MITSUBISHI ELECTRIC

Changes for the Better

for a greener tomorrow eco Changes

MELSEC iQ-F Series
iQ Platform-compatible PLC

The next level of industry

MELSEC iQ-F series

iQ Platform

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.

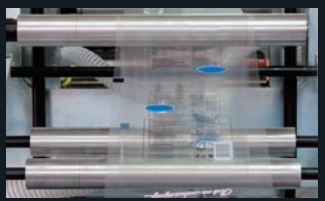
From stand alone use to networked system applications, MELSEC iQ-F Series brings your business to the next level of industry.

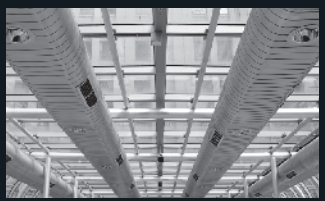
The next level of industry

The newly reborn MELSEC iQ-F Series reaches to new areas of application with a high-speed system bus, extensive built-in functions and network support.


Conveyance


Food & Beverage


Packaging

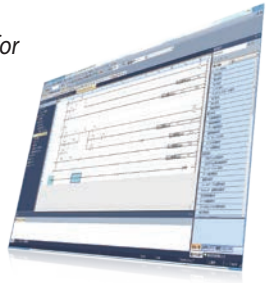

Air-conditioning

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 enormous volumes of control data and production data and establishing traceability

* TCO: Total Cost of Ownership

PLC & HMI

1. MELSEC iQ-F Series greatly enhances the total system performance with the high-speed system bus performance (150× conventional speed *1)
2. Standardize programs with dedicated memory for function blocks and module labels
3. Uniform and powerful security functions

Network

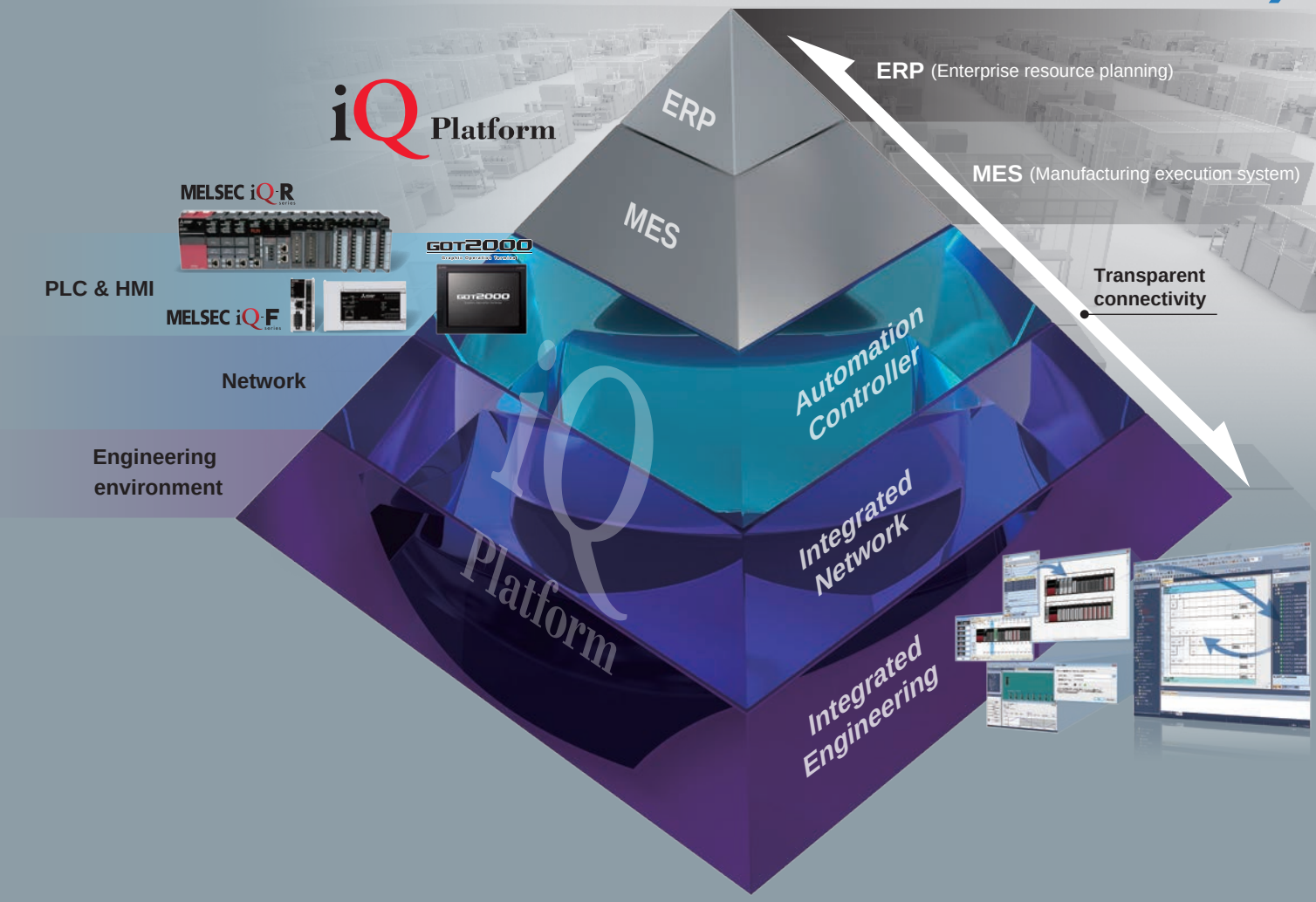
1. Achieve loss-less retrieval with CC-Link IE Field (future support) 1 Gbps high-speed communication (link refresh performance 40× conventional levels *1)
2. Seamless connectivity with each device using SLMP * (future support)

* SLMP: SeamLess Message Protocol

Engineering Environment

1. Detect and automatically generate network configuration diagrams from actual machines (future support)
2. Share parameters across multiple engineering software via MELSOFT Navigator (future support)

* 1: Comparison with FX3U


iQ Platform
ERP
MES
ERP (Enterprise resource planning)
MES (Manufacturing execution system)
Transparent connectivity
MELSEC iQ-R
GOT2000
PLC & HMI
MELSEC iQ-F
Network
Engineering environment
Automation Controller
Integrated Network
Integrated Engineering
iQ Platform


MITSUBISHI ELECTRIC
GOT2000

Advanced Built-in Functions

CPU Performance

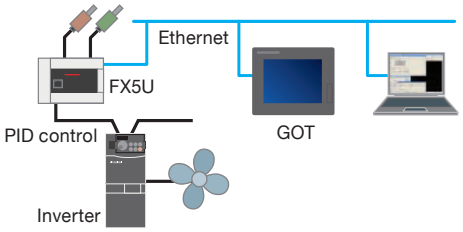
A new sequence execution engine is at the core of MELSEC iQ-F, capable of running structured programs and multiple programs, and supports structured text and function blocks, etc.

Program capacity	Instruction execution speed (LD, MOV instruction)	PC MIX value	Fixed cycle interrupt Program
64 k steps	34 ns	14.6 instructions/µs	minimum 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.

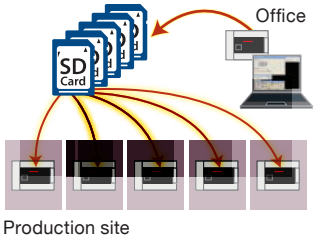
›› *Example of inverter control with analog output*



Built-in SD Card Slot

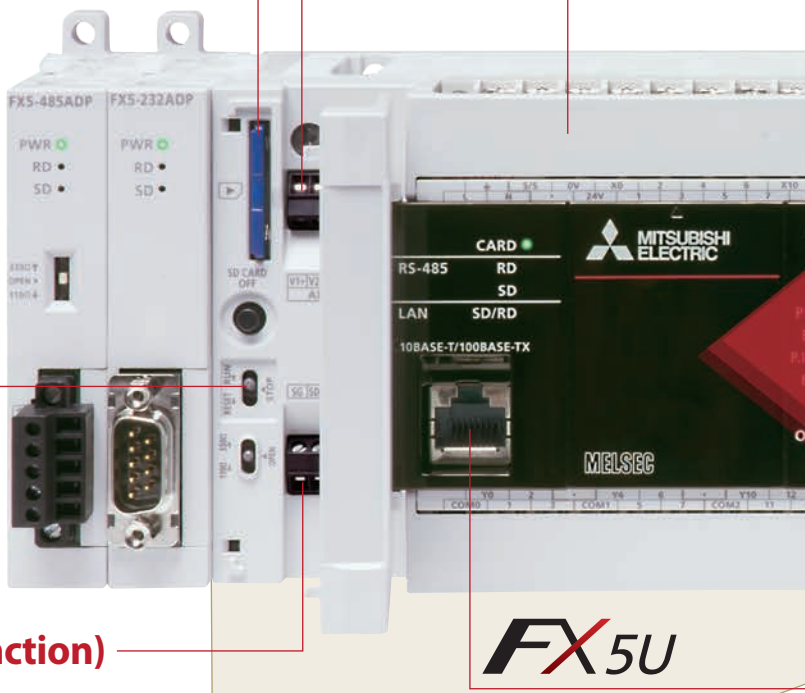
A built-in SD card slot is convenient for updating the program and mass production of equipment.
Data can be logged in SD card (future support), making it easy to analyze the system status and production state, etc.

›› *Example of mass production of equipment using SD card*



RUN/STOP/RESET Switch

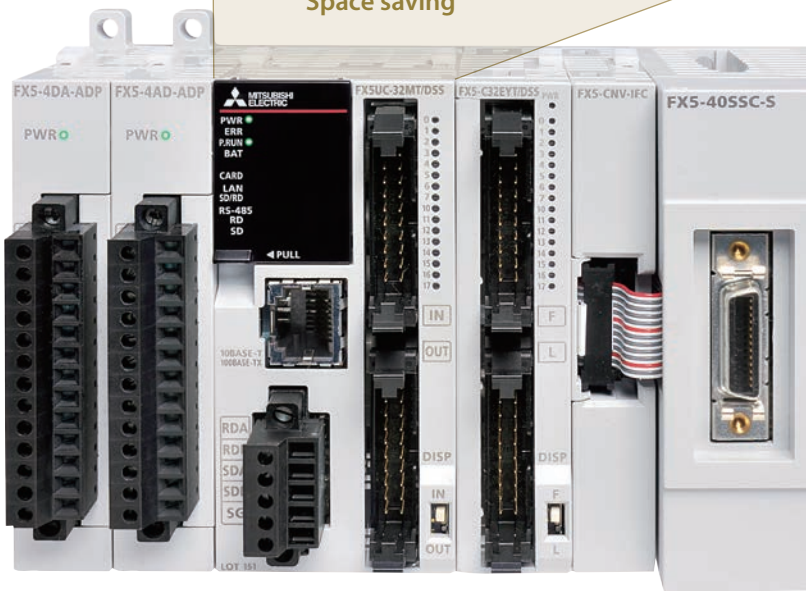
The RUN/STOP switch now includes RESET function.
PLC can be rebooted without turning off the main power for efficient debugging.



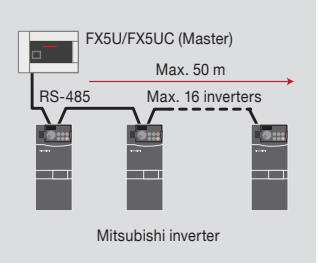
Built-in RS-485 Port (with MODBUS® function)

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. The MODBUS function supports a connection of up to 32 peripheral units including PLCs, sensors and thermoregulators.

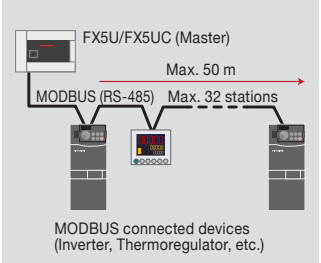
Space saving



›› Inverter Communication



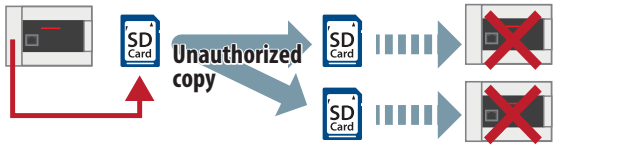
›› MODBUS Communication



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*

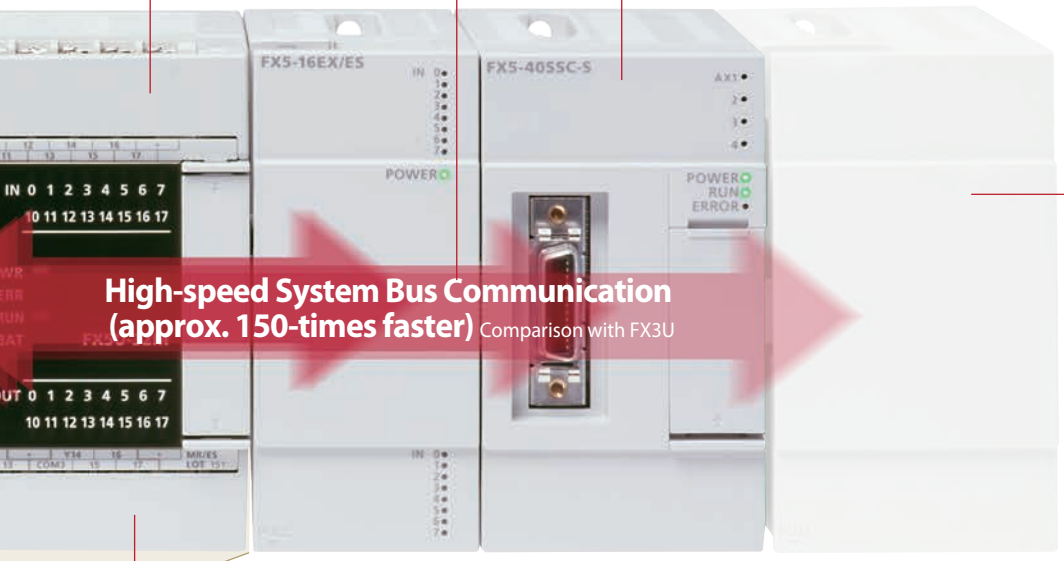


Program cannot be executed
(Program and CPU keys do not match)

High-speed System Bus Communication

MELSEC iQ-F realizes high-speed system bus communication at speeds of 1.5 k words/ms (approx. 150-times faster than FX3U). Achieve maximum performance even when using intelligent function module with large amounts of data.

