JY997D49401F



PROGRAMMABLE CONTROLLERS MFI SFC-F

FX3GE SERIES PROGRAMMABLE CONTROLLERS HARDWARE MANUAI



This manual describes the part names, dimensions, mounting, and specifications of the product. Before use, read this manual and the manuals of all relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions. Store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user. Registration

- Ethernet is a trademark of Xerox Corporation
- Phillips is a registered trademark of Phillips Screw Company

The company and product names described in this manual are registered trademarks or the trademarks of their respective companies.

Effective April 2015 Specifications are subject to change without notice.

© 2013 Mitsubishi Electric Corporation

Safety Precaution (Read these precautions before use.)

This manual classifies the safety precautions into two categories: WARNING 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 medium or slight personal injury or physical damage.

Depending on the circumstances, procedures indicated by ACAUTION may also cause severe injury.

is	impor	tant	to	tollow	all	precautio	ons to	or pe	rsonal	safety	

STARTUP AND MAINTENANCE PRECAUTIONS		
 Do not touch any ter 	minal while the PI C's nower is on	

Doing so may cause electric shock or malfunctions.

- Before cleaning or retightening terminals, cut off all phases of the power supply externally. Failure to do so may cause electric shock
- This product shall be powered by a UL Listed or Recognized 24 V DC isolating source when the DC power supply type product is powered by a power supply converted from hazardous voltages
- Use the battery for memory backup correctly in FX3G Series User's Manual Hardware Edition.
- Use the battery only for the specified purpose. - Connect the battery correctly.
- Do not charge, disassemble, heat, put in fire, short-circuit, connect reversely, weld, swallow or burn the battery, or apply excessive forces (vibration, impact, drop, etc.) to the battery.
- Do not store or use the battery at high temperatures or expose to direct sunlight.
- Do not expose to water, bring near fire or touch liquid leakage or other contents directly

ID Ce NS	

- Incorrect handling of the battery may cause heat excessive generation, bursting, ignition, liquid leakage or deformation, and lead to injury, fire or failures and malfunctions of facilities and other equipment.
- Before modifying or disrupting the program in operation or running the PLC, carefully read through this manual and the associated manuals and ensure the safety of the operation

An operation error may damage the machinery or cause accidents.

STARTUP AND MAINTENANCE

PRECAUTIONS

STARTUP A MAINTENAN

PRECAUTION

- Turn off the power to the PLC before attaching or detaching the memory cassette If the memory cassette is attached or detached while the PLC's power is on, the data in the memory may be destroyed, or the memory cassette may be damaged 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 extension cable
- Failure to do so may cause equipment failures or malfunctions.
- Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause equipment failures or malfunctions.
- Peripheral devices, display module, and expansion boards - Extension units/blocks and special adapters
- Battery and memory cassette

DISPOSAL PRECAUTIONS

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.
- When disposing of batteries, separate them from other waste according to loca regulations
- (For details of the Battery Directive in EU countries, refer to FX3G Series User's Manual - Hardware Edition.

TRANSPORTATION AND /CAUTION STORAGE PRECAUTIONS

- When transporting the FX3GE Series PLC incorporating the optional battery, turn on the PLC before shipment, confirm that the battery mode is set using a parameter and the ALM LED is OFF, and check the battery life.
- If the PLC is transported with the ALM LED on or the battery exhausted, the battery-backed data may be unstable during transportation. The PLC is a precision instrument. During transportation, avoid impacts larger
- than those specified in Section 3.1. Failure to do so may cause failures in the PLC
- After transportation, verify the operations of the PLC.
- When transporting lithium batteries, follow required transportation regulations. (For details of the regulated products, refer to FX3G Series User's Manual Hardware Edition.)

Overview

- FX3GE PLC has an Ethernet communication function and analog input/output function built into a base that is EX3G PLC.
- The Ethernet communication function is equivalent to FX3U-ENET-ADP. The analog input/output function (analog input 2 channels, analog output 1 channel) is
- equivalent to FX3U-3A-ADP.

Associated manuals

How to obtain manuals For the necessary product manuals or documents, consult with your local Mitsubish Electric representative.

Associated manuals

FX3GE Series PLC (main unit) comes with this document (hardware manual). For a detailed explanation of the FX3GE Series hardware and information on instructions for PLC programming and special function unit/block, refer to the relevant documents

Specifications not described in this manual are same as FX3G PLC. For details, refer to the following manual

Manual name	Manual No.	Description
FX3G Series User's Manual - Hardware Edition	JY997D31301 MODEL CODE: 09R521	Explains FX3G Series Pl specification details for I/O, wirin installation, and maintenance.
FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming basic/applied instructions ST SFC programming and devices.
MELSEC-Q/L/F Structured Programming Manual (Fundamentals)	SH-080782 MODEL CODE: 13JW06	Programming method specifications, functions, e required to create structur programs.
FXCPU Structured Programming Manual [Device & Common]	JY997D26001 MODEL CODE: 09R925	Devices, parameters, etc. provided in structured projects GX Works2.
FXCPU Structured Programming Manual [Basic & Applied Instruction]	JY997D34701 MODEL CODE: 09R926	Sequence instructions provided structured projects of GX Works
FXCPU Structured Programming Manual [Application Functions]	JY997D34801 MODEL CODE: 09R927	Application functions provided structured projects of GX Works
FX Series User's Manual - Data Communication Edition	JY997D16901 MODEL CODE: 09R715	Explains N:N link, parallel lir computer link, no protoc communication by RS instruction FX2N-232IF.
FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition	JY997D16701 MODEL CODE: 09R619	Describes specifications for ana control and programming methor for FX3S/FX3G/FX3GC/FX3 FX3UC Series PLC.
FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Positioning Control Edition	JY997D16801 MODEL CODE: 09R620	Explains the specifications positioning control of FX3S/FX: FX3GC/FX3U/FX3UC Series a programming procedures
FX3U-ENET-ADP User's Manual	JY997D45801 MODEL CODE: 09R725	Describes FX3U-ENET-AI Ethernet communication spec adapter details.

Certification of UL, cUL standards

Please consult with Mitsubishi Electric for information on UL, cUL standard practices and the corresponding types of equipment

Compliance with EC directive (CE Marking)

This document does not guarantee that a mechanical system including this product will comply with the following standards.

Compliance to EMC directive and LVD directive of the entire mechanical system should be checked by the user/manufacturer. For more details please contact the local Mitsubishi Electric sales site.

Requirement for Compliance with EMC directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation. Attentior

- · This product is designed for use in industrial applications. Note
- · Authorized Representative in the European Community: Mitsubishi Electric Europe B.V.
- Gothaer Str. 8, 40880 Ratingen, Germany

Programmable Controller (Open Type Equipment) Type : Mo red

Models : MELSEC FX3GE	series, FX3G series, FX	3U series manufacture
from June 1st, 2005	FX3U-232ADP	FX3U-485ADP
	FX3U-4AD-ADP	FX3U-4DA-ADP
	FX3U-4AD-PT-ADP	FX3U-4AD-TC-ADP
from April 1st, 2007	FX3U-232ADP-MB	FX3U-485ADP-MB
from December 1st, 2007	FX3U-4AD-PTW-ADP	
	FX3U-4AD-PNK-ADP	
from November 1st, 2008	FX3G-232-BD	FX3G-422-BD
	FX3G-485-BD	
	FX3G-EEPROM-32L	
	FX3G-2AD-BD	FX3G-1DA-BD
	FX3G-8AV-BD	FX3G-5DM

	GE-**MR/ES
	GE-**MT/ES FX3GE-**MT/ESS
from August 1st, 2013 FX3	GE-**MR/DS FX3GE-**MT/DS
	GE-* *MT/DSS
	ere ★ ★ indicates: 24, 40 G-4EX-BD FX3G-2EYT-BD
	G-485-BD-RJ
Standard	Remark
EN61131-2:2007	Compliance with all relevant aspects of the
Programmable controllers	standard.
 Equipment requirements and 	
tests	 Radiated Emission
	Conducted Emission
	EMS
	Radiated electromagnetic field Fast transient burst
	Electrostatic discharge
	High-energy surge
	 Voltage drops and interruptions
	Conducted RF
	 Power frequency magnetic field
Models : MELSEC FX2N series	nanufactured
	N-**ER-ES/UL FX2N-**ET-ESS/UL
	ere ** indicates:32,48
	N-16EX-ES/UL FX2N-16EYR-ES/UL N-16EYT-ESS/UL
from April 1st, 1998 FX2	N-48ER-DS FX2N-48ET-DSS
	N-48ER-UA1/UL N-8ER-ES/UL FX2N-8EX-ES/UL
FX2	N-8EYR-ES/UL FX2N-8EYT-ESS/UL
from September 1st, 2010 FX2	N-8EYR-S-ES/UL
EN50082-2 from April 1st, 2002 to April 30th, 2	mpliant with EN50081-2 (EN61000-6-4) and 006 are compliant with EN50081-2 (EN61000-
6-4) and EN61131-2:1994+A11:19	96+A12:2000
6-4) and EN61131-2:1994+A11:199 after May 1st, 2006 are compliant	
after May 1st, 2006 are compliant of Standard	vith EN61131-2:2007 Remark
after May 1st, 2006 are compliant	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard Standard EN61000-6-4:2007 - Generic emission standard Industrial environment	vith EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port
after May 1st, 2006 are compliant w Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993	vith EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Low voltage AC mains port
after May 1st, 2006 are compliant of Standard Standard EN61000-6-4:2007 - Generic emission standard Industrial environment	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility	vith EN61131-2:2007
after May 1st, 2006 are compliant w Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995 Electromagnetic compatibility	Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Low voltage AC mains port Emission-Telecommunications/network port Compliance with all relevant aspects of the standard.
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995 Electromagnetic compatibility - Generic immunity standard	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995 Electromagnetic compatibility - Generic immunity standard	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995 Electromagnetic compatibility - Generic immunity standard Industrial environment	Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. RF Immunity Fast Transients ESD
after May 1st, 2006 are compliant of Standard EN61000-64:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996	Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. Compliance with all relevant aspects of the standard. Compliance with all relevant aspects of the standard. Prover magnetic fields Conducted Power magnetic fields Compliance with all relevant aspects of the standard.
after May 1st, 2006 are compliant of Standard EN61000-64:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility EN50082-2:1995 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994	Kemark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Telecommunications/network port Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. RF Immunity Fast Transients ESD Conducted Power magnetic fields Compliance with all relevant aspects of the standard.
after May 1st, 2006 are compliant of Standard EN61000-64:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000	vith EN61131-2:2007
after May 1st, 2006 are compliant of Standard EN61000-64:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers	Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. Compliance with all relevant aspects of the standard. Compliance with all relevant aspects of the standard. RF Immunity Fast Transients ESD Conducted Power magnetic fields Compliance with all relevant aspects of the standard. R Fast Transient burst Electrostatic discharge
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests	with EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Enclosure port • Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Enclosure port • Emission-Telecommunications/network port • Emission-Telecommunications/network port • Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard.
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Enclosure port • Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Compliance with all relevant aspects of the standard. • Radiated electromagnetic fields • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard.
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Telecommunications/network port • Emission-Telecommunications/network port • Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard. • Radiated Emission
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Enclosure port • Emission-Telecommunications/network port • Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard. • Radiated Emission • Radiated Emission
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Enclosure port • Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard. • Radiated Emission • Conducted Emission • Conducted Emission
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Telecommunications/network port • Emission-Telecommunications/network port • Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard. • Radiated Emission • Conducted Emission • Conducted Emission • Radiated electromagnetic field
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Ical voltage AC mains port • Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard. • RAI diated Emission • Conducted Emission • Conducted Emission • Radiated electromagnetic field
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	EN61131-2:2007 Remark Compliance with all relevant aspects of the standard. • Emission-Enclosure port • Emission-Telecommunications/network port • Emission-Telecommunications/network port • Compliance with all relevant aspects of the standard. • RF Immunity • Fast Transients • ESD • Conducted • Power magnetic fields Compliance with all relevant aspects of the standard. • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • Damped oscillatory wave Compliance with all relevant aspects of the standard. • Radiated Emission • Conducted Emission • Conducted Emission • Radiated electromagnetic field
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Elecommunications/network port Compliance with all relevant aspects of the standard. R F Immunity F ast Transients ESD Conducted Power magnetic fields Compliance with all relevant aspects of the standard. Electorstatic discharge Damped oscillatory wave Compliance with all relevant aspects of the standard. EMI Radiated Emission Conducted Emission EMI Radiated electromagnetic field F ast transient burst Electorstatic discharge
after May 1st, 2006 are compliant of Standard EN61000-6-4:2007 - Generic emission standard Industrial environment EN50081-2:1993 Electromagnetic compatibility - Generic immunity standard Industrial environment EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests EN61131-2:2007 Programmable controllers - Equipment requirements and	Remark Compliance with all relevant aspects of the standard. Emission-Enclosure port Emission-Telecommunications/network port Emission-Telecommunications/network port Compliance with all relevant aspects of the standard. RF Immunity Fast Transients ESD Compliance with all relevant aspects of the standard. Power magnetic fields Compliance with all relevant aspects of the standard. Radiated electromagnetic field Fast Transient burst Electrostatic discharge Damped oscillatory wave Compliance with all relevant aspects of the standard. Radiated electromagnetic field Fast Transient burst Electrostatic discharge Damped oscillatory wave Compliance with all relevant aspects of the standard. EMI Radiated Emission Conducted Emission EMI Radiated electromagnetic field Fast transient burst Electrostatic discharge High-energy surge

Power frequency magnetic field

FX3U-3A-ADP

from June 1st. 2009



Requirement for Compliance with LVD directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Low Voltage (2006/95/ EC) when used as directed by the appropriate documentation.

Type : Programmable Controller (Open Type Equipment) Models : MELSEC FX3GE series manufactured from March 1st, 2013 FX3GE+ * MR/ES from June 1st, 2013 FX3GE- * * MR/ES from August 1st, 2013 FX3GE- * * MR/ES from August 1st, 2013 FX3GE * * MR/DS Where ** indicates: 24, 40 Where ** indicates: 24, 40

EN61131-2:2007	The equipment has been assessed as
Programmable controllers - Equipment requirements and tests	a component for fitting in a suitable
 Equipment requirements and tests 	enclosure which meets the
	requirements of EN61131-2:2007

Models :MELSEC FX2N series manufactured

from July 1st, 1997	FX2N-* * ER-ES/UL	FX2N- * * ET-ESS/UL
	Where * * indicates:32	, 48
	FX2N-16EYR-ES/UL	
from April 1st, 1998	FX2N-48ER-DS	
from August 1st, 1998	FX2N-48ER-UA1/UL	
from August 1st, 2005	FX2N-8ER-ES/UL	FX2N-8EYR-ES/UL
from September 1st, 2010	FX2N-8EYR-S-ES/UL	

For the products above, PLCs manufactured

before March 31st, 2002 are compliant with IEC1010-1 from April 1st, 2002 to April 30th, 2006 are compliant with EN61131-2:1994+A111996+A12:2000

after May 1st, 2006 are compliant with EN61131-2:2007

Standard	Remark		
IEC1010-1:1990 /A1:1992 Safety requirements for electrical equipment for measurement, control, and laboratory use - General requirements	The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of IEC 1010-1: 1990+A1:1992		
EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests	The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of EN61131-2: 1994+A11:1996+A12:2000		
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of EN61131-2:2007		

Caution for compliance with EC Directive

Installation in Enclosure

Programmable logic controllers are open-type devices that must be installed and used within conductive control boxes. Please use the FX3GE Series programmable logic controllers while installed in conductive shielded control boxes. Please secure the control box lid to the control box (for conduction). Installation within a control box greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

Analog input/output

The analog input/output have been found to be compliant to the European standards in the aforesaid manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output devices, Mitsubishi Electric would like to make the following points.

As analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow those manufacturers' installation requirements. Mitsubishi Electric recommends that shielded cables be used. If NO other EMC protection is provided, users may experience temporary loss or accuracy between +10% /-10% in very heavy industrial areas.

However, Mitsubishi Electric suggests that adequate EMC precautions be followed for the users complete control system.

- Sensitive analog cables should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible, users should run analog cables separately.
- Good cable shielding should be used. When terminating the shield at Earth, ensure that no earth loops are accidentally created.
- When reading analog values, EMC accuracy can be improved by averaging the readings. This can be achieved either through functions on the analog products or through a user's program in the FX3GE Series PLC main unit.

Incorporated Items

	Included Items	
Main units		
FX3GE-24M□, FX3GE-40M□	Product	1 unit
	Dust proof protection sheet	1 sheet
	Manuals [English]	1 manual

1. Features and cautions on using FX3GE PLC

FX3GE PLC has an Ethernet communication function and analog input/output function built into a base that is FX3G PLC.

This section describes below differences between FX3G and FX3GE and cautions on use. For details, refer also to the FX3G Series User's Manual - Hardware Edition.

→ Refer to FX3G Series User's Manual - Hardware Edition.

1.1 Additional function from the FX3G series Ethernet communication function

The PLC has a Ethernet communication function (Equivalent to FX3U-ENET-ADP). • Analog input/output function

The PLC has analog input 2 channels, analog output 1 channel (Equivalent to FX3U-3A-ADP). Specifications differ from FX3U-3A-ADP in part. For details, refer to Chanter 6

1.2 Programming tool

GX Works2 Ver. 1.91V or later can be used. Select "FX3G" in "PLC Type". When setting "Ethernet port settings", using GX Works2 Ver.1.91V or later. FX-30P and GX Developer can also be used. However, "Ethernet port setting" cannot be set.

In the case that the version does not support FX3G, the programming tool can still be used by choosing FX1N. However, programming is enabled only in the functional range such as instructions, device ranges and program sizes available in a PLC selected as the alternative model.

1.3 Using the built-in Ethernet

When GX Works2 or MX Component is used, set the parameter settings and connection destination settings of the built-in Ethernet using the same settings as FXu=ENET-ADP.

1.4 Terminal block

The input/output terminal block of FX3GE series PLC is built-in. Terminal block cannot be removed.

1.5 System configuration

- Special adapters can be directly connected to the main unit. (It is not necessary to connect a connector conversion adapter.)
- One communication and one analog expansion option can be connected.
 Expansion is available for one expansion board and two special adapters. But the
- expansion is available for one expansion board and two special adapters. But the expansion board cannot be connected when two special adapters are connected. - 40 point I/O type cannot use the BD1 slot.
- FX3G-CNV-ADP, FX3U-ENET-ADP cannot be connected.
- The communication channel of the built-in Ethernet is CH1. When a communication expansion board or a communication special adapter is connected to the PLC, that communication channel becomes CH2.
- The built-in analog is the analog special adapter first unit. When an analog expansion board is connected, the analog expansion board becomes second unit. When an analog special adapter is connected, the analog special adapter becomes second unit.
 Please refer to the following for details.

FX3G-422-BD [Input] FX3G-4EX-BD [Output] FX3G-2EYT-BD [Analog volume] FX3G-8AV-BD Maximum one unit FX3U-4AD-ADP FX3U-4AD-PT-ADP [Analog input/output] FX3U-4DA-ADP FX3U-4AD-PTW-ADP FX3G-2AD-BD FX3U-3A-ADP FX3U-4AD-PNK-ADF FX3G-1DA-BD FX3U-4AD-TC-ADP One unit Maximum one unit 2) In the case of 24 point type FX3G-EEPROM-32L Analog Communicati FX3G-5DM (Can be connected on top of other boards.) special adar BD2 Expansion board FX3U-232ADP (-MB) [Communication] FX3G-232-BD FX3U-485ADP (-MB) EX3G-485-BD FX3G-485-BD-RJ One unit FX3G-422-BD [Input] FX3G-4EX-BD [Output] FX3G-2EYT-BD [Analog volume] FX3G-8AV-BD Maximum one unit FX3U-4AD-ADP FX3U-4AD-PT-ADP [Analog input/output] FX3U-4DA-ADP FX3U-4AD-PTW-ADP EX3G-2AD-BD FX3U-4AD-PNK-ADF FX3U-3A-ADP FX3G-1DA-BD EX3U-4AD-TC-ADP One unit Maximum one unit

1) In the case of 40 point type

Communicatio

special adapte

Cannot use

BD1 slot

FX3U-232ADP (-MB)

FX3U-485ADP (-MB)

One unit

Analog

FX3G-EEPROM-32L

(Can be connected on top of other boards.)

BD2

Expansion board

[Communication]

FX3G-485-BD-RJ

FX3G-232-BD FX3G-485-BD

EX3G-5DM

2. Outline 2.1 Part names For the input/output extension units/blocks, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition. [12] [1] [2] [5] ~00**0**00 ෙරර්ර [16] [15] [14] [13] [10] [5] [11] No Name [1] Peripheral device connector cover [2] Terminal names [3] Top cover (S) (40points type only) [4] Top cover [5] Terminal block covers [6] Input display LEDs (red) Extension device connector cover [7] Operation status display LEDs POW Green On while power is on the PLC. RUN Green On while the PLC is running. [8] Red Flashing when a program error occurs. FRR Red Lit when a CPU error occurs Lit when the battery voltage drops. ALM Red (When the optional battery is used) [9] Output display LEDs (red) [10] Model name (abbreviation) [11] DIN rail mounting hooks [12] Analog input terminal block Analog output terminal block [13] [14] 10BASE-T/100BASE-TX connector (RJ45) [15] Ethernet status LEDs [16] Special adapter connector cover With terminal cover open [1] [2] [3] [4] [6] [7] BH ොටර්ර්ම [12] [5] [11] [10] No Name [1] Peripheral device connector (USB) [2] Peripheral device connector (RS-422) [3] RUN/STOP switch Variable analog potentiometers [4] Upper side : VR1, Lower side : VR2 [5] Terminal cover [6] Optional equipment connector [7] Power supply terminal, Input (X) terminals [8] Battery connector

Jume] JD

[11]

[12]

 Battery connector

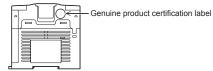
 [9]
 Battery holder

 [10]
 Power supply terminal, Output (Y) terminals

Optional equipment connecting screw holes

Special adapter connector

Right side



The authentication label for authorized products is affixed to the right side of the product to avoid to be forged. Products that do not have the genuine product certification label or nameplate are

not covered by the warranty.

2.2 LED status

PLC part			
LED display	LED color	Status	Description
POW	POW Green		Power is on
FOW Green		OFF	Power is off
RUN Green	ON	Running	
RUN	Green	OFF	Stopped
	ON	When a CPU error occurs.	
ERR	Red	Flicker	When a program error occurs.
		OFF	When a normal status.
ALM Red	ON	When the battery voltage drops. (When the optional battery is installed.)	
ALIVI Reu		OFF	When the battery voltage normal status. (When the optional battery is installed.)
Built-in E	thernet p	art	
LED display	LED color	Status	Description
100M	Green	ON	100Mbps communication
100101	Oreen	OFF	10Mbps communication or not connected
SD/RD	Green	ON	Data being sent or received.
SDIND	Oreen	OFF	Data is not sent or received.
		ON	Setting errors, hardware errors, etc.
ERR	Red	Flicker	Communication errors
		OFF	Setting normal, communication normal
		ON	TCP/IP: 1 or more connections are established. UDP: 1 or more connections are open.
OPEN	Green		

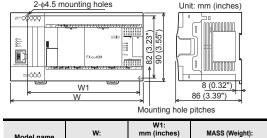
UDP: All connections are closed

OFF

2.3 External dimensions and weight

For the input/output extension units/blocks, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

2-64.5 mounting holes



Model name	w: mm (inches)	Direct mounting hole pitches	kg (lbs)
FX3GE-24M□	130 (5.12")	105 (4.13")	Approx. 0.60 (1.32lbs)
FX3GE-40M□	175 (6.89")	150 (5.90")	Approx. 0.80 (1.76lbs)
Installation			

35-mm-wide DIN rail or Direct (screw) mounting (M4)

3. Installation (general specifications)

As for installation of the input/output extension units/blocks, special adapters and expansion boards, refer to the following manual.

→ Refer to FX3G Series User's Manual - Hardware Edition.

-		CAUTION
	 Use the product within the gene section 3.1 of this manual. 	ric environment specifications described in
-		excessive dust, oily smoke, conductive dusts, SO2 or NO2), flammable gas, vibration or
-	impacts, or expose it to high temper	ature, condensation, or rain and wind. nditions, electric shock, fire, malfunctions,
-	deterioration or damage may occur.	
_	· Do not touch the conductive parts of	f the product directly.
	Doing so may cause device failures	or malfunctions.
-	Install the product securely using a	DIN rail or mounting screws.
_	 Install the product on a flat surface. 	

If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.

- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits.
- Failure to do so may cause fire, equipment failures or malfunctions. Be sure to remove the dust proof sheet from the PLC's ventilation port when installation work is completed.
- Failure to do so may cause fire, equipment failures or malfunctions.
- Connect the extension cables, peripheral device cables, input/output cables and battery connecting cable securely to their designated connectors. Loose connections may cause malfunctions.
- Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause device failures or malfunctions.
- Peripheral devices, display modules, and Extension units/blocks - Expansion boards, special adapters, battery and memory cassette

Notes

- When a dust proof sheet is supplied with units, keep the sheet applied to the ventilation slits during installation and wiring work
- To prevent temperature rise, do not install the PLC on a floor, a ceiling or a vertical surface.
- Install it horizontally on a wall as shown in section 3.2.
- Keep a space of 50mm (1.97") or more between the unit main body and another device or structure (part A). Install the unit as far away as possible from highvoltage lines, high-voltage devices and power equipment.

WIRING PRECAUTIONS WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work.
- Failure to do so may cause electric shock or damage to the product.

3.1 Generic specifications

ltem	Specification				
Ambient temperature	0 to 55°C (32 to 131°F) when operating and -25 to 75°C (-13 to 167°F) when stored				
Ambient humidity	5 to 95%RH (no condensation) when operating				
		Frequency (Hz)	Accele- ration (m/s ²)	Half amplitude (mm)	Sweep Count
Vibration	When installed	10 to 57	-	0.035	for X, Y, Z: 10 times
resistance*1	on DIN rail	57 to 150	4.9	-	(80 min in each
	When installed	10 to 57	-	0.075	direction)
	directly	57 to 150	9.8	-	
Shock resistance ^{*1}	147m/s^2 Acceleration, Action time: 11ms, 3 times by half-sine pulse in each direction X, Y, and Z				
Noise resistance	By noise simulator at noise voltage of 1,000Vp-p, noise width of $1\mu s,$ rise time of 1ns and period of 30 to 100Hz			ise width of $1\mu s$,	
Dielectric	1.5kV AC for one	ie minute			
withstand voltage ^{*2}	500V AC for one	terminal			
Insulation resistance ^{*2}	5MΩ or more b megger				
Grounding	Class D grounding (grounding resistance: 100Ω or less) <common a="" allowed.="" electrical="" grounding="" heavy="" is="" not="" system="" with="">^{*3}</common>				
Working atmosphere	Free from corrosive or flammable gas and excessive conductive dusts				
Working altitude	<2000m ^{*4}				

*1 The criterion is shown in IEC61131-2.

*2 Dielectric withstand voltage and insulation resistance are shown in the following table.

Terminal Dielectric strength		Insulation resistance
Main units, Input/output exter	nsion units/blocks	
Between power supply terminal (AC power) and ground terminal	1.5kV AC for one minute	
Between power supply terminal (DC power) and ground terminal	500V AC for one	
Between input terminal (24V DC) and ground terminal	minute	
Between input terminal (100V AC) and ground terminal ^{*5}	1.5kV AC for one	5MΩ or more by
Between output terminal (relay) and ground terminal	minute	500V DC megger
Between output terminal (transistor) and ground terminal	500V AC for one minute	
Between output terminal (triac) and ground terminal ^{*5}	1.5kV AC for one minute	
10BASE-T/100BASE-TX connector and ground terminal	500V AC for one minute	
Main unit analog terminal and ground terminal	Not allowed	Not allowed
Expansion boards, Special ad	dapters, Special function	blocks
Between terminal of expansion board (except FX3G-4EX-BD and FX3G-2EYT-BD) and ground terminal	Not allowed	Not allowed
Between FX3G-4EX-BD input terminal (24V DC) and ground terminal		
Between FX3G-2EYT-BD output terminal (transistor) and ground terminal	500V AC for one minute	5MΩ or more by 500V DC megger
Between terminal of special adapter and ground terminal		

Terminal	Dielectric strength	Insulation resistance
Special function block	Each manual	

For dielectric with stand voltage test and insulation resistance test of each product, refer to the following manual.

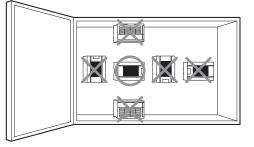
→ Refer to FX3G Series User's Manual - Hardware Edition. *3 For common grounding, refer to section 4.3.

- *4 The PLC cannot be used at a pressure higher than the atmospheric pressure to avoid damage.
- *5 Input/output extension units/blocks only

3.2 Installation location

Install the PLC in an environment conforming to the generic specifications (section 3.1), installation precautions and notes. For more details, refer to FX3G Series User's Manual - Hardware Edition,

Installation location in enclosure

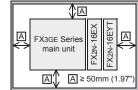


Space in enclosure

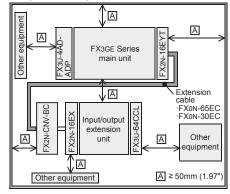
Extension devices can be connected on the left and right sides of the main unit of the PLC

If you intend to add extension devices in the future, keep necessary spaces on the left and right sides.





Configuration in 2 stages with extension cable





3.2.1 Affixing The Dust Proof Sheet

The dust proof sheet should be affixed to the ventilation port before beginning the installation and wiring work.

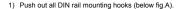
→ For the affixing procedure, refer to the instructions on the dust proof sheet. Be sure to remove the dust proof sheet when the installation and wiring work is completed.

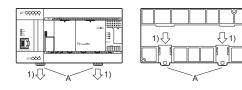
3.3 Procedures for installing to and detaching from DIN rail

The products can be installed on a DIN46277 rail [35mm (1.38") wide]. This section explains the installations of the main units. For the input/output extension units/blocks and special adapters. refer to the following manual

→ Refer to FX3G Series User's Manual - Hardware Edition

3.3.1 Installation

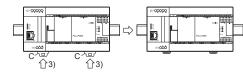




2) Fit the upper edge of the DIN rail mounting groove (right fig.B) onto the DIN rail



3) Lock the DIN rail mounting hooks (below fig.C) while pressing the PLC against the DIN rail.



3.4 Procedures for installing directly (with M4 screws)

The product can be installed directly on the panel (with screws). This section explains the installation of the main units. As for the details of the installation/detaching for input/output extension units/

blocks and special adapters, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

3.4.1 Mounting hole pitches

Refer to the external dimensions (section 2.3) for the product's mounting hole pitch information

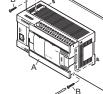
As for the details of the mounting hole pitches for extension unit/block and special adapters, refer to the following manual.

→ Refer to FX3G Series User's Manual - Hardware Edition.

3.4.2 Installation

1) Make mounting holes in the mounting surface referring to the external dimensions diagram.

