Side B

MITSUBISHI ELECTRIC

Side A JAPANESE

Side B ENGLISH

PROGRAMMABLE CONTROLLERS

MELSEC iQ-F

MELSEC iQ-F FX5 Simple Motion Module

Hardware Manual

FX5

Manual Number	BCN-B62008-337
Revision	E
Date	December 2017

This manual describes the part names, dimensions, installation, and specifications of the product. Before use, read this manual and manuals of relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions.
And, store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

Effective December 2017
Specifications are subject to change without notice.

Safety Precaution (Read these precautions before use.)

This manual classifies the safety precautions into two categories:

⚠WARNING and ⚠CAUTION .

⚠WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Depending on the circumstances, procedures indicated by ⚠CAUTION may also cause severe injury.
It is important to follow all precautions for personal safety.

STARTUP AND MAINTENANCE PRECAUTIONS ⚠WARNING

- Do not touch any terminal while the PLC's power is on.
  Doing so may cause electric shock or malfunctions.
- Before cleaning or retightening terminals, cut off all phases of the power supply externally. Failure to do so in the power ON status may cause electric shock.
- Before modifying the program in mid-operation, forcing output, running or stopping the PLC, read through this manual carefully, and ensure complete safety.
  An operation error may damage the machinery or cause accidents.
- Do not change the program in the PLC from two or more peripheral equipment devices at the same time. (i.e. from an engineering tool and a GOT)
  Doing so may cause destruction or malfunction of the PLC program.
- Use the battery for memory backup in conformance with the MELSEC iQ-F FX5 User's Manual (Hardware).
  - Use the battery for the specified purpose only.
  - Connect the battery correctly.
  - Do not charge, disassemble, heat, put in fire, short-circuit, connect reversely, weld, swallow or burn the battery, or apply excessive force (vibration, impact, drop, etc.) to the battery.
  - Do not store or use the battery at high temperatures or expose to direct sunlight.
  - Do not expose to water, bring near fire or touch liquid leakage or other contents directly.

  Incorrect handling of the battery may cause excessive heat, bursting, ignition, liquid leakage or deformation, and lead to injury, fire or failures and malfunction of facilities and other equipment.

Associated Manuals

Manual name	Manual No.	Description
MELSEC iQ-F FX5 Simple Motion Module User's Manual (Startup)	IB-0300251	Explains Simple Motion module specifications, functions list and wiring.
MELSEC iQ-F FX5 Simple Motion Module User's Manual (Application)	IB-0300253	Explains Simple Motion module functions, programming and troubleshooting.
MELSEC iQ-F FX5 Simple Motion Module User's Manual (Advanced Synchronous Control)	IB-0300255	Functions, programming and buffer memory for the synchronous control of the Simple Motion module.
MELSEC iQ-F FX5U User's Manual (Hardware)	JY997D55301	Explains FX5U CPU module specification details for I/O, wiring, installation, and maintenance.
MELSEC iQ-F FX5UC User's Manual (Hardware)	JY997D61301	Explains FX5UC CPU module specification details for I/O, wiring, installation, and maintenance.
GX Works3 Operating Manual	SH-081215ENG	System configuration, parameter settings, and online operations (common to simple project and structured project) of GX Works3.

How to obtain manuals
For the necessary product manuals or documents, consult with your local Mitsubishi Electric representative.

Certification of UL, cUL standards

FX5-40SSC-S or FX5-80SSC-S comply with the UL standards (UL, cUL).

Further information can be found in the following manual.

→ **MELSEC iQ-F FX5U User's Manual (Hardware)**
→ **MELSEC iQ-F FX5UC User's Manual (Hardware)**

Regarding the standards that relate to the CPU module, please refer to either the product catalog or consult with your nearest Mitsubishi product provider.

Attention
This product is designed for use in industrial applications.

Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards. Compliance to EMC directive and LVD directive for the entire mechanical module should be checked by the user / manufacturer. For more information please consult with your nearest Mitsubishi product provider.