SSCNET III/H



CC-Link IE Field

... Future support

High-speed System Bus Communication (approx. 150-times faster) Comparison with FX3U

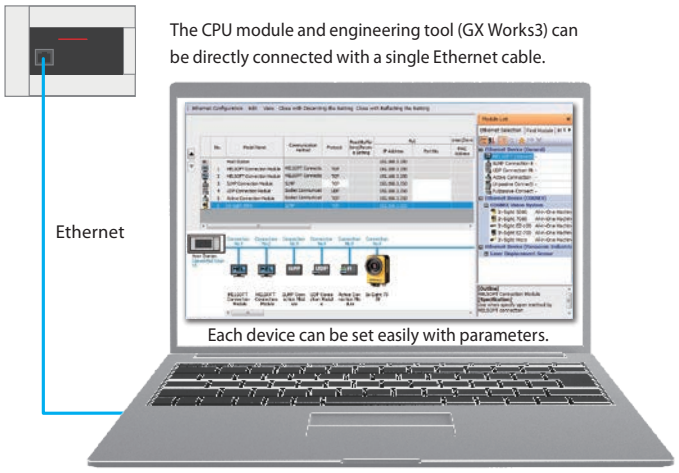
Battery-less and Maintenance-free

Programs can be saved even without a battery, and clock data can be saved for ten days by supercapacitor.
(May vary by usage state)

∗: Clock data and device memory can be saved (latched) during a power outage by using the 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 device. This port also supports remote maintenance and other seamless SLMP communication with host devices.

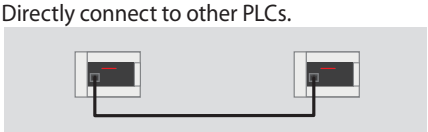


The CPU module and engineering tool (GX Works3) can be directly connected with a single Ethernet cable.

Each device can be set easily with parameters.

›› Socket Communication

Directly connect to other PLCs.



›› Remote Maintenance

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

›› SLMP Communication

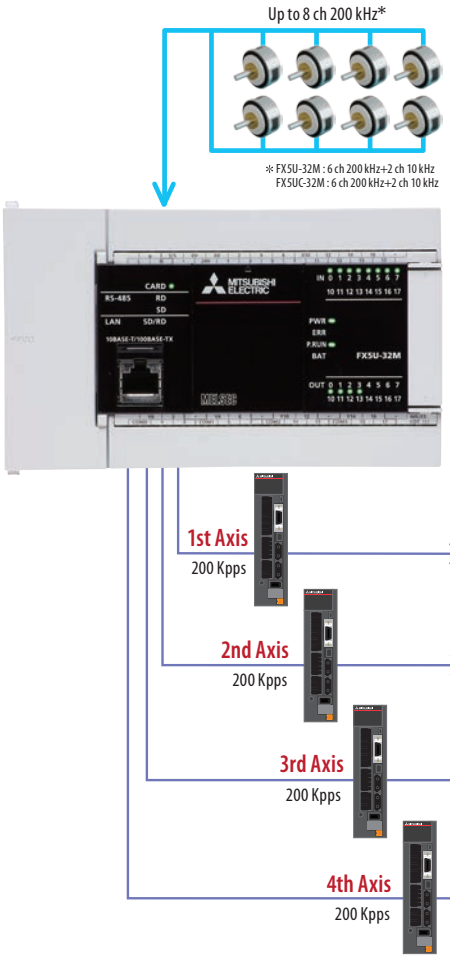
Device data read-out/writing to PLC from external device is possible.

›› MODBUS/TCP client

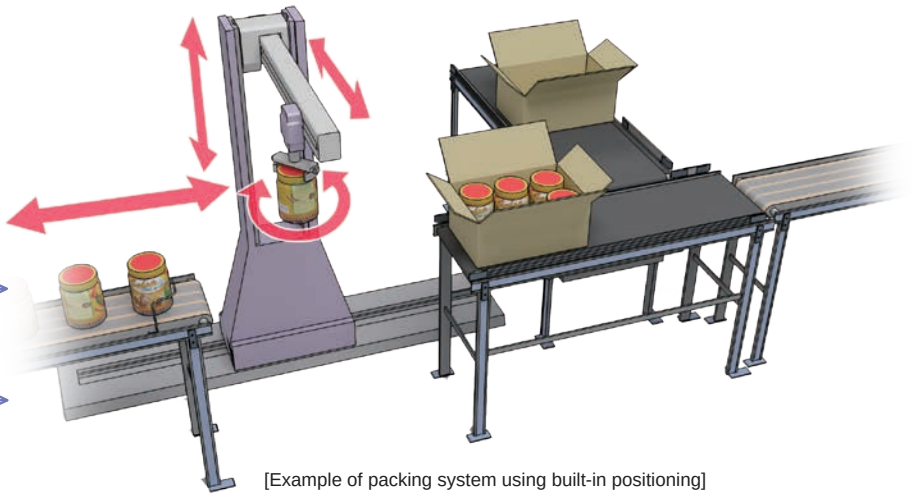
Advanced positioning function

Built-in Positioning (200 Kpps, 4-Axis built-in)

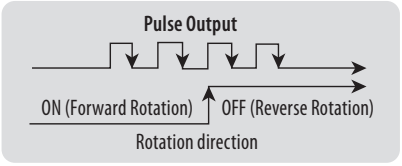
Positioning capable of 20 µs high-speed start

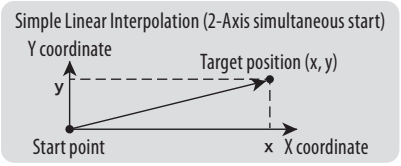


FX5U/FX5UC features powerful positioning functionality with 8 ch high-speed pulse input and 4-axis pulse output.
Positioning operations including interrupt, variable speed, and simple interpolation can easily be set up in tables and executed.



[Example of packing system using built-in positioning]





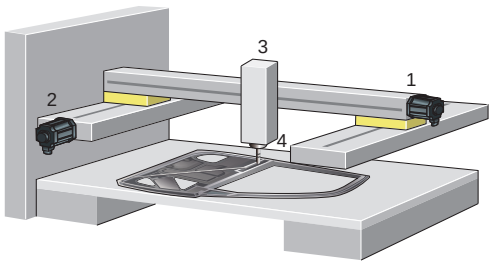
Simple Motion Module <4-Axis control module>

Positioning control with SSCNET III/H

FX5-40SSC-S is equipped with a 4-axis positioning function compatible with SSCNET III/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.

FX5-40SSC-S

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK



[Example of sealing system]

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

Main functions

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

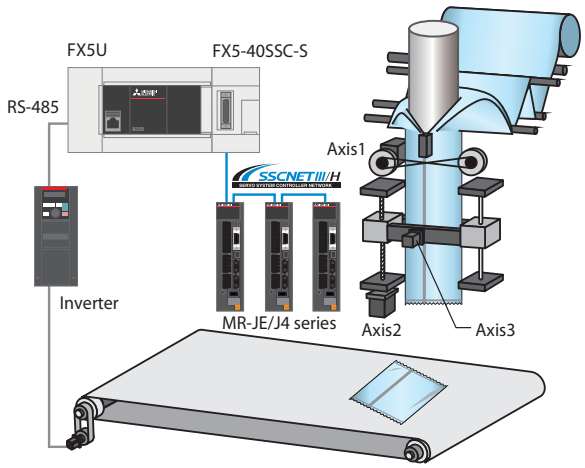
Application examples

- Sealing system
- Automatic vending machines
- 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.



[Example of packaging machine using Simple Motion]

- 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.

Synchronous control

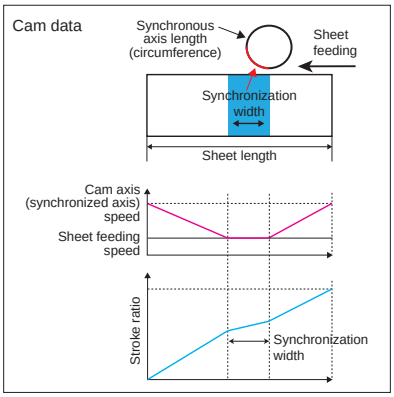
In addition to synchronous control that replaces physical machine mechanisms such as gears, shaft, transmission and cam with software, functions such as cam control, clutch and cam auto-generation are easily realized. Since synchronous control can be started and stopped for each axis, programs can contain 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.

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.

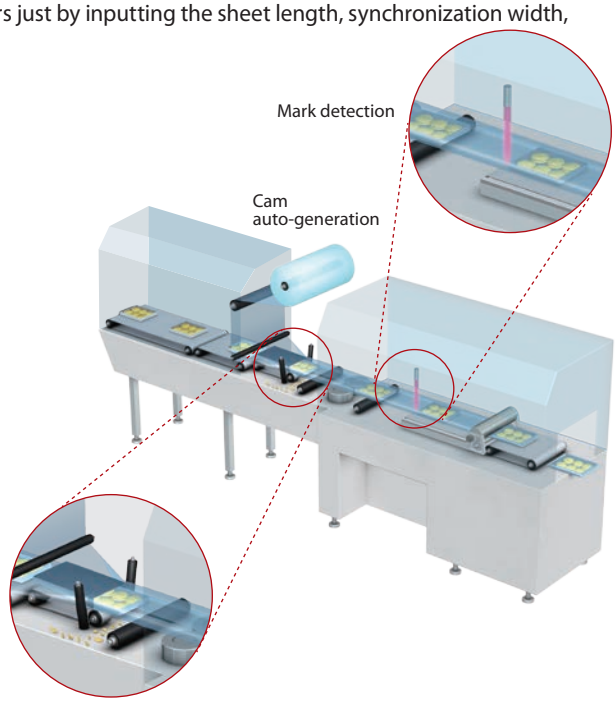
User-created GOT screen

Parameter settings, including items like sheet length, etc.



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]

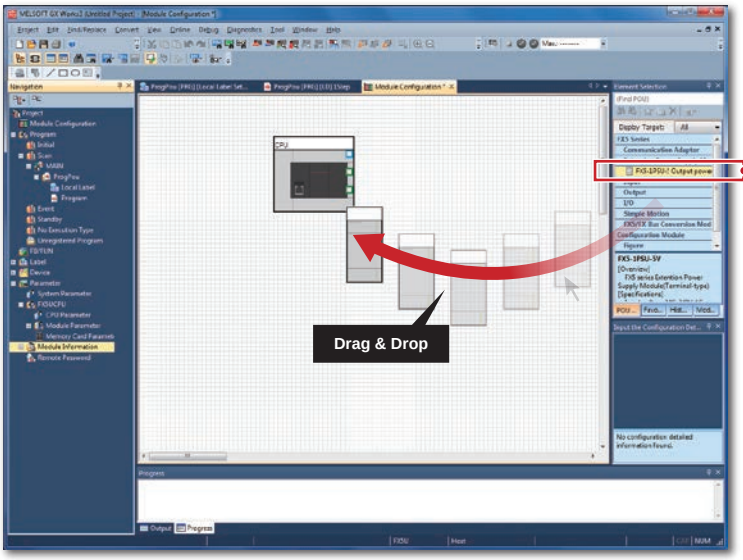
User-friendly programming software

GX Works3

Software that comprehensively supports programming and maintenance streamlines operations.
Easily and intuitively program by making "selections" in a graphical environment.
Reduce maintenance and engineering costs with diagnosis and troubleshooting function.

