Flex Series I/O System Catalog

About Us

INVT (Shenzhen INVT Electric Co., Ltd) has been concentrating on industry automation and energy power since its foundation in 2002 and is committed to "Providing the best product and service to allow customers more competitiveness". INVT goes public in 2010 and is the first A-share listed company (002334) in Shenzhen Stock Exchange in the industry. At present, INVT owns 15 subsidiaries and more than 4500 employees, over 40 branches, forming a sales network covering more than 100 overseas countries and regions.

INVT has been awarded as the Key High-tech Enterprise of National Torch Plan based on mastering of key technologies in power electronics, auto control and IT. With business covering industry automation, electric vehicle, network power and rail transit, INVT has established 10 R&D centers nationwide, boasts more than 1400 patents and owns the first lab in the industry awarded ACT qualification from TÜV SÜD, UL-WTDP and CNAS National Lab. The industrial parks in Shenzhen and Suzhou aim to provide customers with advanced integrated product development design management, comprehensive product R&D test and auto informational production. The worldwide INVT branches and warranty service centers are ready to offer customers all-around back-ups including professional solutions, technical trainings and service support.

In the next decade, INVT will continue to take " Sincere Virtuous, Professional Aspiring" as our business philosophy, enhance core business sectors including industrial automation, electric vehicle, network power and rail transit based on the three major technologies in industry automation and energy power fields, and strive to become a leading, responsible and harmonic international professional group armed with proper product structure, leading technologies, efficient management, robust profitability and superior competitiveness.


INVT Guangming Technology Building

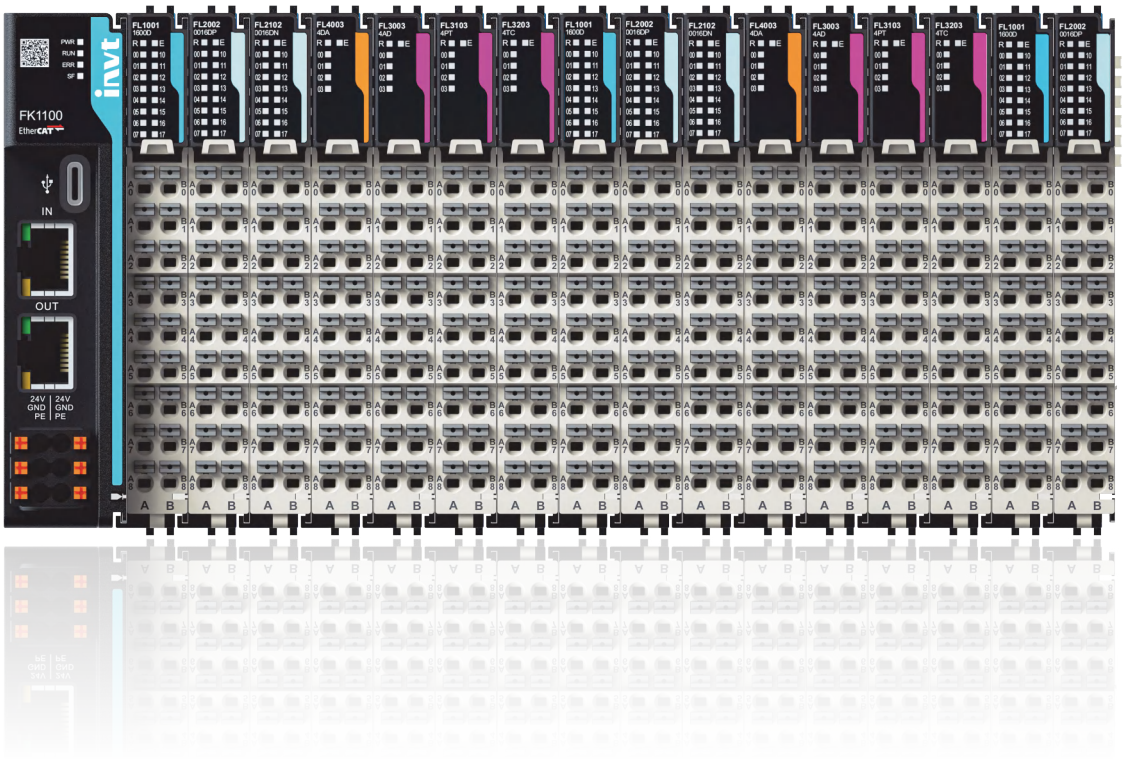
INVT Shenzhen Production Industry Park


INVT Suzhou Industry Park


INVT Zhongshan New Energy Industry Base

Flex series new generation distributed I/O system

INVT Flex series I/O system is a flexible, reliable, and efficient signal transmission system. The system is able to access to multiple standard communication networks, and equipped with rich signal modules to facilitate the deployment of personalized solutions while saving cabinet space, helping you develop more competitive personalized solutions.



Flexible

Rich communication couplers and I/O modules enable the flexible design of control systems.

Efficient

Fully upgraded F-BUS bus with a 100-megabit communication rate creates a high real-time communication system.

Reliable

Tight connection using the gold plating process ensures stable and reliable signal transmission.

Compact

Ultra-thin design significantly saves cabinet space and helps the equipment layout miniaturization.

Flexible

The open **Flex series I/O system adopts a modular design**, supporting various bus network, and is equipped with rich signal modules to create personalized solutions. By importing the device description file to a third-party host controller, the module configuration can be achieved without specialized software configuration.

EtherCAT

Profinet

EtherNet/IP

.....

N + X

Base module

(Digital/analog/temperature module)

Encoder module

Pulse module

Weighing module

.....

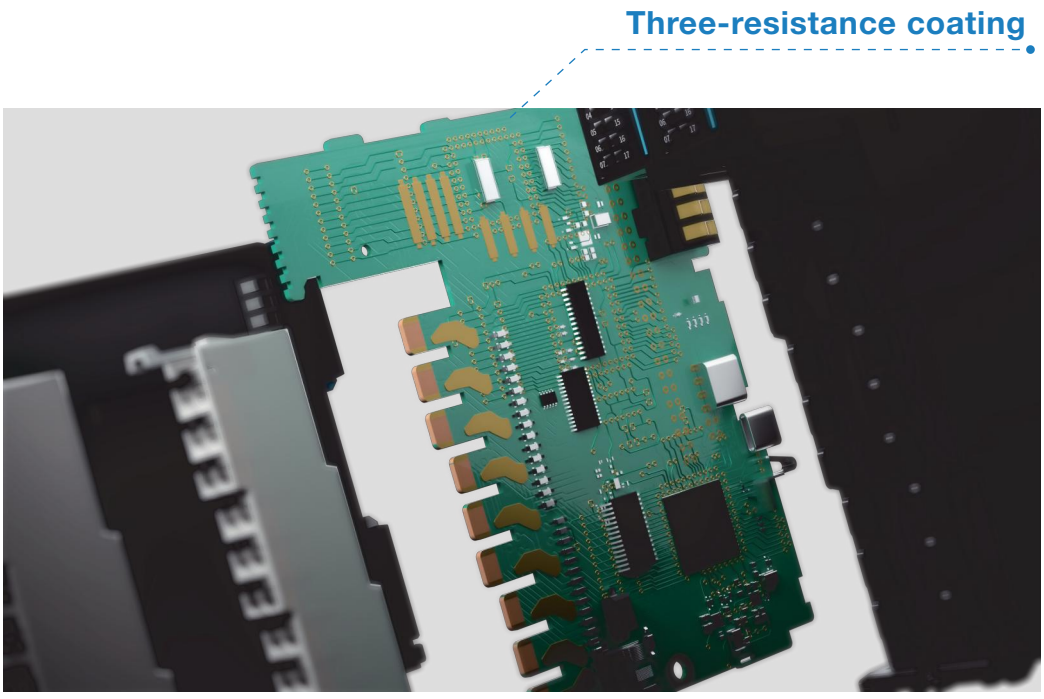
Efficient

The system is equipped with a **100Mbps F-BUS** backplane bus, with a response of I/O refresh in microseconds, achieving high-speed information exchange.