Attention

- This product is designed for use in industrial applications.

Note

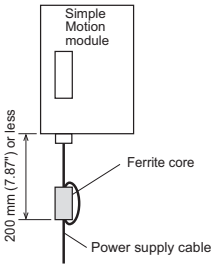
- Manufactured by:Mitsubishi Electric Corporation
  2-7-3 Marunouchi, Chiyoda-ku, Tokyo, 100-8310 Japan
- Manufactured at:Mitsubishi Electric Corporation Nagoya Works
  1-14, Yada-minami 5-chome, Higashi-ku, Nagoya, Japan
- Authorized Representative in the European Community:
  Mitsubishi Electric Europe B.V.
  Gothaer Str. 8, 40880 Ratingen, Germany

Requirement for Compliance with EMC directive
The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Type: Programmable Controller (Open Type Equipment)
Models: MELSEC iQ-F series manufactured
from October 1st, 2014 FX5-40SSC-S
from October 1st, 2016 FX5-80SSC-S

Standard	Remark
EN61131-2: 2007 Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. EMI • Radiated Emission • Conducted Emission EMS • Radiated electromagnetic field • Fast transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

Caution for EC Directive
Attach the ferrite core to the power supply cable (Simple Motion module side).
Attach the ferrite core in 200 mm (7.87") or less from connector on the Simple Motion module side.



The ferrite core should use the following equivalent product. (2 turns necessary)
Model name: ZCAT3035-1330
(Manufactured by TDK co., Ltd.)

1. Outline

FX5-40SSC-S or FX5-80SSC-S type Simple Motion module (hereinafter referred to as FX5SSC) is a intelligent function module applicable to SSCNETIII(/H).
FX5SSC can perform positioning control by servo motor via SSCNETIII(/H) applied servo amplifier.
For positioning control, refer to the following manual.

→ **MELSEC iQ-F FX5 Simple Motion Module User's Manual (Startup)**
→ **MELSEC iQ-F FX5 Simple Motion Module User's Manual (Application)**

For synchronous control, refer to the following manual.

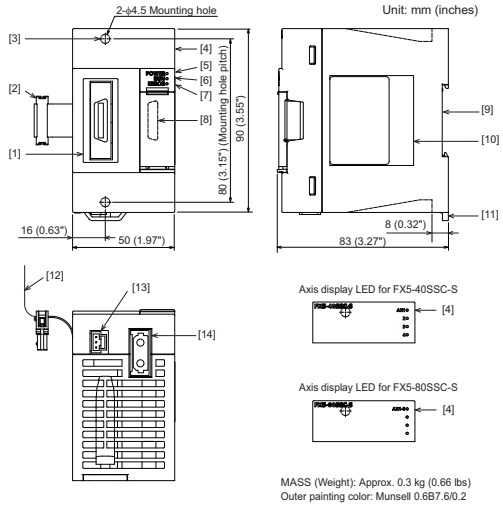
→ **MELSEC iQ-F FX5 Simple Motion Module User's Manual (Advanced Synchronous Control)**

1.1 Incorporated Items

Verify that the following product and items are included in the package:

Product	Module
Included Items	• FX2NC-100MPCB Power supply cable (1 m) × 1 cable • Dust proof protection sheet × 1 sheet • Hardware manual (This manual)

1.2 External Dimensions and Part Names



[1] External input connection connector
[2] Extension cable
[3] Direct mounting hole: 2 holes of ϕ4.5 (0.18") (mounting screw: M4 screw)
[4] Axis display LED
[5] POWER LED
[6] RUN LED
[7] ERROR LED
[8] Extension connector
[9] DIN rail mounting groove (DIN rail: DIN46277, 35 mm (1.38") wide)
[10] Name plate
[11] DIN rail mounting hook
[12] Pullout tab
[13] Power supply connector
[14] SSCNETIII cable connector

1.3 Power and Status LED

□: OFF, ■: ON, ◆: Flashing
(Flashing interval ON: 200 ms/OFF: 200 ms)