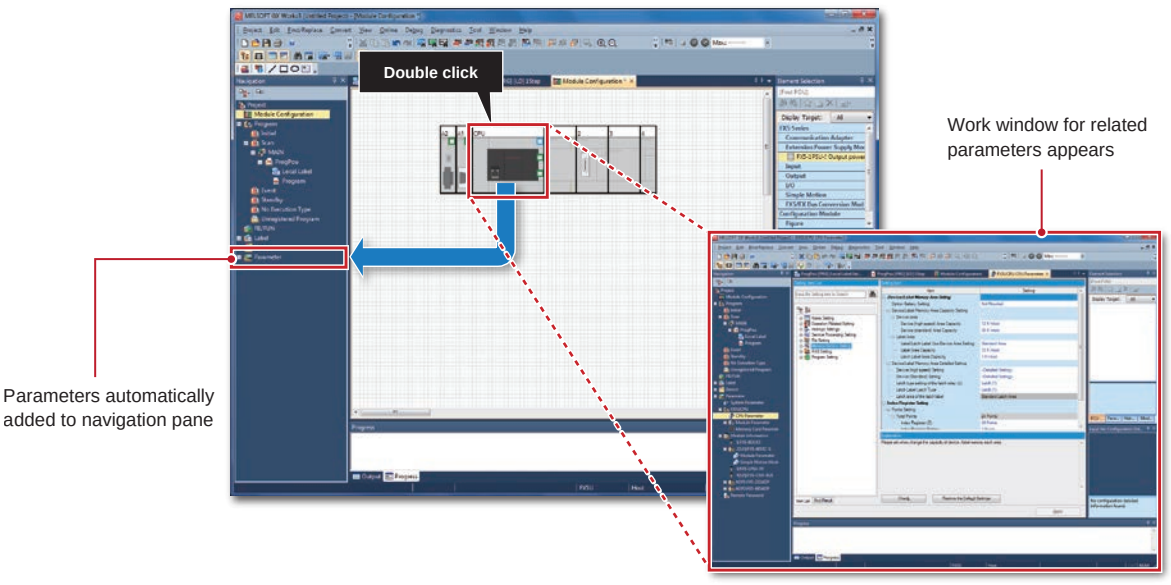
System design with a convenient parts library

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

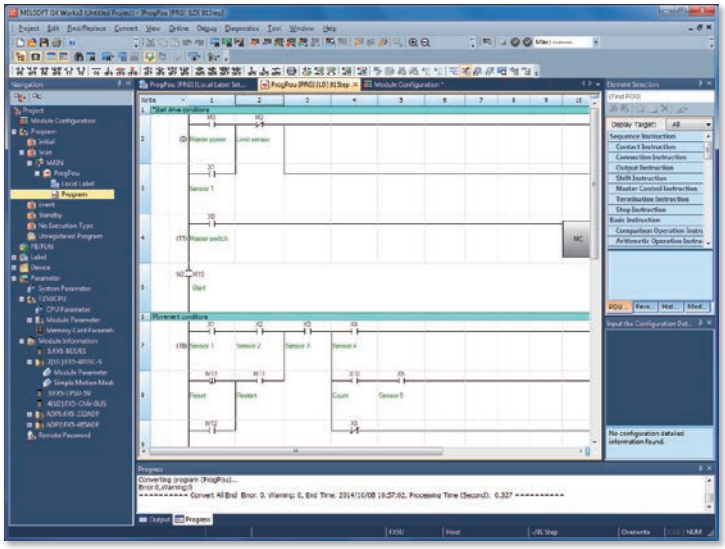
When preparing the module configuration diagram, simply double-click the module to automatically generate the module parameters.
A window with an easy-to-use parameter settings screen opens, enabling module parameters to be modified as needed.



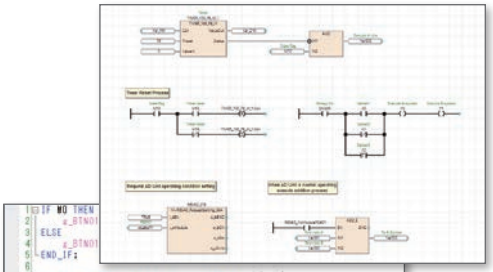
Main programming languages supported

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



Function block diagram



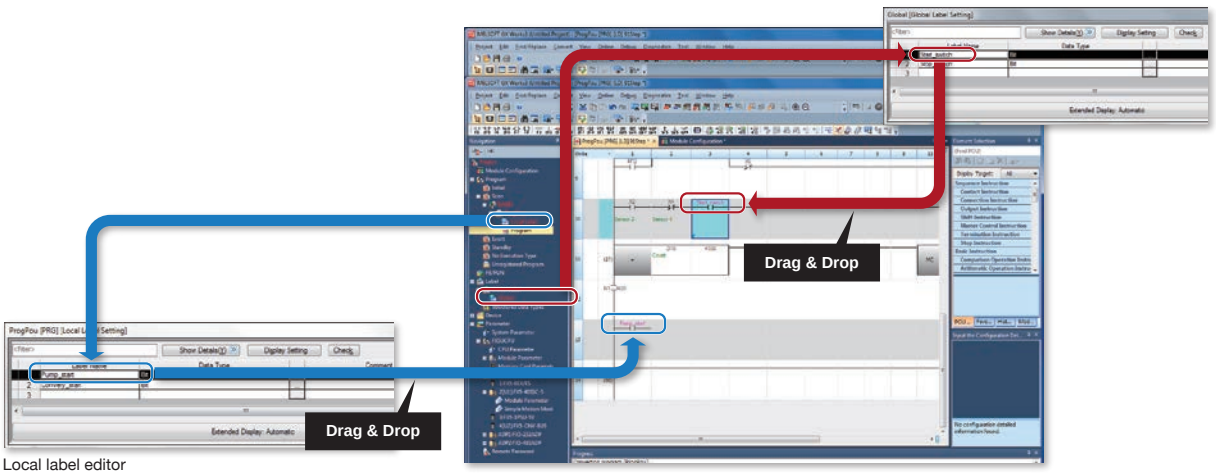
```
IF M0 THEN
    z_BTN01
ELSE
    z_BTN01
END_IF;

Input1 := bool1; Input2 := K1; Input3 := 'ABC';
// LDFB1 Function Block
IF NOT X01 AND X02 THEN
    IF Input1 AND X03 THEN
        Y01 := TRUE;
        OUT_T(TS01, TC01, 3);
    ELSIF NOT Input1 AND Input2 THEN
        Y11 := TRUE;
        OUT_T(NOT TS01, TC01, 10);
    ELSE
        Input2 := FALSE;
        RST(TRUE, TN10);
    END_IF;
    OUT(X5 OR Z1, Y13);
ELSE
Y10 := FALSE;
Y11 := FALSE;

IF NOT X03 AND NOT X04 THEN
    Y10 := Input1;
```

Structured text

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 and eliminates the need to reference buffer memory address.

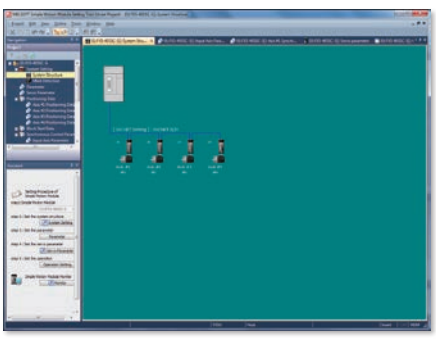
Global label editor



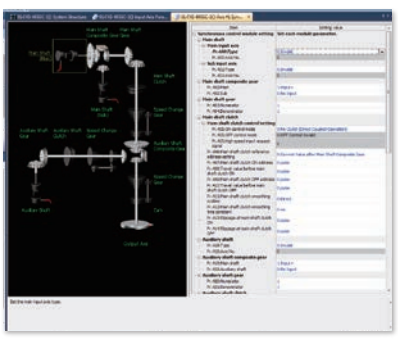
Local label editor

Integrated motion setup tool

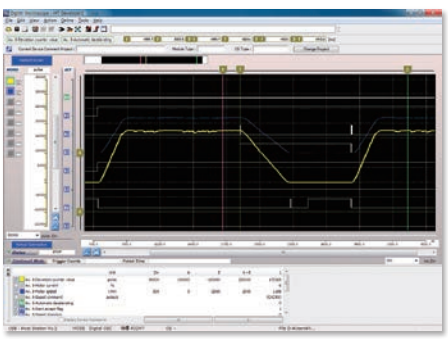
GX Works3 is equipped with a special motion setup tool that makes it easy to change simple motion module settings such as module parameters, positioning data and servo parameters. Also, the servo adjustment is simplified using it.



System configuration



Synchronous control parameter



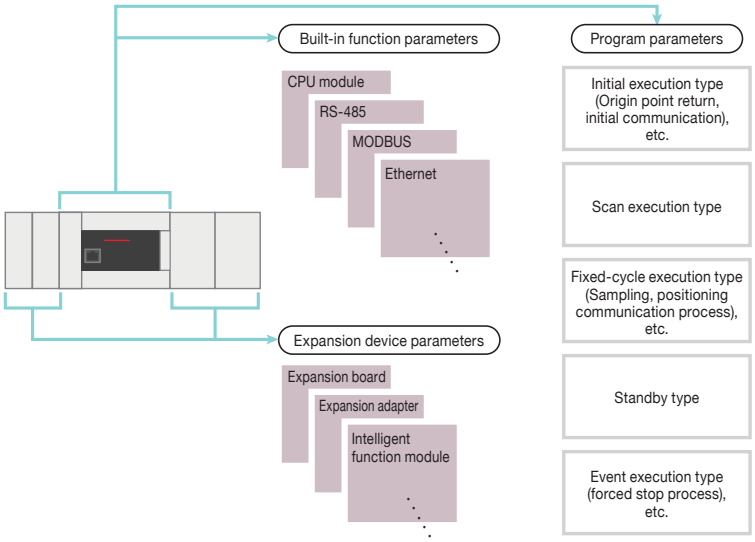
Digital oscilloscope

Advanced MELSEC iQ-F Series

Simple and convenient parameter settings

With MELSEQ 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 expansion 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 adapters and intelligent function module

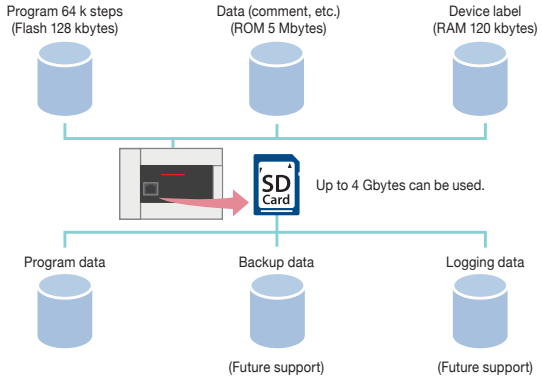


Memory area for each application

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 high-end devices can be added.

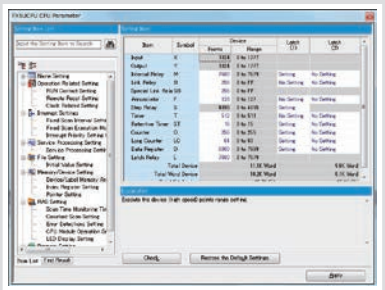
New high-end compatible system devices
- SM/SD 0 to 4099 Compatible with MELSEC iQ-R

Conventional convenient devices
- Conventional M8000 devices
  →Has changed to SM8000 devices
- Conventional D8000 devices
  →Has changed to SD8000 devices

(When migrating an FX3U/FX3UC program created using GX Works2 to FX5, 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 bit counter
OUT LC0.....32 bit counter

Software

Dramatically more dedicated instructions

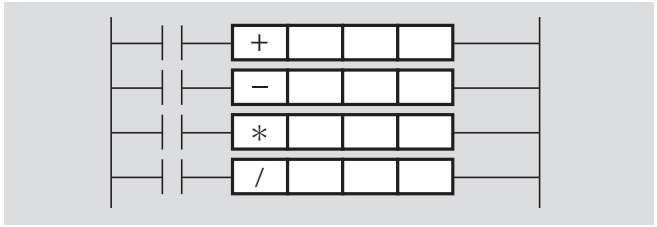
A great number of dedicated instructions have been added since the FX3 Series.

[FX3] 510 types increased to [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.
(Programs created with GX Works2 can also be read in and converted.)

Intuitive and easy-to-understand arithmetic operations

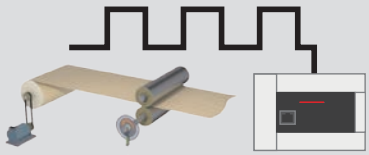
Symbols can be input in the arithmetic operations making it easy and intuitive to describe programs.



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

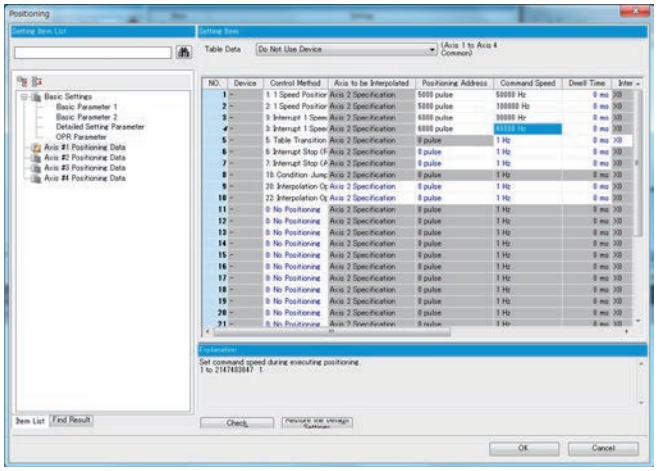


Up to four tables can be set for the high-speed comparison table and up to 128 tables for the multi-point output high-speed comparison table. The HCMOV instruction can be used to read the latest values from the special registers.

Reinforced built-in positioning function

Positioning is easy using table operations. Simple linear interpolation operation is possible by using the positioning instruction DRVTBL with multiple table operation and the multiple axis simultaneous drive positioning instruction DRVMUL.

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

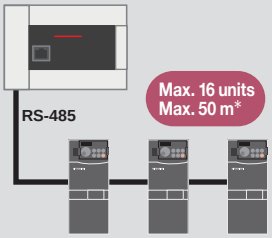


Inverter communication command function

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

- IVCK : Operation monitor
- IVDR : Operation control
- IVRD : Parameter read
- IVWR : Parameter write
- IVBWR : Parameter batch write
- IVMC : Multiple command

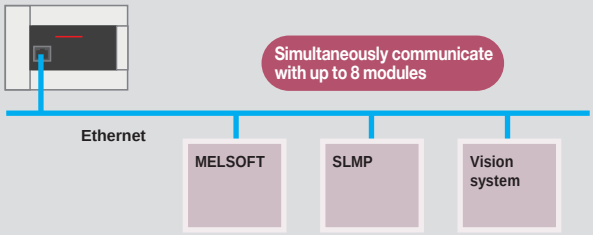
(2 types of settings and 2 types of read)



*: For built-in RS-485 communication

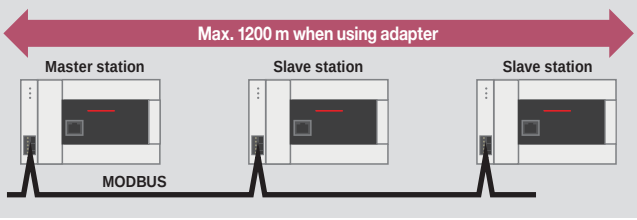
Built-in Ethernet function

Communication is set with parameters and programs are made with dedicated instructions.
Functions including 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.



