MITSUBISHI
PROGRAMMABLE CONTROLLERS
MELSEC-F

FX2N

FX2N-20GM

USER'S GUIDE

JY992D77601C

This manual only describes the specifications for FX2N-20GM 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, operation and programming.

1) FX2N-10GM, FX2N-20GM HARDWARE PROGRAMMING MANUAL
The installation, wiring and the instructions of the FX2N-10GM and FX2N-20GM units 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.

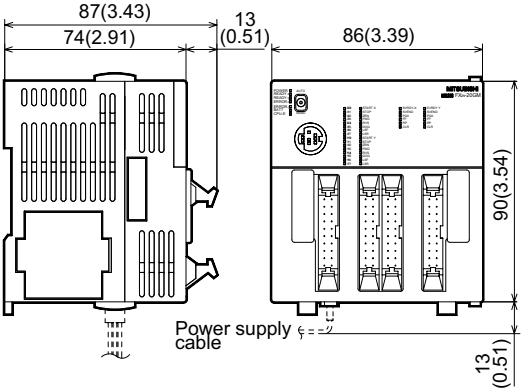
The manual in 1) is not included with the product. Please request from the shop where the unit was purchased if required. The manuals in 2) and 3) are included with the product.

2. Outline of the unit

The FX2N-20GM positioning controller (hereinafter call FX2N-20GM or 20GM) 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. (Linear interpolation and circular interpolation are available.)
- Both dedicated positioning language (cod instructions) and sequence language (basic instructions and application instructions) are available.
- A pulse generator can be connected to each axis or one pulse generator can be connected to both axes and switched as required. 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-20GM can be used alone. When an FX2N-20GM is connected with an FX2N or FX2NC series Programmable controller (hereafter call PLC), reading and writing the positioning data can be done. (When FX2N-20GM is connected with the FX2NC series PLC, an FX2NC-CNV-IF is necessary.)

3. External dimensions

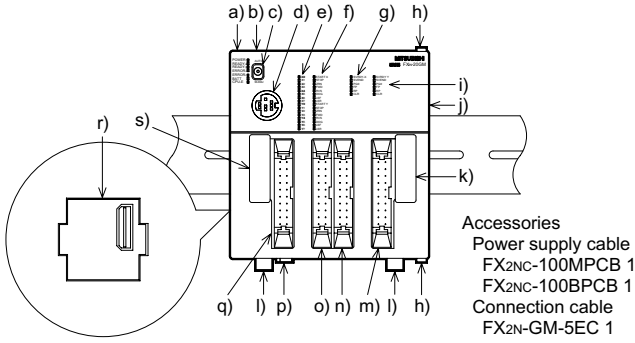


Din rail width: 35mm
Weight: approx.0.4kg
Dimensions mm(inch)

4. Product composition

4.1 Each part name

The name and description of each part of the FX_{2N}-20GM are explained below.



a) Battery
b) Operation indicator LED
c) MANU/AUTO switch
d) Connector for programming tool
e) General-purpose I/O display
f) Display for equipment inputs
g) x axis status display
h) Lock to fix extension block of FX_{2N}-20GM
i) y axis status display
j) Connector for FX_{2N}-20GM extension block
k) Connector for PLC extension block
l) Hook for DIN rail installation
m) Connector for y axis motor amplifier: CON4
n) Connector for x axis motor amplifier: CON3
o) Connector for input equipment: CON2
p) Connector for power supply
q) Connector for general-purpose I/O: CON1
r) Connector for memory board
s) Connector for PLC