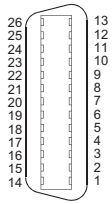
LED display		Description
POWER LED is OFF	FX5-40SSC-S: AX1□, AX2□, AX3□, AX4□ FX5-80SSC-S: AX1-8□	Power of Simple Motion module is OFF
	POWER□, RUN□, ERROR□	
RUN LED is ON ERROR LED is OFF AX LED is OFF	FX5-40SSC-S: AX1□, AX2□, AX3□, AX4□*1 FX5-80SSC-S: AX1-8□*2	The axes stopped The axes on standby
	POWER■, RUN■, ERROR□	
AX LED is ON	FX5-40SSC-S: AX1■, AX2□, AX3□, AX4□*3 FX5-80SSC-S: AX1-8■*4	The axis in operation
	POWER■, RUN■, ERROR□	
ERROR LED is ON AX LED is Flashing	FX5-40SSC-S: AX1◆, AX2□, AX3□, AX□*5 FX5-80SSC-S: AX1-8◆*6	Minor error
	POWER■, RUN■, ERROR■	
ERROR LED is Flashing	FX5-40SSC-S: AX1□, AX2□, AX3□, AX4□ FX5-80SSC-S: AX1-8□	Moderate error Watchdog timer error
	POWER■, RUN■, ERROR◆	

*1 The stop or standby AX LED is OFF.
*2 When all axes are stopped or on standby, the AX LED turns OFF.
*3 The operating AX LED is ON.
*4 When any of the axes is in operation, the AX LED turns ON.
*5 The AX LED in which error occurred is flashing.
*6 When an error occurs in any of the axes, the AX LED is flashing.

1.4 Signal Layout for External Input Connection Connector

For further information on the input wiring and input cable, refer to the following manual.

→ **MELSEC iQ-F FX5 Simple Motion Module User's Manual (Startup)**



Front view of the module

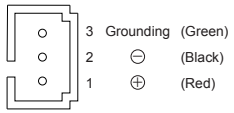
Pin No.	Signal name		Pin No.	Signal name	
1	No connect		14	No connect	
2	SG	Signal ground	15	SG	Signal ground
3	HA	Manual pulse generator/ Incremental synchronous encoder A-phase/PULSE*1	16	HB	Manual pulse generator/ Incremental synchronous encoder B-phase/SIGN*1
4	HAH	Manual pulse generator/ Incremental synchronous encoder A-phase/PULSE*2	17	HBH	Manual pulse generator/ Incremental synchronous encoder B-phase/SIGN*2
5	HAL		18	HBL	
6 to 9	No connect		19 to 22	No connect	
10	EMI	Forced stop input signal	23	EMI. COM	Forced stop input signal common
11	DI1	External command/ Switching signal	24	DI2	External command/ Switching signal
12	DI3		25	DI4	
13	COM	Common (COM)	26	COM	Common (COM)

*1 Voltage-output/open-collector type
*2 Differential-output type

1.5 Power supply connector

For further information on the power supply wiring and power cable, refer to the following manual.

→ **MELSEC iQ-F FX5 Simple Motion Module User's Manual (Startup)**



2. Installation

INSTALLATION PRECAUTIONS ⚠WARNING

- Completely turn off the externally supplied power used in the system before installing or removing the module. Not doing so could result in electric shocks, an operation failure or damage to the module.

INSTALLATION PRECAUTIONS ⚠CAUTION

- Never try to disassemble or modify the modules. It may cause product failure, operation failure, injury or fire.
- Use the programmable controller in an environment that meets the general specifications in the manual supplied with the CPU module. Using the programmable controller in an environment outside the range could result in electric shock, fire, operation failure, and damage to or deterioration of the product.
- Do not directly touch the module's conductive parts and electronic components. Doing so may could cause an operation failure or give damage to the module.
- Lock the control panel and prevent access to those who are not certified to handle or install electric equipment.

2.1 Arrangements

The product connects on the right side of CPU module or extension module.
For further information of installation arrangements, refer to the following manual.