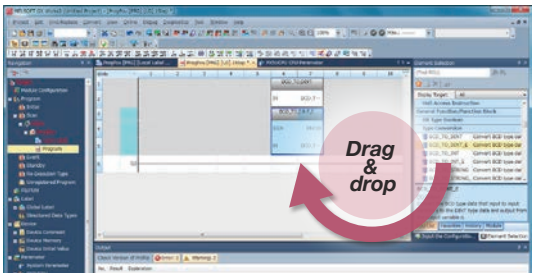
MODBUS function

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.



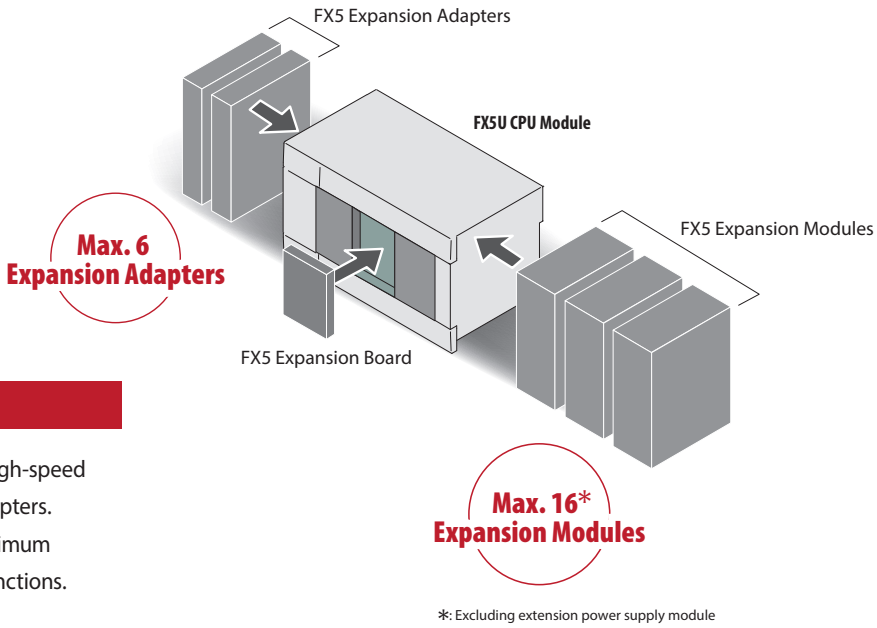
Standard function/function block function

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 expansion 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 expansion devices equipped with intelligent functions.

*: Excluding extension power supply module

FX5 Expansion Adapters

Max. 2 ch

Communication

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

Max. 4 ch

Analog

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

FX5 Expansion Boards

Max. 1 ch

Communication

FX5-232-BD	For RS-232C communication
FX5-485-BD	For RS-485 communication
FX5-422-BD-GOT	For RS-422 GOT communication

FX5U CPU Modules

FX5U-32MR/ES	AC	D	R
FX5U-32MT/ES	AC	D	T1
FX5U-32MT/ESS	AC	D	T2

FX5U-64MR/ES	AC	D	R
FX5U-64MT/ES	AC	D	T1
FX5U-64MT/ESS	AC	D	T2

FX5U-80MR/ES	AC	D	R
FX5U-80MT/ES	AC	D	T1
FX5U-80MT/ESS	AC	D	T2

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

Option

Battery	SD card	Programming software
FX3U-32BL	NZ1MEM-2GBSD (2 GB) NZ1MEM-4GBSD (4 GB)	GX Works3

Generic Specifications

Item		Generic Specifications
Power supply, input/output	Power supply specifications	100 to 240 V AC 50/60 Hz
	Power consumption	30 W (32M), 40 W (64M), 45 W (80M)
	Rush current	FX5U-32M[]: max. 25 A 5 ms or less/100 V AC, max. 50 A 5 ms or less/200 V AC FX5U-64M[]/FX5U-80M[]: max. 30 A 5 ms or less/100 V AC, max. 60 A 5 ms or less/200 V AC
	5 V DC power supply capacity	900 mA or less (32M), 1100 mA or less (64M, 80M)
	24 V DC power supply capacity	400 mA or less (32M), 600 mA or less (64M, 80M) When using external power supply for CPU module input: 480 mA or less (32M) , 740 mA or less (64M) , 770 mA or less (80M)
	Input specifications	24 V DC, 5.3 mA (X020 and above: 4 mA)
	Output specifications	Relay output type: 2 A/1 point, 8 A/4 points common, 8 A/8 points common 250 V AC (240 V for CE, UL/cUL Standard compliance), 30 V DC or less Transistor output type: 0.5 A/1 point, 0.8 A/4 points, 1.6 A/8 points common 5 to 30 V DC
	Input/output expansion	Expansion device for FX5 can be connected
Built-in communication port		Ethernet (100BASE-TX/10BASE-T), RS-485 (MELSOFT connection, MC protocol, non-protocol communication, MODBUS RTU, inverter communication, N:N communication)
Built-in memory card slot		1 slot for SD memory card
Built-in analog input/output		Input 2 ch, output 1 ch

FX5 Expansion Modules

I/O Modules

Powered I/O Modules

Powered I/O Modules

FX5-32ER/ES
FX5-32ET/ES
FX5-32ET/ESS

Unpowered I/O Modules

Input

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

Output

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

Intelligent Function Modules

Simple Motion

FX5-40SSC-S

Network

CC-Link/IE Field slave

... Future support

Extension Power Supply Module

Extension Power Supply Module

FX5-1PSU-5V

Bus Conversion Module

Bus Conversion Module

FX5-CNV-BUS

FX3 Expansion Modules

Extension Power Supply Module

Extension Power Supply Module

FX3U-1PSU-5V

Intelligent Function Modules

Analog

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

Positioning

FX3U-1PG	For high-speed output

Network

FX3U-64CCL	CC-Link slave
FX3U-16CCL-M	CC-Link master

Temperature control

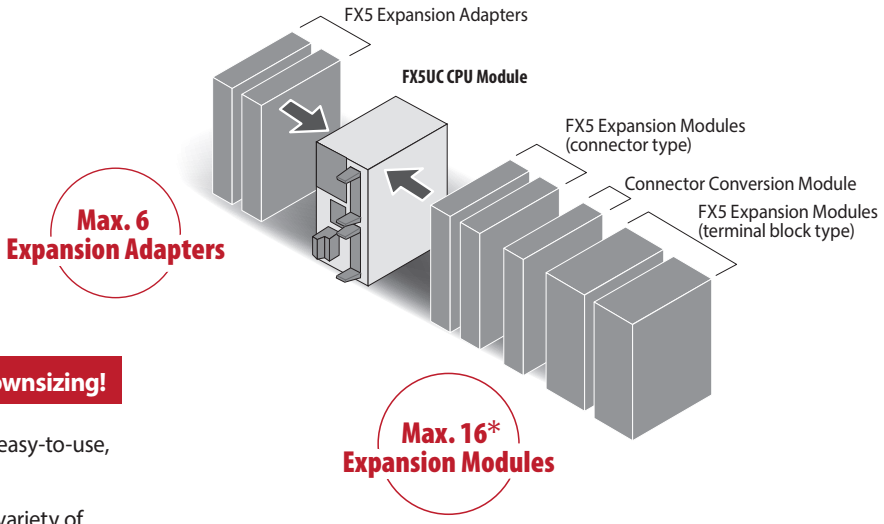
FX3U-4LC	Temperature control

High Speed counter

FX3U-2HC	For high-speed input

The parameters for FX3U intelligent function module must be set by PLC program.
When connecting FX3 expansion module, FX3 speed is applied as the bus speed for accessing the FX3 expansion module.

FX5UC



Compact body packed with diverse functions.

Compact expansion module contributes to system downsizing!

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

*: Due to power limitations, only 12 modules can be directly connected to the CPU module. Up to 16 modules can be connected using the power supply module (future support). Excluding connector conversion module

FX5 Expansion Adapters

Max. 2 ch

Communication

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

Max. 4 ch

Analog

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

FX5UC CPU Modules

Sink type

FX5UC-32MT/D DC D1 T1

Source type

FX5UC-32MT/DSS DC D2 T2

FX5 Expansion Modules (connector type)

I/O Modules

Sink type

FX5-C32EX/D For input expansion
FX5-C32EYT/D For output expansion
FX5-C32ET/D For I/O expansion

Source type

FX5-C32EX/DS For input expansion
FX5-C32EYT/DSS For output expansion
FX5-C32ET/DSS For I/O expansion

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

Option

Battery

FX3U-32BL

SD card

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

Programming software

GX Works3

Terminal block for sink type I/O

FX-16E-TB
FX-16EYT-TB
FX-16EYR-TB
FX-16EX-A1-TB
FX-16EYS-TB
FX-32E-TB

Terminal block for source type I/O

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

I/O cable

- General-purpose I/O cable
  FX-16E-500CAB-S (5 m, 20-pin)
- For terminal block
  FX-16E-[]CAB (double-end 20-pin)
  []: 150 (1.5 m)/300 (3 m)/500 (5 m)
- For terminal block
  FX-16E-[]CAB-R (20-pin)
  []: 150 (1.5 m)/300 (3 m)/500 (5 m)

Generic Specifications

Item		Generic specifications
Power supply, Input/output	Power supply specifications	24 V DC
	Power consumption	8 W (32M)
	Rush current	Max. 30 A 0.5 ms or less/24 V DC
	5 V DC power supply capacity	720 mA or less (32M)
	24 V DC power supply capacity	500 mA or less (32M)
	Input specifications	24 V DC, 5.3 mA
	Output specifications	Transistor output type: Y000 to Y003 0.3 A/1 point, Y004 and higher 0.1 A/1 point, 0.8 A/8 points common 5 to 30 V DC
	Input/output expansion	Expansion device for FX5UC and FX5 (connector adapter required) can be connected
Built-in communication port		Ethernet (100BASE-TX/10BASE-T), RS-485 (MELSOFT connection, MC protocol, non-protocol communication, MODBUS RTU, inverter communication, N:N communication)
Built-in memory card slot		1 slot for SD memory card

FX5 Expansion Modules (terminal block type)

Connector Conversion Module

Connector Conversion Module

FX5-CNV-IFC

I/O Modules

Input

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

Output

FX5-8EYR/ES
FX5-16EYR/ES

Output Modules

Sink type

Output

FX5-8EYT/ES
FX5-16EYT/ES

Source type

Output

FX5-8EYT/ESS
FX5-16EYT/ESS

Intelligent Function Modules

Simple Motion

FX5-40SSC-S

Network

CC-Link/IE Field slave

... Future support

Bus Conversion Modules

Bus Conversion Module

FX5-CNV-BUS

Bus Conversion Module

FX5-CNV-BUSC

FX3 Expansion Modules

Intelligent Function Modules

Analog

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

Positioning

FX3U-1PG	For high-speed output

Network

FX3U-64CCL	CC-Link slave
FX3U-16CCL-M	CC-Link master

Temperature control

FX3U-4LC	Temperature control

High Speed counter

FX3U-2HC	For high-speed input

The parameters for FX3U intelligent function module must be set by PLC program.
When connecting FX3 expansion module, FX3 speed is applied as the bus speed for accessing the FX3 expansion module.

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 input/output*

*: CC-Link

Type	Details	Connection details, model selection
1 CPU module	PLC with built-in CPU, power supply, input/output and program memory.	Various expansion devices can be connected.
2 4 I/O module	Product for expanding I/O. Some products are powered.	Input/output can be expanded to up to 256 points. (Expansion module: Max. 16 modules (excluding extension power supply module)). The total with CC-Link remote input/output is max. 512 points.
3 FX5 extension power supply module	Module for expanding 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 expansion modules including the I/O module can be connected (excluding the extension power supply module).
6 Bus conversion module	Conversion module for connecting FX3 Series expansion module.	FX3 Series expansion module can be connected only to the right side of the bus conversion module.
7 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.)
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 extension power supply module	Module for expanding power supply if CPU module's internal power supply is insufficient.	The bus conversion module is required for use. Up to 2 modules can be connected.
10 FX3 intelligent function module	Module with functions other than input/output.	The bus conversion module is required for use. When using the FX3 extension power supply module, up to 8 modules* can be used. When not using the FX3 extension power supply unit, up to 6 modules* can be used.

*: Excluding some models

1 CPU module

Type	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 (service power built-in)	32 points	900 mA	400 mA (480 mA*)	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*)	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*)	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)		

*: Power supply capacity when using external power supply for input circuit.

2 I/O module

Type	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	Input/output module (service power built-in)	32 points	965 mA	250 mA (310 mA*)	DC input(sink/source)/relay output	16 points	16 points
FX5-32ET/ES					DC input (sink/source)/transistor (sink)		
FX5-32ET/ESS					DC input (sink/source)/transistor (source)		

*: Power supply capacity when using external power supply for input circuit.