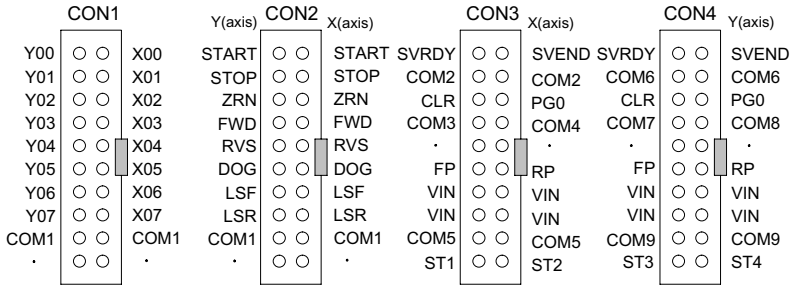
4.2 Operation display

The state of FX_{2N}-20GM 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-X	LED lights when accepting an x-axis instruction. During pulse output or when an error occurs, the LED is off.
READY-Y	LED lights when accepting a y-axis drive instruction. During pulse output or when an error occurs, the LED is off.
ERROR-X	LED is lit or blinks when an error occurs in the positioning drive of x axis.
ERROR-Y	LED is lit or blinks when an error occurs in the positioning drive of y axis.
BATT	LED lights when the buttery voltage drops. (Turn Power Supply On)
CPU-E	CPU error. Incompatible system configuration, excess noise, etc.

4.3 I/O connector

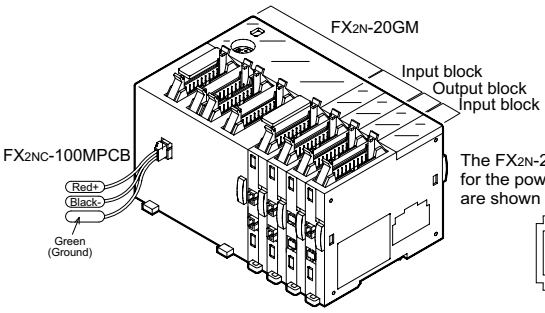
The pin array of the I/O connector is as follows.



All terminals with identical names are shorted internally (Ex. COM1-COM1, VIN-VIN, etc.).
Do not wire "•" terminals.
Refer to the FX_{2N}-10GM, FX_{2N}-20GM HARDWARE PROGRAMMING MANUAL for wiring information.

4.4 Power supply connector

The power to the FX_{2N}-20GM is supplied with the special power supply cable attached to the product. The ground of the FX_{2N}-20GM and the servo amplifier is a common ground. Refer to the FX_{2N}-10GM, FX_{2N}-20GM HARDWARE PROGRAMMING MANUAL for detailed wiring instructions.



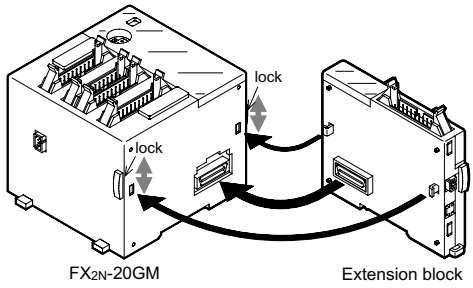
Install a safety circuit outside of FX_{2N}-20GM so that the entire system may work safety when the external power supply fails.

4.5 I/O extension connector

The FX2N-20GM can connect the following extension block.

1) FX2NC series extension block
   - FX2NC-16EX-DS - FX2NC-16EYT-DSS - FX2NC-32EX-DS - FX2NC-32EYT-DSS
   - FX2NC-16EX-T-DS - FX2NC-16EX-D/UL - FX2NC-16EYT-D/UL
   - FX2NC-32EX-D/UL - FX2NC-32EYT-D/UL
2) FX2N series extension block (FX2NC-CNV-IF needs to be used)
   - FX2N-16EX-ES/UL - FX2N-16EYT-ESS/UL

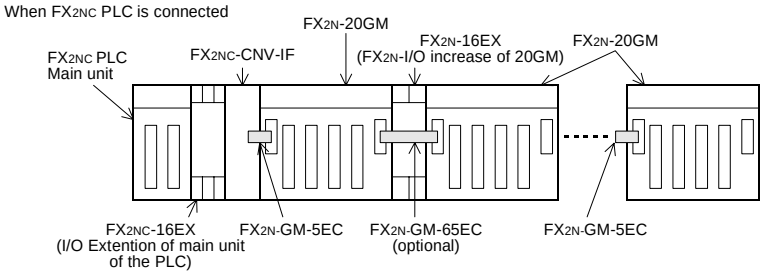
The increase point is 48 points or less. Assume the turning on rate to be 50% or less simultaneously. 48 points may be added to the system if 50% or less are used simultaneously.



1. Detach the extension cover on the right side of the FX_{2N}-20GM.
2. Insert the hooks of the extension blocks into the lock holes, and gently press the units together.
3. lower the lock to fix the units in place.
4. Attach other extension blocks in the same manner.

