6 Slot	XGB-M06A	XGB-E06A
8 Slot	XGB-M08A	XGB-E08A
12 Slot	XGB-M12A	XGB-E12A

Power module
(XGP-□□□□)

Input module
(XGI-□□□□)

Output module
(XGQ-□□□□)

Special module
(XGF-□□□□)

Communication module
(XGL-□□□□)

CPU module	
Type	I/O point
XGK-CPUH	6,144
XGK-CPUA	3,072
XGK-CPUS	3,072
XGK-CPUE	1,536

Item	Type	Description
USB cable	USB-301A	USB downloading cable
RS-232C cable	KIC-050A	RS-232C downloading cable

Power module			
AC	Free Voltage	XGP-ACF1	DC5V 3A DC24V 0.6A
		XGP-ACF2	DC5V 6A
	220V	XGP-AC23	DC5V 8.5A
DC		XGP-DC42	DC5V 6A

Item	Input module		
	AC110V	AC220V	DC24V
8 points	-	XGI-A21A	XGI-D21A
16 points	XGI-A12A	-	XGI-D22A
	-	-	XGI-D22B
32 points	-	-	XGI-D24A
	-	-	XGI-D24B
64 points	-	-	XGI-D28A
	-	-	XGI-D28B

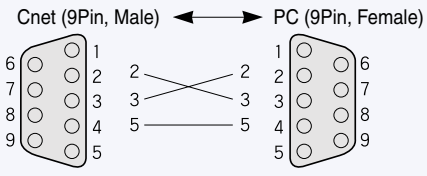
Item	Output module		
	Relay	Triac	Transistor
8 points	XGQ-RY1A	-	-
16 points	XGQ-RY2A	XGQ-SS2A	XGQ-TR2A
	XGQ-RY2B	-	XGQ-TR2B
32 points	-	-	XGQ-TR4A
	-	-	XGQ-TR4B
64 points	-	-	XGQ-TR8A
	-	-	XGQ-TR8B

Item	Input/Output mixed module	
	16-point DC input	16-point TR output

Special module		
Analog input	XGF-AV8A	Voltage input type, 8Ch
	XGF-AC8A	Current input type, 8Ch
Analog output	XGF-DV4A	Voltage output type, 4Ch
	XGF-DC4A	Current output type, 4Ch
	XGF-DV8A	Voltage output type, 8Ch
	XGF-DC8A	Current output type, 8Ch
High-speed counter	XGF-HO2A	Pulse (OC) input type, 2Ch
	XGF-HD2A	Pulse (LD) input type, 2Ch
Positioning	XGF-PO3A	Pulse (OC) output type, 3 axes
	XGF-PO2A	Pulse (OC) output type, 2 axes
	XGF-PO1A	Pulse (OC) output type, 1 axis
	XGF-PD3A	Pulse (LD) output type, 3 axes
	XGF-PD2A	Pulse (LD) output type, 2 axes
	XGF-PD1A	Pulse (LD) output type, 1 axis
Motion control	XGF-M16M	Motion dedicated net (M-II) type, 16 axes
		Motion dedicated net (M-II) type, 8 axes
Temperature control	XGF-TC4S	Temperature (TC) input, 4Ch, Insulation
	XGF-RD4A	Temperature (RTD) input, 4Ch

Communication module		
Cnet	XGL-CH2A	RS-232C/RS-422
	XGL-C22A	RS-232C, 2Ch
	XGL-C42A	RS-422, 2Ch
FEnet (Open Ethernet)	XGL-EFMF	Optical, Master, SC type
	XGL-EFMT	Electric, Master, RJ-45
FDEnet (Dedicated Ethernet)	XGL-EDSF	Optical, Slave, SC type
	XGL-EDST	Electric, Slave, RJ-45
	XGL-EDMF	Optical, Master, SC type
	XGL-EDMT	Electric, Master, RJ-45
Rnet	XGL-RMEA	Rnet, Master, TP
Dnet	XGL-DMEA	DeviceNet, Master, ODVA Standard
Pnet	XGL-PMEA	Profibus-DP, Master, DP Standard

- XG5000 Cable (RS-232C)



Specifications

Item	Description				Standard
Ambient temperature	0 ~ 55 °C				
Storage temperature	-25 ~ +70 °C				
Ambient humidity	5 ~ 95%RH (Non-condensing)				
Storage humidity	5 ~ 95%RH (Non-condensing)				
Vibration resistance	Occasional vibration			-	
	Frequency	Acceleration	Pulse width	10 times each direction (X, Y and Z)	IEC 61131-2
	10 ≤ f < 57Hz	-	0.075mm		
	57 ≤ f < 150Hz	9.8m/s² {1G}	-		
	Continuous vibration				
	Frequency	Acceleration	Pulse width		
	10 ≤ f < 57Hz	-	0.035mm		
	57 ≤ f < 150Hz	4.9m/s² {0.5G}	-		
Shock resistance	· Peak acceleration: 147 m/s² {15G} · Duration: 11ms · Half-sine, 3 times each direction per each axis				IEC 61131-2
Noise resistance	Square wave impulse noise	±1,500Vp-p			LSIS Standard
	Electrostatic discharge	±4KV			IEC 61131-2. IEC 1000-1-2
	Radiated electromagnetic field noise	27~500MHz, 10V/m			IEC 61131-2. IEC 1000-1-3
	Fast transient/ Burst noise	0.25KV			IEC 61131-2. IEC 1000-1-4
Operating Ambience	Free from corrosive gases and excessive dust				
Altitude	Up to 2,000m				
Pollution degree	Less than equal to 2				
Cooling	Air-cooling				

* Pollution degree 2 is nonconductive pollution of the sort where occasionally a temporary conductivity caused by condensation must be expected.

Item		Description				Remarks
		XGK-CPUE	XGK-CPUS	XGK-CPUA	XGK-CPUH	
Operation method		Cyclic execution of stored program, Time-driven interrupt, Process-driven interrupt				
I/O control method		Batch processing by scan synchronization (Refresh), Direct input/output by instructions				
Program language		Ladder diagram, Instruction list				
Number of instructions	Basic	42				
	Application	600				
Processing speed	Sequence instruction (μs)	0.084μs/step		0.028μs/step		
	Application instruction (μs)	0.252μs/step		0.084μs/step		
		±: 0.602μs (S), 1.078μs (D)		±: 0.602μs (S), 1.078μs (D)		
	Floating instruction (μs)	×: 1.106μs (S), 2.384μs (D)		×: 1.106μs (S), 2.384μs (D)		
		÷: 1.134μs (S), 2.66μs (D)		÷: 1.134μs (S), 2.66μs (D)		
Program capacity		16K Steps	32K Steps	32K Steps	64K Steps	
I/O points (available to install)	With 16-point I/O	384	768	768	1536	
	With 32-point I/O	768	1536	1536	3072	
	With 64-point I/O	1536	3072	3072	6144	
Data area	P	P0000 ~ P2047F (32768 points)				I/O relay
	M	M0000 ~ M2047F (32768 points)				Auxiliary relay
	K	K000 ~ K2047F (32768 points)				Special relay
	L	L000 ~ L11263F (32768 points)				Link relay
	F	F000 ~ F2047F (32768 points)				Keep relay
	T	100ms: T0000 - T0999				Timer (Adjustable)
		10ms: T1000 - T1499				
		1ms: T1500 - T1999				
		0.1ms: T2000 - T2047				
	C	C0000 ~ C2047				Counter
	S	S00.00 ~ S127.99				Step controller
	D	D0000 ~ D19999		D0000 ~ D32767		Register
	U	U0.0~U1F.31	U0.0~U3F.31	U0.0~U3F.31	U0.0~U7F.31	Analog resister
	Z	128points				Index register
File register	R	RAM: 1 block		RAM: 2 blocks		1 block: R0 ~ R32767
		Flash: 2M byte, 32 blocks				
Program type	Total program	256				
	Initialization	1 (_INT)				
	Time-driven	32				
	External	32				
	Internal	32				
Operation mode		RUN, STOP, DEBUG				
Self-diagnosis		Execution, Delay, Memory error, I/O error, Battery error, Power error				
Programming port		RS-232C (1Ch), USB (1Ch)				MODBUS slave
Data retention at power failure		Set "retain" at data declaration				
Max. expansion stage		2	4	4	8	
Current consumption (mA)		960		960		
Weight (Kg)		0.12		0.12		

Main system composition

Item	XGK-CPUE	XGK-CPUS	XGK-CPUA	XGK-CPUH
Max. expansion stage	1 stages	3 stages	3 stages	7 stages
Max. installation of module	24 modules	48 modules	48 modules	96 modules
Max. number of I/O point	1,536	3,072	3,072	6,144
Max. expansion distance	15m			

Assignment of I/O number (Fixed)

- 64 points are assigned to each slot of base regardless of installation of module.
- I/O numbers equivalent to 12 slots are assigned to a base.
- The starting number of base '0' is P0000.
- Refer to the following figure regarding the I/O number assignment of 12 slots

Slot number:	0	1	2	3	4	5	6	7	8	9	10	11
Power / CPU	64 points	64 points	64 points	64 points	64 points	64 points	64 points	64 points	64 points	64 points	64 points	64 points
	P0 ~ P3F	P40 ~ P7F	P80 ~ P11F	P120 ~ P15F	P160 ~ P19F	P200 ~ P23F	P240 ~ P27F	P280 ~ P31F	P320 ~ P35F	P360 ~ P39F	P400 ~ P43F	P440 ~ P47F

Assignment of I/O number (Variable)

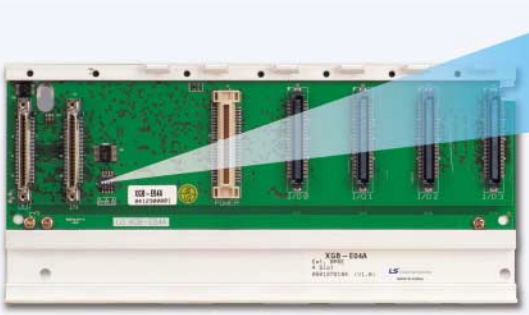
- I/O point is assigned automatically according to the installed module.
- I/O parameter is used to install modules.
- The starting number of base '0' is P0000.
- 16 points are assigned automatically to the slot of special or communication module
- Refer to the following figure regarding the I/O number assignment of 12 slots.

Slot number:	0	1	2	3	4	5	6	7	8	9	10	11
Power / CPU	16 points	16 points	32 points	64 points	16 points	32 points	32 points	64 points	32 points	16 points	32 points	32 points
	P00 ~ P0F	P10 ~ P1F	P20 ~ P3F	P40 ~ P7F	P80 ~ P8F	P90 ~ P10F	P110 ~ P12F	P130 ~ P16F	P170 ~ P18F	P190 ~ P19F	P200 ~ P21F	P0220 ~ P23F

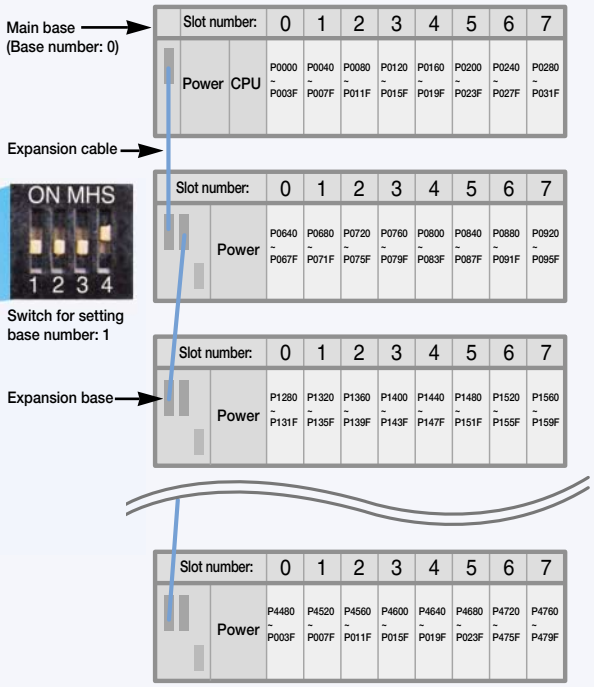
The standard I/O number assignment is 64 points. (Fixed)

Expansion system composition

1. The following figure is the example of expansion system with the fixed I/O point type of XGK-CPUH.
2. The address of I/O point is adjustable by XG5000 parameter.



The lowest expansion base should be connected to the upper stage with expansion terminator(XGF-TERA).



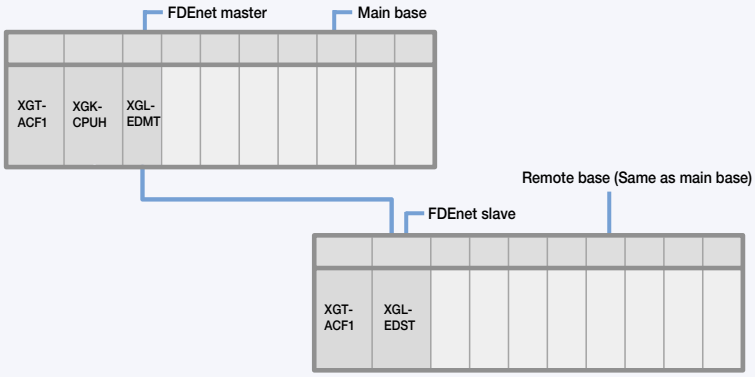
Remote I/O system application

Item	Network type (Master)	XGT base type remote I/O	Block type remote I/O (Smart I/O)
1	FDEnet	0	X
2	Profibus-DP	X	0
3	DeviceNet	X	0
4	Rnet	X	0
5	MODBUS (Cnet)	-	0

XGT base type remote I/O system

XGT base type remote I/O system (Under development)

This system can be configured using only FDEnet.
The master module of main base should be connected to the slave module (XGL-EDST) of remote base. (XGL-EDST is under development)



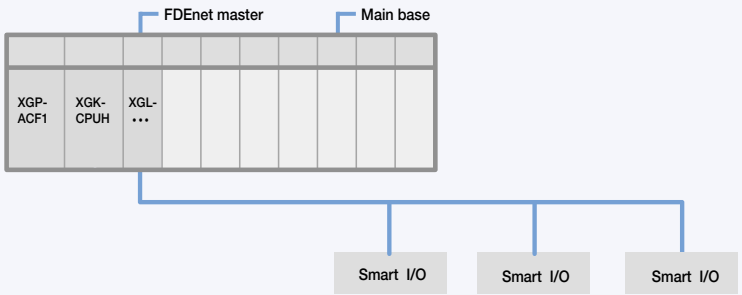
Remark) Assignment of device memory and I/O number

- Through High-speed link parameter, users can assign device memory such as 'P', 'M', 'K', and 'D' to remote I/O. Area 'P' should be set to use various functions such as initial reset, forced ON/OFF.
- Max. available point of I/O device memory (P) is 32,768 (P00000~P2047F)
- In case of constructing remote system, the assignment of I/O number is 'fixed' type (64 points, 4 words per slot)
- When setting up High-speed link parameter, the whole device memory of expansion base should be assigned at once regardless of distinction of I/O.

Ex) In case input module is set on 0, 2 slot and output module is set on 1, 4 slot in the remote 12 station,
- Reception: Starting address - P00000, Size - 20 words (0,1,2,3,4 slot)
- Transmission: Starting address - P00000, Size - 20 words (0,1,2,3,4 slot)

Block type remote I/O system

Block type remote I/O system consists of Profibus-DP, DeviceNet, Rnet.
Users can use this I/O system regardless of which series it is. Complying with the global standard,
Profibus-DP and DeviceNet can be connected to LS Smart-I/O as well as other company's products.



CPU & System configuration / I/O module

Features

- 8, 16, 32, 64 points I/O module
- Operation monitoring by LED display
- Easy maintenance: Terminal block type, one-touch installation of module

Input module specifications

Input type		DC input							AC input	
Type		XGI-D21A	XGI-D22A	XGI-D22B	XGI-D24A	XGI-D24B	XGI-D28A	XGI-D28B	XGI-A12A	XGI-A21A
Input point		8	16		32		64		16	8
Rated input voltage		DC24V							AC100~120V	Free voltage
Rated input current		4mA							8mA	17mA
ON voltage/current		19V or more / 3mA or less							AC80V or more / 5mA or less	AC130V or more / 10mA or less
OFF voltage/current		DC11V or more / 1.7mA or less							AC30V or more / 1mA or less	AC60V or more / 2mA or less
Response	Off→On	1ms/5ms/10ms/20ms/70ms (set by CPU parameter) Initial value: 3ms							15mA or less	
	On→Off	1ms/5ms/10ms/20ms/70ms (set by CPU parameter) Initial value: 3ms							25mA or less	
Common (COM)		8 points/COM	16 points/COM		32 points/COM				16 points/COM	8 points/COM
Insulation method		Photocoupler								
Current consumption (mA)		20	30		50		60		30	20
Weight (Kg)		0.1	0.12		0.1		0.15		0.13	0.13

Output module specifications

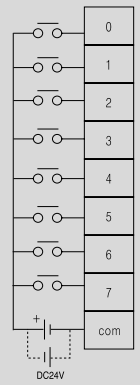
Input type		Relay			Transistor						Triac
Type		XGQ-RY1A	XGQ-RY2A	XGQ-RY2B	XGQ-TR2A	XGQ-TR2B	XGQ-TR4A	XGQ-TR4B	XGQ-TR8A	XGQ-TR8B	XGQ-SS2A
Output point		8	16		16		32		64		16
Rated load voltage		DC12/24V, AC110/220V			DC12/24V						AC110/220V
Rated output current	1 point	2A			0.5A		0.1A				0.6A
	Common	5A			4A		2A				4A
Response time	Off→On	10ms or less			1ms or less						1ms or less
	On→Off	12ms or less			1ms or less						0.5cycle +1ms or less
Common (COM)		1 point/COM	16 points/COM		32 points/COM						16 points/COM
Insulation method		Relay			Photocoupler						
Current consumption (mA)		260	500		70		130		230		300
Weight (Kg)		0.13	0.17	0.19	0.11		0.1		0.15		0.2
Surge killer		-		Varistor	Zener diode						Varistor
External power supply		-			DC						-

Note) B1, B2 of 32, 62 points terminal (connector) are shorted inside of the product.

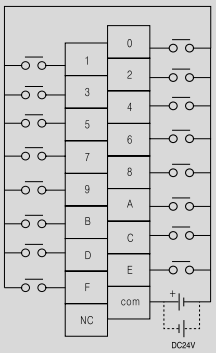
Input			Output		
Input points		16 points	Input points		16 points
Insulation method		Photo coupler	Insulation method		Photo coupler
Rated input voltage		DC24V	Rated input voltage		DC12/24V
Rated input current		4mA	Rated input current		DC10.2~26.4V
Input voltage range		DC20.4~28.8V	Input voltage range		0.1A/point, 1.6A/COM
Insulation pressure		AC560Vrms / 3Cycle	Insulation pressure		0.1mA or less
On voltage/current		DC19V or more / 3mA or more	On voltage/current		0.7A/10ms or less
Off voltage/current		DC11V or more / 1.7mA or more	Off voltage/current		Zener diode
Input resistance		5.6 kΩ	Input resistance		DC 0.2V or less
Response	Off→On	1ms/3ms/5ms/10ms/20ms/70ms/100ms (Setting by CPU parameter) Initial value: 3ms	Response	Off→On	1ms or less
	On→Off	1ms/3ms/5ms/10ms/20ms/70ms/100ms (Setting by CPU parameter) Initial value: 3ms		On→Off	1ms or less (rated load, resistance load)
Common (COM)		16 points/COM			
Operation display		LED lighting when output is ON			
Internal current consumption		100mA			
External connection		40-point connector			
Weight (kg)		0.1			

Wiring diagram for input modules

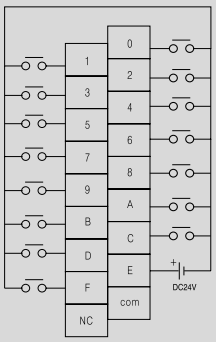
XGI-D21A



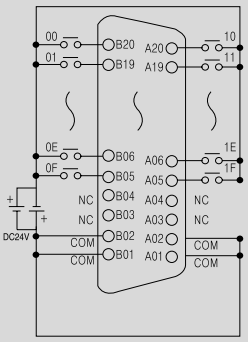
XGI-D22A



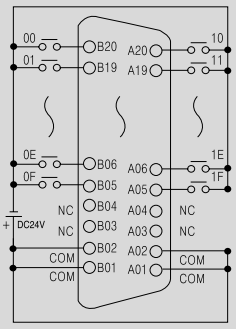
XGI-D22B



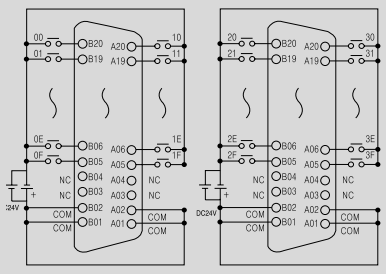
XGI-D24A



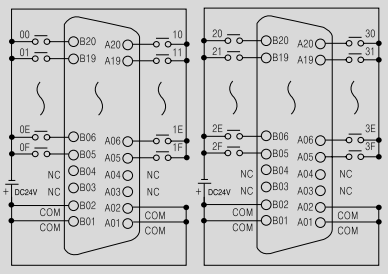
XGI-D24B



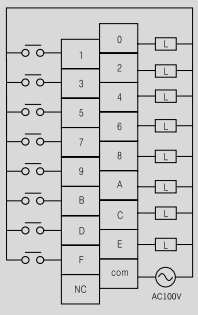
XGI-D28A



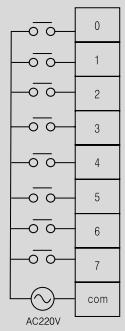
XGI-D28B



XGI-A12A

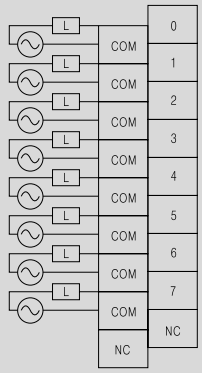


XGI-A21A

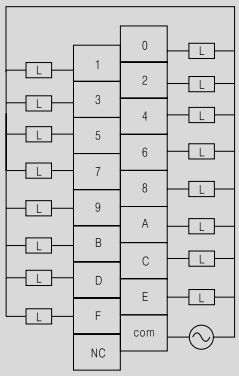


Wiring diagram for output modules

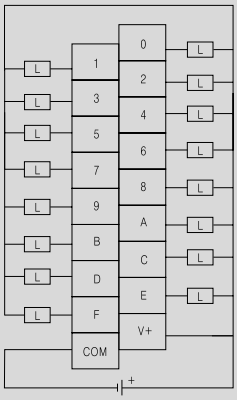
XGQ-RY1A



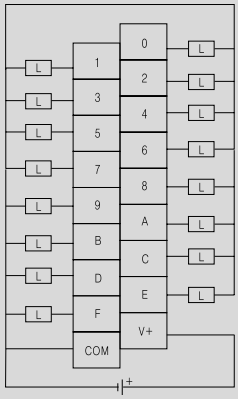
XGQ-RY2A/B



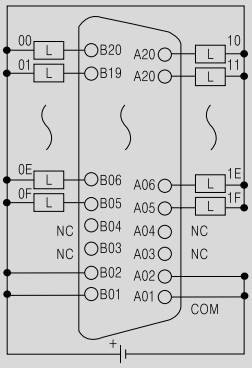
XGQ-TR2A



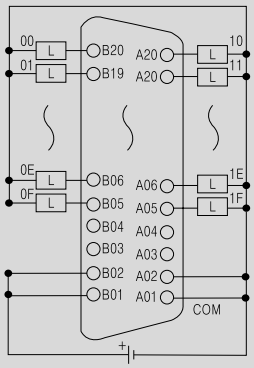
XGQ-TR2B



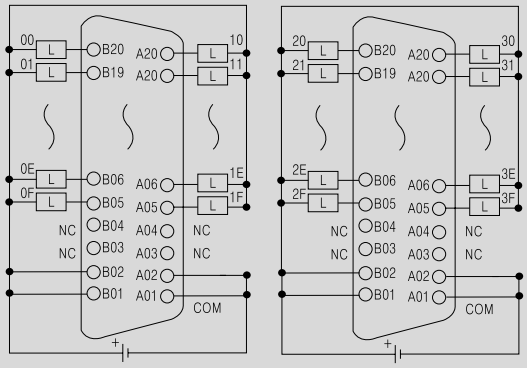
XGQ-TR4A



XGQ-TR4B

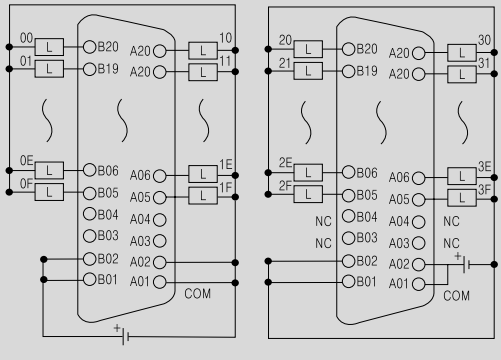


XGQ-TR8A

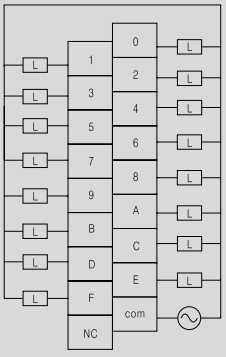


Wiring diagram for Input/output mixed module

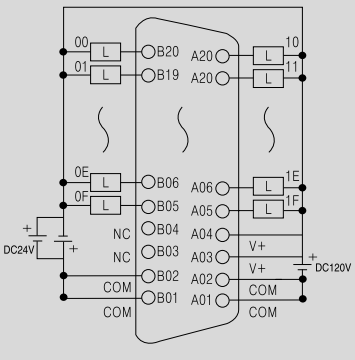
XGQ-TR8B



XGQ-SS2A

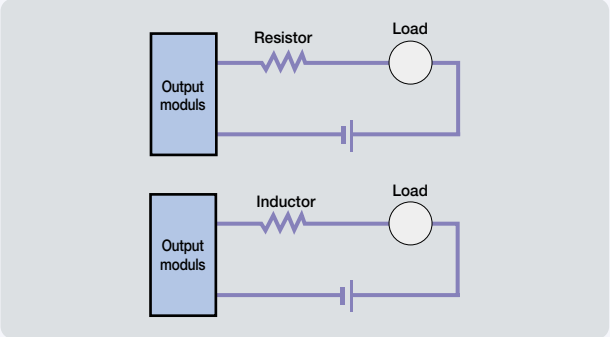


XGH-DT4A



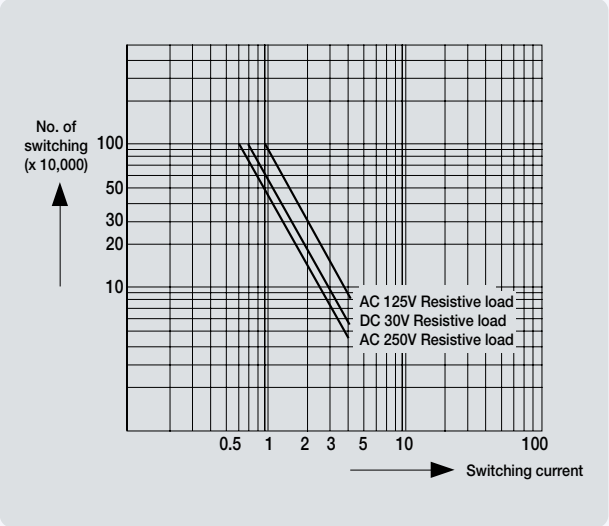
Precaution during installation of I/O module

- XGT has 2 kinds of digital input type: Current sink input, Current source input. For DC input module has different wiring depending on the input type, digital input type should be selected with consideration about connected input device.
- Max. number of simultaneous input point differs according to the module type. Therefore, review specification of input module before its application.
- Use an interrupt module when a response of high-speed input is demanded. But only one interrupt module can be installed per CPU module.
- If switching frequency is high or inductive switching load is used, the lifespan of relay output module will be reduced. Therefore, it is recommended to use transistor output module or triac output module.
- When driving an inductive load with output module, set the maximum switching frequency as 'ON' for 1 second and 'OFF' for 1 second.
- When using counter or timer with DC/DC converter, it is possible to have inrush current which cause a break down. Therefore to reduce an effect of inrush current, connect resistor or inductor to load or use the module whose max. load current is high.

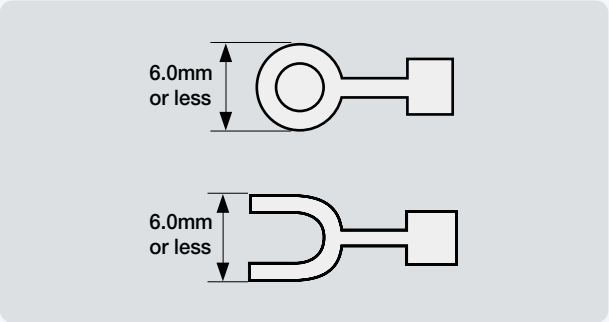


- Fuse of output module is not exchangeable to prevent a damage of external wiring when output module has a short-circuit.
- The number of simultaneous 'ON' points varies depending on input voltage, ambient temperature. Refer to the specification of input module.

- The following graph presents the relay lifespan of relay output module. It shows the maximum lifespan of relay which is used in the relay output.



- Compressed terminal attaching sleeve cannot be mounted to XGT terminal block. The following picture shows appropriate compressed terminals for terminal block.



- Use 0.3~0.75mm² twisted pair, below 2.8mm thickness cable for connecting to terminal block.
- Be careful when choosing and using the cable since the permissible current differs according to the insulation thickness.
- Joint torque of fixed screw and terminal block screw of the module needs to be within the range in the following table.

Joint	Joint torque range
I/O module terminal block screw (M3)	42~58 N · cm
I/O module terminal block fixed screw (M3)	68~89 N · cm

- Thermal protector is built in transistor module. Thermal protector is a function that protects PLC from an overload and overheating.

Network

Along with Ethernet, Profibus-DP, and DeviceNet, XGT series provide the maximum in control integration and communication flexibility.

