



FX₂№-20GM USER'S GUIDE JY992D77601E

This manual only describes the specifications for FX_{2N}-20GM positioning controller. For complete operation, wiring, mounting and programming instructions please refer to the FX_{2N}-10GM, FX_{2N}-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.
- E-20TP OPERATION MANUAL The operation of the input of the program which uses E-20TP and the monitor and the test is explained.
- FX-PCS-VPS/WIN-E SOFTWARE MANUAL The operation program is input using the FX-PCS-VPS/WIN-E software. This manual explains the operation of the monitor and test functions.
- 4) 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) and 4) are included with the product.

2. Outline of the unit

The FX_{2N}-20GM positioning controller (hereinafter call FX_{2N}-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 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 FX2N-20GM can be used alone. When an FX2N-20GM is connected with an FX2N/FX2NC/FX3U/FX3UC series Programmable controller (hereafter call PLC), reading and writing the positioning data can be done. When connecting to an FX2NC PLC, the FX2NC-CNV-IF must be used. When connecting to an FX3UC PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V must be used.

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 FX2N-20GM
- i) y axis status display
- j) Connector for FX2N-20GM extension block
- k) Connector for PLC extension block
- I) 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.

CON1	1	Y(axis)	CON2	X(axis)		CON3	X(axis)		CON4	Y(axis)
00	X00	START	00	START	SVRDY	00	SVEND	SVRDY	00	SVEND
00	X01	STOP	00	STOP	COM2	00	COM2	COM6	00	COM6
00	X02	ZRN	00	ZRN	CLR	00	PG0	CLR	00	PG0
00	X03	FWD	00	FWD	COM3	00	COM4	COM7	00	COM8
00	X04	RVS	00	RVS	•	00	1.	•	00	1 •
0 0	X05	DOG	ool	DOG	FP	00	RP	FP	004	RP
00	X06	LSF	00	LSF	VIN	00	VIN	VIN	00	VIN
00	X07	LSR	00	LSR	VIN	00	VIN	VIN	00	VIN
00	COM1	COM1	00	COM1	COM5	00	COM5	COM9	00	COM9
00	•	•	00	•	ST1	00	ST2	ST3	00	ST4
		O X01 O X02 O X03 O X04 O X04 O X04 O X05 O X06 O X07 O COM1	∩ ○ X00 START ○ X01 STOP ○ X02 ZRN ○ X02 ZRN ○ X03 FWD ○ X04 RVS ○ X05 DOG ○ X06 LSF ○ X07 LSR ○ COM1 COM1	(axis) (axis)	Image: Construct of the construction of the	X(axis) X(axis) O X00 START O START STOP COM2 O X01 STOP O STOP COM2 O X02 ZRN O ZRN CLR O X03 FWD O FWD COM3 O X04 RVS O DOG FP O X05 DOG O DOG FP O X06 LSF O LSF VIN O X07 LSR O LSR VIN	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	V(axis) X(axis) X(axis) 0 X00 START 0 START START 0 SVEND 0 X01 STOP 0 STOP COM2 0 COM4 0 X04 RVS 0 RVS 0 0 COM4 0 0 0 0 0 0 0 0 RP 0 0 RP 0 0 RP 0 0 RP RP 0 0 RP RP 0 0 RP 0 0 0 0 0 0 0 0 0	Non-state Name Nam Name Name	Idaxis) X(axis) X(axis) X(axis) X(axis) Image: Non-Strake intermediate inte

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 FX2N-20GM is supplied with the special power supply cable attached to the product. The ground of the FX2N-20GM and the servo amplifier is a common ground. Refer to the FX2N-10GM, FX2N-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-16EX-T-DS FX2NC-16EX-D/UL
- FX2NC-32EX-DS FX2NC-32EYT-DSS - 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 FX2N-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 the PLC. When a longer distance is required, an FX2N-GM-65EC cable can be used instead. When connecting to an FX2NC PLC, the FX2NC-CNV-IF must be used. When connecting to an FX3UC PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V must be used. Eight units may be connected to an FX2N/FX3U/FX3U/FX3UC⁻¹ PLC. Four units may be connected to an FX2NC PLC.

*1 Seven units may be connected to an FX3UC-32MT-LT 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.
- Install the memory board in the connector.
- Replace the cover before turning on the power supply.
- 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 FX2N-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 FX₂N-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 +10%, -15%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	10W
Fuse	125V 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				
Vibration resistance	Frequeny 10 to 57Hz: Half 0.035mm amplitude, Frequeny 57 to 150Hz: 4.9 m/s ² Acceleration Sweep count for X,Y, Z: 10 times (80 min in each direction).				
Shock resistance	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 $5M\Omega > 500V$ DC, tested between all points, terminal and ground					
Ground	Class D grounding (100 Ω or less)				
Use atmosphere Ambient conditions to be free of corrosive gases. Dust should be minim					
Working altitude	<2000m*1				

*1 Do not use the PLC under pressure higher than the atmospheric pressure. Doing so may damage the PLC.