2) Fit the main unit (A in the right figure) based on the holes, and secure it with M4 screws (B in the right figure). The mounting hole pitches and number of screws depend on the product. Refer to the external dimensions diagram (Section 2.3).



4. Power supply/input/output specifications and external wiring example of the main unit part

As for the details of the power supply wiring and input/output wiring, refer to the following manual.

→ Refer to FX3G Series User's Manual - Hardware Edition.

DESIGN PRECAUTIONS

- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure Otherwise, malfunctions may cause serious accidents
- 1) Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
- 2) Note that when the PLC CPU detects an error, such as a watchdog timer error during self-diagnosis all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled
 - External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
- 3) Note that when an error occurs in a relay, triac or transistor output device, the output could be held either on or off.
- For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

DESIGN PRECAUTIONS

Do not bundle the control line together with or lay it close to the main circuit or power line. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or power line

Noise may cause malfunctions.

Install module so that excessive force will not be applied to the built-in programming connectors, power connectors or I/O connectors. Failure to do so may result in wire damage/breakage or PLC failure.

Notes

- Simultaneously turn on and off the power supplies of the main unit and extension devices
- Even if the AC power supply causes an instantaneous power failure for less than 10 ms, the PLC can continue to operate.
- Even if the DC power supply causes an instantaneous power failure for less than 5 ms, the PLC can continue to operate.
- If a long-time power failure or an abnormal voltage drop occurs, the PLC stops and output is turned off. When the power supply is restored, it will automaticall restart (when the RUN input is on)

WIRING PRECAUTIONS

Make sure to cut off all phases of the power supply externally before attempting installation or wiring work

Failure to do so may cause electric shock or damage to the product.

WIRING PRECAUTIONS **ACAUTION**

- Connect the AC power supply to the dedicated terminals specified in this manual If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the PLC will burn out.
- Do not wire vacant terminals externally.
- Doing so may damage the product.
- Perform class D grounding (grounding resistance: 100Ω or less) to the grounding terminal on the EX3GE Series main unit with a wire 2 mm² or thicker Do not use common grounding with heavy electrical systems (refer to section 4.3).
- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits
- Failure to do so may cause fire, equipment failures or malfunctions
- Make sure to properly wire to the terminal in accordance with the following precautions
- Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product. - The disposal size of the cable end should follow the dimensions described in
- the manual.
- Tightening torque should follow the specifications in the manual.
- Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.

Notes Input/output wiring 50 to 100m (164'1" to 328'1") long will cause almost no problems of noise, but, generally, the wiring length should be less than 20m (65'7") to ensure the safety Extension cables are easily affected by noise. Lay the cables at a distance of at

least 30 to 50mm (1.19" to 1.97") away from the PLC output and other powe lines

4.1 Wiring

This section explains the wiring of the terminal type. For the connectors types, refer to the following manual.

→ Refer to FX3G Series User's Manual - Hardware Edition. 4.1.1 Cable end treatment and tightening torque

For the terminals of FX3GE series PLC, M3 screws are used.

The electric wire ends should be treated as shown below

Tighten the screws to a torgue of 0.5 to 0.8 Nom. Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

 When one wire is connected to one term
--

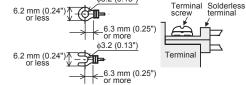


<Reference

or less

Terminal Manufacturer	Type No.	Certification	Pressure Bonding Tool
JAPAN SOLDERLESS	FV1.25-B3A	UL Listed	YA-1(JST)
TERMINAL MFG CO LTD (JST)	FV2-MS3	OL LISIEU	TA-1(331)

· When two wires are connected to one terminal



<Reference>

Terminal Manufacturer	Type No.	Certification	Pressure Bonding Tool
JAPAN SOLDERLESS TERMINAL MFG CO LTD (JST)	FV1.25-B3A	UL Listed	YA-1(JST)

4.2 Power supply specifications and example of external wiring

As for the details of the power supply specifications and example of external wiring, refer to the following manual,

→ Refer to FX3G Series User's Manual - Hardware Edition. 4.2.1 Power supply specifications[Main unit]

		Specification		
Item		AC power type	DC power type	
Supply voltage		100 to 240V AC	24V DC	
Allowable supply v	oltage range	85 to 264V AC	20.4 to 28.8V DC	
Rated frequency		50/60Hz	-	
Allowable instantaneous power failure time		Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less.	Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.	
Power fuse	FX3GE-24M	250V 1A	125V 2.5A	
r ower ruse	FX3GE-40M	250V 3.15A	125V 3.15A	
Rush current		30A max. 5ms or less/100V AC 50A max. 5ms or less/200V AC	30A max. 1ms or less/24 V DC	
Power	FX3GE-24M	32W	21W	
consumption ^{*1}	FX3GE-40M	37W	25W	
24V DC service power supply		400mA	-	

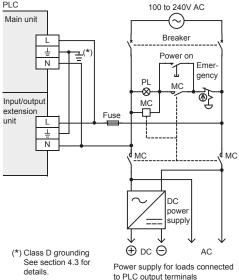
*1 This item shows values when all 24V DC service power supplies are used in the maximum configuration connectable to the main unit. (The DC power type main unit does not have a 24V DC service power supply.)

Power (current) consumption of the input/output extension units/blocks. → Refer to FX3G Series User's Manual - Hardware Edition.

Power consumption of the special function blocks. → Refer to the respective manual.

4.2.2 Example of external wiring (AC power type)

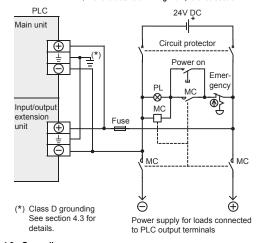
100 to 240V AC power is supplied to the main unit and input/output extension unit. → For the details of wiring work, refer to section 4.1.





4.2.3 Example of external wiring (DC power type)

24V DC power is supplied to the main unit and input/output extension unit. \rightarrow For the details of wiring work, refer to section 4.1.



4.3 Grounding

Ground the PLC as stated below.

- Perform class D grounding. (Grounding resistance: 100Ω or less)
- Ground the PLC independently if possible.
- If it cannot be grounded independently, ground it jointly as shown below.



- Independent grounding (Best condition) Shared grounding (Good condition) (Not allowed)
- Use ground wires thicker than AWG14 (2mm²).
- Position the grounding point as close to the PLC as possible to decrease the length of the ground wire.

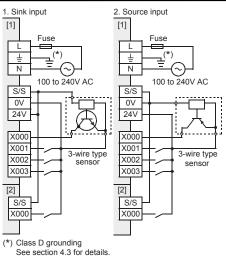
4.4 Input specifications and external wiring

As for the details of the input specifications of I/O extension unit/block and external wiring, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition. 4.4.1 Input specifications [24V DC input type]

Item		Specification	
Number of input	FX3GE-24M	14 points (16 points)*1	
points	FX3GE-40MD	24 points	
Input connecting type		Terminal block (M3 screw)	
Input form		Sink/Source	
Input signal voltage	AC power type	24V DC +10%, -10%	
input signal voltage	DC power type	20.4 to 28.8V DC	
Input impedance	X000 to X007	3.3kΩ	
input impedance	X010 or more	4.3kΩ	
Input signal current	X000 to X007	7mA/24V DC	
input signal current	X010 or more	5mA/24V DC	
ON input sensitivity	X000 to X007	4.5mA or more	
current	X010 or more	3.5mA or more	
OFF input sensitivity c	urrent	1.5mA or less	
Input response time		Approx. 10ms	
Input signal form	Sink input	No-voltage contact input NPN open collector transistor	
input signal 10111	Source input	No-voltage contact input PNP open collector transistor	
Input circuit insulation	•	Photocoupler insulation	
Input operation display		LED on panel lights when photocoupler is driven.	

*1 Each value inside () indicates the number of occupied points.

4.4.2 Examples of input wiring [AC power type]

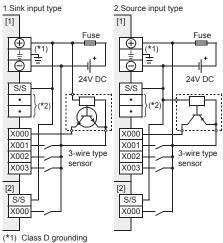


[1]:Main unit, Input/output extension unit (Common to both sink and source inputs)

[2]:Input/output extension block

(Common to both sink and source inputs)

4.4.3 Examples of input wiring [DC power type]



See section 4.3 for details.

(*2) Do not connect the [•] terminals with others, since they are not available.

[1]:Main unit, Input/output extension unit (Common to both sink and source inputs)

[2]:Input/output extension block

(Common to both sink and source inputs)

4.4.4 Instructions for connecting input devices

As for the details of Instructions for connecting input devices, refer to the following manual.

→ Refer to FX3G Series User's Manual - Hardware Edition.

 In the case of no-voltage contact:

The input current of this PLC is 5 to 7mA/24V DC. Use input devices applicable to this minute current.

If no-voltage contacts (switches) for large current are used, contact failure may occur.

 In the case of input device with built-in series diode: The voltage drop of the series diode should be approx. 4V or less. When lead switches with a series LED are used, up to two switches can be connected in series.

Also make sure that the input current is over the input-sensing level while the switches are ON.

 In the case of input device with built-in parallel resistance: Use a device with a parallel resistance of 15kΩ or more. When the resistance is less than 15kΩ, connect a bleeder

resistance.In the case of 2-wire proximity switch:

Use a two-wire proximity switch whose leakage current is 1.5mA or less when the switch is off.

When the current is larger than 1.5mA, connect a bleeder resistance.

4.5 Relay output specifications and example of external wiring

As for the details of the relay output specifications of I/O extension unit/block and external wiring, refer to the following manual. → Refer to FX30 Series User's Manual - Hardware Edition.

4.5.1 Relay output specifications

Item		Specification
		10 points (16 points)*1
output points	FX3GE-40MR	16 points
Output conne	ecting type	Terminal block (M3 screw)
Output form		Relay
External power supply		30V DC or less 240V AC or less ^{*2}
Resistance load		2A/point ^{*3}
Max. Iodu	Inductive load	80VA
Min. load		5V DC, 2mA (reference value)
Open circuit	leakage current	-
Response time OFF→ON ON→OFF Approx. 10ms		Approx. 10ms
Circuit insula	ition	Mechanical insulation
Display of output operation		LED lights when power is applied to relay coil

*1 Each value inside () indicates the number of occupied points.

- *2 Between 250V and 240V CE, UL, and cUL are not compliant.
- *3 The total load current of resistance loads per common terminal should be the following value or less.
 - 1 output point/common terminal : 2A
 - 4 output points/common terminal : 8A
- As for the number of outputs per common terminal, refer to "Section 4.8 interpretation of partition" and the following manual.

→ Refer to FX3G Series User's Manual - Hardware Edition.

4.5.2 Life of relay output contact

The product life of relay contacts considerably varies depending on the load type used. Take care that loads generating reverse electromotive force or rush current may cause poor contact or deposition of contacts which may lead to considerable reduction of the contact product life.

Inductive load

Inductive loads generate large reverse electromotive force between contacts at shutdown may cause arcing. At a fixed current consumption, as the power factor (phase between current and voltage) gets smaller, the arc energy gets larger.

The standard life of the contact used for Inductive loads, such as contactors and solenoid valves, is 500 thousand operations at 20VA. The following table shows the approximate life of the relay based on the

results of our operation life test.

Test condition. T sec. ON / T sec. OFF.			
Load capacity		Contact life	
20VA 0.2A/100V AC		3 million times	
20VA	0.1A/200V AC	5 minior times	
35VA	0.35A/100V AC	1 million times	
JOVA	0.17A/200V AC	1 minior arres	
80VA	0.8A/100V AC	2 hundred thousand times	
0074	0.4A/200V AC	2 nundred thousand times	

The product life of relay contacts becomes considerably shorter than the above conditions when the rush overcurrent is shut down. → For countermeasures while using inductive loads,

refer to Subsection 4.5.4.

Some types of inductive loads generate rush current 5 to 15 times the stationary current at activation. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load.

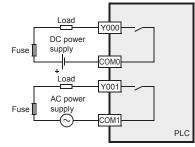
2) Lamp load

Lamp loads generally generate rush current 10 to 15 times the stationary current. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load

Capacitive load

Capacitive loads can generate rush current 20 to 40 times the stationary current. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load. Capacitive loads such as capacitors may be present in electronic circuit loads including inverters

- → For the maximum specified resistance load, refer to Subsection 4.5.1.
- 4.5.3 Example of relay output wiring



4.5.4 Cautions in external wiring

For attention in the external wiring, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

Protection circuit for load short-circuiting When a load connected to the output terminal short-circuits, the printed circuit board may be burnt out. Fit a protective fuse on the output circuit.

Protection circuit of contact when inductive load is used An internal protection circuit for the relays is not provided for the relay output circuit in this product. It is recommended to use inductive loads with built-in

protection circuits. When using loads without built-in protection circuits, insert an external contact protection circuit, etc. to reduce noise and extend the product life. DC circuit

Connect a diode in parallel with the load. Use a diode (for commutation) having the following specifications.

()	5 5 I
Item	Standard
Reverse voltage	5 to 10 times the load voltage
Forward current	Load current or more

2) AC circuit

Connect the surge absorber (combined CR components such as a surge killer and spark killer, etc.) parallel to the load. Select the rated voltage of the surge absorber suitable to the output used

Item	Standard	
Electrostatic capacity	Approx. 0.1µF	
Resistance value	Approx. 100 to 200Ω	

Interlock

Loads, such as contactors for normal and reverse rotations, that must not be turned on simultaneously should have an interlock in the PLC program and an external interlock

Common mode

Use output contacts of the PLC in the common mode.

Refer to the table below for other specifications

4.6 Transistor output specifications and example of external wiring

As for the details of the transistor output specifications of I/O extension unit/block and external wiring, refer to the following manual, → Refer to FX3G Series User's Manual - Hardware Edition.

4.6.1 Transistor output specifications

Item			Specification		
Number of	FX3GE-24MTD FX3GE-40MTD			10 points (16 points)*1	
output points				16 points	
Output con	necting	l type		Terminal block (M3 screw)	
Output	FX3GE	-OMT/OS		Transistor (Sink)	
form	FX3GE		s	Transistor (Source)	
External po	wer su	pply		5 to 30V DC	
Max. load	Resist	ance load		0.5A/point ^{*2}	
Wax. IOau	Induct	ive load		12W/24V DC*3	
Min. load				-	
Open circu	uit leakage current			0.1mA or less/30V DC	
ON voltage	ON voltage			1.5V or less	
		FX3GE- 24MTロ	Y000, Y001	5µs or less/10mA or more (5 to 24V DC)	
	OFF → ON		Y002 or more	0.2ms or less/200mA or more (at 24V DC)	
Response		FX3GE- 40MTロ	Y000 to Y002	5µs or less/10mA or more (5 to 24V DC)	
			Y003 or more	0.2ms or less/200mA or more (at 24V DC)	
time		FX3GE-	Y000, Y001	5µs or less/10mA or more (5 to 24V DC)	
	ON	24MT	Y002 or more	0.2ms or less/200mA or more (at 24V DC)	
	→ OFF	FX3GE- 40MTロ	Y000 to Y002	5µs or less/10mA or more (5 to 24V DC)	
			Y003 or more	0.2ms or less/200mA or more (at 24V DC)	
Circuit insu	lation			Photocoupler insulation	
Display of output operation				LED on panel lights when photocoupler is driven.	

*1 Each value inside () indicates the number of occupied points.

*2 The total load current of resistance loads per common terminal should be the following value or less.

- 1 output point/common terminal : 0.5A

- 4 output points/common terminal : 0.8A

As for the number of outputs per common terminal, refer to "Section 4.8

interpretation of partition" and the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

*3 The total of inductive loads per common terminal should be the following value or less

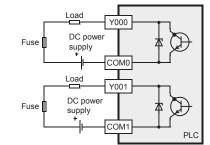
- 1 output point/common terminal : 12W/24V DC
- 4 output points/common terminal : 19.2W/24V DC

As for the number of outputs per common terminal, refer to "Section 4.8 interpretation of partition" and the following manual

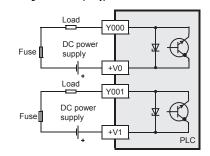
→ Refer to FX3G Series User's Manual - Hardware Edition.