XGT

XGT FEnet / FDEnet (Fast Ethernet)

- 10/100Mbps High-speed Ethernet for industrial use
- 10/100Base-TX, 100Base-FX (Optical)
- Open Ethernet (FEnet) and LSIS dedicated Ethernet (FDEnet)
- High reliability and performance with 32-bit processor
- Various connection to MMI S/W (XGT, MODBUS/TCP)

XGT Cnet

- RS-232C/485/422 communication
- Long-distance communication via modem connection
- Various connection to MMI S/W
  (XGT, MODBUS RTU, MODBUS ASCII)
- User-defined communication support
- Convenient P2P master (XGT, MODBUS)

XGT Rnet

- Economical network
- Communication speed: 1Mbps
- Communication distance: Max. 750m
- Available to use max. 6 repeaters (Support up to 5.25Km)
- Network management using Auto-scan (Slave module information)

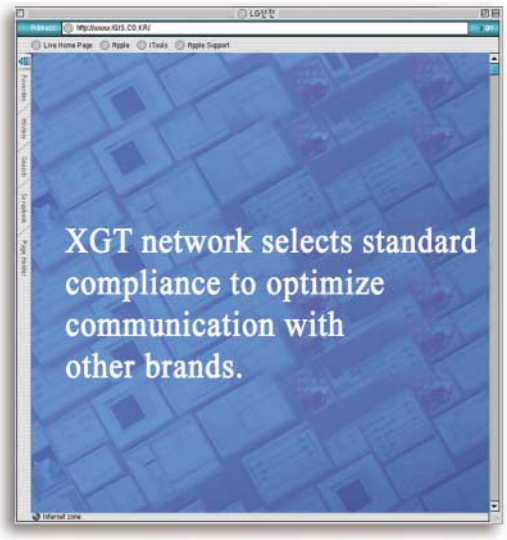
XGT Dnet (DeviceNet)

- Connectable to other PLCs and control device
- Compliance of the ODVA standard
- Flexible communication speed setting: 125/250/500Kbps
- Multi-drop and T branch connection
- Communication distance: Max. 500m
- Convenient parameter setting through SyCon/HS link parameter

XGT Pnet (Profibus-DP)

- Low cost network appropriate to field level
- Proper to communicate among a master automation device and distributed slave I/O devices
- Fast slave communication omitting application layer
- Long communication distance: Max. 1200m
- Convenient parameter setting through SyCon/HS link parameter

Features



XGT FEnet / FDEnet (Fast Ethernet)

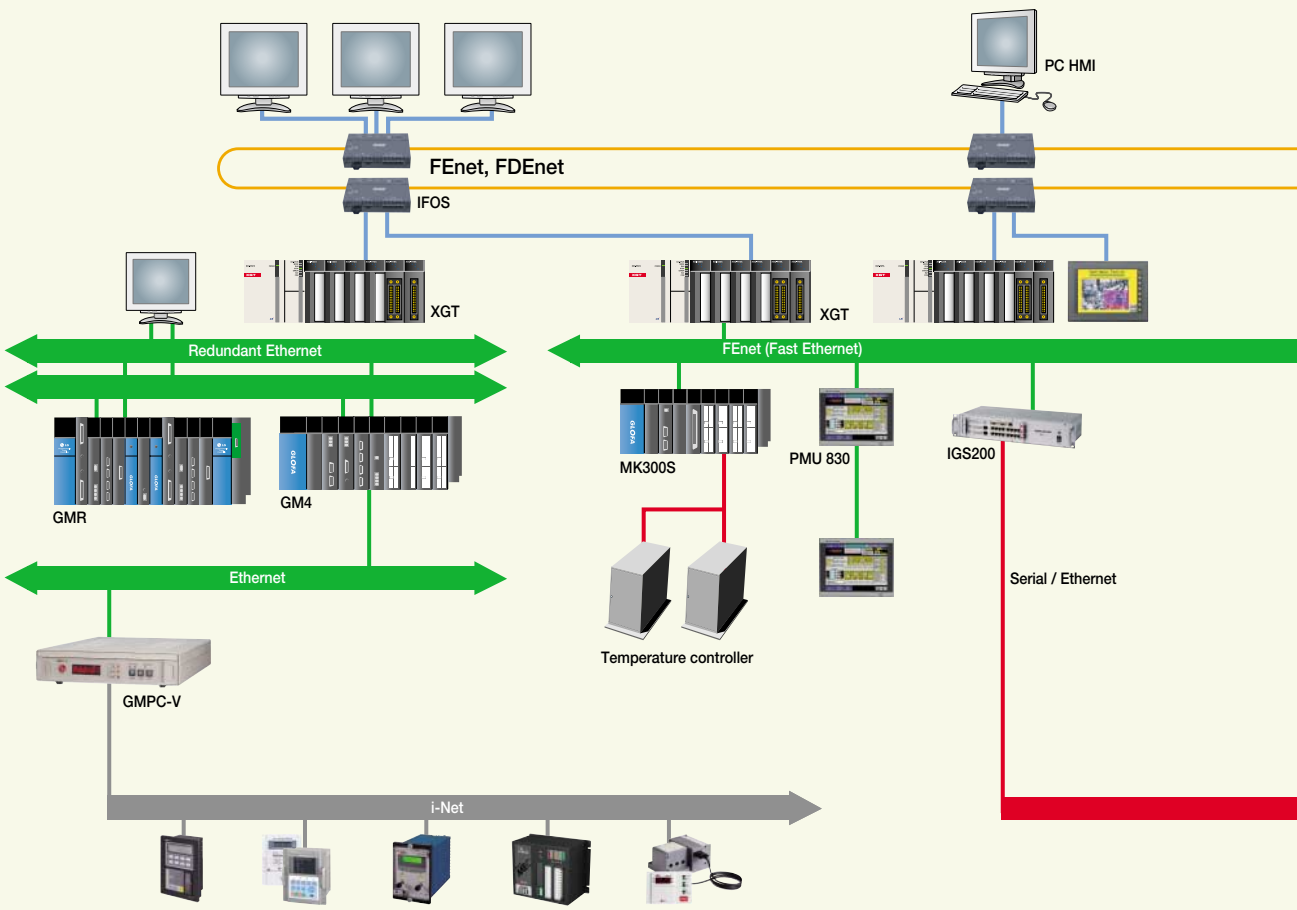
- 10/100Mbps High-speed Ethernet for industrial-use
- 10/100Base-TX, 100Base-FX (Optical)
- Open (Information level) Ethernet and
  LSIS dedicated (Between LS PLCs) Ethernet: FEnet and FDEnet
- High reliability and performance with 32-bit processor
- Various connection to MMI S/W (XGT, MODBUS)

XGT Cnet

- RS-232C/485/422 communication
- Long-distance communication via modem connection
  dedicated line modem connection
- Various connection to MMI S/W
  (XGT, MODBUS RTU, MODBUS ASCII)
- User-defined communication support
- Convenient P2P master (XGT, MODBUS)

XGT Rnet

- Economical and various network
- High-speed communication: 1Mbps
- Long communication distance: Max. 750m
- Available to use max. 6 repeaters (Up to 5.25Km)
- Network management using Auto-scan
  (Slave module information)



XGT Dnet (DeviceNet)

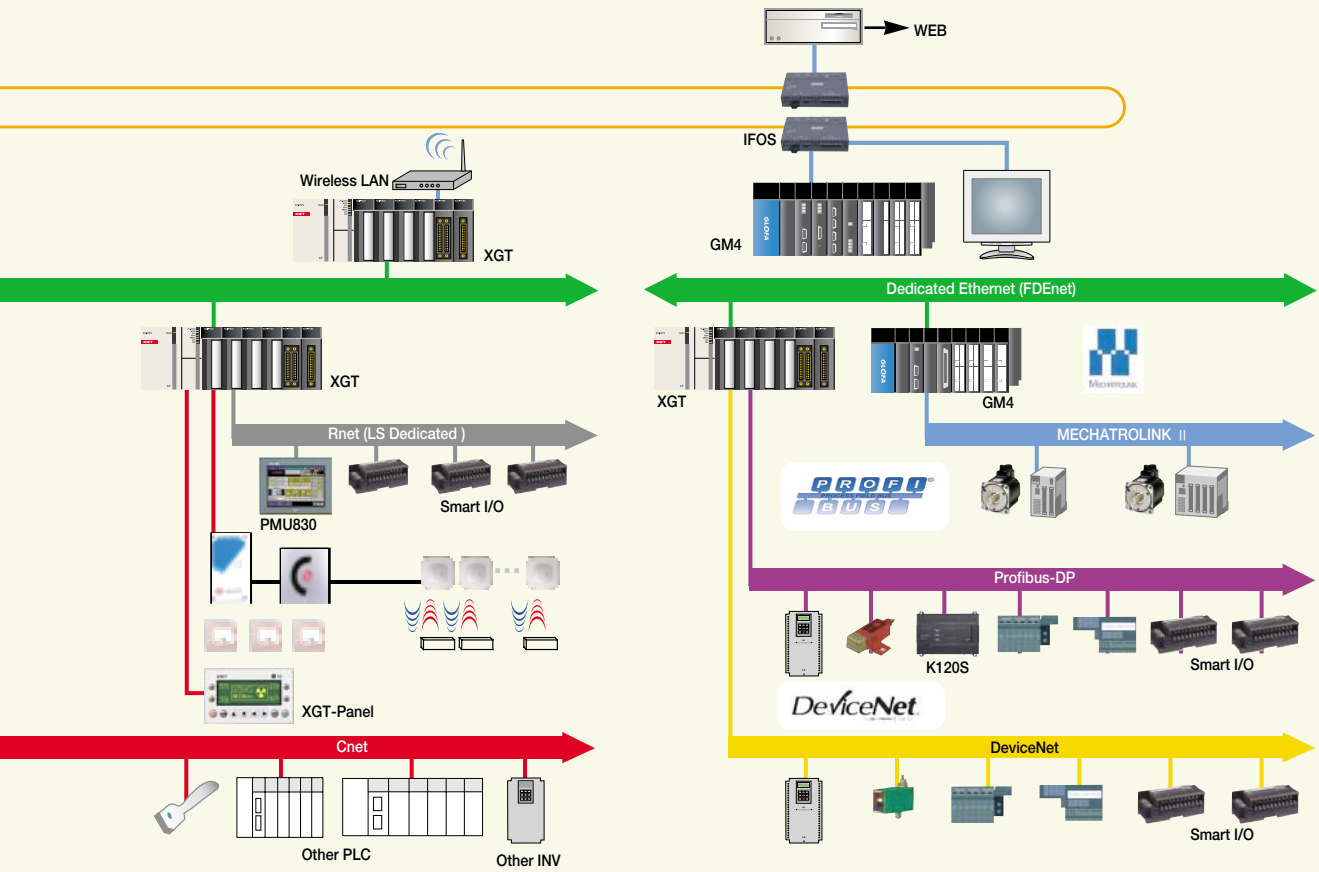
- Connectable to other PLCs and control device
- Compliance of the ODVA standard
- Flexible communication speed setting: 125/250/500Kbps
- Multi-drop and T branch connection
- Long communication distance: Max. 500m

XGT Pnet (Profibus-DP)

- Low cost network appropriate to field level
- Proper to communicate among a master automation device and distributed slave I/O devices
- Fast slave communication omitting application layer
- Long communication distance: Max. 1200m
- Communication using High-speed link parameter

No. of network module available

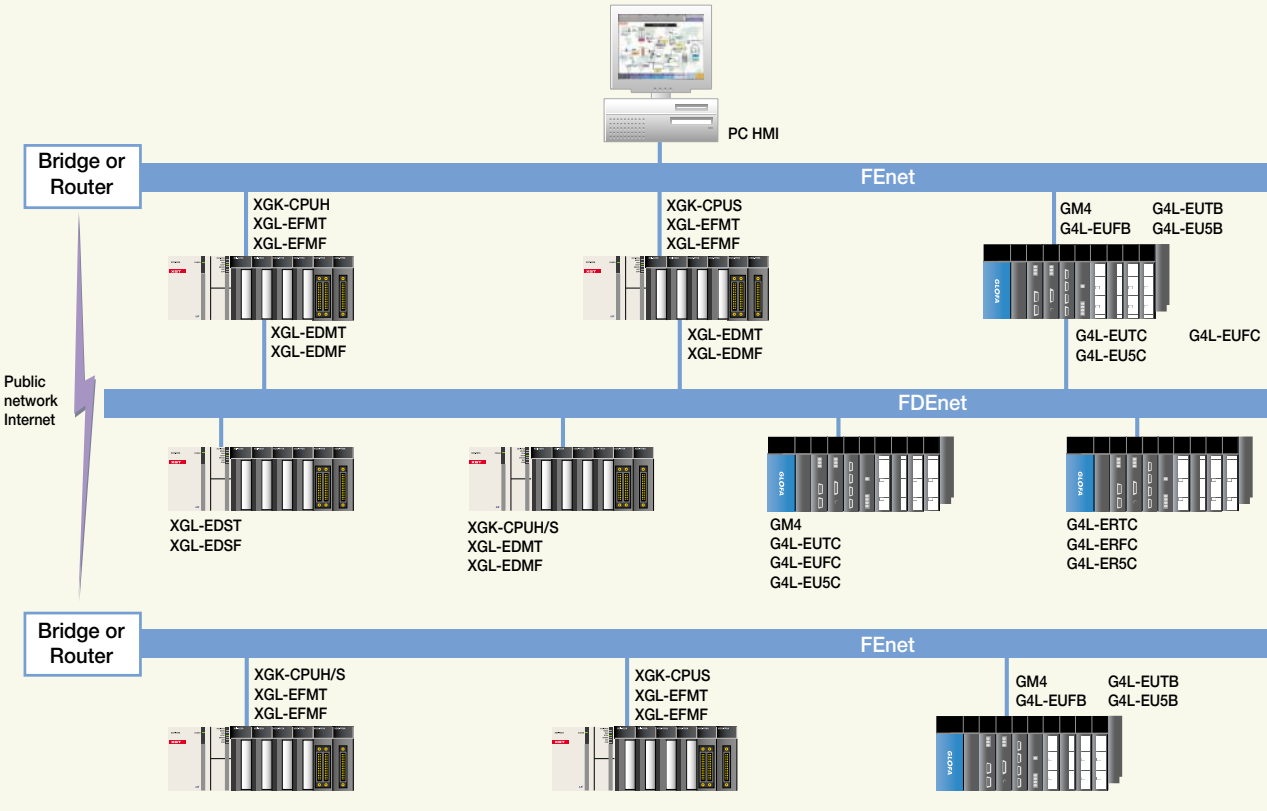
Item	XGK-CPUH	XGK-CPUS
Total network module	24	24
High-speed link module	12	12
P2P service	8	8



XGT FEnet / FDEnet system (Fast Ethernet)

Features

- 10/100Mbps High-speed Ethernet for industrial use (IEEE802.3)
- Expanded High-speed link block (128 blocks)
- 10/100Base-TX, 100Base-FX (Optical)
- Open (Information level) Ethernet and LSIS dedicated (Between LS PLCs) Ethernet: FEnet and FDEnet
- High reliability and performance with 32-bit processor
- Remote programming, monitoring and PLC mode control by XG5000
- E-Mail transmission support
- Easy programming (MODBUS/TCP) with other brands' built-in protocol (Device Driver)
- Providing information of network system by Auto-scan
- Providing XGT/MODBUS communication drivers (MMI/PC communication)
- Easy setting of network configuration and various diagnosis/monitoring: XG-PD
- User protocol editing and command application by P2P service (Connectable to other brands)
- Module checking function (PING)
- Providing information of services (High-speed link, P2P, dedicated service, media condition)



Specifications

FEnet

Item		XGL-EFMT	XGL-EFMF
Communication spec.		10/100 BASE-TX	100 BASE-FX, Fiber Optic
Protocol		TCP/IP, UDP/IP	
Service	With LS PLCs	High-speed link, P2P service	
	With other devices	P2P service	
	Application	Dedicated protocol service, XG5000 service, E-Mail service	
HS link sending/receiving data		200 words/block (Max. 128 blocks)	
No. of channel connectable to upper stage		16 channels	
General use		Communication with PC (HMI) and external devices, High-speed communication among LSIS PLCs	
Media		UTP/STP Category 5	62.5/125㎛, Multi-mode, SC connector
Current consumption (mA)		410	630
Weight (Kg)		0.11	0.15

FDEnet

Item		XGL-EDMT	XGL-EDMF
Communication spec.		10/100 BASE-TX	100 BASE-FX, Fiber Optic
Protocol		Dedicated protocol	
Service	With LS PLCs	High-speed link, P2P service	
	With other devices	-	
	Application	XG5000 service	
Sending/receiving data		200 words /block	
No. of connection stations		64 stations	
General use		High-speed link communication among LSIS PLCs	
Media		UTP/STP Category 5	62.5/125㎛, multi-mode, SC connector
Current consumption (mA)		410	630
Weight (Kg)		0.11	0.15

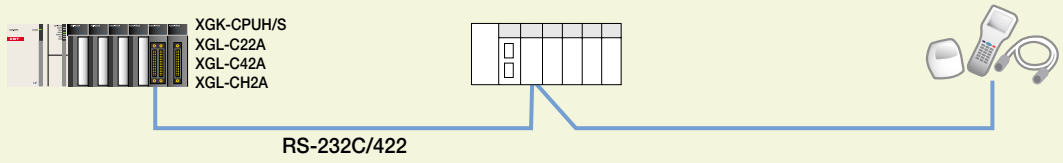
Features

- Various protocol editing and communication parameter setting: XG-PD
- Long-distance communication via modem connection
- Dedicated protocol for multi-drop configuration connectable up to 32 units
- RS-232C/422 communication port
- Flexible communication speed setting (300~115,200bps)
- Supporting full duplex and half duplex communication
- Max. 12 modules available in one CPU
- P2P service: User-defined communication and XGT/MODBUS master
- Various connection to MMI S/W (XGT, MODBUS RTU, MODBUS ASCII)
- Various diagnosis functions using XG-PD
  (I/O, link status, service status), monitoring sending/receiving
  frame simultaneously and displaying frame's result
- Communication service information (Dedicated service, P2P service)
- Supporting simultaneously dedicated service in remote connection
- Communication without additional setting when
  replacing communication module

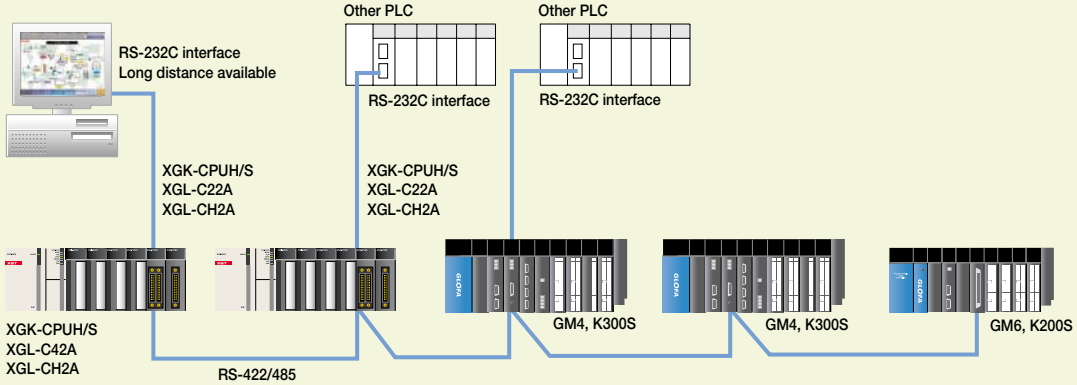
Various independent operation mode

- Operation mode
- Dedicated protocol mode (Simultaneous support)
- Program upload/download by XG5000 protocol (RS-232C)
  Communication using LSIS dedicated protocol
- User-defined communication of P2P mode and
  XGT/MODBUS master

Communication via RS-232C/422



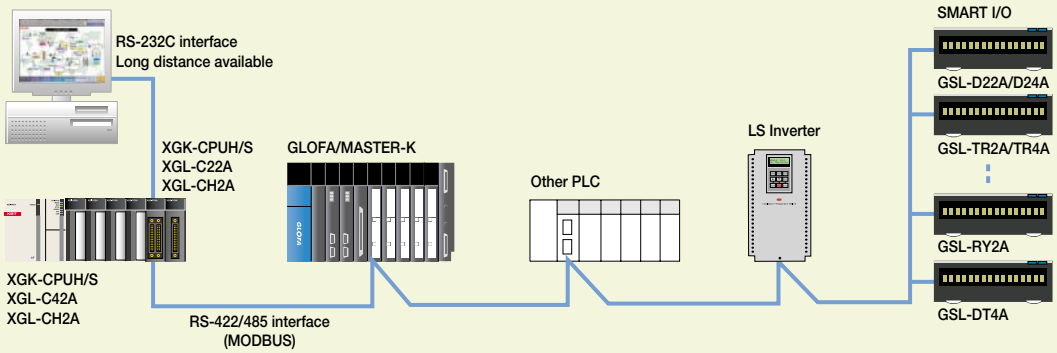
1: N and N: M connection (LSIS and other)



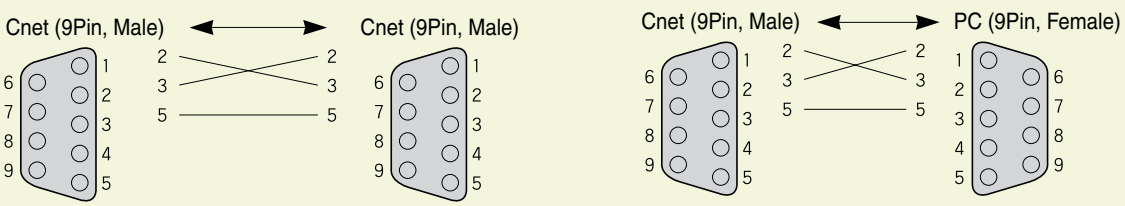
Specifications

Item		Specifications		
		XGL-C22A	XGL-C42A	XGL-CH2A
Interface		RS-232C, 2 channels	RS-422, 2 channels	RS-232C/RS-422, 1 channel
Modem connection		Remote communication with external devices via modem connection. Available for only RS-232C port.		
Comm-unication mode	Dedicated mode	1: 1 or 1: N communication using LSIS dedicated protocol		
	XG5000 mode	Program upload/download and remote control		
	P2P mode	Communication by protocol using XG-PD (Interface with other PLCs), XGT, MODBUS RTU/ASCII master communication		
Operation mode	Server (Slave)	Remote connection simultaneously using XGT/MODBUS Server, user-defined		
	Master	XGT, MODBUS RTU/ASCII master, user-defined		
Data type	Start Bit	1		
	Data Bit	7 or 8		
	Stop Bit	1 or 2		
	Parity	Even/Odd/None		
	Setting	Basic parameter setting with XG-PD		
Synchronization		Asynchronous		
Transmission speed (bps)		Selectable among 300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200 bps		
Station number setting		Up to 32 stations from 0 to 31 with XG-PD		
Transmission distance		RS-232C: Max. 15m (Extendible by using modem), RS-422/485: Max. 500m		
Modem communication		Available	Not available	Available via RS-232C
Network configuration		RS-232C 1: 1, RS-422 1: 1, 1: N, N: M		
Diagnosis function		Available through LED and XG-PD diagnosis service		
Max. number of installation		12		
Current consumption (mA)		310	300	310
Weight (Kg)		0.12	0.12	0.12

MODBUS



Cnet cable connection

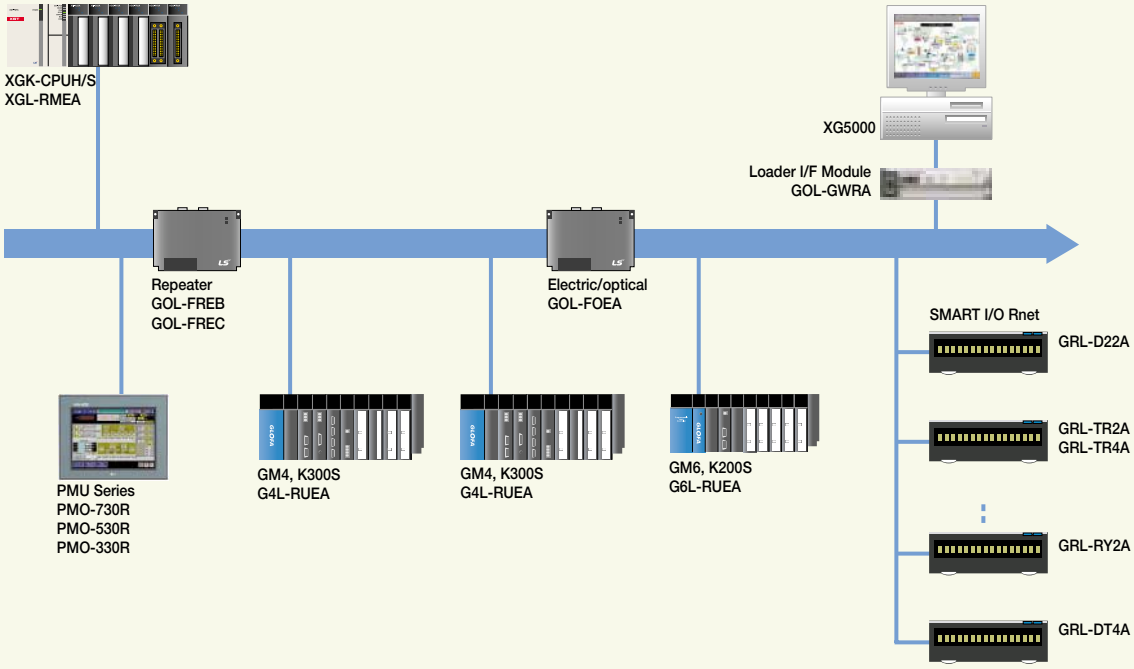


Network / Rnet system

Features

- Economical network
- Communication speed: 1Mbps
- Communication distance: Max. 750m
- Available to use max. 6 repeaters (Up to 5.25Km)
- Network management using Auto-scan (Slave module information)
- Multi-drop network with smart I/O
- Network diagnosis and monitoring by XG-PD
- Max. 64 stations of slave modules controlled by one master module

System configuration



Specifications

Item	Specifications (XGL-RMEA)
Transmission speed	1Mbps
Encoding	Manchester Biphase-L
Transmission distance (Per segment)	Max. 750m
Transmission distance (When using repeater)	Max. 750m * (6 repeater +1) = 5.25Km
Transmission cable	Twisted pair shield cable
Max. number of connection stations	Master + Slave = 64 stations (with repeater), 1 segment=32 stations (with master)
Max. size of protocol	256 bytes
Medium access method	Circulated Token Passing
Frame error check	CRC 16 check
Max. number of installation	12
Installation position	Main base or expansion base
Current consumption (mA)	410
Weight (Kg)	0.12

SMART I/O

- Reduction of wiring and real-time control of distributed I/O
- Various I/O module (16/32 points)

Repeater specifications

Item	Specifications
Type	G0L-FREB: AC110V ~ AC220V, G0L-FREC: DC 24V
Communication speed	1Mbps
Transmission method	Twisted pair shield cable
Transmission distance	Max. 750m per repeater
Max. number of installation between stations	Max. 6 repeaters
Max. distance between stations	5.25Km (when 6 repeaters are installed)
Faulty data reception	Error data transmission
Frame error check	CRC 16 check

Network cable and peripheral devices

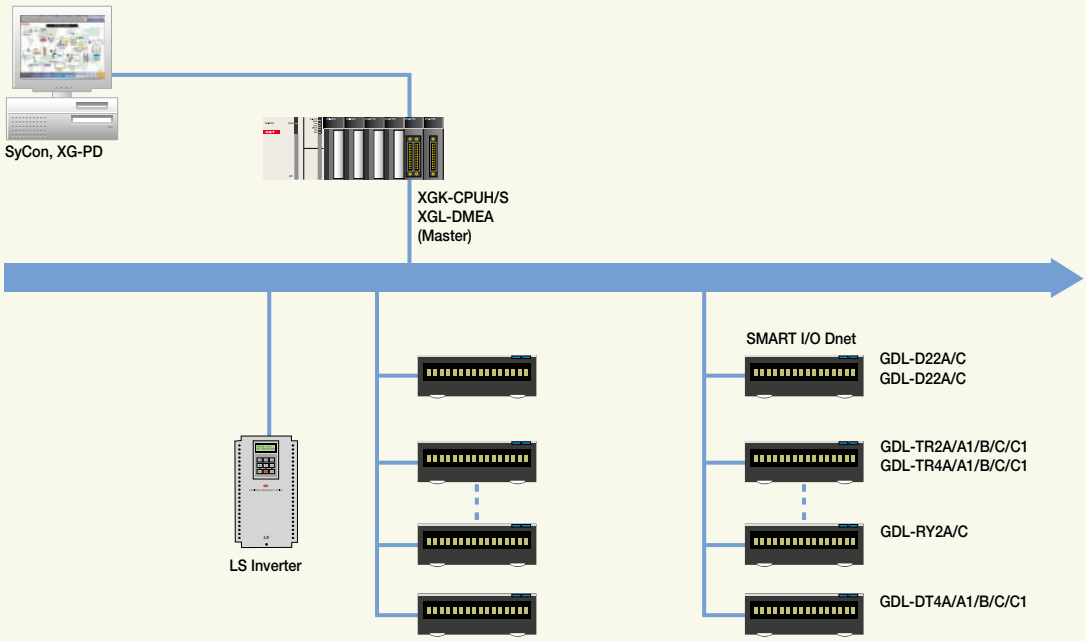
Item	Specifications	Remarks
Twisted pair electric cable	LIREV-AMESB, 2 × 1mm, 18AWG	LS cable
RF terminator	110Ω , 1/2 Watt	-

Network / Dnet system

Features

- DeviceNet protocol
- Direct control of various I/O devices via Dnet system
- Max. 63 slave modules controlled by one master module
- Flexibility in network configuration: Multi-drop and T branch connection
- Connectable to other master module and various slave modules
- Providing 'Auto Network Scan' function and various information with configuration tool (SyCon)
- Communication using High-speed link parameter
- Connectable to various slave I/O including other module
  (Common I/O, Actuator, Switch, Optical switch, Valve, Inverter,
  A/D module, Position controller etc..)
- Automatic monitoring of slave modules in the network:
  Auto-scan (XG-PD)
- Easy expansion for abundant I/O & line:
  1 CPU module affordable up to 12 master modules
- Network setting by SyCon/XG-PD
  (Parameter setting, diagnosis and monitoring)

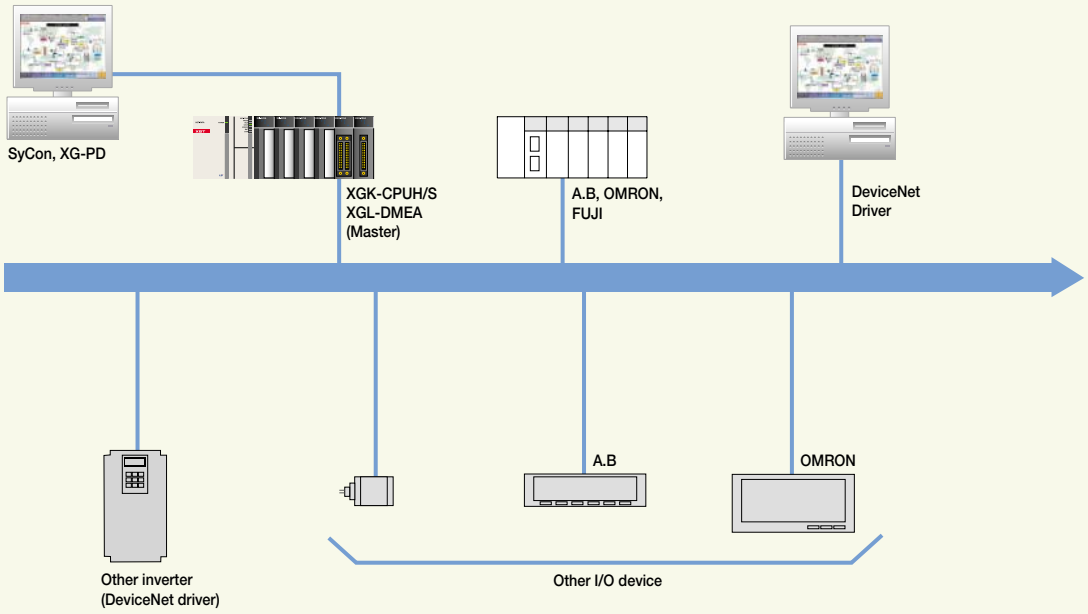
System configuration with LSIS products



Specifications

Item	Specifications (XGL-DMEA)			
Module type	Master			
Transmission distance and speed	Trans. speed	Max. network length	Max. drop cable	Length of all drop cable
	500kbps	100m	6m	39m
	250kbps	250m	6m	78m
	125kbps	500m	6m	156m
Max. number of connection stations	64 stations (Master 1 + Slave 63)			
Max. number of node	Max. 64 MAC ID (Node address)			
Communication method	Bit Strobe, Poll, COS, Cyclic			
Diagnosis function	Duplicated station check Abnormal station detection/CRC error check/Scan List/Operation display (LED)			
Cable	Dnet dedicated cable: 5 (Signal: 2, power: 2, shield: 1)			
Max. number of installation	12			
Configuration tool	SyCon			
Configuration port	RS-232C Configuration Port			
Current consumption (mA)	440			
Weight (Kg)	0.11			

System configuration with other products

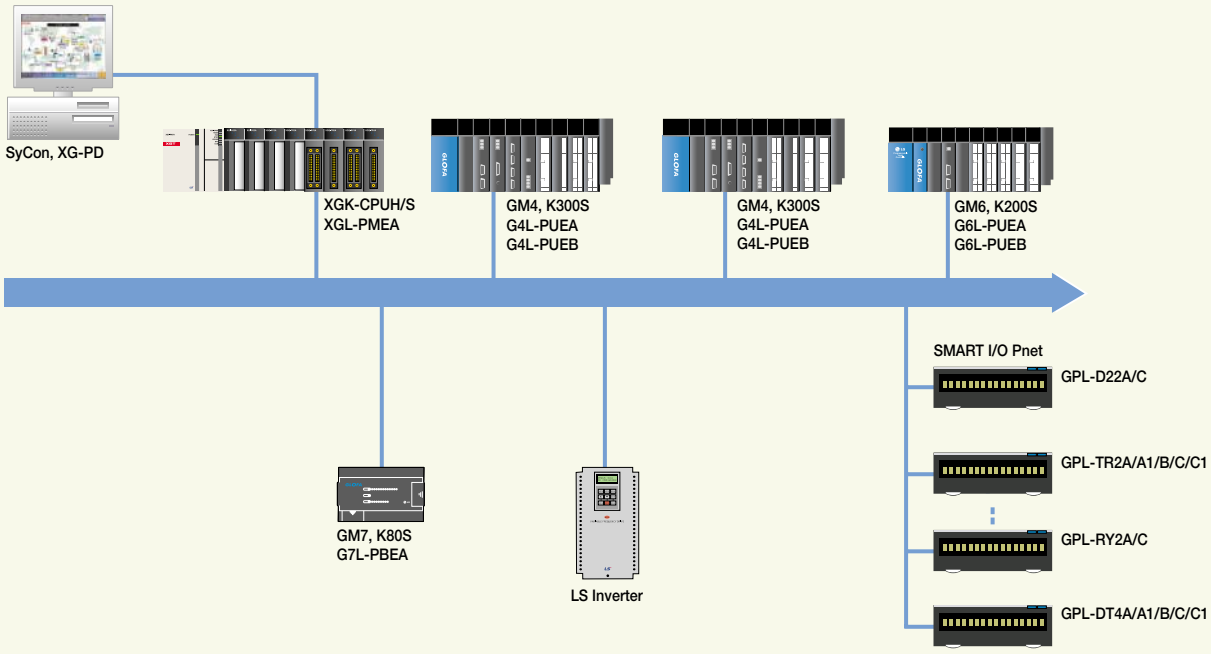


Network / Pnet system

Features

- Profibus-DP protocol
- Low cost network appropriate to field level
- Proper to communicate among a master automation device and distributed slave I/O devices.
- Fast slave communication without application layer
- Transmission speed: 9.6Kbps ~ 12Mbps
- Transmission distance: Max. 1,200m
- Max. 126 slave stations available (32 stations per segment)
- Network setting using SyCon/XG-PD
  (Parameter setting, diagnosis and monitoring)
- Available to use 7Kbytes I/O data of master station
- Automatic monitoring of slave modules in the network:
  Auto-scan (XG-PD)
- Supporting multi-master
- Providing 'Auto Config' and various information
  with configuration tool (SyCon)

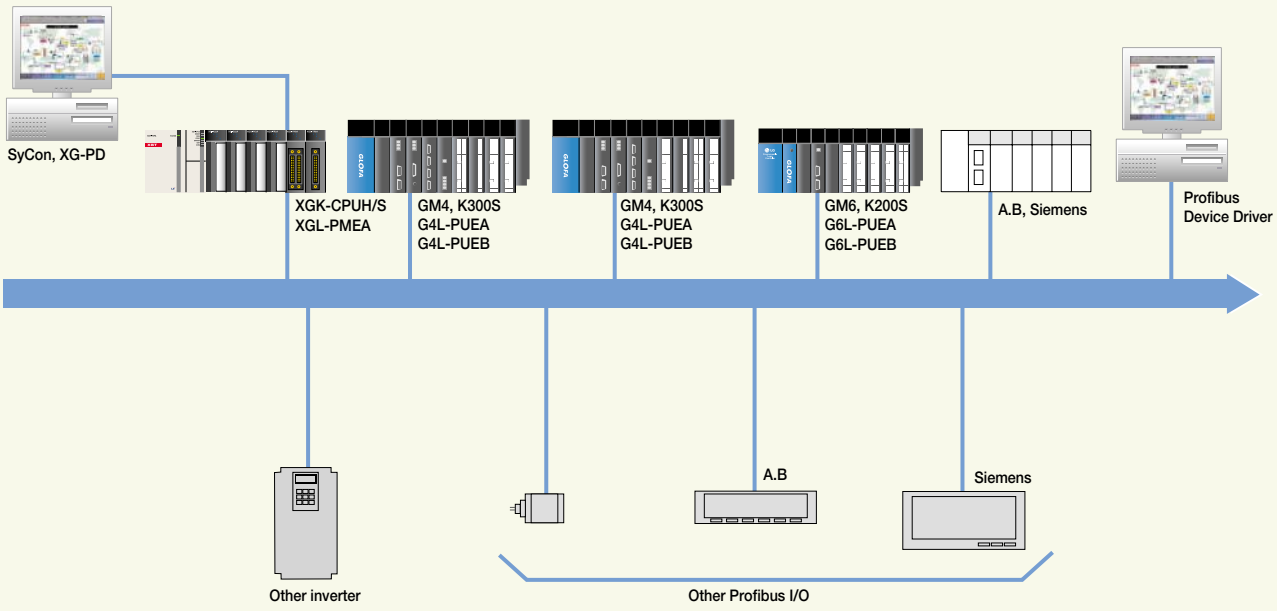
System configuration with LSIS products



Specifications

Item		Specifications (XGL-PMEA)
Module type		Master
Network type		Profibus-DP
Standard		EN50170/DIN19245
Interface		RS-485 (Electric)
Media access		Token Passing & Poll
Topology		Bus
Modulation		NRZ
Cable		Shield Twisted Pair Cable
Transmission distance and speed	1,000m	9.6K~187Kbps
	400m	500Kbps
	200m	1.5Mbps
	100m	3M~12Mbps
Max. number of slave per network		126
Max. number of slave per segment		32
Max. I/O data		Input: 3584byte, Output: 3584byte
Max. number of communication points		7Kbytes
Communication parameter setting		XG-PD, SyCon
Max. number of installation		12
Configuration Tool		SyCon
Configuration Port		RS-232C Configuration Port
Current consumption (mA)		550
Weight (Kg)		0.11

System configuration with other products



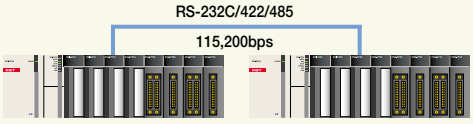
Network / Communication example (Cnet)

Communication among PLCs

This is a system configuration communicating between XGT PLCs by serial communication.
In this case, PLC 1 is the master (Client) and other PLC should be slaves (Server).
It is called Master/Slave communication. Master PLC is defined by comm. basic parameter and P2P setting.
And slave PLC is defined by basic parameter and driver setting.