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).
Applicable PLC	Bus connection with FX2N/FX2NC/FX3U/FX3UC series PLC. The number of I/O points occuupied is 8 points. When connecting to an FX2NC PLC, the FX2NC-CNV-IF must be used. When connecting to an FX3UC PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V must be used.
Program memory	Built-in RAM, FX _{2NC} -EEPROM-16 (optional memory board): 7.8k steps. Memory board with clock function cannot be used.
Battery	Built-in FX2NC-32BL type lithium battery. Longevity: about three years.
Positioning unit	Command units: mm, deg, inch, pls, (relativity/absolutely) Max command value ± 999,999 (32 bits when indirectly specifying)

	Item	Contents					
Accumul address	ation	-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 retu	ırn	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.					
	position	The absolute position detection is possible with MR-J2(S), MR-H and MR-J3 ype servo motors with the ABS detection function.					
detection 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		Servo system: FP (forward rotation pulse). RP (reverse rotation pulse), CLR (counter clear).					
Control o	Julpuls	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)					
	Positioning	Cod No. system (used with instruction cods)-19 types.					
Instruc- tion	Sequence	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, SET, RST and NOP.					
	Application	FNC number system-30 types.					
	•	System setting-12 types. Positioning-27 types. I/O Control-19 types.					
Paramet	er	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-diag	Inosis	"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			
Group 1		START, STOP, ZRN, FWD, RVS, LSF, LSR	SVRDY, SVEND			
Input sig-	Group 2	DOG	PG0			
nal name	Group 3	General-purpose input X00 to X07	-			
	Group 4	Manual pulse generator, interruption input	-			
Circuit insul	ation	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 forma	at	Contact input or NPN open collector transistor input.				
Group 1		Approx. 3msec	Approx. 3msec			
Response-	Group 2	Approx. 0.5msec	Approx. 16µs			
time	Group 3	Approx. 3msec ^{*1}	-			
	Group 4	Approx. 0.1ms ^{*1}	-			

Item	Input from general-purpose equipment	Input from drive unit				
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 sup- ply	5 to 24V DC ± 10%	5 to 24V DC ± 10%		
Load current	50mA or less	20mA or less		
Open circuit leak cur- rent	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 \rightarrow ON and ON \rightarrow 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			

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

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.

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4. Product composition

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





- I) 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



FX2NC-16EX-DS

- FX2NC-16EX-T-DS

- FX2NC-32EX-D/UL

FX2N-20GM

4.6 Connection with PLC

the system configuration.



(I/O Extention of main unit of the PLC)

When a longer distance is required, an FX2N-GM-65EC cable can be used instead. When connecting to an FX2NC PLC, the FX2NC-CNV-IF must be used. When connecting to an FX3UC PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V must be used. Eight units may be connected to an FX2N/FX3U/FX3UC¹ PLC. Four units may be connected to an FX2NC PLC.

*1 Seven units may be connected to an FX3UC-32MT-LT PLC.

4.7 Detaching the memory board

16) can be used. (Program capacity is 7.8k steps)



- 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 FX2N-20GM
- i) y axis status display
- i) Connector for FX2N-20GM extension block

- 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 FX2N-20GM can be used alone.

When an FX2N-20GM is connected with an FX2N/FX3U/FX3U/FX3U/FX3U series Programmable controller (hereafter call PLC), reading and writing the positioning data can be done. When connecting to an FX2NC PLC, the FX2NC-CNV-IF must be used.

When connecting to an FX3UC PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V must be used.

External dimensions



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

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.

	CON1		Y(axis)	CON2	X(axis)		CON3	X(axis)		CON4	Y(axis)
Y00	00	X00	START	00	START	SVRDY	00	SVEND	SVRDY	00	SVEND
Y01	00	X01	STOP	00	STOP	COM2	00	COM2	COM6	00	COM6
Y02	00	X02	ZRN	00	ZRN	CLR	00	PG0	CLR	00	PG0
Y03	00	X03	FWD	00	FWD	COM3	00	COM4	COM7	00	COM8
Y04	00	X04	RVS	00	RVS	•	00	1.	•	00	1 •
Y05	ool	X05	DOG	00	DOG	FP	00	RP	FP	00	RP
Y06	00	X06	LSF	00	LSF	VIN	00	VIN	VIN	00	VIN
Y07	00	X07	LSR	00	LSR	VIN	00	VIN	VIN	00	VIN
COM1	00	COM1	COM1	00	COM1	COM5	00	COM5	COM9	00	COM9
•	00	•	•	00	·	ST1	00	ST2	ST3	00	ST4

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.