4.6.2 External wiring of transistor output

1. External Wiring of Sink Output Type



2. External Wiring of Source Output Type



4.6.3 Cautions in external wiring

As for the details of Instructions for connecting input devices, refer to the following

→ Refer to FX3G Series User's Manual - Hardware Edition.

Protection circuit for load short-circuits A short-circuit at a load connected to an output terminal could cause burnout at the output element or the PCB. To prevent this a protection fuse should be inserted at the

Use a load power supply capacity that is at least 2 times larger than the total rated fuse

Contact protection circuit for inductive loads

When an inductive load is connected, connect a diode (for commutation) in parallel with the load as necessary The diode (for commutation) must comply with the following specifications.

Item	Guide
Reverse voltage	5 to 10 times of the load voltage
Forward current	Load current or more

Interlock

Loads, such as contactors for normal and reverse rotations, that must not be turned on simultaneously should have an interlock in the PLC program and an external interlock.

4.7 Triac output specifications of I/O extension unit/block

As for the details of the triac output specifications and external wiring, refer to the following manual

→ Refer to FX3G Series User's Manual - Hardware Edition

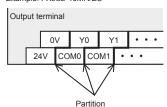
4.8 Terminal block layouts

For details on the terminal block layout, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

Interpretation of partition

The partition of the output terminals (see following figure) indicates the range of the output connected to the same common.

Example: FX3GE-40MR/ES



5. Built-in Ethernet specifications and wiring

As for the details of the specifications and wiring, refer to the following manual. → Refer to FX3U-ENET-ADP User's Manual.

DESIGN PRECAUTIONS

- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure
- Otherwise, malfunctions may cause serious accidents.
- 1) Above all, the following components should be included; an emergency stop circuit, a protection circuit, aninterlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
- 2) Note that when the PLC main unit detects an error during self diagnosis, such as a watchdog timer error, all outputs are turned off. Also, when an error that cannot be detected by the PLC main unit occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such cases.

DESIGN PRECAUTIONS **ACAUTION**

Observe the following items. Failure to do so may cause incorrect data writing through noise to the PLC and result in PLC failure, machine damage or other accident

- 1) Do not bundle the control line together with or lay it close to the main circuit or power line. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or power line. Noise may cause malfunctions
- 2) Ground the shield wire or shield of a shielded cable. Do not use common grounding with heavy electrical systems.

STARTUP AND MAINTENANCE PRECAUTIONS

WARNING

- Do not touch any terminals or connector while the PLC's power is on. Doing so may cause electrical shock or malfunctions
- Before cleaning or retightening screws, externally cut off all phases of the nower supply.
- Failure to do so may cause malfunction or failure of this adapter. When the screws are tightened insufficiently, they may fall out and cause a shortcircuit or malfunction. When tightened too much, the screws or the adapter may be damaged, resulting in short-circuit, or malfunction.
- When controlling the PLC (especially when changing data, the program or
- changing the operating conditions) during operation, ensure that it is safe t do so

STARTUP AND MAINTENANCE PRECAUTIONS

- · Do not disassemble or modify this product.
- Doing so may cause fire, equipment failures, or malfunctions. For repair, contact your local Mitsubishi Electric representative.
- The adapter case is made of resin. If dropped or subjected to strong impact the adapter may be damaged.
- When this adapter is installed or removed from the panel, make sure to externally cut off all phases of the power supply. Failure to do so may cause malfunction or failure of this adapter.

manual output capacity

WIRING PRECAUTIONS

Make sure to cut off all phases of the power supply externally before attempting wiring work Failure to do so may cause electric shock or damage to the product

WIRING PRECAUTIONS **ACAUTION**

- When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions.
- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
- Do not bundle the main circuit line together with or lay it close to the main circuit high-voltage line or load line Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.

5.1 Specification

5.1.1 Communication specification

Item	Specification			
	Data transmission speed	100Mbps/10Mbps		
Transmission	Communication method	Full-duplex/Half-duplex		
specifications	Transmission method	Base band		
	Maximum segment length	100m (328'1")		

5.1.2 Performance specification

Item	Specification
	MELSOFT connections
	Communication Using MC Protocol
	MELSOFT Direct Connection (Simple Connection)
Functions	Find CPU function
	Time setting function ^{*1}
	Diagnostics function from MELSOFT
	Data monitoring function
Number of simultaneously open connections allowed	MELSOFT connection + MC protocol + Data monitoring <= 4

*1 The time setting function (SNTP client) is enabled only after the trigger condition is established

Caution

FX3U-ENET-ADP cannot be connected to the FX3GE Series PLC.

5.2 Wiring

5.2.1 Connecting to the network

The following explains how to connect the built-in Ethernet to 10BASE-T/ 100BASE-TX networks.

Pay close attention to safety and use the built-in Ethernet properly.

- 1) Sufficient network knowledge and safety precautions are required when installing 10BASE-T or 100BASE-TX networks. Consult a specialist when connecting cable terminals or installing trunk line cables, etc.
- 2) Use a connection cable conforming to the standards shown in Subsection 5.2.2

Cautions regarding powering the hub, PLC and Ethernet simultaneously

On some hubs, for a fixed period of time immediately after powering up, even if packets are sent from the Ethernet device, there are cases when packets are not sent to the external device. In this case, create a sequence program that waits a sufficient amount of time after powering up before sending packets.

5.2.2 Applicable cable and connector

- 1) Connector RJ45 type modular jack
- 2) Pin Configuration

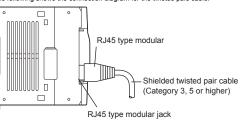
The pin sequence of the 10BASE-T/100BASE-TX connection connector (RJ45 type modular jack) of the built-in Ethernet is as follows:

	Pin No.	Signal	Direction	Contents
	1	TD+	Out	+ side of sending data
1	2	TD-	Out	- side of sending data
	3	RD+	In	+ side of receiving data
	4	Not used	-	
	5	Not used	-	
	6	RD-	In	- side of receiving data
	7	Not used	-	
	8	Not used	-	

	Cable conforming to Ethernet standard practice: Category 3 or higher (STP cable)
100BASE-TX	Cable conforming to Ethernet standard practice: Category 5 or higher (STP cable)

A straight cable is used. A cross cable can also be used when using direct connection (simple connection) between the personal computer and the FX3GE Series PLC

This section explains how to connect the built-in Ethernet to the 10BASE-T. 100BASE-



<Operating procedure>

- (Step 1) Connect the twisted pair cable to the hub.
- (Step 2) Connect the twisted pair cable to the built-in Ethernet.
- 1) The built-in Ethernet detects whether it is 10BASE-T or 100BASE-TX, and in fullduplex or half-duplex transmission mode automatically according to the hub. (Auto detection function)
- For connection to a hub without the auto detection function, set the half-duplex mode on the hub side
- 2) For 10BASE-T or 100BASE-TX connection required devices and a sample system configuration, refer to FX3U-ENET-ADP User's Manual.

6. Built-in analog specifications and wiring

As for the details of the specifications and wiring, refer to the following manual → Refer to FX3S/FX3G/FX3G/FX3U/FX3UC Series User's Manual

- Analog Control Edition. STARTUP AND

MAINTENANCE PRECAUTIONS · Do not disassemble or modify the PLC.

Doing so may cause fire, equipment failures, or malfunctions.

- For repair, contact your local Mitsubishi Electric representative.
- Do not drop the product or exert strong impact to it. Doing so may cause damage.

WIRING PRECAUTIONS WARNING

Make sure to cut off all phases of the power supply externally before attempting wiring work

Failure to do so may cause electric shock or damage to the product

WIRING PRECAUTIONS

- When drilling screw holes or wiring, make sure cutting or wire debris does not enter the ventilation slits
- Failure to do so may cause fire, equipment failures or malfunctions. Make sure to observe the following precautions in order to prevent any damage to

the machinery or accidents due to abnormal data written to the PLC under the influence of noise:

- 1) Do not bundle the power line or shield of the analog input/output cable together with or lay it close to the maincircuit, high-voltage line, or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit, high-voltage line, or load line.
- 2) Ground the shield of the analog input/output cable at one point on the signal receiving side.

However, do not use common grounding with heavy electrical systems. Make sure to properly wire to the terminal block (European type) in accordance with the following precautions.

Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.

The disposal size of the cable end should follow the dimensions described in the manual

- Tightening torque should follow the specifications in the manual.
- Twist the end of strand wire and make sure that there are no loose wires. - Do not solder-plate the electric wire ends.
- Do not connect more than the specified number of wires or electric wires of
- unspecified size
- Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed

6.1 Analog input terminal block (European type)

- 1) Wire size
- Wiring to analog device should use 22-20 AWG wire. 2) Applicable cable

Wiro sizo Item Single wire 0.3 to 0.5mm² (AWG22 to 20)

0.3mm² (AWG22) × 2

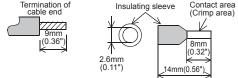
Double wire

Termination Strip the coating of strand wire and twist the cable core before connecting it, or strip the coating of single wire before connecting it. An alternative connection is to use a ferrule with insulating sleeve.

Manufacturer	Model	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6 ^{*1} (or CRIMPFOX 6T-F ^{*2})

- *1 Old model name: CRIMPFOX ZA 3
- *2 Old model name: CRIMPFOX UD 6

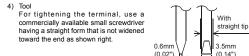
 Stranded wire/solid wire · Bar terminal with insulating sleeve



When using a stick terminal with an insulating sleeve, choose a wire with proper cable sheath referring to the above outside dimensions, otherwise the wire cannot be inserted easily.

Tighten the screws to a torque of 0.22 to 0.25 N·m. Do not tighten terminal screws exceeding with a torque outside the abovementioned range.

Failure to do so may cause equipment failures or malfunctions.



Note:

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the table above, use the following screwdriver or appropriate replacement (grip diameter : approximately 25mm (0.98")).

Manufacturer	Model names
Phoenix Contact Co., Ltd.	SZS 0.6×3.5

5.2.3 Connecting to the 10BASE-T/100BASE-TX network

TX network

The following shows the connection diagram for the twisted paid cable.

)	Applicable cable	

3

6.2 Input/output specifications and external wiring

As for the details of the analog input/output specifications, refer to the following manual

→ Refer to FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual

- Analog Control Edition.

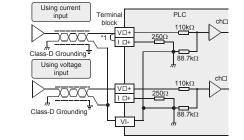
ltem	Specifications			
item	Voltage input	Current input		
Analog input range	0 to 10V DC (Input resistance: 198.7kΩ)	4 to 20mA DC (Input resistance: 250Ω)		
Absolute maximum input	-0.5V, +15V	-2mA, +30mA		
Resolution	2.5mV(10V/4000)	5µA(16mA/3200)		
Overall accuracy	 ±0.5% (±50mV) for 10V full scale (when ambient temperature is 25 ± 5°C) ±1.0% (±100mV) for 10V full scale (when ambient temperature is 0 to 55°C) 	 ±0.5% (±80μA) for 16mA full scale (when ambient temperature is 25 ± 5°C) ±1.0% (±160μA) for 16mA full scale (when ambient temperature is 0 to 55°C) 		
Input characteristics	4080 4000 100 100 100 100 100 100 1	3280 3200 Ugi tan a difference of the second sec		

Analog output performance specifications

ltem	Specifi	cations
item	Voltage output	Current output
Analog output range	0 to 10V DC (External load: 2k to 1MΩ)	4 to 20mA DC (External load: 500Ω or less)
Resolution	2.5mV(10V/4000)	4µA(16mA/4000)
Overall accuracy	 ±0.5% (±50mV) for 10V full scale (when ambient temperature is 25 ±5°C) ±1.0% (±100mV) for 10V full scale (when ambient temperature is 0 to 55°C) Shipment adjustment is carried out by external load resistance 2kΩ. If external load resistance becomes larger than 2kΩ, the output voltage will increase slightly. When the load is 1MΩ, the output voltage becomes about 2% higher than the correct value. 	 ±0.5% (±80µA) for 16mA full scale (when ambient temperature is 25 ± 5°C) ±1.0% (±160µA) for 16mA full scale (when ambient temperature is 0 to 55°C)
Output characteristics	0 to 4000 are adjusted to 0 to 10V when the external load resistance is 2KΩ. 10V Analog 0 ut 0 Digital input Caution: A narea of dead band is located in the region of 0V. Therefore the output analog value may not represent the digital value accurately.	0 to 4000 are adjusted to 4 to 20mA when the external load resistance is 250Ω.

Common Specifications of Analog Input and Output

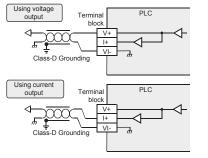
Item	Specification
Digital input and output	12 bits, binary
Conversion time	$90\mu s$ for each selected input channel + $50\mu s$ for each selected output channel (The data will be updated at every scan of the PLC.)
Insulation method	No insulation between each channel or the PLC.
Occupied points	0 point (This number is not related to the maximum number of input and output points of the PLC.)
6.2.1 Example of an	alog input



V□+, I□+, ch □: □represents the channel number.

*1 Make sure to short-circuit the 'V□+' and 'I□+' terminals when current is input. (: input channel number)

3.2.2 Example of analog output



Cautions in wiring

- Use 2-core shielded twisted pair cable for the analog output lines, and separate the analog output lines from other power lines or inductive lines.
- The grounding resistance should be 100Ω or less.

6.3 List of Special Devices

The built-in analog occupies the 1st device assignment.

Special	Device number	Description	R/W
device	1st	· ·	
	M8280	Switches the input mode of channel 1 OFF: Voltage input ON: Current input	R/W
	M8281	Switches the input mode of channel 2 OFF: Voltage input ON: Current input	R/W
	M8282	Switches the output mode OFF: Voltage output ON: Current output	R/W
	M8283 to M8285	Unused (Do not use.)	-
Special auxiliary relay	M8286	Sets the cancel of output holding function. OFF: Holds the analog data output just before stop of the PLC. ON : Outputs the offset data at stop of the PLC.	R/W
	M8287	Sets whether or not input channel 1 is used. OFF: Channel is used. ON: Channel is not used.	R/W
	M8288	Sets whether or not input channel 2 is used. OFF: Channel is used. ON: Channel is not used.	R/M
	M8289	Sets whether or not output channel is used. OFF: Channel is used. ON: Channel is not used.	R/M
	D8280	Channel-1 input data	R
	D8281	Channel-2 input data	R
	D8282	Output setting data	R/W
	D8283	Unused (Do not use.)	-
	D8284	Averaging time for channel-1 (Setting range: 1 to 4095)	R/W
	D8285	Averaging time for channel-2 (Setting range: 1 to 4095)	R/W
Special	D8286	Upused (Do not use)	
data register	D8287	Unused (Do not use.)	-
10919161	D8288	Error status b0: Channel-1 over-scale detection b1: Channel-2 over-scale detection b2: Output data setting error b3: Unused b4: EEPROM error b5: Averaging time setting error b6: Hardware error b7: Communication data error b8 to b15: Unused	R/W
	D8289	Model code = 51	R

As for the details of the special devices, refer to following manual. → Refer to FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition.

> 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.

