Logicbus

Product guide FATEK
By Logicbus

Features

SoC-FATEK's Core Technology

The FBs-PLC's design incorporates a "System on Chip" (SoC) developed in-house by Fatek Corporation. The BGA chip consists of over 120,000 gates which integrates powerful features such as a Central Processing Unit (CPU), Memory, Hardware Logic Solver (HLS), 5 high-speed communication ports, 4 sets of hardware high-speed counters/timers, 4 axes of high-speed pulse outputs for NC positioning control (with linear interpolation), 16 high-speed interrupts and captured inputs. The FBs-PLC represents high functionality and reliability with exceptional value compared to other PLC's in its class.

User friendly and powerful instruction sets

The FBs-PLC has more than 300 instructions which adopts a user friendly and readable multi-input/multi-output function structure. With this multi-input instruction structure the user can derive many types of functionality which other brands of PLC's may require the use of many instructions to achieve this. Also the operation result can be directly sent to internal or external outputs. To increase the program readability, the inputs or outputs for each function instruction have their own mnemonic symbol attached and the content of each operand is also displayed. For high-end applications, such as PLC networking (LINK), PID control and NC positioning etc, the FBs-PLC provides dedicated convenient instructions to assist in program development.

Communication function (up to 5 ports including RS232, RS485, USB, Ethernet, CANopen® and GSM and ZigBee™ wireless communication)

Via the five high-speed communication ports included in the SoC, the FBs-PLC's communication capability is outstanding operating at a maximum speed of 921.6Kbps. Communications can be achieved using ASCII code or the double-speed binary code. Along with FATEK's standard protocol, Modbus ASCII/RTU/TCP or user-definable protocols are also available. The FBs-PLC also provides the option of 8 different communication boards and 10 different communication modules for various types of communication applications. With their high speed and functionality the FBs-PLC has the greatest number of communication ports than any other PLC in its class. Each communication port comes standard with LED indicators for transmission (TX) and reception (RX) to enable the user to monitor the operation.

Up to 4 sets of high-speed pulse width modulation (HSPWM) output

The SoC inside the FBs-PLC incorporates four sets of hardware high-speed pulse width modulation outputs with a maximum frequency of 184.32KHz and 18.432KHz with resolutions of 1% and 0.1%, respectively. Different from the PWM function operated by software alone in other brands of PLC's, the hardware driven high-speed PWM in the FBs-PLC provides the user with easy control with high precision and stability.

PLC & NC Control in one and Dedicated NC Positioning Language

NC Position Control is incorporated into the SoC of the FBs-PLC which integrates PLC+NC control into one unit in order for resources sharing and reducing the need of data exchange. The NC position control adopts special positioning command language, which allows programming by mechanical or electrical units and the changing control of parameters during execution. One single unit has up to four axes outputs with a maximum frequency of 200KHz (MC) or 920KHz (MN) and equipped with multi-axis linear interpolation function. If combined with the four sets of built-in HHSC, it can achieve a fully closed loop positioning control!

Integrated high-speed counters with counting frequency up to 920 KHz

The FBs-PLC includes up to 4 sets of hardware high-speed counters (HHSC) and 4 sets of software high-speed counters (SHSC). The highest counting frequency of a HHSC is 200KHz (MC) or 920KHz (MN). Each HHSC also has a clear and mask function. There are 8 counting modes including U/D, U/Dx2, P/R, P/Rx2, A/B, A/Bx2, A/Bx3 and A/Bx4 which makes the HHSC very powerful and efficient. For example, if the encoder, running at 200 pulses per revolution, adopts A/Bx4 mode the FBs-PLC can achieve the same result that 800 pulses per revolution encoder can provide. The counter is implemented in the hardware so as not to occupy CPU processing time. In addition, 4 sets of software high-speed counters (SHSC) has U/D, P/R, A/B 3 types of counting modes and the total counting frequency is 5KHz.

High-speed timers (HST)

The FBs-PLC is the only PLC in this class providing 0.1mS high-speed timers (the FBs-PLC having one 16-bit and 4 sets of 32-bit HST). Currently, the fastest time base of high speed timers used in other brands of PLC's is 1mS. By incorporating the interrupt function of the FBs-PLC the accuracy of 0.1mS time base high-speed timer of FBs-PLC is further enhanced and can easily achieve more precise speed detection or can be used as a frequency meter. In most cases, expensive speed detection equipment can be replaced by the economical FBs-PLC.

FATEK's Powerful Communication Features

The five communication ports in FBs-PLC can simultaneously connect to various intelligent peripherals with various interfaces such as USB, RS232, RS485, Ethernet, CANopen® and ZigBee™. Apart from the FATEK and Modbus protocol or communication through the FATEK communication server, the user can also use the PLC's CLINK instruction for user-defined protocol to actively or passively establish connections with many intelligent peripherals.

Open communication driver

The open communication protocol of the FBs-PLC is supported by all major brands of Supervisory Software (Scada) and Operator Terminals (HMI). Scada software such as Wonderware, Citec, Labview and LabLink! Operator terminals (HMI) such as Proface, Hitech/Beijer and Cermate can be directly connected with the FBs-PLC via serial and Ethernet interfaces. FATEK also provides FATEK DDE standard communication server or third-party OPC server for the user to easily connect the FBs-PLC to various control or supervisory systems. In addition, reputable companies such as National Instruments and KONTRON both sell FATEK OPC software package for users.

Complete range of peripherals

In addition to over 200 models of main CPU units, the FBs-PLC also provides about 100 models of expansion I/O for selection. The expansion I/O modules include basic DI/O, AI/O and other communication modules, also include thumbwheel switch input module, 16/7 segment LED display module, 8 types (J, K, R, S, E, T, B, N) thermocouple, Pt100, Pt1000 RTD temperature measurement modules. There is also a new additions to the range including load cell module used in weighting, potential meter module used in measuring position, and a user-friendly voice module. The FBs-PLC also provides a FBs-DAP or FBs- PEP simple HMI which can be linked together with a single RS485 bus. The FBs-DAP or FBs-PEP can be a simple Timer/Counter editor or it can also be used as a simple human machine interface through the function of user definable keys and message display. The FBs-DAP or FBs-PEP can be equipped with a wireless RFID sensing module and can be applied to such applications as entrance control, parking equipment and elevator control amongst others.

User-friendly operating environment

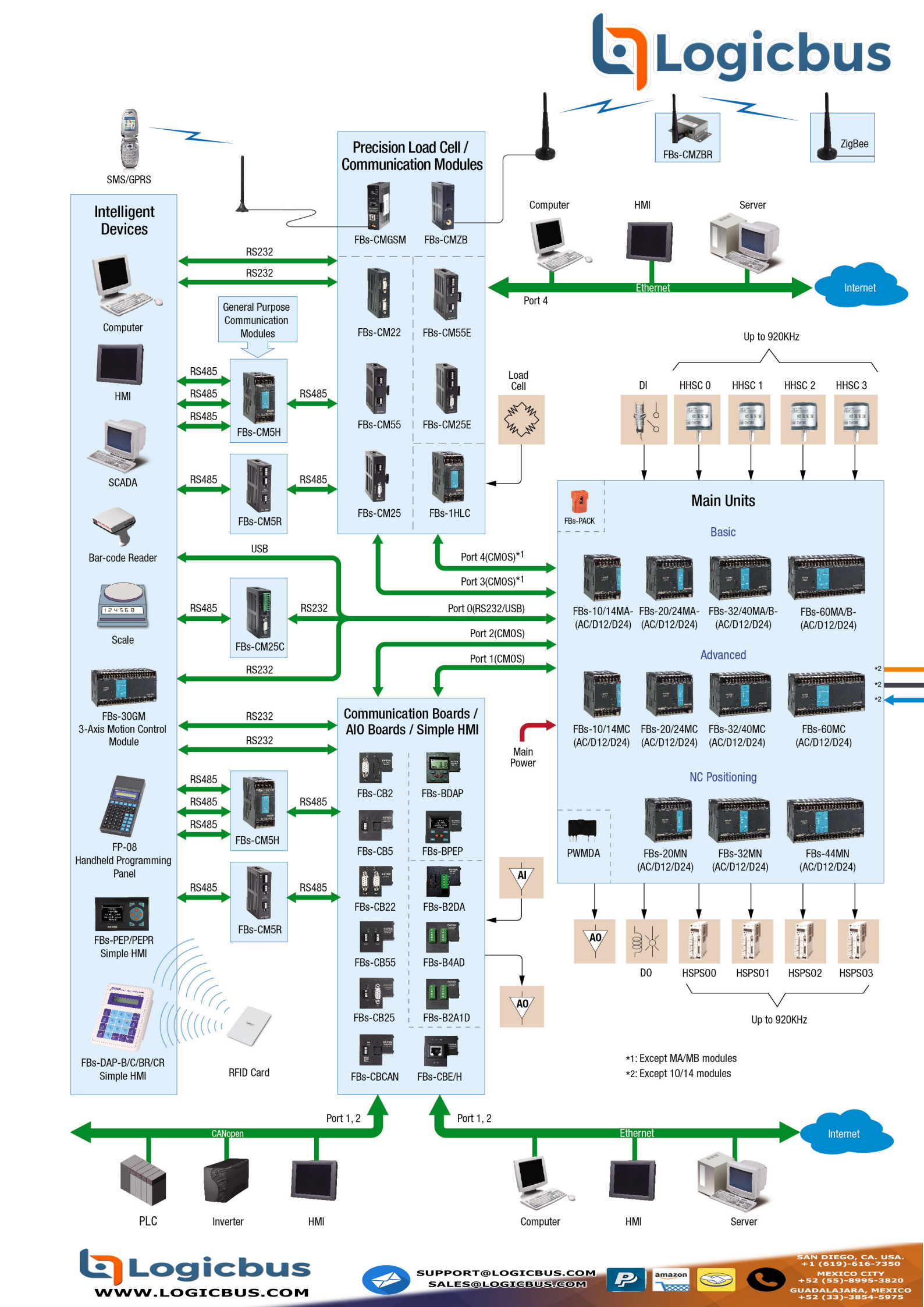
"WinProladder" is the Windows-based ladder diagram programming software for the FBs-PLC. It provides a user-friendly operating environment with editing, monitoring and debugging functions which allows the user to become familiar with the operation of the software in a very short time. The powerful editing function of WinProladder, assisted with keyboard, mouse and on-line help (of ladder instructions and operating guide) greatly reduces programming development time. Features which can display the data registers directly in the ladder diagram and provide multiple status pages for monitoring gives the user the ability to monitor and debug easily.

Up to 36 points of captured input

The SoC in the FBs-PLC has a captured input function, which captures and stores the external pulse of an input shorter than the scanning time of the CPU. Compared to PLC's in this class that either lack this capability or require highly sophisticated interrupt functions (which increase the CPU processing time), the FBs-PLC can handle this task easily as a general input, easily configured with high efficiency and no detriment the CPU scan time.

Single unit with 16 points of high-speed interrupt

The FBs-PLC provides 16 points of external interrupts. The interrupt is edge driven and the user can define which edge triggers the interrupt and can be positive, negative or both edges. The interrupts can perform high speed, emergency processing which can withstand the time jilter caused by the delay and deviation of the scan time and can be used for precision high speed positioning, machine home and high speed RPM measurement applications.


