

PROGRAMMABLE CONTROLLERS
MELSEC-F

USER'S MANUAL (Detailed Volume)

FX2N-64CL-M CC-Link/LT Master Block

FX_{2N}

Foreword

- This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the FX_{2N}-64CL-M CC-Link/LT Master Block. This Manual should be read and understood before attempting to install or use the unit.
- If the user is in any doubt at any stage of the installation of the FX_{2N}-64CL-M CC-Link/LT Master Block always consult a professional electrical engineer who is qualified and trained to local and national standards that apply to the installation site.
- If the user is in any doubt about the operation or use of FX_{2N}-64CL-M CC-Link/LT Master Block please consult the nearest Mitsubishi Electric distributor.
- This manual is subject to change without notice.

FX2N-64CL-M CC-Link/LT Master Block

USER'S MANUAL (Detailed Volume)

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Safety guidelines for the User and Protection of the FX2N-64CL-M

This manual provides information for the use of the FX2N-64CL-M. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows;

- a) 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.
- b) 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.
- c) All operators of the completed equipment (see Note) should be trained to use that product in a safe manner in compliance to established safety practices. The operators should also be familiar with documentation which is associated with the 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.

Notes on the Symbols Used in this Manual

At various times throughout out this manual certain symbols will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of equipment. Whenever any of the following symbols are encountered its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware Warnings



- 1) Indicates that the identified danger **WILL** cause physical and property damage.



- 2) Indicates that the identified danger could **POSSIBLY** cause physical and property damage.



- 3) Indicates a point of further interest or further explanation.

Software Warnings



- 4) Indicates special care must be taken when using this element of software.



- 5) Indicates a special point which the user of the associate software element should be aware of.



- 6) Indicates a point of interest or further explanation.

- Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Please contact a Mitsubishi distributor for more information concerning applications in life critical situations or high reliability.

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List of Manuals

For manuals related to the FX2N-64CL-M, refer to each manual.

When other manuals and data are required, contact the dealer you purchased the product.

Manual title	Manual number	Contents	Model name code
FX1N Hardware Manual	JY992D89301	Items related to the hardware including the I/O specifications, wiring and installation of the PLC main unit	09R511
FX2N Hardware Manual	JY992D66301	Items related to the hardware including the I/O specifications, wiring and installation of the PLC main unit	09R508
FX2NC Hardware Manual	JY992D76401	Items related to the hardware including the I/O specifications, wiring and installation of the PLC main unit	09R509
FX3G Series User's Manual - Hardware Edition	JY997D31301	Detailed items related to the hardware including the I/O specifications, wiring, installation and maintenance of the FX3G Series PLC main unit	09R521
FX3GC Series User's Manual - Hardware Edition	JY997D45401	Detailed items related to the hardware including the I/O specifications, wiring, installation and maintenance of the FX3GC Series PLC main unit	09R533
FX3U Series User's Manual - Hardware Edition	JY997D16501	Detailed items related to the hardware including the I/O specifications, wiring, installation and maintenance of the FX3U Series PLC main unit	09R516
FX3UC Series User's Manual - Hardware Edition	JY997D28701	Detailed items related to the hardware including the I/O specifications, wiring, installation and maintenance of the FX3UC Series PLC main unit	09R519
FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601	Details of sequence programming for FX3S/FX3G/FX3GC/FX3U/FX3UC Series, including explanation for basic instructions, applied instructions and various devices	09R517
CC-Link/LT : Power Adapter•Dedicated Power Supply USER'S MANUAL (Detailed Volume)	JY997D06601	Specifications, installation, power supply wiring, cautions on construction, etc. of the power adapter CL1PAD1 and dedicated power supply CL1PSU-2A	09R712
Remote I/O Remote device	For remote I/O stations and remote device stations for CC-Link/LT, refer to each manual and related data.		—

Generic Names and Abbreviations

The generic names and abbreviations shown below are used within explanation contained in this manual.

Generic name/abbreviation	Description
FX2N-64CL-M	CC-Link/LT Master block FX2N-64CL-M
Master station	Station which controls the data link system. One master station is required in one system.
Remote I/O station	A remote station for bit information only (for external device I/O).
Remote device station	Remote station that handles bit unit and word unit data only.
RD station	Abbreviation of remote device station
Remote station	Generic name for remote I/O station and remote device station. Controlled by the master station.
Remote module	Generic name for remote I/O module and remote device module.
Power adapter	Unit connected to supply the power to the CC-Link/LT system
Dedicated power supply	At least one power adapter or dedicated power supply is required in each CC-Link/LT system.
Connection cable	Generic name of dedicated flat cable, VCTF cable and high flexible cable
Connector	Generic name of dedicated flat cable connector, VCTF cable connector and high flexible cable connector

1. Outline

1.1 Product Outline

The CC-Link/LT master block FX_{2N}-64CL-M can be connected to the FX Series PLC. The CC-Link/LT system can be constructed with an FX Series PLC as the master station.