4.6 Connection with PLC

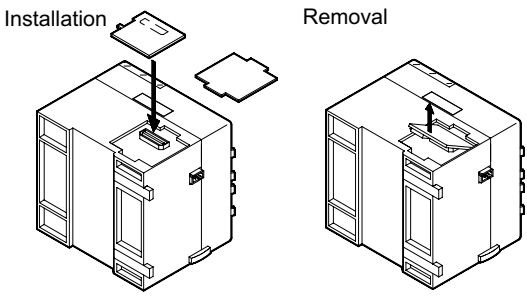
Refer to the FX2N-10GM and the FX2N-20GM HARDWARE PROGRAMMING MANUAL for details concerning the system configuration.



The FX2N-GM-5EC cable is used to connect the FX2N-20GM to an FX2N PLC. When a long 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.

4.7 Detaching the memory board

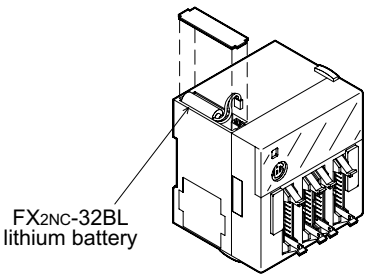
7.8k step of RAM is built into the FX_{2N}-20GM. In addition, the optional memory board (FX_{2NC}-EEPROM-16) can be used. (Program capacity is 7.8k steps)



1) Turn off the power supply to the FX_{2N}-20GM.
2) Remove the cover of the memory board.
3) Install the memory board in the connector.
4) Replace the cover before turning on the power supply.
5) When detaching the memory board, begin by carefully detaching it from the bottom side.

4.8 Procedure of battery exchange

1) The power supply of FX_{2N}-20GM is turned off.
2) Remove side cover from the FX_{2N}-20GM.
3) Remove battery from holder-disconnect and replace. (This must be carried out within 30 sec if the current data held in the FX_{2N}-20GM's RAM is to be saved.)
4) Refit battery and cover.



5. Specification

5.1 Power supply specification

Item	Contents
Power supply	24V DC -15%, +10%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	10W
Fuse	125V AC 1A

5.2 General specification

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	Two axes (two axes or two independent axes simultaneously)
Interpolation function	There is a straight line interpolation and a circular arc interpolation (two axes simultaneously).
Application PLC	Bus connection with FX_{2N} and the FX_{2NC} series PLC. The number of I/O points occuupied is 8 points. An FX_{2NC}-CNV-IF is necessary for the connection with the FX_{2NC} series PLC.
Program memory	Built-in RAM, FX_{2NC}-EEPROM-16 (optional memory board) : 7.8k steps. Memory board with clock function cannot be used.
Battery	With built-in FX_{2NC}-32BL type lithium battery. Longevity and about three years (The guaranteed term is one 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 2,147,483,647pulses
Speed instruction	200kHz max., 153,000cm/min (200kHz or less). Automatic trapezoidal pattern acceleration/deceleration (The interpolation drive is 100kHz or less).
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.

Item		Contents
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 X7. X10 to X67 can be input by using the extension block. (max I/O point: 48 points)
Control outputs		Servo system: FP (forward rotation pulse). RP (reverse rotation pulse), CLR (counter clear).
		General purpose: The main body has Y0 to Y7. Y10 to Y67 can be output by using the extension block. (max I/O point: 48 points)
Control method		Program method: The program is written in the FX_{2N}-20GM by a special programming tool, and the positioning control is done.
Program No.		O00 to O99 (two axes simultaneously), Ox00 to Ox99 and Oy00 to Oy99 (two independent axes), O100 (sub-task program)
Instruc-tion	Positioning	Cod No. system (used with instruction cods)-19 types.
	Sequence	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, SET, RST and NOP.
	Application	FNC number system-30 types.
Parameter		System setting-12 types. Positioning-27 types. I/O Control-19 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 X67, X372 to X377 Outputs:Y0 to Y67, Supplementary relay: M0 to M99 (general purpose), M100 to M511 (general purpose and battery backup area), M9000 to M9175 (special), Pointer:P0 to P255, Data register: D0 to D99 (general purpose), D100 to D3999 (general purpose and battery backup area) (16 bits), D4000 to D6999 (file register and battery backup area)*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 X00 to X07	-
	Group 4	Manual pulse generator, interruption input	-
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 ± 10% (internal power supply)	5 to 24V DC ± 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.	
Responset ime	Group 1	Approx. 3msec	Approx. 3msec
	Group 2	Approx. 0.5msec	Approx. 16μs
	Group 3	Approx. 3msec*1	-
	Group 4	Approx. 0.1ms*1	-
Turning ON rate of I/O simultaneously		50% or less	

*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	Y00 to Y07	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 ± 10%	5 to 24V DC ± 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.
Turning ON rate of I/O simultaneously	50% or less	

Guidelines for the safety of the user and protection of the FX2N-20GM 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-20GM 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-20GM 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.

Manual number : JY992D77601
Manual revision : C
Date : November 2005

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HIMEJI WORKS : 840, CHIYODA CHO, HIMEJI, JAPAN

MITSUBISHI
PROGRAMMABLE CONTROLLERS
MELSEC-F

Changes for the Better

FX2N-20GM

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1. Reference manual

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The installation, wiring and the instructions of the FX_{2N}-10GM and FX_{2N}-20GM units 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
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2. Outline of the unit

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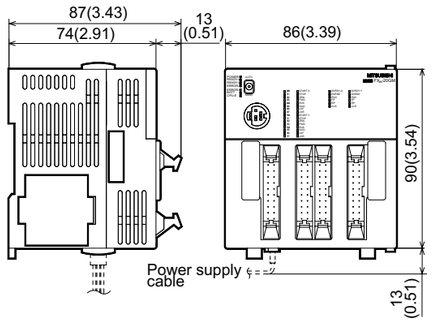
- One FX_{2N}-20GM can control 2 axes. (Linear interpolation and circular interpolation are available.)
- Both dedicated positioning language (cod instructions) and sequence language (basic instructions and application instructions) are available.
- A pulse generator can be connected to each axis or one pulse generator can be connected to both axes and switched as required. 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 FX_{2N}-20GM can be used alone. When an FX_{2N}-20GM is connected with an FX_{2N} or FX_{2NC} series Programmable controller (hereafter call PLC), reading and writing the positioning data can be done. (When FX_{2N}-20GM is connected with the FX_{2NC} series PLC, an FX_{2NC}-CNV-IF is necessary.)

3. External dimensions

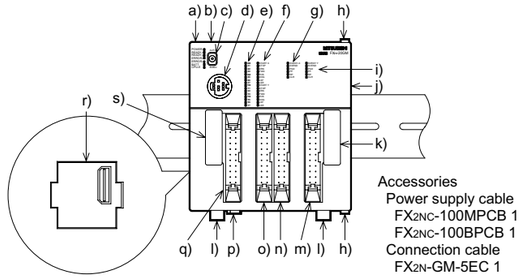


Din rail width: 35mm
Weight: approx.0.4kg
Dimensions mm(inch)

4. Product composition

4.1 Each part name

The name and description of each part of the FX_{2N}-20GM are explained below.



a) Battery
b) Operation indicator LED
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e) General-purpose I/O display
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j) Connector for FX_{2N}-20GM extension block
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m) Connector for y axis motor amplifier: CON4
n) Connector for x axis motor amplifier: CON3
o) Connector for input equipment: CON2
p) Connector for power supply
q) Connector for general-purpose I/O: CON1
r) Connector for memory board
s) Connector for PLC

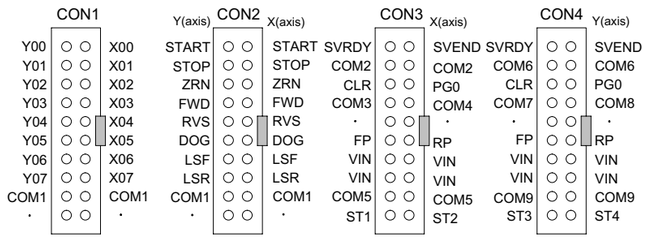
4.2 Operation display

The state of FX_{2N}-20GM 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-X	LED lights when accepting an x-axis instruction. During pulse output or when an error occurs, the LED is off.
READY-Y	LED lights when accepting a y-axis drive instruction. During pulse output or when an error occurs, the LED is off.
ERROR-X	LED is lit or blinks when an error occurs in the positioning drive of x axis.
ERROR-Y	LED is lit or blinks when an error occurs in the positioning drive of y axis.
BATT	LED lights when the buttery voltage drops. (Turn Power Supply On)
CPU-E	CPU error. Incompatible system configuration, excess noise, etc.