Configuration

PLC1 reads present value, C0000 of PLC2's up-counter and then saves it in M0200 of PLC1.

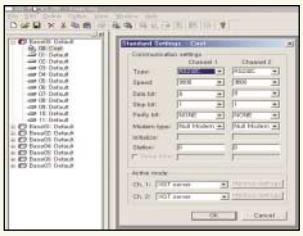


Data memory

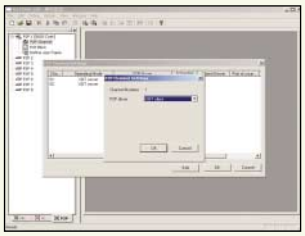
PLC station	PLC memory	Setting Item
PLC 1	M0100	1. XG-PD parameter setting, 2. XG5000 programming
PLC 2	C0000	1. XG-PD parameter setting, 2. XG5000 programming

XG-PD setting

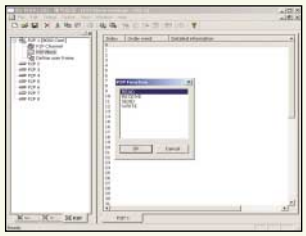
PLC 1 setting (Master)



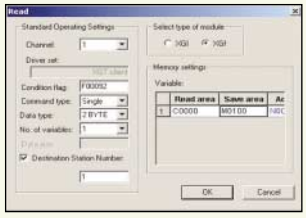
Communication basic parameter setting
Setting up station number, communication speed, etc. And setting up the operation mode as P2P



P2P channel setting
Setting up channel 01 as [XGT client]



P2P setting
Setting up P2P block (READ)

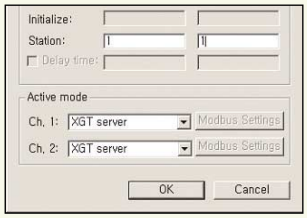


Communication data setting
Setting up Read area, Save area, etc.

Parameter writing
Downloading parameters to PLC after online connection

Enable Link
Enabling P2P for communication start

PLC 2 setting (Slave)



Communication parameter setting
Setting up station number and channel 01 mode as 1 and XGT server

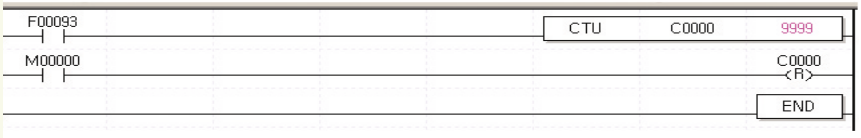
Parameter writing
Downloading parameters to PLC after online connection

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

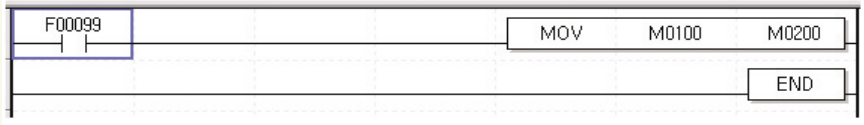
PLC station 2 setting

Make up-counter program using CTU command



PLC station 1 setting

Check out the counter value of M0100 is transmitted.

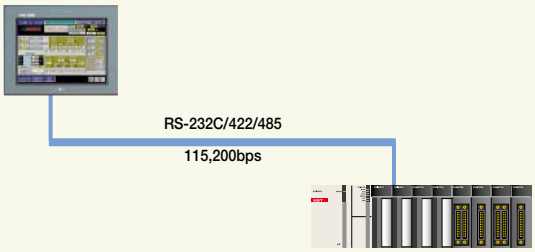


HMI communication configuration

This is a system configuration to monitor and control PLC (XGT) by PMU (HMI). In this case, PLC is the slave (Server) and PMU should be the master (Client).
PLC is defined by comm. basic parameter and driver setting.

Configuration

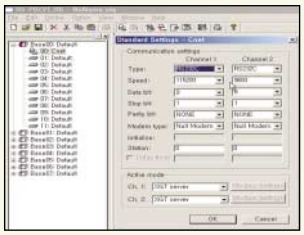
Making On/Off touch tag for controlling M0001 of XGT



Data memory

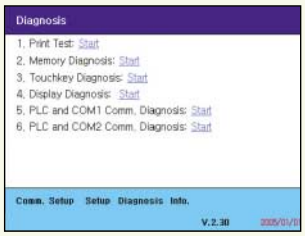
PLC memory	Setting item	PMU
M000D1	1. XG-PD parameter setting	Using touch tag
	2. XG5000 programming	

XG-PD setting



Basic communication parameter setting
Setting up station number, communication speed, etc And setting up the operation mode as XGT server

Parameter writing
Downloading parameters to PLC after online connection

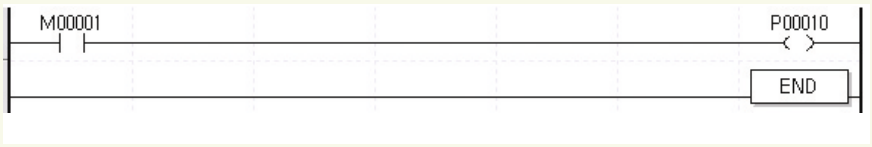


PMU setting
Setting up communication setting (speed, data, stop, parity, etc) same as XGT

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

Create program that P00010 is on right after M00001 is on.



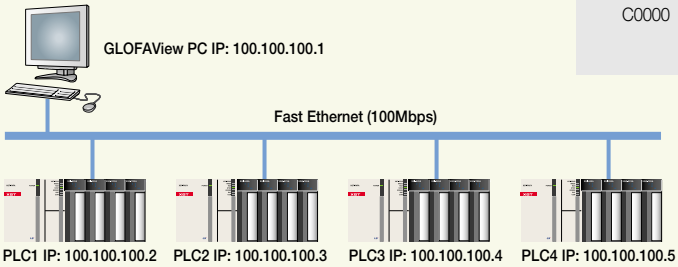
Network / Communication example (FEnet)

HMI communication configuration

This is a data communication system configuration among XGT PLCs via Ethernet network.
In this case, communication is possible by HS link among PLCs.
It just needs basic parameter setting and HS link item setting.

Configuration

Read the up-counter value C0000 of PLC1 and monitor it in GLOFAview.

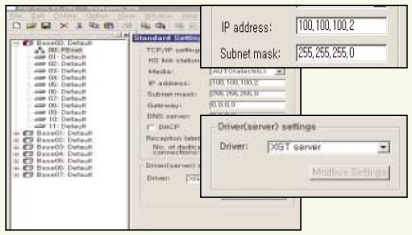


Data memory

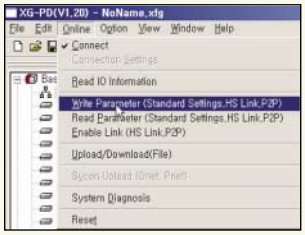
PLC memory	Setting item	GLOFAView
C0000	1. XG-PD parameter setting	Using analog tag
	2. XG5000 programming	

XG-PD setting

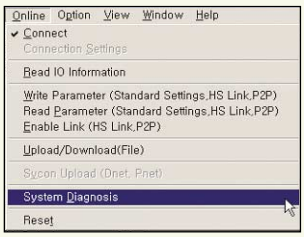
PLC 1 setting (Master)



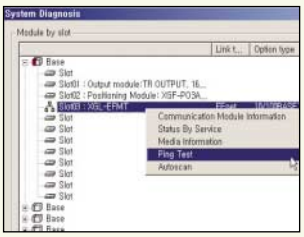
Basic communication parameter setting
Specifying IP address and Subnet mask of PLC as above



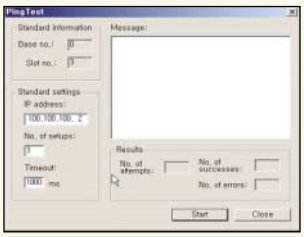
Parameter writing
Downloading parameters to PLC after online connection



Communication test
Checking online and system diagnosis



System Diagnosis
Selecting Ping Test



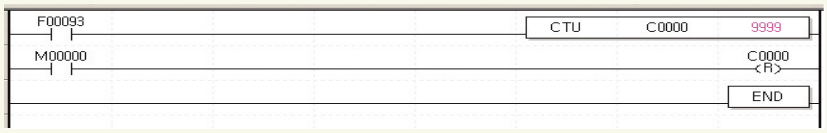
Ping Test
Starting diagnosis after inputting IP address of PLC

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

Make the up-counter program using CTU command.

Check out if the counter value of CTU value is transmitted.

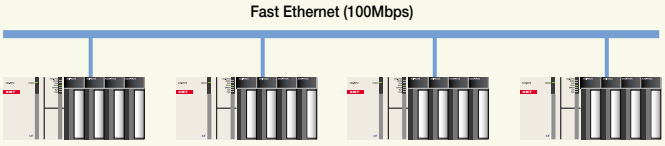


High-speed link communication

This is a configuration for XGT to communicate each other via Ethernet.
It just needs communication basic parameter setting and High-speed link item setting.

Configuration

Read present value C0000 of PLC1 and transmit it to M0000 of PLC2.



PLC1 IP: 100.100.100.2
High-speed link station number 1

PLC2 IP: 100.100.100.3
2

PLC3 IP: 100.100.100.4
3

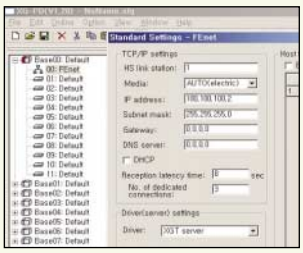
PLC4 IP: 100.100.100.5
4

Data memory

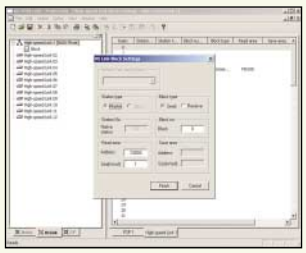
PLC station	PLC memory	Setting Item
PLC 1	C0000	1. XG-PD parameter setting, 2. XG5000 programming
PLC 2	M0100	1. XG-PD parameter setting, 2. XG5000 programming

XG-PD setting

PLC station 1 setting



Basic communication parameter setting
Specifying HS link station, IP address and Subnet mask of PLC as above

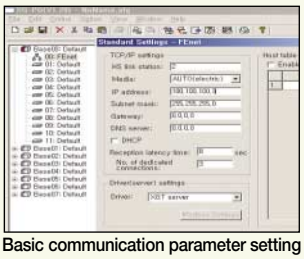


Communication data setting
Setting up communication data in HS link item as above

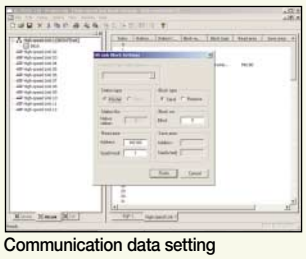
Parameter writing
Downloading parameters to PLC after online connection

Enable Link
Enabling link for communication start

PLC station 2 setting



Basic communication parameter setting
Specifying HS link station, IP address and Subnet mask of PLC as above



Communication data setting
Setting up communication data in HS link item as above

Parameter writing
Downloading parameters to PLC after online connection

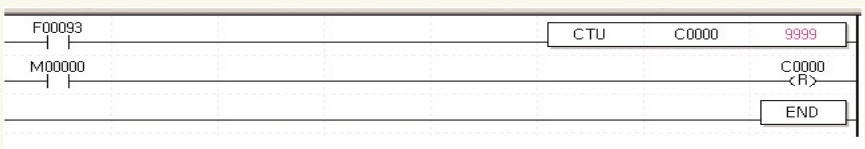
Enable Link
Enabling link for communication start

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

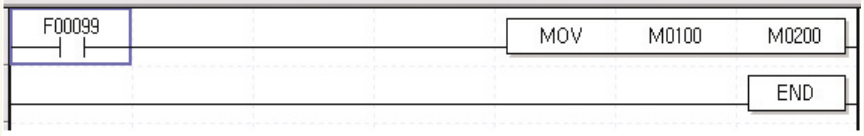
PLC1 setting

Make the up-counter program using CTU command



PLC2 setting

Check out if the counter value of M0100 is transmitted.



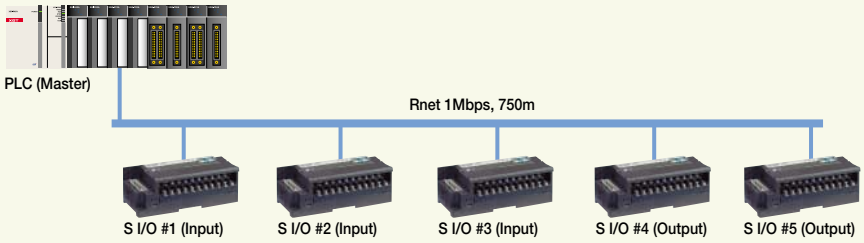
Network / Communication example (Rnet)

Remote I/O configuration

LSIS developed communication method is Rnet which is 'Distributed Control System' using Smart I/O.
In this case, PLC is the master and the other Smart I/O are slaves.
It just needs basic parameter setting for communication and High-speed link setting.

Configuration

PLC controls each Smart I/O (16-point).

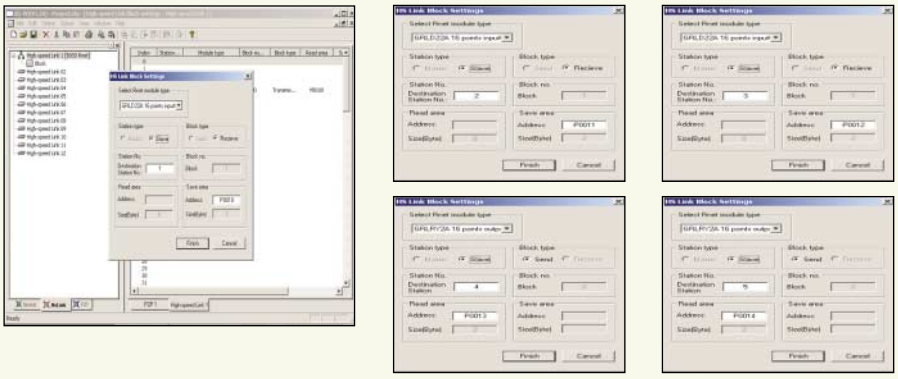


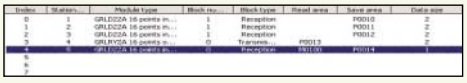
Data memory

Smart I/O #	Smart I/O address	PLC address	Setting item
1	P0000	P0010 (P00100~P0010F)	1. XG-PD parameter setting, 2. XG5000 programming
2	P0000	P0011 (P00110~P0011F)	
3	P0000	P0012 (P00120~P0012F)	
4	P0000	P0013 (P00130~P0013F)	
5	P0000	P0014 (P00140~P0014F)	

XG-PD setting

Communication data setting
Setting up type name, station number, address of each station' s Smart I/O in HS link item as following example.





HS link registration completed

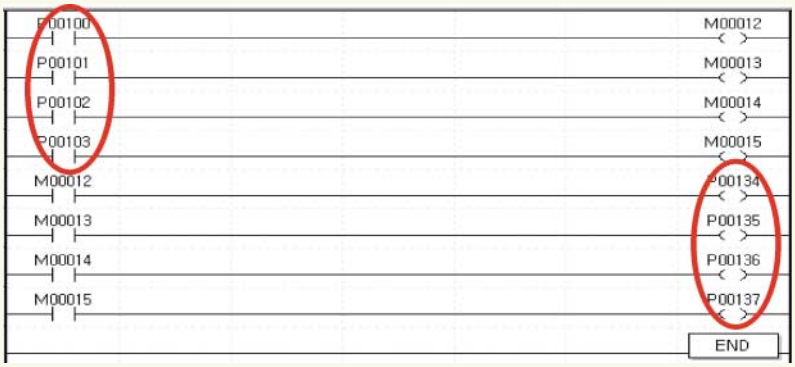
Parameter writing
Downloading parameters to PLC after online connection

Enable Link
Enabling link for communication start

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

Write a program using I/O address of Smart I/O.



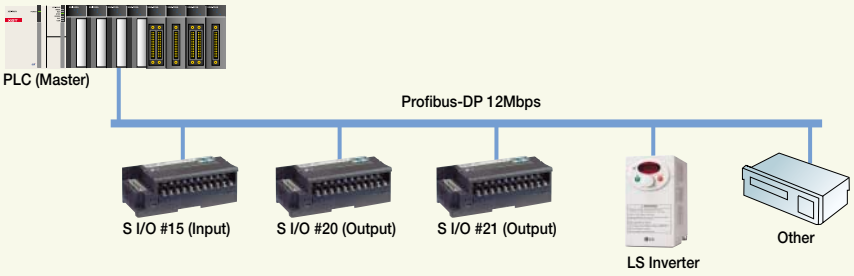
Network / Communication example (Pnet)

High-speed link communication among PLCs

XGT can create 'Distributed Control System' with Smart I/O, Inverter, pneumatic device via Profibus-DP.
In this case, PLC is the master and the other devices such as Smart I/O are slaves.
It just needs SyCon, basic parameter and High-speed link setting.

Configuration

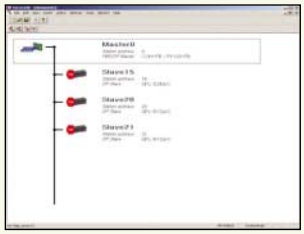
PLC controls each Smart I/O (16-point).



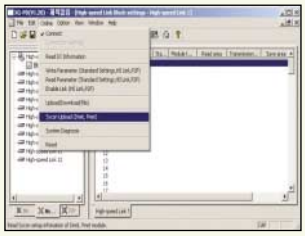
Data memory

Smart I/O #	Smart I/O address	PLC address	Setting item
15	P0000	P0010 (P00100~P0010F)	1. SyCon setting 2. XG-PD parameter setting, 3. XG5000 programming
20	P0000	P0011 (P00110~P0011F)	
21	P0000	P0012 (P00120~P0012F)	

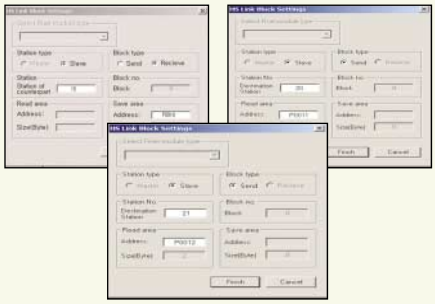
XG-PD setting



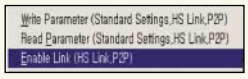
SyCon setting
For detailed setting instruction, refer to page 43 (SyCon setting)



HS link setting
Uploading SyCon and setting up each Smart I/O station as following example



Parameter writing
Downloading parameters to PLC after online connection

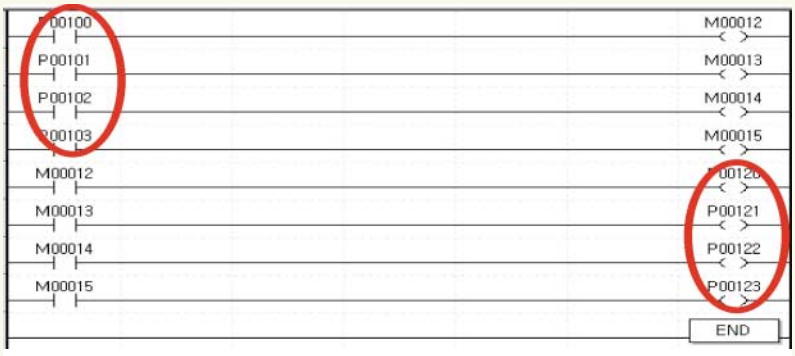


Enable Link
Enabling link for communication start

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

Write a program using I/O address of Smart I/O Pnet



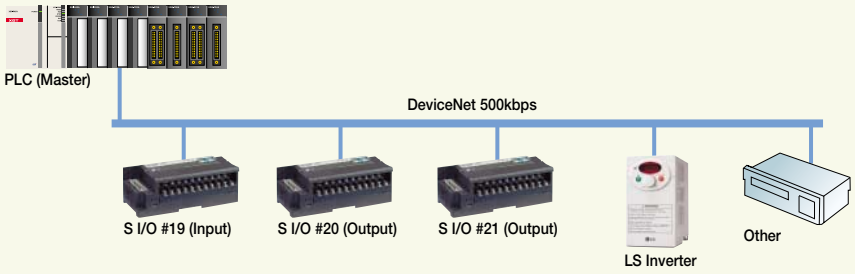
Network / Communication example (Dnet)

High-speed link communication between PLCs

XGT can create 'Distributed Control System' with Smart I/O, Inverter, pneumatic device via Dnet.
In this case, PLC is the master and the other devices such as Smart I/O are Slaves.
It just needs SyCon, basic parameter and High-speed link setting.

Configuration

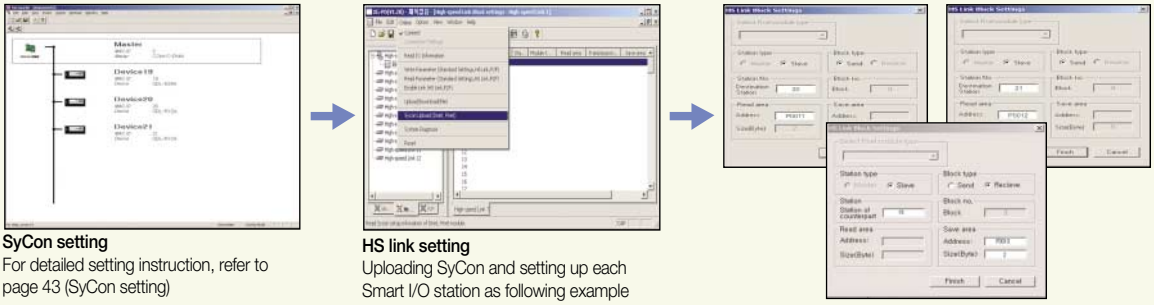
PLC controls each Smart I/O (16 points).



Data memory

Smart I/O #	Smart I/O address	PLC address	Setting item
19	P0000	P0010 (P00100~P0010F)	1. SyCon setting 2. XG-PD parameter setting, 3. XG5000 programming
20	P0000	P0011 (P00110~P0011F)	
21	P0001	P0012 (P00120~P0012F)	

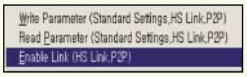
XG-PD setting



SyCon setting
For detailed setting instruction, refer to page 43 (SyCon setting)

HS link setting
Uploading SyCon and setting up each Smart I/O station as following example

Parameter writing
Downloading parameters to PLC after online connection

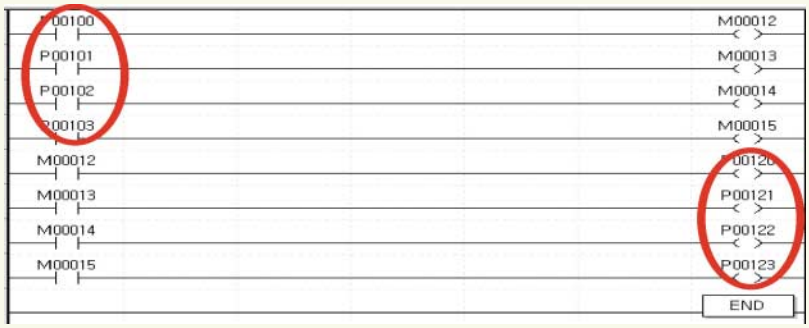


Enable Link
Enabling link for communication start

* For basic parameter setting and SyCon setting/change, reset the module (Online reset).

XG5000 programming

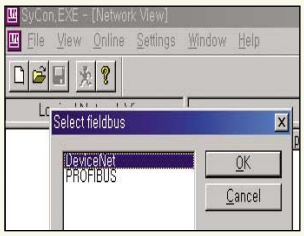
Write a program using I/O address of Smart I/O Dnet.



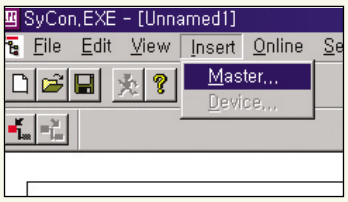
Network / Communication example (SyCon setting for Pnet, Dnet)

SyCon is the dedicated software that help user set up the communication environment for Profibus-DP and DeviceNet more easily and conveniently.

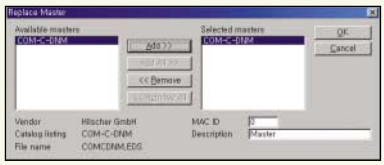
Example of application



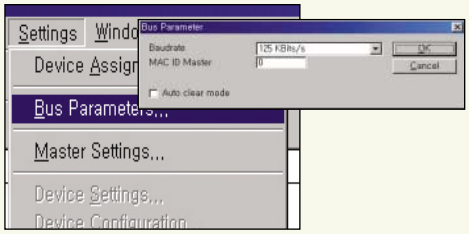
New file
Select fieldbus that is used.



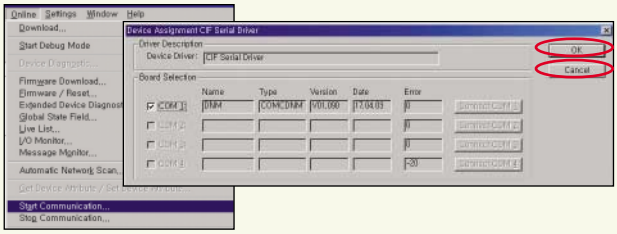
Basic communication parameter setting
Select [Master] in Insert menu.



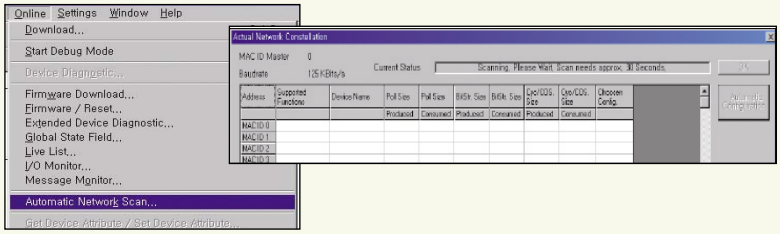
Master module setting
Select [COM-C-DNM] for DeviceNet.
Select [COM-C-DPM] for Profibus-DP.



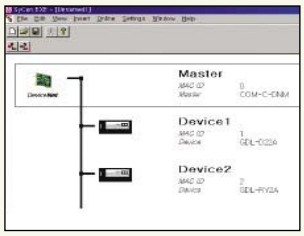
Bus parameter setting
Set up communication speed of master module.



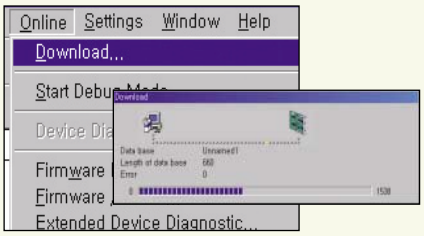
Master module setting
After clicking the port button, check the right check-box.



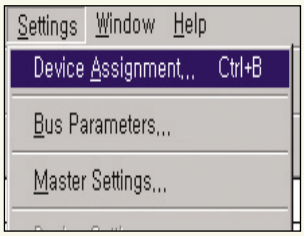
Automatic network scan of connected Smart I/O
Perform automatic network scan after station number setting and wiring with remote device such as Smart I/O.
At this time, all remote devices should be in normal connection (Power-On, etc).
After network scan is completed, press [Automatic Configuration] button and [OK] button.



Network checking
Check normal network (remote) condition.



Parameter download



Disconnect
Disconnect the port in Device Assignment.

Features

- Wiring reduction and real time control of distributed I/O
- Supporting Rnet, DeviceNet, Profibus-DP, MODBUS (RS-422/485)
- Various I/O (DC/TR/Relay) modules with the unit of 16/32 points

Digital I/O specifications

Item		Input		Output			Mixed module	
		DC (Sink/Source)		Transistor (Sink)		Relay	DC (Sink/Source)	Transistor (Sink)
No. of point		16	32	16	32	16	16	16
Rated input (Load voltage)		DC 24V		DC 24V		DC 24V/AC 110V/220V	DC 24V	DC 24V
Input current (Load current)		7mA		0.1A/2A, 0.5A/3A		2A/5A	7mA	0.1A/2A, 0.5A/3A
Response time	Off → On	3ms or less		3ms or less		3ms or less	3ms or less	3ms or less
	On → Off	3ms or less		3ms or less		3ms or less	3ms or less	3ms or less
Common		16 points/COM		16 points/COM		16 points/COM	16 points/COM	16 points/COM
Current consumption		200mA	300mA	280mA	380mA	550mA	350mA	
Network	Rnet	GRL-D22A	GRL-D24A	GRL-TR2A	GRL-TR4A	GRL-RY2A	GRL-DT4A	
	Profibus-DP	GPL-D22A●	GPL-D24A●	GPL-TR2A▲	GPL-TR4A▲	GPL-RY2A●	GPL-DT4A▲	
	DeviceNet	GDL-D22A●	GDL-D24A●	GDL-TR2A▲	GDL-TR4A▲	GDL-RY2A●	GDL-DT4A▲	
	MODBUS	GSL-D22A	GSL-D24A	GSL-TR2A	GSL-TR4A	GSL-RY2A	GSL-DT4A	

Note1) Specification stated in the table is specification of type A.
Refer to XGT user' s manual.
● A, C ▲ A, A1, B, C, C1

A Sink, Rated current: 0.1A, terminal fixed type
A1 Sink, Rated current: 0.5A, terminal fixed type
B Source, Rated current: 0.5A, terminal fixed type
C Source, Rated current: 0.5A, terminal separated type
C1 Sink, Rated current: 0.5A terminal separated type

Analog I/O specifications

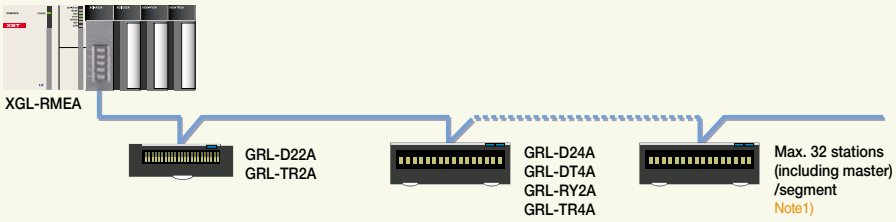
Item	GPL-AV8C	GPL-AC8C	Item	GPL-DV4C	GPL-DC4C
Input channels	8 channels		Output channels	4 channels	
Analog input	DC 1~5V, 0~5V, 0~10V, -10~+10V	0~20mA, 4~20mA, - 20~20mA	Digital input	0~4000, 0~8000, -8000~8000	0~8000
Digital output	0~4000, 0~8000, -8000~8000	0~4000, -8000~8000	Analog output	DC 1~5V, 0~5V, 0~10V, -10~+10V	0~20mA, 4~20mA
Input impedance	1MΩ	250 Ω	Load impedance	1KΩ or more (0~5V or 1~5V) 2KΩ or more (0~10V or -10~10V)	500 Ω or less
Max. resolution	±15V	±30mA			
	1.25mV	2.5㎂	Resolution	1.25mV	2.5㎂
Accuracy	±0.3% (full scale, Ta=0~55°C)	±0.3% (full scale, Ta=23°C±5°C) ±0.4% (full scale, Ta=0~55°C)	Accuracy	±0.3% (full scale, Ta=0~55°C)	±0.3% (full scale, Ta=23°C±5°C) ±0.4% (full scale, Ta=0~55°C)
Conversion speed	10ms or less / 8 channel		Conversion speed	10ms or less / 4 channel	
Response period	10ms or less / 8 channels + Transmisson period (ms)		Response period	10ms or less / 8 channels + Transmisson period (ms)	
Insulation method	Analog input/output terminal with FG→Insulation		Insulation method	Analog input/output terminal with FG→Insulation	
	Analog input/output terminal with Communication terminal→Insulation			Analog input/output terminal with Communication terminal→Insulation	
	Analog input/output terminal with each channel→No insulation			Analog input/output terminal with each channel→No insulation	
External power supply	DC24V (21.6 ~ 26.4)		External power supply	DC24V (20.4 ~ 28.8)	
External current consumption	DC24V : 220mA		External current consumption	210mA	240mA
Weight (kg)	0.313	0.313	Weight (kg)	0.314	0.322

Communication specifications

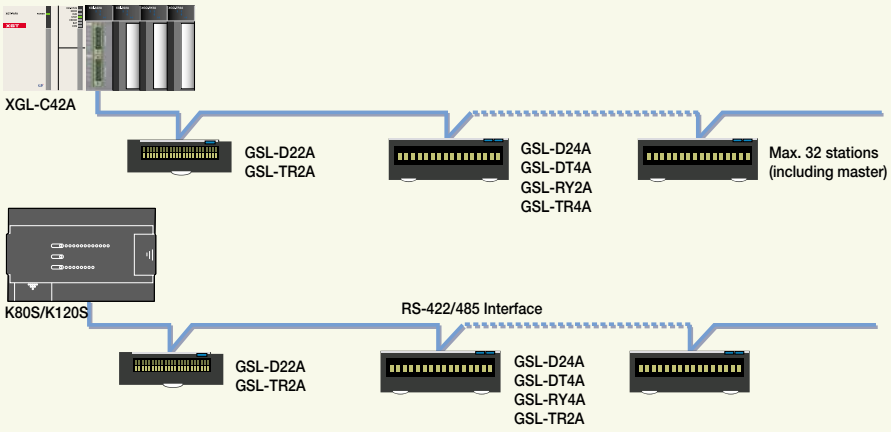
Item	Rnet (Dedicate network for LSIS Smart I/O)	Profibus-DP	DeviceNet	MODBUS
Protocol	LSIS dedicated protocol (Fnet for Remote)	Profibus-DP (RS-485/EN50170)	DeviceNet (CAN)	MODBUS (RS-422/485)
Transmission speed	1Mbps	9.6kbps ~ 12Mbps	125/250/500Kbps	2.4Kbps ~ 38.4Kbps
Transmission distance	750m/segment	100m ~ 1.2Km	500/250/125m (Thin cable: 100m)	500m
Topology	Bus Token	Bus	Trunk & Drop	Bus
Transmission	Pass & Broadcast	Token Pass & Master/Slave (Poll)	CSMA/NBA (Poll, Cyclic, COS, BitStrobe)	Master/Slave (Poll)
No. of stations	32/segment (Input: 32, Output: 32)	32/segment, 99/network	64	32
Link capacity	2,048 points/master (64 stations ×32 points)	7Kbyte/master	2,048 points/master	64 points/station

Note1) Smart I/O supports Poll type currently, but is supposed to support Cyclic, COS and Strobe later on.

