# Guía de productos FATEK
By Logicbus

Caracteristicas

Tecnología Core de SoC-FATEK

El diseño de FBs-PLC incorpora un "Sistema en Chip" (SoC) desarrollado internamente por Fatek Corporation. El chip BGA consta de más de 120,000 compuertas que integran funciones potentes como una Unidad de procesamiento central (CPU), Memoria, Solucionador de lógica de hardware (HLS), 5 puertos de comunicación de alta velocidad, 4 juegos de contadores / temporizadores de alta velocidad de hardware, 4 Ejes de salidas de impulsos de alta velocidad para control de posicionamiento NC (con interpolación lineal), 16 interrupciones de alta velocidad y entradas capturadas. Los FBs-PLC representan una alta funcionalidad y confiabilidad con un valor excepcional en comparación con otros PLC en su clase.
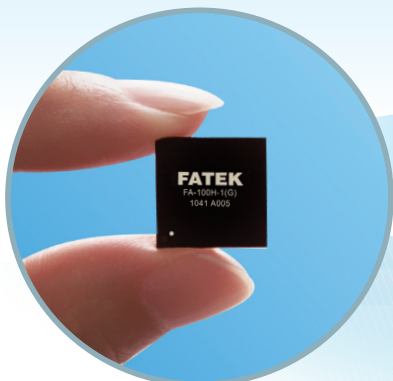
Tamaño real

Conjuntos de instrucciones potentes y fáciles de usar.

El FBs-PLC tiene más de 300 instrucciones que adoptan una estructura de funciones de entrada múltiple / salida múltiple fácil de usar y legible. Con esta estructura de instrucciones de múltiples entradas, el usuario puede obtener muchos tipos de funcionalidad que otras marcas de PLC pueden requerir el uso de muchas instrucciones para lograrlo. Además, el resultado de la operación se puede enviar directamente a las salidas internas o externas. Para aumentar la legibilidad del programa, las entradas o salidas para cada instrucción de función tienen su propio símbolo mnemónico adjunto y también se muestra el contenido de cada operando. Para aplicaciones de gama alta, como las redes de PLC (LINK), el control PID y el posicionamiento NC, etc., el FBs-PLC proporciona instrucciones convenientes dedicadas para ayudar en el desarrollo del programa..

Función de comunicación (hasta 5 puertos incluidos RS232, RS485, USB, Ethernet, CANopen® y GSM y comunicación inalámbrica ZigBee ™)

A través de los cinco puertos de comunicación de alta velocidad incluidos en el SoC, la capacidad de comunicación de FBs-PLC es sobresaliente operando a una velocidad máxima de 921.6Kbps. Las comunicaciones se pueden lograr utilizando el código ASCII o el código binario de doble velocidad. Junto con el protocolo estándar de FATEK, también están disponibles los protocolos Modbus ASCII / RTU / TCP o definibles por el usuario. El FBs-PLC también ofrece la opción de 8 tarjetas de comunicación diferentes y 10 módulos de comunicación diferentes para diversos tipos de aplicaciones de comunicación. Con su alta velocidad y funcionalidad, los FBs-PLC tienen la mayor cantidad de puertos de comunicación que cualquier otro PLC en su clase. Cada puerto de comunicación viene de serie con indicadores LED para transmisión (TX) y recepción (RX) para permitir al usuario monitorear la operación.

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

El SoC dentro del FBs-PLC incorpora cuatro juegos de salidas de modulación de ancho de pulso de alta velocidad de hardware con una frecuencia máxima de 184.32KHz y 18.432KHz con resoluciones de 1% y 0.1%, respectivamente. A diferencia de la función PWM operada solo por software en otras marcas de PLC, el PWM de alta velocidad impulsado por hardware en los FBs-PLC proporciona al usuario un control sencillo con alta precisión y estabilidad.

Control PLC & NC en uno y NC dedicado Lenguaje de posicionamiento

NC Position Control está incorporado en el SoC de FBs-PLC que integra el control PLC + NC en una unidad para compartir recursos y reducir la necesidad de intercambio de datos. El control de posición NC adopta un lenguaje de comando de posicionamiento especial, que permite la programación por unidades mecánicas o eléctricas y el cambio de control de los parámetros durante la ejecución. Una sola unidad tiene hasta cuatro salidas de ejes con una frecuencia máxima de 200 KHz (MC) o 920 KHz (MN) y está equipada con una función de interpolación lineal multieje. ¡Si se combina con los cuatro juegos de HHSC incorporados, puede lograr un control de posicionamiento de bucle totalmente cerrado!

Contadores integrados de alta velocidad con conteo. Frecuencia hasta 920 KHz.

El FBs-PLC incluye hasta 4 conjuntos de contadores de alta velocidad de hardware (HHSC) y 4 conjuntos de contadores de alta velocidad de software (SHSC). La frecuencia de conteo más alta de un HHSC es 200KHz (MC) o 920KHz (MN). Cada HHSC también tiene una función clara y de máscara. Hay 8 modos de conteo que incluyen U / D, U / Dx2, P / R, P / Rx2, A / B, A / Bx2, A / Bx3 y A / Bx4 que hacen que el HHSC sea muy potente y eficiente. Por ejemplo, si el codificador, funcionando a 200 pulsos por revolución, adopta el modo A / Bx4, el FBs-PLC puede lograr el mismo resultado que el codificador de 800 pulsos por revolución. El contador se implementa en el hardware para no ocupar el tiempo de procesamiento de la CPU. Además, 4 juegos de contadores de alta velocidad (SHSC) tienen los modos de conteo U / D, P / R, A / B 3 y la frecuencia total de conteo es de 5 KHz.