Warranty

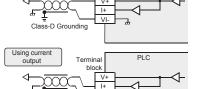
Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties

🕂 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 product fails, install appropriate backup or failsafe functions in the system.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN



			STARTUP AND MAINTENANCE	
PROGRAMMA	MITSL ELEC		 bursting, ignition, lic failures and malfund Before modifying or carefully read through safety of the operation 	f the battery may cause heat excessive generation, juid leakage or deformation, and lead to injury, fire or ctions of facilities and other equipment. disrupting the program in operation or running the PLC this manual and the associated manuals and ensure th
MELSEC-F			STARTUP AND MAINTENANCE	
PROGRA	FX3GE S			he PLC before attaching or detaching the memory cassett e is attached or detached while the PLC's power is on, th
FX.	HARD 3GE	Manual Number JY997D49401 Revision F Date April 2015	 data in the memory may Do not disassemble on Doing so may cause fi For repair, contact you Turn off the power to cable. Failure to do so may contact you Turn off the power to to Failure to do so may contact you Peripheral devices, 	ay be destroyed, or the memory cassette may be damage: r modify the PLC. irre, equipment failures, or malfunctions. Irrocal Mitsubishi Electric representative. the PLC before connecting or disconnecting any extension cause equipment failures or malfunctions. he PLC before attaching or detaching the following device cause equipment failures or malfunctions. display module, and expansion boards cks and special adapters
sure to learn all the pro	oduct information, s	ndling and operating the product. Make afety information, and precautions. it can be taken out and read whenever	DISPOSAL PRECAUTIO	
necessary. Always fon Registration Ethernet is a trademar Phillips is a registered The company and p trademarks or the trad	ward it to the end us rk of Xerox Corporat trademark of Phillip product names des	ser. ion. s Screw Company. cribed in this manual are registered	environmentally safe r When disposing of ba regulations.	certified electronic waste disposal company for th ecycling and disposal of your device. Itteries, separate them from other waste according to loc- tery Directive in EU countries, refer to FX3G Series User dition.)
Effective April 2015 Specifications are sub	ject to change witho	ut notice. © 2013 Mitsubishi Electric Corporation	TRANSPORTATION AN STORAGE PRECAUTIO	
	The safety precaution	precautions before use.) ons into two categories: prrect handling may cause hazardous ig in death or severe injury.	on the PLC before s parameter and the AL If the PLC is transpo battery-backed data m • The PLC is a precision	FX3GE Series PLC incorporating the optional battery, tur shipment, confirm that the battery mode is set using M LED is OFF, and check the battery life. red with the ALM LED on or the battery exhausted, th ay be unstable during transportation. avoid impacts large in Section 3.1. Failure to do so may cause failures in th
CAUTION	Indicates that inco conditions, resultin or physical damag	orrect handling may cause hazardous ng in medium or slight personal injury e.	PLC.After transportation, veWhen transporting lith	erify the operations of the PLC. ium batteries, follow required transportation regulations. gulated products, refer to FX3G Series User's Manual
Depending on the circ cause severe injury. t is important to follow		ures indicated by <u>ACAUTION</u> may also personal safety.		
STARTUP AND MAINTENANCE	Λw	ARNING	Overview	
RECAUTIONS			FX3GE PLC has an Etherr built into a base that is FX	net communication function and analog input/output function
 Before cleaning of supply externally. 	ise electric shock or or retightening term	malfunctions. inals, cut off all phases of the power		ion function is equivalent to FX3U-ENET-ADP. Inction (analog input 2 channels, analog output 1 channel)
 Doing so may cau Before cleaning of supply externally. Failure to do so m This product shal isolating source v 	use electric shock or or retightening term hay cause electric sh Il be powered by a when the DC power	malfunctions. inals, cut off all phases of the power lock. a UL Listed or Recognized 24 V DC supply type product is powered by a	The analog input/output fu	ion function is equivalent to FX3U-ENET-ADP. Inction (analog input 2 channels, analog output 1 channel) P.
 Doing so may cau Before cleaning of supply externally. Failure to do so m This product shal isolating source w power supply com Use the battery for 	ise electric shock or or retightening term hay cause electric sh ll be powered by a when the DC power verted from hazardo r memory backup co	malfunctions. inals, cut off all phases of the power lock. a UL Listed or Recognized 24 V DC supply type product is powered by a	The analog input/output fu equivalent to FX3U-3A-AD	ion function is equivalent to FX3U-ENET-ADP. Inction (analog input 2 channels, analog output 1 channel) P.
Doing so may cau Before cleaning of supply externally. Failure to do so m This product shal isolating source v power supply com Use the battery for Hardware Edition.	se electric shock or or retightening term hay cause electric sh Il be powered by a when the DC power verted from hazardo r memory backup co only for the specifie	malfunctions. inals, cut off all phases of the power lock. a UL Listed or Recognized 24 V DC supply type product is powered by a us voltages. orrectly in FX3G Series User's Manual -	The analog input/output fu equivalent to FX3U-3A-AD Associated manuals How to obtain manuals	ion function is equivalent to FX3U-ENET-ADP. Inction (analog input 2 channels, analog output 1 channel P.

Requirement for Compliance with LVD directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Low Voltage (2006/95/ EC) when used as directed by the appropriate documentation

Programmable Controller (Open Type Equipment) Type :

Models : MELSEC FX3GE series manufactured from March 1st, 2013 FX3GE- * * MR/ES from June 1st, 2013 FX3GE- * * MT/ES FX3GE- * * MT/ESS from August 1st, 2013 FX3GE-**MR/DS Where ** indicates 24.40 Standar

EN61131-2:2007 Programmable contro - Equipment require	ollers ments and tests	The equipme a componen enclosure requirements	nt has bee t for fittin which of EN611	en assesse g in a suit meets 31-2:2007	ed as able the
Models :MELSEC FX2N from July 1st, 1997	series manufact FX2N-* * ER-E		2N- * * ET	ſ-ESS/UL	

	Where * * indicates:32	, 48
	FX2N-16EYR-ES/UL	
from April 1st, 1998	FX2N-48ER-DS	
from August 1st, 1998	FX2N-48ER-UA1/UL	
from August 1st, 2005	FX2N-8ER-ES/UL	FX2N-8EYR-ES/UL
from September 1st, 2010	FX2N-8EYR-S-ES/UL	

For the products above, PLCs manufactured before March 31st. 2002 are compliant with I before N

For the products above, PLCs manufactured		
before March 31st, 2002 are compliant with IEC1010-1		
from April 1st, 2002 to April 30th, 2006 are compliant	with	EN61131-
2:1994+A11:1996+A12:2000		
after May 1st, 2006 are compliant with EN61131-2:2007		

Standard	Remark
IEC1010-1:1990 /A1:1992 Safety requirements for electrical equipment for measurement, control, and laboratory use - General requirements	The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of IEC 1010-1: 1990+A1:1992
EN61131-2:1994 /A11:1996 /A12:2000 Programmable controllers - Equipment requirements and tests	The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of EN61131-2: 1994+A11:1996+A12:2000
EN61131-2:2007 Programmable controllers - Equipment requirements and tests	The equipment has been assessed as a component for fitting in a suitable enclosure which meets the requirements of EN61131-2:2007

 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 extension cable. Failure to do so may cause equipment failures or malfunctions. Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause equipment failures or malfunctions. Peripheral devices, display module, and expansion boards Extension units/blocks and special adapters Battery and memory cassette
 Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device. When disposing of batteries, separate them from other waste according to local regulations. (For details of the Battery Directive in EU countries, refer to FX3G Series User's Manual - Hardware Edition.)
 When transporting the FX3GE Series PLC incorporating the optional battery, turn on the PLC before shipment, confirm that the battery mode is set using a parameter and the ALM LED is OFF, and check the battery life. If the PLC is transported with the ALM LED on or the battery exhausted, the battery-backed data may be unstable during transportation. The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in Section 3.1. Failure to do so may cause failures in the PLC. After transportation, verify the operations of the PLC. When transporting lithium batteries, follow required transportation regulations. (For details of the regulated products, refer to FX3G Series User's Manual - Hardware Edition.)
Overview
FX3GE PLC has an Ethernet communication function and analog input/output function built into a base that is FX3G PLC. The Ethernet communication function is equivalent to FX3U-ENET-ADP. The analog input/output function (analog input 2 channels, analog output 1 channel) is equivalent to FX3U-3A-ADP.
Associated manuals
How to obtain manuals For the necessary product manuals or documents, consult with your local Mitsubishi Electric representative.
Associated manuals FX3GE Series PLC (main unit) comes with this document (hardware manual). For a detailed explanation of the FX3GE Series hardware and information on instructions for PLC programming and special function unit/block, refer to the relevant documents. Specifications not described in this manual are same as FX3G PLC. For details, refer to the following manual

Manual name	Manual No.	Description	from March 1st, 20 from June 1st, 20
FX3G Series User's Manual Hardware Edition	JY997D31301 MODEL CODE: 09R521	Explains FX3G Series PLC specification details for I/O, wiring, installation, and maintenance.	from August 1st, 2
FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601 MODEL CODE: 09R517	Describes PLC programming for basic/applied instructions STL/ SFC programming and devices.	EN61131-2:2007
MELSEC-Q/L/F Structured Programming Manual (Fundamentals)	SH-080782 MODEL CODE: 13JW06	Programming methods, specifications, functions, etc. required to create structured programs.	Programmable - Equipment r tests
FXCPU Structured Programming Manual [Device & Common]	JY997D26001 MODEL CODE: 09R925	Devices, parameters, etc. provided in structured projects of GX Works2.	
FXCPU Structured Programming Manual [Basic & Applied Instruction]	JY997D34701 MODEL CODE: 09R926	Sequence instructions provided in structured projects of GX Works2.	
FXCPU Structured Programming Manual [Application Functions]	JY997D34801 MODEL CODE: 09R927	Application functions provided in structured projects of GX Works2.	
FX Series User's Manual - Data Communication Edition	JY997D16901 MODEL CODE: 09R715	Explains N:N link, parallel link, computer link, no protocol communication by RS instructions/ FX2N-232IF.	Models : MELSE from July 1st, 199
FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Analog Control Edition	JY997D16701 MODEL CODE: 09R619	Describes specifications for analog control and programming methods for FX3S/FX3G/FX3GC/FX3U/ FX3UC Series PLC.	from April 1st, 199 from August 1st, 1 from August 1st, 2
FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - Positioning Control Edition	JY997D16801 MODEL CODE: 09R620	Explains the specifications for positioning control of FX3S/FX3G/ FX3GC/FX3U/FX3UC Series and programming procedures	from September 1st, For the products a before March 31: EN50082-2
FX3U-ENET-ADP User's Manual	JY997D45801 MODEL CODE: 09R725	Describes FX3U-ENET-ADP Ethernet communication special adapter details.	from April 1st, 200 6-4) and EN61131 after May 1st, 200
			Stan
Certification of UL, cUL Please consult with Mitsubishi E and the corresponding types of e	Electric for informa	ation on UL, cUL standard practices	EN61000-6-4:200 - Generic em Industrial er EN50081-2:1993 Electromagne
Compliance with EC dire	ective (CE Ma	arking)	EN50082-2:1995
comply with the following standa Compliance to EMC directive an	rds. d LVD directive of	cal system including this product will the entire mechanical system should e details please contact the local	 Electromagnet Generic imm Industrial en

itsubishi Electi les site **Requirement for Compliance with EMC directive**

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation. Attention

This product is designed for use in industrial applications.

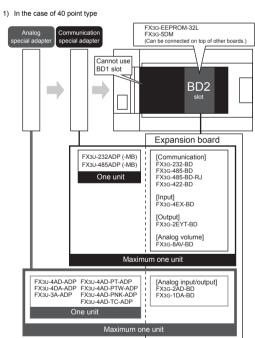
- Note
- Authorized Representative in the European Community: Mitsubishi Electric Europe B.V.
 Gothaer Str. 8, 40880 Ratingen, Germany

••	Controller (Open Type E series, FX3G series, FX	quipment) 3U series manufactured
from June 1st, 2005	FX3U-232ADP FX3U-4AD-ADP FX3U-4AD-PT-ADP	FX3U-485ADP FX3U-4DA-ADP FX3U-4AD-TC-ADP
from April 1st, 2007 from December 1st, 2007	FX3U-232ADP-MB FX3U-4AD-PTW-ADP FX3U-4AD-PNK-ADP	FX3U-485ADP-MB
from November 1st, 2008	FX3G-232-BD FX3G-485-BD FX3G-EEPROM-32L	FX3G-422-BD
	FX3G-2AD-BD FX3G-8AV-BD	FX3G-1DA-BD FX3G-5DM

from March 1st, 2013 from June 1st, 2013	FX3GE	E-★★MR/ES E-★★MT/ES	FX3GE- * * MT/ESS
from August 1st, 2013		E-★★MR/DS E-★★MT/DSS	FX3GE-**MT/DS
from September 1st, 2013	FX3G-	e * * indicates: 2 4EX-BD 485-BD-RJ	24, 40 FX3G-2EYT-BD
Standard			Remark
EN61131-2:2007 Programmable controllers - Equipment requiremen tests		Compliance with standard. EMI • Radiated Em • Conducted E EMS	
		 High-energy 	surge s and interruptions
		 Power freque 	ency magnetic field
from July 1st, 1997 from April 1st, 1998 from August 1st, 1998 from August 1st, 2005 from September 1st, 2010	Where FX2N- FX2N- FX2N- FX2N- FX2N- FX2N-	* * ER-ES/UL * * indicates:3 16EXT-ES/UL 16EYT-ESS/UL 48ER-DS 48ER-DS 48ER-UA1/UL 8ER-ES/UL 8EYR-ES/UL 8EYR-S-ES/UL	12,48 FX2N-16EYR-ES/UL FX2N-48ET-DSS FX2N-8EX-ES/UL FX2N-8EYT-ESS/UL
For the products above, PLC before March 31st, 2002 a EN50082-2 from April 1st, 2002 to April 3	re com 80th, 200	pliant with EN5 06 are compliant	
For the products above, PLC before March 31st, 2002 a EN50082-2 from April 1st, 2002 to April 3 6-4) and EN61131-2:1994+A after May 1st, 2006 are comp	re com 80th, 200 11:1996	pliant with EN5 06 are compliant +A12:2000	with EN50081-2 (EN61000
For the products above, PLC before March 31st, 2002 a EN50082-2 from April 1st, 2002 to April 3 6-4) and EN61131-2:1994+A after May 1st, 2006 are comp Standard	re com 80th, 200 11:1996	pliant with EN5 06 are compliant +A12:2000 h EN61131-2:20	with EN50081-2 (EN61000 07 Remark
For the products above, PLC before March 31st, 2002 a EN50082-2 from April 1st, 2002 to April 3 6-4) and EN61131-2:1994+A after May 1st, 2006 are comp	dard	pliant with EN5 06 are compliant +A12:2000 h EN61131-2:20 Compliance with standard. • Emission-En • Emission-Lo	with EN50081-2 (EN61000 07 Remark h all relevant aspects of the
For the products above, PLC before March 31st, 2002 a EN50082-2 from April 1st, 2002 to April 3 6-4) and EN61131-2:1994+A after May 1st, 2006 are comp Standard EN61000-6-4:2007 - Generic emission stant Industrial environment EN50081-2:1993	officiency of the second secon	pliant with EN5 6 are compliant +A12:2000 h EN61131-2:20 Compliance with standard. • Emission-En • Emission-Lo • Emission-Tel port	with EN50081-2 (EN61000 07 Remark h all relevant aspects of the closure port w voltage AC mains port lecommunications/network h all relevant aspects of the r nts
For the products above, PLC before March 31st, 2002 a EN50082-2 from April 1st, 2002 to April 3 6-4) and EN61131-2:1994+A after May 1st, 2006 are comp Standard EN61000-6-4:2007 - Generic emission stand Industrial environment EN60081-2:1993 Electromagnetic compatit EN50082-2:1995 Electromagnetic compatit - Generic immunity stand	and the second s	pliant with EN5 26 are compliant +A12:2000 h EN61131-2:20 Compliance with standard. • Emission-Lon • Emission-Tel port Compliance with standard. • RF Immunity • Fast Transie • ESD • Conducted • Power magn Compliance with standard.	with EN50081-2 (EN61000 07 Remark h all relevant aspects of the closure port w voltage AC mains port lecommunications/network h all relevant aspects of the r, nts letic fields h all relevant aspects of the ctromagnetic field nt burst

FX3U-3A-ADP

FX3GE- * * MR/ES



2) In the case of 24 point type



2. Outline 2.1 Part names For the input/output extension units/blocks, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition [12] [1] [2] [3] [4] [5] 1970 1970 1976 1976 -[8] P -[9] öçö [15] [14] [13] [10] [16] [5] -[11]-No. Name [1] Peripheral device connector cover [2] Terminal names [3] Top cover (S) (40points type only) [4] Top cove

Conducted RF

Power frequency magnetic field

[-+]						
[5]	Terminal block covers					
[6]	Input display LEDs (red)					
[7]	Extension device connector cover					
	Operation status display LEDs					
	POW	Green	On while power is on the PLC.			
	RUN	Green	On while the PLC is running.			
[8]	ERR	Red	Flashing when a program error occurs.			
	LINIX	Red	Lit when a CPU error occurs.			
	ALM Red		Lit when the battery voltage drops. (When the optional battery is used)			
[9]	Output display	y LEDs (red)				
[10]	0] Model name (abbreviation)					

FX3U-ENET-ADP. 1.4 Terminal block

the alternative model

Chapter 6.

be set

1.2 Programming tool

Incorporated Items

Main un

FX3GE-24M□, FX3GE-40M□

use

Check if the following product and items are included in the package

roduct

1. Features and cautions on using FX3GE PLC

1.1 Additional function from the FX3G series

Dust proof protection sheet

FX3GE PLC has an Ethernet communication function and analog input/output function built into a base that is FX3G PLC.