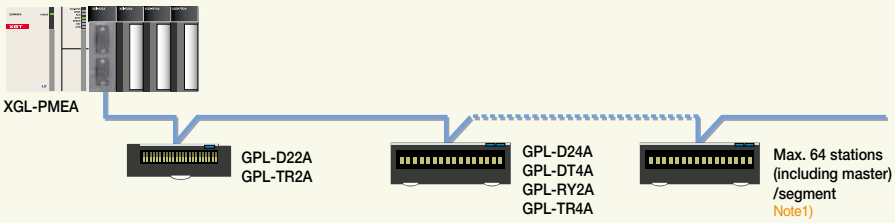
Smart I/O Rnet system



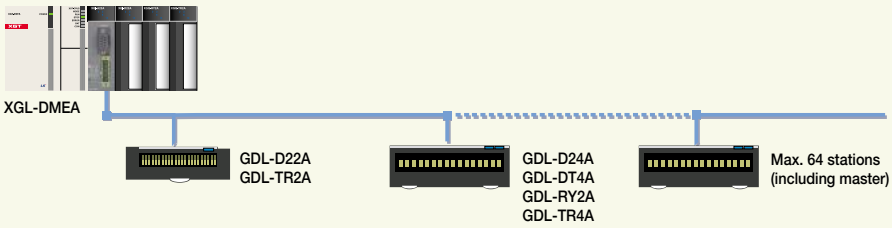
Smart I/O MODBUS system



Smart I/O Profibus-DP system



Smart I/O DeviceNet system

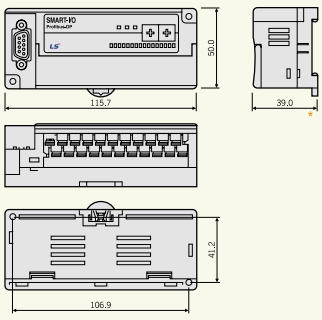


Note1) Segment: Communication section that does not use repeater or second master.

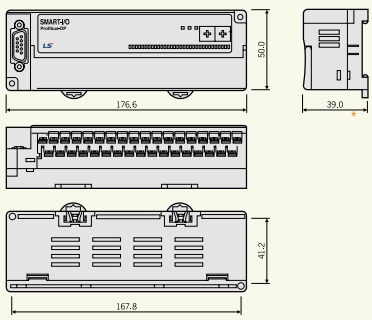
Dimensions

Unit: mm

• 16points



• 32points



* GxL-RY2 (16-point relay output) module follows the dimension of 32-point module.
* The length of C type Smart I/O is 47.5mm

Special

XGT series offer diverse special modules
such as analog, HSC, and positioning
to satisfy complicated industrial needs

Revolution of easy to use ···XGT Special module

Fast processing of parameter and data of special module

- Continually refreshing operation data of special module by CPU module
- Including contact points such as conversion data of AD/DA module and command of HSC & positioning module

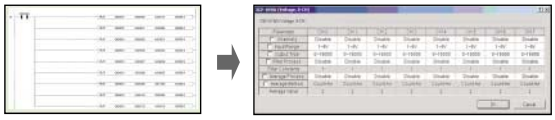
Easy- to-use (Easy operation parameter setting and data monitoring)

- Convenient parameter setting available through XG5000
- Providing useful functions that can monitor and test operation data and contact points through XG5000

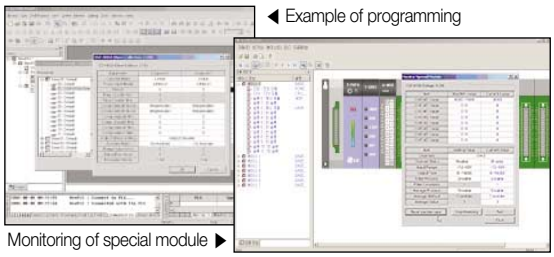
Simple maintenance (Changing online module)

- Without turning off and holding CPU, users can change special module with ease.

Before



◀ Example of programming



Monitoring of special module ▶

Analog input module

XGF-AV8A	8 channels, voltage input
XGF-AC8A	8 channels, current input
XGF-AD4S	4 channels, voltage/current input

Analog output module

XGF-DV4A	4 channels, voltage output
XGF-DV4S	4 channels, voltage output,insulation
XGF-DC4A	4 channels, current output
XGF-DC4S	4 channels, current output, insulation

Temperature input module

XGF-TC4S	4 channels, thermocouple input, Insulation
XGF-RD4A	4 channels, RTD input
XGF-RD4S	4 channels, RTD input, Insulation

High-speed counter module

XGF-HO2A	2 channels, Open collector
XGF-HD2A	2 channels, Line driver

Positioning module

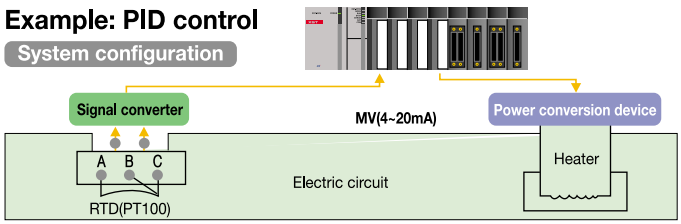
XGF-PO(1/2/3)A	1/2/3-axis, Open collector
XGF-PD(1/2/3)A	1/2/3-axis, Line Driver

Motion control module

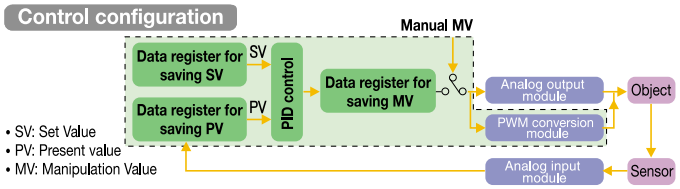
XGF-M16M	Mechatrolink-II, 16-axis

Example: PID control

System configuration

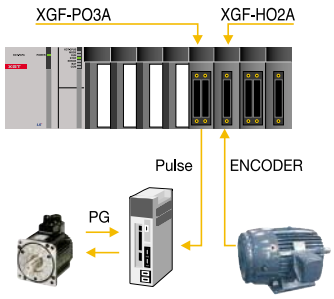


Control configuration

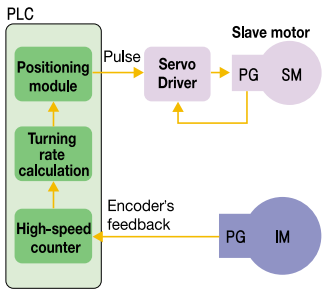


Application example: Synchronous operation of inductive motor and servo motor

System configuration



Control configuration



Special

Special module / Analog input module

Features

- Fast conversion processing
- High resolution
- Setting and monitoring the special module parameter through XG5000
- Supporting 4 types of digital output data format

Specifications

Item	XGF-AV8A (Voltage input)	XGF-AC8A (Current input)	XGF-AD4S (Voltage/Current input)
No. of input channel	8 channels		4 channels
Analog input	DC 1~5V, 0~5V, 0~10V, -10~10V	DC 4~20mA, 0~20mA	DC 1~5V, 0~5V, 0~10V, -10~10V DC 4~20mA, 0~20mA
	Selection of input range in program or S/W package (Available to be set per channel)		

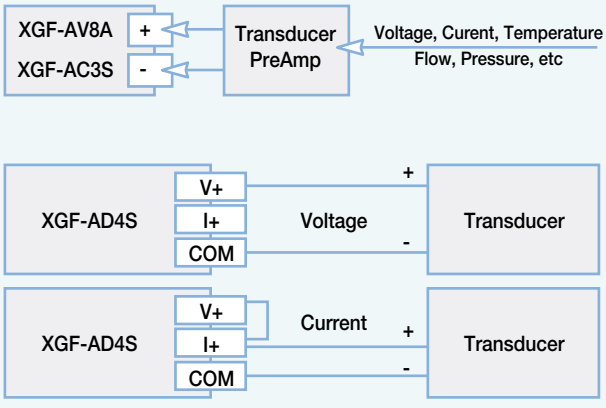
Digital output

Voltage	Analog input		1~5V	0~5V	0~10V	-10~10V		
	Digital output	Unsigned value	0~16,000					
		Signed value	-8000~8,000					
		Precise value	1,000~5,000	0~5,000	0~10,000	-10,000~10,000		
		Percentile value	0~10,000					
Current	Analog input		4~20mA		0~20mA			
	Digital output	Unsigned value	0~16,000					
		Signed value	-8,000~8,000					
		Precise value	4,000~20,000		0~20,000			
		Percentile value	0~10,000					
Voltage / Current	Analog input		1~5V	0~5V	0~10V	-10~10V	4~20mA	0~20mA
	Digital output	Signed value	-32,000~32,000					
		Precise value	1,000~5,000	0~5,000	0~10,000	-10,000~10,000	4,000~20,000	0~20,000
		Percentile value	0~10,000					

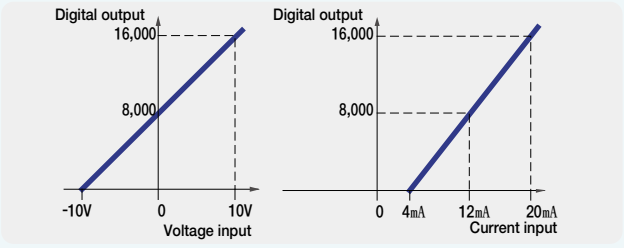
Resolution	1/16,000				1/64,000			
	1~5V	0.250mV	4~20mA	1.0μA	1 ~ 5V	62.5μV	4~20mA	250nA
	0~5V	0.3125mV			0~5V	78.1μV		
	0~10V	0.625mV	0~20mA	1.25μA	0 ~ 10V	156.3μV	0~20mA	312.5nA
	-10V~10V	1.250mV			±10V	312.5μV		

Accuracy	±0.2% or less (Ambient temperature 25°C), ±0.3% or less (Range of operation temperature)		
Conversion speed	250μs/channel		
Max. absolute output	15V	±30mA	Voltage: ±15V, Current: ±30mA
Insulation method	Photo-coupler insulation between input terminal and power supply		
	No insulation between channels		Insulation between channels
Connection terminal	18 points		
No. of occupied I/O points	Fixed type (Setting in basic parameter): 64 points Variable type (Dissolving in basic parameter): 16 points		
Current consumption	DC 5V : 420mA		
Weight (Kg)	0.14		

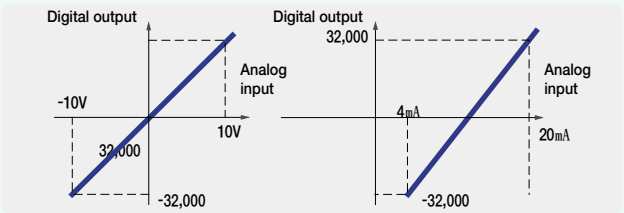
Configuration



A/D conversion characteristics



Inpulation type

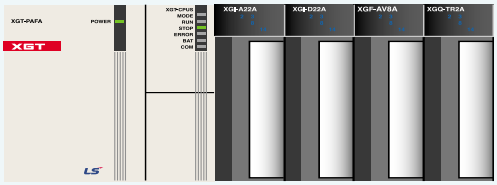


Special

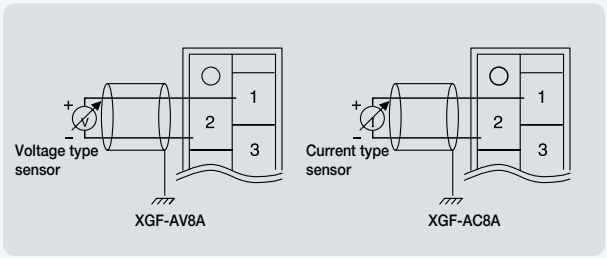
Special module / Analog input module (Example)

This is a simple example to start Analog input module setting. For more details, refer to user's manual.

System configuration

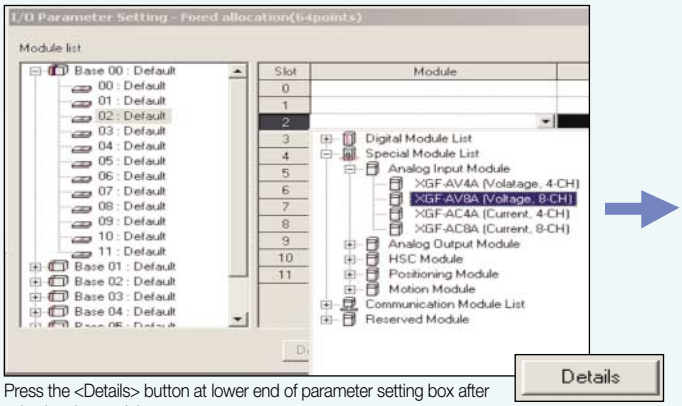


Wiring

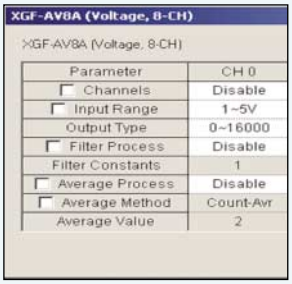


Parameter setting

In the parameter setting box, select slot and analog module that you want to use.
(This example shows to select '0' channel of voltage input type.)



Press the <Details> button at lower end of parameter setting box after selecting the module.



You need to fill out each item suitable for your system.

Programming

Create a program for A/D conversion (0~10V to 0~16000).

Special devices for programming

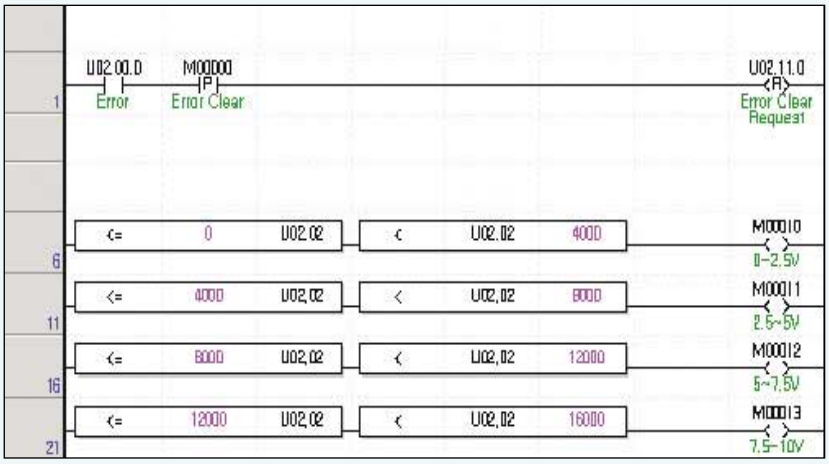
Refer to user's manual for more details.

U02.0.0: Error

U02.11.0: Requesting error-clear

U02.02: Memory of channel A/D value

Uxy.aa.bb
x: Base number
y: Slot number
aa,bb: Refer to user's manual.



Features

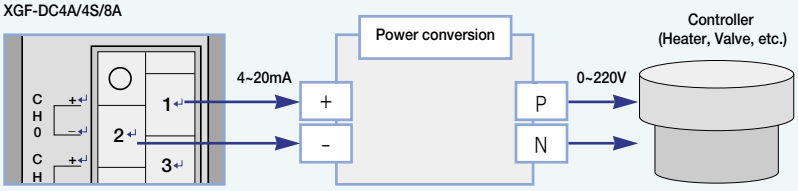
- Fast conversion processing
- High resolution
- Setting and monitoring the special module parameter through XG5000
- Supporting 4 types of digital input data format

Specifications

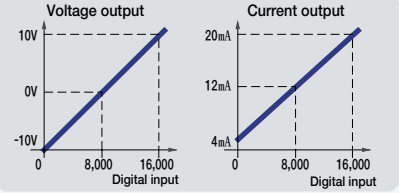
Item	XGF-DV4A, XGF-DV4S (Voltage output type)	XGF-DC4A, XGF-DC4S (Current output type)
No. of output channel	XGF-DV4A/4S, XGF-DC4A/4S : 4 channels / XGF-DV8A, XGF-DC8A : 8 channels	
Analog output range	DC 1~5V, 0~5V	DC 4~20mA
	DC 0~10V, -10~10V	DC 0~20mA
	Selection of input range in the program or S/W package (Available to set per each channel)	
Digital input range	Analog output / Digital input / Voltage type: 1~5V, 0~5V, 0~10V, -10~10V	
	Unsigned value: 0~16,000	
	Signed value: -8,000~8,000	
	Precise value: 1,000~5,000, 0~5,000, 0~10,000, -10,000~10,000	
	Percentile value: 0~10,000	
	Analog output / Digital input / Current type: 4~20mA, 0~20mA	
	Unsigned value: 0~16,000	
	Signed value: -8,000~8,000	
	Precise value: 4,000~20,000, 0~20,000	
	Percentile value: 0~10,000	
	16-bit binary value: selection of input type by program or parameter (Available to be set per each channel)	
Max. resolution	1/16,000 (Per each input range)	
	1~5V: 0.250mV; 4~20mA: 1.0μA	
	0~5V: 0.3125mV; 4~20mA: 1.0μA	
	0~10V: 0.625mV; 0~20mA: 1.25μA	
	±10V: 1.250mV; 0~20mA: 1.25μA	
Accuracy	XGF-DV4A/8A, DC4A/8A : ±0.2% or less (Ambient temperature 25°C), ±0.3% or less (Range of operation temperature)	
	XGF-DV4S/DC4S : ±0.1% or less (Ambient temperature 25°C), temp coefficient: ±80ppm/°C	
Conversion speed	250μs/channel	
Max. absolute output	±15V	±24mA
Insulation method	Photo-coupler insulation between terminal and power supply XGF-DV4A/8A, XGF-DC4A/8A: No insulation between channels XGF-DV4S, XGF-DC4S (Insulation type): Insulation between channels	
Connection terminal	18 point terminal	
No. of occupied points	Fixed type (Setting in basic parameter): assign 64 points	
	Variable type (Dissolving in basic parameter): assign 16 points	
Current consumption	Internal: DC 5V: 190mA; External: DC24V: 250mA	Internal: DC 5V: 190mA; External: DC24V: 400mA
Weight (Kg)	0.15	

Output wiring

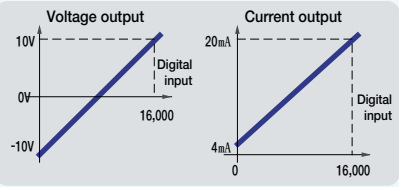
XGF-DV4A/4S/8A
XGF-DC4A/4S/8A



I/O conversion characteristics



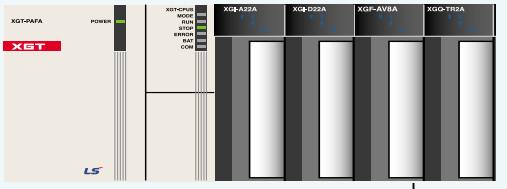
Insulation type



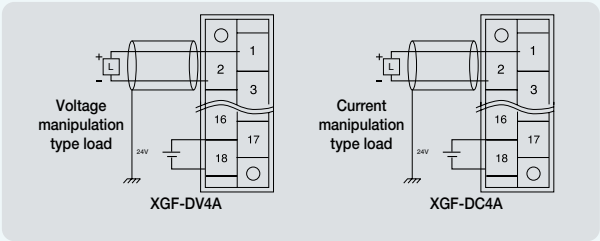
Special module / Analog output module (Example)

This is a simple example to start Analog output module setting. For more details, refer to user's manual.

System configuration

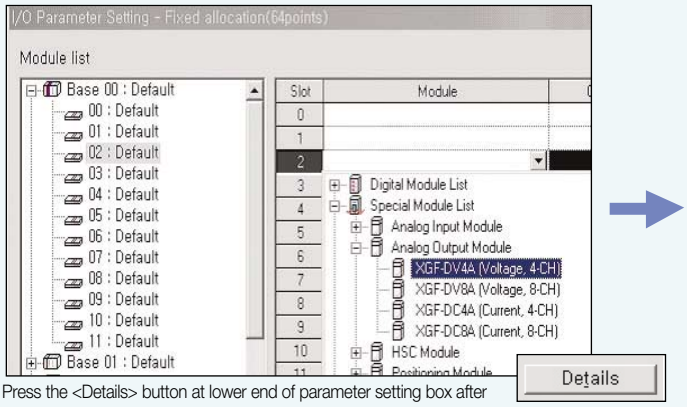


Wiring

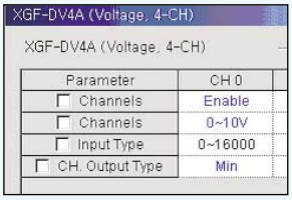


Parameter setting

In the parameter setting box, select slot and analog module that you want to use. (This example shows to select '0' channel of voltage output type.)



Press the <Details> button at lower end of parameter setting box after selecting the module.



You need to fill out each item suitable for your system.

Programming

Create a program for D/A conversion (0~16000 to 0~10V).

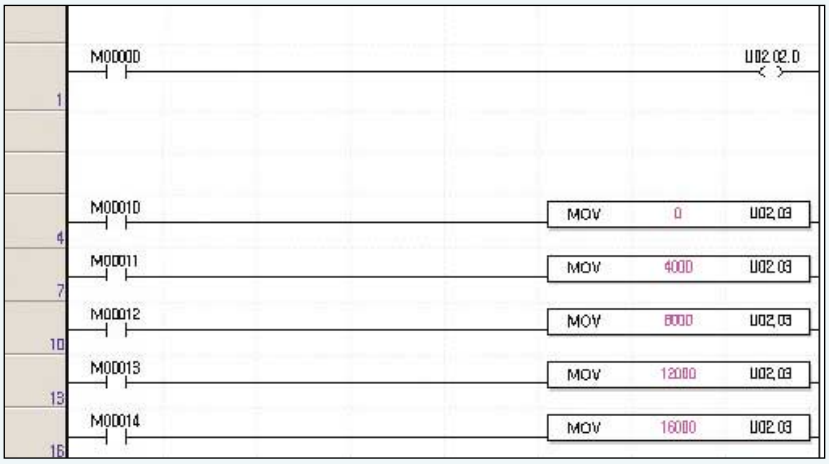
Special devices for programming

Refer to user' s manual for more details.

U02.02.0: Admitting Channel 0 output

U02.03: Output data of channel 0

Uxy.aa.bb
x: Base number
y: Slot number
aa,bb: Refer to user' s manual.



Special

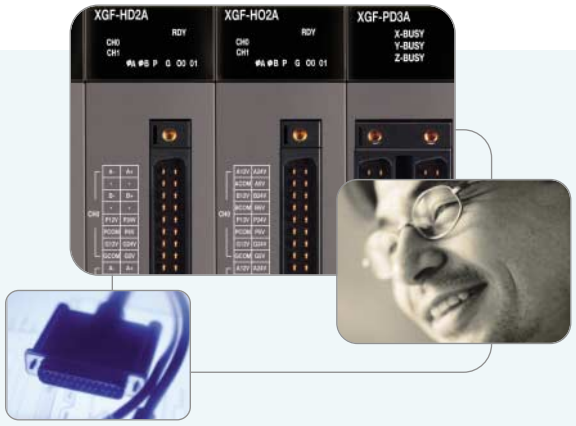
Special module / High-speed counter module

Features

- Parameter setting and monitoring using XG5000
- Incremental encoder available
- Supporting various pulse input (5V, 12V, 24V)
- Various multiplication (1/2 phase pulse input)
- External present input
- Providing function to prevent from counting external signal
- Supporting HTL-level incremental encoder in the line-drive input type

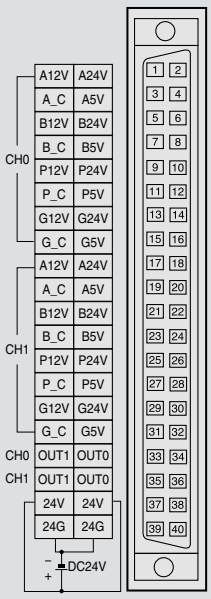
Specifications

Item		Specification			
		XGF-HO2A			XGF-HD2A
No. of command	Signal	A Phase, B Phase			
	Input type	Voltage input (Open Collector)			Differential input (Line Driver)
	Signal level	DC 5/12/24V			RS-422 Line Drive/HTL LEVEL Line Drive
	Input voltage	24V DC (17.0V ~ 26.4V)	12V DC (9.8V ~ 13.2V)	5V DC (4.5V ~ 5.5V)	Line Driver
	Input current	7~11mA	7~11mA	7~11mA	RS-422 Line Drive HTL Level Line Drive
	Min. On guaranteed voltage	17.0V	9.8V	4.5V	
	Max. Off guaranteed voltage	4.5V	3.0V	1.7V	
	Counter enable	Set by program (Count only in 'Enable')			
Max. counting speed		200Kpps			500Kpps (HTL input: 250Kpps)
No. of channels		2 channels			
Counting range		Signed 32 Bit (-2,147,483,647 ~ 2,147,483,647)			
Counting type (Program setting)		Linear count (Generating Carry/Borrow when exceeding counting range, Max/Min value)			
Input mode (Program setting)		1 Phase input			
		2 Phase input			
		CW/CCW input			
Signal type		Voltage			
Up/Down counter setting	1-phase input	Program or B-phase			
	2-phase input	Phase difference			
	CW/CCW	A-phase input: Up count B-phase input: Down count			
Multiplication	1-phase input	1/2 multiplication (Programming)			
	2-phase input	1/2/4 multiplication (Programming)			
	CW/CCW	1 multiplication			
Control input	Signal	Preset signal, Signal to admit additional signal (Setting by terminal block or programming)			
	Signal level	DC 5V/12V/24V input type (Selecting terminal)			
	Signal type	Voltage			
External output	No. of output point	2 points/channel: Terminal output available			
	Type	Single comparison (>,>=,=,=<,<) or section comparison			
	Output type	Open Collector (Sink)			
Operating status display	Input signal	A-phase, B-phase, Preset signal, Signal to admit additional signal			
	Output signal	OUT1, OUT2			
	Operation status	Module Ready, Pulse input status of A, B phase			
Addition functions (Program setting)		· Count clear, Count latch · Pulse frequency count (Each input channel) · Section count (Set time value:1~60000ms) · Measuring counting number per a unit time (Set time value:1~60000ms) · Preventing from counting (Setting by internal/external input during counting)			
No. of occupied I/O points		Fixed type (Setting in basic parameter): 64 points			
		Variable type (Dissolving in basic parameter): 16 points			
Terminal block		40-pin connector			
Current consumption		270			330
Weight (Kg)		0.09			

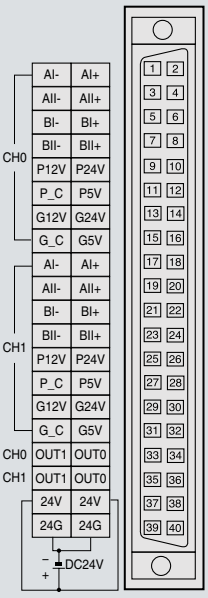


Terminal block configuration

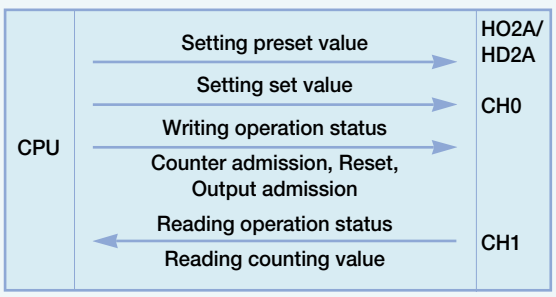
XGF-HO2A

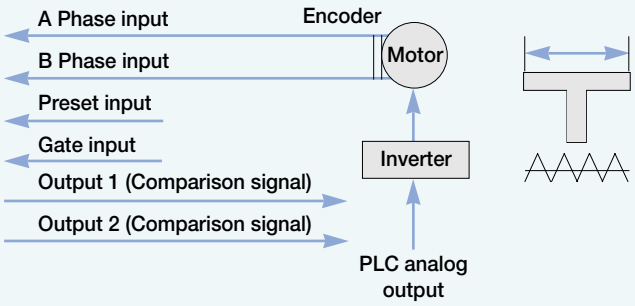
Pin layout	Pin number CHO	Pin number CH1	Signal name	
	1	17	A12V	A phase DC12V input
	2	18	A24V	A phase DC24V input
	3	19	A_C	A phase COM
	4	20	A5V	A phase DC5V input
	5	21	B12V	B phase DC12V input
	6	22	B24V	B phase DC24V input
	7	23	B_C	B phase COM
	8	24	B5V	B phase DC5V input
	9	25	P12V	Preset DC12V input
	10	26	P24V	Preset DC24V input
	11	27	P_C	Preset COM
	12	28	P5V	Preset DC5V input
	13	29	G12V	Gate DC12V input
	14	30	G24V	Gate DC24V input
	15	31	G_C	Gate COM
	16	32	G5V	Gate DC5V input
	33	35	OUT1	Comparison output OUT1
	34	36	OUT0	Comparison output OUT0
	37	38	24V	External power supply
	39	40	24G	DC24V

XGF-HD2A

Pin layout	Pin number CHO	Pin number CH1	Signal name	
	1	17	AI-	AI-Input (LINE DRIVE TTL LEVEL Input)
	2	18	AI+	AI+Input (LINE DRIVE TTL LEVEL Input)
	3	19	AII-	AII-Input (LINE DRIVE HTL LEVEL Input)
	4	20	AII+	AII+Input (LINE DRIVE HTL LEVEL Input)
	5	21	BI-	BI- Input (LINE DRIVE TTL LEVEL Input)
	6	22	BI+	BI+Input (LINE DRIVE TTL LEVEL Input)
	7	23	BII-	BII-Input (LINE DRIVE HTL LEVEL Input)
	8	24	BII+	BII+Input (LINE DRIVE HTL LEVEL Input)
	9	25	P12V	Preset DC12V input
	10	26	P24V	Preset DC24V input
	11	27	P_C	Preset COM
	12	28	P5V	Preset DC5V input
	13	29	G12V	Gate DC12V input
	14	30	G24V	Gate DC24V input
	15	31	G_C	Gate COM
	16	32	G5V	Gate DC5V input
	33	35	OUT1	Comparison output OUT1
	34	36	OUT0	Comparison output OUT0
	37	38	24V	External power supply
	39	40	24G	DC24V

Configuration



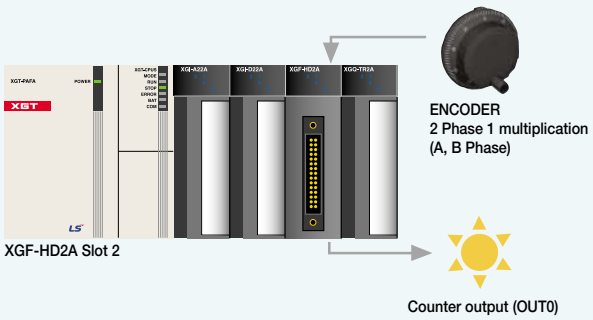


Special

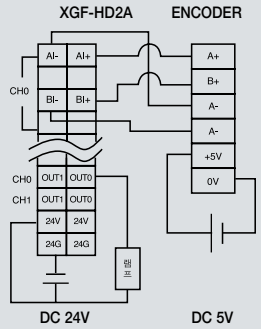
Special module / High-speed counter module

This is a simple example of high-speed counter module setting.
For more details, refer to user's manual.

System configuration



Wiring



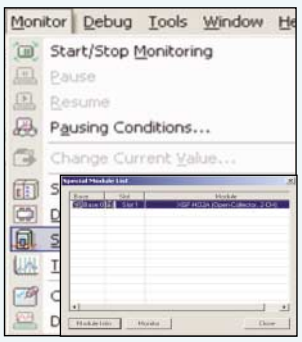
* This is wiring diagram of line driver. For open collector or other control, refer to user's manual.

Control configuration

- Light a lamp of output when present value reaches 1000 of pulse input counted by encoder.
- Current value of pulse is saved in D100~D101 and is monitored.

Module test (On Line)

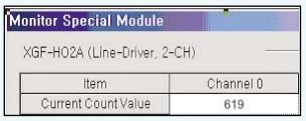
- Module test function of XGT enables to monitor operation status of high-speed counter module and to test-run.



Select [Monitor] → [Special Module Monitoring] in menu and appoint high-speed counter.

After pressing the button for [Start Monitoring], press the button [FLAG monitor].

Change [Counter Enable] status to ON.



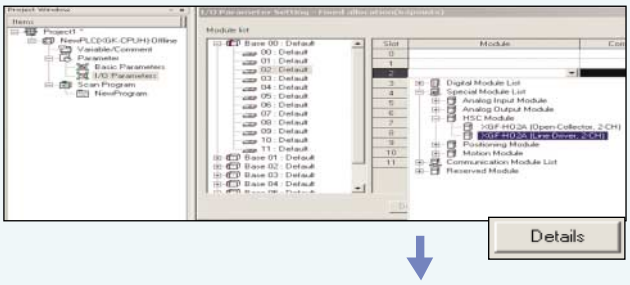
Check current counting value in 'Monitor Special Module' screen box.