Temporizadores de alta velocidad (HST)

El FBs-PLC es el único PLC en esta clase que proporciona temporizadores de alta velocidad de 0.1 mS (el FBs-PLC tiene un HST de 16 bits y 4 juegos de HST de 32 bits). Actualmente, la base de tiempo más rápida de los temporizadores de alta velocidad utilizados en otras marcas de PLC es 1 ms. Al incorporar la función de interrupción de los FBs-PLC, la precisión del temporizador de alta velocidad de la base de tiempo de 0.1 mS de FBs-PLC se mejora aún más y puede alcanzar fácilmente una detección de velocidad más precisa o puede usarse como un medidor de frecuencia. En la mayoría de los casos, los costosos equipos de detección de velocidad pueden reemplazarse por los económicos FBs-PLC.

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Las potentes funciones de comunicación de FATEK

Los cinco puertos de comunicación en FBs-PLC pueden conectarse simultáneamente a varios periféricos inteligentes con varias interfaces como USB, RS232, RS485, Ethernet, CANopen® y ZigBee ™. Además del protocolo FATEK y Modbus o la comunicación a través del servidor de comunicación FATEK, el usuario también puede usar la instrucción CLINK del PLC para el protocolo definido por el usuario para establecer conexiones activa o pasivamente con muchos periféricos inteligentes.

Controlador de comunicación abierta

El protocolo de comunicación abierta de FBs-PLC es compatible con todas las principales marcas de software de supervisión (Scada) y terminales de operador (HMI). Software Scada como Wonderware, Citec, Labview y LabLink! Los terminales del operador (HMI) como Proface, Hitech / Beijer y Cermate se pueden conectar directamente con los FBs-PLC a través de interfaces seriales y Ethernet. FATEK también proporciona un servidor de comunicaciones estándar FATEK DDE o un servidor OPC de terceros para que el usuario pueda conectar fácilmente los FBs-PLC a varios sistemas de control o supervisión. Además, empresas de renombre como National Instruments y KONTRON venden paquetes de software FATEK OPC para los usuarios.

Gama completa de periféricos.

Además de más de 200 modelos de unidades de CPU principales, el FBs-PLC también proporciona alrededor de 100 modelos de expansión de E / S para la selección. Los módulos de E / S de expansión incluyen DI / O básico, AI / O y otros módulos de comunicación, también incluyen un módulo de entrada de interruptor de control, un módulo de pantalla LED de 16/7 segmentos, 8 tipos (J, K, R, S, E, T, B, N) termopar, Pt100, Pt1000 RTD módulos de medición de temperatura. También hay una nueva incorporación al rango que incluye el módulo de celdas de carga usado en la ponderación, el módulo de medidor potencial usado en la posición de medición y un módulo de voz fácil de usar. El FBs-PLC también proporciona un HMI simple FBs-DAP o FBs-PEP que se puede unir con un solo bus RS485. El FBs-DAP o FBs-PEP puede ser un simple editor de temporizador / contador o también puede usarse como una simple interfaz de máquina humana a través de la función de teclas definibles por el usuario y la pantalla de mensajes. Los FBs-DAP o FBs-PEP pueden equiparse con un módulo de detección RFID inalámbrico y pueden aplicarse a aplicaciones tales como control de entrada, equipos de estacionamiento y control de ascensores, entre otros.

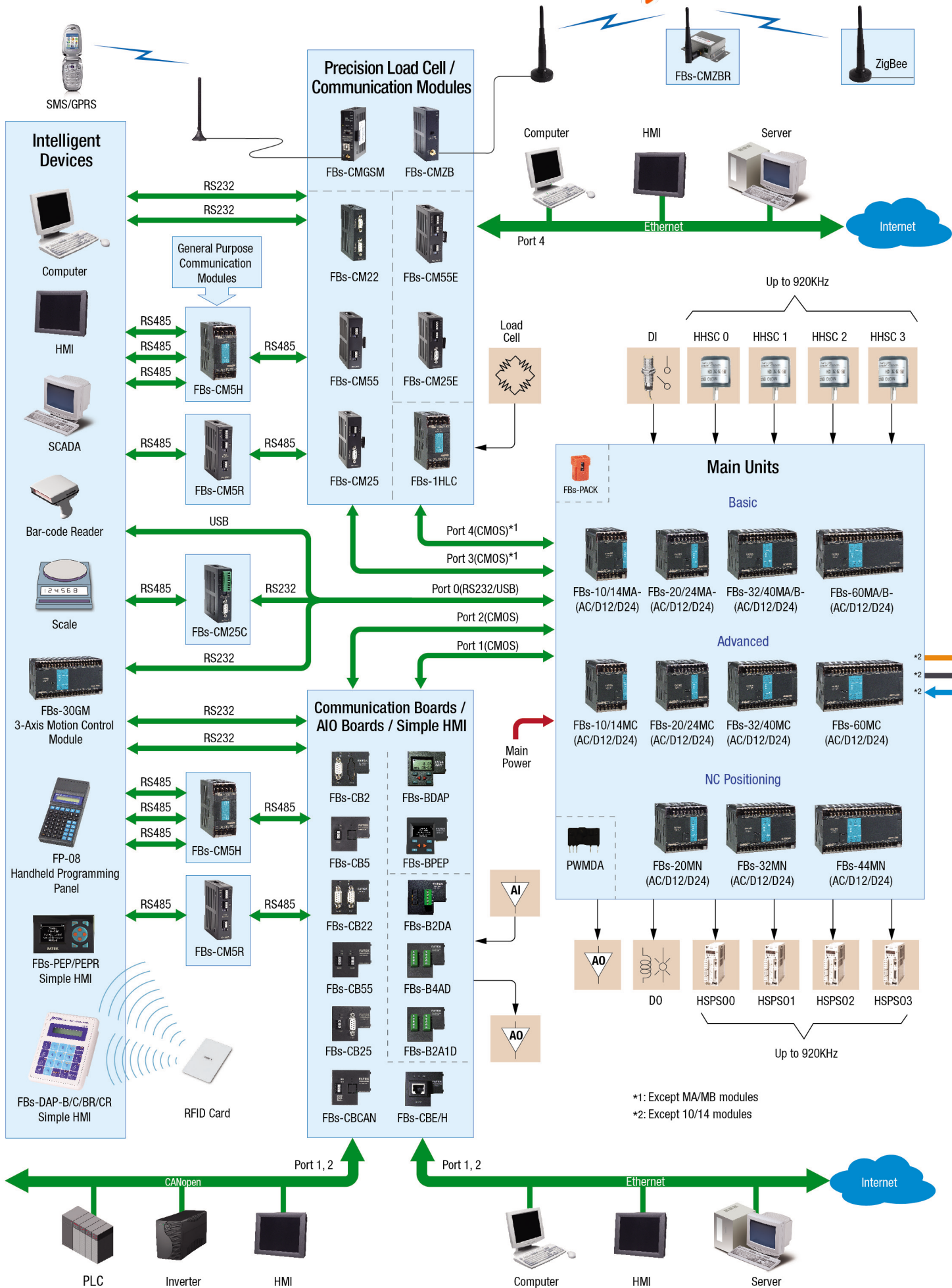### Entorno operativo fácil de usar

"WinProladder" es el software de programación de diagramas de escalera basado en Windows para el FBs-PLC. Proporciona un entorno operativo fácil de usar con funciones de edición, monitoreo y depuración que le permite al usuario familiarizarse con el funcionamiento del software en muy poco tiempo. La poderosa función de edición de WinProladder, asistida con el teclado, el mouse y la ayuda en línea (de instrucciones de escalera y guía de operación) reduce considerablemente el tiempo de desarrollo de la programación. Las características que pueden mostrar los registros de datos directamente en el diagrama de escalera y proporcionar múltiples páginas de estado para el monitoreo le dan al usuario la capacidad de monitorear y depurar fácilmente.

Hasta 36 puntos de entrada capturados.

El SoC en el FBs-PLC tiene una función de entrada capturada, que captura y almacena el pulso externo de una entrada más corta que el tiempo de exploración de la CPU. En comparación con los PLC de esta clase que carecen de esta capacidad o que requieren funciones de interrupción altamente sofisticadas (que aumentan el tiempo de procesamiento de la CPU), los FBs-PLC pueden manejar esta tarea fácilmente como una entrada general, configurada fácilmente con alta eficiencia y sin detrimento de la CPU tiempo de escaneo

Unidad única con 16 puntos de interrupción de alta velocidad.

El FBs-PLC proporciona 16 puntos de interrupciones externas. La interrupción es controlada por el borde y el usuario puede definir qué borde activa la interrupción y puede ser positivo, negativo o ambos bordes. Las interrupciones pueden realizar un procesamiento de emergencia a alta velocidad que puede soportar la desviación del tiempo causada por el retraso y la desviación del tiempo de escaneo y se puede usar para aplicaciones de medición de alta velocidad de posicionamiento de alta velocidad, en el hogar de la máquina y de alta velocidad.

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Intelligent Devices

- 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

SMS/GPRS

Precision Load Cell / Communication Modules

- FBs-CMGSM
- FBs-CMZB

General Purpose Communication Modules

- FBs-CM5H
- FBs-CM5R
- FBs-CM22
- FBs-CM55
- FBs-CM25
- FBs-CM55E
- FBs-CM25E
- FBs-1HLC

Load Cell

RS232
RS232
RS485
RS485
RS485
RS485
RS485

Communication Boards / AIO Boards / Simple HMI

- FBs-CB2
- FBs-CB5
- FBs-CB22
- FBs-CB55
- FBs-CB25
- FBs-CBCAN
- FBs-BDAP
- FBs-BPEP
- FBs-B2DA
- FBs-B4AD
- FBs-B2A1D
- FBs-CBE/H

USB
RS485
RS232
RS232
RS485
RS485
RS485
RS485
RS485
RS485

FBs-CM25C

AI
AO
AO

Main Power

Computer   HMI   Server

Ethernet   Port 4   Internet

FBs-CMZBR   ZigBee

Main Units

FBs-PACK

Up to 920KHz

DI   HHSC 0   HHSC 1   HHSC 2   HHSC 3

Port 4(CMOS)*1
Port 3(CMOS)*1
Port 0(RS232/USB)
Port 2(CMOS)
Port 1(CMOS)

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)

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
*2
*2

NC Positioning

- FBs-20MN (AC/D12/D24)
- FBs-32MN (AC/D12/D24)
- FBs-44MN (AC/D12/D24)

PWMDA

AO   DO   HSPS00   HSPS01   HSPS02   HSPS03

Up to 920KHz

*1: Except MA/MB modules
*2: Except 10/14 modules

CANopen   Port 1, 2   Port 1, 2   Ethernet   Internet

PLC   Inverter   HMI   Computer   HMI   Server

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DIO Expansion Units

Main Power

Sensor power
BUS power
I/O BUS

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   Potential Meter Module

FBs-1LC   FBs-4PT

Potential Meter

Load Cell

Especificaciones generales

Especificaciones ambientales

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

Especificaciones de la fuente de alimentación de AC

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			

Especificaciones de alimentación DC

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		

Especificaciones de la unidad principal

* : 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)	