This section describes below differences between FX3G and FX3GE and cautions on

For details, refer also to the FX3G Series User's Manual - Hardware Edition. → Refer to FX3G Series User's Manual - Hardware Edition.

Ethernet communication function
 The PLC has a Ethernet communication function (Equivalent to FX3U-ENET-ADP).

Analog input/output function
 The PLC has analog input 2 channels, analog output 1 channel (Equivalent to
 FX3U-3A-ADP). Specifications differ from FX3U-3A-ADP in part. For details, refer to

Manuals [English]

Included Items

1 unit

1 sheet

1 manual

GX Works2 Ver. 1.91V or later can be used. Select "FX3G" in "PLC Type". When setting "Ethernet port settings", using GX Works2 Ver.1.91V or later. FX-30P and GX Developer can also be used. However, "Ethernet port setting" cannot be used. In the case that the version does not support FX3G, the programming tool can still be used by choosing FX1N. However, programming is enabled only in the functional range such as instructions, device ranges and program sizes available in a PLC selected as the advancetice model.

Caution for compliance with EC Directive

Installation in Enclosure

Installation in Enclosure Programmable logic controllers are open-type devices that must be installed and used within conductive control boxes. Please use the FX3GE Series programmable logic controllers while installed in conductive shielded control boxes. Please secure the control box lid to the control box (for conduction). Installation within a control box greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

Analog input/output

The analog input/output have been found to be compliant to the European standards in the aforesaid manual and directive. However, for the very best standards in the aforesaid manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output devices, Mitsubishi Electric would like to make the following points. As analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow those manufacturers' installation requirements. Mitsubishi Electric recommends that shielded cables be used. If NO other EMC protection is provided, users may experience temporary loss or accuracy between +10% /-10% in very heavy industrial areas. However, Mitsubishi Electric suggests that adequate EMC precautions be followed for the users complete control system. - Sensitive analog cables should not be laid in the same trunking or cable

- Sensitive analog cables should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible, users should run analog cables separately. Good cable shielding should be used. When terminating the shield at Earth,
- ensure that no earth loops are accidentally created.
- When reading analog values, EMC accuracy can be improved by averaging the readings. This can be achieved either through functions on the analog products or through a user's program in the FX3GE Series PLC main unit.

The input/output terminal block of FX3GE series PLC is built-in. Terminal block cannot be ren

1.5 System configuration

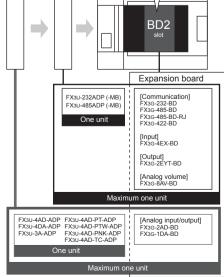
1.3 Using the built-in Ethernet

- Special adapters can be directly connected to the main unit. (It is not necessary to connect a connector conversion adapted ersion adapter.)
- One communication and one analog expansion option can be connected. Expansion is available for one expansion board and two special adapters. But the expansion board cannot be connected when two special adapters are connected.

When GX Works2 or MX Component is used, set the parameter settings and connection destination settings of the built-in Ethernet using the same settings as EVALEDET ADD

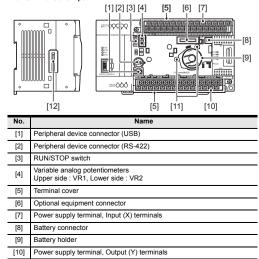
- 40 point I/O type cannot use the BD1 slot.
- FX3G-CNV-ADP, FX3U-ENET-ADP cannot be connected.
- The communication channel of the built-in Ethernet is CH1. When a communication expansion board or a communication special adapter is connected to the PLC, that communication channel becomes CH2.
- The built-in analog is the analog special adapter first unit. When an analog expansion board is connected, the analog expansion board becomes second unit. When an analog special adapter is connected, the analog special adapter becomes second unit.

Please refer to the following for details.



[11]	DIN rail mounting hooks
[12]	Analog input terminal block
[13]	Analog output terminal block
[14]	10BASE-T/100BASE-TX connector (RJ45)
[15]	Ethernet status LEDs
[16]	Special adapter connector cover

With terminal cover open



[11] Optional equipment connecting screw holes

[12] Special adapter connector

Right side

Genuine product certification label

The authentication label for authorized products is affixed to the right side of the The adultsmucaum node no detailed and the product of a void to be forged. Products that do not have the genuine product certification label or nameplate are not covered by the warranty.

2.2 LED status

LED display	LED color	Status	Description
POW Green		ON	Power is on
FOW	Gleen	OFF	Power is off
RUN	Green	ON	Running
RUN	Gleen	OFF	Stopped
		ON	When a CPU error occurs.
ERR	Red	Flicker	When a program error occurs.
		OFF	When a normal status.
ALM	M Red	ON	When the battery voltage drops. (When the optional battery is installed.)
ALIVI		OFF	When the battery voltage normal status. (When the optional battery is installed.)
Built-in E	thernet p	art	·
LED display	LED color	Status	Description
100M	Green	ON	100Mbps communication
100101	Gleen	OFF	10Mbps communication or not connected
SD/RD	Green	ON	Data being sent or received.
SDIRD	Gleen	OFF	Data is not sent or received.
		ON	Setting errors, hardware errors, etc.
ERR	Red	Flicker	Communication errors
		OFF	Setting normal, communication normal
0.0551	0	ON	TCP/IP: 1 or more connections are established. UDP: 1 or more connections are open.
OPEN	Green	OFF	TCP/IP: All connections are unestablished.

JDP: All connections are closed.

2.3 External dimensions and weight

For the input/output extension units/blocks, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edi Unit: mm (inches) MADDODDDD, ſ 1010 100 1010 1010 D 82 0 , IIII boorood 8 (0.32") W1 86 (3.39") ng hole pitches

Model name	W: mm (inches)	W1: mm (inches) Direct mounting hole pitches	MASS (Weight): kg (Ibs)
FX3GE-24M□	130 (5.12")	105 (4.13")	Approx. 0.60 (1.32lbs)
FX3GE-40M□	175 (6.89")	150 (5.90")	Approx. 0.80 (1.76lbs)

3. Installation (general specifications)

As for installation of the input/output extension units/blocks, special adapters and expansion boards, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

INSTALLATION PRECAUTIONS	
section 3.1 of this man Never use the product corrosive gas (salt a impacts, or expose it It If the product is use deterioration or dama; Do not touch the cond Doing so may cause c Install the product sec	in areas with excessive dust, oily smoke, conductive dusts ir, Cl2, H2S, SO2 or NO2), flammable gas, vibration o o high temperature, condensation, or rain and wind. d in such conditions, electric shock, fire, malfunctions ge may occur. uctive parts of the product directly. evice failures or malfunctions. urely using a DIN rail or mounting screws.
 Install the product on a If the mounting surfa- thereby causing nonce 	ce is rough, undue force will be applied to the PC board

When drilling screw holes or wiring, make sure that cutting and wiring debris of not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions

Be sure to remove the dust proof sheet from the PLC's ventilation port whe installation work is completed. Failure to do so may cause fire, equipment failures or malfunctions

Connect the extension cables, peripheral device cables, input/output cables and battery connecting cable securely to their designated connectors.

- Loose connections may cause malfunctions. Turn off the power to the PLC before attaching or detaching the following devices Failure to do so may cause device failures or malfunctions.
- Peripheral devices, display modules, and Extension units/blocks Expansion boards, special adapters, battery and memory cassette
- Notes
- When a dust proof sheet is supplied with units, keep the sheet applied to th ventilation slits during installation and wiring work.
- To prevent temperature rise, do not install the PLC on a floor, a ceiling or a vertical surface
- Keep a space of 50mm (1.97") or more between the unit main body and another device or structure (part A). Install the unit as far away as possible from high-voltage lines, high-voltage devices and power equipment.

VIRING PRECAUTIONS

- installation or wiring work. Failure to do so may cause electric shock or damage to the product.

ltem			Specificatio	n		
Ambient emperature	0 to 55°C (32 to 131°F) when operating and -25 to 75°C (-13 to 167°F when stored					
Ambient numidity	5 to 95%RH (no condensation) when operating					
		Frequency (Hz)	Accele- ration (m/s ²)	Half amplitude (mm)	Sweep Coun	
Vibration	When installed	10 to 57	-	0.035	for X, Y, Z: 10 times	
esistance ^{*1}	on DIN rail	57 to 150	4.9	-	(80 min in each	
	When installed	10 to 57	-	0.075	direction)	
	directly	57 to 150	9.8	-		
Shock resistance ^{*1}	147m/s^2 Acceleration, Action time: 11ms, 3 times by half-sine pulse in each direction X, Y, and Z					
Noise resistance	By noise simulator at noise voltage of 1,000Vp-p, noise width of 1 μ s, rise time of 1ns and period of 30 to 100Hz					
Dielectric	1.5kV AC for one	e minute				
vithstand voltage ^{*2}	500V AC for one minute		Between each terminals ^{*2} and ground terminal			
nsulation resistance ^{*2}	5MΩ or more by megger	y 500V DC	OV DC			
Grounding Class D grou grounding wit					less) <commor :d.>^{*3}</commor 	
Working atmosphere	Free from corros	ive or flamm	able gas an	d excessive	conductive dusts	
Working <2000m ^{*4}						

Terminal Dielectric strength		resistance	
Main units, Input/output exter	ision units/blocks		
Between power supply terminal (AC power) and ground terminal	1.5kV AC for one minute		
Between power supply terminal (DC power) and ground terminal	500V AC for one		
Between input terminal (24V DC) and ground terminal	minute		
Between input terminal (100V AC) and ground terminal ^{*5}	1.5kV AC for one	5M Ω or more by	
Between output terminal (relay) and ground terminal	minute	500V DC megger	
Between output terminal (transistor) and ground terminal	500V AC for one minute]	
Between output terminal (triac) and ground terminal ^{*5}	1.5kV AC for one minute		
10BASE-T/100BASE-TX connector and ground terminal	500V AC for one minute	1	
Main unit analog terminal and ground terminal	Not allowed	Not allowed	
Expansion boards, Special ad	apters, Special functior	blocks	
Between terminal of expansion board (except FX3G-4EX-BD and FX3G-2EYT-BD) and ground terminal	Not allowed	Not allowed	
Between FX3G-4EX-BD input terminal (24V DC) and ground terminal			
Between FX3G-2EYT-BD output terminal (transistor) and ground terminal	500V AC for one minute	$5 \text{M}\Omega$ or more by 500V DC megger	
Between terminal of special adapter and ground terminal			

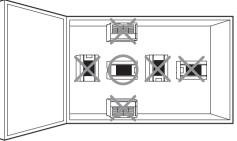
Termina Dielectric strength resistance Special function block

- For dielectric with stand voltage test and insulation nce test of each product, refer to the following manual → Refer to FX3G Series User's Manual - Hardware Edition
- *3 For common grounding, refer to section 4.3. $^{\ast}4$ The PLC cannot be used at a pressure higher than the atmospheric pressure to avoid damage.
- *5 Input/output extension units/blocks only

3.2 Installation location

Install the PLC in an environment conforming to the generic specifications (section 3.1), installation precautions and notes. For more details, refer to FX3G Series User's Manual - Hardware Edition.

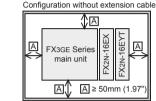
Installation location in enclosure



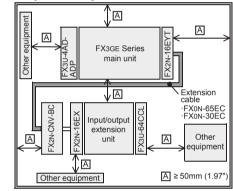
Space in enclosure

Extension devices can be connected on the left and right sides of the main unit of the PLC. If you intend to add extension devices in the future, keep necessary spaces on the left and right sides.





Configuration in 2 stages with extension cable



Affixing The Dust Proof Sheet 3.2.1

OFF

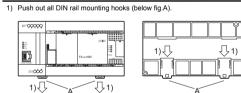
The dust proof sheet should be affixed to the ventilation port before beginning the installation and wiring work.

 \rightarrow For the affixing procedure, refer to the instructions on the dust proof sheet. Be sure to remove the dust proof sheet when the installation and wiring work is completed.

3.3 Procedures for installing to and detaching from DIN rail

The products can be installed on a DIN46277 rail [35mm (1.38") wide]. This section explains the installations of the main units. For the input/output extension units/blocks and special adapters, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

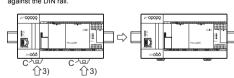
3.3.1 Installation



2) Fit the upper edge of the DIN rail mounting groove (right fig.B) onto the DIN rail.



Lock the DIN rail mounting hooks (below fig.C) while pressing the PLC against the DIN rail.



	the details of the power supply wiring and input/output wiring, refer to the ng manual. → Refer to FX3G Series User's Manual - Hardware Edition
DESI	
sy: Ot 1) 2)	ke sure to have the following safety circuits outside of the PLC to ensure safe stem operation even during external power supply problems or PLC failure. herwise, malfunctions may cause serious accidents. Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits). Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such a case. Note that when an error occurs in a relay, triac or transistor output device, the output could be held either on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
DESI	
po aw No Ins pro	not bundle the control line together with or lay it close to the main circuit or wer line. As a guideline, lay the control line at least 100mm (3.94") or more ay from the main circuit or power line. ise may cause malfunctions. tall module so that excessive force will not be applied to the built-in gramming connectors, power connectors or I/O connectors. liure to do so may result in wire damage/breakage or PLC failure.

Notes
 Input/output wiring 50 to 100m (164'1" to 328'1") long will cause almost no problems of noise, but, generally, the wiring length should be less than 20m (65'7") to ensure the safety. Extension cables are easily affected by noise. Lay the cables at a distance of at least 30 to 50mm (1.19" to 1.97") away from the PLC output and other power
least 30 to 50mm (1.19 to 1.97) away from the PLC output and other power lines.

4.1 Wiring

This section explains the wiring of the terminal type. For the connectors types, refer to the following n → Refer to FX3G Series User's Manual - Hardware Edition. 4.1.1 Cable end treatment and tightening torque

For the terminals of FX3GE series PLC, M3 screws are used.

