

*Deliberate Design to  
Address Market Demands*

# VB SERIES

Material Size



**PROGRAMMABLE CONTROLLER**

## A Fabulous Product That Comes Closer to Market

**Market demands are the initial point for all products while a fabulous product should come closer to the market.**

Based on the idea "proximity to market needs", VIGOR fulfills market demands, visible or audible or imaginable, with VB Series Programmable Controller developed from professional expertise of its development workforce. More than a technology, VIGOR's expertise contains transcendent interactions between business and technologies.

VB Series PLC not only provides the new generation compact features with functionality but offers innovation design closer to the market, which will ensure diversified needs for control be satisfied.

VB Series Programmable Controller, which has proximity to the market, expects your appreciation and affirmation.

## Patented Function, Enhancing Product Added Value

**The state -of-the-art multifunctional display will effectively enhance product added value.**

Any machine may have potential breakdown problems. Machine designers want to have machine operators properly informed whenever a breakdown occurs in order for earlier maintenance to moderate losses. However, this important function is always omitted and discarded due to limited budgets.

Now VB Series PLC finds this requirement. There are many function displays designed for the PLC master, which allows you to easily and clearly detect machinery operation status and error messages without increasing additional costs.

Such an accommodating function has acquired a patent license. This manifests the extremely innovative and useful design. Besides, the multifunctional display can demonstrate graphics and text messages, and can be used as a data access unit if incorporated with button operation. Thus it is an edge tool for enhancing product additional value.



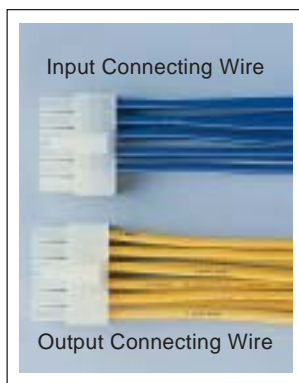
## Innovative Design, Effectively Reducing Labor Hour Costs

Terminal wiring with solidity and reliability seems to be the common type for current commercial PLCs. But many people are concerned about the deployment as it takes much time and makes mistakes easily, as well as has difficulties in maintenance.

VB Series PLC has found such a demand, for which it delivers a full series of solution for terminal blocks and connectors, including master, expansion unit and expansion module, to meet various needs and ideas.

To avoid any trouble with production of connecting wires, VB Series PLC comes with a connecting wire as long as 2 meters.

The "fast linkage" characteristic of the connector-type PLC will efficiently moderate wiring labor hours; moreover, it provides a feature facilitating the maintenance of machines. Particularly for machines in the mass-production industry, the efficiency stands out remarkably.



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## ◆ Programming Tool



Windows-based Programming Tool – Ladder Master



PDA-based Programming Tool – NeoTouch

## ◆ Memory Pack Expansion Card



RTC Expansion Card VB-RTC



Program Memory Card VB-MP1R



Data Bank Expansion Card – VB-DB1R

## ◆ Expansion Unit



Terminal Block Expansion Unit

VB-32E★◆	16-point Input 16-point Output
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Connector Expansion Unit

VB-32E★◆C	16-point Input 16-point Output
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## ◆ Communication Expansion



RS-232 Communication Expansion Card VB-232



RS-422/RS-485 Communication Expansion Card VB-485



RS-485 Communication Expansion Module VB-485A



Dual Communication Port Expansion Module VB-CADP

## ◆ Master



Terminal Block Master

VB2-16M★◆	8-point Input	8-point Output
VB2-32M★◆	16-point Input	16-point Output
VB0-14M★◆	8-point Input	6-point Output
VB0-20M★◆	12-point Input	8-point Output
VB0-28M★◆	16-point Input	12-point Output
VB0-32M★◆	16-point Input	16-point Output



Connector Master

VB2-32M★◆C	16-point Input	16-point Output
VB0-32M★◆C	16-point Input	16-point Output

## ◆ Expansion Module



Terminal Block Expansion Module

VB-16XY★	8-point Input 8-point Output
VB-16X	16-point Input
VB-8XY★	4-point Input 4-point Output
VB-8X	8-point Input
VB-8Y★	8-point Output



Connector Expansion Module

VB-16XY★-C	8-point Input 8-point Output
VB-16X-C	16-point Input
VB-8X-C	8-point Input
VB-8Y★-C	8-point output

## ◆ Special Module



VB-4AD	4-point 12-bit Analog Input
VB-2DA	2-point 12-bit Analog Output
VB-4DA	4-point 8-bit Analog Output
VB-3A	2-point 12-bit Analog Input 1-point 12-bit Analog Output
VB-6A	4-point 12-bit Analog Input 2-point 12-bit Analog Output
VB-4TC	4-point J/K TC Temperature Input
VB-8TC	8-point J/K TC Temperature Input
VB-1PG	Single Axis 100KPPS Output
VB-1HC	Single Axis 45KHz High Speed Counter
VB-1COM	A Serial Link Communication Interface
VB-PWR	24W Power Expansion

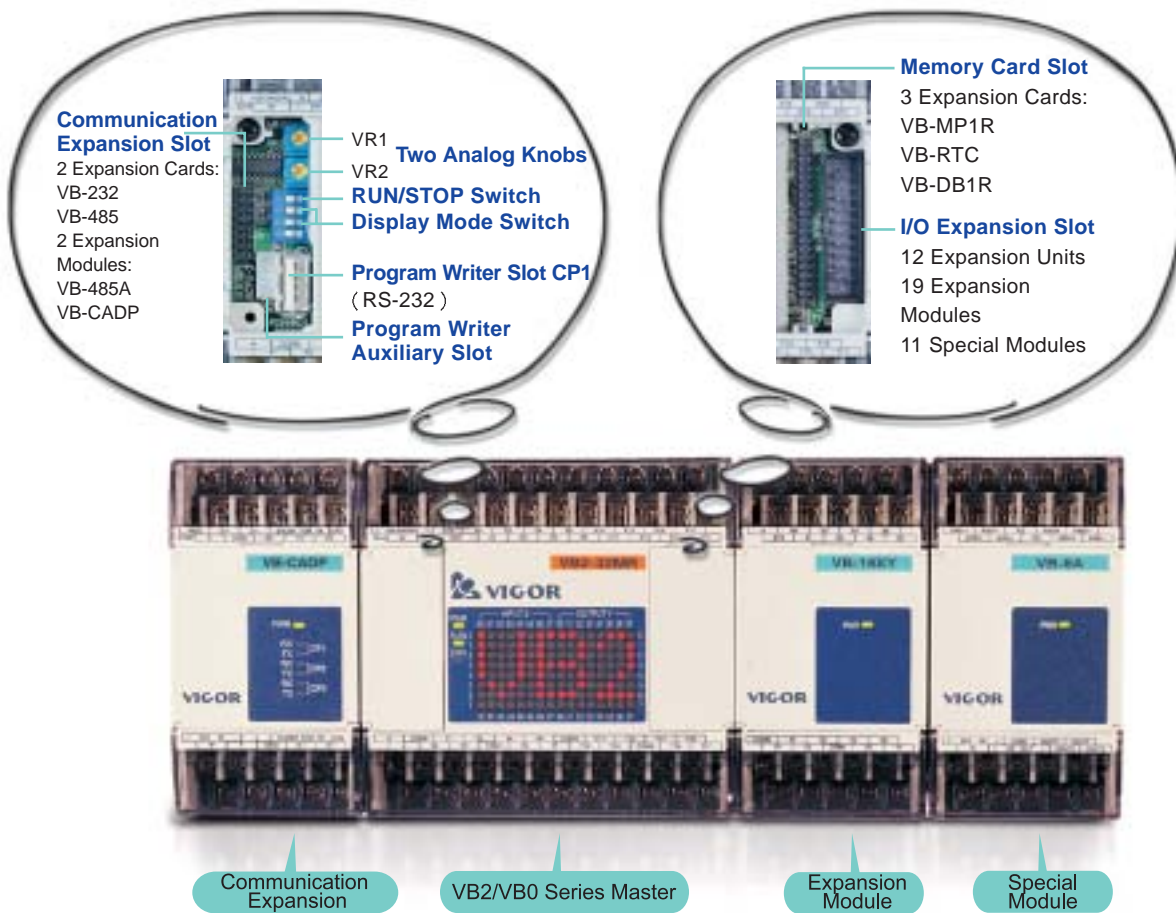
### ★ Indicates the output type

R: Relay Output  
T: NPN Transistor Output  
P: PNP Transistor Output

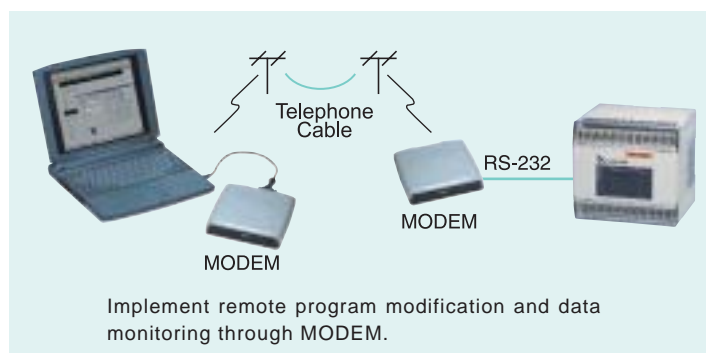
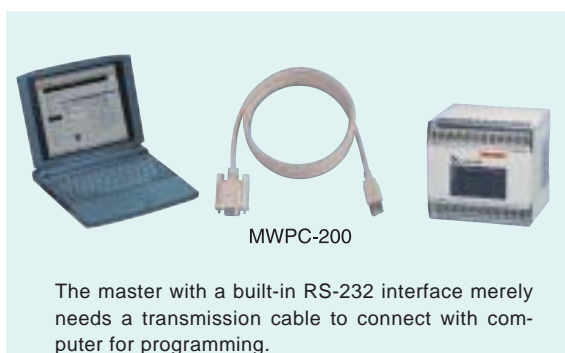
### ◆ Indicates the power type

A: AC100-240V – 15%/+ 10%  
D: DC24V – 15%/+ 20%



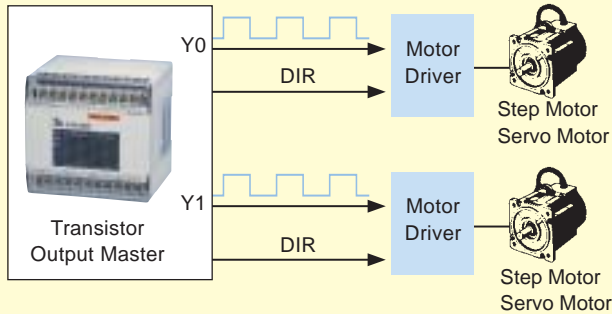


- The two analog knobs (VR1 and VR2) with readings of 0~255 can be used as data input (i.e. changing timer settings) and have ingenious purposes if incorporated with the multifunctional display.
- The master has built-in a RUN/STOP switch, allowing convenient control of running or stopping the PLC.
- The switch converting display modes chooses to demonstrate the display of I/O status or to implement the display for multifunctional purposes.
- The communication slot can be fitted with RS-232 or RS-422/RS-485 communication expansion card and the communication expansion module.
- The memory card slot can be fitted with the program memory card, RTC expansion card and data bank expansion card.
- The I/O slot can be fitted with various I/O expansion units, expansion modules and special modules.
- The program writer slot, USB A-type outlet and RS-232 interface can be connected with programming tools (computer or PDA), the Human-Machine Interface or SCADA(Supervisor Control And Data Acquisition). Remote program modification and data monitoring through MODEM are also available.
- Either the program writer auxiliary slot or the JST4P outlet can be parallel linked with the program writer slot.



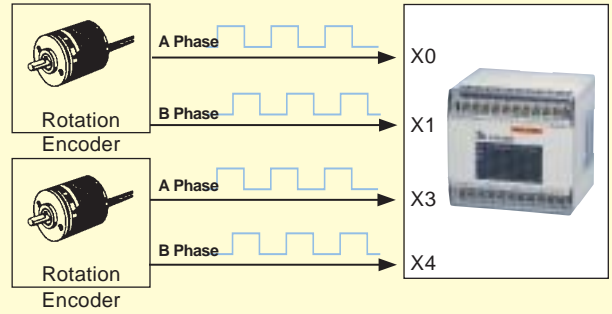
## ◆ Rapid Pulse Output Function

The master consists of two points (Y0, Y1) of rapid pulse output. The output pulse frequency reaches up to 7 KHz which may drive the step motor or servo motor. For higher frequency of pulse output, an additional VB-IPG pulse output positioning module is available.



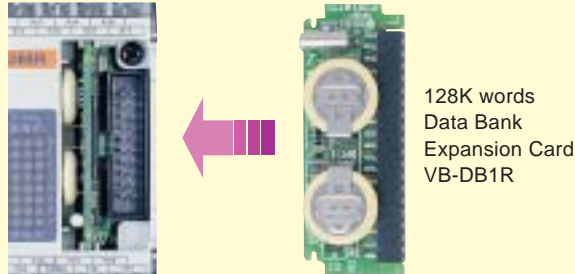
## ◆ Interrupt Input and High Speed Counter Function

The master, containing 6 points (X0~X5) of rapid input, can be used as the external interrupt input terminal and high speed counter input terminal. It can be connected with maximally 6 single-phase high-speed counter input signals or 2 AB-phase rotation encoders. For higher frequency of counter input, it can be installed with a VB-1HC high-speed counter module additionally.



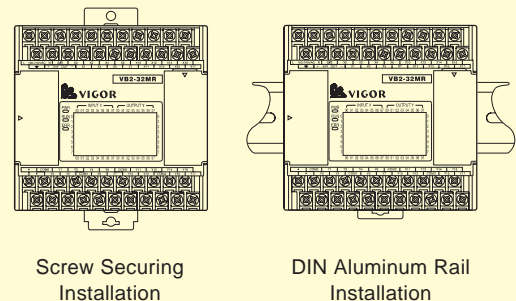
## ◆ Data Bank Supplies Large Capacity of Data Storage Function

The master contains 8,192 data registers and 512 registers providing the "latched" function. Installed with VB-DB1R data bank expansion card, the master will have 128,000 data registers with the "latched" function for application of storing tremendous data.