3 FX5 extension power supply module

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

*: Refer to the manual if the ambient temperature exceeds 40°C.

4 I/O module

Type	I/O format	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external electric supply
FX5-8EX/ES	DC input (sink/source)	8 points	75 mA	50 mA	—
FX5-16EX/ES	DC input (sink/source)	16 points	100 mA	85 mA	
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)				

5 FX5 intelligent function module

Type	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 electric supply
FX5-40SSC-S	Simple Motion 4-axis control (SSCNET III/H compatible)	8 points	—	—	250 mA

6 Bus conversion module

Type	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 electric supply
FX5-CNV-BUS	Bus conversion FX5→FX3	8 points	150 mA	—	—

7 FX5 Expansion board

Type	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 electric 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.

8 FX5 Expansion adapter

Type	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 electric 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 extension power supply module

Type	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 electric supply
FX3U-1PSU-5V	Extension power supply	—	1000 mA*	300 mA*	—

*: Refer to the manual if the ambient temperature exceeds 40°C.

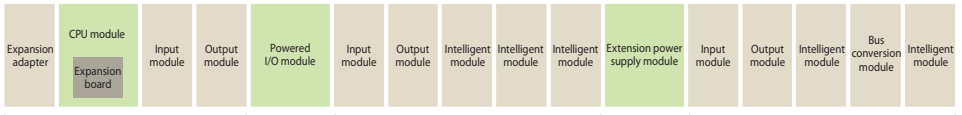
10 FX3 intelligent function module

Type	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 electric 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 (thermocouple, PT and mini voltage)		160 mA		50 mA
FX3U-16CCL-M	CC-Link Master (Ver. 2.00 and Ver. 1.10 compatible)	*	—		240 mA
FX3U-64CCL	CC-Link intelligent device station	8 points			220 mA
FX3U-1PG	Pulse output for independent 1-axis control		150 mA		40 mA
FX3U-2HC	2 ch high-speed counter		245 mA		—

*: Varies according to settings.

Calculation of current consumed by expansion modules

The power required for the expansion adapter, expansion board and expansion 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 fed from CPU module
[5 V DC power supply]

5 V DC power supply capacity (CPU module) − Total current consumption (total of connected expansion devices) = Calculation results ≧ 0 mA

[24 V DC power supply]

24 V DC service power supply capacity (CPU module) − Total current consumption (total of connected expansion devices) = Calculation results ≧ 0 mA*

■Power fed from powered I/O module
[5 V DC power supply]

5 V DC power supply capacity (powered I/O module) − Total current consumption (total of connected expansion devices) = Calculation results ≧ 0 mA

[24 V DC power supply]

24 V DC service power supply capacity (powered I/O module) − Total current consumption (total of connected expansion devices) = Calculation results ≧ 0 mA*

■Power fed from extension power supply module
[5 V DC power supply] (Separate calculations are required when using the FX3 Series extension power supply module)

5 V DC power supply capacity (Extension power supply module) − Total current consumption (total of connected expansion devices) = Calculation results ≧ 0 mA

[24 V DC power supply]

24 V DC service power supply capacity (Extension power supply module) − Total current consumption (total of connected expansion devices) = Calculation results ≧ 0 mA*

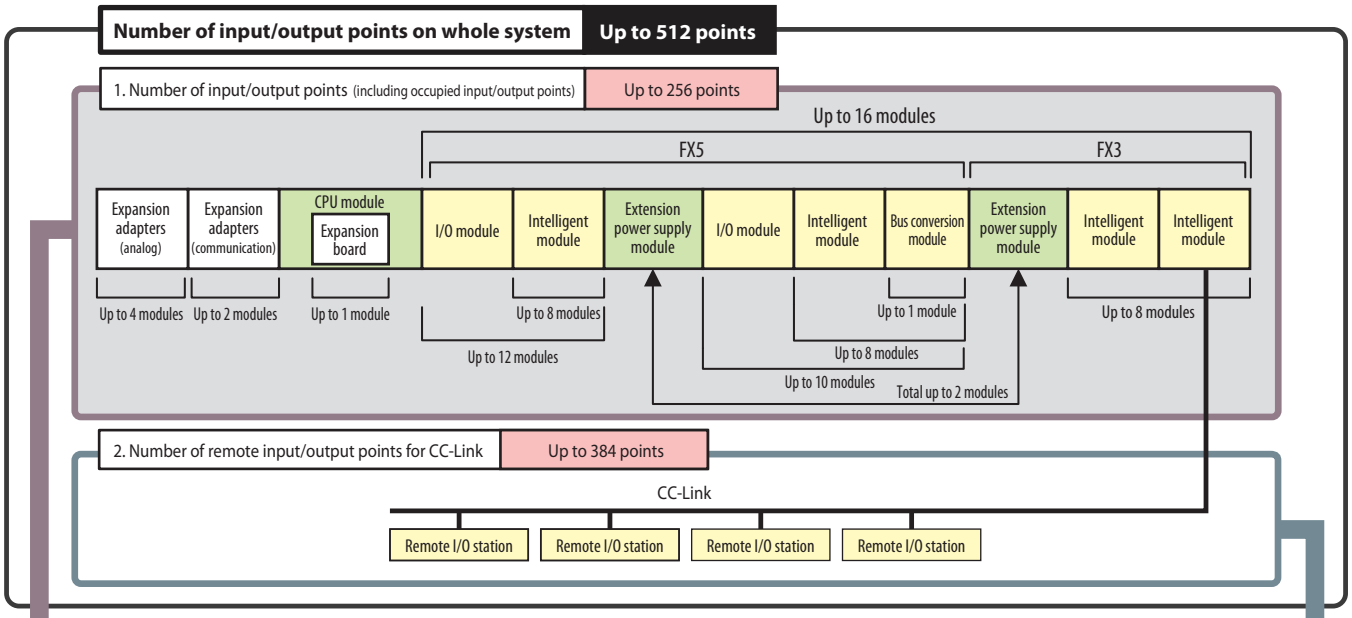
<Caution> If the calculation results are negative, the power capacity is exceeded so review the system configuration.

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

The number of connected modules may be limited for some products. Refer to page 20 for details.

Rules of System Configuration

The FX5U CPU module can control a total of 512 points including the CPU module and expansion device input/output points and remote input/output points.



■ Number of I/O points

The maximum number of input/output points that can be configured with the FX5U is shown below.

Maximum number of input/output points

256 points ≧

Number of occupied input/output points

CPU module: **(A) points** + I/O module: **Total (B) points** + Intelligent module: **(C) modules** × **8 points**

Expansion adapter, expansion board and extension power supply module do not occupy any input/output.

(A): Number of CPU module input/output points (B): Total number of I/O module input/output points (C): Total number of intelligent modules

Total 512 points or less

■ Number of input/output points when using network master module

The maximum number of input/output points when using the network master module is shown below.

Maximum number of input/output points

384 points ≧

Number of occupied remote input/output points

CC-Link: **(D) station** × **32 points**

CC-Link is the total of the number of remote I/O stations x 32 points.
(Calculated as 32 points regardless of the number of remote I/O points.)

(D): Number of CC-Link remote I/O stations

Limitation on number of modules when expanding

The number of connectable modules is limited for the following products. Refer to the manual for details.

Type	Model/type	Setting method/precautions
Intelligent function module for FX3 Series	FX3U-4AD	■ When using FX3U extension power supply module: Up to 8 modules can be connected per system ■ When not using FX3U extension power supply module: Up to 6 modules can be connected per system.
	FX3U-4DA	
	FX3U-1PG	
	FX3U-4LC	
	FX3U-16CCL-M	Up to 1 module can be connected for the entire system.
	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 device.

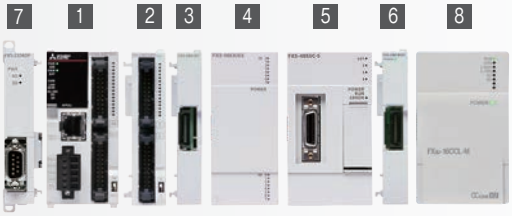
Selecting the FX5UC Model

■Product configuration

FX5UC

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

*: CC-Link



Type	Details	Connection details, model selection
1 CPU module	PLC with built-in CPU, power supply, input/output and program memory.	Various expansion devices can be connected.
2 I/O module (connector type)	Connector type product for expanding the input/output.	The input/output can be expanded to up to 256 points. (Expansion module: Max. 12 modules (excluding connector conversion module)). The total with CC-Link remote input/output is max. 512 points.
3 Connector conversion module	Converts the connector for connecting the FX5 Series expansion devices.	Expansion devices for the FX5 Series can be connected.
4 I/O module (terminal block type)	Product for expanding the input/output.	The input/output can be expanded to up to 256 points. (Expansion module: Max. 12 modules (excluding connector conversion module)). The total with CC-Link remote input/output is max. 512 points.
5 FX5 intelligent function module	Module with functions other than input/output.	Up to 12 expansion modules including the I/O module can be connected (excluding the connector conversion module).
6 Bus conversion module	Conversion module for connecting FX3 Series expansion module.	The FX3 Series expansion module can be connected only to the right side of the bus conversion module.
7 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.
8 FX3 intelligent function module	Module with functions other than input/output.	A bus conversion module is required for use. Up to 6 bus conversion modules* can be connected on the right side.

*: Excluding some models

1 CPU module

Type	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			
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)		

2 I/O module(connector type)

Type	I/O format	Number of occupied input/output points	Current consumption		
			5 V DC internal current consumption	24 V DC internal current consumption	24 V DC external electric supply
FX5-C32EX/D	DC input (sink)	32 points	120 mA	—	—
FX5-C32EX/DS	DC input (sink/source)				
FX5-C32EYT/D	Transistor output (sink)			200 mA	
FX5-C32EYT/DSS	Transistor output (source)				
FX5-C32ET/D	DC input (sink)/Transistor output (sink)			100 mA	
FX5-C32ET/DSS	DC input (sink/source)/Transistor output (source)				

3 Connector conversion module

Type	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 electric supply
FX5-CNV-IFC	Connector conversion	—	—	—	—

4 I/O module (terminal block type)

Type	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 electric supply
FX5-8EX/ES	DC input (sink/source)	8 points	75 mA	50 mA*	—
FX5-16EX/ES	DC input (sink/source)	16 points	100 mA	85 mA*	
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)				

∗ : Since external power supply is used for input circuit in FX5UC CPU module systems, power supply from CPU module is not included.

5 FX5 intelligent function module

Type	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 electric supply
FX5-40SSC-S	Simple Motion 4-axis control (SSCNET III/H compatible)	8 points	—	—	250 mA

6 Bus conversion module

Type	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 electric supply
FX5-CNV-BUSC	Bus conversion (connector)FX5→FX3	8 points	150 mA	—	—
FX5-CNV-BUS	Bus conversion FX5→FX3				

7 FX5 Expansion adapter

Type	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 electric 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

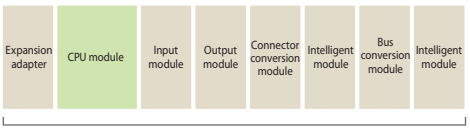
8 FX3 intelligent function module

Type	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 electric 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 (thermocouple, PT and mini voltage)		160 mA		50 mA
FX3U-16CCL-M	CC-Link Master (Ver. 2.00 and Ver. 1.10 compatible)	∗	—		240 mA
FX3U-64CCL	CC-Link intelligent device station	8 points			220 mA
FX3U-1PG	Pulse output for independent 1-axis control		150 mA		40 mA
FX3U-2HC	2 ch high-speed counter		245 mA		—

∗ : Varies according to settings.

Calculation of current consumed by expansion modules

The power required for the expansion adapter and expansion 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.)



■Power fed from CPU module
[5 V DC power supply]

5 V DC power supply capacity (CPU module) − Total current consumption (total of connected expansion devices) = Calculation results ≥ 0 mA

[24 V DC power supply]

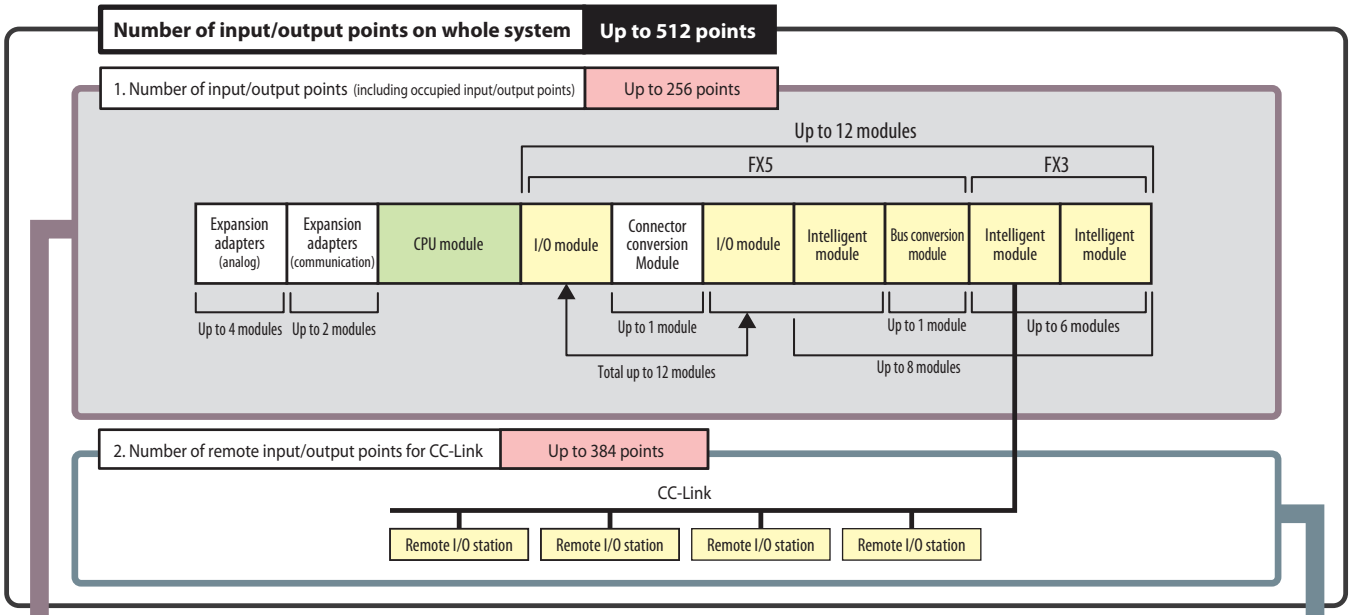
24 V DC service power supply capacity (CPU module) − Total current consumption (total of connected expansion devices) = Calculation results ≥ 0 mA

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

The number of connected modules may be limited for some products. Refer to page 20 for details.

