FATEK® The Brand You Can Rely on!

Since 1992

Economical and High-Quality PLC
FATEK B1/B1z Series Micro-Programmable Controllers

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Impressed with the high quality !

Features

Core Technology of Advanced SoC

With advanced software and hardware technique and over 20 years of experience in automation industry, FATEK has integrated the entire PLC system with self-developed CPU, hardware logic solver (HLS), hardware high-speed counter/timer, NC positioning, communication, FLASH, and SRAM, into a tiny BGA chip. This is the first attempt of PLC industry that makes FATEK a leading brand in micro PLC.

Compact and Rugged

As most parts of the system are integrated into a SoC, the processor and I/O section can be manufactured in a single PCB board and thus substantially reduced the dimension. Since a single board does not need any board-to-board connector, the overall structure becomes more stable and reliable.

High Quality and High Reliability

As the excellent streamline of hardware design and highly integrated of SoC technology, it minimizes the number of constituent parts of B1/B1z series of PLC. And with the combination of high quality parts and rigorous quality control procedures, FATEK creates a high quality and high reliability PLC for the industry.

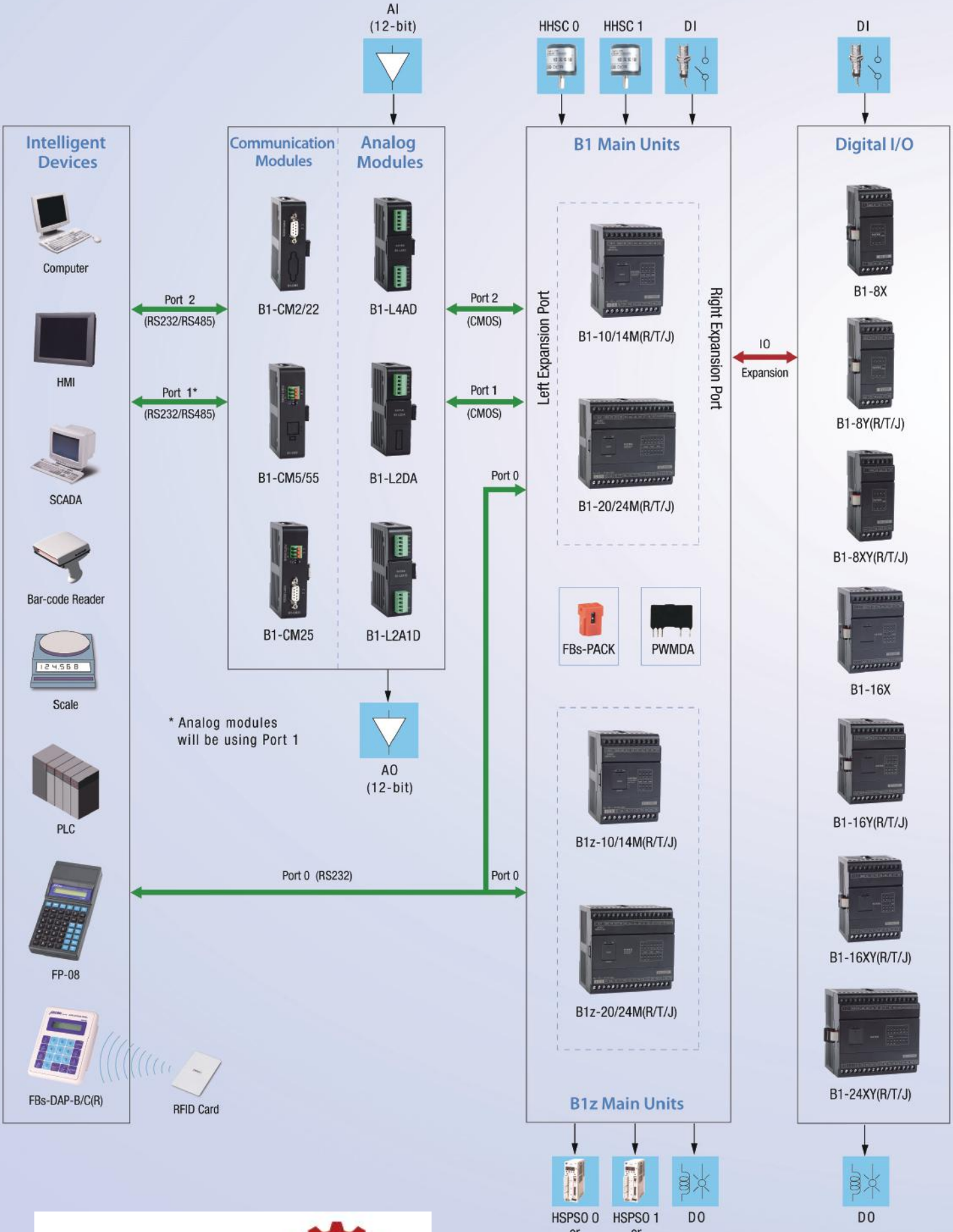
Competitive Low Price

Besides the streamline design of SoC technology that significantly reduces the hardware costs, B1/B1z series PLC incorporates the most sophisticated manufacturing process and most mature and stable quality of two-layer board design. With FATEK's many years of experience in EMC control, the capability of noise resistance of FATEK PLC using two-layer board design is better than four-layer board design of other PLC, thus making B1/B1z PLC a price-competitive must-buy for smart dealers.

Easy to use, consistent instruction

The instruction sets of B1/B1z series PLC is based on the FBs series PLC, which is the best-selling series of FATEK. Considering compatibility and simplicity, the instructions for B1/B1z series PLC are thoughtfully selected from the most useful and frequently used instructions of FBs series PLC.

System Configuration



General Specifications

Environmental specifications

Item			Specification	Note
Operating ambient temperature	Enclosure space	Minimum	5°C	Permanent installation
		Maximum	40°C	
	Open space	Minimum	5°C	
		Maximum	55°C	
Storage temperature			-25°C ~ +70°C	
Relative humidity (non-condensing, RH-2)			5% ~ 95%	
Pollution resistance			Degree II	
Corrosion resistance			Base on IEC-68 standard	
Altitude			≤2000m	
Vibration resistance	Fixed by DIN RAIL		0.5G, 2 hours for each direction of 3 axes	
	Fasten by screw		2G, 2 hours for each direction of 3 axes	
Shock resistance			10G, three times for each direction of 3 axes	
Noise resistance			1500 Vp-p, pulse width 1μS	
Withstand voltage			1500VAC, 1 minute	L, N to any terminal

AC power supply

Specification \ Item		10 points main unit	14 points main unit	20 points main unit	24 points main unit
Input power	Voltage	85VAC~264VAC			
	Frequency	50/60Hz ±5%			
Max. power consumption (built-in power supply)		21W			
Inrush current		20A@264VAC			
Allowable power momentary interruption time		< 20mS			
Fuse rating		2A, 250VAC			

DC power supply

Specification \ Item	10 points main unit	14 points main unit	20 points main unit	24 points main unit
Input voltage	20.4VDC~28.8VDC			
Max. power consumption	2.5W	3.0W	3.5W	4.0W
Inrush current	20A@DC24V			
Allowable power momentary interruption time	< 2mS			
Fuse rating	1A, 125V			

Functional Specifications

Main unit specifications

Specification \ Model			B1	B1z
Execution speed			0.33uS/Contact instruction	
Memory capacity		Program capacity (Step)	7936	3840
		Element comment capacity (Byte)	8K	4K
Maximum I/O points		Input contact X (Point)	X+Y=64 *1	6/8/12/14
		Output contact Y (Point) *4		4/6/8/10
		Analog input (Point)	D4072~D4075 (4) *2	—
		Analog output (Point)	D4076~D4077 (2) *2	—
Internal relay (M)		Non-retentive (Point)	M0~M799 (800) M1400~M1911 (512)	M0~M511 (512)
		Retentive (Point)	M800~M1399 (600)	M512~M767 (256)
		Special relay (Point)	M1912~M2001 (90)	M1912~M2001 (90)
Step relay (S)		Initial step (Point)	S0~S7 (8)	S0~S7 (8)
		Non-retentive (Point)	S20~S499 (480)	S20~S143 (124)
		Retentive (Point)	S500~S999 (500)	S144~S271 (128)
Timer		1S	T200~T219 (20)	T200~T219 (20)
		100mS	T50~T199 (150)	T50~T113 (64)
		10mS	T0~T49 (50)	T0~T49 (50)
		1mS	R4151 (1)	R4151 (1)
		Accumulative	FUN87~ FUN89	FUN87~ FUN89
Counter	16-bit up Counter	Retentive	C0~C47 (48)	C0~C31 (32)
		Non-retentive	C48~C95 (48)	C32~C63 (32)
	32-bit up Counter	Retentive	C200~C215 (16)	C200~C207 (8)
		Non-retentive	C216~C231 (16)	C208~C215 (8)
	Up/Down Counter	Retentive / Non-retentive (16-bit)	FUN7	FUN7
		Retentive / Non-retentive (32-bit)	FUN7D	FUN7D
High-speed counter 1 or 2 HHSC*5 + 4 SHSC*6		1-phase 1 input (P or U or D)	HSC0 & HSC1 (2 points, 10K Hz each) + HSC4~7 (total < 5K Hz)	
		1-phase 2 input (U/D or P/R)	HSC0 (1 point, 10K Hz) + HSC4~7 (total < 5K Hz)	
		2-phase 2 input (A/B)	HSC0 (1 point, 5K Hz) + HSC4~7 (total < 5K Hz)	
Register		Retentive	R0~R2999 (3000) D0~D4095 (4096)	R0~R127 (128)
		Non-retentive	R3000~R3839 (840)	R128~R511 (384)
		Special use	R3840~R4167 (328) R3968~R4167 (Retentive)	R3840~R4167 (328) R4030~R4057 (Retentive) R4088~R4166 (Retentive)
		Index register (Retentive)	V · Z (2), P0~P9 (10)	V · Z (2)
		Read only register	R5000~R8071 (3072)	R5000~R5255 (256)
Interrupt			X0~X3 (4 points)	
High Speed Pulse Output (HSPSO0, HSPSO1)			Y0~Y3 (4 points, 10K Hz each), after Y4 is low speed (limited in software)	
Serial Communication Port (Port 0 ~ Port 2)			Built-in Port 0, left side is expandable port 1 and port 2 *2 Built-in Port 0 (RS232) + Port 2 (RS485) *3	Built-in Port 0, is not expandable
Program and data backup battery			Yes	No (program and data backup are within system FLASH)

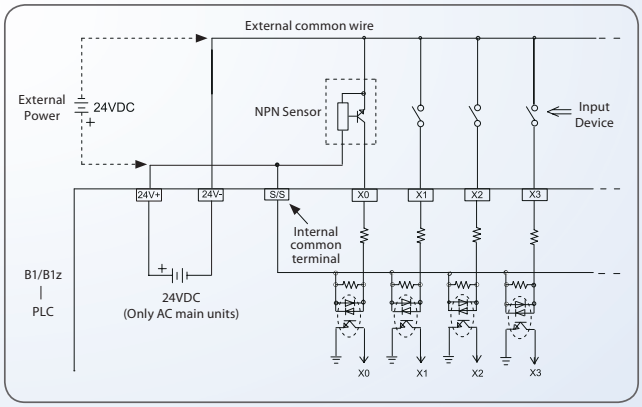
*1 . Input (X) + Output (Y) total maximum point is 64 (including the points on main unit)
*2 . Analog expansion module will occupy Port 1. When using analog expansion module, communication can only expand Port 2 one port.
*3 . (△ : 25 module, please refer to page 10), left side is not expandable.
*4 . B1/B1z series does not support run time editing function and also not support Y0~Y255 of Latch Coil –(L); that is, Latch Coil is non-retention.
*5 . HHSC means Hardware High-Speed Counter
*6. SHSC means Software High-Speed Counter

(Continue)

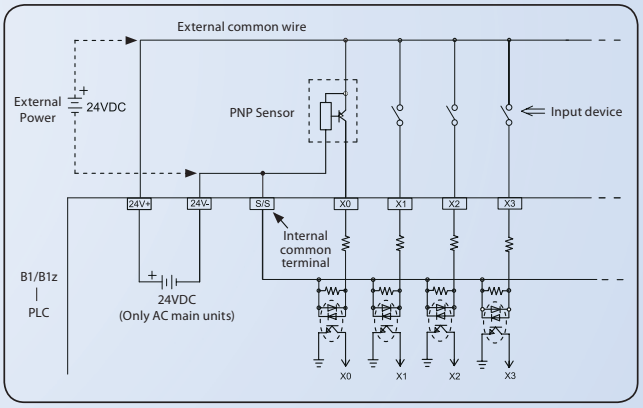
Digital Input (DI) specifications

Specification \ Item		24VDC single-end input		Note
		Medium speed(X0~X3)	Low speed (After X4)	
Maximum input frequency *		10KHz	50Hz	*: Limited in hardware frequency and half of maximum frequency while A/B phase input
Input signal voltage		24VDC ± 10%		
Threshold current	ON	> 4mA	> 2.3mA	
	OFF	< 1.5mA	< 0.9mA	
Maximum input current		7mA	4.2mA	
Input indication		Displayed by LED: Light when "ON", dark when "OFF"		DHF: Digital Hardware Filter AHF: Analog Hardware Filter
Isolation method		Photocouple isolation		
SINK/SOURCE wiring		Via variation of internal common terminal S/S and external common wiring		
Noise filtering methods		DHF (0mS ~ 15mS) + AHF (4.7μS)	AHF (4.7mS)	

Wiring of 24VDC single-end SINK input



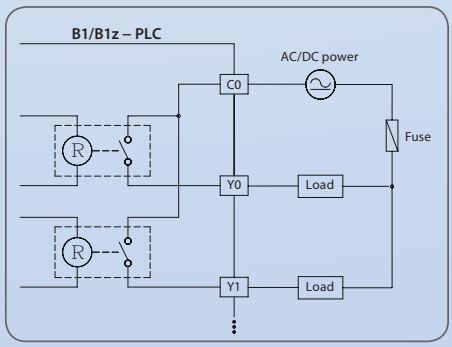
Wiring of 24VDC single-end SOURCE input



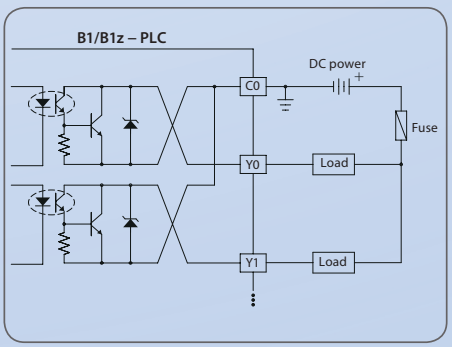
Digital Output (DO) specifications

Specification \ Item		Single-end relay output	Single-end transistor output	Note
Maximum output frequency*		—	10KHz	*: Limited in hardware frequency and half of maximum frequency while A/B phase output
Working voltage		< 250VAC, 30VDC	5 ~ 30 VDC	
Maximum load current	Resistive	2A/single, 4 A/common	0.5A	
	Inductive	80VA		
Maximum voltage drop (@ maximum load)		0.06V (initial)	2.2V	
Minimum load		2mA/DC power	—	
Leakage current		—	< 0.1mA / 30VDC	
Maximum output delay time	ON→OFF	10mS	15μS	
	OFF→ON		30μS	
Output status indication		Displayed by LED: Light when "ON", dark when "OFF"		
Over current protection		N/A		
Isolation type		Electromagnetic isolation	Photocouple isolation	
SINK/SOURCE output type		Bilateral device, can be arbitrarily set to SINK/SOURCE output	Choose SINK/SOURRCE by models and non-exchangeable	

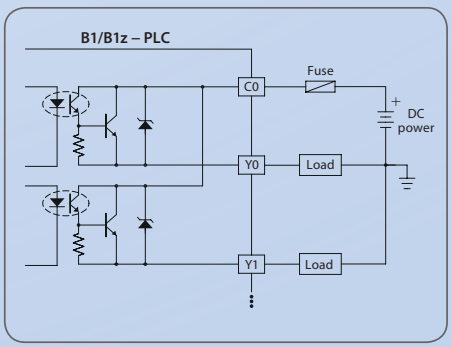
Wiring of relay single-end output



Wiring of transistor single-end SINK output



Wiring of transistor single-end SOURCE output



Model Specifications

B1z main units

Spec. \ Model			B1z-10MR	B1z-10M(T/J)	B1z-14MR	B1z-14M(T/J)	B1z-20MR	B1z-20M(T/J)	B1z-24MR	B1z-24M(T/J)
Digital input	24VDC	Medium speed 10KHz	4 points							
		Low speed	2 points		4 points		8 points		10 points	
Digital output	Relay	AC/DC(2A)	4 points	—	6 points	—	8 points	—	10 points	—
	Transistor (5~30 VDC)	Medium speed 10KHz (0.5A)	—	4 points	—	4 points	—	4 points	—	4 points
		Low speed (0.5A)	—	—	—	2 points	—	4 points	—	6 points
Comm. port	Built-in		1 port (Port0, USB or RS232)							
	Expandable		N/A							
Calendar			—							
Built-in power supply			ZPOW14(AC power) or N/A (DC power)							
Wiring mechanism			5 mm European fixed terminal block							
Dimension			Standard (Figure 1), Slim (Figure 2)*				Standard (Figure 3), Slim (Figure 4)*			

* AC power supply of main unit has no slim shell.

B1 main units

Spec. \ Model			B1-10MR	B1-10M(T/J)	B1-14MR	B1-14M(T/J)	B1-20MR	B1-20M(T/J)	B1-24MR	B1-24M(T/J)
Digital input	24VDC	Medium speed 10KHz	4 points							
		Low speed	2 points		4 points		8 points		10 points	
Digital output	Relay	AC/DC(2A)	4 points	—	6 points	—	8 points	—	10 points	—
	Transistor (5~30 VDC)	Medium speed 10KHz (0.5A)	—	4 points	—	4 points	—	4 points	—	4 points
		Low speed (0.5A)	—	—	—	2 points	—	4 points	—	6 points
Comm. port	Built-in		1 port (Port0, USB or RS232)							
	Expandable		2 ports (Port1 ~ 2, RS485 or RS232)							
Calendar			Optional							
Built-in power supply			ZPOW14(AC power) or N/A (DC power)							
Wiring mechanism			5 mm European fixed terminal block							
Dimension			Standard (Figure 1), Slim (Figure 2)*				Standard (Figure 3), Slim (Figure 4)*			

* AC power supply of main unit has no slim shell.

Right Side Digital I/O Expansion Modules

Spec. \ Model			B1-8X	B1-8YR	B1-8Y(T/J)	B1-8XYR	B1-8XY(T/J)	B1-16X	B1-16YR
Digital input	24VDC	Low speed	8 points	—	—	4 points	4 points	16 points	—
Digital output	Relay	AC/DC(2A)	—	8 points	—	4 points	—	—	16 points
	Transistor (5 ~ 30VDC)	Low speed (0.5A)	—	—	8 points	—	4 points	—	—
Wiring mechanism			5 mm European fixed terminal block						
Dimension			Standard (Figure 5), Slim (Figure 6)					Standard (Figure 1), Slim (Figure 2)	

Right Side Digital I/O Expansion Modules

Spec. \ Model			B1-16Y(T/J)	B1-16XYR	B1-16XY(T/J)	B1-24XYR	B1-24XY(T/J)
Digital input	24VDC	Low speed	—	8 points	8 points	14 points	14 points
Digital output	Relay	AC/DC(2A)	—	8 points	—	10 points	—
	Transistor (5 ~ 30VDC)	Low speed (0.5A)	16 points	—	8 points	—	10 points
Wiring mechanism			5 mm European fixed terminal block				
Dimension			Standard (Figure 1), Slim (Figure 2)			Standard (Figure3), Slim (Figure 4)	

(Continue)

Left Side Expansion Modules



Spec. \ Model	B1-L2DA	B1-L4AD	B1-L2A1D
Features	2 channels, 12-bit analog output module (0~10V or 0~20mA)	4 channels, 12-bit analog input module (0~10V or 0~20mA)	2 channels, 12-bit analog input + 1 channel, 12-bit analog output combo analog module (0~10V or 0~20mA)
Wiring mechanism	3.81 mm European detachable terminal block		
Dimension	Standard (Figure 8)		

Left Side Communication Expansion Modules





Spec. \ Model	B1-CM2	B1-CM22	B1-CM5	B1-CM55	B1-CM25
Features	1 RS232 port with TX, RX indicators	2 RS232 ports with TX, RX indicators	1 RS485 port with TX, RX indicators	2 RS485 ports with TX, RX indicators	1 RS232 port (Port 1) + 1 RS485 port (Port 2) with TX & RX indicators
Wiring mechanism	D-SuB female		3.5mm Screwless terminal block		D-SuB female 3.5mm Screwless terminal block
Dimension	Standard (Figure 7)				

Memory pack

Spec. \ Model	FBs-PACK
Memory	1M bits FLASH ROM
Memory capacity	20K* words program + 20K* words data
Write protection	DIP switch ON/OFF protection

*Capacity is limited for B1/B1z

PWMDA

Spec. \ Model	PWMDA
Output range	0~10V
Output value	0~1000
Resolution	10mV(10V/1000)
Output impedance	1KΩ
Min. load(≥10V)	5.2KΩ
D/A conversion time	<50mS

Handheld programming panel

Spec. \ Model	FP-08
Max. consumption power	5V/100mA
Keyboard	48 silicon rubber keys
Display	Two rows 16-character, dot matrix LCD display, with LED backlight
Communication port	RS232 serial communication port

Data Access Panel


Spec. \ Model		FBs-DAP-B/BR	FBs-DAP-C/CR
Display		Two rows 16-character, dot matrix LCD display, with LED backlighting	
Key pads		20 (membrane)	
Max. consumption power		24V, 48mA	5V, 120mA
Communication Interface	Electric	RS485	RS232
	Mechanism	5-pin European detachable terminal block	D-sub 9 pins male connector
	Number of linked station	Max. 16 stations	1
General features		Timer, counter, register, relay, access of contact in PLC	
Special features		Alarm, information display, user definable special quick keys	
Card access feature		Available only in -BR/-CR models, with maximum distance of 6 ~ 12 cm	

RFID card

Spec. \ Model	CARD-H
Operated frequency	13.56MHz
Memory	64-bit with Cyclic Redundancy Check (CRC) on data
Working temperature	-25°C ~ 50°C (ISO7810)
Power source	Powered by RF
Receivable distance	6~12cm
Writable times	at least 10000 times
Dimension(mm)	86 X 54 X 0.76
Weight	5g

Dimensions

Figure 1 Standard

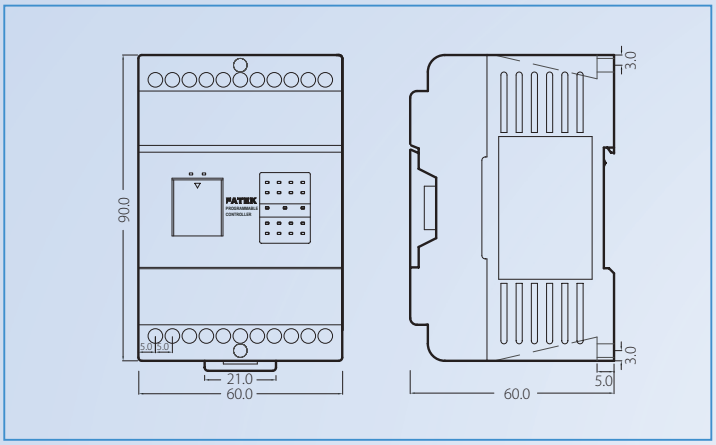


Figure 2 Slim

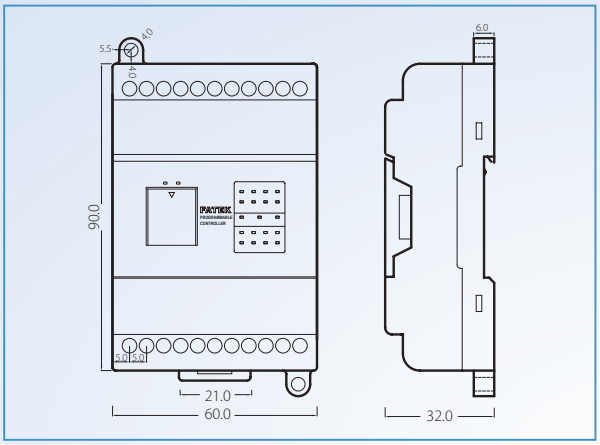


Figure 3 Standard

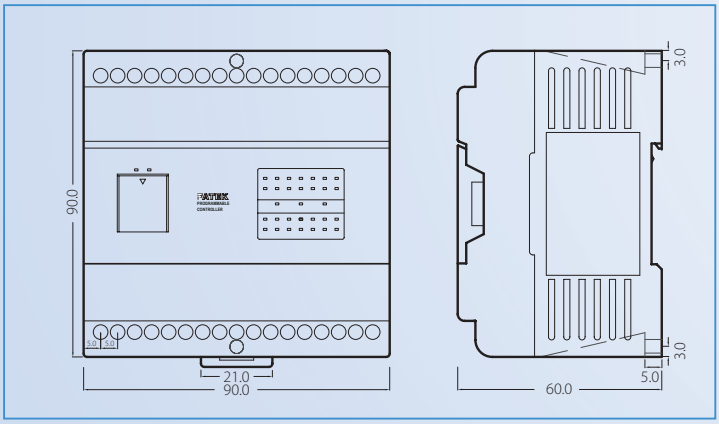


Figure 4 Slim

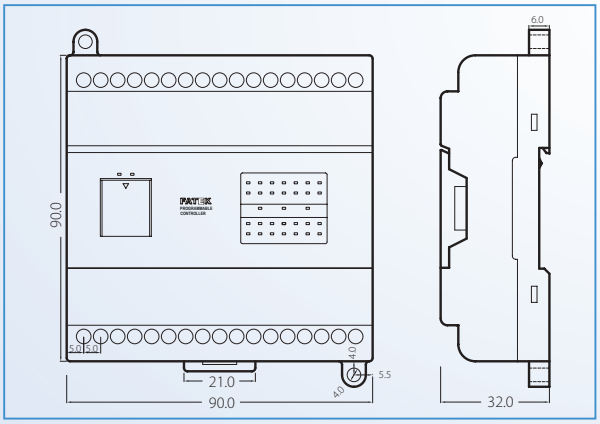


Figure 5 Standard

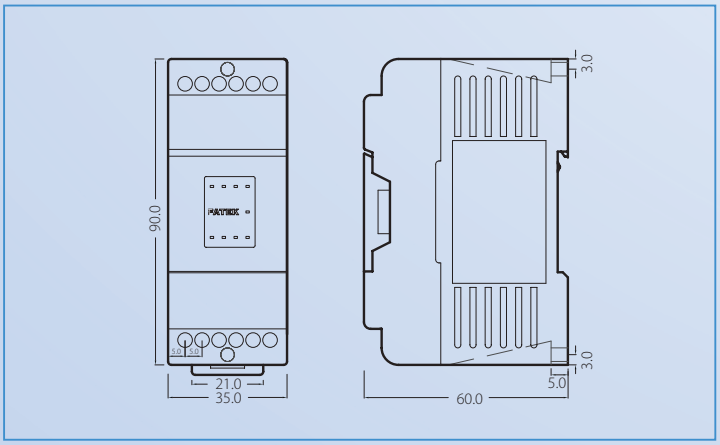


Figure 6 Slim

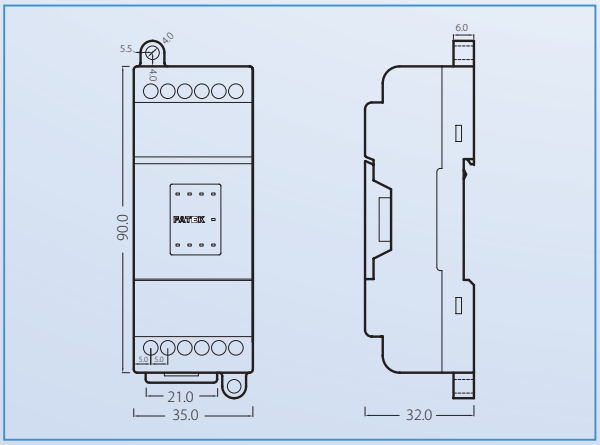


Figure 7 Standard

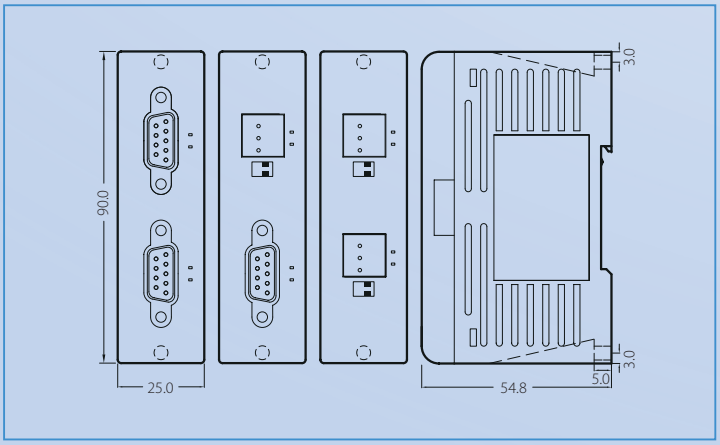
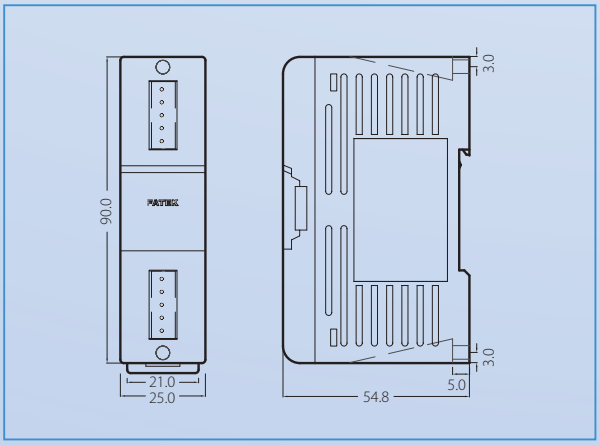


Figure 8 Slim



B1/B1z PLC Model List

Item Name		Model	Specifications
B1z main units		B1z-10M◇△-◎☆	6 points 24VDC digital input (4 points 10KHz), 4 points relay output or transistor output (4 points 10KHz), built-in 1 communication port, left/right side is not expandable
		B1z-14M◇△-◎☆	8 points 24VDC digital input (4 points 10KHz), 6 points relay output or transistor output (4 points 10 KHz), built-in 1 communication port, left/right side is not expandable
		B1z-20M◇△-◎☆	12 points 24VDC digital input (4 points 10KHz), 8 points relay output or transistor output (4 points 10KHz), built-in 1 communication port, left/right side is not expandable
		B1z-24M◇△-◎☆	14 points 24VDC digital input (4 points 10KHz), 10 points relay output or transistor output (4 points 10KHz), built-in 1 communication port, left/right side is not expandable
B1 main units		B1-10M◇△-◎☆	6 points 24VDC digital input (4 points 10KHz), 4 points relay output or transistor output (4 points 10KHz), built-in 1~2 communication ports, left side is expandable 2~0 modules, right side is expandable up to 64 I/O points
		B1-14M◇△-◎☆	8 points 24VDC digital input (4 points 10KHz), 6 points relay output or transistor output (4 points 10KHz), built-in 1~2 communication ports, left side is expandable 2~0 modules, right side is expandable up to 64 I/O points
		B1-20M◇△-◎☆	12 points 24VDC digital input (4 points 10KHz), 8 points relay output or transistor output (4 points 10KHz), built-in 1~2 communication ports, left side is expandable 2~0 modules, right side is expandable up to 64 I/O points
		B1-24M◇△-◎☆	14 points 24VDC digital input (4 points10KHz), 10 points relay output or transistor output (4 points 10KHz), built-in 1~2 communication ports, left side is expandable 2~0 modules, right side is expandable up to 64 I/O points
Right Side Expansion Modules	Digital I/O	B1-8X☆	8 points 24VDC digital input
		B1-8Y◇☆	8 points relay or transistor output
		B1-8XY◇☆	4 points 24VDC digital input, 4 points relay or transistor output
		B1-16X☆	16 points 24VDC digital input
		B1-16Y◇☆	16 points relay or transistor output
		B1-16XY◇☆	8 points 24VDC digital input, 8 points relay or transistor output
		B1-24XY◇☆	14 points 24VDC digital input, 10 points relay or transistor output
Left Side Expansion Modules	Analog	B1-L2DA	2 channels, 12-bit analog output module(0~10V or 0~20mA)
		B1-L4AD	4 channels, 12-bit analog input module(0~10V or 0~20mA)
		B1-L2A1D	2 channels, 12-bit analog input + 1 channel, 12-bit analog output combo analog module(0~10V or 0~20mA)
	Communication	B1-CM2	1 port RS232 (Port 2) communication module
		B1-CM5	1 port RS485 (Port 2) communication module
		B1-CM22	2 port RS232 communication module
		B1-CM55	2 port RS485 communication module
		B1-CM25	1 port RS232 (Port1) + 1 port RS485(Port2) communication module
Memory Pack programming devices		FBs-PACK	B1/B1z/FBs series of PLC program memory pack with 20K words program, 20K words register, write protection switch
PWMDA		PWMDA	10-bit single channel pulse width modulation(PWM) 0~10V analog output(AO) module
Memory Pack programming devices		FP-08	Handheld programmer for B1/B1z/FBs series of PLC
		Winproladder	FATEK-PLC Winproladder Programming software for Windows
Data Access Panels / RFID Card		FBs-DAP-B/BR	16 x 2 LCD character display, 20 keys keyboard, 24VDC power supply, RS485 communication interface (suffixed R means wireless card read/write module included)
		FBs-DAP-C/CR	16 x 2 LCD character display, 20 keys keyboard, 5VDC power supply, RS232 communication interface (suffixed R means wireless card read/write module included)
		CARD-H	Read / write wireless card (for FBs-DAP-BR/CR)

1. ◇ : R – Relay output T. – Transistor SINK (NPN) output J. – SOURCE (PNP) output
2. △ : 2 – built-in 1 RS232 communication port, U – built-in 1 USB communication port, } left side of B1 main units can expand 1 analog module + 1 communication module (1 port) or 1 communication module (1 or 2 ports)
   25 – built-in 2 communication ports (RS232 + RS485), only B1 main units provided, and left side is not expandable
3. ◎ : AC – 100~240VAC power supply–D24– 24VDC power supply
4. ☆ : Blank – Standard case, -S – Slim case (AC power supply has no slim case)

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