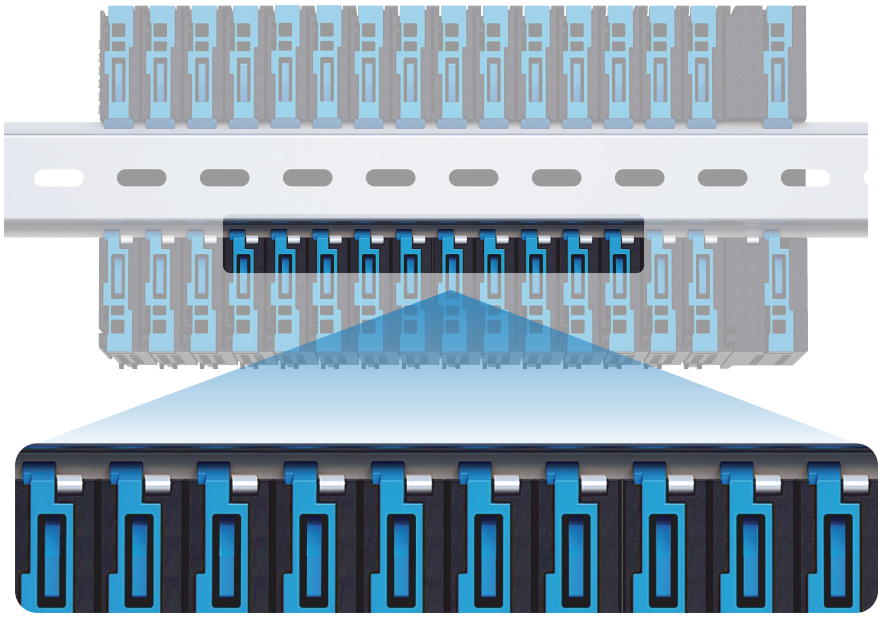
Reliable

Spring-loaded connection technology and 5u" gold plating process keep the connectors away from various types of corrosion and ensure a long service life of connectors.

The entire series adopts three-resistance coating to prevent dust, moisture, and salt spray, meeting a wider range of operating conditions and extending service life.



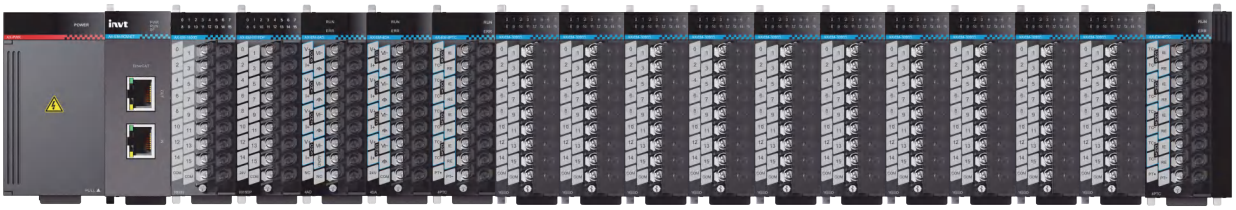
Reliable grounding, further enhancing anti-interference capability.

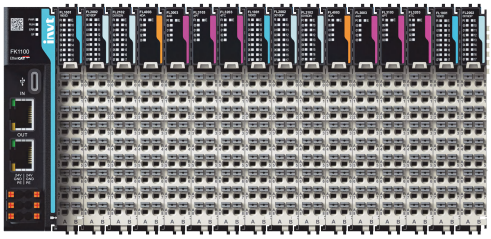


Capable of operating in **-25~55°C** and at an altitude of **3000m**, fearless of freezing weather.

Compact

12mm ultra-thin design, saving 64% of the cabinet space, achieving miniaturization of the cabinet.

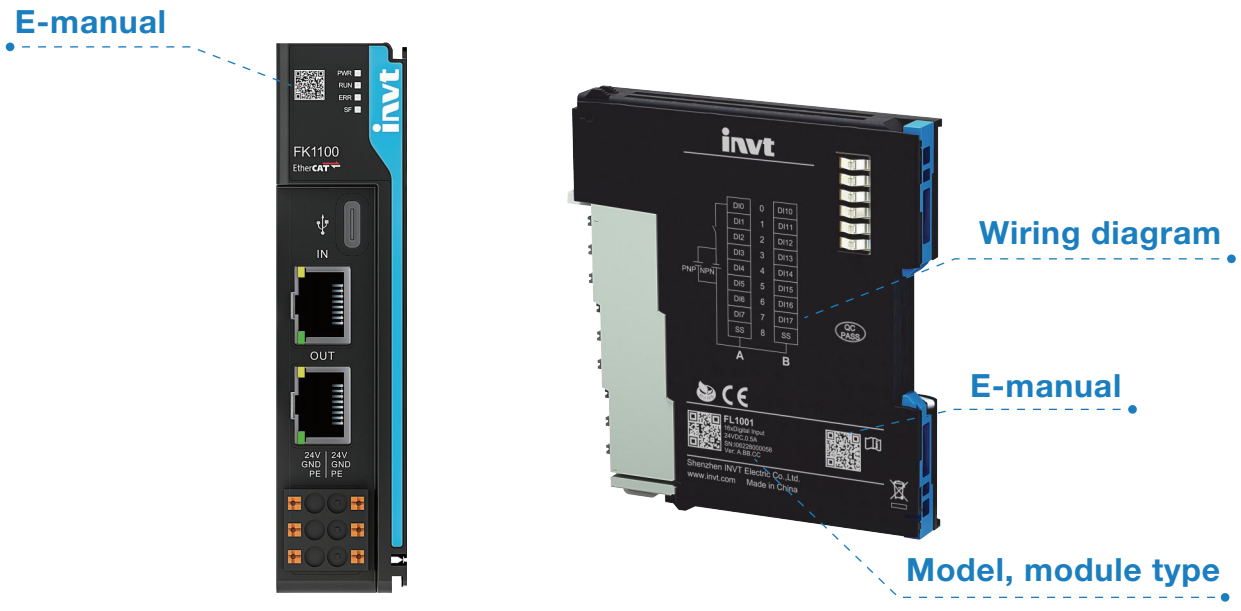




64%
space saving

Easy installation

The wiring diagram is printed on the module so the wiring can be completed without referencing a user manual. By scanning the QR code on the front, you can obtain an electronic version of the user manual for more information.



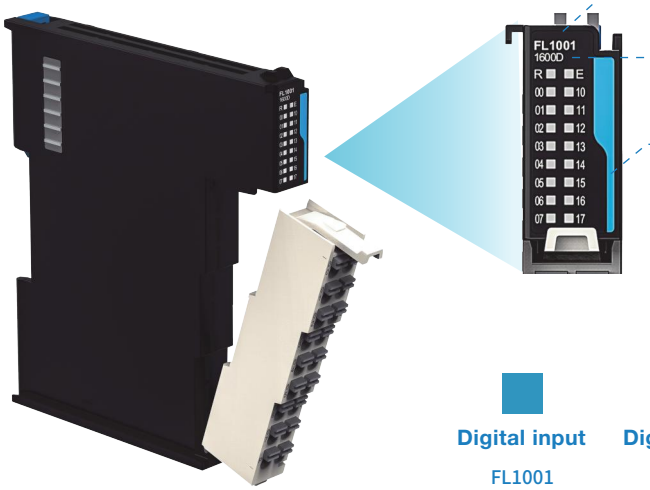
Tool-free quick connection

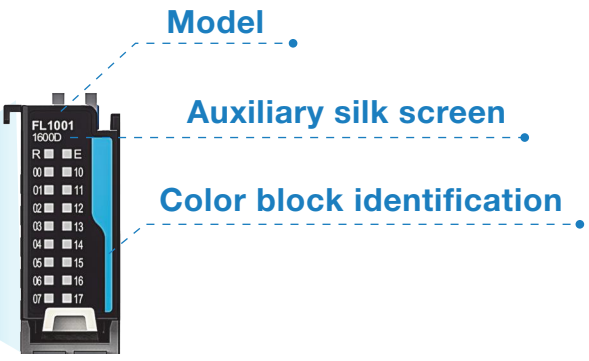
PUSH IN connection technology enables easy installation without any tools, with a 70% improvement in wiring efficiency compared to screw terminals, effectively reducing installation time while ensuring good reliability.

Direct plug-in connection, effectively reducing installation time

Clear identification

Different modules are distinguished by **color blocks and auxiliary codes**, making identification and positioning more accurate and convenient.

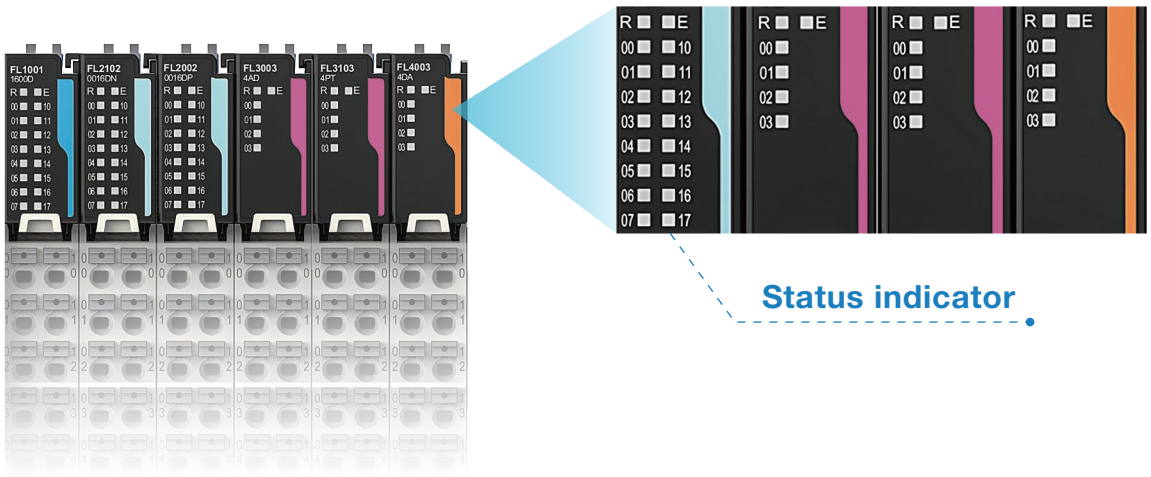




Digital input	Digital output	analog input	analog output
FL1001	FL2002	FL3003	FL4003
FL1002	FL2003	FL3103	
	FL2102	FL3203	
	FL2103		
	FL2201		

