MITSUBISHI ELECTRIC

Programmable Controller MELSEC-F

> FX2N-10PG PULSE GENERATOR BLOCK

INSTALLATION MANUAL



Thank you for purchasing the FX2N-10PG pulse generator block for the Mitsubishi Electric programmable controllers.

This manual describes the handling of the MELSEC-F series FX2N-10PG pulse generator block.Before using the product, please read this manual and the relevant manuals carefully and develop familiarity with their specifications to bandle the reading the residue the reading the residue the residue the reading the residue the resi

relevant manuals carefully and develop familiarity with their specifications to handle the product correctly. Make sure that the end users read the manuals included with each product, and keep the manuals in a safe place for future reference. Trademarks:

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Published in August 2022 Specifications are subject to change without notice. © 2001 MITSUBISHI ELECTRIC CORPORATION

Safety Precautions (Read these precautions before use.)

Before installing, operating, maintaining, and inspecting this product, read carefully this manual and the relevant manuals and documents for the programmable controller and devices connected to the product.

Make sure that the users familianze yourself with all the device knowledge and the safety information and precautions, and then use the product correctly. This manual classifies the safety precautions into two categories: MWARNING

and ACAUTION

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

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

Further Information Manual Lists

LED name State

a)	When using the FX2N-10PG for the first time, FX2N-10PG USER'S
	MANUAL will be required.

	For the manual, please consult your local Mitsubishi representative.				
	Manual name	Manual number	Description		
FX2N-10PG User's Manual		JY992D93401	Describes specifications, wiring, installation, handling, etc. of FX2N-10PG.		
	FX2N HARDWARE MANUAL	JY992D66301	Describes contents related to hardware of FX2N series PLC such as specifications, wiring and installation.		
	FX3U Series User's Manual - Hardware Edition	JY997D16501	Describes the specification, wiring and installation of FX3U series PLC.		

Content of display

Manual name	Manual number	Description
FX2NC HARDWARE MANUAL	JY992D76401	Describes contents related to hardware of FX2NC series PLC such as specifications, wiring and installation.
FX3UC Series User's Manual - Hardware Edition	JY997D28701	Describes the specification, wiring and installation of FX3UC series PLC.
FX SERIES PROGRAMMING MANUAL II	JY992D88101	Describes instructions of FX1S/ FX1N/FX2N/FX2NC series PLC.
FX3S/FX3G/FX3GC/FX3U/ FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601	This manual explains the installations of FX3S/FX3G/ FX3GC/FX3U/FX3UC series PLC

Compliance with EC Directives (CE marking)

This manual does not guarantee that an entire machinery which equips with this product will comply with the following directives.

The manufacturer of the machinery must determine whether to declare conformity to the EMC Directive and Low Voltage Directive (LVD).For more information, please

consult your local Mitsubishi representative. Regarding the standards that the main unit complies with, please refer to the FX series

product catalog or consult your local Mitsubishi representative Requirement for Compliance with EMC Directive

The following products are compliant with the EC Directives for Electromagnetic Compatibility (2014/30/EU) through direct testing (of the specified standards below) and design analysis (through the creation of a technical construction file) when they a used by following the guidance of the appropriate documents. Attention

This product is designed for use in general industrial applications Type:Programmable Controller (Open Type Equipment) Models:FX2N series programmable controllers Manufactured from 1 June, 2001

EX2N-10PG

Electromagnetic Compatibility Standards (EMC)	Remark
EN61000-6-4: 2007 Electromagnetic compatibility -Generic emission standard Industrial environment	Compliance with all relevant aspects of the standard. (Radiated Emissions and Mains Terminal Voltage Emissions)
EN50082-2: 1995 Electromagnetic compatibility -Generic immunity standard Industrial environment	Compliance with all relevant aspects of the standard. (RF Immunity, Fast Transients, ESD, Conducted, and Power magnetic fields)
EN61131-2: 2007 ^{*1} Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. (Radiated Emissions, Conducted Emissions, Radiated electromagnetic field, Fast Transient burst, Electrostatic discharge, High- energy surge, Voltage Drops and Interruptions, Conducted RF, and Power frequency magnetic fields)
*1 The FX2N-10PG pulse generator blocks main comply with EN61131-2:2003.	nufactured before July 31 2010
Caution for EC Directives	