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Especificaciones generales

| 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)	

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Especificaciones generales

Especificaciones de entrada digital (DI)

| Item / Specification	5VDC differential input – Ultra high speed	24VDC single-end input – High speed	24VDC single-end input – Medium speed(HSC)	24VDC single-end input – Medium low speed (capture input)	24VDC single-end input – Low speed	Notes
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	
Threshold current — 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

Cableado de entrada diferencial de 5 VCC (con frecuencia de hasta 920 KHz, para entornos de alta velocidad o alto ruido)
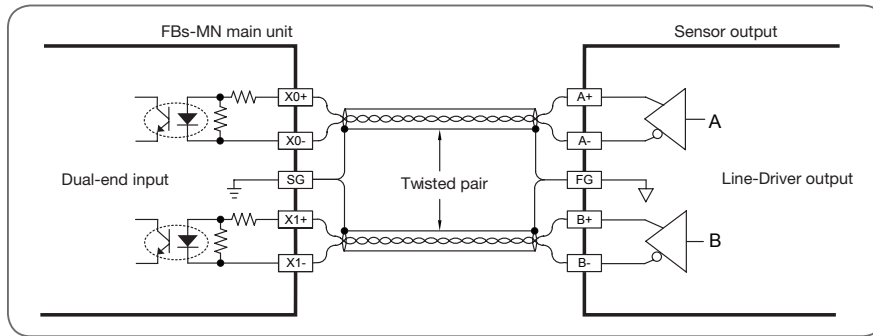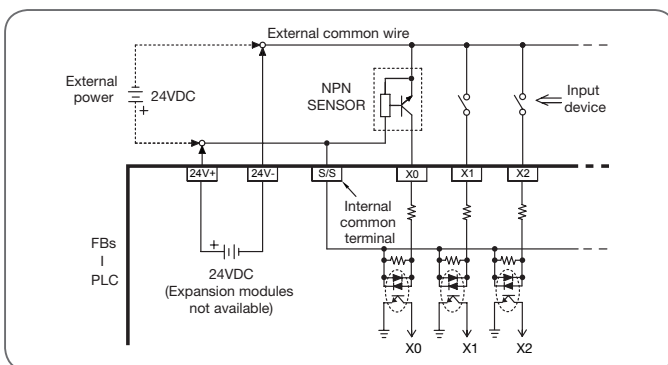

Cableado de la entrada diferencial de 5 VCC a la entrada SINK / FUENTE de un extremo de 5 VCC (máx. 200 KHz)
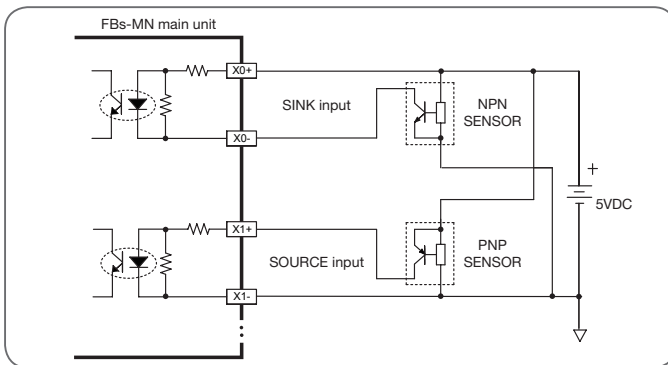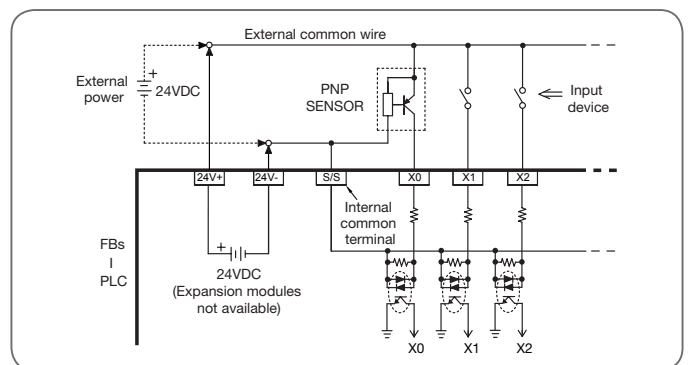

Cableado de la entrada diferencial de 5 VCC a la entrada SINK / FUENTE de un extremo de 24 VCC (máx. 200 KHz)
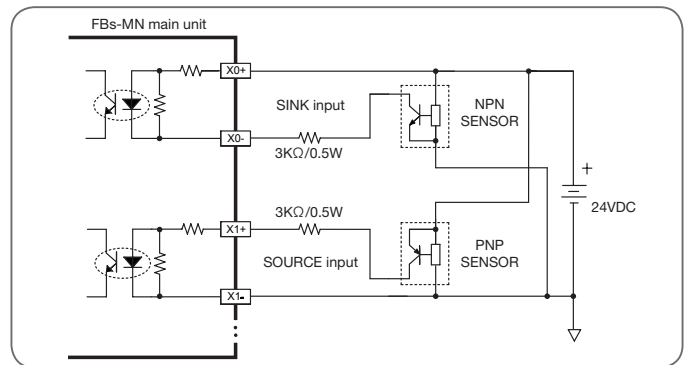
Cableado de entrada SINK de un extremo de 24VDC

