eco Changes for a greener tomorrow

MITSUBISHI ELECTRIC
Changes for the Better

FACTORY AUTOMATION

MELSEC iQ-F Series
iQ Platform-compatible PLC

e-F@ctory

iF DESIGN AWARD 2016

GOOD DESIGN AWARD 2015

The next level of industry

MELSEC iQ-F series

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and Electric Systems
A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

OVERVIEW

MELSEC iQ-F series

Designed on the concepts of outstanding performance, superior drive control and user centric programming, Mitsubishi's MELSEC-F Series has been reborn as the MELSEC iQ-F Series.

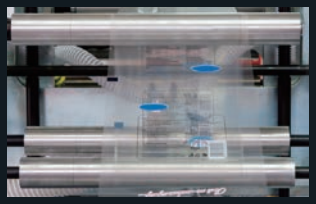
From stand alone use to networked system applications, MELSEC iQ-F Series brings your business to the next level of industry.

The next level of industry

Further extending the range of applications through improved fundamental performance, cooperation with drive devices and improved programming environment.


Conveyance


Food & Beverage


Packaging

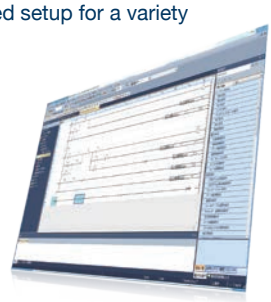

Air-conditioning

New micro PLC designed on the concepts of ...

- High-speed system bus
- Extensive built-in functions
- Enhanced security functions
- Battery-less

- Easy built-in positioning (4-axis 200 kpps)
- Simple interpolation functions
- 4-axis synchronous control with simple motion module (dedicated positioning software not needed)

- Easy programming by drag and drop
- Reduced development time with module FB
- Parameterized setup for a variety of functions



GX Works3

MELSEC iQ-F series The next level of industry

iQ Platform

Taking the iQ Platform to the next level.

iQ platform minimizes TCO* by providing innovative solutions for:

Building a stable production system with enhanced productivity

Reducing the time from system development to startup for shorter product cycles

Efficiently managing and servicing the system to reduce down time and maintain productivity

Ensuring product quality by swiftly processing large volumes of control data and production data and establishing traceability

*TCO: Total Cost of Ownership

PLC & HMI

1. High-speed bus performance greatly enhances the total system performance with the high-speed system bus performance (150× conventional speed*1)
2. Standardize programs with pre-defined module function blocks and module labels
3. Uniform and powerful security functions

Network

1. Achieve loss-less retrieval with CC-Link IE Field 1 Gbps high-speed communication (link refresh performance 40× conventional levels*1)
2. Seamless connectivity with each device using SLMP*

*SLMP: SeamLess Message Protocol

Engineering Environment

1. The intuitive programming environment of GX Works3 reduces development cost.
2. Module configuration drawings can be generated through direct reading from actual hardware.
3. Share parameters across multiple engineering software via MELSOFT Navigator.

*1: Comparison with FX3U

e-F@ctory

iQ Platform

Ethernet

Advanced Built-in Functions

CPU Performance

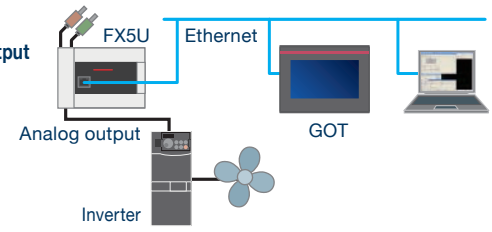
MELSEC iQ-F is powered by a high speed CPU that can execute the LD instruction in 34 ns.
Furthermore, MELSEC iQ-F can execute structured programs, execute multiple programs and handle ST language and function blocks.

Program capacity 64 k Step	Instruction execution speed (LD, MOV instruction) 34 ns
PC MIX value 14.6 instructions/μs	Fixed Cycle Interrupt Program Min. 1 ms

Built-in Analog Input/Output (with alarm output) FX5U

FX5U is equipped with 12-bit 2ch analog input and 1ch analog output.
With parameter setup, no programming is required.
Value shifting, scaling and alarm output can also be set easily with parameters.

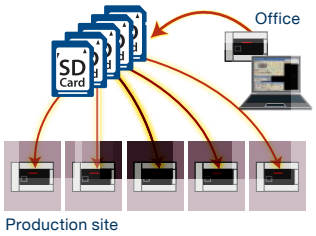
>> Example of inverter control using analog output



Built-in SD Memory Card Slot

A built-in SD memory card slot is convenient for updating the program and mass production of equipment. Data can be logged in SD memory card (future support), making it easy to analyze the system status and production state, etc.

>> Example of mass-production of equipment using SD memory card



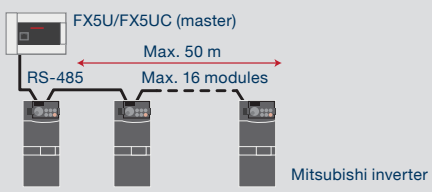
RUN/STOP/RESET Switch

RUN/STOP/RESET switch is built in.
PLC can be rebooted without turning off the main power for efficient debugging.

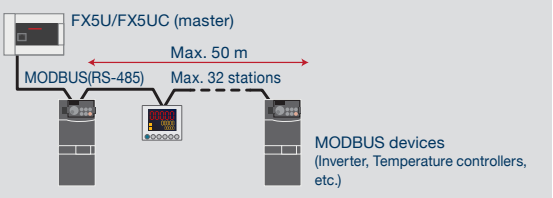
Built-in RS-485 port (with MODBUS® function)

Connect to serial devices up to 50 m away with built-in RS-485 port. Control for up to 16 Mitsubishi inverters is possible with dedicated inverter communication instructions. MODBUS is also supported and can connect up to 32 MODBUS devices such as PLCs, sensors and temperature controllers.

>> Inverter Communication



>> MODBUS Communication



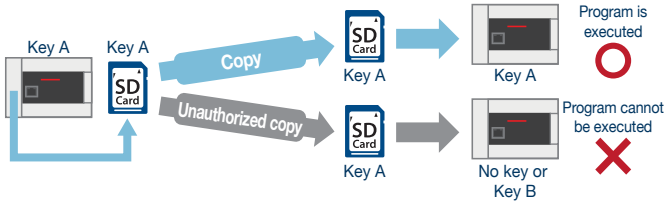
FX5U

Space saving FX5UC

Security

MELSEC iQ-F has advanced security functions (file password, remote password, security key) to prevent data theft and illegal operations by unauthorized persons.

>> Example of security key function

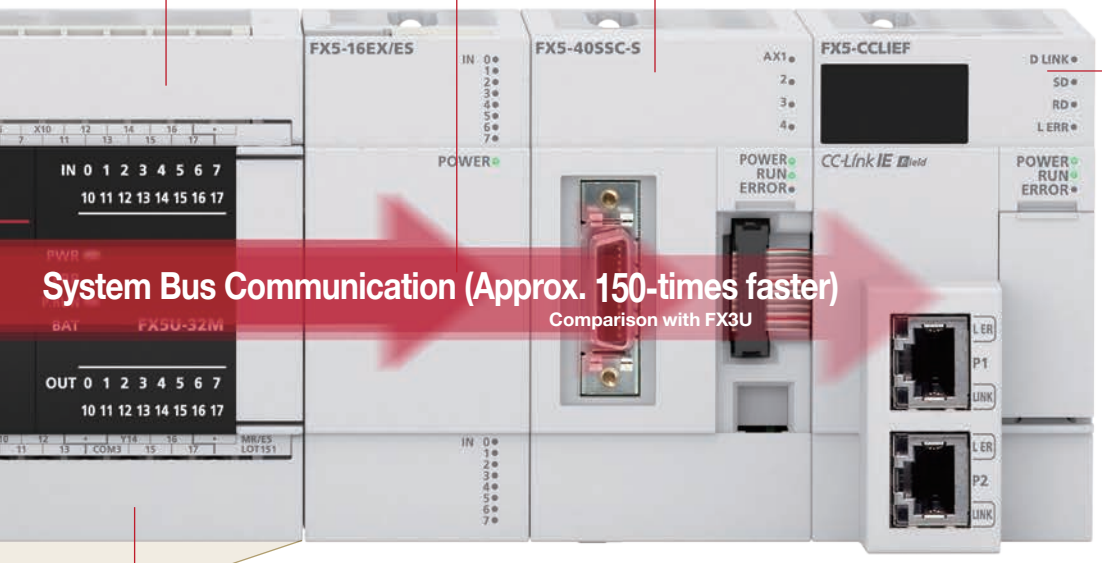


High-speed System Bus Communication

High-speed system bus communication at 1.5 K words/ms (approximately 150 times faster compared with FX3U), together with high speed CPU, allows MELSEC iQ-F to output maximum performance even when heavy data communication intelligent function modules are used.

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK

CC-Link IE Field



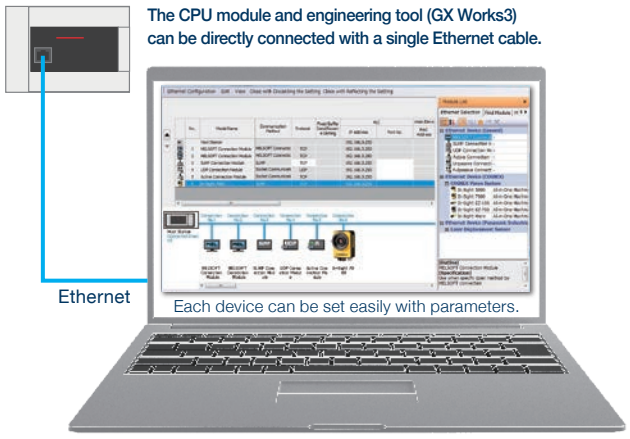
Battery-less and Maintenance-free

MELSEC iQ-F series holds programs and devices in nonvolatile memory such as flash ROM, and does not require a battery.

* It is possible to increase the capacity of held devices by using an optional battery.

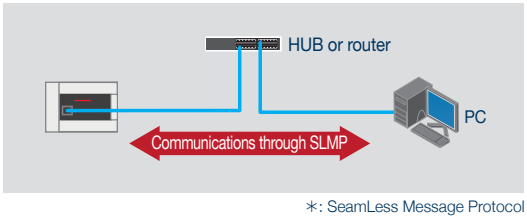
Built-in Ethernet Port

The Ethernet communication port can handle communication of up to 8 connections on the network, and can support multiple connections with personal computer and other devices. In addition, the Ethernet communication port can handle seamless SLMP communication with the upper-level device.



>> SLMP Communication

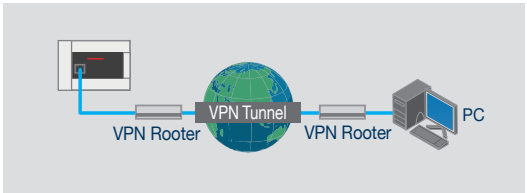
PC and other devices can read/write to the CPU module via the open protocol SLMP*.



*: SeamLess Message Protocol

>> Remote Maintenance

Program read/write can be made by GX Works3 connected via VPN.

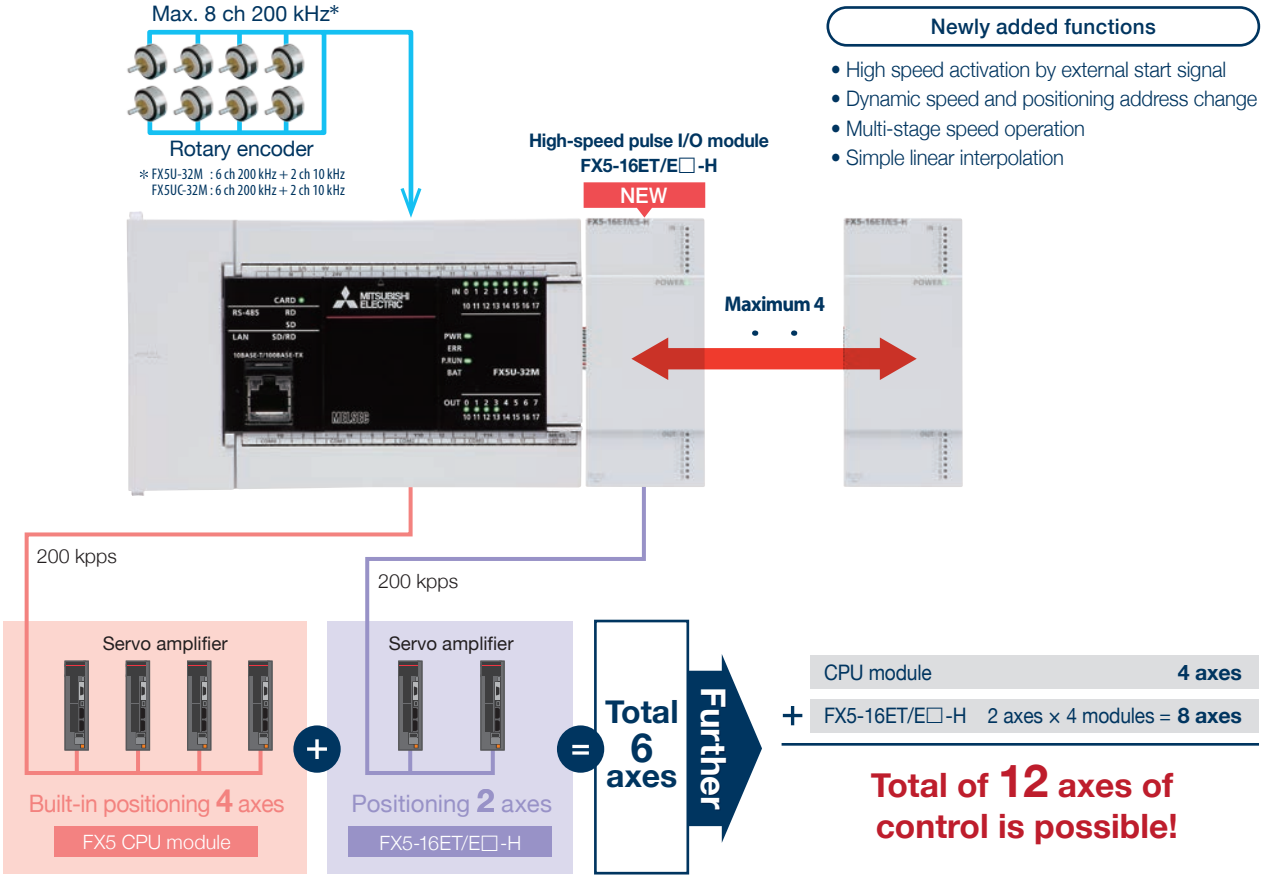


Advanced positioning function

Built-in Positioning (200 kpps, 4 axes built in) + Positioning 2 axes (200 kpps, 2 axes)

Positioning capable of 20 µs high-speed start

FX5U/FX5UC is equipped with built-in positioning functions that can utilize 8 ch high speed counter function and 4 axes pulse output. In addition to the existing interrupt stop operation and variable speed operation, new functions have been added and made even easier to use. Furthermore, up to four high-speed pulse I/O modules can be connected for affordable multi-axis control.

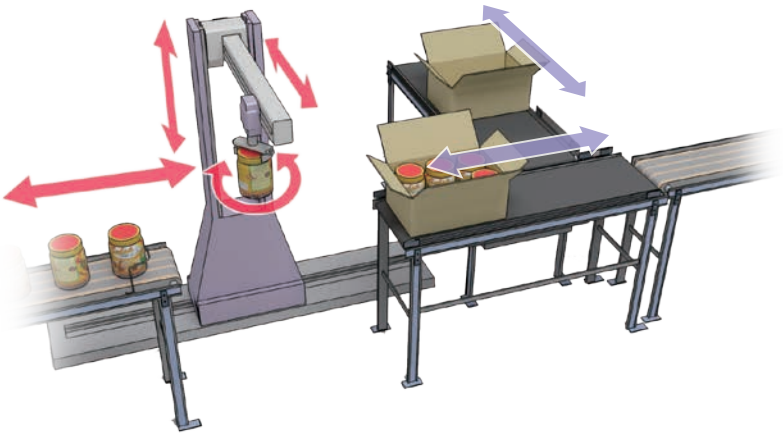


Newly added functions

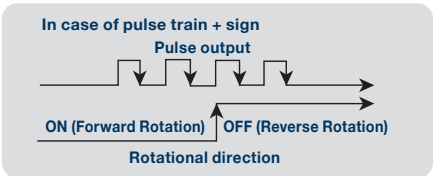
- High speed activation by external start signal
- Dynamic speed and positioning address change
- Multi-stage speed operation
- Simple linear interpolation

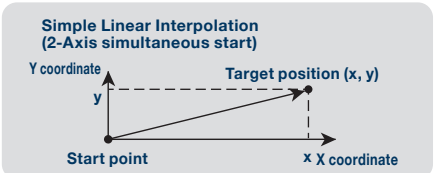
CPU module	**4 axes**
+ FX5-16ET/E□-H 2 axes x 4 modules =	**8 axes**

Total of 12 axes of control is possible!



[Example of carton packing system]





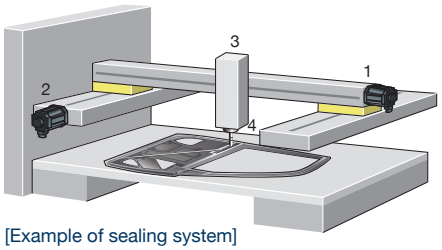
Simple Motion Module (4-axis control module)

Positioning control with SSCNETIII/H

FX5-40SSC-S is equipped with a 4-axis positioning function compatible with SSCNETIII/H. By combining linear interpolation, 2-axis circular interpolation and continuous trajectory control in the program set with a table, a smooth trajectory can be easily drawn.

SSCNETIII/H
SERVO SYSTEM CONTROLLER NETWORK

FX5-40SSC-S



1. X axis
2. Y axis
3. Z axis
4. Paint

[Example of sealing system]

Main functions

- Linear interpolation
- Circular interpolation
- Continuous trajectory control
- S-curve acceleration/deceleration

Application examples

- Sealing system
- Palletizer
- Grinding system

Advanced Motion Control

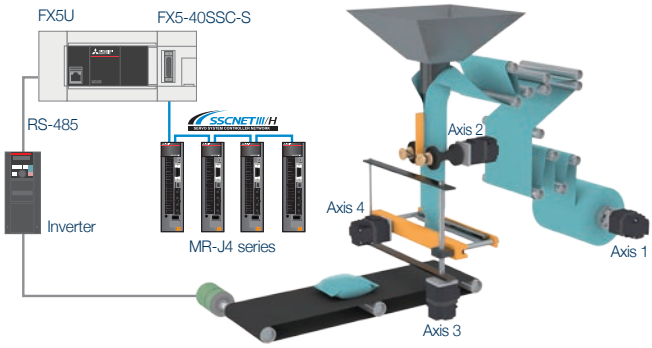
Making simple motion with compactly packed extra functions

By starting with parameter settings and the sequence program, the simple motion modules can realize a variety of motion control including positioning control, advanced synchronous control, cam control and speed-torque control.

● Synchronous control

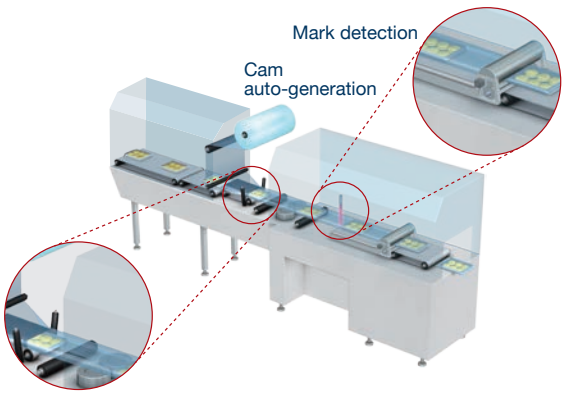
In addition to synchronous control that replaces physical machine mechanisms such as gears, shaft, transmission and cam with software, functions such as cam control, clutch and cam auto-generation are easily realized. Since synchronous control can be started and stopped for each axis, programs can contain both synchronous control axes and positioning control axes.
Up to four axes can be synchronized to the synchronous encoder axis, enabling use with a variety of systems.

- Use synchronous control and cam control to build a system perfect for your equipment.
- Register up to 64 types of cam patterns to respond to any type of packaging needs.
- Perform continuous operation without stopping the workpiece operation.



● Mark detection function

The cutter axis deviation can be compensated by detecting a mark on the workpiece so the workpiece can be cut at a constant position.



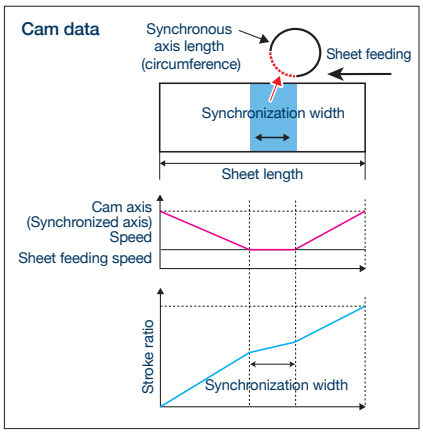
[Example of rotary cutter control with mark detection and cam data]

● Cam data auto-generation

Easily program and automatically generate difficult cam data for rotary cutters just by inputting the sheet length, synchronization width, and cam resolution, etc.

User-created GOT screen

Parameter settings, including items like sheet length, etc.



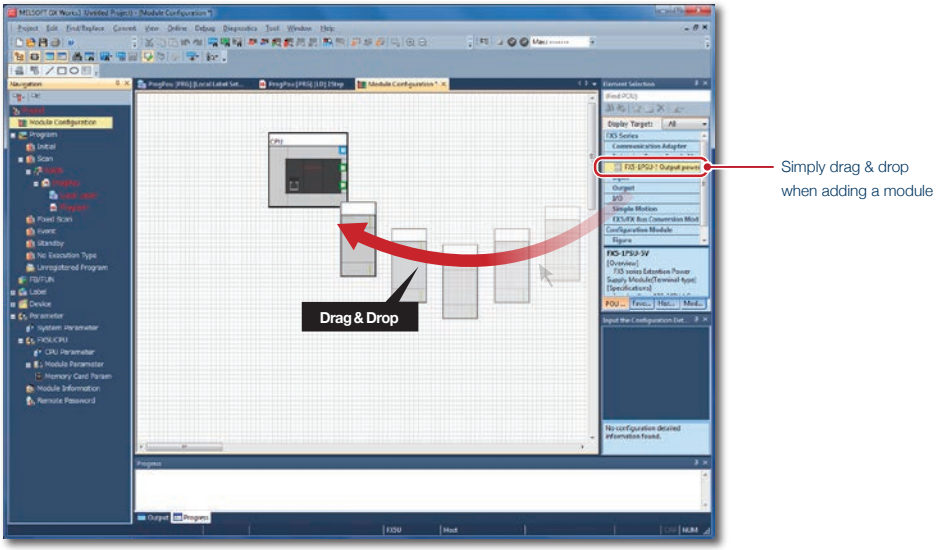
User-friendly programming software

GX Works3

Software for comprehensively supporting the design and maintenance of sequence programs.
Easily and intuitively program by making "selections" in a graphical environment.
Reduce maintenance and engineering costs with diagnosis and troubleshooting function.

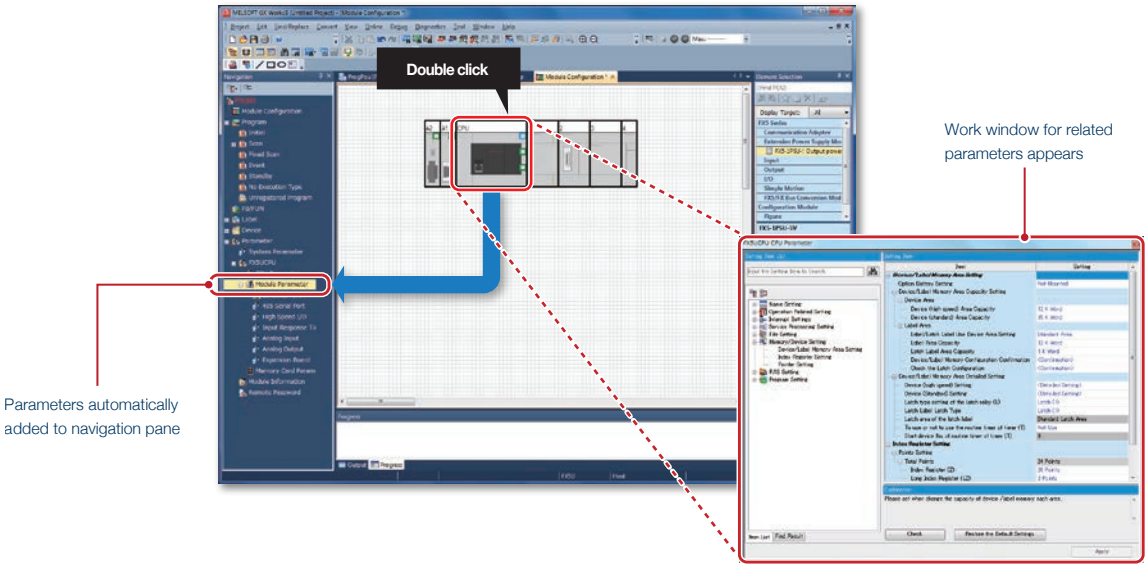
System design with a convenient parts library

With GX Works3, designing a system is as easy as preparing the module configuration diagram by dragging and dropping selected parts.



Auto-generation of module parameters

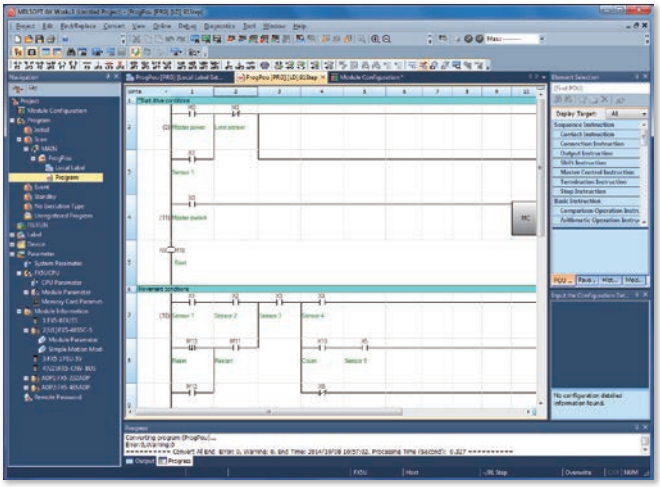
When preparing the module configuration diagram, simply double-click the module to automatically generate the module parameters.
A window with an easy-to-use parameter settings screen opens, enabling module parameters to be modified as needed.



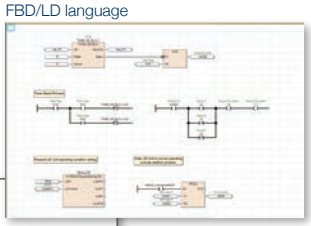
Main programming languages supported

The main IEC languages are supported by GX Works3. Various different programming languages can be used within the same project simultaneously and can be viewed easily via the menu tab. The labels and devices used in each program can be shared across multiple platforms, with user defined function blocks supported.

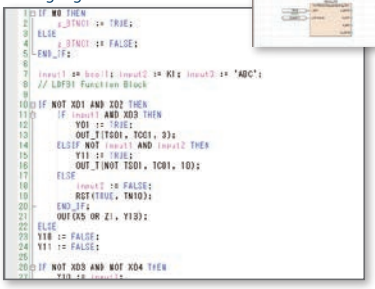
Ladder diagram



FBD/LD language

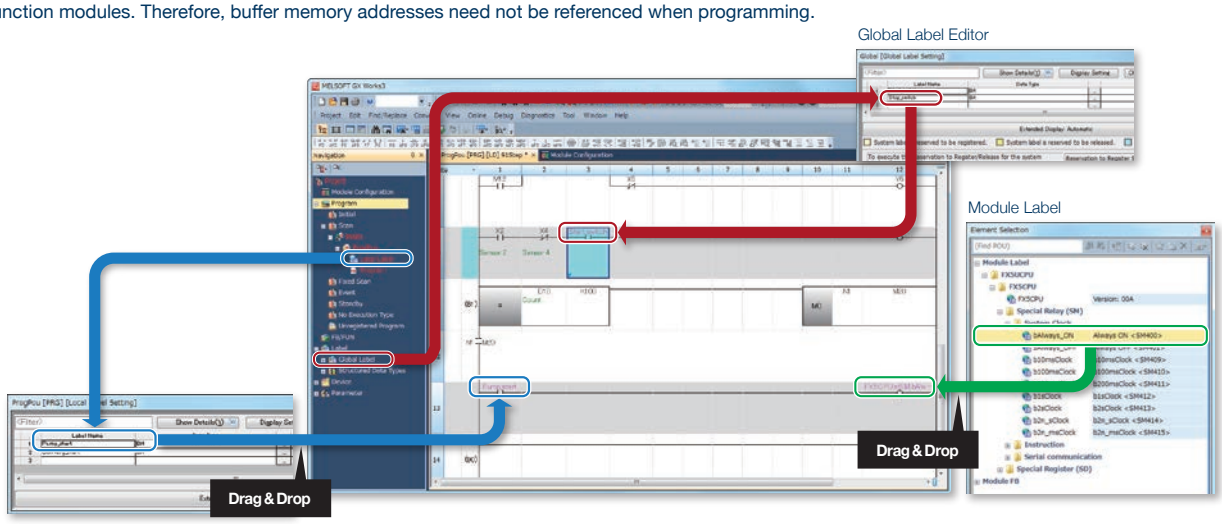


ST language



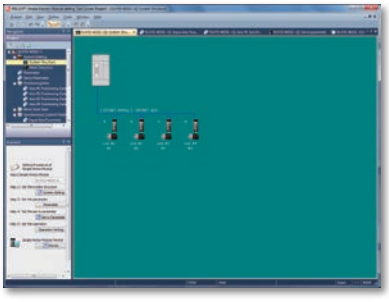
Reduce repetitive program tasks

Global labels, local labels and module labels are supported by GX Works3. Global labels can be shared by multiple programs and with other MELSOFT software. Local labels can be used in registered programs and function blocks. Module labels contain buffer memory information for various intelligent function modules. Therefore, buffer memory addresses need not be referenced when programming.

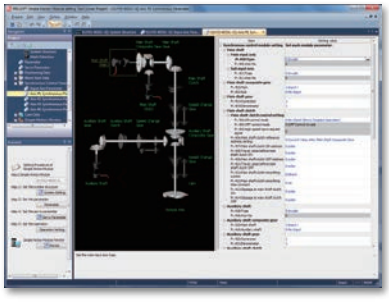


Integrated simple motion setup tool

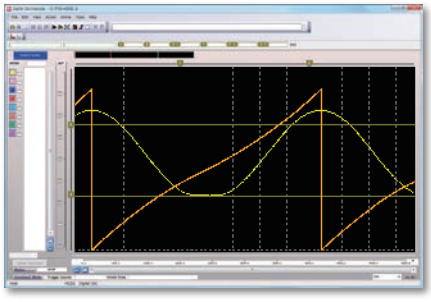
GX Works3 is equipped with a simple motion setup tool that makes it easy to change simple motion module settings such as module parameters, positioning data and servo parameters. Also, the servo adjustment is simplified using it.



System Configuration



Synchronized Control Parameter



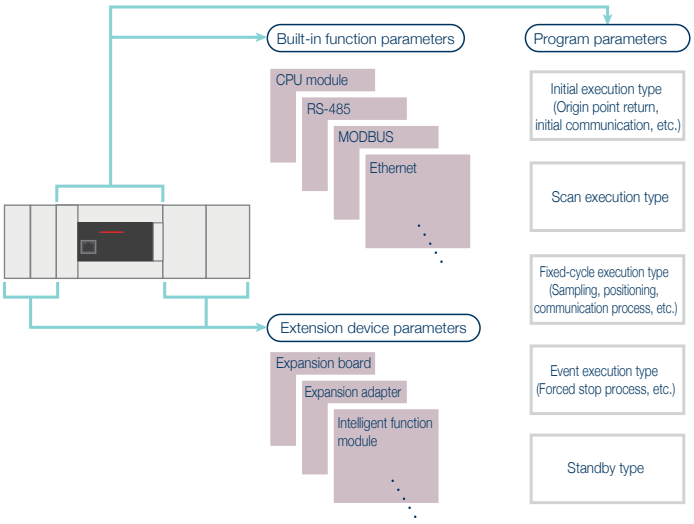
Digital Oscilloscope

Advanced MELSEC iQ-F Series

Simple and convenient parameter settings

With MELSEC iQ-F, various device settings that conventionally had to be programmed can be input in table format.
Easily set the built-in functions as well as extension devices just by inputting values into the parameters.
The program's execution trigger can also be set with the parameters.

[Functions set with parameters]
Settings for CPU parameters, Ethernet port, RS-485 communication port, input response time, expansion board, memory card, security, etc.
Settings for expansion adapter, intelligent function module and program parameters

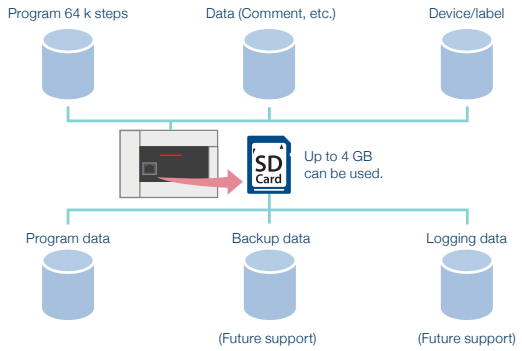


Memory area for each application

The CPU module has 64 k steps of program memory capacity, but the MELSEC iQ-F has a memory data area for each application, so all 64 k steps can be used as the program area.
Comments and statements can be written freely without affecting the program area.

[Maximum number of characters]
Comment: 1024 characters Statement: 5000 characters

MELSEC iQ-F Series stores the program and devices in non-volatile memory such as Flash ROM, so no battery is required.



Flexible internal devices

A variety of devices including new latch relays and link relays, and expanded timers and counters are available.
The number of device points can be reassigned and used in the internal memory.

●Providing the convenience of special devices

In addition to the conventional special devices, up to 12000 points of convenient system devices compatible with upper level devices are added.

New upper level compatible system devices

- SM/SD0 to 4099 Compatible with MELSEC iQ-R

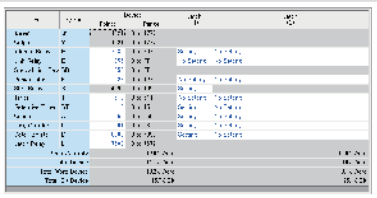
Conventional convenient devices

- Conventional M8000 or later devices
  → Has changed to SM8000 or later devices
- Conventional D8000 or later devices
  → Has changed to SD8000 or later devices

(When migrating an FX3U/FX3UC program created using GX Works2 to MELSEC iQ-F Series, the devices are automatically converted.)

●Freely customize the latch range setting

The latch range can be set for each device, so the latch clear range can be selected during the clearing operation.



●Handy timer and counter settings

The timer and counter properties are determined by data type and how instruction is written, so programs can be created regardless of the device number.

Timers:
OUT T0..... 100 ms timer
OUTH T0 ..... 10 ms timer
OUTHS T0 ..... 1 ms timer
OUT ST0..... Retentive timer

Counters:
OUT C0 ..... 16 bits counter
OUT LC0 ..... 32 bits counter

Dramatically more dedicated instructions

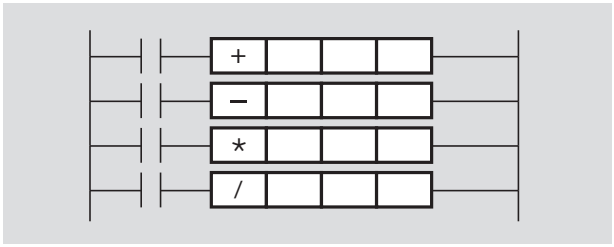
A great number of dedicated instructions have been added since the FX3.

[FX3] 510 types → [FX5] 1014 types

The newly added instructions include convenient ones that are interchangeable with the MELSEC iQ-R and dedicated instructions for built-in functions.
(Only FX3U and FX3UC programs can be imported)

Intuitive and easy-to-understand arithmetic operations

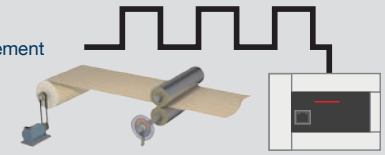
Symbols can be input in the arithmetic operations making it easy and intuitive to describe programs.



High-performance built-in high-speed counter function

Input and measure three modes by setting the parameters.

- Normal mode
- Pulse density measurement mode
- Rotation speed measurement mode

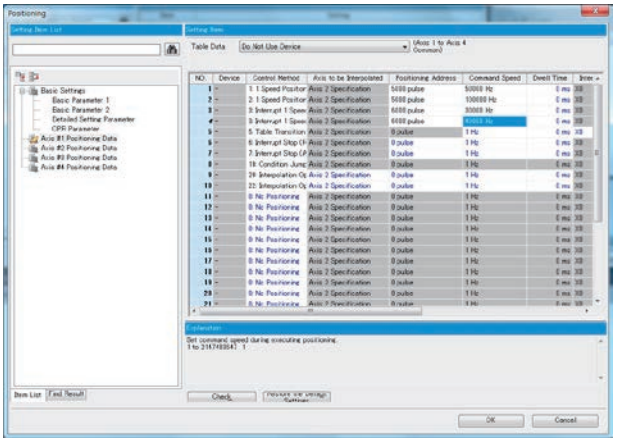


Up to 32 tables can be set for the high-speed comparison table and up to 128 tables for the multi-point output high-speed comparison table. The DHCMOV instruction can be used to read the latest values from the special registers.

Reinforced built-in positioning function

Positioning can be easily performed with table operation instructions. Even advanced positioning like simple linear interpolation is possible with the multi-table operation (DRVTBL) instruction and multi-axis table operation (DRVMUL) instruction.

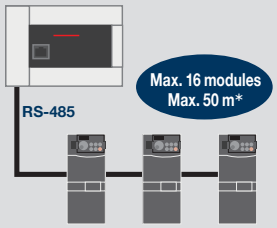
Diverse table operation settings for multi-speed and interrupt positioning, etc.



Inverter communication command function

The built-in Mitsubishi inverter protocol makes it possible to use inverter communication instructions to control Mitsubishi inverters connected with RS-485 communication.

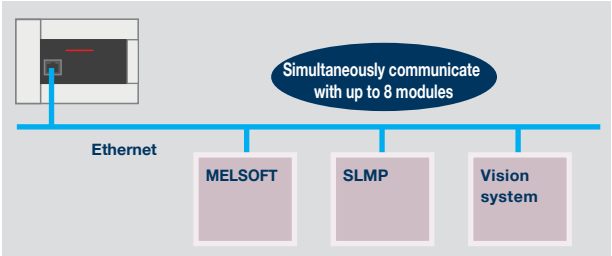
- IVCK: Operation monitor
- IVDR: Operation control
- IVRD: Parameter read
- IVWR: Parameter write
- IVBWR: Parameter batch write
- IVMC: Multiple command (2 types of settings and 2 types of read)



*: For built-in RS-485 and RS-485 expansion boards

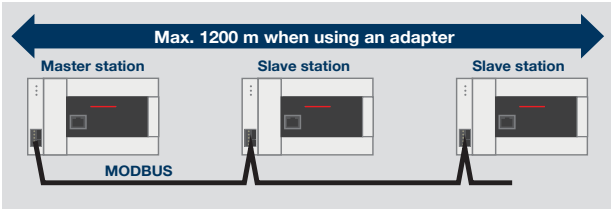
Built-in Ethernet function

Communication is set with parameters easily.
Functions include the diagnosis function from GX Works3, SLMP function, socket communication function and IP address change function, and unauthorized access from an external source can be prevented with remote password.



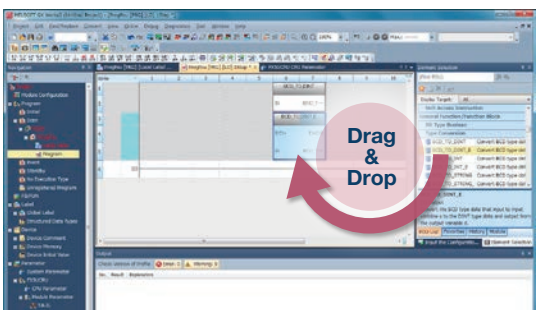
MODBUS function

The MODBUS function can be used with parameter settings and ADPRW (MODBUS master communication instruction [data read/write.])
Communicate with devices up to 1200 m away using the RS-485 communication adapter.



Standard function/function block function

110 types of basic standard function and function blocks are provided.
These can be used as parts by dragging and dropping, so when used together with dedicated instructions, programming time can be greatly reduced.



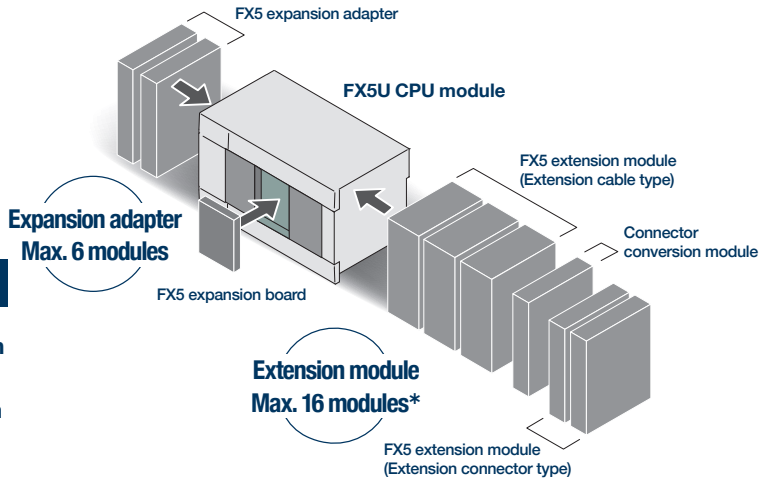
System Configuration

FX5U

Flagship model equipped with advanced built-in functions and diverse expandability

Simplifying use with renewed extension modules!

FX5U is equipped with analog functions, communication and high-speed I/O, and can easily be expanded with expansion boards and adapters. The high-speed system bus communication brings out the maximum performance of extension devices equipped with intelligent functions.



*: Up to 12 modules can be directly connected to CPU module. Up to 16 modules can be connected by connecting a powered I/O module or an extension power supply module. Extension power supply modules and connector conversion modules are not included in the number of connected modules.

FX5 expansion adapters

Max. 2 modules

For Communication

FX5-232ADP	For RS-232C communication
FX5-485ADP	For RS-485 communication

Max. 4 modules

Analog

FX5-4AD-ADP	For analog input
FX5-4DA-ADP	For analog output

FX5 expansion boards

Max. 1 module

For Communication

FX5-232-BD	For RS-232C communication
FX5-485-BD	For RS-485 communication
FX5-422-BD-GOT	For RS-422 communication (For GOT connection)

Peripheral device

HMI

GOT2000, GOT1000

FX5U CPU module

	FX5U-32MR/ES	AC D2	R
	FX5U-32MT/ES	AC D2	T1
	FX5U-32MT/ESS	AC D2	T2
NEW	FX5U-32MR/DS	DC D2	R
NEW	FX5U-32MT/DS	DC D2	T1
NEW	FX5U-32MT/DSS	DC D2	T2

Input: 16 points/Output: 16 points

	FX5U-64MR/ES	AC D2	R
	FX5U-64MT/ES	AC D2	T1
	FX5U-64MT/ESS	AC D2	T2
Available soon	FX5U-64MR/DS	DC D2	R
Available soon	FX5U-64MT/DS	DC D2	T1
Available soon	FX5U-64MT/DSS	DC D2	T2

Input: 32 points/Output: 32 points

	FX5U-80MR/ES	AC D2	R
	FX5U-80MT/ES	AC D2	T1
	FX5U-80MT/ESS	AC D2	T2
Available soon	FX5U-80MR/DS	DC D2	R
Available soon	FX5U-80MT/DS	DC D2	T1
Available soon	FX5U-80MT/DSS	DC D2	T2

Input: 40 points/Output: 40 points

AC AC power supply
DC DC power supply
D2 DC input (sink/source)
T1 Transistor output (sink)
T2 Transistor output (source)
R Relay output

Connector connection
Cable connection

Option

Terminal module

FX-16E-TB	FX-16E-TB/UL
FX-32E-TB	FX-32E-TB/UL
FX-16EYR-TB	FX-16EYR-ES-TB/UL
FX-16EYS-TB	FX-16EYS-ES-TB/UL
FX-16EYT-TB	FX-16EYT-ES-TB/UL
	FX-16EYT-ESS-TB/UL

I/O cable

●Genera-purpose I/O cable
FX-16E-500CAB-S (5 m, 20-pin)

●For terminal modules
FX-16E-□CAB (Both end, 20-pin)
□: 150 (1.5 m)/300 (3 m) /500 (5 m)

●For terminal modules
FX-16E-□CAB-R (20-pin)
□: 150 (1.5 m)/300 (3 m)/500 (5 m)

Battery

FX3U-32BL

SD memory card

NZ1MEM-2GBSD (2 GB)
NZ1MEM-4GBSD (4 GB)

Engineering tool

GX Works3

Power supply cable

●Power supply cable
FX2NC-100BPCB (1 m)
●Power crossover cable
FX2NC-10BPCB1 (0.1 m)

Extended extension cable

●Extended extension cable
NEW FX5-30EC*2
NEW FX5-65EC*2

●Connector conversion adapter
NEW FX5-CNV-BC

Generic Specifications

Item		Generic Specifications
Power supply	Rated voltage	AC power supply type: 100 to 240 V AC, 50/60 Hz DC power supply type: 24 V DC
	Power consumption*1	AC power supply type: 30 W (32M), 40 W (64M), 45 W (80M) DC power supply type: 30 W
	Rush current	AC power supply type: 32M: max. 25 A for 5 ms or less/100 V AC, max. 50 A for 5 ms or less/200 V AC 64M/80M: max. 30 A for 5 ms or less/100 V AC, max. 60 A for 5 ms or less/200 V AC DC power supply type: max. 50 A for 0.5 ms or less/24 V DC
	5 V DC internal power supply capacity	AC power supply type: 900 mA (32M), 1100 mA (64M/80M) DC power supply type: 900 mA (775 mA)*2
	24 V DC service power supply capacity	AC power supply type: 400 mA [300 mA*3] (32M), 600 mA [300 mA*3] (64M/80M) When an external power supply is used for the input circuit of the CPU module: 480 mA [380 mA*3] (32M), 740mA [440 mA*3] (64M), 770 mA [470 mA*3] (80M)
	24 V DC internal power supply capacity	DC power supply type: 480 mA (360 mA)*2
Input/output	Input specifications	5.3 mA/24 V DC (X020 and later: 4.0 mA/24 V DC)
	Output specifications	Relay output type: 2 A/1 point, 8 A or less/4 points common, 8 A or less/8 points common, 30 V DC or less, 240 V AC or less (250 V AC or less in case of noncompliance with CE, UL/cUL Standards) Transistor output type: 0.5 A/1 point, 0.8 A or less/4 points common, 1.6 A or less/8 points common, 5 to 30 V DC
	Input/output extension	Extension devices for FX5 can be connected: when adding an extension connector type, the connector conversion module (FX5-CNV-IF) is required.
Built-in communication port		Ethernet (100BASE-TX/10BASE-T), RS-485 1 ch each
Built-in memory card slot		1 slot for SD memory card
Built-in analog input/output		Input 2 ch, output 1 ch

∗1: The values show the state where the service power of 24 V DC is consumed to the maximum level in case that its configuration has the max. no. of connections provided to CPU module. (Including the current in the input circuit)
∗2: The values in the parentheses ( ) indicate the power supply capacity to be resulted when the power supply voltage falls in the range from 16.8 to 19.2 V DC.
∗3: The values in the brackets [ ] will result when the ambient temperature is less than 0°C during operations.

Please choose the I/O type of CPU module or I/O module suited for your equipment. Refer to the page below for the details of I/O type of each product.

FX5 extension module

I/O module

Powered I/O module

Powered I/O module

FX5-32ER/ES
FX5-32ET/ES
FX5-32ET/ESS
NEW FX5-32ER/DS
NEW FX5-32ET/DS
NEW FX5-32ET/DSS

I/O module

Input module

FX5-8EX/ES
FX5-16EX/ES

High-speed pulse input/output module

NEW FX5-16ET/ES-H
NEW FX5-16ET/ESS-H

Output modules

FX5-8EYR/ES
FX5-8EYT/ES
FX5-8EYT/ESS
FX5-16EYR/ES
FX5-16EYT/ES
FX5-16EYT/ESS

Intelligent function module

SSCNETIII/H
SERVO SYSTEM CONTROLLER NETWORK

Simple motion

FX5-40SSC-S

CC-Link IE Field Network

NEW FX5-CCLIEF

Extension power supply module

Extension power supply module

FX5-1PSU-5V*3

FX5 extension module (Extension cable type)

Connector conversion module

Connector conversion module

NEW FX5-CNV-IF

FX5 extension module (Extension connector type)

I/O module

Input module

FX5-C16EX/D
FX5-C16EX/DS
FX5-C32EX/D
FX5-C32EX/DS

Output module

FX5-C16EYT/D
FX5-C16EYT/DSS
FX5-C32EYT/D
FX5-C32EYT/DSS

Input/output module

FX5-C32ET/D
FX5-C32ET/DSS

Extension power supply module

Extension power supply module

FX5-C1PS-5V*1*4

Bus conversion module

Bus conversion module

FX5-CNV-BUSC

Bus conversion module

FX5-CNV-BUS

FX3 extension module

Intelligent function module

Analog

FX3U-4AD For input
FX3U-4DA For output

Temperature control

FX3U-4LC Temperature control

Positioning

FX3U-1PG For pulse output

High speed counter

FX3U-2HC For high-speed input

Communication/Network

FX3U-64CCL CC-Link slave
FX3U-16CCL-M CC-Link master
FX3U-128ASL-M AnyWireASLINK master

For the module requiring parameter in FX3 extension module, parameter settings by program are necessary. When connecting the FX3 extension module, the bus speed for FX3 applies for access.

Extension power supply module

Extension power supply module

FX3U-1PSU-5V*1

∗1: When adding the extension module, it is necessary to connect it to the front stage of extension module in case of a shortage of internal power supply in CPU module.
∗2: Attach when connecting an extension cable type module to a distant location or when making two-tier connections. The connector conversion adapter (FX5-CNV-BC) is required when connected with an input/output module (extension cable type), high-speed pulse input/output module, or an intelligent function module. When using also the bus conversion module in the same system, connect the FX5 extension power supply module or the powered I/O module right after the extended extension cable.
∗3: Can be connected only to the AC power type system.
∗4: Can be connected only to the DC power type system.