→ **MELSEC iQ-F FX5U User's Manual (Hardware)**
→ **MELSEC iQ-F FX5UC User's Manual (Hardware)**

2.2 Mounting

The product is mounted by the following method.

- Direct mounting (Mounting screw: M4 screw)
- DIN rail mounting

For further information on mounting, refer to the following manual.

→ **MELSEC iQ-F FX5U User's Manual (Hardware)**
→ **MELSEC iQ-F FX5UC User's Manual (Hardware)**

3. Specification

DISPOSAL PRECAUTIONS ⚠CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

TRANSPORTATION AND STORAGE PRECAUTIONS ⚠CAUTION

- The product is a precision instrument. During transportation, avoid any impacts. Failure to do so may cause failures in the product.

3.1 Applicable PLC

Model name	Applicability
FX5U PLC	FX5-40SSC-S: Ver. 1.000 or later (from first production) FX5-80SSC-S: Ver. 1.014 or later
FX5UC PLC	FX5-40SSC-S: Ver. 1.000 or later (from first production) FX5-80SSC-S: Ver. 1.014 or later

3.2 General Specifications

The items other than the following are equivalent to those of the CPU module.
For the general specification, refer to the following manual.

→ **MELSEC iQ-F FX5U User's Manual (Hardware)**
→ **MELSEC iQ-F FX5UC User's Manual (Hardware)**

Items	Specifications	
Operating ambient temperature	0 to 55 °C	
Dielectric withstand voltage	500 V AC for 1 minute	Between all terminals and ground terminal
Insulation resistance	10 MΩ or higher by 500 V DC insulation resistance tester	

3.3 Power Supply Specifications

Items		Specifications
External power supply	Power supply voltage	24 V DC +20% -15%
	Permitted instantaneous power failure time	Operation continues when the instantaneous power failure is shorter than 5 ms.
	Power consumption	6 W
	Power fuse	1 A
Internal power supply	PLC power supply	Not used.

3.4 Performance Specifications

Items		Specifications
Number of control axes		FX5-40SSC-S: 4 axes FX5-80SSC-S: 8 axes
Operation cycle		0.888 ms/1.777 ms
External wiring connection system		26-pin connector
Applicable wire size		AWG30 to 24 (0.05 to 0.2 mm^2)*1
External input wiring connector		LD77MHIOCON
SSCNETIII cable	MR-J3BUS_M*2	• FX5SSC ⇔MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B • MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B ⇔MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B • Standard cord for inside panel 0.15 m (0.49 ft.), 0.3 m (0.98 ft.), 0.5 m (1.64 ft.), 1 m (3.28 ft.), 3 m (9.84 ft.)
	MR-J3BUS_M-A*2	• FX5SSC ⇔MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B • MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B ⇔MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B • Standard cable for outside panel 5 m (16.40 ft.), 10 m (32.81 ft.), 20 m (65.62 ft.)
	MR-J3BUS_M-B*2*3	• FX5SSC ⇔MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B • MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B ⇔MR-J4(W)-B/MR-JE-B(F)/MR-J3(W)-B • Long distance cable 30 m (98.43 ft.), 40 m (131.23 ft.), 50 m (164.04 ft.)
Flash memory (Flash ROM) write count		Max. 100000 times
No. of occupied I/O points		8 points

*1 AWG24 (0.2 mm^2) is recommended.
*2 _ = Cable length (015: 0.15 m (0.49 ft.), 03: 0.3 m (0.98 ft.), 05: 0.5 m (1.64 ft.), 1: 1 m (3.28 ft.), 3: 3 m (9.84 ft.), 5: 5 m (16.40 ft.), 10: 10 m (32.81 ft.), 20: 20 m (65.62 ft.), 30: 30 m (98.43 ft.), 40: 40 m (131.23 ft.), 50: 50 m (164.04 ft.))
*3 For the cable of less than 30 m (98.43 ft.), contact your nearest Mitsubishi sales representative.

⚠ For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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