Rules of System Configuration

The FX5UC CPU module can control a total of 512 points including the CPU module and expansion device input/output points and remote input/output points.



■ Number of I/O points

The maximum number of input/output points that can be configured with the FX5UC is shown below.

Maximum number of input/output points

256 points

≧

Number of occupied input/output points

CPU module: (A) points + I/O module: Total (B) points + Intelligent module: (C) modules × 8 points

The expansion adapter and connector conversion module are not included in the number of occupied points.

(A): Number of CPU module input/output points (B): Total number of I/O module input/output points (C): Total number of intelligent modules

Total 512 points or less

■ Number of input/output points when using network master module

The maximum number of input/output points when using the network master module is shown below.

Maximum number of input/output points

384 points

≧

Number of occupied remote input/output points

CC-Link: (D) station × 32 points

CC-Link is the total of the number of remote I/O stations x 32 points.
(Calculated as 32 points regardless of the number of remote I/O points.)

(D): Number of CC-Link remote I/O stations

Limitation on number of modules when expanding

The number of connectable modules is limited for the following products. Refer to the manual for details.

Type	Model/type	Setting method/precautions
Intelligent function module for FX3 Series	FX3U-4AD	Up to 6 modules can be connected for the entire system.
	FX3U-4DA	
	FX3U-1PG	
	FX3U-4LC	
	FX3U-16CCL-M	Up to 1 module can be connected for the entire system.
	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 device.

Product specifications

CPU module specification

☐ Generic Specifications

Item	Specifications								
	FX5U					FX5UC			
Operating ambient temperature*1	0 to 55°C (32 to 131°F)*2								
Storage ambient temperature	-25 to 75°C (-13 to 167°F)								
Operating ambient humidity	5 to 95%RH, non-condensation								
Storage ambient humidity	5 to 95%RH, non-condensation								
Vibration resistance*3*4		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*3	147 m/s^2, Action time: 11 ms, 3 times by half-sine pulse in each direction X, Y, and Z								
Grounding	Class D grounding (grounding resistance: 100 Ω or less) <Common grounding with a heavy electrical system is not allowed.>*5								
Working atmosphere	Free from corrosive or flammable gas and excessive conductive dust								
Operating altitude*6	0 to 2000 m								
Installation location	Inside a control panel								
Overvoltage category*7	II or less								
Pollution degree*8	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, refer to manuals of each product.
∗2 : For details on Intelligent function modules, refer to manuals of each product.
∗3 : The criterion is shown in IEC61131-2.
∗4 : 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.
∗5 : For grounding, refer to manuals of each product.
∗6 : The PLC cannot be used at a pressure higher than the atmospheric pressure to avoid damage.
∗7 : 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.
∗8 : 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

Item		Specifications			
		FX5U-32M[]	FX5U-64M[]	FX5U-80M[]	FX5UC-32MT/[]
Rated voltage		100 to 240 V AC			24 V DC
Allowable supply voltage range		85 to 264 V AC			20.4 to 28.8 V DC
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.			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	250 V, 5 A Time-lag fuse		125 V, 3.15 A Time-lag fuse
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/200 V AC		30 A max. 0.5 ms or less/24 V DC
Power consumption*1		30 W	40 W	45 W	8 W
5 V DC power supply capacity*3		900 mA	1100 mA	1100 mA	720 mA
24 V DC power supply capacity*2*3	Supply capacity when service power supply is used for input circuit of the CPU module	400 mA	600 mA	600 mA	500 mA
	Supply capacity when external power supply is used for input circuit of the CPU module	480 mA	740 mA	770 mA	

∗1 : This item shows value when all 24 V DC service power supplies are used in the maximum configuration connectable to the CPU module. (The current of the input circuit is included.)
∗2 : When I/O modules are connected, they consume current from the 24 V DC service power. For details on the service power supply, refer to manuals of each product.
∗3 : Internal power supply in case of FX3UC-32MT/[]

☐ Performance Specifications

Item		Specifications
		FX5U/FX5UC
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 diagram (FBD/LD)
	Programming extension function	Function block (FB), structured ladder, 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, event execution type
	Interrupt type	Internal timer interrupt, input interruption, high-speed comparison match interrupt
Command 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 GB)
	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 GB: 511*1
		4 GB: 65534*1
Clock function	Display data	Year, month, day, hour, minute, second, day of week (leap year automatic detection)
	Precision	-2.96 to +3.74 (TYP.+1.42) s/d (Ambient temperature: 0°C (32°F)) -3.18 to +3.74 (TYP.+1.50) s/d (Ambient temperature: 25°C (77°F)) -13.20 to +2.12 (TYP.-3.54) s/d (Ambient temperature: 55°C (131°F))
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*2	Retention method	Large-capacity capacitor
	Retention time	10 days (Ambient temperature: 25°C (77°F))
	Data retained	Clock data

∗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.

Refer to the manual for details on each device.

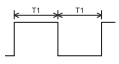
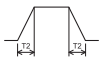
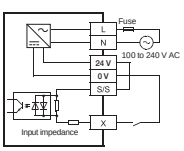
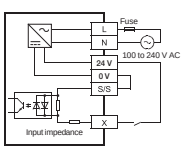
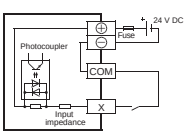
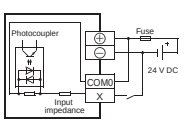
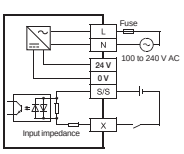
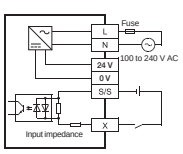
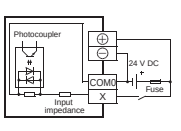
☐ Number of device points

Item			Base	Max. number of points
No. of user device points	Input relay (X)		8	1024 points (The total number of X and Y assigned to input/output points is up to 256 points.)
	Output relay (Y)		8	1024 points
	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.

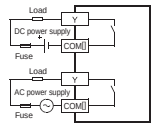
☐ Input Specifications

24 V DC Input (sink/source)

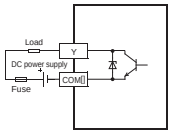
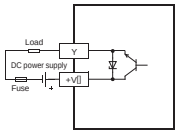
Item		Specifications				
		FX5U-32M[]	FX5U-64M[]	FX5U-80M[]	FX5UC-32MT/D	FX5UC-32MT/DSS
No. of input points		16 points	32 points	40 points	16 points	
Connection type		Removable terminal block (M3 screws)			Connector	
Input type		Sink/source			Sink	Sink/source
Input signal voltage		24 V DC +20 %, -15%				
Input signal current	X000 to X017	5.3 mA/24 V DC			5.3 mA/24 V DC	
	X020 and subsequent	4.0 mA/24 V DC			—	
Input impedance	X000 to X017	4.3 kΩ			4.3 kΩ	
	X020 and subsequent	5.6 kΩ			—	
ON input sensitivity current	X000 to X017	3.5 mA or more			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	200 kHz		200 kHz	
	X006 to X007	10 kHz			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	T1: 2.5 µs or more, T2: 1.25 µs or less		T1: 2.5 µs or more, T2: 1.25 µs or less	
	X006 to X007	T1: 50 µs or more, T2: 25 µs or less			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	ON: 2.5 µs or less, OFF: 2.5 µs or less		ON: 2.5 µs or less, OFF: 2.5 µs or less	
	X006 to X007	ON: 30 µs or less, OFF: 50 µs or less			ON: 30 µs or less, OFF: 50 µs or less	
	X010 to X017	—	ON: 30 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			No-voltage contact input NPN open collector transistor	No-voltage contact input Sink: NPN open collector transistor Source: PNP open collector transistor
Input circuit insulation		Photo-coupler insulation				
Indication of input operation		LED is lit when input is on			LED is lit when input is on (DISP switch: IN)	
Input circuit configuration		When using service power supply Sink input wiring  Source input wiring 			Sink input wiring 	Sink input wiring 
		When using external power supply Sink input wiring  Source input wiring 				Source input wiring 

□Output Specifications

Relay output

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		
Insulation of circuit		Mechanical insulation		
Indication of output operation		LED is lit when output is on		
Output circuit configuration		 A number is entered in the [] of [COM[]].		

Transistor output

Item		Specifications				
		FX5U-32MT/[]	FX5U-64MT/[]	FX5U-80MT/[]	FX5UC-32MT/D	FX5UC-32MT/DSS
No. of output points		16 points	32 points	40 points	16 points	
Connection type		Removable terminal block (M3 screws)			Connector	
Output type		Transistor/sink output (FX5U-[]MT/ES) Transistor/source output (FX5U-[]MT/ESS)			Transistor/sink output	Transistor/source output
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			Y000 to Y003: 0.3 A/point Y004 and subsequent: 0.1 A/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/200 mA or more (24 V DC)			0.2 ms or less/100 mA (24 V DC)	
Insulation of circuit		Photo-coupler insulation				
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 []].				

∗: When 2 common terminals are connected outside the CPU module, resistance load is 1.6 A or less.

□Built-in Analog input

Item		Specifications
		FX5U
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
I/O characteristics, Maximum resolution	Digital output value	0 to 4000
	Maximum resolution	2.5 mV
Accuracy (Accuracy in respect to maximum digital output value)	Ambient temperature 25 ±5°C (77±41°F)	Within ±0.5% (±20 digit*)
	Ambient temperature 0 to 55°C (32±131°F)	Within ±0.1% (±40 digit*)
Conversion speed		30 µs/channels (data refreshed every operation cycle)
Absolute maximum input		-0.5 V, +15 V
Isolation		No isolation between analog input circuit and PLC circuit. No isolation between input terminals (channels).
Occupied points		0 points (does not pertain to the max. No. of input/output points of the PLC.)
Terminal block used		European-type terminal block

∗: "Digit" refers to digital values.

□Built-in Analog output

Item		Specifications
		FX5U
Analog output points		1 points (1 channels)
Digital input		Unsigned 12-bit binary
Analog output	Voltage	0 to 10 V DC (external load resistance 2 k to 1 MΩ)
I/O characteristics, Maximum resolution	Digital input value	0 to 4000
	Maximum resolution	2.5 mV
Accuracy (Accuracy in respect to maximum analog output value)	Ambient temperature 25 ±5°C (77±41°F)	Within ±0.5% (±20 digit*)
	Ambient temperature 0 to 55°C (32±131°F)	Within ±0.1% (±40 digit*)
Conversion speed		30 µs (data refreshed every operation cycle)
Isolation		No isolation between analog output circuit and PLC circuit.
Occupied points		0 points (does not pertain to the max. No. of input/output points of the PLC.)
Terminal block used		European-type terminal block

∗: "Digit" refers to digital values.

☐ Built-in RS-485 communication

Item	Specifications
	FX5U/FX5UC
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 total extension distance	50 m (164' 0")
Protocol type	MELSOFT connection
	MELSEC Communication protocol (3C/4C frames)
	Non-protocol communication
	MODBUS RTU
	Inverter communication
	N:N network
	Predefined protocol support
Insulation method	Not insulated
Terminal resistors	Built-in (OPEN/110 Ω/330 Ω)
Terminal block used	European-type terminal block

☐ Built-in Ethernet communication

Item		Specifications
		FX5U/FX5UC
Data transmission speed		100/10 Mbps
Communication mode		Full-duplex (FDX) / Half-duplex (HDX)
Interface		RJ45 connector
Transmission method		Base band
Maximum segment length (The distance between hub and node)		100 m (328' 1")
Cascade connection	100BASE-TX	Cascade connection max. 2 stages*1
	10BASE-T	Cascade connection max. 4 stages*1
Protocol type		MELSOFT connection
		SLMP (3E frame)
		Socket communication
		Predefined protocol support
Number of simultaneously open connections allowed		Total of 8 for socket communication, MELSOFT connection, SLMP, and Predefined protocol support (Up to 8 external devices can access one CPU module at the same time.)
Insulation method		Pulse transformer insulation
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: Number of stages that can be connected when a repeater hub is used. When a switching hub is used, check the specifications of the switching hub used.
∗2: A straight cable can be used. If a personal computer or GOT and CPU module are directly connected a cross cable can be used.