The electric wire ends should be treated as shown below

Tighten the screws to a torouge of 0.5 to 0.8 Nem. Do not tighten terminal screws with a torque outside the above-mentioned range Failure to do so may cause equipment failures or malfunctions.

Terminal Manufacturer	Type No.	Certification	Pressure Bonding Tool
JAPAN SOLDERLESS	FV1.25-B3A	UL Listed	YA-1(JST)
TERMINAL MFG CO LTD (JST)	FV2-MS3	OL LISIED	TA-1(JST)

When two wires are co φ3.2 (0.13")

Terminal Solderless 6.2 mm (0.24") screw terminal 6.3 mm (0.25") Þ or more φ3.2 (0.13")

4.2 Power supply specifications and example of external wiring

As for the details of the power supply specifications and example of external As for the details or the point and the second sec

4.2.1 Power supply specifications[Main unit]

lte		Specification		
ne		AC power type	DC power type	
Supply voltage		100 to 240V AC	24V DC	
Allowable supply v	oltage range	85 to 264V AC	20.4 to 28.8V DC	
Rated frequency		50/60Hz	-	
Allowable instantaneous power failure time		Operation can be continued upon occurrence of instantaneous power failure for 10 ms or less.	Operation can be continued upon occurrence of instantaneous power failure for 5 ms or less.	
Power fuse	FX3GE-24M	250V 1A	125V 2.5A	
Poweriuse	FX3GE-40M	250V 3.15A	125V 3.15A	
Rush current		30A max. 5ms or less/100V AC 50A max. 5ms or less/200V AC	30A max. 1ms or less/24 V DC	
Power	FX3GE-24M	32W	21W	
consumption*1	FX3GE-40MD	37W	25W	
24V DC service por	wer supply	400mA	-	

*1 This item shows values when all 24V DC service power supplies are used in the maximum configuration connectable to the main unit (The DC power type main unit does not have a 24V DC service power supply.)

Power (current) consumption of the input/output extension units/blocks. → Refer to FX3G Series User's Manual - Hardware Edition.

Power consumption of the special function blocks. → Refer to the respective manual

lied to the main unit and input/output extension unit

→ For the details of wiring work, refer to section 4.1.

4.2.2 Example of external wiring (AC power type)

100 to 240V AC power is supp

· When one wire is connected to one terminal φ3.2 (0.13") Terminal Solderless 6.2 mm (0.24") screw termina é φ3.2 (0.13") 6.2 mm (0.24") Termina

WARNING Make sure to cut off all phases of the power supply externally before attemptin

Install it horizontally on a wall as shown in section 3.2

3.4 Procedures for installing directly (with M4 screws)

The product can be installed directly on the panel (with screws). This section explains the installation of the main units. As for the details of the installation/detaching for input/output extension units/ blocks and special adapters, refer to the following manual. \rightarrow Refer to FX3G Series User's Manual - Hardware Edition.

3.4.1 Mounting hole pitches

Refer to the external dimensions (section 2.3) for the product's mounting hole

pitch information. As for the details of the mounting hole pitches for extension unit/block and special adapters, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

B

-

3.4.2 Installation

- 1) Make mounting holes in the mounting surface referring to the external dimensions diagram.
- 2) Fit the main unit (A in the right figure) based on the holes, and secure it with M4 screws (B in the right figure). The mounting hole pitches and number of screws depend on the product. Refer to the external dimensions diagram (Section 2.3).



- 10 ms, the PLC can continue to operate
- Even if the DC power supply causes an instantaneous power failure for less that 5 ms, the PLC can continue to operate.
- If a long-time power failure or an abnormal voltage drop occurs, the PLC stops and output is turned off. When the power supply is restored, it will autor restart (when the RUN input is on).

IRING PRECAUTIONS

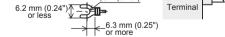
Make sure to cut off all phases of the power supply externally before attemptin installation or wiring work. Failure to do so may cause electric shock or damage to the produ

IRING PRECAUTIONS

- Connect the AC power supply to the dedicated terminals specified in this manual If an AC power supply is connected to a DC input/output terminal or DC power If an AC power supply is connected a supply terminal, the PLC will burn out.
- Do not wire vacant terminals externally. Doing so may damage the product.
- Perform class D grounding (grounding resistance: 100Ω or less) to the grounding terminal on the FX3GE Series main unit with a wire 2 mm² or thicker.
- Do not use common grounding with heavy electrical systems (refer to section 4.3)
- When drilling screw holes or wiring, make sure cutting or wire debris does no enter the ventilation slits.
 - Failure to do so may cause fire, equipment failures or malfunctions
- Make sure to properly wire to the terminal in accordance with the followin precautions

Failure to do so may cause electric shock, equipment failures, a short-circuit, wir breakage, malfunctions, or damage to the product.

- The disposal size of the cable end should follow the dimensions described in he manual
- Tightening torque should follow the specifications in the manual.
- Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24⁺) or less). Make sure that the screwdriver does not touch the partition part of the terminal block.



<Reference>

Terminal Manufacturer	Type No.	Certification	Pressure Bonding Tool
JAPAN SOLDERLESS TERMINAL MFG CO LTD (JST)	FV1.25-B3A	UL Listed	YA-1(JST)

PLC 100 to 240V AC Main unit \odot Breaker + Power on Ν 1 gency MC ¢, -0 Input/outpu MC extension п Fuse unit L Ŧ Ν MC MC DC powe Innl \oplus DC Θ AC (*) Class D grounding

See section 4.3 for details.

Power supply for loads connected to PLC output terminals

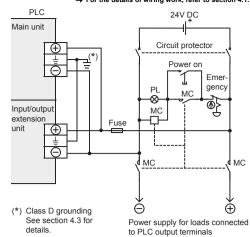
JY997D49401F

4.4 Inp

Input operation display

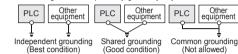
24V DC power is supplied to the main unit and input/output extension unit. → For the details of wiring work, refer to section 4.1.

4.2.3 Example of external wiring (DC power type)



4.3 Grounding

- Ground the PLC as stated below. Perform class D grounding. (Grounding resistance: 100 Ω or less)
- Ground the PLC independently if possible. If it cannot be grounded independently, ground it jointly as shown below

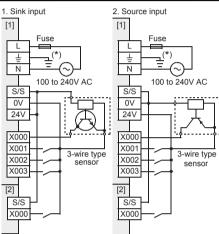


- Use ground wires thicker than AWG14 (2mm²)
- · Position the grounding point as close to the PLC as possible to decrease the length of the ground wire

4.4 Input specifica	4 Input specifications and external wiring				
wiring, refer to the followi	ng manual. → Refer to FX3G Se	of I/O extension unit/block and externa ries User's Manual - Hardware Edition			
1.4.1 Input specifica	itions [24V DC inp	ut type]			
Item	I	Specification			
Number of input	FX3GE-24M	14 points (16 points) ^{*1}			
points	FX3GE-40MD	24 points			
nput connecting type		Terminal block (M3 screw)			
Input form		Sink/Source			
nput signal voltage	AC power type	24V DC +10%, -10%			
nput signal voltage	DC power type	20.4 to 28.8V DC			
Input impedance	X000 to X007	3.3kΩ			
	X010 or more	4.3kΩ			
Input signal current	X000 to X007	7mA/24V DC			
nput signal current	X010 or more	5mA/24V DC			
ON input sensitivity X000 to X007		4.5mA or more			
current	X010 or more	3.5mA or more			
OFF input sensitivity current		1.5mA or less			
Input response time		Approx. 10ms			
Input signal form	Sink input	No-voltage contact input NPN open collector transistor			
input signal form	Source input	No-voltage contact input PNP open collector transistor			
Input circuit insulation		Photocoupler insulation			
-					

LED on panel lights when photocoupler is driven. *1 Each value inside () indicates the number of occupied points

4.4.2 Examples of input wiring [AC power type]



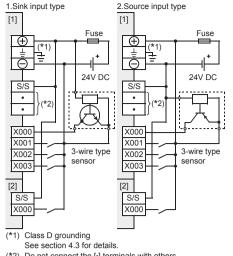
(*) Class D grounding

See section 4.3 for details

[1]:Main unit, Input/output extension unit

(Common to both sink and source inputs)

4.4.3 Examples of input wiring [DC power type]



(*2) Do not connect the [•] terminals with others. since they are not available. [1]:Main unit, Input/output extension unit (Common to both sink and source inputs)

[2]:Input/output extension block (Common to both sink and source inputs)

Instructions for connecting input devices

As for the details of Instructions for connecting input devices, refer to the following

→ Refer to FX3G Series User's Manual - Hardware Edition

In the case of no-voltage contact: The input current of this PLC is 5 to 7mA/24V DC.

Use input devices applicable to this minute current. If no-voltage contacts (switches) for large current are used, contact failure may occur

- 2) In the case of input device with built-in series diode: The voltage drop of the series diode should be approx. 4V or less. When lead switches with a series LED are used, up to two switches can be connected in series Also make sure that the input current is over the input-sensing level while the
- In the case of input device with built-in parallel resistance: Use a device with a parallel resistance of $15 k\Omega$ or more. When the resistance is less than $15 k\Omega$, connect a bleeder
- resistance
- Use a two-wire proximity switch whose leakage current is 1.5mA or less when the switch is off.

When the current is larger than 1.5mA, connect a bleeder resistance

4.5 Relay output specifications and example of external wiring

As for the details of the relay output specifications of I/O extension unit/block and external wiring, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

4.5.1	Relay output specifications	
-------	-----------------------------	--

	Item	Specification		
Number of output	FX3GE-24MR	10 points (16 points)*1		
points	FX3GE-40MR	16 points		
Output conne	ecting type	Terminal block (M3 screw)		
Output form		Relay		
External power supply		30V DC or less 240V AC or less ^{*2}		
Max. load	Resistance load	2A/point ^{*3}		
max. Iouu	Inductive load	80VA		
Min. load		5V DC, 2mA (reference value)		
Open circuit	leakage current	-		
Response time OFF→ON ON→OFF		Approx. 10ms		
Circuit insula	ition	Mechanical insulation		
Display of output operation		LED lights when power is applied to relay coil.		

*1 Each value inside () indicates the number of occupied points.

- *2 Between 250V and 240V CE, UL, and cUL are not compliant. *3 The total load current of resistance loads per common terminal should be
- the following value or less.
- 1 output point/common terminal : 2A
- 4 output points/common terminal : 8A

A soft the number of outputs per common terminal, refer to "Section 4.8 interpretation of partition" and the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

4.5.2 Life of relay output contact

The product life of relay contacts considerably varies depending on the load type used. Take care that loads generating reverse electromotive force or rush current may cause poor contact or deposition of contacts which may lead to considerable reduction of the contact product life. 1) Inductive load

Inductive load Inductive loads generate large reverse electromotive force between contacts at shutdown may cause arcing. At a fixed current consumption, as the power factor (phase between current and voltage) gets smaller, the arc energy gets larger. The standard life of the contact used for Inductive loads, such as contactors and colongit voltage is 600 the usered conceptions at 20VA

and solenoid valves, is 500 thousand operations at 20VA. The following table shows the approximate life of the relay based on the results of our operation life test

Test condition: 1 sec. ON / 1 sec. OFF

L	oad capacity	Contact life	
20VA	0.2A/100V AC	3 million times	
2004	0.1A/200V AC	- 3 million times	
35VA	0.35A/100V AC	1 million times	
33VA	0.17A/200V AC		
80VA	0.8A/100V AC	2 hundred thousand times	
ouva	0.4A/200V AC	2 nunured thousand times	

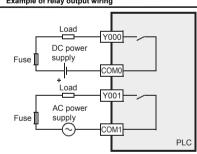
The product life of relay contacts becomes considerably shorter than the above conditions when the rush overcurrent is shut down. \rightarrow For countermeasures while using inductive loads, refer to Subsection 4.5.4. Some types of inductive loads generate rush current 5 to 15 times the stationary current at activation. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load.

Lamp load Lamp loads generally generate rush current 10 to 15 times the stationary current. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load.

3) Capacitive load

Capacitive loads can generate rush current 20 to 40 times the stationary current. Make sure that the rush current does not exceed the current corresponding to the maximum specified resistance load. Capacitive loads such as capacitors may be present in electronic circuit loads including

For the maximum specified resistance load, refer to Subsection 4.5.1. 4.5.3 Example of relay output wiring



4.5.4 Cautions in external wiring

For attention in the external wiring, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition. Protection circuit for load short-circuiting

When a load connected to the output terminal short-circuits, the printed circuit board may be burnt out. Fit a protective fuse on the output circuit. Protection circuit of contact when inductive load is used

An internal protection circuit for the relays is not provided for the relay output circuit in this product. It is recommended to use inductive loads with built-in protection circuits. When using loads without built-in protection circuits, insert an external contact protection circuit, etc. to reduce noise and extend the product life.

1) DC circuit Connect a diode in parallel with the load

Use a diode (for commutation) having the following specifications

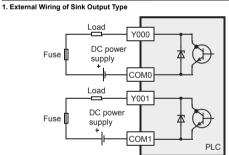
4.6 Transistor output specifications and example of external

wiring As for the details of the transistor output specifications of I/O extension unit/block and Wiring, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Editio

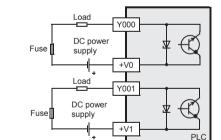
4.6.1 Transistor output specifications

Item			Specification		
Number of output	FX3GE	FX3GE-24MT		10 points (16 points) ^{*1}	
points	FX3GE	-40MTロ		16 points	
Output con	necting	j type		Terminal block (M3 screw)	
Output	FX3GE			Transistor (Sink)	
form	FX3GE		s	Transistor (Source)	
External po	wer su	pply		5 to 30V DC	
Max. load	Resist	ance load		0.5A/point ^{*2}	
wax. ioau	Induct	tive load		12W/24V DC*3	
Min. load				-	
Open circu	it leaka	ge current	:	0.1mA or less/30V DC	
ON voltage				1.5V or less	
	OFF ↑ ON	FX3GE- 24MTロ	Y000, Y001	5µs or less/10mA or more (5 to 24V DC)	
			Y002 or more	0.2ms or less/200mA or more (at 24V DC)	
		FX3GE- 40MTロ	Y000 to Y002	5µs or less/10mA or more (5 to 24V DC)	
Response			Y003 or more	0.2ms or less/200mA or more (at 24V DC)	
time	ON → OFF	FX3GE- 24MTロ	Y000, Y001	5µs or less/10mA or more (5 to 24V DC)	
			Y002 or more	0.2ms or less/200mA or more (at 24V DC)	
		FX3GE-	Y000 to Y002	5µs or less/10mA or more (5 to 24V DC)	
		40MT	Y003 or more	0.2ms or less/200mA or more (at 24V DC)	

4.6.2 External wiring of transistor output



2. External Wiring of Source Output Type



4.6.3 Cautions in external wiring

As for the details of Instructions for connecting input devices, refer to the following manual

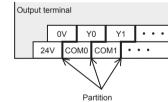
→ Refer to FX3G Series User's Manual - Hardware Edition. Protection circuit for load short-circuits

4.8 Terminal block layouts

For details on the terminal block layout, refer to the following manual. → Refer to FX3G Series User's Manual - Hardware Edition. Interpretation of partition

artition of the output terminals (see following figure) indicates the range of the output connected to the same com

Example: FX3GE-40MR/ES



5. Built-in Ethernet specifications and wiring

As for the details of the spec ns and wiring, refer to the following manual. → Refer to FX3U-ENET-ADP User's Manual.

DESIGN PRECAUTIONS **WARNING**

 Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PL safe system operation even during external power su failure. Otherwise, malfunctions may cause serious accidents s or PLC

- 1) Above all, the following components should be included: an emergency stop circuit, a protection circuit, aninterlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
- 2) Note that when the PLC main unit detects an error during self diagnosis, such as a watchdog timer error, all outputs are turned off. Also, when an error that cannot be detected by the PLC main unit occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such cases.