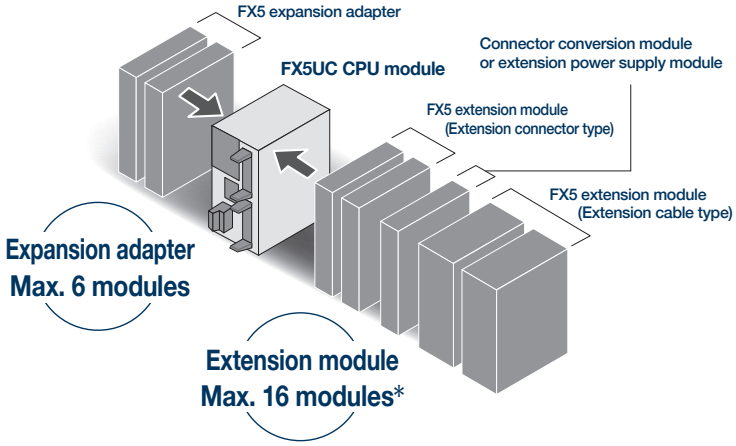
System Configuration

FX5UC

Compact body packed with diverse functions.

Simplifying use with renewed extension modules!

The extension module compatible with FX5UC is compact and easy-to-use, and helps to downsize your system. Easily connect to the FX5 and FX3 extension modules with the variety of conversion modules available.



*: Up to 12 modules can be directly connected to the CPU module. Up to 16 modules can be connected by connecting a powered I/O module or an extension power supply module. Extension power supply modules and connector conversion modules are not included in the number of connected modules.

FX5 expansion adapter

Max. 2 modules

For Communication

FX5-232ADP	For RS-232C communication
FX5-485ADP	For RS-485 communication

Max. 4 modules

Analog

FX5-4AD-ADP	For analog input
FX5-4DA-ADP	For analog output

FX5UC CPU module

FX5UC-32MT/D — DC D1 T1
FX5UC-32MT/DSS — DC D2 T2
Input: 16 points/Output: 16 points

FX5UC-64MT/D — DC D1 T1
FX5UC-64MT/DSS — DC D2 T2
Input: 32 points/Output: 32 points

FX5UC-96MT/D — DC D1 T1
FX5UC-96MT/DSS — DC D2 T2
Input: 48 points/Output: 48 points

DC DC power supply
D1 DC input (sink)
D2 DC input (sink/source)
T1 Transistor output (sink)
T2 Transistor output (source)

Connector connection
Cable connection

FX5 extension module (extension connector type)

I/O module

Input module

FX5-C16EX/D
FX5-C16EX/DS
FX5-C32EX/D
FX5-C32EX/DS

Output module

FX5-C16EYT/D
FX5-C16EYT/DSS
FX5-C32EYT/D
FX5-C32EYT/DSS

I/O module

FX5-C32ET/D
FX5-C32ET/DSS

Peripheral device

HMI

GOT2000, GOT1000

Option

Battery

FX3U-32BL

SD memory card

NZ1MEM-2GBSD (2 GB)
NZ1MEM-4GBSD (4 GB)

Engineering tool

GX Works3

I/O cable

●Genera-purpose I/O cable
FX-16E-500CAB-S (5 m, 20-pin)

●For terminal modules
FX-16E-□CAB (Both end, 20-pin)
□: 150 (1.5 m)/300 (3 m) /500 (5 m)

●For terminal modules
FX-16E-□CAB-R (20-pin)
□: 150 (1.5 m)/300 (3 m)/500 (5 m)

Terminal module

FX-16E-TB	FX-16E-TB/UL
FX-32E-TB	FX-32E-TB/UL
FX-16EYR-TB	FX-16EYR-ES-TB/UL
FX-16EYS-TB	FX-16EYS-ES-TB/UL
FX-16EYT-TB	FX-16EYT-ES-TB/UL
	FX-16EYT-ESS-TB/UL

Power supply cable

●CPU module power supply cable
FX2NC-100MPCB (1 m)
(attached to CPU module)

●Power supply cable
FX2NC-100BPCB (1 m)
(attached to FX5UC-□MT/D)

●Power supply crossover cable
FX2NC-10BPCB1 (0.1 m)
(attached to FX5-C□EX/D, FX5-C32ET/D)

Extended extension cable

●Extended extension cable
NEW FX5-30EC*3
NEW FX5-65EC*3

●Connector conversion adapter
NEW FX5-CNV-BC

Generic Specifications

Item		Generic Specifications
Power supply	Rated supply voltage	24 V DC
	Power consumption*1	5 W (32M), 8 W (64M), 11 W (96M)
	Rush current	32M: Max. 35 A 0.5 ms or less/24 V DC 64M/96M: Max. 40 A 0.5 ms or less/24 V DC
	5 V DC power supply capacity	720 mA
	24 V DC power supply capacity	500 mA
Input/output	Input specifications	5.3 mA/24 V DC (X020 and later: 4.0 mA/24 V DC)
	Output specifications	Transistor output type: Y000 to Y003 0.3 A/1 point, Y004 and later 0.1 A/1 point, 0.8 A/8 points common*2 5 to 30 V DC
	Input/output extension	Extension device for FX5 can be connected (extension power supply module (FX5-C1PS-5V) or connector conversion module (FX5-CNV-IFC) is required when connecting an extension cable type)
Built-in communication port		Ethernet (100BASE-TX/10BASE-T), RS-485 1 ch each
Built-in memory card slot		1 slot for SD memory card

*1: The values show the state where the power of 24 V DC is consumed to the maximum level in case that its configuration has the max. no. of connections provided to CPU module. (Including the current in an input circuit)
*2: 1.6 A or less when two common terminals are connected to the external part.

Please choose the I/O type of CPU module or I/O module suited for your equipment. Refer to the page below for the details of I/O type of each product.

FX5 extension module (extension connector type)

Extension power supply module

Extension power supply module
FX5-C1PS-5V*1 *2

or

Connector conversion module

Connector conversion module
FX5-CNV-IFC

FX5 extension module (extension cable type)

I/O module

Powered I/O module

Powered I/O module
NEW FX5-32ER/DS
NEW FX5-32ET/DS
NEW FX5-32ET/DSS

Input/output module

Input module
FX5-8EX/ES
FX5-16EX/ES

High-speed pulse input/output module
NEW FX5-16ET/ES-H
NEW FX5-16ET/ESS-H

Output module
FX5-8EYR/ES
FX5-8EYT/ES
FX5-8EYT/ESS
FX5-16EYR/ES
FX5-16EYT/ES
FX5-16EYT/ESS

Intelligent function module

SSCNET III/H

Simple motion
FX5-40SSC-S

CC-Link IE Field

Network
NEW FX5-CCLIEF

Bus conversion module

Bus conversion module
FX5-CNV-BUS

Bus conversion module
FX5-CNV-BUSC

FX3 extension module

Intelligent function module

Analog

FX3U-4AD	For input
FX3U-4DA	For output

Positioning

FX3U-1PG	For pulse output

Communication/Network

FX3U-64CCL	CC-Link slave
FX3U-16CCL-M	CC-Link master
FX3U-128ASL-M	AnyWireASLINK master

Temperature control

FX3U-4LC	Temperature control

High speed counter

FX3U-2HC	For high-speed input

For the module requiring parameter in FX3 extension module, parameter settings by program are necessary.
When connecting the FX3 extension module, the bus speed for FX3 applies for access.

*1: When adding the extension module, it is necessary to connect it to the front stage of extension module in case of a shortage of internal power supply in CPU module.
*2: Next-stage extension connector of an extension power supply module can be used only for either connector connection or cable connection. In case of connector connection, an extension connector type module can be connected.
*3: Attach when connecting an extension cable type module to a distant location or when making two-tier connections. The connector conversion adapter (FX5-CNV-BC) is required when connected with an input/output module (extension cable type) or an intelligent function module. When using also the bus conversion module in the same system, connect the powered I/O module right after the extended extension cable.

FX5U FX5UC

Performance Specifications

■ FX5U/FX5UC CPU Module Performance Specifications

Items		Specifications
Control system		Stored-program repetitive operation
Input/output control system		Refresh system (Direct access input/output allowed by specification of direct access input/output [DX, DY])
Programming specifications	Programming language	Ladder diagram (LD), structured text (ST), function block diagram/ladder language (FBD/LD)
	Programming expansion function	Function block (FB), function (FUN), label programming (local/global)
	Constant scan	0.2 to 2000 ms (can be set in 0.1 ms increments)
	Fixed cycle interrupt	1 to 60000 ms (can be set in 1 ms increments)
	Timer performance specifications	100 ms, 10 ms, 1 ms
	No. of program executions	32
	No. of FB files	16 (Up to 15 for user)
Operation specifications	Execution type	Standby type, initial execution type, scan execution type, fixed-cycle execution type, event execution type
	Interrupt type	Internal timer interrupt, input interruption, high-speed comparison match interrupt, interrupt from module
Instruction processing time	LD X0	34 ns
	MOV D0 D1	34 ns
Memory capacity	Program capacity	64 k steps (128 kbytes, flash memory)
	SD memory card	Memory card capacity (SD/SDHC memory card: Max. 4 Gbytes)
	Device/label memory	120 kbytes
	Data memory/standard ROM	5 Mbytes
Flash memory (Flash ROM) write count		Max. 20000 times
File storage capacity	Device/label memory	1
	Data memory P: No. of program files FB: No. of FB files	P: 32, FB: 16
	SD memory card	2 Gbytes: 511*1, 4 Gbytes: 65534*1
Clock function	Display data	Year, month, day, hour, minute, second, day of week (leap year automatic detection)
	Precision	Monthly difference: ±45 sec at 25°C (typical value)
No. of input/output points	(1) No. of input/output points	256 points or less
	(2) No. of remote I/O points	384 points or less
	Total No. of points of (1) and (2)	512 points or less
Power failure retention (Clock data*2)	Retention method	Large-capacity capacitor
	Retention time	10 days (Ambient temperature: 25°C (77°F))
Power failure retention (Device)	Capacity for power failure retention	12 K words maximum*3

*1: The value listed above indicates the number of files stored in the root folder.

*2: Clock data is retained using the power accumulated in a large-capacity capacitor incorporated into the PLC. When voltage of the large-capacity capacitor drops, clock data is no longer accurately retained. The retention period of a fully charged capacitor (electricity is conducted across the PLC for at least 30 minutes) is 10 days (ambient temperature: 25°C (77°F)). How long the capacitor can hold the data depends on the operating ambient temperature. When the operating ambient temperature is high, the holding period is short.

*3: All devices in the (high-speed) device area can be held against power failure. Devices in the (standard) device area can be held also when the optional battery is mounted.

■ Number of device points

Item			Base	Max. number of points	
No. of user device points	Input relay (X)		8	1024 points or less	The total number of X and Y assigned to input/output points is up to 256 points.
	Output relay (Y)		8	1024 points or less	
	Internal relay (M)		10	32768 points (can be changed with parameter)*1	
	Latch relay (L)		10	32768 points (can be changed with parameter)*1	
	Link relay (B)		16	32768 points (can be changed with parameter)*1	
	Annunciator (F)		10	32768 points (can be changed with parameter)*1	
	Link special relay (SB)		16	32768 points (can be changed with parameter)*1	
	Step relay (S)		10	4096 points (fixed)	
	Timer system	Timer (T)	10	1024 points (can be changed with parameter)*1	
	Accumulation timer system	Accumulation timer (ST)	10	1024 points (can be changed with parameter)*1	
	Counter system	Counter (C)	10	1024 points (can be changed with parameter)*1	
		Long counter (LC)	10	1024 points (can be changed with parameter)*1	
	Data register (D)		10	8000 points (can be changed with parameter)*1	
	Link register (W)		16	32768 points (can be changed with parameter)*1	
	Link special register (SW)		16	32768 points (can be changed with parameter)*1	
No. of system device points	Special relay (SM)		10	10000 points (fixed)	
	Special register (SD)		10	12000 points (fixed)	
Module access device	Intelligent function module device		10	65536 points (designated by U□\G□)	
No. of index register points	Index register (Z)*2		10	24 points	
	Long index register (LZ)*2		10	12 points	
No. of file register points	File register (R)		10	32768 points (can be changed with parameter)*1	
No. of nesting points	Nesting (N)		10	15 points (fixed)	
No. of pointer points	Pointer (P)		10	4096 points	
	Interrupt pointer (I)		10	178 points (fixed)	
Others	Decimal constant (K)	Signed	–	16 bits: -32768 to +32767, 32 bits: -2147483648 to +2147483647	
		Unsigned	–	16 bits: 0 to 65535, 32 bits: 0 to 4294967295	
	Hexadecimal constant (H)		–	16 bits: 0 to FFFF, 32 bits: 0 to FFFFFFFF	
	Real constant (E)	Single precision	–	E-3.40282347+38 to E-1.17549435-38, 0, E1.17549435-38 to E3.40282347+38	
	Character string		–	Shift-JIS code max. 255 single-byte characters (256 including NULL)	

*1: Can be changed with parameters within the capacity range of the CPU built-in memory.

*2: Total of the index register (Z) and long index register (LZ) is maximum 24 words.

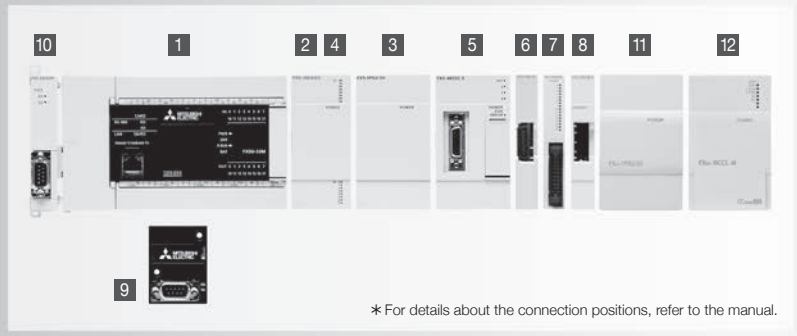
Table of Contents

Selecting the FX5U model

◇ Product configuration

- **Control scale: 32 to 256 points (CPU module: 32/64/80 points)**
- **Control points up to 512 input/output points, including remote I/O***

*: For CC-Link and AnyWireASLINK



*For details about the connection positions, refer to the manual.

Type	Details	Connection details, model selection
1 CPU module	PLC with built-in CPU, power supply, input/output and program memory.	Various extension devices can be connected.
2 4 I/O module (extension cable type)	Product for extending I/O of extension cable type. Some products are powered.	Input/output can be extended to up to 256 points. Up to 16 extension modules can be connected. (Extension power supply modules and connector conversion modules are not included in the number of connected modules.) Up to 4 high-speed pulse I/O modules can be connected. For details, refer to “Rules for System Configuration” on p. 26.
3 FX5 extension power supply module	Module for extending power supply if CPU module's internal power supply is insufficient. Extension cable is enclosed.	Power can be supplied to I/O module, intelligent function module, and bus conversion module. Up to 2 modules can be connected.
5 FX5 intelligent function module	Module with functions other than input/output.	Up to 16 extension modules including the I/O module can be connected (Extension power supply modules and connector conversion modules are not included in the number of connected modules.)
6 Connector conversion module	Module for connecting FX5 Series (extension connector type) extension module	An extension module (extension connector type) for FX5 can be connected.
7 I/O module (Extension connector type)	Product for adding extension connector type inputs/outputs.	The maximum number of points for input/output extension is 256. Up to 16 extension modules can be connected. (Extension power supply modules and connector conversion modules are not included in the number of connected modules.) Using this type of I/O module requires the connector conversion module.
8 Bus conversion module	Conversion module for connecting FX3 Series extension module.	FX3 extension module can be connected only to the right side of the bus conversion module. When using FX5-CNV-BUSC, a connector conversion module is required.
9 FX5 expansion board	Board connected to front of CPU module to expand functions.	Up to 1 module can be connected to the front of the CPU module. (Expansion adapter can also be used.)
10 FX5 expansion adapter	Adapter connected to left side of CPU module to expand functions.	Up to 6 modules can be connected to the left side of the CPU module.
11 FX3 extension power supply module	Module for extending power supply if CPU module's internal power supply is insufficient. Extension cable is enclosed.	Up to 2 modules can be connected. The bus conversion module is required for use.
12 FX3 intelligent function module	Module with functions other than input/output.	When using the FX3 extension power supply module, up to 8 modules* can be used. When not using the FX3 extension power supply module, up to 6 modules* can be used. The bus conversion module is required for use.

*: Excluding some models

1 -1) CPU module (AC power supply, DC input type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC service power supply			
FX5U-32MR/ES	CPU module (24 V DC service power built-in)	32 points	900 mA	400 mA (480 mA*1) [300 mA (380 mA*1)]*2	DC input (sink/source)/relay output	16 points	16 points
FX5U-32MT/ES					DC input (sink/source)/transistor (sink)		
FX5U-32MT/ESS					DC input (sink/source)/transistor (source)		
FX5U-64MR/ES		64 points	1100 mA	600 mA (740 mA*1) [300 mA (440 mA*1)]*2	DC input (sink/source)/relay output	32 points	32 points
FX5U-64MT/ES					DC input (sink/source)/transistor (sink)		
FX5U-64MT/ESS					DC input (sink/source)/transistor (source)		
FX5U-80MR/ES		80 points	1100 mA	600 mA (770 mA*1) [300 mA (470 mA*1)]*2	DC input (sink/source)/relay output	40 points	40 points
FX5U-80MT/ES					DC input (sink/source)/transistor (sink)		
FX5U-80MT/ESS					DC input (sink/source)/transistor (source)		

*1: Power supply capacity when an external power supply is used for input circuits
*2: Value inside [ ] indicates the power supply capacity when the CPU module is used at the operating ambient temperature of less than 0°C.

1 -2) CPU module (DC power supply/DC input type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5U-32MR/DS	CPU module	32 points	900 mA [775 mA]*	480 mA [360 mA]*	DC input (sink/source)/relay output	16 points	16 points
FX5U-32MT/DS					DC input (sink/source)/transistor output (sink)		
FX5U-32MT/DSS					DC input (sink/source)/transistor output (source)		

∗: Value inside [ ] indicates the power supply capacity when the supply voltage is 16.8 to 19.2 V DC.

2 -1) I/O module (AC power supply/DC input type) (extension cable type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC service power supply			
FX5-32ER/ES*1	I/O module (24 V DC service power built-in)	32 points	965 mA	250 mA (310 mA*2)	DC input (sink/source)/relay output	16 points	16 points
FX5-32ET/ES*1					DC input (sink/source)/transistor (sink)		
FX5-32ET/ESS*1					DC input (sink/source)/transistor (source)		

∗1: Can be connected only to the AC power type system
∗2: Power supply capacity when an external power supply is used for input circuits

2 -2) I/O module (DC power supply/DC input type) (extension cable type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5-32ER/DS*	I/O module	32 points	965 mA	310 mA	DC input (sink/source)/relay output	16 points	16 points
FX5-32ET/DS*					DC input (sink/source)/transistor output (sink)		
FX5-32ET/DSS*					DC input (sink/source)/transistor output (source)		

∗: Can be connected only to the DC power type system

3 FX5 extension power supply module

Model	Function	Number of occupied input/output points	Power supply capacity	
			5 V DC power supply	24 V DC power supply
FX5-1PSU-5V*1	Extension power supply	—	1200 mA*3	300 mA*3
FX5-C1PS-5V*2	Extension power supply	—	1200 mA*3	625 mA*3

∗1: Can be connected only to the AC power type system
∗2: Can be connected only to the DC power type system
∗3: Derating occurs when the ambient temperature exceeds 40°C. For details, refer to manuals of each product.

4 I/O module (extension cable type)

Model	I/O type	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-8EX/ES	DC input (sink/source)	8 points	75 mA	50 mA*2	—
FX5-16EX/ES	DC input (sink/source)	16 points	100 mA	85 mA*2	
FX5-8EYR/ES	Relay output	8 points	75 mA	75 mA	
FX5-8EYT/ES	Transistor output (sink)				
FX5-8EYT/ESS	Transistor output (source)				
FX5-16EYR/ES	Relay output	16 points	100 mA	125 mA	
FX5-16EYT/ES	Transistor output (sink)				
FX5-16EYT/ESS	Transistor output (source)				
FX5-16ET/ES-H*1	DC input (sink/source)/transistor output (sink)	16 points	100 mA	125 mA (85 mA)*3	
FX5-16ET/ESS-H*1	DC input (sink/source)/transistor output (source)				

∗1: Compatible with FX5U CPU modules from Ver. 1.030 (Serial number: 165∗∗∗∗(May 2016))
∗2: Adopt "0 mA" in the current consumption calculation for the system configuration when an external power supply is used for input circuits.
∗3: Current consumption when an external power supply is used for input circuits (not including the input circuit current)

5 FX5 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-40SSC-S	Simple motion 4-axis control (SSCNETIII/H compatible)	8 points	—	—	250 mA
FX5-CCLIEF*	CC-Link IE field network intelligent device station	8 points	10 mA	—	230 mA

∗: Compatible with FX5U CPU modules from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016))

6 Connector conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-IF	Connector conversion (FX5 (Extension cable type) →FX5 (Extension connector type))	–	–	–	–

7 I/O module (Extension connector type)

Model	I/O type	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-C16EX/D	DC input (sink)	16 points	100 mA	–	65 mA*
FX5-C32EX/D		32 points	120 mA		130 mA*
FX5-C16EX/DS	DC input (sink/source)	16 points	100 mA		65 mA*
FX5-C32EX/DS		32 points	120 mA		130 mA*
FX5-C16EYT/D	Transistor output (sink)	16 points	100 mA	100 mA	–
FX5-C32EYT/D		32 points	120 mA	200 mA	
FX5-C16EYT/DSS	Transistor output (source)	16 points	100 mA	100 mA	
FX5-C32EYT/DSS		32 points	120 mA	200 mA	
FX5-C32ET/D	DC input (sink)/transistor output (sink)	32 points (16 input points, 16 output points)	120 mA	100 mA	65 mA*
FX5-C32ET/DSS	DC input (sink/source)/transistor output (source)				

*: Current consumption when a service power supply is used for the input circuit.

8 Bus conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-BUSC	Bus conversion FX5 (extension connector type) →FX3 extension	8 points	150 mA	–	–
FX5-CNV-BUS	Bus conversion FX5 (extension cable type) →FX3 extension				

9 FX5 expansion board

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-232-BD	RS-232C communication	–	20 mA	–	–
FX5-485-BD	RS-485 communication				
FX5-422-BD-GOT	RS-422 communication (for GOT connection)		20 mA*		

*: The current consumption will increase when the 5 V type GOT is connected.

10 FX5 expansion adapter

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-232ADP	RS-232C communication	–	30 mA	30 mA	–
FX5-485ADP	RS-485 communication		20 mA		
FX5-4AD-ADP	4 ch voltage input/current input		10 mA	20 mA	
FX5-4DA-ADP	4 ch voltage output/current output			–	160 mA

11 FX3 extension power supply module

Model	Function	Number of occupied input/output points	Power supply capacity		
			5 V DC power supply	24 V DC power supply	24 V DC external power supply
FX3U-1PSU-5V	Extension power supply	–	1000 mA*	300 mA*	–

*: Derating occurs when the ambient temperature exceeds 40°C. For details, refer to manuals of each product.

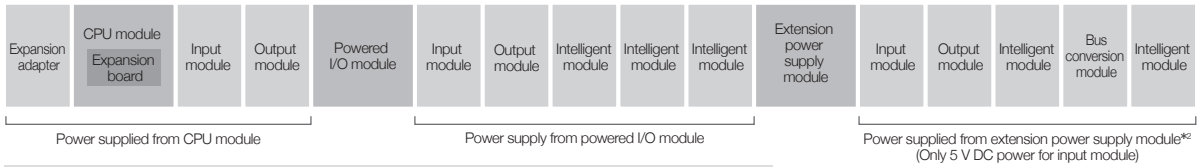
12 FX3 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX3U-4AD	4 ch voltage input/current input	8 points	110 mA	–	90 mA
FX3U-4DA	4 ch voltage output/current output		120 mA		160 mA
FX3U-4LC	4-loop temperature control (resistance thermometer/thermocouple/low voltage)		160 mA		50 mA
FX3U-1PG	Pulse output for 1-axis control		150 mA		40 mA
FX3U-2HC	2 ch high-speed counter		245 mA		–
FX3U-16CCL-M	CC-Link master	*	–		240 mA
FX3U-64CCL	CC-Link intelligent device station	8 points			220 mA
FX3U-128ASL-M	AnyWireASLINK master	*	130 mA		–

*: Varies according to settings.

Calculation of current consumed by extension modules (For the AC power supply type)*1

The power required for the expansion adapter, expansion board and extension module is supplied from the CPU module or extension power supply module. Use the following calculations to confirm whether the required power can be supplied. (All calculations must be satisfied.)



■ Power supply from CPU module

[5 V DC power supply]

5 V DC power supply capacity (CPU module) – (Total current consumption (Total no. of extension devices to be connected)) = Calculation results ≥ **0 mA**

[24 V DC power supply]

24 V DC service power supply capacity (CPU module) – (Total current consumption (Total no. of extension devices to be connected)) = Calculation results ≥ **0 mA***3

■ Power supply from powered I/O module

[5 V DC power supply]

5 V DC power supply capacity (Powered I/O module) – (Total current consumption (Total no. of extension devices to be connected)) = Calculation results ≥ **0 mA**

[24 V DC power supply]

24 V DC service power supply capacity (Powered I/O module) – (Total current consumption (Total no. of extension devices to be connected)) = Calculation results ≥ **0 mA***3

■ Power supply from extension power supply module (When using FX3 extension power supply module, another calculation is required. Refer to manuals for more details.)

[5 V DC power supply]

5 V DC power supply capacity (Extension power supply module) – (Total current consumption (Total no. of extension devices to be connected)) = Calculation results ≥ **0 mA**

[24 V DC power supply]

24 V DC power supply capacity (Extension power supply module) – (Total current consumption (Total no. of extension devices to be connected)) = Calculation results ≥ **0 mA**

<Cautions>

If the calculation results are negative, the power capacity is exceeded so review the system configuration.

*1: For calculation for the DC power supply type, refer to the manual.

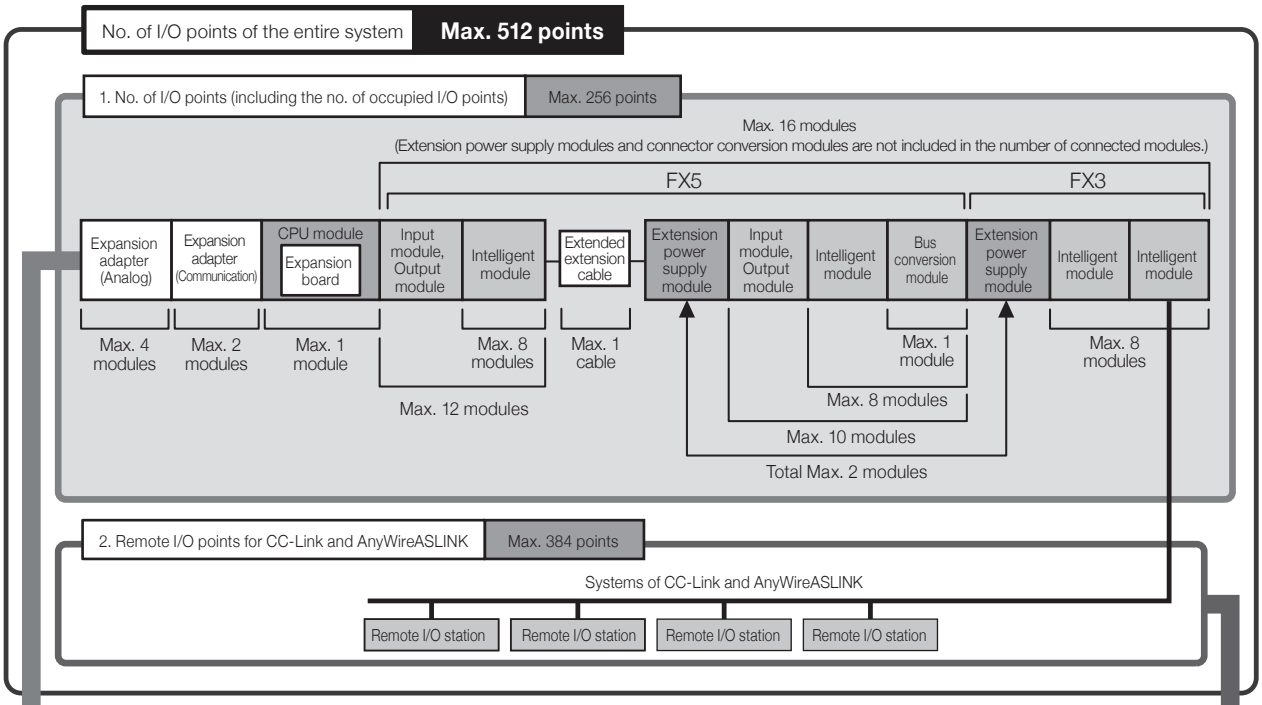
*2: When connecting an input module to the back stage (right side) of the extension power supply module , power will be supplied from the CPU module or a powered I/O module.
5V DC power is supplied from an extension power supply module.

*3: The 24 V DC service power calculation results value (when positive) indicates the 24 V DC service power supply's remaining capacity, and can be used as an external load power.

Refer to the next section for the details of some products since the number of connected modules may be limited.

Rules for System Configuration

The total number of I/O points and remote I/O points for the CPU module and extension devices controllable in FX5U CPU module is 512 points or less.



■No. of I/O points

The max. no. of I/O points configurable in FX5U is as follows:

Max. no. of I/O points: 256 points ≥ No. of occupied I/O points: CPU module (A) points + I/O module Total (B) points + Intelligent module (C) modules × 8 points

The no. of occupied I/O points does not include those of the expansion adapter, expansion board, connector conversion module and extension power supply module.

(A): I/O points of CPU module (B): Total I/O points of I/O module (C): Total no. of intelligent modules

Total 512 points or less

■No. of I/O points when using a network master module

The max. no. of I/O points when using a network master module is as follows:

Max. no. of I/O points: 384 points ≥ No. of occupied remote I/O points: AnyWireASLINK*1 (D) points + CC-Link*2 (E) stations × 32 points

As for CC-Link, the no. of remote I/O points x 32 points.
(calculated as 32 points regardless of the no. of remote I/O points)

(D): Remote I/O points of AnyWireASLINK (E): No. of CC-Link Remote I/O stations (no. of modules)

∗1: Please recognize the no. of I/O points set by the rotary switch of AnyWireASLINK master as the no. of remote I/O points.

∗2: When simultaneously using CC-Link master and AnyWireASLINK master, please connect AnyWireASLINK master to the front stage (left side). FX5U CPU occupies the max. 256 points of remote I/O points including the no. of those not occupied since CC-Link master parameters are set by PLC program. Therefore, when connecting CC-Link master to the front stage (left side), the no. of remote I/O points of AnyWireASLINK master may be less than 128. Refer to the "FX3U-128ASL-M and FX3U-16CCL-M user's manual" for simultaneous use.

Limitation on power supply type when connecting

It is not possible to install both the AC type and the DC type in one system.
The power supply type is limited for extension modules connectable to the following CPU modules. For details, refer to the manual of each product.

Type/model/power supply type	Connectable extension module	
	Type	Model/power supply type
FX5U CPU module FX5U-□M□/E□ (AC power supply type)	Powered I/O module	FX5-32E□/E□ (AC power supply type)
	Extension power supply module	FX5-1PSU-5V (AC power supply type)
FX5U CPU module FX5U-□M□/D□ (DC power supply type)	Powered I/O module	FX5-32E□/D□ (DC power supply type)
	Extension power supply module	FX5-C1PS-5V (DC power supply type)

Limitation on number of modules when extending

The number of connectable modules is limited for the following products. For details, refer to manuals of each product.

Type	Model/type	Setting method/precautions
I/O module (Extension cable type)	FX5-16ET/ES-H	Up to 4 modules can be connected for the entire system.
	FX5-16ET/ESS-H	
FX5 intelligent function module	FX5-CCLIEF	Only 1 module can be connected in the whole system.
FX3 intelligent function module	FX3U-4AD	■When using FX3U-1PSU-5V: Up to 8 modules can be connected per system. ■When not using FX3U-1PSU-5V: Up to 6 modules can be connected per system.
	FX3U-4DA	
	FX3U-1PG	
	FX3U-4LC	
	FX3U-128ASL-M	Up to 1 module of each model type can be connected in the whole system.
	FX3U-16CCL-M	
	FX3U-64CCL	
	FX3U-2HC	Up to 2 modules can be connected for the entire system. When not using the FX3U-1PSU-5V, connect immediately after the bus conversion module.

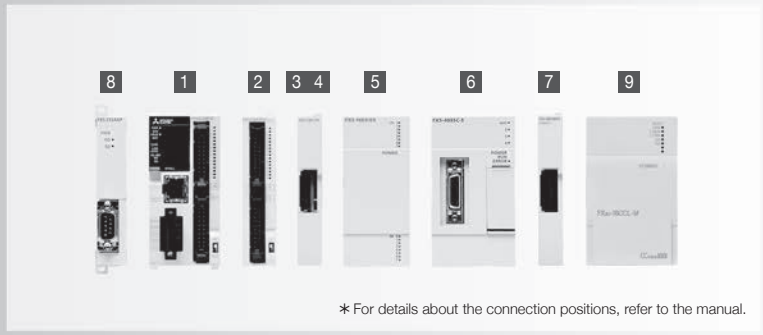
∗Refer to the manual for details on each model.

Selecting the FX5UC model

◇ Product configuration

- **Control scale: 32 to 256 points (CPU module: 32/64/96 points)**
- **Control points up to 512 input/output points, including remote input/output***

*: For CC-Link and AnyWireASLINK



*For details about the connection positions, refer to the manual.

Type	Details	Connection details, model selection
1 CPU module	PLC with built-in CPU, power supply, input/output and program memory.	Various extension devices can be connected.
2 I/O module (extension connector type)	Product for extension I/O of extension connector type.	Input/output can be extended to up to 256 points. Up to 16 extension modules can be connected. (Extension power supply modules and connector conversion modules are not included in the number of connected modules.) For details, refer to “Rules for System Configuration” on p. 31.
3 FX5 extension power supply module	Module for extension power supply if CPU module's internal power supply is insufficient. Connector conversion function is also provided.	Power can be supplied to I/O module, intelligent function module, and bus conversion module. Up to 2 modules can be connected.
4 Connector conversion module	Module for connecting FX5 Series (extension cable type) extension module	Extension devices (extension cable type) for FX5 can be connected.
5 I/O module (extension cable type)	Product for extending I/O of extension cable type.	Input/output can be extended to up to 256 points. Up to 16 extension modules can be connected. (Connector conversion modules are not included in the number of connected modules.) Up to 4 high-speed pulse I/O modules can be connected. Using this type of I/O module requires the connector conversion module.
6 FX5 intelligent function module	Module with functions other than input/output.	Up to 16 extension modules including I/O modules can be connected. (Connector conversion modules are not included in the number of connected modules.) Using this type of module requires the connector conversion module.
7 Bus conversion module	Conversion module for connecting FX3 extension module.	FX3 Series extension modules can be connected only to the right side of the bus conversion module. Using the FX5-CNV-BUS requires the connector conversion module or extension power supply module.
8 FX5 expansion adapter	Adapter connected to left side of CPU module to expand functions.	Up to 6 modules can be connected to the left side of the CPU module.
9 FX3 intelligent function module	Module with functions other than input/output.	Up to 6 modules* can be connected to the right side of the bus conversion module. The bus conversion module is required for use.

*: Excluding some models

1 CPU module

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5UC-32MT/D	CPU module	32 points	720 mA	500 mA	DC input (sink)/transistor (sink)	16 points	16 points
FX5UC-32MT/DSS					DC input (sink/source)/transistor (source)		
FX5UC-64MT/D		64 points			DC input (sink)/transistor (sink)	32 points	32 points
FX5UC-64MT/DSS					DC input (sink/source)/transistor (source)		
FX5UC-96MT/D		96 points			DC input (sink)/transistor (sink)	48 points	48 points
FX5UC-96MT/DSS					DC input (sink/source)/transistor (source)		

2 I/O module (extension connector type)

Model	I/O type	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-C16EX/D	DC input (sink)	16 points	100 mA	–	65 mA*
FX5-C32EX/D		32 points	120 mA		130 mA*
FX5-C16EX/DS	DC input (sink/source)	16 points	100 mA		65 mA*
FX5-C32EX/DS		32 points	120 mA		130 mA*
FX5-C16EYT/D	Transistor output (sink)	16 points	100 mA	100 mA	–
FX5-C32EYT/D		32 points	120 mA	200 mA	
FX5-C16EYT/DSS	Transistor output (source)	16 points	100 mA	100 mA	
FX5-C32EYT/DSS		32 points	120 mA	200 mA	
FX5-C32ET/D	DC input (sink)/transistor output (sink)	32 points (16 input points, 16 output points)	120 mA	100 mA	65 mA*
FX5-C32ET/DSS	DC input (sink/source)/transistor output (source)				

*: Adopt "0 mA" in the current consumption calculation for the system configuration when an external power supply is used for input circuits.

3 FX5 extension power supply module

Model	Function	Number of occupied input/output points	Power supply capacity	
			5 V DC power supply	24 V DC power supply
FX5-C1PS-5V	Extension power supply	–	1200 mA*	625 mA*

*: Derating occurs when the ambient temperature exceeds 40°C. For details, refer to the manual.

4 Connector conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-IFC	Connector conversion (FX5 (Extension connector type) →FX5 (Extension cable type))	–	–	–	–

5 -1) I/O module (DC power supply/DC input type) (extension cable type)

Model	Function	Number of occupied input/output points	Power supply capacity		I/O type	No. of input points	No. of output points
			5 V DC power supply	24 V DC power supply			
FX5-32ER/DS	Input/output module	32 points	965 mA	310 mA	DC input (sink/source)/relay output	16 points	16 points
FX5-32ET/DS					DC input (sink/source)/transistor output (sink)		
FX5-32ET/DSS					DC input (sink/source)/transistor output (source)		

5 -2) I/O module (extension cable type)

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-8EX/ES	DC input (sink/source)	8 points	75 mA	50 mA*1	–
FX5-16EX/ES	DC input (sink/source)	16 points	100 mA	85 mA*1	
FX5-8EYR/ES	Relay output	8 points	75 mA	75 mA	
FX5-8EYT/ES	Transistor output (sink)				
FX5-8EYT/ESS	Transistor output (source)				
FX5-16EYR/ES	Relay output	16 points	100 mA	125 mA	
FX5-16EYT/ES	Transistor output (sink)				
FX5-16EYT/ESS	Transistor output (source)				
FX5-16ET/ES-H*2	DC input (sink/source)/transistor output (sink)	16 points	100 mA	125 mA (85 mA)*3	
FX5-16ET/ESS-H*2	DC input (sink/source)/transistor output (source)				

*1: Adopt "0 mA" in the current consumption calculation for the system configuration when an external power supply is used for input circuits.
*2: Compatible with FX5UC CPU modules from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016))
*3: Current consumption when an external power supply is used for input circuits (not including the input circuit current)

6 FX5 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-40SSC-S	Simple motion 4-axis control (SSCNETIII/H compatible)	8 points	–	–	250 mA
FX5-CCLIEF*	CC-Link IE field network intelligent device station	8 points	10 mA	–	230 mA

*: Compatible with FX5UC CPU modules from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016))

7 Bus conversion module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-CNV-BUSC	Bus conversion FX5 (extension connector type) →FX3 extension	8 points	150 mA	–	–
FX5-CNV-BUS	Bus conversion FX5 (extension cable type) →FX3 extension				

8 FX5 expansion adapter

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX5-232ADP	RS-232C communication	–	30 mA	30 mA	–
FX5-485ADP	RS-485 communication		20 mA		
FX5-4AD-ADP	4 ch voltage input/current input		10 mA	20 mA	
FX5-4DA-ADP	4 ch voltage output/current output			–	160 mA

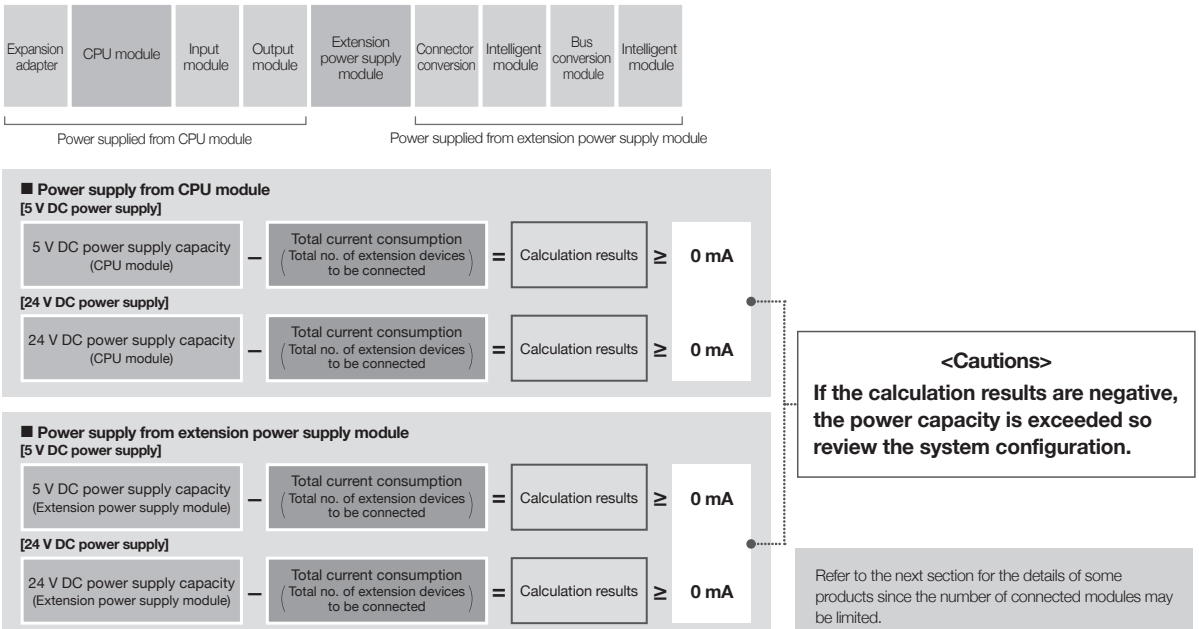
9 FX3 intelligent function module

Model	Function	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external power supply
FX3U-4AD	4 ch voltage input/current input	8 points	110 mA	–	90 mA
FX3U-4DA	4 ch voltage output/current output		120 mA		160 mA
FX3U-4LC	4-loop temperature control (resistance thermometer/thermocouple/low voltage)		160 mA		50 mA
FX3U-1PG	Pulse output for 1-axis control		150 mA		40 mA
FX3U-2HC	2 ch high-speed counter		245 mA		–
FX3U-16CCL-M	CC-Link master	*	–		240 mA
FX3U-64CCL	CC-Link intelligent device station	8 points			220 mA
FX3U-128ASL-M	AnyWireASLINK master	*	130 mA		–

*: Varies according to settings.

Calculation of current consumed by extension modules

The power required for the expansion adapter and extension module is supplied from the CPU module.
Use the following calculations to confirm whether the required power can be supplied. (All calculations must be satisfied.)



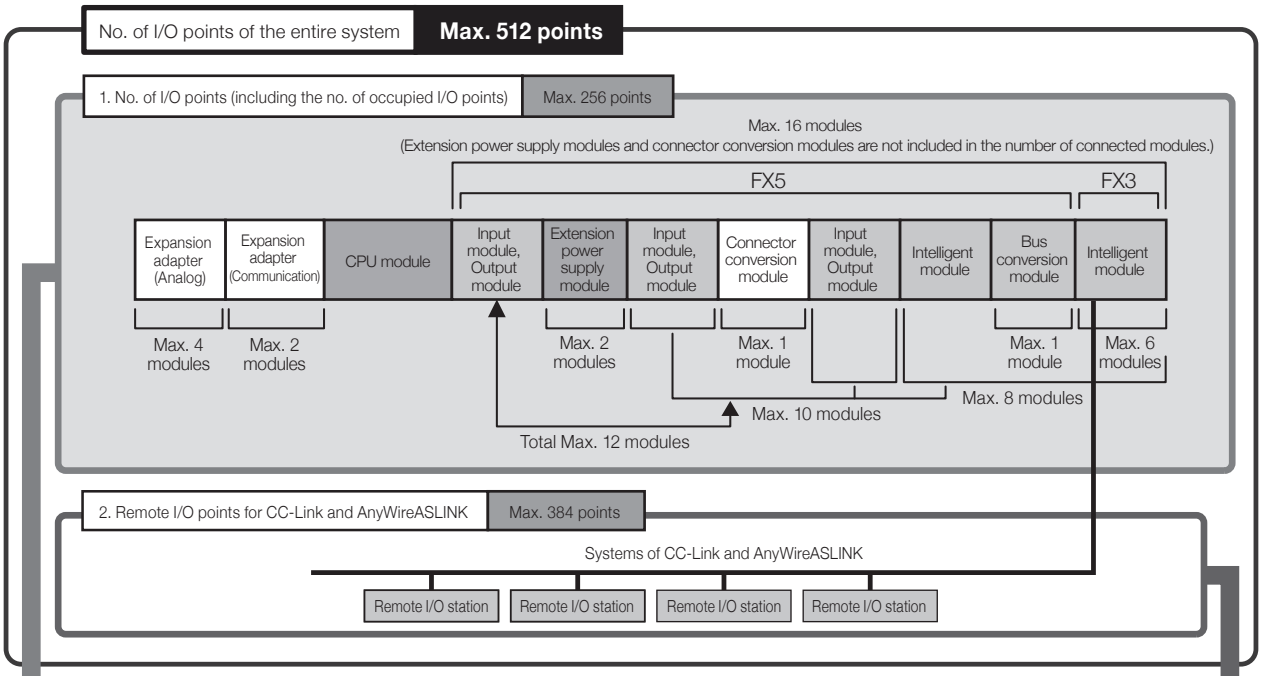
<Cautions>

If the calculation results are negative, the power capacity is exceeded so review the system configuration.

Refer to the next section for the details of some products since the number of connected modules may be limited.

Rules for System Configuration

The total number of I/O points and remote I/O points for the CPU module and extension devices controllable in FX5UC CPU module is 512 points or less.



■No. of I/O points

The max. no. of I/O points configurable in FX5UC is as follows:

Max. no. of I/O points: 256 points ≥ No. of occupied I/O points: CPU module (A) points + I/O module Total (B) points + Intelligent module (C) modules × 8 points

The number of occupied I/O points does not include those of the expansion adapter, connector conversion module, extension power supply module.

(A): I/O points of CPU module (B): Total I/O points of I/O module (C): Total no. of intelligent modules

Total 512 points or less

■No. of I/O points when using a network master module

The max. no. of I/O points when using a network master module is as follows:

Max. no. of I/O points: 384 points ≥ No. of occupied remote I/O points: AnyWireASLINK*1 (D) points + CC-Link*2 (E) stations × 32 points

As for CC-Link, the no. of remote I/O points x 32 points.
(calculated as 32 points regardless of the no. of remote I/O points)

(D): Remote I/O points of AnyWireASLINK (E): No. of CC-Link Remote I/O stations (no. of modules)

∗1: Please recognize the no. of I/O points set by the rotary switch of AnyWireASLINK master as the no. of remote I/O points.

∗2: When simultaneously using CC-Link master and AnyWireASLINK master, please connect AnyWireASLINK master to the front stage (left side). FX5UC CPU occupies the max. 256 points of remote I/O points including the no. of those not occupied since CC-Link master parameters are set by PLC program. Therefore, when connecting CC-Link master to the front stage (left side), the no. of remote I/O points of AnyWireASLINK master may be less than 128. Refer to the "FX3U-128ASL-M and FX3U-16CCL-M user's manual" for simultaneous use.

Lineup details/model selection

Limitation on power supply type when connecting

It is not possible to install both the AC type and the DC type in one system.
The power supply type is limited for extension modules connectable to the following CPU modules. For details, refer to the manual of each product.

Type/model/power supply type	Connectable extension module	
	Type	Model/power supply type
FX5U CPU module FX5U-□M□/D□ (DC power supply type)	Powered I/O module	FX5-32E□/D□ (DC power supply type)
	Extension power supply module	FX5-C1PS-5V (DC power supply type)

Limitation on number of modules when extending

The number of connectable modules is limited for the following products. For details, refer to manuals of each product.

Type	Model/type	Setting method/precautions
I/O module (Extension cable type)	FX5-16ET/ES-H	Up to 4 modules can be connected for the entire system.
	FX5-16ET/ESS-H	
FX5 intelligent function module	FX5-CCLIEF	Only 1 module can be connected in the whole system.
FX3 intelligent function module	FX3U-4AD	Up to 6 modules can be connected for the entire system.
	FX3U-4DA	
	FX3U-1PG	
	FX3U-4LC	
	FX3U-128ASL-M	Up to 1 module of each model type can be connected in the whole system.
	FX3U-16CCL-M	
	FX3U-64CCL	
	FX3U-2HC	Up to 2 modules can be connected for the entire system. Connect immediately after the bus conversion module.

∗Refer to the manual for details on each model.

I/O Module

The I/O module is a product for extending inputs/outputs.
Some products are powered.

Powered input/output modules

Powered input/output module is a powered input/output extension device.
Like with the CPU module, various I/O modules and intelligent function modules can be connected to the rear stage of extension module.

◇ List of powered input/output modules

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
AC power supply type 	FX5-32ER/ES	32 points	16 points	24 V DC (sink/source)	16 points	Relay	○	×	Approx. 0.65	150 × 90 × 83
	FX5-32ET/ES					Transistor (sink)				
	FX5-32ET/ESS					Transistor (source)				
DC power supply type 	FX5-32ER/DS	32 points	16 points	24 V DC (sink/source)	16 points	Relay	○	○*	Approx. 0.65	150 × 90 × 83
	FX5-32ET/DS					Transistor (sink)				
	FX5-32ET/DSS					Transistor (source)				

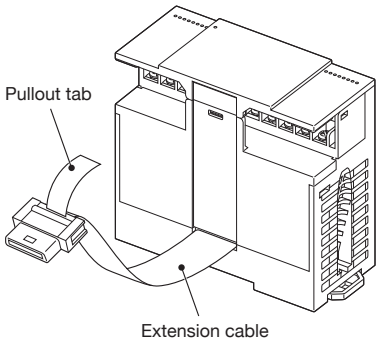
*:Connection with FX5UC requires FX5-CNV-IFC.

◇ Connection cable

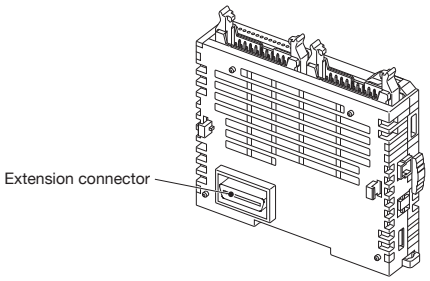
The extension cable for connection to the right side of the front-stage device is offered as an accessory of each powered I/O module.

I/O module

Input modules/output modules receive the power from the CPU module, and extend input/output points.
Each module can be offered as the extension cable type or extension connector type.