☐ Built-in positioning function

Item	Specifications
	FX5U/FX5UC
Number of control axes	Independent 4 axes* (Simple linear interpolation by 2-axis simultaneous start)
Maximum frequency	2147483647 (200 Kpps in pulses)
Positioning program	Sequence program, Table operation
Supported CPU units	Transistor output type
Pulse output	1 instruction (PLSY)
Positioning	8 instructions (DSZR, DVIT, TBL, PLSV, DRVI, DRVA, DRVTBL, DRVMUL) pulse output

∗: 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	
	Input specifications	Maximum frequency
Types of high-speed counters	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 • Reset 32-bit data comparison • Comparison of 32-bit data band • Start/stop of the 16-bit data high-speed I/O function • Start/stop of the 32-bit data high-speed I/O function [High-speed current value transfer instruction] • High-speed current value transfer of 16-bit data • High-speed current value transfer of 32-bit data	

∗: Refer to manuals of each product.

Refer to the manual for details on each device.

Expansion 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)	

Input modules

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-C32EX/D	32 points	32 points	24 V DC (sink)	—	—	Connector
FX5-C32EX/DS			24 V DC (Sink/source)			

Output modules

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-C32EYT/D	32 points	—	—	32 points	Transistor (sink)	Connector
FX5-C32EYT/DSS					Transistor (source)	

Input/output modules

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 (source)		Transistor (source)	

☐ Expansion adapters

FX5-232ADP

Item	Specifications
Transmission standard/ Maximum transmission distance/ Insulation	Conforming to RS-232C/15 m (49' 2")/Photo-coupler isolation (Between communication line and CPU module)
Connection method	9-pin D-sub, male
Communication method	Half-duplex/Full-duplex
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)
Number of occupied I/O points	0 point (no points occupied)
Applicable CPU module	FX5U, FX5UC PLC
Control power (supplied from CPU module)	5 V DC, 30 mA / 24 V DC, 30 mA

FX5-485ADP

Item	Specifications
Transmission standard/ Maximum transmission distance/ Insulation	Conforming to RS-485, RS-422/1200 m (3937' 0")/Photo-coupler isolation (Between communication line and CPU module)
Connection method	European terminal block
Communication method	Half-duplex/Full-duplex
Baud rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 (bps)
Terminal resistor	Built-in (OPEN/110 Ω/330 Ω)
Number of occupied I/O points	0 point (no points occupied)
Applicable CPU module	FX5U, FX5UC PLC
Control power (supplied from CPU module)	5 V DC, 20 mA / 24 V DC, 30 mA

FX5-4AD-ADP

Item	Specifications			
Number of 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*	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 +10V	-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 for the full scale digital output value)	Ambient temperature 25±5°C: within ±0.1% (±16 digit) Ambient temperature 0 to 55°C: within ±1.0% (±32 digit)			
Absolute maximum input	Voltage: ±15 V, Current: ±30 mA			
Isolation method	Between input terminal and PLC: Photocoupler Between input channels: Non-isolation			
Number of occupied I/O points	0 point (no points occupied)			
Applicable CPU module	FX5U,FX5UC PLC			

∗: For the input conversion characteristic, refer to manuals of each product.

FX5-4DA-ADP

Item	Specifications			
Number of analog output points	4 points (4 channels)			
Analog output voltage	-10 to +10 V DC (external load resistance value 1 k 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*	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 +10V	-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 for the full scale of the analog output value)	Ambient temperature 25±5°C: ±0.1% (Voltage ±20 mV, Current ±40 μA) Ambient temperature 0 to 55°C: ±0.2% (Voltage ±30 mV, Current ±60 μA)			
Isolation method	Between output terminal and PLC: Photocoupler Between output channels: Non-isolation			
Number of occupied I/O points	0 point (no points occupied)			
Applicable CPU module	FX5U, FX5UC PLC			

∗: For the output conversion characteristic, refer to manuals of each product.

☐ Expansion boards

Item	Specifications		
	FX5-232-BD	FX5-485-BD	FX5-422-BD-GOT
Transmission standard	Conforming to RS-232C	Conforming to RS-485, RS-422	Conforming to RS-422
Maximum transmission distance	15 m (49' 2")	50 m (164' 0")	According to the specification of the GOT
Connection method	9-pin D-sub, male	European terminal block	8-pin MINI-DIN, female
Insulation	Not insulated (Between communication line and CPU module)		
Communication method	Half-duplex/Full-duplex	Half-duplex/Full-duplex*	Half-duplex
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 resistor	—	Built-in (OPEN/110 Ω/330 Ω)	—

∗: 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
All owable supply voltage range		85 to 264 V AC
Rated frequency		50/60 Hz
Accuracy (accuracy for the full scale digital output value		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*	24 V DC	0.3 A (Maximum output current depends on the ambient temperature.)
	5 V DC	1.2 A (Maximum output current depends on the ambient temperature.)

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

☐ Bus conversion modules

FX5-CNV-BUS (FX5 (terminal block) → FX3 (terminal block) extension)

Item	Specifications
Number of occupied I/O points	8 point
Applicable CPU module	FX5U, FX5UC PLC
Control power (supplied from CPU module)	5 V DC, 150 mA

FX5-CNV-BUSC (FX5 (connector) → FX3 (terminal block) extension)

Item	Specifications
Number of occupied I/O points	8 point
Applicable CPU module	FX5UC PLC
Control power (supplied from CPU module)	5 V DC, 150 mA

☐ Connector conversion module

FX5-CNV-IFC (FX5 (connector) → FX5 (terminal block) extension)

Item	Specifications
Number of occupied I/O points	0 point (does not occupy any I/O points)
Applicable CPU module	FX5U, FX5UC PLC
Control power (supplied from CPU module)	0 mA (no power consumed)

Simple Motion module specification

FX5-40SSC-S

☐ Control specification

Item		Specifications
Number of control axes		Up to 4 axes
Operation cycle		1.777 ms
Interpolation function		Linear interpolation (Up to 4 axes), Circular interpolation (2 axes)
Control modes		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	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)
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
	Sub functions	Home position return retry, Home position shift
Positioning control	Linear control	1-axis linear control, 2-axis linear interpolation control, 3-axis linear interpolation control, 4-axis linear interpolation control*1 (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*1
	2-axis circular interpolation	Sub point designation, center point designation
	Speed control	1-axis speed control, 2-axis speed control*1, 3-axis speed control*1, 4-axis speed control*1
	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)
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 channel (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	Provided
	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 internal interface, CPU, servo amplifier
Amplifier-less operation function		Provided
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
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: Only reference axis speed can be specified as the interpolation speed designation method.
∗2: 8 ch word data and 8 ch bit data can be displayed in real time.

☐ Module specification

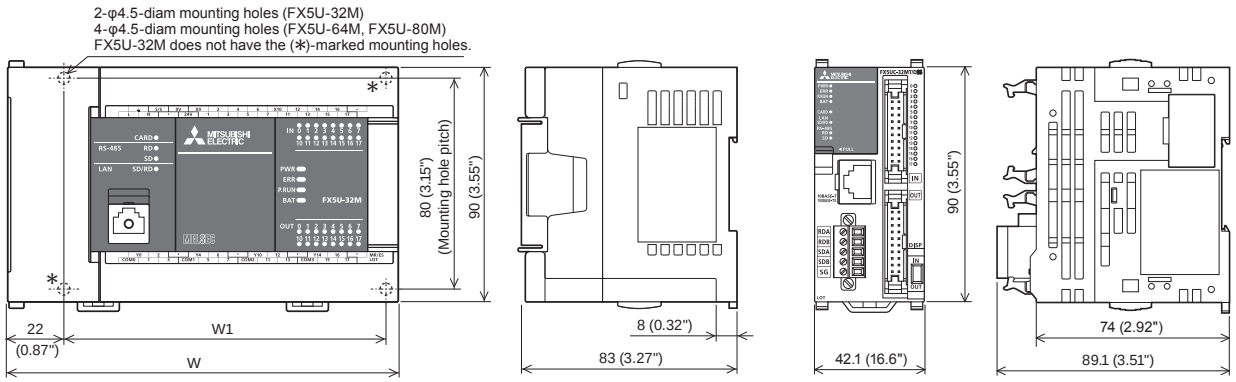
Item			Specifications
Servo amplifier connection method			SSCNET III/H
Maximum overall cable distance [m(ft.)]			400 (1312.32)
Maximum distance between stations [m(ft.)]			100 (328.08)
Peripheral I/F			Via CPU module (Ethernet)
Manual pulse generator operation function			Possible to connect 1 module
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)	Number 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 ~ 30 (0.2 ~ 0.05 mm^2) ∗ AWG24 (0.2 mm^2) recommended
Forced stop input signal (EMI)	Number 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 ~ 30 (0.2 ~ 0.05 mm^2) ∗ AWG24 (0.2 mm^2) recommended
Signal input form			Phase A/Phase B (magnification by 4/magnification by 2/magnification by 1), PULSE/SIGN
Manual pulse generator/ Incremental synchronous encoder signal	Differential output type (26LS31 or equivalent)	Input pulse frequency	Up to 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 voltage	2.0 to 5.25 V DC
		Low voltage	0 to 0.8 V DC
		Differential voltage	±0.2 V
		Cable length	Up to 30 m (98.43 ft.)
	Voltage output Open-collector type (5 V DC)	Input pulse frequency	Up to 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 voltage	3.0 to 5.25 V DC
		Low voltage	0 to 1.0 V DC
		Cable length	Up to 10m (32.81 ft.)
Number of occupied I/O points			8 points
24 V DC internal current consumption			0.25 A

Refer to the manual for details on each device.

External Dimensions

Unit: mm (inches)

CPU Modules

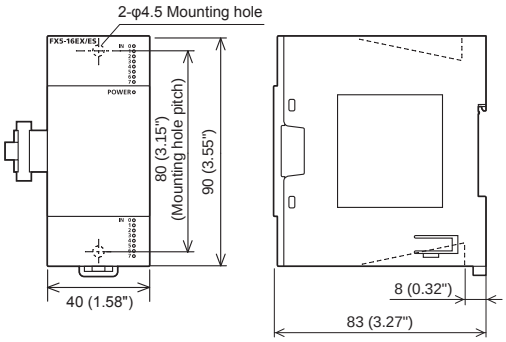


Model name	W: mm (inches)	W1: mm (inches) Mounting hole pitches	MASS (Weight): kg (lbs)
FX5U-32M[]	150 (5.91")	123 (4.85")	Approx. 0.65 (1.43")
FX5U-64M[]	220 (8.67")	193 (7.60")	Approx. 1.0 (2.20")
FX5U-80M[]	285 (11.23")	258 (10.16")	Approx. 1.2 (2.64")

Model name	MASS (Weight): kg (lbs)
FX5UC-32M[]	Approx. 0.2 (0.44")

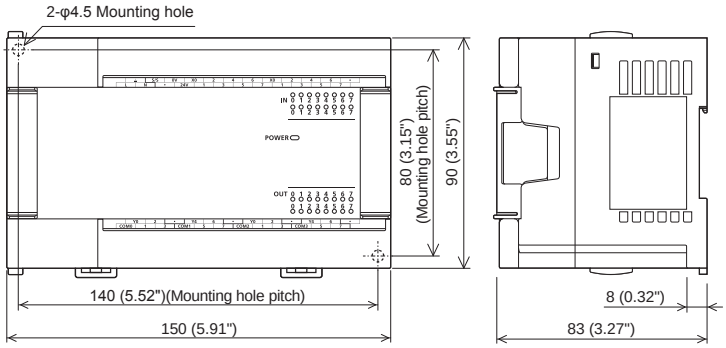
I/O Modules

FX5 input module/output module (terminal block type)



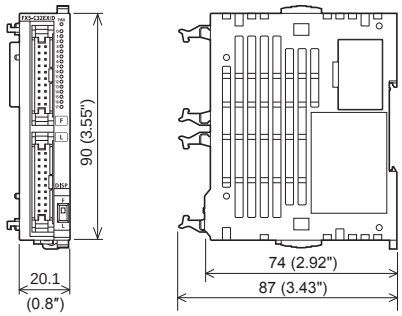
Model name	MASS (Weight): kg (lbs)
FX5-8EX/ES, FX5-8EYR/ES, FX5-8EYT/ES, FX5-8EYT/ESS	Approx. 0.2 (0.44")
FX5-16EX/ES, FX5-16EYR/ES, FX5-16EYT/ES, FX5-16EYT/ESS	Approx. 0.25 (0.551")

FX5 Powered I/O Modules



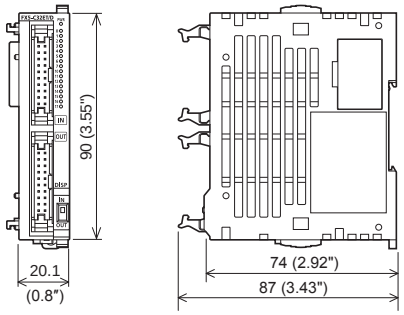
Model name	MASS (Weight): kg (lbs)
FX5-32ER/ES, FX5-32ET/ES, FX5-32ET/ESS	Approx. 0.65 (1.43")

FX5 input module/output module (connector type)



Model name	MASS (Weight): kg (lbs)
FX5-C32EX/D, FX5-C32EX/DS	Approx. 0.15 (0.33")
FX5-C32EYT/D, FX5-C32EYT/DSS	

FX5 I/O module (connector type)

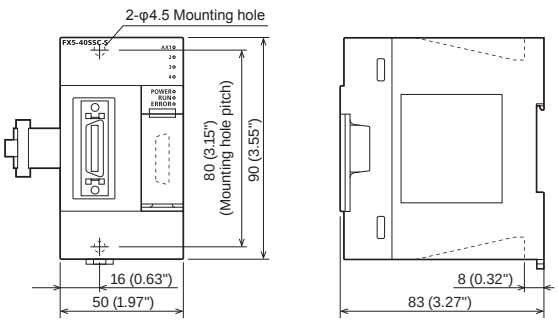


Model name	MASS (Weight): kg (lbs)
FX5-C32ET/D, FX5-C32ET/DSS	Approx. 0.15 (0.33")