(Common to both sink and source inputs) [2]:Input/output extension block

switches are ON.

4) In the case of 2-wire proximity switch:

nem	otandara	
Reverse voltage	5 to 10 times the load voltage	
Forward current	Load current or more	

2) AC circuit

Connect the surge absorber (combined CR components such as a surge killer and spark killer, etc.) parallel to the load Select the rated voltage of the surge absorber suitable to the output used. Refer to the table below for other specifications.

Item	Standard	
Electrostatic capacity	Approx. 0.1µF	
Resistance value	Approx. 100 to 200Ω	

Interlock

Loads, such as contactors for normal and reverse rotations, that must not be turned on simultaneously should have an interlock in the PLC program and an external interlock

Common mode

Use output contacts of the PLC in the common mode

	(at 24V DC)		
Circuit insulation	Photocoupler insulation		
	LED on panel lights when photocoupler is driven.		

*1 Each value inside () indicates the number of occupied points

*2 The total load current of resistance loads per common terminal should be the following value or less.

1 output point/common terminal : 0.5A

4 output points/common terminal : 0.8A

A stor the number of outputs per common terminal, refer to "Section 4.8 interpretation of partition" and the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

- *3 The total of inductive loads per common terminal should be the following value or less
- 1 output point/common terminal : 12W/24V DC
- 4 output points/common terminal : 19.2W/24V DC

As for the number of outputs per common terminal, refer to "Section 4.8 interpretation of partition" and the following manual. → Refer to FX3G Series User's Manual - Hardware Edition.

A short-circuit at a load connected to an output terminal could cause burnout at the output element or the PCB. To prevent this, a protection fuse should be inserted at the output

Use a load power supply capacity that is at least 2 times larger than the total rated fuse

Contact protection circuit for inductive loads

When an inductive load is connected, connect a diode (for commutation) in parallel with the load as necessary.

The diode (for commutation) must comply with the following specifications

Item	Guide
Reverse voltage	5 to 10 times of the load voltage
Forward current	Load current or more

Interlock

Loads, such as contactors for normal and reverse rotations, that must not be turned on simultaneously should have an interlock in the PLC program and an external interlock

4.7 Triac output specifications of I/O extension unit/block

As for the details of the triac output specifications and external wiring, refer to the

→ Refer to FX3G Series User's Manual - Hardware Edition

DESIGN PRECAUTIONS

- Observe the following items. Failure to do so may cause incorrect data writing through noise to the PLC and result in PLC failure, machine damage or other accident.
- 1) Do not bundle the control line together with or lay it close to the main circuit or power line. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or power line. Noise may cause malfunctions
- 2) Ground the shield wire or shield of a shielded cable. Do not use common grounding with heavy electrical systems

TARTUP AND AINTENANCE

PRECAUTIONS

- Do not touch any terminals or connector while the PLC's power is on. Doing so may cause electrical shock or malfunctions.
- Before cleaning or retightening screws, externally cut off all phases of th

power supply. Failure to do so may cause malfunction or failure of this adapter. When the screws are tightened insufficiently, they may fall out and cause a shortcircui or malfunction. When tightened too much, the screws or the adapter may be damaged, resulting in short-circuit, or malfunction.

When controlling the PLC (especially when changing data, the program or changing the operating conditions) during operation, ensure that it is safe to do so.

STARTUP AND MAINTENANCE PRECAUTIONS

- Do not disassemble or modify this product. Doing so may cause fire, equipment failures, or malfunctions For repair, contact your local Mitsubishi Electric representative
- The adapter case is made of resin. If dropped or subjected to strong impact adapter may be damaged
- When this adapter is installed or removed from the panel, make sure t externally cut off all phases of the power supply. Failure to do so may caus malfunction or failure of this adapter.

WIRING PRECAUTIONS Make sure to cut off all phases of the power supply externally before attempting wiring work. Failure to do so may cause electric shock or damage to the product VIRING PRECAUTIONS

- When drilling screw holes or wiring, make sure that cutting and wiring debris
- do not enter the ventilation slits. Failure to do so may cause fire, equipment failures or malfunctions
- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise: Do not bundle the main circuit line together with or lay it close to the main
- Circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94*) or more away from the main circuit or high-voltage lines.

5.1 Specification

5.1.1 Communication specification

ltem	Specification		
	Data transmission speed	100Mbps/10Mbps	
Transmission specifications	Communication method	Full-duplex/Half-duplex	
	Transmission method	Base band	
	Maximum segment length	100m (328'1")	

5.1.2 Performance specification

Item	Specification	
	MELSOFT connections	
	Communication Using MC Protocol	
	MELSOFT Direct Connection (Simple Connection)	
Functions	Find CPU function	
	Time setting function ^{*1}	
	Diagnostics function from MELSOFT	
	Data monitoring function	
Number of simultaneously open connections allowed	MELSOFT connection + MC protocol + Data monitoring <= 4	

*1 The time setting function (SNTP client) is enabled only after the trigger condition is established.

Caution

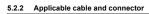
FX3U-ENET-ADP cannot be connected to the FX3GE Series PLC.

5.2 Wiring

- 5.2.1 Connecting to the network The following explains how to connect the built-in Ethernet to 10BASE-T/
- 100BASE-TX networks Pay close attention to safety and use the built-in Ethernet properly.
- Sufficient network knowledge and safety precautions are required when installing 10BASE-T or 100BASE-TX networks. Consult a specialist when connecting cable terminals or installing trunk line cables, etc.
- 2) Use a connection cable conforming to the standards shown in Subsection

Cautions regarding powering the hub, PLC and Ethernet simultaneously

On some hubs, for a fixed period of time immediately after powering up, even if packets are sent from the Ethernet device, there are cases when packets are not sent to the external device. In this case, create a sequence program that waits a sufficient amount of time after powering up before sending packets.



- 1) Connector RJ45 type modular jack
- Pin Configuration The pin sequence of the 10BASE-T/100BASE-TX connection connector (RJ45 type modular jack) of the built-in Ethernet is as follows:

	Pin No.	Signal	Direction	Contents
	1	TD+	Out	+ side of sending data
8 1	2	TD-	Out	- side of sending data
	3	RD+	In	+ side of receiving data
	4	Not used	-	
	5	Not used	-	
	6	RD-	In	- side of receiving data
	7	Not used	-	
	8	Not used	-	

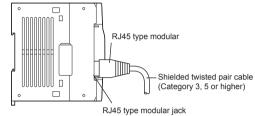
3) Applicable cable

	Cable conforming to Ethernet standard practice: Category 3 or higher (STP cable)
100BASE-TX	Cable conforming to Ethernet standard practice: Category 5 or higher (STP cable)

A straight cable is used. A cross cable can also be used when using direct connection (simple connection) between the personal computer and the FX3GE Series PLC 5.2.3 Connecting to the 10BASE-T/100BASE-TX network

This section explains how to connect the built-in Ethernet to the 10BASE-T, 100BASE-

TX network. The following shows the connection diagram for the twisted paid cable



<Operating procedure> (Step 1) Connect the twisted pair cable to the hub.

- (Step 2) Connect the twisted pair cable to the built-in Ethernet.
 The built-in Ethernet detects whether it is 10BASE-T or 100BASE-TX, and in fullduplex or half-duplex transmission mode automatically according to the hub. (Auto detection function)
- For connection to a hub without the auto detection function, set the half-duplex mode on the hub side.
- For 10BASE-T or 100BASE-TX connection required devices and a sample system configuration, refer to FX3U-ENET-ADP User's Manual.

6. Built-in analog specifications and wiring As for the details of the specifications and wiring, refer to the following manual. → Refer to FX3S/FX3G/FX3G/FX3U/FX3UC Series User's Manual - Analog Control Edition. STARTUP AND **ACAUTION** PRECAUTIONS Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. For repair, contact your local Mitsubishi Electric representative. Do not drop the product or exert strong impact to it. Doing so may cause damage. WIRING PRECAUTIONS WARNING Make sure to cut off all phases of the power supply externally before attemptin wiring work

Failure to do so may cause electric shock or damage to the product

VIRING PRECAUTIONS

When drilling screw holes or wiring, make sure cutting or wire debris does not ntilation slits enter the ve

- Failure to do so may cause fire, equipment failures or malfunctions Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
- Initiation of bundle the power line or shield of the analog input/output cable together with or lay it close to the maincircuit, high-voltage line, or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94*) or more away from the main circuit, high-voltage line, or load line.
- 2) Ground the shield of the analog input/output cable at one point on the signal receiving side. However, do not use common grounding with heavy electrical systems
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
- The disposal size of the cable end should follow the dimensions described in
- the manual. Tightening torque should follow the specifications in the manual. Twist the end of strand wire and make sure that there are no loose wires.
- Do not solder-plate the electric wire ends. Do not connect more than the specified number of wires or electric wires of
- unspecified size. Affix the electric wires so that neither the terminal block nor the connected part
- are directly stressed.

6.1 Analog input terminal block (European type)

- 1) Wire size Wiring to analog device should use 22-20 AWG wire.
- 2) Applicable cable

3)

Item Wire size Single wire 0.3 to 0.5mm² (AWG22 to 20) 0.3mm² (AWG22) × 2 Double wire

)	Termination
	Strip the coating of strand wire and twist the cable core before connecting it,
	or strip the coating of single wire before connecting it. An alternative
	connection is to use a formula with insulating allogue

Manufacturer	Model	Caulking tool
Phoenix Contact Co., Ltd.	AL0.5-8WH	CRIMPFOX 6 ^{*1} (or CRIMPFOX 6T-F ^{*2})

*1 Old model name: CRIMPFOX ZA 3

*2 Old model name: CRIMPEOX UD 6 Bar terminal with insulating sleeve Stranded wire/solid wire Termination of cable end Contact area (Crimp area) Insulating sleeve ///// 9mm V (0.36' 8mm (0.32)2.6mm (0.11") 14mm(0.56")

When using a stick terminal with an insulating sleeve, choose a wire v proper cable sheath referring to the above outside dimensions, otherwise wire cannot be inserted easily. Tighten the screws to a torque of 0.22 to 0.25 N+m. Do not tighten terminal screws exceeding with a torque outside the abo a wire with sions, otherwise the

straight tip

3.5mm

0.14")

mentioned range. Failure to do so may cause equipment failures or malfunctions. 4) Tool $\uparrow \uparrow \uparrow$ With

For tightening the terminal, use a				
commercially available small screwdriver				
having a straight form that is not widened			>	
toward the end as shown right.		J		
	0.6mm	\ /		/
	(0.02")	¥.		Ļ

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the table above, use the following screwdriver or appropriate replacement (grip diameter : approximately 25mm (0.98")).

Manufacturer	Model names
Phoenix Contact Co., Ltd.	SZS 0.6×3.5

6.2 Input/output specifications and external wiring

As for the details of the analog input/output specifications, refer to the following

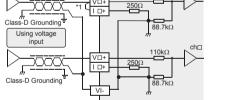
→ Refer to FX3S/FX3G/FX3GC/FX3U/FX3UC Series User's Manual Analog Control Edition

ltem	Specifications	
item	Voltage input	Current input
Analog input range	0 to 10V DC (Input resistance: 198.7kΩ)	4 to 20mA DC (Input resistance: 250Ω)
Absolute maximum input	-0.5V, +15V	-2mA, +30mA
Resolution	2.5mV(10V/4000)	5µA(16mA/3200)
Overall accuracy	 ±0.5% (±50mV) for 10V full scale (when ambient temperature is 25 ± 5°C) ±1.0% (±100mV) for 10V full scale (when ambient temperature is 0 to 55°C) 	 ±0.5% (±80μA) for 16mA full scale (when ambient temperature is 25 ± 5°C) ±1.0% (±160μA) for 16mA full scale (when ambient temperature is 0 to 55°C)
Input characteristics	4080 4000 Uigitation 0 0 0 0 0 0 0 0 0 0 0 0 0 0	3280 3200 U gt at 4mA -> 20mA 20.4mA Analog input

Analog output pe	enormance specifications		
ltem	Specifications		
nem	Voltage output	Current output	
Analog output range	0 to 10V DC (External load: 2k to 1MΩ)	4 to 20mA DC (External load: 500Ω or less)	
Resolution	2.5mV(10V/4000)	4µA(16mA/4000)	
	 ±0.5% (±50mV) for 10V full scale (when ambient 		

Common Specifications of Analog Input and Output

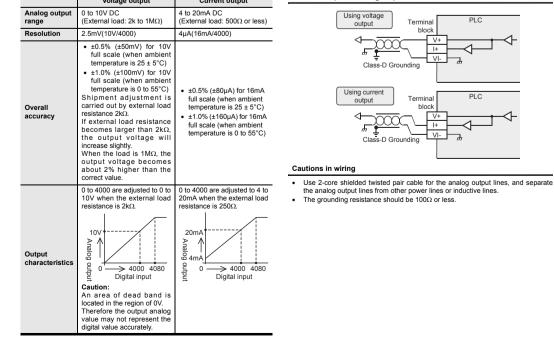
ltem	Specification	
Digital input and output	12 bits, binary	
Conversion time	$90\mu s$ for each selected input channel + $50\mu s$ for each selected output channel (The data will be updated at every scan of the PLC.)	
Insulation method	No insulation between each channel or the PLC.	
Occupied points	0 point (This number is not related to the maximum number of input and output points of the PLC.)	
6.2.1 Example of an	alog input	
Using cur input	Terminal PLC block 110kΩ COX *1 CVX *1	



V□+, I□+, ch □: □represents the channel number.

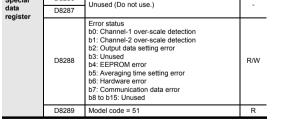
*1 Make sure to short-circuit the 'V +' and 'I +' terminals when current is input. (
: input channel number)

6.2.2 Example of analog output



6.3 List of Special Devices

	nalog occupie	is the 1st device assignment.	\A/: \A/rito
Special	Device number		
device	1st	Description	R/W
	M8280	Switches the input mode of channel 1 OFF: Voltage input ON: Current input	R/W
	M8281	Switches the input mode of channel 2 OFF: Voltage input ON: Current input	R/W
	M8282	Switches the output mode OFF: Voltage output ON: Current output	R/W
	M8283 to M8285	Unused (Do not use.)	-
Special auxiliary relay	M8286	Sets the cancel of output holding function. OFF: Holds the analog data output just before stop of the PLC. ON : Outputs the offset data at stop of the PLC.	R/W
	M8287	Sets whether or not input channel 1 is used. OFF: Channel is used. ON: Channel is not used.	R/W
	M8288	Sets whether or not input channel 2 is used. OFF: Channel is used. ON: Channel is not used.	R/W
	M8289	Sets whether or not output channel is used. OFF: Channel is used. ON: Channel is not used.	R/W
	D8280	Channel-1 input data	R
	D8281	Channel-2 input data	R
	D8282	Output setting data	R/W
	D8283	Unused (Do not use.)	-
	D8284	Averaging time for channel-1 (Setting range: 1 to 4095)	R/W
	D8285	Averaging time for channel-2 (Setting range: 1 to 4095)	R/W
Special	D8286	Unused (Do not use.)	
data	D8287	Unused (DO NOLUSE.)	-



As for the details of the special devices, refer to following manual. → Refer to FX3s/FX3G/FX3G/FX3U/FX3UC Series User's Manual Analog Control Edition

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.

Warrantv

Warranty Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

A For safe use

This product has been manufactured as a general-purpose part for general I his 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 exponder thas been manufactured under strict quality control. However, and the second seco

- This product has been manufactured under strict quality control. Howeve 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

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN