

FX2N

FX2N-10GM

USER'S GUIDE

JY992D77701B

This manual only describes the specifications for FX2N-10GM positioning controller.

For complete operation, wiring, mounting and programming instructions please refer to the FX2N-10GM, FX2N-20GM HARDWARE PROGRAMMING MANUAL, FX PROGRAMMING MANUAL and FX SERIES HARDWARE MANUAL.

These manuals should be read and understood before attempting to install or use the unit.

1. Reference manual

Refer to the under mentioned manual for details about product installation, and programming.

- 1) FX2N-10GM, FX2N-20GM HARDWARE PROGRAMMING MANUAL
The installation of FX2N-10GM and FX2N-20GM and wiring and the instructions are explained.
- 2) E-20TP OPERATION MANUAL
The operation of the input of the program which uses E-20TP and the monitor and the test is explained.
- 3) FX-PCS-KIT-GM-EE SOFTWARE MANUAL
The program is input via the FX-PCS-KIT-GM-EE. The manual explains the operation of the monitor and test functions.

The manual in 1) is not included with the product. Please request from the shop where the units was purchased if required.

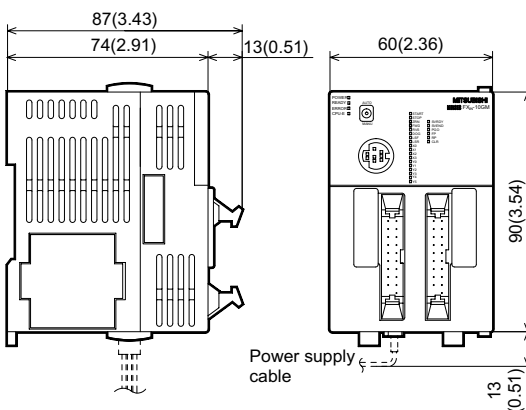
The manuals in 2) and 3) are included with the product.

2. Outline of the unit

The FX2N-10GM positioning controller (hereinafter call FX2N-10GM or 10GM) is a pulse chain output unit that enables the positioning control of a stepping motor or a servo motor via the drive unit.

- One FX2N-20GM can control 2 axes.
- Both dedicated positioning language (cod instructions) and sequence language (basic instructions and application instructions) are available.
- A pulse generator can be connection.(The manual pulse generators must be an open collector output type.)
- The zero return operation at each start can be omitted with a servo amplifier with the absolute position (ABS) detection function.
- The FX2N-10GM can be used alone. When an FX2N-10GM is connected with an FX2N or FX2NC series Programmable controller (here after call PLC), reading and writing the positioning data can be done. (When FX2N-10GM is connected with the FX2NC series PLC, an FX2NC-CNV-IF is necessary.)

3. External dimensions

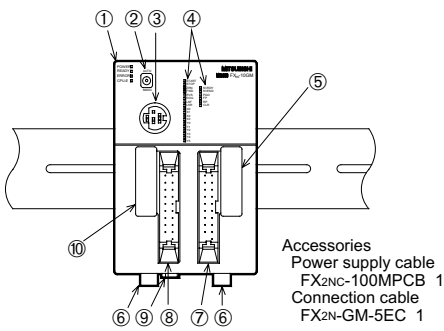


Din rail width: 35mm
Weight: approx.0.3kg
Dimensions mm(inch)

4. Product composition

4.1 Each part name

The name and description of each part of the FX2N-10GM are explained below.



- ① Operation indicator LED
- ② MANU/AUTO switch
- ③ Connector for programming tool
- ④ I/O display
- ⑤ Connector for PLC extension block
- ⑥ Hook for DIN rail installation
- ⑦ Connector for motor amplifier: CON2
- ⑧ Connector for I/O: CON1
- ⑨ Connector for power supply
- ⑩ Connector for PLC

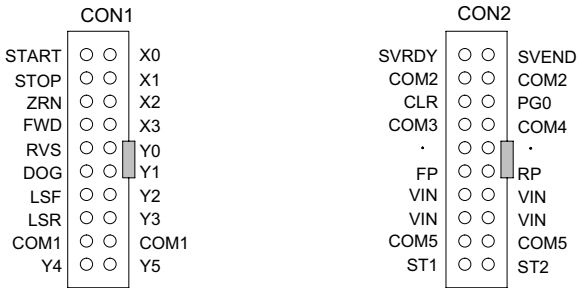
4.2 Operation display

The state of FX2N-10GM is displayed by LED.

Name of LED	Content
POWER	LED lights when power is supplied. If LED is not lit, check power supply voltage and current.
READY	LED lights when accepting an axis instruction. During pulse output or when an error occurs, the LED is off.
ERROR	LED is lit or blinks when an error occurs in the positioning drive of FX2N-10GM.
CPU-E	CPU error. Incompatible system configuration, excess noise, etc. (Mixing foreign body, and influence of noise, etc.)