4.3 I/O connector

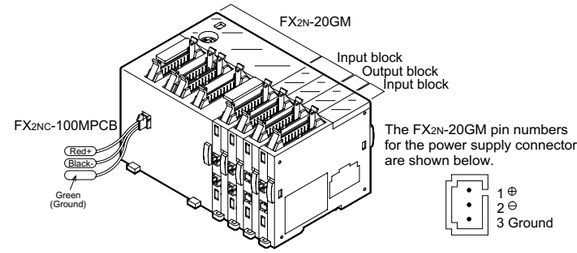
The pin array of the I/O connector is as follows.



All terminals with identical names are shorted internally (Ex. COM1-COM1, VIN-VIN, etc.).
Do not wire "•" terminals.
Refer to the FX_{2N}-10GM, FX_{2N}-20GM HARDWARE PROGRAMMING MANUAL for wiring information.

4.4 Power supply connector

The power to the FX_{2N}-20GM is supplied with the special power supply cable attached to the product. The ground of the FX_{2N}-20GM and the servo amplifier is a common ground. Refer to the FX_{2N}-10GM, FX_{2N}-20GM HARDWARE PROGRAMMING MANUAL for detailed wiring instructions.



Install a safety circuit outside of FX_{2N}-20GM so that the entire system may work safety when the external power supply fails.

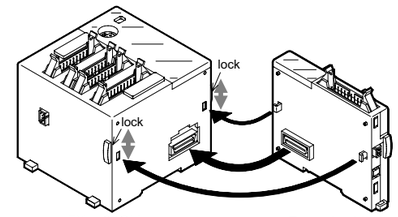
4.5 I/O extension connector

The FX_{2N}-20GM can connect the following extension block.

1) FX_{2NC} series extension block
- FX_{2NC}-16EX-DS - FX_{2NC}-16EYT-DSS - FX_{2NC}-32EX-DS - FX_{2NC}-32EYT-DSS
- FX_{2NC}-16EX-T-DS - FX_{2NC}-16EX-D/UL - FX_{2NC}-16EYT-D/UL
- FX_{2NC}-32EX-D/UL - FX_{2NC}-32EYT-D/UL

2) FX_{2N} series extension block (FX_{2NC}-CNV-IF needs to be used)
- FX_{2N}-16EX-ES/UL - FX_{2N}-16EYT-ESS/UL

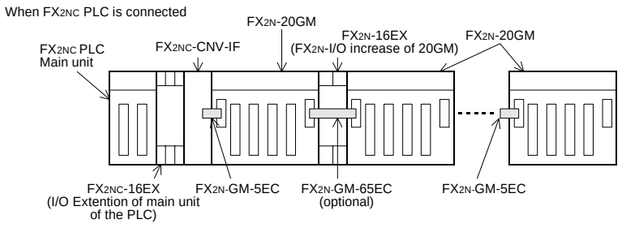
The increase point is 48 points or less. Assume the turning on rate to be 50% or less simultaneously. 48 points may be added to the system if 50% or less are used simultaneously.



1. Detach the extension cover on the right side of the FX_{2N}-20GM.
2. Insert the hooks of the extension blocks into the lock holes, and gently press the units together.
3. lower the lock to fix the units in place.
4. Attach other extension blocks in the same manner.

4.6 Connection with PLC

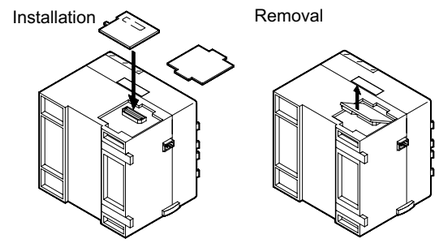
Refer to the FX_{2N}-10GM and the FX_{2N}-20GM HARDWARE PROGRAMMING MANUAL for details concerning the system configuration.



The FX_{2N}-GM-5EC cable is used to connect the FX_{2N}-20GM to an FX_{2N} PLC. When a long distance is required, one FX_{2N}-GM-65EC cable can be used per system. To connect to an FX_{2NC} PLC, the FX_{2NC}-CNV-IF must be used. Eight blocks may be connected to an FX_{2N} PLC and four blocks may be connected to an FX_{2NC} PLC.