Intelligent Function Module

FX5-40SSC-S

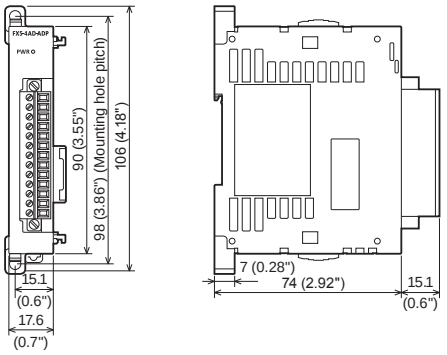
MASS (Weight): Approx. 0.3 kg (0.66 lbs)



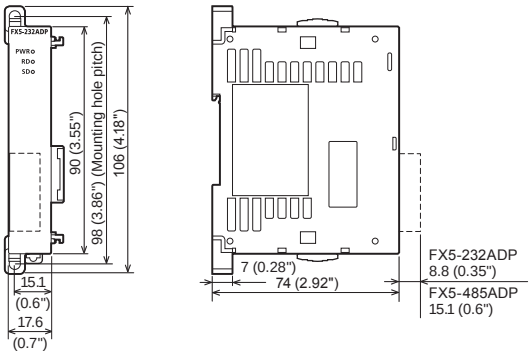
Unit: mm (inches)

Expansion adapters

FX5-4AD-ADP / FX5-4DA-ADP MASS (Weight): Approx. 0.1 kg (0.22 lbs)

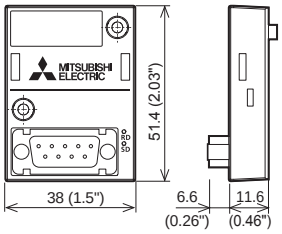


FX5-232ADP / FX5-485ADP MASS (Weight): Approx. 0.08 kg (0.18 lbs)

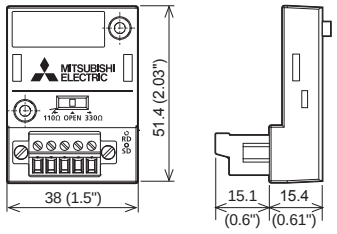


Expansion boards

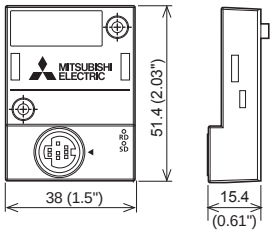
FX5-232-BD MASS (Weight): Approx. 0.02 kg (0.05 lbs)



FX5-485-BD MASS (Weight): Approx. 0.02 kg (0.05 lbs)

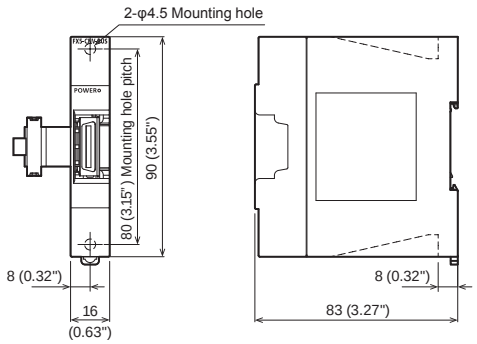


FX5-422-BD-GOT MASS (Weight): Approx. 0.02 kg (0.05 lbs)

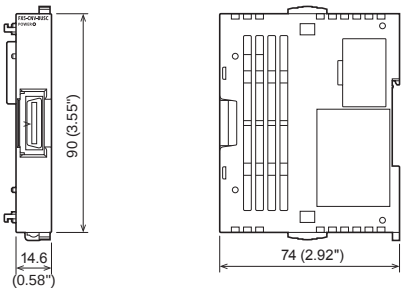


Bus conversion modules

FX5-CNV-BUS MASS (Weight): Approx. 0.1 kg (0.22 lbs)

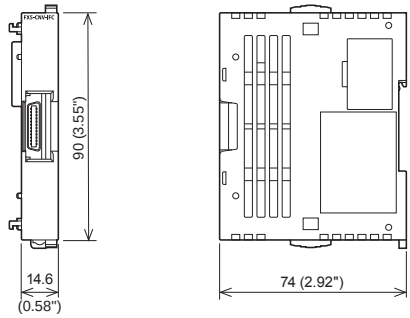


FX5-CNV-BUSC MASS (Weight): Approx. 0.1 kg (0.22 lbs)



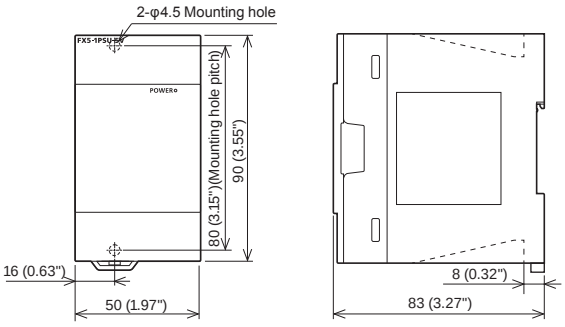
Connector conversion module

FX5-CNV-IFC MASS (Weight): Approx. 0.06 kg (0.14 lbs)



Extension power supply module

FX5-1PSU-5V MASS (Weight): Approx. 0.3 kg (0.66 lbs)



Standards

List of Compatible Products

Model Name	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	○	○	○	○	—	—	—	—	—	—	—	—
◆ FX5UC CPU modules												
FX5UC-32MT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5UC-32MT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 I/O modules (terminal block 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	○	□	○	○	—	—	—	—	—	—	—	—
FX5-32ER/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/ES	○	○	○	○	—	—	—	—	—	—	—	—
FX5-32ET/ESS	○	○	○	○	—	—	—	—	—	—	—	—
◆ FX5 I/O modules (connector type)												
FX5-C32EX/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EX/DS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EYT/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32EYT/DSS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32ET/D	○	□	○	○	—	—	—	—	—	—	—	—
FX5-C32ET/DSS	○	□	○	○	—	—	—	—	—	—	—	—

Model Name	CE		UL cUL	KC	Ship approvals							
	EMC	LVD			ABS	DNV	LR	GL	BV	RINA	NK	KR
◆ FX5 Intelligent function module												
FX5-40SSC-S	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 Extension power supply module												
FX5-1PSU-5V	○	○	○	○	—	—	—	—	—	—	—	—
◆ FX5 Bus conversion modules												
FX5-CNV-BUS	○	□	○	○	—	—	—	—	—	—	—	—
FX5-CNV-BUSC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 Connector conversion module												
FX5-CNV-IFC	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5 Expansion adapters												
FX5-4AD-ADP	○	□	○	○	—	—	—	—	—	—	—	—
FX5-4DA-ADP	○	□	*	○	—	—	—	—	—	—	—	—
FX5-232ADP	○	□	○	○	—	—	—	—	—	—	—	—
FX5-485ADP	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX5U Expansion boards												
FX5-232-BD	○	□	—	○	—	—	—	—	—	—	—	—
FX5-485-BD	○	□	—	○	—	—	—	—	—	—	—	—
FX5-422-BD-GOT	○	□	—	○	—	—	—	—	—	—	—	—
◆ FX3 Intelligent function modules												
FX3U-4AD	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-4DA	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-4LC	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-1PG	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-2HC	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-16CCL-M	○	□	○	○	—	—	—	—	—	—	—	—
FX3U-64CCL	○	□	○	○	—	—	—	—	—	—	—	—
◆ FX3 Extension power supply module												
FX3U-1PSU-5V	○	○	○	○	—	—	—	—	—	—	—	—

○: Compliant with standards or self-declaration □: No need to comply *: Support planned

■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.

■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.

Products list

CPU & I/O modules

Model	Specification				
	Power Supply	Input		Output	
CPU modules					
FX5U-32MR/ES	100 to 240 V AC 50/60 Hz	16 points	24 V DC Sink/source	16 points	Relay
FX5U-32MT/ES					Transistor/sink
FX5U-32MT/ESS					Transistor/source
FX5U-64MR/ES		32 points		32 points	Relay
FX5U-64MT/ES					Transistor/sink
FX5U-64MT/ESS					Transistor/source
FX5U-80MR/ES		40 points		40 points	Relay
FX5U-80MT/ES					Transistor/sink
FX5U-80MT/ESS					Transistor/source
FX5UC-32MT/D	24 V DC	16 points	24 V DC Sink	16 points	Transistor/sink
FX5UC-32MT/DSS			24 V DC Sink/source		Transistor/source
I/O modules					
FX5-8EX/ES	Power supply from CPU module	8 points	24 V DC Sink/source	—	—
FX5-16EX/ES		16 points			
FX5-8EYR/ES		—	—	8 points	Relay
FX5-8EYT/ES					Transistor/sink
FX5-8EYT/ESS					Transistor/source
FX5-16EYR/ES		—	—	16 points	Relay
FX5-16EYT/ES					Transistor/sink
FX5-16EYT/ESS					Transistor/source
FX5-32ER/ES	100 to 240 V AC 50/60 Hz	16 points	24 V DC Sink/source	16 points	Relay
FX5-32ET/ES					Transistor/sink
FX5-32ET/ESS					Transistor/source
FX5-C32EX/D	Power supply from CPU module	32 points	24 V DC Sink	—	—
FX5-C32EX/DS			24 V DC Sink/source		—
FX5-C32EYT/D		—	—	32 points	Transistor/sink
FX5-C32EYT/DSS					Transistor/source
FX5-C32ET/D		16 points	24 V DC Sink	16 points	Transistor/sink
FX5-C32ET/DSS			24 V DC Sink/source		Transistor/source

Expansion Boards & Adapters

Model	Specification
FX5-232-BD	For RS-232C communication
FX5-485-BD	For RS-485 communication
FX5-422-BD-GOT	For GOT RS-422 communication
FX5-232ADP	For RS-232C communication
FX5-485ADP	For RS-485 communication
FX5-4AD-ADP	4 ch analog input adapter
FX5-4DA-ADP	4 ch analog output adapter

Intelligent function modules

Model	Specification
FX5-40SSC-S	Simple Motion 4-Axis module
FX3U-4AD	4 ch analog input
FX3U-4DA	4 ch analog output
FX3U-4LC	4 ch temperature control
FX3U-1PG	Positioning pulse output 200 kHz
FX3U-2HC	2 ch 200 kHz high-speed counter
FX3U-16CCL-M	Master for CC-Link (compatible with Ver. 2.00)
FX3U-64CCL	Interface for CC-Link (compatible with Ver. 2.00)

Power supply modules & Bus/Connector conversion modules

Model	Specification
FX5-1PSU-5V	Extension power supply module
FX5-CNV-BUS	Bus conversion FX5(terminal block)→FX3 (terminal block)
FX5-CNV-BUSC	Bus conversion FX5(connector)→FX3 (terminal block)
FX5-CNV-IFC	Connector conversion FX5(connector)→FX5 (terminal block)
FX3U-1PSU-5V	FX3U Extension power supply module

Software

Type	Model	Specification
MELSOFT iQ Works (DVD-ROM)	SW2DND-IQWK-E	FA engineering software*1
MELSOFT GX Works3 (DVD-ROM)	SW1DND-GXW3-E	PLC engineering software (includes GX Works2, GX Developer)

*1: Refer to the manual of the software for supported models.

User's manuals for the applicable modules

Manual name <manual number>	Description
MELSEC iQ-F FX5 User's Manual (Startup) <JY997D58201>	Describes the performance specifications, procedures before operation, and troubleshooting of the CPU module.
MELSEC iQ-F FX5UC User's Manual (Hardware) <JY997D61401>	Describes the details on the hardware of the FX5UC CPU module, including input/output specifications, wiring, installation and maintenance.
MELSEC iQ-F FX5U User's Manual (Hardware) <JY997D55301>	Describes the details on hardware of the FX5U series CPU module, including input/output specifications, wiring, installation, and maintenance.
MELSEC iQ-F FX5 User's Manual (Application) <JY997D55401>	Describes basic knowledge required for program design, functions of the CPU module, devices/labels, and parameters.
MELSEC iQ-F FX5 Programming Manual (Program Design) <JY997D55701>	Describes specifications of ladder, ST, and other programs and of labels.
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) <JY997D55801>	Describes specifications of instructions and functions that can be used in programs.
MELSEC iQ-F FX5 User's Manual (Serial Communication) <JY997D55901>	Describes inverter communication, and non-protocol communication.
MELSEC iQ-F FX5 User's Manual (SLMP) <JY997D56001>	Describes SLMP communication.
MELSEC iQ-F FX5 User's Manual (MELSEC Communication Protocol) <JY997D60801>	Describes MC protocol.
MELSEC iQ-F FX5 User's Manual (MODBUS Communication) <JY997D56101>	Describes MODBUS serial communication.
MELSEC iQ-F FX5 User's Manual (Ethernet Communication) <JY997D56201>	Describes the functions of the built-in Ethernet port communication function.
MELSEC iQ-F FX5 User's Manual (Positioning Control) <JY997D56301>	Describes the built-in positioning function.
MELSEC iQ-F FX5 User's Manual (Analog Control) <JY997D60501>	Describes the analog function.

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 units are relevant for installation, commissioning and handling of the units and the accessories. The information given in the manuals must be read before installation and commissioning of the units or software.
If any questions arise regarding the application or use of the PLC units and accessories described in this catalog, please contact your Mitsubishi Electric product provider.

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