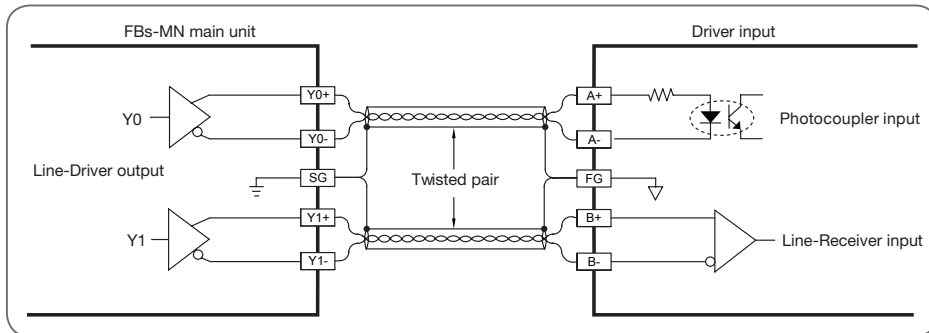**Cableado de entrada de FUENTE de un solo extremo de 24VDC**

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Especificaciones generales

Especificaciones de salida digital (DO)

Item / Specification		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
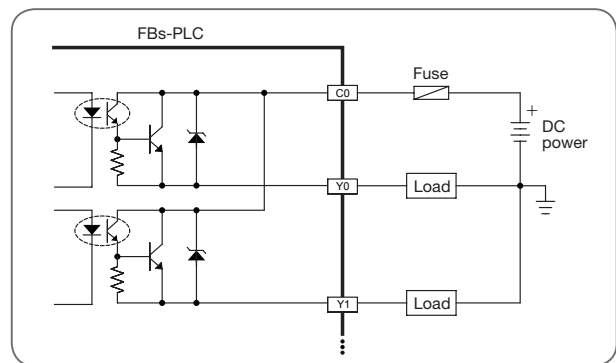
Cableado de salida diferencial de 5 VCC (con frecuencia de hasta 920 KHz, para entornos de alta velocidad o alto ruido)
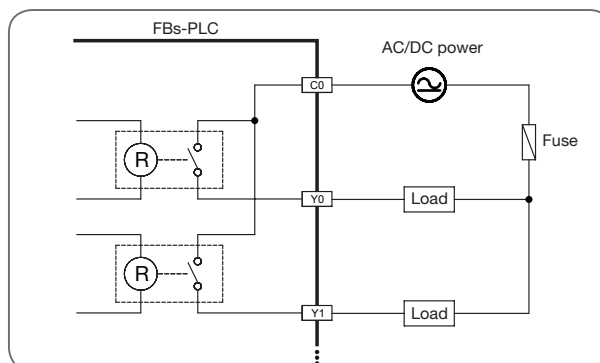

Cableado de transistor de salida SINK de un solo extremo.
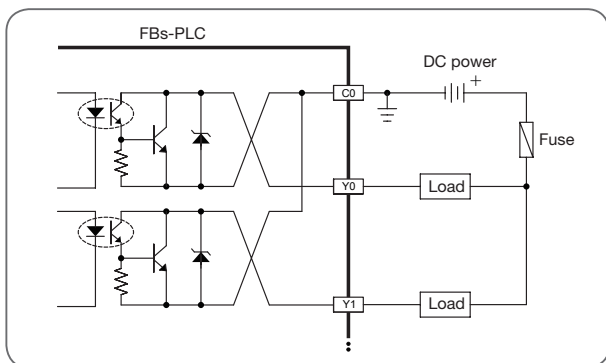
Cableado de transistor de salida única FUENTE

Cableado de relé de salida de un solo extremo.

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Especificaciones de la unidad principal

Unidades principales básicas (MA)

		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			

Unidades principales básicas (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					

Unidades principales avanzadas (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			

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Especificaciones de la unidad principal

Unidades principales avanzadas (MC)

Specification			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					

Unidades principales de posicionamiento NC (MN)

Specification			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					

Especificaciones del módulo de expansión del lado derecho

DIO Expansion Units

Specification			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					

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Especificaciones del módulo de expansión del lado derecho

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Fuentes de alimentación para módulos de expansión

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		

Módulo de interruptor de rueda de pulgar

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

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Especificaciones del módulo de expansión del lado derecho

16/7 módulos de pantalla LED de segmento

Specification		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)	
	Driving voltage — 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	

Módulo AIO

Specification		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			

Módulos de medición de temperatura

Specification	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	

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Especificaciones del módulo de expansión del lado derecho / izquierdo

Módulos combinados de medición de temperatura AI +

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	

Módulo de celda de carga

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

Módulo de voz

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	

Módulo de medidor de potencial

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

Especificaciones del módulo de expansión del lado izquierdo

Tableros / módulos de comunicación general

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		

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Especificaciones del módulo de expansión del lado izquierdo

Tarjetas / módulos de comunicación Ethernet

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	

Tablero de comunicación CANopen®

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

Módulos de comunicación ZigBee ™

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)

Módulo de comunicación GSM

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

Módulos de comunicación de propósito general

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

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Especificaciones del módulo de expansión del lado izquierdo

Tableros de AIO

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		

Módulo de control de movimiento de 3 ejes

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

Módulo de Precisión Celda de Carga

	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

Panel de programación de mano

	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

Especificaciones de periféricos y accesorios

Tarjeta RFID

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

Paquete de memoria

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

Cable convertidor USB-RS232

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

Cable de comunicacion

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

Cable de conexión DIO de alta densidad

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

Pantalla LED de 16/7 segmentos
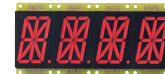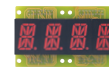
Model	DBAN.8-nR	DBAN2.3-nR
Features	0.8" 4-digit 16-segment LED display, , n means R(Red) 16-segment LED characters display installed, can be 1~4	2.3" 4-digit 16-segment LED display, n means R(Red) 16-segment LED characters display installed, can be 1~4

(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

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Caja de entrenamiento

Caja de entrenamiento

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)

caracteristicas:

Contiene los elementos básicos requeridos por el entrenamiento de E / S digital de PLC, como la unidad principal avanzada FBs-24MCT, el módulo Ethernet FBs-CM25E, el zócalo de entrada digital, los interruptores simulados y el zócalo de salida digital.

Los tres puertos RS232, RS485 y Ethernet incorporados (se pueden ampliar a cinco con tableros de comunicación) no solo permiten que la computadora del profesor se conecte con los kits de capacitación de todos los estudiantes para llevar a cabo la enseñanza en red en línea, como carga, monitoreo, Modificación y almacenamiento, pero también se puede utilizar en un curso avanzado, como conexión a una computadora, y también periféricos ASCII inteligentes.

Un software especial diseñado El "asistente de enseñanza de WinProladder" puede permitir que el instructor descargue o suba el programa de escalera a o desde el PLC de toda la clase o individuo a través de la computadora.

La salida del PLC se aísla mediante el relé con el zócalo y el fusible y luego se envía al terminal. Estos aislamientos pueden evitar que el PLC se dañe debido a un cableado incorrecto y sea fácil de reparar y reemplazar.

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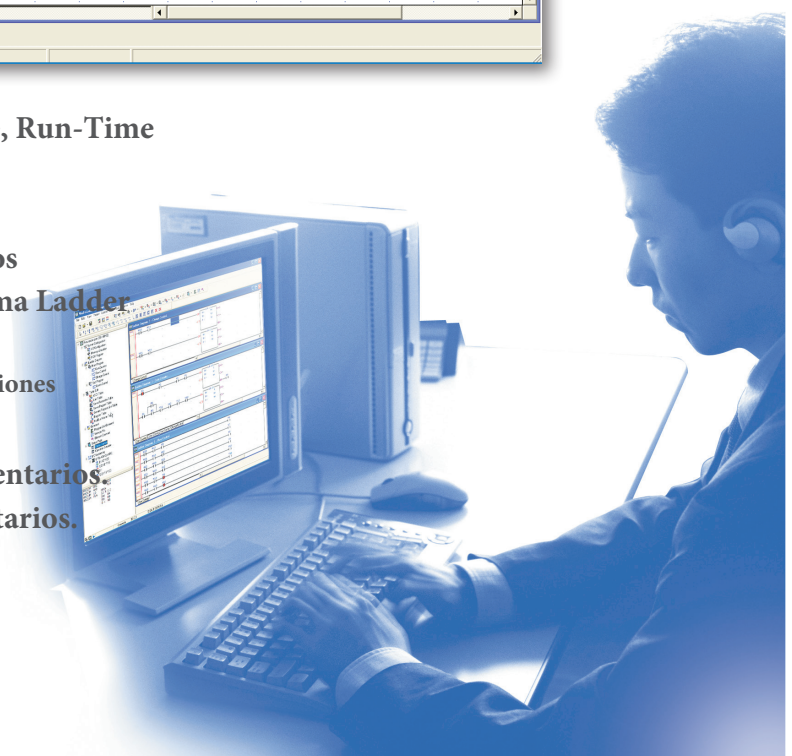# Programa de desarrollo de programas

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Características Generales

- Programa de aplicación basado en Windows que sigue las convenciones estándar de un entorno de Windows para facilitar el aprendizaje y el funcionamiento, independientemente de si el usuario es un usuario principiante o frecuente.

- El entorno de aplicación para el desarrollo de proyectos es a través de un árbol jerárquico. Todos los elementos del proyecto se pueden activar haciendo clic directamente en el botón del mouse en el objeto del árbol, lo que brinda acceso y vistas integrales del proyecto en funcionamiento.

- Métodos de entrada fáciles que incorporan el teclado y el mouse como dispositivos de entrada. No importa si en el sitio o en un entorno de oficina, el software puede operarse con facilidad y eficiencia

- Proporciona varios tipos de conexiones al PLC a través de una PC. Las conexiones incluyen serie, USB, Ethernet / Internet y módem. Para cada conexión diferente, WinProladder proporciona un nombre de sesión para asociar la configuración de los parámetros de comunicación, como el número de puerto, la velocidad de transmisión, la dirección IP, el número de teléfono, etc.
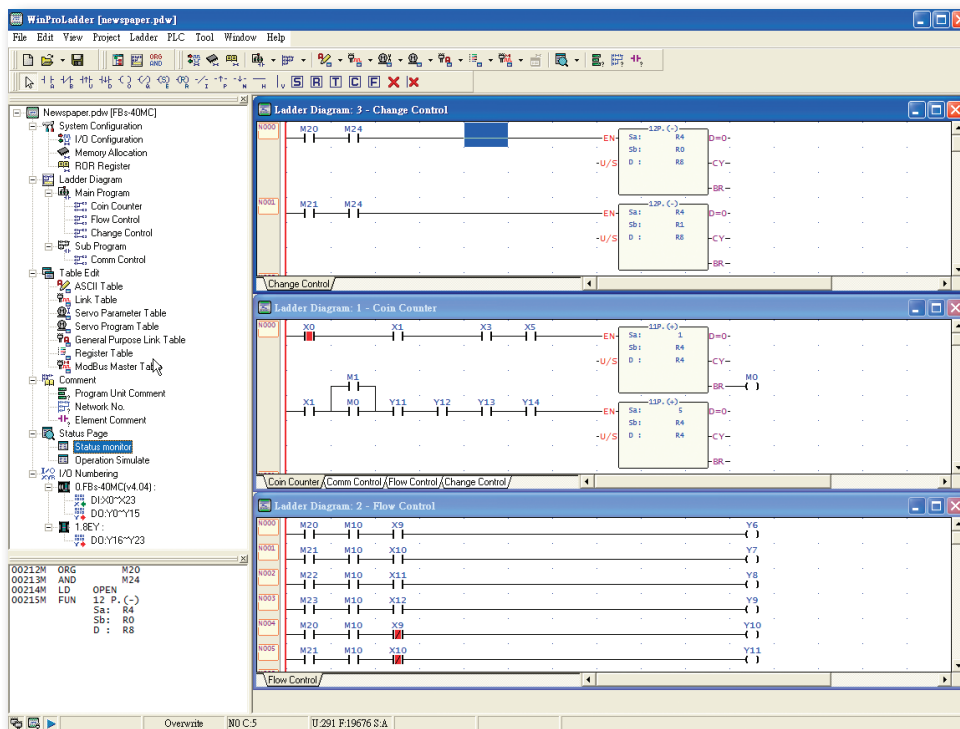
- Edición de programas On-Line, Run-Time
- Programa de prueba
- Comentarios del programa
- Programa orientado a proyectos
- Pantalla de edición del programa Ladder
- Monitor de estado y control
- Ventana de visualización de instrucciones de escalera mnemotécnica

- Diagrama de escalera con comentarios
- Elemento de edición de comentarios.
- Simulación fuera de línea

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Conjuntos de instrucciones

Instrucciones secuenciales

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	(L)	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		(S)	Set a coil
RST		(R)	Reset a coil

Instrucciones de la escalera de tijera (SFC)

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

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

Instrucciones de funcionamiento

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	$Sa+Sb \rightarrow D$
	12	(−)	DP	$Sa-Sb \rightarrow D$
	13	(×)	DP	$Sa \times Sb \rightarrow D$
	14	(/)	DP	$Sa / Sb \rightarrow D$
	15	(+1)	DP	Add 1 to D
	16	(−1)	DP	Subtract 1 from D
	23	DIV48	P	48 bits integer division $Sa / Sb \rightarrow D$
	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

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Conjuntos de instrucciones

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

Dimensiones

Figura1

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
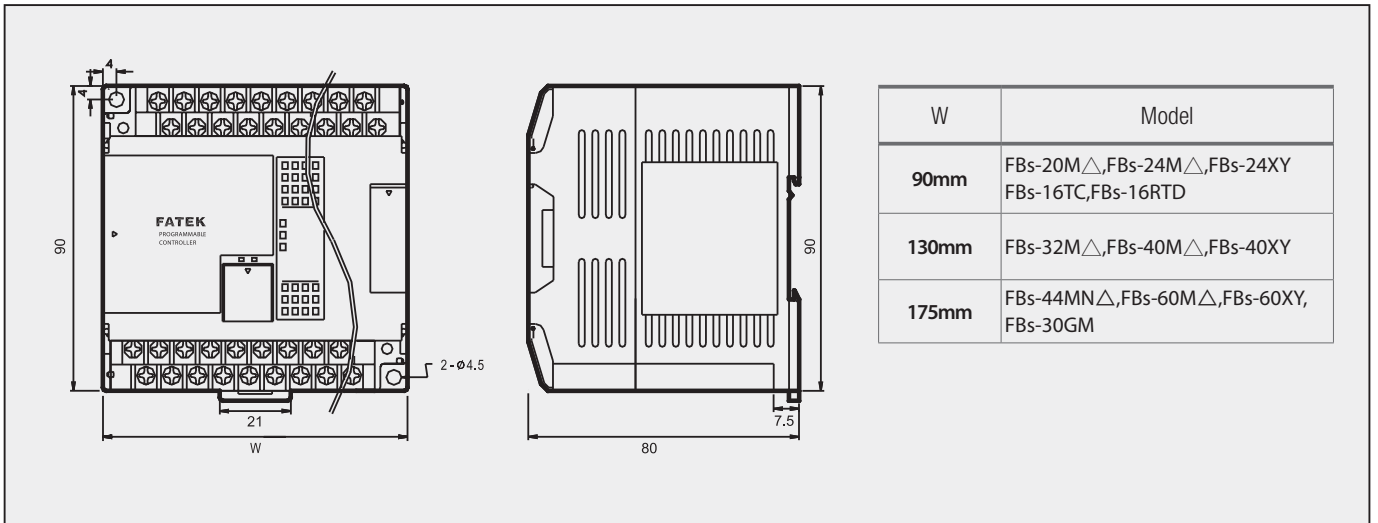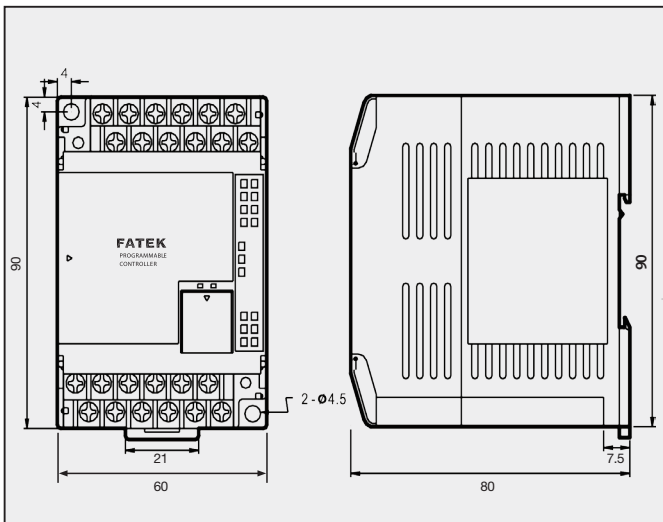
Figura 2

Figura 3

Figura 4

Figura 5

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Dimensiones
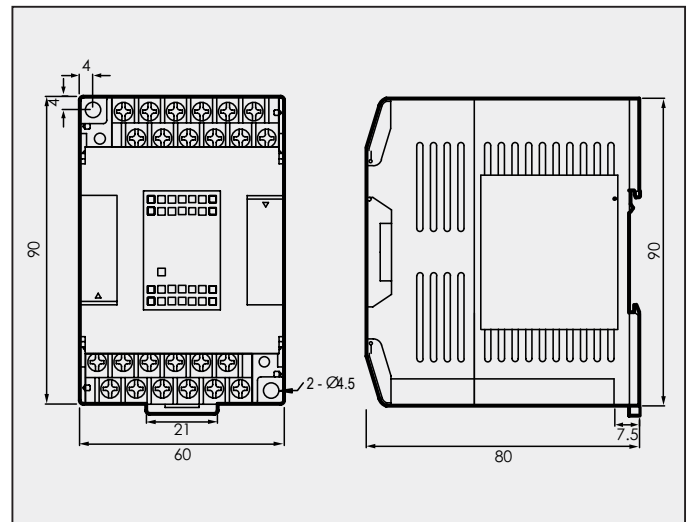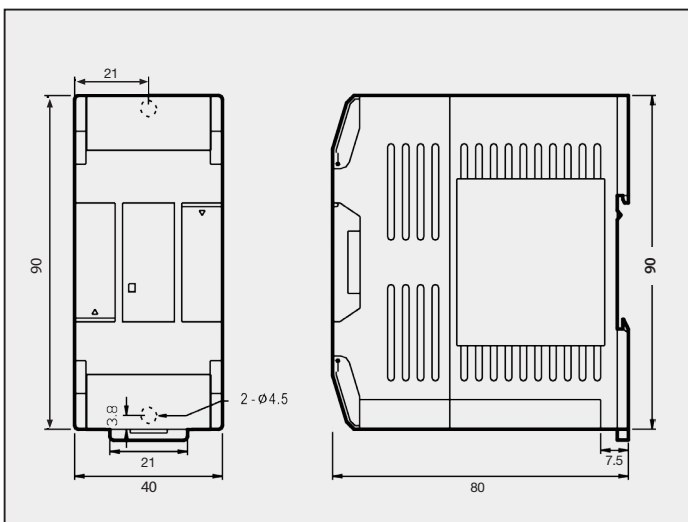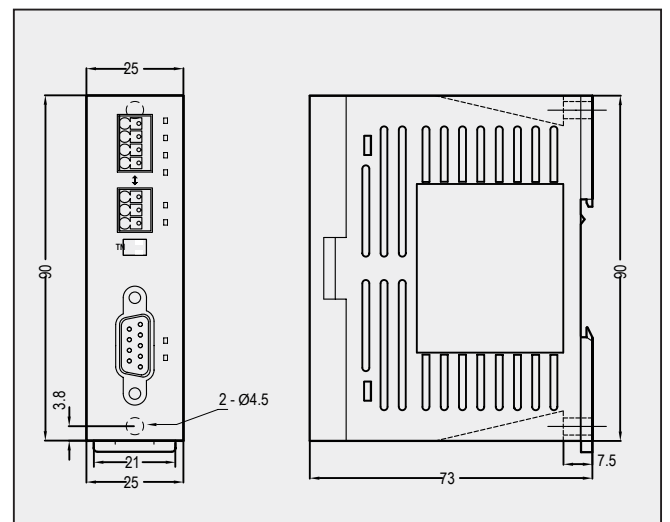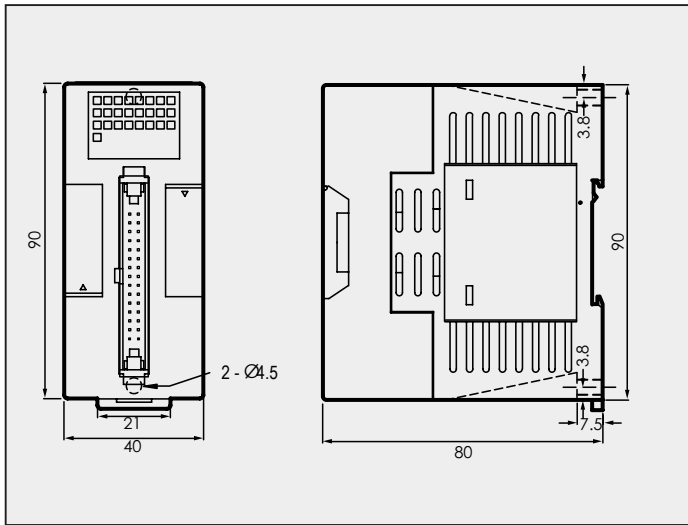
Figura 6

Figura 7

Figura 8

Figura 9

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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.

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Lista de modelos

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	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.