1.2 Features

The FX_{2N}-64CL-M has the following features:

1) Reduced wiring time

Using CC-Link/LT connection cables and connectors allow for reduced wiring times. (Dedicated flat cables, VCTF cables and high flexible cables are available.)

2) Simplified programs

Link devices within CC-Link/LT are assigned to X/Y devices in the PLC, therefore, sequence programs can be prepared without recognizing the network.

3) High speed refresh

High speed refresh (128 points/0.3 ms) is realized (as and when the transmission speed is 2.5 Mbps, 16-point mode is selected and eight stations are connected to the network).

4) Slave station disconnection function

Even if some units are down due to an abnormality, communication with the remaining functional units is not affected.

When a cable in the trunk line is disconnected, however, the data link is disabled for remote stations connected to the disconnected cable.

5) Automatic return function

When a unit that was disconnected due to an abnormality is restored to its normal status, the unit will return to the data link automatically and continue data transfer.

6) Data link stop/re-start

While data link is being executed, the user can stop and start the link again.

7) Remote station type information storage

In the CONFIG mode, the number of points occupied by remote stations, I/O types, etc. is detected, and stored within the EEPROM.

8) Mode selection

The ONLINE, CONFIG and TEST modes are available.

ONLINE mode : Executes the data link for the CC-Link/LT system.

Select the ONLINE mode usually.

CONFIG mode: Allows automatic assignment of the I/O number.

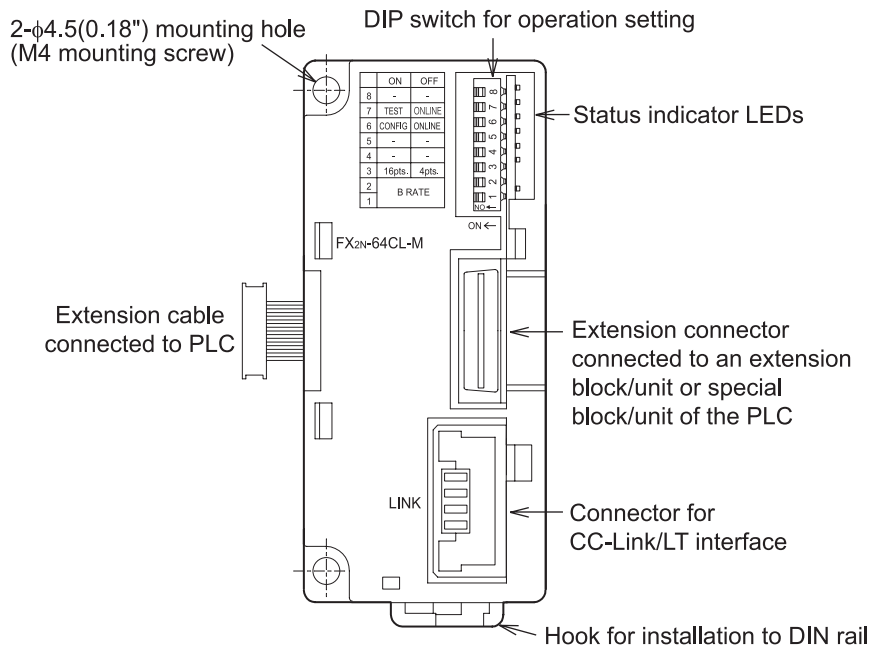
When remote stations are planned to be added in the future, reserved stations can be specified and detailed remote station information can be edited.

After constructing the CC-Link/LT system, make sure to execute the CONFIG mode once to assign the I/O number.

TEST mode : Executes self-diagnosis to judge whether the FX_{2N}-64CL-M itself is in the master station.

If the data link cannot be executed normally, the self-diagnosis function analyses the FX_{2N}-64CL-M itself.

1.3 Name and assignment of each part



Name		Description
Status indicator LEDs	POWER	<ONLINE mode/CONFIG mode/TEST mode> Lit :Power is supplied Extinguished :Power is not supplied
	RUN	<ONLINE mode> Lit :FX2N-64CL-M is operating normally Extinguished :FX2N-64CL-M is abnormal Power is interrupted EEPROM read error (sum mismatch) occurred <CONFIG mode> Lit :FX2N-64CL-M is operating normally Extinguished :FX2N-64CL-M is abnormal Power is interrupted <TEST mode> Lit :FX2N-64CL-M is operating normally Extinguished :FX2N-64CL-M is abnormal Power is interrupted

Name		Description
Status indicator LEDs	ERR.	<ONLINE mode> Lit :Communication speed setting error occurred EEPROM read error (sum mismatch) occurred Flickering :Power supplied for communication is abnormal DIP switch for operation setting was changed during operation Extinguished :FX2N-64CL-M is operating normally <CONFIG mode> Lit :Communication speed setting error occurred EEPROM write error occurred Flickering :Power supplied for communication is abnormal DIP switch for operation setting was changed during operation Extinguished :FX2N-64CL-M is operating normally <TEST mode> Lit :Communication speed setting error occurred Flickering :Power supplied for communication is abnormal DIP switch for operation setting was changed during operation Extinguished :FX2N-64CL-M is operating normally
	L RUN	<ONLINE mode/CONFIG mode> Lit :Data link is executed Extinguished :Data link is stopped <TEST mode> Lit :Self-loop back Test was finished normally Extinguished :Self-loop back Test was finished abnormally (Extinguished while the self-loop back Test is executed)
	L ERR.	<ONLINE mode> Lit :Use station number discrepancy Outside-control-range station error occurred Flickering :Stations are abnormal Extinguished :Data link is executed normally <CONFIG mode> Lit :Use station number discrepancy (when BFM#32(20h) to #95(5Fh) is edited, the station numbers are checked.) (When the power is turned ON while a remote station is attached and the following setting is made: number of connected stations varies by editing BFM#32(20h) to #95(5Fh)) Flickering :All stations are abnormal (when BFM#32(20h) to #95(5Fh) is edited, the station numbers are checked.) (When power is turned ON while no remote station is attached and then BFM#32(20h) to #95(5Fh) is edited) Extinguished :Data link is executed normally <TEST mode> Lit :Self-loop back Test was finished abnormally Extinguished :Self-loop back Test was finished normally (Extinguished while the self-loop back Test is executed)
	SD	<ONLINE mode/CONFIG mode/TEST mode> Lit: Data is currently being sent
	RD	<ONLINE mode/CONFIG mode/TEST mode> Lit: Data is currently being received
Interface		Connector for CC-Link/LT interface (24G/DB/DA/+24 V)

Name		Description															
DIP switch for operation setting	1	Communication speed setting <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Communication speed</th> <th>SW1</th> <th>SW2</th> </tr> </thead> <tbody> <tr> <td>156 kbps</td> <td>OFF</td> <td>OFF</td> </tr> <tr> <td>625 kbps</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>2.5 Mbps</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>Setting disabled</td> <td>ON</td> <td>ON</td> </tr> </tbody> </table>	Communication speed	SW1	SW2	156 kbps	OFF	OFF	625 kbps	ON	OFF	2.5 Mbps	OFF	ON	Setting disabled	ON	ON
	Communication speed		SW1	SW2													
	156 kbps		OFF	OFF													
	625 kbps		ON	OFF													
	2.5 Mbps		OFF	ON													
	Setting disabled	ON	ON														
	B RATE																
	2																
3	Point mode setting (Select the number of I/O points per station.) OFF:4-point mode (4 input points and 4 output points in each station) ON :16-point mode (16 input points and 16 output points in each station)																
4	Setting is disabled. (Make sure that it is OFF during operation.)																
5	Setting is disabled. (Make sure that it is OFF during operation.)																
6	CONFIG mode OFF: ONLINE mode (normal operation) ON : CONFIG mode (The information on the connected stations is saved to the EEPROM.)																
7	TEST mode OFF: ONLINE mode (normal operation) ON : TEST mode (Self-loop back Test)																
8	Setting is disabled. (Make sure that it is OFF during operation.)																

- Factory default, DIP switches are set OFF.
- The Test mode is selected when both the CONFIG and TEST modes are set ON simultaneously.
- For each setting, the status at the time of power ON is valid.
(If a setting is changed after the power is set ON, such a change is invalid.)
- In the CONFIG mode, the L ERR. indicator lights or flickers when the detailed information on the remote station actually connected at the time of power ON do not match the detailed remote station information within the master.
(When BFM #32 (20h) to #95 (5Fh) are edited, the station numbers are checked.)
If the remote station information is not edited, the L ERR. does not light or flicker when turning ON the all disconnected remote station, or when removing the remote station after power ON.

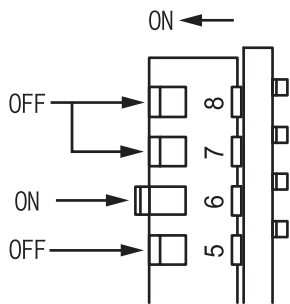
Note: Setting DIP switches component change

Products manufactured in March 2012 or later have a different component used for the setting DIP switches compared with products produced earlier.

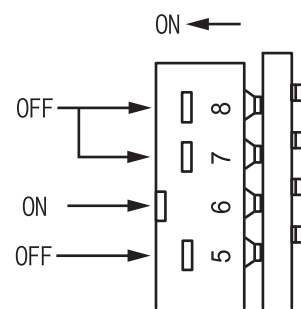
Due to the component change, take note of the change in the ON/OFF position of each DIP switch.

Even with the component change, the direction for setting each DIP switch ON/OFF is the same.

When product manufactured February, 2012 or earlier



When product manufactured in March 2012 or later



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2. Specifications

This section explains the specifications of the FX_{2N}-64CL-M.



DESIGN PRECAUTIONS

When a remote module fails, outputs may randomly set ON or OFF, therefore, build an external monitoring circuit that will monitor any input signals that could cause a serious accident.



DESIGN PRECAUTIONS

- Do not bind control and connection cables to CC-Link/LT together with power cables. Keep control and connection cables to CC-Link/LT away from major circuits and power cables by 100 mm (3.93") or more. It may cause a malfunction due to noise interference.
- Use the FX_{2N}-64CL-M in such status that any force is not applied on connectors for CC-Link/LT interface and connection cables to CC-Link/LT. If any force is applied, wire breakage and failure may be caused.