Special

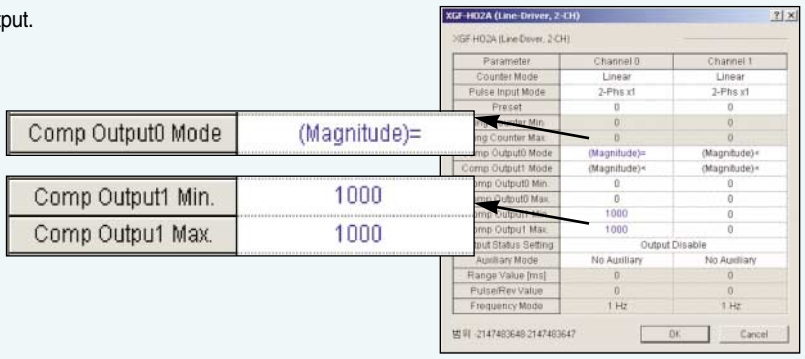
Parameter setting

• In I/O parameter setting box, select slot and analog module that you want to use.
(This example shows to select 2-channel line driver.)

Press the <Details> button at lower end of parameter setting box after selecting the module.



Input 1000 as Max. and Min. comparison output.



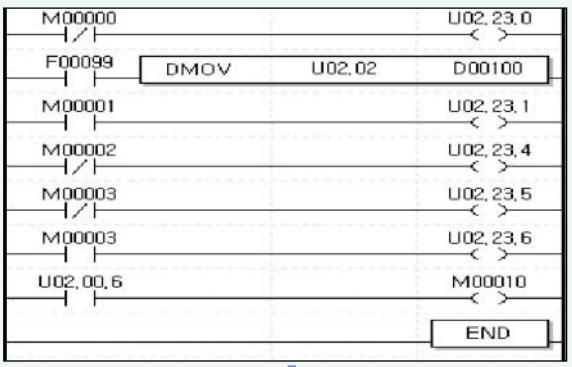
Programming

• After completing programming like following figure, download it to PLC and check operation status.

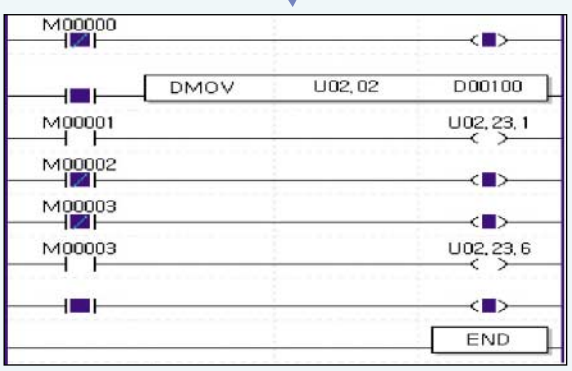
Special devices for programming

Refer to user' s manual for more details.
U02.23.0: Count operation admission
U02.23.1: Count preset
U02.23.4: Consistent output admission
U02.23.5: Output external terminal admission
U02.23.6: OUT0 consistent signal reset
U02.00.6: Contact for checking external output (Practically effective output is outputted through OUT0 terminal)
U02.02~U02.03: Counter present value

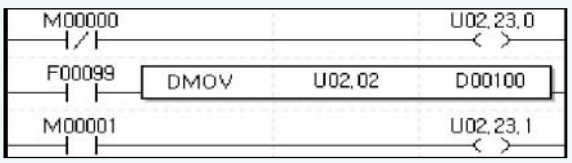
Uxy.aa.bb
x: Base number
y: Slot number
aa,bb: Refer to user' s manual



After downloading, monitor operation status.



For monitoring just present value, follow the example.



Special

Special module / Positioning module [APM]

Features

- Highly reliable position control with LSIS ASIC-embedded processor
- Enhanced control with fast control processing speed
- High-speed motor control (Max. pulse output: 1Mbps)
- Circular/linear interpolation, separate/synchronous operation
- Trapezoidal & S-curve acceleration/deceleration
- Easy and quick control through external input (JOG operation included)
- Encoder input support
- High-speed processing of command (4ms)
- Easy to set positioning parameters (Windows)
- Monitoring/Tracking/Simulation
- Available to edit operation parameter data in EXCEL
- Self-diagnosis
- Real-time information and solution for each error

Specifications

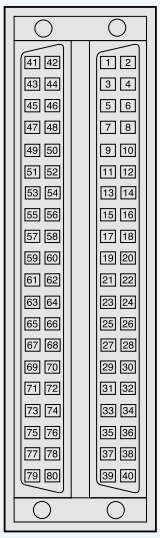
Item			Specifications		
			XGF-PO1A, XGF-PD1A	XGF-PO2A, XGF-PD2A	XGF-PO3A, XGF-PD3A
Number of axis			1	2	3
Interpolation				2-axis linear interpolation, 2-axis circular interpolation	2/3-axis linear interpolation, 2-axis circular interpolation
Control method			Position control, speed control, speed/position control, position/speed control		
Setting unit			Pulse, mm, inch, degree		
Positioning data			Each axis has 400 data items (Operation step number 1~400). It is available to set with software package or programming.		
Software package			Available (Connected with RS-232C Port of CPU module)		
Data backup			Flash memory (No battery)		
Positioning	Positioning method		Absolute / relative method		
	Position address range	mm	-214748364.8 ~ 214748364.7 (㎛)		
		Inch	-21474.83648 ~ 21474.83647		
		Degree	-21474.83648 ~ 21474.83647		
		Pulse	-2147483648 ~ 2147483647		
	Type		XGF-PO□A: Open collector, XGF-PD□A: Line Driver		
	Position speed range	mm	0.01 ~ 20000000.00 (㎜/min)		
		Inch	0.001 ~ 2000000.000 (inch/min)		
		Degree	0.001 ~ 2000000.000 (degree/min)		
		Pulse	XGF-PO□A: 1~200,000 (pulse/sec), XGF-PD□A: 1~1,000,000 (pulse/sec)		
	Accel/Decel pattern		Trapezoidal & S-curve acceleration/deceleration		
	Accel/Decel time		1 ~ 65,535㎳		
Max. output pulse			XGF-PO□A: 200Kpps / XGF-PD□A: 1Mpps		
Max. distance			XGF-PO□A: 2m / XGF-PD□A: 10m		
Max. encoder input			200 Kpps		
Error display			LED		
Operation display			LED		
Connection connector			40 Pin connector		
Size of cable			AWG #24		
Occupied points of I/O			64 points (Fixed type), 16 points (Variable type)		
Current consumption (mA)			XGF-PO1A: 340	XGF-PO2A: 360	XGF-PO3A: 400
			XGF-PD1A: 510	XGF-PD2A: 790	XGF-PD3A: 860
Weight (Kg)			0.12	0.13	0.135

※ XGF-PO□O: Open Collector type, □: Number of axis
XGF-PD□D: Line Drive type, □: Number of axis

Terminal block configuration

Pin layout

1 axis



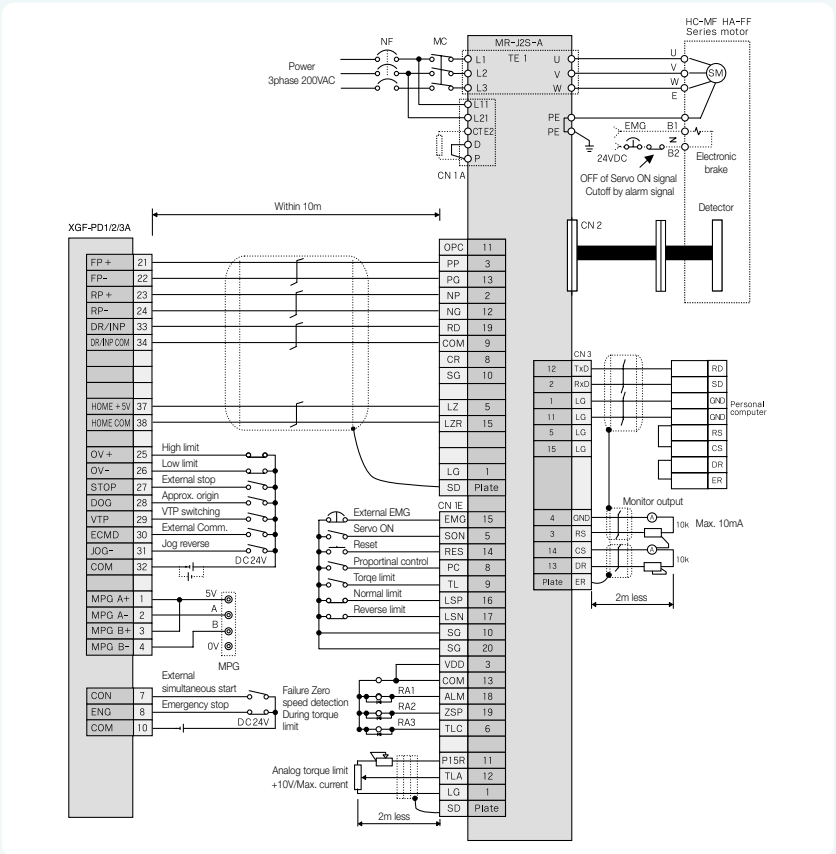
2/3 axes

For	Pin number X	Pin number Y	Pin number Z	Signal name		Signal direction APM - Ext. device	Condition
Axis	21	41	61	FP+	Pulse output (Differential +)	→	
	22	42	62	FP-	Pulse output (Differential -)	→	
	23	43	63	RP+	Pulse sign (Differential +)	→	
	24	44	64	RP-	Pulse sign (Differential -)	→	
	25	45	65	OV+ *	High limit	←	
	26	46	66	OV- *	Low limit	←	
	27	47	67	STOP	External stop signal	←	
	28	48	68	DOG	Approximate origin	←	
	29	49	69	VTP	Speed/Position switching signal	←	
	30	50	70	ECMD	External command signal	Start	←
						Skip	←
						JOG+ (Forward)	←
	31	51	71	JOG-	JOG reverse operation	←	
	32	52	72	COM	Common (OV+, OV-, STOP, DOG, VTP, ECMD, JOG-)	⇔	
	33	53	73	DR/INP	Inposition/Driver Ready signal	←	
	34	54	74	DR/INP COM	Inposition/Driver Ready signal Common	⇔	
	35	55	75	HOME +24V	Zero signal (+24V)	←	
	36	56	76	NC	Not used		
	37	57	77	HOME +5V	Zero signal (+5V)	←	
	38	58	78	HOME COM	Zero signal (+24V, +5V) Common	⇔	
	39	59	79	24V	24V Power supply (Not used in case of line drive output)		
	40	60	80	P COM	External 24V GND (Not used in case of line drive output)		
Common	1			MPG A+	Manual pulse generator/Encoder A+ Input	←	
	2			MPG A-	Manual pulse generator/Encoder A- Input	←	
	3			MPG B+	Manual pulse generator/Encoder B+ Input	←	
	4			MPG B-	Manual pulse generator/Encoder B- Input	←	
	5			NC	Not used	←	
	6			NC	Not used	←	
	7			CON	External simultaneous start	←	
	8			EMG *	Emergency stop	←	
	9			NC	Not used		
	10			COM	(CON, EMG) Common	⇔	
	11~20			NC	Not used		

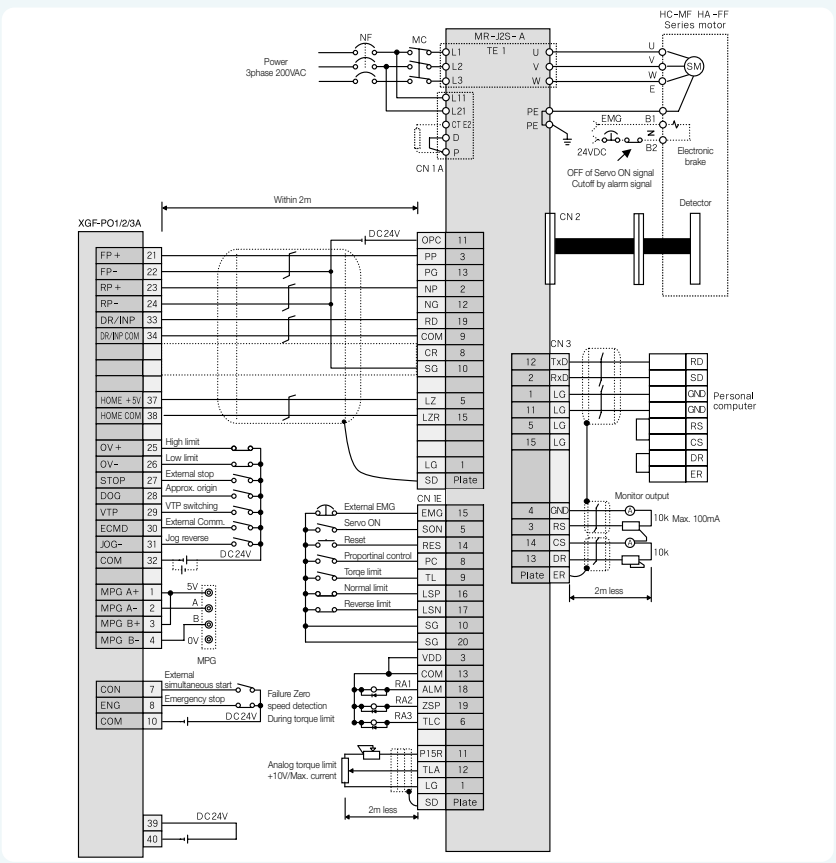
Special

Connection with MR-J2/J2S-□A

• XGF-PD1/2/3A (Line Driver)

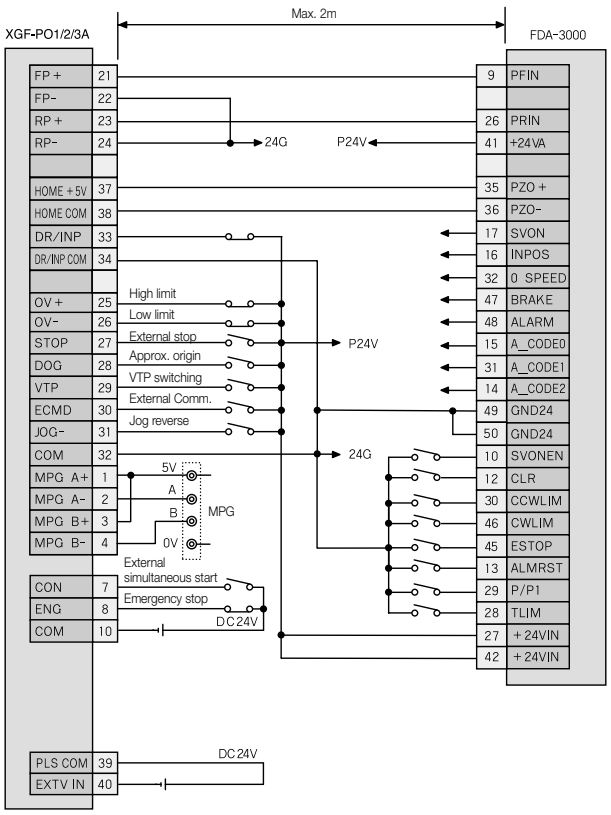


• XGF-PO1/2/3A (Open Collector)



Connection with FDA-3000 AC Servo driver

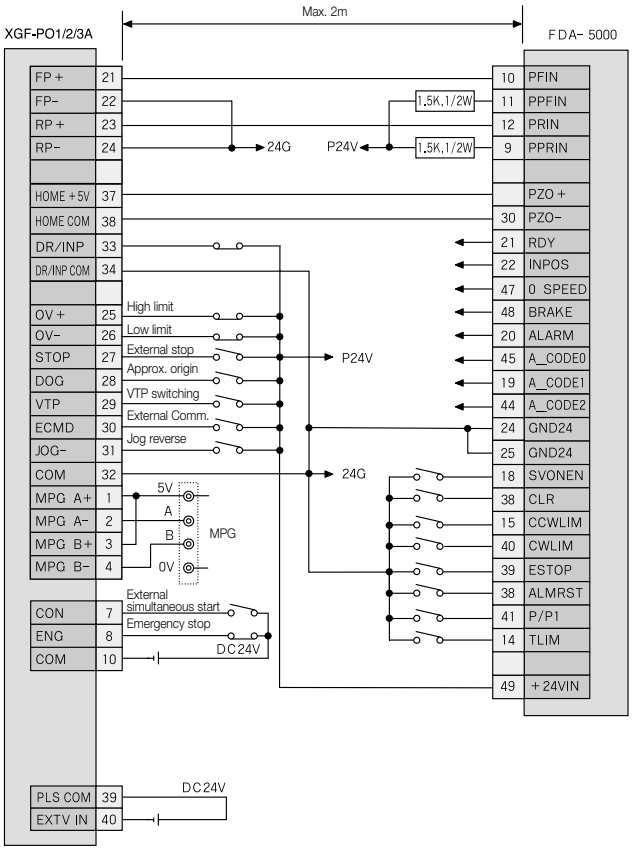
• XGF-PO1/2/3A (Open Collector)



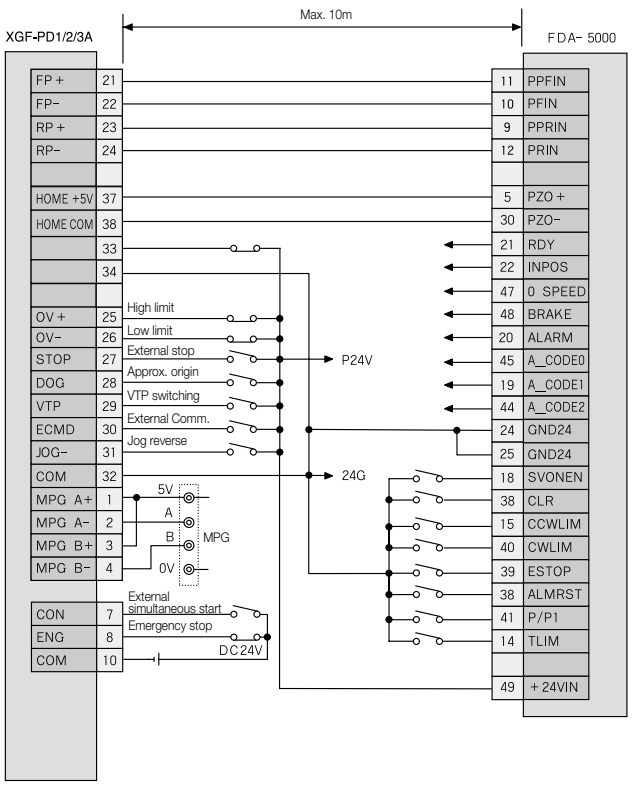
Special

Connection with FDA-5000 AC Servo driver

• XGF-PO1/2/3A (Open Collector)



• XGF-PD1/2/3A (Line Driver)

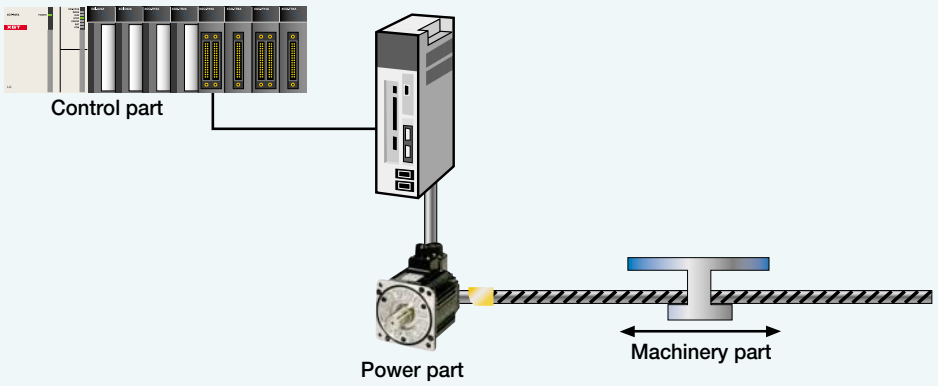


Special module / Positioning module (Example)

This is a simple example to control 1-axis servo motor.

System configuration

- Positioning system consists of control part, power part, and machinery part.
- Control part: Install APM module on base and complete parameter setting and programming.
- Power part: Power part generates momentum, and it consists of [servo-driver + servo-motor] and [step-driver + step-motor].
- Machinery part: Machinery part is to transport objects, and it can be ball screw, timing belt and rack gear.

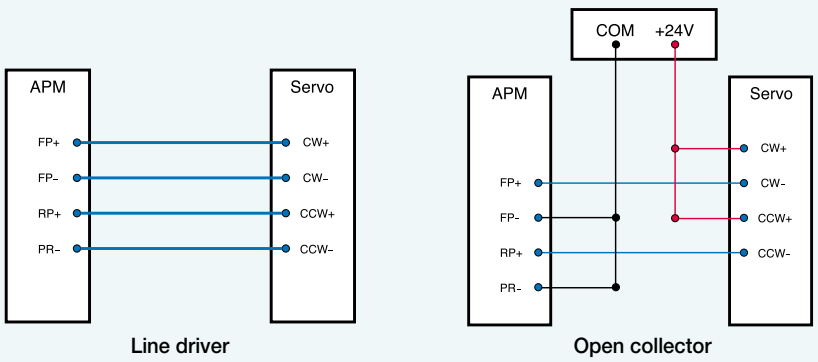


System design

- APM: Determine type and quantity considering the number of control axis and operation function.
- Driver: Select driver with identical output type of APM.
  (In case output type of APM is line driver, driver should support a pulse train input type of line driver.)
- Motor: Select capacity considering operation characteristics of load.
- Mechanical: Design precise mechanical system to minimize error.

Connection to drivers

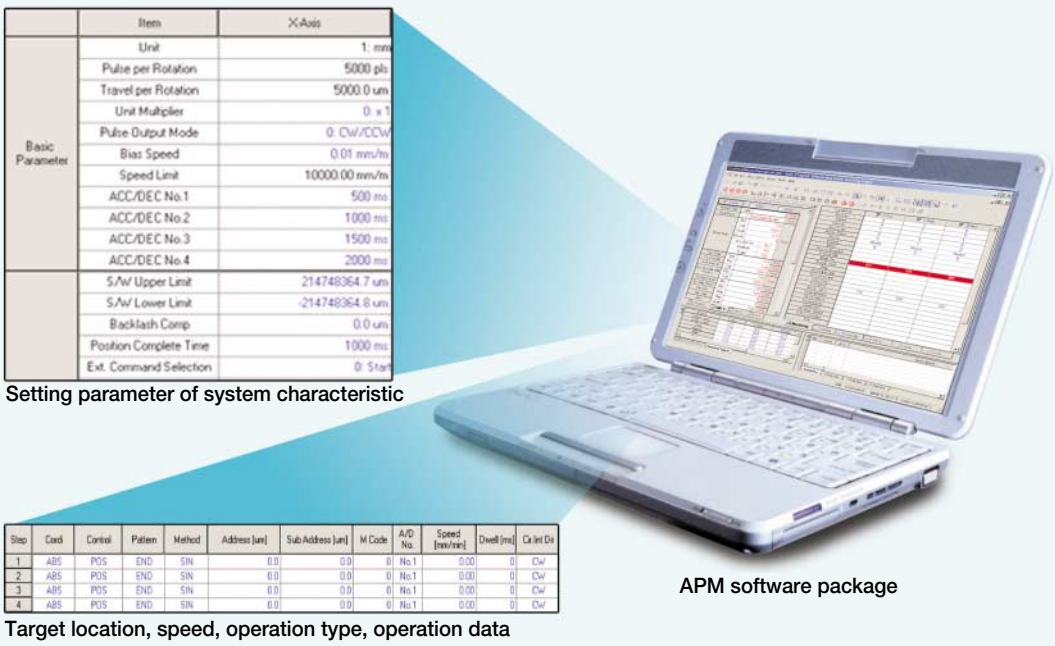
- The following picture is wiring pulse train signal between driver and APM for pulse train signal.
- Terminal besides pulse train signal is used additionally according to user-purpose, system characteristics.
- For wiring of optional terminal of Servo (Step) driver, refer to user' s manual.



Special module / Positioning module (Example)

Parameter, data setting and transmission

- Set system characteristic, target location, operation speed, and operation type using APM software package.
- Transmit operation parameter and data to APM.



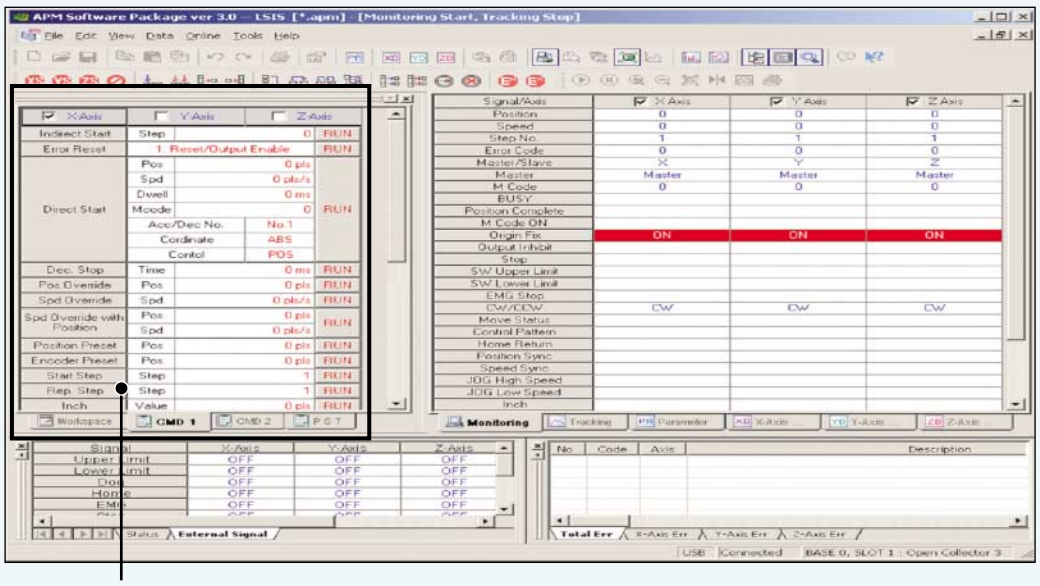
Setting parameter of system characteristic

APM software package

Target location, speed, operation type, operation data

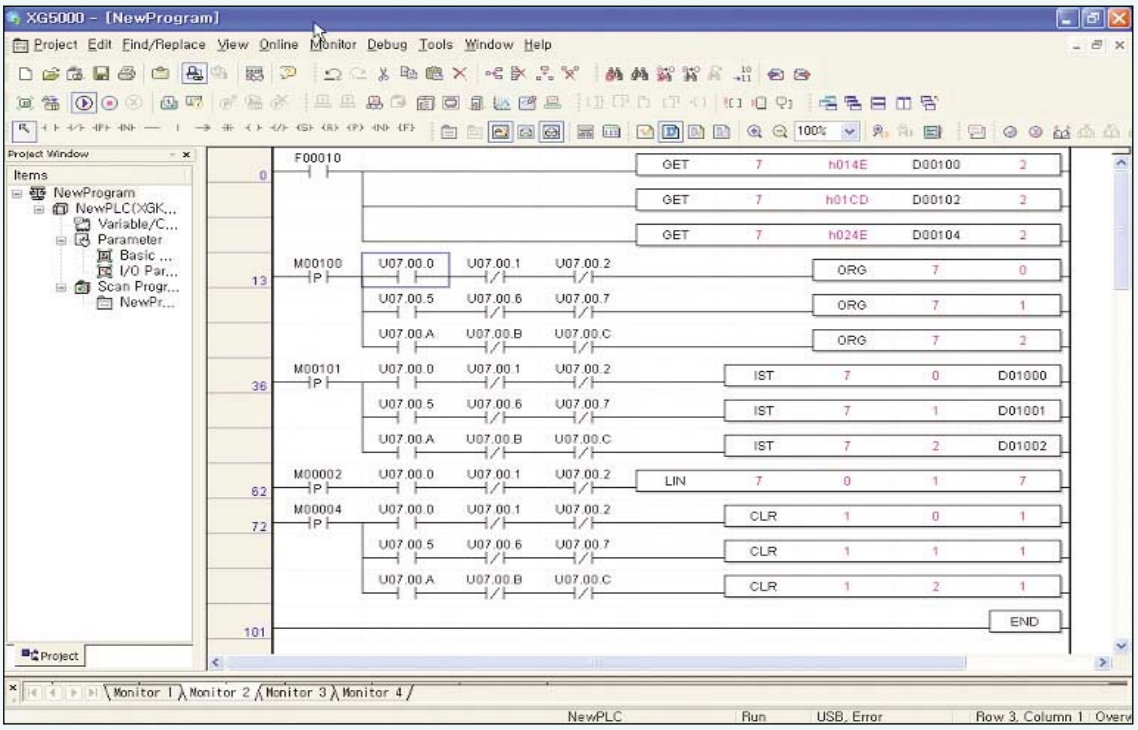
Initial system inspection

- Perform a trial-run using APM Software Package, and check external wiring, operation data setting, and status of machinery part. It is recommended to do trial-run before programming.
- If a program is saved in CPU and operation mode is 'RUN', a unexpected fault can occur due to disagreement between operation condition of operation control program and operation result of APM Software Package.



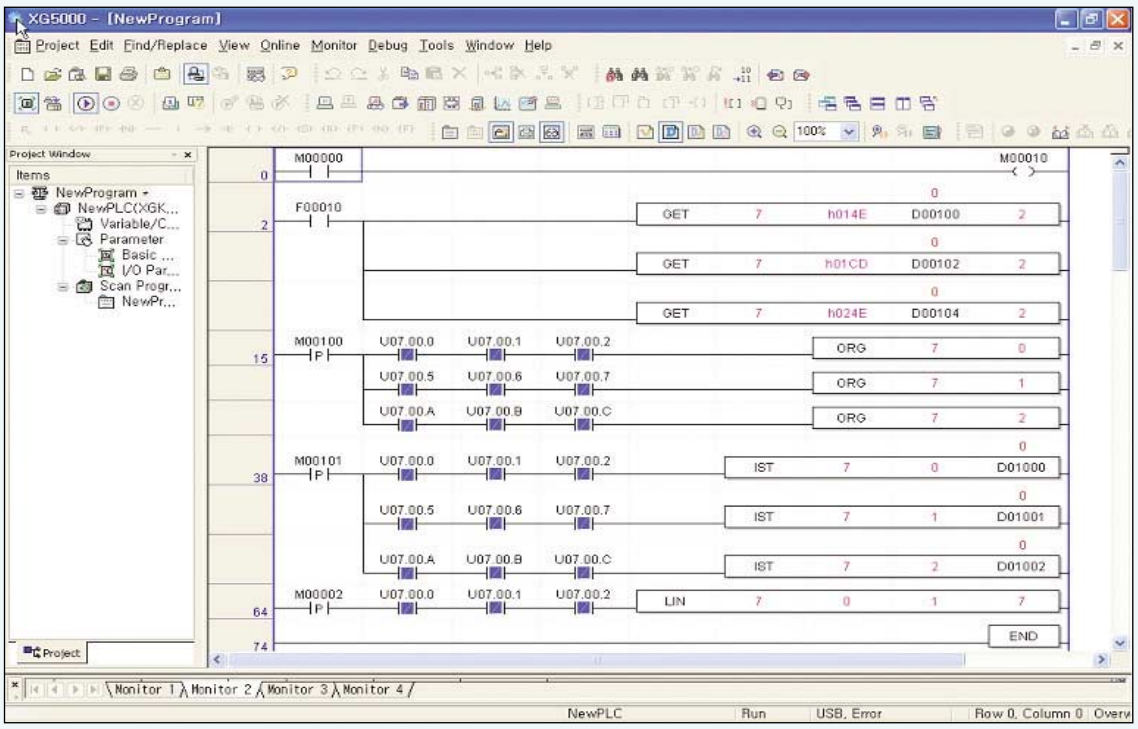
Programming

• Create a program using dedicated command for APM control.
ex) Origin point return-ORG, Independent operation-IST



Program monitoring

• Monitor output condition following input condition and inspect operation status of APM and correct programming error.



Special

Special module / Motion control module

Features

Motion control module adopting Mechatrolink-II

- Quick and precise motion control via high-speed network (Mechatrolink-II)
  (Transmission speed: 10Mbps, Transmission period: 1ms/1.5ms/2ms)

Enhanced performance of motion synchronization

- Perfect synchronization of Max. 16 axes
- High-speed synchronous motion control by synchronizing execution period of application with transmission period of network

Efficient system

- Wiring reduction with motion control system via network
- Enhanced stability and efficiency of system through absolute-coordinate operation

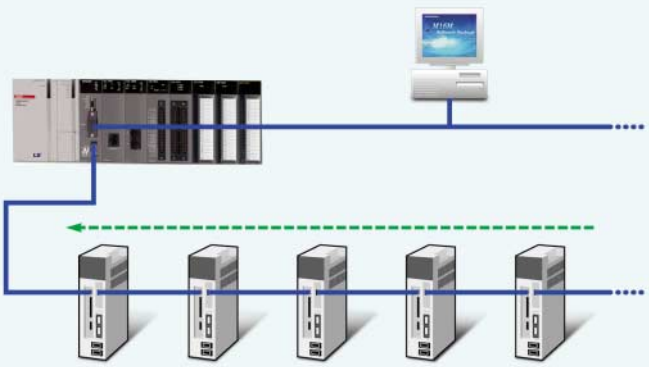
Multi-function engineering tool -> M16M software package

- Providing various functions from system design to maintenance
- Automatic setting of communication & servo parameter by 'Self Configuration'

Specifications

Item		XGF-M16M
Control performance	Control axis	Motion: 6 axes/1ms, MOV: 16 axes/2ms
	Data transmission time	9 axes/1 port (M II -1ms) 15 axes/1 port (M II -1.5ms) 16 axes /1 port (M II -2ms) 15 axes/1 port (M II -17byte-1ms)
Max. number of control axis		16 axes
Max. transmission distance		50m
Count range		Signed 32 Bit (-2,147,483,648 ~ 2,147,483,647)
Scan time setting		1.0~32.0ms (Unit: 0.5ms)
Memory capacity	RAM	32MB (SDRAM)/512KB (SRAM)
	FLASH	8MB (Firm 2MB/User 6MB)
	User memory	6MB
Data trace		128kW (32kW × 4Gr)
Program language	Motion language	No. of program: 256 No. of command: about 70 No. of simultaneous execution: 16
Memory backup		FLASH
Engineering port		RS-232C × 1
Self-configuration		○
No. of occupied I/O points		Fixed type (Setting in basic parameter): 64 points Variable type (Dissolving in basic parameter): 16 points

System configuration



MECHATROLINK-II

Max. number of station: 16

Transmission period: 1ms/1.5ms/2ms

Features: Simple and easy system setup using 'Self-Configuration'

S/W: M16M software package

Special module / M16M software package

Features

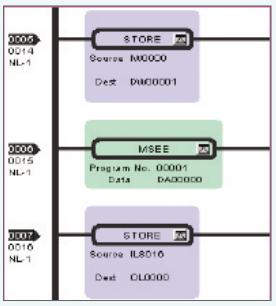
- Providing 'Self-Configuration'
- Reduced system setting time thanks to automatic recognition of network motion system and automatic setting of comm. & servo parameter
- Providing various screens (6 types of Manager, E-CAM tool)
- Supporting dedicated language and ladder language for motion control
- Easy programming and maintenance

Programming

Program for data exchange with M16M using motion instruction of XG5000
Programming and editing ladder and motion program using M16M software package

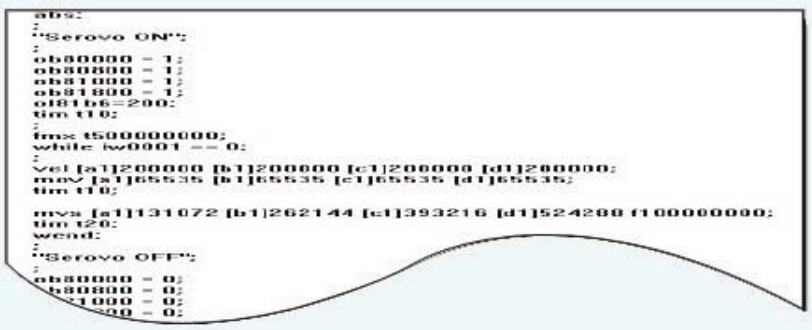
GETM	1	h0200	D00000	3
PUTM	1	0	M0004	4

Sharing data memory between XGT CPU and motion module (XGF-M16M)



Motion language

Easy and convenient programming and editing using structured Text-type language.