Extension cable type



Extension connector type

◇ List of input modules (extension cable type)

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
	FX5-8EX/ES	8 points	8 points	24 V DC (sink/source)	—	—	○	○*	Approx. 0.2	40 × 90 × 83
	FX5-16EX/ES	16 points	16 points	24 V DC (sink/source)	—	—			Approx. 0.25	

∗: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

◇ List of output modules (extension cable type)

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
	FX5-8EYR/ES	8 points	—	—	8 points	Relay	○	○*	Approx. 0.2	40 × 90 × 83
	FX5-8EYT/ES	8 points			8 points	Transistor (sink)			Approx. 0.2	
	FX5-8EYT/ESS	8 points			8 points	Transistor (source)			Approx. 0.2	
	FX5-16EYR/ES	16 points			16 points	Relay			Approx. 0.25	
	FX5-16EYT/ES	16 points			16 points	Transistor (sink)			Approx. 0.25	
	FX5-16EYT/ESS	16 points			16 points	Transistor (source)			Approx. 0.25	

∗: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

◇ List of high-speed pulse input/output modules (extension cable type)

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
	FX5-16ET/ES-H	16 points	8 points	24 V DC (sink/source)	8 points	Transistor (sink)	○	○*	Approx. 0.25	40 × 90 × 83
	FX5-16ET-ESS-H					Transistor (source)				

∗: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

Connection cable

Extension cable type input/output modules are equipped with the extension cable for connection to the right side of the front-stage device.

◇ List of input modules (extension connector type)

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
	FX5-C16EX/D	16 points	16 points	24 V DC (sink)	–	–	○*	○	Approx. 0.10	14.6 ×90 × 87
	FX5-C32EX/D	32 points	32 points						Approx. 0.15	20.1 × 90 × 87
	FX5-C16EX/DS	16 points	16 points	24 V DC (sink/source)					Approx. 0.10	14.6 × 90 × 87
	FX5-C32EX/DS	32 points	32 points						Approx. 0.15	20.1 × 90 × 87

∗: Connection with FX5U requires FX5-CNV-IF.

◇ List of output modules (extension connector type)

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
	FX5-C16EYT/D	16 points	–	–	16 points	Transistor (sink)	○*	○	Approx. 0.10	14.6 × 90 × 87
	FX5-C32EYT/D	32 points			32 points				Approx. 0.15	20.1 × 90 × 87
	FX5-C16EYT/DSS	16 points			16 points	Transistor (source)			Approx. 0.10	14.6 × 90 × 87
	FX5-C32EYT/DSS	32 points			32 points				Approx. 0.15	20.1 × 90 × 87

∗: Connection with FX5U requires FX5-CNV-IF.

◇ List of I/O modules (extension connector type)

Model		Total No. of points	No. of input/output points & Input/output type				Compatible CPU module		MASS (Weight): kg	External dimensions W × H × D (mm)
			Input		Output		FX5U	FX5UC		
	FX5-C32ET/D	32 points	16 points	24 V DC (sink)	16 points	Transistor (sink)	○*	○	Approx. 0.15	20.1 × 90 × 87
	FX5-C32ET/DSS			24 V DC (sink/source)	16 points	Transistor (source)				

∗: Connection with FX5U requires FX5-CNV-IF.

Examples of combinations of FX5U inputs/outputs

FX5U

The table below shows examples of combinations of FX5U extension modules. The contents of combinations can be described based on the number of input points.

- In addition to the combinations shown below, various combinations can be made by changing selected I/O modules and extension modules.

Number of I/O points		CPU module	Input/output module				Powered input/output module FX5-32E		Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output	Input	Output	Input	Output	
16	16	32M	16	16							32
16	24	32M	16	16	0	8					40
16	32	32M	16	16	0	16					48
16	40	32M	16	16	0	24					56
16	48	32M	16	16	0	32					64
16	64	32M	16	16	0	48					80
24	16	32M	16	16	8	0					40
24	24	32M	16	16	8	8					48
24	32	32M	16	16	8	16					56
24	40	32M	16	16	8	24					64
32	16	32M	16	16	16	0					48
32	32	32M	16	16	16	16					64
32	32	32M	16	16	0	0	16	16			64
32	32	64M	32	32							64
32	40	32M	16	16	0	8	16	16			72
32	40	64M	32	32	0	8					72
32	48	32M	16	16	0	16	16	16			80
32	48	64M	32	32	0	16					80
32	56	32M	16	16	0	24	16	16			88
32	56	64M	32	32	0	24					88
32	64	64M	32	32	0	32					96
32	80	64M	32	32	0	48					112
32	80	64M	32	32	0	48					112
32	80	64M	32	32	0	48					112
40	16	32M	16	16	24	0					56
40	24	32M	16	16	24	8					64
40	32	32M	16	16	8	0	16	16			72
40	40	32M	16	16	8	8	16	16			80
40	40	80M	40	40							80
40	56	80M	40	40	0	16					96
40	72	80M	40	40	0	32					112
40	88	80M	40	40	0	48					128
48	16	32M	16	16	32	0					64
48	32	32M	16	16	16	0	16	16			80
48	32	64M	32	32	16	0					80
48	48	32M	16	16	16	16	16	16			96
48	48	64M	32	32	16	16					96
48	48	64M	32	32	0	0	16	16			96
48	64	64M	32	32	16	32					112
48	64	64M	32	32	0	16	16	16			112
48	80	64M	32	32	0	32	16	16			128
48	96	64M	32	32	0	48	16	16			144

Number of I/O points		CPU module	Input/output module		Powered input/output module FX5-32E		Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output	Input	Output	
56	32	32M	16	16	24	0	16	16	88
56	40	32M	16	16	24	8	16	16	96
56	40	80M	40	40	16	0			96
56	56	80M	40	40	16	16			112
56	56	80M	40	40	0	0	16	16	112
56	72	80M	40	40	16	32			128
56	72	80M	40	40	0	16	16	16	128
56	88	80M	40	40	0	32	16	16	144
56	104	80M	40	40	0	48	16	16	160
64	32	32M	16	16	32	0	16	16	96
64	32	64M	32	32	32	0			96
64	48	32M	16	16	0	0	16	16	112
64	48	64M	32	32	16	0	16	16	112
64	48	64M	32	32	32	16			112
64	56	32M	16	16	0	8	16	16	120
64	56	64M	32	32	32	24			120
64	64	32M	16	16	0	16	16	16	128
64	64	64M	32	32	16	16	16	16	128
64	72	32M	16	16	0	24	16	16	136
64	80	64M	32	32	16	32	16	16	144
72	40	80M	40	40	32	0			112
72	48	32M	16	16	8	0	16	16	120
72	56	32M	16	16	8	8	16	16	128
72	56	80M	40	40	32	16			128
72	56	80M	40	40	16	0	16	16	128
72	64	80M	40	40	32	24			136
72	72	80M	40	40	16	16	16	16	144
72	88	80M	40	40	16	32	16	16	160
80	32	64M	32	32	48	0			112
80	48	32M	16	16	16	0	16	16	128
80	48	64M	32	32	48	16			128
80	48	64M	32	32	32	0	16	16	128
80	64	32M	16	16	16	16	16	16	144
80	64	64M	32	32	32	16	16	16	144
80	72	64M	32	32	32	24	16	16	152
80	80	64M	32	32	0	16	16	16	160
80	96	64M	32	32	0	32	16	16	176
80	112	64M	32	32	0	48	16	16	192

Number of I/O points		CPU module			Input/output module		Powered input/output module FX5-32E		Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output	Input	Output	Input	Output	
88	40	80M	40	40	48	0					128
88	48	32M	16	16	24	0	16	16	32	16	136
88	56	32M	16	16	24	8	16	16	32	16	144
88	56	80M	40	40	48	16					144
88	56	80M	40	40	32	0	16	16			144
88	64	32M	16	16	24	8	16	16	32	24	152
88	72	80M	40	40	32	16	16	16			160
88	80	80M	40	40	32	24	16	16			168
88	88	80M	40	40	0	16	16	16	32	16	176
88	104	80M	40	40	0	32	16	16	32	16	192
88	120	80M	40	40	0	48	16	16	32	16	208
96	32	64M	32	32	64	0					128
96	48	32M	16	16	32	0	16	16	32	16	144
96	48	64M	32	32	48	0	16	16			144
96	56	32M	16	16	32	0	16	16	32	24	152
96	64	64M	32	32	48	16	16	16			160
96	64	64M	32	32	16	0	16	16	32	16	160
96	80	64M	32	32	16	16	16	16	32	16	176
96	96	64M	32	32	16	32	16	16	32	16	192
104	40	80M	40	40	64	0					144
104	56	80M	40	40	48	0	16	16			160
104	72	80M	40	40	48	16	16	16			176
104	72	80M	40	40	16	0	16	16	32	16	176
104	88	80M	40	40	16	16	16	16	32	16	192
104	104	80M	40	40	16	32	16	16	32	16	208
112	48	64M	32	32	64	0	16	16			160
112	64	64M	32	32	32	0	16	16	32	16	176
112	80	64M	32	32	32	16	16	16	32	16	192
112	88	64M	32	32	32	24	16	16	32	16	200
120	56	80M	40	40	64	0	16	16			176
120	72	80M	40	40	32	0	16	16	32	16	192
120	88	80M	40	40	32	16	16	16	32	16	208
120	96	80M	40	40	32	24	16	16	32	16	216
128	64	64M	32	32	48	0	16	16	32	16	192
128	80	64M	32	32	48	16	16	16	32	16	208
128	88	64M	32	32	48	16	16	16	32	24	216
136	72	80M	40	40	48	0	16	16	32	16	208
136	88	80M	40	40	48	16	16	16	32	16	224
136	96	80M	40	40	48	16	16	16	32	24	232

Number of I/O points		CPU module			Input/output module		Powered input/output module FX5-32E		Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output	Input	Output	Input	Output	
144	64	64M	32	32	64	0	16	16	32	16	208
144	72	64M	32	32	64	0	16	16	32	24	216
144	80	64M	32	32	64	0	16	16	32	32	224
152	72	80M	40	40	64	0	16	16	32	16	224
152	80	80M	40	40	64	0	16	16	32	24	232

Examples of combinations of FX5UC inputs/outputs

FX5UC

The table below shows examples of combinations of FX5UC extension modules. The contents of combinations can be described based on the number of input points.

- In addition to the combinations shown below, various combinations can be made by changing selected I/O modules and extension modules.

Number of I/O points		CPU module			Input/output module		Connector conversion module	Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output		Input	Output	
16	16	32M	16	16	0	0				32
16	24	32M	16	16	0	0	●		8	40
16	32	32M	16	16	0	16				48
16	48	32M	16	16	0	32				64
24	16	32M	16	16	0	0	●	8		40
24	48	32M	16	16	0	32	●	8		72
24	64	32M	16	16	0	48	●	8		88
24	80	32M	16	16	0	64	●	8		104
32	16	32M	16	16	16	0				48
32	32	32M	16	16	16	16				64
32	32	64M	32	32	0	0				64
32	48	32M	16	16	16	32				80
32	48	64M	32	32	0	16				80
32	64	64M	32	32	0	32				96
32	72	32M	16	16	16	48	●		8	104
32	80	64M	32	32	0	48				112
40	16	32M	16	16	16	0	●	8		56
40	32	32M	16	16	16	16	●	8		72
40	32	64M	32	32	0	0	●	8		72
40	48	32M	16	16	16	32	●	8		88
40	64	64M	32	32	0	32	●	8		104
48	16	32M	16	16	32	0				64
48	32	64M	32	32	16	0				80
48	32	32M	16	16	32	16				80
48	48	32M	16	16	32	32				96
48	48	64M	32	32	16	16				96
48	48	96M	48	48	0	0				96
48	64	96M	48	48	0	16				112
48	64	64M	32	32	16	32				112
48	80	96M	48	48	0	32				128
56	32	32M	16	16	32	16	●	8		88
56	48	32M	16	16	32	32	●	8		104
56	48	64M	32	32	16	16	●	8		104
56	48	96M	48	48	0	0	●	8		104
56	64	32M	16	16	32	48	●	8		120
56	64	64M	32	32	16	32	●	8		120
56	64	96M	48	48	0	16	●	8		120
56	80	64M	32	32	16	48	●	8		136
56	96	96M	48	48	0	48	●	8		152
64	32	32M	16	16	48	16				96
64	48	64M	32	32	32	16				112
64	64	32M	16	16	48	48				128
64	64	96M	48	48	16	16				128
64	80	64M	32	32	32	48				144
64	96	96M	48	48	16	48				160

Number of I/O points		CPU module			Input/output module		Connector conversion module	Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output		Input	Output	
72	32	32M	16	16	48	16	●	8		104
72	48	64M	32	32	32	16	●	8		120
72	64	32M	16	16	48	48	●	8		136
72	64	96M	48	48	16	16	●	8		136
72	64	64M	32	32	32	32	●	8		136
72	80	32M	16	16	48	64	●	8		152
72	80	64M	32	32	32	48	●	8		152
72	96	96M	48	48	16	48	●	8		168
80	32	64M	32	32	48	0				112
80	48	64M	32	32	48	16				128
80	48	32M	16	16	64	32				128
80	64	32M	16	16	64	48				144
80	64	96M	48	48	32	16				144
80	80	64M	32	32	48	48				160
80	80	32M	16	16	64	64				160
80	96	64M	32	32	48	64				176
80	96	96M	48	48	32	48				176
88	48	32M	16	16	64	32	●	8		136
88	48	64M	32	32	48	16	●	8		136
88	64	96M	48	48	32	16	●	8		152
88	64	32M	16	16	64	48	●	8		152
88	80	64M	32	32	48	48	●	8		168
88	80	96M	48	48	32	32	●	8		168
88	96	64M	32	32	48	64	●	8		184
88	112	64M	32	32	48	80	●	8		200
88	112	96M	48	48	32	64	●	8		200
88	128	96M	48	48	32	80	●	8		216
96	32	64M	32	32	64	0				128
96	48	96M	48	48	48	0				144
96	48	32M	16	16	80	32				144
96	64	32M	16	16	80	48				160
96	80	64M	32	32	64	48				176
96	96	32M	16	16	80	80				192
96	112	64M	32	32	64	80				208
96	112	96M	48	48	48	64				208
96	128	96M	48	48	48	80				224
96	144	96M	48	48	48	96				240
104	32	32M	16	16	80	16	●	8		136
104	48	96M	48	48	48	0	●	8		152
104	48	32M	16	16	80	32	●	8		152
104	48	64M	32	32	64	16	●	8		152
104	64	32M	16	16	80	48	●	8		168
104	64	64M	32	32	64	32	●	8		168
104	96	64M	32	32	64	64	●	8		200
104	112	96M	48	48	48	64	●	8		216
104	112	64M	32	32	64	80	●	8		216
104	128	96M	48	48	48	80	●	8		232

Number of I/O points		CPU module			Input/output module		Connector conversion module	Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output		Input	Output	
112	64	64M	32	32	80	32				176
112	80	96M	48	48	64	32				192
112	96	32M	16	16	96	80				208
112	112	64M	32	32	80	80				224
112	112	96M	48	48	64	64				224
112	128	32M	16	16	96	112				240
112	128	64M	32	32	80	96				240
112	144	96M	48	48	64	96				256
120	64	32M	16	16	96	48	●	8		184
120	80	64M	32	32	80	48	●	8		200
120	96	96M	48	48	64	48	●	8		216
120	112	32M	16	16	96	96	●	8		232
120	112	64M	32	32	80	80	●	8		232
120	128	96M	48	48	64	80	●	8		248
120	128	64M	32	32	80	96	●	8		248
120	136	96M	48	48	64	80	●	8	8	256
128	64	32M	16	16	112	48				192
128	96	96M	48	48	80	48				224
128	96	32M	16	16	112	80				224
128	96	64M	32	32	96	64				224
128	112	96M	48	48	80	64				240
128	112	64M	32	32	96	80				240
128	128	96M	48	48	80	80				256
136	48	32M	16	16	112	32	●	8		184
136	80	64M	32	32	96	48	●	8		216
136	96	96M	48	48	80	48	●	8		232
136	96	64M	32	32	96	64	●	8		232
136	112	64M	32	32	96	80	●	8		248
136	120	96M	48	48	80	64	●	8	8	256
144	64	32M	16	16	128	48				208
144	80	64M	32	32	112	48				224
144	96	96M	48	48	96	48				240
144	112	64M	32	32	112	80				256
144	112	96M	48	48	96	64				256
152	64	32M	16	16	128	48	●	8		216
152	64	64M	32	32	112	32	●	8		216
152	96	96M	48	48	96	48	●	8		248
152	96	64M	32	32	112	64	●	8		248
152	104	96M	48	48	96	48	●	8	8	256
160	64	64M	32	32	128	32				224
160	80	96M	48	48	112	32				240
160	96	64M	32	32	128	64				256
160	96	96M	48	48	112	48				256
168	64	64M	32	32	128	32	●	8		232
168	80	96M	48	48	112	32	●	8		248
168	80	64M	32	32	128	48	●	8		248
168	88	96M	48	48	112	32	●	8	8	256

Number of I/O points		CPU module			Input/output module		Connector conversion module	Input/output module		I/O total
Input	Output	Module model	Input	Output	Input	Output		Input	Output	
176	64	64M	32	32	144	32				240
176	64	96M	48	48	128	16				240
176	80	64M	32	32	144	48				256
184	64	96M	48	48	128	16	●	8		248
184	64	64M	32	32	144	32	●	8		248
184	72	96M	48	48	128	16	●	8	8	256
192	48	64M	32	32	160	16				240
192	56	96M	48	48	144	0	●		8	248
192	64	96M	48	48	144	16				256
200	32	64M	32	32	160	0	●	8		232
200	48	96M	48	48	144	0	●	8		248
200	56	96M	48	48	144	0	●	8	8	256
208	48	96M	48	48	160	0				256

memo

Input/output devices for voltage and current

Analog input/output devices can be used to input and output analog amount of voltage, current, etc.
Analog control essential for FA control can easily be implemented by the PLC.
(For supporting low voltage input of 0 to 10 mV DC, 0 to 100 mV DC, refer to FX3U-4LC for "input device for temperature sensor".)

List of analog input/output devices

◇ Analog input expansion adapter (A/D conversion)

Model (Number of channels)	Input specifications			Isolation	Compatible CPU module		Analog input points
	Item	Input current	Input voltage		FX5U	FX5UC	
FX5-4AD-ADP (4 ch) 	Input range	-20 to +20 mA DC (Input resistance 250 Ω)	-10 to +10 V DC (Input resistance 1 MΩ)	Between input terminal and PLC: Photocoupler isolation Between input channels: No isolation	○	○	4 points (4 ch)
	Resolution	1.25 μA (20 mA × 1/16000) 1.25 μA ((20-4) mA × 1/12800) 2.5 μA (20- (-20) mA × 1/16000)	625 μV (10 V × 1/16000) 312.5 μV (5 V × 1/16000) 312.5 μV ((5-1) V × 1/12800) 1250 μV (10- (-10) V × 1/16000)				

◇ Analog output expansion adapter (D/A conversion)

Model (Number of channels)	Output specifications			Isolation	Compatible CPU module		Analog output points
	Items	Output current	Output voltage		FX5U	FX5UC	
FX5-4DA-ADP (4 ch) 	Output range	0 to 20 mA DC (External load resistance value 0 to 500 Ω)	-10 to +10 V DC (External load resistance value 1 kΩ to 1 MΩ)	Between output terminal and PLC: Photocoupler isolation Between output channels: No isolation	○	○	4 points (4 ch)
	Resolution	1.25 μA (20 mA × 1/16000) 1 μA ((20-4) mA × 1/16000)	625 μV (10 V × 1/16000) 312.5 μV (5 V × 1/16000) 250 μV ((5-1) V × 1/16000) 1250 μV (10- (-10) V × 1/16000)				

◇ Analog input module (A/D conversion)

Model (Number of channels)	Input specifications			Isolation	Compatible CPU module		Analog input points
	Items	Input current	Input voltage		FX5U	FX5UC	
FX3U-4AD (4 ch) 	Input range	-20 to +20 mA DC, 4 to 20 mA DC (Input resistance 250 Ω)	-10 to +10 V DC (Input resistance 200 kΩ)	Between input terminal and PLC: Photocoupler isolation Between input channels: No isolation	○*	○*	4 points (4 ch)
	Resolution	1.25 μA (40 mA × 1/32000)	320 μV (20 V × 1/64000)				

∗: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.

◇ Analog output module (D/A conversion)

Model (Number of channels)	Output specifications			Isolation	Compatible CPU module		Analog output points
	Items	Output current	Output voltage		FX5U	FX5UC	
FX3U-4DA (4 ch) 	Output range	0 to 20 mA DC, 4 to 20 mA DC (External load resistance value 500 Ω or less)	-10 to +10 V DC (external load resistance value 1 kΩ to 1 MΩ)	Between output terminal and PLC: Photocoupler isolation Between output channels: No isolation	○*	○*	4 points (4 ch)
	Resolution	0.63 μA (20 mA × 1/32000)	320 μV (20 V × 1/64000)				

∗: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.

◇ FX5U CPU module

Built-in analog input

Model (Number of channels)	Input specifications		Isolation
	Items	Input voltage	
FX5U CPU module (2 ch) 	Input range	0 to 10 V DC (Input resistance 115.7 kΩ)	Between analog input circuit and PLC circuit: No isolation Between input channels: No isolation
	Resolution	2.5 mV	

Built-in analog output

Model (Number of channels)	Output specifications		Isolation
	Items	Output voltage	
FX5U CPU module (1 ch) 	Output range	0 to 10 V DC (External load resistance value 2 kΩ to 1 MΩ)	Between analog input circuit and PLC circuit: No isolation
	Resolution	2.5 mV	

FX5-4AD-ADP type expansion adapter

◇ Features

1) High-precision analog input adapter with resolution of 14 bits binary.
2) 4-channel voltage input (-10 to +10 V DC) or current input (-20 to +20 mA DC) is allowed.
3) Voltage or current input can be specified for each channel.
4) Data can be transferred programless (no dedicated instructions).

◇ Specifications

Items	Specifications			
Analog input points	4 points (4 channels)			
Analog input voltage	-10 to +10 V DC (input resistance 1 MΩ)			
Analog input current	-20 to +20 mA DC (input resistance 250 Ω)			
Digital output value	14-bit binary value			
Input characteristics, resolution*1		Analog input range	Digital output value	Resolution
	Voltage	0 to 10 V	0 to 16000	625 μV
		0 to 5 V	0 to 16000	312.5 μV
		1 to 5 V	0 to 12800	312.5 μV
		-10 to +10 V	-8000 to +8000	1250 μV
	Current	0 to 20 mA	0 to 16000	1.25 μA
		4 to 20 mA	0 to 12800	1.25 μA
		-20 to +20 mA	-8000 to +8000	2.5 μA
Accuracy (Accuracy in respect to full-scale digital output value)	Ambient temperature 25±5°C: within ±0.1% (±16 digits) Ambient temperature 0 to 55°C: within ±0.2% (±32 digits) Ambient temperature -20 to 0°C*2: within ±0.3% (±48 digits)			
Absolute maximum input	Voltage: ±15 V, Current: ±30 mA			
Conversion speed	Up to 450 μs (data refreshed every operation cycle)			
Isolation	Between input terminal and PLC: Photocoupler isolation Between input channels: No isolation			
Compatible CPU module	FX5U, FX5UC, compatible from initial product			
Number of occupied input/output points	0 points (no points occupied)			
Number of connectable modules	FX5U, FX5UC: Up to 4 modules to the left side of CPU module			
External dimensions W × H × D (mm)	17.6 × 106 × 89.1			
MASS (Weight): kg	Approx. 0.1			

*1: For the input conversion characteristics, refer to manuals of each product.
*2: Products manufactured earlier than June 2016 do not support this specification.

FX5-4DA-ADP type expansion adapter

◇ Features

1) High-precision analog output adapter with resolution of 14 bits binary.
2) 4-channel voltage output (-10 to +10 V DC) or current output (0 to 20 mA DC) is allowed.
3) Voltage or current output can be specified for each channel.
4) Data can be transferred programless (no dedicated instructions).

◇ Specifications

Items	Specifications			
Analog output points	4 points (4 channels)			
Digital input	14-bit binary value			
Analog output voltage	-10 to +10 V DC (external load resistance value 1 kΩ to 1 MΩ)			
Analog output current	0 to 20 mA DC (external load resistance value 0 to 500 Ω)			
Output characteristics, resolution*1		Analog output range	Digital value	Resolution
	Voltage	0 to 10 V	0 to 16000	625 μV
		0 to 5 V	0 to 16000	312.5 μV
		1 to 5 V	0 to 16000	250 μV
		-10 to +10 V	-8000 to +8000	1250 μV
	Current	0 to 20 mA	0 to 16000	1.25 μA
		4 to 20 mA	0 to 16000	1 μA
Accuracy (Accuracy in respect to full-scale analog output value)	Ambient temperature 25±5°C: within ±0.1% (Voltage ±20 mV, Current ±20 μA) Ambient temperature -20 to 55°C*2: within ±0.2% (Voltage ±40 mV, Current ±40 μA)			
Conversion speed	Up to 950 μs (data refreshed every operation cycle)			
Isolation	Between output terminal and PLC: Photocoupler isolation Between output channels: No isolation			
Compatible CPU module	FX5U, FX5UC, compatible from initial product			
Number of occupied input/output points	0 points (no points occupied)			
Number of connectable modules	FX5U, FX5UC: Up to 4 modules to the left side of CPU module			
External dimensions W × H × D (mm)	17.6 × 106 × 89.1			
MASS (Weight): kg	Approx. 0.1			

*1: For details on the output conversion characteristic, refer to manuals of each product.
*2: The ambient temperature specification is 0 to 55°C for products manufactured earlier than June 2016.

FX3U-4AD type analog input module

◇ Features

1) High-precision analog input module with resolution of 15 bits binary + 1-bit sign (voltage) and 14 bits binary + 1-bit sign (current).
2) 4-channel voltage input (-10 to +10 V DC) or current input (-20 to +20 mA DC, 4 to 20 mA DC) is allowed.
3) Voltage or current input can be specified for each channel.
4) High-speed AD conversion of 500 µs/ch has been implemented.
5) Various functions such as digital filter function and peak value hold function have been provided.

◇ Specifications

Items	Input voltage	Input current
Analog input range	-10 to +10 V DC (Input resistance 200 kΩ)	-20 to +20 mA DC, 4 to 20 mA (Input resistance 250 Ω)
Effective digital output	15 bits binary + 1-bit sign	14 bits binary + 1-bit sign
Resolution	0.32 mV (20 V × 1/64000)	1.25 µA (40 mA × 1/32000)
Total precision	[With ambient temperature 25°C±5°C] ±0.3% in respect to full-scale 20 V (±60 mV) [With ambient temperature 0 to 55°C] ±0.5% in respect to full-scale 20 V (±100 mV)	[With ambient temperature 25°C±5°C] With input of -20 to +20 mA ±0.5% (±200 µA) in respect to full-scale 40 mA Same as with input 4 to 20 mA [With ambient temperature 0 to 55°C] With input of -20 to +20 mA ±1% (±400 µA) in respect to full-scale 40 mA Same as with input 4 to 20 mA
Conversion speed	500 µs × Number of channels (5 ms × Number of channels used when digital filter is used)	
Isolation	Use of photocoupler for isolation between analog input and PLC Use of DC/DC converter for isolation between analog input and power supply (No isolation between channels)	
Power supply	5 V DC 110 mA (PLC internal power feed) 24 V DC ±10% 90 mA/24 V DC (external power feed)	
Compatible CPU module	FX5U, FX5UC, compatible from initial product Connection with FX5U requires FX5-CNV-BUS, and connection with FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.	
Number of occupied input/output points	8 points (Either input or output is available for counting)	
Communication with PLC	Carried out by FROM/TO instruction via buffer memory (buffer memory can directly be specified)	
Number of connectable modules	FX5U : Up to 8 modules when FX3U extension power supply modules are used Up to 6 modules when FX3U extension power supply modules are not used FX5UC: Up to 6 modules	
External dimensions W × H × D (mm)	55 × 90 × 87	
MASS (Weight): kg	Approx. 0.2	

FX3U-4DA type analog output module

◇ Features

1) High-precision analog output module with resolution of 15 bits binary + 1-bit sign (voltage) and 15 bits binary (current).
2) 4-channel voltage output (-10 to + 10 V DC) or current output (0 to 20 mA DC, 4 to 20 mA DC) is allowed.
3) Voltage or current output can be specified for each channel.
4) Various functions such as table output function and upper-limit/lower-limit value function have been provided.

◇ Specifications

Items	Output voltage	Output current
Analog output range	-10 to +10 V DC (External load 1 kΩ to 1 MΩ)	0 to 20 mA DC, 4 to 20 mA DC (External load 500 Ω or less)
Effective digital input	15 bits binary + 1-bit sign	15-bit binary value
Resolution	0.32 mV (20 V × 1/64000)	0.63 µA (20 mA × 1/32000)
Total precision	Ambient temperature 25 ±5°C ±0.3% (±60 mV) in respect to full-scale 20 V Ambient temperature 0 to 55°C ±0.5% (±100 mV) in respect to full-scale 20 V	Ambient temperature 25 ±5°C ±0.3% (±60 µA) in respect to full-scale 20 mA Ambient temperature 0 to 55°C ±0.5% (±100 µA) in respect to full-scale 20 mA
Conversion speed	1 ms (unrelated to the number of channels used)	
Isolation	Use of photocoupler for isolation between analog output and PLC Use of DC/DC converter for isolation between driving power supply and analog output (No isolation between channels)	
Power supply	5 V DC 120 mA (PLC internal power feed) 24 V DC ±10% 160 mA/24 V DC (external power feed)	
Compatible CPU module	FX5U, FX5UC, compatible from initial product Connection with FX5U requires FX5-CNV-BUS, and connection with FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.	
Number of occupied input/output points	8 points (Either input or output is available for counting)	
Communication with PLC	Carried out by FROM/TO instruction via buffer memory (buffer memory can directly be specified)	
Number of connectable modules	FX5U : Up to 8 modules when FX3U extension power supply modules are used Up to 6 modules when FX3U extension power supply modules are not used FX5UC: Up to 6 modules	
External dimensions W × H × D (mm)	55 × 90 × 87	
MASS (Weight): kg	Approx. 0.2	

Built-in analog input/output function of FX5U CPU module

◇ Features

1) FX5U CPU module has built-in analog input/output. It contains 2-channel analog input and 1-channel analog output.

◇ Specifications (built-in analog input/output only)

Items		Specifications
A/D part	Analog input	0 to 10 V DC (Input resistance 115.7 Ω)
	Absolute maximum input	-0.5 V, +15 V
	Digital output value	0 to 4000
	Digital output	Unsigned 12-bit binary
	Maximum resolution	2.5 mV
	Precision	At ambient temperature of 25°C ± 5°C, within ±0.5% (±20 digit*1) At ambient temperature of 0 to 55°C, within ±1.0% (±40 digit*1) At ambient temperature of -20 to 0°C*2, within ±1.5% (±60 digit*1)
	Conversion speed	30 µs/channels (data refreshed every operation cycle)

Items		Specifications
D/A part	Analog output	0 to 10 V DC (External load resistance value 2 kΩ to 1 MΩ)
	Digital input value	0 to 4000
	Digital input	Unsigned 12-bit binary
	Maximum resolution	2.5 mV
	Precision	At ambient temperature of 25°C ± 5°C, within ±0.5% (±20 digit*1) At ambient temperature of 0 to 55°C, within ±1.0% (±40 digit*1) At ambient temperature of -20 to 0°C*2, within ±1.5% (±60 digit*1)
	Conversion speed	30 µs (data refreshed every operation cycle)

Items		Input specifications	Output specifications
Common part	Isolation	No isolation from the CPU module internal circuit No isolation between the input terminals (channels)	No isolation from the CPU module internal circuit
	Number of occupied input/output points	0 points (no points occupied)	
	External dimensions W × H × D (mm)	FX5U-32M□: 150 × 90 × 83 FX5U-64M□: 220 × 90 × 83 FX5U-80M□: 285 × 90 × 83	
	MASS (Weight): kg	FX5U-32M□: Approx. 0.70 FX5U-64M□: Approx. 1.00 FX5U-80M□: Approx. 1.20	

∗1: Digit refers to digital values.
∗2: Products manufactured earlier than June 2016 do not support this specification.

Input device for temperature sensor

Platinum resistance thermometer sensor (Pt100) or thermocouple temperature sensors can be connected.
FX3U-4LC type temperature control module, which provides PID control function with auto tuning, can use a function of intelligent function module to perform temperature control.

◇ List of devices for temperature sensor input

Model (Number of channels)	Available sensor	Input specifications		Isolation	Compatible CPU module		Number of channels
		Items	Temperature input		FX5U	FX5UC	
FX3U-4LC (4 ch) 	Platinum resistance thermometer sensor Pt100, JPt100, Pt1000	Input range	[Typical example] Pt100: -200 to 600°C Pt1000: -200.0 to 650.0°C	Between internal circuit and channel: Isolation Between internal circuit and power supply: Isolation Between channels: Isolation	○*	○*	4 ch
		Resolution	0.1°C or 1°C (differs depending on the sensor used)				
	Thermocouple K/J/R/S/E/T/B/N/PLII/W5Re/W26Re/U/L type	Input range	[Typical example] K type: -200.0 to 1300°C J type: -200.0 to 1200°C				
		Resolution	0.1°C or 1°C (differs depending on the sensor used)				
	Low voltage input	Input range	0 to 10 mV DC 0 to 100 mV DC				
		Resolution	0.5 μV or 5.0 μV				

∗: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.

FX3U-4LC type temperature control module

◇ Features

1) The module provides 4-ch temperature sensor input and control output through which "two-position control, standard PID control (auto-tuning possible), heating/cooling PID control, and cascade control" can be carried out. It can also be used in combination with an analog input/output module to perform PID control by voltage and current.
2) The module is equipped with cascade control. The module can use 2 control loops (master and slave) to perform rapid temperature control in response to temperature change due to disturbance, etc.
3) Heating/cooling PID control of up to 4 loops can be performed by output operation of 2 systems (heating output and cooling output). Temperature control can be achieved with high stability in both the heating and cooling sides.
4) Low voltage signals such as "0-10 mV DC" and "0-100 mV DC" can be input. Sensors such as low voltage output sensor can directly be connected.
5) The module supports a wide range of thermocouple temperature sensor and high-precision Pt1000 temperature sensor.

◇ Specifications

Items		Details
Control system		Two-position control, standard PID control, heating/cooling PID control, and cascade control
Control operation cycle		250 ms/4 ch
Setting temperature range*		K: -200.0 to 1300°C (-100 to 2400°F) J: -200.0 to 1200°C (-100 to 2100°F) Low voltage input: 0 to 10 mV DC, 0 to 100 mV DC Pt100 (3-wire type): -200.0 to 600.0°C (-300.0 to 1100°F) Pt100 (2-/3-wire type): -200.0 to 650.0°C (-328 to 1184°F)
Heater disconnection detection		Detection of alarm by buffer memory (variable in the range from 0.0 to 100.0 A)
Input specifications	No. of input points	4 points
	Type of input (selectable for each channel)	[Thermocouple] K, J, R, S, E, T, B, N, PLII, W5Re/W26Re, U, L [Resistance thermometer sensor] 3-wire type Pt100 3-wire type Pt100 2-/3-wire type Pt1000 [Low voltage input] 0 to 10 mV DC, 0 to 100 mV DC
	Example of measurement accuracy*	[With ambient temperature 25°C ± 5°C] When the input range of K-type thermocouple is 500°C or more: ±0.3% (±1 digit) in respect to full-scale [With ambient temperature 0 to 55°C] When the input range of K-type thermocouple is 500°C or more: ±0.7% (±1 digit) in respect to full-scale
	Example of resolution*	0.1°C (0.1°F), 1°C (1°F), 0.5 μV, or 5.0 μV
	Sampling cycle	250 ms/4 ch
	Operation at the time of input disconnection/ short-circuit	Up scale/down scale (at the time of resistance thermometer sensor input)
Current detector (CT) input specification		Number of points: 4 Current detector: CTL-12-S36-8, CTL-12-S56-10, CTL-6-P-H (manufactured by U.R.D. Ltd.), sampling cycle: 0.5 sec.
Output specifications		Number of points: 4 Type: NPN open collector transistor, Rated load voltage: 5 to 24 V DC, Maximum load current: 100 mA, Control output cycle: 0.5 to 100.0 sec.
Power supply		5 V DC 160 mA (internal power feed from CPU module) 24 V DC +20% -15% 50 mA (external power feed from terminal block)
Isolation		Use of photocoupler for isolation between analog inputs/transistor outputs and PLC Use of DC/DC converter for isolation between analog inputs/transistor outputs and power supply Isolation between channels
Compatible CPU module		FX5U, FX5UC, compatible from initial product Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.
Number of occupied input/output points		8 points (Either input or output is available for counting)
Communication with PLC		Carried out by FROM/TO instruction via buffer memory (buffer memory can directly be specified)
Number of connectable modules		FX5U : Up to 8 modules when FX3U extension power supply modules are used Up to 6 modules when FX3U extension power supply modules are not used FX5UC: Up to 6 modules
External dimensions W × H × D (mm)		90 × 90 × 86
MASS (Weight): kg		Approx. 0.4

*: Differs depending on the sensor input range.

High speed counter

Using high-speed counters allow PLC to capture high-speed signals from encoders and sensors.
Since the CPU module has built-in high performance high-speed counters, high-speed control is possible with simple programs.

List of high-speed counters

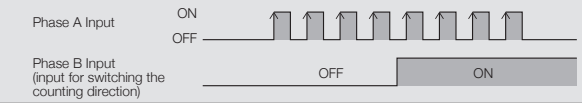
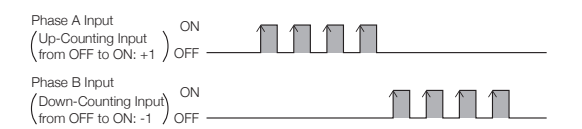
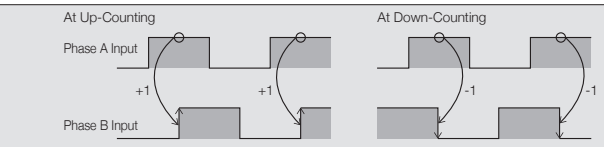
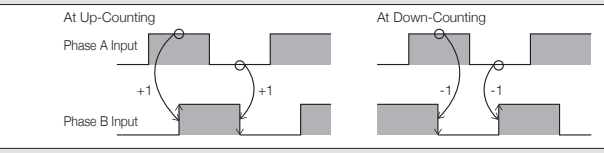
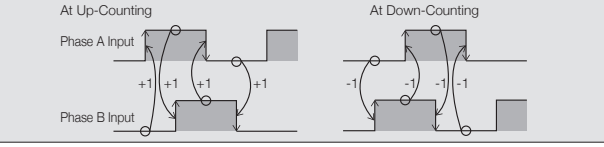
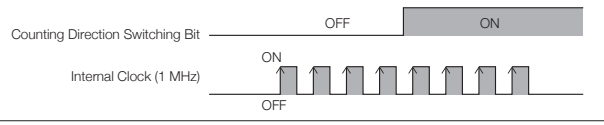
◇ Built-in high-speed counter functions of CPU module

Model	Model	Maximum frequency	Operation mode	High-speed processing instruction
FX5U/FX5UC  	1 phase, 1 input (S/W)	200 kHz	- Normal mode - Pulse density measurement mode - Rotation speed measurement mode	- 32-bit data comparison set - 32-bit data comparison reset - 32-bit data band comparison - 16-bit data high-speed input/output function start/stop - 32-bit data high-speed input/output function start/stop
	1 phase, 1 input (H/W)	200 kHz		
	1 phase, 2 input	200 kHz		
	2 phase, 2 input [1 edge count]	200 kHz		
	2 phase, 2 input [2 edge count]	100 kHz		
	2 phase, 2 input [4 edge count]	50 kHz		
	Internal clock	1 MHz (fixed)		

∗: For details, refer to the programming manual and hardware manual of each product.

◇ High-speed counter of FX5U/FX5UC CPU module

High speed counters use parameters to make input allocation and function settings and use HIOEN instruction to perform operations.

Types of high-speed counters		Pulse input signal type
1 phase, 1 input counter (S/W)		
1 phase, 1 input counter (H/W)		
1 phase, 2 input counter		
2 phase, 2 input counter	1 edge count	
	2 edge count	
	4 edge count	
Internal clock		

◇ Built-in high-speed counter input allocation

Parameter is used to set the input device allocation of high-speed counters.
Parameter is used to set the function for each channel, and input device allocation is determined by the settings.
When internal clock is used, the allocation is the same as that of 1 phase, 1 input (S/W), without using phase A.

CH	Type of high-speed counter	X0	X1	X2	X3	X4	X5	X6	X7	X10	X11	X12	X13	X14	X15	X16	X17
CH1	1 phase, 1 input (S/W)	A								P	E						
	1 phase, 1 input (H/W)	A	B							P	E						
	1 phase, 2 input	A	B							P	E						
	2 phase, 2 input	A	B							P	E						
CH2	1 phase, 1 input (S/W)		A									P	E				
	1 phase, 1 input (H/W)			A	B							P	E				
	1 phase, 2 input			A	B							P	E				
	2 phase, 2 input			A	B							P	E				
CH3	1 phase, 1 input (S/W)			A										P	E		
	1 phase, 1 input (H/W)					A	B							P	E		
	1 phase, 2 input					A	B							P	E		
	2 phase, 2 input					A	B							P	E		
CH4	1 phase, 1 input (S/W)				A											P	E
	1 phase, 1 input (H/W)							A	B							P	E
	1 phase, 2 input							A	B							P	E
	2 phase, 2 input							A	B							P	E
CH5	1 phase, 1 input (S/W)					A				P	E						
	1 phase, 1 input (H/W)									A	B	P	E				
	1 phase, 2 input									A	B	P	E				
	2 phase, 2 input									A	B	P	E				
CH6	1 phase, 1 input (S/W)						A					P	E				
	1 phase, 1 input (H/W)											A	B	P	E		
	1 phase, 2 input											A	B	P	E		
	2 phase, 2 input											A	B	P	E		
CH7	1 phase, 1 input (S/W)							A						P	E		
	1 phase, 1 input (H/W)													A	B	P	E
	1 phase, 2 input													A	B	P	E
	2 phase, 2 input													A	B	P	E
CH8	1 phase, 1 input (S/W)								A							P	E
	1 phase, 1 input (H/W)															A	B
	1 phase, 2 input															A	B
	2 phase, 2 input															A	B
CH1 to CH8	Internal clock	Not used															

A: Phase A input
B: Phase B input (With 1 phase 1 input (H/W), however, direction switching input is made.)
P: External preset input (Use or nonuse can be selected for each channel using parameters.)
E: External enable input (Use or nonuse can be selected for each channel using parameters.)

◇ High-speed pulse input/output module

Model	Type	Highest frequency	Operation mode	High-speed processing instruction	Compatible CPU module	
					FX5U	FX5UC
FX5-16ET/ES-H **FX5-16ET/ESS-H** 	1 phase, 1 input (S/W)	200 kHz	- Normal mode	- 16-bit data high-speed input/output function start/stop - 32-bit data high-speed input/output function start/stop	○	○*
	1 phase, 1 input (H/W)	200 kHz				
	1 phase, 2 input	200 kHz				
	2 phase, 2 input [1 edge count]	200 kHz				
	2 phase, 2 input [2 edge count]	100 kHz				
	2 phase, 2 input [4 edge count]	50 kHz				
	Internal clock	1 MHz (fixed)				

∗: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

◇ Input assignment and the maximum frequency for each input assignment of the high-speed pulse input/output module

"□" of each input represents the prefix input number of the high-speed pulse input/output module.
"X□+6" and "X□+7" are input frequency up to 10 kHz without regard to the maximum frequency value.
The "preset" input and "enable" input are input frequency up to 10 kHz without regard to the maximum frequency value.

CH	High-speed counter type	X□	X□+1	X□+2	X□+3	X□+4	X□+5	X□+6	X□+7	Maximum frequency
CH9, CH11, CH13, CH15	1 phase, 1 input (S/W)	A	P					E		200 kHz
	1 phase, 1 input (H/W)	A	B	P				E		200 kHz
	1 phase, 2 input	A	B	P				E		200 kHz
	2 phase, 2 input [1 edge count]	A	B	P				E		200 kHz
	2 phase, 2 input [2 edge count]	A	B	P				E		100 kHz
	2 phase, 2 input [4 edge count]	A	B	P				E		50 kHz
CH10, CH12, CH14, CH16	1 phase, 1 input (S/W)				A	P			E	200 kHz
	1 phase, 1 input (H/W)				A	B	P		E	200 kHz
	1 phase, 2 input				A	B	P		E	200 kHz
	2 phase, 2 input [1 edge count]				A	B	P		E	200 kHz
	2 phase, 2 input [2 edge count]				A	B	P		E	100 kHz
	2 phase, 2 input [4 edge count]				A	B	P		E	50 kHz
CH9 to CH16	Internal clock	Not used								

A: Phase A input
B: Phase B input (For 1-phase 1-input (H/W): direction change input)
P: External "preset" input (Use or nonuse can be selected for each channel using parameters.)
E: External "enable" input (Use or nonuse can be selected for each channel using parameters.)

◇ High-speed counter module

Model (Number of channels)	Type	Highest response frequency	Function	Hardware comparison output function	2-phase counter edge count function	Compatible CPU module	
						FX5U	FX5UC
FX3U-2HC (2 ch) 	1 phase 1 input	Max. 200 kHz	With match output (delay of up to 30 μs) function Output type: Output common to sink/source 2 points/channel	○	–	○* Up to 2 modules	○* Up to 2 modules
	1 phase 2 input	Max. 200 kHz					
	2 phase 2 input	1 edge count: Max. 200 kHz 2 edge count: Max. 100 kHz 4 edge count: Max. 50 kHz			○		

*: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.

FX3U-2HC type high-speed counter module

◇ Features

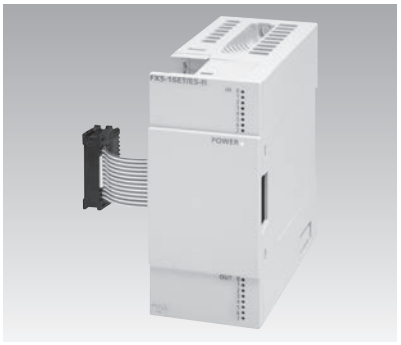
1) Input of 2-ch high-speed signal can be made in a module to count a maximum of 200 kHz. Each channel is equipped with 2 high-speed output terminal points based on the setting of comparison value received from CPU module.
2) In 2-phase input, 1/2/4 edge count mode can be set.
3) Counting can be permitted/inhibited in CPU module or external input.
4) Connection with an encoder of line driver output type can be made.
5) Employment of a connector system for connection with input/output signals makes the module compact. Available connection connectors include "FX-I/O-CON2-S and FX-I/O-CON2-SA". (The customer is requested to prepare the distribution cables.)

◇ Specifications

Items	Specifications
No. of input points	2 points
Signal level	According to connection terminals, 5 V DC, 12 V DC and 24 V DC are selectable. The line driver output type is connected to the 5 V terminal.
Frequency	1 phase, 1 input: 200 kHz or less 1 phase, 2 input: 200 kHz or less 2 phase, 2 input: 200 kHz or less/1 edge count, 100 kHz or less/2 edge count, 50 kHz or less/4 edge count
Counting range	Binary signed 32 bits (-2,147,483,648 to +2,147,483,647) or binary unsigned 16 bits (0 to 65,535)
Count mode	Automatic up/down (with 1 phase 2 input or 2 phase input, or selected up/down (with 1 phase 1 input)
Match output	When the current value of the counter matches a comparison set value, comparison output is set within 30 µs (ON), and cleared (OFF) within 100 µs by reset instruction.
Output type	2 points/ch, 5 to 24 V DC 0.5 A (output common to sink/source)
Additional function	Buffer memory is available to set mode and comparison data from the CPU module. Current value, comparison results, and error status can be monitored via the CPU module.
Current consumption	5 V DC 245 mA (internal power feed from CPU module)
Compatible CPU module	FX5U, FX5UC, compatible from initial product Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.
Number of occupied input/output points	8 points (Either input or output is available for counting)
Communication with PLC	Carried out by FROM/TO instruction via buffer memory (buffer memory can directly be specified)
Number of connectable modules	FX5U, FX5UC: Up to 2 modules
External dimensions W × H × D (mm)	55 × 90 × 87
MASS (Weight): kg	Approx. 0.2

FX5-16ET/ES□-H type high-speed pulse input/output module

◇ Features



1) Input of high-speed pulses can be counted (2 ch, 200 kHz).
2) The high-speed counter function and the positioning function can be used together (2 ch + 2 axes). The terminals not assigned can be used as general-purpose input/output.

◇ Specifications

Items		Specifications
High-speed pulse input		2 ch
Input response frequency	X□ to X□+5*	200 kHz
	X□+6, X□+7*	10 kHz
Compatible CPU module		FX5U, FX5UC from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016)) Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.
Number of connectable modules		FX5U, FX5UC: Up to 4 modules
External dimensions W × H × D (mm)		40 × 90 × 83
MASS (Weight): kg		Approx. 0.25

∗: "□" represents the prefix input number of each high-speed pulse input/output module.

Positioning control

In addition to CPU module built-in positioning instructions, a pulse output module has been prepared to achieve full-scale positioning control. Furthermore, simple motion modules, which can perform complicated control as well as even multi-axis/interpolation control, are lined up to support positioning control.

Built-in pulse output function of CPU module, positioning instructions list

◇ Built-in pulse output function of CPU module

Model/feature		Items	Function
Built-in pulse output function of CPU module	**FX5U/FX5UC**   The module is equipped with positioning function for 4-axis pulse output and 8-ch of high-speed pulse input.	Number of control axes	4 axes* (Simple linear interpolation by 2-axis simultaneous start)
		Maximum frequency	2147483647 (200 kpps in pulses)
		Positioning program	Sequence program, Table operation
		Compatible CPU module	Transistor output type
		Pulse output instruction	PLSY and DPLSY instructions
		Positioning instruction	DSZR, DDSZR, DVIT, DDVIT, TBL, DRVTBL, DRVMUL, DABS, PLSV, DPLSV, DRVI, DDRVI, DRVA, and DDRVA instructions

∗: The number of control axes is 2 when the pulse output mode is CW/CCW mode.

◇ High-speed pulse input/output module

Model/feature		Items	Function	Compatible CPU module	
				FX5U	FX5UC
High-speed pulse input/output module	**FX5-16ET/ES-H** **FX5-16ET/ESS-H**  Up to 200 kpps pulse output is possible. Because various positioning operation modes are supported, the module is suitable for 2-axis simple positioning.	Number of control axes	2 axes (Simple linear interpolation by 2-axis simultaneous start)	○	○*
		Maximum frequency	2147483647 (200 kpps in pulses)		
		Positioning program	Sequence program, Table operation		
		Output type	FX5-16ET/ES-H: Transistor output (Sink type)		
			FX5-16ET/ESS-H: Transistor output (Source type)		
		Pulse output instruction	–		
		Positioning instruction	DSZR, DDSZR, DVIT, DDVIT, DRVTBL, DRVMUL, DABS, PLSV, DPLSV, DRVI, DDRVI, DRVA, and DDRVA instructions		

∗: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

◇ Pulse output module

Model/feature		Items	Function	Compatible CPU module	
				FX5U	FX5UC
Pulse output module	**FX3U-1PG**  Up to 200 kpps pulse output is possible. Because various positioning operation modes are supported the module is suitable for 1-axis simple positioning.	Number of control axes	1 axis	○*	○*
		Interpolation function	–		
		Maximum frequency	200 kpps		
		Pulse output type	Forward rotation pulse/reverse rotation pulse, or pulse train + direction		
		Manual pulse generator connection	–		
		Positioning program	Sequence program (FROM/TO instruction)		
		ABS current value read	Allowed by a sequence program		
		Number of occupied input/output points	8 points (Either input or output is available for counting)		

∗: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.