FX_{2N}-20GM **USER'S GUIDE** JY992D77601E

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

1. Reference manual

HARDWARE MANUAI

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-VPS/WIN-E SOFTWARE MANUAL
- The operation program is input using the FX-PCS-VPS/WIN-E software. This manual explains the operation of the monitor and test functions.
- 4) 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) and 4) are included with the product.

2. Outline of the unit

The FX_{2N}-20GM positioning controller (hereinafter call FX_{2N}-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.



4.2 Operation display

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.

Y00	00	X00	START	00	START	SVRDY	00	SVEND	SVRDY	00	SVEN
Y01	00	X01	STOP	00	STOP	COM2	00	COM2	COM6	00	COM
Y02	00	X02	ZRN	00	ZRN	CLR	00	PG0	CLR	00	PG0
Y03	00	X03	FWD	00	FWD	COM3	00	COM4	COM7	00	COM
Y04	00	X04	RVS	00	RVS	•	00	1.	•	00	1 · 1
Y05	o o l	X05	DOG	OOL	DOG	FP	0 0	RP	FP	0 0	RP
Y06	00	X06	LSF	00	LSF	VIN	00	VIN	VIN	00	VIN
Y07	00	X07	LSR	00	LSR	VIN	00	VIN	VIN	00	VIN
COM1	00	COM1	COM1	00	COM1	COM5	00	COM5	COM9	00	COMS
•	00	•	•	00	•	ST1	00	ST2	ST3	00	ST4
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4.4 Power supply connector

The power to the FX2N-20GM is supplied with the special power supply cable attached to the product. The ground of the FX2N-20GM and the servo amplifier is a common ground. Refer to the FX2N-10GM. FX2N-20GM HARDWARE PROGRAMMING MANUAL for detailed wiring instructions.



4.5 I/O extension connector

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

1) FX2NC series extension block

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



- 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

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

The FX2N-GM-5EC cable is used to connect the FX2N-20GM to the PLC.

7.8k step of RAM is built into the FX_{2N}-20GM. In addition, the optional memory board (FX_{2NC}-EEPROM-

- 1) Turn off the power supply to the FX_{2N}-20GM
- Remove the cover of the memory board. 2)
- 3) Install the memory board in the connector.
- Replace the cover before turning on the 4) power supply.
- 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 FX2N-20GM is turned off.
- 2) Remove side cover from the FX2N-20GM.
- 3) Remove battery from holder-disconnect and replace. (This must be carried out within 30 sec if the current data held in the FX2N-20GM's RAM is to be saved.)
- 4) Refit battery and cover.

FX2NC-32BL lithium batterv

5. Specification

5.1 Power supply specification

Item	Contents
Power supply	24V DC +10%, -15%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	10W
Fuse	125V 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
Vibration resistance	Frequeny 10 to 57Hz: Half 0.035mm amplitude, Frequeny 57 to 150Hz: 4.9 m/s ² Acceleration Sweep count for X,Y, Z: 10 times (80 min in each direction).
Shock resistance	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	$5M\Omega > 500V$ DC, tested between all points, terminal and ground
Ground	Class D grounding (100 Ω or less)
Use atmosphere	Ambient conditions to be free of corrosive gases. Dust should be minimal.
Working altitude	<2000m*1

*1 Do not use the PLC under pressure higher than the atmospheric pressure. Doing so may damage the PLC.

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).
Applicable PLC	Bus connection with FX2N/FX2NC/FX3U/FX3UC series PLC. The number of I/O points occuupied is 8 points. When connecting to an FX2NC PLC, the FX2NC-CNV-IF must be used. When connecting to an FX3UC PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V must be used.
Program memory	Built-in RAM, FX _{2NC} -EEPROM-16 (optional memory board): 7.8k steps. Memory board with clock function cannot be used.
Battery	Built-in FX2NC-32BL type lithium battery. Longevity: about three years.
Positioning unit	Command units: mm, deg, inch, pls, (relativity/absolutely) Max command value ± 999,999 (32 bits when indirectly specifying)

	ltem	Contents	
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.	
Absolute detectior	position	The absolute position detection is possible with MR-J2(S), MR-H and MR-J3 type servo motors 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)	
	Positioning	Cod No. system (used with instruction cods)-19 types.	
Instruc- tion	Sequence	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, SET, RST and NOP.	
	Application	FNC number system-30 types.	
		System setting-12 types. Positioning-27 types. I/O Control-19 types.	
Parameter		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

lte	m	Input from general-purpose equipment	Input from drive unit	
Input sig- nal 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 ir	ndication	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.		
Response- time	Group 1	Approx. 3msec	Approx. 3msec	
	Group 2	Approx. 0.5msec	Approx. 16µs	
	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	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 sup- ply	5 to 24V DC ± 10%	5 to 24V DC ± 10%
Load current	50mA or less	20mA or less
Open circuit leak cur- rent	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 \rightarrow ON and ON \rightarrow 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	

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

- distributor.

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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Input from general-purpose equipment	Input from drive unit

50% or less

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

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.

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