STARTING AND MAINTENANCE PRECAUTIONS

- Do not touch the terminals while the power is ON. It may cause an electric shock or malfunction.
- Shut down all phases of the power supply outside the master block before starting any cleaning procedures. If the power is not disconnected from all sources, the FX_{2N}-64CL-M may fail or malfunction.



STARTING AND MAINTENANCE PRECAUTIONS

- Do not disassemble or modify the FX_{2N}-64CL-M. Doing so may cause failure, malfunction, injury, or fire.
- The case of the FX_{2N}-64CL-M is made of resin. Do not drop or apply strong impacts to the FX_{2N}-64CL-M.



DISPOSAL PRECAUTIONS

- Treat the FX_{2N}-64CL-M as industrial waste when disposing of the product.

2.1 General specifications

The general specifications except the following are the same as the PLC main unit. (For the general specifications except the following, refer to the PLC main unit manual.)

Item	Specification	
Dielectric withstand voltage	500V AC for 1 min	Between case and PLC grounding terminal
Isolation resistance	5 M Ω or more by 500V DC megger	

2.2 Network wiring specifications

Item	Specification			Remarks
Communication speed	2.5Mbps	625kbps	156kbps	--
Distance between stations	No restriction			--
Maximum number of modules connected in 1 drop line	8 units			Maximum number of remote modules connected per branch in a drop line
Maximum trunk length	35m (114' 9")	100m (328' 1")	500m (1640' 5")	Cable length between terminating resistors
T-branch interval	No restriction			--
Maximum drop length	4m (13' 1")	16m (52' 5")	60m (196' 10")	Cable length per branch
Cumulative drop line length	15m (49' 2")	50m (164' 0")	200m (656' 2")	Sum of all drop lines

2.3 Cable specifications

Dedicated flat cables, VCTF cables and high flexible cables are available.

1) Dedicated flat cable

Type	Service temperature range	Rated voltage	Number of cores	Conductor resistance (at 20°C)	Safety	Flame resistance
Flat cable	-10 to 80 °C	30V	4	23.4 Ω/km or less	UL Subject758	UL VW-1 • -F-

2) VCTF cable specifications (Extract from JIS C 3306)

Type	Number of cores	Conductor			Insulator thickness	Sheath thickness	Conductor resistance (at 20°C)
		Nominal cross-sectional area	Number of element wires/Wire diameter	Outside diameter			
Vinyl cabtyre, Round cord	4	0.75mm ²	30/0.18mm	1.1mm	0.6mm	1.0mm	25.1Ω/km

3) High flexible cable

Use the following high flexible cables certified by the CC-Link Association.

Manufacturer name	Cable model name
DAIDEN Co., Ltd.	CM/LT(2586) AWG19/4C
Yoshinogawa Electric Wire & Cable Co.,Ltd	CRFV-A075C04-LT
Kuramo Electric Co., Ltd.	FANC-Z/LT 4×0.75mm ²
Mitsubishi Electric System & Service Co.Ltd	CL9-MV4-075

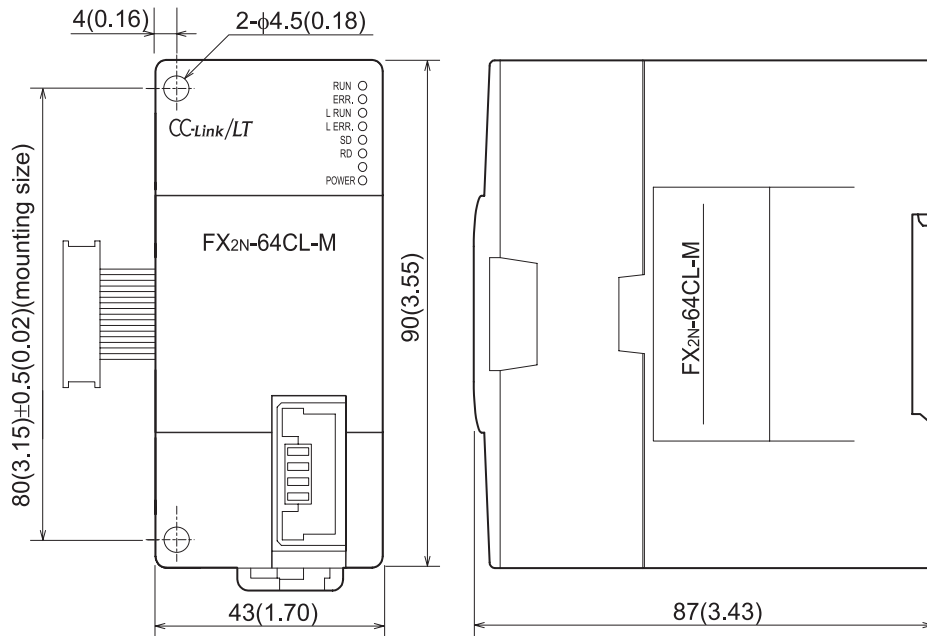
2.4 Performance specifications

Item		Specification			
Applicable PLC		FX1N/FX2N/FX2NC/FX3G/FX3GC/FX3U ^{*1} /FX3UC ^{*1} Series PLC (FX2NC-CNV-IF is required when FX2NC Series PLC is connected.) (FX2NC-CNV-IF or FX3UC-1PS-5V is required when FX3GC/FX3UC Series PLC is connected.)			
Number of connectable master blocks		FX1N Series: Up to 4 ^{*2} FX2NC Series: Up to 3 ^{*3} FX3GC/FX3UC Series: Up to 5 ^{*3}	FX2N Series: Up to 8 ^{*3} FX3G/FX3U Series: Up to 8 ^{*3}		
Applicable point mode		4-point mode and 16-point mode (selectable by DIP switch)			
Control specifications			4-point mode	16-point mode	
	Maximum number of link points		Connected to FX1N/FX3G/FX3GC Series PLC: 128 points Connected to FX2N/FX2NC/FX3U/FX3UC Series PLC: 256 points (including the number of I/O points in each PLC) (For the number of I/O points in each PLC, refer to the manual of the PLC main unit.)		
	Number of link points per station () shows the number of link points when composite remote module is used.		4 points (8 points)	16 points (32 points)	
	Link scan time	32 stations	Points	128 points	256 points
			2.5Mbps	0.7ms	1.0ms
			625kbps	2.2ms	3.8ms
			156kbps	8.0ms	14.1ms
		64 stations	Points	256 points	256 points
			2.5Mbps	1.2ms	2.0ms
			625kbps	4.3ms	7.4ms
156kbps			15.6ms	27.8ms	
Communication specifications	Communication speed		2.5 Mbps, 625 kbps and 156 kbps (selectable by DIP switch)		
	Protocol		BITR method (Broadcastpolling + Interval Timed Response)		
	Network topology		T-branch		
	Error control method		CRC		
	Number of connected stations		64 stations maximum		
	Remote station numbers		1 to 64		
	Master station connection position		Connected at end of trunk line		
	RAS function		Communication error detection, automatic return to system, slave station disconnection and internal loop back diagnosis		
	Connection cable		Dedicated flat cable (0.75 mm ² × 4) VCTF cable (0.75 mm ² × 4 cable specifications, refer to Section 2.3) High flexible cable (0.75 mm ² × 4)		
Number of occupied I/O points		8 points (fixed) + Number of connected remote I/O points (in multiples of eight)			
Current consumption inside 5V DC		190 mA (Supplied by PLC via extension connector)			
24V DC power supply	Voltage	20.4V to 28.8V DC			
	Current consumption	25 mA			
	Initial current	35 mA			
Mass (weight)		0.15 kg (0.33 lbs)			

*1 FX3U/FX3UC Series PLC can use direct specification of buffer memory.
Refer to the FX3S/FX3G/FX3GC/FX3U/FX3UC Series Programming Manual - Basic & Applied Instruction Edition for details.

- *2 When connected to an FX1N Series PLC, up to two FX2N-64CL-M can be connected to each of the main and extension units.
- *3 The FX2N-64CL-M draws 190mA from the 5V DC source.
The total 5V consumption of all special function blocks connected to the main unit or extension unit must not exceed the 5V source capacity of the system.
(For details, refer to the manual of the PLC main unit.)

2.5 Outside Dimensions



Unit: mm(inches)

2.6 Compliance with EC directive

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards.

Compliance to EMC directive of the entire mechanical module should be checked by the user / manufacturer.

Attention

- This product is designed for use in industrial applications.

Note

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

Requirement for Compliance with EMC directive

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

Type : Programmable Controller (Open Type Equipment)

Models : Products manufactured from February 1st, 2003

Standard		Remark
EN61000-6-4: 2007	Generic emission standard Industrial environment	Compliance with all relevant aspects of the standard. <ul style="list-style-type: none"> • Emission-Enclosure port • Emission-Low voltage AC mains port • Emission-Telecommunications/ network port
EN61131-2:2007	Programmable controllers - Equipment requirements and tests	Compliance with all relevant aspects of the standard. <p>EMI</p> <ul style="list-style-type: none"> • Radiated Emissions • Conducted Emissions <p>EMS</p> <ul style="list-style-type: none"> • Radiated electromagnetic field • Fast Transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • Power frequency magnetic field

Notes for compliance to EMC regulation

- It is necessary to install the FX_{2N}-64CL-M in a shielded metal control panel. For more details please contact the local Mitsubishi Electric sales site.
- Use the CC-Link/LT module in Zone A^{*1} as defined in EN61131-2. The terminal and the wiring for the following table can be used in zone B^{*1}.

Classification	Model	Terminal that can be used in zone B	Rated load voltage
Relay output ^{*2}	CL1Y4-R1B1 CL1Y4-R1B2	Terminal to connect output signals and load power supply.	240V AC or less ^{*3} 30V DC or less
DC input/ Relay output ^{*2}	CL1XY4-DR1B2 CL1XY8-DR1B2	Terminal to connect output signals and load power supply.	240V AC or less ^{*3} 30V DC or less
CC-Link/LT Dedicated Power Supply	CL1PSU-2A	Terminal block to connect power supply.	100/120/200/230/ 240V AC

*1 Zone defined in EN61131-2

Separation defined in EN61131-2 for EMC LVD regulation decided depending on condition in industrial setting.

Zone C = Factory mains which is isolated from public mains by dedicated transformers.

Zone B = Dedicated power distribution which is protected by secondary surge protection. (300V or less in the rated voltage is assumed.)

Zone A = Local power distribution which is isolated from dedicated power distribution by AC/DC converters, isolation transformers, etc. (120V or less in the rated voltage is assumed.)

*2 Terminal block connection type.

*3 250V AC or less when the unit does not comply with UL or cUL standards.

- When the following models use the CC-Link/LT power adapter model (CL1PAD1), a power line connecting to the external power supply terminal of the CL1PAD1 must be 30m (98'5") or less.

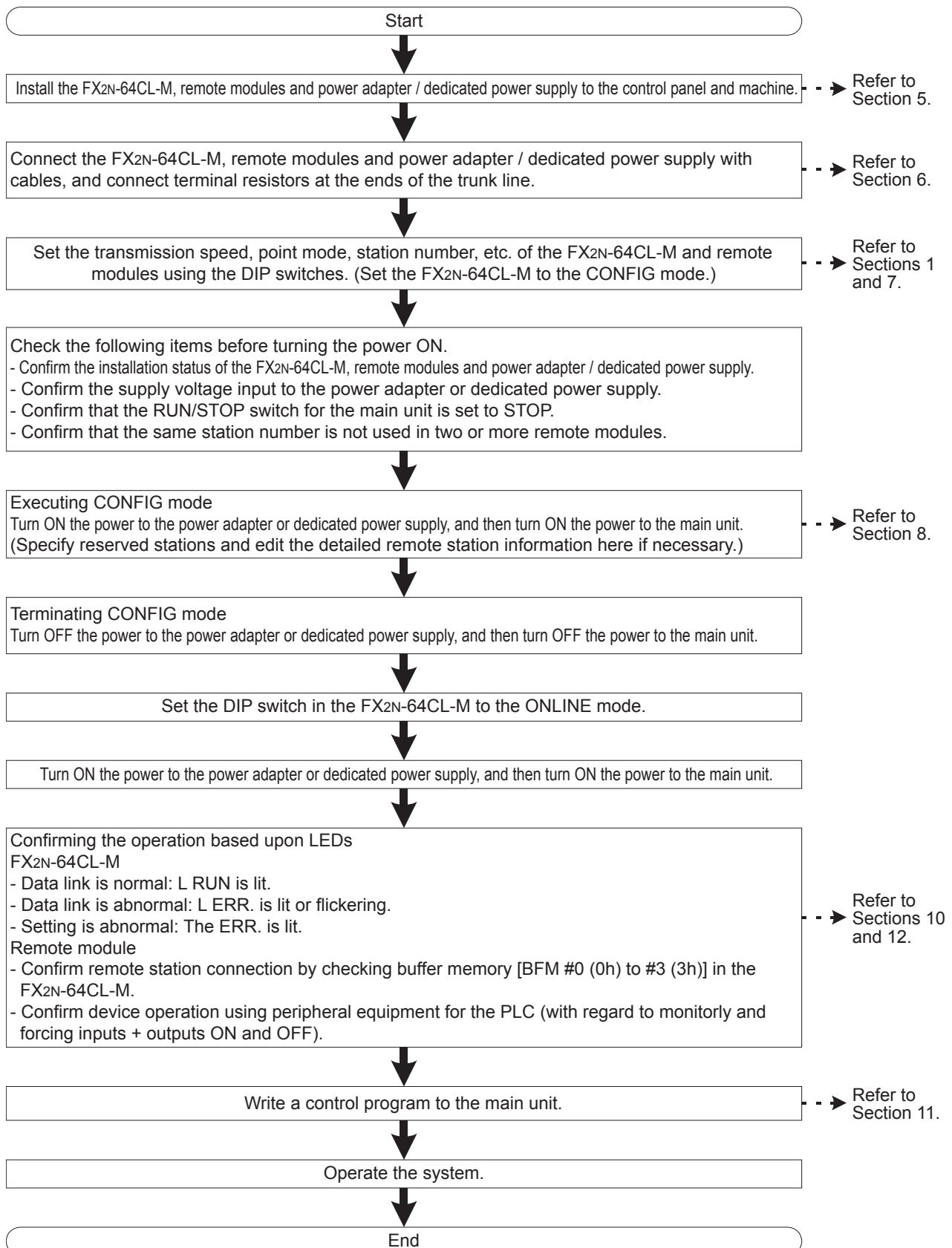
Classification	Model
Analog-Digital Converter ^{*4}	CL2AD4-B
Digital-Analog Converter ^{*4}	CL2DA2-B

*4 Terminal block connection type.

MEMO

3. System Startup Procedure

Start up the CC-Link/LT system using the following procedure.



MEMO

4. System Configuration

This section explains the CC-Link/LT system configuration.



DESIGN PRECAUTIONS

When a remote module fails, outputs may randomly turn ON or OFF, therefore, build an external monitoring circuit that will protect from any input signals that could cause a serious accident.

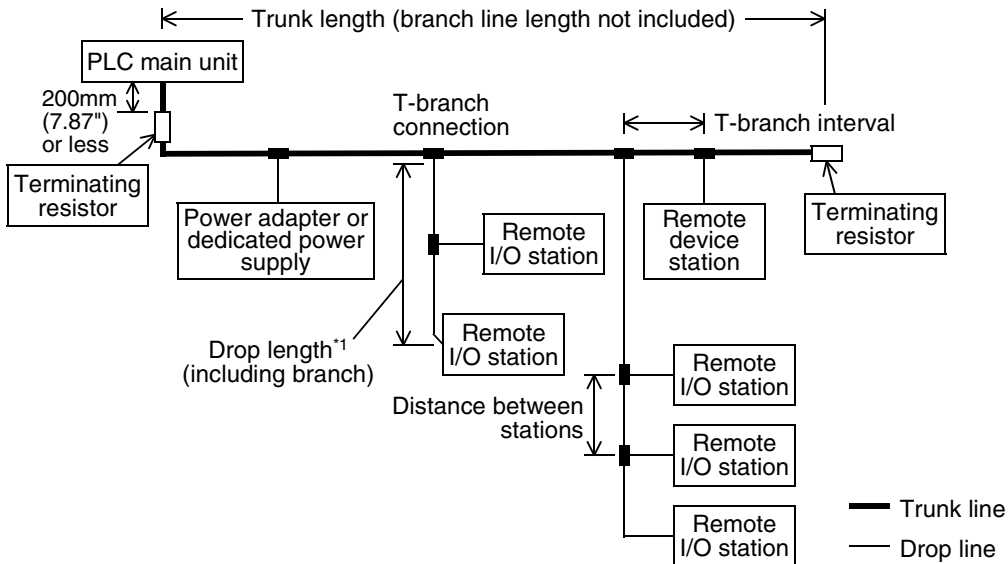


DESIGN PRECAUTIONS

- Do not bind control cables and connection cables to CC-Link/LT together with power cables.
Keep control cables and connection cables to CC-Link/LT away from major circuits and power cables by 100 mm (3.93") or more.
It may cause a malfunction due to noise interference.
- Use the FX2N-64CL-M in an environment status that any force is not directly applied on connectors for CC-Link/LT interface and connection cables to CC-Link/LT.
If any force is applied, wire breakage and failure may occur.

4.1 Total configuration

This paragraph describes the system configuration and cautions for CC-Link/LT.



*1 The maximum drop line length and total drop line length include the branch length from the drop line.

- Connect the master station, power adapter / dedicated power supply and remote stations using cables and connectors. For the combination and mixed use of cables, refer to Section 4.5.
- The trunk line and drop line can be connected using connectors or terminal blocks. Terminal blocks are available only when VCTF cables or high flexible cables are used.
- Make sure to install the FX2N-64CL-M at the end of the trunk line.
- Up to 64 remote stations can be connected to one FX2N-64CL-M as far as the condition shown in the table below are satisfied.

Item	Specification			Remarks
Communication speed	2.5Mbps	625kbps	156kbps	--
Distance between stations	No restriction			--
Maximum number of modules connected in 1 drop line	8 units			Maximum number of remote modules connected per branch in a drop line
Maximum trunk length	35m (114' 9")	100m (328' 1")	500m (1640' 5")	Cable length between terminating resistors (excluding drop line length)
T-branch interval	No restriction			--
Maximum drop length	4m (13' 1")	16m (52' 5")	60m (196' 10")	Cable length per branch
Cumulative drop line length	15m (49' 2")	50m (164' 0")	200m (656' 2")	Sum of all drop lines

- The connection order of remote stations has no relevance to the station number. Even if the station number of remote stations is not consecutive, no error will occur in the data link.
- In the CC-Link/LT system, terminating resistors should be connected to both ends of the trunk line.
Connect the terminating resistor on the FX2N-64CL-M side to a position within 200 mm (7.87") from the FX2N-64CL-M.
- Equipment for CC-Link cannot be connected to the CC-Link/LT system.
On the contrary, equipment for CC-Link/LT cannot be connected to the CC-Link system.
- For the installation conditions of the power adapter, dedicated power supply and remote module, refer to the instruction manual of each one. Install each of them correctly.
- Refer to the homepage of the CC-Link Partner Association (CLPA) "<http://www.cc-link.org/>" for details concerning connection cabling, terminating resistors and connector for CC-Link/LT.

4.2 PLC connection

This section explains which PLC series are connectable with the FX_{2N}-64CL-M and gives cautions on the number of connectable FX_{2N}-64CL-M blocks.