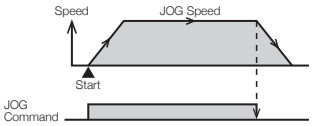
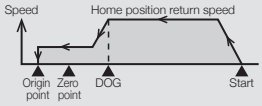
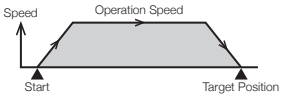
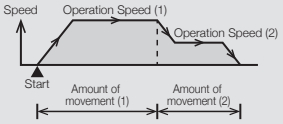
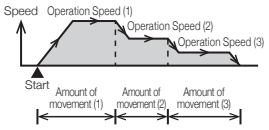
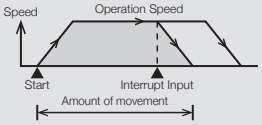
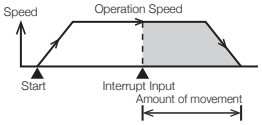
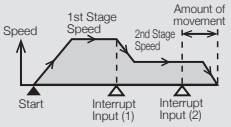
◇ Simple motion module

Model/feature		Items	Function	Compatible CPU module	
				FX5U	FX5UC
Simple motion module	**FX5-40SSC-S**  Since the module is compatible with SSCNETIII/H, high-speed/high-precision positioning can be achieved in combination with MR-J4 servo motor. Parameter settings and table operation settings can easily be made with GX Works3.	Number of control axes	4 axes	○	○*1
		Interpolation function	Linear interpolation (4 axes maximum)		
		Control system	PTP (Point To Point) control, Trajectory control (both linear and arc), Speed control, Speed-position switching control, Position-speed switching control, Speed-torque control		
		Mark detection function	Regular mode, Specified Number of Detections mode, Ring Buffer mode Mark detection signal: up to 4 points, mark detection setting: 16 settings		
		Digital oscilloscope function*2	Bit data: 16 ch, Word data: 16 ch		
		Servo amplifier connection method	SSCNETIII/H		
		Manual pulse generator connection	Possible to connect 1 module		
		Positioning program	Sequence program		
		Number of occupied input/output points	8 points (Either input or output is available for counting)		

∗1: Connection to FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.
∗2: 8 ch word data and 8 ch bit data can be displayed in real time.

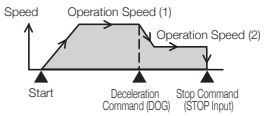
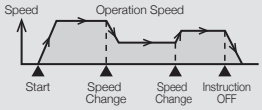
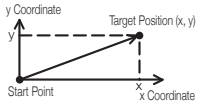
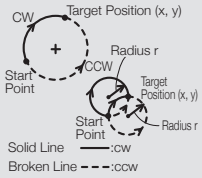
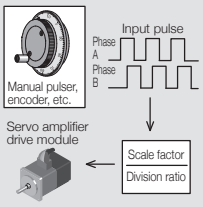
◇ List of positioning operation modes

To confirm detailed operation of each module, refer to manuals of the product.

Positioning instruction Operation pattern	Details	FX5U, FX5UC	FX5-16ET/E□-H	FX3U-1PG	FX5-40SSC-S
◆ JOG operation 	While the forward rotation/reverse rotation instruction input is ON, the motor performs forward rotation/reverse rotation.	○ ∗1	○ ∗1	○	○
◆ Machine home position return 	The module starts operation at a home position return speed according to the machine home position return start instruction and then outputs clear signal after the end of machine home position return.	○ ∗2	○ ∗2	○ ∗2∗3	○ ∗2∗4
◆ 1-speed positioning 	The module starts operation at an operation speed according to start instruction and then stops at a target position.	○	○	○	○
◆ 2-speed operation (2-speed positioning) 	The module moves at operation speed (1) for amount of movement (1) and then moves at operation speed (2) for amount of movement (2) according to start instruction.	○ ∗5	○ ∗5	○	○
◆ Multi-speed operation 	Multi-speed operation can be achieved by performing continuous trajectory control of multiple tables. The diagram at left shows continuous trajectory control of 3 tables.	○ ∗5	○ ∗5	×	○
◆ Interrupt stop 	The module starts operation according to start instruction and then stops at the target position. When interrupt input is ON, the module decelerates and stops.	○	○	○	×
◆ Interrupt and 1-speed positioning (interrupt and 1-speed pitch feed) 	When interrupt input is ON, the module moves at the same speed for the specified amount of movement, and then decelerates and stops.	○	○	○	○
◆ Interrupt and 2-speed positioning (interrupt and 2-speed pitch feed) 	When interrupt input (1) is ON, the module decelerates to the 2nd speed. When interrupt input (2) is ON again, the module moves only for the specified amount of movement, and then decelerates and stops.	○ ∗6	○ ∗6	○	O

∗1: Replaceable with 1-speed positioning (relative positioning) instruction.
∗2: With DOG search function
∗3: With Count method/Data set method function
∗4: With Count method/Scale home position signal detection method/Data set method function
∗5: Replaceable with 1-speed positioning table operation
∗6: Replaceable with variable speed operation or interrupt 1-speed positioning operation
∗7: Simple linear interpolation only

Positioning control

Positioning instruction Operation pattern	Details	FX5U, FX5UC	FX5-16ET/E□-H	FX3U-1PG	FX5-40SSC-S
◆ Interrupt 2-speed positioning (external instruction positioning) 	The module starts operation at operation speed (1) according to start instruction and then starts decelerating according to deceleration instruction. The module performs operation at operation speed (2) until the input of stop instruction.	○ *6	○ *6	○	×
◆ Variable speed operation 	The module operates at the operation speed specified from PLC.	○	○	○	○
◆ Linear interpolation 	The module moves to the target position at the specified speed. For the speed, composite speed and reference axis speed are selectable.	○ *7	○ *7	×	○
◆ Circular interpolation 	The module moves to the target position (x, y) at the peripheral speed according to circular interpolation instruction. Operation can be performed according to sub point designation or center point designation.	×	×	×	○
◆ Table operation <table><tr><th>No.</th><th>Position</th><th>Speed</th><th>.....</th></tr><tr><td>1</td><td>200</td><td>500</td><td></td></tr><tr><td>2</td><td>500</td><td>1000</td><td></td></tr><tr><td>3</td><td>1000</td><td>2000</td><td></td></tr></table>	A table is available to create a program for positioning control.	○	○	×	○
◆ Pulse generator input operation 	External pulse can be input from the manual pulse generator input terminal. Synchronous ratio operation using an encoder etc., can be performed.	×	×	×	○

Built-in positioning function of FX5U/FX5UC CPU module

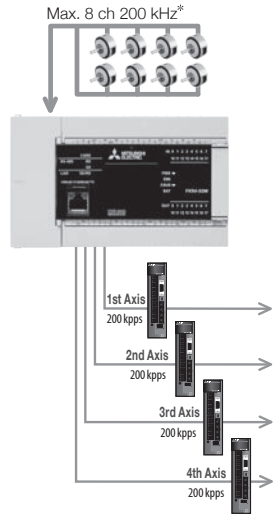
◇ Features

1) Can position up to 4 axes using transistor outputs (Y000, Y001, Y002 and Y003) of the CPU module.
2) Can output pulse trains of 200 kpps maximum.
3) Can realize a reasonable system configuration because the intelligent function module for positioning is not required.
4) Change of the speed and positioning address can be made during positioning operation.
5) Supports the simple linear interpolation operation.

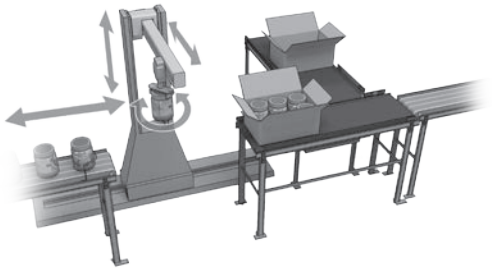
◇ Specifications

Items	Specifications
Number of control axes	4 axes* (Simple linear interpolation possible by 2-axis simultaneous start)
Maximum frequency	2147483647 (200 kpps in pulses)
Positioning program	Sequence program, Table operation
Compatible CPU module	Transistor output type
Pulse output instruction	PLSY and DPLSY instructions
Positioning instruction	DSZR, DDSZR, DVIT, DDVIT, TBL, DRVTBL, DRVMUL, DABS, PLSV, DPLSV, DRVI, DDRVI, DRVA, and DDRVA instructions

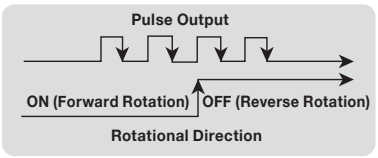
∗: The number of control axes is 2 when the pulse output mode is CW/CCW mode.

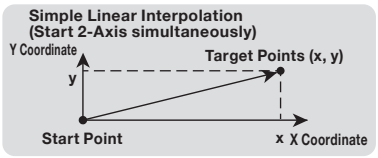


[Example of Packaging System Using built-in positioning]



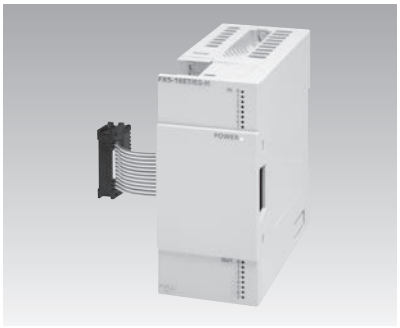
∗FX5U-32M : 6 ch 200 kHz + 2 ch 10 kHz
FX5UC-32M : 6 ch 200 kHz + 2 ch 10 kHz





FX5-16ET/E□-H type high-speed pulse input/output module

◇ Features



1) Can extend the high-speed counter function (2 channels) and positioning function (2 axes) at the same time, and realize a reasonable system configuration.
2) Offers easy extension in the same way as the positioning function built in the CPU module.
3) Can output pulse trains of 200 kpps maximum.
4) Allows terminals not using the high-speed counter function or positioning function to be used for general-purpose inputs/outputs.

◇ Specifications

Items	Specifications
Number of control axes	2 axes (Simple linear interpolation by 2-axis simultaneous start)
Maximum frequency	2147483647 (200 kpps in pulses)
Positioning program	Sequence program, Table operation
Output type	FX5-16ET/ES-H: Transistor output (Sink type) FX5-16ET/ESS-H: Transistor output (Source type)
Pulse output instruction	—
Positioning instruction	DSZR, DDSZR, DVIT, DDVIT, DRVTBL, DRVMUL, DABS, PLSV, DPLSV, DRVI, DDRVI, DRVA, and DDRVA instructions
Compatible CPU module	FX5U, FX5UC from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016)) Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.
Number of connectable modules	FX5U, FX5UC: Up to 4 modules
External dimensions W × H × D (mm)	40 × 90 × 83
MASS (Weight): kg	Approx. 0.25

FX3U-1PG type pulse output module

◇ Features

1) The module is equipped with 7 operation modes necessary for simple positioning control.
2) Pulse train of up to 200 kpps can be output.
3) Speed and target address can be changed during positioning operation to perform operation for each process.
4) Approximate S-curve acceleration/deceleration is supported. Smooth high-speed operation can be performed.

◇ Specifications

Items	Specifications
Number of control axes	1 axis
Instruction speed	1 pps to 200 kpps (instruction unit can be selected from among 1 pps, cm/min, 10 deg/min, and inch/min)
Set pulse	-2,147,483,648 to 2,147,483,647 (Instruction unit can be selected from pulse, μm, mdeg, 10^{-4} inch. In addition, magnification can be set for position data.)
Pulse output	Output signal format: Forward rotation (FP)/reverse rotation (RP) pulse or pulse (PLS)/direction (DIR) can be selected. Pulse output terminal: Transistor output 5 to 24 V DC, 20 mA or less (photo-coupler isolation, with indication of operation by LED)
External input/output specification	Input: For STOP/DOG terminal, 24 V DC, 7 mA For zero-point signal PG0 terminal, 5 to 24 V DC, 20 mA or less Output: For each of FP (forward rotation), RP (reverse rotation), and CLR (clear) terminals, 5 to 24 V DC, 20 mA or less
Driving power	For input signal: 24 V DC, 40 mA For pulse output: 5 to 24 V DC, power consumption 35 mA or less
Control power	5 V DC, 150 mA (supplied from PLC via extension cable)
Compatible CPU module	FX5U, FX5UC, compatible from initial product Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.
Number of occupied input/output points	8 points (Either input or output is available for counting)
Communication with PLC	Carried out by FROM/TO instruction via buffer memory (buffer memory can directly be specified)
Number of connectable modules	FX5U : Up to 8 modules when FX3U extension power supply modules are used Up to 6 modules when FX3U extension power supply modules are not used FX5UC : Up to 6 modules
External dimensions W × H × D (mm)	43 × 90 × 87
MASS (Weight): kg	Approx. 0.2

Advanced synchronous control

FX5-40SSC-S type simple motion module is an intelligent function module compatible with SSCNETIII/H.
It can use a servo motor to perform positioning control via SSCNETIII/H compatible servo amplifier. For positioning control, refer to the relevant manual.

FX5-40SSC-S type simple motion module

◇ Features

FX5-40SSC-S is equipped with 4-axis positioning function compatible with SSCNETIII/H.
By combining linear interpolation, 2-axis circular interpolation and continuous trajectory control in the program set with a table, a smooth trajectory can be easily drawn.
In "synchronous control", "parameter for synchronous control" is set and synchronous control is started for each output axis to perform control in synchronization with the input axes (servo input axis, instruction generation axis*, and synchronous encoder axis).

*: The instruction generation axis is used only for instruction generation. It can be controlled independently as an axis connected to a servo amplifier. (It is not counted as a control axis.)

◇ Specifications

Items		Specifications
Number of control axes		4 axes
Operation cycle		1.777 ms
Interpolation function		Linear interpolation (4 axes maximum)
Control system		PTP (Point To Point) control, Trajectory control (both linear and arc), Speed control, Speed-position switching control, Position-speed switching control, Speed-torque control
Acceleration/deceleration process		Trapezoidal acceleration/deceleration, S-curve acceleration/ deceleration
Synchronous control	Input axis	Servo input axis, Synchronous encoder axis
	Output axis	Cam axis (Up to 4 axes)
Cam control	Number of registration	Up to 64 (depending on memory capacity, cam resolution and number of coordinates)
	Cam data type	Stroke ratio data type, Coordinate data type
	Cam auto-generation	Cam auto-generation for rotary cutter
Control unit		mm, inch, degree, pulse
Number of positioning data		600 data (positioning data No. 1 to 600)/ axis (Can be set with MELSOFT GX Works3 or a sequence program.)
Backup		Parameters, positioning data, and block start data can be saved on flash ROM (battery-less backup)
Positioning control	Linear control	1-axis linear control, 2-axis linear interpolation control, 3-axis linear interpolation control, 4-axis linear interpolation control* (Composite speed, Reference axis speed)
	Fixed-pitch feed control	1-axis fixed-pitch feed, 2-axis fixed-pitch feed, 3-axis fixed-pitch feed, 4-axis fixed-pitch feed*
	2-axis circular interpolation	Sub point designation, center point designation
	Speed control	1-axis speed control, 2-axis speed control*, 3-axis speed control*, 4-axis speed control*
	Speed-position switching control	INC mode, ABS mode
	Position-speed switching control	INC mode
	Current value change	Positioning data, Start No. for a current value changing
	NOP instruction	Provided
	JUMP instruction	Unconditional JUMP, Conditional JUMP
	LOOP, LEND	Provided
	High-level positioning control	Block start, Condition start, Wait start, Simultaneous start, Repeated start
Servo amplifier connection method		SSCNETIII/H
Maximum overall cable distance [m]		400
Maximum distance between stations [m]		100
24 V DC external current consumption		250 mA
Compatible CPU module		FX5U, FX5UC, compatible from initial product
Number of occupied input/output points		8 points (Either input or output is available for counting)
Communication with PLC		Carried out by FROM/TO instruction via buffer memory (buffer memory can directly be specified)
Number of connectable modules		FX5U, FX5UC: Up to 16 modules
External dimensions W × H × D (mm)		50 × 90 × 83
MASS (Weight): kg		Approx. 0.3

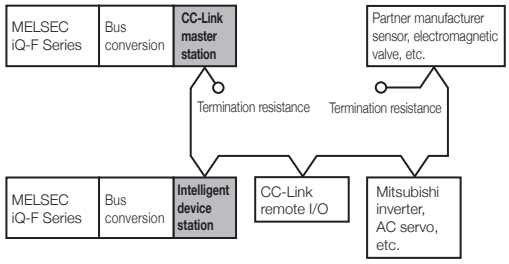
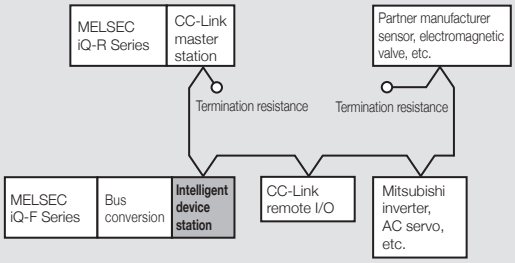
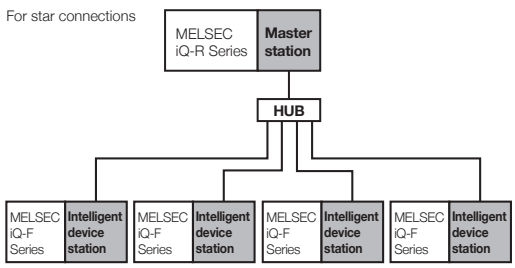
*: Only reference axis speed can be specified as the interpolation speed designation method.

memo

Network/Communication

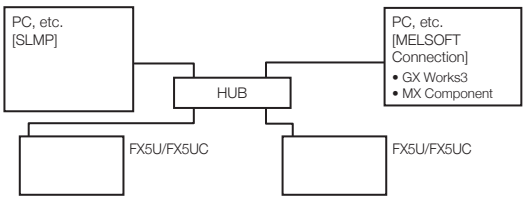
MELSEC iQ-F Series can support not only high-speed networks like CC-Link but also other networks corresponding to control contents such as Ethernet and MODBUS.
In addition, communication function to easily establish simple data link between MELSEC iQ-F Series and to RS-232C and RS-485 devices is also supported.

◇ Open field network: CC-Link

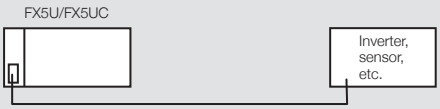
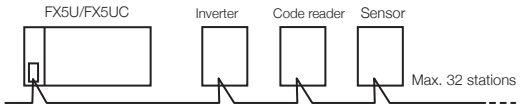
Types	Contents	Total extension length or transmission distance	Station types	Compatible CPU module	
				FX5U	FX5UC
CC-Link V2 (CC-Link V2 system supported by MELSEC iQ-F Series master) 	● Outline This is a CC-Link V2 system where MELSEC iQ-F Series is used as master station. CC-Link V2 system can be established using just MELSEC iQ-F Series. Ver. 1.10 is also supported. ● Scale Remote I/O station: max. 8 modules Intelligent device station or remote device station: max. 8 modules ● Scope Distributed control and central management of lines, configuration of small-scale and high-speed network, etc.	Max. 1200 m	Master station (FX3U-16CCL-M)	○*1	○*1
			Intelligent device station (FX3U-64CCL)	○*1	○*1
CC-Link V2 (CC-Link V2 system with MELSEC iQ-R Series master) 	● Outline MELSEC iQ-F Series can be connected as intelligent device stations for CC-Link V2 system using MELSEC iQ-R series as master station. ● Scale Max. 64 modules ● Scope Distributed control and central management of lines, information transfer from the host network, etc.	Max. 1200 m	Intelligent device station (FX3U-64CCL)	○*1	○*1
CC-Link IE Field 	● Outline MELSEC iQ-F Series can be connected as intelligent device stations for the CC-Link IE field network system using MELSEC iQ-R series as master station. ● Scale Max. 121 modules (1 master station, 120 slave stations) ● Scope Distributed control and central management of lines, information transfer from the host network, etc.	Line topology: 12000 m (With 121 modules connected) Star topology: Depending on the system configuration Ring topology: 12100 m (With 121 modules connected)	Intelligent device station (FX5-CCLIEF)	○	○*2

∗1: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.
∗2: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

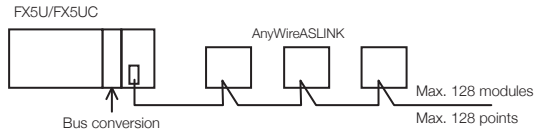
◇ Ethernet

Types	Contents	Total extension length or transmission distance	Compatible CPU module	
			FX5U	FX5UC
FX5U/FX5UC CPU Module 	● Outline Ethernet port is built in. Settings can be done by GX Works3. MELSOFT connection, communication using SLMP, and remote maintenance are supported. ● Scale 1 : n ● Scope Distributed control of lines, central management, data collection, program maintenance, etc.	–	○	○

◇ MODBUS

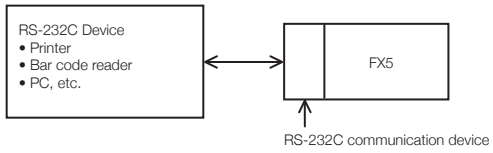
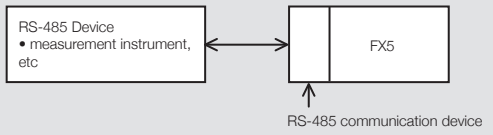
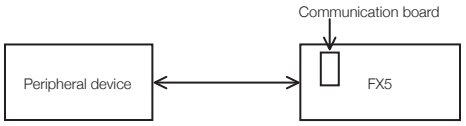
Types	Contents	Total extension length or transmission distance	Compatible CPU module	
			FX5U	FX5UC
FX5U/FX5UC CPU Module (built-in RS-485 port), FX5-485-BD 	● Outline Connectable from RS-485 to MODBUS by using FX5 as master or slave. ● Scale Max. 32 stations ● Scope Configuration of small-size and high-speed network, etc.	Max. 50 m	○	○
FX5-232ADP, FX5-232-BD 	● Outline Connectable from RS-232C to MODBUS by using FX5 as master or slave. ● Scale 1 : 1 ● Scope Data transfer from PCs, bar code readers, printers, various measurement devices, etc.	Max. 15 m	○	○
FX5-485ADP 	● Outline Connectable from RS-485 to MODBUS by using FX5 as master or slave. ● Scale Max. 32 stations ● Scope Distributed control of lines, central management, etc.	Max. 1200 m	○	○

◇ Sensor Solution

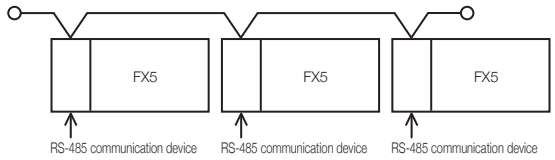
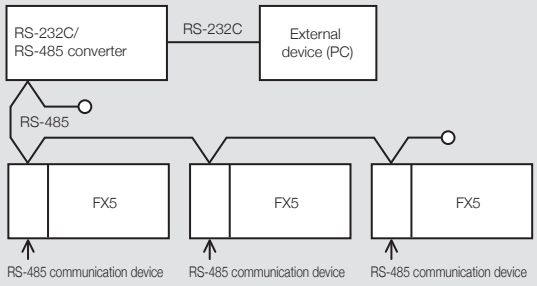
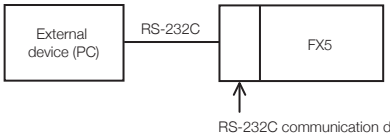
Types	Contents	Total extension length or transmission distance	Compatible CPU module	
			FX5U	FX5UC
FX3U-128ASL-M 	● Outline Master module of AnyWireASLINK Sensor wire-saving system of AnyWireASLINK is configurable. ● Scale Max. 128 modules ● Scope Distributed control of lines and sensor intensive management, etc.	Max. 200 m	○*	○*

*: Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.

◇ General-purpose communication/peripheral device communication

Types	Contents	Distance	Compatible CPU module	
			FX5U	FX5UC
RS-232C Communication (Communication between FX5 and RS-232C device) 	● Outline Data can be transferred from various devices with built-in RS-232C interface by non-protocol communication. ● Scale 1:1 ● Scope Data transfer from PCs, bar code readers, printers, various measurement devices, etc.	Max. 15 m	○	○
RS-485 Communication (Communication between FX5 and RS-485 device) 	● Outline Data can be transferred from various devices with built-in RS-485 interface by non-communication protocol. ● Scale 1:1 (1:n) ● Scope Data transfer from PCs, bar code readers, printers, various measurement devices, etc.	Max. 50 m or 1200 m	○	○
Addition of peripheral device connection port (Connection between FX5 and peripheral device) 	● Outline RS-232C or RS-422 port (GOT port) can be added. ● Scale 1:1 ● Scope Simultaneous connection of two HMI, etc.	[RS-422] Depends on peripheral devices to be connected. [RS-232C] Max.15 m	○	○

◇ Data link

Types	Contents	Total extension length or transmission distance	Compatible CPU module	
			FX5U	FX5UC
N:N network (n:n connection) 	● Outline Enabling a simple data link between FX5 and FX3. ● Scale Max. 8 modules ● Scope Distributed control and central management of lines, etc.	Max. 50 m or 1200 m	○	○
MC protocol (1: n connection to external device) 	● Outline FX5 can be connected as a slave station by setting an external device (PC, etc.) as a master station. Frame 3C: Compatible to Type 1/Type 4 Frame 4C: Compatible to Type 1/Type 4/Type 5 ● Scale 1:n (n = max. 16 modules) ● Scope Distributed control and central management of lines, etc.	Max. 50 m or 1200 m	○	○
MC protocol (1:1 connection to external device) 	● Outline FX5 can be connected as a slave station by setting an external device (PC, etc.) as a master station. Frame 3C: Compatible to Type 1/Type 4 Frame 4C: Compatible to Type 1/Type 4/Type 5 ● Scale 1:1 ● Scope Distributed control and central management of lines, etc.	Max. 15 m	○	○

CC-Link IE Field

CC-Link IE Field is a high speed (1Gbps), high capacity open field network using Ethernet (1000BASE-T).
FX5-CCLIEF is an intelligent function module to connect the FX5 CPU module as an intelligent device station to a CC-Link IE Field network.

FX5-CCLIEF

◇ Features

MELSEC iQ-F Series modules can be connected as intelligent device stations in the CC-Link IE Field network.

◇ Specifications

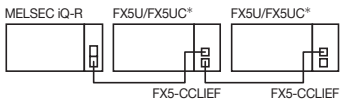
Items		Specifications
Station type		Intelligent device station
Station number		1 to 120 (set by parameter or program)
Communication speed		1 Gbps
Network topology		Line topology, star topology (coexistence of line topology and star topology is also possible), and ring topology
Maximum station-to-station distance		100 m(conforms to ANSI/TIA/EIA-568-B (Category 5e))
Cascade connection		Max. 20 stages
Communication method		Token passing
Maximum number of link points*1	RX	384 points, 48 bytes
	RY	384 points, 48 bytes
	RWr	1024 points, 2048 bytes*2
	RWw	1024 points, 2048 bytes*2
Compatible CPU module		FX5U, FX5UC*3 from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016))
Number of occupied I/O points		8 points (Either input or output is available for counting)
Communication with PLC		Done by FROM/TO instruction via buffer memory (buffer memory can be directly specified)
Number of connectable modules		FX5U, FX5UC: Max. 1 module
External power supply	Power supply voltage/ Current consumption	24 V DC +20%, -15%, ripple (p-p) 5% or less/230 mA
Internal power supply		5 V DC/10 mA
Included Items		FX2NC-100MPCB power cable: (1 m, three wire)
External dimensions W × H × D (mm)		50 × 90 × 103
MASS (Weight): kg		Approx. 0.3

∗1: The maximum number of link points that a master station can assign to one FX5- CCLIEF module.
∗2: 256 points (512 bytes) when the mode of the master station is online (High-Speed Mode).
∗3: Connection with the FX5UC CPU module requires FX5-CNV-IFC or FX5-C1PS-5V.

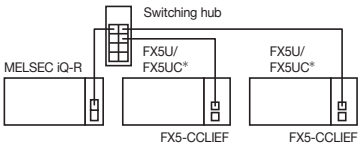
◇ Network topology

Item

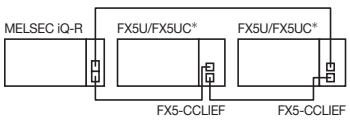
● Line topology



● Star topology



● Ring topology



∗: Connection with FX5UC requires FX5-CNV-IFC or FX5-C1PS-5V.

CC-Link V2

CC-Link V2 is an open network enabling connection of various FA equipment.
A master module to set MELSEC iQ-F Series as CC-Link master, as well as an interface to connect as a CC-Link slave are available.

FX3U-16CCL-M type CC-Link master module

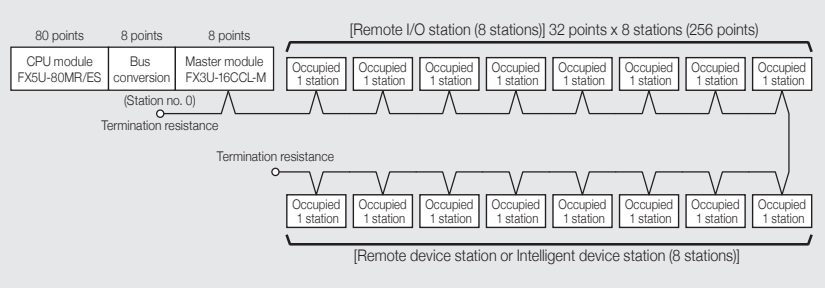
◇ Features

1) A master module setting MELSEC iQ-F Series as master station of CC-Link.
2) Up to 8 remote I/O stations and up to 8 remote device stations or intelligent device stations can be connected to a master station.

◇ Specifications

Items		Specifications							
Supported functions		Master station function (No local station and standby master station functions)							
CC-Link compatible version		Ver. 2.00 compliance (Ver. 1.10 compatible at the time of setting extension cyclic to 1 time)							
Transmission speed		156 kbps/625 kbps/2.5 Mbps/5 Mbps/10 Mbps (setting by a rotary switch)							
Station No.		0 (setting by a rotary switch)							
Max. cable extension length		Max. 1200 m depending on transmission speed							
Max. no. of connection stations		Max. 16 stations • Remote I/O station: max. 8 stations (One station occupies 32 remote I/O points of PLC.) • Total no. of remote device stations + Intelligent device stations: max. 8 stations (However, the total number of RX/RY must be 256 points or less.)							
Max. no of I/O points per system		[FX5U/FX5UC] The total connectable no. of (1) + (2) points below is 512 or less. (1) (No. of PLC actual I/O points) + (No. of occupied intelligent function module points) + (Occupied FX3U-16CCL-M points: 8 points) ≤ 256 (2) (32 × No. of remote I/O stations) ≤ 256							
		CC-Link Ver. 1.10		CC-Link Ver. 2.00					
No. of link points	Extension cyclic setting	Set to 1 time		Set to 2 times		Set to 4 times		Set to 8 times	
	No. of occupied stations	Remote I/O	Remote register	Remote I/O	Remote register	Remote I/O	Remote register	Remote I/O	Remote register
	One station occupied	RX: 32 points RY: 32 points	RWw: 4 points RWr: 4 points	RX: 32 points RY: 32 points	RWw: 8 points RWr: 8 points	RX: 64 points RY: 64 points	RWw: 16 points RWr: 16 points	RX: 128 points RY: 128 points	RWw: 32 points RWr: 32 points
	Two stations occupied	RX: 64 points RY: 64 points	RWw: 8 points RWr: 8 points	RX: 96 points RY: 96 points	RWw: 16 points RWr: 16 points	RX: 192 points RY: 192 points	RWw: 32 points RWr: 32 points		
	Three stations occupied	RX: 96 points RY: 96 points	RWw: 12 points RWr: 12 points	RX: 160 points RY: 160 points	RWw: 24 points RWr: 24 points				
	Four stations occupied	RX: 128 points RY: 128 points	RWw: 16 points RWr: 16 points	RX: 224 points RY: 224 points	RWw: 32 points RWr: 32 points				
Transmission cable		CC-Link specific cable, CC-Link specific high-performance cable, Ver. 1.10 compatible CC-Link specific cable							
RAS function		Automatic return function, slave separating function, abnormal detection by link special relay/register, slave station refresh/Forced clear settings at the time of PLC CPU stop, and cyclic data consistency function							
Compatible CPU module		Supported from the first product of FX5U or FX5UC Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.							
No. of occupied I/O points		8 points (countable either by input or output)							
Communication with PLC		Done by FROM/TO instruction via buffer memory (buffer memory can be directly specified)							
No.of connectable modules		FX5U, FX5UC: Max. 1 module							
External power supply	Power supply voltage/ Current consumption	24 V DC +20%/ -15% ripple (p-p) within 5% (Electricity supplied from terminal block for power supply)/240 mA							
Accessories		Terminal resistors • For standard cable:110 Ω 1/2 W (Color code, brown brown brown) 2 pcs. • For high-performance cable:130 Ω 1/2 W (Color code, brown orange brown) 2 pcs. Special block No. label							
External dimensions W × H × D (mm)		55 × 90 × 87							
MASS (Weight): kg		Approx. 0.3							

◇ Example of system configuration with FX5U



The maximum number of remote I/O stations to be connected is 8 when connecting 80-point type CPU module and FX3U-16CCL-M.
The maximum number of remote I/O stations to be connected is less than 8 when the total number of points exceeds the maximum I/O points (512 points) due to the connection of I/O modules and intelligent function modules.

FX3U-64CCL type CC-Link interface module

◇ Features

MELSEC iQ-F Series can be connected as intelligent device stations of CC-Link.

◇ Specifications

Items		Specifications							
Isolation type		Photocoupler isolation							
CC-Link compatible version		Ver. 2.00 (Ver. 1.10 compliance at the time of setting extension cyclic to 1 time; Buffer memory FX2N-32CCL compatibility also selectable)							
Station types		Intelligent device station							
Station No.		1 to 64 (setting by a rotary switch)							
No. of occupied stations/ Extension cyclic setting		Occupied 1 to 4 stations, set to 1 to 8 times (setting by a rotary switch). Refer to the table below for the details of allowable range.							
Transmission speed		156 kbps/625 kbps/2.5 Mbps/5 Mbps/10 Mbps (setting by a rotary switch)							
Transmission cable		Ver. 1.10 compatible CC-Link specific cable, CC-Link specific high-performance cable							
		CC-Link Ver. 1.10		CC-Link Ver. 2.00					
No. of link points	Extension cyclic setting	Set to 1 time		Set to 2 times		Set to 4 times		Set to 8 times	
	No. of occupied stations*	Remote I/O	Remote register	Remote I/O	Remote register	Remote I/O	Remote register	Remote I/O	Remote register
	One station occupied	RX: 32 points RY: 32 points	RWw: 4 points RWr: 4 points	RX: 32 points RY: 32 points	RWw: 8 points RWr: 8 points	RX: 64 points RY: 64 points	RWw: 16 points RWr: 16 points	RX: 128 points RY: 128 points	RWw: 32 points RWr: 32 points
	Two stations occupied	RX: 64 points RY: 64 points	RWw: 8 points RWr: 8 points	RX: 96 points RY: 96 points	RWw: 16 points RWr: 16 points	RX: 192 points RY: 192 points	RWw: 32 points RWr: 32 points		
	Three stations occupied	RX: 96 points RY: 96 points	RWw: 12 points RWr: 12 points	RX: 160 points RY: 160 points	RWw: 24 points RWr: 24 points				
	Four stations occupied	RX: 128 points RY: 128 points	RWw: 16 points RWr: 16 points	RX: 224 points RY: 224 points	RWw: 32 points RWr: 32 points				
Compatible CPU module		Supported from the first product of FX5U or FX5UC Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.							
No. of occupied I/O points		8 points (countable either by input or output)							
Communication with PLC		Done by FROM/TO instruction via buffer memory (buffer memory can be directly specified)							
No.of connectable modules		FX5U, FX5UC: Max. 1 module							
External power supply	Power supply voltage/ Current consumption	24 V DC +20%/ -15% ripple (p-p) within 5% (Electricity supplied from terminal block for power supply)/220 mA							
External dimensions W × H × D (mm)		55 × 90 × 87							
MASS (Weight): kg		Approx. 0.3							

∗: RX/RY for a high-order word of the last station of "Remote I/O" points is occupied as a system area.

Ethernet

Connecting FX5 to LAN (Local Area Network) via Ethernet enables various data communications and program maintenance.

◇ Built-in Ethernet communication

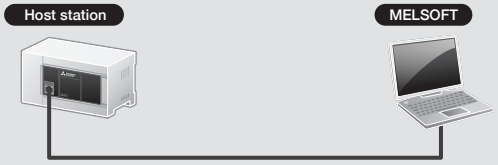
Items		Specifications
		FX5U / FX5UC
Data transmission speed		100/10Mbps
Communication mode		Full duplex/Half duplex*1
Interface		RJ45 connector
Transmission method		Base band
Maximum segment length (The distance between hub and node)		100 m
Cascade connection	100BASE-TX	Max. 2 stages*3
	10BASE-T	Max. 4 stages*3
Supported protocol		MELSOFT connection
		SLMP (3E frame)
		Socket communication
		Predefined protocol support
No. of connections		Total of 8 connections for MELSOFT connection, SLMP, socket communication, and Predefined protocol support (Up to 8 external devices are accessible to one CPU module at a time.)
IP address		Initial value: 192.168.3.250
Isolation method		Pulse transformer isolation
Hub*1		A hub having 100BASE-TX or 10BASE-T port*4 can be used
Cable used*2	When connecting 100BASE-TX	Ethernet standard-compatible cable Category 5 or higher (STP cable)
	When connecting 10BASE-T	Ethernet standard-compatible cable Category 3 or higher (STP cable)

∗1: IEEE802.3x flow control is not supported.
∗2: Straight cables can be used. When connecting a CPU module with GOTs directly through Ethernet cables, crossover cables (category 5e or less) can also be used.
∗3: No. of connectable stages when using a repeater hub. For the no. of connectable stages when a switching hub is in use, check with the manufacturer of the switching hub.
∗4: The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standards.

● Outline of Functions

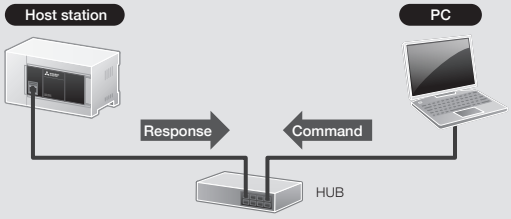
MELSOFT connection

The CPU module is connected to an engineering tool (GX Works3) without using a hub but only by one Ethernet cable. This connection communicates by only specifying the connection destination without setting an IP address.



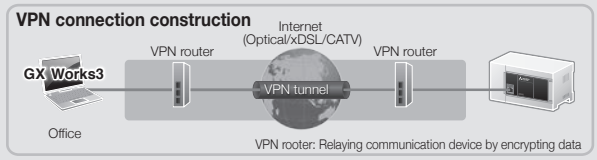
Communication by SLMP

SLMP (SeamLess Message Protocol) can read/write the device data of PLC from the PC via the Ethernet communication (up to 8 connections).



Remote maintenance

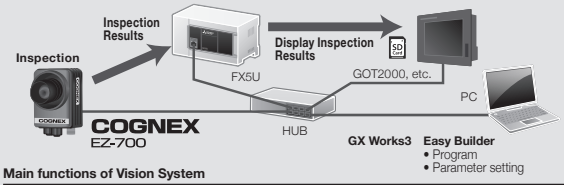
Remote maintenance enables comfortable remote maintenance and monitoring. Realizes flexible maintenance using Internet regardless of where base is located!



VPN (Virtual Private Network)*
This is a technology that connects networks by encrypting the communication contents. In combination with the Internet, VPN allows remotely separated networks to be accessed as if connected with each other via LAN.
∗: A VPN connection service support partner will help you support VPN system construction.

Vision system

An image inspection device with a high cost performance can be configured by combining FX5U and EZ-700 series into an all-in-one system.



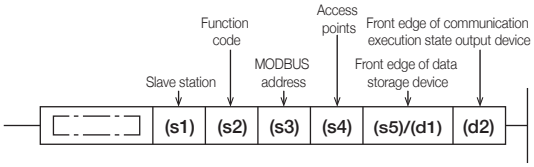
Main functions of Vision System

- Presence Inspection
- Fault Test
- Dimensional Inspection
- Flaw/Stain Inspection
- Burr Inspection
- Positioning
- Inclination Inspection
- Foreign Matter Inspection
- Number Counting
- Code Reading
- Character Recognition, etc.

MODBUS

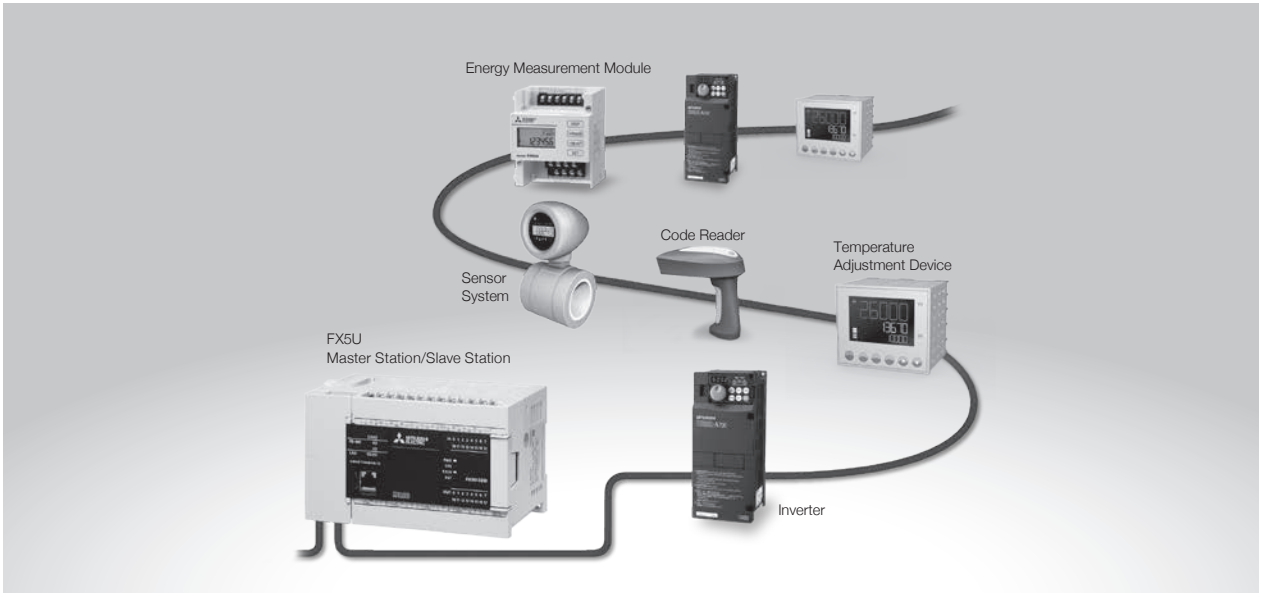
FX5 can be connected to various MODBUS communication devices as master station or slave station of the MODBUS communication.

◇ Outline of Functions

Outline
• When using as a master station, a slave station can be controlled by setting parameters and MODBUS dedicated instruction [ADPRW].    • When using as a slave station, an automatic response can be provided by setting parameters. In addition, MODBUS address can be allocated by setting parameters.

◇ List of Function Codes

Function code	Details
01H	Coil read (multiple points possible)
02H	Input read (multiple points possible)
03H	Storage register read (multiple points possible)
04H	Input register read (multiple points possible)
05H	Coil write (1 point only)
06H	Storage register write (1 point only)
0FH	Multiple points of coil write
10H	Multiple points of storage register write



Sensor Solution

Sensor wire-saving system of AnyWireASLINK is easily configurable.

FX3U-128ASL-M type AnyWireASLINK Master Module

◇ Characteristics

1) A master module enables MELSEC iQ-F series to be connected to the AnyWireASLINK sensor wire-saving system of Anywire Corporation.
2) For FX3U-128ASL-M type AnyWireASLINK master module, a unique transmission method of AnyWire is utilized in a transmission signal having a power supply (equiv. to 24 V DC, MAX. 2 A). It enables wire saving of max. 200 m using 4-core or 2-core power cables.
3) When using ASLINKAMP or ASLINK SENSOR, settings can be changed by a ladder program, engineering tool or GOT. Set-up changes can be done remotely.

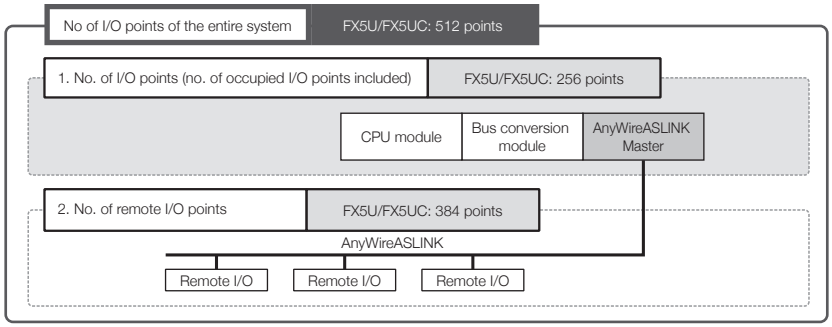
◇ Safety Precautions

FX3U-128ASL-M is jointly developed/ manufactured with Anywire Corporation. Guarantee details are different from other PLC products. Refer to manuals for guarantees/ specifications.

◇ Specifications

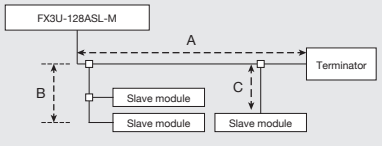
Items	Specifications
Transmission clock	27.0 kHz
Max. transmission distance (total extension length)	200 m
Transmission method	DC power supply superimposing total frame/cyclic method
Connection configuration	Bus type (Multi-drop method, T-branch method, tree branch method)
Transmission protocol	Dedicated protocol (AnyWireASLINK)
Error control	Double verification method, checksum
No. of connection I/O points	Max. 128 points
No. of connection modules	Max. 128 modules (variable depending on current consumption)
Max. no of I/O points per system	No. of input points of slave module + No. of output points of slave module ≤ 128 points
RAS function	Transmission line disconnection position detection function, transmission line shortage detection function, transmission power drop detection function
AnyWireASLINK transmission line	UL supported general-use 2-line cable (VCTF, VCT 1.25 mm^2, 0.75 mm^2, rated temperature: 70°C or higher) UL supported general-use electric wire (1.25 mm^2, 0.75 mm^2, rated temperature: 70°C or higher), dedicated flat cable (1.25 mm^2, 0.75 mm^2, rated temperature: 90°C)
24 V DC power supply line	UL supported general-use 2-line cable (VCTF, VCT 0.75 to 2.0 mm^2, rated temperature: 70°C or higher) UL supported general-use electric wire (0.75 to 2.0 mm^2, rated temperature: 70°C or higher), dedicated flat cable (1.25 mm^2, 0.75 mm^2, rated temperature: 90°C)
Compatible CPU module	Supported from the first product of FX5U or FX5UC Connection with FX5U or FX5UC requires FX5-CNV-BUS or FX5-CNV-BUSC.
No. of occupied I/O points	8 points (countable either by input or output)
Communication with PLC	Done by FROM/TO instruction via buffer memory (buffer memory can be directly specified)
No.of connectable modules	FX5U, FX5UC: Max. 1 module
External dimensions W x H x D (mm)	43 × 90 × 95.5
MASS (Weight): kg	Approx. 0.2

◇ Example of remote I/O allocation of the entire system



◇ Example of AnyWireASLINK configuration

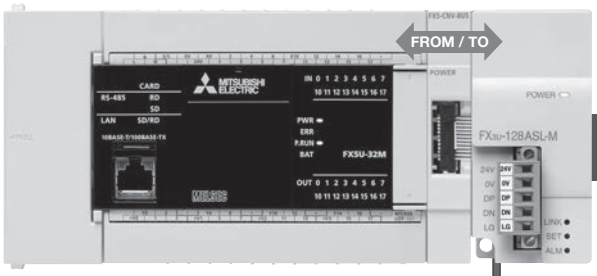
The "total extension length" of transmission distance of the system: A + B + C ≤ 200 m. Up to 3 terminators can be set per system and a terminator needs to be mounted to the part furthest from the master module and to a branch line exceeding 30 m.



Your requests for reduced wiring, detecting of disconnection/short circuit, setting of sensor sensitivity, and status monitoring
can be satisfied by MELSEC iQ-F.

Powered by Anywire

▶ Example of system configuration (AnyWireASLINK)



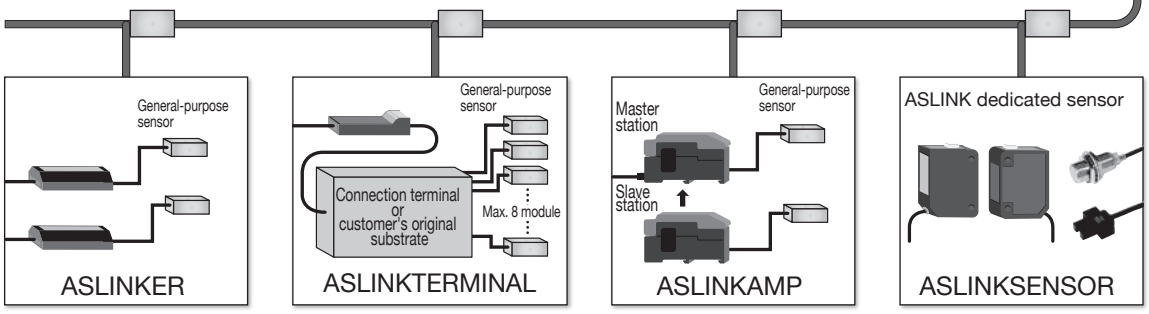
FX3U-128ASL-M

AnyWireASLINK sensor system is connectable

Detection of short circuit and disconnection, setting of sensor sensitivity, address automatic recognition

Total extension length of 200 m*1 *2, Max. 128 points and Max. 128 modules*2 connectable

*1: Total extension distance including the portion of branch line *2: Subject to change based upon current consumption of each slave module



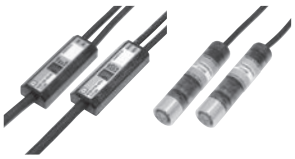
Sensor disconnection is detectable

Disconnection and short-circuit of sensors are detectable
Setting of sensor sensitivity or status monitoring are possible

AnyWireASLINK

Max. no. of I/O: 2 points

■ASLINKER



Cable lamp Connector type

Max. no. of I/O: 8 points

■ASLINKTERMINAL

8-point input terminal 8-point output terminal

General-purpose sensor head connection

■ASLINKAMP

Max. 16 modules can be added

Directly connected sensors

■ASLINKSENSOR

Optical sensor Photo interrupter

General-purpose Communication Devices

Various communication functions can be added easily using an expansion board or expansion adapter.
Communications with data link or external serial interface device can be realized easily by adding an expansion board.