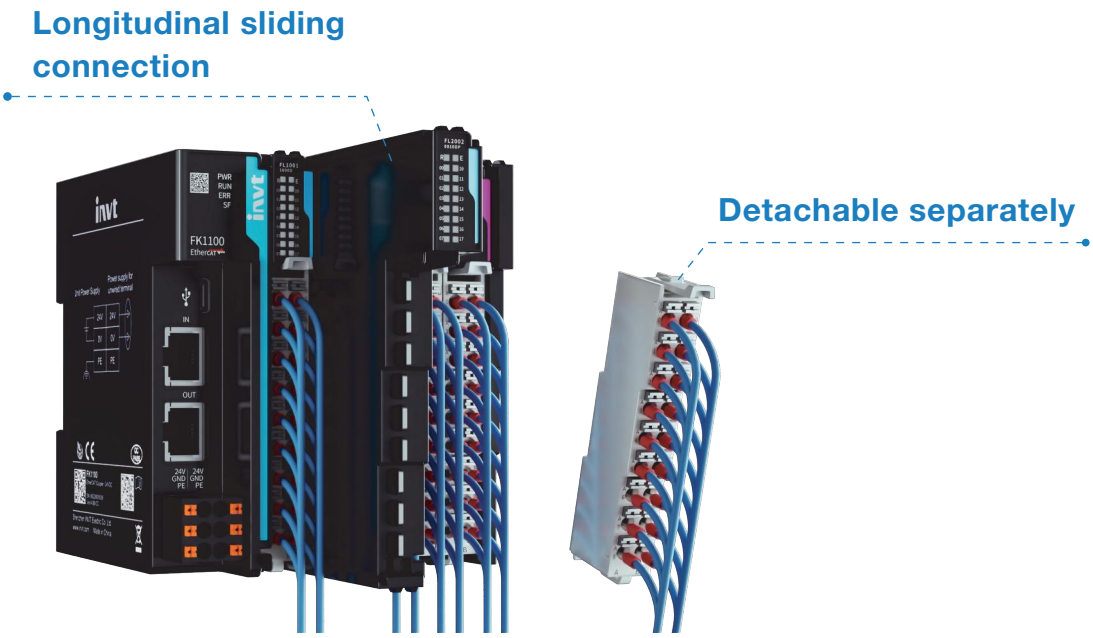
Channel-level diagnosis

Each channel has a **status indicator light**, and each module can independently display its working status. The operating status and fault information are clear at a glance.



Easy to maintain

Longitudinal sliding connection allows terminal assembly and disassembly without moving the left and right modules. Adopting a two-section modular design, the wiring terminals can be disassembled separately without repeated wiring.

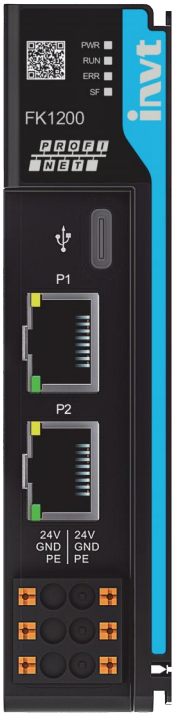


Specification parameters

Communication coupler (EtherCAT)

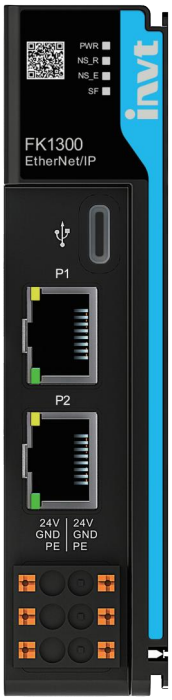
Item	Specifications		
Ordering code	11016-00005		
Model	FK1100		
Product type	EtherCAT communication coupler		
Power supply	Rated voltage	24VDC (-15% – +20%)	
	Power consumption of module	<10W	
	Isolation	No isolation	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
interface	USB2.0	×1, for module upgrade	
	RJ45	×2, EtherCAT IN&OUT	
	EtherCAT slave	Synchronization method	Distributed clocks or input and output synchronization
		Physical layer	100BASE-TX
		Baud rate	100Mbit/s
		Output distance	Less than 100m between two nodes
		Transmission mode	Full duplex
		Topology structure	Linear, star-shape, tree-shape
		Slave address range	Assigned by the system
		Quantity of input PDO	Up to 768 bytes
		Quantity of output PDO	Up to 768 bytes
		Input mailbox size	Up to 128 bytes
		Output mailbox size	Up to 128 bytes
	Expansion bus	Number of I/O expansions	Up to 16,which depends on the actual power consumption calculation
		Output power supply	5V/2.5A
Certification	CE, RoHS		
Environment	IP rating	IP20	
	Working temperature	-25°C–55°C	
	Working humidity	10%–95%RH (no condensation)	
	Air	No corrosive gas	
	Storage temperature	-40°C–70°C (RH<90%RH, no condensation)	
	Altitude	Lower than 3000m	
	Pollution degree	Degree 2, compliant with IEC61131-2	
	Anti-interference	2kV power cable compliant with IEC61000-4-4	
	EMC anti-interference level	Zone B,IEC61131-2 (General industrial environment)	
	Vibration resistant	IEC60068-2-6 5Hz–8.4Hz, vibration amplitude of 3.5mm, 8.4Hz–150Hz, acceleration 9.8m/s2, 100 minutes for each in X, Y, and Z directions (10 times, 10 minutes each time, a total of 100 minutes)	
	Impact resistance	IEC60068-2-27, 9.8m/s^2, 11ms, X/Y/Z, 3 times for each of 3 axes and 6 directions	
Installation method	35mm standard rail		
Weight (kg)	Net: 0.25	Gross: 0.28	
Dimensions W×H×D(mm)	Product dimension: 25×105×96	Package dimension: 29×109×100	

communication coupler (Profinet)



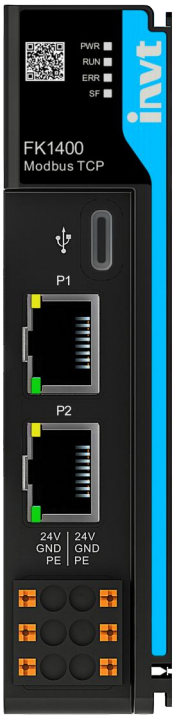
Item	Specifications		
Ordering code	11016-00012		
Model	FK1200		
Product type	PROFINET communication coupler		
Power supply	Rated voltage	24VDC (-15% – +20%)	
	Power consumption of module	<10W	
	Isolation	No isolation	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
interface	USB2.0	×1, for module upgrade	
	RJ45	×2, Profinet P1&P2	
	Profinet slave	Physical layer	100BASE-TX
		Baud rate	100Mbit/s
		Output distance	Less than 100m between two nodes
		Transmission mode	Full duplex
		Topology structure	Linear, star-shape, tree-shape
		Communication protocol	Profinet IO Device
		Communication mode	RT
		Communication period	Min. 1ms
		Process data zone	Input max. 1440 bytes, output max. 1440bytes; IM0–IM3
		Profinet switch function	Supports networking function
		Ethernet service	Supports TCP/IP, SNMP, LLDP, ping, arp
		Port diagnosis	Supported
		Port disabling	Supported
		Factory settings reset	Supported
	Expansion bus	Number of I/O expansions	Up to 16,which depends on the actual power consumption calculation
		Output power supply	5V/2.5A
Certification	CE, RoHS		
Environment	IP rating	IP20	
	Working temperature	-25°C–55°C	
	Working humidity	10%–95%RH (no condensation)	
	Air	No corrosive gas	
	Storage temperature	-40°C–70°C (RH<90%RH, no condensation)	
	Altitude	Lower than 3000m	
	Pollution degree	Degree 2, compliant with IEC61131-2	
	Anti-interference	2kV power cable compliant with IEC61000-4-4	
	EMC anti-interference level	Zone B,IEC61131-2 (General industrial environment)	
	Vibration resistant	IEC60068-2-6 5Hz–8.4Hz, vibration amplitude of 3.5mm, 8.4Hz–150Hz, acceleration 9.8m/s2, 100 minutes for each in X, Y, and Z directions (10 times, 10 minutes each time, a total of 100 minutes)	
	Impact resistance	IEC60068-2-27, 9.8m/s², 11ms, X/Y/Z, 3 times for each of 3 axes and 6 directions	
Installation method	35mm standard rail		
Weight (kg)	Net: 0.25	Gross: 0.28	
Dimensions W×H×D(mm)	Product dimension: 25×105×96	Package dimension: 29×109×100	

communication coupler (EtherNet/IP)



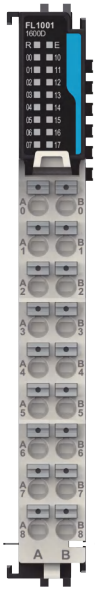
Item	Specifications		
Ordering code	11016-00018		
Model	FK1300		
Product type	EtherNet/IP communication coupler		
Power supply	Rated voltage	24VDC（-15%~+20%）	
	Power consumption of module	<10W	
	Isolation	No isolation	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
interface	USB2.0	×1, used for module upgrade	
	RJ45	×2, EtherNet/IP P1&P2	
	EtherNet/IP slave	Physical layer	100BASE-TX
		Baud rate	100Mbit/s
		Output distance	Less than 100m between two nodes
		Transmission mode	Full duplex
		Topology structure	Linear, star, or tree
		Communication protocol	EtherNet/IP
		Max input length	504 bytes
		Max output length	504 bytes
		Max number of explicit message connections	6
		Max number of implicit message connections	3
		Max number of CIP connections	6
		Min. request packet interval (RPI)	1ms
		Alarm/Diagnosis status information	Supporting the upload of function codes from the local to the PLC
	Expansion bus	Number of I/O expansions	Up to 16,which depends on the actual power consumption calculation
		Output power supply	5V/2.5A
Certification	CE, RoHS		
Environment	IP rating	IP20	
	Working temperature	-25°C–55°C	
	Working humidity	10%–95%RH (no condensation)	
	Air	No corrosive gas	
	Storage temperature	-40°C–70°C (RH<90%RH, no condensation)	
	Altitude	Lower than 3000m	
	Pollution degree	Degree 2, compliant with IEC61131-2	
	Anti-interference	2kV power cable compliant with IEC61000-4-4	
	EMC anti-interference level	Zone B,IEC61131-2 (General industrial environment)	
	Vibration resistant	IEC60068-2-6 5Hz–8.4Hz, vibration amplitude of 3.5mm, 8.4Hz–150Hz, acceleration 9.8m/s2, 100 minutes for each in X, Y, and Z directions (10 times, 10 minutes each time, a total of 100 minutes)	
	Impact resistance	IEC60068-2-27, 9.8m/s², 11ms, X/Y/Z, 3 times for each of 3 axes and 6 directions	
Installation method	35mm standard rail		
Weight (kg)	Net: 0.25	Gross: 0.28	
Dimensions W×H×D(mm)	Product dimension: 25×105×96	Package dimension: 29×109×100	

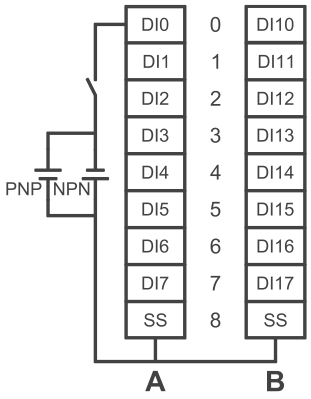
Communication coupler (Modbus TCP)



Item	Specifications		
Ordering code	11016-00029		
Product model	FK1400		
Product type	Modbus TCP communication coupler		
Power supply	Rated voltage	24VDC (-15%–+20%)	
	Module power consumption	<10W	
	Isolation	No isolation	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
Interface	USB2.0	1, used for module upgrade	
	RJ45	2, Modbus TCP	
	Modbus TCP server (slave)	Max. number of client connections	5
		TCP keepalive timer	Supported
		Watchdog setting	Supported (on by default, 30s)
		Supported function codes	01/02/03/04/05/06/15/16/23
		IP address setting	Using the Ttools-IO tool
		Diagnostic function	Supported
		Physical layer	100BASE-TX
		Communication rate	10M/100Mbps, adaptive
		Communication method	Full duplex
		Topology structure	Linear, star, tree
		Transmission medium	Category-5 or higher network cables
		Transmission distance	Max. segment length: 100m
	Expansion bus	Scalable I/O count	Up to 32, must be used with power feed modules. The actual number depends on power consumption.
		Output power supply	5V/2.5A(12.5W)
Certification	CE、RoHS		
Environment	IP rating	IP20	
	Working environment temperature	-25°C–55°C	
	Working environment relative humidity (RH)	10%–95% (no condensation)	
	Air	No corrosive gas	
	Storage environment temperature	-40°C–70°C (RH < 90%, no condensation)	
	Altitude	Below 3000m	
	Pollution degree	Degree 2 or lower, compliant with IEC61131-2	
	Immunity standard	2kV power cable, compliant with IEC61000-4-4	
	EMC standard	Zone B, IEC61131-2 (general industrial environment)	
	Vibration resistance standard	IEC60068-2-6	
	Impact test	IEC60068-2-27, 9.8m/s², 11ms, X/Y/Z, 3 axes in 6 directions repeated 3 times.	
Installation method	35mm standard DIN rail		
Weight (kg)	"Without package 0.25 With package: 0.28"		
W×H×D(mm)	Product dimension: 25×105×96 Package dimensions: 29×109×100		

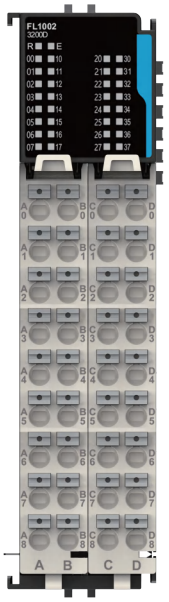
Digital input

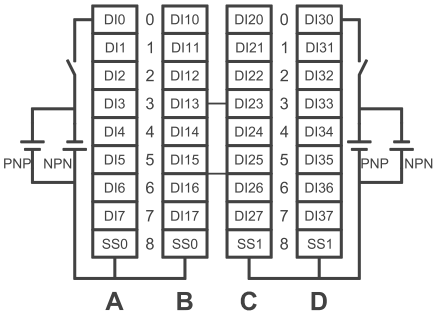




Item	Performance Specification
Ordering code	11016-00004
Model	FL1001
Product type	Digital input, supporting source type/sink type
Power loss,typ	0.71W
Number of channels	16
Input type	Source/sink
Input voltage	DC24V ± 10%
Input current,typ	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of filter parameter. Every eight channels use a group of filter parameter
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55°C (with no more than 12 input points that are on at the same time), or by 10°C when all input points are on
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

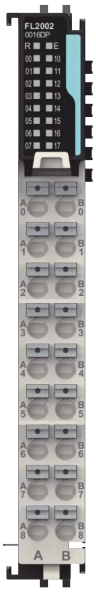
Digital input

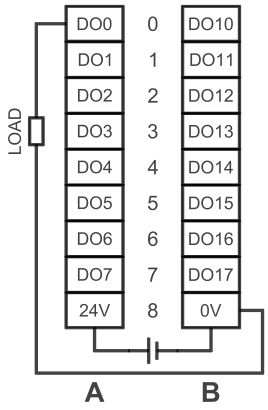




Item	Performance Specification
Ordering code	11016-00016
Model	FL1002
Product type	Digital input, supporting source type/sink type
Power loss,typ	0.73W
Number of channels	32
Input type	Source/sink
Input voltage	DC24V ± 10%
Input current,typ	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of filter parameter. Every eight channels use a group of filter parameter.
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55°C (with no more than 12 input points that are on at the same time), or by 10°C when all input points are on
Weight (kg)	Net: 0.30 Gross: 0.33
DimensionsW×H×D(mm)	Product dimension: 25×105×96 Package dimension: 29×109×100

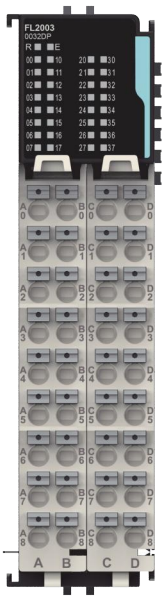
Digital output (source type)

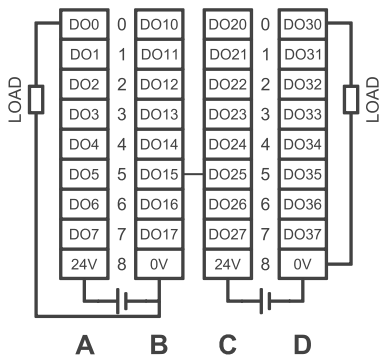




Item	Specifications
Ordering code	11016-00006
Model	FL2002
Product type	Digital output, transistor source type output, active high
Power loss,typ	0.77W
Number of channels	16
External power	DC24V(-15%～+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point；2A/module
	Inductive load: 7.2W/point, 12W/module
	Illumination load: 5W/point, 18W/module
Leakage current/point	<10μA
OFF-ON	100μs
ON-OFF	100μs
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

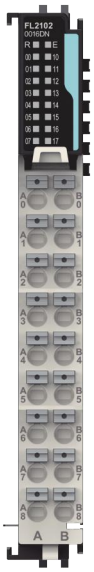
Digital output (source type)

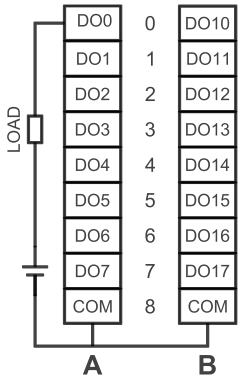




Item	Specifications
Ordering code	11016-00013
Model	FL2003
Product type	Digital output, transistor source type output, active high
Power loss,typ	0.78W
Number of channels	32
External power	DC24V(-15%～+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point；2A/module
	Inductive load: 7.2W/point, 12W/module
	Illumination load: 5W/point, 18W/module
Leakage current/point	<10μA
OFF-ON	100μs
ON-OFF	100μs
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight (kg)	Net: 0.30 Gross: 0.33
DimensionsW×H×D(mm)	Product dimension: 25×105×96 Package dimension: 29×109×100

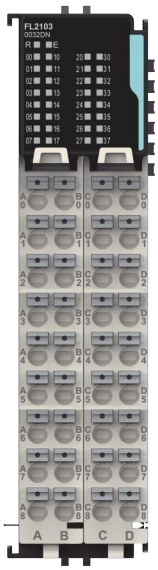
Digital output (sink type)

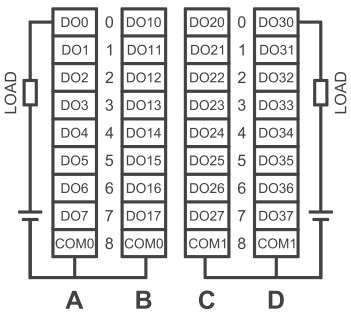




Item	Specifications
Ordering code	11016-00003
Model	FL2102
Product type	Digital output, transistor sink type output, active low
Power loss,typ	1.04W
Number of channels	16
External power	DC24V(-15%～+20%)
Output voltage	24V±10%
Max. output frequency	1kHz (duty ratio: 40%–60%)
Max. load	Resistive load: 0.5A/point, 4A/module
	Inductive load: 7.2W/point, 24W/module
	Illumination load: 5W/point, 18W/module
Leakage current/point	<10μA
OFF-ON	100μs
ON-OFF	100μs
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension:12.5×105×96 Package dimension: 17.5×109×100

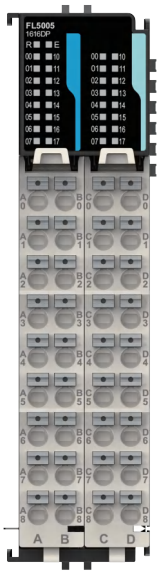
Digital output (sink type)

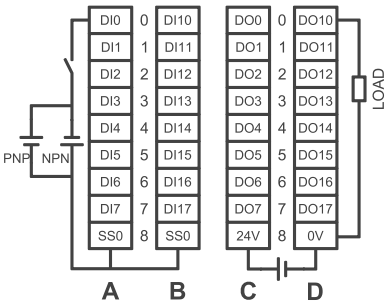




Item	Specifications
Ordering code	11016-00017
Model	FL2103
Product type	Digital output, transistor sink type output, active low
Power loss,typ	1.46W
Number of channels	32
External power	DC24V(-15%～+20%)
Output voltage	24V±10%
Max. output frequency	1kHz (duty ratio: 40%–60%)
Max. load	Resistive load: 0.5A/point, 4A/module
	Inductive load: 7.2W/point, 24W/module
	Illumination load: 5W/point, 18W/module
Leakage current/point	<10μA
OFF-ON	100μs
ON-OFF	100μs
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight (kg)	Net: 0.30 Gross: 0.33
DimensionsW×H×D(mm)	Product dimension: 25×105×96 Package dimension: 29×109×100

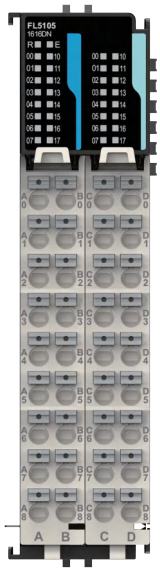
Digital Input&Output(source type)

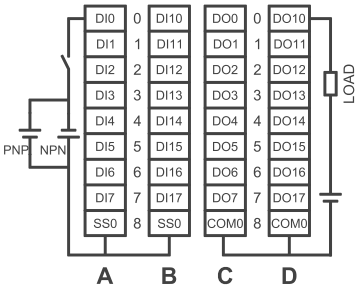




Item	Performance Specification
Ordering code	11016-00015
Model	FL5005
Product type	Digital input and output
Power loss,typ	0.68W
Number of input channels	16
Input type	Source/sink
Input voltage	DC24V±10%
Input current	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of filter parameter. Every eight channels use a group of filter parameter
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55°C (with no more than 12 input points that are on at the same time), or by 10℃ when all input points are on
Number of output channels	16
Output type	Source,active high
External power	DC24V(-15%–+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point； 2A/module
	Inductive load: 7.2W/point, 12W/module
	Illumination load: 5W/point, 18W/module
Leakage current/point	<10uA
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
OFF-ON	100μs
ON-OFF	100μs
Weight (kg)	Net: 0.30 Gross: 0.33
Dimensions W×H×D(mm)	Product dimension: 25×105×96 Package dimension: 29×109×100

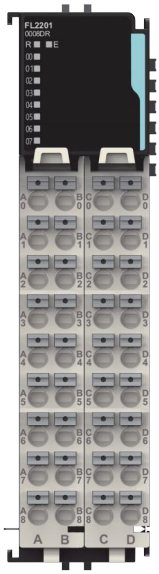
Digital Input&Output(sink type)

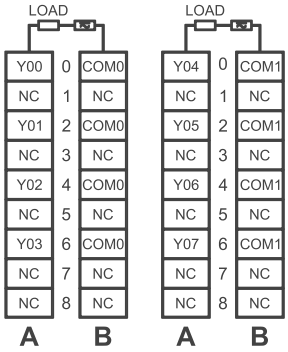




Item	Performance Specification
Ordering code	11016-00014
Model	FL5105
Product type	Digital input and output
Power loss,typ	1.05W
Number of input channels	16
Input type	Source/sink
Input voltage	DC24V±10%
Input current	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of filter parameter. Every eight channels use a group of filter parameter
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55℃ (with no more than 12 input points that are on at the same time), or by 10℃ when all input points are on
Number of output channels	16
Output type	sink, active low
External power	DC24V(-15%–+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point, 4A/module
	Inductive load: 7.2W/point, 24W/module
	Illumination load: 5W/point, 18W/module
Leakage current/point	<10uA
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
OFF-ON	100μs
ON-OFF	100μs
Weight (kg)	Net: 0.30 Gross: 0.33
Dimensions W×H×D(mm)	Product dimension: 25×105×96 Package dimension: 29×109×100

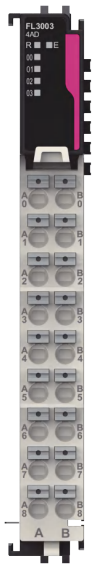
Digital output (relay)

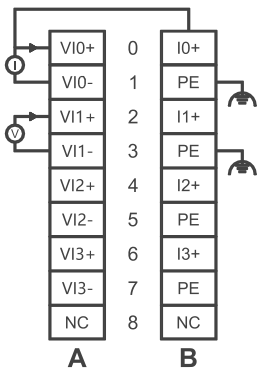




Item	Performance Specification
Ordering code	11016-00009
Model	FL2201
Product type	Digital output, relay output
Power loss,typ	1.56W
Number of channels	8
Contact type	N.O. contact
Contact load (resistive)	3A 250VAC/30VDC
Max. switching voltage	250VAC/125VDC@0.3A
Max. switching current	5A
Service life of relay	Electrical: 100,000 times
	Mechanical: 20,000,000 times
OFF-ON response time	≤15ms
ON-OFF response time	≤10ms
Weight (kg)	Net: 0.30 Gross: 0.33
DimensionsW×H×D(mm)	Product dimension: 25×105×96 Package dimension: 29×109×100

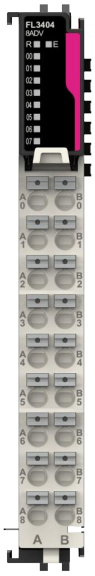
Analog input

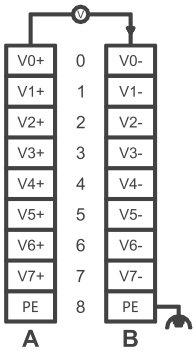




Item	Specifications
Ordering code	11016-00011
Model	FL3003
Product type	4 channels of analog input
Power loss,typ	0.83W
Number of channels	4
Voltage range	±5V, ±10V, +5V, +10V
Current range	0–20mA, 4–20mA, ±20mA
Accuracy in room temperature (of 25°C)	Voltage±0.1%FS, current±0.1%FS
Converting speed	320μs/channel
Max. common-mode voltage between channels	30VDC
Disconnection detection	Support (only voltage)
Isolation method	Between I/O port and power supply: isolated
	Between channels: not isolated
Resolution	16 bits
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

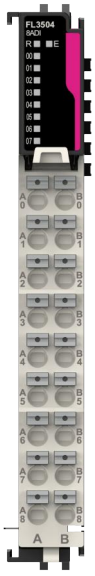
Analog input

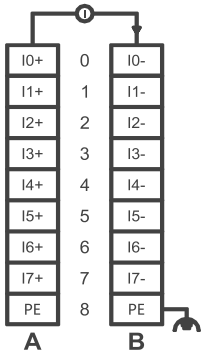




Item	Specifications
Ordering code	11016-00026
Product model	FL3404
Product type	8-channel analog voltage input
Power consumption	0.81W
Number of channels	8
Voltage range	±5V, ±10V, 0–5V, 0–10V, 1–5V
Input mode	Differential
Accuracy in room temperature (of 25°C)	±0.15%FS
Accuracy in working temperature	±0.3%FS
Converting speed	170μs/channel
Voltage input limit	±15VDC
Max. common-mode voltage between channels	30VDC
Disconnection detection	Not supported
Overlimit detection	Supported
Over range detection	Supported
Isolation method	Isolated between I/O ports and power supplies
	Not isolated between channels
Resolution	16 bits
Weight (kg)	Without package 0.15 With package: 0.18
W x H x D (mm)	Product dimensions: 12.5×105×96 Package dimensions: 17.5×109×100

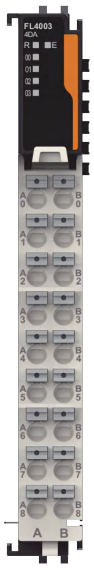
Analog input

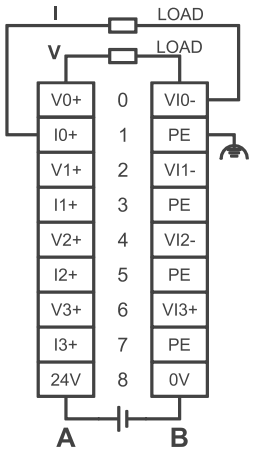




Item	Specifications
Ordering code	11016-00027
Product model	FL3504
Product type	8-channel analog current input
Power consumption	0.81W
Number of channels	8
Current range	0–20mA, 4–20mA, ±20mA
Input mode	Differential
Accuracy in room temperature (of 25°C)	±0.15%FS
Accuracy in working temperature	±0.3%FS
Converting speed	170μs/channel
Current input limit	30mA
Max. common-mode voltage between channels	30VDC
Disconnection detection	Not supported
Overlimit detection	Supported
Over range detection	Supported
Isolation method	Isolated between I/O ports and power supplies
	Not isolated between channels
Resolution	16 bits
Weight (kg)	Without package 0.15 With package: 0.18
W x H x D (mm)	Product dimensions: 12.5×105×96 Package dimensions: 17.5×109×100

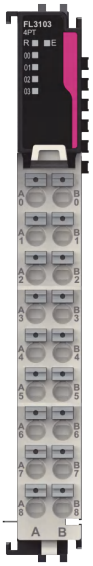
Analog output

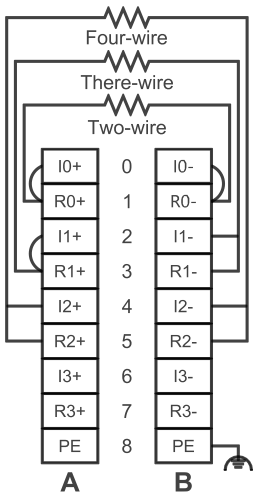




Item	Specifications
Ordering code	11016-00008
Model	FL4003
Product type	4 channels of analog output
External power	24VDC (-15%–20%)
Power loss,typ	0.68W
Number of channels	4
Voltage range	±5V, ±10V, 0–5V, 1–5V, 0–10V
Current range	0–20mA, 4–20mA
Accuracy in room temperature (of 25°C)	Voltage±0.1%FS, current±0.1%FS
Converting speed	40μs/channel
Min. load resistance during voltage output	1kΩ
Max. load resistance during current output	600Ω
Disconnection detection	Support (only current)
Isolation method	Between I/O port and power supply: isolated
	Between channels: not isolated
Resolution	16 bits
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

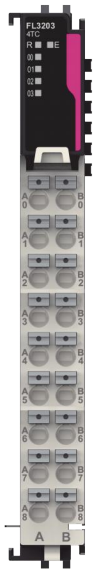
Temperature measuring (thermistor)

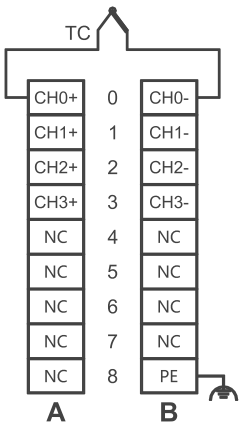




Item	Specifications
Ordering code	11016-00007
Model	FL3103
Product type	4 channels of thermistor input
Power loss,typ	0.88W
Number of channels	4
Wiring method	Two-, three-, or four-wire
Supported thermal resistors	PT100, PT500, PT1000, CU100
Sensitivity	0.0625 /0.0625
SamplePeriod	240ms/channel (typical value)
Accuracy in room temperature (of 25°C)	±0.3%FS
Accuracy in working temperature	±1%FS
Filter time	Adjustable
Accuracy in working temperature	±1%FS
Isolation method	Between I/O port and power supply: isolated
	Between channels: not isolated
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

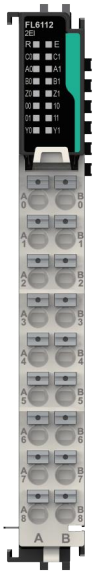
Temperature measuring (thermocouple)

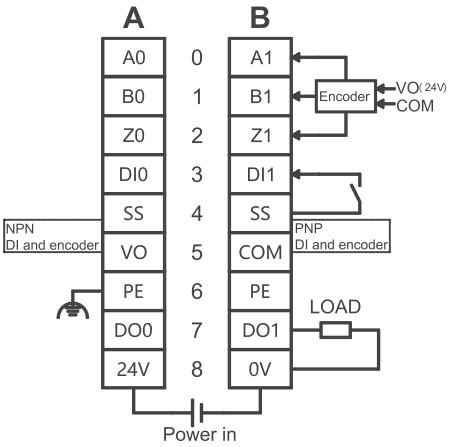




Item	Specifications
Ordering code	11016-00010
Model	FL3203
Product type	4 channels of thermocouple input
Power loss,typ	0.78W
Number of channels	4
Supported thermocouples	Types B, E, J, K, N, R, S, and T
Sensitivity	0.0625°C/0.0625°F
SamplePeriod	360ms/channel
Accuracy in room temperature (of 25°C)	±0.1%FS+cold junction compensation error
Accuracy in working temperature	±0.3%FS+cold junction compensation error
Cold junction compensation method	Internal
Disconnection detection	Supported
Isolation method	Between I/O port and power supply: isolated
	Between channels: not isolated
Weight (kg)	Net: 0.15 Gross: 0.18
DimensionsW×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

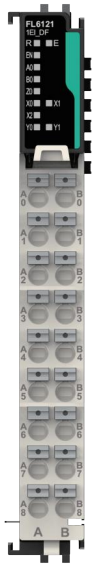
Counting and position measurement

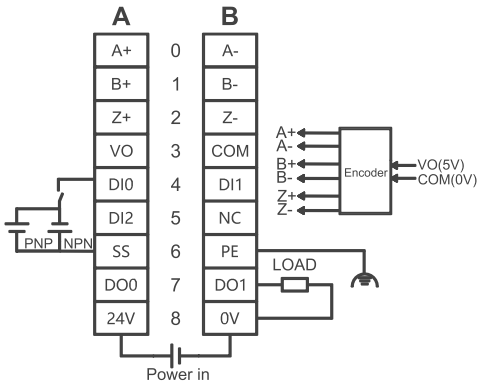




Item	Performance
Ordering code	11016-00019
Model	FL6112
Product category	Incremental encoder module
Power consumption	0.68W
Number of channels	2
Encoder voltage	24VDC±15%
Counting range	-2147483648~2147483647
Pulse mode	AB-phase quadrature pulse/Pulse + direction
Pulse frequency	200KHz
Frequency multiplication mode	X1/X2/X4
Resolution	1-65535 ppr (number of pulses per revolution)
Counter preset	Software preset
Z-pulse calibration	Supported by default for Z signal
Counter filter	0.1~65535*0.1μs per channel
Number of DIs	1 per channel
DI voltage	24VDC
DI edge selection	Rising edge/Falling edge/Rising or falling edge
DI type	Source or sink
DI filter time setting	0.1~65535*0.1μs per channel
DI function	Latch and reset
Latched value	Total latched values and latch completion flags
ON/OFF response time	μs level
Number of DOs	1 per channel
DO voltage	24V
DO type	Sink type, max. current 0.16A
DO function	High-speed comparison output
Measurement variable	Frequency/Speed
Update time of the measurement function	20/100/500/1000ms
Gating function	Software gate
Weight (kg)	Net: 0.15 Gross: 0.18
Dimensions W×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

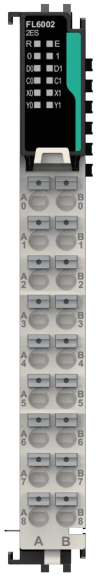
Counting and position measurement

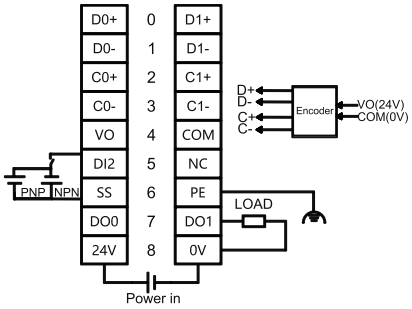




Item	Performance
Ordering code	11016-00021
Model	FL6121
Product category	Incremental encoder module
Power consumption	0.69W
Number of channels	1
Encoder voltage	5VDC
Encoder signal type	RS422 electrical level standards, differential input
Counting range	-2147483648~2147483647
Pulse mode	ABZ-phase quadrature pulse/Pulse + direction
Pulse frequency	100Hz~2MHz
Frequency multiplication mode	X1/X2/X4
Resolution	1-65535ppr
Counter preset	Software preset
Z-pulse calibration	Supported by default for Z signal
Counter filter	(0~65535)*10ns
Number of DIs	3
DI voltage	24VDC±10%
DI type	Source or sink
DI edge selection	Rising edge/Falling edge/Rising or falling edge
DI filter time	0~65535*10ns per channel
DI function	2XLatch、1XReset
Latched value	Latched value 0, latched value 1, and latch completion flag
Hardware reset	Rising edge reset
Number of DOs	2
DO voltage	24VDC
DO type	Source type, rated output current 0.16A
DO function	High-speed comparison output
Measurement variable	Frequency/Speed
Update time of the measurement	20/100/500/1000ms
Gating function	Software gate
Weight (kg)	Net: 0.15 Gross: 0.18
Dimensions W×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

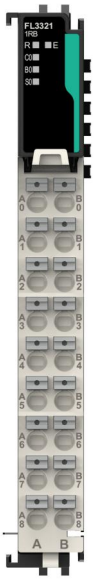
Counting and position measurement

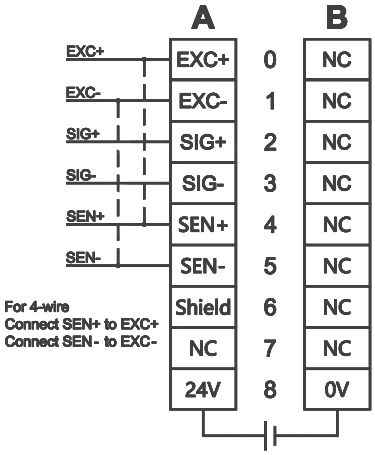




Item	Performance
Ordering code	11016-00022
Model	FL6002
Product category	SSI absolute encoder module
Power consumption	0.69W
Number of channels	2
Encoder voltage	24VDC
Encoder signal type	RS422 electrical level standards, differential input
SSI frame length	10~40 (Default: 13)
SSI clock frequency	125K/250K/500K/1M/1.5M/2MHz
Signal type	Gray code (default)/Binary
SSI interval time	(1~65536)*100us
Number of DIs	1 per channel
DI voltage	24VDC
DI edge selection	Rising edge/Falling edge/Rising or falling edge
DI type	Source or sink
DI filter time	(1~65536)*0.1us
DI function	Latch
Latched value	Latched values and latch completion flags
Number of DOs	1 per channel
DO voltage	24V
DO type	Source type, rated output current 0.16A
DO function	High-speed comparison output
Measurement variable	Frequency/Speed
Update time of the measurement function	20ms/100ms/500ms/1000ms
Gating function	Software gate
Weight (kg)	Net: 0.15 Gross: 0.18
Dimensions W×H×D(mm)	Product dimension: 12.5×105×96 Package dimension: 17.5×109×100

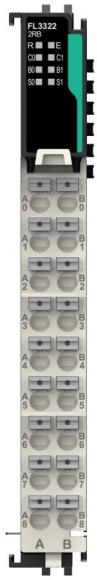
Resistance bridge measurement

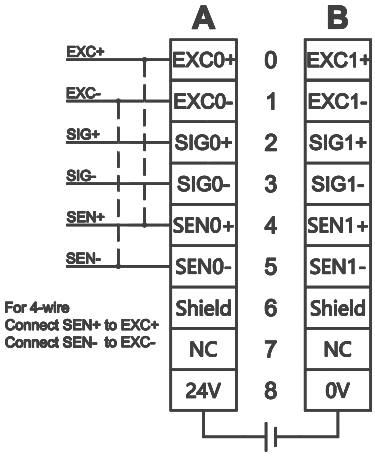




Item	Specifications
Ordering code	11016-00030
Product model	FL3321
Product type	Resistance bridge measurement
Power consumption	0.5W
Number of channels	1
Input sensor type	4-wire or 6-wire bridge sensor
Input mode	Differential
Input signal range	±30mVDC
Load cell characteristics	(1/2/4/6)mV/V
Sampling time	2, 5, 10, 20, 40, 80 (default), 200, 400 ms x channel number (fine-tuning according to the ADC device)
Load range	40~4010Ω
Max. exciting current	5V@250mA
Accuracy in room temperature (of 25°C)	±0.01%FS (25°C, sampling rate < 80ms)
Accuracy in working temperature	±0.05%FS(-25°C–+55°C)
Disconnection detection	Supported
Short circuit detection	Exciting power short circuit detection supported
Over range detection	Supported
Isolation method	Not isolated between channels
Resolution	16 bits
Weight (kg)	Without package 0.15 With package: 0.18
W x H x D (mm)	Product dimensions: 12.5×105×96 dimensions: 17.5×109×100

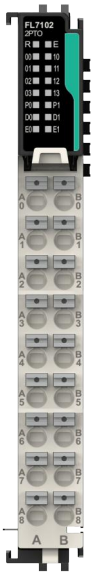
Resistance bridge measurement

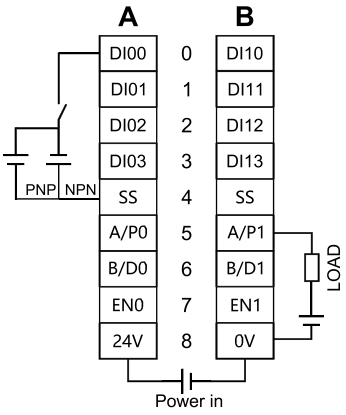




Item	Specifications
Ordering code	11016-00031
Product model	FL3322
Product type	Resistance bridge measurement
Power consumption	0.55W
Number of channels	2
Input sensor type	4-wire or 6-wire bridge sensor
Input mode	Differential
Input signal range	±30mVDC
Load cell characteristics	(1/2/4/6)mV/V
Sampling time	2, 5, 10, 20, 40, 80 (default), 200, 400 ms x channel number (fine-tuning according to the ADC device)
Load range	40~4010Ω
Max. exciting current	5V@250mA
Accuracy in room temperature (of 25°C)	±0.01%FS (25°C, sampling rate < 80ms)
Accuracy in working temperature	±0.05%FS(-25°C–+55°C)
Disconnection detection	Supported
Short circuit detection	Exciting power short circuit detection supported
Over range detection	Supported
Isolation method	Not isolated between channels
Resolution	16 bits
Weight (kg)	Without package 0.15 With package: 0.18
W x H x D (mm)	Product dimensions: 12.5×105×96 dimensions: 17.5×109×100

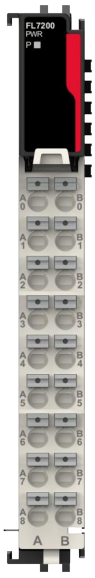
Pulse module

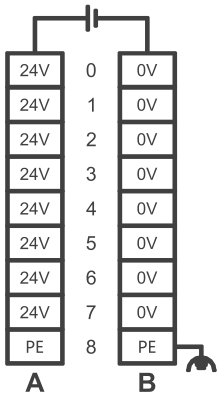




Item	Specifications
Ordering code	11016-00025
Product model	FL7102
Product type	Pulse output module
Power consumption	0.75W
Number of pulse channels	2
Output mode	Single-ended NPN output
Output voltage range	(12~24VDC)±15%
Output frequency	Up to 200kHz
Pulse mode	Pulse + direction, CW/CCW
Input channel	8 channels (4x2CH)
Input channel function	Positive limit, negative limit, origin switch, and emergency stop
Input type	PNP/NPN
Input voltage range	24VDC±15%
Input signal logic	Limit, origin, and emergency stop are individually configured as normally open/normally closed, defaulting to normally open.
Motion mode	Absolute position mode, relative position mode, and speed mode
Trapezoidal ACC/DEC	Supported
Motion merging	Supported
Homing mode	4 modes (19, 21, 24, 28) supported
Forced emergency stop	Supported
Refresh rate	⩾1ms
Weight (kg)	Without package 0.15 With package: 0.18
W x H x D (mm)	Product dimensions: 12.5×105×96 dimensions: 17.5×109×100

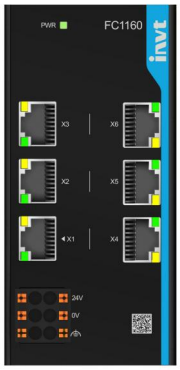
Power feed module

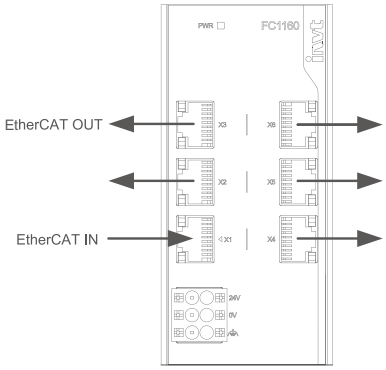




Item	Specifications
Ordering code	11016-00025
Product model	FL7200
Product type	Power feed module
Power consumption	1.4W
Terminal input power rated voltage	24VDC±15%
Terminal input power rated current	0.7A (typical value at 24V)
Terminal current capacity	<4A
Terminal input power reverse connection protection	Supported
Fieldbus output power rated voltage	5VDC(4.5VDC ~ 5.5VDC)
Fieldbus output power rated current	2.5A (typical value at 25°C ambient temperature)
Fieldbus output power short circuit protection	Supported, hiccup-mode protection
Isolation method	No isolation
Module addressing	No addressing, no slot occupying
Module status reading	Not supported
Weight (kg)	Without package 0.15 With package: 0.18
W x H x D (mm)	Product dimensions: 12.5×105×96 dimensions: 17.5×109×100

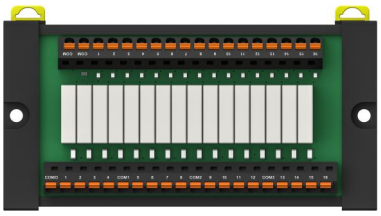
EtherCAT branch device

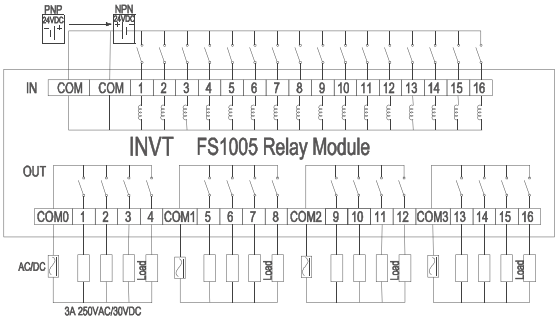




Item	Performance
Ordering code	11016-00020
Product model	FC1160
Product type	EtherCAT branch device
Power consumption	3.6W
Rated voltage	24VDC (-15%–+20%)
Number of EtherCAT ports	6 (1 input, 5 outputs)
Communication protocol	EtherCAT
Synchronization method	Distributed clocks (DCs)
Topology structure	Star (supporting splitter based cascade)
Physical layer	100BASE-TX
Data transmission rate	100MBit/s
Transmission mode	Full duplex
Output distance	Less than 100m between the two nodes
Weight (kg)	Without package:0.38 With package:0.41
W x H x D (mm)	Product dimensions: 50×105×112.8 dimensions: 51×112×120

Relay module





Item	Performance
Ordering code	11016-00024
Product model	FS1005
Product type	Digital input and relay output module
Power consumption	0.23W
Number of input channels	16
Input type	Source/sink
Input voltage	DC24V±10%
Input current (typical value)	9.5mA
Max. input frequency	500Hz (duty cycle: 40%–60%)
Port filter time	1ms
Logic 1 signal	≥15V DC
Logic 0 signal	≤5V DC
Isolation method	Relay isolation
Number of output channels	16
Output type	Relay
Touch point type	N.O. contact
Contact load (resistive)	3A 250VAC/30VDC
Max. switching voltage	250VAC/125VDC@0.3A
Max. switching current	5A
Relay lifespan	Electrical: 100,000 times
	Mechanical: 20 million times
Response time of OFF-ON	≤15ms
Response time of ON-OFF	≤10ms
Weight (kg)	Without package 0.157 With package: 0.186
W x H x D (mm)	Product dimensions: 129.2×70.9×29.9 dimensions: 142×90×37

Ordering list

Ordering code	Model	Product type	Specifications
11016-00005	FK1100	Communication coupler (EtherCAT)	Coupler, EtherCAT, 24VDC; RoHS
11016-00012	FK1200	Communication coupler (Profinet)	Coupler, Profinet, 24VDC; RoHS
11016-00018	FK1300	Communication Coupler (EtherNet/IP)	Coupler, EtherNet/IP, 24VDC; RoHS
11016-00029	FK1400	Communication coupler (Modbus TCP)	Coupler, Modbus TCP, 24VDC; RoHS
11016-00004	FL1001	Digital input	Digital input module, 16 channels, supporting the source and sink types, 500mA@ 24 VDC inputs; RoHS
11016-00016	FL1002	Digital input	Digital input module, 32 channels, supporting the source and sink types, 500mA@ 24 VDC inputs; RoHS
11016-00006	FL2002	Digital output (source type)	Digital output module, with 16 channels of PNP transistor output, 500mA @ 24 VDC; RoHS
11016-00013	FL2003	Digital output (source type)	Digital output module, with 32 channels of PNP transistor output, 500mA @ 24 VDC; RoHS
11016-00003	FL2102	Digital output (sink type)	Digital output module, with 16 channels of NPN transistor output, 500mA @ 24 VDC; RoHS
11016-00017	FL2103	Digital output (sink type)	Digital output module, with 32 channels of NPN transistor output, 500mA @ 24 VDC; RoHS
11016-00015	FL5005	Digital input/output (source type)	Digital input/output, 16 channels of input, 16 channels of PNP transistor output; RoHS
11016-00014	FL5105	Digital input/output (sink type)	Digital input/output, 16 channels of input, 16 channels of NPN transistor output; RoHS
11016-00009	FL2201	Digital output (relay)	Digital output, 8 relay outputs, dry contacts,3A@30VDC/250VAC;RoHS
11016-00011	FL3003	Analog input	Analog input, 4 channels, 16-bit resolution, room-temperature accuracy of±0.1%FS; RoHS
11016-00026	FL3404	Analog input	Analog input; 8 channels; voltage signals; 16-bit resolution; accuracy ±0.15%FS at room temperature
11016-00027	FL3504	Analog input	Analog input; 8 channels; current signal; 16-bit resolution; accuracy ±0.15%FS at room temperature
11016-00008	FL4003	Analog output	Analog output module, 4 channels, 16-bit resolution, room-temperature accuracy of ±0.1% FS; RoHS
11016-00007	FL3103	Temperature measurement (thermal resistor)	Thermal resistor detection, 4 channels, 24-bit resolution, sensitivity of 0.1°C/°F; RoHS
11016-00010	FL3203	Temperature measurement (thermocouple)	Thermocouple detection, 4 channels, 24-bit resolution, sensitivity of 0.1°C/°F; RoHS
11016-00019	FL6112	Counting module	Incremental encoder input, 2 channels, 24V single-ended, 200kHz; RoHS
11016-00021	FL6121	Counting module	Incremental encoder input, 1 channel, 5VDC differential, 2MHz; RoHS
11016-00022	FL6002	Counting module	SSI absolute input encoder module, 2 channels, 24VDC, 2MHz; RoHS
11016-00030	FL3321	Resistance bridge measurement	4-wire/6-wire resistor bridge sensor input, 1 channel, 24-bit, 5VDC, RoHS
11016-00031	FL3322	Resistance bridge measurement	4-wire/6-wire resistor bridge sensor input, 2 channel, 24-bit, 5VDC, RoHS
11016-00025	FL7102	Pulse module	Pulse output, 2 channels, 200kHz; RoHS
11016-00028	FL7200	Power feed module	Power feed; input: 24VDC, output: 5VDC 2.5A; RoHS
11016-00020	FC1160	EtherCAT branch device	Network component, EtherCAT, 6 ports, 100Mbit/s, 24VDC; RoHS
11016-00024	FS1005	Relay module	16 channels of input, supporting source/sink type, 16 channels of relay output, 5A@250VAC/30VDC

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