Drivers & motors for MECHATROLINK-II

Driver	Motor	Option	Remarks
SGDH	Σ - II series (Servo motor)	JUSP-NS115	Installing option module in servo module
SGDS	Σ - III series	—	Servo motor
	Linear Σ series	—	Linear motor
	Direct-drive Σ series	—	Direct drive motor

RTD input module

Features

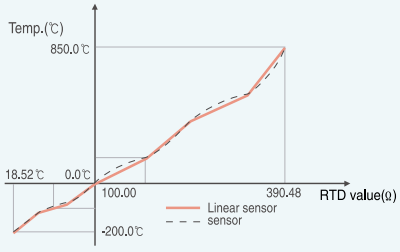
- Supports various additional functions (average, alarm, filter)
- Special module parameter setting and monitoring with XG5000
- Supports digital conversion, temperature display and user scaling

Specifications

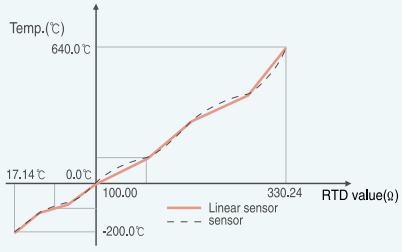
Item	XGF-RD4A		
Input channels	4 channels		
Input sensor type	PT100	JIS C1604-1991	
	JPT100	JIS C1604-1981, KS C1603-1991	
Input temperature range	PT100	-200 ~ 850℃	
	JPT100	-200 ~ 640℃	
Digital output	Temperature range (0.1℃ unit)	PT100	-2000 ~ 8500
		JPT100	-2000 ~ 6400
	Scaling (User range setting)	0 ~ 65535	
		-32768 ~ 32767	
Accuracy	Normal temp. (25℃)	±0.2% or less	
	Overall (0~55℃)	±0.3% or less	
Conversion speed	40ms/ channel		
Insulation	Between channels	No insulation	
	Between terminals and power	Insulation	
Wiring	3-wire type		
Function	Average	Average time (320 ~ 6400ms)	
		Average number (2~ 6400)	
		Average move (2 ~100)	
	Alarm	Process Alarm	
		Input change rate alarm (Rate Alarm)	
		Burn-out detection	
	Filter	Digital filter (160 ~ 64000ms)	
Terminal block	18-point terminal block		
Current consumption	5V: 450mA		
Weight (kg)	0.150		

Characteristics of temperature conversion

• Pt100 : JIS1604-1997

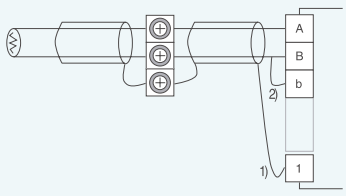


• jPt100 : JIS1604-1981, KS C1603-1991

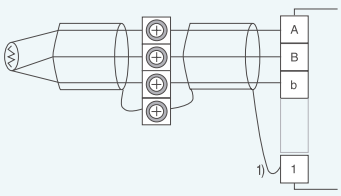


Wiring

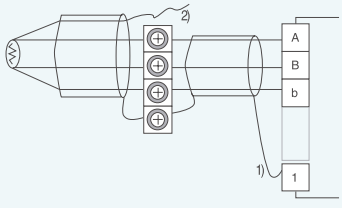
• Connection with 2-wire type sensor



• Connection with 3-wire type sensor



• Connection with 4-wire type sensor



1) When sensor and compansating wire are shielded, shield-connection to FG terminal of the module is available.
2) The wiring of 4-wire type sensor is identical with the wiring of 3-wire type sensor. 3 wires is connected to the module. But the other wire is not connected with the module.

Thermocouple module

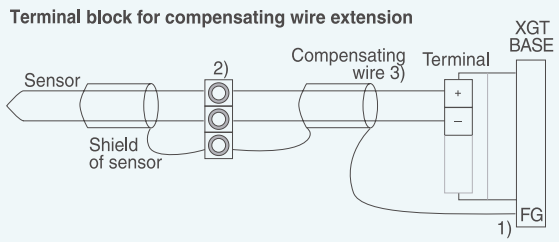
Features

- Insulation between channels
- ±0.1% (25℃) constant density
- Supports various input sensor (supporting C-type sensor)
- Various additional functions (average, filter, alarm, max/min value display)
- Special module parameter setting and monitoring with XG5000

Specifications

Item	XGF-TC4S	
Input channels	4 channels	
Input sensor type	K, J, E, T, B, R, S, N, C	JIS C1602-1995ITS-90
Input temperature range	K	-250 ~ 1350℃
	J	-200 ~ 1200℃
	E	-250 ~ 1000℃
	T	-250 ~ 400℃
	B	400 ~ 1800℃
	R	-50 ~ 1750℃
	S	-50 ~ 1750℃
	N	-270 ~1300℃
	C	0 ~ 2300℃
Digital output	Temperature display (unit: 0.1)	Display down to the first decimal place (0.1℃)
	Scaling	0 ~ 65535
	(User range setting)	-32768 ~ 32767
Accuracy	Normal temp. (25℃)	±0.1%
		Some section can permit 0.5%
	Temperature coefficient (Operating temp. range)	±100ppm℃
Conversion speed	40ms/ channel	
Insulation	Between channels	Insulation
	Between terminals and power	Insulation(Photo-Coupler)
Compensation	Automatic compensation by RJC sensing (PT100)	
	Compensation degree	±1.0%
Function	Average	Average time (320 ~ 6400ms)
		Average number (2~ 64000)
		Average move (2 ~100)
	Alarm	Process Alarm
		Change rate alarm
		Burn-out detection
	Filter	Digital filter (160 ~ 64000ms)
	Max./Min. values display	Max./Min. values display
Terminal block	18-point terminal block	
Current consumption	5V : 610mA	
Weight (kg)	0.150	

Input wiring

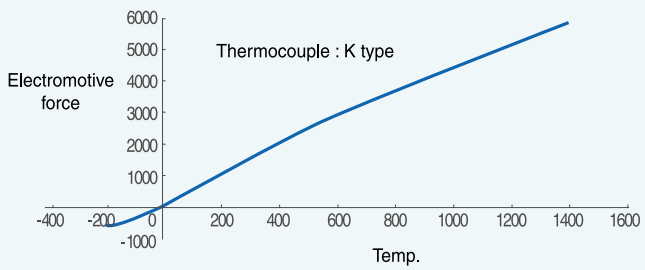


1) When sensor and compensating wire are shielded, shield connection to FG terminal is available.

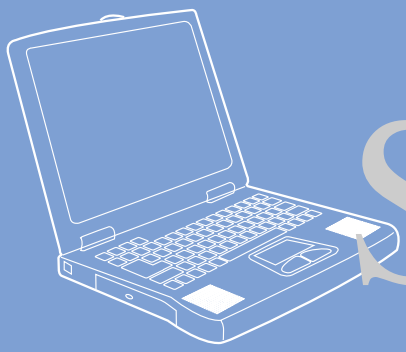
2) To minimize an error, overall temperature of block terminal need to be equal.

3) Compensating sensor should be the same type of sensor which is used for measurement.

Characteristics of I/O conversion



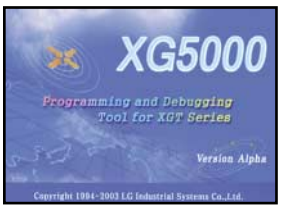
Special



Software

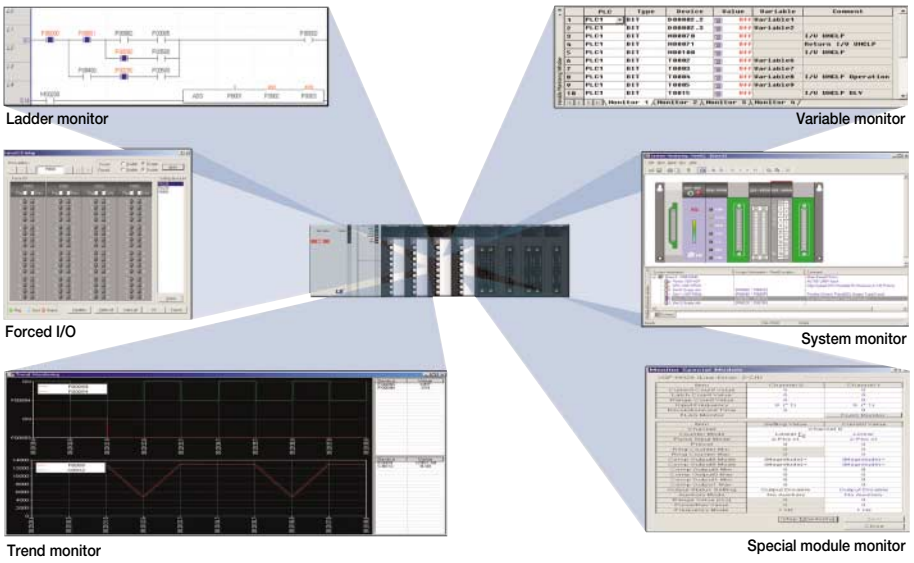
Software innovation for integrated solution.

XG5000 is the optimum software which can cover various programming needs, debugging, and easy maintenance. Especially, XG-PD achieves customer satisfaction with useful maintenance tool by internet.



Programming software XG5000

- Program editing & Engineering software
- Windows-based easy operation
- Multi-PLC, Multi-programming support
- Various monitoring and diagnosis functions
- Windows 2000, XP (Limited use in Windows 98, ME)



Programming
XG5000

Easy how to use
Letter type, color, short key, tool bar

Convenient editing
Undo, Redo, Excel editing

Structuralized program
Scan, task (Initialization, normal cycle, external contact point, internal device)

Various monitoring
Special module, trend, user-event, etc

Network set up, diagnosis
XG-PD

Communication module parameter setting
Basic, high-speed link parameter setting

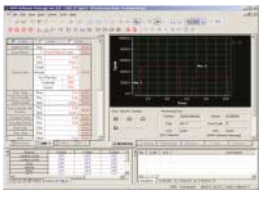
System diagnosis and monitoring
Ping/Self test
Monitoring of sending/receiving frame
Display of status and diagnosis of each module

Positioning
APM S/W Package

Easy parameter setting

Data editing in Excel

Monitoring and trace



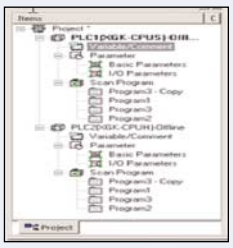
Features

- Program editing & Engineering software
- Windows-based easy operation
- Multi-PLC, Multi-program, Multi-task in one project
- Various monitoring and diagnosis functions
- Windows 2000, XP (Limited use in Windows 98, ME)

Programming tools

MPMP (Multi-PLC Multi-programming)

Different PLC systems can be edited, monitored, and managed simultaneously in one project.

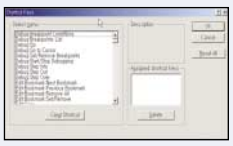


Drag & Drop

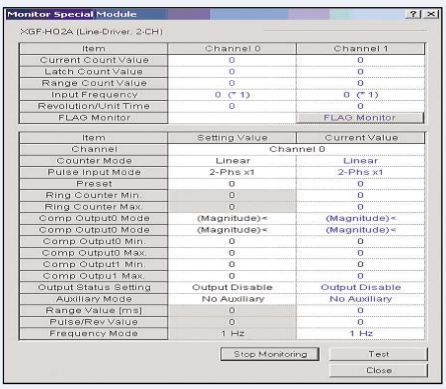
It is available in project, variable/comment, ladder diagram editing and monitoring.

User-defined shortcut keys

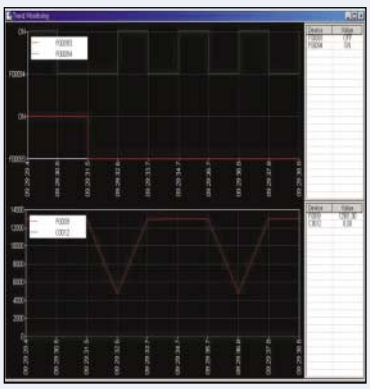
User-defined shortcut keys increase editing convenience.



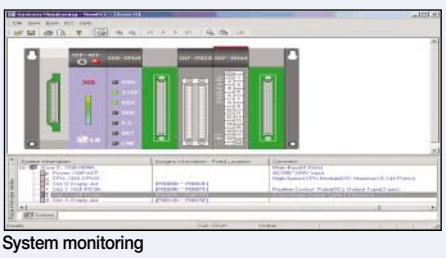
Monitoring



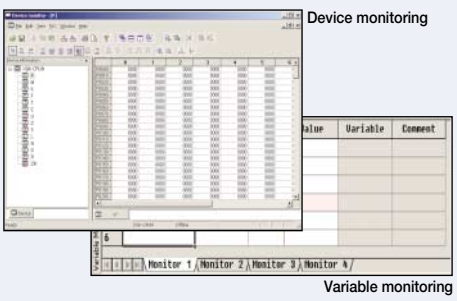
Special module monitoring
Monitoring and test-run of various special modules are available.



Trend monitoring
The changing value of specific device can be monitored and saved as a file.



System monitoring



Device monitoring

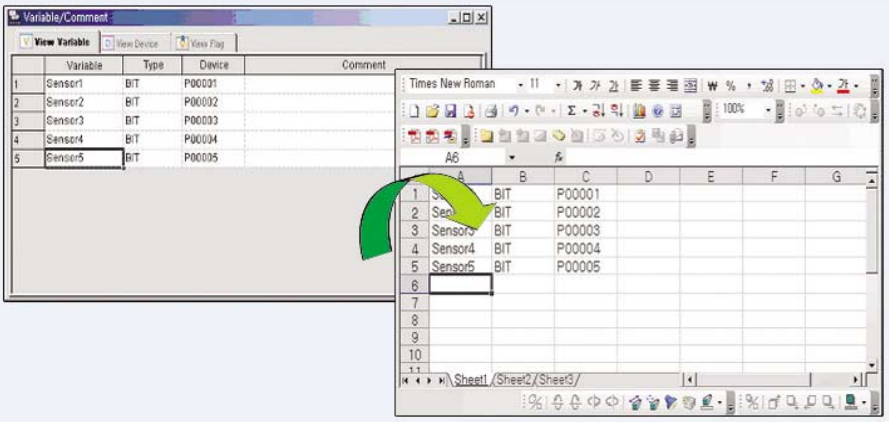
Variable monitoring

System requirement

Item	System requirement
O/S	Windows 2000, XP (Limited use in Windows 98, ME)
CPU	IBM compatible PC with Min. 200MHz Pentium processor
Memory	Min. 128M
HDD	100 MB (Free memory space)
Serial port	Communication port for program transmission (RS-232C, USB)
Printer	Compatible with Windows 98 or later
Mouse	Compatible with Windows 98 or later

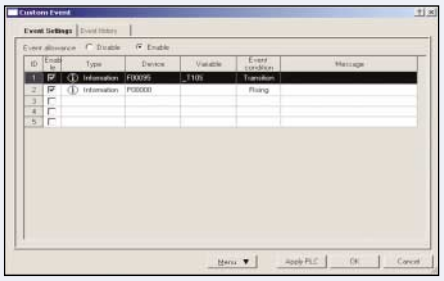
Variable and programming editing

- Data input like EXCEL
- Cell-unit edit
- Auto Fill function
- Compatible with Microsoft Excel
- Redo and Undo (Unlimited)
- Segment screen edit

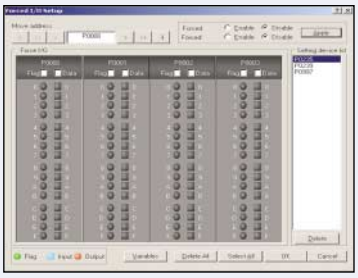


Improved diagnosis and maintenance

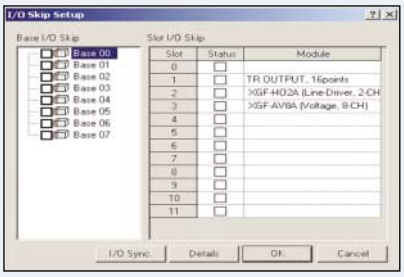
Module exchange wizard
It supports safe module exchange during 'RUN' mode.



User-defined event
By registering user-defined event, users can read the record of specified event and use it for PLC operation and debugging.



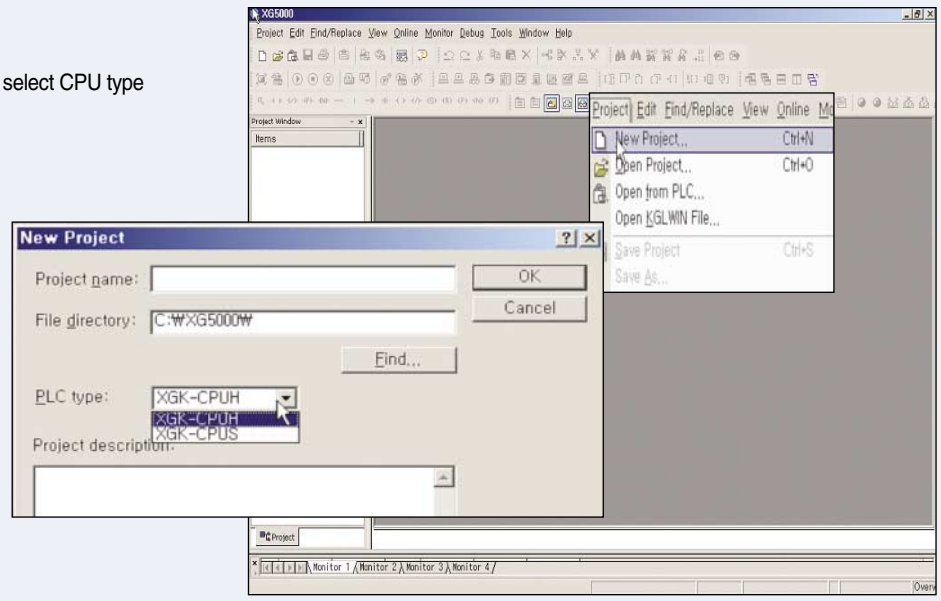
Forced I/O
The status of external output device can be checked without program.
And when input device breaks down, forced input function specifies ON/OFF and can operate the system without interruption of equipment.



I/O skip, Error Mask
I/O inspection and renewal can be set for specific module and continuous operation is available when an error is occurred.

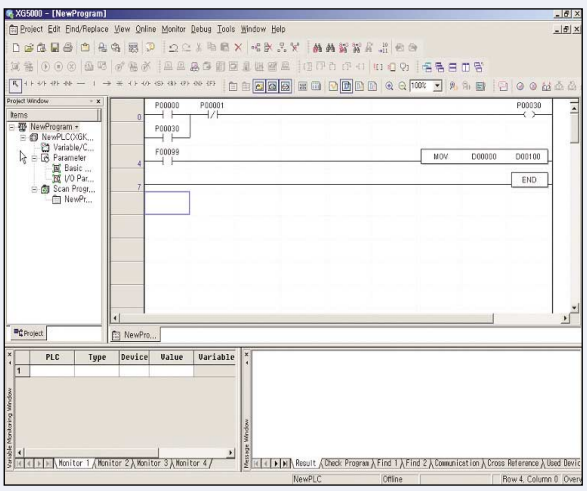
Program editing

- Start XG5000
- Select [New Project]
- Write project name and select CPU type



Configure ladder lines as below with ladder input tool bar

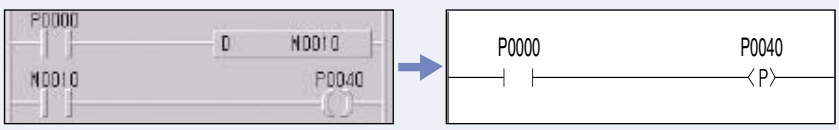
- Select input point and command with ladder tool bar.



Icon	Description	Short key
	Arrow mode	ESC
	Normally open contact	F3
	Normally closed contact	F4
	Positive transition-sensing contact (On for 1 scan when Off-->On)	Shift+F1
	Negative transition-sensing contact(On for 1 scan when On-->Off)	Shift+F2
	Horizontal line	F5
	Vertical line	F6
	Fill horizontal line.	Shift+F8
	Coil	F9
	NOT instruction contact	Shift+F9
	Negated coil	F11
	SET coil	Shift+F3
	RESET coil	Shift+F4
	Positive transition-sensing coil (On for 1 scan when Off-->On)	Shift+F5
	Negative transition-sensing coil (On for 1 scan when On-->Off)	Shift+F6
	Function	F10

Note) Addition of 'EDGE' detection instructions

Develop user-friendly programming through adding D, D NOT instructions (Rising EDGE, dropping EDGE) to contact and output coil.



Software

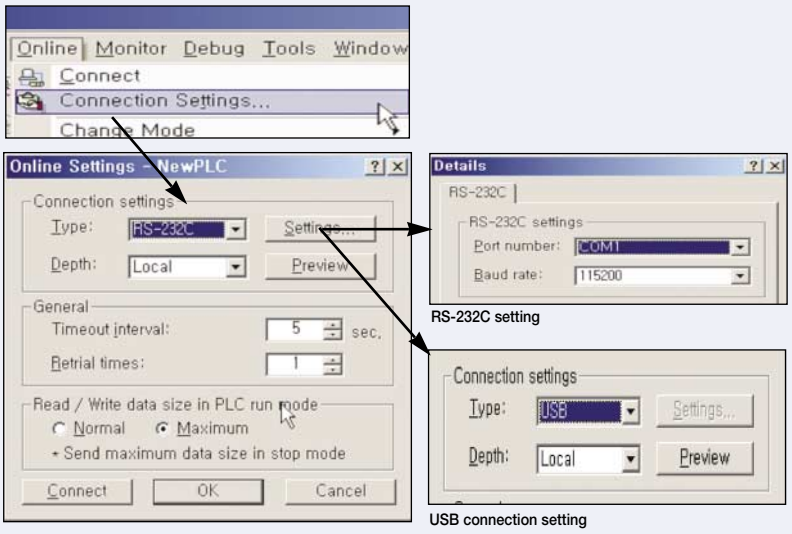
Program download

Connection setting

- Check a setting for connection between XGT and XG5000
- XGT supports USB and RS-232C

Set up communication port and download speed

* using 'USB TO RS-232C' converter, 115,200bps connection may be unavailable depending on characteristics of converter. In this case, change the communication speed to 38,400bps.

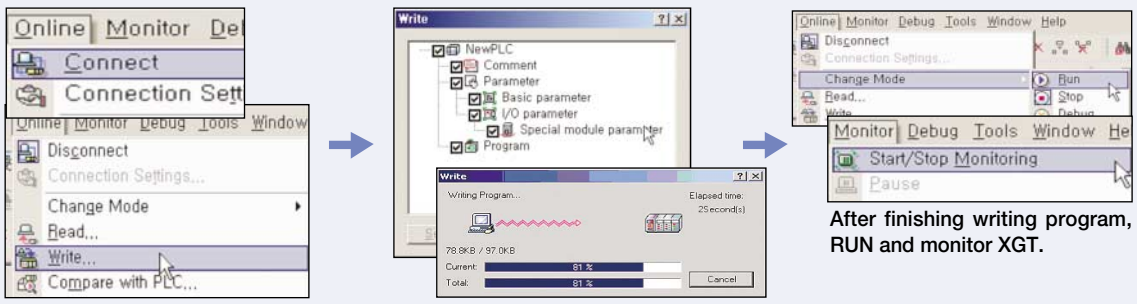


RS-232C setting

USB connection setting

Connection

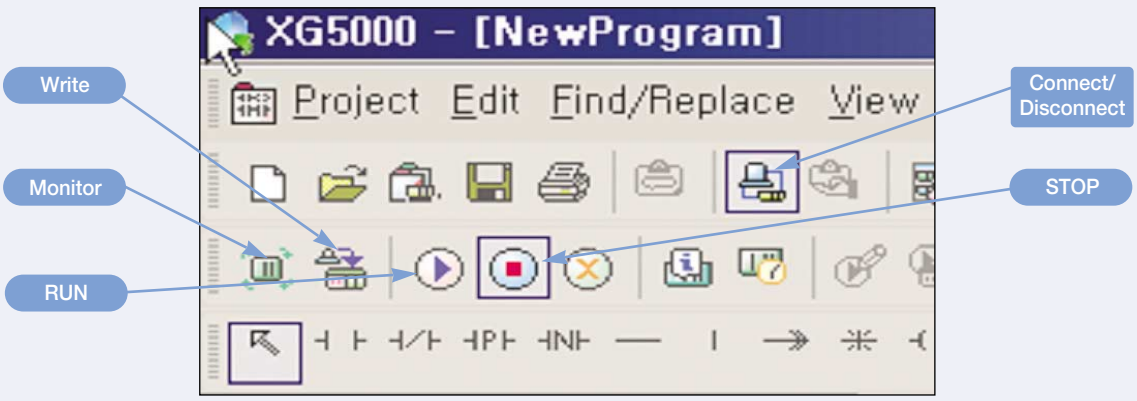
Connect to PLC and download the program as below.



After finishing writing program, RUN and monitor XGT.

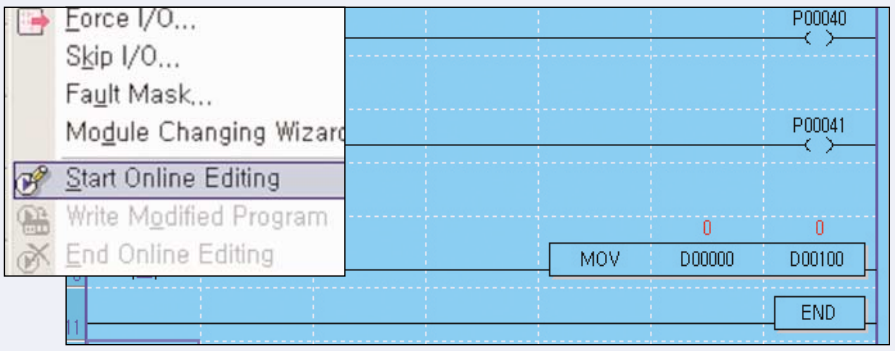
Short icon

* XGT doesn't support collective-writing monitoring for system safety.



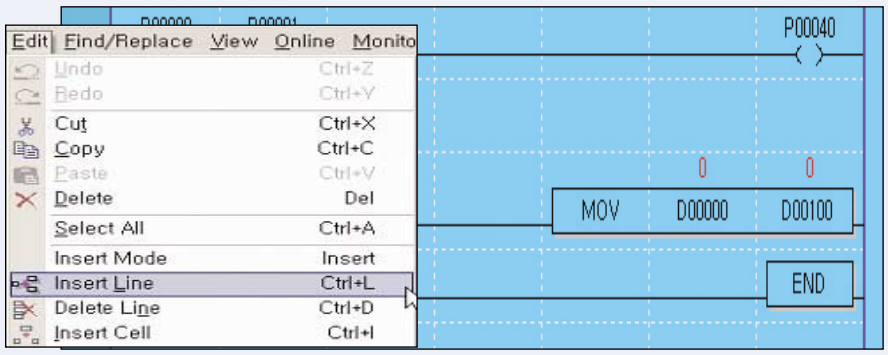
Online Editing

Select [Start Online Editing] in Online menu.



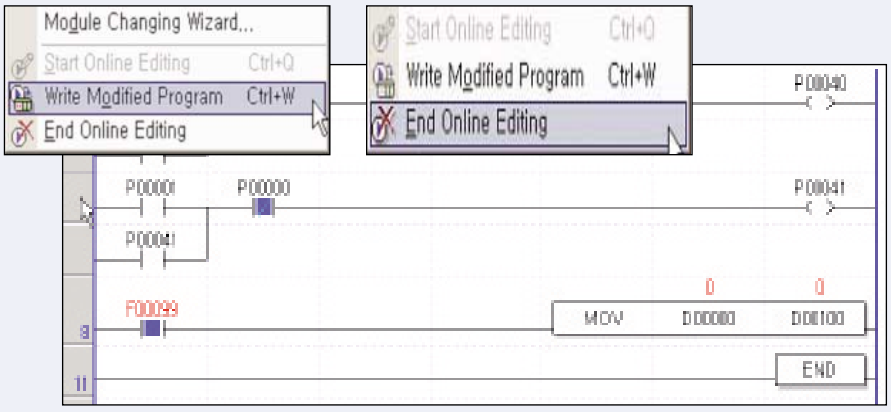
When starting Online Editing, the screen color becomes blue.

Modify the program.



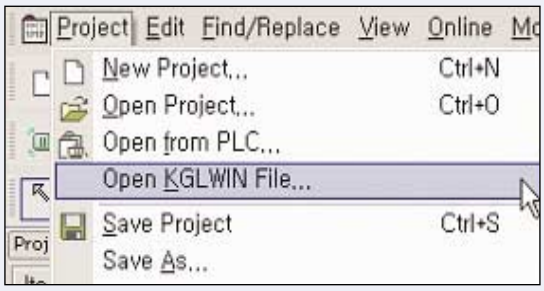
Edit menu

After finishing modifying the program, select [Write Modified Program] and [End Online Editing].

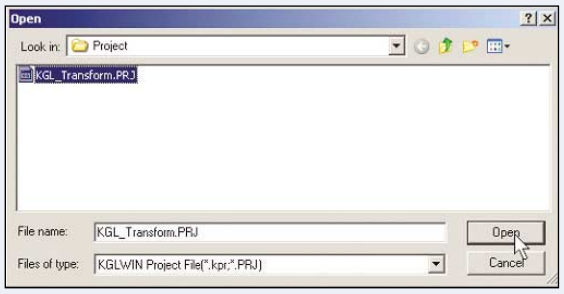


After finishing 'Online Editing'

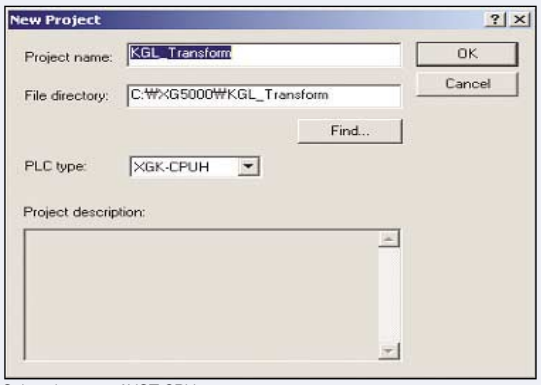
Open a project written in KGL-WIN



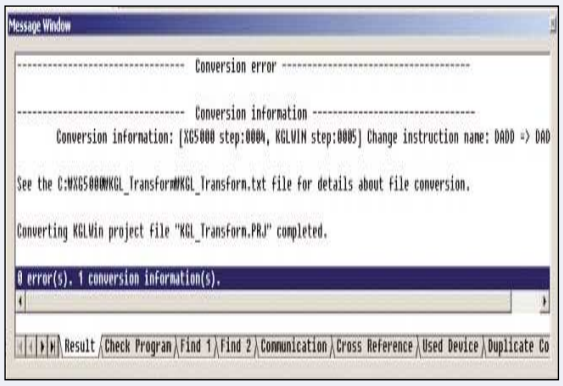
Select [Open KGWIN file] in project.



Select the file.

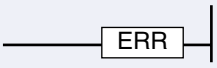


Select the type of XGT CPU.



Check converted information in the message window.

Note) Dedicated instructions and special parameters for MASTER-K cannot be converted.
Mostly General instructions and descriptions are converted.
Information impossible to be converted is displayed as ERR.