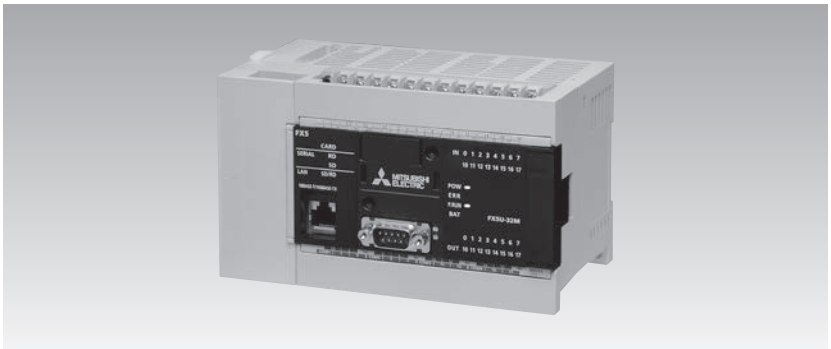
Expansion board (for communication)

◇ Features

1) Communication expansion board can be added to FX5U CPU module.
2) Communication function can be added inexpensively.

Refer to the following items for usage method of expansion board.

- "N:N network"
- "MC protocol"
- "Non-protocol communication"
- "Connection to peripheral device"
- "Inverter communication function"



◇ Specifications

Model/Characteristics	Items	Specifications
FX5-232-BD RS-232C communication expansion board 	Transmission standard	Conforming to RS-232C standard
	Max. transmission distance	15 m
	External device connection method	9-pin D-sub (male)
	Isolation	No isolation (between communication line and CPU)
	Communication method	Half-duplex bidirectional/Full-duplex bidirectional*
	Communication speed	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
	Terminal resistors	—
	Compatible CPU module	FX5U CPU module
	No. of occupied I/O points	0 points (No occupied points)
	External dimensions W × H × D (mm)	38 × 51.4 × 18.2
	MASS (Weight): kg	Approx. 0.02

*: The communication method and communication speed vary depending upon the communication type.

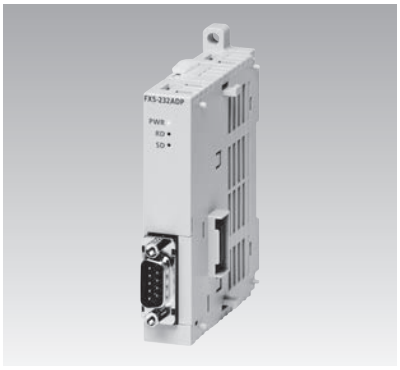
Model/Characteristics	Items	Specifications
FX5-485-BD RS-485 communication expansion board 	Transmission standard	Conforming to RS-485 and RS-422 standards
	Max. transmission distance	50 m
	External device connection method	European-type terminal block
	Isolation	No isolation (between communication line and CPU)
	Communication method	Half-duplex bidirectional/Full-duplex bidirectional*
	Communication speed	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
	Terminal resistors	Built in (OPEN/110 Ω/330 Ω)
	Compatible CPU module	FX5U CPU module
	No. of occupied I/O points	0 points (No occupied points)
	External dimensions W × H × D (mm)	38 × 51.4 × 30.5
	MASS (Weight): kg	Approx. 0.02

*: The communication method and communication speed vary depending upon the communication type.

Model/Characteristics	Items	Specifications
FX5-422-BD-GOT RS-422 communication expansion board (GOT connection) 	Transmission standard	Conforming to RS-422 standard
	Max. transmission distance	As per GOT specifications
	External device connection method	8-pin MINI-DIN (female)
	Isolation	No isolation (between communication line and CPU)
	Communication method	Half-duplex bidirectional
	Communication speed	9600/19200/38400/57600/115200 (bps)
	Terminal resistors	—
	Compatible CPU module	FX5U CPU module
	No. of occupied I/O points	0 points (No occupied points)
	External dimensions W × H × D (mm)	38 × 51.4 × 15.4
	MASS (Weight): kg	Approx. 0.02

FX5-232ADP type RS-232C communication expansion adapter

◇ Features



Isolation type RS-232C communication adapter
Refer to the "MC protocol", "Non-protocol communication", "Connection to peripheral device" for more details of functions.

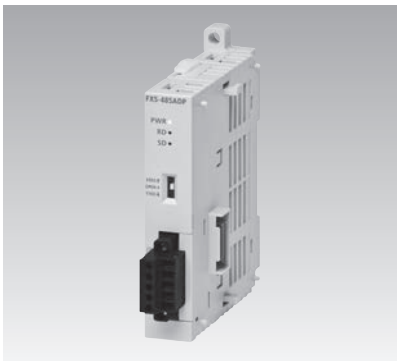
◇ Specifications

Items	Specifications
Transmission standard	Conforming to RS-232C standard
Max. transmission distance	15 m
Isolation	Photocoupler isolation (between communication line and CPU)
External device connection method: connector	9-pin D-sub (male)
Communication method	Half-duplex bidirectional/Full-duplex bidirectional
Communication speed	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
No. of occupied I/O points	0 points (No occupied points)
Current consumption (internal supply)	5 V DC 30 mA/24 V DC 30 mA
No.of connectable modules	FX5U, FX5UC: Up to 2 communication adapters at left side of CPU module
Compatible CPU module	Supported from the first product of FX5U or FX5UC
External dimensions W × H × D (mm)	17.6 × 106 × 74
MASS (Weight): kg	Approx. 0.08

∗: The communication method and communication speed vary depending upon the communication type.

FX5-485ADP type RS-485 communication expansion adapter

◇ Features



Isolation type RS-485 communication adapter
Refer to the "N:N network", "MC Protocol", "Non-protocol communication", "Connection to peripheral device", "Inverter communication function" for more details of functions.

◇ Specifications

Items	Specifications
Transmission standard	Conforming to RS-485 and RS-422 standards
Max. transmission distance	1200 m
Isolation	Photocoupler isolation (between communication line and CPU)
External device connection method	European-type terminal block
Communication method	Half-duplex bidirectional/Full-duplex bidirectional
Communication speed	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
Terminal resistors	Built in (OPEN/110 Ω/330 Ω)
No. of occupied I/O points	0 points (No occupied points)
Current consumption (internal supply)	5 V DC 20 mA/24 V DC 30 mA
No.of connectable modules	FX5U, FX5UC: Up to 2 communication adapters at left side of CPU module
Compatible CPU module	Supported from the first product of FX5U or FX5UC
External dimensions W × H × D (mm)	17.6 × 106 × 74
MASS (Weight): kg	Approx. 0.08

∗: The communication method and communication speed vary depending upon the communication type.

N:N Network

Using the built-in RS-485 port, RS-485 communication expansion board, or expansion adapter enables data link of 2 to 8 PLCs easily.

RS-485 communication device

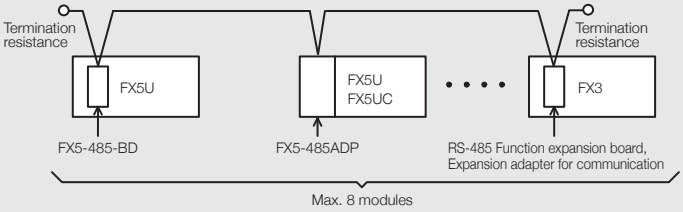
Model	Types	Compatible CPU module	
		FX5U	FX5UC
FX5-485-BD	Expansion board	○	×
FX5-485ADP	Expansion adapter	○	○
—	Built-in RS-485 port	○	○

N:N network function

◇ Features

1) Data link can be realized by a simple program for connecting up to 8 modules of FX5 or FX3.
2) The bit device (0 to 64 points) and word device (4 to 8 points) are automatically linked between each station. The ON/OFF state of other stations and data register values can be obtained by the device allocated on the local station.

◇ System configuration example



◇ Specifications of N:N network function

Items		Specifications
Transmission standard		Conforming to RS-485 standard
Total extension length		Configuration only using FX5-485ADP: 1200 m or less Configuration using FX5-485ADP, FX3U-485ADP: 500 m or less Configuration other than above: 50 m or less (at coexisting of built-in RS-485 port, FX5-485-BD and 485-BD for FX3: 50 m or less)
Communication method/Transmission speed		Half-duplex bidirectional, 38400 bps
No.of connectable modules		Max. 8 modules
No. of link points	Pattern 0	Bit device: 0 points Word device: 4 points
	Pattern 1	Bit device: 32 points Word device: 4 points
	Pattern 2	Bit device: 64 points Word device: 8 points
Link refresh time (ms)	Pattern 0	Based on the no. of connection modules, 2 modules (20), 3 modules (29), 4 modules (37), 5 modules (46), 6 modules (54), 7 modules (63), 8 modules (72)
	Pattern 1	Based on the no. of connection modules, 2 modules (24), 3 modules (35), 4 modules (45), 5 modules (56), 6 modules (67), 7 modules (78), 8 modules (88)
	Pattern 2	Based on the no. of connection modules, 2 modules (37), 3 modules (52), 4 modules (70), 5 modules (87), 6 modules (105), 7 modules (122), 8 modules (139)
Connection device with PLC	FX5U	FX5-485ADP, FX5-485-BD
	FX5UC	FX5-485ADP
	FX3S	FX3G-485-BD (-RJ) or FX3S-CNV-ADP+FX3U-485ADP (-MB)
	FX3G	FX3G-485-BD (-RJ) or FX3G-CNV-ADP+FX3U-485ADP (-MB)
	FX3GC	FX3U-485ADP(-MB)
	FX3U, FX3UC*	FX3U-485-BD or Function expansion board+FX3U-485ADP(-MB)
Compatible CPU module		FX5U, FX5UC, FX3S, FX3G, FX3GC, FX3U, FX3UC

*: Function expansion board cannot be connected to FX3UC-□□MT/D and FX3UC-□□MT/DSS. Specific adapter can be directly connected.

MC Protocol

Data link of multiple PLCs can be realized by setting a CPU module or external device as a master station using MC protocol (serial communication).
Since data link is done by command from the external device, it is suitable for configuration of data management and control system by the external device as the main controller.

RS-232C, RS-485 communication device

Model	Types	Compatible CPU module	
		FX5U	FX5UC
FX5-232-BD	Expansion board	○	×
FX5-232ADP	Expansion adapter	○	○
FX5-485-BD	Expansion board	○	×
FX5-485ADP	Expansion adapter	○	○
—	Built-in RS-485 port	○	○

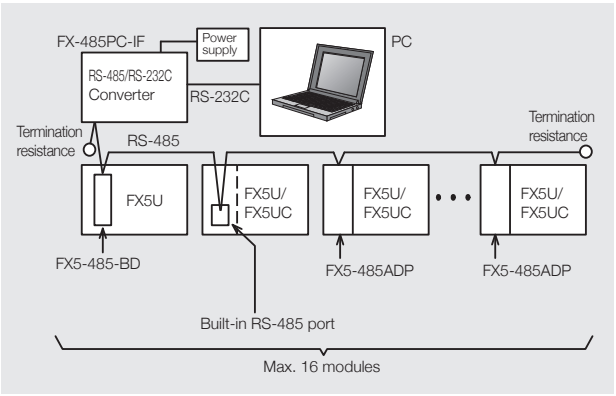
MC protocol function

◇ Features

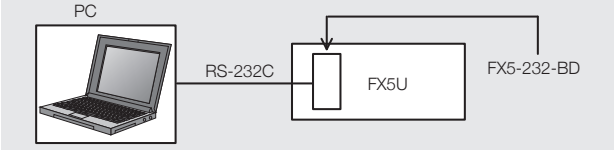
1) Using the RS-485 communication device enables connection of up to 16 modules of FX5U/FX5UC, and data can be transferred according to commands from the PC.
2) Using the RS-232C communication device enables 1 : 1 data transfer with the PC.
3) Communication by the MC protocol QnA compatible 3C/4C frame can be done. (Type 1/Type 4/Type 5)

◇ System configuration example

1) 1 : n connection using RS-485 communication



2) 1 : 1 connection using RS-232C communication



◇ MC protocol function specifications

Items		Specifications
Transmission standard		Conforming to RS-485/RS-232C standard
Total extension length	RS-485	When using FX5-485ADP: 1200 m or less When using the built-in RS-485 port or FX5-485-BD: 50 m or less
	RS-232C	15 m or less
Communication method		Half-duplex bidirectional
Transmission speed		300/600/1200/2400/4800/9600/19200/38400/57600/115200 bps
No.of connectable modules		Max. 16 modules
Protocol types		MC protocol (dedicated protocol) 3C Frame (Type1/Type4) / 4C Frame (Type1/Type4/Type5)
RS-485 connection device	FX5U, FX5UC	Built-in RS-485 port, FX5-485-BD or FX5-485ADP
RS-232C connection device	FX5U, FX5UC	FX5-232-BD or FX5-232ADP
Compatible CPU module		FX5U, FX5UC

RS-232C/RS-485 Non-protocol communication

MELSEC iQ-F Series modules can communicate with printers, code readers, measurement instruments, etc. having an interface in accordance with RS-232C/RS-485 (RS-422).
Communication is performed using sequence programs (RS2 instruction).

RS-232C communication

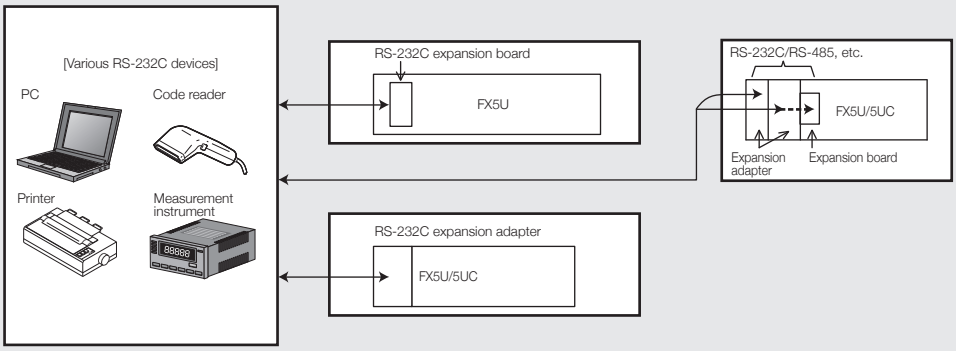
◇ RS-232C communication device

Model (No. of channels)	Communication method	Isolation	Maximum transmission distance	Control instruction	Compatible CPU module	
					FX5U	FX5UC
FX5-232-BD (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	No isolation (between communication line and CPU)	15 m	RS2 instruction	○ (Max. 1 module)	×
FX5-232ADP (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	Photocoupler isolation (between communication line and CPU)	15 m	RS2 instruction	○ (Max. 2 modules)	○ (Max. 2 modules)

◇ Communication specification

Refer to the specifications of each communication device for the details of RS-232C device specifications.

◇ System configuration



RS-485 (RS-422) communication

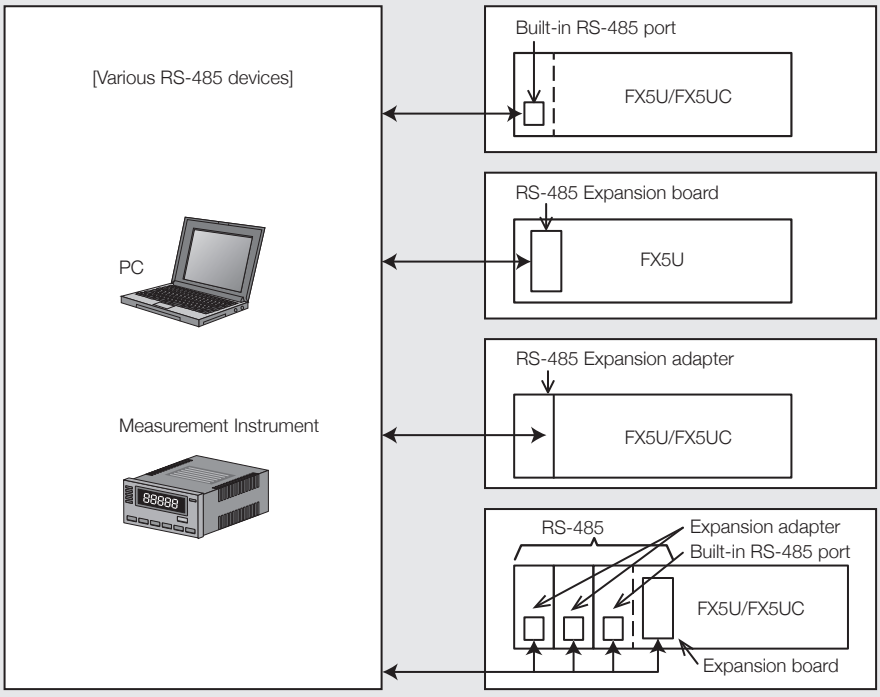
◇ RS-485 (RS-422) communication device

Model (No. of channels)	Communication method	Isolation	Maximum transmission distance	Control instruction	Compatible CPU module	
					FX5U	FX5UC
FX5-485-BD (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	No isolation (between communication line and CPU)	50 m	RS2 instruction	○ (Max. 1 module)	×
FX5-485ADP (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	Photocoupler isolation (between communication line and CPU)	1200 m	RS2 instruction	○ (Max. 2 modules)	○ (Max. 2 modules)
Built-in RS-485 port (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	No isolation (between communication line and CPU)	50 m	RS2 instruction	○	○

◇ Communication specification

Refer to the specifications of each communication device for the details of RS-485 device specifications.

◇ System configuration example



Connection to Peripheral Devices

Installing RS-422/RS-232C communication devices enables addition of connection ports with peripheral devices.
PLC programming devices such as PC and HMI (GOT) can be connected to the added ports.

RS-232C communication

◇ RS-232C communication device

Model (No. of channels)	Communication method	Isolation	Maximum transmission distance	Compatible CPU module	
				FX5U	FX5UC
FX5-232-BD (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	No isolation (between communication line and CPU)	15 m	○ (Max. 1 module)	×
FX5-232ADP (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional	Photocoupler isolation (between communication line and CPU)	15 m	○ (Max. 2 modules)	○ (Max. 2 modules)

◇ Communication specification

Refer to the specifications of each communication device for the detailed specifications of RS-232C peripheral devices (programming protocol).

◇ Connection cable for RS-232C communication device and peripheral devices

The main connection cables are as follows:

Connection destination	Cable
DOS/V PC (9-pin D-SUB)	FX-232CAB-1
HMI (GOT)	Use the specific cable or wire for RS-232C connection of each HMI.

◇ Concurrent use of peripheral device

Connect an engineering tool such as PC software to either one of peripheral devices to avoid programs from being changed by multiple peripheral devices.

RS-422 (GOT) communication

◇ RS-422 communication device

Model (No. of channels)	Communication method	Isolation	Maximum transmission distance	Compatible CPU module	
				FX5U	FX5UC
FX5-422-BD-GOT (1 ch) 	Half-duplex bidirectional	No isolation (between communication line and CPU)	As per GOT specifications	○ (Max. 1 module)	×

◇ Communication specification

Refer to the manual of GOT.

◇ Communication cable

Use a dedicated cable for GOT.

Inverter Communication Function

Dedicated instructions for Mitsubishi inverter protocol and communication control are built in FX5. Connecting an inverter enables simple control of inverter.

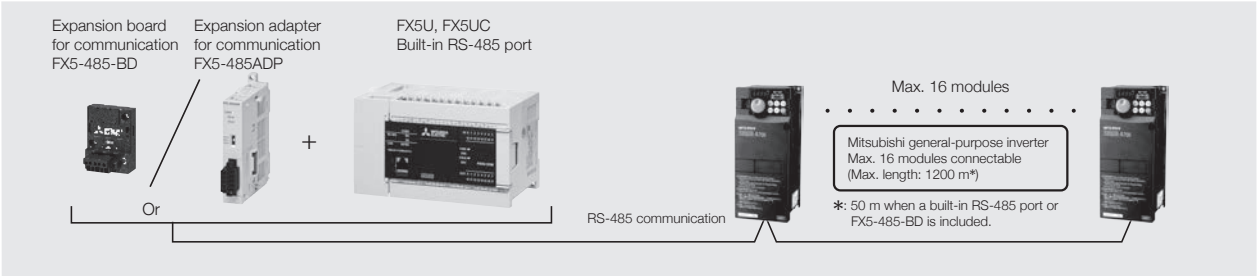
RS-485 communication

◇ RS-485 communication device

Model (No. of channels)	Communication method	Isolation	Maximum transmission distance	Control instruction	Compatible CPU module	
					FX5U	FX5UC
FX5-485-BD (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional*	No isolation (between communication line and CPU)	50 m	Inverter instruction	○ (Max. 1 module)	×
FX5-485ADP (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional*	Photocoupler isolation (between communication line and CPU)	1200 m	Inverter instruction	○ (Max. 2 modules)	○ (Max. 2 modules)
Built-in RS-485 port (1 ch) 	Half-duplex bidirectional/ Full-duplex bidirectional*	No isolation (between communication line and CPU)	50 m	Inverter instruction	○	○

∗: Half-duplex bidirection in case of connecting to inverter.

◇ System configuration example



● **Connectable Mitsubishi general-purpose inverter**

FREQROL series

[Connectable Models]
FREQROL series
A800/F700PJ/F700P/A700/E700/E700EX (sensorless servo) /D700/V500

Engineering Tool

We are proud to offer you the "MELSOFT GX series" for easy programming and enjoyable operation of Mitsubishi PLC.

A special catalog (separate booklet) of MELSOFT iQ Works is available. (Functions shown in the catalog vary according to PLC model.)
For details, refer to the following catalog:
"MELSOFT iQ Works catalog" L(NA)08232ENG

MELSOFT iQ Works FA Integrated Engineering Software

◇ List of Engineering Tools

Types/Models		Compatible CPU module	
		FX5U	FX5UC
MELSOFT iQ Works (English version)*	Model: SW2DND-IQWK-E (DVD-ROM)	○	○
MELSOFT GX Works3 (English version)*	Model: SW1DND-GXW3-E (DVD-ROM)	○	○

*: Connection cable and interface are optional.

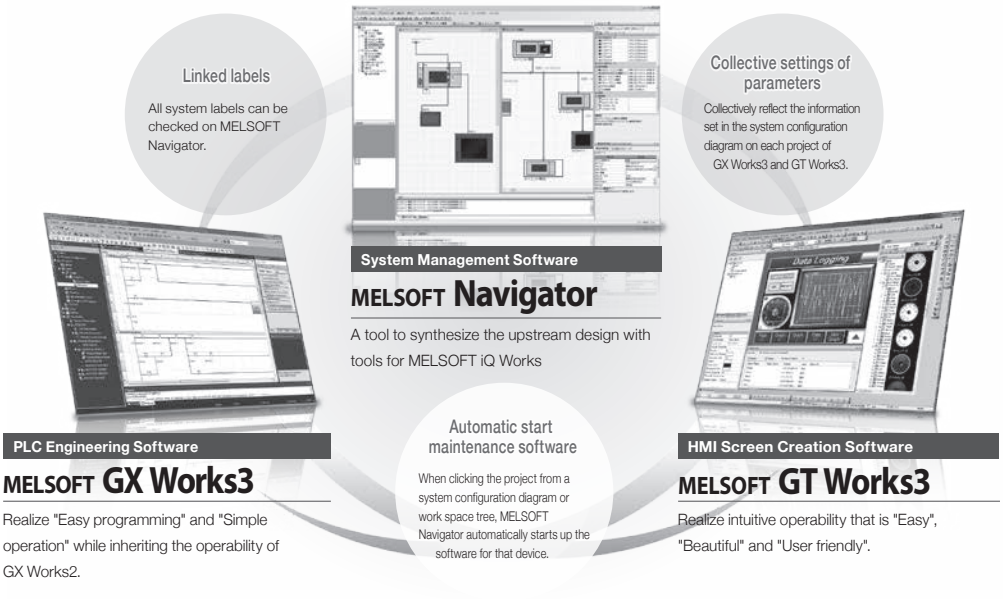
◇ Operation Environment

Items		Contents		
PC Module	OS*1 English Version	Microsoft® Windows® 10 Microsoft® Windows® 10 Home Microsoft® Windows® 10 Enterprise Microsoft® Windows® 10 Education Microsoft® Windows® 8.1 Microsoft® Windows® 8.1 Pro Microsoft® Windows® 8.1 Enterprise Microsoft® Windows® 8	Microsoft® Windows® 8 Pro Microsoft® Windows® 8 Enterprise Microsoft® Windows® 7 Starter Microsoft® Windows® 7 Home Premium Microsoft® Windows® 7 Professional Microsoft® Windows® 7 Enterprise Microsoft® Windows® 7 Ultimate Microsoft® Windows Vista® Home Basic	Microsoft® Windows Vista® Home Premium Microsoft® Windows Vista® Business Microsoft® Windows Vista® Ultimate Microsoft® Windows Vista® Enterprise Microsoft® Windows® XP Home Edition, Service Pack3 Microsoft® Windows® XP Professional, Service Pack3
	CPU	Intel® Core™2 Duo 2 GHz or more recommended		
	Memory Requirements	1 GB or more recommended*2		
Hard Disc Free Space		10 GB or more		
Disc Drive		DVD-ROM supported disc drive		
Display		Resolution 1024 × 768 dots or more		
Connection to PLC		Optional connection cable and interface are necessary. [PC Communication Port] Connectable from Ethernet port or RS-232C port. FU5U PLC : Directly connectable by Ethernet, or connectable by RS-232C communication expansion adapter or RS-232C communication expansion board. FU5UC PLC : Directly connectable by Ethernet or connectable by RS-232C communication expansion adapter. Refer to the "PC and PLC Connection Method" below for the details of connection method and required cable types.		
Compatible CPU module		FX5U, FX5UC (Refer to the specific catalog above for the details of FX series, L series, Q series, and iQ-R series.)		

*1: 64-bit versions of Windows Vista® and Windows® XP are not supported.
*2: 2 GB or more recommended for 64-bit version

In a seamless and integrated engineering environment, the total cost can be reduced!

MELSOFT Navigator is sold as a set of products including GX Works3, GT Works3 and MT Works2 (MELSOFT iQ Works). You don't need to purchase them separately.



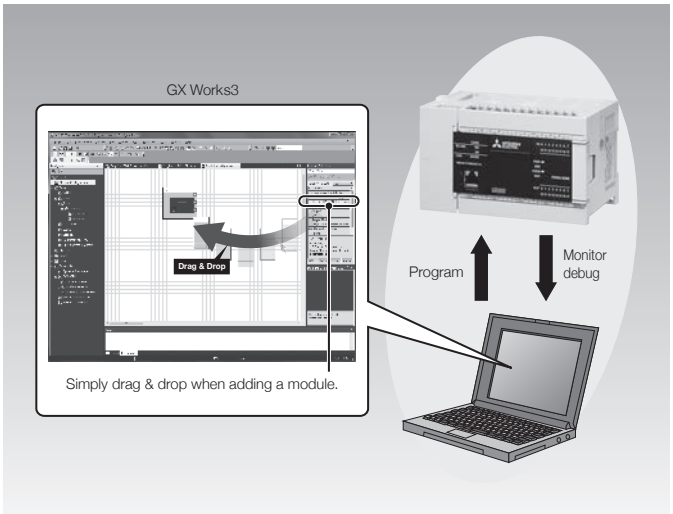
MELSOFT GX Works3 PLC Engineering Software

● **GX Works3 ..... Model: SW1DND-GXW3-E**

A special catalog (separate booklet) of MELSOFT GX Works3 is available.
(Functions shown in the catalog vary according to PLC model.)
For details, refer to the following catalog available on request:
"MELSOFT GX Works3 catalog" L(NA)08334ENG

◇ Features

- Achieving an easy and intuitive programming by only making "selections" in a graphical environment with module configuration diagram and module label/ module FB.
- Supporting various applications (parameter settings of simple motion module, creation of positioning data, parameter setting and servo adjustments of servo amplifier).
- Complying to the international standard IEC 61131-3 for engineering software and supporting the modularized and structured programming. Programming languages such as ladder, ST, FBD/ LD are available.
- Enabling transmitting/receiving of the data between an external device and the CPU module by matching the protocol of the external device. (Communication protocol support function)



MELSOFT MX series Integrated Data Link Software

● **MX Component (Communication ActiveX® Library) Model: SW4DNC-ACT-E**
● **MX Sheet (Excel® Communication Support Tool) Model: SW2DNC-SHEET-E**
● **MX Works (a set product of MX Component and MX Sheet)**
Model: SW2DNC-SHEETSET-E

◇ Features

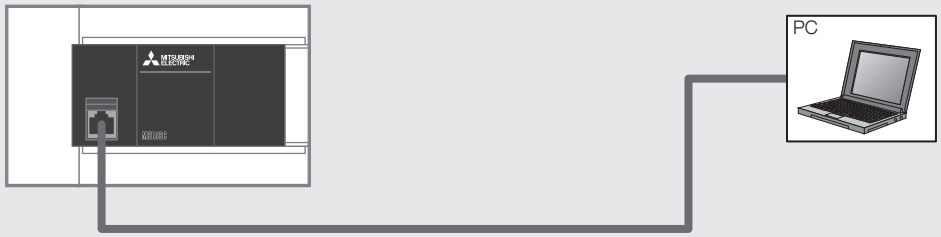
- A group of middleware remarkably improving development efficiency in the system configuration.
- Familiar Excel® settings on the screen enables easy data access of the on-site PLC without any program.
- Enabling the system to be configurable without considering a communication protocol.
- Enabling monitoring of on-site system only by setting parameters on the screen.

PC and PLC Connection Method and Required Equipment

◇ In case of connection between Ethernet port on the PC side

Connecting to the Ethernet port

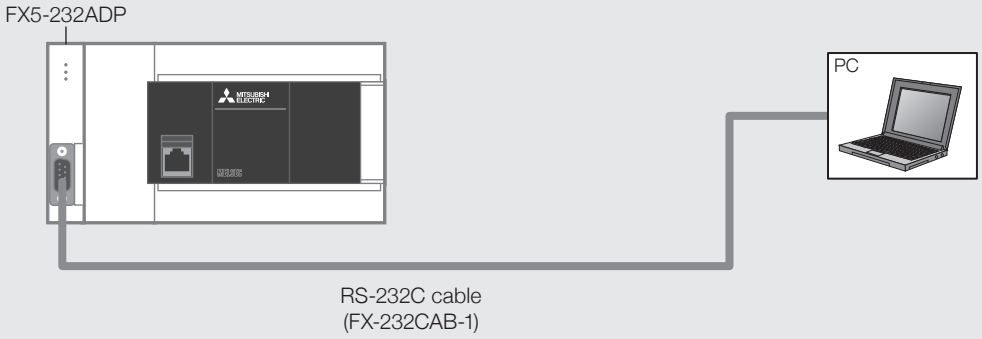
Configuration example



◇ In case of connection between RS-232C port on the PC side

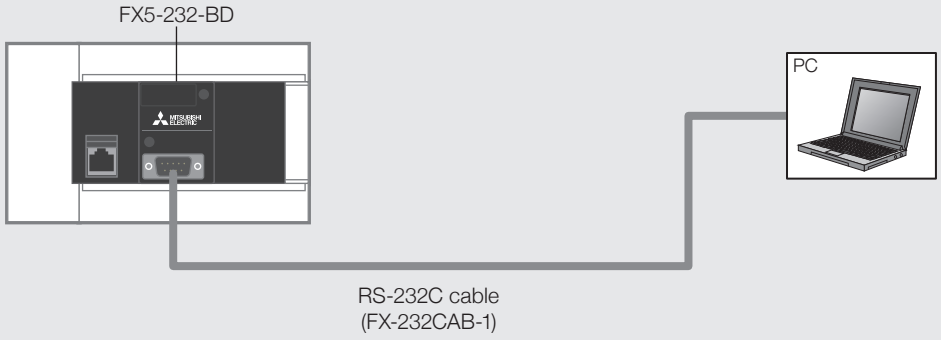
(1) Connection with the RS-232C port attached to PLC (using FX5-232ADP)

Configuration example



(2) Connection with the RS-232C port attached to PLC (using FX5-232-BD)

Configuration example



Compatible Versions of Software

The followings are compatible versions of each software.
New versions may be required due to addition of functions and products. Please refer to the manuals for more details.

Category	Type	Compatible version		
		FX5U	FX5UC	Precautions
Software for PLC	iQ Works	Ver. 2.07H or above	Ver. 2.07H or above	Use the latest version when new functions are added.
	GX Works3	Ver. 1.007H or above	Ver. 1.007H or above	
Software for GOT (GOT1000 series, GOT2000 series)	GT Works3	Ver. 1.126G or above	Ver. 1.126G or above	Compatible to the device scope. Refer to the GOT manual for other compatible items.

Option/Related Products

We are pleased to offer you a wide variety of our products including SD memory cards, batteries, connection cables for PLC as well as interfaces for signal exchange.

SD Memory Card

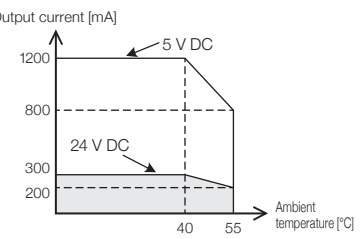
Model/Appearance	Contents		
NZ1MEM-2GBSD **NZ1MEM-4GBSD** 	NZ1MEM-2GBSD	Type	SD memory card
		Capacity	2 GB
	NZ1MEM-4GBSD	Type	SDHC memory card
		Capacity	4 GB

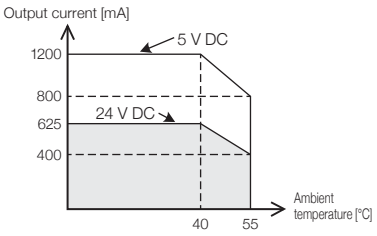
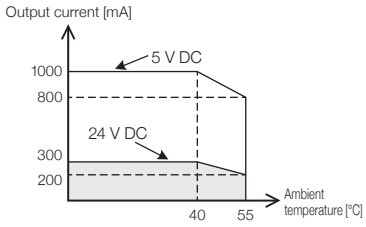
Battery

Model/Appearance	Contents
FX3U-32BL 	The battery can be used to retain (latch) the status of the device memory or clock data before a power failure. At the time of delivery from the factory, the battery is not built in the CPU module. Please make arrangements if required. Setting of parameter is required for power failure retention.

Extension Device

The extension cable for connecting to the right side of the front-stage device has been attached to the extension module (extension cable type).

Model/Characteristics	Items		Specifications
◆Bus Conversion Module			
FX5-CNV-BUS (FX5 (extension cable type) → FX3 extension)  Conversion module for connecting FX3 extension module to FX5U and FX5UC CPU modules.	Compatible CPU module		FX5U, FX5UC FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect to FX5UC.
	No. of occupied I/O points		8 points (countable either by input or output)
	No.of connectable modules		Max. 1 module
	Current consumption (internal supply)		5 V DC 150 mA
	External dimensions W × H × D (mm)		16 × 90 × 83
	MASS (Weight): kg		Approx. 0.1
FX5-CNV-BUSC (FX5 (extension connector type) → FX3 extension)  Conversion module for connecting FX3 extension modules to FX5U and FX5UC CPU modules.	Compatible CPU module		FX5U, FX5UC FX5-CNV-IF is necessary to connect to FX5U.
	No. of occupied I/O points		8 points (countable either by input or output)
	No. of connectable modules		Max. 1 module
	Current consumption (internal supply)		5 V DC 150 mA
	External dimensions W × H × D (mm)		16 × 90 × 83
	MASS (Weight): kg		Approx. 0.1
◆Extension Power Supply Module			
FX5-1PSU-5V  Module for extending power supply if FX5U (AC power supply type) CPU module's internal power supply is insufficient. Extension cable is enclosed. Derating diagram  	Rated power supply voltage		100 to 240 V AC
	Allowable power supply voltage range		85 to 264 V AC
	Rated frequency		50/60 Hz
	Allowable instantaneous power failure time		Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less.
	Power fuse		250 V 3.15 A time lag fuse
	Rush current		Max. 25 A 5 ms or less/100 V DC Max. 50 A 5 ms or less/200 V DC
	Power consumption		Max. 20 W
	Current output (back-stage supply)	24 V DC	300 mA (Maximum output current depends on the ambient temperature.)
		5 V DC	1200 mA (Maximum output current depends on the ambient temperature.)
	Compatible CPU module		FX5U (AC power supply type)
	No. of occupied I/O points		0 points (No occupied points)
	No. of connectable modules		Max. 2 modules
	External dimensions W × H × D (mm)		50 × 90 × 83
	MASS (Weight): kg		Approx. 0.3

Model/Characteristics	Items		Specifications
FX5-C1PS-5V  Required when the built-in power supply is insufficient in the FX5U (DC power type) and FX5UC CPU modules. Next-stage extension connector of an extension power supply module can be used only for either connector connection or cable connection. Derating diagram 	Power supply voltage		24 V DC
	Voltage variation range		+20%, -15%
	Allowed time duration at instantaneous power failure		Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.
	Power fuse		125 V 3.15 A time lag fuse
	Rush current		Max. 35 A 0.5 ms or less/24 V DC
	Power consumption		Max. 30 W
	Current output (back-stage supply)	24 V DC	625 mA (Maximum output current depends on the ambient temperature.)
		5 V DC	1200 mA (Maximum output current depends on the ambient temperature.)
	Compatible CPU module		FX5U (DC power supply type), FX5UC
	No. of occupied I/O points		0 points (No occupied points)
	No. of connectable modules		Max. 2 modules
	External dimensions W × H × D (mm)		20.1 × 90 × 74
	MASS (Weight): kg		Approx. 0.1
◆ Connector Conversion Module			
FX5-CNV-IF (FX5 (Extension cable type) → FX5 (Extension connector type))  Converts the connector for connecting an extension connector type for FX5.	Compatible CPU module		FX5U
	No.of occupied input/output points		0 points (No occupied I/O)
	No.of connectable modules		Max. 1 module
	Current consumption (internal supply)		0 mA (no power consumed)
	External dimensions W × H × D (mm)		14.6 × 90 × 74
	MASS (Weight): kg		Approx. 0.06
FX5-CNV-IFC (FX5 (extension connector type) → FX5 (extension cable type))  Converts the connector for connecting an extension cable type for FX5.	Compatible CPU module		FX5UC
	No. of occupied I/O points		0 points (No occupied I/O)
	No. of connectable modules		Max. 1 module
	Current consumption (internal supply)		0 mA (no power consumed)
	External dimensions W × H × D (mm)		14.6 × 90 × 74
	MASS (Weight): kg		Approx. 0.06
◆ Extension Power Supply Module (for FX3 Extension Module)			
FX3U-1PSU-5V  For extension of power supply when power supply for FX3 extension module is insufficient. Derating diagram 	Power supply voltage		100 to 240 V AC
	Allowable power supply voltage range		85 to 264 V AC
	Rated frequency		50/60 Hz
	Allowable instantaneous power failure time		Conditions vary depending on power sources as follows: • 100 V AC power supply: Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less. • 200 V AC power supply: Operation can be continued upon occurrence of instantaneous power failure for 100 ms or less.
	Rush current		Max. 30 A 5 ms or less/100 V AC Max. 65 A 5 ms or less/200 V AC
	Power consumption		Max. 20 W
	Current output (back-stage supply)	24 V DC	0.3 A (Derate the maximum output current at an ambient temperature of 40°C or above.)
		5 V DC	1 A (Derate the maximum output current at an ambient temperature of 40°C or above.)
	Compatible CPU module		FX5U (AC power supply type)
	No. of occupied I/O points		0 points (No occupied points)
	No. of connectable modules		Max. 2 modules
	External dimensions W × H × D (mm)		55 × 90 × 87
	MASS (Weight): kg		Approx. 0.3

Extension Module Options (Extended Extension Cables/Connector Conversion Adapters)

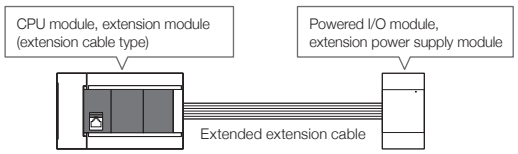
FX5 extension modules (extension cable type) are equipped with the extension cable for connection to the right side of the front-stage device.
If intending extension of the connection distance or two-row placement of PLCs, an optional "Extended extension cable" is required. Only a single extended extension cable can be used per system.

◇ Extended extension cable

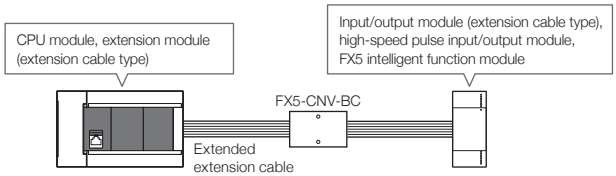
Model	Specifications
FX5-30EC (30 cm) **FX5-65EC (65 cm)** 	◇Extended extension cable Extension cable for the FX5 extension module. Only a single cable can be used per system. Depending on the CPU module to be used or the device to be connected with, the following connection conversion adapter (FX5-CNV-BC) is required. [Connector conversion adapter requirement.] When connected with an input/output module (extension cable type), high-speed pulse input/output module, or an intelligent function module.
FX5-CNV-BC 	●Connector conversion adapter This connects between an extension cable and an extension cable type module when an extended extension cable is used.

◇ Main connection methods

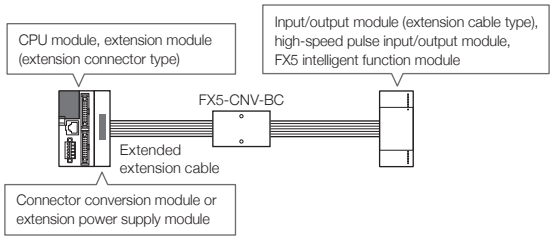
1) Connections with the Powered I/O module and FX5 extension power supply module (extension cable type)



2) Connections with the input/output module (extension cable type) and FX5 intelligent function module



3) For FX5UC



Terminal Module

This allows conversion of the connector of the FX5UC CPU module or the I/O module (extension connector type) to the terminal block (M3.5 terminal screw), resulting in the reduced no. of man-hours for I/O wiring.
Using an internal type of I/O element enables driving of a heavy load by a relay or a transistor.

Terminal module

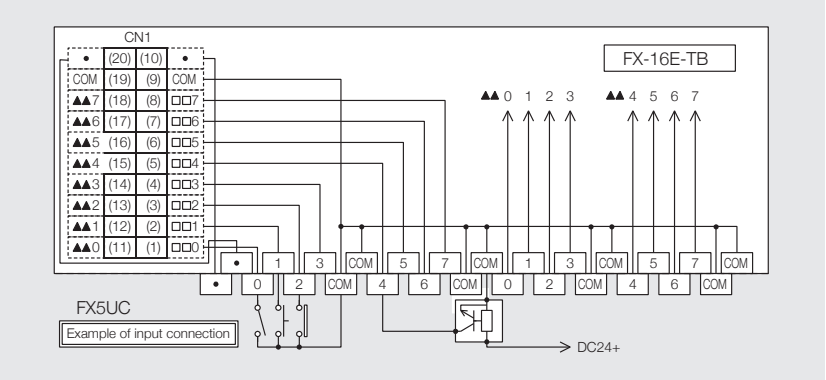
◇ List of Terminal Modules (Refer to the next page for the details of connection cables and optional connectors.)

Model	No. of input points	No. of output points	Function
FX-16E-TB	Input 16 points or output 16 points		Directly connected to the I/O terminal of PLC. Using this module instead of the PLC terminals or relaying a wiring of I/O device located remotely from PLC enables reducing of the I/O wiring man-hours.
FX-32E-TB	Input 32 points or output 32 points (Division possible: input 16 points and output 16 points)		
FX-16E-TB/UL	Input 16 points or output 16 points		
FX-32E-TB/UL	Input 32 points or output 32 points (Division possible: input 16 points and output 16 points)		
FX-16EYR-TB	—	16	Relay Output Type
FX-16EYS-TB	—	16	Triac Output Type
FX-16EYT-TB	—	16	Transistor Output Type
FX-16EYR-ES-TB/UL	—	16	Relay Output Type
FX-16EYS-ES-TB/UL	—	16	Triac Output Type
FX-16EYT-ES-TB/UL	—	16	Transistor Output Type (Sink output)
FX-16EYT-ESS-TB/UL	—	16	Transistor Output Type (Source output)

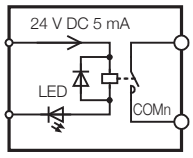
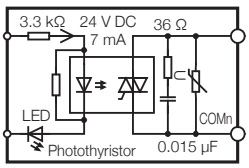
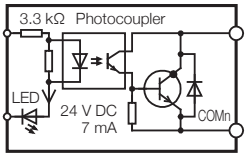
◇ Specifications

1. PLC Direct Connection (FX-16E-TB, FX-32E-TB)

Since it is for direct connection of PLC I/O terminal, no electrical components are built in.
Electrical specifications are equivalent to that of the connected CPU module or connector type I/O module. A drawing on the right shows the internal connection of FX-16E-TB. In case of FX-32E-TB, CN2 is provided with the same connection.



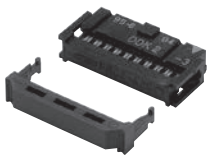
2. Output (FX-16EY□-TB)

Model		Relay output	Triac output	Transistor output
		FX-16EYR-TB	FX-16EYS-TB	FX-16EYT-TB
I/O circuit configuration				
Load voltage		250 V AC 30 V DC or less	85 V to 242 V AC	5 V to 30 V DC
Circuit isolation		Mechanical isolation	Photocoupler isolation	Photocoupler isolation
Operation display		An LED is turned on when applying an electrical current to a relay coil	An LED is turned on when applying an electrical current to a photothyristor	An LED is turned on when applying an electrical current to a photocoupler
Max. load	Resistance load	2 A/1 point 8 A/4 points	0.3 A/1 point 0.8 A/4 points	0.5 A/1 point 0.8 A/4 points
	Inductive load	80 VA	15 VA/100 V AC, 36VA/240 V AC	12 W/24 V DC
Open circuit leakage current		—	1 mA/A100 V AC, 2 mA/200 V AC	0.1 mA/30 V DC
Min. load		5 V DC, 2 mA (reference value)	0.4 VA/100 V AC, 1.6 VA/200 V AC	—
Response time	OFF → ON	Approx. 10 ms	2 ms or less	0.2 ms or less
	ON → OFF	Approx. 10 ms	12 ms or less	1.5 ms or less
Input signal current		5 mA/24 V DC for each point (current consumption)	7 mA/24 V DC for each point (current consumption)	7 mA/24 V DC for each point (current consumption)

I/O Cable

Model/Appearance	Contents
FX-16E-500CAB-S (5 m) 	● General-purpose I/O Cable A 20-pin connector attached to one end of loose wire
FX-16E-150CAB (1.5 m) **FX-16E-300CAB (3 m)** **FX-16E-500CAB (5 m)** 	● I/O Cable for Terminal Module A 20-pin connector attached to both ends of a flat cable (with tube)
FX-16E-150CAB-R (1.5 m) **FX-16E-300CAB-R (3 m)** **FX-16E-500CAB-R (5 m)** 	● I/O Cable for Terminal Module A 20-pin connector attached to both ends of round multi core cable

I/O Connector

Model/Appearance	Contents
◆Connector for self-manufactured I/O cable 20-pin type (electric wire or crimp tool is not enclosed.)	
FX2C-I/O-CON 	●Flat Cable Connector AWG28 (0.1 mm²): A set of 10 pcs • Crimp connector: FRC2-A020-3OS 1.27-pitch 20 cores • Crimp tool: Separately arrange the tool manufactured by DDK Ltd. 357J-4674D Main Module 357J-4664N Attachment
FX2C-I/O-CON-S **FX2C-I/O-CON-SA** 	(1) Connector for loose wire AWG22 (0.3 mm²): 5 sets • Housing: HU-200S2-001 • Crimp contact: HU-411S • Crimp tool: A product manufactured by DDK Ltd. is separately required. 357J-5538
	(2) Connector for loose wire AWG20 (0.5 mm²): 5 sets • Housing: HU-200S2-001 • Crimp contact: HU-411SA • Crimp tool: A product manufactured by DDK Ltd. is separately required. 357J-13963

Model/Appearance	Contents
◆Connector for self-manufactured I/O cable: 40-pin type (electric wire or crimp tool is not enclosed.)	
FX-I/O-CON2-S **FX-I/O-CON2-SA**  (For FX3U-2HC)	(1) Connector for loose wire AWG22 (0.3 mm²): 2 sets • Housing: HU-400S2-001 • Crimp contact: HU-411S • Crimp tool: A product manufactured by DDK Ltd. is separately required. 357J-5538
	(2) Connector for loose wire AWG20 (0.5 mm²): 2 sets • Housing: HU-400S2-001 • Crimp contact: HU-411SA • Crimp tool: A product manufactured by DDK Ltd. is separately required. 357J-13963

Power Cable

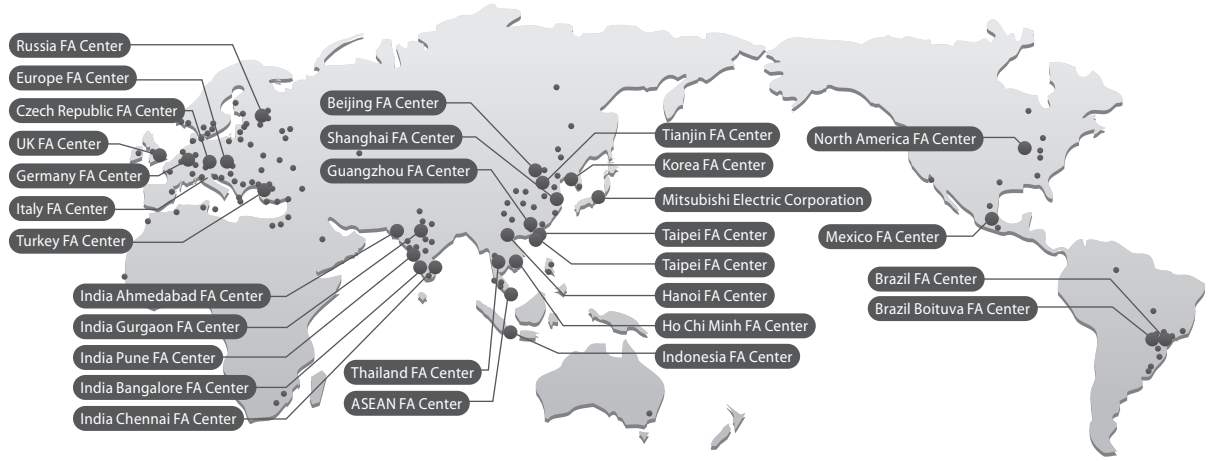
Model/Appearance	Contents
FX2NC-100MPCB (1 m) 	●CPU Module Power Cable Cable for providing 24 V DC power supply to FX5UC CPU module Offered as an accessory of FX5UC CPU module.
FX2NC-100BPCB (1 m) 	●Power Cable Cable for supplying 24 V DC input power supply to an extension connector type input module or input/output module. Offered as an accessory of FX5UC-□MT/D. It is necessary to purchase this cable separately when using an extension connector type input module or input/output module in the FX5U system.
FX2NC-10BPCB1 (0.1 m) 	●Power Supply Transition Cable Cable for crossover wiring of 24 V DC input power supply to two or more extension connector type input modules or input/output modules. Offered as an accessory of FX5-C□EX/D and FX5-C32ET/D.

memo

Overseas service system

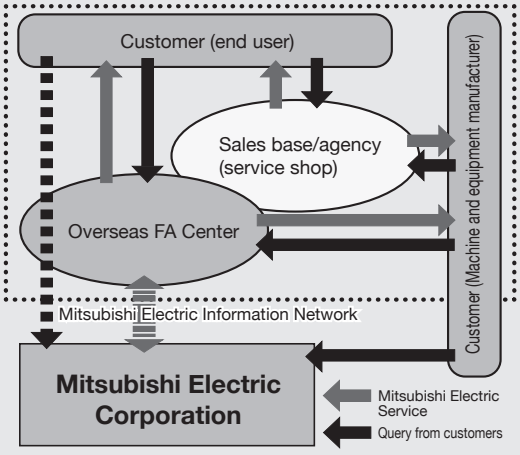
Mitsubishi's MELSEC-F Series is a worldwide programmable controller that is used in more than 50 countries all over the world.
For local after-sales services in the overseas countries, "Mitsubishi Electric Global FA Centers" timely provide the best possible products, high technology and reliability services to our customers.