## ◆ Two Installation Methods Meets Various Demands

The DIN Aluminum Rail installation is an easy and fast installation method. For an installation secured with screws, simply push out the mobile screw hole hidden under the bottom. Such a deliberate design gives consideration to both the pleasing shape and practical uses.



## ◆ Robust System Function

- The PLC has a program capacity of up to 8K Steps and uses Flash ROM storage programs, batteries can be discarded.
- Control programs, component comments and program comments can be loaded to the PLC altogether, which is easy for system maintenance.
- The system provides program encryption protection, ensuring intelligent property rights.
- The additional RTC expansion card allows regular, periodic and auto control.
- The master with a built-in multifunctional display can displays information in a timely and convenient manner.

## ◆ Full Communication Function

- The master with an RS-232 standard interface can be connected with the computer, human machine interface and graphic control system. Remote program modification and data monitoring through MODEM are also available.
- A number of communication cards and expansion modules provide RS-232, RS-485 interfaces. The system can be expanded with up to 11 communication ports.
- The system offers various communication functions, e.g. Computer Link, CPU Link, Parallel Link, Easy Link, MODBUS Communication, MODEM Communication, Non Protocol Communication, to meet complicated needs for communication.

## ◆ Modular Structure with Flexible Combination of Many Models and Modules

## ◆ Diversified Models Satisfies Needs for Various Control

- The master containing 14~32 points offers many optional models.
- With various models such as 4X/4Y Module ~ 16X/16Y expansion units, the systems provides complete expansion features.
- Two I/O connection modes (terminal block and connector) are available.
- Two types of power input: AC85V ~ 264V and DC24V.
- The relay, NPN transistor and PNP transistor output forms are optional.
- The input form uses the sinking/sourcing common mode.

## ◆ Numerous kinds of Special Modules Supplies various Special Application

The analog I/O module, temperature input module, pulse output positioning module, high-speed counter module and serial link communication modules.

## ◆ Compact with Sophisticated Design Saves Installation Space

## ◆ Windows-based Programming Software Ladder Master, Easy to Learn and Use

## ◆ PDA-based Programming Software NeoTouch, an Advanced and Fashionable Design

## Multifunctional Display

This state-of-the-art multifunctional display can be used to demonstrate error messages, program implementation processes, texts and graphics, etc.

Incorporated with keystroke input, the display further can be used as a data access unit. A better utilization will help enhance product added value.

- The external appearance of VB Series PLC is equipped with a 16 × 8 matrix LED display, i.e. the multifunctional display.
- The second dip-switch within the master's left cover determines the usage of the display.

When the dip-switch is turned OFF - the display is used to indicate input/output status.

When the dip-switch is turned ON - the display is used as a multifunctional display.

- There are 8 display modes for a multifunctional display (Mode 0~7), depending on the content value of Special Register D9080.

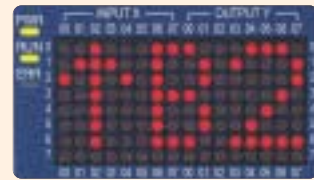
During the program operation, the display mode of the display will be changed as long as the content value of D9080 is changed.



**Display Mode 0:** displays Input / Output status



**Display Mode 1:** displays values, texts and graphics. User can designate 128 LEDs of the display as ON or OFF, so as to show various graphics in the display. Graphic or text cycling LEDs are also available.



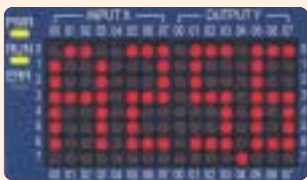
**Display Mode 2:** displays Error Code. It displays the register's content value in error codes. This mode is typically used to the machine where any fault occurs, demonstrating relative error codes to help eliminate errors as soon as possible. It is useful with simple implementation.



**Display Mode 3:** displays a four-digit value (0000~9999). It displays the register's content value in the display. This mode is always used as the counter for finished goods or to demonstrate working hours.



**Display Mode 4:** displays a two-digit value (00~99). It displays two register content values in the display for simultaneous observation on the change of these data.



**Display Mode 5:** displays an alphanumeric and a three-digit value (000~999). It displays a designated alphanumeric (0~9, A~Z, a~z) on the left side of the display. This mode can be applied to multiple data display where the left side displays the title and the right side displays the data content.



**Display Mode 6:** data access unit. This mode can have functions as a data access unit when incorporated with our configuration panel DAP-100, undertaking monitoring and configuration for several register content values.



**Display Mode 7:** displays a five-digit value (0~32767). It displays the register's content value in the display. This mode is always used as the counter for finished goods or to demonstrate working hours.



Specification of VB Series PLC Function

Item		VB0 Series	VB2 Series
Control Approach		Programmed Storage, Circulating Scan	
Programming Language		Ladder Chart + Stepladder Chart	
Control Method of Input / Output		General Processing	
Execution Velocity	Basic instruction	0.375 - 12.56 $\mu$ S	
	Applied Instruction	Some $\mu$ S - hundreds of $\mu$ S	
Number of Instructions	Basic instruction	27(including LDP, LDF, ANDP,ANDF, ORP, ORF, INV)	
	Stepladder Instruction	2	
	Applied Instruction	93	
Memory Capacity	Program capacity	2.5K Steps Flash ROM	8K Steps Flash ROM
	Component Comment Capacity	2730 (8 Chinese characters or 16 English characters for each comment)	
	Program Comment Capacity	10,000 Chinese characters or 20,000 English characters	
Max. Input / Output Points		128 points: X0 - X77, Y0 - Y77	256 points: X0 - X177, Y0 - Y177
Internal Relay	Auxiliary Relay (M)	General	3120 points: M0 - M1999, M4000 - M5119
		Latched	2000 points: M2000 - M3999
		For Special Use	256 points: M9000 - M9255
	Stepladder Relay (S)	For Initiation	10 points: S0 - S9
		General	490 points: S10 - S499
		Latched	400 points: S500 - S899
	For Annunciator	100 points: S900 - S999(Latched)	
Timer (T)		100mS	200 points: T0 - T199 (Timer range: 0.1 - 3276.7 Sec.)
		10mS	46 points: T200 - T245 (Timer range: 0.01 - 327.67 Sec.)
		1mS (Retentive)	4 points: T246 - T249 (Timer range: 0.001 - 32.767 Sec.)
		100mS (Retentive)	6 points: T250 - T255 (Timer range: 0.1 - 3276.7 Sec.)
Counter (C)	16-bit Up	General	100 points: C0 - C99
		Latched	100 points: C100 - C199
	32-bit Up/Down	General	20 points: C200 - C219
		Latched	15 points: C220 - C234
High Speed Counter (C)	32-bit Up/Down, Latched	1-phase Counter	11 points: C235 - C245 (Max. Counter Frequency: 10KHz)
		2-phase Counter	5 points: C246 - C250 (Max. Counter Frequency: 10KHz)
		A/B Phase Counter	5 points: C251 - C255 (Max. Counter Frequency: 5KHz)
Register (D)		General	7680 points: D0 - D6999, D7512 - D8191
		Latched	512 points: D7000 - D7511
		File Register	7000 points: D1000 - D7999
		For Special Use	256 points: D9000 - D9255
		For Index	16 points: V0 - V7, Z0 - Z7
Level		Branch Level (P)	256 points: P0 - P255
		Interrupt Level (I)	15 points: 6 points for external interrupt, 3 points for timer interrupt, and 6 points for counter interrupt
		Nest Level (N)	8 points: N0 - N7
Numerical System	Decimal (K)	16 Bits	-32768 - 32767
		32 Bits	-2147483648 - 2147483647
	Hexadecimal (H)	16 Bits	0H - FFFFH
		32 Bits	0H - FFFFFFFFH
Pulse Output		2 points; Max. Output Pulse Frequency: 7KHz	
Programming Device Link Interface		RS-232C, directly connected to computer, Human-Machine Interface and MODEM	
Communication Link Interface (Optional)		RS-232C or RS-422 / RS-485	
Real Time Clock (Optional)		To indicate year, month, day, hour, min., sec. and week	
Number of Special Modules Linked		2 (Max.)	8 (Max.)
Multi-function Display		128 display points, displaying input/output status and a variety of information.	
Analog Knob		2 analog knobs, readings: 0 - 255	

Basic Instruction Table

Instruction Title	Function	Device	Instruction Title	Function	Device	Instruction Title	Function	Device
LD	Initial logical operation contact type NO (normally open)	X·Y·M·S·T·C	PLS	Rising edge pulse	Y·M	MPS	Stores the current result of the internal PLC operations	—
LDI	Initial logical operation contact type NC (normally closed)	X·Y·M·S·T·C	PLF	Falling edge pulse	Y·M	MRD	Reads the current result of the internal PLC operations	—
AND	Serial link of NO (normally open) contacts	X·Y·M·S·T·C	LDP	Initial logical operation contact Rising edge pulse	X·Y·M·S·T·C	MPP	Pops (recalls and removes) the currently stored result	—
ANI	Serial link of NC (normally closed) contacts	X·Y·M·S·T·C	LDF	Initial logical operation contact Falling edge pulse	X·Y·M·S·T·C	NOP	No operation or null step	—
OR	Parallel link of NO (normally open) contacts	X·Y·M·S·T·C	ANDP	Serial link of Rising edge contacts	X·Y·M·S·T·C	END	Force the current program scan to end	—
ORI	Parallel link of NC (normally closed) contacts	X·Y·M·S·T·C	ANDF	Serial link of Falling edge contacts	X·Y·M·S·T·C	<b>Stepladder Instruction</b>		
ANB	Serial link of multiple parallel circuits	—	ORP	Parallel link of Rising edge contacts	X·Y·M·S·T·C			
ORB	Parallel link of multiple contact circuits	—	ORF	Parallel link of Falling edge contacts	X·Y·M·S·T·C	Instruction Title	Function	Device
OUT	Final logical operation type coil drive	Y·M·S·T·C	INV	Contradictory Result	—	STL	Initiation of Stepladder	S
SET	Sets component permanently ON	Y·M·S	MC	Denotes the start of a master control block	N0 ~ N7	RET	End of Stepladder	—
RST	Resets component permanently OFF	Y·M·S·T·C·D	MCR	Denotes the end of a master control block	N0 ~ N7			

Applied Instruction Table

Type	FNC No.	Instruction Title		Function
		D	P	
Program Flow	00	CJ	P	Conditional Jump
	01	CALL	P	Call subroutine
	02	SRET		Subroutine Return
	03	IRET		Interrupt Return
	04	EI		Enable Interrupt
	05	DI		Disable Interrupt
	06	FEND		First End
	07	WDT	P	Watch Dog Timer refresh
	08	FOR		Start of a FOR-NEXT loop
09	NEXT		End of a FOR-NEXT loop	
Compare and Move	10	D CMP	P	Compare
	11	D ZCP	P	Zone Compare
	12	D MOV	P	Move
	13	SMOV	P	Shift Move
	14	D CML	P	Compliment
	15	BMOV	P	Block Move
	16	D FMOV	P	Fill Move
	17	D XCH	P	Exchange
	18	D BCD	P	Converts BIN to BCD
19	D BIN	P	Converts BCD to BIN	
Arithmetic and Logical Operations	20	D ADD	P	Addition
	21	D SUB	P	Subtraction
	22	D MUL	P	Multiplication
	23	D DIV	P	Division
	24	D INC	P	Increment
	25	D DEC	P	Decrement
	26	D WAND	P	Logic Word AND
	27	D WOR	P	Logic Word OR
	28	D WXOR	P	Logic Word exclusive OR
29	D NEG	P	Negation	
Rotary and Shift	30	D ROR	P	Rotation Right
	31	D ROL	P	Rotation Left
	32	D RCR	P	Rotation Right with Carry
	33	D RCL	P	Rotation Left with Carry
	34	SFTR	P	Bit Shift Right
	35	SFTL	P	Bit Shift Left
	36	WSFR	P	Word Shift Right
	37	WSFL	P	Word Shift Left
	38	SFWR	P	Shift register Write (FIFO Write)
39	SFRD	P	Shift register Read (FIFO Read)	
Data Operation	40	ZRST	P	Zone Reset
	41	DECO	P	Decode
	42	ENCO	P	Encode
	43	D SUM	P	The Sum of active bits
	44	D BON	P	Check specified bit status
	45	D MEAN	P	Mean
	46	ANS		Timed Annunciator set
	47	ANR	P	Annunciator Reset
	48	D SQR	P	Square Root

Type	FNC No.	Instruction Title		Function	
		D	P		
High Speed Processing	50	REF	P	I/O Refresh	
	51	REFF	P	I/O Refresh and filter adjust	
	52	MTR		Input Matrix	
	53	D HSCS		High Speed Counter Set	
	54	D HSCR		High Speed Counter Reset	
	55	D HSZ		High Speed Counter Zone compare	
	56	SPD		Speed Detection	
	57	D PLSY		Pulse Y output	
	58	PWM		Pulse Width Modulation	
Handy Instruction	61	D SER	P	Search	
	62	D ABSD		Absolute Drum	
	63	INCD		Incremental Drum	
	64	TTMR		Teaching Timer	
	65	STMR		Special Timer	
	66	ALT		Alternate state	
	67	RAMP		Ramp -variable value	
	69	SORT		Sort data	
	70	D TKY		Ten Key input	
External Default and Display	71	D HKY		Hexadecimal Key input	
	72	DSW		Digital Switch (thumbwheel input)	
	73	SEGD	P	Seven Segment Decoder	
	74	SEGL		Seven Segment with Latch	
	76	ASC		ASCII code Convert	
	77	PR		Print	
	78	D FROM	P	Read from a special function block	
	79	D TO	P	Write to a special function block	
	80	RS		Serial communication instruction	
Serial Communication	81	D PRUN	P	Parallel Run	
	82	ASCI	P	Converts HEX to ASCII	
	83	HEX	P	Converts ASCII to HEX	
	84	CCD	P	Check Code	
	85	VRRD	P	VR volume read	
	86	VRSC	P	VR volume scale	
	89	LINK		Easy Link communication	
	Miscellaneous Instructions	160	TCMP	P	Read Data Bank
		161	TZCP	P	Write Data Bank
162		TADD	P	Byte Swap	
163		TSUB	P	10mS Timer	
166		TRD	P	100mS Timer	
167		TWR	P	1Sec. Timer	
170		D GRY	P	Time Compare	
171		D GBIN	P	Time Zone Compare	
90		DBRD	P	Time Add	
Time & Convert	91	DBWR	P	Time Subtract	
	147	D SWAP	P	Read RTC data	
	176	TFT		Set RTC data	
	177	TFH		Converts BIN to Gray code	
178	TFK		Converts Gray code to BIN		