4.3 I/O connector

The pin array of the I/O connector is as follows.



All terminals with identical names are shorted internally. (Ex. COM1-COM1, VIN-VIN, etc.)

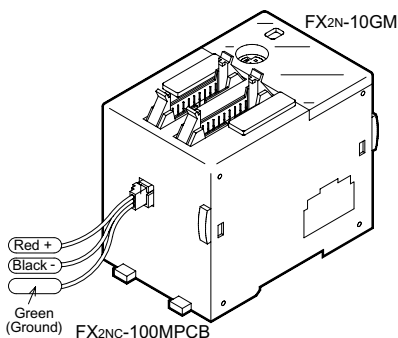
Do not wire “·” terminals.

Refer to the FX2N-10GM, FX2N-20GM HARDWARE PROGRAMMING MANUAL for wiring information.

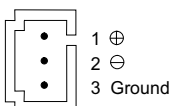
4.4 Power supply connector

The power to the FX2N-10GM is supplied with the special power supply cable attached to the product.

The ground of the FX2N-10GM and the servo amplifier is a common ground. Refer to the FX2N-10GM, FX2N-20GM HARDWARE PROGRAMMING MANUAL for details wiring instruction.



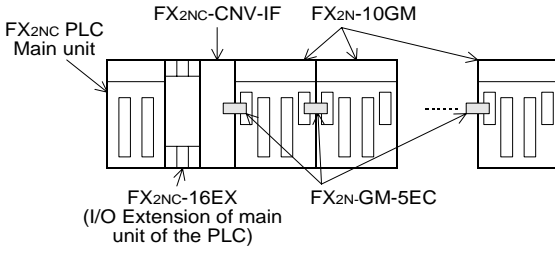
The pin number of the power supply connector of FX2N-10GM



Install a safety circuit outside of FX2N-10GM so that the entire system may work safety when the external power supply fails.

4.5 Connection with PLC

Refer to the FX2N-10GM, FX2N-20GM HARDWARE PROGRAMMING MANUAL for details concerning the system configuration.



The FX2N-GM-5EC cable is used to connect the FX2N-10GM to an FX2N PLC. When along distance is required, one FX2N-GM-65EC cable can be used per system. To connect to an FX2NC PLC, the FX2NC-CNV-IF must be used. Eight blocks may be connected to an FX2N PLC and four blocks may be connected to an FX2NC PLC.

5. Specification

5.1 Power supply specification

Item	Contents
Power supply	DC24V -15%, +10%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	5W

5.2 General specifications

Item	Contents
Ambient temperature	0 to 55 °C (operation). -20 to 70 °C (storage).
Surrounding humidity	35 to 85%,No condensation (operation). 35 to 90% (storage).
Vibration resistance	Conforms to JIS C0040. 10 to 57Hz: Half 0.035mm amplitude, 57 to 150Hz: 4.9 m/s ² Acceleration Sweep count for X,Y,Z: 10 times (80 min in each direction).
Shock resistance	Conforms to JIS C0041. 147m/s ² acceleration, Action time: 11ms. 3 times in each direction X, Y, Z.
Noise immunity	1,000Vp-p,1μs. 30 to 100Hz, tested by noise simulator.
Dielectric withstand voltage	500V AC > 1 min, tested between all points, terminal and ground.
Insulation resistance	5MΩ > 500V DC, tested between all points, terminal and ground
Ground	Class 3 (100Ω or less)
Use atmosphere	Ambient conditions to be free of corrosive gases. Dust should be minimal.

5.3 Performance specification

Item	Contents
Number of control axes	One axes
Application PLC	Bus connection with FX2N and the FX2NC series PLC. The number of I/O points occupied is 8 points. An FX2NC-CNV-IF is necessary for the connection with the FX2NC series PLC.
Program memory	3.8 K steps. With built-in RAM
Battery	With built-in FX2NC-32BL type lithium battery. Longevity and about 3 years (The guaranteed term is 1 year).
Positioning unit	Command units: mm, deg, inch, pls, (relativity/absolutely) Max command value ± 999,999 (32 bits when indirectly specifying)
Accumulation address	-2,147,483,648 to 2,147,483,647 pulses
Speed instruction	200kHz max., 153,000cm/min (200kHz or less). Automatic trapezoidal pattern acceleration/deceleration
Zero return	Manual operation or automatic operation. The DOG type machine zero return (The DOG search function is provided). An automatic electric zero return is possible by the electric starting point setting.
Absolute position detection	The absolute position detection is possible with MR-J2 and the MR-H type servo motor with the ABS detection function.
Control inputs	Operation system: FWD (manual forwarding), RVS (manual reversal) ZRN (machine zero return), START (automatic start), STOP, Manual pulse generator (2kHz max), Single-step operation input (Depends upon the parameter setting). Mechanical system: DOG (near-point signal), LSF (forward rotation limit), LSR (reverse rotation limit), Interrupt: 4 points Servo system: SVRDY(servo ready), SVEND (servo end), PG0 (zero-point signal)
	General purpose: The main body has X0 to X3.
Control outputs	Servo system: FP (forward rotation pulse). RP (reverse rotation pulse), CLR (counter clear).
	General purpose: The main body has Y0 to Y5.

