MITSUBISHI ELECTRIC

PROGRAMMABLE CONTROLLERS

MELSEC-F

FX CPU

FX(FX2N,FX2NC)→FX3 series Replacement Guidance

Conversion tools

- GX Works2
- GX Developer Ver. 8

FX

Safety Precautions

(Read these precautions before using.)

Before installation, operation, maintenance or inspection of this product, thoroughly read through and understand this manual and the associated manuals. Also, take care to handle the module properly and safely.
This manual classifies the safety precautions into two categories: DANGER and CAUTION.

DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
CAUTION	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 CAUTION may also cause severe injury.
It is important to follow all precautions for personal safety.
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.

1. DESIGN PRECAUTIONS

DANGER

- Make sure to include the following safety circuits outside 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, 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.

CAUTION

- 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.
- Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not ground them at the same point as the high-voltage lines.
  Noise may cause malfunctions.
- Install module so that excessive force will not be applied to the terminal blocks.
  Failure to do so may result in wire damage/breakage or PLC failure.

2. INSTALLATION PRECAUTIONS

DANGER

- Make sure to shut down all phases of the power supply externally before installing.
  Failure to do so may cause electric shock or damage to the product.

CAUTION

- Use the product within the generic environment specifications described in PLC main unit manual (Hardware Edition).
  Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl_2, H_2S, SO_2, or NO_2), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.
  If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.
- Do not touch the conductive parts of 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 extension cables 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, expansion boards and special adapters
  - I/O extension units/blocks, FX Series terminal block and the special function units/blocks
  - Battery and memory cassette

3. WIRING PRECAUTIONS

DANGER

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

⚠CAUTION

- 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.
- Use class D grounding (grounding resistance of 100Ω or less) with a wire of 2mm² or thicker on the grounding terminal of the PLC.
  However, do not connect the ground terminal at the same point as a heavy electrical system.
- 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 malfunctions under the influence of noise.
  - Do not bundle the power line or twisted shielded cable 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, high-voltage line, or load line.
  - Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire to the terminal blocks 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.

4. STARTUP AND MAINTENANCE PRECAUTIONS

⚠DANGER

- Do not touch any terminal while the PLC's power 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.
- 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.

⚠CAUTION

- Do not disassemble or modify the PLC.
  Doing so may cause fire, equipment failures, or malfunctions.
  For repair, contact your local Mitsubishi Electric distributor.
- 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 modules, expansion boards and special adapters
  - I/O extension units/blocks, FX Series terminal block and the special function units/blocks
  - Battery and memory cassette

5. DISPOSAL PRECAUTION

⚠CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

6. TRANSPORTATION PRECAUTION

⚠CAUTION

- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications of the PLC main unit manual.
  Failure to do so may cause failures in the PLC.
  After transportation, verify the operations of the PLC.

FX (FX2N, FX2NC) -> FX3 series Replacement Guidance

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Sub-number	A
Create date	September 2012

Preface

This manual describes the replacement method of MELSEC-F series from FX (FX2N, FX2NC) series to FX3 series.
The replacement tools for sequence programs are described in the operation procedure of GX Works2/GX Developer Ver. 8 of the programming software. As for the handling method of the software, please refer to the Operating Manual of GX Works2/GX Developer Ver. 8.
As for the FX series related manuals, please refer to Appendix B.

Text taken from the FX analog control manual

- This manual provides information for the use of the FX3 Series Programmable Controllers. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows;
  (1) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.
  (2) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.
  (3) All operators of the completed equipment should be trained to use that product in a safe and coordinated manner in compliance to established safety practices. The operators should also be familiar with documentation which is connected with the actual operation of the completed equipment.

  Note: The term 'completed equipment' refers to a third party constructed device which contains or uses the product associated with this manual
- 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.
- When combining this product with other products, please confirm the standard and the code, or regulations with which the user should follow. Moreover, please confirm the compatibility of this product to the system, machine, and apparatus with which a user is using.
- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained to the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric distributor.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification etc. may be changed without a notice for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you have noticed a doubtful point, a doubtful error, etc., please contact the nearest Mitsubishi Electric distributor.

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- Other company names and product names are registered trademarks of the individual companies.

Generic names and abbreviations used in this manual

Generic name, abbreviation	Description
Programmable controller	
FX programmable controller	Generic name of PLCs in FX3G, FX3GC, FX3U, FX3UC, FX2N, FX2NC, FX1N, FX1NC, FX1S, FX2, FX2C, FX1, FX0N, FX0S, FX0 series
FX3 series	Generic name of PLCs in FX3G, FX3GC, FX3U, FX3UC series
FX3G series	Generic name of PLCs in FX3G series
FX3GC series	Generic name of PLCs in FX3GC series
FX3U series	Generic name of PLCs in FX3U series
FX3UC series	Generic name of PLCs in FX3UC series
FX2N series	Generic name of PLCs in FX2N series
FX2NC series	Generic name of PLCs in FX2NC series
FX1N series	Generic name of PLCs in FX1N series
FX1NC series	Generic name of PLCs in FX1NC series
FX1S series	Generic name of PLCs in FX1S series
FX2 series	Generic name of PLCs in FX2 series
FX2C series	Generic name of PLCs in FX2C series
FX1 series	Generic name of PLCs in FX1 series
FX0N series	Generic name of PLCs in FX0N series
FX0S series	Generic name of PLCs in FX0S series
FX0 series	Generic name of PLCs in FX0 series
Function expansion board	
Communication function expansion board or communication board	Generic name of communication function expansion boards
232BD	FX3U-232-BD, FX3G-232-BD
422BD	FX3U-422-BD, FX3G-422-BD
485BD	FX3U-485-BD, FX3G-485-BD
USBBD	FX3U-USB-BD
Special adapter connection board or connector conversion board	Generic name of CNVBD
CNVBD	FX3U-CNV-BD, FX3G-CNV-ADP
Special adapter	
Communication special adapter or communication adapter	Generic name of communication special adapters
232ADP	FX3U-232ADP
485ADP	FX3U-485ADP
Programming tool software	
FX-PCS/WIN	Generic name of programming software FX-PCS/WIN
GX Developer	Generic name of programming software GX Developer
GX Works2	Generic name of programming software GX Works2
Handy programming panel	Generic name of FX-30P, FX-20P

Table of Contents

1. Introduction

1.1 Outline

Thank you very much for your continued use of Mitsubishi PLCs.
It may be time to renew your PLCs due to aging or deterioration over years of use, discontinued production of products, or termination of service or repair term.
This manual describes the procedure of replacing your FX (FX2N, FX2NC) series PLCs with FX3 series PLCs.

1.1.1 Replacement models

To replace FX (FX2N, FX2NC) series PLCs, a system configuration composed of FX3 series models is recommended.
Recommended replacement models introduced in this manual are general representative models selected based on the number of inputs and outputs, program capacity, and shapes of input and output terminals (terminal blocks, connectors, etc.). Depending on actual usage, models other than the recommended ones may be more suitable.

1.1.2 Necessity of renewal

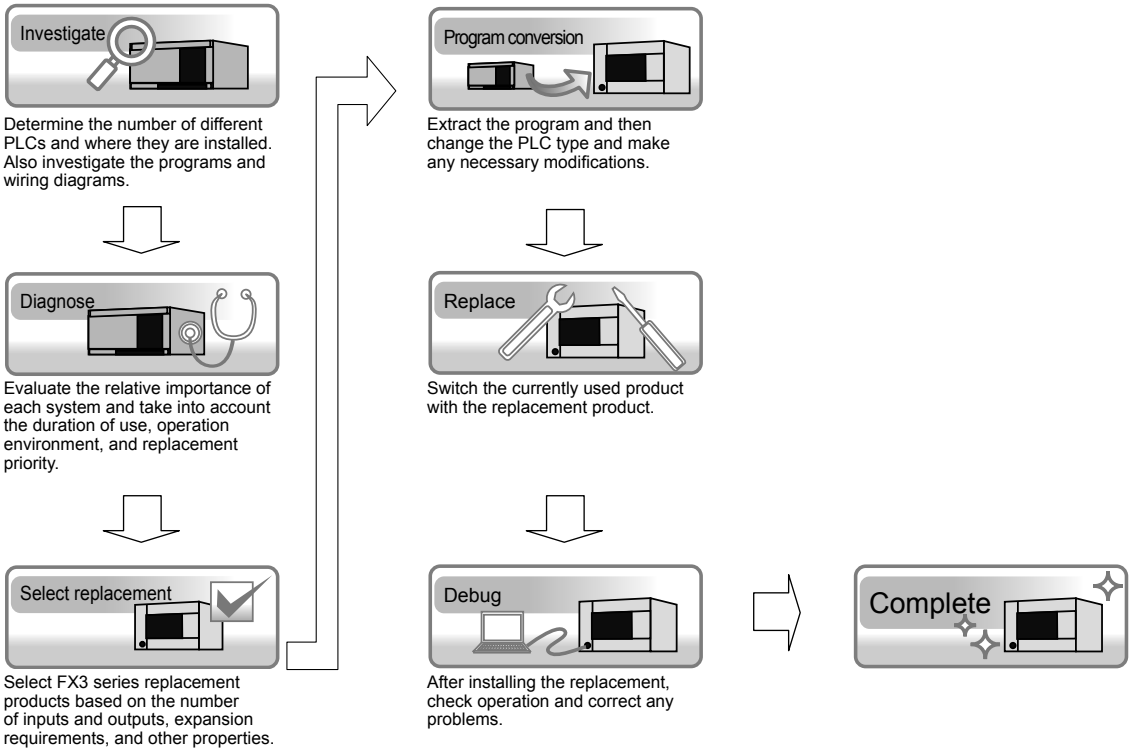
(1) Service life

Our products are composed of very reliable parts, but inside each product is a great number of electronic components.
When all components function normally, optimal function and performance of the product will be realized.
However, some parts (electrolytic capacitors, relays, switches and others) have a limited service life. The length of the service life varies depending on the part, and if used beyond the service life, optimal operation can not be expected and troubles or failures may occur. Generally, the deterioration of electronic components depends on the operating environment, and premature deterioration may occur if used in hot environments, overloaded conditions, or if incorrectly installed or connected.
Deterioration of parts due to aging or environment may shorten the service life of the product, and periodic renewal becomes necessary.

(2) Systematic and planned preventive maintenance

It can be difficult to dedicate resources for maintenance of systems that may still be functioning within an acceptable range.
Conversely, poor maintenance may accelerate deterioration.
Once a problem occurs, it may take an increased amount of time for recovery, and losses incurred may end up being significantly greater than if preventative maintenance had been performed routinely.
Therefore, it is important to plan maintenance carefully by investigating the equipment, reading the programs, preparing spare parts, and considering a renewal procedure.
Carefully planned maintenance and renewal should always be recommended.

Planning of renewal

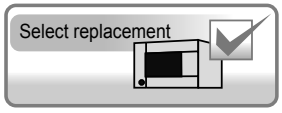


1.2 Replacement of FX series

1.2.1 Replacement selection

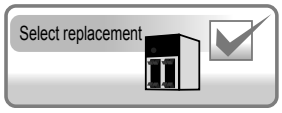
Select FX3 series main units and expansion equipment to replace existing systems.

FX2N series



Refer to Chapter 2. “Replacement of FX2N series”

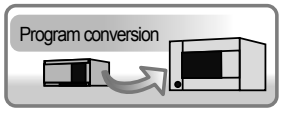
FX2NC series



Refer to Chapter 3. “Replacement of FX2NC series”

1.2.2 Program conversion

Conversion of the FX sequence programs to FX3 series can be done using GX Works2 or GX Developer Ver. 8.



Refer to Chapter 4. “Program conversion method”

2. Replacement of FX2N series

2.1 Outline

The production of the FX2N series main units and certain expansion equipment will be terminated in September 2012.
The repair service period will end at the end of September 2019.
The procedure to replace the FX2N series with its successor, the FX3U series, is outlined here.

2.1.1 Cautions

(1) "Recommended replacement models" lists the most fitting FX3 series product based on specification comparison. Depending on the operation environment or the system configuration (connection of expansion equipment), or when the number of inputs and outputs in use is smaller, other products may be more appropriate than the recommended replacement model.

(2) Recommended replacement models for extension blocks, extension units, special function modules, expansion boards, and batteries are selected based on compatibility with current FX3 series main units.

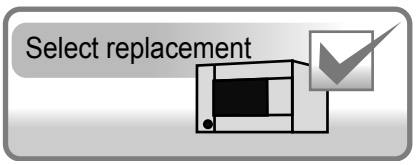
(3) Pay close attention to notes marked as "Special remarks." For attributes such as external dimensions, there can be slight differences between the recommended replacement model and existing product. Before performing replacement, be sure to review other relevant details such as dimensions, and power supply requirements.

(4) For instances where there is no recommended replacement model, a message stating "No recommended replacement model" will be shown. In this case, a FX3 series system may still be able to provide equivalent operation.
Evaluate the requirements of the application and use a FX3 series system configuration for replacement.

2.2 Replacement procedure

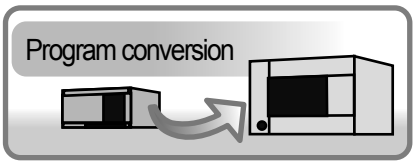
The replacement procedure is shown below.

FX3U series products are generally recommended as replacements for FX2N series products.



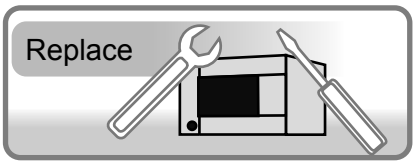
2.3
Selection of replacement models

2.3.1 Recommended replacement models
2.3.2 Cautions about hardware

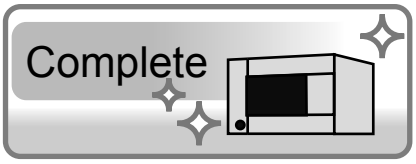


2.4 / 4.1
Program conversion

2.4.1 Cautions for program change
2.4.2 Device comparison
4.1.1 Program conversion procedure
4.1.2 Programming tool



2.5
Replacement of PLCs



2.3 Selection of replacement models

2.3.1 Recommended replacement models

(1) Main unit recommended replacement models

FX3U series recommended replacement models corresponding to the FX2N series are introduced. Please replace currently used main units with the following recommended models.