## Typical Specification

Item	Specification
Work Ambient Temperature	0~55°C
Storage Ambient Temperature	-20~70°C
Work Ambient Humidity	10~90% RH, with no condensation
Storage Ambient Humidity	10~90% RH, with no condensation
Vibration Tolerance	10~55 Hz with amplitude of 0.075mm; acceleration at 55 Hz~150 Hz = 1G; 80 minutes (Scan Time 8 minutes × 10 times = 80 minutes) in each of X, Y and Z axes
Shock Resistance	10 G three times for each of X, Y and Z axes
Noise Immunity	Noise Simulator: 1500 Vp-p, Pulse Width: 1 μS, Frequency: 25~60Hz
Dielectric Strength	1500VAC, 1 min. (between AC terminal and rack panel) / 500VAC, 1 min. (between DC terminal and rack panel)
Insulation Resistance	5 MΩ or above at 500 VDC (between AC terminal and rack panel)
Grounding	Class-3 Grounding
Atmosphere	Free from corrosive gas or dusty environment

## Power Specification (Including All VB Series Masters and Expansion Units)

Item	AC Power	DC Power
Power Voltage	AC 100~240V +10%/-15%	DC 24V +20%/-15%
Power Frequency	50/60 Hz	—
Guaranteed Voltage Interrupt Time	Within 10mS	Within 1 mS
Power Fuse	250V 2A	250V 5A
Power Consumption	30VA	12W
Rated Current	DC5V 400mA	DC5V 400mA
	DC12V 530mA	DC12V 530mA
	DC24V ± 15% 420mA, output from terminal	—

### ◆ Precautions for Expansion

- As all of the VB Series main unit occupy the I/O address, X0~X17/Y0~Y17, the I/O address of the first expansion module will be aligned from X20/Y20.
- Special modules of VB Series will not occupy any I/O address.
- The expansion module VB-8XY will occupy 8 points of input and 8 points of output.

- The maximum number of I/O points:  
128 points, X0~X77 and Y0~Y77, for VB0 Series;  
256 points, X0~X177 and Y0~Y177, for VB2 Series

- The number of the special modules to be linked:  
2 special modules maximally, for VB0 Series;  
8 special modules maximally, for VB2 Series

#### • Relative Conditions for I/O Expansion

The main unit and expansion unit of VB Series PLC are equipped with power circuits, while the power supply to expansion modules and special modules depends on the main/expansion unit or the VB-PWR power expansion module. The number of the modules that can be expanded with the main unit, expansion unit and VB-PWR is specified as below:

#### The following requirements should be fulfilled for a power expansion module VB-PWR expanded with modules:

- (1)  $[(\text{number of expansion modules}) + (\text{number of special modules} \times 2)] \leq 4$
- (2) Output points of the main unit and the points attached behind the master  
 $[(\text{number of the relays at ON} \times 6) + (\text{number of transistors at ON})] \leq 192$

#### The following requirements should be fulfilled for an expansion unit expanded with modules

- (1)  $[(\text{number of expansion modules}) + (\text{number of special modules} \times 2)] \leq 12$
- (2) Output points of the expansion unit and the points attached behind the expansion unit  
 $[(\text{number of the relays at ON} \times 6) + (\text{number of transistors at ON})] \leq 192$

#### The following requirements should be fulfilled for a power expansion module VB-PWR expanded with modules

- (1)  $[(\text{number of expansion modules}) + (\text{number of special modules} \times 2)] \leq 12$
- (2) Output points attached behind VB-PWR  
 $[(\text{number of the relays at ON} \times 6) + (\text{number of transistors at ON})] \leq 288$



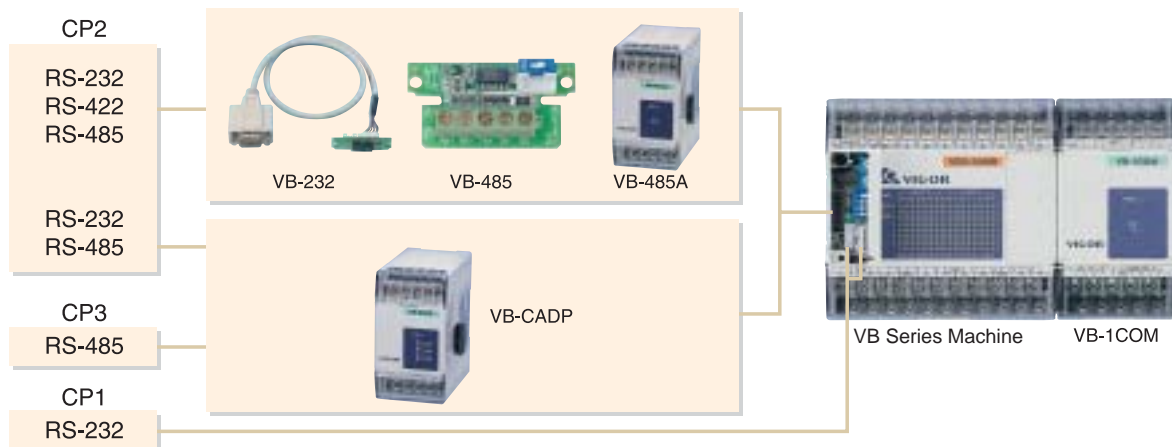
Input Specification

Item	Specification
External Power Supply	DC24V ± 15%
Input Signal Circuit	7mA/DC24V
Input ON Circuit	Above 3.5mA
Input OFF Circuit	Below 1.7mA
Input Resistance	3.3KΩ approximately
Input Response Time	10mS approximately, X0~X7 can be set between 0~60mS.
Input Signal Type	No voltage contact or NPN/PNP open collector transistor
Isolation Mode	Photocoupler Isolation
Circuit Diagram	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>AC Power Model</p> </div> <div style="text-align: center;"> <p>AC Power Model</p> </div> <div style="text-align: center;"> <p>DC Power Model</p> </div> <div style="text-align: center;"> <p>DC Power Model</p> </div> </div>

Output Specification

Item	Specification			
Output Type	Relay Output	NPN Transistor Output	PNP Transistor Output	
Load Power	Below AC250V/DC30V	DC5V~30V	DC5V~30V	
Max. Load	Resistive Load	0.5A/1 point, 0.8A/4-point shared COM	0.5A/1 point, 0.8A/4-point shared COM	
	Inductive Load	80VA	12W/DC24V	12W/DC24V
	Lamp Load	100W	1.5W/DC24V	1.5W/DC24V
Open-Drain Circuit	—	Below 0.1mA	Below 0.1mA	
Output Response Time	10mS approximately	OFF→ON: below 20 μ S ON→OFF: below 100 μ S	OFF→ON: below 20 μ S ON→OFF: below 100 μ S	
Isolation Mode	Mechanic Isolation	Photocoupler Isolation	Photocoupler Isolation	
Circuit Diagram				

## Communication System Composition



### ◆ COM Port 1 (CP1) :

CP1 is a built-in RS-232 communication interface. In the figure above, either the USB port or the white JST4P port is available. Computer Link, the communication application type for CP1, is used for implementing M and VB Series communication protocol. Its main purposes are to:

1. Connect programmable tools (Computer + Ladder or PDA + NeoTouch)
2. Connect the Human-Machine Interface or SCADA(Supervisor Control And Data Acquisition).
3. Connect MODEM for remote program modification and data monitoring.

### ◆ COM Port 2 (CP2) :

CP2 is a multifunctional expansion communication port and can be used for implementation of various communication applications.

1. Computer Link – enables M and VB Series communication protocol and has the same purpose for use as CP1 in RS-232 interface. In RS-485 interface, the computer and several PLCs constitute the monitoring local access network.
2. CPU Link – enables the dedicated communication protocol and is only available in RS-485 interface. CPU Link allows data exchange between 2~8 PLCs, usually used for the distributed control system.
3. Parallel Link – enables the dedicated communication protocol and has the same purpose for use as CPU Link, except allowing data exchange between 2 PLCs with simple usage.
4. Easy Link – enables M and VB Series communication protocol. Basically this application type is similar to Computer Link, except that M or VB Series PLCs (called “Master PLCs” replace the computer in LAN). In the Master PLC program we use LINK (FUN89) to access all the Slave PLC’s data in the network for data exchange.
5. MODBUS – enables MODBUS communication protocol. MODBUS is a commercially available communication protocol. Normal SCADA(Supervisor Control And Data Acquisition) and Human-Machine Interfaces will support MODBUS communication protocol. Those devices without VB Series communication protocol can acquire links to VB Series PLCs with such an application.
6. MODEM Communication – initiatively contacts with MODEM when the PLC boots (MODEM’s “AA” should light on), and then enables M and VB Series communication protocol. The remote computer can therefore link PLCs with MODEM and perform remote program modification or data monitoring.
7. MODEM Dialing – uses the above-mentioned MODEM Communication to enable the PLC to link the other PLC of the phone number (if the dialing function of VB Series PLC is activated) after the PLC has contacted with MODEM. The function is very useful especially for remote abnormality report, security system and data open collector.
8. Non Protocol – does not enable any specific communication protocol. All communication processes are customized and completed with PLC programs. It uses RS (FUN80) to receive and transfer communication data for communication operation. This application type is usually used for communication links for peripherals, such as commercially available temperature controller, frequency converter and bar code reader.

### ◆ COM Port3 (CP3) :

CP3 is an expanded RS-485 communication port. Acquired from the expansion of VB-CADP expansion module, the application type is classified as Computer Link, enabling M and VB Series communication protocol. It is typically used for links between the Human-Machine Interface and the SCADA(Supervisor Control And Data Acquisition), and sets up the monitoring LAN.

### ◆ VB-1COM :

VB Series PLC Serial Link Communication Module provides a RS-232/RS-485 communication port. It does not enable any specific communication protocol. All communication processes are customized and completed with PLC programs. This application type is usually used for communication links for peripherals, such as commercially available temperature controller, frequency converter and bar code reader. A machine can be expanded with 8 VB-1COM modules maximally.

## Communication Expansion Card

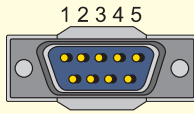
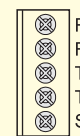
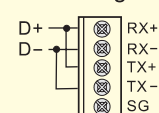


**VB-232**  
RS-232 Communication  
Expansion Card



**VB-485**  
RS-485 Communication  
Expansion Card

- VB-232 and VB-485 are the COM Port 2 (CP2) expansion cards of VB Series PLC.
- VB Series PLC's CP2 is a multifunctional communication port that enables a number of communication applications, e.g. Computer Link, CPU Link, Parallel Link, Easy Link, MODBUS Communication, MODEM Communication and Non-Protocol Communication.

Item	VB-232	VB-485
Communication Interface	RS-232C	RS-422/RS-485
Isolation Mode	No Isolation	
LED Indicator	RXD, TXD	
Max. Communication Distance	15M	50M
Communication Method	Semi-duplex	
Baud Rate	300/600/1200/2400/4800/9600/19200/38400 bps	
Communication Protocol	Computer Link } M Series and VB Series PLC communication protocol Easy Link } MODEM } Parallel Link : Dedicated communication protocol MODBUS : The third supplier's communication protocol Non Protocol : Customized by users, completed with PLC programs, and communicated with other devices with RS instructions	Computer Link } M Series and VB Series PLC communication protocol Easy Link } CPU Link } Dedicated communication protocol Parallel Link } MODBUS : The third supplier's communication protocol Non Protocol : Customized by users, completed with PLC programs, and communicated with other devices with RS instructions.
Power Supply	DC5V 10mA (Power supply from PLC)	DC5V 60mA (Power supply from PLC)
Connection	 <p>D-Sub Connector 9-pin male</p> <p>1 : CD 2 : RXD 3 : TXD 5 : SG 7 : RTS 8 : CTS 4,6,9 : Not Use</p>	European-Type Terminal Block  <p>Note: 1.RS-485 Wiring Method</p>  <p>2.SW1 is the terminal resistance switch (terminal resistance 120Ω)</p>
Parameter Configuration Setting	For selection of CP2 application types and relevant parameter configuration settings, please use the option "System Configuration - COM Port Setting of CPU Expansion Card" of the editing software Ladder Master.	





### VB-CADP Bi-Port Communication Expansion Module

- CP2 and CP3 expansion module.
- CP2 provides isolated RS-232/RS-485 communication interface. The communication distance of RS-485 reaches up to 1000M.
- CP3 provides isolated RS-485 communication interface with the communication distance of up to 1000M.
- CP2 is a multifunctional communication port that enables a number of communication applications, e.g. Computer Link, CPU Link, Parallel Link, Easy Link, MODBUS Communication, MODEM Communication and Non-Protocol Communication.