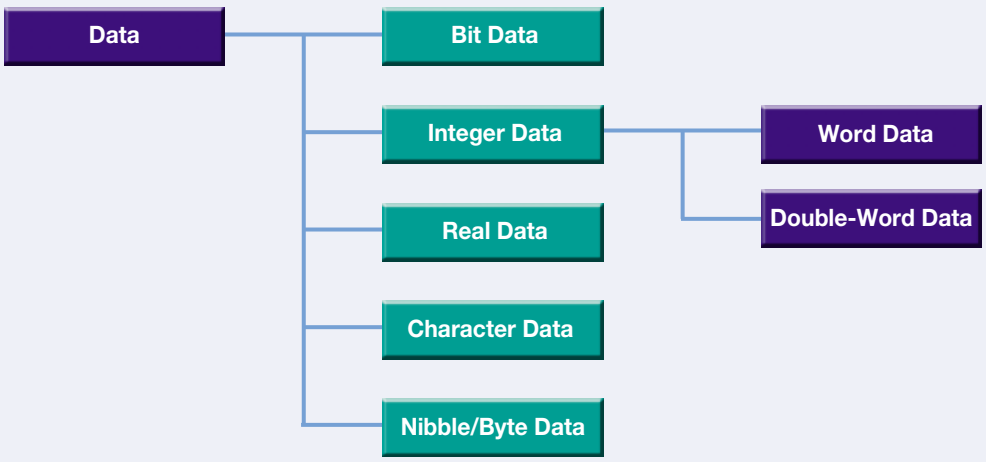


• Content of main special flag (F) change

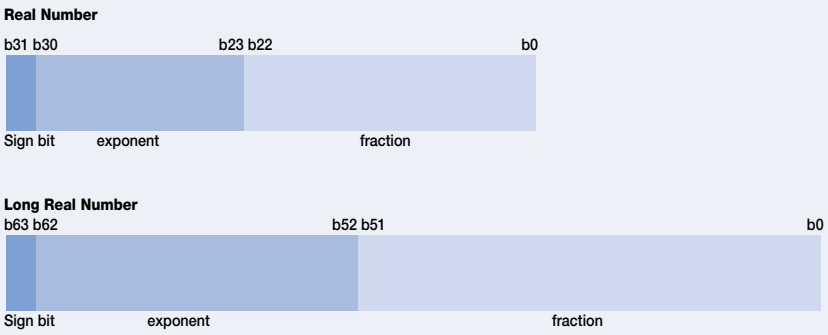
MASTER-K	XGT	Specifications
F10	F99	ON regularly
F11	F9A	OFF regularly
F12	F9B	ON during first one scan
F13	F9C	OFF during first one scan

For more detailed information, refer to user's manual.

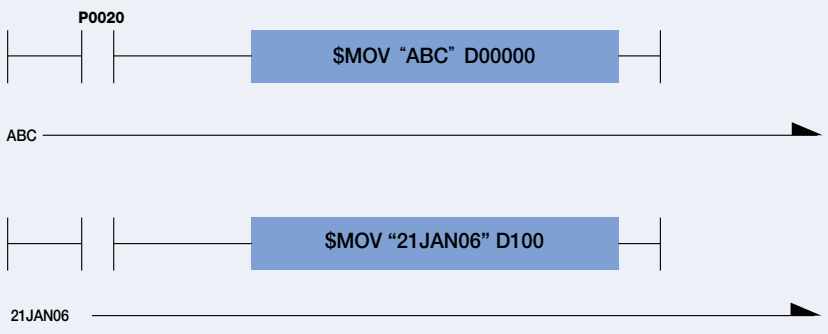
Data type



- Nibble: 4-bit unit data
- Byte: 8-bit unit data
- Real Data: 32-bit/64-bit floating point data



- Character Data: Saving numbers, alphabets, symbols as a type of ASCII code



D100	Ox31	Ox32
D101	Ox41	Ox4A
D102	Ox30	Ox4E
D103	Ox00	Ox36
D104	Ox00	Ox36

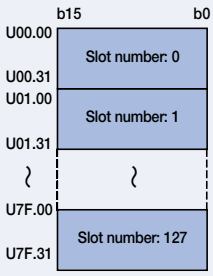
Device Type

Device	Size	Bit Contact	Word Data	Name
P	32768 points	P00000 ~ P2047F	P0000 ~ P2047	I/O Relay
M	32768 points	M00000 ~ M2047F	M0000 ~ M2047	Assistant Relay
L	180224 points	L00000 ~ L11263F	L0000 ~ L11263	Link Relay
N *1)	21K words	N/A	N00000 ~ N21503	Comm. data register
K	32768 points	K00000 ~ K2047F	K0000 ~ K2047	Keep Relay
F	32768 points	F00000 ~ F2047F	F0000 ~ F2047	Special Relay
T *2)	2048 points	T0000 ~ T2047	T0000 ~ T2047	Timer
C *3)	2048 points	C0000 ~ C2047	C0000 ~ C2047	Counter
U	3072 words	U00.00.0 ~ U7F.31.F	U00.00 ~ U7F.31	Special Module Counter
Z	128 words	N/A	Z0 ~ Z127	Index Register
S	128 groups	S00.00 ~ S127.99	N/A	Step Control Relay
D	32K words	D00000.0 ~ D32767.F	D00000 ~ D32767	Data Register
R (Internal RAM) *4)	32K words	R00000.0 ~ R32767.F	R00000 ~ R32767	File Register
ZR (Internal RAM) *5)	32K words	N/A	ZR00000 ~ ZR65535	File Register
R (Expanded)	1M words	N/A	Available as much as extension size	File Register
ZR (Expanded)	1M words	N/A	Available as much as extension size	File Register

Note) 1. When communication module is not used, it can be used as internal data area.
2. Word data in timer shows a current value of relevant bit contact.
3. Word data in counter shows a current value of relevant bit contact
4. Even when using more than 32K words internal RAM, bit contact available to display is R00000.0~R32767.F Also word data enable to be displayed in the range of R00000.0~R32767.F
5. When internal RAM is more than 32K words, bit contact can be in the range of ZR00000.0~ZR32767.F and word data can be displayed as much as the size of internal RAM

Special module register U

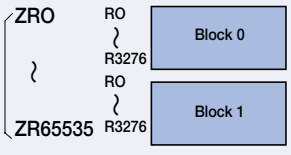
Register for reading data from special module mounted in slot



- Assigning 32 words per slot in U area
- Bit type display available
  Ex) U93.12.x (x: Bit location, Hexadecimal display)
- Available to read/write internal memory value of special module without using PUT (P), GET (P), PUTS (P), GETS (P)
- Basic display in U area
  Ex) Uxy.z
  x: Base number (0~7)
  y: Slot number (0~F)
  z: Word number of special module internal memory

File register R, ZR

Register that a recorded value is not deleted when power failure is occurred. File register is used for data backup or data storage.

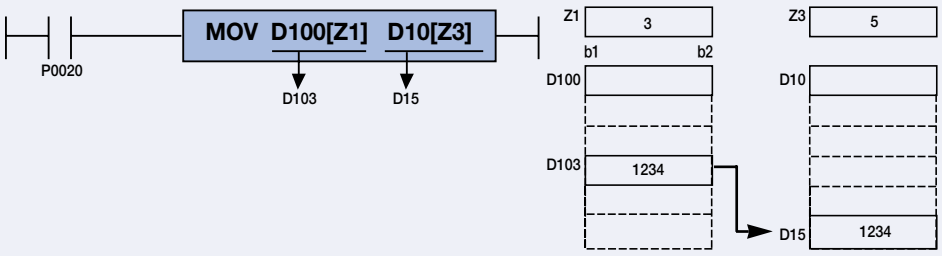


R: Block unit access
ZR: Entire file register access

Internal RAM (Temporary preservation): 32K words
FLASH (Permanent preservation): 1M words

Index register

Index register sets up devices using index function.
The sum of index register value and directly specified device number is real device number.

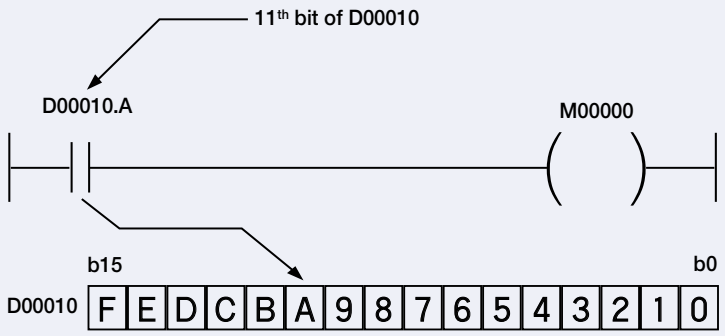


Available Device

- Bit Device: P, M, L, K, F, T, C
- Word Device: U, D, R, ZR, N, present value of T and present value of C

Ex) MOV T1[Z1] D10 : If Z1 is 5, present value of T(1+5)=T6 is transmitted to D10.
Ex) LOAD D10[Z1].5 : If Z1 is 5, LOAD(10+5).5 => LOAD D15.5 is set.

Bit specifying method of word device



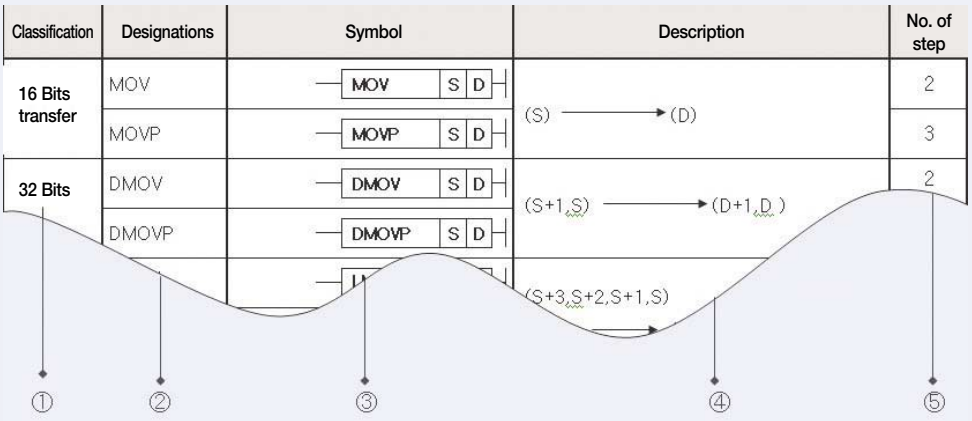
By assigning bit number to word device, bit data is available to use.

Word device number	.	Bit number

In this case, word device number should be addressed as decimal and bit number should be addressed as hexadecimal.

Relevant Device: U, D, R

Instructions



① Classification: Classifies instructions into applications.

② Designations: Displays instruction names to be used in program.

- Display rules: Instructions shall be basically displayed in word unit. According to data size, operation characteristics, real number data process, text process, the rules are as follows;
- Based on Data Size & Type

D: Double Word related instruction.
R: Real Number related instruction.
L: Long Real Number related instruction.
However, LMOV is 64 Bits transfer instruction.
$: String related instruction.
G: Group calculation.
4: Nibble related instruction, used only at the back of instruction.
8: Byte related instruction, used only at the back of instruction.
3: Instruction that process 3 operands, used only at the back of instruction.

- Based on Operation Characteristics

P: Instruction that is executed for 1 scan when input signal is changed OFF => ON

③ Symbol: Displays symbols used in program, showing the number of used operands and the type of Source or Destination. Operand display rules are as follows;

S: Source, with data value not changed after calculated.
D: Destination, with data value changeable after calculated.
N, n: The number to process.
St, En: Start and End, used only in BSFT & WSFT.
Sb: Source in case Bit position is specified, mostly used in Nibble/Byte instruction.
Db: Destination in case Bit position is specified.
Z: Control word, which means previously specified format as based on each instruction.

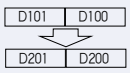
④ Description: Describes general functions of instruction.

⑤ No. of step: The number of basic steps of instruction, which means the number of steps in case indirect specification, index formula and direct variable input were not used.

Basic Instruction

Item	Name	Symbol	No. of step	Remark
Contact	LOAD		1	
	LOAD NOT		1	
	AND		1	
	AND NOT		1	
	OR		1	
	OR NOT		1	
	LOADP	P	2	
	LOADN	N	2	
	ANDP	P	2	
	ANDN	N	2	
	ORP	P	2	
	ORN	N	2	
Combination	LOAD LOAD	A B	1	
	OR LOAD	A B	1	
	MPUSH	MPUSH	1	
	MLOAD	MLOAD	1	
	MPOP	MPO	1	
Reverse	NOT		1	
Master control	MCS	MCS n	1	
	MCSCLR	MCSCLR n	1	
Output	OUT		1	
	OUT NOT		1	
	OUTP	p	2	
	OUTN	N	2	
	SET	S	1	
	RST	R	1	
	FF	FF D	1	
Step control	SES S	sxx.xx S	1	
	OUT S	sxx.xx	1	
End	END	END	1	
No-Process	NOP	No ladder	1	
Timer	TON	TON T t	2	
	TOFF	TOFF T t	2	
	TMR	TMR T t	2	
	TMON	TMON T t	2	
	TRTG	TRTFG T t	2	
Counter	CTD	CTD C c	2	
	CTU	CTU C c	2	
	CTR	CTR C c	2	
	CTUD	CTUD C U D c	4	

Note) D: Double word related commands
It is located at the first of command.
Ex) [DMOV D100 D200]



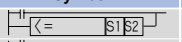
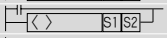
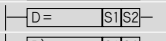
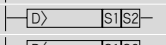
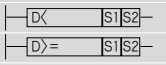
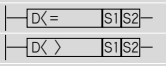
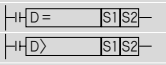
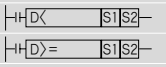
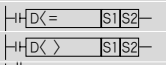
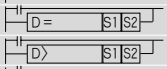
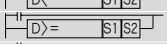
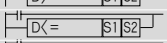
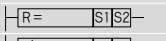
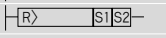
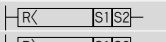
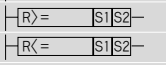
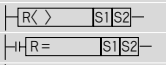
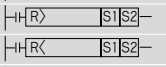
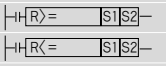
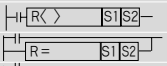
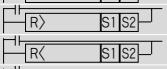
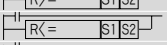
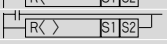
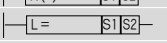
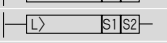
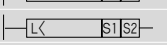
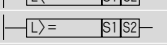
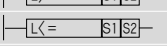
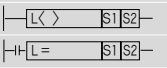
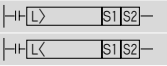
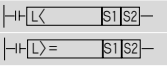
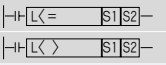
P: It indicates the commands executed one time when input signal is change from OFF to ON.
It is located at the last of command.
Ex) [DMOVP D100 D200]

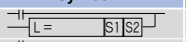
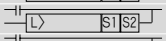
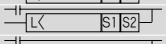
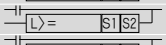
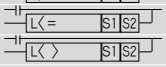
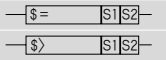
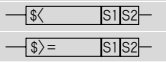
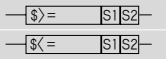
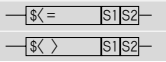
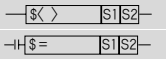
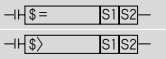
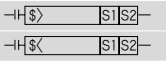
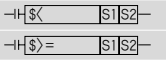
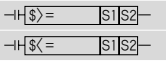
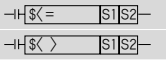
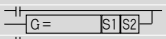
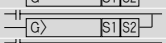
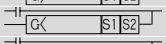
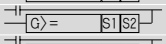
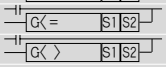
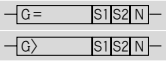
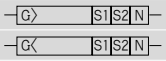
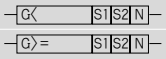
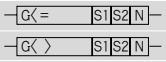
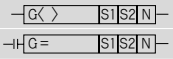
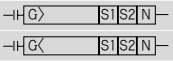
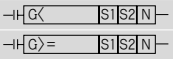
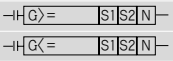
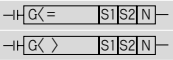
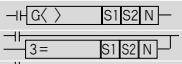
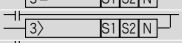
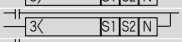
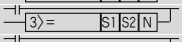
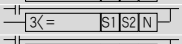
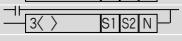
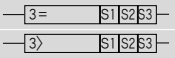
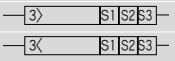
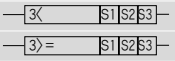
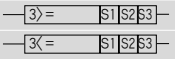
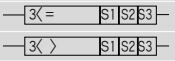
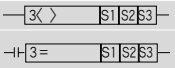
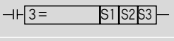
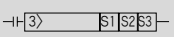
Applied instruction

Item		Name	Symbol	No. of step	Remark
Data Transfer	1 word	MOV	MOV S D	2	D/P
	Real Number	RMOV	RMOV S D	2	P
	Long Real Number	LMOV	LMOV S D	2	P
	4 bits	MOV4	MOV4 Sb Db	3	P
	8 bits	MOV8	MOV8 Sb Db	3	P
	1' s complement	CMOV	CMOV S D	2	D/P
	16 bits group	GMOV	GMOV S D N	4	P
	Multiple	FMOV	FMOV S D N	4	P
	Specified bit	BMOV	BMOV S D N	4	P
	Specified bit group	GBMOV	GBMOV S D Z N	4	P
	String	$MOV	$MOV S D	2	P
Data Conversion	BCD	BCD	BCD S D	2	D/P
	BIN	BIN	BIN S D	2	D/P
	Group	GBCD	GBCD S D N	4	P
	BCD, BIN	GBIN	GBIN S D N	4	P
	16 bits	12R	12L S D	2	P
	integer-to-real	12L	D2L S D	2	P
	32 bits	D2R	R2D S D	2	P
	integer-to-real	D2L	L2D S D	2	P
	Real-interger	R2I	R2I S D	2	P
		R2D	R2D S D	2	P
	Long Real-interger	L2I	L2I S D	2	P
		L2D	L2D S D	2	P
Data Comparison	Unsigned comparison with special flag	CMP	CMP S1 S2	2	D/P
	4/8 bits	CMP4	CMP4 S1 S2	3	P
	comparison	CMP8	CMP8 S1 S2	3	P
	Table comparison	TCMP	TCMP S1 S2 D	4	D/P
	Group comparison	GEQ	GEQ S1 S2 D N	4	P
		GGT	GGT S1 S2 D N	4	P
		GLT	GLT S1 S2 D N	4	P
		GGE	GGE S1 S2 D N	4	P
		GLE	GLE S1 S2 D N	4	P
		GNE	GNE S1 S2 D N	4	P
	16 bits data comparison (LOAD)	LOAD=	= S1 S2	2	
		LOAD>	> S1 S2	2	
		LOAD<	< S1 S2	2	
		LOAD>=	>= S1 S2	2	
		LOAD<=	<= S1 S2	2	
		LOAD< >	<> S1 S2	2	
	16 bit data comparison (AND)	AND=	= S1 S2	2	
		AND>	> S1 S2	2	
		AND<	< S1 S2	2	
		AND>=	>= S1 S2	2	
		AND<=	<= S1 S2	2	
		AND< >	<> S1 S2	2	
	16 bit data comparison (OR)	OR=	= S1 S2	2	
		OR>	> S1 S2	2	
		OR<	< S1 S2	2	
		OR>=	>= S1 S2	2	

Software

Applied instruction

Item		Name	Symbol	No. of step	Remark
Data comparison	16 bits data comparison (OR)	OR<=		2	
		OR< >		2	
	32 bits data comparison (LOAD)	LOADD=		2	
		LOADD>		2	
		LOADD<		2	
		LOADD>=		2	
		LOADD<=		2	
		LOADD< >		2	
	32 bits data comparison (AND)	ANDD=		2	
		ANDD>		2	
		ANDD<		2	
		ANDD>=		2	
		ANDD<=		2	
		ANDD< >		2	
	32 bits data comparison (OR)	ORD=		2	
		ORD>		2	
		ORD<		2	
		ORD>=		2	
		ORD<=		2	
		ORD< >		2	
	Real number comparison (LOAD)	LOADR=		2	
		LOADR>		2	
		LOADR<		2	
		LOADR>=		2	
		LOADR<=		2	
		LOADR< >		2	
	Real number comparison (AND)	ANDR=		2	
		ANDR>		2	
		ANDR<		2	
		ANDR>=		2	
		ANDR<=		2	
		ANDR< >		2	
	Real number comparison (OR)	ORR=		2	
		ORR>		2	
		ORR<		2	
		ORR>=		2	
		ORR<=		2	
		ORR< >		2	
	Long real number comparison (LOAD)	LOADL=		2	
		LOADL>		2	
		LOADL<		2	
		LOADL>=		2	
		LOADL<=		2	
		LOADL< >		2	
	Long real number comparison (AND)	ANDL=		2	
		ANDL>		2	
		ANDL<		2	
		ANDL>=		2	
		ANDL<=		2	
		ANDL< >		2	

Item		Name	Symbol	No. of step	Remark
Data comparison	Long real number comparison (OR)	ORL=		2	
		ORL>		2	
		ORL<		2	
		ORL>=		2	
		ORL<=		2	
		ORL< >		2	
	String comparison (LOAD)	LOAD$=		2	
		LOAD$>		2	
		LOAD$<		2	
		LOAD$>=		2	
		LOAD$<=		2	
		LOAD$< >		2	
	String comparison (AND)	AND$=		2	
		AND$>		2	
		AND$<		2	
		AND$>=		2	
		AND$<=		2	
		AND$< >		2	
	String comparison (OR)	OR$=		2	
		OR$>		2	
		OR$<		2	
		OR$>=		2	
		OR$<=		2	
		OR$< >		2	
	16 bits data group comparison (LOAD)	LOADG=		4	
		LOADG>		4	
		LOADG<		4	
		LOADG>=		4	
		LOADG<=		4	
		LOADG< >		4	
	16 bits data group comparison (AND)	ANDG=		4	
		ANDG>		4	
		ANDG<		4	
		ANDG>=		4	
		ANDG<=		4	
		ANDG< >		4	
	16 bits data group comparison (OR)	ORG=		4	
		ORG>		4	
		ORG<		4	
		ORG>=		4	
		ORG<=		4	
		ORG< >		4	
	Three 16 bits data group comparison (LOAD)	LOAD3=		4	
		LOAD3>		4	
		LOAD3<		4	
		LOAD3>=		4	
		LOAD3<=		4	
		LOAD3<>		4	
	Three 16 bits data group comparison (AND)	AND3=		2	
		AND3>		2	

Software

Applied instruction

Item		Name	Symbol	No. of step	Remark
Data comparison	Three 16 bits data group comparison (AND)	AND3<	3< S1 S2 S3	2	
		AND3>=	3>= S1 S2 S3	2	
		AND3<=	3<= S1 S2 S3	2	
		AND3< >	3<> S1 S2 S3	2	
	Three 16 bits data group comparison (OR)	OR3=	3= S1 S2 S3	4	
		OR3>	3> S1 S2 S3	4	
		OR3<	3< S1 S2 S3	4	
		OR3>=	3>= S1 S2 S3	4	
		OR3<=	3<= S1 S2 S3	4	
		OR3< >	3<> S1 S2 S3	4	
	Three 32 bits data group comparison (LOAD)	LOADD3=	D3= S1 S2 S3	4	
		LOADD3>	D3> S1 S2 S3	4	
		LOADD3<	D3< S1 S2 S3	4	
		LOADD3>=	D3>= S1 S2 S3	4	
		LOADD3<=	D3<= S1 S2 S3	4	
		LOADD3< >	D3<> S1 S2 S3	4	
	Three 32 bits data group comparison (AND)	ANDD3=	D3= S1 S2 S3	4	
		ANDD3>	D3> S1 S2 S3	4	
		ANDD3<	D3< S1 S2 S3	4	
		ANDD3>=	D3>= S1 S2 S3	4	
		ANDD3<=	D3<= S1 S2 S3	4	
		ANDD3< >	D3<> S1 S2 S3	4	
	Three 32 bits data group comparison (OR)	ORD3=	D3= S1 S2 S3	4	
		ORD3>	D3> S1 S2 S3	4	
		ORD3<	D3< S1 S2 S3	4	
		ORD3>=	D3>= S1 S2 S3	4	
		ORD3<=	D3<= S1 S2 S3	4	
		ORD3< >	D3<> S1 S2 S3	4	
Data increase/decrease	Data increase/ decrease (signed)	INC	INC D	2	D/P
		DEC	DEC D	2	D/P
	4/8 bits data increase/ decrease (Signed)	INC4	INC4 Db	2	P
		INC8	INC8 Db	2	P
		DEC4	DEC4 Db	2	P
		DEC8	DEC8 Db	2	P
	Data increase/ decrease (Unsigned)	INCU	INCU D	2	D/P
		DECU	DECU D	2	D/P
Location	Left rotation	ROL	ROL D n	2	D/P
	4/8 bits left rotation	ROL4	ROL4 Db n	3	P
		ROL8	ROL8 Db n	3	P
	Right rotation	ROR	ROR D n	2	D/P
	4/8 bits right rotation	ROR4	ROR4 Db n	3	P
		ROR8	ROR8 Db n	3	P
	Left rotation (Including carry)	RCL	RCL D n	2	P
	4/8 bits left rotation (Including carry)	RCL4	RCL4 Db n	3	P
		RCL8	RCL8 Db n	3	P
	Right rotation (Including carry)	RCR	RCR D n	2	P
	4/8 bits right rotation (Including carry)	RCR4	RCR4 Db n	3	P
		RCR8	RCR8 Db n	3	P
Shift	Bit shift	BSFT	BSFT St Ed	3	P

Item		Name	Symbol	No. of step	Remark
Shift	Bit shift to left	BSFL	BSFL D n	2	
	4 Bits shift to left	BSFL4	BSFL4 Db n	3	
	8 Bits shift to left	BSFL8	BSFL8 Db n	3	
	Bit shift to right	BSFR	BSFR D n	2	
	4 Bit shift to right	BSFR4	BSFR4 Db n	3	
	8 Bit shift to right	BSFR8	BSFR8 Db n	3	
	Word shift	WSFT	WSFT Et Ed	2	P
	Word shift to left	WSFL	WSFL D1 D2 N	3	
	Word shift to right	WSFR	WSFR D1 D2 N	3	
	Bit movement	SR	SR Db I D N	2	
Exchange	Data exchange	XCHG	XCHG D1 D2	2	D/P
	Group data exchange	GXCHG	GXCHG D1 D2 N	4	P
	Byte swap	SWAP	SWAP D	2	P
	Group byte swap	GSWAP	GXCHG D N	2	P
Integer calculation	Integer addition(signed)	ADD	ADD S1 S2 D	4	D/P
	Integer substraction(signed)	SUB	SUB S1 S2 D	4	D/P
	Integer multiplication(signed)	MUL	MUL S1 S2 D	4	D/P
	Integer division(signed)	DIV	DIV S1 S2 D	4	D/P
	Integer addition(unsigned)	ADDU	ADDU S1 S2 D	4	D/P
	Integer substraction (unsigned)	SUBU	SUBU S1 S2 D	4	D/P
	Integer multiplication (unsigned)	MULU	MULU S1 S2 D	4	D/P
	Integer division (unsigned)	DIVU	DIVU S1 S2 D	4	
Real number calculation	Real number addition	RADD	RADD S1 S2 D	4	P
		LADD	LADD S1 S2 D	4	P
	Real number substraction	RSUB	RSUB S1 S2 D	4	P
		LSUB	LSUB S1 S2 D	4	P
	Real number multilplcation	RMUL	RMUL S1 S2 D	4	P
		LMUL	LMUL S1 S2 D	4	P
	Real number division	RDIV	RDIV S1 S2 D	4	P
		LDIV	LDIV S1 S2 D	4	P
String	String addition	$ADD	$ADD S1 S2 D	4	P
Group calculation	Group addition	GADD	GADD S1 S2 D N	4	P
	Group substraction	GSUB	GSUB S1 S2 D N	4	P
BCD calculation	BCD addition	ADDB	ADDB S1 S2 D	4	D/P
	BCD substraction	SUBB	SUBB S1 S2 D	4	D/P
	BCD multiplication	MULB	MULB S1 S2 D	4	D/P
	BCD division	DIVB	DIVB S1 S2 D	4	D/P
Logical calculation	Logical AND	WAND	WAND S1 S2 D	4	D/P
	Logical OR	WOR	WOR S1 S2 D	4	D/P
	Exclusive OR	WXOR	WXOR S1 S2 D	4	D/P
	Exclusive AND	WXNR	WXNR S1 S2 D	4	D/P
	Group logical calculation	GWAND	GWAND S1 S2 D N	4	P
		GWOR	GWOR S1 S2 D N	4	P
		GWXOR	GWXOR S1 S2 D N	4	P

Applied instruction

	Item	Name	Symbol	No. of step	Remark
	Group logical calculation	GWXNR	GWXNR S1 S2 D N	4	P
System	Time clock	TFLK	TFLK D1 S1 S2 D2	5	
System	Emergency stop	ESTOP	ESTOP	1	
System	Fault indication	FALS	FALS n	2	
System	Scan clock	DUTY	DUTY D n1 n2	4	
System	WDT initialization	WDT	WDT	1	P
System	Output control	OUTOFF	OUTOFF	1	
System	Operation stop	STOP	STOP	1	
System	I/O refresh	IORF	IORF S D n	2	P
Data processing	Bit check	BSUM	BSUM S D	2	D/P
Data processing	Encoding	ENCO	ENCO S D n	4	P
Data processing	Decoding	DECO	DECO S D n	4	P
Data processing	Data disconnection	DIS	DIS S D n	4	P
Data processing	Data union	UNI	UNI S D n	4	P
Data processing	Data search	SCH	SCH S1 S2 D N	4	D/P
Data processing	Max. value search	MAX	MAX S D n	4	D/P
Data processing	Min. value search	MIN	MIN S D n	4	D/P
Data processing	Sum	SUM	SUM S D n	4	D/P
Data processing	Average	AVE	AVE S D n	4	D/P
Data processing	MUX	MUX	MUX S1 S2 D N	4	D/P
Data processing	Data detection	DETECT	DETECT S1 S2 D N	4	P
Data processing	Ramp signal output	RAMP	RAMP n1 n2 D1 n3 D2	5	
Data processing	Data sorting	SORT	SORT s n1 n2 D1 D2	5	P
Data processing	Data writing	FIWR	FIWR S D	2	P
Data processing	First-input, first-read	FIFRD	FIFRD S D	2	P
Data processing	First-input, later-read	FILRD	FILRD S D	2	P
Data processing	Data inserting	FIINS	FIINS S D n	4	P
Data processing	Data pulling	FIDEL	FIDEL S D n	4	P
Data processing	Word/ Byte conversion	WTOB	WTOB S D n	4	P
Data processing		BTOW	BTOW S D n	4	P
Display	7 segment display	SEG	SEG S D Z	4	P
Display	Message display	MSG	MSG S D Z	4	p
String processing	Conversion to decimal ASCII code	BINDA	BINDA S D	2/3	D/P
String processing	Conversion to hexadecimal ASCII code	BINHA	BINHA S D	2/3	D/P
String processing	BCD-to-Decimal ASCII conversion	BCDDA	BCDDA S D	2/3	D/P
String processing	Decimal ASCII-to-BIN conversion	DABIN	DABIN S D	2/3	D/P
String processing	Hexadecimal ASCII-to-BIN conversion	HABIN	HABIN S D	2/3	D/P
String processing	Decimal ASCII-to-BCD conversion	DABCD	DABCD S D	2/3	D/P
String processing	BIN 16/32-to-String conversion	STR	STR S1 S2 D	4	D/P
String processing	String-to-BIN 16/32 conversion	VAL	VAL S D1 D2	4	D/P
String processing	Real-to-String conversion	RSTR	RSTR S1 S2 D	4	P
String processing	Long real-to-String conversion	LSTR	LSTR S1 S2 D	4	P
String processing	String-to-Real conversion	STRR	STRR S D	2	P

	Item	Name	Symbol	No. of step	Remark
String processing	String length	STRL	STRL S D	2	P
String processing		LEN	LEN S D	2/3	P
String processing	ASCII conversion	ASC	ASC S D cw	4	P
String processing	Hexadecimal conversion	HEX	HEX S D N	4	P
String processing	String extraction from right	RIGHT	RIGHT S D N	4	P
String processing	String extraction from left	LEFT	LEFT S D N	4	P
String processing	String random extraction	MID	MID S1 S2 D	4	P
String processing	String random replacement	REPLACE	REPLACE S1 D S2	4	P
String processing	String search	FIND	FIND S1 S2 D N	4	P
String processing	Real-to-BCD conversion	RBCD	RBCD S1 S2 D	4	P
String processing	Long real-to-BCD conversion	LBCD	LBCD S1 S2 D	4	P
String processing	BCD-to-Real conversion	BCDR	BCDR S1 S2 D	4	P
String processing	BCD-to-Long real conversion	BCDL	BCDL S1 S2 D	4	P
String processing	Read comment	CMTRD	CMTRD S D	2	D/P
String processing	String length	LEN	LEN S D	2	P
Special function	SIN	SIN	SIN S D	2	P
Special function	COS	COS	COS S D	2	P
Special function	TAN	TAN	TAN S D	2	P
Special function	SIN-1	ASIN*	ASIN S D	2	P
Special function	COS-1	ACOS*	ACOS S D	2	P
Special function	TAN-1	ATAN*	ATAN S D	2	P
Special function	RAD conversion	RAD	RAD S D	2	P
Special function	Degree conversion	DEG	DEG S D	2	P
Special function	Square root	SQRT	SQRT S D	2	P
Special function	Natural exponential	EXP*	EXP S D	2	P
Special function	Exponential	EXPT*	EXPT S1 S2 D	4	P
Special function	Common Logarithm	LOG*	LOG S D	2	P
Special function	Natural Logarithm	LN*	LN S D	2	P
Data control	Limit control	LIMIT	LIMIT S1 S2 S3 D	4	D/P
Data control	Band control	BAND	BAND S1 S2 S3 D	4	D/P
Data control	Zone control	ZONE	ZONE S1 S2 S3 D	4	D/P
RTC	Date/Time data read	DATERD	DATERD S	2	P
RTC	Date/Time data write	DATEWR	DATEWR S	2	P
RTC	Time data addition	ADDCLK	ADDCLK S1 S2 D	4	P
RTC	Time data substraction	SUBCLK	SUBCLK S1 S2 D	4	P
RTC	Time data format conversion	SECOND	SECOND S D	2	P
RTC		HOUR	HOUR S D	2	P
Branch	Branching instruction	JMP	JMP LABEL	1	
Branch		LABEL	LABEL	5	
Branch	Subroutine call function	CALL	CALL LABEL	1	P
Branch		SBRT	SBRT LABEL	1	
Branch		RET	RET	1	
LOOP	Loop instruction	FOR	FOR N	2	
LOOP		NEXT	NEXT	1	
LOOP		BREAK	BREAK	1	
Error	Carry flag set	STC	STC	1	
Error	Carry flag reset	CLC	CLC	1	
Error	Error flag clear	CLE	CLE	1	
Interrupt	Interrupt setting for all channels	EI	EI	1	
Interrupt		DI	DI	1	
Interrupt	Interrupt setting for each channel	EIN	EIN N	2	
Interrupt		DIN	DIN N	2	

Applied instruction

Item		Name	Symbol	No. of step	Remark
Sign inversion	2's complement	NEG	NEG D	2	D/P
	Real number data sign inversion	RNEG	RNEG D	2	P
		LNEG	LNEG D	2	P
	Absolute value inversion	ABS	ABS D	2	D/P
	Block change	RSET	RSET S	2	P
File related	Transmission of flash word data	EMOV	EMOV S1 S2 D	4	P
	Transmission of flash double word data	EDMOV	EDMOV S1 S2 D	4	P
	Block reading	EBREAD	EBREAD S1 S2 D	2	
	Block writing	EBWRITE	EBWRITE S1 S2 D	2	
	Block comparison	EBCMP	EBCMP S1 S2 D1 D2	4	

PID control instruction

Item		Name	Symbol	No. of step	Remark
Built-in PID	Run	PIDRUN	PIDRUN N	2	
	Pause	PIDPAUSE	PIDPAUSE N	2	
	Parameter change	PIDPRMT	PIDPRMT S N	2	
	Stop	PIDSTOP	PIDSTOP	2	

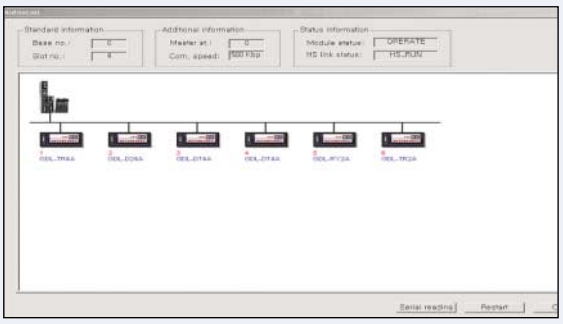
Special module control instruction

Item	Name	Symbol	No. of step	Remark
Internal memory reading	GET	GET sl S D N	4	P
Internal memory writing	PUT	PUT sl S1 S2 N	4	P
P2P writing	P2PWR	P2PWR N1 N2 N3 $	4	P
Return to origin point	ORG	ORG sl ax	2	
Fixed origin point setting	FLT	FLT sl ax	2	
Direct start	DST	DST sl ax n1 n2 n3 n4 n5	8	
Indirect start	IST	IST sl ax n	4	
Linear interpolation	LIN	LIN sl ax n1 n2	4	
Circular arc interpolation	CIN	CIN sl ax n1 n2	4	
Simultaneous start	SST	SST sl ax n1 n2 n3 n4	5	
Speed-to-position transformation	VTP	VTP sl ax	2	
Position-to-speed transformation	PTV	PTV sl ax	2	
Skip operation	SKP	SKP sl ax	2	
Position synchronization	SSP	SSP sl ax n1 n2 n3	5	
Speed synchronization	SSS	SSS sl ax n1 n2 n3	5	
Position override	VTP	VTP sl ax n	2	
Speed Override	SOR	SOR sl ax n	4	
Position specified speed override	PSO	PSO sl ax n	4	
Continuous operation	NMV	NMV sl ax n	2	
Inching	INC	INCH sl ax n	4	
Return to previous position of manual operation	RTP	RTP sl ax	2	
Start-step no. change	SNS	SNS sl ax n	4	
Repeated step no. change	SRS	SRS sl ax n	4	
M code Off	MOF	MOF sl ax	2	
Present position change	PRS	PRS sl ax n	4	
Zone enable	ZOE	ZOE sl ax	2	
Zone disable	ZOD	ZOD sl ax	2	
Encoder preset	EPRS	EPRS sl ax n	4	
Teaching	TEA	TEA sl ax n1 n2 n3 n4	5	
Teaching array	TEAA	TEAA sl ax n1 n2 n3 n4	5	
Emergency stop	EMG	EMG sl ax	2	
Error reset	CLR	CLR sl ax n	4	
Error history reset	ECLR	ECLR sl ax	2	
Point operation	PST	PST sl ax n	4	
Basic parameter setting	TBP	TBP sl ax n1 n2	4	
Extension parameter setting	TEP	TEP sl ax n1 n2	4	
Return to origin parameter setting	THP	THP sl ax n1 n2	4	
Manual operation parameter setting	TMP	TMP sl ax n1 n2	4	
Input signal parameter setting	TSP	TSP sl ax n	4	
Common parameter setting	TCP	TCP sl ax n1 n2	4	
Decelerated stop	STP	STP sl ax n	4	
Parameter/data saving	WRT	WRT sl ax n	4	
Multi teaching data saving	TWR	TWR sl ax n1 n2	4	
Point operation step saving	PWR	PWR sl ax n1 n2	4	
Present status reading	SRD	SRD sl ax n	4	

XG-PD programming

Features

- Convenient user-program, network initial basic setting
- Providing extended monitoring, control function of network system and communication module
- Fast interface with CPU by efficient network management
- Unification of instruction system
- Simple and easy connection using dedicated driver (XGT) and other driver (MODBUS)
- Various built-in Diagnosis functions (Link, Auto-scan, Frame, etc.)