Global FA Center



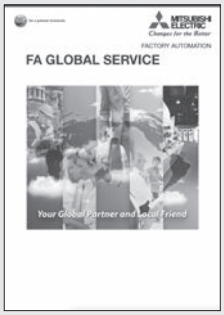
◇ FA Global Service Network "Place contact our FA Center first."

If you have any questions, please contact our FA Centers in each country.
FA Centers located around the world respond to various customer needs in close communication with our sales offices, branches, and distributors as key stations.



◇ Detailed information on overseas services

"FA Global Service" (KK001-EN)
Service contents and contact information of our FA Centers are detailed.
For more information on overseas support, please request this document.



Certifications

MELSEC iQ-F Series conforms to European Standards (EN) and North American Standards (UL/cUL).
Using MELSEC iQ-F Series can reduce the workload to make machines/equipment conform to EN and UL/cUL standards.

◇ EN Standards: Compliance with EC Directives/CE marking

EC Directives were issued by the European Council of Ministers to unify standards in the EU Community, and to ensure smooth distribution of products for which safety is ensured. Approximately 20 types of EC Directives for product safety have been issued.
Attachment of a CE mark (CE marking) is mandatory on specific products before they may be distributed in the EU.
The EMC Directive (Electromagnetic Compatibility Directive) and LVD Directive (Low Voltage Directive) apply to the programmable controller, which is labeled as an electrical part of a machine product under the EC Directives.

1) EMC Directive
   The EMC Directive is a directive that requires products to have "Capacity to prevent output of obstructive noise that adversely affects external devices: Emission damage" and "Capacity to not malfunction due to obstructive noise from external source: Immunity".
2) LVD Directive (Low Voltage Directive)
   The LVD Directive is enforced to distribute safe products that will not harm or damage people, objects or assets, etc. With the programmable controller, this means a product that does not pose a risk of electric shock, fire or injury, etc.

CE

◇ "ISO 9001" international standard for quality-assurance system

Mitsubishi Electric Corporation Nagoya Works has acquired "ISO 9001" international standard for quality-assurance system for the development/manufacture on the whole from order reception to shipment of all series of micro sequencer.
Of the ISO 9000 series by which the International Organization for Standardization (ISO) defines the standards of quality-assurance systems, "ISO 9001" assumes a wide range of quality-assurance systems related to development, manufacture, materials, quality and sales. The MELSEC iQ-F Series is manufactured under the control system based on an internationally recognized quality-assurance system.
It is also used as a registration site of "ISO 14001" environmental management system.

◇ UL/cUL Standards

UL is the United State's main private safety testing and certification agency for ensuring public safety.
UL sets the safety standards for a variety of fields. Strict reviews and testing are performed following the standards set forth by UL. Only products which pass these tests are allowed to carry the UL Mark.
As opposed to the EN Standards, the UL Standards do not have a legally binding effect. However, they are broadly used as the U.S. safety standards, and are an essential condition for selling products into the U.S.
UL is recognized as a certifying and testing agency by the Canadian Standards Association (CSA). Products evaluated and certified by UL in accordance with Canadian standards are permitted to carry the cUL Mark.

c UL US LISTED

Conformance of FX5U and FX5UC with European Standard (EN)/North American Standard (UL/cUL)

◇ International standards supported

MELSEC iQ-F Series conforms to the CE marking and UL/cUL Standard.

◇ Korean Certification Mark (KC Mark)

- The KC mark, which is a safety certification mark required to be affixed to the specified products distributed in Korea (products required to be legally certificated for safety, quality, environment, etc.), indicates compliance with various requirements.
- KC mark is indicated on FA products, which conform to the Radio Act. Note that other standards are not applicable.

List of compatible products

Model	CE		UL cUL	KC	Ship approvals							
	EMC	LVD			ABS	DNV	LR	GL	BV	RINA	NK	KR
◆ FX5U CPU modules												
FX5U-32MR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-64MR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-64MT/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-64MT/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-80MR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-80MT/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-80MT/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MR/DS	○	○	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5U-32MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5UC CPU modules												
FX5UC-32MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-32MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-64MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-64MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-96MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-96MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 I/O modules (extension cable type)												
FX5-8EX/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16EX/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-8EYR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-8EYT/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-8EYT/ESS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16EYR/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-16EYT/ES	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16EYT/ESS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16ET/ES-H	○	□	○	○	—	—	—	—	—	—	—	—
FX5-16ET/ESS-H	○	□	○	○	—	—	—	—	—	—	—	—
FX5-32ER/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/ESS	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ER/DS	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-32ET/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 I/O module (extension connector type)												
FX5-C16EX/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C16EX/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EX/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EX/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C16EYT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C16EYT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EYT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EYT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32ET/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32ET/DSS	○	□	○	○	—	—	—	—	—	—	—	—

Model	CE		UL cUL	KC	Ship approvals							
	EMC	LVD			ABS	DNV	LR	GL	BV	RINA	NK	KR
◆ FX5 intelligent function module												
FX5-40SSC-S	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CCLIEF	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 extension power supply module												
FX5-1PSU-5V	○	○	○	○	—	—	—	—	—	—	—	—
FX5-C1PS-5V	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 bus conversion module												
FX5-CNV-BUS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CNV-BUSC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 connector conversion module												
FX5-CNV-IF	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CNV-IFC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 expansion adapter												
FX5-4AD-ADP	○	□	○	○	—	—	—	—	—	—	—	—
FX5-4DA-ADP	○	□	○*1	○	—	—	—	—	—	—	—	—
FX5-232ADP	○	□	○	○	—	—	—	—	—	—	—	—
FX5-485ADP	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5U expansion board												
FX5-232-BD	○	□	—	○	—	—	—	—	—	—	—	—
FX5-485-BD	○	□	—	○	—	—	—	—	—	—	—	—
FX5-422-BD-GOT	○	□	—	○	—	—	—	—	—	—	—	—
◆ Terminal module												
FX-16E-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-32E-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYR-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYS-TB	—	—	—	—	—	—	—	—	—	—	—	—
FX-16EYT-TB	—	—	○	□	—	—	—	—	—	—	—	—
FX-16E-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-32E-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYR-ES-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYS-ES-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYT-ES-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
FX-16EYT-ESS-TB/UL	—	—	○	□	—	—	—	—	—	—	—	—
◆ Extended extension cable												
FX5-30EC	○	□	○	○	—	—	—	—	—	—	—	—
FX5-65EC	○	□	○	○	—	—	—	—	—	—	—	—
◆ Connector conversion adapter												
FX5-CNV-BC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX3 intelligent function module												
FX3U-4AD	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-4DA	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-4LC	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-1PG	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-2HC	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-16CCL-M	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-64CCL	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-128ASL-M	○*2	□	○	—	—	—	—	—	—	—	—	—
◆ FX3 extension power supply module												
FX3U-1PSU-5V	○	○	○	○	—	—	—	—	—	—	—	—

○: Compliant with standards or self-declaration □: No need to comply
∗1: Supported by manufacturing serial number 1660001 and later
∗2: Zone A

Performance specifications

FX5U FX5UC

◇ FX5U/FX5UC CPU module performance specifications

Items		Specifications
Control system		Stored-program repetitive operation
Input/output control system		Refresh system (Direct access input/output allowed by specification of direct access input/output [DX, DY])
Programming specifications	Programming language	Ladder diagram (LD), structured text (ST), function block diagram/ladder language (FBD/LD)
	Programming expansion function	Function block (FB), function (FUN), label programming (local/global)
	Constant scan	0.2 to 2000 ms (can be set in 0.1 ms increments)
	Fixed cycle interrupt	1 to 60000 ms (can be set in 1 ms increments)
	Timer performance specifications	100 ms, 10 ms, 1 ms
	No. of program executions	32
	No. of FB files	16 (Up to 15 for user)
Operation specifications	Execution type	Standby type, initial execution type, scan execution type, fixed-cycle execution type, event execution type
	Interrupt type	Internal timer interrupt, input interruption, high-speed comparison match interrupt, interrupt from module
Instruction processing time	LD X0	34 ns
	MOV D0 D1	34 ns
Memory capacity	Program capacity	64 k steps (128 kbytes, flash memory)
	SD memory card	Memory card capacity (SD/SDHC memory card: Max. 4 Gbytes)
	Device/label memory	120 kbytes
	Data memory/standard ROM	5 Mbytes
Flash memory (Flash ROM) write count		Max. 20000 times
File storage capacity	Device/label memory	1
	Data memory P: No. of program files FB: No. of FB files	P: 32, FB: 16
	SD memory card	2 Gbytes: 511*1, 4 Gbytes: 65534*1
Clock function	Display data	Year, month, day, hour, minute, second, day of week (leap year automatic detection)
	Precision	Monthly difference: ±45 sec at 25°C (typical value)
No. of input/output points	(1) No. of input/output points	256 points or less
	(2) No. of remote I/O points	384 points or less
	Total No. of points of (1) and (2)	512 points or less
Power failure retention (Clock data*2)	Retention method	Large-capacity capacitor
	Retention time	10 days (Ambient temperature: 25°C (77°F))
Power failure retention (Device)	Capacity for power failure retention	12 K words maximum*3

∗1: The value listed above indicates the number of files stored in the root folder.
∗2: Clock data is retained using the power accumulated in a large-capacity capacitor incorporated into the PLC. When voltage of the large-capacity capacitor drops, clock data is no longer accurately retained. The retention period of a fully charged capacitor (electricity is conducted across the PLC for at least 30 minutes) is 10 days (ambient temperature: 25°C (77°F)). How long the capacitor can hold the data depends on the operating ambient temperature. When the operating ambient temperature is high, the holding period is short.
∗3: All devices in the (high-speed) device area can be held against power failure. Devices in the (standard) device area can be held also when the optional battery is mounted.

◇ Number of device points

Items			Base	Max. number of points	
No. of user device points	Input relay (X)		8	1024 points or less	The total number of X and Y assigned to input/output points is up to 256 points.
	Output relay (Y)		8	1024 points or less	
	Internal relay (M)		10	32768 points (can be changed with parameter)*1	
	Latch relay (L)		10	32768 points (can be changed with parameter)*1	
	Link relay (B)		16	32768 points (can be changed with parameter)*1	
	Annunciator (F)		10	32768 points (can be changed with parameter)*1	
	Link special relay (SB)		16	32768 points (can be changed with parameter)*1	
	Step relay (S)		10	4096 points (fixed)	
	Timer system	Timer (T)	10	1024 points (can be changed with parameter)*1	
	Accumulation timer system	Accumulation timer (ST)	10	1024 points (can be changed with parameter)*1	
	Counter system	Counter (C)	10	1024 points (can be changed with parameter)*1	
		Long counter (LC)	10	1024 points (can be changed with parameter)*1	
	Data register (D)		10	8000 points (can be changed with parameter)*1	
	Link register (W)		16	32768 points (can be changed with parameter)*1	
	Link special register (SW)		16	32768 points (can be changed with parameter)*1	
No. of system device points	Special relay (SM)		10	10000 points (fixed)	
	Special register (SD)		10	12000 points (fixed)	
Module access device	Intelligent function module device		10	65536 points (designated by U□\G□)	
No. of index register points	Index register (Z)*2		10	24 points	
	Long index register (LZ)*2		10	12 points	
No. of file register points	File register (R)		10	32768 points (can be changed with parameter)*1	
No. of nesting points	Nesting (N)		10	15 points (fixed)	
No. of pointer points	Pointer (P)		10	4096 points	
	Interrupt pointer (I)		10	178 points (fixed)	
Others	Decimal constant (K)	Signed	—	16 bits: -32768 to +32767, 32 bits: -2147483648 to +2147483647	
		Unsigned	—	16 bits: 0 to 65535, 32 bits: 0 to 4294967295	
	Hexadecimal constant (H)		—	16 bits: 0 to FFFF, 32 bits: 0 to FFFFFFFF	
	Real constant (E)	Single precision	—	E-3.40282347+38 to E-1.17549435-38, 0, E1.17549435-38 to E3.40282347+38	
	Character string		—	Shift-JIS code max. 255 single-byte characters (256 including NULL)	

∗1: Can be changed with parameters within the capacity range of the CPU built-in memory.
∗2: Total of the index register (Z) and long index register (LZ) is maximum 24 words.

List of instructions

◇ CPU module application instruction

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
Rotation	ROR(P)	16-bit data right rotation	○	○
	RCR(P)	Right rotation with 16-bit data carry	○	○
	ROL(P)	16-bit data left rotation	○	○
	RCL(P)	Left rotation with 16-bit data carry	○	○
	DROR(P)	32-bit data right rotation	○	○
	DRCR(P)	Right rotation with 32-bit data carry	○	○
	DROL(P)	32-bit data left rotation	○	○
	DRCL(P)	Left rotation with bit data carry	○	○
Program branch	CJ(P)	Pointer branch	○	○
	GOEND	Jump to END	○	○
Program execution control	DI	Interrupt disable	○	○
	EI	Interrupt enable	○	○
	DI	Interrupt disable when lower than specified priority	○	○
	IMASK	Interrupt program mask	○	○
	SIMASK	Specified interrupt pointer disable/enable	○	○
	IRET	Return from interrupt program	○	○
	WDT(P)	WDT reset	○	○
Structured instruction	FOR	Executed (n) times between ROM instruction and NEXT instruction	○	○
	NEXT		○	○
	BREAK(P)	FOR to NEXT forced end	○	○
	CALL(P)	Subroutine program call	○	○
	RET	Return from subroutine program	○	○
	SRET		○	○
	XCALL	Subroutine program call	○	○
Data table operation	SFRD(P)	First-in data read from data table	○	○
	POP(P)	Last-in data read from data table	○	○
	SFWR(P)	Data write to data table	○	○
	FINS(P)	Data insertion to data table	○	○
	FDEL(P)	Data delete from data table	○	○
Character string processing	LD$=	Character string comparison LD (S1) = (S2)	○	○
	LD$<>	Character string comparison LD (S1) <> (S2)	○	○
	LD$>	Character string comparison LD (S1) > (S2)	○	○
	LD$<=	Character string comparison LD (S1) <= (S2)	○	○
	LD$<	Character string comparison LD (S1) < (S2)	○	○
	LD$>=	Character string comparison LD (S1) >= (S2)	○	○
	AND$=	Character string comparison AND (S1) = (S2)	○	○
	AND$<>	Character string comparison AND (S1) <> (S2)	○	○
	AND$>	Character string comparison AND (S1) > (S2)	○	○
	AND$<=	Character string comparison AND (S1) <= (S2)	○	○
	AND$<	Character string comparison AND (S1) < (S2)	○	○
	AND$>=	Character string comparison AND (S1) >= (S2)	○	○
	OR$=	Character string comparison OR (S1) = (S2)	○	○
	OR$<>	Character string comparison OR (S1) <> (S2)	○	○
	OR$>	Character string comparison OR (S1) > (S2)	○	○
	OR$<=	Character string comparison OR (S1) <= (S2)	○	○
	OR$<	Character string comparison OR (S1) < (S2)	○	○
	OR$>=	Character string comparison OR (S1) >= (S2)	○	○
	$+(P)	Combination of character strings	○	○
	$MOV(P)	Transfer of character string	○	○
	BINDA(P)(_U)	BIN 16-bit data → Decimal ASCII conversion	○	○
	DBINDA(P)(_U)	BIN 32-bit data → Decimal ASCII conversion	○	○
	ASCI(P)	HEX code data → ASCII conversion	○	○
	STR(P)(_U)	BIN 16-bit data → Character string conversion	○	○
	DSTR(P)(_U)	BIN 32-bit data → Character string conversion	○	○
	ESTR(P)	Single precision actual number → Character string conversion	○	○
	DESTR(P)		○	○
	LEN(P)	Detection of character string length	○	○
	RIGHT(P)	Extraction from right side of character string	○	○
	LEFT(P)	Extraction from left side of character string	○	○
	MIDR(P)	Extraction of any part from the middle of character string	○	○
	MIDW(P)	Replacement of any part in the middle of character string	○	○
	INSTR(P)	Character string search	○	○
	STRINS(P)	Character string insertion	○	○
	STRDEL(P)	Character string deletion	○	○

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
Actual number	LDE$=	Single precision actual number comparison LDE (S1) = (S2)	○	○
	LDE$<>	Single precision actual number comparison LDE (S1) <> (S2)	○	○
	LDE$>	Single precision actual number comparison LDE (S1) > (S2)	○	○
	LDE$<=	Single precision actual number comparison LDE (S1) <= (S2)	○	○
	LDE$<	Single precision actual number comparison LDE (S1) > (S2)	○	○
	LDE$>=	Single precision actual number comparison LDE (S1) >= (S2)	○	○
	ANDE$=	Single precision actual number comparison ANDE (S1) = (S2)	○	○
	ANDE$<>	Single precision actual number comparison ANDE (S1) <> (S2)	○	○
	ANDE$>	Single precision actual number comparison ANDE (S1) > (S2)	○	○
	ANDE$<=	Single precision actual number comparison ANDE (S1) <= (S2)	○	○
	ANDE$<	Single precision actual number comparison ANDE (S1) < (S2)	○	○
	ANDE$>=	Single precision actual number comparison ANDE (S1) >= (S2)	○	○
	ORE$=	Single precision actual number comparison ORE (S1) = (S2)	○	○
	ORE$<>	Single precision actual number comparison ORE (S1) <> (S2)	○	○
	ORE$>	Single precision actual number comparison ORE (S1) > (S2)	○	○
	ORE$<=	Single precision actual number comparison ORE (S1) <= (S2)	○	○
	ORE$<	Single precision actual number comparison ORE (S1) < (S2)	○	○
	ORE$>=	Single precision actual number comparison ORE (S1) >= (S2)	○	○
	DECMP(P)	Single precision actual number comparison	○	○
	DEZCP(P)	Binary floating point bandwidth comparison	○	○
	E+(P)	Single precision actual number addition	○	○
	E-(P)	Single precision actual number subtraction	○	○
	DEADD(P)	Single precision actual number addition	○	○
	DESUB(P)	Single precision actual number subtraction	○	○
	E*(P)	Single precision actual number multiplication	○	○
	E/(P)	Single precision actual number division	○	○
	DEMUL(P)	Single precision actual number multiplication	○	○
	DEDIV(P)	Single precision actual number division	○	○
	INT2FLT(P)	Signed BIN 16-bit data → Single precision actual number conversion	○	○
	UINT2FLT(P)	Unsigned BIN 16-bit data → Single precision actual number conversion	○	○
	DINT2FLT(P)	Signed BIN 32-bit data → Single precision actual number conversion	○	○
	EVAL(P)	Character string → Single precision actual number conversion	○	○
	DEVAL(P)		○	○
	DEBCD(P)	Binary floating point → Decimal floating point conversion	○	○
	DEBIN(P)	Decimal floating point → Binary floating point conversion	○	○
	ENEG(P)	Reverse of single precision actual number sign	○	○
	DENEG(P)		○	○
	EMOV(P)	Transfer of single precision actual number data	○	○
	DEMOV(P)		○	○
	SIN(P)	Single precision actual number SIN operation	○	○
	DSIN(P)		○	○
	COS(P)	Single precision actual number COS operation	○	○
	DCOS(P)		○	○
	TAN(P)	Single precision actual number TAN operation	○	○
	DTAN(P)		○	○
	ASIN(P)	Single precision actual number SIN^{-1} operation	○	○
	DASIN(P)		○	○
	ACOS(P)	Single precision actual number COS^{-1} Operation	○	○
	DACOS(P)		○	○
	ATAN(P)	Single precision accuracy TAN^{-1} operation	○	○
	DATAN(P)		○	○
	RAD(P)	Single precision actual number angle → Radian conversion	○	○
	DRAD(P)		○	○
	DEG(P)	Single precision actual number radian → Angle conversion	○	○
	DDEG(P)		○	○
	DESQR(P)	Square root of single precision actual number	○	○
	ESQRT(P)		○	○
	EXP(P)	Index operation of single precision actual number	○	○
	DEXP(P)		○	○
	LOG(P)	Inferior logarithm operation of single precision actual number	○	○
	DLOGE(P)		○	○
	POW(P)	Exponentiation operation of single precision actual number	○	○
	LOG10(P)	Common logarithm operation of single precision actual number	○	○
	DLOG10(P)		○	○
	EMAX(P)	Search for maximum value of single precision actual number	○	○
	EMIN(P)	Search for minimum value of single precision actual number	○	○

For sequence instructions and basic instructions, refer to manuals.

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
Random number	RND(P)	Random number generation	○	○
Index register operation	ZPUSH(P)	Collective saving of index register	○	○
	ZPOP(P)	Corrective return of index register	○	○
	ZPUSH(P)	Selection and saving of index register/long index register	○	○
	ZPOP(P)	Selection and return of index register/long index register	○	○
Data control	LIMIT(P)(_U)	BIN 16-bit data upper-/lower-limit control	○	○
	DLIMIT(P)(_U)	BIN 32-bit data upper-/lower-limit control	○	○
	BAND(P)(_U)	BIN 16-bit data dead band control	○	○
	DBAND(P)(_U)	BIN 32-bit data dead band control	○	○
	ZONE(P)(_U)	BIN 16-bit data zone control	○	○
	DZONE(P)(_U)	BIN 32-bit data zone control	○	○
	SCL(P)(_U)	BIN 16-bit unit scaling (point-specific coordinate data)	○	○
	DSCL(P)(_U)	BIN 32-bit unit scaling (point-specific coordinate data)	○	○
	SCL2(P)(_U)	BIN 16-bit unit scaling (X-/Y-specific coordinate data)	○	○
	DSCL2(P)(_U)	BIN 32-bit unit scaling (X-/Y-specific coordinate data)	○	○
Special timer	TTMR	Teaching timer	○	○
	STMR	Special function timer	○	○
Special counter	UDCNTF	Signed 32-bit up/down counter	○	○
Shortcut control	ROTC	Rotary table shortcut control	○	○
Inclination signal	RAMPF	Control inclination signal	○	○
Pulse system	SPD	Measurement of BIN 16-bit pulse density	○	○
	DSPD	Measurement of BIN 32-bit pulse density	○	○
	PLSY	BIN 16-bit pulse output	○	○
	DPLSY	BIN 32-bit pulse output	○	○
	PWM	BIN 16 pulse width modulation	○	○
	DPWM	BIN 32-bit pulse width modulation	○	○
Matrix input	MTR	Matrix input	○	○
Initial state	IST	Initial state	○	○
Drum sequence	ABSD	BIN 16-bit data absolute method	○	○
	DABSD	BIN 32-bit data absolute method	○	○
	INCD	Relative method	○	○
Check code	CCD(P)	Check code	○	○
Data processing instruction	SERMM(P)	Data processing instruction	○	○
	DSERMM(P)	32-bit data search	○	○
	SUM(P)	16-bit data bit check	○	○
	DSUM(P)	32-bit data bit check	○	○
	BON(P)	Bit detection of 16-bit data	○	○
	DBON(P)	Bit detection of 32-bit data	○	○
	MAX(P)(_U)	Search for maximum value of 16-bit data	○	○
	DMAX(P)(_U)	Search for maximum value of 32-bit data	○	○
	MIN(P)(_U)	Search for minimum value of 16-bit data	○	○
	DMIN(P)(_U)	Search for minimum value of 32-bit data	○	○
	SORTTBL(_U)	16-bit data sort	○	○
	SORTTBL2(_U)	16-bit data alignment 2	○	○
	DSORTTBL2(_U)	32-bit data alignment 2	○	○
	WSUM(P)(_U)	16-bit data total value calculation	○	○
	DWSUM(P)(_U)	32-bit data total value calculation	○	○
	MEAN(P)(_U)	16-bit data average value calculation	○	○
	DMEAN(P)(_U)	32-bit data average value calculation	○	○
	SQRT(P)	Calculation of 16-bit square root	○	○
	DSQRT(P)	Calculation of 32-bit square root	○	○
	CRC(P)	CRC calculation	○	○
Indirect address read	ADRSET(P)	Indirect address read	○	○

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
For clock	TRD(P)	Clock data read	○	○
	TWR(P)	Clock data write	○	○
	TADD(P)	Addition of clock data	○	○
	TSUB(P)	Subtraction of clock data	○	○
	HTOS(P)	16-bit data conversion of time data (hour/minute/second → second)	○	○
	DHTOS(P)	32-bit data conversion of time data (hour/minute/second → second)	○	○
	STOH(P)	16-bit data conversion of time data (second → hour/minute/second)	○	○
	DSTOH(P)	32-bit data conversion of time data (second → hour/minute/second)	○	○
	LDDT$=	Date comparison LDDT (S1) = (S2)	○	○
	LDDT$<>	Date comparison LDDT (S1) <> (S2)	○	○
	LDDT$>	Date comparison LDDT (S1) > (S2)	○	○
	LDDT$<=	Date comparison LDDT (S1) <= (S2)	○	○
	LDDT$<	Date comparison LDDT (S1) < (S2)	○	○
	LDDT$>=	Date comparison LDDT (S1) >= (S2)	○	○
	ANDDT$=	Date comparison ANDDT (S1) = (S2)	○	○
	ANDDT$<>	Date comparison ANDDT (S1) <> (S2)	○	○
	ANDDT$>	Date comparison ANDDT (S1) > (S2)	○	○
	ANDDT$<=	Date comparison ANDDT (S1) <= (S2)	○	○
	ANDDT$<	Date comparison ANDDT (S1) < (S2)	○	○
	ANDDT$>=	Date comparison ANDDT (S1) >= (S2)	○	○
	ORDT$=	Date comparison ORDT (S1) = (S2)	○	○
	ORDT$<>	Date comparison ORDT (S1) <> (S2)	○	○
	ORDT$>	Date comparison ORDT (S1) > (S2)	○	○
	ORDT$<=	Date comparison ORDT (S1) <= (S2)	○	○
	ORDT$<	Date comparison ORDT (S1) < (S2)	○	○
	ORDT$>=	Date comparison ORDT (S1) >= (S2)	○	○
	LDTM$=	Time comparison LDTM (S1) = (S2)	○	○
	LDTM$<>	Time comparison LDTM (S1) <> (S2)	○	○
	LDTM$>	Time comparison LDTM (S1) > (S2)	○	○
	LDTM$<=	Time comparison LDTM (S1) <= (S2)	○	○
	LDTM$<	Time comparison LDTM (S1) < (S2)	○	○
	LDTM$>=	Time comparison LDTM (S1) >= (S2)	○	○
	ANDTM$=	Time comparison ANDTM (S1) = (S2)	○	○
	ANDTM$<>	Time comparison ANDTM (S1) <> (S2)	○	○
	ANDTM$>	Time comparison ANDTM (S1) > (S2)	○	○
	ANDTM$<=	Time comparison ANDTM (S1) <= (S2)	○	○
	ANDTM$<	Time comparison ANDTM (S1) < (S2)	○	○
	ANDTM$>=	Time comparison ANDTM (S1) >= (S2)	○	○
	ORTM$=	Time comparison ORTM (S1) = (S2)	○	○
	ORTM$<>	Time comparison ORTM (S1) <> (S2)	○	○
	ORTM$>	Time comparison ORTM (S1) > (S2)	○	○
	ORTM$<=	Time comparison ORTM (S1) <= (S2)	○	○
	ORTM$<	Time comparison ORTM (S1) < (S2)	○	○
	ORTM$>=	Time comparison ORTM (S1) >= (S2)	○	○
	TCMP(P)	Clock data comparison	○	○
	TZCP(P)	Clock data bandwidth comparison	○	○
Timing measurement	DUTY	Timing pulse generation	○	○
	HOURM	Hour meter (BIN 16-bit data)	○	○
	DHOURM	Hour meter (BIN 32-bit data)	○	○
Module access	REF(P)	I/O refresh	○	○
	RFS(P)		○	○
	FROM(P)	Read of 1-word data from other module (16-bit specified)	○	○
	DFROM(P)	Read of 2-word data from other module (16-bit specified)	○	○
	TO(P)	Write of 1-word data from other module (16-bit specified)	○	○
	DTO(P)	Write of 2-word data from other module (16-bit specified)	○	○
	FROMD(P)	Read of 1-word data from other module (32-bit specified)	○	○
	DFROMD(P)	Read of 2-word data from other module (32-bit specified)	○	○
	TOD(P)	Write of 1-word data from other module (32-bit specified)	○	○
	DTOD(P)	Write of 2-word data from other module (32-bit specified)	○	○

For sequence instructions and basic instructions, refer to manuals.

◇ Step ladder instruction

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
Step ladder	STL	Start of step ladder	○	○
	RETSTL	End of step ladder	○	○

◇ Built-in Ethernet function instruction

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
Built-in Ethernet function instruction	SP.SOCOPEN	Connection establishment	○	○
	SP.SOCCLOSE	Connection disconnection	○	○
Socket Communication function	SP.SOCRCV	Read of received data during END processing	○	○
	SP.SOCSND	Data transmission	○	○
	SP.SOCCINF	Read of connection information	○	○
	S(P).SOCRDATA	Read of received data of socket communication	○	○
Communication protocol support function	SP.ECPRTCL	Execution of registration protocol of communication protocol support function	○	○

◇ PID control instruction

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
PID control	PID	PID operation	○	○

◇ List of module dedicated instructions

Classification	Instruction symbol	Function	Compatible CPU module	
			FX5U	FX5UC
CC-Link IE field network	GP.READ	Reading data from the PLC of another station	○	○
	GP.SREAD	Reading data from the PLC of another station (A read notice is issued.)	○	○
	GP.WRITE	Writing data to the PLC of another station	○	○
	GP.SWRITE	Writing data to the PLC of another station (A write notice is issued.)	○	○
	GP.SEND	Transmission of data to the PLC of another station	○	○
	GP.RECV	Reception of data from the PLC of another station	○	○
	G(P).CCPASET	Parameter setting	○	○
	G(P).UINI	Own station number setting	○	○
High speed counter	DHSCS	32-bit data comparison set	○	○
	DHSCR	32-bit comparison reset	○	○
	DHSZ	32-bit data bandwidth comparison	○	○
	HIOEN(P)	Start and stop of 16-bit data high speed input/ output function	○	○
	DHIOEN(P)	Start and stop of 32-bit data high speed input/ output function	○	○
High-speed transfer of current value	HCMOV(P)	High-speed transfer of 16-bit data current value	○	○
	DHCMOV(P)	High-speed transfer of 32-bit data current value	○	○
External device communication	RS2	Serial data transfer 2	○	○
Inverter communication	IVCK	Inverter operation monitor	○	○
	IVDR	Inverter operation control	○	○
	IVRD	Inverter parameter read	○	○
	IVWR	Inverter parameter write	○	○
	IVBWR	Inverter parameter batch write	○	○
	IVMC	Multiple commands of inverter	○	○
MODBUS	ADPRW	MODBUS data read/write	○	○
Communication protocol support function	S(P).CPRTCL	Execution of communication protocol registered by engineering tool	○	○
Positioning	DSZR	Home position return with 16-bit data dog search	○	○
	DDSZR	Home position return with 32-bit data dog search	○	○
	DVIT	16-bit data interrupt positioning	○	○
	DDVIT	32-bit data interrupt positioning	○	○
	TBL	Positioning by 1-table operation	○	○
	DRVTBL	Positioning by multiple-table operation	○	○
	DRVMUL	Multiple axis simultaneous drive positioning	○	○
	DABS	32-bit data ABS current value read	○	○
	PLSV	16-bit data variable speed pulse	○	○
	DPLSV	32-bit data variable speed pulse	○	○
	DRVI	16-bit data relative positioning	○	○
	DDRVI	32-bit data relative positioning	○	○
	DRVA	16-bit data absolute positioning	○	○
	DDRVA	32-bit data absolute positioning	○	○
BFM split read/ write	RBFM	BFM split read	○	○
	WBFM	BFM split write	○	○

For sequence instructions and basic instructions, refer to manuals.

Special devices

Typical special relays and special registers are described below.
For details, refer to FX5 User's Manual (Application).

List of special relays

◇ Diagnostic information

No.	Name	FX5U	FX5UC
SM0	Latest self diagnosis error (including annunciator ON)	○	○
SM1	Latest self diagnosis error (not including annunciator ON)	○	○
SM50	Error reset	○	○
SM51	Battery low latch	○	○
SM52	Battery low	○	○
SM53	AC/DC DOWN	○	○
SM56	Instruction execution fault	○	○
SM61	I/O module verify error	○	○
SM62	Annunciator	○	○

◇ System information

No.	Name	FX5U	FX5UC
SM203	STOP contact	○	○
SM204	PAUSE contact	○	○
SM210	Clock data set request	○	○
SM211	Clock data set error	○	○
SM213	Clock data read request	○	○

◇ System clock

No.	Name	FX5U	FX5UC
SM400	Always ON	○	○
SM401	Always OFF	○	○
SM402	After RUN, ON for one scan only	○	○
SM403	After RUN, OFF for one scan only	○	○
SM409	0.01 sec. clock	○	○
SM410	0.1 sec. clock	○	○
SM411	0.2 sec. clock	○	○
SM412	1 sec. clock	○	○
SM413	2 sec. clock	○	○
SM414	2n sec. clock	○	○
SM415	2n ms clock	○	○

◇ Instruction related

No.	Name	FX5U	FX5UC
SM700	Carry flag	○	○
SM701	Output characters selection	○	○
SM703	Sort order	○	○
SM704	Block comparison	○	○
SM709	DT/TM instruction improper data detection	○	○

◇ For serial communication

No.	Name	FX5U	FX5UC
SM8500	Serial communication error (ch1)	○	○
SM8560	Data transfer delayed (ch1)	○	○
SM8561	Data transfer flag (ch1)	○	○
SM8562	Receive completion flag (ch1)	○	○
SM8563	Carrier detection flag (ch1)	○	○
SM8564	Data set ready flag (ch1)	○	○
SM8565	Time-out check flag (ch1)	○	○
SM8740	Station No. setting SD latch enabled (ch1)	○	○
SM8800	MODBUS RTU communication (ch1)	○	○
SM8801	Retry (ch1)	○	○
SM8802	Timeout (ch1)	○	○
SM8861	Host station No. setting SD latch enabled (ch1)	○	○
SM8920	Inverter communication (ch1)	○	○
SM8921	IVBWR instruction error (ch1)	○	○
SM9040	Data communication error (Master station)	○	○
SM9041	Data communication error (Slave station No.1)	○	○

◇ FX compatible area

No.	Name	FX5U	FX5UC
SM8000	RUN monitor NO contact	○	○
SM8001	RUN monitor NC contact	○	○
SM8002	Initial pulse NO contact	○	○
SM8003	Initial pulse NC contact	○	○
SM8004	Error occurrence	○	○
SM8005	Battery voltage low	○	○
SM8006	Battery error latch	○	○
SM8007	Momentary power failure	○	○
SM8008	Power failure detected	○	○
SM8011	10 msec clock pulse	○	○
SM8012	100 msec clock pulse	○	○
SM8013	1 sec clock pulse	○	○
SM8014	1 min clock pulse	○	○
SM8015	Clock stop and preset	○	○
SM8016	Time read display is stopped	○	○
SM8017	±30 seconds correction	○	○
SM8019	Real time clock error	○	○
SM8020	Zero	○	○
SM8021	Borrow	○	○
SM8022	Carry	○	○
SM8023	Real time clock access error	○	○
SM8026	RAMP mode	○	○
SM8029	Completion of instruction execution	○	○
SM8031	Completion of instruction execution	○	○
SM8032	Non-latch memory all clear	○	○
SM8033	Latch memory all clear	○	○
SM8034	Memory hold function when RUN→ STOP	○	○
SM8039	All outputs prohibited	○	○
SM8040	Constant scan mode	○	○
SM8041	For STL: Transition prohibited	○	○
SM8042	For STL: Start of operation during automatic operation	○	○
SM8043	For STL: Start pulse	○	○
SM8044	For STL: Completion of home position return	○	○
SM8045	For STL: Home position condition	○	○
SM8046	For STL: All output reset prohibited during mode switch	○	○
SM8047	For STL: With STL state ON	○	○
SM8048	For STL: STL monitor (SD8040 to SD8047) enabled	○	○
SM8049	Annunciator operation	○	○
SM8063	ON annunciator minimum number enabled	○	○
SM8067	Operation error	○	○
SM8068	Operation error latch	○	○

List of special registers

◇ Diagnostic information

No.	Name	FX5U	FX5UC
SD0	Latest self diagnosis error code	○	○
SD1	Clock time for self diagnosis error occurrence (Year)	○	○
SD2	Clock time for self diagnosis error occurrence (Month)	○	○
SD3	Clock time for self diagnosis error occurrence (Day)	○	○
SD4	Clock time for self diagnosis error occurrence (Hour)	○	○
SD5	Clock time for self diagnosis error occurrence (Minute)	○	○
SD6	Clock time for self diagnosis error occurrence (Second)	○	○
SD7	Clock time for self diagnosis error occurrence (Day Week)	○	○

◇ System information

No.	Name	FX5U	FX5UC
SD203	CPU Status	○	○
SD210	Clock Data (Year)	○	○
SD211	Clock Data (Month)	○	○
SD212	Clock Data (Day)	○	○
SD213	Clock Data (Hour)	○	○
SD214	Clock Data (Minute)	○	○
SD215	Clock Data (Second)	○	○
SD216	Clock Data (Day Week)	○	○

◇ System clock

No.	Name	FX5U	FX5UC
SD412	One second counter	○	○
SD414	2n second clock setting	○	○
SD415	2n ms second clock setting	○	○
SD420	Scan counter	○	○

◇ Scan information

No.	Name	FX5U	FX5UC
SD500	Execution program number	○	○
SD520	Current scan time (ms)	○	○
SD521	Current scan time (μs)	○	○
SD522	Minimum scan time (ms)	○	○
SD523	Minimum scan time (μs)	○	○
SD524	Maximum scan time (ms)	○	○
SD525	Maximum scan time (μs)	○	○

◇ For serial communication

No.	Name	FX5U	FX5UC
SD8500	Serial communication error code (ch1)	○	○
SD8501	Serial communication error details (ch1)	○	○
SD8502	Serial communication setting (ch1)	○	○
SD8503	Serial communication operational mode (ch1)	○	○

◇ For built-in Ethernet

No.	Name	FX5U	FX5UC
SD10050	Local node IP address [low-order]	○	○
SD10051	Local node IP address [high-order]	○	○
SD10060	Subnet mask [low-order]	○	○
SD10061	Subnet mask [high-order]	○	○
SD10064	Default gateway IP address [low-order]	○	○
SD10065	Default gateway IP address [high-order]	○	○
SD10074	Local node MAC address	○	○
SD10075	Local node MAC address	○	○
SD10076	Local node MAC address	○	○
SD10082	Communication speed setting	○	○
SD10084	MELSOFT connection TCP port No.	○	○
SD10086	MELSOFT direct connection port No.	○	○

◇ FX compatible area

No.	Name	FX5U	FX5UC
SD8000	Watch dog timer	○	○
SD8001	PLC type and system version	○	○
SD8005	Battery voltage	○	○
SD8006	Low battery voltage	○	○
SD8007	Power failure count	○	○
SD8008	Power failure detection period	○	○
SD8010	Current scan time	○	○
SD8011	Minimum scan time	○	○
SD8012	Maximum scan time	○	○
SD8013	RTC: Seconds	○	○
SD8014	RTC: Minute data	○	○
SD8015	RTC: Hour data	○	○
SD8016	RTC: Day data	○	○
SD8017	RTC: Month data	○	○
SD8018	RTC: Year data	○	○
SD8019	RTC: Day of week data	○	○
SD8039	Constant scan duration	○	○
SD8040	ON state number 1	○	○
SD8041	ON state number 2	○	○
SD8042	ON state number 3	○	○
SD8043	ON state number 4	○	○
SD8044	ON state number 5	○	○
SD8045	ON state number 6	○	○
SD8046	ON state number 7	○	○
SD8047	ON state number 8	○	○
SD8049	Lowest active Annunciator	○	○
SD8063	Serial communication error code (ch1)	○	○
SD8067	Operation error	○	○

General, power supply, input/output specifications

For specifications of intelligent function modules, refer to manuals of each product.

◇ General specifications

Item	Specifications								
	FX5U					FX5UC			
Operating ambient temperature*1	-20 to 55°C (-4 to 131°F), non-freezing*2 *3								
Storage ambient temperature	-25 to 75°C (-13 to 167°F), non-freezing								
Operating ambient humidity	5 to 95%RH, non-condensation*4								
Storage ambient humidity	5 to 95%RH, non-condensation								
Vibration resistance*5 *6		Frequency	Acceleration	Half amplitude	Sweep count	Frequency	Acceleration	Half amplitude	Sweep count
	Installed on DIN rail	5 to 8.4 Hz	—	1.75 mm	10 times each in X, Y, Z directions (80 min in each direction)	5 to 8.4 Hz	—	1.75 mm	10 times each in X, Y, Z directions (80 min in each direction)
		8.4 to 150 Hz	4.9 m/s^2	—		8.4 to 150 Hz	4.9 m/s^2	—	
	Direct installing	5 to 8.4 Hz	—	3.5 mm		—			
		8.4 to 150 Hz	9.8 m/s^2	—					
Shock resistance*5	147 m/s^2, Action time: 11 ms, 3 times by half-sine pulse in each direction X, Y, and Z								
Noise durability	By noise simulator at noise voltage of 1000 Vp-p, noise width of 1 ms and period of 30 to 100 Hz								
Grounding	Class D grounding (grounding resistance: 100 Ω or less) <Common grounding with a heavy electrical system is not allowed.> *7								
Working atmosphere	Free from corrosive or flammable gas and excessive conductive dust								
Operating altitude*8	0 to 2000 m								
Installation location	Inside a control panel								
Overvoltage category*8	II or less								
Pollution degree*10	2 or less								
Equipment class	Class 2								

∗1: The simultaneous ON ratio of available PLC inputs or outputs changes with respect to the ambient temperature. For details, refer to manuals of each product.
∗2: 0 to 55°C for products manufactured before June 2016. For intelligent function modules, refer to the manual of each product.
The following products cannot be used when the ambient temperature is less than 0°C:
FX5-40SSC-S, FX5-CNV-BUS, FX5-CNV-BUSC, battery (FX3U-32BL), SD memory cards (NZ1MEM-2GBSD, NZ1MEM-4GBSD, L1MEM-2GBSD and L1MEM-4GBSD), FX3 extension modules, terminal modules and I/O cables (FX-16E-500CAB-S, FX-16E-□CAB and FX-16E-□CAB-R)
∗3: The specifications are different in the use at less than 0°C. For details, refer to the manual of each product.
∗4: When used in a low-temperature environment, use in an environment with no sudden temperature changes. If there are sudden temperature changes because of opening/closing of the control panel or other reasons, condensation may occur, which may cause a fire, fault, or malfunction. Furthermore, use an air conditioner in dehumidifier mode to prevent condensation.
∗5: The criterion is shown in IEC61131-2.
∗6: When the system has equipment which specification values are lower than above mentioned vibration resistance specification values, the vibration resistance specification of the whole system is corresponding to the lower specification.
∗7: For grounding, refer to manuals of each product.
∗8: The PLC cannot be used at a pressure higher than the atmospheric pressure to avoid damage.
∗9: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.
∗10: This index indicates the degree to which conductive material is generated in the environment in which the equipment is used. Pollution level 2 is when only non-conductive pollution occurs. Temporary conductivity caused by condensation must be expected occasionally.

◇ Power supply specifications

● Power supply specifications (FX5U CPU module, AC power supply type)

Item		Specifications		
		FX5U-32M□/E□	FX5U-64M□/E□	FX5U-80M□/E□
Rated voltage		100 to 240 V AC		
Allowable supply voltage range		85 to 264 V AC		
Voltage fluctuation range		–		
Frequency rating		50/60 Hz		
Allowable instantaneous power failure time		Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less. If the supply voltage is 200 V AC system, change in the range from 10 to 100 ms can be made by the user program.		
Power fuse		250 V 3.15 A Time-lag Fuse	250 V 5 A Time-lag Fuse	
In-rush current		25 A Max. 5 ms or less/100 V AC 50 A Max. 5 ms or less/200 V AC	30 A Max. 5 ms or less/100 V AC 60 A Max. 5 ms or less/100 V AC	
Power consumption*1		30 W	40 W	45 W
5 V DC internal power supply capacity*3		900 mA	1100 mA	1100 mA
24 V DC service power supply*2	Supply capacity when service power supply is used for input circuit of the CPU module*4	400 mA (300 mA)	600 mA (300 mA)	600 mA (300mA)
	Supply capacity when external power supply is used for input circuit of the CPU module*4	480 mA (380 mA)	740 mA (440 mA)	770 mA (470mA)

∗1: The values show the state where the service power of 24 V DC is consumed to the maximum level in case that its configuration has the max. no. of connections provided to CPU module. (Including the current in an input circuit)
∗2: When I/O modules are connected, they consume current from the 24 V DC service power supply, resulting in decrease of usable current. For details about the service power supply, refer to the manual.
∗3: The values designate power supply capacity for an intelligent function module, expansion adapter, and expansion board.
∗4: The values in the parentheses ( ) will result when the ambient temperature is less than 0°C during operations.

General, power supply, input/output specifications

● Power supply specifications (FX5U CPU module, DC power supply type)

Item	Specifications
	FX5U-32M□/D□
Rated voltage	24 V DC
Allowable supply voltage range	16.8 to 28.8 V DC
Allowable instantaneous power failure time	Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.
Power fuse	250 V 3.15 A Time-lag Fuse
In-rush current	50 A Max. 0.5 ms or less/24 V DC
Power consumption*1	30 W
5 V DC internal power supply capacity*2 *3	900 mA (775 mA)
24 V DC internal power supply capacity*2	480 mA (360 mA)

∗1: The values show the state where power is consumed to the maximum level in case that the configuration has the max. no. of connections provided to CPU module.
∗2: The values in the parentheses ( ) indicate the power supply capacity to be resulted when the power supply voltage falls in the range from 16.8 to 19.2 V DC.
∗3: The values designate power supply capacity for an intelligent function module, expansion adapter, and expansion board.

● Power supply specifications (FX5UC CPU module)

Item	Specifications		
	FX5UC-32MT/□	FX5UC-64MT/□	FX5UC-96MT/□
Rated voltage	24 V DC		
Allowable supply voltage range	+20%, -15%		
Allowable instantaneous power failure time	Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.		
Power fuse	125 V 3.15 A Time-lag Fuse		
In-rush current	35 A Max. 0.5 ms or less/24 V DC	40 A Max. 0.5 ms or less/24 V DC	
Power consumption*	5 W/24 V DC (30 W/24 V DC +20%, -15%)	8 W/24 V DC (33 W/24 V DC +20%, -15%)	11 W/24 V DC (36 W/24 V DC +20%, -15%)
5 V DC internal power supply capacity	720 mA		
24 V DC internal power supply capacity	500 mA		

∗: The value results when the CPU module is used alone.
The values in the parentheses ( ) result when the maximum no. of connections have been made to the CPU module. (External DC 24 V power supplies of extension modules are not included.)

● Power supply specifications (FX5-4AD-ADP)

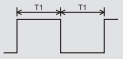
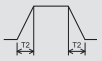
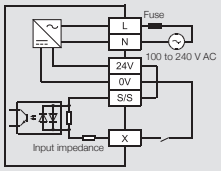
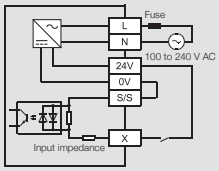
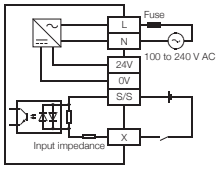
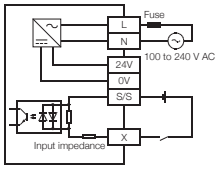
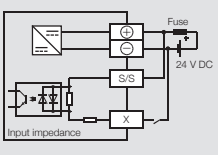
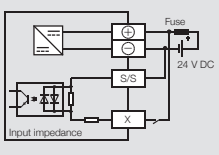
Item	Specifications
Internal power feed (A/D conversion circuit)	24 V DC 20 mA Power is internally fed from the 24 V DC power supply of the CPU module.
Internal power feed (interface)	5 V DC 10 mA Power is internally fed from the 5 V DC power supply of the CPU module.

● Power supply specifications (FX5-4DA-ADP)

Item	Specifications
External power feed (D/A conversion circuit)	24 V DC +20%/-15% 160 mA Power is externally fed from the power supply connector of the adapter.
Internal power feed (interface)	5 V DC 10 mA Power is internally fed from the 5 V DC power supply of the CPU module.