Item		Contents
Control method		Program method: The program is written in the FX2N-10GM by a special programming tool, and the positioning control is done. Table method : When the PLC is used together, the positioning control is done by the FROM/TO instruction.
Program No.		Ox00 to Ox99 (Positioning program), O100 (sub-task program)
Instruction	Positioning	Cod No. system (used with instruction cods). 13 kinds.
	Sequence	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, SET, RST and NOP.
	Application	FNC number system-29 types.
Parameter		System setting-9 types. Positioning-27 types. I/O Control-18 types.
		Settings in the program can be changed by using a special data register (The system settings are excluded)
M cods		M00:Program stop (WAIT), M02: (End of positioning program), m01 and m03 to m99 can be arbitrarily used. (AFTER mode and WITH mode) M100(WAIT) and m102(END) are used by a sub-task.
Device		Inputs: X0 to X3, X375 to X377 Outputs: Y0 to Y5, Supplementary relay: M0 to M511 (general purpose), M9000 to M9175 (special) Pointer: P0 to P127 Data register: D0 to D1999 (general purpose) (16 bits) D4000 to D6999 (file register and latched relays) ^{*1} D9000 to D9599 (special) Index: V0 to V7 (16 bits), Z0 to Z7 (32 bits)
Self-diagnosis		"Parameter error", "Program error", and "External error" can be diagnosed by the display and the error code.

* 1:When the file register is used, it is necessary to set PARA.101.

5.4 Input specifications

Item		Input from general-purpose equipment	Input from drive unit
Input signal name	Group 1	START, STOP, ZRN, FWD, RVS, LSF, LSR	SVRDY, SVEND
	Group 2	DOG	PG0
	Group 3	General-purpose input, interruption input: X0 to X3	-
	Group 4	Manual pulse generator	-
Circuit insulation		By photocoupler	By photocoupler
Operation indication		LED is lit while input is ON	LED is lit while input is ON
Signal voltage		24V DC \pm 10% (internal power supply)	5 to 24V DC \pm 10%
Input current		7mA/24V DC	7mA/24V DC (PG0 11.5mA/24V DC)
Input ON current		4.5mA or more	0.7mA or more (PG0 1.5mA or more)
Input OFF current		1.5mA or less	0.3mA or less (PG0 0.5mA or less)
Signal format		Contact input or NPN open collector transistor input.	
Response time	Group 1	Approx. 3msec	Approx. 3msec
	Group 2	Approx. 0.5msec	Approx. 16 μ s
	Group 3	Approx. 3msec ^{*1}	-
	Group 4	Approx. 0.1ms ^{*1}	-

*1:The selection of general purpose inputs, manual pulse generator inputs or interrupt inputs in the parameter settings automatically adjusts the input filters.

5.5 Output specification

Item	General-purpose output	Output to drive unit
Signal name	Y0 to Y5	FP, RP, CLR
Circuit isolation	By photocoupler	By photocoupler
Operation indication	LED is lit while output is ON	LED is lit while output is ON
External power supply	5 to 24V DC \pm 10%	5 to 24V DC \pm 10%
Load current	50mA or less	20mA or less
Open circuit leak current	0.1mA/24V DC or less	0.1mA/24V DC or less
Output ON voltage	0.5V max	0.5V max (CLR is 1.5V max.)
Response time	0.2ms max. for both OFF→ON and ON → OFF.	Pulse output FP RP is 200kHz max. Pulse output width of the CLR signal: Approx. 20msec.

Guidelines for the safety of the user and protection of the FX2N-10GM POSITIONING CONTROLLER

- This manual has been written to be used by trained and competent personnel. This is defined by the European directives for machinery, low voltage and EMC.
- If in doubt at any stage during the installation of the FX2N-10GM always consult a professional electrical engineer who is qualified and trained to the local and national standards. If in doubt about the operation or use of the FX2N-10GM please consult the nearest Mitsubishi Electric distributor.
- Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Owing to the very great variety in possible application of this equipment, you must satisfy yourself as to its suitability for your specific application.

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