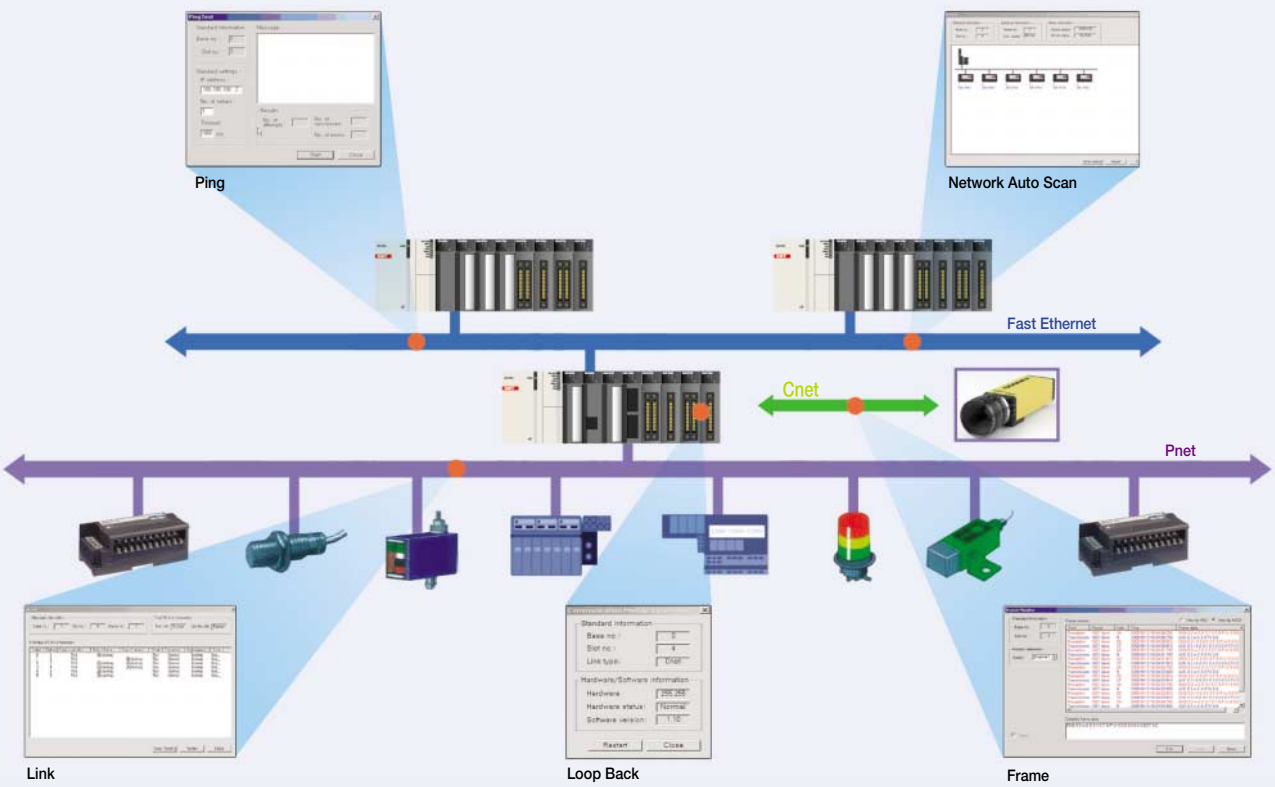


Item	FEnet	Cnet	FDEnet	Rnet	Dnet	Pnet
High-speed link	Max. 64 stations (Max. transmission block=64x200 words) Transmission period collective setting High-speedlink flag	N/A	Max. 64 stations (Max. transmission block=64x200 words) Transmission period collective setting High-speed link flag	60 words per block Transmission period collective setting High-speed link flag	Max. 64 stations Supports POLL, COS, CYCLIC, STROBE Transmission period collective setting Flag	Max. 128 stations Token Passing & Poll High-speed flag
XG5000	1,2-stage connection	1,2-stage connection	1,2-stage connection	1 stage connection	1,2-stage connection	1,2-stage connection
Dedicated service P2P service	XGT MODBUS	XGT MODBUS		Max. 64 parameters expandable		
System diagnosis	Providing connection status of LS communication module Network information (Display status of connected station)	Providing connection status of LS communication module Network information (Display status of connected station)	Providing connection status of LS communication module Network information (Display status of connected station)	Providing connection status of LS communication module Network information (Display status of connected station)	Providing connection status of LS communication module Network information (Display status of connected station)	Providing connection status of LS communication module Network information (Display status of connected station)
Self-diagnosis	Error-check	Error-check	Error-check	Error-check	Error-check	Error-check
Configuration tool	XG-PD	XG-PD	XG-PD	XG-PD	XG-PD/SyCon	XG-PD/SyCon
Media	10/100 BASE-TX 100 BASE-FX IEEE 802.3	900-115.2Kbps RS-232 * 2 RS-232 * 1+RS	10/100 BASE-TX 100 BASE-FX Toke Bus & CSMA/CD mixed type	1Mbps	125/250/500Kbps CSMA/NBA Trunk/Drop line Power signal line in	9.6k~12Mbps RS-485 (Electricity)

Various network diagnosis and monitoring

- Auto Scan: Searching and displaying each node connected to network
- Link Monitor: Monitoring status of high-speed link communication of each station
- Frame Monitor: Collecting and displaying sending/receiving frame in real time

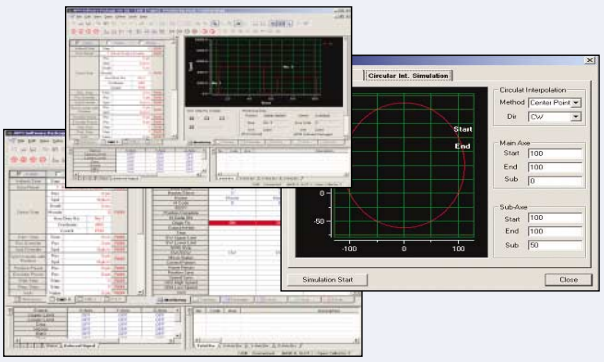
Item	FEnet	FDEnet	Cnet	Pnet	Dnet
	Fast Ethernet	Dedicated Ethernet			
Auto Scan	●	●	●	●	●
Link Monitor	●	●	●	●	●
Frame Monitor	—	—	●	—	—



APM[Positioning module] Software Package

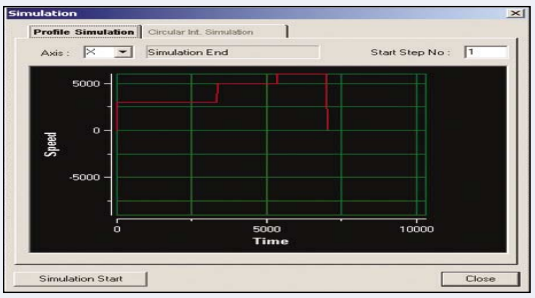
Features

- Windows-based easy operation
- Supporting all types of LS APM module
- Improved parameter editing (Copy, Paste, Initialization, etc.)
- Various monitoring (Operation type of each axis, etc.)
- Profile trace and operation monitoring
- Profile graph and simulation of circular interpolation
- Available to edit operation parameter in EXCEL

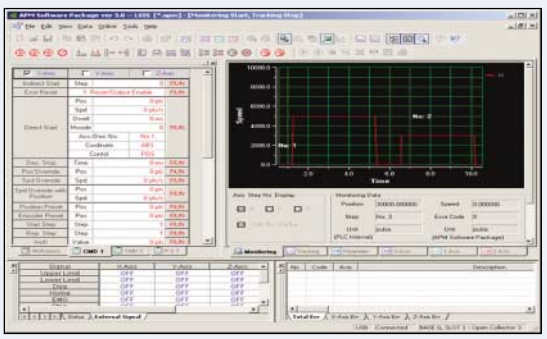


Step	Cordi	Control	Pattern	Method	Address [pulse]	Sub Address [pulse]	M Code	A/D No.	Speed [pls/s]	Dwell [ms]	Cir.Int Dir
1	ABS	POS	END	SIN	10000	0	0	No.1	1000	0	CW
2	ABS	POS	END	SIN	0	0	0	No.1	0	0	CW
3	ABS	POS	END	SIN	0	0	0	No.1	0	0	CW
4	ABS	POS	END	SIN	0	0	0	No.1	0	0	CW
5	ABS	POS	KEEP	SIN	100000	0	0	No.1	0	0	CW
6	ABS	POS	END	SIN	0	0	0	No.1	10000	0	CW
7	ABS	POS	END	SIN	0	0	0	No.1	10000	0	CW
8	ABS	POS	END	SIN	0	0	0	No.1	0	0	CW
9	ABS	POS	END	SIN	0	0	0	No.1	0	0	CW
10	ABS	POS	CONT	SIN	100000	0	0	No.1	0	0	CW
11	ABS	POS	END	SIN	1000	0	0	No.1	10000	0	CW
12	ABS	POS	END	SIN	0	0	0	No.1	5000	0	CW

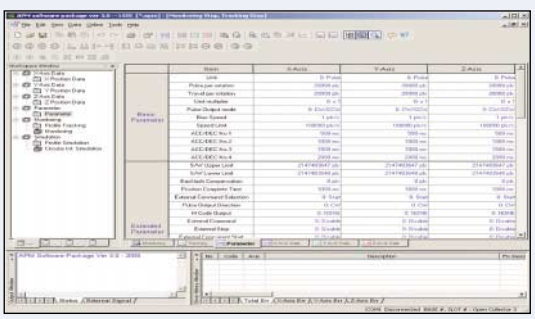
Operation Data
Define operation method, target location, operation speed of each axis.



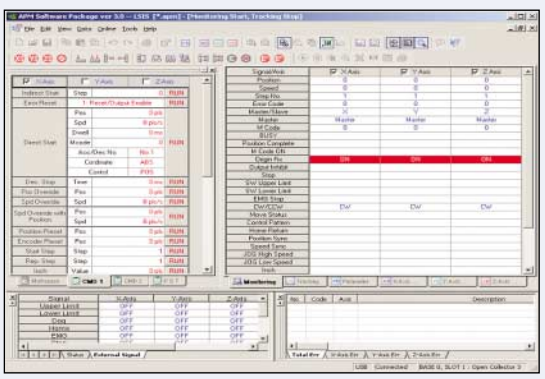
Profile simulation (Off-line)
Monitoring operation speed of each axis with graph type and saving result as image file.



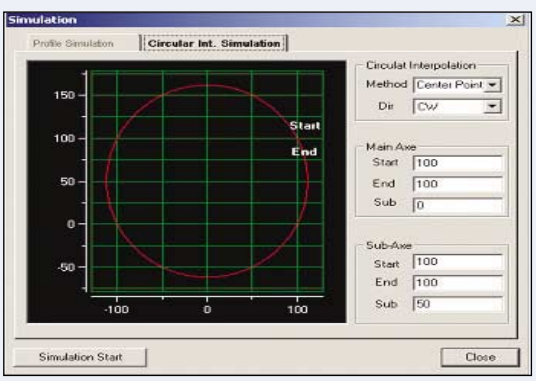
Profile Trace (On-line)
Monitoring operation speed of each axis with graph type and saving result as image file.



Operation parameter
Setting basic operation characteristics and limit value.



Monitoring (On-line)
Checking basic operation characteristics about each axis and monitoring operation condition.



Circular interpolation simulation (Off-line)

Product list

CPU, Power, Base

Product		Type	Specifications		
CPU		XGK-CPUH	No. of input/output points: 6,144 points	No. of input/output device points: 32,000 points	
			Program capacity: 64K steps	Processing speed (LD instruction): 0.028㎲	
		XGK-CPUA	No. of input/output points: 3,072 points	No. of input/output device points: 32,000 points	
			Program capacity: 32K steps	Processing speed (LD instruction): 0.028㎲	
		XGK-CPUH	No. of input/output points: 6,144 points	No. of input/output device points: 32,000 points	
			Program capacity: 64K steps	Processing speed (LD instruction): 0.028㎲	
		XGK-CPUE	No. of input/output points: 1,536 points	No. of input/output device points: 32,000 points	
			Program capacity: 16K steps	Processing speed (LD instruction): 0.084㎲	
Power		XGP-ACF1	Input voltage range: Free voltage	Output voltage: DC5V/DC24V	Output current: 3A/0.6A
		XGP-ACF2	Input voltage range: Free voltage	Output voltage: DC5V	Output current: 6A
		XGP-AC23	Input voltage range: AC220V	Output voltage: DC5V	Output current: 8.5A
		XGP-DC42	Input voltage range: DC24V	Output voltage: DC5V	Output current: 6A
Base	Main Base	XGB-M04A	4 slots main base board		
		XGB-M06A	6 slots main base board		
		XGB-M08A	8 slots main base board		
		XGB-M12A	12 slots main base board		
	Expansion Base	XGB-E04A	4 slots expansion base board		
		XGB-E06A	6 slots expansion base board		
		XGB-E08A	8 slots expansion base board		
		XGB-E12A	12 slots expansion base board		
	Expansion Cable	XGC-E041	0.4m expansion cable		
		XGC-E061	0.6m expansion cable		
		XGC-E121	1.2m expansion cable		
		XGC-E301	3.0m expansion cable		
		XGC-E501	5.0m expansion cable		
		XGC-E102	10m expansion cable		
		XGC-E152	15m expansion cable		
	Expansion terminator	XGT-TERA	Expansion terminator		

Input/Output module

Product		Type	Specifications
Input	DC	XGI-D21A	8 points DC24V 4mA Response time: 1/5/10/20/70ms 8 points/COM Sink/Source type
		XGI-D22A	16 points DC24V 4mA Response time: 1/5/10/20/70ms 16 points/COM Sink/Source type
		XGI-D22B	16 points DC24V 4mA Response time: 1/5/10/20/70ms 16 points/COM Source type
		XGI-D24A	32 points DC24V 4mA Response time: 1/5/10/20/70ms 32 points/COM Sink/Source type
		XGI-D24B	32 points DC24V 4mA Response time: 1/5/10/20/70ms 32 points/COM Source type
		XGI-D28A	64 points DC24V 4mA Response time: 1/5/10/20/70ms 32 points/COM Sink/Source type
		XGI-D28B	64 points DC24V 4mA Response time: 1/5/10/20/70ms 32 points/COM Source type
	AC	XGI-A12A	16 points AC110V 4mA Response time: 15ms or less(Off→On), 25ms or less(On→Off) 8 points/COM
		XGI-A21A	8 points Free voltage 4mA Response time: 15ms or less(Off→On), 25ms or less(On→Off) 8 points/COM
Output	Relay	XGQ-RY1A	8 points DC12/24V, AC110/220V 2A/point 5A/COM Response time: 10ms or less(Off→On), 12ms or less(On→Off) 1 point/COM
		XGQ-RY2A	16 points DC12/24V, AC110/220V 2A/point 5A/COM Response time: 10ms or less(Off→On), 12ms or less(On→Off) 16 points/COM
		XGQ-RY2B	16 points DC12/24V, AC110/220V 2A/point 5A/COM Response time: 10ms or less(Off→On), 12ms or less(On→Off) 16 points/COM Surge killer: Varistor, CR absorber
	Transistor	XGQ-TR2A	16 points DC12/24V 0.5A/point 4A/COM Response time: 1ms or less 32 points/COM Surge killer: Zenor diode Sink type
		XGQ-TR2B	16 points DC12/24V 0.5A/point 4A/COM Response time: 1ms or less 32 points/COM Surge killer: Zenor diode Source type
		XGQ-TR4A	32 points DC12/24V 0.1A/point 2A/COM Response time: 1ms or less 32 points/COM Surge killer: Zenor diode Sink type
		XGQ-TR4B	32 points DC12/24V 0.1A/point 2A/COM Response time: 1ms or less 32 points/COM Surge killer: Zenor diode Source type
		XGQ-TR8A	64 points DC12/24V 0.1A/point 2A/COM Response time: 1ms or less 32 points/COM Surge killer: Zenor diode Sink type
		XGQ-TR8B	64 points DC12/24V 0.1A/point 2A/COM Response time: 1ms or less 32 points/COM Surge killer: Zenor diode Source type
	Triac	XGQ-SS2A	16 points AC110/220V 0.6A/point 4A/COM Response time: 1ms or less(Off→On), 0.5Cycle+1ms or less(On→Off) Surge killer: Varistor
Input/ Output Mixed	DC/TR	XGH-DT4A	DC Input: 16 points DC24V 4mA Response time: 1/5/10/20/70/100ms 16 points/COM TR Output: 16 points DC12/24V 0.1A/point 1.6A/COM Response time: 1ms or less 16 points/COM Surge killer: Zenor diode

Product list

Network module

Product		Type	Specifications
Cnet		XGL-CH2A	RS-232C/422 (Each 1 channel)
		XGL-C22A	RS-232C 2 channels
		XGL-C42A	RS-422 2 channels
Fast Ethernet	FEnet (Open Ethernet)	XGL-EFMF	10/100 BASE-FX optical cable Transmission speed: 100Mbps Protocol: TCP/IP, UDP/IP Max. protocol size: 1500 bytes
		XGL-EFMT	10/100 BASE-TX coaxial cable Transmission speed: 10/100Mbps Protocol: TCP/IP, UDP/IP Max. protocol size: 1500 bytes
	FDEnet (Dedicated Ethernet)	XGL-EDMF	100 BASE-FX optical cable Transmission speed: 100Mbps Protocol: Dedicated protocol Max. protocol size: 1500 bytes
		XGL-EDMT	10/100 BASE-TX coaxial cable Transmission speed: 10/100Mbps Protocol: Dedicated protocol Max. protocol size: 1500 bytes
Rnet		XGL-RMEA	Transmission speed: 1Mbps Transmission distance: Max. 750m Protocol size: Max. 256 bytes Encoding: Manchester Biphase-L Twisted shield cable
Dnet		XGL-DMEA	DeviceNet Transmission speed: Max. 500Kbps No. of connection station: Max. 64(1 Master+63 Slave) Configuration port: RS-232C Transmission distance: Max. 500m
Pnet		XGL-PMEA	Profibus-DP Interface: RS-485 Transmission speed: Max. 12Mbps No. of slave: Max. 126 stations/network, Media acess: Tokin passing & Poll Transmission distance: 1200m Max. 32 stations/segment

Special module

Product		Type	Specifications
Analog input	Voltage input	XGF-AV8A	8 channels Input: DC1~5V, 0~5V, 0~10V, -10~10V Output(resolution): 0~16000, -8000~8000, 1000~5000, 0~5000, 0~10000, -10000~10000 Conversion speed: 250㎲/channel 18-point terminal block
	Current input	XGF-AC8A	8 channels Input: 4~20mA, 0~20mA Output(resolution): 0~16000, -8000~8000, 4000~20000, 0~20000, 0~10000 Conversion speed: 250㎲/channel 18-point terminal block
	Voltage/ current input	XGF-AD4S	4 channels Input: DC1~5V, 0~5V, 0~10V, -10~10V, 4~20mA, 0~20mA Output(resolution): -32000~32000, 1000~5000, 0~5000, 0~10000, -10000~10000, 4000~20000, 0~20000 Conversion speed: 250㎲/channel 18-point terminal block
Analog output	Voltage output	XGF-DV4A	4 channels Input(resolution): 0~16000, -8000~8000, 1000~5000, 0~5000, 0~10000, -10000~10000 Output: DC1~5V, 0~5V, 0~10V, -10~10V Conversion speed: 250㎲/channel 18-point terminal block
		XGF-DV4S	4 channels Input(resolution): 0~16000, -8000~8000, 1000~5000, 0~5000, 0~10000, -10000~10000 Output: DC1~5V, 0~5V, 0~10V, -10~10V Conversion speed: 250㎲/channel 18-point terminal block insulaion
		XGF-DV8A	8 channels Input(resolution): 0~16000, -8000~8000, 1000~5000, 0~5000, 0~10000, -10000~10000 Output: DC1~5V, 0~5V, 0~10V, -10~10V Conversion speed: 250㎲/channel 18-pointterminalblock
	Current output	XGF-DC4A	4 channels Input(resolution): 0~16000, -8000~8000, 4000~20000, 0~20000, 0~10000 Output: DC4~20mA, 0~20mA Conversion speed: 250㎲/channel 18-point terminal block
		XGF-DC4S	4 channels Input(resolution): 0~16000, -8000~8000, 4000~20000, 0~20000, 0~10000 Output: DC4~20mA, 0~20mA Conversion speed: 250㎲/channel 18-point terminal block insulation
		XGF-DC8A	8 channels Input(resolution): 0~16000, -8000~8000, 1000~5000, 0~5000, 0~10000, -10000~10000 Output: DC1~5V, 0~5V, 0~10V, -10~10V Conversion speed: 250㎲/channel 18-point terminal block

Special module

Product		Type	Specifications
High-speed counter	Open collector input	XGF-HO2A	2 channels Max. count speed: 200Kpps Input signal: DC5/12/24V, 7~11mA external input: DC5/12/24V Count range: Signed 32bit (-2147483648~2147483647) 40-pin connector
	Line Driver input	XGF-HD2A	2 channels Max. count speed: 500Kpps Input signal: RS-422, HTL Level Line driver external input: DC5/12/24V Count range: Signed 32bit (-2147483648~2147483647) 40-pin connector
Positioning	Open collector output	XGF-PO1A	1-axis Control unit: pulse, mm, inch, degree No. of positioning data item: 400 data item/axis max. output pulse: 200kpps 40-pin connector
		XGF-PO2A	2-axis 2-axis linear interpolation, 2-axis circular interpolation Control unit: pulse, mm, inch, degree No. of positioning data item: 400 data item/axis max. output pulse: 200kpps 40-pin connector
		XGF-PO3A	3-axis 2/3-axis linear interpolation, 2-axis circular interpolation Control unit: pulse, mm, inch, degree No. of positioning data item: 400 data item/axis max. output pulse: 200kpps 40-pin connector
	Line Driver output	XGF-PD1A	1-axis Control unit: pulse, mm, inch, degree No. of positioning data item: 400 data item/axis max. output pulse: 1Mpps 40-pin connector
		XGF-PD2A	2-axis 2-axis linear interpolation, 2-axis circular interpolation Control unit: pulse, mm, inch, degree No. of positioning data item: 400 data item/axis max. output pulse: 1Mpps 40-pin connector
		XGF-PD3A	3-axis 2/3-axis linear interpolation, 2-axis circular interpolation Control unit: pulse, mm, inch, degree No. of positioning data item: 400 data item/axis max. output pulse: 1Mpps 40-pin connector
Motion control		XGF-M16M	Mechatrolink-II 16-axis Transmission speed: 10Mbps Transmission period: 1/1.5/2ms Memory capacity: 32MB/ 512KB(SDRAM) Memory backup: FLASH
Temperature input	Thermocouple	XGF-TC4S	4 channels Thermocouple(K,J,E,T,B,R,S,N,C) input Conversion speed: 40ms/channel 18-point terminal block Insulation
	Resistance thermometer device	XGF-RD4A	4 channels Platinum temperature-measuring resistor: Pt100(JIS C1604-1997), JPt100(JIS C1604-1981, KS C1603-1991) Conversion speed: 40ms/channel 18-point terminal block
		XGF-RD4S	4 channels Platinum temperature-measuring resistor: Pt100(JIS C1604-1997), JPt100(JIS C1604-1981, KS C1603-1991) Conversion speed: 40ms/channel 18-point terminal block Insulation

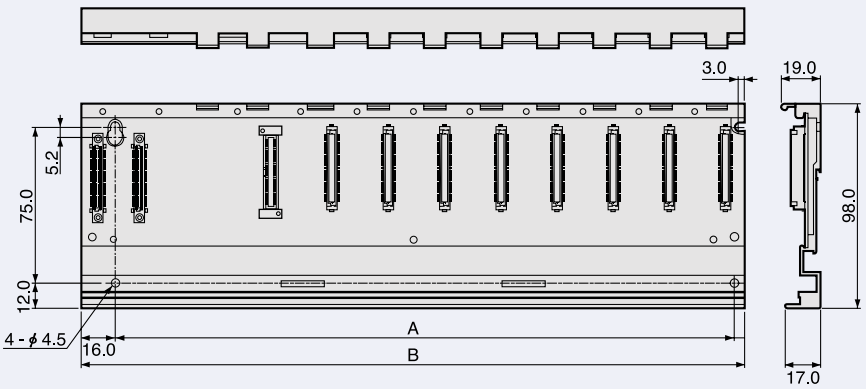
Software

Product	Specifications
XG5000	Program editing & Engineering software
XG-PD	Network setting & monitoring & diagnosis tool
APM Software Package	Positioning parameter/data setting & monitoring tool

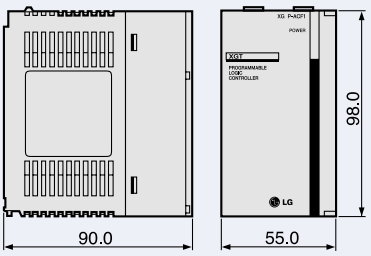
Dimensions

Dimensions

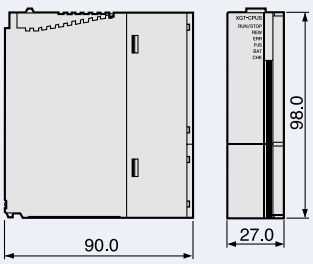
• Base



• Power module



• CPU and I/O module



Base Dimensions (W)

Item	XGB-M04A/E04A	XGB-M06A/E06A	XGB-M08A/E08A	XGB-M12A/E12A
A	190	244	298	406
B	210	264	318	426

Memo

Memo

Memo

Memo

Leader in Electrics & Automation

Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
  Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

LS Industrial Systems Co., Ltd.

www.lsis.biz

HEAD OFFICE

Yonsei Jaedan Severance Bldg., 84-11, Namdaemunno 5ga,
Jung-gu, Seoul, 100-753, Korea

Tel. (82-2)2034-4870

Fax. (82-2)2034-4713

Specifications in this catalog are subject to change without notice due to continuous product development and improvement.

Global Network

- **LS Industrial Systems Tokyo Office >> Tokyo, Japan**
  Address: 16F, Higashi-Kan, Akasaka Twin Towers 17-22, 2-chome, Akasaka, Minato-ku Tokyo 107-8470, Japan
  Tel: 81-3-3582-9128 Fax: 81-3-3582-0065 e-mail: dongjins@lsis.biz
- **LS Industrial Systems Dubai Rep. Office >> Dubai, U.A.E**
  Address: P.O.Box-114216, API World Tower, 303B, Sheikh Zayed road, Dubai, UAE.
  Tel: 971-4-3328289 Fax: 971-4-3329444 e-mail: hwyim@lsis.biz
- **LS-VINA Industrial Systems Co., Ltd >> Hanoi, Vietnam**
  Address: LSIS VINA Congty che tao may dien Viet-Hung Dong Anh Hanoi, Vietnam
  Tel: 84-4-882-0222 Fax: 84-4-882-0220 e-mail: srjo@hn.vnn.vn
- **LS Industrial Systems Hanoi Office >> Hanoi, Vietnam**
  Address: Room C21, 5Th Floor, Horison Hotel, 40 Cat Linh , Hanoi, Vietnam
  Tel: 84-4-736-6270/1 Fax: 84-4-736-6269
- **Dalian LS Industrial Systems Co., Ltd. >> Dalian, China**
  Address: No. 15 Liaohexi 3 Road, Economic and Technical Development zone, Dalian, China
  Tel: 86-411-8273-7777 Fax: 86-411-8730-7560 e-mail: lixk@lgis.com.cn
- **LS Industrial Systems (Wuxi) Co., Ltd. >> Wuxi, China**
  Address: 102-A National High&New Tech Industrial Development Area, Wuxi, Jiangsu, China
  Tel: 86-510-534-6666 Fax: 86-510-522-4078 e-mail: Xuhg@lgis.com.cn
- **LS Industrial Systems International Trading (Shanghai) Co., Ltd >> Shanghai, China**
  Address: Room E-G, 12th Floor Huamin Empire Plaza, No.726, West Yan'an Road Shanghai 200050, P.R. China
  Tel: 86-21-6278-4291 Fax: 86-21-6278-4372 e-mail: xuhg@lgis.com.cn
- **LS Industrial Systems Shanghai Office >> Shanghai, China**
  Address: Room 1705~1707, 17th Floor Xinda Commercial Building, No.322, Xian Xia Road Shanghai 200336, China
  Tel: 86-21-6208-7610 Fax: 86-21-6278-4292
- **LS Industrial Systems Beijing Office >> Beijing, China**
  Address: B-Tower 17 Fl. Beijing Global Trade Center B/D. No. 36, BeisanhUanDong-Lu, DongCheong-District, Beijing 100013, P.R. China
  Tel: 86-10-6462-3254 Fax: 86-10-6462-3236 e-mail: linsz@lgis.com.cn
- **LS Industrial Systems Guangzhou Office >> Guangzhou, China**
  Address: Room 1403, 14F, New Poly Tower, 2 Zhongshan Liu Road, Guangzhou, China
  Tel: 86-20-8326-6754 Fax: 86-20-8326-6287 e-mail: zhangch@lgis.com.cn
- **LS Industrial Systems Chengdu Office >> Chengdu, China**
  Address: 12Floor, Guodong Building, No52 Jindun Road Chengdu, 610041, P.R. China
  Tel: 86-28-8612-9151 Fax: 86-28-8612-9236 e-mail: hongkonk@vip.163,com
- **LS Industrial Systems Qingdao Office >> Qingdao, China**
  Address: 7B40,Haixin Guangchang Shenye Building B, No. 9, Shangdong Road Qingdao, China
  Tel: 86-532-580-2539 Fax: 86-532-583-3793 e-mail: bellkuk@hanmail.net

2006. 07 XGT Series (E) 2005. 11/(03) 2006. 07 Printed in Korea STAFF