■ FX2N series and recommended replacement models (main units)

FX2N series		Recommended replacement model	Special remarks
Description	Model name	Model name	
Main unit(100-240V AC power supply) (sink/source input, relay output)	FX2N-16MR-ES/UL	FX3U-16MR/ES	*1
	FX2N-32MR-ES/UL	FX3U-32MR/ES	*1
	FX2N-48MR-ES/UL	FX3U-48MR/ES	*1
	FX2N-64MR-ES/UL	FX3U-64MR/ES	*1
	FX2N-80MR-ES/UL	FX3U-80MR/ES	*1
	FX2N-128MR-ES/UL	FX3U-128MR/ES	*1
Main unit(100-240V AC power supply) (sink input, triac output)	FX2N-32MS-E/UL	FX3U-32MS/ES	*1
	FX2N-48MS-E/UL	FX3U-64MS/ES	*1
Main unit(100-240V AC power supply) (sink input, transistor sink output)	FX2N-16MT-E/UL	FX3U-16MT/ES	*1
	FX2N-32MT-E/UL	FX3U-32MT/ES	*1
	FX2N-48MT-E/UL	FX3U-48MT/ES	*1
Main unit(100-240V AC power supply) (sink/source input, transistor source output)	FX2N-16MT-ESS/UL	FX3U-16MT/ESS	*1
	FX2N-32MT-ESS/UL	FX3U-32MT/ESS	*1
	FX2N-48MT-ESS/UL	FX3U-48MT/ESS	*1
	FX2N-64MT-ESS/UL	FX3U-64MT/ESS	*1
	FX2N-80MT-ESS/UL	FX3U-80MT/ESS	*1
	FX2N-128MT-ESS/UL	FX3U-128MT/ESS	*1
Main unit (24V DC power supply) (sink/source input, relay output)	FX2N-16MR-DS	FX3U-16MR/DS	*1
	FX2N-32MR-DS	FX3U-32MR/DS	*1
	FX2N-48MR-DS	FX3U-48MR/DS	*1
	FX2N-64MR-DS	FX3U-64MR/DS	*1
	FX2N-80MR-DS	FX3U-80MR/DS	*1
Main unit (24V DC power supply) (sink/source input, transistor source output)	FX2N-16MT-DSS	FX3U-16MT/DSS	*1
	FX2N-32MT-DSS	FX3U-32MT/DSS	*1
	FX2N-48MT-DSS	FX3U-48MT/DSS	*1
	FX2N-64MT-DSS	FX3U-64MT/DSS	*1
	FX2N-80MT-DSS	FX3U-80MT/DSS	*1
Main unit(100-240V AC power supply) (100V AC input, relay output)	FX2N-16MR-UA1/UL	FX3U-32MR/UA1	
	FX2N-32MR-UA1/UL	FX3U-32MR/UA1	
	FX2N-48MR-UA1/UL	FX3U-64MR/UA1	
	FX2N-64MR-UA1/UL	FX3U-64MR/UA1	

FX2N series		Recommended replacement model	Special remarks
Description	Model name	Model name	
Main unit(100-240V AC power supply), (sink input, relay output)	FX2N-16MR(-001)	FX3U-16MR/ES(-A)	*1 *2
	FX2N-32MR(-001)	FX3U-32MR/ES(-A)	*1 *2
	FX2N-48MR(-001)	FX3U-48MR/ES(-A)	*1 *2
	FX2N-64MR(-001)	FX3U-64MR/ES(-A)	*1 *2
	FX2N-80MR(-001)	FX3U-80MR/ES(-A)	*1 *2
	FX2N-128MR(-001)	FX3U-128MR/ES(-A)	*1 *2
Main unit(100-240V AC power supply), (sink input, triac output)	FX2N-16MS	FX3U-32MS/ES	*1
	FX2N-32MS	FX3U-32MS/ES	*1
	FX2N-48MS	FX3U-64MS/ES	*1
	FX2N-64MS	FX3U-64MS/ES	*1
	FX2N-80MS	FX3U-64MS/ES +FX2N-8EX +FX2N-16EYS	*1
Main unit(100-240V AC power supply), (sink input, transistor sink output)	FX2N-16MT(-001)	FX3U-16MT/ES(-A)	*1 *2
	FX2N-32MT(-001)	FX3U-32MT/ES(-A)	*1 *2
	FX2N-48MT(-001)	FX3U-48MT/ES(-A)	*1 *2
	FX2N-64MT(-001)	FX3U-64MT/ES(-A)	*1 *2
	FX2N-80MT(-001)	FX3U-80MT/ES(-A)	*1 *2
	FX2N-128MT(-001)	FX3U-128MT/ES(-A)	*1 *2
Main unit(24V DC power supply), (sink input, relay output)	FX2N-32MR-D	FX3U-32MR/DS	*1
	FX2N-48MR-D	FX3U-48MR/DS	*1
	FX2N-64MR-D	FX3U-64MR/DS	*1
	FX2N-80MR-D	FX3U-80MR/DS	*1
Main unit(24V DC power supply), (sink input, transistor sink output)	FX2N-32MT-D	FX3U-32MT/DS	*1
	FX2N-48MT-D	FX3U-48MT/DS	*1
	FX2N-64MT-D	FX3U-64MT/DS	*1
	FX2N-80MT-D	FX3U-80MT/DS	*1

*1. External wiring should be connected between the S/S terminal and 24V terminal.

*2. The product for Asia.

(2) Expansion equipment recommended replacement models

When changing from FX2N to FX3U series main units, the following expansion equipment and option equipment must be replaced at the same time.
If replacement models with the same performance are not available, please review and consider to re-design the system following the comments included in the "Special remarks" column.

■ Expansion and option equipment required to be replaced when FX2N series main units are changed to FX3U series.

Models connectable to FX2N series		Recommended replacement models connectable to FX3U	Special remarks
Description	Model name	Model name	
Special adapter (for RS-232C communication)	FX2NC-232ADP	FX3U-232ADP (-MB)	Interface board or expansion board is needed for connection of recommended replacement model.
Special adapter (for RS-485 communication)	FX2NC-485ADP	FX3U-485ADP (-MB)	
Interface board (for special adapter connection)	FX2N-CNV-BD	FX3U-CNV-BD	
Expansion board (analog VR)	FX2N-8AV-BD	FX3U-8AV-BD	
Expansion board (RS-232C communication)	FX2N-232-BD	FX3U-232-BD	
Expansion board (RS-485 communication)	FX2N-485-BD	FX3U-485-BD	The FX2N model Ver. 2.0 and later can use full duplex communication, the FX3U model can only use half duplex.
Expansion board (RS-422 communication)	FX2N-422-BD	FX3U-422-BD	
Memory cassette	FX-RAM-8	FX3U-FLROM-16	
Memory cassette	FX-EEPROM-4	FX3U-FLROM-16	
Memory cassette	FX-EEPROM-8	FX3U-FLROM-16	
Memory cassette	FX-EEPROM-16	FX3U-FLROM-16	
Memory cassette	FX-EPROM-8	FX3U-FLROM-16	
Function extension memory cassette	FX2N-ROM-E1	FX3U-FLROM-16	The FX3U series recommended replacement model only has memory functions. Inverter communication function is built into the FX3U main unit.
Special function block (ASI master)	FX2N-32ASI-M	No replacement model	Create a new system using CC-Link etc.
Special function block (I/O link master)	FX2N-16LNK-M	No replacement model	Create a new system using CC-Link/LT etc.
Conversion cable (FX1, FX2 extension connection)	FX2N-CNV-IF	No replacement model	FX1, FX2 expansion equipment cannot be connected. Create a new system made up of FX3U series components.
Dummy input switch	FX2N-□□SW	No replacement model	

(3) FX2N expansion equipment usable when the main unit is changed to FX3U series

When main units are changed from FX2N series to FX3U series, the following FX2N expansion equipment in general can be used.
However, if use is expected to continue for a long period, it is recommended to replace units following the practices of preventative maintenance.

■ Expansion equipment usable when main units are changed from FX2N series to FX3U series

Input/output extension unit	Input extension block	Analog input	Communication/ network
FX2N-32ER-ES/UL	FX2N-8EX-ES/UL	FX2N-2AD	FX2N-232IF
FX2N-32ET-ESS/UL	FX2N-16EX-ES/UL	FX2N-4AD	FX2N-32ASI-M
FX2N-48ER-ES/UL	FX2N-8EX-UA1/UL	FX2N-8AD	FX2N-32CAN
FX2N-48ET-ESS/UL	FX2N-8EX	Analog output	FX2N-32CCL
FX2N-48ER-DS	FX2N-16EX	FX2N-2DA	FX2N-16CCL-M
FX2N-48ET-DSS	FX2N-16EX-C	FX2N-4DA	FX2N-64CL-M
FX2N-48ER-UA1/UL	FX2N-16EXL-C	Analog input and output mix	FX2N-16LNK-M
FX2N-32ER	Output extension block	FX0N-3A	
FX2N-32ES	FX2N-8EYR-ES/UL	FX2N-5A	
FX2N-32ET	FX2N-8EYT-ESS/UL	Temperature sensor, temperature control	
FX2N-48ER	FX2N-16EYR-ES/UL	FX2N-4AD-TC	
FX2N-48ET	FX2N-16EYT-ESS/UL	FX2N-4AD-PT	
FX2N-48ER-D	FX2N-8EYR	FX2N-2LC	
FX2N-48ET-D	FX2N-8EYT	High-speed counter	
Input/output extension block	FX2N-8EYT-H	FX2N-1HC	
FX2N-8ER-ES/UL	FX2N-16EYR	Positioning control	
FX2N-8ER	FX2N-16EYT	FX2N-1PG-E	
Connector conversion, extension cable	FX2N-16EYT-C	FX2N-10PG	
FX2N-CNV-BC	FX2N-16EYS	FX2N-1RM-E-SET	
FX0N-30EC/FX0N-65EC		FX2N-10GM	
		FX2N-20GM	

(4) Expansion equipment newly available with the FX3U series

When main units are changed from FX2N series to FX3U series, the following FX3U series expansion equipment can be used.
Since FX3 series special adapters do not consume any input or output points, they can be added without affecting the number of I/O points.
System performance can be increased over that of the existing system by using equipment available for the FX3U series.

■ Expansion equipment for the FX3U series

Analog input	Analog volume	High-speed counter	Communication/ network
FX3U-4AD-ADP	FX3U-8AV-BD	FX3U-4HSX-ADP	
FX3U-4AD	Temperature sensor, temperature control	FX3U-2HC	FX3U-232-BD
Analog output		Positioning control	FX3U-422-BD
FX3U-4DA-ADP	FX3U-4AD-TC-ADP	FX3U-2HSY-ADP	FX3U-485-BD
FX3U-4DA	FX3U-4AD-PT(W)-ADP	FX3U-20SSC-H	FX3U-USB-BD
Analog input and output mix	FX3U-4AD-PNK-ADP	Data collection	FX3U-232ADP(-MB)
	FX3U-4LC	FX3U-CF-ADP	FX3U-485ADP(-MB)
FX3U-3A-ADP	Power source extension unit		FX3U-16CCL-M
			FX3U-64CCL
	FX3U-1PSU-5V		FX3U-ENET-ADP
			FX3U-ENET

(5) Battery

The batteries used in the FX2N series and FX3U series main units are different.
Select batteries based on the main unit.

Battery for FX2N series	F2-40BL
Battery for FX3U series	FX3U-32BL

(6) Use of the MELSEC-F series Selection Tool

By using the MELSEC-F series Selection Tool, it is possible to confirm whether or not a system configuration containing FX2N series expansion equipment is valid for a FX3U series main unit.

2.3.2 Cautions about hardware

- Comparison of FX2N series and FX3U series and cautions for replacement
  This is a list of hardware cautions. When performing replacement, please refer to the manual of each model and confirm details list here.

■ Hardware differences of FX2N series and FX3U series, and cautions

No.	Item	Difference		Caution
		FX2N series	FX3U series	
1	Pitch of mounting holes in lateral direction	Overall dimension -10mm	Different depending on the number of I/O points.	Mounting hole positions in the lateral direction are different (see Fig. 1. Outline Drawing on the next page).
2	Input wiring	FX2N Japan type models are sink input only.	FX3U has standard sink/source input.	Wiring to the S/S terminal is needed for the FX3U (see Fig. 2. on the next page).
3	Battery and mounting position	F2-40BL, lithium thionyl chloride primary battery	FX3U-32BL, lithium manganese dioxide primary battery	Type name (model) is different. Mounting position is different.
4	Battery voltage	Nominal voltage 3.6V	Nominal voltage 3.0V	Be careful when using special device D8005 (battery voltage).
5	Input hardware filter (when digital filter is zero) • High-speed counter • Input interrupt function • Pulse catch function	X0, X1: 20µs X2 to X7: 50µs X10 to X17: 200µs* *16 I/O point main unit: 10ms	X0 to X5: 5µs X6, X7: 50µs X10 to X17: 200µs* *16 I/O point main unit: 10ms	Noise, not detected in FX2N, may affect input of FX3U. If necessary, implement a noise countermeasure external to the main unit.
6	FX1, FX2 series expansion	Expansion possible using FX2N-CNV-IF.	Expansion not possible.	Using FX2N or FX3U series replacement models.
7	Terminal end resistance of 485-BD, 485ADP	Packaged together with BD and ADP, to be selected and installed.	Built into BD and ADP, selectable using a switch.	In FX3U, the resistance value can be selected using a built-in switch.
8	Wire size of 485-BD, 485ADP	AWG26 to 16	AWG22 to 20	Wire size is different. A large wire size may not be usable in FX3U. (See Table 1. Cable size, page 17).

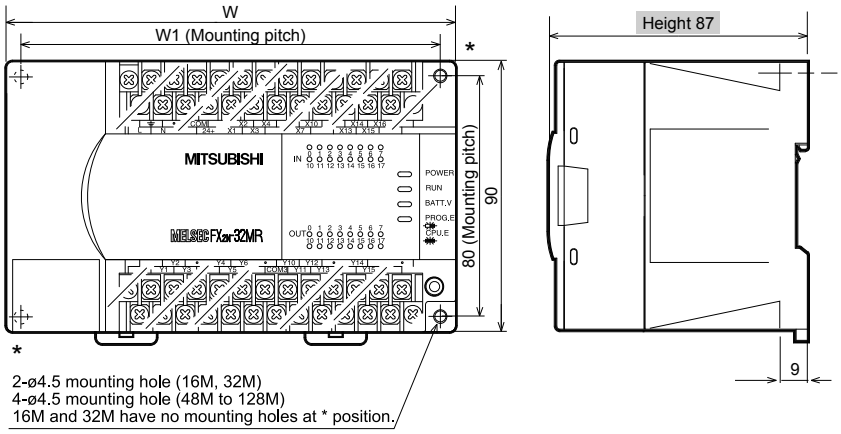
Fig. 1. Outline drawing.

The FX2N series and FX3U series main units have slightly different dimensions.

Take into account any differences when performing replacement.

Differences
- Height is different by 1mm.
- Screw mounting pitch W1 is different.

■ FX2N series main unit

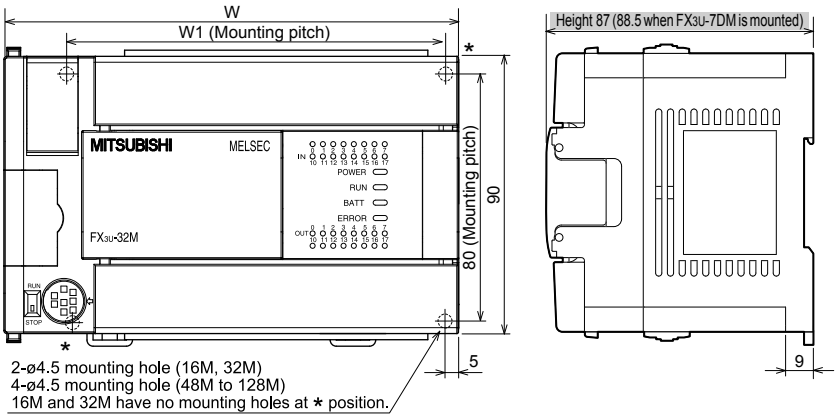


Outer coat color: Munsell 0.08GY/7.64/0.81
Unit: mm

Type name	W (mm)	W1 (mm)	Mass (kg)
FX2N-16M	130	120	0.60
FX2N-16MR-UA1/UL	130	120	0.65
FX2N-32M	150	140	
FX2N-48M, FX2N-32MR-UA1/UL	182	172	0.85
FX2N-64M, FX2N-48MR-UA1/UL	220	210	1.00
FX2N-80M, FX2N-64MR-UA1/UL	285	275	1.20
FX2N-128M	350	340	1.80

- Terminal stand is connected by M3 terminal screw.
- 35mm wide DIN rail can be mounted.

■ FX3U series main unit



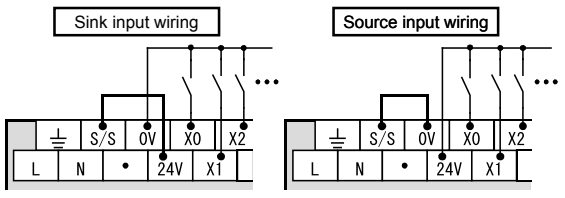
Outer coat color: Munsell 0.08GY/7.64/0.81
Top cover: Munsell N1.5
Unit: mm

Type name	W (mm)	W1 (mm)	Mass (kg)
FX3U-16M	130	103	0.60
FX3U-32M	150	123	0.65
FX3U-48M, FX3U-32MR/UA1	182	155	0.85
FX3U-64M	220	193	1.00
FX3U-80M, FX3U-64MR/UA1	285	258	1.20
FX3U-128M	350	323	1.80

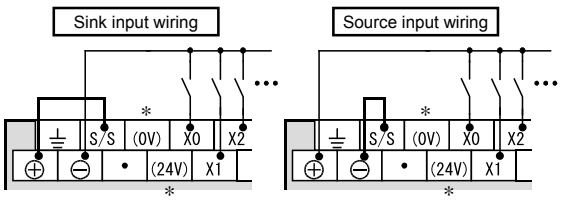
- Terminal stand is connected by M3 terminal screw.
- 35mm wide DIN rail can be mounted.

Fig. 2. Wiring diagram of S/S terminal in FX3U series.

• Input wiring example of AC power supply type



• Input wiring example of DC power supply type



* Do not connect wiring to the (0V), (24V) terminals of DC power supply type.

Table 1. Cable size of European type terminal connectors

For connection with RS-485 communication equipment, use a twisted pair cable with shielding. Conforming wire size and tightening torque are as follows.

	Wire size of one-wire connection	Wire size of two-wire connection	Wire ferrule with insulation sleeve (wire size)	Tightening torque	Insulation sheath stripping length*
FX2N-485-BD	AWG26 to AWG16		Not usable	0.6N·m	6mm
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not usable	0.4 to 0.5N·m	8mm
FX3U-485-BD FX3U-485ADP(-MB)	AWG22 to AWG20	AWG22	Usable (AWG22 to AWG20)	0.22 to 0.25N·m	9mm

* Insulation sheath stripping length shows the dimension when connecting the wire to the terminal directly.

For details, please refer to the FX Series User's Manual (Data Communication Edition) JY997D16901.

2.4 Program conversion

2.4.1 Cautions for program change

- Operational difference of FX2N series and FX3U series
  The FX3U series can use the same instructions used in the FX2N series, but the following operations are different. Depending on the hardware configuration or program contents, check the corresponding items by correcting or replacing the sequence program or checking operations.

■ Operational difference and cautions about program and system

Item			Operational difference		Caution
			FX2N series	FX3U series	
System related					
Initial setting	When DC power supply type is used Initial setting of D8008		Program for writing -1 in D8008 is needed for initialization.	Not needed because the system is initialized automatically.	FX3U DC power supply type does not require initialization of D8008. Please delete the initial setting program.
	Devices monitored by M8004 for error detection		M8060 to M8067, except for M8062.	M8060 to M8067, except for M8062 and M8063.	If M8004 is used to monitor M8063, add an additional program to provide equivalent operation.
High-speed input	32-bit counter specified in single word instruction		If double words C200 to C255 are specified in a single word applied instruction, an operation error occurs when the command is executed.	If double words C200 to C255 are specified in a single word applied instruction, RUN is not executed, and a syntax error occurs. However, the ZRST command can designate C200 to C255.	In FX3U, error detection before RUN is implemented. Check the program, and correct so as to avoid errors.
	Pulse catch function		After the EI command is executed, the pulse catch function is made valid.	If there is EI command in the sequence program, the pulse catch function is always valid.	In FX3U, the pulse catch function is valid even in DI state.
Communication	Clear timing for serial communication error M8063 and D8063 devices.		When changed from STOP to RUN.	When power is turned OFF.	Not cleared when changed from STOP to RUN; when necessary to clear, add an initializing program using the RST command.
	Parallel link	Baud rate	19,200bps	115,200bps	It must be noted that there is an increased possibility of noise with faster communication speeds.
		Link time of ordinary parallel link mode	70ms +master station operation period (ms) +slave station operation period (ms)	15ms +master station operation period (ms) +slave station operation period (ms)	Since the link time becomes shorter, confirm the update timing of the link device.
		Link time of high-speed parallel link mode	20ms +master station operation period (ms) +slave station operation period (ms)	5ms +master station operation period (ms) +slave station operation period (ms)	
Instruction related					
Step ladder program	STL instruction in transfer and recombination programs.		If a NOP instruction is inserted between STL instructions, transfer and recombination are not enabled.	If a NOP instruction is inserted between STL instructions, transfer and recombination are enabled.	If a NOP instruction is inserted between STL instructions, replace it with a dummy program not containing the NOP instruction and having no effect on the sequence operation.
	ON condition of STL operation device M8046.		If S0 to S899 is ON and M8047 is enabled.	If S0 to S899, S1000 to S4095 is ON when M8047 is enabled.	Since the object device range differs, add a program for initializing S1000 to S4095.

Item		Operational difference		Caution
		FX2N series	FX3U series	
Step ladder program	Range of device numbers to be stored in D8040 to D8047 when M8047 is enabled.	Stores active state numbers sequentially in ascending order from the range S0 to S899.	Stores active state numbers sequentially in ascending order from the range S0 to S899, S1000 to S4095.	Since the object device range differs, add a program for initializing S1000 to S4095.
Common items	Instruction execution time	See 7. Execution Times and Instructional Hierarchy of the "FX1S/FX1N/FX2N series programming manual."	See Appendix B: Instruction Execution Times of the "FX3G/FX3U/FX3UC series programming manual."	Since the instruction execution time varies, confirm operation for programs that operate in concert with the scan time.
Program flow	FNC00/01	If the destination of a jump or call is not available, an operation error occurs when the CJ or CALL instructions are executed.	If the destination of a jump or call is not available, when not in RUN state, a syntax error occurs. However, if the pointer is indexed, an operation error occurs when executing the instruction.	In the FX3U, error detection before RUN is implemented. Check the program, and correct to avoid errors.
	Detection of error designated by pointer not using the CJ or, CALL instructions.			
Move, compare	FNC15	10 to 20ms per 8 consecutive points.	66 to 132ms per 500 consecutive points.* * Even writing of one point may require the specified time.	When writing into file registers using the BMOV instruction when a memory cassette is in use, the scan time may be extended when executing the BMOV instruction. During execution of the BMOV instruction, the watch dog timer is not refreshed. Insert the WDT command as required, or take other measures.
	File register write execution time using the BMOV instruction			
Shift	FNC34 to 37	If S or D device ranges are overlapped, correct operation results may not be obtained, but operation is executed.	If S or D device ranges are overlapped, and operation error (6710) occurs, and operation is not executed.	Since the operation result becomes abnormal, the FX3U has been changed so that an operation error occurs. Make modifications so as to avoid an operation error.
	Operation when devices are overlapped with the SFTR, SFTL, WSFR, WSFL instructions.			
Data processing	FNC40	If the ZRST instruction designating a timer or counter as the operand is executed, the reset coil of this timer or counter is not cleared.	If the ZRST instruction designating a timer or counter as the operand is executed, the reset coil of this timer or counter is also cleared.	In the FX2N, to clear the reset coil of a timer or counter, a RST instruction was needed, but in the FX3U, batch resetting is possible using the ZRST instruction.
	Clearing of a reset coil with the ZRST instruction.			
	FNC40	The ZRST instruction resets the state of the designated device, but does not reset the previous status for the PLS or PLF instructions. If a ZRST instruction designating the same device as a PLS command has been programmed previously, the PLS instruction is not performed again unless the drive contact is changed from OFF to ON.	The ZRST instruction resets not only the state of the designated device, but also resets the previous status for the PLS or PLF instructions. If a ZRST instruction designating the same device as a PLS command has been programmed previously, the PLS instruction is performed again if the drive contact remains in the ON status.	Change the drive contact of PLS instructions to LDP instructions, or add MEP instructions between drive contacts and PLS instructions.
	Combined operation of the ZRST and PLS, PLF instructions.			
	FNC48	M8020 (zero flag), M8021 (borrow flag) are not cleared when the instruction is executed.	M8020 (zero flag), M8021 (borrow flag) is cleared when the instruction is executed.	If a part of the program references M8020 or M8021 after a SQR or DSQR instructions, create a sequence program to store the status of M8020 and M8021 in a separate device before execution of the instructions.
	Clearing timing of SQR, DSQR instruction flags.			

Item		Operational difference		Caution
		FX2N series	FX3U series	
High-speed processing	FNC53/54/55 High-speed counter comparison applied instructions DHSCS, DHSCR, DHSZ.	When the same comparison value is set for DHSCS, DHSCR, and DHSZ instructions, and interrupt process timings are overlapped, processing is executed in the same order that the instructions appear in the program.	When the same comparison value is set for DHSCS, DHSCR, and DHSZ instructions, and interrupt process timings are overlapped, processing is executed according to following the priority order. ①DHSCR(self-reset) ②DHSZ ③DHCT ④DHSCS ⑤DHSCR	Refer to Common caution 6 in section 13.4 of the FX3G/FX3U/FX3UC series programming manual when using high-speed counter comparison instructions.
	FNC56 Reflection of change of counting time during execution of the SPD instruction.	If an indirect device used to store the counting time is changed while the SPD instruction is being executed, changes are reflected when the instruction is executed again.	If an indirect device used to store the counting time is changed while the SPD instruction is being executed, changes are reflected after the remaining time has elapsed.	If having the changed counting time being reflected before the SPD instruction is executed again is a problem, make changes to the device containing the counting time before the SPD instruction is executed.
External FX I/O device	FNC70 to 75,77 TKY, HKY, DSW, SEGL, ARWS, PR instructions	When the number of devices necessary for operation is greater than the range of devices designated by the operand, it is not an error, but the arithmetic operation is conducted within the possible range.	When the number of devices necessary for operation is greater than the range of devices designated by the operand, an operation error (6706) occurs, and the arithmetic operation is not executed.	In the FX3U, error detection in instruction execution is implemented. Please check the program, and change the device allocation so as to avoid errors.
	FNC78/79 Designation of number of transfer points of FROM/TO instruction	By turning on M8164, the value of D8164 becomes the number of transfer points n.	D and R devices can be designated as the number n of transfer points.	For the number n of transfer points, indirect designation of D and R devices is possible. Please revise the program so as to use D and R devices.
External FX device	FNC80 Echo communication when one-pair wiring is used for RS-485 RS communication	Because of the full duplex interface, in the case of one-pair wiring with the RS command, echo communication occurs.	Because of the half duplex interface, in the case of one-pair wiring with the RS command, echo communication does not occur.	In the case of one-pair wiring with the RS command, in the FX2N, a program for discarding the data received in echo communication is needed, but it is not needed in the FX3U. Delete the program for discarding the echo communication data.
	FNC81 PRUN instructions	If M devices are designated in S· and D·, and the number of devices necessary for operation exceeds the range of M devices, it is not an error, but the arithmetic operation is conducted within the possible range.	If M devices are designated in S· and D·, and the number of devices necessary for operation exceeds the range of M devices, an operation error (6706) occurs, and the arithmetic operation is not conducted.	In the FX3U, error detection in instruction execution is implemented. Please check the program, and change the device allocation so as to avoid errors.
	FNC88 Increase in number of occupied points for S3 of the PID instruction.	S3 occupies 25 points.	S3 occupies 29 points.	The number of occupied points is increased. Confirm devices are allocated correctly.
Data conversion	FNC129 Operation in the event of an overflow INT instruction execution result	If the conversion result overflows, a positive maximum value or a negative maximum value is stored in D·.	If the conversion result overflows, D· is not updated, and remains at the value before execution of the instruction.	If the carry flag (M8022) is ON, change the program so as to process without referring to D·.

Item			Operational difference		Caution
			FX2N series	FX3U series	
External ROM function	FNC180		-	-	-
	EXTR instruction inverter communication function	Operation monitor	EXTR(K10)	IVCK	Please replace with the corresponding inverter instruction. For details, please refer to the External Device Communication (Inverter Communication) section of the FX3G/FX3U/FX3UC programming manual.
		Operation control	EXTR(K11)	IVDR	
		Parameter reading	EXTR(K12)	IVRD	
		Parameter writing	EXTR(K13)	IVWR	
		Flag during communication	M8155	M8151(ch1)	Change allocation to the corresponding device.
		Communication error	M8156	M8152(ch1)	Change allocation to the corresponding device.
		Communication error latch	M8157	M8153(ch1)	Change allocation to the corresponding device.
		Response waiting time	D8154	D8150(ch1)	Change allocation to the corresponding device.
		Step number of instruction during communication	D8155	D8151(ch1)	Change allocation to the corresponding device.
		Communication error code	D8156	D8152(ch1)	Change allocation to the corresponding device.
		Communication error occurrence step	D8157	D8153(ch1)	Change allocation to the corresponding device.

2.4.2 Device comparison

● Comparison of FX2N series and FX3U series devices

The devices used in FX2N series can be used in the FX3U series including special devices.
The following table also shows devices implemented in the FX3U series.

■ Device comparison table (the shaded cells indicates difference in specification).

Device			FX2N series		FX3U series	
Division		Use	Number	No. of points	Number	No. of points
M	Auxiliary relay	General use [variable]	M0 to M499	500 points	M0 to M499	500 points
		Latched [variable]	M500 to M1023	524 points	M500 to M1023	524 points
		Latched [fixed]	M1024 to M3071	2048 points	M1024 to M7679	6656 points
		Special	M8000 to M8255	256 points	M8000 to M8511	512 points
S	State relay	Initial state (general) [variable]	S0 to S9	10 points	S0 to S9	10 points
		General use [variable]	S10 to S499	490 points	S10 to S499	490 points
		Latched [variable]	S500 to S899	400 points	S500 to S899	400 points
		Annunciator (latched) [variable]	S900 to S999	100 points	S900 to S999	100 points
		Latched [fixed]	-	-	S1000 to S4095	3096 points
T	Timer	100ms	T0 to T191	192 points	T0 to T191	192 points
		100ms (for subroutine or interrupt)	T192 to T199	8 points	T192 to T199	8 points
		10ms	T200 to T245	46 points	T200 to T245	46 points
		1ms retentive type	T246 to T249	4 points	T246 to T249	4 points
		100ms retentive type	T250 to T255	6 points	T250 to T255	6 points
		1ms	-	-	T256 to T511	256 points
C	Counter	General up counter (16-bit) [variable]	C0 to C99	100 points	C0 to C99	100 points
		Latched up counter (16-bit) [variable]	C100 to C199	100 points	C100 to C199	100 points
		General bi-directional counter (32-bit) [variable]	C200 to C219	20 points	C200 to C219	20 points
		Latched bi-directional counter (32-bit) [variable]	C220 to C234	15 points	C220 to C234	15 points
	High-speed counter	1-phase 1-counting input bi-directional (32-bit) [variable]	C235 to C245 60kHz 2 points +10kHz 4 points	6 points	C235 to C245 100kHz 6 points +10kHz 2 points	8 points
		1-phase 2-counting input bi-directional (32-bit) [variable]	C246 to C250 60kHz 1 points or 10kHz 2 points	2 points	C246 to C250 100kHz 2 points or 40kHz 2 points	2 points
		2-phase 2-counting input bi-directional (32-bit) [variable]	C251 to C255 5kHz 2 points	2 points	C251 to C255 50kHz 2 points or 40kHz 2 points	2 points

Device		Use	FX2N series		FX3U series	
Division			Number	No. of points	Number	No. of points
D	Data register	General use (16-bit) [variable]	D0 to D199	200 points	D0 to D199	200 points
		Latched (16-bit) [variable]	D200 to D511	312 points	D200 to D511	312 points
		Latched (16-bit) [fixed]	D512 to D7999	7488 points	D512 to D7999	7488 points
		Special (16-bit)	D8000 to D8255	256 points	D8000 to D8511	512 points
		Index (16-bit)	V0 to V7, Z0 to Z7	16 points	V0 to V7, Z0 to Z7	16 points
		Extension register (16-bit)	-	-	R0 to R32767	32768 points
		Extension file register 16-bit	-	-	ER0 to ER32767 (when memory cassette is installed)	32768 points
P	Pointer	For JUMP, CALL branch	P0 to P127	128 points	P0 to P4095	4096 points
		Input interrupt	I00□ to I50□	6 points	I00□ to I50□	6 points in total
		Input delay interrupt	-	-	I00□ to I50□	
		Timer interrupt	I6□□ to I8□□	3 points	I6□□ to I8□□	3 points
		Counter interrupt	I010 to I060	6 points	I010 to I060	6 points

2.5 Replacement of PLCs

The following includes main points of caution when replacing main units and expansion equipment. For more details on each item, please refer to the reference page of this manual, and the hardware and programming manuals of the PLCs and related documents.

Applicable equipment	Item	Measures and cautions	Reference page
Main unit	Change of mounting width dimension when mounting with screws	Screw mounting positions in the lateral direction are different. Modifications may be required for hardware installation.	Section 2.3
	Additional wiring for input terminal block	Add wiring to the S/S terminal of the FX3U series.	
	Input and output wiring change	Wiring change required for terminal block connections.	
RS-485 communication expansion equipment	Checking cable size for wiring of FX2N-485-BD or FX2N-485ADP	Make sure FX3U RS-485 communication equipment conforms to the corresponding wire size. If it does not conform, change the wire size.	
	Handling of terminal end resistance of FX2N-485-BD or FX2N-485ADP	FX3U RS-485 communication equipment incorporates terminal end resistance. Select the resistance value by using the built-in selection switch.	
Other expansion equipment	Wiring to each unit and block	Re-wiring is needed for terminal block type equipment.	
Operation confirmation	Operation and test of sequence program	Operate the replacement sequence program and hardware equipment, check and adjust the equipment function and operation timing. Note the difference in function mentioned in the reference page, and make sure the equipment operates in conformity with the designed specification.	Section 2.4

3. Replacement of FX2NC series

3.1 Outline

The production of the FX2NC series main unit and certain expansion equipment will be terminated in September 2012.
The repair service period will end at the end of September 2019.
The procedure to replace the FX2NC series with its successor, the FX3UC series, is outlined here.

3.1.1 Cautions

(1) "Recommended replacement models" lists the most fitting FX3 series product based on specification comparison. Depending on operation environment or the system configuration (connection status of expansion equipment), or when the number of inputs and outputs in use is smaller, other products may be more appropriate than the recommended replacement model.

(2) Recommended replacement models for extension blocks, extension units, special function modules, expansion boards, and batteries are selected based on compatibility with current FX3 series main units.

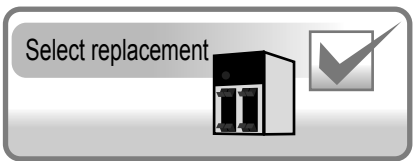
(3) Pay close attention to notes marked as "Special remarks." For attributes such as external dimensions, there can be slight differences between the recommended replacement model and existing product. Before performing replacement, be sure to review other relevant details such as dimensions, and power supply requirements.

(4) For instances where there is no recommended replacement model, a message stating "No recommended replacement model" will be shown. In this case, a FX3 series system may still be able to provide equivalent operation.
Evaluate the requirements of the application and use a FX3 series system configuration for replacement.

3.2 Replacement procedure

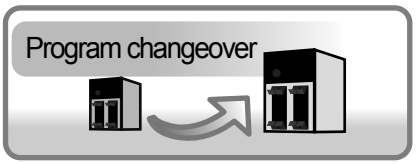
The replacement procedure is shown below.

FX3UC series products are generally recommended as replacements for FX2NC series products.



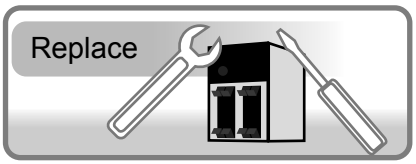
3.3
Selection of replacement models

3.3.1 Recommended replacement models
3.3.2 Cautions about hardware

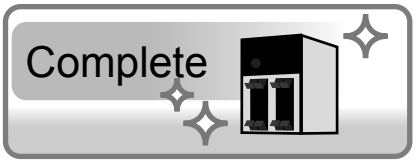


3.4 / 4.1
Program conversion

3.4.1 Cautions for program change
3.4.2 Device comparison
4.1.1 Program conversion procedure
4.1.2 Programming tool



3.5
Replacement of PLCs



3.3 Selection of replacement models

3.3.1 Recommended replacement models

(1) Main unit recommended replacement models

FX3UC recommended replacement models corresponding to the FX2NC series are introduced.
Please replace currently used main units with the following recommended models.

■ FX2NC series and recommended replacement models (main units)

FX2NC series		Recommended replacement model	Special remarks
Description	Model name	Model name	
Main unit (24V DC power source) (sink input, transistor sink output)	FX2NC-16MT-D/UL	FX3UC-16MT/D	
	FX2NC-32MT-D/UL	FX3UC-32MT/D	
	FX2NC-64MT-D/UL	FX3UC-64MT/D	
	FX2NC-96MT-D/UL	FX3UC-96MT/D	
Main unit (24V DC power source) (sink/source input, transistor source output)	FX2NC-16MT-DSS	FX3UC-16MT/DSS	
	FX2NC-32MT-DSS	FX3UC-32MT/DSS	
	FX2NC-64MT-DSS	FX3UC-64MT/DSS	
	FX2NC-96MT-DSS	FX3UC-96MT/DSS	
Main unit (24V DC power source) (sink/source input, relay output)	FX2NC-16MR-T-DS	FX3UC-16MR/DS-T	
Main unit (24V DC power source) (sink input, transistor sink output)	FX2NC-16MT	FX3UC-16MT/D	
	FX2NC-32MT	FX3UC-32MT/D	
	FX2NC-64MT	FX3UC-64MT/D	
	FX2NC-96MT	FX3UC-96MT/D	
Main unit (24V DC power source) (sink input, relay output)	FX2NC-16MR-T	FX3UC-16MR/D-T	

(2) Expansion equipment recommended replacement models

When changing from FX2NC to FX3UC main units, the following expansion equipment and option equipment must be replaced at the same time.
If replacement models with the same performance are not available, please review and consider to re-design the system following the comments included in the "Special remarks" column.

■ List of expansion equipment and option equipment required to be replaced when FX2NC series main units are changed to FX3UC series.

Models connectable to FX2NC series		Recommended replacement models connectable to FX3UC	Special remarks
Description	Model name	Model name	
Special adapter (for RS-232C communication)	FX2NC-232ADP	FX3U-232ADP	
Special adapter (for RS-485 communication)	FX2NC-485ADP	FX3U-485ADP	
Memory board	FX2NC-EEPROM-16	FX3U-FLROM-16	
Memory board with real-time clock function	FX2NC-EEPROM-4C FX2NC-EEPROM-16C	FX3U-FLROM-16	Recommended replacement model for FX3UC only has memory back-up functionality. Clock function is built into the FX3UC main unit.
Function extension memory board	FX2NC-ROM-CE1	FX3U-FLROM-16	Recommended replacement model for FX3UC only has memory back-up functionality. Clock function and inverter communication function are built into the FX3UC main unit.
Real-time clock function board	FX2NC-RTC	No replacement model	Clock function is built into the FX3UC main unit.
Special block (ASI master)	FX2N-32ASI-M	No replacement model	Create a new system using CC-Link etc.
Special block (I/O link master)	FX2N-16LNK-M	No replacement model	Create a new system using CC-Link/LT etc.

(3) FX2NC expansion equipment usable when the main unit is changed to FX3UC series

When main units are changed from FX2NC series to FX3UC series, the following FX2NC expansion equipment in general can be used.
However, if use is expected to continue for a long period, it is recommended to replace units following the practices of preventative maintenance.

■ FX2NC series expansion equipment usable by the FX3UC-□□MT/DSS type.

Input extension block		Output extension block	
FX2NC-16EX-D/UL	FX2NC-32EX-D/UL	FX2NC-16EYT-D/UL	FX2NC-32EYT-D/UL
FX2NC-16EX-DS	FX2NC-32EX-DS	FX2NC-16EYT-DSS	FX2NC-32EYT-DSS
FX2NC-16EX-T-DS		FX2NC-16EYR-T-DS	

■ FX2N series expansion equipment usable by the FX3UC-□□MT/DSS type.

Input/output extension unit	Output extension block
FX2N-8ER-ES/UL	FX2N-8EYR-ES/UL
	FX2N-8EYT-ESS/UL
Input extension block	FX2N-8EYR-S-ES/UL
FX2N-8EX-ES/UL	FX2N-16EYR-ES/UL
FX2N-16EX-ES/UL	FX2N-16EYT-ESS/UL

For connection of expansion blocks, a FX2NC-CNV-IF or FX3UC-1PS-5V is needed.

■ Expansion equipment usable when main units are changed from FX2NC series to FX3UC series

Connector conversion, extension cable	Input extension block	Analog input	High-speed counter
FX2N-CNV-BC	FX2NC-16EX	FX2NC-4AD	FX2NC-1HC
FX0N-30EC	FX2NC-16EX-T	FX2N-2AD	FX2N-1HC
FX0N-65EC	FX2NC-32EX	FX2N-4AD	Positioning control
Input/output extension block	FX2N-8EX	FX2N-8AD	FX2N-1PG-E
	FX2N-8EX-UA1/UL	Analog output	FX2N-10PG
FX2NC-64ET	FX2N-16EX	FX2NC-4DA	FX2N-1RM-E-SET
FX2N-8ER	FX2N-16EX-C	FX2N-2DA	FX2N-10GM
	FX2N-16EXL-C	FX2N-4DA	FX2N-20GM
	Output extension block	Analog input and output mix	Communication/ network
	FX2NC-16EYT		
	FX2NC-16EYR-T	FX0N-3A	FX2N-232IF
	FX2NC-32EYT	FX2N-5A	FX2N-32ASI-M
	FX2N-8EYR	Temperature sensor, temperature control	FX2N-32CAN
	FX2N-8EYT		FX2N-32CCL
	FX2N-8EYT-H	FX2N-4AD-TC	FX2N-16CCL-M
	FX2N-16EYR	FX2N-4AD-PT	FX2N-64CL-M
	FX2N-16EYT	FX2N-2LC	FX2N-16LNK-M
	FX2N-16EYT-C		
	FX2N-16EYS		

For connection of FX2N series expansion blocks, a FX2NC-CNV-IF or FX3UC-1PS-5V is needed.

(4) Expansion equipment newly available with the FX3UC series

When main units are changed from FX2NC series to FX3UC series, the following FX3 series expansion equipment can be used.
Since FX3 series special adapters do not consume any inputs or output points, they can be added without affecting the number of I/O points.
System performance can be increased over that of the existing system by using equipment available for the FX3UC series.

■ FX3 series expansion equipment for the FX3UC series

Analog input	Temperature sensor, temperature control	High-speed counter	Communication/ network
FX3UC-4AD	FX3U-4AD-TC-ADP	FX3U-2HC	FX3U-232ADP(-MB)
FX3U-4AD-ADP	FX3U-4AD-PT(W)-ADP	Positioning control	FX3U-485ADP(-MB)
FX3U-4AD	FX3U-4AD-PNK-ADP	FX3U-20SSC-H	FX3U-16CCL-M
Analog output	FX3U-4LC	Data collection	FX3U-64CCL
FX3U-4DA-ADP	Power supply extension unit	FX3U-CF-ADP	FX3U-ENET-ADP
FX3U-4DA	FX3UC-1PS-5V		FX3U-ENET
Analog input and output mix			
FX3U-3A-ADP			

For connection of FX3U series expansion blocks, a FX2NC-CNV-IF or FX3UC-1PS-5V is needed.

(5) Battery

The batteries used in the FX2N series and FX3U series main units are different.
Select batteries based on the main unit.

Battery for FX2NC series	FX2NC-32BL
Battery for FX3UC series	FX3U-32BL

(6) Use of the MELSEC-F series selection tool

By using the MELSEC-F series Selection Tool, it is possible to confirm whether or not a system configuration containing FX2N series expansion equipment is valid for a FX3U series main unit.

3.3.2 Cautions about hardware

- Comparison of FX2N series and FX3U series and cautions for replacement
  This is a list of hardware cautions. When performing replacement, please refer to the manual of each model and confirm details there.

■ Hardware differences of FX2NC series and FX3UC series, and cautions

No.	Item	Difference		Caution
		FX2NC series	FX3UC series	
1	Battery and mounting position	FX2NC-32BL lithium thionyl chloride primary battery	FX3U-32BL lithium manganese dioxide primary battery	Type name (model) is different. Mounting position is different.
2	Voltage of battery	Nominal voltage 3.6V	Nominal voltage 3.0V	Be careful when using special device D8005 (battery voltage).
3	Product width dimension	-	Width of main unit is shorter by 0.3 to 1mm depending on the model.	See Fig. 1 on next page.
4	Input hardware filter (when digital filter is zero) • High-speed counter • Input interrupt function • Pulse catch function	X0, X1: 20µs X2 to X7: 50µs X10 to X17: 200µs* *16-I/O point main unit: 10ms	X0 to X5: 5µs X6, X7: 50µs X10 to X17: 200µs* *16-I/O point main unit: 10ms	Noise, not detected in FX2NC, may affect input of FX3UC. If necessary, implement a noise countermeasure external to the main unit.
5	Terminal end resistance of 485ADP	Packaged together with ADP; to be selected and mounted.	Built into ADP; selectable using a switch.	In FX3UC, the resistance value can be selected using a built-in switch.
6	Wire size of 485ADP	AWG26 to 16	AWG22 to 20	Wire size is different. A large wire size may not be usable in FX3UC. (See cable size in Table 1. below).

Table 1. Cable size European terminal type connectors

For connection with RS-485 communication equipment, use a twisted pair cable with shielding. Conforming wire size and tightening torque are as follows.

	Wire size of one-wire connection	Wire size of two-wire connection	Wire ferrule with insulation sleeve (wire size)	Tightening torque	Insulation sheath stripping length*
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not usable	0.4 to 0.5N·m	8mm
FX3U-485ADP(-MB)	AWG22 to AWG20	AWG22	Usable (AWG22 to AWG20)	0.22 to 0.25N·m	9mm

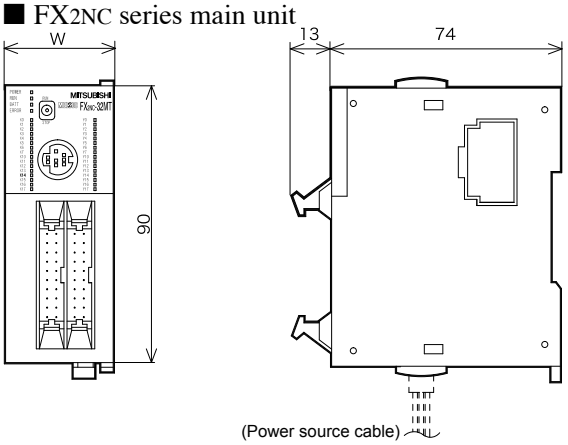
* Insulation sheath stripping length shows the dimension when connecting the wire to the terminal directly.

For details, please refer to the FX Series User's Manual (Data communication edition) JY997D16907.

Fig. 1. Outline drawing.

The overall dimensions of the FX2NC and FX3UC are almost identical, but the FX3UC has a 0.3 to 1mm shorter width, depending on model.

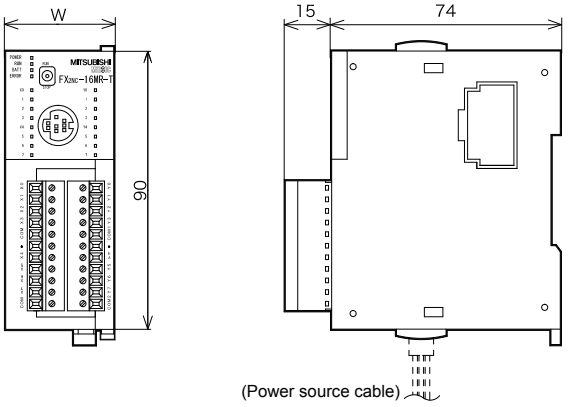
■ FX2NC series main unit



Outer coat color: Munsell 0.08GY/7.64/0.81
Unit: mm

Type name	W (mm)	Mass(kg)
FX2NC-16MT-D/DSS	35	0.20
FX2NC-32MT-D/DSS	35	0.20
FX2NC-64MT-D/DSS	60	0.35
FX2NC-96MT-D/DSS	86	0.45

- 35mm DIN rail can be mounted.
- FX2NC-100MPCB, FX2NC-100BPCB type power cables are provided.



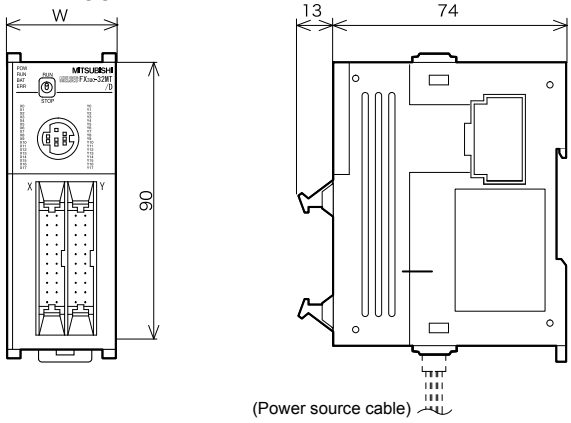
Type name	W (mm)	Mass (kg)
FX2NC-16MR-T	35	0.25
FX2NC-16MR-T-DS	35	0.25

- 35mm DIN rail can be mounted.

[Accessory]

- FX2NC-16MR-T
  FX2NC-100MPCB type power cable
  FX2NC-100BPCB type power cable
- FX2NC-16MR-T-DS
  FX2NC-100MPCB type power cable

■ FX3UC series main unit



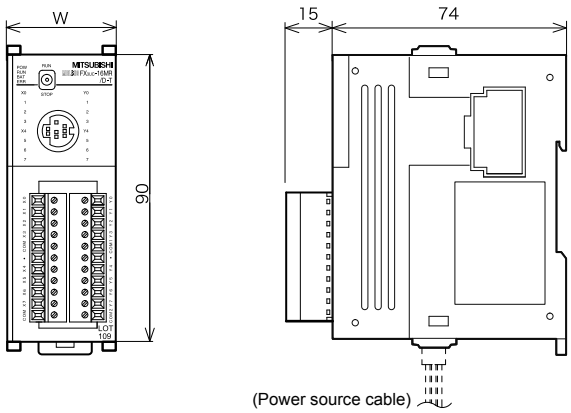
Outer coat color: Munsell 0.08GY/7.64/0.81
Unit: mm

Type name	W (mm)	Mass (kg)
FX3UC-16MT/D, DSS	34.0	0.20
FX3UC-32MT/D, DSS	34.0	0.20
FX3UC-64MT/D, DSS	59.7	0.30
FX3UC-96MT/D, DSS	85.4	0.35

- 35mm DIN rail can be mounted.

[Accessory]

- FX3UC-□□MT/D
  FX2NC-100MPCB type power cable
  FX2NC-100BPCB type power cable
- FX3UC-□□MT/DSS
  FX2NC-100MPCB type power cable



Type name	W (mm)	Mass (kg)
FX3UC-16MR/D-T	34	0.25
FX3UC-16MR/DS-T	34	0.25

- 35mm DIN rail can be mounted.

[Accessory]

- FX3UC-16MR/D-T
  FX2NC-100MPCB type power cable
  FX2NC-100BPCB type power cable
- FX3UC-16MR/DS-T
  FX2NC-100MPCB type power cable

3.4 Program conversion

3.4.1 Cautions for program change

- Operational difference of FX2NC series and FX3UC series
  The FX3UC series can use the same instructions used in the FX2NC series, but the following operations are different. Depending on the hardware configuration or program contents, check the corresponding items by correcting or replacing the sequence program or checking operations.

■ Function difference and cautions about program and system

Item			Operational difference		Caution
			FX2NC series	FX3UC series	
System related					
Initial setting	Initial setting of D8008		Program for writing -1 in D8008 is needed for initialization.	Not needed because the system is initialized automatically.	In FX3UC, initial setting in D8008 is not needed. Please delete the initial setting program.
	Devices monitored by M8004 for error detection		M8060 to M8067, except for M8062.	M8060 to M8067, except for M8062 and M8063.	If M8004 is used to monitor M8063, add an additional program to provide equivalent operation.
High-speed input	32-bit counter specified in single word instruction		If double words C200 to C255 are specified in a single word applied instruction, an operation error occurs when the command is executed.	If double words C200 to C255 are specified in a single word applied instruction, RUN is not executed, and a syntax error occurs. However, the ZRST command can designate C200 to C255.	In FX3UC, error detection before RUN is implemented. Check the program, and correct so as to avoid errors.
	Pulse catch function		If interrupt is permitted in EI command only, the pulse catch function is valid.	EI command is not needed. The pulse catch function is always valid.	In FX3UC, it must be noted that the pulse catch function is always valid.
Communication	Clear timing for serial communication error M8063 and D8063 devices.		When changed from STOP to RUN.	When power is turned OFF.	Not cleared when changed from STOP to RUN; when necessary to clear, add an initializing program using the RST command.
	Parallel link	Baud rate	19,200bps	115,200bps	It must be noted that there is an increased possibility of noise with faster communication speeds.
		Link time of ordinary parallel link mode	70ms +master station operation period (ms) +slave station operation period (ms)	15ms +master station operation period (ms) +slave station operation period (ms)	Since the link time becomes shorter, confirm the update timing of the link device.
		Link time of high-speed parallel link mode	20ms +master station operation period (ms) +slave station operation period (ms)	5ms +master station operation period (ms) +slave station operation period (ms)	
Instruction related					
Step ladder program	STL instruction in transfer and recombination programs.		If a NOP instruction is inserted between STL instructions, transfer and recombination are not enabled.	If a NOP instruction is inserted between STL instructions, transfer and recombination are enabled.	If a NOP instruction is inserted between STL instructions, replace it with a dummy program not containing the NOP instruction and having no effect on the sequence operation.
	ON condition of STL operation device M8046.		If S0 to S899 is ON and M8047 is enabled.	If S0 to S899, S1000 to S4095 is ON when M8047 is enabled.	Since the object device range differs, add a program for initializing S1000 to S4095.

Item		Operational difference		Caution
		FX2NC series	FX3UC series	
Step ladder program	Range of device numbers to be stored in D8040 to D8047 when M8047 is enabled.	Stores active state numbers sequentially in ascending order from the range S0 to S899.	Stores active state numbers sequentially in ascending order from the range S0 to S899, S1000 to S4095.	Since the object device range differs, add a program for initializing S1000 to S4095.
Common items	Instruction execution time	See 7. Execution Times and Instructional Hierarchy of the "FX1S/FX1N/FX2N series programming manual."	See Appendix B: Instruction Execution Times of the "FX3G/FX3U/FX3UC series programming manual."	Since the instruction execution time varies, confirm operation for programs that operate in concert with the scan time.
Program flow	FNC00/01 Detection of error designated by pointer not using the CJ or, CALL instructions.	If the destination of a jump or call is not available, an operation error occurs when the CJ or CALL instructions are executed.	If the destination of a jump or call is not available, when not in RUN state, a syntax error occurs. However, if the pointer is indexed, an operation error occurs when executing the instruction.	In the FX3UC, error detection before RUN is implemented. Check the program, and correct to avoid errors.
Move, compare	FNC15 File register write execution time using the BMOV instruction	10 to 20ms per 8 consecutive points.	66 to 132ms per 500 consecutive points.* * Even writing of one point may require the specified time.	When writing into file registers using the BMOV instruction when a memory cassette is in use, the scan time may be extended when executing the BMOV instruction. During execution of the BMOV instruction, the watch dog timer is not refreshed. Insert the WDT command as required or take other measures.
Shift	FNC34 to 37 Operation when devices are overlapped with the SFTR, SFTL, WSFR, WSFL instructions.	If S or D device ranges are overlapped, correct operation results may not be obtained, but operation is executed.	If S or D device ranges are overlapped, and operation error (6710) occurs, and operation is not executed.	Since the operation result becomes abnormal, the FX3UC has been changed so that an operation error occurs. Make modifications so as to avoid an operation error.
Data processing	FNC40 Clearing of a reset coil with the ZRST instruction.	If the ZRST instruction designating a timer or counter as the operand is executed, the reset coil of this timer or counter is not cleared.	If the ZRST instruction designating a timer or counter as the operand is executed, the reset coil of this timer or counter is also cleared.	In the FX2NC, to clear the reset coil of a timer or counter, a RST instruction was needed, but in the FX3UC, batch resetting is possible using the ZRST instruction.
	FNC40 Combined operation of the ZRST and PLS, PLF instructions.	The ZRST instruction resets the state of the designated device, but does not reset the previous status for the PLS or PLF instructions. If a ZRST instruction designating the same device as a PLS command has been programmed previously, the PLS instruction is not performed again unless the drive contact is changed from OFF to ON.	The ZRST instruction resets not only the state of the designated device, but also resets the previous status for the PLS or PLF instructions. If a ZRST instruction designating the same device as a PLS command has been programmed previously, the PLS instruction is performed again if the drive contact remains in the ON status.	Change the drive contact of PLS instructions to LDP instructions, or add MEP instructions between drive contacts and PLS instructions.
	FNC48 Clearing timing of SQR, DSQR instruction flags.	M8020 (zero flag), M8021 (borrow flag) are not cleared when the instruction is executed.	M8020 (zero flag), M8021 (borrow flag) is cleared when the instruction is executed.	If a part of the program references M8020 or M8021 after a SQR or DSQR instructions, create a sequence program to store the status of M8020 and M8021 in a separate device before execution of the instructions.

Item		Operational difference		Caution
		FX2NC series	FX3UC series	
High-speed processing	FNC53/54/55 High-speed counter comparison applied instructions DHSCS, DHSCR, DHSZ.	When the same comparison value is set for DHSCS, DHSCR, and DHSZ instructions, and interrupt process timings are overlapped, processing is executed in the same order that the instructions appear in the program.	When the same comparison value is set for DHSCS, DHSCR, and DHSZ instructions, and interrupt process timings are overlapped, processing is executed according to following the priority order. ①DHSCR(self-reset) ②DHSZ ③DHCT ④DHSCS ⑤DHSCR	Refer to Common caution 6 in section 13.4 of the FX3G/FX3U/FX3UC series programming manual when using high-speed counter comparison instructions.
	FNC56 Reflection of change of counting time during execution of the SPD instruction.	If an indirect device used to store the counting time is changed while the SPD instruction is being executed, changes are reflected when the instruction is executed again.	If an indirect device used to store the counting time is changed while the SPD instruction is being executed, changes are reflected after the remaining time has elapsed.	If having the changed counting time being reflected before the SPD instruction is executed again is a problem, make changes to the device containing the counting time before the SPD instruction is executed.
External FX I/O device	FNC70 to 75,77 TKY, HKY, DSW, SEGL, ARWS, PR instructions	When the number of devices necessary for operation is greater than the range of devices designated by the operand, it is not an error, but the arithmetic operation is conducted within the possible range.	When the number of devices necessary for operation is greater than the range of devices designated by the operand, an operation error (6706) occurs, and the arithmetic operation is not executed.	In the FX3UC, error detection in instruction execution is implemented. Please check the program, and change the device allocation so as to avoid errors.
	FNC78/79 Designation of number of transfer points of FROM/TO instruction	By turning on M8164, the value of D8164 becomes the number of transfer points n.	D and R devices can be designated as the number n of transfer points.	For the number n of transfer points, indirect designation of D and R devices is possible. Please revise the program so as to use D and R devices.
External FX device	FNC80 Echo communication when one-pair wiring is used for RS-485 RS communication	Because of the full duplex interface, in the case of one-pair wiring with the RS command, echo communication occurs.	Because of the half duplex interface, in the case of one-pair wiring with the RS command, echo communication does not occur.	In the case of one-pair wiring with the RS command, in the FX2N, a program for discarding the data received in echo communication is needed, but it is not needed in the FX3U. Delete the program for discarding the echo communication data.
	FNC81 PRUN instructions	If M devices are designated in S· and D·, and the number of devices necessary for operation exceeds the range of M devices, it is not an error, but the arithmetic operation is conducted within the possible range.	If M devices are designated in S· and D·, and the number of devices necessary for operation exceeds the range of M devices, an operation error (6706) occurs, and the arithmetic operation is not conducted.	In the FX3UC, error detection in instruction execution is implemented. Please check the program, and change the device allocation so as to avoid errors.
	FNC88 Increase in number of occupied points for S3 of the PID instruction.	S3 occupies 25 points.	S3 occupies 29 points.	The number of occupied points is increased. Confirm devices are allocated correctly.
Data conversion	FNC129 Operation in the event of an overflow INT instruction execution result	If the conversion result overflows, a positive maximum value or a negative maximum value is stored in D·.	If the conversion result overflows, D· is not updated, and remains at the value before execution of the instruction.	If the carry flag (M8022) is ON, change the program so as to process without referring to D·.

Item			Operational difference		Caution
			FX2NC series	FX3UC series	
External ROM function	FNC180		-	-	-
	EXTR instruction inverter communication function	Operation monitor	EXTR(K10)	IVCK	Please replace with the corresponding inverter instruction. For details, please refer to the External Device Communication (Inverter Communication) section of FX3G/FX3U/FX3UC programming manual.
		Operation control	EXTR(K11)	IVDR	
		Parameter reading	EXTR(K12)	IVRD	
		Parameter writing	EXTR(K13)	IVWR	
		Flag during communication	M8155	M8151(ch1)	Change allocation to the corresponding device.
		Communication error	M8156	M8152(ch1)	Change allocation to the corresponding device.
		Communication error latch	M8157	M8153(ch1)	Change allocation to the corresponding device.
		Response waiting time	D8154	D8150(ch1)	Change allocation to the corresponding device.
		Step number of instruction during communication	D8155	D8151(ch1)	Change allocation to the corresponding device.
		Communication error code	D8156	D8152(ch1)	Change allocation to the corresponding device.
		Communication error occurrence step	D8157	D8153(ch1)	Change allocation to the corresponding device.

3.4.2 Device comparison

- Comparison of FX2NC series and FX3UC series devices

  The devices used in FX2NC series can be used in the FX3UC series including special devices.
  The following table also shows devices implemented in the FX3UC series.

■ Device comparison table (the shaded cells indicates difference in specification).

Device			FX2NC series		FX3UC series	
Division		Use	Number	No. of points	Number	No. of points
M	Auxiliary relay	General use [variable]	M0 to M499	500 points	M0 to M499	500 points
		Latched [variable]	M500 to M1023	524 points	M500 to M1023	524 points
		Latched [fixed]	M1024 to M3071	2048 points	M1024 to M7679	6656 points
		Special	M8000 to M8255	256 points	M8000 to M8511	512 points
S	State relay	Initial state (general) [variable]	S0 to S9	10 points	S0 to S9	10 points
		General use [variable]	S10 to S499	490 points	S10 to S499	490 points
		Latched [variable]	S500 to S899	400 points	S500 to S899	400 points
		Annunciator (latched) [variable]	S900 to S999	100 points	S900 to S999	100 points
		Latched [fixed]	-	-	S1000 to S4095	3096 points
T	Timer	100ms	T0 to T191	192 points	T0 to T191	192 points
		100ms (for subroutine or interrupt)	T192 to T199	8 points	T192 to T199	8 points
		10ms	T200 to T245	46 points	T200 to T245	46 points
		1ms retentive type	T246 to T249	4 points	T246 to T249	4 points
		100ms retentive type	T250 to T255	6 points	T250 to T255	6 points
		1ms	-	-	T256 to T511	256 points
C	Counter	General up counter (16-bit) [variable]	C0 to C99	100 points	C0 to C99	100 points
		Latched up counter (16-bit) [variable]	C100 to C199	100 points	C100 to C199	100 points
		General bi-directional counter (32-bit) [variable]	C200 to C219	20 points	C200 to C219	20 points
		Latched bi-directional counter (32-bit) [variable]	C220 to C234	15 points	C220 to C234	15 points
	High-speed counter	1-phase 1-counting input bi-directional (32-bit) [variable]	C235 to C255 60kHz 2 points +10kHz 4 points	6 points	C235 to C255 100kHz 6 points +10kHz 2 points	8 points
		1-phase 2-counting input bi-directional (32-bit) [variable]	C246 to C250 60kHz 1 points or 10kHz 2 points	2 points	C246 to C250 100kHz 2 points or 40kHz 2 points	2 points
		2-phase 2-counting input bi-directional (32-bit) [variable]	C251 to C255 5kHz 2 points	2 points	C251 to C255 50kHz 2 points or 40kHz 2 points	2 points

Device			FX2NC series		FX3UC series	
Division		Use	Number	No. of points	Number	No. of points
D	Data register	General use (16-bit) [variable]	D0 to D199	200 points	D0 to D199	200 points
		Latched (16-bit) [variable]	D200 to D511	312 points	D200 to D511	312 points
		Latched (16-bit) [variable]	D512 to D7999	7488 points	D512 to D7999	7488 points
		Special (16-bit)	D8000 to D8255	256 points	D8000 to D8511	512 points
		Index (16-bit)	V0 to V7, Z0 to Z7	16 points	V0 to V7, Z0 to Z7	16 points
		Extension register (16-bit)	-	-	R0 to R32767	32768 points
		Extension file register 16-bit	-	-	ER0 to ER32767 (when memory cassette is installed)	32768 points
P	Pointer	For JUMP, CALL branch	P0 to P127	128 points	P0 to P4095	4096 points
		Input interrupt	I00□ to I50□	6 points	I00□ to I50□	6 points in total
		Input delay interrupt	-	-	I00□ to I50□	
		Timer interrupt	I6□□ to I8□□	3 points	I6□□ to I8□□	3 points
		Counter interrupt	I010 to I060	6 points	I010 to I060	6 points

3.5 Replacement of PLCs

The following includes main points of caution when replacing main units and expansion equipment. As for the detail of each item, please refer to the reference page of this manual, and the hardware and programming manuals of the PLCs and related documents.

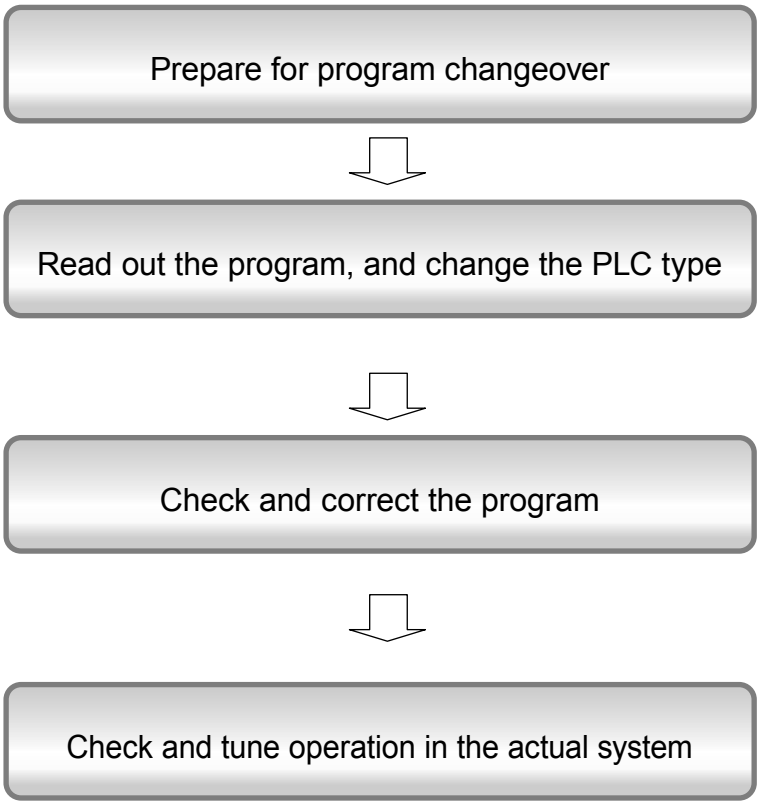
Applicable equipment	Item	Measures and cautions	Reference page
Main unit	Input and output connection	FX2NC input and output connectors, as well as 24V DC connectors are identical to those of the FX3UC, in shape and signal arrangement. Detach the connectors from the FX2NC and attach them to the FX3UC.	Section 3.3
	24V DC power connection		
RS-485 communication expansion equipment	Checking cable size of wiring for FX2NC-485ADP	Make sure RS-485 communication equipment conforms to the corresponding wire size. If it does not conform, change the wire size.	
	Handling of terminal end resistance of FX2NC-485ADP	FX3UC RS-485 communication equipment incorporates terminal end resistance. Select the resistance value by using the built-in selection switch.	
Other expansion equipment	Wiring to each unit and block	Re-wiring is needed for terminal block type equipment.	
Operation confirmation	Operation and test of sequence program	Operate the replacement sequence program and hardware equipment check and adjust the equipment function, and operation timing. Note the difference in function mentioned in the reference page, and make sure the equipment operates in conformity with the designed specification.	Section 3.4

4. Program changeover method

4.1 Preparation for program changeover

To changeover the program to FX3 series, use an appropriate programming tool, such as a personal computer software application.
The changeover procedure and necessary tools are explained in the following sections.

4.1.1 Program changeover procedure



- Prepare programming tools (see Subsection 4.1.2, Subsection 4.2.1).
- Changeover the program from the current type to the target FX3 series type (see Subsection 4.2.2, Subsection 4.2.3).
- Check the program contents, and correct the program portions where there are operation differences (see Subsection 2.4.1, Subsection 2.4.2, Subsection 3.4.1, Subsection 3.4.2).
- Using the actual system, debug, tune, and check operation (see Subsection 4.3.1).

4.1.2 Programming tool

● Programming tool

Program conversion tool are available in two forms: personal computer software and handy programming panel (HPP).

Tools with ◎marks in the table below are recommended for program changeover to the FX3 series.

Tools with △marks indicate that FX3 series functions cannot be added and that it may not be possible to changeover the program based on the connected device.

Model	Software			HPP	
	GX Works2	GX Developer Ver. 8*	FX-PCS/WIN	FX-30P	FX-20P
FX2N, FX2NC series	○	○	○	○	○
FX3U, FX3UC series	◎	○	△	◎	△

△: Can only be programmed within the same functional range as the FX2N(C) series.

■ Programming tools supporting the FX3 series

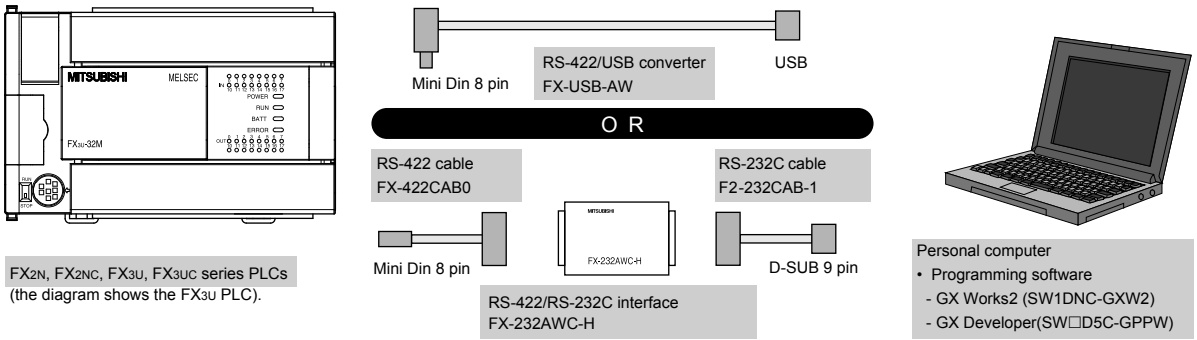
Type	Product names supporting the FX3 series
Programming software	GX Developer Ver. 8* Japanese (SW8D5C-GPPW-J) English (SW8D5C-GPPW-E)
	GX Works2 Japanese (SW1DNC-GXW2-J) English (SW1DNC-GXW2-E)
Handy programming panel	FX-30P Japanese, English, Chinese (Simplified Chinese, Traditional Chinese)

* FX3U series requires Ver. 8.23Z or later, FX3UC series requires Ver. 8.13P or later.

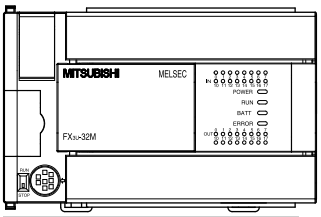
● Connection method

For connecting the programming tool with the PLC, the following cables and interface are additionally required.

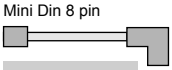
■ Personal computer connection



■ Handy programming panel connection



FX2N, FX2NC, FX3U, FX3UC series PLCs
(the diagram shows the FX3U PLC).



RS-422 cable
FX-20P-CAB0
(packaged together
with FX-30P)

FX-30P

4.2 Conversion of program by using GX Works2

This section explains the changeover procedure using the GX Works2 software application.
(The conversion procedure is the same in GX Developer Ver. 8).

4.2.1 Preparation for program changeover

Please prepare the following items before performing changeover of a program to FX3 series using GX Works2.

- FX PLC containing the source program, or saved program data.
- Personal computer with GX Works2 installed.
- Connection cable between PLC and personal computer (see Subsection 4.1.2).
- Related manuals (see Appendix B for related manuals).

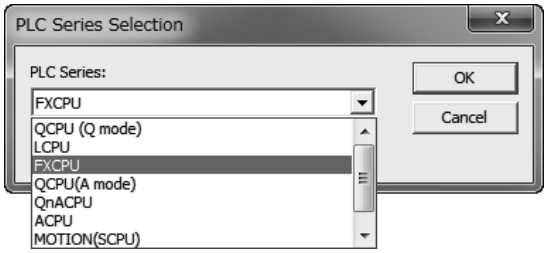
4.2.2 Reading of program

- Reading source program from PLC

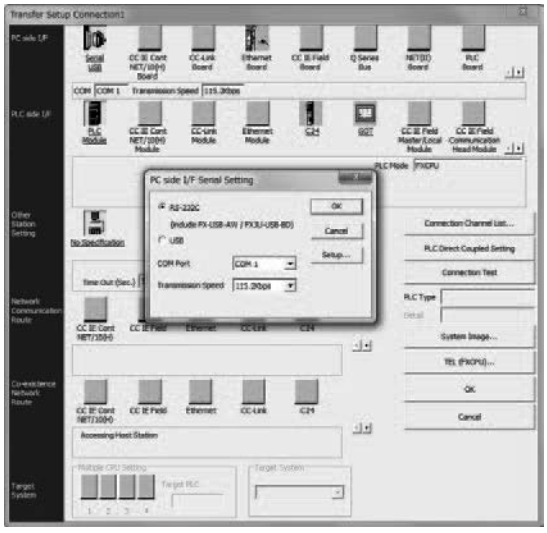
(1) Connect the FX PLC to the personal computer (see Subsection 4.1.2).

(2) Start GX Works2, and select “Online” -> “Read from PLC...” from the menu.

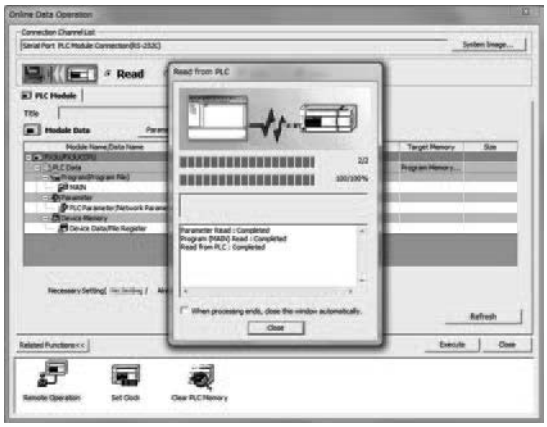
(3) Select “FXCPU” for the PLC series selection.



(4) Set the connection destination based on the current method of connection.



(5) Click “Parameter + Program”, and designate the data to be read out.
Click “Execute”, and execute reading.



(6) Once PLC reading is complete, confirm the reading result of the sequence program on the program display screen.

● Reading source program from saved project data

(1) Locate the saved data for the source program.

(2) Start GX Works2.

(3) Select and open out the source project.

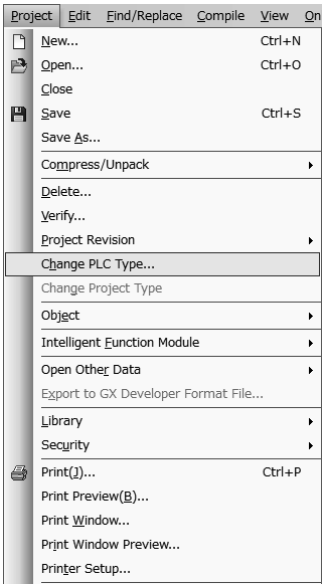
- When the project is saved as a GX Works2 type file
  Select “Project” -> “Open project” from the menu, and select the conversion source file.
- When the project is saved as a GX Developer type file
  Select “Project” -> “Open other data” -> “Open other project” from the menu, and select the conversion source file.

(4) Confirm the reading result of the sequence program on the program display screen.

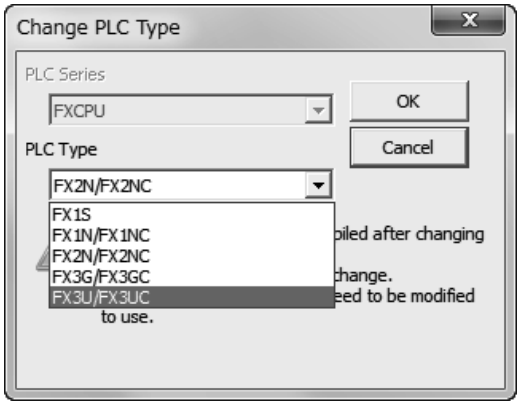
4.2.3 Model change to FX3 series (change of PLC type)

Changeover the PLC type of the target program to FX3 series.

(1) Select “Project” -> “Change PLC type...” from the menu.

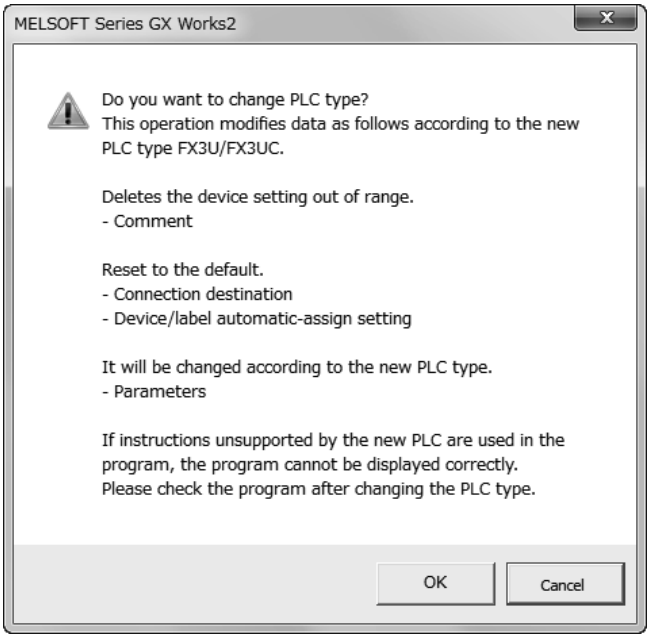


(2) In the “Change PLC type...” dialog box select the FX3 series main unit type to be used from the “PLC type” drop down list and click “OK”.



(3) A dialog box appears, listing cautions and asking to confirm the PLC type change. After reading the contents select “OK”.

When the type change has been completed a dialog box confirming that the operation was successful appears.



4.3 Correction of program and checking of operation

4.3.1 Checking and correction of program

- After changing the PLC type to FX3 series, check the program by referring to the program conversion cautions of each PLC, and check the program contents and correct affected functions.

- To check the sequence program, from the GX Works2 menu, select items to check in “Tool” -> “Check program...” or “Check parameter...”, and execute.

- Use of simulation function
  By using the simulation function of GX Works2, the operation of the program can be checked on the personal computer before downloading it to the PLC.
  From the GX Works2 menu, select “Debug” -> “Start/Stop Simulation”. GX Simulator2 starts, and debugging is possible by examining the operation of the simulated PLC.

4.3.2 Checking operation

- After completing changing the program to FX3 series, use the replacement hardware to run the program, then check and tune functions and operation timing of applicable equipment.
  When checking operation, pay attention to the differences in functions mentioned in this document, and make sure operation conforms with the designed specification.

Appendix A. Models affected by production termination

In addition to the MELSEC-F series PLCs mentioned in this document, production of the following models has been terminated prior to the end of March 2010.

Discontinued model	Discontinuation date	Repair service period
F1 series	September 30, 2000	September 30, 2007
F1J series	September 30, 2000	September 30, 2007
F2 series	September 30, 1995	September 30, 2002
FX0 series	June 30, 2002	June 30, 2009
FX0S series	January 31, 2006	January 31, 2013
FX0N series	January 31, 2006	January 31, 2013
FX1 series	June 30, 2002	June 30, 2009
FX2 series	June 30, 2002	June 30, 2009
FX2C series	June 30, 2002	June 30, 2009

For the FX2N and FX2NC series PLCs focused upon in this document, production will be ending soon.

Model to be discontinued	Discontinuation date	Repair service period
FX2N series	September 30, 2012	September 30, 2019
FX2NC series	September 30, 2012	September 30, 2019

Models to be discontinued

- FX2N series
  Production discontinued by the end of September 2012
  Repair service available until the end of September 2019

Main unit model name	Main unit model name	Expansion equipment model name
FX2N-16MT-E/UL	FX2N-16MR	FX2N-CNV-IF
FX2N-32MT-E/UL	FX2N-16MS	FX2N-12SW
FX2N-48MT-E/UL	FX2N-16MT	FX2N-32SW
FX2N-16MR-ES/UL	FX2N-32MR	FX2N-48SW
FX2N-32MR-ES/UL	FX2N-32MS	FX2N-64SW
FX2N-48MR-ES/UL	FX2N-32MT	FX2N-80SW
FX2N-64MR-ES/UL	FX2N-48MR	FX2N-128SW
FX2N-80MR-ES/UL	FX2N-48MS	FX2N-16LNK-M
FX2N-128MR-ES/UL	FX2N-48MT	FX2N-16CCL-M
FX2N-16MT-ESS/UL	FX2N-64MR	
FX2N-32MT-ESS/UL	FX2N-64MS	
FX2N-48MT-ESS/UL	FX2N-64MT	
FX2N-64MT-ESS/UL	FX2N-80MR	
FX2N-80MT-ESS/UL	FX2N-80MS	
FX2N-128MT-ESS/UL	FX2N-80MT	
FX2N-16MR-DS	FX2N-128MR	
FX2N-32MR-DS	FX2N-128MT	
FX2N-48MR-DS	FX2N-32MR-D	
FX2N-64MR-DS	FX2N-32MT-D	
FX2N-80MR-DS	FX2N-48MR-D	
FX2N-16MT-DSS	FX2N-48MT-D	
FX2N-32MT-DSS	FX2N-64MR-D	
FX2N-48MT-DSS	FX2N-64MT-D	
FX2N-64MT-DSS	FX2N-80MR-D	
FX2N-80MT-DSS	FX2N-80MT-D	
FX2N-32MS-E/UL	FX2N-16MR-UA1/UL	
FX2N-48MS-E/UL	FX2N-32MR-UA1/UL	
	FX2N-48MR-UA1/UL	
	FX2N-64MR-UA1/UL	

- FX2NC series

  Production discontinued by the end of September 2012

  Repair service available until the end of September 2019

Main unit model name	Main unit model name
FX2NC-16MT-D/UL	FX2NC-16MT
FX2NC-32MT-D/UL	FX2NC-32MT
FX2NC-64MT-D/UL	FX2NC-64MT
FX2NC-96MT-D/UL	FX2NC-96MT
FX2NC-16MT-DSS	FX2NC-16MR-T
FX2NC-32MT-DSS	
FX2NC-64MT-DSS	
FX2NC-96MT-DSS	
FX2NC-16MR-T-DS	

Appendix B. Related manuals

Before use, please read this document, together with the user's manual of the PLC main unit, and the manual of the program conversion tool used. Read these manuals carefully to obtain a full understanding of the product specifications and operations, prior to starting operation.
The necessary manuals are available from your local representative.

■ FX2N series related

Reference document		Contents
Type	Manual name (manual number)	
Main unit	FX2N series hardware manual (manual number: JY992D66301)	Includes input and output specification and wiring of FX2N series, mounting, explanation of various devices, and extended devices.
Analog input and output	FX2N-5A user's manual (manual number: JY997D11401)	Includes names of parts of FX2N-5A type analog input and output blocks, overall dimensions, specifications, and usage instructions.
	FX2N-2AD user's manual (manual number: JY992D74701)	Includes names of parts of FX2N-2AD type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX2N-4AD user's manual (manual number: JY992D65201)	Includes names of parts of FX2N-4AD type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX2N-8AD user's manual (manual number: JY992D86001)	Includes names of parts of FX2N-8AD type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX2N-2DA user's manual (manual number: JY992D74901)	Includes names of parts of FX2N-2DA type analog output blocks, overall dimensions, specifications, and usage instructions.
	FX2N-4DA user's manual (manual number: JY992D65901)	Includes names of parts of FX2N-4DA type analog output blocks, overall dimensions, specifications, and usage instructions.
Analog input (temperature control)	FX2N-4AD-PT user's manual (manual number: JY992D65601)	Includes names of parts of FX2N-4AD-PT type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX2N-4AD-TC user's manual (manual number: JY992D65501)	Includes names of parts of FX2N-4AD-TC type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX2N-2LC user's manual (manual number: JY992D85801)	Includes names of parts of FX2N-2LC type temperature regulation blocks, overall dimensions, specifications, and usage instructions.
High-speed counter	FX2N-1HC user's manual (manual number: JY992D65401)	Includes names of parts of FX2N-1HC type high-speed counter blocks, overall dimensions, specifications, and usage instructions.

Reference document		Contents
Type	Manual name (manual number)	
Positioning	FX2N-1PG user's manual (manual number: JY992D65301)	Includes names of parts of FX2N-1PG type pulse output blocks, overall dimensions, specifications, and usage instructions.
	FX2N-10PG user's manual (manual number: JY992D93401)	Includes names of parts of FX2N-10PG type pulse output blocks, overall dimensions, specifications, and usage instructions.
	FX2N-10GM Handy manual (manual number:JY992D77601)	Includes names of parts of FX2N-10GM type positioning units, overall dimensions, specifications, and usage instructions.
	FX2N-20GM Handy manual (manual number:JY992D77701)	Includes names of parts of FX2N-20GM type positioning units, overall dimensions, specifications, and usage instructions.
	FX-PCS-VPS/WIN Operation manual (manual number: JY992D86801)	Includes handling and manipulation methods of software for FX-PCS-VPS/WIN type positioning units.
Cam switch	FX2N-1RM-SET Handy manual (manual number: Y992D71101)	Includes names of parts of FX2N-1RM-SET type programmable cam switches, specifications, and programs.
Communication	FX series user's manual [communication control edition] (manual number: JY997D16901)	Includes simplified inter-PC link/parallel link/computer link/inverter communication/no-protocol communication/ programming communication, function explanation, and program examples.
	FX2N-232-BD user's manual (manual number: JY992D66001)	Includes names of parts of FX2N-232-BD type RS-232C communication boards, overall dimensions, mounting, and specifications.
	FX2N-422-BD hardware manual (manual number: JY992D66101)	Includes names of parts of FX2N-422-BD type RS-422 communication boards, overall dimensions, mounting, and specifications.
	FX2N-485-BD user's manual (manual number: JY992D74401)	Includes names of parts of FX2N-485-BD type RS-485 communication boards, overall dimensions, mounting, and specifications.
	FX2N-232IF hardware manual (manual number: JY992D73501)	Includes names of parts of FX2N-232IF type RS-232C communication blocks, overall dimensions, and specifications.
	FX2N-1DIF user's manual (manual number: JY992D67901)	Includes names of parts of FX2N-1DIF type interface blocks, overall dimensions, and specifications.
Network	FX2N-64CL-M user's manual [hardware edition] (manual number: JY997D05401)	Includes names of parts of FX2N-64CL-M type CC-Link/LT master blocks, overall dimensions, and specifications.
	FX2N-16CCL-M user's manual (manual number: JY992D93101)	Includes names of parts of FX2N-16CCL-M type CC-Link master blocks, overall dimensions, and specifications.
	FX2N-32CCL user's manual (manual number: JY992D71801)	Includes names of parts of FX2N-32CCL type CC-Link slave blocks, overall dimensions, and specifications.
	FX2N-16LNK-M user's manual (manual number: JY992D73701)	Includes names of parts of FX2N-16LNK-M type I/O-link master blocks, overall dimensions, and specifications.
	FX2N-32ASI-M user's manual (manual number: JY992D76901)	Includes names of parts of FX2N-32ASI-M type ASI-link master blocks, overall dimensions, and specifications.
Programming	FX1S/FX1N/FX2N/FX1NC/FX2N series programming manual (manual number: JY992D88101)	Includes FX1S/FX1N/FX2N/FX1NC/FX2NC series basic commands, step ladder commands, application commands, description of various devices, program explanations, etc.

■ FX2NC series related

Reference document		Contents
Type	Manual name (manual number)	
Main body	FX2NC series hardware manual (manual number: JY992D76401)	Includes FX2NC series input and output specifications and wiring, mounting, description of various devices, and extension devices.
Analog input and output	FX2NC-4AD user's manual (manual number: JY997D07801)	Includes names of parts of FX2NC-4AD type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX2NC-4DA user's manual (manual number: JY997D07601)	Includes names of parts of FX2NC-4DA type analog output blocks, overall dimensions, specifications, and usage instructions.
High-speed counter	FX2NC-1HC user's manual (manual number: JY992D30701)	Includes names of parts of FX2NC-1HC type high-speed counter blocks, overall dimensions, specifications, and usage instructions.
Communication	FX series user's manual [communication control edition] (manual number: JY997D16901)	Includes simplified inter-PC link/parallel link/computer link/inverter communication/no-procedure communication/ programming communication, function explanation, and program examples.
	FX2NC-232ADP installation manual (manual number: JY997D01101)	Includes names of parts of FX2NC-232ADP type RS-232C communication adapters, overall dimensions, mounting instructions, and specifications.
	FX2NC-485ADP installation manual (manual number: JY997D01201)	Includes names of parts of FX2NC-485ADP type RS-485 communication adapters, overall dimensions, mounting instructions, and specifications.
Programming	FX1S/FX1N/FX2N/FX1NC/FX2NC series programming manual (manual number: JY992D88101)	Includes FX1S/FX1N/FX2N/FX1NC/FX2NC series basic commands, step ladder commands, application commands, description of various devices, program explanations, etc.

■ FX3U series related

Reference document		Contents
Type	Manual name (manual number)	
Main body	FX3U series user's manual [hardware edition] (manual number: JY997D16501)	Includes FX3U series input and output specifications and wiring, mounting, and hardware instructions.
Analog input and output	FX3G, FX3U, FX3UC series user's manual [analog control edition] (manual number: JY997D16701)	Includes FX3G, FX3U, FX3UC series analog control.
	FX3U-3A-ADP user's manual (manual number: JY997D35601)	Includes names of parts of FX3U-3A-ADP type analog input and output adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-ADP user's manual (manual number: JY997D13901)	Includes names of parts of FX3U-4AD-ADP type analog input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4DA-ADP user's manual (manual number: JY997D14001)	Includes names of parts of FX3U-4DA-ADP type analog output adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD installation manual (manual number: JY997D20701)	Includes names of parts of FX3U-4AD type analog input blocks, overall dimensions, specifications, and usage instructions.
	FX3U-4DA installation manual (manual number: JY997D20801)	Includes names of parts of FX3U-4DA type analog output blocks, overall dimensions, specifications, and usage instructions.
Analog input (temperature control)	FX3U-4LC user's manual (manual number: JY997D39101)	Includes names of parts of FX3U-4LC type temperature regulation blocks, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-PT-ADP user's manual (manual number: JY997D14701)	Includes names of parts of FX3U-4AD-PT-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-PTW-ADP user's manual (manual number: JY997D29101)	Includes names of parts of FX3U-4AD-PTW-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-PNK-ADP user's manual (manual number: JY997D29201)	Includes names of parts of FX3U-4AD-PNK-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-TC-ADP user's manual (manual number: JY997D14801)	Includes names of parts of FX3U-4AD-TC-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
High-speed counter	FX3U-2HC user's manual (manual number: JY997D36701)	Includes names of parts of FX3U-2HC type high-speed counter blocks, overall dimensions, specifications, and usage instructions.
	FX3U-4HSX-ADP installation manual (manual number: JY997D16301)	Includes names of parts of FX3U-4HSX-ADP type high-speed counter adapters, overall dimensions, specifications, and usage instructions.
Positioning	FX3G, FX3U, FX3UC series user's manual [positioning control edition] (manual number: JY997D16801)	Includes positioning control of FX3G, FX3U, FX3UC series.
	FX3U-2HSY-ADP installation manual (manual number: JY997D16401)	Includes names of parts of FX3U-2HSY-ADP type pulse output adapters, overall dimensions, specifications, and usage instructions.
	FX3U-20SSC-H user's manual (manual number: JY997D21301)	Includes names of parts of FX3U-20SSC-H type SSNETIII positioning control blocks, overall dimensions, specifications, and usage instructions.
	FX Configurator-FP Operation manual (manual number: JY997D21801)	Includes instructions for operation of the software tool for the FX3U-20SSC-H positioning module.

Reference document		Contents
Type	Manual name (manual number)	
Communication	FX series user's manual [communication control edition] (manual number: JY997D16901)	Includes simplified inter-PC link/parallel link/ computer link/inverter communication/no-procedure communication/programming communication, function explanation, and program examples.
	FX3U-232-BD installation manual (manual number: JY997D12901)	Includes names of parts of FX3U-232-BD type RS-232C communication adapters, overall dimensions, mounting instructions, and specifications.
	FX3U-422-BD hardware manual (manual number: JY997D13101)	Includes names of parts of FX3U-422-BD type RS-422 communication boards, overall dimensions, mounting instructions, and specifications.
	FX3U-485-BD installation manual (manual number: JY997D13001)	Includes names of parts of FX3U-485-BD type RS-485 communication adapters, overall dimensions, mounting instructions, and specifications.
	FX3U-USB-BD user's manual (manual number: JY997D13501)	Includes names of parts of FX3U-USB-BD type USB communication boards, overall dimensions, mounting instructions, and specifications.
	FX3U-232ADP-MB installation manual (manual number: JY997D26301)	Includes names of parts of FX3U-232ADP type RS-232C communication adapters, overall dimensions, mounting instructions, and specifications.
	FX3U-485ADP-MB installation manual (manual number: JY997D26401)	Includes names of parts of FX3U-485ADP type RS-485 communication adapters, overall dimensions, mounting instructions, and specifications.
Network	FX3U-ENET user's manual (manual number: JY997D38001)	Includes names of the parts of the FX3U-ENET type Ethernet communication block, overall dimensions, specifications, and usage instructions.
	FX Configrator-EN operation manual (manual number: JY997D20501)	Includes description of operation method of the parameter setup software of the FX3U-ENET.
	FX3U-ENET-ADP user's manual (manual number: JY997D45801)	Includes names of the parts of the FX3U-ENET-ADP type Ethernet communication block, overall dimensions, specifications, and usage instructions.
	FX3U-16CCL-M user's manual (manual number: JY997D43601)	Includes names of parts of FX3U-16CCL-M type CC-Link V2 master blocks, overall dimensions, specifications, and usage instructions.
	FX3U-64CCL user's manual (manual number: JY997D30401)	Includes names of parts of FX3U-64CCL type CC-Link V2 intelligent device blocks, overall dimensions, specifications, and usage instructions.
Data collection	FX3U-CF-ADP user's manual (manual number: JY997D35401)	Includes names of parts of FX3U-CF-ADP type CF card special adapters, overall dimensions, mounting instructions, and specifications.
Programming	FX3G, FX3U, FX3UC series programming manual [basic & application commands explanation edition] (manual number: JY997D16601)	Includes FX3G, FX3U, FX3UC series basic commands, step ladder commands, application commands, description of various devices, and sequence program instructions.
	FX-30P Operation manual (manual number: JY997D34401)	Includes FX series list editing basic commands, step ladder commands, application commands, and sequence program instructions.

■ FX3UC series related

Reference document		Contents
Type	Manual name (manual number)	
Main body	FX3UC series user's manual [hardware edition] (manual number: JY997D28701)	Includes FX3UC series input and output specification and wiring, mounting, and hardware instructions.
Analog input and output	FX3G, FX3U, FX3UC series user's manual [analog control edition] (manual number: JY997D16701)	Includes FX3G, FX3U, FX3UC series analog control.
	FX3U-3A-ADP user's manual (manual number: JY997D35601)	Includes names of parts of FX3U-3A-ADP type analog input and output adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-ADP user's manual (manual number: JY997D13901)	Includes names of parts of FX3U-4AD-ADP type analog input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4DA-ADP user's manual (manual number: JY997D14001)	Includes names of parts of FX3U-4DA-ADP type analog output adapters, overall dimensions, specifications, and usage instructions.
	FX3UC-4AD installation manual (manual number: JY997D14901)	Includes names of parts of FX3UC-4AD type analog input blocks, overall dimensions, specifications, and usage instructions.
Analog input (temperature control)	FX3U-4AD-PT-ADP user's manual (manual number: JY997D14701)	Includes names of parts of FX3U-4AD-PT-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-PTW-ADP user's manual (manual number: JY997D29101)	Includes names of parts of FX3U-4AD-PTW-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-PNK-ADP user's manual (manual number: JY997D29201)	Includes names of parts of FX3U-4AD-PNK-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
	FX3U-4AD-TC-ADP user's manual (manual number: JY997D14801)	Includes names of parts of FX3U-4AD-TC-ADP type temperature sensor input adapters, overall dimensions, specifications, and usage instructions.
Positioning	FX3G, FX3U, FX3UC series user's manual [positioning control edition] (manual number: JY997D16801)	Includes FX3G, FX3U, FX3UC series positioning control.
Communication	FX series user's manual [communication control edition] (manual number: JY997D16901)	Includes simplified inter-PC link/parallel link/ computer link/inverter communication/no-procedure communication/programming communication device configuration, function explanation, and program examples.
	FX3U-232ADP-MB installation manual (manual number: JY997D26301)	Includes names of parts of FX3U-232ADP type RS-232C communication adapters, overall dimensions, mounting instructions, and specifications.
	FX3U-485ADP-MB installation manual (manual number: JY997D26401)	Includes names of parts of FX3U-485ADP type RS-485 communication adapters, overall dimensions, mounting instructions, and specifications.
Program	FX3G, FX3U, FX3UC series programming manual [basic, application commands explanation edition] (manual number: JY997D16601)	Includes FX3G, FX3U, FX3UC series basic commands, step ladder commands, application commands, description of various devices, and sequence program instructions.
	FX-30P Operation manual (manual number: JY997D34401)	Includes FX series list editing basic commands, step ladder commands, application commands, and sequence program instructions.

Appendix C. Frequently asked questions

■ PLC

Question	Answer
Is there a difference in memory capacity for the FX3U(C)?	The FX2N(C) has 8K steps, or 16K steps when expanded with FX-EEPROM-16. FX3U(C) has 64K steps.
Is there a difference in communication speed of the built-in programming port?	FX2N(C) operates at 19.2 kbps (9.6kbps prior to Ver. 3.00). FX3U(C) operates at 115.2 kbps.
Is the wiring of FX2N directly usable in FX3U?	Yes, except for DC power type FX3U, in which the S/S terminal cannot be connected to the (0V) and (24V) terminals.
Are the connectors of the FX2NC detachable and usable in the FX3UC as replacements?	Yes. The wiring is also usable.
Can FX2N expansion boards be used by the FX3U?	No. FX3U expansion boards must be used.
Can FX2NC expansion boards be used by the FX3UC?	No. The clock function and the inverter operation function are built into the FX3UC.
Can FX2N memory cassettes be used by the FX3U?	No. A FX3U memory cassette must be used.
Can FX2NC memory boards be used by the FX3UC?	No. A FX3U memory cassette must be used.

■ System

Question	Answer
Can FX0N I/O extension blocks or special function blocks be used by the FX3U(C)?	No. Use I/O extension blocks or special function blocks compatible with the FX3U(C).
Can FX2N I/O extension units, I/O extension blocks, and special function blocks be used by the FX3U(C)?	Yes.
Can FX2 special function blocks which were connected to the FX2N with the FX2N-CNV-IF be used by the FX3U in the same configuration?	No. Use special function blocks compatible with the FX3U.
The FX2N-CNV-BC and FX0N-65EC are being used in the current system. Can they be used by the FX3 series?	Yes. One extension cable can be connected to the system.
A FX2NC special adapter is being used for communications with the FX2N(C). Can it be used by the FX3 series?	No. Use a communication special adapter compatible with the FX3U.

■ Tool

Question	Answer
Can the FX-20P be used with the FX3U(C)?	Yes. However, it is limited to the devices and command range of the FX2N.
Can FX-PCS/WIN be used with the FX3U(C)?	Yes. However, it is limited to the devices and command range of the FX2N.
Which versions of GX Developer support the FX3U(C)?	The FX3U(C) is supported in GX Developer from Ver. 8.24A and later. Earlier versions of the software may be used by selecting "FX2N(C)", but it is limited to the device and functionality range of the FX2N.

■ Connection of display units

Question	Answer
Can the FX-DU series of display units be connected directly to the FX3U(C)?	Yes. (Screen program modification is required when the sequence program is changed). However, it is limited to the devices and command range of the FX2N.
Can the F900GOT series be connected directly to the FX3U(C)?	Yes. (Screen program modification is required when the sequence program is changed). However, it is limited to the devices and command range of the FX2N.

MEMO

Revision history

Date compiled	Sub-number	Contents
Sep. 2012	A	First edition

FX CPU

FX(FX2N,FX2NC)→FX3 series Replacement Guidance

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