Logicbus
SMS/GPRS
FBs-CMZBR
ZigBee
Precision Load Cell / Communication Modules
FBs-CMGSM
FBs-CMZB
Intelligent Devices
Computer
HMI
Server
RS232
RS232
Ethernet
Port 4
Internet
Computer
HMI
SCADA
Bar-code Reader
Scale
FBs-30GM 3-Axis Motion Control Module
FP-08 Handheld Programming Panel
FBs-PEP/PEPR Simple HMI
FBs-DAP-B/C/BR/CR Simple HMI
RFID Card
General Purpose Communication Modules
FBs-CM22
FBs-CM55E
FBs-CM55
FBs-CM25E
FBs-CM25
FBs-1HLC
RS485
FBs-CM5H
FBs-CM5R
USB
FBs-CM25C
RS232
Load Cell
Up to 920KHz
DI
HHSC 0
HHSC 1
HHSC 2
HHSC 3
Main Units
FBs-PACK
Basic
FBs-10/14MA- (AC/D12/D24)
FBs-20/24MA- (AC/D12/D24)
FBs-32/40MA/B- (AC/D12/D24)
FBs-60MA/B- (AC/D12/D24)
Port 4(CMOS)*1
Port 3(CMOS)*1
Port 0(RS232/USB)
Port 2(CMOS)
Port 1(CMOS)
Advanced
FBs-10/14MC (AC/D12/D24)
FBs-20/24MC (AC/D12/D24)
FBs-32/40MC (AC/D12/D24)
FBs-60MC (AC/D12/D24)
*2
Main Power
NC Positioning
PWMDA
FBs-20MN (AC/D12/D24)
FBs-32MN (AC/D12/D24)
FBs-44MN (AC/D12/D24)
Communication Boards / AIO Boards / Simple HMI
FBs-CB2
FBs-BDAP
FBs-CB5
FBs-BPEP
FBs-CB22
FBs-B2DA
FBs-CB55
FBs-B4AD
FBs-CB25
FBs-B2A1D
FBs-CBCAN
FBs-CBE/H
AI
AO
AO
DO
HSPSO0
HSPSO1
HSPSO2
HSPSO3
Up to 920KHz
*1: Except MA/MB modules
*2: Except 10/14 modules
Port 1, 2
CANopen
Port 1, 2
Ethernet
Internet
PLC
Inverter
HMI
Computer
HMI
Server

Logicbus

Main Power

Sensor power
BUS power
I/O BUS

DIO Expansion Units

FBs-60XY-(AC/D12/D24)

FBs-40XY-(AC/D12/D24)

FBs-24XY-(AC/D12/D24)

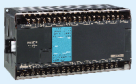
DI

DO

DIO Expansion Modules

FBs-24XY

FBs-40XY


FBs-60XY

FBs-8X

FBs-8Y

FBs-8XY

FBs-20X

FBs-16Y

FBs-16XY

FBs-24X

FBs-24YT/J

DI

DO

Thumbwheel Switch and 16/7 Segment LED Display Modules

FBs-32DGI

FBs-7SG1

FBs-7SG2

Thumbwheel Switch

LED Display

Power Supplies for Expansion Modules

Sensor power
BUS power

FBs-EPW-(AC/D24)

Main Power

AIO Modules

FBs-6AD

FBs-2DA

FBs-4DA

FBs-4A2D

AO

AI

AI + Temperature Measurement Combo Modules

FBs-2A4TC

FBs-2A4RTD

AI

TC

RTD

Temperature Measurement Modules

FBs-6NTC

FBs-2TC

FBs-6TC

FBs-6RTD

FBs-16TC

FBs-16RTD

TC

RTD

Voice Module

FBs-VOM

Speaker

Load Cell Module

FBs-1LC

Potential Meter Module

FBs-4PT

Potential Meter

Load Cell

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			-25~70°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 specifications

Specification \ Item		10/14 points main units	20/24 points main units	32/40 points main units	60 points main units
Input range	Voltage	100~240VAC, -15%/+10%			
	Frequency	50/60Hz ±5%			
Max. power consumption (built-in power supply)		21W(SPW14-AC)	36W(SPW24-AC)		
Inrush current		20A@264VAC			
Allowable power momentary interruption time		< 20mS			
Fuse rating		2A, 250V			

DC power supply specifications

Specification \ Item	10/14 points main units	20/24 points main units	32/40 points main units	60 points main units
Input voltage	12 or 24 VDC, -15%/+20%			
Max. power consumption (@ full built-in power supply)	21W(SPW14-D12/D24)	36W(SPW24-D12/D24)		
Inrush current	20A@12 or 24VDC			
Allowable power momentary interruption time	< 2mS			
Fuse rating	3A(D12)/1.5A(D24),125V	5A(D12)/2.5A(D24),125V		

Main unit specifications

* : Default, changable by user

Item			Specification	Note
Execution speed			0.33uS/Sequential instruction	
Program capacity			20K Words	
Program memory			FLASH ROM or SRAM + Lithium battery for Back-up	
Sequential instruction			36 instructions	
Function instruction			326 instructions (126 kinds)	Include derivative instructions
Flow chart command (SFC)			4 instructions	
Communication Interface	Port 0 (RS232 or USB)		Communication speed 4.8k ~ 115.2Kbps (9.6Kbps)*	
	Port 1 ~ Port 4 (RS232, RS485 , Ethernet, CANopen or GSM)		Communication speed 4.8k ~ 921.6Kbps (9.6Kbps)*	Port1 ~ 4 provides FATEK or Modbus RTU/ASC II or user defined communication protocol
	Maximum link stations		254	
Digital (Bit status)	X	Input contact (DI)	X0~X255 (256)	Corresponding to external digital input
	Y	Output relay (DO)	Y0~Y255 (256)	Corresponding to external digital output
	TR	Temporary relay	TR0~TR39 (40)	

General Specifications

(Continue)

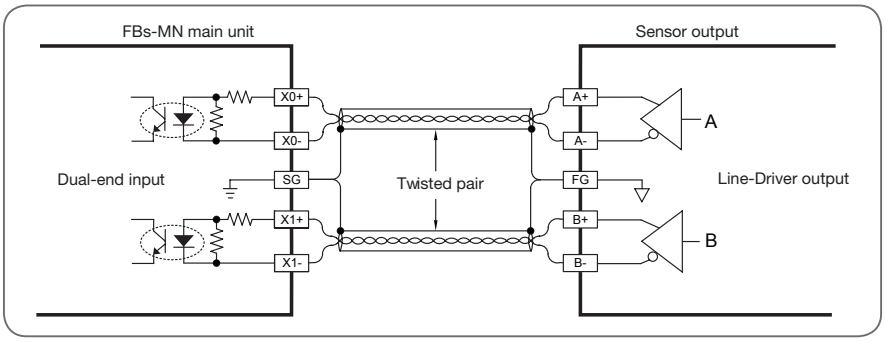
Item				Specification	Note
Digital (Bit status)	M	Internal relay	Non-retentive	M0 ~ M799 (800)*	Can be configured as retentive type
				M1400 ~ M1911 (512)	
			Retentive	M800 ~ M1399 (600)*	Can be configured as non-retentive type
		Special relay		M1912 ~ M2001 (90)	
	S	Step relay	Non-retentive	S0 ~ S499 (500)*	S20 ~ S499 can be configured as retentive type
			Retentive	S500 ~ S999 (500)*	Can be configured as non-retentive type
	T	Timer "Time-Up" status contact		T0 ~ T255 (256)	
	C	Counter "Count-Up" status contact		C0 ~ C255 (256)	
Register (Word data)	TMR	Timer current value register	0.01S Time base	T0 ~ T49 (50)*	T0 ~ T255 numbers for each time base can be adjusted.
			0.1S Time base	T50 ~ T199 (150)*	
			1S Time base	T200 ~ T255 (56)*	
	CTR	Counter current value register	16-bit Retentive	C0 ~ C139 (140)*	Can be configured as non-retentive type
			16-bit Non-retentive	C140 ~ C199 (60)*	Can be configured as retentive type
			32-bit Retentive	C200 ~ C239 (40)*	Can be configured as non-retentive type
			32-bit Non-retentive	C240 ~ C255 (16)*	Can be configured as retentive type
	HR DR	Data register	Retentive	R0 ~ R2999 (3000)*	Can be configured as non-retentive type
				D0 ~ D3999 (4000)	
			Non-retentive	R3000 ~ R3839 (840)*	Can be configured as retentive type
	HR ROR		Retentive	R5000 ~ R8071 (3072)*	When not configured as ROR, it can serve normal register (for read/write)
			Read only register	R5000 ~ R8071 can be set as ROR ~ default setting is (0)*	ROR is stored in special ROR area and not occupy program space
			File register	F0 ~ F8191 (8192)	Save/retrieved via dedicated instruction
	IR	Input register		R3840 ~ R3903 (64)	Corresponding to external numeric input
	OR	Output register		R3904 ~ R3967 (64)	Corresponding to external numeric output
	SR	Special system register		R3968 ~ R4167 (197), D4000 ~ D4095 (96)	
		0.1mS high-speed timer register		R4152 ~ R4154 (3)	
		High-speed counter register	Hardware (4 sets)	DR4096 ~ DR4110 (4x4)	
			Software (4 sets)	DR4112 ~ DR4126 (4x4)	
		Calendar Register		R4128 (sec) / R4129 (min) / R4130 (hour) / R4131 (day)	Optional for MA model
				R4132 (month) / R4133 (year) / R4143 (week)	
	XR	Index register		V · Z (2), P0 ~ P9 (10)	
Interrupt control		External interrupt control		32 interrupts (16 points input positive/negative edge)	
		Internal interrupt control		8 interrupts (1, 2, 3, 4, 5, 10, 50, 100mS)	
0.1mS high speed timer(HST)				1 (16-bit), 4 (32-bit, share with HHSC)	
High-speed counter (HSC)	Hardware high-speed counter (HHSC) /32-bit		No. of channel	Up to 4	• Total number of HHSC and SHSC is 8 HHSC can be converted into 32-bit/0.1mS time base High-Speed Timer (HST) • Half of maximum frequency while A/B input
			Counting mode	8 modes (U/D, U/Dx2, P/R, P/Rx2, A/B, A/Bx2, A/Bx3, A/Bx4)	
			Counting frequency	Maximum is 200KHz (Single-end input) or 920KHz (differential input)	
	Software high-speed counter (SHSC) /32-bit		No. of channel	Up to 4	
			Counting mode	3 modes (U/D, P/R, A/B)	
			Counting frequency	Maximum sum up to 5KHz	
NC position pulse out (HSPSO)		Number of axis		Up to 4	
		Output frequency		Maximum is 200KHz (Single-end output) or 920KHz (differential output)	Half of the maximum while A/B output
		Pulse output mode		3 modes (U/D, P/R, A/B)	
		Programming method		Dedicated position language	
		Interpolation		Maximum 4 axes linear interpolation	
HSPWM output		Number of points		Up to 4	
		Output frequency		72Hz ~ 18.432KHz (with 0.1% resolution) 720Hz ~ 184.32KHz (with 1% resolution)	
Captured input			Points	Maximum 36 points (All inputs in main unit are suitable this feature)	
			Minimum capturable Pulse width	>10 µS (for ultra high speed / high speed input)	
				>47 µS (for Medium speed input)	
				>470 µS (for Medium low speed input)	
Digital filter			X0 ~ X15	Adjustable frequency 14KHz ~ 1.8MHz	Chosen by frequency at high frequency
				Adjustable time constant 0 ~ 1.5mS/0~15mS (unit: 0.1mS/1mS)	Chosen by time constant at low frequency
			X16 ~ X35	Time constant 1 ~ 15mS adjustable (unit: 1ms)	

General Specifications

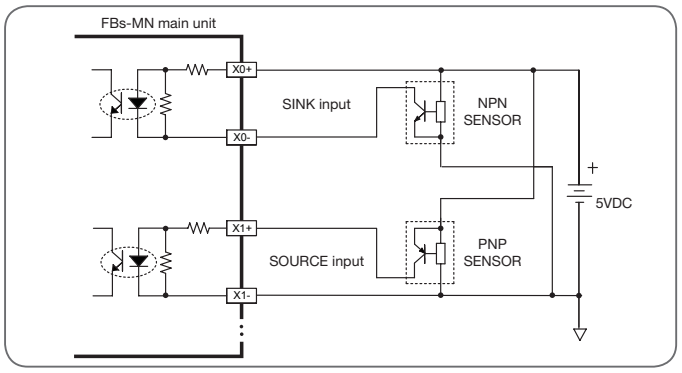
Digital Input (DI) Specifications

Item / Specification		5VDC differential input	24VDC single-end input				Notes
		Ultra high speed	High speed	Medium speed(HSC)	Medium low speed (capture input)	Low speed	
Maximum input frequency*/ accumulated time		920KHz	200KHz	20KHz(HHSC) Total 5KHz(SHSC)	0.47mS	4.7mS	*: Half of maximum frequency while A/B phase input
Input signal voltage		5VDC ± 10%	24VDC ± 10%				
Threshold current	ON	>11mA	>8mA	>4mA		>2.3mA	
	OFF	<2mA		<1.5mA		<0.9mA	
Maximum input current		20mA	10.5mA	7.6mA		4.5mA	
Input indication		Displayed by LED: light when "ON", dark when "OFF"					
Isolation method		Optical isolation, 500VAC, 1 minute					
SINK/SOURCE wiring		Independent wiring	Via variation of internal common terminal S/S and external common wiring				
Noise filtering methods		DHF (0~15mS) +AHF (0.47μS)		DHF (0~15mS) +AHF (4.7μS)	DHF (0~15mS) +AHF (0.47mS)	AHF (4.7mS)	DHF: Digital Hardware Filter AHF: Analog Hardware Filter

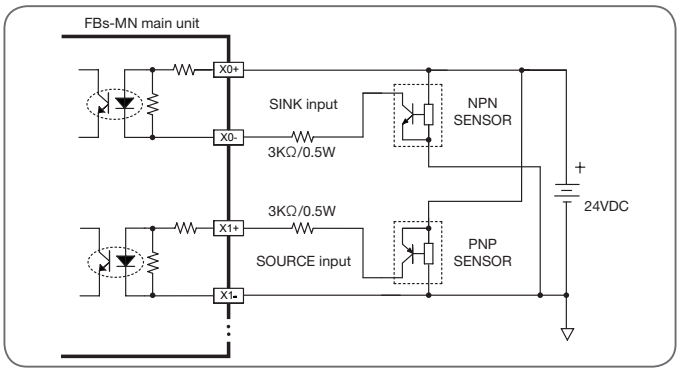
Wiring of 5VDC differential input (with frequency up to 920KHz, for high speed or high noise environments)