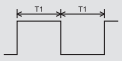
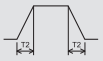
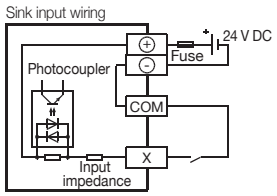
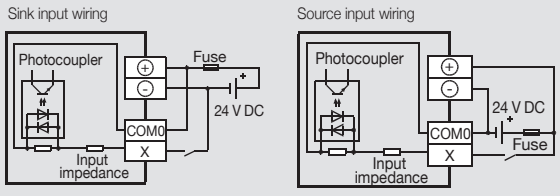
◇ Input specifications

● Input specifications (FX5U CPU module)

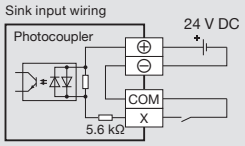
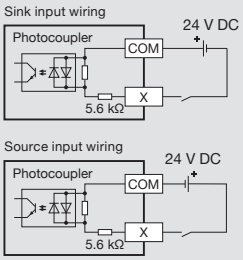
Item		Specifications		
		FX5U-32M□	FX5U-64M□	FX5U-80M□
No. of input points		16 points	32 points	40 points
Connection type		Removable terminal block (M3 screws)		
Input type		Sink/source		
Input signal voltage		24 V DC +20%, -15%		
Input signal current	X000 to X017	5.3 mA/24 V DC		
	X020 and subsequent	4.0 mA/24 V DC		
Input impedance	X000 to X017	4.3 kΩ		
	X020 and subsequent	5.6 kΩ		
ON input sensitive current	X000 to X017	3.5 mA or more		
	X020 and subsequent	3.0 mA or more		
OFF input sensitivity current		1.5 mA or less		
Input response frequency	X000 to X005	200 kHz	—	
	X000 to X007	—	200 kHz	
	X006 to X017	10 kHz	—	
	X010 to X017	—	10 kHz	
Pulse waveform	Waveform	 T1 (pulse width)	 T2 (rise/fall time)	
	X000 to X005	T1: 2.5 µs or more, T2: 1.25 µs or less	—	
	X000 to X007	—	T1: 2.5 µs or more, T2: 1.25 µs or less	
	X006 to X017	T1: 50 µs or more, T2: 25 µs or less	—	
	X010 to X017	—	T1: 50 µs or more, T2: 25 µs or less	
Input response time (H/W filter delay)	X000 to X005	ON: 2.5 µs or less, OFF: 2.5 µs or less	—	
	X000 to X007	—	ON: 2.5 µs or less, OFF: 2.5 µs or less	
	X006 to X017	ON: 30 µs or less, OFF: 50 µs or less	—	
	X010 to X017	—	ON: 30 µs or less, OFF: 50 µs or less	
	X020 and subsequent	—	ON: 50 µs or less, OFF: 150 µs or less	
Input response time (Digital filter setting value)		None, 10 µs, 50 µs, 0.1 ms, 0.2 ms, 0.4 ms, 0.6 ms, 1 ms, 5 ms, 10 ms (initial values), 20 ms, 70 ms When using this product in an environment with much noise, set the digital filter.		
Input signal format		No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor		
Input circuit isolation		Photo-coupler isolation		
Input operation display		LED is lit when input is on		
Input circuit configuration	AC power supply type	- When using service power supply Sink input wiring  Source input wiring 		
		- When using external power supply Sink input wiring  Source input wiring 		
	DC power supply type	Sink input wiring  Source input wiring 		

General, power supply, input/output specifications

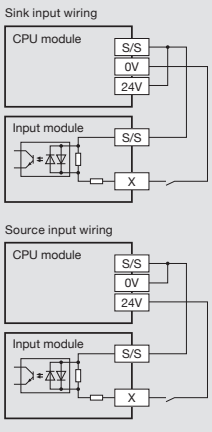
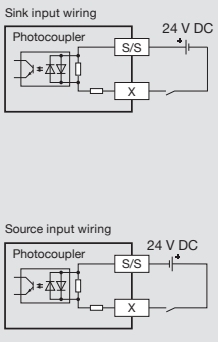
● **Input specifications (FX5UC CPU module)**

Item		Specifications		
		FX5UC-32MT/□	FX5UC-64MT/□	FX5UC-96MT/□
No. of input points		16 points	32 points	48 points
Connection type		Connector		
Input type		FX5UC-□MT/D: Sink FX5UC-□MT/DSS: Sink/source		
Input signal voltage		24 V DC +20%, -15%		
Input signal current	X000 to X017	5.3 mA/24 V DC		
	X020 and subsequent	4.0 mA/24 V DC		
Input impedance	X000 to X017	4.3 kΩ		
	X020 and subsequent	5.6 kΩ		
ON input sensitivity current	X000 to X017	3.5 mA or more		
	X020 and subsequent	3.0 mA or more		
OFF input sensitivity current		1.5 mA or less		
Input response frequency	X000 to X005	200 kHz	—	
	X000 to X007	—	200 kHz	
	X006 to X017	10 kHz	—	
	X010 to X017	—	10 kHz	
Pulse waveform	Waveform	 T1 (pulse width)	 T2 (rise/fall time)	
	X000 to X005	T1: 2.5 µs or more, T2: 1.25 µs or less	—	
	X000 to X007	—	T1: 2.5 µs or more, T2: 1.25 µs or less	
	X006 to X017	T1: 50 µs or more, T2: 25 µs or less	—	
	X010 to X017	—	T1: 50 µs or more, T2: 25 µs or less	
Input response time (H/W filter delay)	X000 to X005	ON: 2.5 µs or less, OFF: 2.5 µs or less	—	
	X000 to X007	—	ON: 2.5 µs or less, OFF: 2.5 µs or less	
	X006 to X017	ON: 30 µs or less, OFF: 50 µs or less	—	
	X010 to X017	—	ON: 30 µs or less, OFF: 50 µs or less	
	X020 and subsequent	—	ON: 50 µs or less, OFF: 150 µs or less	
Input response time (Digital filter setting value)		None, 10 µs, 50 µs, 0.1 ms, 0.2 ms, 0.4 ms, 0.6 ms, 1 ms, 5 ms, 10 ms (initial values), 20 ms, 70 ms When using this product in an environment with much noise, set the digital filter.		
Input signal format		FX5UC-□MT/D No-voltage contact input NPN open collector transistor		
		FX5UC-□MT/DSS No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor		
Input circuit isolation		Photo-coupler isolation		
Input operation display		LED is lit when input is on (DISP switch: IN)		
Input circuit configuration		FX5UC-□MT/D 		
		FX5UC-□MT/DSS 		

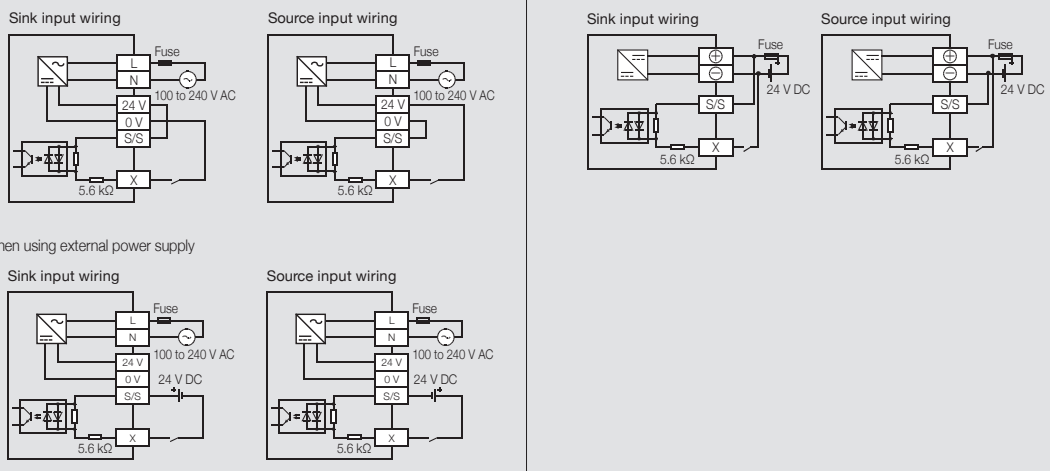
● Input specifications (Extension module (extension connector type), input, input/output module)

Item		Specifications					
		FX5-C16EX/D	FX5-C32EX/D	FX5-C32ET/D	FX5-C16EX/DS	FX5-C32EX/DS	FX5-C32ET/DSS
Connection type		Connector					
Input type		Sink			Sink/source		
Input signal voltage		24 V DC +20%, -15%					
Input signal current		4.0 mA/24 V DC					
Input impedance		5.6 kΩ					
Input sensitivity current	ON	3.0 mA or more					
	OFF	1.5 mA or less					
Input response time		ON: 50 µs or less OFF: 150 µs or less					
Input signal format		No-voltage contact input Sink: NPN open collector transistor			No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor		
Input circuit isolation		Photo-coupler isolation					
Input operation display		LED is lit when input is on.	LED is lit when input is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when input is on. (DISP switch: IN)	LED is lit when input is on.	LED is lit when input is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when input is on. (DISP switch: IN)
Input circuit configuration							

● Input specifications (Extension module (extension cable type), input, input/output module)

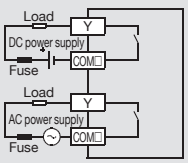
Item		Specifications			
		FX5-8EX/ES	FX5-16EX/ES	FX5-16ET/ES-H	FX5-16ET/ESS-H
Connection type		Terminal block (M3 screws)			
Input type		Sink/source			
Input signal voltage		24 V DC +20%, -15%			
Input signal current		4.0 mA/24 V DC		5.3 mA/24 V DC	
Input impedance		5.6 kΩ		4.3 kΩ	
Input sensitivity current	ON	3.0 mA or more		3.5 mA or more	
	OFF	1.5 mA or less			
Input response time		ON: 50 µs or less OFF: 150 µs or less		X0 to 5 ON: 2.5 µs or less OFF: 2.5 µs or less X6, 7 ON: 30 µs or less OFF: 50 µs or less	
Input signal format		No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor			
Input circuit isolation		Photo-coupler isolation			
Input operation display		LED is lit when input is on.			
Input circuit configuration		When using service power supply 		When using external power supply 	

● Input specifications (Extension module powered input/output module)

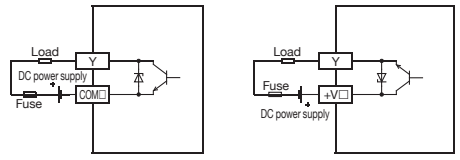
Item		Specifications					
		FX5-32ER/ES	FX5-32ET/ES	FX5-32ET/ESS	FX5-32ER/DS	FX5-32ET/DS	FX5-32ET/DSS
Connection type		Terminal block (M3 screws)					
Input type		Sink/source					
Input signal voltage		24 V DC +20%, -15%					
Input signal current		4.0 mA/24 V DC					
Input impedance		5.6 kΩ					
Input sensitivity current	ON	3.0 mA or more					
	OFF	1.5 mA or less					
Input response time		ON: 50 μs or less OFF: 150 μs or less					
Input signal format		No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor					
Input circuit isolation		Photo-coupler isolation					
Input operation display		LED is lit when input is on.					
Input circuit configuration		When using service power supply 					

◇ Output specifications

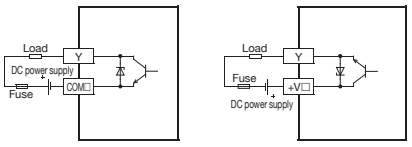
● Relay output (FX5U CPU module)

Item		Specifications		
		FX5U-32MR/☐	FX5U-64MR/☐	FX5U-80MR/☐
No. of output points		16 points	32 points	40 points
Connection type		Removable terminal block (M3 screws)		
Output type		Relay		
External power supply		30 V DC or less 240 V AC or less ("250 V AC or less" if not a CE, UL, cUL compliant item)		
Max. load		2 A/point The total load current per common terminal should be the following value. · 4 output points/common terminal: 8 A or less · 8 output points/common terminal: 8 A or less		
Min. load		5 V DC, 2 mA (reference values)		
Open circuit leakage current		–		
Response time	OFF→ON	Approx. 10 ms		
	ON→OFF	Approx. 10 ms		
isolation of circuit		Mechanical isolation		
Indication of output operation		LED is lit when output is on		
Output circuit configuration		 A number is entered in the ☐ of [COM☐].		

● **Transistor output (FX5U CPU module)**

Item		Specifications		
		FX5U-32MT/☐	FX5U-64MT/☐	FX5U-80MT/☐
No. of output points		16 points	32 points	40 points
Connection type		Removable terminal block (M3 screws)		
Output type		Transistor/sink output (FX5U-☐MT/ES, FX5U-32MT/DS) Transistor/source output (FX5U-☐MT/ESS, FX5U-32MT/DSS)		
External power supply		5 to 30 V DC		
Max. load		0.5 A/point The total load current per common terminal should be the following value. · 4 output points/common terminal: 0.8 A or less · 8 output points/common terminal: 1.6 A or less		
Open circuit leakage current		0.1 mA or less/30 V DC		
Voltage drop when ON	Y000 to Y003	1.0 V or less		
	Y004 and subsequent	1.5 V or less		
Response time	Y000 to Y003	2.5 μs or less/10 mA or more (5 to 24 V DC)		
	Y004 and subsequent	0.2 ms or less/200 mA or more (24 V DC)		
Isolation of circuit		Photo-coupler isolation		
Indication of output operation		LED is lit when output is on		
Output circuit configuration		Sink output wiring Source output wiring  A number is entered in the ☐ of [COM☐]. A number is entered in the ☐ of [+V☐].		

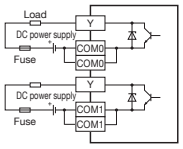
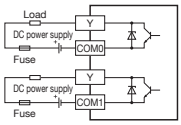
● **Transistor output (FX5UC CPU module)**

Item		Specifications		
		FX5UC-32MT/☐	FX5UC-64MT/☐	FX5UC-96MT/☐
No. of output points		16 points	32 points	48 points
Connection type		Connector		
Output type		Transistor/sink output (FX5UC-☐MT/D) Transistor/source output (FX5UC-☐MT/DSS)		
External power supply		5 to 30 V DC		
Max. load		Y000 to Y003: 0.3 A/1 point Y004 and subsequent: 0.1 A/1 point The total load current per common terminal should be the following value. · 8 output points/common terminal: 0.8 A or less*		
Open circuit leakage current		0.1 mA or less/30 V DC		
Voltage drop when ON	Y000 to Y003	1.0 V or less		
	Y004 and subsequent	1.5 V or less		
Response time	Y000 to Y003	2.5 μs or less/10 mA or more (5 to 24 V DC)		
	Y004 and subsequent	0.2 ms or less/100 mA (24 V DC)		
Isolation of circuit		Photo-coupler isolation		
Indication of output operation		LED is lit when output is on (DISP switch set to OUT)		
Output circuit configuration		Sink output wiring Source output wiring  A number is entered in the ☐ of [COM☐]. A number is entered in the ☐ of [+V☐].		

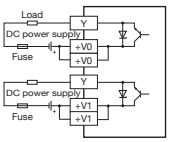
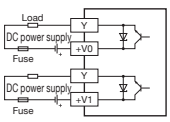
*: 1.6 A or less when two common terminals are connected outside.

General, power supply, input/output specifications

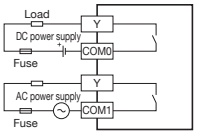
● Transistor output (sink output, extension module)

Item		Specifications							
		FX5-C16EYT/D	FX5-C32EYT/D	FX5-C32ET/D	FX5-8EYT/ES	FX5-16EYT/ES	FX5-32ET/ES	FX5-32ET/DS	FX5-16ET/ES-H
Connection type		Connector			Terminal block (M3 screws)				
Output type		Transistor output/sink output							
External power supply		5 to 30 V DC							
Max. load		0.1 A/1 point The total load current per common terminal should be the following value. · 8 output points/common terminal: 0.8 A or less			0.5 A/1 point The total load current per common terminal should be the following value. · 4 output points/common terminal: 0.8 A or less · 8 output points/common terminal: 1.6 A or less				
Open circuit leakage current		0.1 mA/30 V DC							
Voltage drop when ON		1.5 V or less							
Response time	OFF→ON	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)				Y0, Y1, Y4, Y5: 2.5 µs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)
	ON→OFF	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)				Y0, Y1, Y4, Y5: 2.5 µs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)
Isolation of circuit		Photo-coupler isolation							
Isolation of output operation		LED is lit when output is on.	LED is lit when output is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when output is on. (DISP switch set to OUT)	LED is lit when output is on.				
Output circuit configuration									

● Transistor output (source output, extension module)

Item		Specifications							
		FX5-C16EYT/DSS	FX5-C32EYT/DSS	FX5-C32ET/DSS	FX5-8EYT/ESS	FX5-16EYT/ESS	FX5-32ET/ESS	FX5-32ET/DSS	FX5-16ET/ESS-H
Connection type		Connector			Terminal block (M3 screws)				
Output type		Transistor/source output							
External power supply		5 to 30 V DC							
Max. load		0.1 A/1 point The total load current per common terminal should be the following value. · 8 output points/common terminal: 0.8 A or less			0.5 A/1 point The total load current per common terminal should be the following value. · 4 output points/common terminal: 0.8 A or less · 8 output points/common terminal: 1.6 A or less				
Open circuit leakage current		0.1 mA/30 V DC							
Voltage drop when ON		1.5 V or less							
Response time	OFF→ON	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)				Y0, Y1, Y4, Y5: 2.5 µs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)
	ON→OFF	0.2 ms or less/100 mA (at 24 V DC)			0.2 ms or less/200 mA (at 24 V DC)				Y0, Y1, Y4, Y5: 2.5 µs or less/10 mA (at 5 to 24 V DC) Y2, Y3, Y6, Y7: 0.2 ms or less / 200 mA (at 24 V DC)
Isolation of circuit		Photo-coupler isolation							
Indication of output operation		LED is lit when output is on.	LED is lit when output is on. (F/L of DISP switch is used to change between lower and higher numbers.)	LED is lit when output is on. (DISP switch set to OUT)	LED is lit when output is on.				
Output circuit configuration									

● Relay output (extension module)

Item		Specifications			
		FX5-8EYR/ES	FX5-16EYR/ES	FX5-32ER/ES	FX5-32ER/DS
Connection type		Terminal block (M3 screws)			
Output type		Relay			
External power supply		30 V DC or less 240 V AC or less ("250 V AC or less" if not a CE, UL, cUL compliant item)			
Max. load		2 A/1 point The total load current per common terminal should be the following value. · 4 output points/common terminal: 8 A or less · 8 output points/common terminal: 8 A or less			
Min. load		5 V DC, 2 mA (reference values)			
Response time	OFF→ON	Approx. 10 ms			
	ON→OFF	Approx. 10 ms			
Isolation of circuit		Mechanical isolation			
Indication of output operation					

● Built-in analog input

Item		Specifications
		FX5U CPU module
Analog input points		2 points (2 channels)
Analog input	Voltage	0 to 10 V DC (input resistance 115.7 kΩ)
Digital output		Unsigned 12-bit binary
Input characteristics, maximum resolution	Digital output value	0 to 4000
	Maximum resolution	2.5 mV
Precision (Accuracy in respect to full-scale digital output value)	Ambient temperature 25 ±5°C (77±41°F)	Within ±0.5% (±20 digit*2)
	Ambient temperature 0 to 55°C (32±131°F)	Within ±1.0% (±40 digit*2)
	Ambient temperature -20 to 0°C (32±131°F)*1	Within ±1.5% (±60 digit*2)
Conversion speed		30 µs/channels (data refreshed every operation cycle)
Absolute maximum input		-0.5 V, +15 V
Isolation		No isolation from the CPU module internal circuit, no isolation between the input terminals (channels)
Number of occupied input/output points		0 points (No concern with the maximum no. of input/output points of the CPU module)
Terminal block used		European-type terminal block

∗1: Products manufactured earlier than June 2016 do not support this specification.
∗2: The term "digit" refers to "digital value".

● Built-in analog output

Item		Specifications
		FX5U CPU module
Analog output points		1 point (1 channel)
Digital input		Unsigned 12-bit binary
Analog output	Voltage	0 to 10 V DC (external load resistance 2 kΩ to 1 MΩ)
Output characteristics, maximum resolution	Digital input value	0 to 4000
	Maximum resolution	2.5 mV
Accuracy (Accuracy in respect to full-scale analog output value)	Ambient temperature 25 ±5°C (77±41°F)	Within ±0.5% (±20 digit*2)
	Ambient temperature 0 to 55°C (32±131°F)	Within ±1.0% (±40 digit*2)
	Ambient temperature -20 to 0°C (32±131°F)*1	Within ±1.5% (±60 digit*2)
Conversion speed		30 µs (data refreshed every operation cycle)
Isolation		No isolation from the CPU module internal circuit
Number of occupied input/output points		0 points (No concern with the maximum no. of input/output points of the CPU module)
Terminal block used		European-type terminal block

∗1: Products manufactured earlier than June 2016 do not support this specification.
∗2: The term "digit" refers to "digital value".

● Built-in RS-485 communication

Item	Specifications
	FX5U / FX5UC CPU module
Transmission standards	Conforms to RS-485/RS-422 specifications
Data transmission speed	Max. 115.2 kbps
Communication method	Full-duplex (FDX) / Half-duplex (HDX)
Maximum transmission distance	50 m
Protocol type	MELSOFT connection
	MELSEC Communication protocol (3C/4C frames)
	Non-protocol communication
	MODBUS RTU communication
	Inverter communication
	N:N network
	Predefined protocol support
Isolation of circuit	Not isolated
Terminal resistors	Built-in (OPEN/110 Ω/330 Ω)
Terminal block used	European-type terminal block

● Built-in Ethernet communication

Item		Specifications
		FX5U / FX5UC CPU module
Data transmission speed		100/10 Mbps
Communication method		Full-duplex (FDX) / Half-duplex (HDX)*1
Interface		RJ45 connector
Transmission method		Base band
Maximum segment length (The distance between hub and node)		100 m
Cascade connection	100BASE-TX	Cascade connection max. 2 stages*3
	10BASE-T	Cascade connection max. 4 stages*3
Protocol type		MELSOFT connection
		SLMP (3E frame)
		Socket communication
		Predefined protocol support
Number of connections		Total of 8 for MELSOFT connection, SLMP, socket communication and predefined protocol support (Up to 8 external devices can access one CPU module at the same time.)
Hub*1		Hubs with 100BASE-TX or 10BASE-T ports*4 are available.
IP address		Initial value: 192.168.3.250
Isolation of circuit		Pulse transformer isolation
Cable used*2	For 100BASE-TX connection	Ethernet standard-compatible cable, category 5 or higher (STP cable)
	For 10BASE-T connection	Ethernet standard-compatible cable, category 3 or higher (STP cable)

∗1: IEEE802.3x flow control is not supported.
∗2: Straight cables can be used. When connecting a CPU module with GOTs directly through Ethernet cables, crossover cables (category 5e or less) can also be used.
∗3: No. of connectable stages when using a repeater hub. For the no. of connectable stages when a switching hub is in use, check with the manufacturer of the switching hub.
∗4: The ports must comply with the IEEE802.3 100BASE-TX or IEEE802.3 10BASE-T standards.

● Built-in positioning function

Item	Specifications
	FX5U / FX5UC CPU module
Number of control axes	4 axes* (Simple linear interpolation by 2-axis simultaneous start)
Maximum frequency	2147483647 (200 kpps in pulses)
Positioning program	Sequence program, Table operation
Pulse output instruction	PLSY and DPLSY instructions
Positioning instruction	DSZR, DDSZR, DVIT, DDVIT, TBL, DRVTBL, DRVMUL, DABS, PLSV, DPLSV, DRVI, DDRVI, DRVA, and DDRVA instructions

∗: The number of control axes is 2 when the pulse output mode is CW/CCW mode.

● Built-in high speed counter function

Item	Specifications	
	FX5U / FX5UC CPU module	
Types of high-speed counters	Input specifications	Maximum frequency
	1 phase, 1 input counter (S/W)	200 kHz
	1 phase, 1 input counter (H/W)	200 kHz
	1 phase, 2 input counter	200 kHz
	2 phase, 2 input counter [1 edge count]	200 kHz
	2 phase, 2 input counter [2 edge count]	100 kHz
	2 phase, 2 input counter [4 edge count]	50 kHz
Input allocation	Parameter setup*	
High-speed counter instruction	[High-speed processing instruction] - Setting 32-bit data comparison (DHSCS) - Resetting 32-bit data comparison (DHSCR) - Comparison of 32-bit data band (DHSZ) - Start/stop of the 16-bit data high-speed I/O function (HIOEN) - Start/stop of the 32-bit data high-speed I/O function (DHIOEN) [High-speed transfer instruction of current value] - High-speed current value transfer of 16-bit data (HCMOV) - High-speed current value transfer of 32-bit data (DHCMOV)	

∗: For details, refer to manuals of each product.

◇ Extension Device Specifications I/O Modules

● Powered input/output modules

Model	Total No. of points	No. of input/output points & Input/output type				Connection type
		Input		Output		
FX5-32ER/ES	32 points	16 points	24 V DC (Sink/source)	16 points	Relay	Terminal block
FX5-32ET/ES					Transistor (Sink)	
FX5-32ET/ESS					Transistor (Source)	
FX5-32ER/DS					Relay	
FX5-32ET/DS					Transistor (Sink)	
FX5-32ET/DSS					Transistor (Source)	

● Input module

Model	Total No. of points	No. of input/output points & Input/output type				Connection type
		Input		Output		
FX5-8EX/ES	8 points	8 points	24 V DC (Sink/source)	–	–	Terminal block
FX5-16EX/ES	16 points	16 points				
FX5-C16EX/D			24 V DC (Sink)			Connector
FX5-C16EX/DS			24 V DC (Sink/source)			
FX5-C32EX/D	32 points	32 points	24 V DC (Sink)			
FX5-C32EX/DS			24 V DC (Sink/source)			

● Output module

Model	Total No. of points	No. of input/output points & Input/output type				Connection type
		Input		Output		
FX5-8EYR/ES	8 points	–	–	8 points	Relay	Terminal block
FX5-8EYT/ES					Transistor (Sink)	
FX5-8EYT/ESS					Transistor (Source)	
FX5-16EYR/ES	16 points			16 points	Relay	
FX5-16EYT/ES					Transistor (Sink)	
FX5-16EYT/ESS					Transistor (Source)	
FX5-C16EYT/D					Transistor (Sink)	Connector
FX5-C16EYT/DSS					Transistor (Source)	
FX5-C32EYT/D	32 points			32 points	Transistor (Sink)	
FX5-C32EYT/DSS					Transistor (Source)	

● I/O module

Model	Total No. of points	No. of input/output points & Input/output type				Connection type
		Input		Output		
FX5-C32ET/D	32 points	16 points	24 V DC (Sink)	16 points	Transistor (Sink)	Connector
FX5-C32ET/DSS			24 V DC (Sink/source)		Transistor (Source)	

● High-speed pulse input/output module

Model	Total No. of points	No. of input/output points & Input/output type				Connection type
		Input		Output		
FX5-16ET/ES-H*	16 points	8 points	24 V DC (Sink/source)	8 points	Transistor (Sink)	Terminal block
FX5-16ET/ESS-H*					Transistor (Source)	

∗: Compatible with FX5U/FX5UC CPU modules from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016))

◇ Expansion adapter

● FX5-232ADP

Item	Specifications
Transmission standard/ Maximum transmission distance/Isolation	Conforming to RS-232C/15 m/Photo-coupler isolation (Between communication line and CPU module)
External device connection method	9-pin D-sub, male
Communication method	Half-duplex bidirectional/Full-duplex bidirectional
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
Compatible CPU module	FX5U, FX5UC
Number of occupied input/output points	0 points (no points occupied)
Control power (supplied from CPU module)	5 V DC, 30 mA /24 V DC, 30 mA

∗: The communication method and baud rate vary depending on the type of communication.

● FX5-485ADP

Item	Specifications
Transmission standard/ Maximum transmission distance/Isolation	Conforming to RS-485, RS-422/1200 m/Photo-coupler isolation (Between communication line and CPU module)
External device connection method	European-type terminal block
Communication method	Half-duplex bidirectional/Full-duplex bidirectional
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)*
Terminal resistors	Built-in (OPEN/110 Ω/330 Ω)
Compatible CPU module	FX5U, FX5UC
Number of occupied input/output points	0 points (no points occupied)
Control power (supplied from CPU module)	5 V DC, 20 mA /24 V DC, 30 mA

∗: The communication method and baud rate vary depending on the type of communication.

● FX5-4AD-ADP

Item	Specifications			
Analog input points	4 points (4 channels)			
Analog input voltage	-10 to +10 V DC (input resistance 1 MΩ)			
Analog input current	-20 to +20 mA DC (input resistance 250 Ω)			
Digital output value	14-bit binary value			
Input characteristics, resolution*1	Analog input range		Digital output value	Resolution
	Voltage	0 to 10 V	0 to 16000	625 μV
		0 to 5 V	0 to 16000	312.5 μV
		1 to 5 V	0 to 12800	312.5 μV
		-10 to +10 V	-8000 to +8000	1250 μV
	Current	0 to 20 mA	0 to 16000	1.25 μA
		4 to 20 mA	0 to 12800	1.25 μA
		-20 to +20 mA	-8000 to +8000	2.5 μA
Accuracy (Accuracy in respect to full-scale digital output value)	Ambient temperature 25±5°C: within ±0.1% (±16 digit) Ambient temperature 0 to 55°C: within ±0.2% (±32 digit) Ambient temperature -20 to 0°C*2: within ±0.3% (±48 digit)			
Absolute maximum input	Voltage: ±15 V, Current: ±30 mA			
Isolation	Between input terminal and PLC: Photo-coupler isolation Between input channels: No isolation			
Compatible CPU module	FX5U, FX5UC			
Number of occupied input/output points	0 points (no points occupied)			

∗1: For the input conversion characteristic, refer to manuals of each product.
∗2: Products manufactured earlier than June 2016 do not support this specification.

● FX5-4DA-ADP

Item	Specifications			
Analog output points	4 points (4 channels)			
Analog output voltage	-10 to +10 V DC (external load resistance value 1 kΩ to 1 MΩ)			
Analog output current	0 to 20 mA DC (external load resistance value 0 to 500 Ω)			
Digital input	14-bit binary value			
Output characteristics, resolution*1	Analog output range		Digital input value	Resolution
	Voltage	0 to 10 V	0 to 16000	625 μV
		0 to 5 V	0 to 16000	312.5 μV
		1 to 5 V	0 to 16000	250 μV
		-10 to +10 V	-8000 to +8000	1250 μV
	Current	0 to 20 mA	0 to 16000	1.25 μA
		4 to 20 mA	0 to 16000	1 μA
Accuracy (Accuracy in respect to full-scale analog output value)	Ambient temperature 25±5°C: within ±0.1% (Voltage ±20 mV, Current ±20 μA) Ambient temperature -20 to 55°C*2: within ±0.2% (Voltage ±40 mV, Current ±40 μA)			
Isolation	Between output terminal and PLC: Photo-coupler isolation Between output channels: No isolation			
Compatible CPU module	FX5U, FX5UC			
Number of occupied input/output points	0 points (no points occupied)			

∗1: For details on the output conversion characteristic, refer to manuals of each product.
∗2: The ambient temperature specification is 0 to 55°C for products manufactured earlier than June 2016.

◇ Expansion board

Item	Specifications		
	FX5-232-BD	FX5-485-BD	FX5-422-BD-GOT
Transmission standards	Conforming to RS-232C	Conforming to RS-485, RS-422	Conforming to RS-422
Maximum transmission distance	15 m	50 m	According to the specification of the GOT
External device connection method	9-pin D-sub, male	European-type terminal block	8-pin MINI-DIN, female
Isolation	No isolation (Between communication line and CPU module)	No isolation (Between communication line and CPU module)	No isolation (Between communication line and CPU module)
Communication method	Half-duplex bidirectional/Full-duplex bidirectional*	Half-duplex bidirectional/Full-duplex bidirectional	Half-duplex bidirectional
Baud rate	300/600/1200/2400/4800/9600/19200/ 38400/57600/115200 (bps)*	300/600/1200/2400/4800/9600/19200/ 38400/57600/115200 (bps)*	9600/19200/38400/57600/115200 (bps)
Terminal resistors	—	Built-in (OPEN/110 Ω/330 Ω)	—
Compatible CPU module	FX5U	FX5U	FX5U
Number of occupied input/output points	0 points (no points occupied)	0 points (no points occupied)	0 points (no points occupied)

∗: The communication method and baud rate vary depending on the type of communication.

◇ Extension power supply module

● FX5-1PSU-5V

Item		Specifications
Rated supply voltage		100 to 240 V AC
Allowable range of supply voltage		85 to 264 V AC
Frequency rating		50/60 Hz
Allowable instantaneous power failure time		Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less.
Power fuse		250 V, 3.15 A time-lag fuse
In-rush current		25 A Max. 5 ms or less/100 V AC 50 A Max. 5 ms or less/200 V AC
Power consumption		20 W Max.
Output current* (For power supply to rear stage)	24 V DC	300 mA (Maximum output current depends on the ambient temperature.)
	5 V DC	1200 mA (Maximum output current depends on the ambient temperature.)
Compatible CPU module		FX5U (AC power supply type)
Number of occupied input/output points		0 points (no points occupied)

∗: For details on the current conversion characteristic, refer to manuals of each product.

● FX5-C1PS-5V

Item		Specifications
Supply voltage		24 V DC
Voltage fluctuation range		+20%, -15%
Allowable time of momentary power failure		Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.
Power fuse		125 V, 3.15 A time-lag fuse
In-rush current		35 A Max. 0.5 ms or less/24 V DC
Power consumption		30 W Max.
Output current* (For power supply to rear stage)	24 V DC	625 mA (Maximum output current depends on the ambient temperature.)
	5 V DC	1200 mA (Maximum output current depends on the ambient temperature.)
Compatible CPU module		FX5U (DC power supply type) FX5UC
Number of occupied input/output points		0 points (no points occupied)

∗: For details on the current conversion characteristic, refer to manuals of each product.

◇ Bus conversion module

● FX5-CNV-BUS (FX5 (extension cable type)→FX3 extension)

Item	Specifications
Compatible CPU module	FX5U, FX5UC
Number of occupied input/output points	8 points (Either input or output is available for counting)
Control power (supplied from PLC)	5 V DC 150 mA

● FX5-CNV-BUSC (FX5 (extension connector type)→FX3 extension)

Item	Specifications
Compatible CPU module	FX5U, FX5UC
Number of occupied input/output points	8 points (Either input or output is available for counting)
Control power (supplied from PLC)	5 V DC 150 mA

◇ Connector conversion module

● FX5-CNV-IF (FX5 (extension cable type)→ FX5 (extension connector type) extension)

Item	Specifications
Compatible CPU module	FX5U
Number of occupied input/output points	0 points (no points occupied)
Control power (supplied from PLC)	0 mA (no power consumed)

● FX5-CNV-IFC (FX5 (extension connector type)→ FX5 (extension cable type) extension)

Item	Specifications
Compatible CPU module	FX5UC
Number of occupied input/output points	0 points (no points occupied)
Control power (supplied from PLC)	0 mA (no power consumed)

◇ Intelligent function module

● FX5-CCLIEF

Item		Specifications
Station type		Intelligent device station
Station number		1 to 120 (sets by parameter or program)
Communication speed		1 Gbps
Network topology		Line topology, star topology (coexistence of line topology and star topology is also possible), and ring topology
Maximum station-to-station distance		Max. 100 m (Conforming to ANSI/TIA/EIA-568-B (Category 5e))
Cascade connection		Max. 20 stages
Communication method		Token passing
Maximum number of link points*1	RX	384 points, 48 bytes
	RY	384 points, 48 bytes
	RWr	1024 points, 2048 bytes*2
	RWw	1024 points, 2048 bytes*2
Compatible CPU module		FX5U, FX5UC from Ver. 1.030 (Serial number: 165∗∗∗∗ (May 2016))
Number of occupied input/output points		8 points (Either input or output is available for counting)
Control power (supplied from PLC)		5 V DC 10 mA
Control power (supplied from outside)		24 V DC 230 mA

∗1: The maximum number of link points that a master station can assign to one FX5-CCLIEF module.
∗2: 256 points (512 bytes) when the mode of the master station is online (High-Speed Mode).

◇ Simple motion module

● FX5-40SSC-S

Control specification

Item		Specifications
Number of control axes (Virtual servo amplifier axis included)		Max. 4 axes
Operation cycle (Operation cycle settings)		1.777 ms
Interpolation function		Linear interpolation (Up to 4 axes)
Control system		PTP (Point To Point) control, Trajectory control (both linear and arc), Speed control, Speed-position switching control, Position-speed switching control, Speed-torque control
Acceleration/deceleration process		Trapezoidal acceleration/deceleration, S-curve acceleration/ deceleration
Compensation function		Backlash compensation, Electronic gear, Near pass function
Synchronous control		Synchronous encoder input, Cam, Phase compensation, Cam auto-generation
Control unit		mm, inch, degree, pulse
Number of positioning data		600 data (positioning data No. 1 to 600)/axis (Can be set with MELSOFT GX Works3 or a sequence program.)
Backup		Parameters, positioning data, and block start data can be saved on flash ROM (battery-less backup)
Home position return	Home position return method	Proximity dog method, Count method 1, Count method 2, Data set method, Scale home position signal detection method
	Fast home position return control	Provided
	Auxiliary functions	Home position return retry, Home position shift
Positioning control	Linear control	Linear interpolation control (Up to 4 axes)*1 (Vector speed, Reference axis speed)
	Fixed-pitch feed control	Fixed-pitch feed control (Up to 4 axes)
	2-axis circular interpolation	Auxiliary point-specified circular interpolation, Central point-specified circular interpolation
	Speed control	Speed control (Up to 4 axes)
	Speed-position switching control	INC mode, ABS mode
	Position-speed switching control	INC mode
	Current value change	Positioning data, Start No. for a current value changing
	NOP instruction	Provided
	JUMP instruction	Unconditional JUMP, Conditional JUMP
	LOOP, LEND	Provided
	High-level positioning control	Block start, Condition start, Wait start, Simultaneous start, Repeated start
Manual control	JOG operation	Provided
	Inching operation	Provided
	Manual pulse generator	Possible to connect 1 module (Incremental), Unit magnification (1 to 10000 times)

Item		Specifications
Expansion control	Speed-torque control	Speed control without positioning loops, Torque control, Tightening & press-fit control
Absolute position system		Made compatible by setting a battery to servo amplifier
Synchronous encoder interface		Up to 4 channels (Total of the internal interface, via PLC CPU interface, and servo amplifier interface)
	Internal interface	1 ch (Incremental)
Functions that limit control	Speed limit function	Speed limit value, JOG speed limit value
	Torque limit function	Torque limit value same setting, torque limit value individual setting
	Forced stop	Valid/Invalid setting
	Software stroke limit function	Movable range check with current feed value, movable range check with machine feed value
	Hardware stroke limit function	Provided
Functions that change control details	Speed change function	Provided
	Override function	1 to 300 [%]
	Acceleration/deceleration time change function	Provided
	Torque change function	Provided
	Target position change function	Target position address and speed are changeable
Other functions	M-code output function	WITH mode/AFTER mode
	Step function	Deceleration unit step, Data No. unit step
	Skip function	Via PLC CPU, Via external command signal
	Teaching function	Provided
Parameter initialization function		Provided
External input signal setting function		Via CPU
Amplifier-less operation function		Provided
Mark detection function		Continuous Detection mode, Specified Number of Detections mode, Ring Buffer mode
	Mark detection signal	Up to 4 points
	Mark detection setting	4 settings
Optional data monitor function		4 points/axis
Driver communication function		Provided
SSCNET connect/disconnect function		Provided
Digital oscilloscope function*2	Bit data	16 ch
	Word data	16 ch

*1: 4-axis linear interpolation control is enabled only at the reference axis speed.
*2: 8 ch word data and 8 ch bit data can be displayed in real time.

Module specification

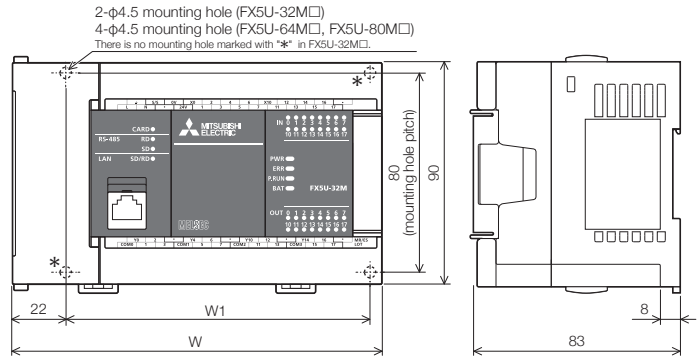
Item		Specifications
Servo amplifier connection method		SSCNETIII/H
Maximum overall cable distance [m]		400
Maximum distance between stations [m]		100
Peripheral I/F		Via CPU module (Ethernet)
Manual pulse generator operation function		Possible to connect 1 module
Synchronous encoder operation function		Possible to connect 4 modules (Total of the internal interface, via PLC CPU interface, and servo amplifier interface)
Input signals (DI)	No. of input points	4 points
	Input method	Positive common/Negative common shared (Photocoupler isolation)
	Rated input voltage/ current	24 V DC/Approx. 5 mA
	Operating voltage range	19.2 to 26.4 V DC (24 V DC +10%/-20%, ripple ratio 5% or less)
	ON voltage/current	17.5 V DC or more/3.5 mA or more
	OFF voltage/current	7 V DC or less/1.0 mA or less
	Input resistance	Approx. 6.8 kΩ
	Response time	1 ms or less (OFF→ON, ON→OFF)
	Recommended wire size	AWG24 (0.2 mm²)
Forced stop input signal (EMI)	No. of input points	1 point
	Input method	Positive common/Negative common shared (Photocoupler isolation)
	Rated input voltage/ current	24 V DC/Approx. 5 mA
	Operating voltage range	19.2 to 26.4 V DC (24 V DC +10%/-20%, ripple ratio 5% or less)
	ON voltage/current	17.5 V DC or more/3.5 mA or more
	OFF voltage/current	7 V DC or less/1.0 mA or less
	Input resistance	Approx. 6.8 kΩ
	Response time	4 ms or less (OFF→ON, ON→OFF)
	Recommended wire size	AWG24 (0.2 mm²)

Item			Specifications
Manual pulse generator / Incremental synchronous encoder signal	Signal input form		Phase A/Phase B (magnification by 4/magnification by 2/magnification by 1), PULSE/SIGN
	Differential output type (26LS31 or equivalent)	Input pulse frequency	Max. 1 Mpulse/s (After magnification by 4, up to 4 Mpulse/s)
		Pulse width	1 µs or more
		Leading edge/ trailing edge time	0.25 µs or less
		Phase difference	0.25 µs or more
		Rated input voltage	5.5 V DC or less
		High/Low-voltage	2.0 to 5.25 V DC/0 to 0.8 V DC
		Differential voltage	±0.2 V
		Cable length	Up to 30 m
	Voltageoutput/ Opencollector type (5 V DC)	Input pulse frequency	Max. 200 kpulse/s (After magnification by 4, up to 800 kpulse/s)
		Pulse width	5 µs or more
		Leading edge/ trailing edge time	1.2 µs or less
		Phase difference	1.2 µs or more
		Rated input voltage	5.5 V DC or less
		High/Low-voltage	3.0 to 5.25 V DC/2 mA or less, 0 to 1.0 V DC/5 mA or more
		Cable length	Up to 10 m
Compatible CPU module			FX5U, FX5UC
Number of occupied input/output points			8 points (Either input or output is available for counting)
24 V DC internal current consumption			0.25 A

External Dimensions

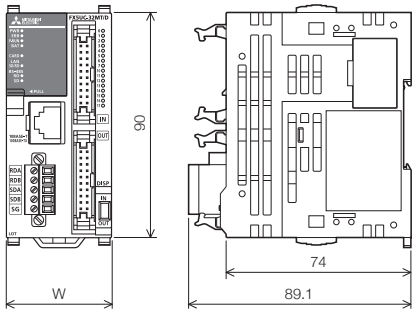
Unit: mm

CPU module



- External color: Main body, Munsell 0.6B7.6/0.2

Model	W: mm	W1: mm Mounting hole pitches	MASS (Weight): kg
FX5U-32MR/ES, FX5U-32MT/ES, FX5U-32MT/ESS FX5U-32MR/DS, FX5U-32MT/DS, FX5U-32MT/DSS	150	123	Approx. 0.7
FX5U-64MR/ES, FX5U-64MT/ES, FX5U-64MT/ESS	220	193	Approx. 1.0
FX5U-80MR/ES, FX5U-80MT/ES, FX5U-80MT/ESS	285	258	Approx. 1.2

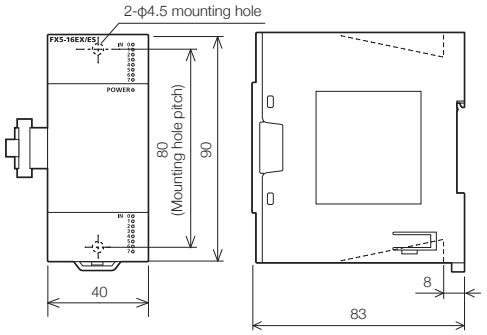


- External color: Main body, Munsell 0.6B7.6/0.2
- Accessories: FX2NC-100MPCB type power cable
  FX2NC-100BPCB type power cable (FX5UC-□MT/D only)

Model	W: mm	MASS (Weight): kg
FX5UC-32MT/D,FX5UC-32MT/DSS	42.1	Approx. 0.2
FX5UC-64MT/D,FX5UC-64MT/DSS	62.2	Approx. 0.3
FX5UC-96MT/D,FX5UC-96MT/DSS	82.3	Approx. 0.35

I/O module

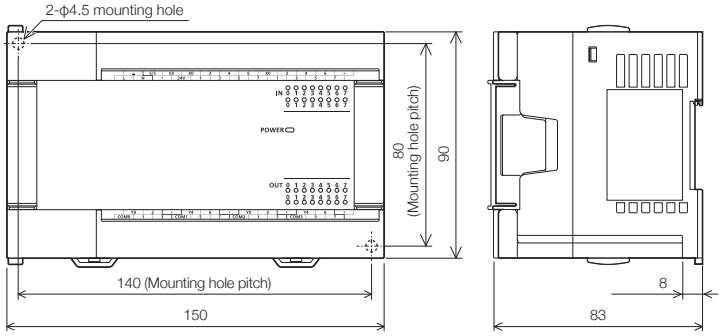
Input module/output module (extension cable type), high-speed pulse input/output module



- External color: Munsell 0.6B7.6/0.2

Model	MASS (Weight): kg
FX5-8EX/ES, FX5-8EYR/ES, FX5-8EYT/ES, FX5-8EYT/ESS	Approx. 0.2
FX5-16EX/ES, FX5-16EYR/ES, FX5-16EYT/ES, FX5-16EYT/ESS,FX5-16ET/ES-H, FX5-16ET/ESS-H	Approx. 0.25

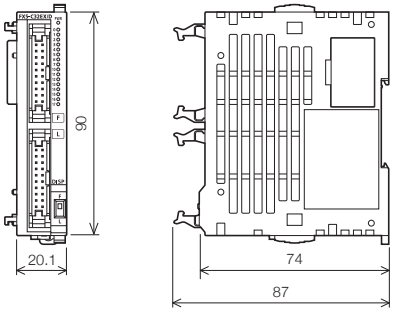
Powered input/output modules



- External color: Munsell 0.6B7.6/0.2
- Accessories: Extension cable

Model	MASS (Weight): kg
FX5-32ER/ES, FX5-32ET/ES, FX5-32ET/ESS FX5-32ER/DS, FX5-32ET/DS, FX5-32ET/DSS	Approx. 0.65

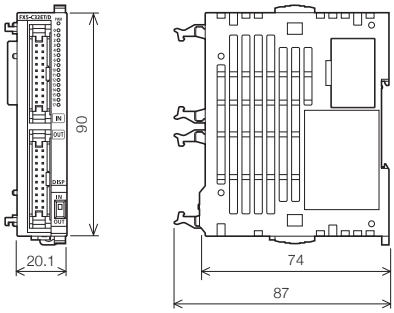
Input module/output module (extension connector type)



- External color: Munsell 0.6B7.6/0.2

Model	W: mm	MASS (Weight): kg
FX5-C16EX/D, FX5-C16EX/DS FX5-C16EYT/D, FX5-C16EYT/DSS	14.6	Approx. 0.1
FX5-C32EX/D, FX5-C32EX/DS FX5-C32EYT/D, FX5-C32EYT/DSS	20.1	Approx. 0.15

I/O module (extension connector type)



- External color: Munsell 0.6B7.6/0.2

Model	MASS (Weight): kg
FX5-C32ET/D, FX5-C32ET/DSS	Approx. 0.15

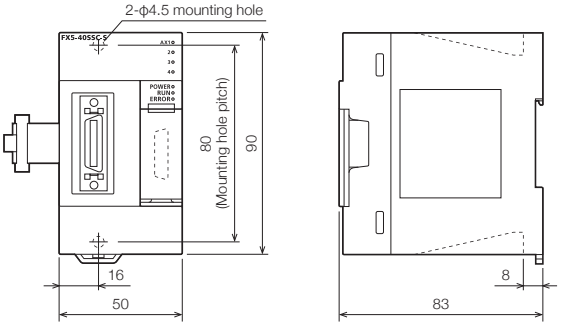
External Dimensions

Unit: mm

Intelligent function module

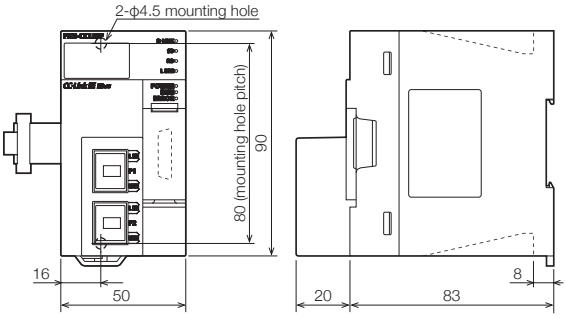
FX5-40SSC-S

- MASS (Weight): Approx. 0.3 kg
- External color: Munsell 0.6B7.6/0.2



FX5-CCLIEF

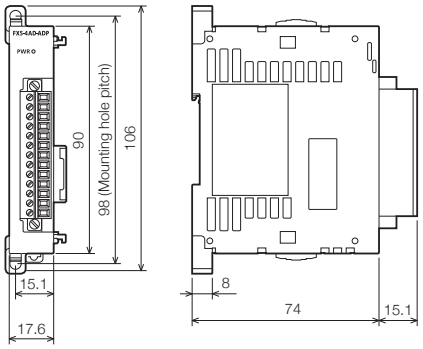
- MASS (Weight): Approx. 0.3 kg
- External color: Munsell 0.6B7.6/0.2



Expansion adapter

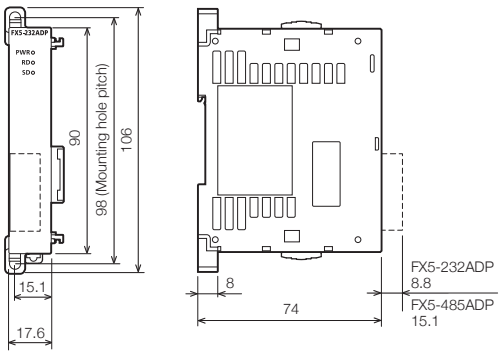
FX5-4AD-ADP/FX5-4DA-ADP

- MASS (Weight): Approx. 0.1 kg
- External color: Munsell 0.6B7.6/0.2



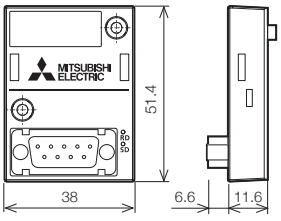
FX5-232ADP/FX5-485ADP

- MASS (Weight): Approx. 0.08 kg
- External color: Munsell 0.6B7.6/0.2

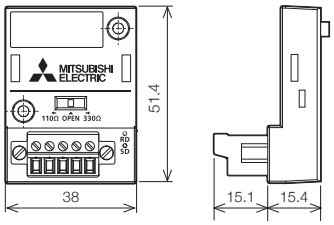


Expansion board

FX5-232-BD

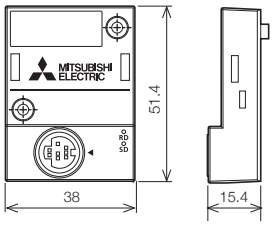


FX5-485-BD



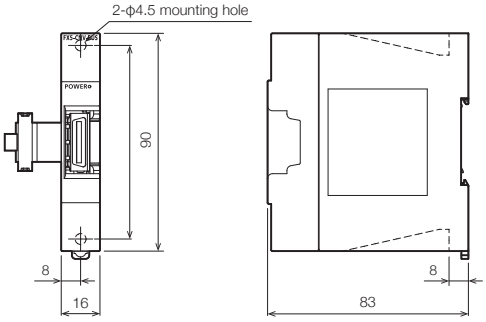
FX5-422-BD-GOT

- MASS (Weight): Approx. 0.02 kg
- External color: Munsell N1.5



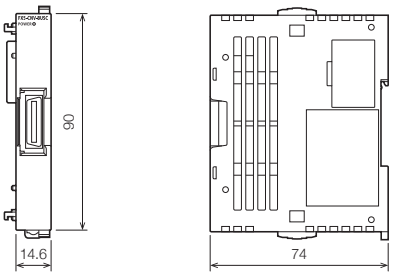
Bus conversion module

FX5-CNV-BUS



FX5-CNV-BUSC

- MASS (Weight): Approx. 0.1 kg
- External color: Munsell 0.6B7.6/0.2

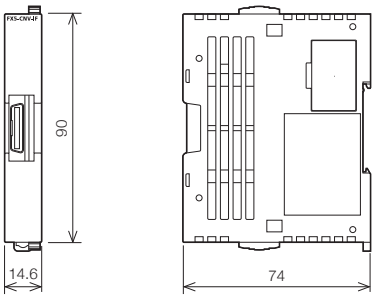


Unit: mm

Connector conversion module

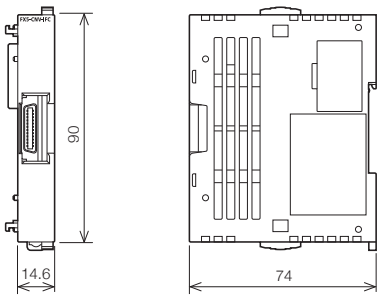
FX5-CNV-IF

- MASS (Weight): Approx. 0.06 kg
- External color: Munsell 0.6B7.6/0.2
- Accessory: Extension cable