Item	CP2		CP3
Communication Interface	RS-232C	RS-485	RS-485
Isolation Mode	Photocoupler Isolation		
LED Indicator	RX, TX (CP2)		
Max. Communication Distance	15M	1000M	1000M
Communication Method	Semi-duplex		
Baud Rate	300/600/1200/2400/4800/9600/19200/38400 bps		19200 bps
Communication Protocol	Computer Link } M Series and VB Series PLC communication protocol Easy Link } MODEM(RS-232) CPU Link(RS-485) } Dedicated communication protocol Parallel Link } MODBUS : The third supplier's communication protocol Customized by users, completed with PLC programs, and communicated with other devices with RS instructions Non Protocol :		Computer Link : M Series and VB Series PLC communication protocol  Baud Rate : 19200bps Data Length : 7 bit (ASCII) Parity : EVEN Stop bit : 1 bit
Power Supply	DC24V ± 10% 70mA (External power supply)		
Connection	Terminal Block Connection 		
Parameter Configuration Setting	For selection of CP2 application types and relevant parameter configuration settings, please use the option "System Configuration - COM Port Setting of CPU Expansion Card" of the editing software Ladder Master.		Communication station number setting: designated by the turn knob switch on the left side of the module (00~99).

- ◆ After linking VB-CADP Module, the machine's CP1 will be disabled, and its function will be replaced by VB-CADP's CP1.
- ◆ VB-CADP Module provides RX, TX indicator lamps of PWR and CP1.



### VB-485A RS-485 Communication Expansion Module

- COM Port 2 (CP2) expansion module of the machine
- Isolated RS-485 communication interface with the communication distance of up to 1000 M
- VB Series PLC CP2 is a multifunctional communication port that enables a number of communication applications, e.g. Computer Link, CPU Link, Parallel Link, Easy Link, MODBUS Communication, MODEM Communication and Non-Protocol Communication.

Item	Specification
Communication Interface	RS-485
Isolation Type	Photocoupler Isolation
LED Indicator	PWR, RX, TX
Max. Communication Distance	1000 M
Communication Method	Semi-duplex
Baud Rate	300/600/1200/2400/4800/9600/19200/38400 bps
Communication Protocol	Computer Link } M Series and VB Series PLC communication protocol Easy Link }
	CPU Link } Dedicated communication protocol Parallel Link }
	MODBUS : The third supplier's communication protocol
	Non Protocol : Customized by users, completed with PLC programs, and communicated with other devices with RS instructions
Power Supply	DC24V ± 10% 55mA (External power supply)
Connection	Terminal block connection
Parameter Configuration Setting	For selection of CP2 application types and relevant parameter configuration settings, please use the option "System Configuration - COM Port Setting of CPU Expansion Card" of the editing software Ladder Master.



### VB-1COM Serial Link Communication Module

- VB-1COM is a VB Series special module.
- VB-1COM provides both optional RS-232 and RS-485 interfaces.
- RS-232 and RS-485 are all isolation-based interfaces. RS-485 has a communication distance of up to 1000 M.
- The module features receive/transfer HEX code and ASCII auto conversion.
- A machine can be expanded with 8 VB-1COM modules maximally.

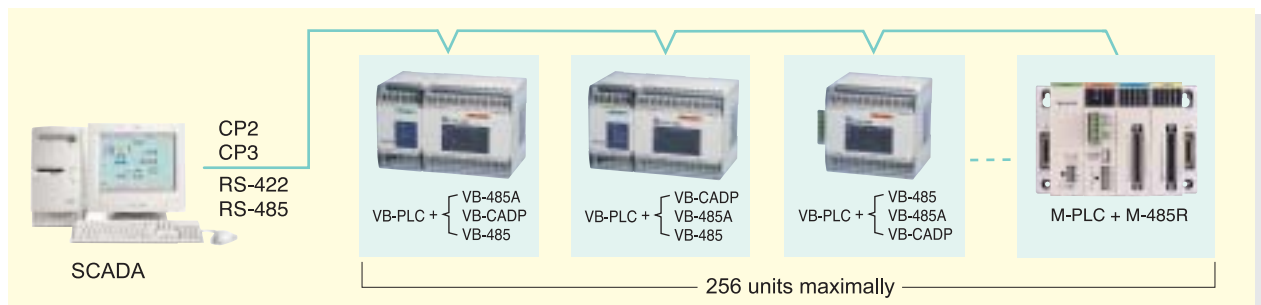
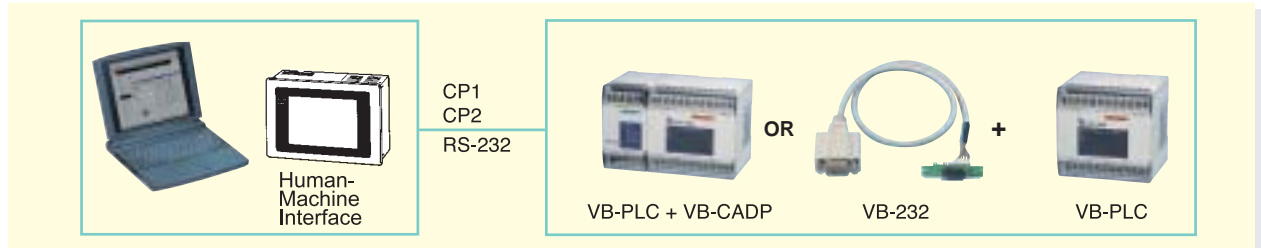
Item	Specification	
Communication Interface	RS-232	RS-485
Isolation Type	Photocoupler Isolation	
LED Indicator	PWR, RX, TX	
Max. Communication Distance	15 M	1000 M
Communication Method	Semi-duplex	
Baud Rate	300/600/1200/2400/4800/9600/19200/38400/76800/14400/28800/57600 bps	
Communication Protocol	Non Protocol: Protocol procedures are customized by users, and are completed with PLC programs.	
Communication Format	Designated by BFM (9 formats in total)	
Communication with PLC	Using FROM/TO instructions with BFM	
Power Supply	DC24 ± 10% 45mA (External power supply), DC5V 75mA (PLC internal power supply)	
Connection	Terminal block connection	

# Communication Operation Modes

VB Series PLC has robust communication functions. It provides several communication operation modes that will achieve various applications such as LAN monitoring, disputed control, links to peripherals and MODEM communication. The communication operation modes of VB Series PLC are specified as follows:

## ◆ Computer Link

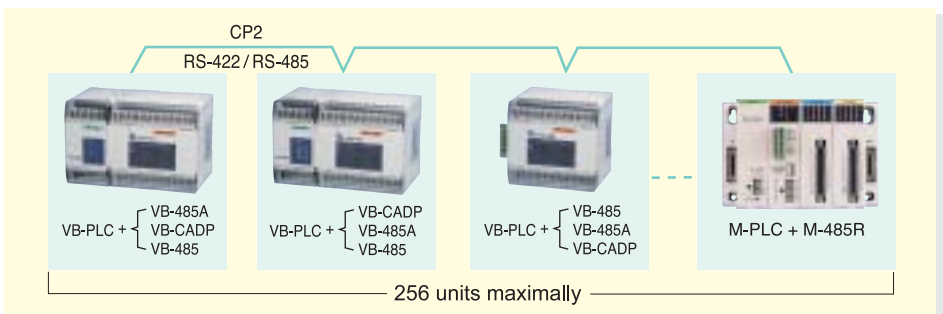
- The communication between PLC, Computer and the human-machine interface is enabled with M and VB Series communication protocol.



Item	Specification	
Communication Interface	RS-485	RS-422/RS-485
Communication Protocol	VB Series Communication Protocol (Same as M Series Communication Protocol)	
Communication Method	Semi-duplex	
Communication Parameter	Data Length: 7 bits (ASCII)	Parity: EVEN Stop Bit: 1 bit
Baud Rate	CP1 and CP3: 19200 bps	CP2: 4800/9600/19200/38400 bps (optional)
Communication Distance	15 M	1000 M (50 M, if VB-485 exists in the communication loop)
Number of Link Stations	1 station	256 stations maximally (an additional power amplifier is required when there are more than 32 stations)
Connection Facility	CP1: Built-in Main unit CP2: VB-232 or VB-CADP	CP2: VB-485, VB-485A or VB-CADP CP3: VB-CADP M Series: M-485R
Linkable PLC	VB0 Series, VB2 Series and M Series PLC	
Data Transfer Range	Transferable, including all of X, Y, M, S, T, C and D	

## ◆ Easy Link

- PLC will enable VB Series communication protocol while the master's PLC programs control data transfer between PLCs.

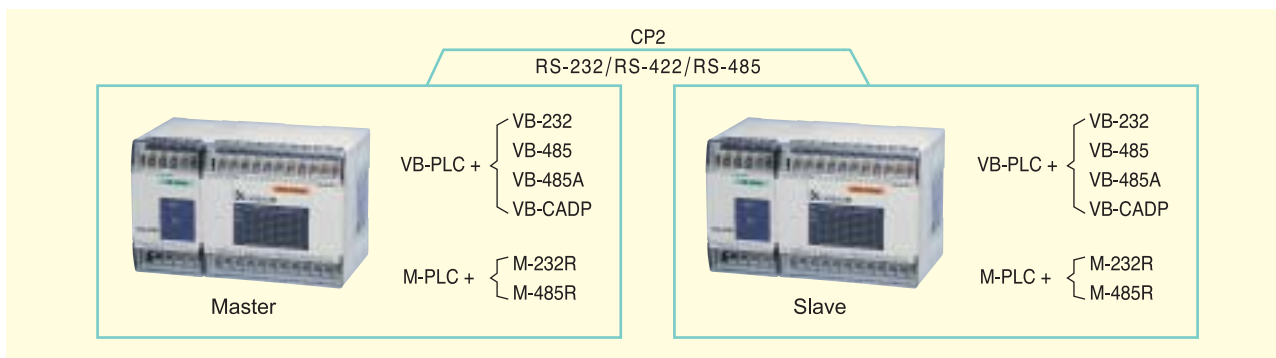


Item	Specification	
Communication Interface	RS-422/RS-485	
Communication Protocol	VB Series Communication Protocol (Same as M Series Communication Protocol)	
Communication Method	Semi-duplex	
Communication Parameter	Data Length: 7 bits (ASCII)	Parity: EVEN Stop Bit: 1 bit
Baud Rate	4800/9600/19200/38400 bps	
Communication Distance	1000 M (50 M, if VB-485 exists in the communication loop)	
Number of Link Stations	256 stations maximally (an additional power amplifier is required when there are more than 32 stations)	
Connection Facility	VB Series: VB-485, VB-485A or VB-CADP	
Linkable PLC	VB0 Series, VB2 Series and M Series PLC	
Data Transfer Range	Transferable, including all of X, Y, M, S, T, C and D	



## ◆ Parallel Link

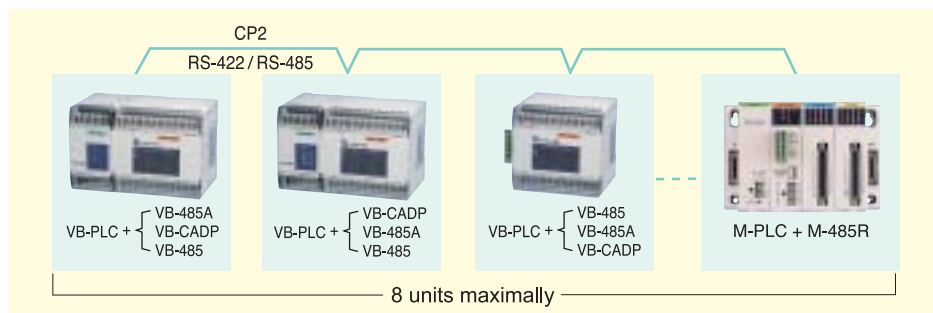
- PLC will enable dedicated communication protocol, and two PLCs will transfer data automatically depending on configuration settings.



Item	Specification	
Communication Interface	RS-485	RS-422/RS-485
Communication Protocol	Dedicated Communication Protocol	
Communication Method	Semi-duplex	
Baud Rate	4800/9600/19200/38400 bps	
Communication Distance	15 M	1000M (50M, if VB-485 exists in the communication loop)
Number of Link Stations	2 stations	
Connection Facility	VB Series: VB-232 or VB-CADP M Series: M-232R	VB Series: VB-485, VB-485A or VB-CADP M Series: M-485R
Linkable PLC	VB0 Series, VB2 Series and M Series PLC	
Data Transfer Range	Low Speed	Master→Slave: M800~899, D490~499      Slave→Master: M900~999, D500~509
	High Speed	Master→Slave: D490, D491      Slave→Master: D500, D501
Communication Time	Low Speed	73mS + Master Scan Time + Slave Scan Time (The value when Baud Rate = 19200 bps)
	High Speed	14mS + Master Scan Time + Slave Scan Time (The value when Baud Rate = 19200 bps)

## ◆ CPU Link

- PLC will enable dedicated communication protocol, and PLCs in the network will transfer data automatically depending on configuration settings.

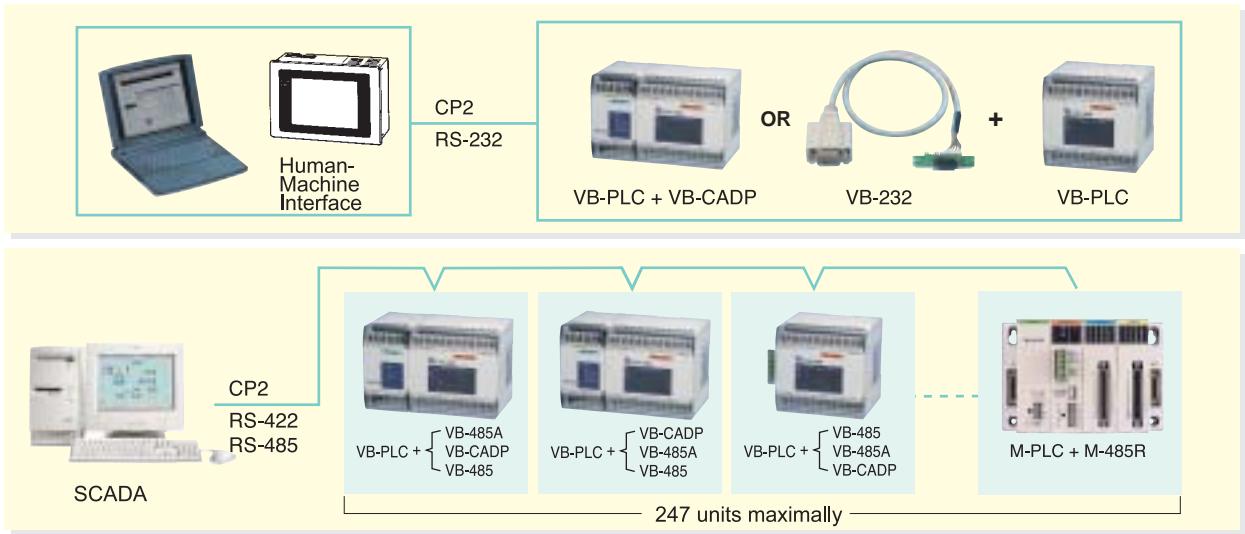


Item	Specification								
Communication Interface	RS-422/RS-485								
Communication Protocol	Dedicated Communication Protocol								
Communication Method	Semi-duplex								
Baud Rate	38400 bps								
Communication Distance	1000 M (50 M, if VB-485 exists in the communication loop)								
Number of Link Stations	2~8 stations								
Connection Facility	VB Series: VB-485, VB-485A or VB-CADP				M Series: M-485R				
Linkable PLC	VB0 Series, VB2 Series and M Series PLC								
Data Transfer Range	Station No.	0 (Master)	1 (Slave)	2 (Slave)	3 (Slave)	4 (Slave)	5 (Slave)	6 (Slave)	7 (Slave)
	Mode 1	D0~3	D10~13	D20~23	D30~33	D40~43	D50~53	D60~63	D70~73
	Mode 2	D0~3 M1000~1031	D10~13 M1064~1095	D20~23 M1128~1159	D30~33 M1192~1223	D40~43 M1256~1287	D50~53 M1320~1351	D60~63 M1384~1415	D70~73 M1448~1479
	Mode 3	D0~7 M1000~1063	D10~17 M1064~1127	D20~27 M1128~1191	D30~37 M1192~1255	D40~47 M1256~1391	D50~57 M1320~1383	D60~67 M1384~1447	D70~77 M1448~1511
Communication Time	Number of Linked Stations	2 Stations	3 Stations	4 Stations	5 Stations	6 Stations	7 Stations	8 Stations	
	Mode 1	7mS	11mS	15mS	19mS	23mS	27mS	31mS	
	Mode 2	10mS	15mS	20mS	25mS	30mS	35mS	40mS	
	Mode 3	16mS	24mS	33mS	42mS	50mS	59mS	68mS	

# Communication Operation Modes

## ◆ MODBUS Communication

- Communication between PLC, Computer and Human-machine Interface, etc. with MODBUS communication protocol.



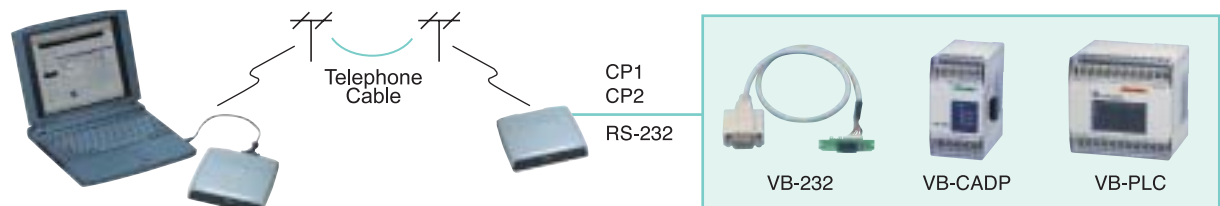
### Contrast of Component Number between VB-PLC and MODBUS

Item	Specification	
Communication Interface	RS-232	RS-422/ RS-485
Communication Method	Semi-duplex	
Communication Parameter	Communication Mode: ASCII or RTU Data Length: 7 bits/ 8 bits Parity: None/Odd/Even Stop Bit: 1 bit/ 2 bits	
Baud Rate	300/600/1200/2400/4800/9600/19200/38400 bps	
Communication Distance	15 M	1000 M (50 M for VB-485)
Number of Link Stations	1 station	Up to 247 Stations
Connection Facility	VB-232 or VB-CADP	VB-485, VB-485A or VB-CADP M Series: M-485R
Linkable PLC	VB0 Series, VB2 Series and M Series PLC	

Item	VB-PLC Component No.	MODBUS Component No.
Bit Component	X000~X177	10000~10127
	Y000~Y177	00000~00127
	M0~M5119	00512~05631
	S0~S999	05632~06631
	T0~T255	06656~06911
	C0~C255	06912~07167
Character Component	M9000~M9255	07424~07679
	D0~D8191	40000~48191
	T0~T255	48192~48447
	C0~C199	48448~48647
	C200~C255	48648~48759
	D9000~D9255	48760~49015

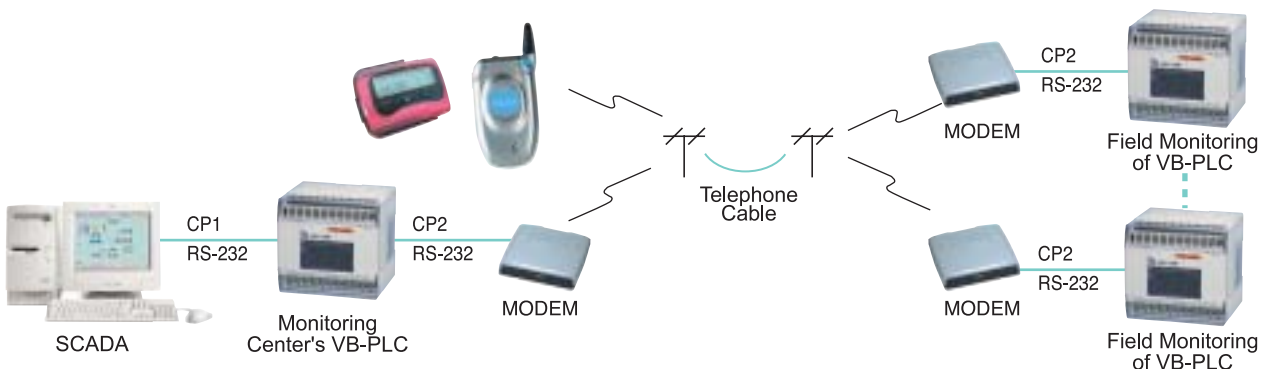
## ◆ MODEM Communication

- This communication is implemented with VB Series communication protocol. Using this mode to monitor the computer allows remote monitoring of PLCs through telephone lines or system maintenance or data collection.



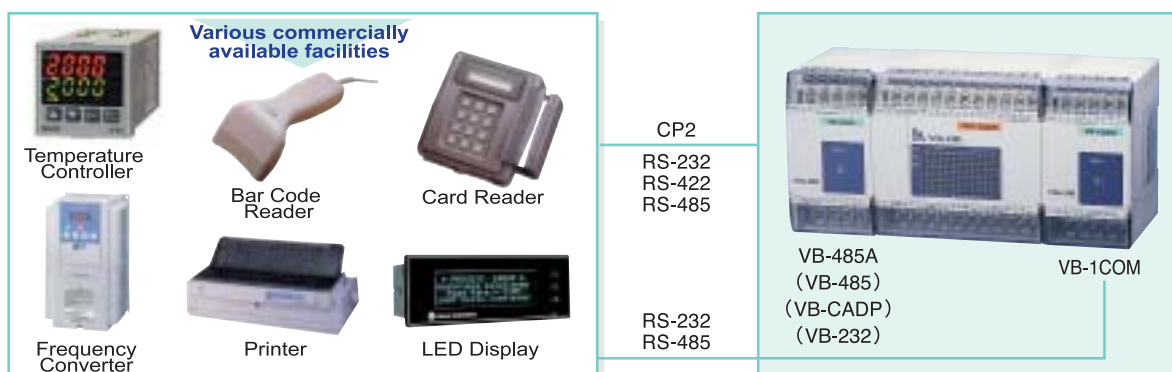
## ◆ MODEM Dialing

- VB Series PLC a telephone number register that can enable MODEM dialing function. Field monitoring of VB-PLC through MODEM dialing will transfer data to the monitoring center's VB-PLC for data collection, or dial the pager (BB CALL) and mobile phone for caller display.



### ◆ Non Protocol Communication

- PLC does not enable any specific communication protocol. All communication processes are customized and completed with PLC programs. Combination with various commercially available facilities for communication is acceptable.



### COM2 Non Protocol Communication Specification

Item	Specification	
Communication Interface	RS-232	RS-422/ RS-485
Communication Protocol	Non Protocol	
Communication Method	Semi-duplex	
Communication Parameter (Set by "System Configuration - COM Port Setting of CPU Expansion Card" of Ladder Master)	Baud Rate	300/600/1200/2400/4800/9600/19200 bps
	Data Length	7 bits/ 8 bits
	Parity	None/Odd/Even
	Stop Bit	1 bit/ 2 bits
	Initiation Code	None or arbitrary data
	Termination Code	None or arbitrary data
Communication Distance (reference of interfaced facility specification)	Up to 15 M	Up to 1000 M (50 M for VB-485) (50 M, if VB-485 exists in the communication loop)
Connection Facility	VB-232 or VB-CADP	VB-485, VB-485A or VB-CADP
Linkable PLC	VB0 Series and VB2 Series PLC	

### VB-1COM Communication Specification

Item	Specification	
Communication Interface	RS-232	RS-485
Communication Protocol	Non Protocol	
Communication Method	Semi-duplex	
Communication Parameter (Set by "System Configuration - COM Port Setting of CPU Expansion Card" of Ladder Master)	Baud Rate	300/600/1200/2400/4800/9600/19200/38400/76800/14400/28800/57600 bps
	Data Length	7 bits/ 8 bits
	Parity	None/Odd/Even
	Stop Bit	1 bit/ 2 bits
	Initiation Code	None or arbitrary data
	Termination Code	None or arbitrary data
Communication Distance (reference of interfaced facility specification)	Up to 15 M	Up to 1000 M (50 M for VB-485) (50 M, if VB-485 exists in the communication loop)



### VB-4AD 4-Point, 12-Bit Analog Input Module

- 12-bit resolution provides high resolution power.
- Each input can be independently set as voltage input or circuit input.
- The gain and offset at each input contact can be configured independently.
- 10V accurate voltage output offers reference power supply for the linear potentiometer
- Input signals are isolated from PLC by Photocoupler isolation.

Item	Specification	
	Voltage Input	Circuit Input
Analog Input Type	Voltage Input	Circuit Input
Analog Input Range	-10V~+10V	-20mA~+20mA/4mA~20mA
Digital Output Range	-2000~+2000	-2000~+2000/0~2000
Input Resistance	200KΩ	250Ω
Resolution	5mV	10 μA
Max. Input Range	±15V	±32mA
Total Accuracy	±1% (Max.)	
Conversion Rate	0.5mS × (1~4) point(s)	
Isolation Method	Photocoupler isolation between PLC and input contacts; no isolation between each input contact	
10V Accurate Voltage Output	DC10V±0.5%, 60mA (Max.)	
Power Consumption	DC24V±20%, 120mA (Max.)	



### VB-2DA 2-Point, 12-Bit Analog Output Module

- 12-bit resolution provides high resolution power.
- Each output can be independently set as voltage output or circuit output.
- The gain and offset at each output contact can be configured independently.
- Output signals are isolated from PLC by photocoupler isolation.

Item	Specification	
	Voltage Output	Circuit Output
Analog Output Type	Voltage Output	Circuit Output
Analog Output Range	0~10V	4~20mA
Digital Input Range	0~4000	0~4000
External Loading Resistance	500Ω~1MΩ	Below 500Ω
Resolution	2.5mV	5 μA
Total Accuracy	±1% (Max.)	
Conversion Rate	0.4mS/ 2 points	
Isolation Method	Photocoupler isolation between PLC and output contacts; no isolation between each output contact	
Power Consumption	DC24V±20%, 100mA (Max.)	





### VB-4DA 4-Point, 8-Bit Analog Output Module

- Providing 5 conversion modes: 0V~+10V, 0V~+5V, +1V~+5V, 0mA~+20mA and +4mA~+20mA
- Each output can offer voltage output or circuit output; the conversion mode at each output contact can be configured independently.
- Output signals are isolated from PLC by photocoupler isolation.

Item	Specification				
Analog Output Type	Voltage Output			Circuit Output	
Analog Output Range	0V~+10V	0V~+5V	+1V~+5V	0mA~+20 mA	+4 mA~+20 mA
Digital Input Range	0~+250			0~+250	
External Loading Resistance	500Ω~1MΩ			Below 500Ω	
Resolution	40mV	20mV	16mV	80 μA	64 μA
Total Accuracy	±1% (Max.)				
Conversion Rate	0.8mS/ 4 points				
Isolation Method	Photocoupler isolation between PLC and output contacts; no isolation between each output contact				
Power Consumption	DC24V±20%/-15%, 120mA (Max.)				



### VB-6A 4-Point, 12-Bit Analog Input Module/2-Point, 12-Bit Analog Output Module VB-3A 2-Point, 12-Bit Analog Input Module/1-Point, 12-Bit Analog Output Module

- 12-bit resolution provides high resolution power.
- Each input can be independently set as voltage input or circuit input.
- Each output can offer voltage input or circuit input.
- The gain and offset at each input/output contact can be configured independently.
- 10V accurate voltage output offers reference power supply for the linear potentiometer
- Input/output signals are isolated from PLC by photocoupler isolation.

#### Analog Input Feature Specification

Item	Specification	
Analog Input Type	Voltage Input	Circuit Input
Analog Input Range	-10V~+10V	-20mA~+20 mA/4~20 mA
Digital Output Range	-2000~+2000	-2000~+2000/0~2000
Input Resistance	200KΩ	250 Ω
Resolution	5mV	10 μA
Max. Input Range	±15V	±32mA
Total Accuracy	±1% (Max.)	
Conversion Rate	0.5mS × (1~4) points	

#### Analog Output Feature Specification

Item	Specification	
Analog Output Type	Voltage Output	Circuit Output
Analog Output Range	0V~10V	4~20mA
Digital Input Range	0~4000	0~4000
External Loading Resistance	500Ω~1MΩ	Below 500Ω
Resolution	2.5mV	5 μA
Total Accuracy	±1% (Max.)	
Conversion Rate	VB-6A( 0.4mS/2 points), VB-3A( 0.2mS/1 point)	

#### Common Specification

Item	Specification	
10V Accurate Voltage Output	DC10V±0.5%, 60mA (Max.)	
Isolation Method	Photocoupler isolation between PLC and input/output contacts; no isolation between each input/output contact	
Power Consumption	VB-6A	DC24V±20%, 210mA (Max.)
	VB-3A	DC24V±20%, 160mA (Max.)



**VB-8TC 8-Point J/K TC Input Temperature Module**  
**VB-4TC 4-Point J/K TC Input Temperature Module**

- Each input can be set as J Type or K Type Thermocouple Input independently.
- It is possible to set the temperature limits and resolution for each input independently.
- Supply of 0.1°C high resolution temperature detection.
- Supply of Centigrade (°C) and Fahrenheit (°F) temperature detection values.
- Providing the disconnection detection function.

Item		Specification	
Temperature		Centigrade (°C)	Fahrenheit (°F)
Mode 0	Temperature Input Range	K Type -100°C~1200°C	K Type -148°F~2192°C
	Digital Output Range	-1000~+12000	-1480~+21920
	Resolution	0.4°C	0.72°F
Mode 1	Temperature Input Range	K Type -15°C~270°C	K Type -5°F~518°F
	Digital Output Range	-150~+2700	-50~+518
	Resolution	0.1°C	0.18°F
Mode 2	Temperature Input Range	J Type -100°C~600°C	J Type -148°F~1112°F
	Digital Output Range	-1000~+6000	-1480~+11120
	Resolution	0.3°C	0.54°F
Mode 3	Temperature Input Range	J Type 0°C~200°C	J Type 32°F~392°F
	Digital Output Range	0~+2000	+320~+3920
	Resolution	0.1°C	0.18°F
Total Accuracy		±(1%+1.5°C)	
Conversion Rate		VB-8TC:0.25S~8S/8 points, VB-4TC:0.25S~8S/4 points	
Isolation Method		Relay isolation between PLC and input contacts, and relay isolation between each input contact	
Power Consumption	VB-8TC	DC24V ± 20%, 55mA (Max.)	
	VB-4TC	DC24V ± 20%, 55mA (Max.)	



**VB-1PG Single Axis Pulse Output Positioning Module**

- Supply of seven operating modes, easy to achieve positioning control.
- Up to 100 KHz pulse output frequency.
- Providing two pulse output methods: FP and RP pulse output and pulse output with direction control.
- Providing DOG, PGO and STOP input terminals.
- Connection with multiple modules achieve a multi-spool control system.

Item		Specification
Number of Control Spools		1 axis; up to 8 independent spools to be controlled for VB Series PLC
Rate		Pulse Output Frequency: 10 Hz~100 KHz Optional units: PLS/sec, cm/min, 10deg/min and inch/min 0~±999,999,999
Position Data Configuration Range		Absolute position or Relative movement is optional Optional units: PLS, um, mdeg and 10-4 inch Optional position data: 10°, 10 <sup>1</sup> , 10 <sup>2</sup> , 10 <sup>3</sup>
Pulse Output Method		Output FP (forward polarity)/ RP (reverse polarity) pulse or output pulse (PLS) with direction control (DIR) Open collector transistor output circuit, DC5~24V, below 20mA
External output/Output Contact		Photocoupler isolation with LED indicator for all Input 3 points: (STOP/DOG) DC24V 7mA, (PGO) DC24V 20mA Output 3 points: (FP/RP/CLR) DC5~24V below 20mA
Power Consumption	For Input Signal	DC24V ± 10%, below 50mA, external power supply
	For Internal Control	DC5V 50mA, internal PLC power supply
	For Pulse Output	DC5~24V, below 35mA, power supply from servo-motor driver or external sources



### VB-1HC High Speed Counter Module

- One-phase, two-phase or A/B-phase pulse input is available.
- A/B-phase pulse count can be set as ×1, ×2 and ×4 mode
- Two groups of hardware compare output.
- Providing software/hardware "Do Not Count" and "Default Count Value" function.
- Supply of 5V, 12V and 24V connection terminal for each input.

Item		Specification				
Input Signal	Max Count Frequency	One-Phase Input	Two-Phase Input	A/B-Phase Input		
		45KHz	20KHz	×1 Count	×2 Count	×4 Count
	Signal Specification	A: A-Phase Signal                      A24+ , B24+ , P24+ , D24+ : DC24V ± 10% B: B-Phase Signal                      A12+ , B12+ , P12+ , D12+ : DC12V ± 10% P: Preset Count Value Signal        A5+ , B5+ , P5+ , D5+ : DC5V ± 10% D: Do Not Count Signal                Operating Circuit: 14mA ± 10%				
Count Specification	Count Mode	Two-Phase and A/B-Phase: Auto up/down count One-Phase: Up/down count determined by PLC instructions or an input signal				
	Count Range	32-bit Counter: 16-bit Counter:				
	Compare Method	When Current Value = Default, output becomes ON. All can be cleared OFF with PLC instructions. YH1 and YH2 use the hardware compare unit to compare output directly.				
Output Signal	Output Type	YH1 and YH2 are NPN open collector transistor.				
	Output capacity	DC5~24V , 0.5A				
Power Consumption		DC5V 85mA (Internal PLC power supply)				



### VB-PWR Power Expansion Module

- Expansion PLC's internal power can provide the expansion module and special module with required power.
- Providing DC24V 500mA together with circuit protection for sensors
- Power input is designed within the wide input range, AC85~264V.

Item	Specification
Input Voltage	AC100~240V+10%/-15%
Power frequency	50/60Hz
Guaranteed Voltage Interrupt Time	Within 10mS
Power Fuse	250V 2A
Power Consumption	40VA
Rated Output Power	DC5V 400mA for the interior of PLC
	DC12V 800mA for the interior of PLC
	Sensor-used power,DC24V ± 15% 500mA, output from the terminal block
Number of Expansion Modules	The expansion module should meet the following two requirements: 1. [(Number of Expansion Modules)+(Number of Special Modules × 2)] ≤ 12 2. Output contacts following VB-PWR [(Number of Relay ON × 6)+(Number of Transistor ON)] ≤ 288

◆ VB-30PS Power Supply Module



Item	Specification
Input Voltage	AC110V or AC220V (selected by the terminal block), ±20%
Power frequency	50/60Hz
Guaranteed Voltage Interrupt Time	Within 10mS
Power Fuse	250V 2A
Power Consumption	50VA
Rated Output Power	DC5V ±5% 200mA, output from the terminal block
	DC24V ±5% 1.2A, output from the terminal block
Installation Method	DIN Aluminum Rail installation or secured with screws

◆ DAP-100 Configuration Panel



Item	Specification
Product Composition	Trim Panel of Display + 4-key Configuration Keyboard
Surface Membrane Material	Gloss PC with width of 0.254mm
Button Specification	12×12 Tact Switch
Button Life	500,000 times
Interface incorporated with PLC	4 PLC input contacts
Connection Mode	European-Type Terminal block
Form Factor (W×H)	110mm×45mm for Trim Panel of Display and Configuration Keyboard



VB-RTC Real Time Clock Expansion Card

- With installation of the Real Time Clock Expansion Card, PLC can enable automatic control of date and time, etc.
- Indication of Year, Month, Day, Hour, Minute, Second and Week is available.
- The battery life approximates 5 years at 25°C.
- When the battery power is low, Special Relay M9005 will be ON.



VB-MP1R Program Memory Card

- Common Program Memory Card for VB Series PLC. The memory ranges from programs, component annotation, program annotation to file registers.
- With Flash ROM, the memory can overwrite for over 10,000 times.
- Providing program upload/download function, easy for program copies and machine maintenance.
- Including RTC function, the battery life approximates 5 years at 25°C.
- When the battery power is low, Special Relay M9005 will be ON.



VB-DB1R Data Bank Expansion Card

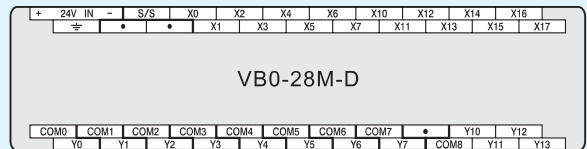
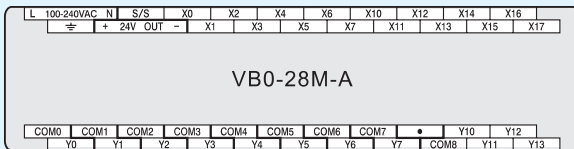
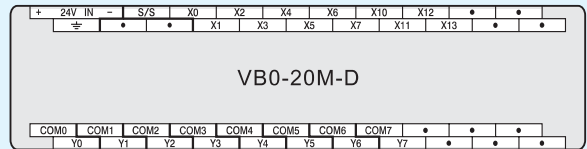
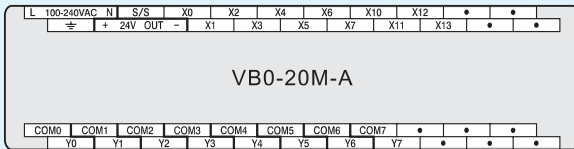
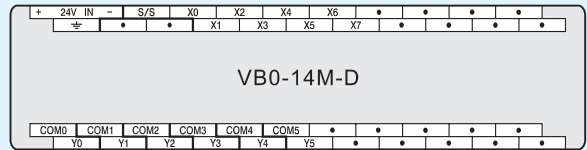
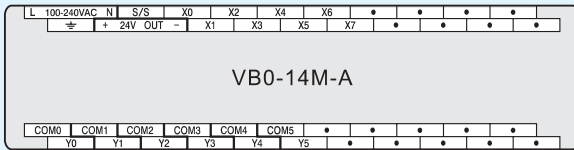
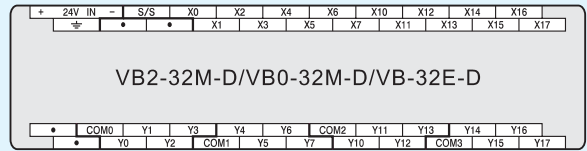
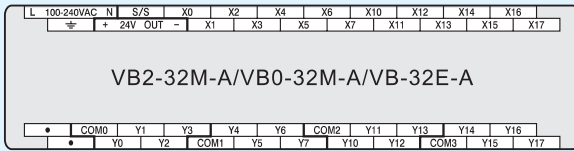
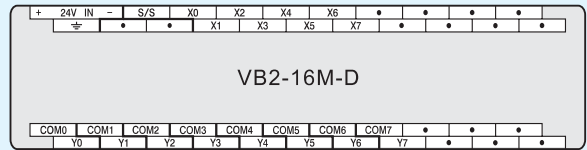
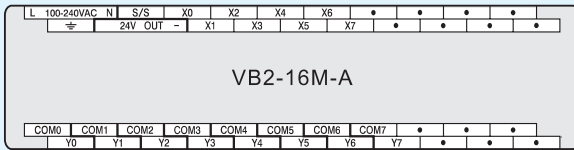
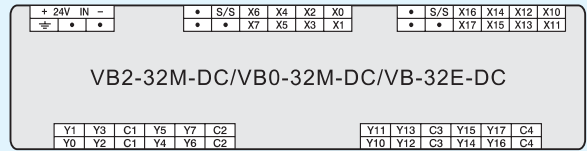
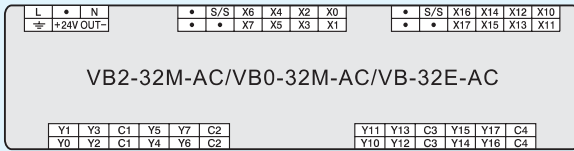
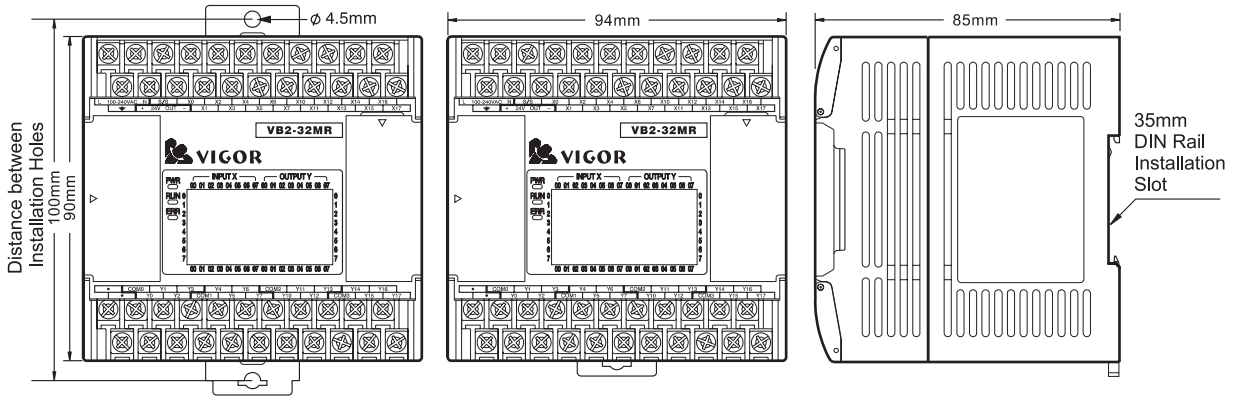
- Data storage capacity of 128K words. The memory uses SRAM. Lithium batteries are used for latched data.
- Providing room for extensive latched data, typically used for storage of formula data or long-time data collection.
- Using DBWR and DBRD for data access.
- The editing software Ladder Master is available for data bank modification, archiving and upload/download.
- Including RTC function, the battery life approximates 5 years at 25°C.
- When the battery power is low, Special Relay M9005 will be ON.



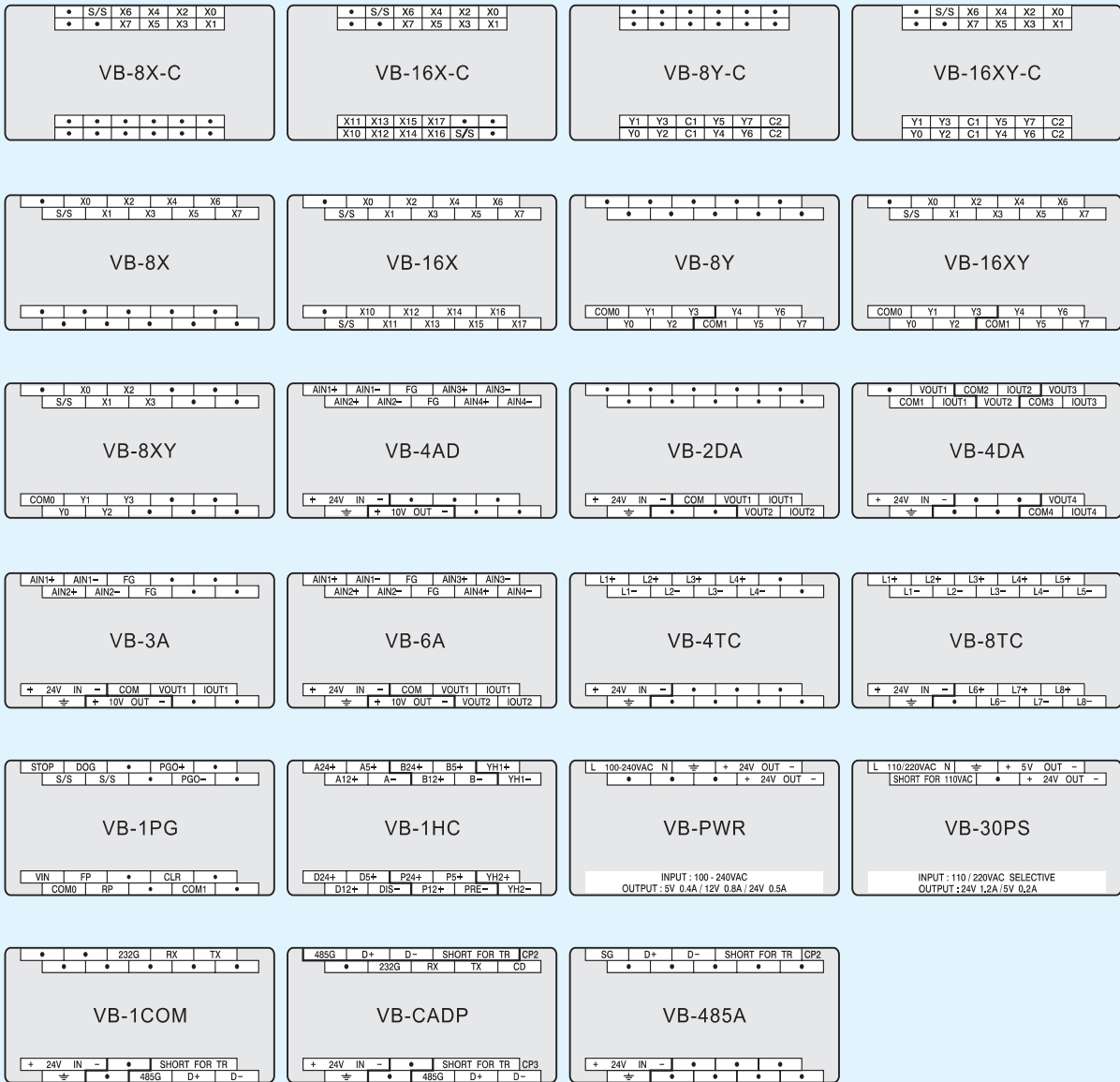
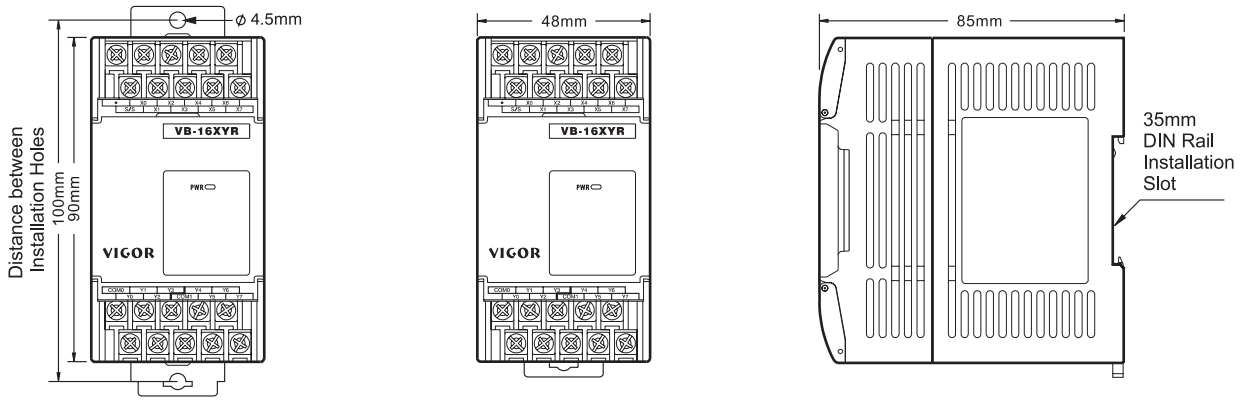
Model	Physical Demonstration	Connection Schematics	Application
MWPC-200 (Length: 200cm)		 DSUB 9P Female Connector USB A-Type Connector	<ul style="list-style-type: none"> <li>• PC ↔ VB Series and M Series PLC</li> </ul>
MWPC25-200 (Length: 200cm)		 DSUB 25P Female Connector USB A-Type Connector	<ul style="list-style-type: none"> <li>• PC ↔ VB Series and M Series PLC</li> <li>• Hitech HMI ↔ VB Series and M Series PLC</li> </ul>
MWMD-200 (Length: 200cm)		 DSUB 9P Male Connector USB A-Type Connector	<ul style="list-style-type: none"> <li>• MODEM ↔ VB Series and M Series PLC</li> <li>• EASY VIEW HMI ↔ VB Series and M Series PLC</li> </ul>
VBPC09-200 (Length: 200cm)		 DSUB 9P Female Connector JST 4P Female Connector	<ul style="list-style-type: none"> <li>• PC ↔ VB Series PLC</li> </ul>
VBPC25-200 (Length: 200cm)		 DSUB 25P Female Connector JST 4P Female Connector	<ul style="list-style-type: none"> <li>• PC ↔ VB Series PLC</li> <li>• Hitech HMI ↔ VB Series PLC</li> </ul>
VBMD09-200 (Length: 200cm)		 DSUB 9P Male Connector JST 4P Female Connector	<ul style="list-style-type: none"> <li>• MODEM ↔ VB Series PLC</li> <li>• EASY VIEW HMI ↔ VB Series PLC</li> </ul>
VBFDHMI-200 (Length: 200cm)		 DSUB 25P Male Connector JST 4P Female Connector	<ul style="list-style-type: none"> <li>• FUJI HMI ↔ VB Series PLC</li> <li>• DIGITAL HMI ↔ VB Series PLC</li> </ul>
VBEC-050 (Length: 50cm)		—	<ul style="list-style-type: none"> <li>• VB Series PLC Expansion Extended Line (As the signal of this extended line is vulnerable to noise interference, it should be noted to avoid high noise sources as possible during wiring.)</li> </ul>
VBEC-100 (Length: 100cm)			

# Form Factor and Terminal Arrangement

## ◆ Form Factor and Terminal Alignment



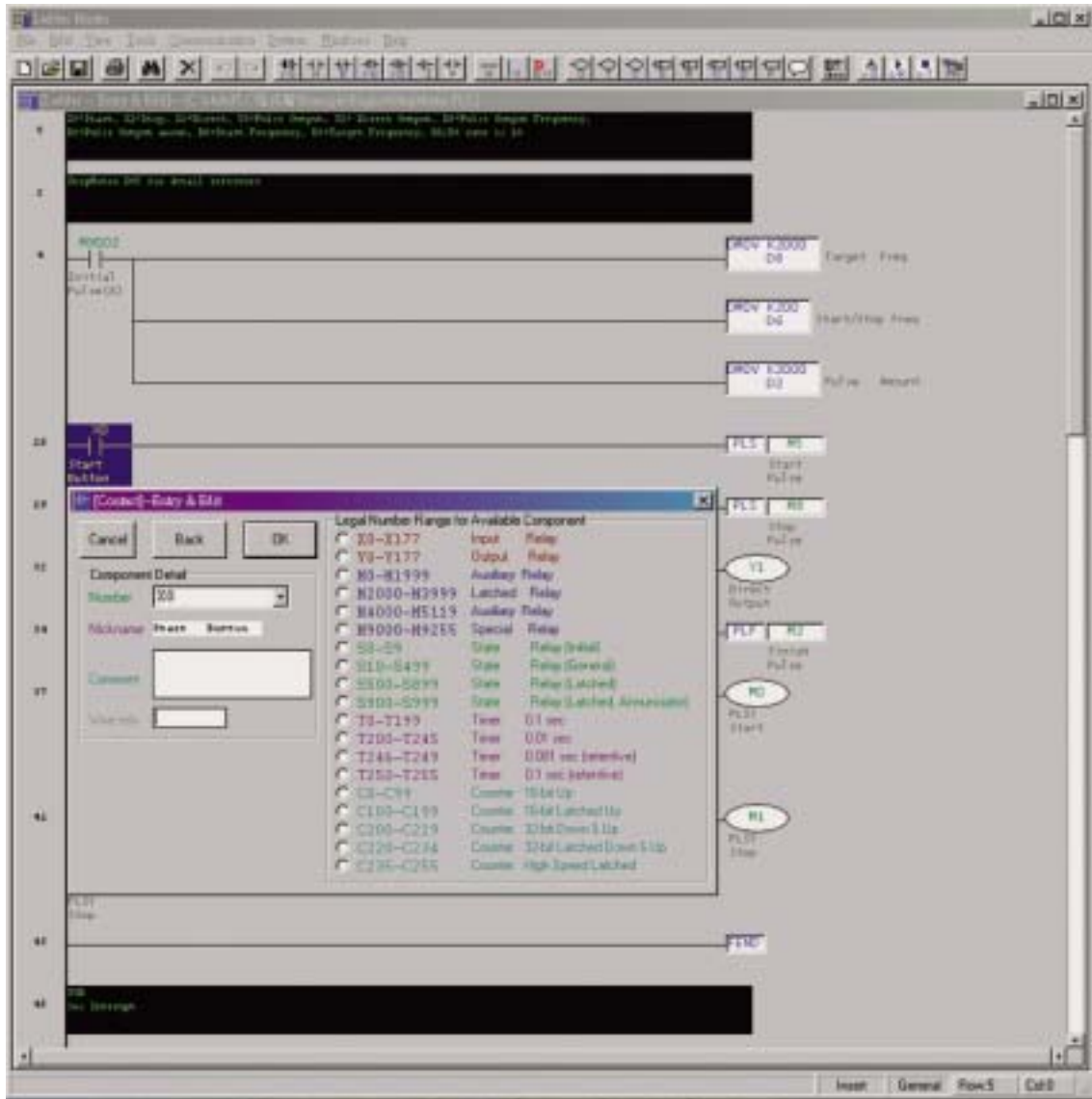
## ◆ Form Factor and Terminal Alignment



## Ladder Master – Window-based Programming Software

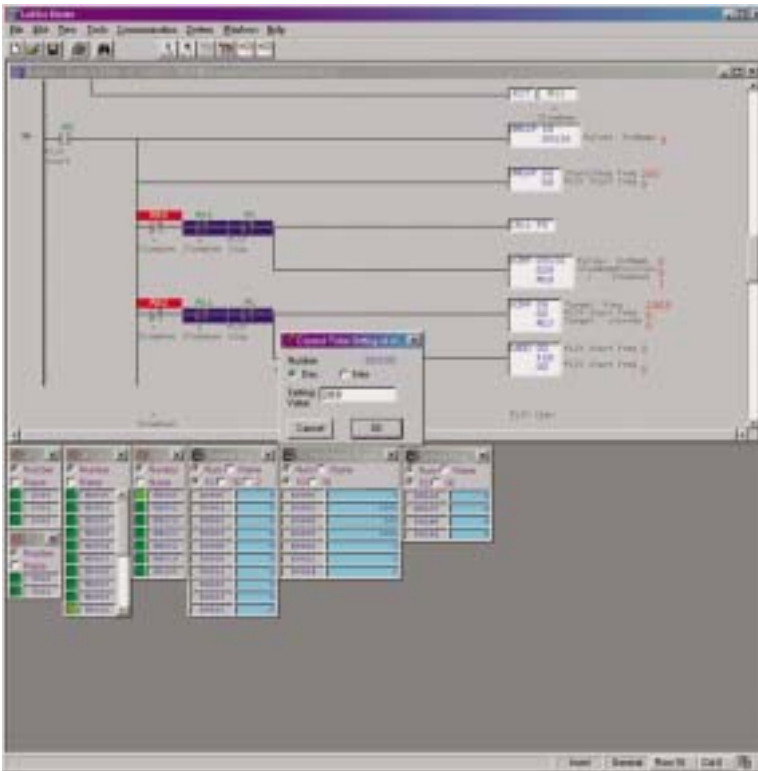
Ladder Master is ladder-chart programming software exclusively developed for VB Series and M Series PLC. With the use of the Windows-based operating environment, mouse and keyboard, it features high friendliness, easy to learn, understand and operate.

Ladder Master, which provides powerful and robust functions in programming, operation monitoring and system maintenance, will actively help you to complete the job.



- The operating inertia fits the Windows-based environment with high friendliness, easy to learn for application.
- Providing various language versions such as Conventional Chinese, Simple Chinese and English versions that are convenient for different language users.
- Providing direct connection and MODEM connection functions allows remote program modification and data monitoring.
- The program quick input enhances the programming efficiency by processing graphic input and component designation separately.
- Featuring program Insert, Delete, Cut, Copy, Paste, Undo and part of Export/Import functions.
- Up to 8 Chinese words of component annotation with program sectional annotation fully expresses the program meaning and improves program readability.
- Providing comprehensive reference guidelines for instant prompts and real-time error retrieved during programming processes.





- Simultaneous monitoring of the ladder chart and component status allows efficient program debugging.
- Selectable group modules for component monitoring facilitate the use of the monitoring layout.
- Providing contacts with Component ON/OFF and Register Component Value Configuration functions.
- Providing the monitoring-page function, customized by users, also allows monitoring page archiving, easy for test run, debugging and system maintenance.
- Conversation-based system configuration enables easy system parameter settings.
- The program and parameter list print function for easy archiving and creation of engineering document/data.
- The editing and archiving functions for the latched area, file register and data bank allow easy system maintenance and machine data duplication.

## NeoTouch – PDA-based Programming Software

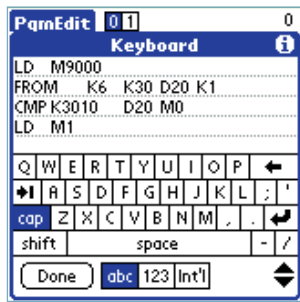
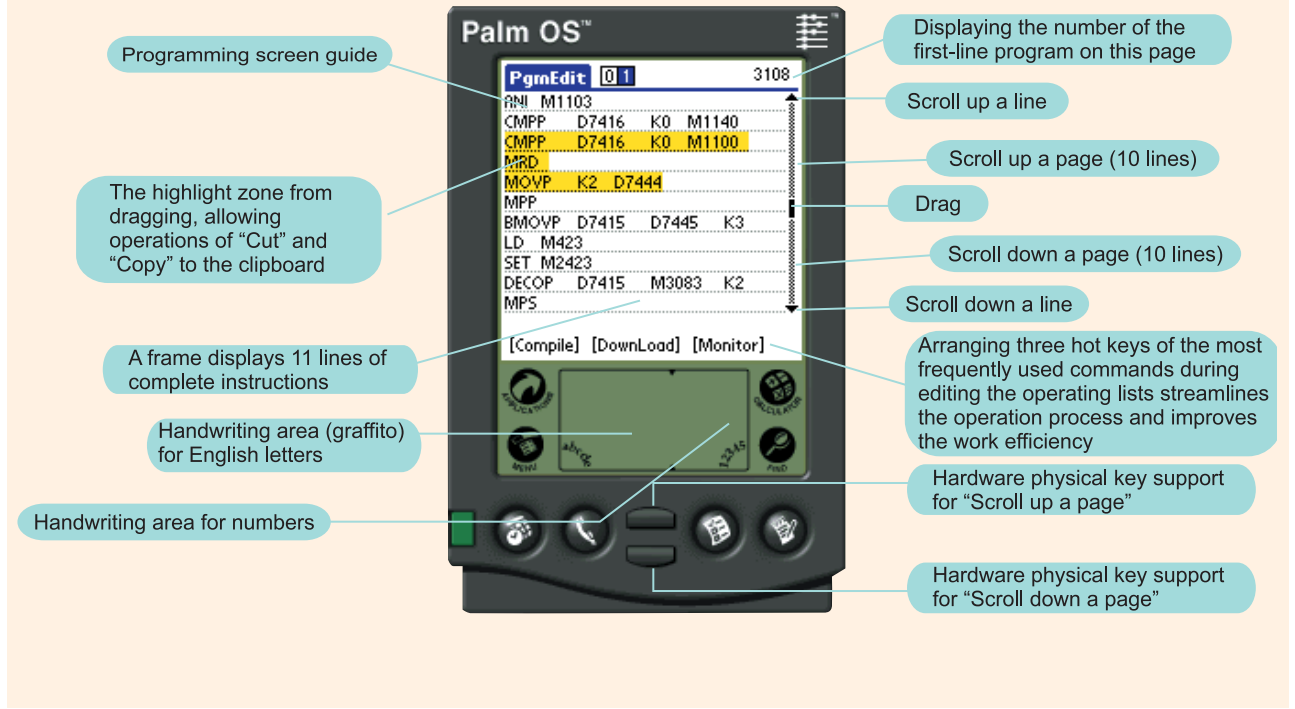
NeoTouch is an application exclusively developed for VB Series and M Series PLC. Installed in several commercially available Palm OS PDAs, it offers many functions better than those of the palm writer. The advanced design idea creates a new standard for PLC program writers.

- PDA features compactness and mobility with internal power supply for offline operation.
- The Touch screen incorporated with conversation-based windows allows easy-to-learn simple operation.
- The wide frame displaying 11 lines of complete instructions simultaneously facilitates programming and operation monitoring.
- Featuring modern editing functions such as Cut, Copy, Paste and Undo functions.
- The perfect component replacement function enables a complete replacement of various components and multiple components once for all.
- Allowing simultaneous monitoring of programs and customized components. The monitoring target component may be changed from time to time.
- Providing contacts with Component ON/OFF and Register Value Configuration functions.

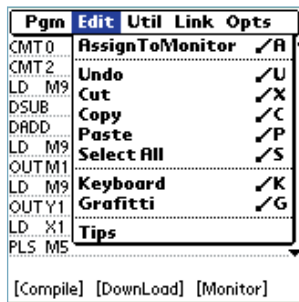


PDA-based NeoTouch

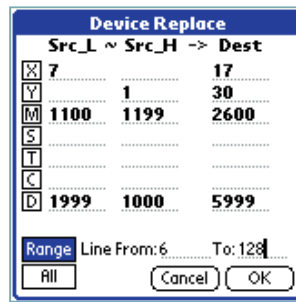
## Advanced and State-of-the-art Design



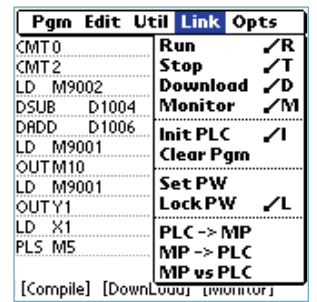
Providing the software keyboard, in addition to handwriting, for Click Input



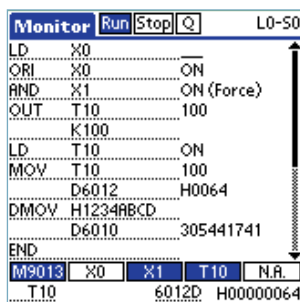
Featuring modern editing functions such as Cut, Copy, Paste and Undo functions



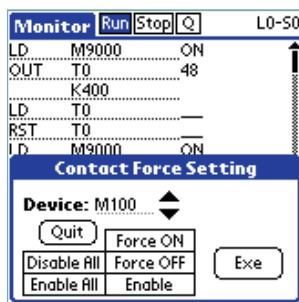
The perfect component replacement function enables a replacement of multiple components once for all.



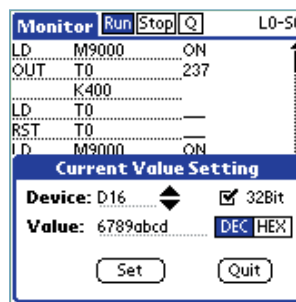
Providing rich communication commands, e.g. Operate / Stop Control, Program Upload / Download and Encryption



Allowing simultaneous monitoring of programs and customized components with a simple method for component selection



The Customized monitoring contact component with Component ON/OFF and Register; easy for program's test run and debugging



The customized monitoring value component provides the component value setting function, easy for modification of system parameters



The user interface of high level and high friendliness with short instructions largely improves the work efficiency and operating safety

## Table of Machine Models

Item	Model	Main Specification
VB0 Series Main Unit	VB0-14M★-◆	8 points, DC24V Input; 6 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB0-20M★-◆	12 points, DC24V Input; 8 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB0-28M★-◆	16 points, DC24V Input; 12 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB0-32M★-◆	16 points, DC24V Input; 16 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB0-32M★-◆C	16 points, DC24V Input; 16 points output; offering 420mA of DC24V output; connecting input/output with ATX connector(with wire)
VB2 Series Main Unit	VB2-16M★-◆	8 points, DC24V Input; 8 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB2-32M★-◆	16 points, DC24V Input; 16 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB2-32M★-◆C	16 points, DC24V Input; 16 points output; offering 420mA of DC24V output; connecting input/output with ATX connector (with wire)
Expansion Unit	VB-32E★-◆	16 points, DC24V Input; 16 points output; offering 420mA of DC24V output; connecting input/output with terminal blocks
	VB-32E★-◆C	16 points, DC24V Input; 16 points output; offering 420mA of DC24V output; connecting input/output with ATX connector (with wire)
Expansion Module	VB-16XY★	8 points, DC24V Input; 8 points output; connecting input/output with terminal blocks
	VB-16X	16 points, DC24V Input; connecting input with terminal blocks
	VB-8XY★	4 points, DC24V Input; 4 points output; connecting input/output with terminal blocks
	VB-8X	8 points, DC24V Input; connecting input with terminal blocks
	VB-8Y★	8 points output; connecting output with terminal blocks
	VB-16XY★-C	8 points, DC24V Input; 8 points output; connecting input/output with ATX connector (with wire)
	VB-16X-C	16 points, DC24V Input; connecting input with ATX connector (with wire)
	VB-8X-C	8 points, DC24V Input; connecting input with ATX connector (with wire)
Special Module	VB-4AD	Analog Input Module; four 12-bit points; arbitrary option of Voltage or Circuit type
	VB-2DA	Analog Output Module; two 12-bit points; arbitrary option of Voltage or Circuit type
	VB-4DA	Analog Output Module; four 8-bit points; arbitrary option of Voltage or Circuit type
	VB-3A	Analog Input/Output Module; two 12-bit points for input and one 12-bit point for output; arbitrary option of Voltage or Circuit type
	VB-6A	Analog Input/Output Module; four 12-bit points for input and two 12-bit points for output; arbitrary option of Voltage or Circuit type
	VB-4TC	Temperature Input Module; four J/K Thermo Couple points for input; input range:-100~1200°C; resolution: 0.1~0.3°C
	VB-8TC	Temperature Input Module; eight J/K Thermo Couple points for input; input range:-100~1200°C; resolution: 0.1~0.3°C
	VB-1PG	Single-axle Pulse Output Position Module; Output Pulse Frequency: 10 - 100Kpps
	VB-1HC	High Speed Counter Module; one point 45KHz High Speed Count input;
	VB-1COM	Serial Link Communication Module; RS-232/RS485 Interface; Photocoupler Isolation; Communication Distance 1000M
	VB-PWR	Power Expansion Module; Input AC85~264V, Output for PLC DC5V 0.4A/DC12V 0.8A, DC24V 0.5A for sensors
Communication Module	VB-485A	RS-485 Communication Module; Photocoupler Isolation; Communication Distance 1000M
	VB-CADP	Dual Communication Port Expansion Module; 1 Port Isolation RS-422/RS-485; 1 Port Isolation RS-485; Communication Distance 1000M
Communication Card	VB-232	RS-232 Communication Expansion Card
	VB-485	RS-422/RS-485 Communication Expansion Card
Expansion Card	VB-MP1R	8K Steps Flash ROM Memory Cartridge (Only 2.5K Steps programs stored for VB0 Master); including RTC function
	VB-RTC	RTC (Real Time Clock) Expansion Card
Data Bank	VB-DB1R	128K Words Data Storage Expansion Card; including RTC (Real Time Clock) function
Connection Cable	MWPC-200	Connection cable of PLC Writer Slot and Computer (9-pin female connector) with a length of 200 cm
	MWMD-200	Connection cable of PLC Writer Slot and MODEM (9-pin male connector) with a length of 200 cm
	MWPC25-200	Connection cable of PLC Writer Slot and Computer (25-pin female connector) with a length of 200 cm
	VBPC09-200	Connection cable of PLC Writer Auxiliary Slot and Computer (9-pin female connector) with a length of 200 cm
	VBMD09-200	Connection cable of PLC Writer Auxiliary Slot and MODEM (9-pin male connector) with a length of 200cm
	VBPC25-200	Connection cable of PLC Writer Auxiliary Slot and Computer (25-pin female connector) with a length of 200 cm
	VBFDHMI-200	Connection cable of PLC Writer Auxiliary Slot and Fuji, Digital (25-pin male connector) with a length of 200 cm
	VBEC-050	VB Series PLC Expansion cable with a length of 50 cm
	VBEC-100	VB Series PLC Expansion cable with a length of 100 cm
Power Supplier	VB-30PS	30W power supply; power input: AC 110V or AC 220V (optional); power output: DC 24V 1.2A and DC 5V 0.2A
Setting Panel	DAP-100	4-key data setting panel, can be incorporated with multifunction display for multiple sets of parameter data settings

★ indicates the input type      R: Relay Output      T: NPN Transistor      P: PNP Transistor  
◆ indicates the power type      A: AC100~240V-15%/+10%      D: DC24V-15%/+20%

# VIGOR ELECTRIC

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