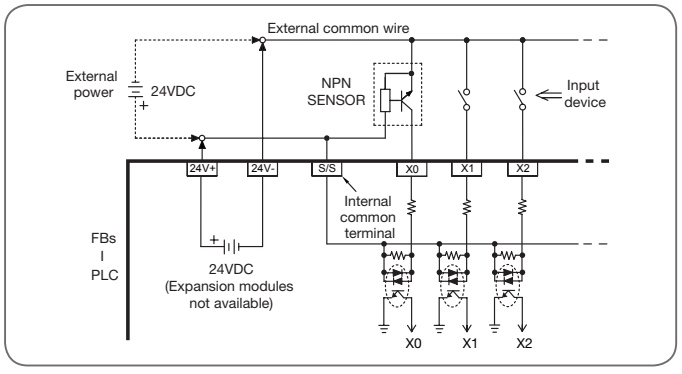
Wiring of 5VDC differential input to 5VDC single-end SINK /SOURCE input (Max. 200KHz)



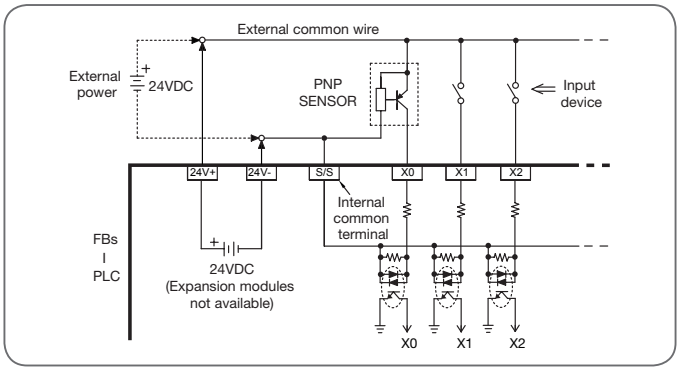
Wiring of 5VDC differential input to 24VDC single-end SINK /SOURCE input (Max. 200KHz)



Wiring of 24VDC single-end SINK input



Wiring of 24VDC single-end SOURCE input



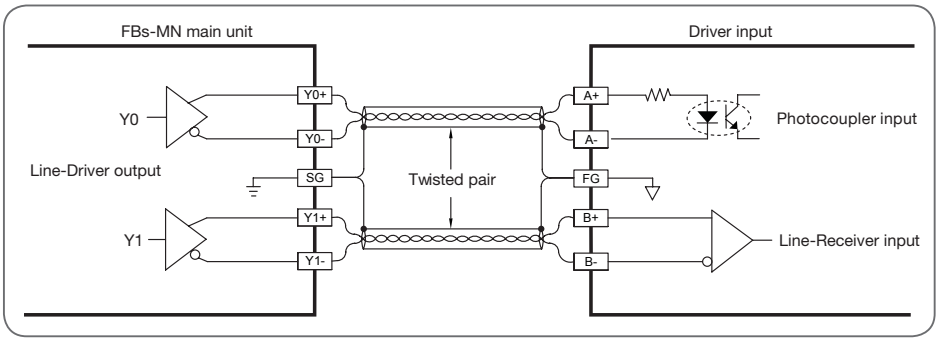
General Specifications

Digital Output (DO) Specifications

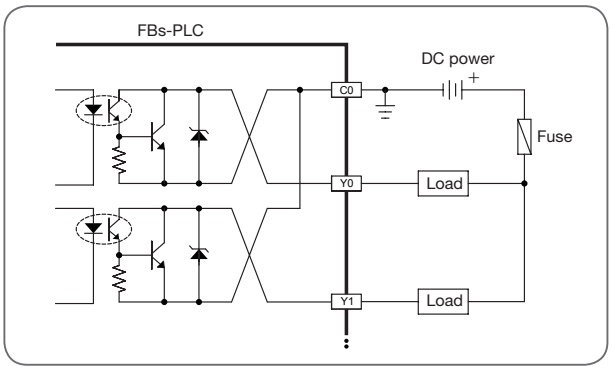
Specification \ Item		Differential output	Single-end transistor output			Single-end relay output
		Ultra high speed	High speed	Medium speed	Low speed	
Maximum output frequency*		920KHz	200KHz	20KHz	—	—
Working voltage		5VDC±10%	5~30 VDC			< 250VAC/30VDC
Maximum load current	Resistive	50mA	0.5A	0.5A	0.5A/0.1A (24YT/J)	2A/single, 4A/common
	Inductive					80VA(AC)/24VA(DC)
Maximum voltage drop/ conducting resistance		—	0.6V	2.2V	2.2V	0.06V (initial)
Minimum load		—	—			2mA/DC power
Leakage current		—	< 0.1mA/30VDC			—
Maximum output delay time	ON→OFF	200nS	2μS	15μS		10mS
	OFF→ON			30μS		
Output status indication		Displayed by LED: Light when "ON", dark when "OFF"				
Over current protection		N/A				
Isolation type		Optical isolation, 500VAC, 1 minute				Electromagnetic isolation 1500VAC, 1 minute
SINK/SOURCE output type		Independent dual terminals for arbitrary connection	Choose SINK/SOURCE by models and non-exchangeable			Can be arbitrarily set to SINK/SOURCE output

* : Half of the maximum frequency while A/B phase output

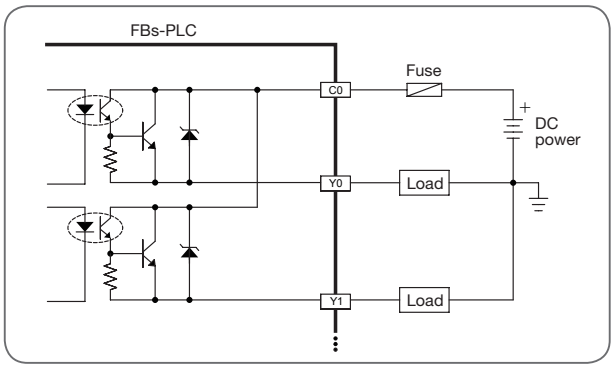
Wiring of 5VDC differential output (with frequency up to 920KHz, for high speed or high noise environments)



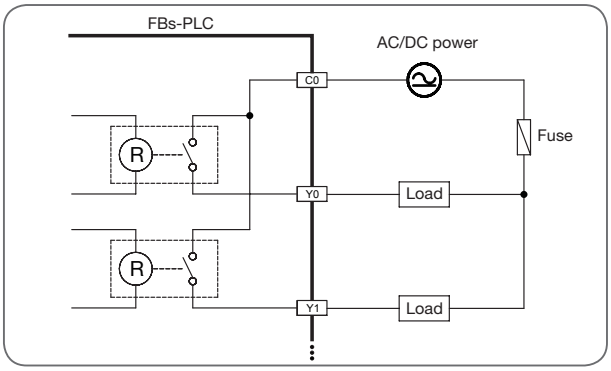
Wiring of transistor single-end SINK output



Wiring of transistor single-end SOURCE output



Wiring of relay single-end output



Main Unit Specifications

Basic Main Units (MA)

Specification \ Model			FBs-10MAR	FBs-10MAT/J	FBs-14MAR	FBs-14MAT/J	FBs-20MAR	FBs-20MAT/J	FBs-24MAR	FBs-24MAT/J
Digital Input	24VDC	High speed (100KHz)	2 points							
		Medium speed (20KHz)	2 points				4 points		6 points	
		Medium speed (Total 5KHz)	2 points		4 points		6 points			
Digital Output	Relay		4 points	—	6 points	—	8 points	—	10 points	—
	Transistor	High speed (100KHz)	2 points							
		Medium speed (20KHz)	—	2 points	—	4 points	—	6 points	—	6 points
		Low speed	—	—	—	—	—	—	—	2 points
Communication Port		Built-in	1 port (Port0, USB or RS232)							
		Expandable	2 ports (Port1~2, RS485 or RS232 or Ethernet)							
Calendar			built-in							
Built-in power supply			SPW14-AC/D12/D24				SPW24-AC/D12/D24			
Wiring mechanism			7.62mm fixed terminal block							
Dimension			Figure 2				Figure 1			

Basic Main Units (MA/MB)

Specification \ Model			FBs-32MAR FBs-32MBR	FBs-32MAT/J FBs-32MBT/J	FBs-40MAR FBs-40MBR	FBs-40MAT/J FBs-40MBT/J	FBs-60MAR FBs-60MBR	FBs-60MAT/J FBs-60MBT/J
Digital Input	24VDC	High speed (100KHz)	2 points					
		Medium speed (20KHz)	6 points					
		Medium speed (Total 5KHz)	8 points					
		Medium low speed	4 points		8 points		20 points	
Digital Output	Relay		12 points	—	16 points	—	24 points	—
	Transistor	High speed (100KHz)	2 points					
		Medium speed (20KHz)	—	6 points	—	6 points	—	6 points
		Low speed	—	4 points	—	8 points	—	16 points
Communication Port		Built-in	1 port (Port0, USB or RS232)					
		Expandable	2 ports (Port1~2, RS485 or RS232 or Ethernet)					
Calendar			built-in					
Built-in power supply			SPW24-AC/D12/D24					
Wiring mechanism			7.62mm fixed terminal block(MA), 7.62mm detachable terminal block (MB)					
Dimension			Figure 1					

Advanced Main Units (MC)

Specification \ Model			FBs-10MCR	FBs-10MCT/J	FBs-14MCR	FBs-14MCT/J	FBs-20MCR	FBs-20MCT/J	FBs-24MCR	FBs-24MCT/J
Digital Input	24VDC	High speed (200KHz)	2 points				4 points			
		Medium speed (20KHz)	2 points				2 points		4 points	
		Medium speed (Total 5KHz)	2 points		4 points		6 points			
Digital output	Relay		4 points	—	6 points	—	8 points	—	10 points	—
	Transistor	High speed (200KHz)	—	2 points	—	2 points	—	4 points	—	4 points
		Medium speed (20KHz)	—	2 points	—	4 points	—	4 points	—	4 points
		Low speed	—	—	—	—	—	—	—	2 points
Communication Port		Built-in	1 port (Port0, USB or RS232)							
		Expandable	4 ports (Port1~4, RS485 or RS232 or Ethernet or GSM or ZigBee)							
Calendar			Built-in							
Built-in power supply			SPW14-AC/D12/D24				SPW24-AC/D12/D24			
Wiring mechanism			7.62mm fixed terminal block				7.62mm detachable terminal block			
Dimension			Figure 2				Figure 1			

Main Unit Specifications

Advanced Main Units (MC)

Specification \ Model			FBs-32MCR	FBs-32MCT/J	FBs-40MCR	FBs-40MCT/J	FBs-60MCR	FBs-60MCT/J
Digital Input	24VDC	High speed (200KHz)	6 points				8 points	
		Medium speed (20KHz)	2 points				—	
		Medium speed (Total 5KHz)	8 points					
		Medium low speed (0.47ms)	4 points		8 points		20 points	
Digital output	Relay		12 points	—	16 points	—	24 points	—
	Transistor	High speed (200KHz)	—	6 points	—	6 points	—	8 points
		Medium speed (20KHz)	—	2 points	—	2 points	—	—
		Low speed	—	4 points	—	8 points	—	16 points
Communication Port		Built-in	1 port (Port0, USB or RS232)					
		Expandable	4 ports (Port1~4, RS485 or RS232 or Ethernet or GSM or ZigBee)					
Calendar			Built-in					
Built-in power supply			SPW24-AC/D12/D24					
Wiring mechanism			7.62mm detachable terminal block					
Dimension			Figure 1					

NC Positioning Main Units (MN)

Specification \ Model			FBs-20MNR	FBs-20MNT/J	FBs-32MNR	FBs-32MNT/J	FBs-44MNR	FBs-44MNT/J
Digital Input	5VDC Differential	Ultra high speed (920KHz)	2 points (1 axis)		4 points(2 axes)		8 points(4 axes)	
	24VDC	High speed (200KHz)	4 points		4 points		—	
		Medium speed (Total 5KHz)	6 points		8 points			
		Low speed	—		4 points		12 points	
Digital output	Relay		6 points	—	8 points	—	8 points	—
	5VDC Differential	Ultra high speed (920KHz)	2 points (1 axis)		4 points (2 axes)		8 points(4 axes)	
	Transistor	High speed (200KHz)	—	6 points	—	4 points	—	—
		Low speed	—	—	—	4 points	—	8 points
Communication Port		Built-in	1 port (Port0, USB or RS232)					
		Expandable	4 ports (Port1~4, RS485 or RS232 or Ethernet or GSM or ZigBee)					
Calendar			Built-in					
Built-in power supply			SPW24-AC/D12/D24					
Wiring mechanism			7.62mm detachable terminal block					
Dimension			Figure 1					

Right Side Expansion Module Specifications

DIO Expansion Units

Specification \ Model			FBs-24XYR	FBs-24XYT/J	FBs-40XYR	FBs-40XYT/J	FBs-60XYR	FBs-60XYT/J
Digital Input	24VDC	Low speed	14 points		24 points		36 points	
Digital output	Relay		10 points	—	16 points	—	24 points	—
	Transistor	Low speed	—	10 points	—	16 points	—	24 points
Built-in power supply			SPW24-AC/D12/D24					
Wiring mechanism			7.62mm fixed terminal block					
Dimension			Figure 1					