4.7 Detaching the memory board

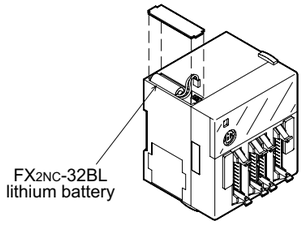
7.8k step of RAM is built into the FX_{2N}-20GM. In addition, the optional memory board (FX_{2NC}-EEPROM-16) can be used. (Program capacity is 7.8k steps)



1) Turn off the power supply to the FX_{2N}-20GM.
2) Remove the cover of the memory board.
3) Install the memory board in the connector.
4) Replace the cover before turning on the power supply.
5) When detaching the memory board, begin by carefully detaching it from the bottom side.

4.8 Procedure of battery exchange

1) The power supply of FX_{2N}-20GM is turned off.
2) Remove side cover from the FX_{2N}-20GM.
3) Remove battery from holder-disconnect and replace. (This must be carried out within 30 sec if the current data held in the FX_{2N}-20GM's RAM is to be saved.)
4) Refit battery and cover.



5. Specification

5.1 Power supply specification

Item	Contents
Power supply	24V DC -15%, +10%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	10W
Fuse	125V AC 1A

5.2 General specification

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	Two axes (two axes or two independent axes simultaneously)
Interpolation function	There is a straight line interpolation and a circular arc interpolation (two axes simultaneously).
Application PLC	Bus connection with FX_{2N} and the FX_{2NC} series PLC. The number of I/O points occuupied is 8 points. An FX_{2NC}-CNV-IF is necessary for the connection with the FX_{2NC} series PLC.
Program memory	Built-in RAM, FX_{2NC}-EEPROM-16 (optional memory board) : 7.8k steps. Memory board with clock function cannot be used.
Battery	With built-in FX_{2NC}-32BL type lithium battery. Longevity and about three years (The guaranteed term is one 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 2,147,483,647pulses
Speed instruction	200kHz max., 153,000cm/min (200kHz or less). Automatic trapezoidal pattern acceleration/deceleration (The interpolation drive is 100kHz or less).
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.

Item		Contents
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 X7. X10 to X67 can be input by using the extension block. (max I/O point: 48 points)
Control outputs		Servo system: FP (forward rotation pulse). RP (reverse rotation pulse), CLR (counter clear).
		General purpose: The main body has Y0 to Y7. Y10 to Y67 can be output by using the extension block. (max I/O point: 48 points)
Control method		Program method: The program is written in the FX_{2N}-20GM by a special programming tool, and the positioning control is done.
Program No.		O00 to O99 (two axes simultaneously), Ox00 to Ox99 and Oy00 to Oy99 (two independent axes), O100 (sub-task program)
Instruction	Positioning	Cod No. system (used with instruction cods)-19 types.
	Sequence	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, SET, RST and NOP.
	Application	FNC number system-30 types.
Parameter		System setting-12 types. Positioning-27 types. I/O Control-19 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 X67, X372 to X377 Outputs:Y0 to Y67, Supplementary relay: M0 to M99 (general purpose), M100 to M511 (general purpose and battery backup area), M9000 to M9175 (special), Pointer:P0 to P255, Data register: D0 to D99 (general purpose), D100 to D3999 (general purpose and battery backup area) (16 bits), D4000 to D6999 (file register and battery backup area)*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 X00 to X07	-
	Group 4	Manual pulse generator, interruption input	-
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 ± 10% (internal power supply)	5 to 24V DC ± 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.	
Responsetime	Group 1	Approx. 3msec	Approx. 3msec
	Group 2	Approx. 0.5msec	Approx. 16µs
	Group 3	Approx. 3msec*1	-
	Group 4	Approx. 0.1ms*1	-
Turning ON rate of I/O simultaneously		50% or less	

*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	Y00 to Y07	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 ± 10%	5 to 24V DC ± 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.
Turning ON rate of I/O simultaneously	50% or less	

Guidelines for the safety of the user and protection of the FX_{2N}-20GM 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 FX_{2N}-20GM 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 FX_{2N}-20GM 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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