



FX2N-10GM

USER'S GUIDE

JY992D77701D

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 II 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.
- E-20TP-E OPERATION MANUAL The operation of the input of the program which uses E-20TP-E 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.
- 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), 3) and 4) 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-10GM can control 1 axis.
- 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/FX2NC/FX3U/FX3UC series Programmable logic controller (here after call PLC), the positioning data can be read/written. 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



4. Product composition

4.1 Each part name

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



①Operation indicator LED
②MANU/AUTO switch
③Connector for programming tool
④I/O display
⑤Connector for PLC extension block
⑥Hook for DIN rail installation
⑦Connector for motor amplifier: CON2
⑧Connector for I/O: CON1
⑨Connector for power supply
⑩Connector 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 FX_{2N} -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 " \bullet " 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}-10GM is supplied with the special power supply cable attached to the product. The ground of the FX_{2N}-10GM and the servo amplifier is a common ground. Refer to the FX_{2N}-10GM, FX_{2N}-20GM HARDWARE PROGRAMMING MANUAL for details wiring instruction.









Install a safety circuit outside of FX_{2N} -10GM so that the entire system may work safety when the external power supply fails.

4.5 Connection with PLC

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



The FX2N-GM-5EC cable is used to connect the FX2N-10GM 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/FX3UC¹ PLC. Four units may be connected to an FX2NC PLC.

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

5. Specification

5.1 Power supply specification

Item	Contents
Power supply	DC24V +10%, -15%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	5W
Fuse	125V 1A

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
Vibration resistance	Frequency 10 to 57Hz : Half 0.035mm amplitude, Frequency 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	One axis
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	3.8 K steps. Built-in EEPROM
Battery	No battery included.
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(S), MR-H and the 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 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.	
Progran	n No.	Ox00 to Ox99 (Positioning program), O100 (sub-task program)	
La alta da	Positioning	Cod No. system (used with instruction cods). 13 types.	
tion	Sequence	LD, LDI, AND, ANI, OR, ORI, ANB, ORB, SET, RST and NOP.	
	Application	FNC number system-29 types.	
		System setting-9 types. Positioning-27 types. I/O Control-18 types.	
Parame	ter	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	
	Group 1	START, STOP, ZRN, FWD, RVS, LSF, LSR	SVRDY, SVEND	
Input signal	Group 2	DOG	PG0	
name	Group 3	General-purpose input, interruption input: X0 to X3	-	
	Group 4	Manual pulse generator	-	
Circuit insulat	tion	By photocoupler	By photocoupler	
Operation ind	ication	LED is lit while input is ON	LED is lit while input is ON	
Signal voltage	Э	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 cu	rrent	1.5mA or less	0.3mA or less (PG0 0.5mA or less)	
Signal format		Contact input or NPN open collector transistor input.		
	Group 1	Approx. 3msec	Approx.3msec	
Response time	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	Y0 to Y5	FP, RP, CLR
Circuit isolation	By photocoupler	By photocoupler
Operation indi- cation	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 volt- age	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.

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

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.

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Effective Nov. 2008 Specifications are subject to change without notice



FX2N-10GM

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4. Product composition

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4.1 Each part name

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

Accessories

Power supply cable FX2NC-100MPCB 1

Connection cable FX2N-GM-5EC 1

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

4.5 Connection with PLC

system configuration.

The FX2N-GM-5EC cable is used to connect the FX2N-10GM 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/FX3UC*1 PLC. Four units may be connected to an FX2NC PLC.

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

4.2 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 FX _{2N} -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.

	CON	1		CON2	2
START	00	X0	SVRDY	00	SVEND
STOP	00	X1	COM2	00	COM2
ZRN	00	X2	CLR	00	PG0
FWD	00	X3	COM3	00	COM4
RVS	00]Y0	•	00	1.
DOG	00	Y1	FP	၀၀၂	RP
LSF	00	Y2	VIN	00	VIN
LSR	00	Y3	VIN	00	VIN
COM1	00	COM1	COM5	00	COM5
Y4	00	Y5	ST1	00	ST2

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

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Green (Ground) FX2NC-100MPCB

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



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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 II 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-E OPERATION MANUAL The operation of the input of the program which uses E-20TP-E 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 units was purchased if required.

The manuals in 2), 3) and 4) 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-10GM can control 1 axis.
- 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/FX2NC/FX3U/FX3U/FX3Uc series Programmable logic controller (here after call PLC), the positioning data can be read/written. 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 3.



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

K2N-10GM The pin number of the power supply connector of FX2N-10GM . 1 🕀 ٠ 2 🖯 . 3 Ground (Red + (Black -

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



5. Specification

.1 Power supply specification	
Item Contents	
Power supply	DC24V +10%, -15%
Allowance power failure time	The operation is continued to the momentary power failure is 5ms or less.
Power consumption	5W
Fuse	125V 1A

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
Vibration resistance	Frequency 10 to 57Hz : Half 0.035mm amplitude, Frequency 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	One axis	
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	3.8 K steps. Built-in EEPROM	
Battery	No battery included.	
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(S), MR-H and the 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 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)		
Instruc tion	Positioning	Cod No. system (used with instruction cods). 13 types.		
	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 ± 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.		
	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}	-	

*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 indi- cation	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 volt- age	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.

Guidelines for the safety of the user and protection of the FX_{2N} -10GM POSITIONING CONTROLLER

- distributor.



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}-10GM always consult a professional electrical engineer who is gualified 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

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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: November 2008

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