Right Side Expansion Module Specifications

Power Supplies for Expansion Modules

Specification \ Model		FBs-EPW-AC	FBs-EPW-D24
Capacity of output power	5VDC Bus power	400mA	
	24VDC Bus power	250mA	
	24VDC Sensor power	250mA	
Input voltage		100~240 VAC, -15%/+10%	24VDC, -15%/+20%
Maximum power consumption		21W	
Wiring mechanism		7.62mm fixed terminal block	
Dimension		Figure 4	

DIO Expansion Modules

Specification \ Model			FBs-8XYR	FBs-8XYT/J	FBs-8X	FBs-8YR	FBs-8YT/J	FBs-16XYR	FBs-16XYT/J	FBs-20X
Digital Input	24VDC	Low Speed	4 points		8 points	—	—	8 points		20 points
Digital Output	Relay		4 points	—	—	8 points	—	8 points	—	—
	Transistor	Low Speed	—	4 points	—	—	8 points	—	8 points	—
Wiring mechanism			7.62 mm fixed terminal block							
Dimension			Figure 4					Figure 3		

(Continue)

Specification \ Model			FBs-16YR	FBs-16YT/J	FBs-24X	FBs-24YT/J	FBs-24XYR	FBs-24XYT/J	FBs-40XYR
Digital Input	24VDC	Low Speed	—	—	24 points	—	14 points		24 points
Digital Output	Relay		16 points	—	—	—	10 points	—	16 points
	High density low speed		—	—	—	24 points	—	—	—
	Transistor	Low Speed	—	16 points	—	—	—	10 points	—
Wiring mechanism			7.62 mm fixed terminal block		30 pins header with latch		7.62 mm fixed terminal block		
Dimension			Figure 3		Figure 6		Figure 1		

(Continue)

Specification \ Model			FBs-40XYT/J	FBs-60XYR	FBs-60XYT/J
Digital Input	24VDC	Low Speed	24 points	36 points	
Digital Output	Relay		—	24 points	—
	Transistor	Low Speed	16 points	—	24 points
Wiring mechanism			7.62 mm fixed terminal block		
Dimension			Figure 1		

Thumbwheel Switch Module

Specification \ Model	FBs-32DGI
Refresh time for input	10mS max.
Input capability	8 words (32 digits/128 individual points)
Input method	1/8 duty multiplexing input scan
Wiring mechanism	30 pins header with latch
Dimension	Figure 6

Right Side Expansion Module Specifications

16/7 Segment LED Display Modules

Specification \ Model			FBs-7SG1	FBs-7SG2
Display mode	Decoding display		4 bits to represent a character. It can display 16 kinds of pre-decoded character including 0 ~ 9, -, E, H, c, t and blank	
	Non-decoding display		Each segment controlled by 1 individual bit, one 7 segment digits needs 8 bits to control (including decimal), displayable any set of segments (EX: character and number display) or each LED display	
Display number of character (points)			1 channel, 7 segment 8 words / 16 segment 4 words or 64 points individual LED	2 channels, 7 segment 16 words/ 16 segment 8 words or 128 points individual LED
Refresh time for display			10mS max.	
LED driving specification	Driving current		40mA / segment	
	Display method		1~8 duty multiplexing display	
	Driving voltage	Low voltage	5VDC (can be 10% up)	
		High voltage	7.5V, 10V, 12.5V selectable (can be 10% up)	
	Fine tune of voltage drop		0.6V, 1.2V, 1.8V selectable	
Over voltage driving indication			Each channel has individual Over Voltage (O.V.) driving LED indication (should be under Test Mode)	
Isolation method			Transformer (power) and optical (signal) isolation, 500VAC, 1 minute	
Power consumption			24VDC–15%/+20%, static consumption is 2W max., dynamic current is increased according to display	
Wiring mechanism			16 pins flat cable, 2.54mm header connector	
Dimension			Figure 4	

AIO Module

Specification \ Model		FBs-6AD	FBs-4A2D	FBs-2DA	FBs-4DA
Input point		6 points	4 points	—	—
Output point		—	2 points	2 points	4 points
Input/Output value		-8192~8191 or 0~16383 (14-bit)			
Input/output Signal range	Bipolar	Voltage: -10~10V or -5~5V Current: -20~20mA or -10~10mA			
	Unipolar	Voltage: 0~10V or 0~5V Current: 0~20mA or 0~10mA			
Maximum resolution		Voltage: 0.3mV (5V/16384) Current: 0.61μA (10mA/16384)			
Accuracy		± 1%			
Conversion time		Conversion once for each scan			
Maximum input signal		Input voltage: ±15V Input current: ±30mA		—	
Allowable load range		—	Output voltage: 500Ω~1MΩ Output current: 0~500Ω		
Input impedance		Input voltage: 63.2KΩ Input current: 250Ω		—	
Isolation method		Transformer(power) and optical(signal) isolation, 500VAC, 1 minute, no isolation between each channel			
Power consumption		24VDC -15%/+20%, 3.2W max.			
Wiring mechanism		7.62 mm fixed terminal block			
Dimension		Figure 4			

Temperature Measurement Modules

Specification \ Model	FBs-2TC	FBs-6TC	FBs-16TC	FBs-6RTD	FBs-16RTD	FBs-6NTC
Number of input points	2 points	6 points	16 points	6 points	16 points	6 points
Sensor type and temperature measurement range	Thermocouple Sensor: J (-200~1200˚C) E (-190~1000˚C) K (-190~1300˚C) T (-190~380˚C) R (0~1800˚C) B (350~1800˚C) S (0~1700˚C) N (-200~1000˚C)			3-wire RTD sensor (JIS or DIN) Pt100(-200~850˚C) Pt1000(-200~600˚C)		NTC sensor 10 KΩ at 25˚C, B optional -20~100˚C
Temperature compensation	Built-in cold junction compensation			—	—	—
Resolution	0.1°C					
Temperature refresh time	1 or 2 seconds	2 or 4 seconds	3 or 6 seconds	1 or 2 seconds	2 or 4 seconds	2 or 4 seconds
Overall Precision	± (1%+1˚C)			± 1%		±1% of full scale at 25˚C
Isolation method	Transformer(power) and optical(signal) isolation, 500VAC, 1 minute, isolation between each channel			Transformer(power) and optical(signal) isolation, 500VAC, 1 minute, no isolation between each channel		
Power consumption	24VDC -15%/+20%, 2W max.					
Wiring mechanism	3.81 mm european terminal block		7.62 mm fixed terminal block			
Dimension	Figure 4		Figure 1	Figure 4	Figure 1	Figure 4

Right/Left Side Expansion Module Specifications

AI+Temperature Measurement Combo Modules

Specification \ Model	FBs-2A4TC	FBs-2A4RTD
Analog input (AI) points	2 points / 14-bit	
Temperature measurement input points	4 points (thermocouple)	4 points (RTD)
Analog input specification	Same as FBs-6AD	Same as FBs-6AD
Temperature input specification	Same as FBs-6TC	Same as FBs-6RTD
Power consumption	24VDC-15%/+20%, 2W max.	
Wiring mechanism	7.62 mm fixed terminal block	
Dimension	Figure 4	

Load Cell Module

Specification \ Model	FBs-1LC
Number of channel	1 channel
Resolution	16-bit (including sign bit)
Occupied I/O points	1 IR (input register) and 8 points DO
Conversion Rate	5/10/25/30/60/80 Hz optional
Non-linearity degree	0.01% full scale @25 ℃
Zero drift	0.2 μV/ ℃
Gain drift	10 ppm/ ℃
Excitation voltage	5V, maximum load is 250Ω
Level of sensitivity	2mV/V, 5mV/V, 10mV/V, 20mV/V
Filters	Moving averages
Isolation method	Transformer (power) and optical (signal) isolation, 500VAC, 1 minute
Power consumption	24VDC, -15%/+20%, 2W
Wiring mechanism	7.62 mm fixed terminal block
Dimension	Figure 4

Voice Module

Specification \ Model		FBs-VOM
Number of recorded messages		245 messages
Sound storage device		Internal memory or external SD memory card
Maximum sound storage capacity	Internal memory	1MB, can play up to 2 minutes of sound recordings.
	External SD memory card	Maximum 4 GB memory card, up to 8000 minutes of sound recordings can be played.
Applicable sound encoding format		Mono 8 bit 8KHz sample
Signal output		Dual output 8Vp-p, 4Ω load 2W output
Sound input method		Computer editing, SD memory card
Sound playback control		PLC control or manual sequencing (test play)
Volume control		PLC control, total of 10 volumes
I/O points occupy		8 points DI and 8 points DO
Status display		3 LEDs
Power consumption		Internal 5V, 500mA (@2W output)
Dimension		Figure 4

Potential Meter Module

Specification \ Model	FBs-4PT
Number of channel	4 channels
Resolution	14 or 12 bits
Occupied I/O points	4 IR (input registers) and 1 unused OR (output register)
Conversion time	Conversion once for each scan
Accuracy	±1%
Potential meter impedance	1K~10KΩ
Voltage Input Range	0~10V
Potential meter voltage	10V
Filters	Moving averages
Isolation method	Transformer (power) and optical (signal) isolation, 500VAC, 1 minute
Power consumption	24VDC, -15%/+20%, 2W
Wiring mechanism	7.62 mm fixed terminal block
Dimension	Figure 4

Left Side Expansion Module Specifications

General Communication Boards/Modules

Specification \ Model	FBs-CB2	FBs-CB22	FBs-CB5	FBs-CB55	FBs-CB25
RS232 Port	1 port (Port2)	2 ports (Port1, Port 2)	—	—	1 port (Port1)
RS485 Port	—	—	1 port (Port2)	2 ports (Port1, Port 2)	1 port (Port2)
Indicators	Each Port has its own TX, RX LED indicators				
Wiring mechanism	DB9F	DB9F	3 pins spring terminal		DB9F, 3 pins spring terminal
Installation position	Expansion slot of main unit				

(Continue)

Specification \ Model	FBs-CM22	FBs-CM55	FBs-CM25
RS232 Port	2 ports (Port3, Port4)	—	1 port (Port3)
RS485 Port	—	2 ports (Port3, Port4)	1 port (Port4)
Indicators	Each Port has its own TX, RX LED indicators		
Wiring mechanism	DB9F	3 pins spring terminal	DB9F, 3 pins spring terminal
Installation position	Figure 5		

Left Side Expansion Module Specifications

Ethernet Communication Boards/Modules

Specification \ Model	FBs-CBEH	FBs-CBE	FBs-CM25E	FBs-CM55E
Network interface	10/100 Base T	10 Base T		
Network protocol	TCP/UDP/IP, ICMP, ARP			
Application protocol	FATEK client and server mode, Modbus-TCP client or server mode	FATEK client and server mode, Modbus-TCP server mode		
PLC interface	Port1, Port2		Port4	
PLC communication speed	307.2 Kbps	115.2 Kbps	9.6K / 19.2K / 38.4K / 57.6K / 115.2Kbps / 230.4Kbps	
Expansion communication interface	N/A		RS232 (Port3), RS485 (Port4)	RS485 (Port3, Port4)
Application IP port number	FATEK port number 500, Modbus-TCP 502 or customized			
Security protection	IP based access control			
Indicators	Internet RX, TX, LINK LEDs indicators			
Wiring mechanism	RJ-45		DB9F, spring terminal block 4-pin x1, 3-pin x1	Spring terminal block 4-pin x1, 3-pin x1
Dimension (Installation position)	Expansion slot of main unit		Figure 5	

CANopen® Communication Board

Specification \ Model	FBs-CBCAN
Communication standard	CAN 2.0A CANopen
Network topology	3-Phase fieldbus
Communication speed	10K / 20K / 50K / 125K / 250K / 500K / 1Mbps
Maximum number of connection station	127 stations
Method of sending signal	Event or cyclic transmission
Isolation method	Optical (signal) isolation, 500VAC, 1 minute
Number of PDO communication	RXPDO-10, TXPDO-10 total up to 80 registers
Number of SDO channels	Client -1, Server-1
Error control	Heartbeat
Wiring mechanism	3-pin spring terminal block
ID setup method	Same as PLC station number or setup by software
Working mode	Master or slave dual modes
Installation position	Expansion slot of main unit

ZigBee™ Communication Modules

Specification \ Model	FBs-CMZB	FBs-CMZBR
Standards	Based on IEEE 802.15.4 and ZigBee™ standard	
Network topology	Mesh, Star, and Cluster-tree	
Frequency	2.4GHz, Unlicensed ISM Band	
Modulation	QPSK	
Data rate	250 Kbps	
RF channels	16(5MHz)	
Data encryption	AES(option)	
Transmit power	-7~18dBm	
Transmission distance	1200m (LOS)	
Nodes	Maximum 65535	
Communication interface	Port3	—
Power consumption	24VDC, -15%/+20%, 2W	
Dimension	Figure 5	62 x 54 x 29 (mm)