FX5-CNV-IFC

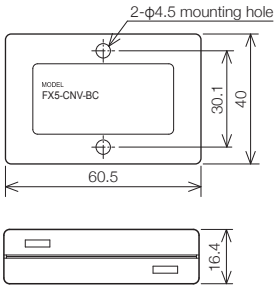
- MASS (Weight): Approx. 0.06 kg
- External color: Munsell 0.6B7.6/0.2



Connector conversion adapter

FX5-CNV-BC

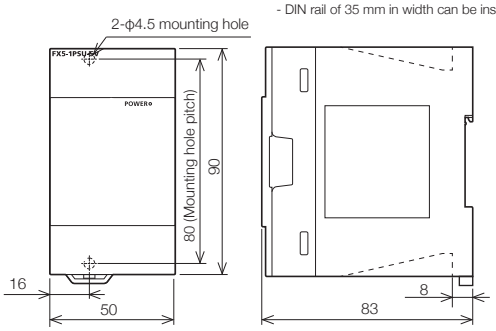
- MASS (Weight): Approx. 0.04 kg
- External color: Munsell 0.08GY/7.64/0.81



FX5 extension power supply module

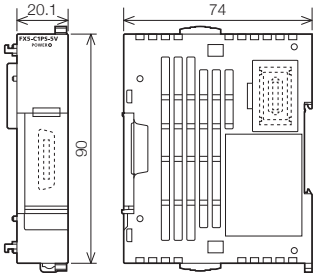
FX5-1PSU-5V

- MASS (Weight): Approx. 0.3 kg
- External color: Munsell 0.6B7.6/0.2
- Accessories: Extension cable
- M3 terminal screw for terminal block
- DIN rail of 35 mm in width can be installed



FX5-C1PS-5V

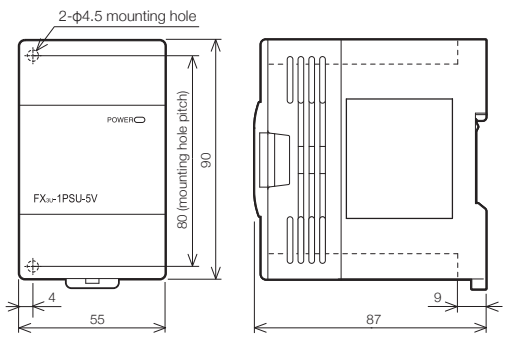
- Mass: approx. 0.1 kg
- External color: Munsell 0.6B7.6/0.2



FX3 extension power supply module

FX3U-1PSU-5V

- MASS (Weight): Approx. 0.3 kg
- External color: Munsell 0.08GY/7.64/0.81
- Accessories: Extension cable
- M3 terminal screw for terminal block
- DIN rail of 35 mm in width can be installed



External Dimensions

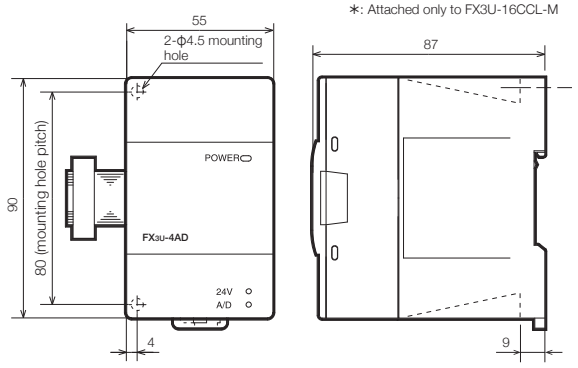
Unit: mm

FX3 intelligent function module

FX3U-4AD/FX3U-4DA
FX3U-64CCL/FX3U-16CCL-M

- External color: Munsell 0.08GY/7.64/0.81
- Accessories: Special block No. label, dust sheet, and terminating resistor*
- M3 terminal screw for terminal block
- DIN rail of 35 mm in width can be installed

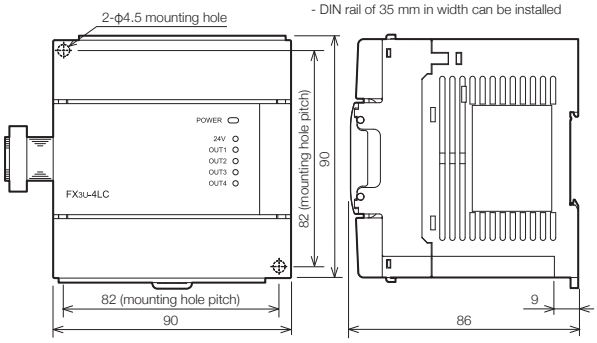
*: Attached only to FX3U-16CCL-M



Model	MASS (Weight): kg
FX3U-4AD, FX3U-4DA	Approx. 0.2 kg
FX3U-64CCL, FX3U-16CCL-M	Approx. 0.3 kg

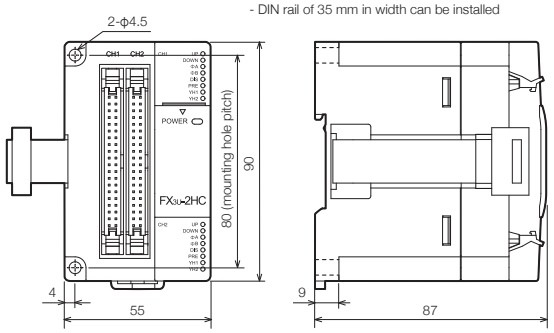
FX3U-4LC

- Mass: approx. 0.4 kg
- External color: Munsell 0.08GY/7.64/0.81
- M3 terminal screw for terminal block
- DIN rail of 35 mm in width can be installed



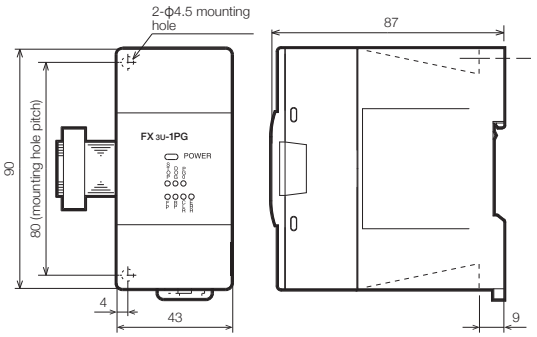
FX3U-2HC

- Mass: approx. 0.2 kg
- External color: Munsell 0.08GY/7.64/0.81
- DIN rail of 35 mm in width can be installed



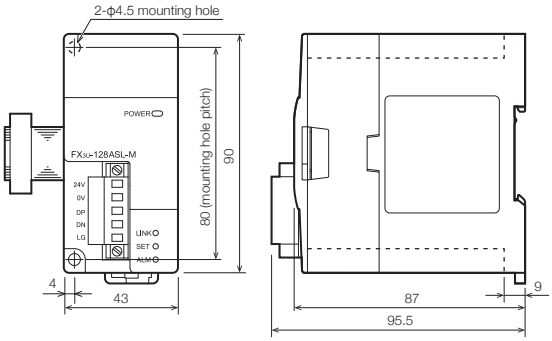
FX3U-1PG

- Mass: approx. 0.2 kg
- External color: Munsell 0.08GY/7.64/0.81
- M3 terminal screw for terminal block
- DIN rail of 35 mm in width can be installed



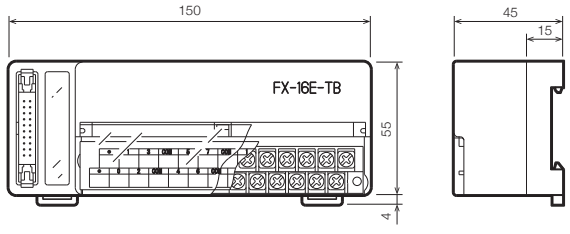
FX3U-128ASL-M

- Mass: approx. 0.2 kg
- External color: Munsell 0.08GY/7.64/0.81
- DIN rail of 35 mm in width can be installed



Terminal module (common to all models)

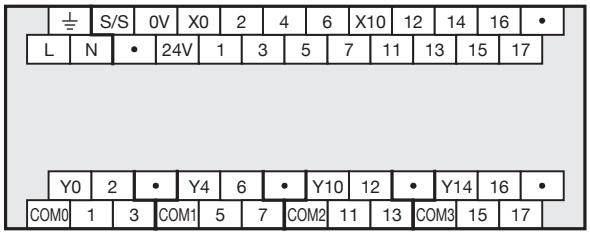
- External color: Munsell 0.08GY/7.64/0.81
- Accessory: Terminal block arrangement card
- M3.5 terminal screw for terminal block
- DIN rail of 35 mm in width can only be installed



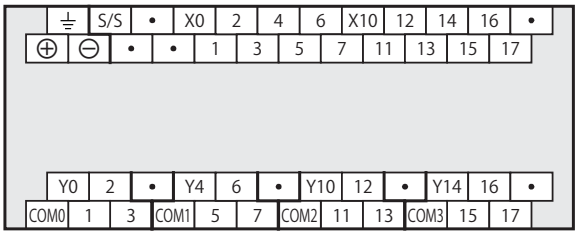
Terminal arrangement

FX5U CPU module

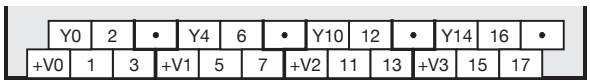
FX5U-32MR/ES, FX5U-32MT/ES



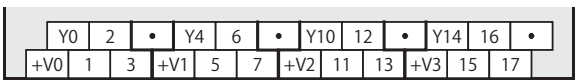
FX5U-32MR/DS, FX5U-32MT/DS



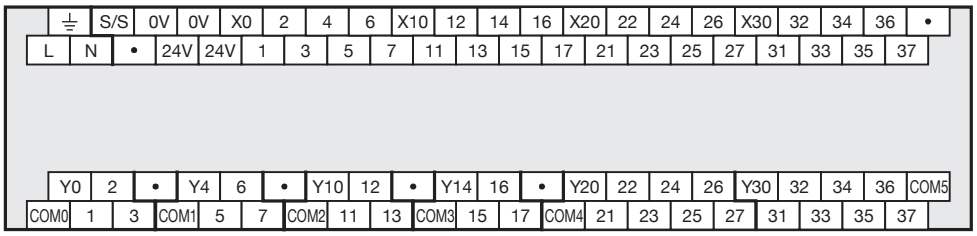
FX5U-32MT/ESS



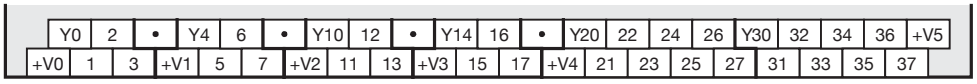
FX5U-32MT/DSS



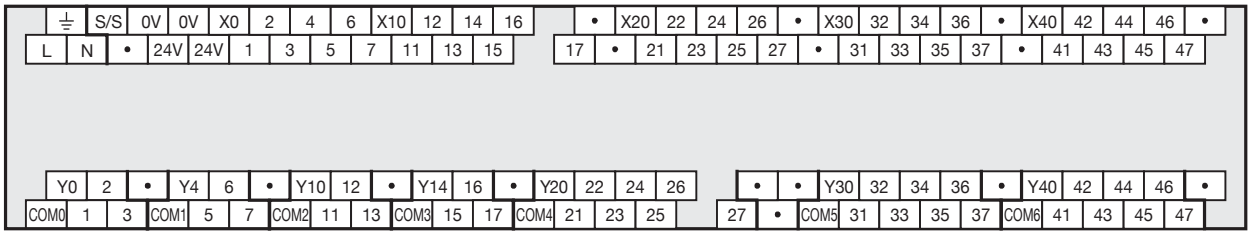
FX5U-64MR/ES, FX5U-64MT/ES



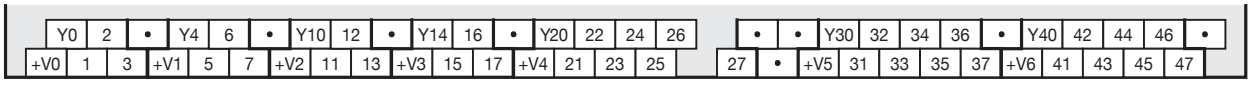
FX5U-64MT/ESS



FX5U-80MR/ES, FX5U-80MT/ES

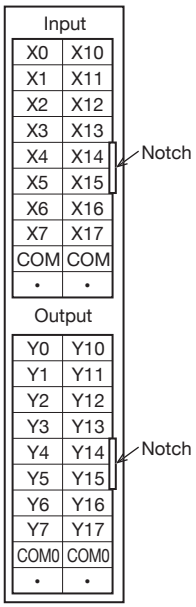


FX5U-80MT/ESS

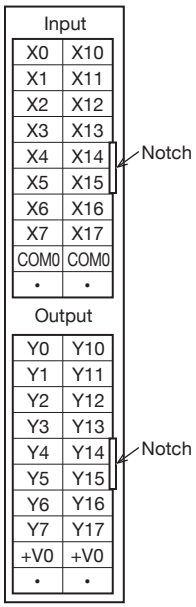


FX5UC CPU module

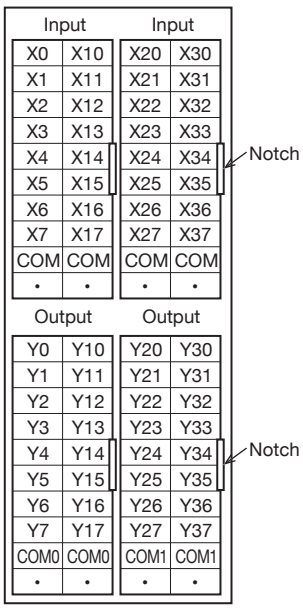
FX5UC-32MT/D



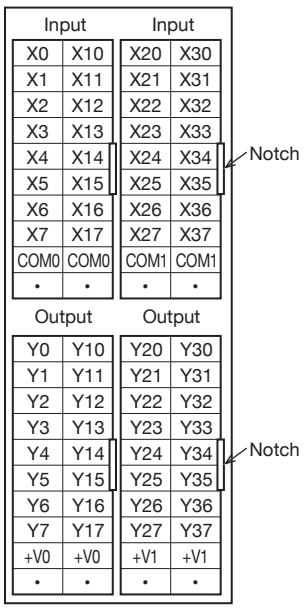
FX5UC-32MT/DSS



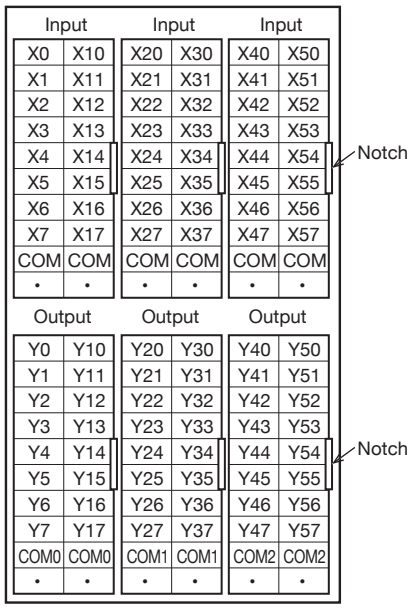
FX5UC-64MT/D



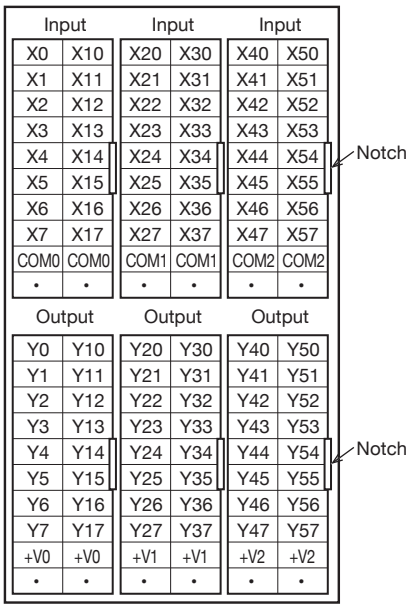
FX5UC-64MT/DSS



FX5UC-96MT/D



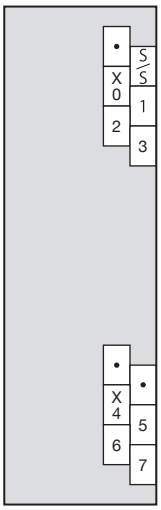
FX5UC-96MT/DSS



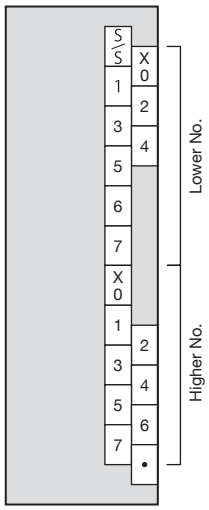
I/O module

◇ Input module/output module (extension cable type)

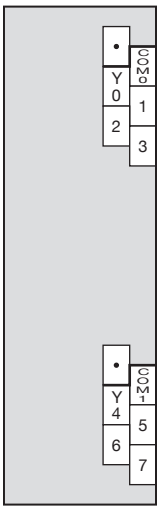
FX5-8EX/ES



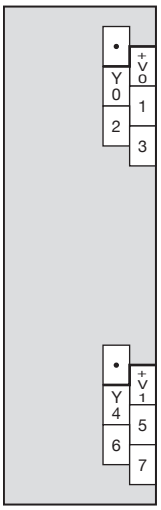
FX5-16EX/ES



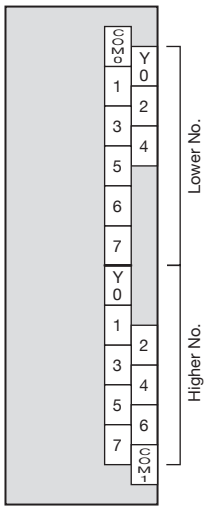
FX5-8EYR/ES
FX5-8EYT/ES



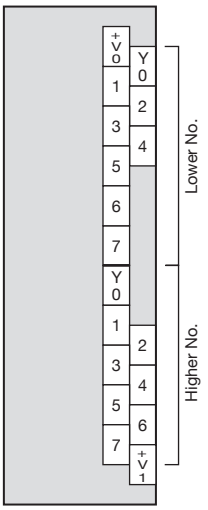
FX5-8EYT/ESS



FX5-16EYR/ES
FX5-16EYT/ES

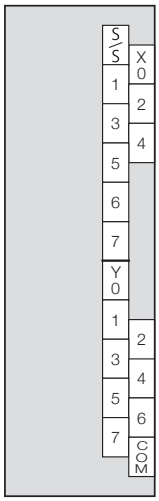


FX5-16EYT/ESS

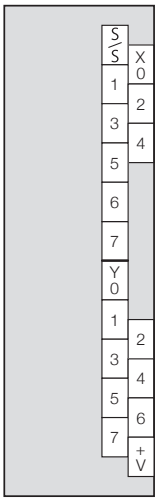


◇ High-speed pulse input/output module

FX5-16ET/ES-H

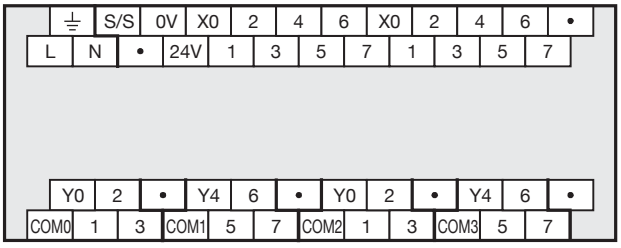


FX5-16ET/ESS-H

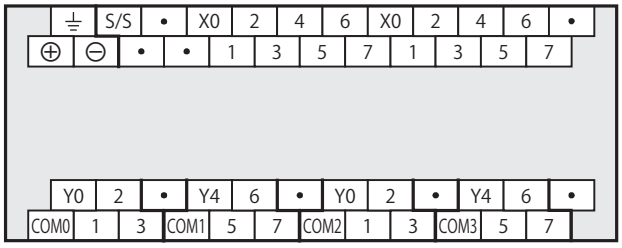


◇ Powered input/output modules

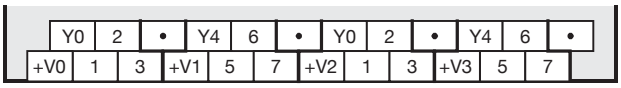
FX5-32ER/ES, FX5-32ET/ES



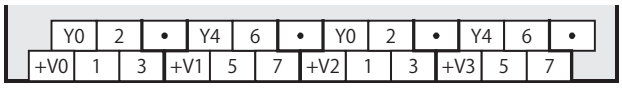
FX5-32ER/DS, FX5-32ET/DS



FX5-32ET/ESS



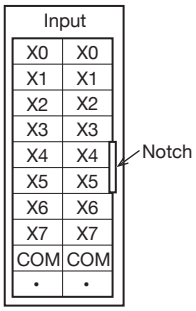
FX5-32ET/DSS



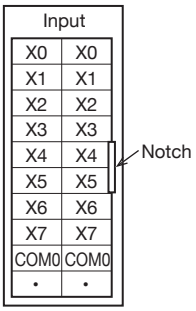
I/O module

◇ Input module/output module (extension connector type)

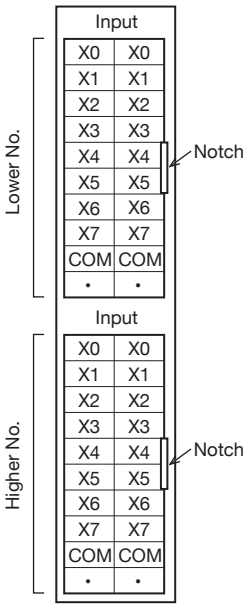
FX5-C16EX/D



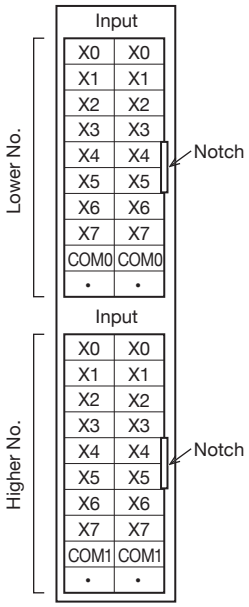
FX5-C16EX/DS



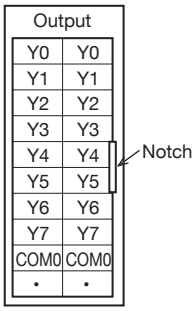
FX5-C32EX/D



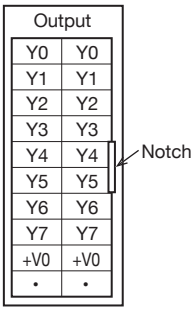
FX5-C32EX/DS



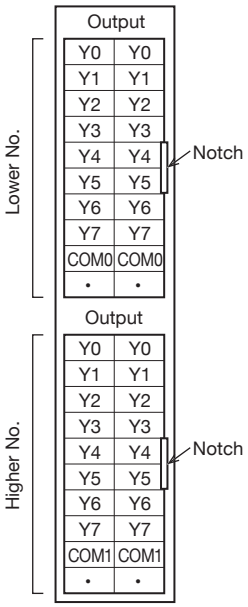
FX5-C16EYT/D



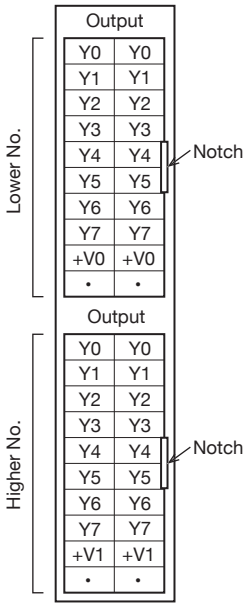
FX5-C16EYT/DSS



FX5-C32EYT/D

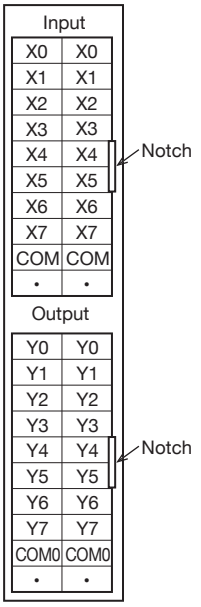


FX5-C32EYT/DSS

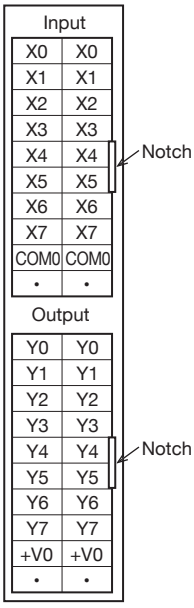


◇ I/O module (extension connector type)

FX5-C32ET/D

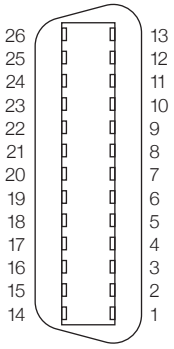


FX5-C32ET/DSS



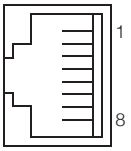
FX5 intelligent function module

FX5-40SSC-S



Pin No.	Signal name	Pin No.	Signal name
1	Idle	14	Idle
2	SG	15	SG
3	HA	16	HB
4	HAH	17	HBH
5	HAL	18	HBL
6 to 9	Idle	19 to 22	Idle
10	EMI	23	EMI.COM
11	DI1	24	DI2
12	DI3	25	DI4
13	COM	26	COM

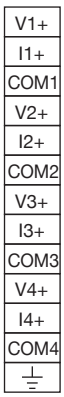
FX5-CCLIEF



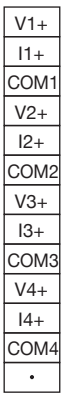
Pin	Signal name	Direction	Description
1	TP0	+	Data 0 transmission/reception (positive side)
2	TP0	-	Data 0 transmission/reception (negative side)
3	TP1	+	Data 1 transmission/reception (positive side)
4	TP2	+	Data 2 transmission/reception (positive side)
5	TP2	-	Data 2 transmission/reception (negative side)
6	TP1	-	Data 1 transmission/reception (negative side)
7	TP3	+	Data 3 transmission/reception (positive side)
8	TP3	-	Data 3 transmission/reception (negative side)

Expansion adapter

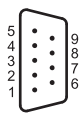
FX5-4AD-ADP



FX5-4DA-ADP



FX5-232ADP



Pin No.	Signal
1	CD (DCD)
2	RD (RXD)
3	SD (TXD)
4	ER (DTR)
5	SG (GND)
6	DR (DSR)
7,8,9	Not used

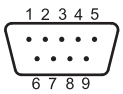
9-pin D-SUB (male)
Mounting screw:
Inch thread

FX5-485ADP

Terminal arrangement

Expansion board

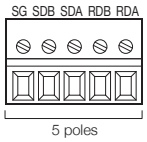
FX5-232-BD



Pin No.	Signal
1	CD (DCD)
2	RD (RXD)
3	SD (TXD)
4	ER (DTR)
5	SG (GND)
6	DR (DSR)
7,8,9	Not used

9-pin D-SUB (male)
Mounting screw: Inch thread

FX5-485-BD



Signal Name
RDA (RXD+)
RDB (RXD-)
SDA (TXD+)
SDB (TXD-)
SG (GND)

FX5-422-BD-GOT

8-pin MINI-DIN (female)

FX5 extension power supply module

FX5-1PSU-5V

FX5-C1PS-5V

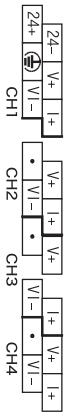
FX3 extension power supply module

FX3U-1PSU-5V

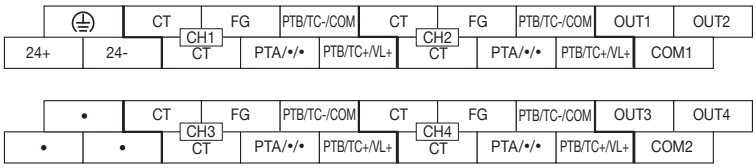
FX3 intelligent function module

FX3U-4AD

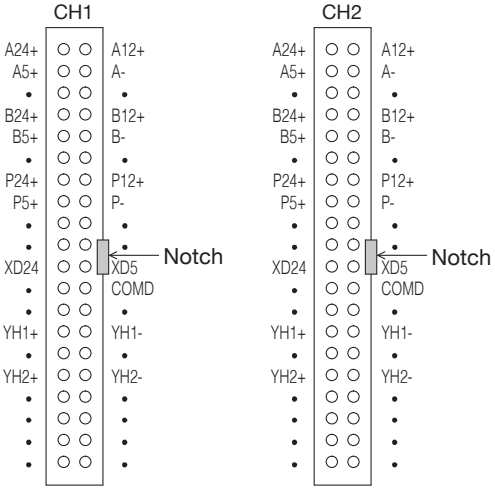
FX3U-4DA



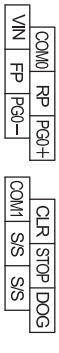
FX3U-4LC



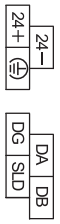
FX3U-2HC



FX3U-1PG



FX3U-64CCL/FX3U-16CCL-M



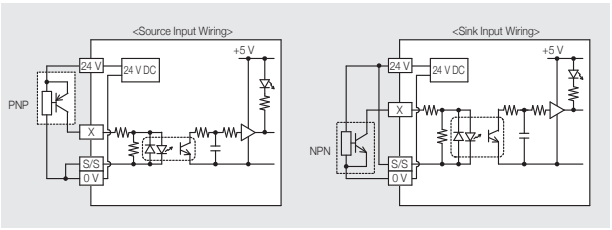
FX3U-128ASL-M

◇ Type system (CPU module, input/output extension device)

				Model system						
(1)	CPU category	FX5U, FX5UC, etc.		FX5 - C 32 M R /ES -□						
(2)	Type category	C (Extension connector type)								
		None (Extension cable type)								
(3)	Total number of input/output points	8, 16, 32, 40, 64, 80, 96, etc.								
(4)	Module category	M	CPU module							
		E	Extension devices including both input and output devices							
		EX	Input extension module							
		EY	Output extension module							
(5)	Output type	R	Relay output							
		T	Transistor output							
(6)	Power supply, input/output system			CPU module, extension module				Input/output extension module		
		Symbol	Power supply	Input type		Transistor output type		Input type	Transistor output type	
		/ES	AC	24 V DC, sink/source		sink		sink/source	–	
		/ESS	AC	24 V DC, sink/source		source		–	source	
		/DS	DC	24 V DC, sink/source		sink		sink/source	–	
		/DSS	DC	24 V DC, sink/source		source		–	source	
		/D	DC	24 V DC, sink		sink		sink	sink	
(7)	Other suffix symbols	-H	High-speed input/output function expansion							

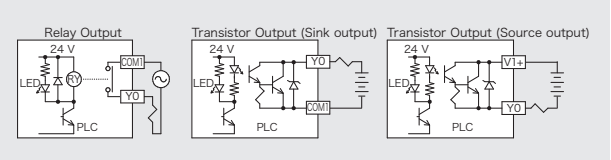
◇ Input signal format

1) When a contactless sensor output is connected to PLC, PNP open collector transistor output can be handled via source input wiring, and NPN open collector transistor output via sink input wiring.
2) S/S terminal and 0 V terminal are short-circuited by source input wiring. (Left side of the drawing below)
S/S terminal and 24 V terminal are short-circuited by sink input wiring. (Right side of the drawing below)



◇ Output signal format

1) Relay output type is mechanically isolated by a relay, while transistor output type is isolated by a photocoupler.
In addition, LED for output indication is driven by internal power supply.
2) Transistor output is made up of NPN open collector output (sink [-common]) system and NPN emitter follower output (source [+common]) system.



Terminal arrangement

memo

Products list

◇ CPU module

Model	Specifications					Description page
	Rated voltage	Input		Output		
◆ FX5U CPU modules						
FX5U-32MR/ES	100 to 240 V AC 50/60 Hz	16 points	24 V DC sink/source	16 points	Relay	22
FX5U-32MT/ES					Transistor/sink	22
FX5U-32MT/ESS					Transistor/source	22
FX5U-64MR/ES		32 points		32 points	Relay	22
FX5U-64MT/ES					Transistor/sink	22
FX5U-64MT/ESS					Transistor/source	22
FX5U-80MR/ES		40 points		40 points	Relay	22
FX5U-80MT/ES					Transistor/sink	22
FX5U-80MT/ESS					Transistor/source	22
FX5U-32MR/DS	24 V DC	16 points	24 V DC sink/source	16 points	Relay	23
FX5U-32MT/DS					Transistor/sink	23
FX5U-32MT/DSS					Transistor/source	23
◆ FX5UC CPU modules						
FX5UC-32MT/D	24 V DC	16 points	24 V DC sink	16 points	Transistor/sink	28
FX5UC-32MT/DSS			24 V DC sink/source		Transistor/source	28
FX5UC-64MT/D		32 points	24 V DC sink	32 points	Transistor/sink	28
FX5UC-64MT/DSS			24 V DC sink/source		Transistor/source	28
FX5UC-96MT/D		48 points	24 V DC sink	48 points	Transistor/sink	28
FX5UC-96MT/DSS			24 V DC sink/source		Transistor/source	28

◇ I/O module

Model	Specifications					Description page
	Rated voltage	Input		Output		
■■■ Extension cable type ■■■						
◆ Input module						
FX5-8EX/ES	Supplied from CPU module	8 points	24 V DC sink/source	–	–	34
FX5-16EX/ES		16 points		–	–	34
◆ Output module						
FX5-8EYR/ES	Supplied from CPU module	–	–	8 points	Relay	34
FX5-8EYT/ES					Transistor/sink	34
FX5-8EYT/ESS					Transistor/source	34
FX5-16EYR/ES		–	–	16 points	Relay	34
FX5-16EYT/ES					Transistor/sink	34
FX5-16EYT/ESS					Transistor/source	34
◆ High-speed pulse input/output module						
FX5-16ET/ES-H	Supplied from CPU module	8 points	24 V DC sink/source	8 points	Transistor/sink	34
FX5-16ET/ESS-H					Transistor/source	34
◆ Powered input/output module						
FX5-32ER/ES	100 to 240 V AC 50/60 Hz	16 points	24 V DC sink/source	16 points	Relay	33
FX5-32ET/ES					Transistor/sink	33
FX5-32ET/ESS					Transistor/source	33
FX5-32ER/DS	24 V DC	16 points	24 V DC sink/source	16 points	Relay	33
FX5-32ET/DS					Transistor/sink	33
FX5-32ET/DSS					Transistor/source	33
■■■ Extension connector type ■■■						
◆ Input module						
FX5-C16EX/D	Supplied from CPU module	16 points	24 V DC sink	–	–	35
FX5-C16EX/DS			24 V DC sink/source			35
FX5-C32EX/D		32 points	24 V DC sink	–	–	35
FX5-C32EX/DS			24 V DC sink/source			35
◆ Output module						
FX5-C16EYT/D	Supplied from CPU module	–	–	16 points	Transistor/sink	35
FX5-C16EYT/DSS					Transistor/source	35
FX5-C32EYT/D		–	–	32 points	Transistor/sink	35
FX5-C32EYT/DSS					Transistor/source	35
◆ Input/output module						
FX5-C32ET/D	Supplied from CPU module	16 points	24 V DC sink	16 points	Transistor/sink	35
FX5-C32ET/DSS			24 V DC sink/source		Transistor/source	35

◇ Expansion boards & Expansion adapter

Model	Specifications	Description page
FX5-232-BD	For RS-232C communication	67
FX5-485-BD	For RS-485 communication	67
FX5-422-BD-GOT	For GOT connection RS-422 communication	67
FX5-232ADP	For RS-232C communication	70
FX5-485ADP	For RS-485 communication	70
FX5-4AD-ADP	4 ch analog input adapter	42
FX5-4DA-ADP	4 ch analog output adapter	42

◇ FX5 extension power supply module, bus conversion module, connector conversion module

Model	Specifications	Description page
FX5-1PSU-5V	FX5U extension power supply	82
FX5-C1PS-5V	FX5UC extension power supply	83
FX5-CNV-BUS	Bus conversion FX5 (extension cable type) → FX3	82
FX5-CNV-BUSC	Bus conversion FX5 (extension connector type) → FX3	82
FX5-CNV-IF	Connector conversion FX5 (extension cable type) → FX5 (extension connector type)	83
FX5-CNV-IFC	Connector conversion FX5 (extension connector type) → FX5 (extension cable type)	83

◇ FX5 intelligent function module

Model	Specifications	Description page
FX5-40SSC-S	Simple motion 4-axis control	57
FX5-CCLIEF	Intelligent device station for CC-Link IE Field network	62

◇ FX3 extension power supply module

Model	Specifications	Description page
FX3U-1PSU-5V	FX3 extension power supply	83

◇ FX3 intelligent function module

Model	Specifications	Description page
FX3U-4AD	4 ch analog input	43
FX3U-4DA	4 ch analog output	43
FX3U-4LC	4 ch temperature control	46
FX3U-1PG	Positioning pulse output 200 kpps	56
FX3U-2HC	2 ch 200 kHz high-speed counter	50
FX3U-16CCL-M	Master for CC-Link V2	63
FX3U-64CCL	Interface for CC-Link V2	64
FX3U-128ASL-M	Master for AnyWireASLINK	67

◇ Software package

Type	Model	Specifications	Description page
MELSOFT iQ Works (DVD-ROM)	SW2DND-IQWK-E*1	FA engineering software (English)*2	83
MELSOFT GX Works3 (DVD-ROM)	SW1DND-GXW3-E	PLC engineering software*2 ((English) includes GX Works2, GX Developer)	83

*1: Purchase the upgraded version separately if your software is the conventional model (SW1DND-IQWK-E). Contact our sales section.
*2: For the models corresponding to software, refer to manuals of each product.

◇ Communication cable

Model	Specifications		Description page
FX-232CAB-1	3 m	9-pin D-sub (female) ⇔ 9-pin D-sub (female) (for DOS/V, etc.)	75

◇ Input/output cable

Model	Specifications		Description page
FX-16E-150CAB	1.5 m	For connection between terminal module and FX5 PLC (Flat cable with connectors at both ends)	86
FX-16E-300CAB	3.0 m		86
FX-16E-500CAB	5.0 m		86
FX-16E-500CAB-S	5.0 m	Loose wire with connector on one end	86
FX-16E-150CAB-R	1.5 m	For connection between terminal module and FX5 PLC (Multi-core round cable with connectors at both ends)	86
FX-16E-300CAB-R	3.0 m		86
FX-16E-500CAB-R	5.0 m		86

◇ Input/output connector

Model	Specifications	Description page
FX2C-I/O-CON	20-pin connector and 10 pressure connectors for flat cable	86
FX2C-I/O-CON-S	20-pin connector and 5 sets of housing for loose wire and crimp contact (for 0.3 mm^2)	86
FX2C-I/O-CON-SA	20-pin connector and 5 sets of housing for loose wire and crimp contact (for 0.5 mm^2)	86
FX-I/O-CON2-S	40-pin connector, 2 sets of loose wire, AWG22 (0.3 mm^2)	86
FX-I/O-CON2-SA	40-pin connector, 2 sets of loose wire, AWG20 (0.5 mm^2)	86

◇ Terminal module

Model	Specifications	Description page
FX-16E-TB	16 input or output points	85
FX-32E-TB	32 input or output points	85
FX-16E-TB/UL	16 input or output points	85
FX-32E-TB/UL	32 input or output points	85
FX-16EYR-TB	16 relay output points 2 A/1 point (8 A/4 points)	85
FX-16EYS-TB	16 triac output points, 0.3 A/1 point (0.8 A/4 points)	85
FX-16EYT-TB	16 transistor output points, 0.5 A/1 point (0.8 A/4 points) (sink output)	85
FX-16EYR-ES-TB/UL	16 relay output points 2 A/1 point (8 A/4 points)	85
FX-16EYS-ES-TB/UL	16 triac output points, 0.3 A/1 point (0.8 A/4 points)	85
FX-16EYT-ES-TB/UL	16 transistor output points, 0.5 A/1 point (0.8 A/4 points) (sink output)	85
FX-16EYT-ESS-TB/UL	16 transistor output points, 0.5 A/1 point (0.8 A/4 points) (source output)	85

◇ Power cable

Model	Specifications	Description page
FX2NC-100MPCB	FX5UC CPU module, for 24 V DC power supply	87
FX2NC-100BPCB	Extension module (extension connector type), for 24 V DC input power supply	87
FX2NC-10BPCB1	Extension module (extension connector type), for 24 V DC input power supply connection wiring	87

◇ Extended cable/connector conversion adapter

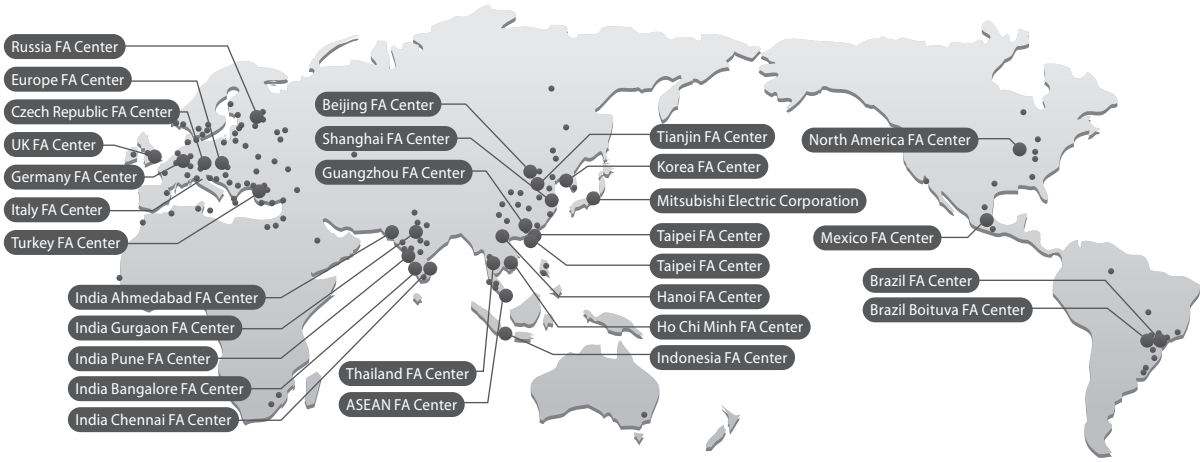
Model	Specifications		Description page
FX5-30EC	30 cm	For the extension of FX5 extension module	84
FX5-65EC	65 cm		84
FX5-CNV-BC	For the connection between an extended extension cable and an FX5 input/output module (extension cable type), a high-speed pulse input/output module, or an FX5 intelligent function module		84

◇ SD memory card & battery

Model	Specifications	Description page
NZ1MEM-2GBSD	SD memory card (2 GB)	81
NZ1MEM-4GBSD	SDHC memory card (4 GB)	81
FX3U-32BL	Battery	81

Global FA Center

Mitsubishi Electric Corporation FA Centers support all our customers and users of MELSEC iQ-F Series all over the world.



Japan (Tokyo)	FA Global Solution Technical Department	(TEL:+81-3-3218-6422)
Japan (Tokyo)	Asian Business Development Department	(TEL:+81-3-3218-6284)
China (Shanghai)	Mitsubishi Electric Automation (China) Ltd.	(TEL:+86-21-2322-3030)
China (Beijing)	Mitsubishi Electric Automation (China) Ltd. Beijing Branch	(TEL:+86-10-6518-8830)
China (Tianjin)	Mitsubishi Electric Automation (China) Ltd. Tianjin Branch	(TEL:+86-22-2813-1015)
China (Guangzhou)	Mitsubishi Electric Automation (China) Ltd. Guangzhou Branch	(TEL:+86-20-8923-6730)
Taiwan (Taichung)	Mitsubishi Electric Taiwan Co., Ltd.	(TEL:+886-4-2359-0688)
Taiwan (Taipei)	Setsuyo Enterprise Co., Ltd.	(TEL:+886-2-2299-9917)
Korea	Mitsubishi Electric Automation Korea Co., Ltd.	(TEL:+82-2-3660-9605)
ASEAN	MITSUBISHI ELECTRIC ASIA PTE. LTD.	(TEL:+65-6473-2308)
Thailand	MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO.,LTD.	(TEL:+66-2682-6522)
Indonesia	PT. MITSUBISHI ELECTRIC INDONESIA	(TEL:+62-21-2961-7797)
Vietnam (Hanoi)	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED Hanoi Branch	(TEL:+84-4-3937-8075)
Vietnam (Ho Chi Minh)	MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED	(TEL:+84-8-3910-5945)
India (Pune)	MITSUBISHI ELECTRIC INDIA PVT. LTD. Pune Branch	(TEL:+91-20-2710-2000)

India (Gurgaon)	MITSUBISHI ELECTRIC INDIA PVT. LTD. Gurgaon Head Office	(TEL:+91-124-463-0300)
India (Bangalore)	MITSUBISHI ELECTRIC INDIA PVT. LTD. Bangalore Branch	(TEL:+91-80-4020-1600)
India (Chennai)	MITSUBISHI ELECTRIC INDIA PVT. LTD. Chennai Branch	(TEL:+91-44-4554-8772)
India (Ahmedabad)	MITSUBISHI ELECTRIC INDIA PVT. LTD. Ahmedabad Branch	(TEL:+91-79-6512-0063)
North America	MITSUBISHI ELECTRIC AUTOMATION, INC.	(TEL:+1-847-478-2100)
Mexico	MITSUBISHI ELECTRIC AUTOMATION, INC. Mexico Branch	(TEL:+52-55-3067-7500)
Brazil	MITSUBISHI ELECTRIC DO BRASIL COMÉRCIO E SERVIÇOS LTDA.	(TEL:+55-11-4689-3000)
Brazil (Votorantim)	MELCO CNC DO BRASIL COMÉRCIO E SERVIÇOS S.A.	(TEL:+55-15-3023-9000)
Europe	MITSUBISHI ELECTRIC EUROPE B.V. Polish Branch	(TEL:+48-12-347-65-00)
Germany	MITSUBISHI ELECTRIC EUROPE B.V. German Branch	(TEL:+49-2102-486-0)
UK	MITSUBISHI ELECTRIC EUROPE B.V. UK Branch	(TEL:+44-1707-28-8780)
Czech Republic	MITSUBISHI ELECTRIC EUROPE B.V. Czech Branch	(TEL:+420-255-719-200)
Italy	MITSUBISHI ELECTRIC EUROPE B.V. Italian Branch	(TEL:+39-039-60531)
Russia	MITSUBISHI ELECTRIC (RUSSIA) LLC St.Petersburg Branch	(TEL:+7-812-633-3497)
Turkey	MITSUBISHI ELECTRIC TURKEY ELEKTRİK ÜRÜNLERİ A.Ş. Ümraniye Branch	(TEL:+90-216-969-2500)

About this product catalog

Due to the constantly growing product range and new or changed product features, the information in this catalog may be updated without notice. Please contact your Mitsubishi Electric product provider for more details.

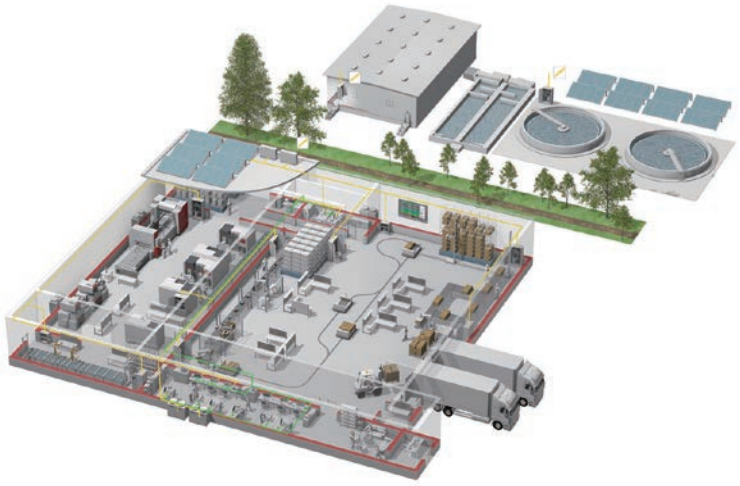
Texts, figures and diagrams shown in this product catalog are intended exclusively for explanation and assistance in planning and ordering the FX5 programmable logic controllers (PLCs) and the associated accessories. Only the manuals supplied with the modules are relevant for installation, commissioning and handling of the modules and the accessories. The information given in the manuals must be read before installation and commissioning of the modules or software. If any questions arise regarding the application or use of the PLC modules and accessories described in this catalog, please contact your Mitsubishi Electric product provider.

This catalog confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this catalog.

©2016 MITSUBISHI ELECTRIC CORPORATION

- Microsoft, Windows, Windows Me, Windows NT, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8, Windows 8.1, Windows 10, Internet Explorer, ActiveX, Outlook, Excel, Visio are the registered trademarks or the trademarks of Microsoft Corporation in the US and in each country.
- Ethernet is a trademark of Xerox Corporation.
- MODBUS is a registered trademark of Schneider Electric SA.
- Intel Core is a trademark or registered trademark of Intel Corporation in the US and in each country.
- The SD and SDHC logos are trademarks or registered trademarks of SD-3C, LLC.
- All other company names and product names used in this document are trademarks or registered trademarks of their respective companies.

YOUR SOLUTION PARTNER



Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

A NAME TO TRUST

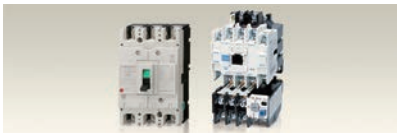
Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

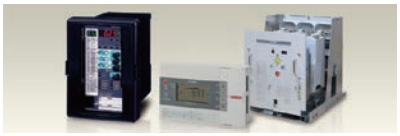
Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.



Low voltage: MCCB, MCB, ACB



Medium voltage: VCB, VCC

Power monitoring, energy management

Compact and Modular Controllers

Inverters, Servos and Motors

Visualisation: HMIs

Numerical Control (NC)

Robots: SCARA, Articulated arm

Processing machines: EDM, Lasers, IDS

Transformers, Air conditioning, Photovoltaic systems

* Not all products are available in all countries.

PROGRAMMABLE CONTROLLERS
MELSEC iQ-F Series

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
http://Global.MitsubishiElectric.com

L(NA)08428ENG-A 1609(MEE) Printed September 2016

All trademarks acknowledged.