Installation in Enclosure

Programmable controllers are open-type devices that must be installed and used within conductive control cabinets. Please use the programmable controller while installed within a conductive shielded control cabinet. Please secure the cabinet door to the control cabinet (for conduction). Installation within a control cabinet greatly affects the safety of the system and aids in shielding noise from the programmable controlle

- Control cabinet The control cabinet must be conductive
- Ground the control cabinet with the thickest possible grounding cable To ensure that there is electric contact between the control cabinet and its
- don, connect the cabinet and its doors with thick wires. In order to suppress the leakage of radio waves, the control cabinet structure must have minimal openings. Also, wrap the cable holes with a shielding cover or when the the double structure is a structure of the shielding cover or
- other shielding devices. The gap between the control cabinet and its door must be as small as possible by

attaching EMI gaskets between them



*2 These wires are used to improve the conductivity between the door and control cabinet.

• Note for compliance with EN61131-2: 2007

- General note on the use of the power supply cable. The FX2N-10PG requires that the cable used for power supply is 30m or less. Misubishi FX2N-10PG pulses generator block (identified overleaf) has been found to be compliant to the European standards and directives when the system is installed with ferrite cores (Ex. TOKIN ESD-SR-25 or similar). The ferrite cores should be placed on the signal cabling as close (within 150mm) to the FX2N-10PG termination points as possible.
- Use the FX2N-10PG in Zone A^{*3} as defined in EN61131-2. *3 Zone defined in EN61131-2.

Separation defined in EN61131-2 for EMC LVD regulation decided

- Separation defined in EN61131-2 for EMC LVD regulation decided depending on condition in industrial setting.
 Zone C = Factory mains which are isolated from public mains by dedicated transformers.
 Zone B = Dedicated power distribution which is protected by secondary surge protection.
 (300V or less in the rated voltage is assumed.)
 Zone A = Local power distribution which is isolated from dedicated power
- Zone A = Local power distribution which is isolated from dedicated power distribution by AC/DC converters, isolation transformers, etc. (120V or less in the rated voltage is assumed.)

Compliance with UKCA marking

The requirements for compliance with UKCA marking are the same as that with EC directive (CE marking)

1. Introduction

DESIGN WARNING PRECAUTIONS To make sure the entire system operates safely even when problems such as a faulty external power supply, PLC, or FX2N-10PG occurs, provide safety circuits outside the PLC and FX2N-10PG. Otherwise, improper operation or wrong output may cause an accident. The emergency stop circuit, protective circuit, interlock circuit against machine breakage, etc. must be provided as circuits outside the PLC and FX2N-10PG. If the PLC or FX2N-10PG detects any problem using the selfdiagnosis function for the watchdog timer errors and input value errors, or if any trouble occurs in the input/output control area, etc. which cannot be detected by the PLC CPU, output control may sometimes become impossible. Be sure to design the external circuits and mechanisms to operate the machine safely in such cases. If any relay, transistor, triac, etc. in the output unit of the FX2N-10PG or PLC malfunctions, the output may sometimes be kept on or off. Design the external circuits and mechanisms to operate the machine safely regarding output signals which may lead to a serious accident.

DISPOSAL PRECAUTIONS

When disposing of the product, handle it as industrial waste.

The FX2N-10PG pulse generator block (Hereafter referred to as "FX2N-10PG" or "pulse generator block") outputs pulses of 1MHz or less. It is a special function block to drive amplifiers for serve motors or stepper motors. It is connected to an FX2N/FX2NC/FX3U/FX3UC series Programmable controller (Hereafter referred to as "PLC") and used

1.1 Features of the FX2N-10PG

- Positioning control with a stepper motor or servo motor. (1 FX2N-10PG can control 1 positioning axis.)
- Can be connected to an FX2N/FX2NC/FX3U/FX3UC series PLC. Data is read/written using FROM/TO instructions.
 Pulses at up to 1MHz can be output.