GSM Communication Module

Specification \ Model	FBs-CMGSM
Function	SMS, GPRS, and dial up data transfer (CSD), and etc
Frequencies	850/900/1800/1900MHz
RF power	2W
Communication interface	Port3
Dimension	Figure 5

General Purpose Communication Modules

Specification \ Model	FBs-CM25C	FBs-CM5R	FBs-CM5H
Function	General purpose RS232 to RS485 bi-directional signal converter	General purpose RS485 repeater	General purpose 1 to 3 RS485 HUB
Indicators	Each port has its own independent TX, RX LED indicator		
External power	24VDC, -15%/+20%		
Wiring mechanism	DB9F, 3.81mm European terminal block	3 pins spring terminal block	7.62mm fixed terminal block
Dimension	Figure 5		Figure 4

Left Side Expansion Module Specifications

AIO Boards

Specification \ Model	FBs-B2DA	FBs-B4AD	FBs-B2A1D
Input point	—	4 points	2 points
Output point	2 points	—	1 point
Input / Output value	0~16380 (14-bit representation, valid 12-bit)		
Input / Output polar	Unipolar		
Input / Output counting range	0~10V		
Conversion time	Conversion once for each scan		
Accuracy	±1%		
Isolation method	Non-isolation		
Wiring mechanism	3.81 mm European terminal block		
Installation position	The expansion slot of main unit		

3-Axis Motion Control Module

Specification \ Model	FBs-30GM
Number of DIO points	14 points (8 inputs/6 outputs)
Program capacity	16M Bytes
Data Register	20K Words
High speed pulse Input	200KHz X,Y,Z 3-Axis A/B differential signal input
High speed pulse Output	500KHz X,Y,Z 3-Axis A/B differential signal output
Manual input	A/B differential signal input
Communication port	RS485 x1, Ethernet x1
Built-in power supply	SPW24-AC/D12/D24
Wiring mechanism	7.62mm detachable terminal block
Dimension	Figure 1

Precision Load Cell Module

Specification \ Model	FBs-1HLC
Number of channels	1 channel
Resolution	0.10 μV/1D (24-bit AD)
Filters	Digital filter, sampling rate 6.25~120Hz
Measurement range	-1~39mV
Sensor voltage	5VDC±5%
No. of sensor connections	350Ω sensor x 8
Isolation Method	Transformer (power) and optical (signal) isolation, 500VAC, 1 minute
Power consumption	24VDC, -15%/+20%, 2W
Wiring mechanism	7.62mm fixed terminal block
Dimension	Figure 4

Handheld Programming Panel

Specification \ Model	FP-08
Main function	Program editor (Mnemonic language), status monitoring, parameters setup, program/parameter import and recording, etc.
Max. of power consumption	5V/100mA
Keyboard	48 silicon rubber keys
Display	Two rows 16 characters, dot matrix LCD display, with LED backlight
Recording device	FBs-PACK read/write
Communication port	RS232 serial communication port
Connectors	DB9F, Mini-DIN
Dimension	Figure 7

Simple HMI

Specification \ Model		FBs-DAP-B/BR	FBs-DAP-C/CR	FBs-PEP/PEPR	FBs-BDAP	FBs-BPEP
Display		Two rows 16-character, dot matrix LCD display, with LED backlighting		128x96 points white light OLED	128segments fixed-pattern LCD	128x64 points white light OLED
Key pads		20 buttons (4x5) membrane		8 operation keys (rubber)	6 operation keys (rubber)	6 operation keys(rubber)
Maximum of consumption power		24V, 48mA	5V, 120mA	5V, 100mA	5V, 100mA	5V, 100mA
Communication interface	Electric	RS485	RS232	RS232	Port1, CMOS	Port1, CMOS
	Mechanism	5 pins European detachable terminal block	DB9M	Mini-DIN	—	—
	Number of linked station	Max. 16 stations	Single unit	Single unit	—	—
General features		Timer, counter, register, relay, access of contact in PLC				
Special features		Alarm, information display, and user definable special hot keys		Station number setup, run/stop, Control Calendar* display and setup		
Card access features (RFID card)		Available only in –R models, with maximum distance of 6~12cm			—	—
Dimension (Installation position)		Figure 8		Figure 9	Expansion slot of main unit	

* The PLC main unit must be of calendar built-in type

Peripheral and Accessory Specifications

RFID Card

Specification \ Model	CARD-H
Operated frequency	13.56MHz
Memory	64-bit with Cyclic Redundancy Check (CRC) on data
Working temperature	-25~50 (ISO7810)
Power source	Powered by RF
Receivable distance	6~12cm
Writable times	At least 10000 times

PWMDA

Specification \ 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

Memory Pack

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

USB-RS232 Converter Cable

Specification \ Model	FBs-U2C-MD-180
Features	Standard USB AM connector to RS232 MD4M connector (used in standard PC USB to FBs main unit Port 0 RS232), length 180cm

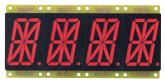
Communication Cable

Specification \ Model	FBs-232P0-9F-150	FBs-232P0-9M-400	FBs-232P0-MD-200	FBs-232P0-MDR-200
Features	Dedicated communication cable for FBs main unit Port 0 (RS232) to DB9F connector, length 150cm	Dedicated communication cable for FBs main unit Port 0 (RS232) to DB9M connector, length 400cm	Dedicated communication cable for FBs main unit Port 0 (RS232) to FBs-PEP/PEPR Mini-DIN male connector, length 200cm	Dedicated communication cable for FBs main unit port 0 (RS232) to FBs-PEP/PEPR 90 Mini-DIN male connector, length 200cm

High Density DIO Connection Cable

Specification \ Model	HD30-22AWG-200
Features	22AWG I/O cable with 30 pins Socket, length 200 (for FBs-24X, 24YT/J and 32DGI)

16/7 Segment LED Display



	DBAN.8-nR	DBAN2.3-nR
Features	0.8" 4-digit 16-segment LED display, , n means R(Red) 16-segment LED characters display installed, can be 1~4	2.3" 4-digit 16-segment LED display, n means R(Red) 16-segment LED characters display installed, can be 1~4

(Continue)

DB.56-nR	DB.8-nR	DB2.3-nR	DB4.0-nR
0.56" 8-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~8	0.8" 8-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~8	2.3" 8-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~8	4.0" 4-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~4

Training Box

Training Box

Specification / Model			FBs-TBOX
Case			Aluminum suitcase. Dimension is 46x32x16cm. Top cover and box body can be separated.
Power supply			100~240VAC / 2A fuse / power switch with indicator
PLC			FBs-24MCT(transistor output)+FBs-CM25E(Ethernet communication module)
Programming tool	Programmer		FP-08 handheld programming panel, can develop program, monitor (optional)
	Winproladder Programming Software		Instructor site: WinProladder with ' teaching assistant' utility
			Student site: WinProladder
Communication interface	Built-in	Port0	RS 232 Mini-DIN
	Communication board(CB) (optional)	Port1	RS232 or RS485 selectable, directly mounted on FBs-24MCT main unit
		Port2	
	FBs-CM25E	Port3	RS232, standard DB-9F connector
		Port4	RS485, 3-pin European terminal block
		(Port4)	Ethernet 10 Base T, IEEE 802.3 standard. Use port4 to interface PLC main unit
Input interface			Banana terminal and simulation switch with automatic and manual reset functions
Output interface			Banana terminal, 10 points. Transistor output(Y0~Y9). All outputs buffer with discrete relay before come to terminal. Y0 and Y1 also provide a direct output terminal for high-speed pulse output (HSPSO) application.
Expansion module (optional)			Secured by DIN Rail, 12.5cm wide slot, can accommodate three 4cm thin modules or other modules with equivalent width
Application peripheral	Display module		4 digits 7-segment display module, attached with BCD decoding circuit
	Thumbwheel switch		4 digits BCD thumbwheel switch module
	Keyboard module		4 x 4 matrix keyboard module (Wiring coordinate with convenient instruction)
	Encoder		Power supply 24VDC, 200P/R, open collector, A/B phase
	Stepping motor		Pules/DIR control, 200P/R
	LED display		10 of 10mmØ high-brightness LED (in red, yellow, and green), driven individually by Y0 to Y9
Number of linked stations			Maximum 254 stations (1 station for instructor, 253 stations for student)

Features:

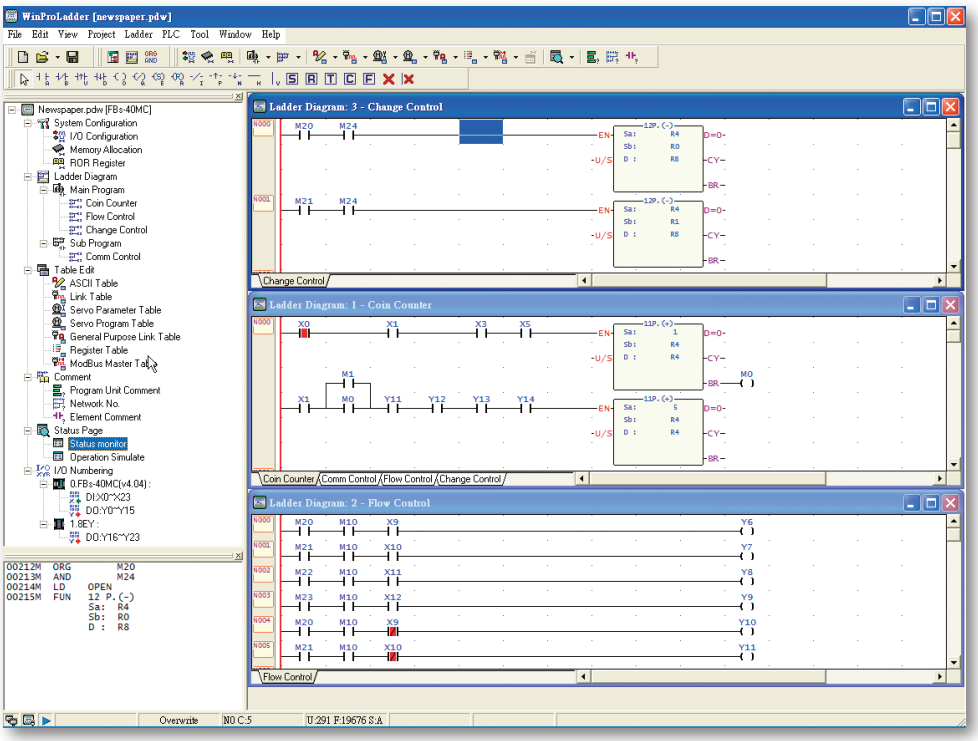
- It contains the basic items required by PLC digital I/O training, such as the FBs-24MCT advanced main unit, the FBs-CM25E Ethernet module, digital input socket, simulated switches, and digital output socket.
- The built-in RS232, RS485 and the Ethernet three ports (can be expanded to five with communication boards) not only enable the teacher's computer to connect with the training kits of all students to conduct networking on-line teaching such as loading, monitoring, modifying, and storing, but also can be used in advanced course such as computer connection, intelligent ASCII peripherals as well.

- A special designed software "WinProladder teaching assistant" can let instructor download or upload ladder program to or from the PLC of the whole class or individual through computer.
- PLC output is isolated by the Relay with socket and fuse and then output to terminal. These isolations can prevent PLC from damaging caused by incorrect wiring and easy for repair and replacement.

Program Development Software

General Features

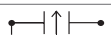
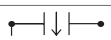
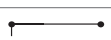
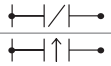
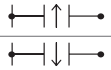
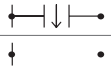
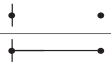
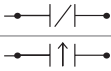
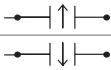
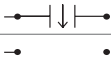
- Windows based application program following the standard conventions of a windows environment for ease of learning and operation regardless of whether the user is a beginner or frequent user.
- Application environment for project development is via a hierarchical tree. All the elements of the project can be activated by directly clicking the mouse button on the tree object providing comprehensive access and views of the working project.
- Easy entry methods which incorporate both the keyboard and mouse as entry devices. No matter whether on site or in an office environment the software can be operated with ease and efficiency.
- Provides various types of connections to the PLC via a PC. Connections include serial, USB, Ethernet / Internet and Modem. For every different connection WinProladder provides a session name to associate the setting of the communication parameters, such as port no., baud rate, IP address, phone number, etc.

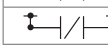
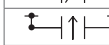
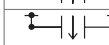
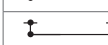
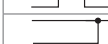
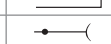
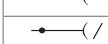
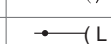


- On-Line, Run-Time program editing
- Program testing
- Program comments
- Project oriented program
- Ladder program editing screen
- Status monitor and control
- Mnemonic ladder instruction display window
- Ladder diagram with comments
- Element comment editing
- Off-Line Simulation

Instruction Sets

Sequential instructions

Instruction	Operand	Ladder symbol	Function
ORG	X,Y,M, S,T,C		Network starts by an A contact
ORG NOT			Network starts by a B contact
ORG TU			Network starts by a TU contact
ORG TD			Network starts by a TD contact
ORG OPEN			Network starts by an open contact
ORG SHORT			Network starts by a short contact
LD	X,Y,M, S,T,C		Branch line starts by an A contact
LD NOT			Branch line starts by a B contact
LD TU			Branch line starts by a TU contact
LD TD			Branch line starts by a TD contact
LD OPEN			Branch line starts by an open contact
LD SHORT			Branch line starts by a short contact
AND	X,Y,M, S,T,C		Serial connect with an A contact
AND NOT			Serial connect with a B contact
AND TU			Serial connect with a TU contact
AND TD			Serial connect with a TD contact
AND OPEN			Serial connect with an open contact
AND SHORT			Serial connect with a short contact

Instruction	Operand	Ladder symbol	Function
OR	X,Y,M, S,T,C		Parallel connect with an A contact
OR NOT			Parallel connect with a B contact
OR TU			Parallel connect with a TU contact
OR TD			Parallel connect with a TD contact
OR OPEN			Parallel connect with an open contact
OR SHORT			Parallel connect with a short contact
ANDLD			Concatenate two blocks in series
ORLD			Merge two blocks in parallel
OUT	Y,M,S		Output result to coil
OUT NOT			Output the inverse of result to a coil
OUT L	Y		Output result to a retentive coil
OUT	TR		Store node status in temporary relay
LD			Retrieve node status from temporary relay
TU			Take differential up of node status
TD			Take differential down of node status
NOT			Inverse node status
SET			Set a coil
RST			Reset a coil

Step ladder instructions (SFC)

Instruction	Operand	Ladder symbol	Function
STP	Snnn		Define STEP program
STPEND			STEP program end

Instruction	Operand	Ladder symbol	Function
TO	Snnn		STEP divergence
FROM			STEP convergence

Function instructions

Category	NO.	Instruction	Derivative	Function
Timer		Tnnn		General timer instruction (T0 ~ T255)
Counter		Cnnn		General counter instruction (C0 ~ C255)
	7	UDCTR	D	16 or 32-bit up/down counter
Setting / Resetting		SET	DP	Set all bits of register or a discrete point to 1
		RST	DP	Clear all bits of register or a discrete point to 0
	114	Z-WR	P	Zone set or clear
Digital operation	4	DIFU		Take differential up of the node status to operand
	5	DIFD		Take differential down of the node status too operand
	10	TOGG		Toggle the coil status
Mathematical operation	11	(+)	DP	Sa+Sb → D
	12	(–)	DP	Sa–Sb → D
	13	(×)	DP	Sa × Sb → D
	14	(/)	DP	Sa / Sb → D
	15	(+1)	DP	Add 1 to D
	16	(–1)	DP	Subtract 1 from D
	23	DIV48	P	48 bits integer division Sa / Sb → D
	24	SUM	DP	Sum of N consecutive registers
	25	MEAN	DP	Average of N consecutive registers
	26	SQRT	DP	Square root of S
	27	NEG	DP	Two's complement of D (Negative number)
	28	ABS	DP	Absolute value of D
	29	EXT	P	Extend 16 bits into 32 bits
	30	PID	P	PID calculation
	31	CRC16	P	CRC16 calculation
	32	ADCNV		Offset and full scale conversion for analog input
	33	LCNV	P	Linear conversion
	34	MLC	P	Multiple linear conversion

Category	NO.	Instruction	Derivative	Function
Mathematical operation	200	I→F	DP	Integer to floating point number conversion
	201	F→I	DP	Floating point number to integer conversion
	202	FADD	P	Addition of floating point number
	203	FSUB	P	Subtraction of floating point number
	204	FMUL	P	Multiplication of floating point number
	205	FDIV	P	Division of floating point number
	206	FCMP	P	Comparison of floating point number
	207	FZCP	P	Zone comparison of floating point number
	208	FSQR	P	Square root of floating point number
	209	FSIN	P	SIN trigonometric function
	210	FCOS	P	COS trigonometric function
	211	FTAN	P	TAN trigonometric function
	212	FNEG	P	Change sign of floating point number
	213	FABS	P	Absolute value of floating point number
	214	FLN	P	Floating point napierian logarithm
	215	FEXP	P	Floating point exponential function
	216	FLOG	P	Floating point logarithm
	217	FPOW	P	Floating point power function
	218	FASIN	P	Floating point arc sine function
	219	FACOS	P	Floating point arc cosine function
	220	FATAN	P	Floating point arc tangent function
Logic operation	18	AND	DP	Sa AND Sb
	19	OR	DP	Sa OR Sb
	35	XOR	DP	Sa XOR Sb
	36	XNR	DP	Sa XNR Sb
Comparison	17	CMP	DP	Value Compare
	37	ZNCMP	DP	Zone Compare

Instruction Sets

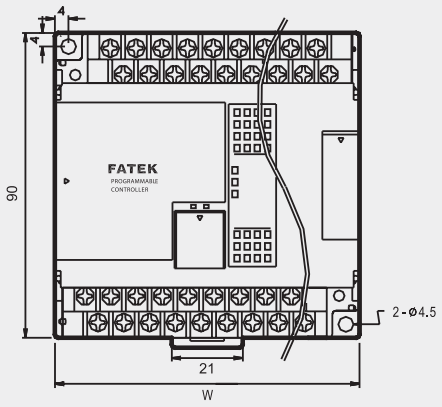
(Continue)

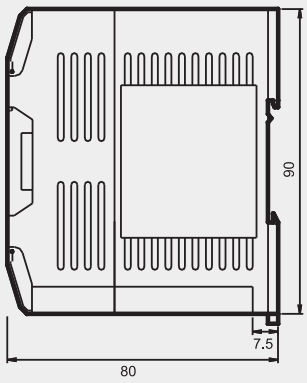
Category	NO.	Instruction	Derivative	Function
Move operation	8	MOV	DP	Move S to D
	9	MOV/	DP	Inverse S and move to D
	40	BITRD	DP	Move the Bit-N of S to FO
	41	BITWR	DP	Write INB input to the Bit-N of D
	42	BITMV	DP	Move the Bit-Ns of S to the Bit -Nd of D
	43	NBMV	DP	Move the Nibble-Ns of S to the Nibble-Nd of D
	44	BYMV	DP	Move the Byte-Ns of S to the Byte-Nd of D
	45	XCHG	DP	Exchange Da and Db
	46	SWAP	P	Swap the High-Byte of D with the Low-Byte of D
	47	UNIT	P	Take Nb0 of N words to form a Word
	48	DIST	P	Distribute N Nb of S to Nb0 of N Words
	49	BUNIT	P	Low byte of words re-unit
	50	BDIST	P	Words split into multi-byte
	160	RW-FR	DP	File register access
	161	WR-MP		Write memory pack
	162	RD-MP	P	Read memory pack
Shift / Rotation	6	BSHF	DP	Shift D right 1 bit or left 1 bit
	51	SHFL	DP	Shift D left N bits
	52	SHFR	DP	Shift D right N bits
	53	ROTL	DP	Rotate D left N bits
	54	ROTR	DP	Rotate D right N bits
Code conversion	20	→BCD	DP	Convert S into BCD
	21	→BIN	DP	Convert S into Binary
	55	B→G	DP	Binary to Gray code conversion
	56	G→B	DP	Gray code to Binary conversion
	57	DECOD	P	Decode the Ns ~ Nl of S
	58	ENCOD	P	Encode the Ns ~ Nl of S
	59	→7SG	P	Convert N+1' Nb of S into 7-segment code
	60	→ASC	P	Convert character/number into ASCII code
	61	→SEC	P	Convert hour, minute, second by seconds
	62	→HMS	P	Convert second by hour, minute and second
	63	→HEX	P	Convert ASCII code into hexadecimal
	64	→ASCII	P	Convert hexadecimal into ASCII code
Flow control	0	MC		Master control loop start
	1	MCE		Master control loop end
	2	SKP		The start of the skip loop
	3	SKPE		The end of the skip loop
		END		Terminate the execution of program (for debugging)
	22	BREAK	P	Exit from FOR-NEXT loop
	65	LBL		Define the string as label
	66	JMP	P	Jump instruction
	67	CALL	P	Call instruction
	68	RTS		Subroutine return instruction
	69	RTI		Interrupt return instruction
	70	FOR		The start of the FOR loop
	71	NEXT		Return point of FOR loop
I/O instruction	74	IMDIO	P	Refresh I/O immediately
	76	TKEY	D	10 keys input convenient instruction
	77	HKEY	D	16 keys input convenient instruction
	78	DSW	D	Thumbwheel switch input convenient instruction
	79	7SGDL	D	7-segment multiplexing display convenient Instruction
	80	MUXI		Multiplexing input convenient instruction
	81	PLSO	D	Pulse output(PSO) instruction
	82	PWM		Pulse Width Modulation (PWM) output instruction
	83	SPD		Pulse speed detection instruction
	84	TDSP		7/16-segment LED display control
	86	TPCTL		PID temperature control
	139	HSPWM		High speed PWM pulse output

Category	NO.	Instruction	Derivative	Function
Accumulative Timer	87	T.01S		0.01S time base accumulative timer
	88	T.1S		0.1S time base accumulative timer
	89	T1S		1S time base accumulative timer
Monitor and control	90	WDT	P	Set watchdog timer
	91	RSWDT	P	Reset watchdog timer
HSC/HST	92	HSCTR	P	Read CV of hardware high speed counter/timer
	93	HSCTW	P	Write CV or PV of hardware high speed counter/timer
Text	94	ASCWR		Output ASCII message
Ascend/ Descend	95	RAMP		Ascending/Descending convenient instruction
	98	RAMP2		Tracking type RAMP function for D/A output
Com-munication	150	M-BUS		Modbus protocol communication
	151	CLINK		Fatek CPU link/Generic protocol communication
Table operation	100	R→T	DP	Move register Rs to the table Td
	101	T→R	DP	Move the Rp of table Ts to register Rd
	102	T→T	DP	Move the Rp of table Ts to the Rp of table Td
	103	BT_M	DP	Move table Ts to table Td
	104	T_SWP	DP	Swap Ta and Tb
	105	R-T_S	DP	Search Rs from table Ts
	106	T-T_C	DP	Compare table Ta and table Tb
	107	T_FIL	DP	Fill Rs into Td table
	108	T_SHF	DP	Shift table left or right
	109	T_ROT	DP	Rotate table left or right
	110	QUEUE	DP	First in first out (Queue) instruction
	111	STACK	DP	First in last out (Stack) instruction
	112	BKCMP	DP	Compare Rs with zone defined by two tables
	113	SORT	DP	Sort the table
Matrix operation	120	MAND	P	AND two matrixes
	121	MOR	P	OR two matrixes
	122	MXOR	P	Exclusive OR (XOR) two matrixes
	123	MXNR	P	Exclusive NOR (XNR) two matrixes
	124	MINV	P	Inverse matrix
	125	MCMP	P	Compare two matrixes and find out the differences between two matrixes
	126	MBRD	P	Read the bit of a matrix pointed by pointer
	127	MBWR	P	Write the bit of a matrix pointed by pointer
	128	MBSHF	P	Shift matrix left 1 bit or right 1 bit
	129	MBROT	P	Rotate matrix left 1 bit or right 1 bit
	130	MBCNT	P	Count the number of bit whose value is 1 or 0 in the matrix
NC position control	140	HSPSO		High-speed pulse output
	141	MPARA		Set NC position parameters
	142	PSOFF	P	Force to stop pulse output
	143	PSCNV	P	Convert pulse count into mechanical value for display
	147	MHSPO		Multi-Axis high speed pulse output
	148	MPG		Manual pulse generator for positioning
Interrupt control	145	EN	P	Enable external input or peripheral interrupt
	146	DIS	P	Disable external input or peripheral interrupt
In Line Comparison Instructions	170	=	D	Equal to compare
	171	>	D	Greater than compare
	172	<	D	Less than compare
	173	<>	D	Not equal to compare
	174	>=	D	Greater than or equal to compare
	175	=<	D	Less than or equal to compare
Other	190	STAT		Read system status

Dimensions

Figure 1





W	Model
90mm	FBs-20M△,FBs-24M△,FBs-24XY FBs-16TC,FBs-16RTD
130mm	FBs-32M△,FBs-40M△,FBs-40XY
175mm	FBs-44MN△,FBs-60M△,FBs-60XY, FBs-30GM

Figure 2

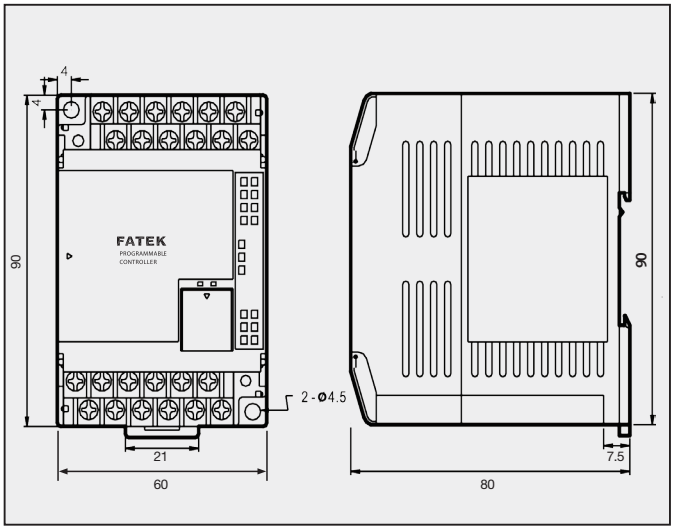


Figure 3

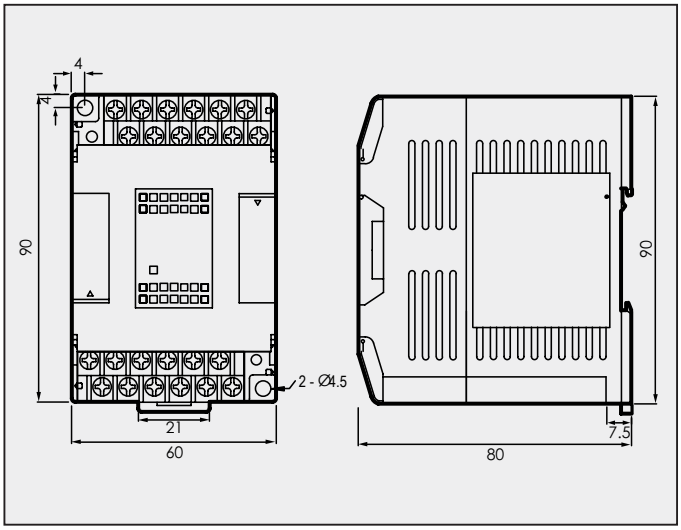


Figure 4

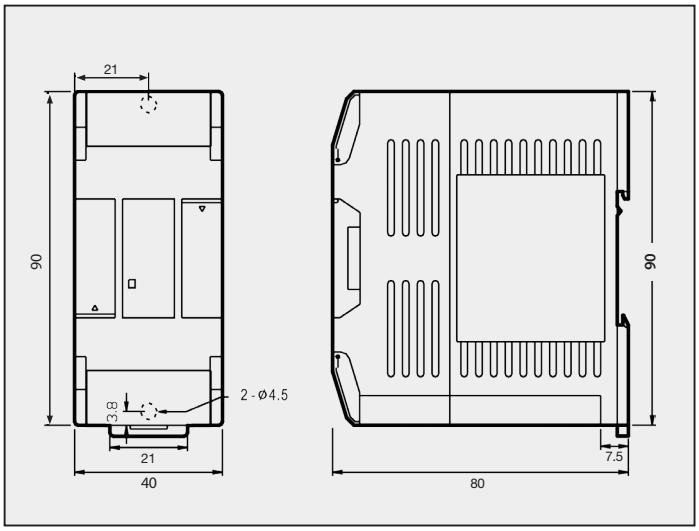
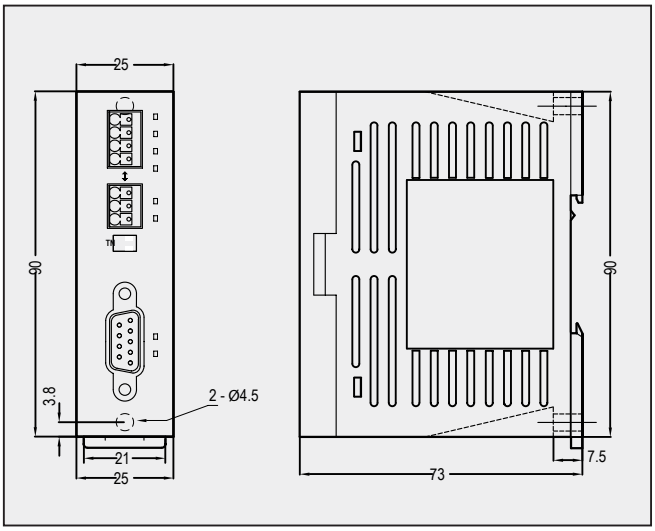


Figure 5



Dimensions

Figure 6

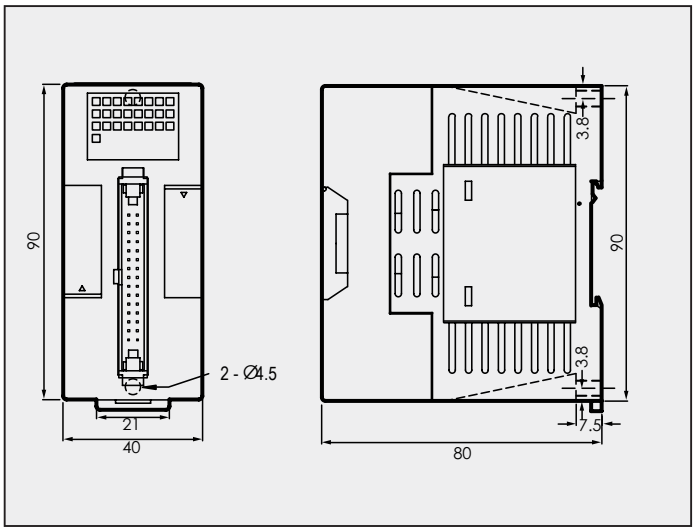


Figure 7

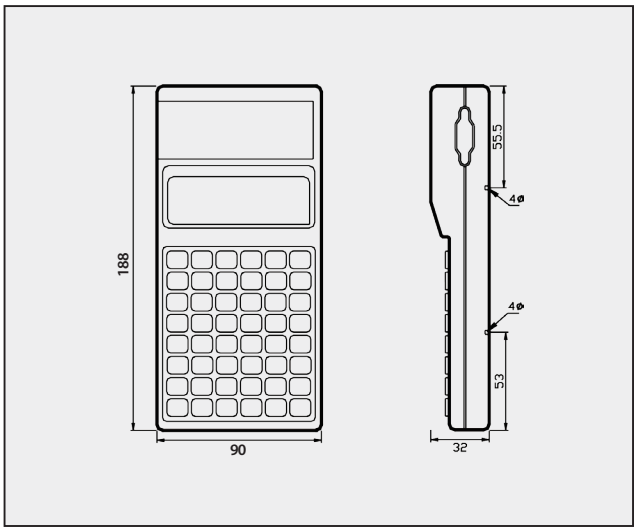


Figure 8

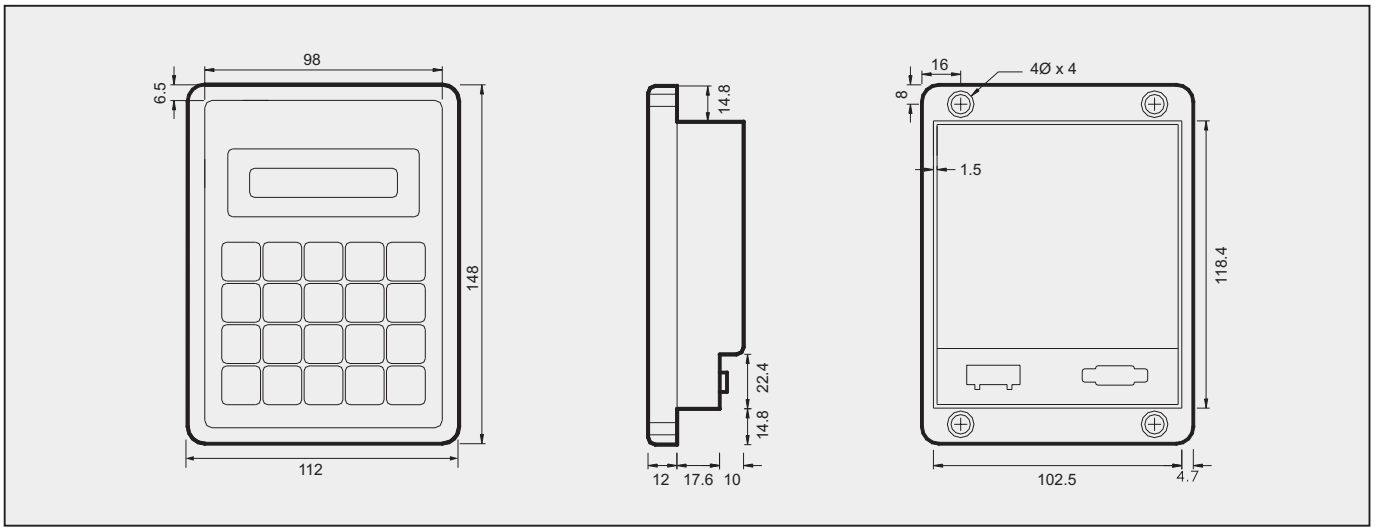
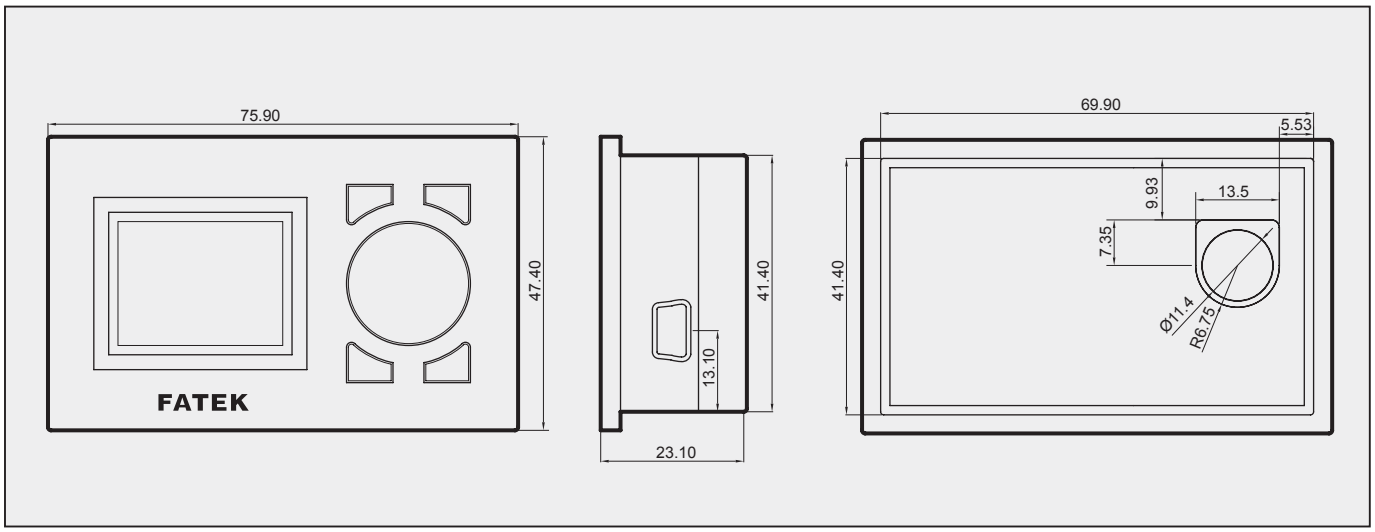


Figure 9



Model List

	Module Name		Specifications
Main Units	Basic Main Units	FBs-10MA◇△-◎	6 points 24VDC digital input (2 points high speed 100KHz, 2 points medium speed 20KHz, 2 points medium speed total 5KHz); 4 points relay or transistor output (2 points high speed 100KHz, 2 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC; I/O is not expandable
		FBs-14MA◇△-◎	8 points 24VDC digital input (2 points high speed 100KHz, 2 points medium speed 20KHz, 4 points medium speed total 5KHz); 6 points relay or transistor output (2 points high speed 100KHz, 4 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC; I/O is not expandable
		FBs-20MA◇△-◎	12 points 24VDC digital input (2 points high speed 100KHz, 4 points medium speed 20KHz, 6 points medium speed total 5KHz); 8 points relay or transistor output (2 points high speed 100KHz, 6 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC
		FBs-24MA◇△-◎	14 points 24VDC digital input (2 points high speed 100KHz, 6 points medium speed 20KHz, 6 points medium speed total 5KHz); 10 points relay or transistor output (2 points high speed 100KHz, 6 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC
		FBs-32MA◇△-◎ FBs-32MB◇△-◎	20 points 24VDC digital input (2 points high speed 100KHz, 6 points medium speed 20KHz, 8 points medium speed total 5KHz); 12 points relay or transistor output (2 points high speed 100KHz, 6 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC; (MB is detachable terminal block)
		FBs-40MA◇△-◎ FBs-40MB◇△-◎	24 points 24VDC digital input (2 points high speed 100KHz, 6 points medium speed 20KHz, 8 points medium speed total 5KHz); 16 points relay or transistor output (2 points high speed 100KHz, 6 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC; (MB is detachable terminal block)
		FBs-60MA◇△-◎ FBs-60MB◇△-◎	36 points 24VDC digital input (2 points high speed 100KHz, 6 points medium speed 20KHz, 8 points medium speed total 5KHz); 24 points relay or transistor output (2 points high speed 100KHz, 6 points medium speed 20KHz); 1 RS232 or USB port(expandable up to 3); built-in RTC; (MB is detachable terminal block)
	Advanced Main Units	FBs-10MC◇△-◎	6 points 24VDC digital input (2 points high speed 200KHz, 2 points medium speed 20KHz, 2 points medium speed total 5KHz); 4 points relay or transistor output (2 points high speed 200KHz, 2 points medium speed 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; I/O is not expandable
		FBs-14MC◇△-◎	8 points 24VDC digital input (2 points high speed 200KHz, 2 points medium speed 20KHz, 4 points medium speed total 5KHz); 6 points relay or transistor output (2 points high speed 200KHz, 4 points medium speed 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; I/O is not expandable
		FBs-20MC◇△-◎	12 points 24VDC digital input (4 points high speed 200KHz, 2 points medium speed 20KHz, 6 points medium speed total 5KHz); 8 points relay or transistor output (4 points high speed 200KHz, 4 points medium speed 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
		FBs-24MC◇△-◎	14 points 24VDC digital input (4 points high speed 200KHz, 4 points medium speed 20KHz, 6 points medium speed total 5KHz); 10 points relay or transistor output (4 points high speed 200KHz, 4 points medium sped 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
		FBs-32MC◇△-◎	20 points 24VDC digital input (6 points high speed 200KHz, 2 points medium speed 20KHz, 8 points medium speed total 5KHz); 12 points relay or transistor output (6 points high speed 200KHz, 2 points medium speed 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
		FBs-40MC◇△-◎	24 points 24VDC digital input (6 points high speed 200KHz, 2 points medium speed 20KHz, 8 points medium speed total 5KHz); 16 points relay or transistor output (6 points high speed 200KHz, 2 points medium speed 20KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
		FBs-60MC◇△-◎	36 points 24VDC digital input (8 points high speed 200KHz, 8 points medium speed total 5KHz); 24 points relay or transistor output (8 points high speed 200KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
	NC Positioning Main Units	FBs-20MN◇△-◎	2 sets (1 axis) 920KHz 5VDC digital differential input, 10 points 24VDC digital input (4 points high speed 200KHz, 6 points medium speed total 5KHz); 2 sets (1 axis) 920KHz 5VDC digital differential output, 6 points relay or transistor output (average high speed 200KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
		FBs-32MN◇△-◎	4 sets (2 axes) 920KHz 5VDC digital differential input, 16 points 24VDC digital input (4 points high speed 200KHz, 8 points medium speed total 5KHz); 4 sets (2 axes) 920KHz 5VDC digital differential output, 8 points relay or transistor output (4 points high speed 200KHz); 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
		FBs-44MN◇△-◎	8 sets (4 axes) 920KHz 5VDC digital differential input, 20 points 24VDC digital input (8 points medium speed total 5KHz); 8 sets (4 axes) 920KHz 5VDC digital differential output, 8 points relay or low speed transistor output; 1 RS232 or USB port (expandable up to 5); built-in RTC; detachable terminal block
Right Side Expansion Modules	Expansion Power Supply	FBs-EPW-AC/D24	Power supply of 100~240VAC or 24VDC input for expansion module; 3 sets output power with 5VDC, 24VDC, and 24VDC, 14W capacity
	DIO Expansion Units	FBs-24XY◇-◎	14 points 24VDC digital input, 10 points relay or transistor output, built-in power supply
		FBs-40XY◇-◎	24 points 24VDC digital input, 16 points relay or transistor output, built-in power supply
		FBs-60XY◇-◎	36 points 24VDC digital input, 24 points relay or transistor output, built-in power supply
	DIO Expansion Modules	FBs-8X	8 points 24 VDC digital input
		FBs-8Y◇	8 points relay or transistor output
		FBs-8XY◇	4 points 24VDC digital input, 4 points relay or transistor output
		FBs-16Y◇	16 points relay or transistor output
		FBs-16XY◇	8 points 24VDC digital input, 8 points relay or transistor output
		FBs-20X	20 points 24VDC digital input
		FBs-24XY◇	14 points 24VDC digital input, 10 points relay or transistor output
		FBs-40XY◇	24 points 24VDC digital input, 16 points relay or transistor output
		FBs-60XY◇	36 points 24VDD digital input, 24 points relay or transistor output
		FBs-24X	24 points high-density 24VDC digital input, 30 pins header with latch
		FBs-24YT/J	24 points high-density transistor SINK(T) or SOURCE(J) output (0.1A max.), 30 pins header with latch
	Thumbwheel Switch Module	FBs-32DGI	8 sets 4 digits (total 32 digits) thumbwheel switch (or 128 points independent switch) multiplex input module, 30 pins header connector
	16/7 Segment LED Display Modules	FBs-7SG1	1 set 8 digits 7-segment/4 digits 16-segment LED display (or 64 points independent LED) output display module, 16 pins header connector
		FBs-7SG2	2 sets 8 digits 7-segment/4 digits 16-segment LED display (or 128 points independent LED) output display module, 16 pins header connector
	AIO Modules	FBs-2DA	2 channels, 14-bit analog output module (-10~10V, 0~10V or -20~20mA, 0~20mA)
		FBs-4DA	4 channels, 14-bit analog output module (-10~10V, 0~10V or -20~20mA, 0~20mA)
		FBs-4A2D	4 channels, 14-bit analog input (same specification as 6AD)+2 channels, 14-bit analog output (same specification as 2DA) combo module
		FBs-6AD	6 channels, 14-bit analog input module (-10~10V, 0~10V or -20~20mA, 0~20mA)
	Temperature Measurement Modules	FBs-2TC	2 channels, thermocouple temperature input module with 0.1°C resolution.
		FBs-6TC	6 channels, thermocouple temperature input module with 0.1°C resolution.
		FBs-16TC	16 channels, thermocouple temperature input module with 0.1°C resolution.
		FBs-6RTD	6 channels, RTD temperature input module with 0.1°C resolution.
		FBs-16RTD	16 channels, RTD temperature input module with 0.1°C resolution.
		FBs-6NTC	6 channels, NTC temperature input module with 0.1°C resolution.

Model List

	Module Name		Specifications
Right Side Expansion Modules	AI + Temperature Measurement Combo Modules	FBs-2A4TC	2 channels, 14-bit analog input (same specifications as 6AD)+ 4 channels thermocouple temperature input (same specifications as 6TC) combo module
		FBs-2A4RTD	2 channels, 14-bit analog input (same specifications as 6AD) + 4 channels RTD temperature input (same specifications as 6RTD) combo module
	Voice Modules	FBs-VOM	Built-in 1MB memory (play continuously up to 2 minutes), extendable 4GB SD card(play continuously up to 8,000 minutes) voice module, 245 messages, output 2W
	Load Cell Module	FBs-1LC	1 channel, load cell measurement module with 16-bit resolution (including sign bit)
		FBs-2LC	2 channels, load cell measurement module with 16-bit resolution (including sign bit)
	Potential Meter Module	FBs-4PT	4 channels, 14-bit potential meter input module (Impedance range: 1~10K Ω)
Left Side Expansion Modules	Communication Modules	FBs-CM22	2 ports RS232 (Port3 +Port 4) communication module
		FBs-CM55	2 ports RS485 (Port3 +Port 4) communication module
		FBs-CM25	1 port RS232 (Port3) + 1 port RS485 (port 4) communication module
		FBs-CM25E	1 port RS232 (Port3) + 1 port RS485 (port 4) + Ethernet network interface communication module
		FBs-CM55E	1 port RS485 (Port3) + 1 port RS485 (port 4) + Ethernet network interface communication module
		FBs-CMZB	ZigBee communication module
		FBs-CMZBR	ZigBee communication repeater
		FBs-CMGSM	GSM wireless communication module
		FBs-CM25C	General purpose RS232 to RS485/RS422 communication interface converter with optical isolation
		FBs-CM5R	General purpose RS485 repeater with optical isolation
		FBs-CM5H	General purpose 4 ports RS485 HUB with optical isolation, RS485 can be connected as star connection
	Communication Boards	FBs-CB2	1 port RS232 (Port 2) communication board
		FBs-CB22	2 ports RS232 (Port 1+ Port 2) communication board
		FBs-CB5	1 port RS485 (Port 2) communication board
		FBs-CB55	2 ports RS485 (Port 1+ Port 2) communication board
		FBs-CB25	1 port RS232 (Port 1) + 1 port RS485 (Port 2) communication board
		FBs-CBE	1 port 10 Base T Ethernet communication board
		FBs-CBEH	1 port 100 Base T Ethernet communication board
		FBs-CBCAN	1 port CANopen communication board
	AIO Boards	FBs-B2DA	2 channels, 12-bit analog output board (0~10V or 0~20mA)
		FBs-B2A1D	2 channels, 12-bit analog input + 1 channel, 12-bit analog output combo analog board (0~10V or 0~20mA)
		FBs-B4AD	4 channels, 12-bit analog input board (0~10V or 0~20mA)
	Precision Load Cell Module	FBs-1HLC	1 channel, high precision weighing control module with 24-bit resolution
	3-Axis Motion Control Module	FBs-30GM	3-Axis with linear and circular interpolation advanced motional control module, 3 sets of 200KHz high speed pulse input, 3 sets of 500KHz high speed pulse output, 14 points main unit, 16M Bytes program capacity, 20K Words retentive file register, built-in RS485 and Ethernet, 7.62mm detachable terminal block
	Simple HMI	FBs-BDAP	Board type Data Access Panel
		FBs-BPEP	Board type Parameter Entry Panel
		FBs-PEP/PEPR	Multi characters with graphics-based Parameter Entry Panel, built-in RFID Read/Write module with PEPR
		FBs-DAP-B/BR	16 X 2 LCD character display, 20 keys keyboard, 24VDC power supply, RS485 comm. port, built-in RFID Read/Write module with BR
		FBs-DAP-C/CR	16 X 2 LCD character display, 20 keys keyboard, 5VDC power supply, RS232 comm. port, built-in RFID Read/Write module with CR
Peripheral and Accessory	RFID Card	CARD-H	Read / Write wireless card (for FBs-DAP-BR/CR and FBs-PEPR)
	Programming Devices	FP-08	FBs- Series PLC handheld programmer
		Winproladder	FATEK-PLC Winproladder Programming software
	Memory Pack	FBs-PACK	FBs-PLC program memory pack with 20K Words program, 20K Words register, write protection switch
	PWMDA Module	PWMDA	10-bit single channel pulse width modulation(PWM) 0~10V analog output (AO) module
	USB- RS232 Converter Cable	FBs-U2C-MD-180	Communication converter cable with standard USB AM connector to RS232 MD4M connector (used in standard PC USB to FBs main unit Port 0 RS232), length 180cm
	Communication Cables	FBs-232P0-9F-150	MD4M to DB9F communication cable (FBs main unit Port 0 RS232 connect to standard DB9M), length 150cm
		FBs-232P0-9M-400	MD4M to DB9M communication cable (FBs main unit Port 0 RS232 connect to DB9F), length 400cm
		FBs-232P0-MD-200	MD4M to MD4M communication cable (FBs main unit Port 0 RS232 connect to FBs-PEP/PEPR), length 200cm
		FBs-232P0-MDR-200	MD4M to 90° MD4M communication cable (FBs main unit Port 0 RS232 connect to FBs-PEP/PEPR), length 200cm
	High Density DIO Connection Cable	HD30-22AWG-200	High density modules(FBs-24X, FBs-24YT/J, FBs-32DGI) connector 30pin Socket, 22AWG I/O cable length200cm
	16/7-Segment LED Display	DBAN.8-nR	0.8" 4-digit 16-segment LED display, n means R(Red) 16-segment LED characters display installed, can be 1~4
		DBAN.2.3-nR	2.3" 4-digit 16-segment LED display, n means R(Red) 16-segment LED characters display installed, can be 1~4
		DB.56-nR	0.56" 8-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~8
		DB.8-nR	0.8" 8-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~8
		DB2.3-nR	2.3" 8-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~8
		DB4.0-nR	4.0" 4-digit 7-segment display, n means R(Red) 7-segment LED characters display installed, can be 1~4
	Training Box	FBs-TBOX	46cm x 32 cm x 16cm suitcase, containing FBs-24MCT main unit. FBs-CM25E communication module (RS232 + RS485 + Ethernet network), 14 simulated input switches, 10 external relay output, Doctor terminal outlet I/O, peripherals such as stepping motor, encoder, 7-segment display, 10 of 10mm LED indicator, thumbwheel switch, and 16 key keyboard.

1. ◇ : R — Relay output ; T — Transistor SINK(NPN) output
   J — Transistor SOURCE (PNP) output
2. △ : 2 — built-in RS232 port ; U — built-in USB port (non-standard)
3. ◎ : AC — 100~240VAC power supply
   D12 — 12VDC power supply
   D24 — 24VDC power supply
4. The unmarked frequencies of Digital Input (DI) or Digital Output (DO) are low speed.