1.2 External Dimensions and Each Part Name

Dimensions: mm (inches)



a)	Extension cable and connector	MASS (Weight)
b)	Mounting hole 2-q4.5(0.18inch)	Approx. 0.2kg (0.44 lbs)
c)	Extension port	Accessory:
d)	I/O port	Special block No. label
e)	DIN rail clip	
0	A 44 1	

35mm(1.38inch) wide DIN rail

LED name	State	Content of display
	OFF	No 5V DC power from PLC main unit by way of the extension cable.
FOWER	Lit	5V DC is fed from the PLC main unit by way of the extension cable.
STADT	OFF	START input OFF.
SIANI	Lit	START input ON.
	OFF	Normal operation.
ERROR	Blinking	Error has occurred.
	Lit	CPU error
ED	OFF	Forward pulse or pulses not output.
	Blinking	Forward pulse or pulses output.
DD	OFF	Reverse pulse or direction command not output.
i Ni	Blinking or lit	Reverse pulse or direction command output.
	OFF	CLR signal idle.
CLR	Lit	CLR signal output (It completes Home position return).
DOC	OFF	DOG input OFF.
DOG	Lit	DOG input ON.
PC0	OFF	Zero point signal input OFF.
1 30	Lit	Zero point signal input ON.
m۸	OFF	A phase input of manual pulse generator OFF.
ψA	Blinking	A phase input of manual pulse generator ON.
۳B	OFF	B phase input of manual pulse generator OFF.
ψĎ	Blinking	B phase input of manual pulse generator ON.

X0,X1	OF	=F it	Interrupt input OFF. Interrupt input ON.		Trom the nost PLC. Only one extension cable can be used per system. T Because the special unit No.0 is assigned to the built-in CC-Link//LT master			
1.4 Arra I/O port	y and a	allocat	ion of pin		*2	the FX3UC- No.1. Up to 7 units	32MT-LT(-2), unit numbers assigned to special units begin with can be connected to the FX3UC-32MT-LT(-2) PLC.	
VIN+	0	VIN-	Terminal name	Content	2.1	Series name	Applicable version	
FP+ O	0	FP-		Power supply input terminal for	FX2	N series	All versions (First release).	
RP+	0	RP-	VIN+	(5 to 24V DC)	FX2	NC series	All versions (First release).	
		PG0-		Forward/reversal mode	FX3	U series	All versions (First release).	
		CLR-	FP+	Forward pulse output terminal	FX3	UC series	All versions (First release).	
		φA-		Pulse output terminal				
DOG O s/s O X0 O	0000	START S/S	RP+	 Forward/reversal mode Reversal pulse output terminal Pulse/direction mode Direction output terminal 	3. Installation		N A CAUTION	
	0	<u></u>	PG0+	Zero point signal input terminal			s ACCAUTION	
			CLR+	Output terminal to clear collecting deflection counter pulse of servo amplifier	• L 	Jse the block un to not use the un orrosive gas or	der the environmental conditions specified in the manual. nit in a location surrounded by dust, oil fumes, conductive dust, combustible gas, exposed to high temperature, condensation,	
			φΑ+	A phase input terminal of manual pulse generator	e e	wind or rain, or su electric shock, fire	wind or rain, or subject to vibration or impact. Use in such a location may cause electric shock, fire hazard, malfunction, or breakage or degradation of the proc Before installation winding a similar work he guts to gut the systematic	ubject to vibration or impact. Use in such a location may cause a e hazard, malfunction, or breakage or degradation of the produce n wiring or similar work, be sure to switch off the external power of the external power because the sure to switch off the external power and the sure to switch off the sure to switch off the external power and the sure to switch off the switch off the sure to switch off the sure to switch off the switch off th
			φB+	B phase input terminal of manual pulse generator	s tt	upply to isolate ne product.	the block. Otherwise, it may cause an electric shock or damage	
			DOG	DOG input terminal	• ٧	Vhen turning on	the power supply or operating the block after installation, wiring	
			5/5	Power supply input terminal (START,DOG,X0,X1) (24V DC)	• V	Vhen tapping a l	hole or routing a wire, prevent chips or wire chips from dropping hows of the EX2N-10PG. Such chips may cause a fire hazard o	

When tapping a hole or routing a wire, prevent chips or wire chips from dropping into the vent windows of the FX2N-10PG. Such chips may cause a fire hazard or nalfunction Securely fasten the extension cable to a specified connector. If it is poorly

connected, it will cause a malfunction

The FX2N-10PG can be connected on the right side of the FX2NC, FX3U, or FX3UC series PLC main unit, extension unit, or another exter sion bloc The FX2N-10PG is mounted either on DIN rail (DIN46277 with 35mm width) or directly with 4M screws

1 Mountin

- 4.2 Power Supply Specifications LED name display Items Specifications START, DOG, X0, X1: 24V DC +10% -10%. Consumption current PG0, ϕ A, ϕ B; 3 to 5.5V DC. Consumption current 20mA or less. ERROF VIN: 5 to 24V DC. The consumption current when the power VIN: 5 to 24V DC. The consumption current when the power supply is used 5V DC is 100mA or less. The consumption current when the power supply is used 24V DC is 70mA or less. Power from external power supply. START,DOG,X0,X1 can connect service power supply of programmable controller main unit (24+ terminal) nput igna FP Power RP supply nterna 5V DC consumption current 120mA from PLC main unit. ontrol FP, RP (Supply the power supply by the terminal of VIN. 5 to 24V DC): Have the current to 25mA or less. Output . ignal CLR: 5 to 24V DC have the consumption current to 20mA or less. CLR Power from servo amplifier or external power supply Refer to the USER'S MANUAL for the performance specification and the I/O 5. Diagnostics DOG STARTUP AND MAINTENANCE WARNING PG0 PRECAUTIONS
- Do not touch any terminal while the PLC's power is on Doing so may cause electric shock.
- Before cleaning or retightening terminals, cut off all phases of the power supply

Failure to do so may cause electric shock.

- Before modifying or disrupting the program in operation or running the PLC, carefully read through this manual and the associated manuals and ensure t safety of the operation.
- An operation error may damage the machinery or cause accidents

MAINTENANCE PRECAUTIONS

STARTUP AND

 Error occurs in FX2N-10PG. Do measures corresponding to the content after checking the content of buffer memory (BFM#37).
 Refer to Specific manual name for details of BFM#37. · Please contact a service representative. When output forward pulses and reverse pulses. OFF Dependent on PLC program, start each drive or check.
Do not output the pulse when there are stop, forward limit, and reversal limit instruction. OFF When Home position return is completed. Home position return is completed.
 Home position return, and the compulsion output of the CLR signal must be executed by programming the PLC main unit or check. OFF When a clear signal is not input with the servo amplifier. Check the output wiring. An external power supply is necessary for the terminal Lit CLR output (5 to 24V DC). At DOG input ON. OFF Check the input wiring. An external portion /er supply is necessary for the terminal DOG. (24V DC). At PG0 input ON. Check the input wiring. When NPN/PNP opening collector transistor is used, an external power supply is necessary for the terminal PG0. (5V DC). OFF At φA, φB input ON. φΑ OFF Check the input wiring. When manual pulse generator of opening collector output type is used, an external φΒ OFF power supply is necessary for the terminals ϕA , ϕB (5V DC). At X0,X1 input ON. OFF X0,X1 Check the input wiring. An external power supply is necessary for the terminal X0,X1 (24V DC).

Measures

LC.

Optional cables FX0N-65EC or FX0N-30EC can be used to extend the distance

	2.1 Applicable PLC				
	Series name	Applicable version			
FX2N series		All versions (First release).			
	FX2NC series	All versions (First release).			
	FX3U series	All versions (First release).			
	EX3LIC series	All versions (First release)			

- manual. onductive dust condensation n may cause a n of the produc
- external powe ock or damage

CLR-	Common terminal for CLR+
φΑ-	Common terminal of A phase input for manual pulse generator
φΒ-	Common terminal of B phase input for manual pulse generator
START	START input terminal
X1	Interruption input terminal

Pins (S/S) are short-circuited

Interruption input terminal

Common terminal for VIN+

Common terminal for FP+

Common terminal for RP+

ternally

2. System configuration

The FX2N-10PG connects on the right side of a PLC main unit or extension unit/ block (including special function blocks). FX2N-10PG connects by extension cable from the PLC main unit. (It is not possible to use the FX2N-10PG as a stand alone unit) FX2N-10PG is a special function block. A special function unit number 0-7 is automatically assigned from the PLC corresponding to its location on the

S/S

X0

VIN-

FP-

RP-

PG0

communication.¹¹ (Specified by FROM/TO instruction) The FX2N-10PG occupies eight points of I/O. Refer to the hardware manual of the connected main u ted main unit



 Up to 8 EX2N-10PG can be connected to an EX2N/EX3U/EX3U/C^{*2} series PI C

Up to 4 units can be connected to an FX2NC series PLC.

When connected to an FX2NC Series PLC, the FX2NC-CNV-IF is required. When connected to an FX3UC Series PLC, the FX2NC-CNV-IF or FX3UC-1PS-5V is required.

The FX2N-10PG can be DIN rail direct wall mounted

1) DIN rail mounting

- a) Align the upper side of the DIN rail mounting groove of the FX2N-10PG with
 - a DIN rail *1 (1), and push it on the DIN rail (2). See Figure 3.1.
- b) When removing the FX2N-10PG from the DIN rail, the hook for DIN rail is pulled (3), and the FX2N-10PG is removed (4). See Figure 3.1.
- Uses DIN 46277 <35mm (1.38")> *1



Direct mounting to back walls The FX2N-10PG can be mounted with M4 screws, using the direct mounting

An interval space between each unit of 1-2 mm is necessary.

4. Installation

4.1 General Specifications

Items	Specifications
Items other than the	Same as general specification of the PLC main unit.
following	(Refer to the PLC MANUAL)
Dielectric with stand	AC 500V 1 minute
voltage	(between each terminal and earth terminal)

Do not disassemble or modify the PLC

Doing so may cause fire, equipment failures, or malfunctions. For repair, contact your local Mitsubishi Electric representative

Turn off the power to the PLC before connecting or disconnecting any e

Failure to do so may cause equipment failures or malfunctions

- If there is the possibility of touching the PLC inside a control panel in maintenance, make sure to discharge to avoid the influence of static electricity.

5.1 Preliminary Checks

Check Wiring and Program of the PLC main unit when FX2N-10PG does not operate

normally. FX2N-10PG will not operate normally if the FROM/TO instruction is executed when an abnormality occurs in the PLC main unit. Correspond according to the content when an abnormality occurs in the main unit (off POWER LED and blinking ERROR LED/LI ERROR LED). (Refer to the HARDWARE WILLING MANILAL INFORCE). MANUAL, PROGRAMMING MANUAL II for PLC)

ERROR LED is lit when an operation error occurs in the PLC main unit while turned off. (The instruction where the operation error occurs is not executed.) Check the ON/OFF status of M8067 with external programming equipment, and correct

LÉD check

LE nan	D ne	State display	Measures	
POW	/ER	OFF/ Blinking	When the LED does not lit even if the power supply is supplied PLC. • Connect the extension cable between the PLC main unit and FX2N-10PG correctly. • Supply power to the PLC main unit correctly. • PLC service power supply capacity is exceeded. • Remove wiring from the terminal of the service power supply	
STA	RT	OFF	At START input ON. • Check the input wiring. An external power supply is necessary for the terminal START. (24V DC)	

「电器电子产品有害物质限制使用标识要求」的表示方式

Note: This symbol mark is for China only.

含有有害6物质的名称,含有量,含有部品 本产品中所含有的有害6物质的名称,含有量,含有部品如下表所示。 产品中有害物质的名称及含量

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	有害物质											
部件名称	铅	汞	镉	六价铬	多溴联苯	多溴 二苯醚						

		(Pb)	(Hg)	(Cd)	(Cr(VI))	(PBB)	本醚 (PBDE)		
可编程 控制器	外壳	0	0	0	0	0	0		
	印刷基板	×	0	0	0	0	0		
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本表格依据SJ/T 11364的规定编制。

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基于中国标准法的参考规格:GB/T15969.2

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- Warranty

 Exclusion of loss in opportunity and secondary loss from warranty liability

 Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

 (1) Damages caused by any cause found not to be the responsibility of Mitsubishi

 (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

 (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

 (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

A For safe use

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

MITSUBISHI ELECTRIC CORPORATION

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