4.2.1 Applicable PLC and number of connectable FX_{2N}-64CL-M

Applicable PLC	FX _{1N} /FX _{2N} /FX _{2NC} /FX _{3G} /FX _{3GC} /FX _{3U} /FX _{3UC} Series PLC (FX _{2NC} -CNV-IF is required when an FX _{2NC} Series PLC is connected.) (FX _{2NC} -CNV-IF or FX _{3UC} -1PS-5V is required when an FX _{3GC} /FX _{3UC} Series PLC is connected.)	
Number of connectable master blocks	FX _{1N} Series: Up to 4 FX _{2NC} Series: Up to 3 FX _{3GC} /FX _{3UC} Series: Up to 5	FX _{2N} Series: Up to 8 FX _{3G} /FX _{3U} Series: Up to 8

- Connect the FX_{2N}-64CL-M to the right side of the PLC using an extension cable.
- The number of occupied I/O points is "8 (either input or output) points + Number of connected remote I/O points (in multiples of eight)".
The total number of I/O points including extended points must not exceed 128 points for the FX_{1N}, FX_{3G} and FX_{3GC} Series or 256 points for the FX_{2N}, FX_{2NC}, FX_{3U} and FX_{3UC} Series. For the number available of I/O points of the connected PLC, refer to the manual of the PLC main unit.
- The FX_{2N}-64CL-M consumes 190 mA from the 5V DC source.
The total current consumption from the 5V source of special function blocks connected to the PLC must not exceed the 5 V power capacity of the main unit and extension units. When connecting to the FX_{1N} Series PLC, a maximum of two FX_{2N}-64CL-M can be connected to the main and another two on the extension unit. For details on connection to the PLC main unit, refer to the manual of the PLC main unit.

4.3 Installation concept and condition of power adapter or dedicated power supply

At least one power adapter or dedicated power supply is required for each CC-Link/LT system.

4.3.1 Power adapter installation concept

When constructing a system using only one power adapter, the following three conditions should be satisfied.

- 1) Total current consumption of remote modules, I/O equipment and the master block receiving power from power adapter (including current consumption at startup) ≤ 5 A
- 2) To operate the system in a stable environment, the voltage drop* should be equivalent to or less than 3.6V.
- 3) As the minimum operating voltage from the power adapter is 20.4V for each remote module, Supply voltage to power adapter - Voltage drop* ≥ 20.4 V

If the total current consumption or voltage drop* is large, the power adapter position should be changed or additional power adapters should be installed.

It is necessary to consider the maximum output voltage, rated output current and maximum output current for the general-purpose power supply connected to the power adapter.

For details on the CL1PAD1 (power adapter), refer to the separate document "CC-Link/LT: Power Adapter•Dedicated Power Supply USER'S MANUAL (Detailed Volume)".

When using another product, refer to the corresponding manual.

* Voltage drop from the power adapter to the master station and remote modules (when operating temperature is 20°C)

4.3.2 Power adapter installation condition

The condition for installing the power adapter supplying the power to the CC-Link/LT varies depending on the connected equipment and wiring length. For details on the condition for installing the CL1PAD1 (power adapter), refer to the separate document "CC-Link/LT: Power Adapter•Dedicated Power Supply USER'S MANUAL (Detailed Volume)".

When using another product, refer to the corresponding manual.

4.3.3 Dedicated power supply installation concept

When constructing a system using only one dedicated power supply, the following three conditions should be satisfied.

- 1) Total current consumption of remote modules, I/O equipment and master block receiving power from dedicated power supply (including current consumption at startup) $\leq 2A$
- 2) To operate the system in a stable environment, the voltage drop* should be equivalent to or less than 3.6V.
- 3) As the minimum operating voltage from the dedicated power supply is 20.4V for each remote module, Supply voltage to dedicated power supply - Voltage drop* $\geq 20.4 V$

If the total current consumption or voltage drop* is large, the dedicated power supply position should be changed or additional dedicated power supply should be installed.

For details on the CL1PSU-2A (dedicated power supply), refer to the separate document "CC-Link/LT: Power Adapter•Dedicated Power Supply USER'S MANUAL (Detailed Volume)".

When using another product, refer to the corresponding manual.

* Voltage drop from the power adapter to the master station and remote modules (when operating temperature is 20°C)

4.3.4 Dedicated power supply installation condition

The condition for installing the dedicated power supply supplying the power to the CC-Link/LT varies depending on the connected equipment and wiring length. For details on the condition for installing the CL1PSU-2A (dedicated power supply), refer to the separate document "CC-Link/LT: Power Adapter•Dedicated Power Supply USER'S MANUAL (Detailed Volume)".

When using another product, refer to the corresponding manual.

4.4 Selection of connection cables, connectors and terminal resistors

For the latest information on the connection cables, connectors and terminal resistors, refer to the homepage of the CC-Link Association (<http://www.cc-link.org/>) or catalogs (issued by the CC-Link Association).

4.4.1 Selection of cables

For details on selection of connection cables, refer to the homepage of the CC-Link Association or CC-Link/LT catalogs.

Connection cable	Reference
Dedicated flat cable	For specifications, refer to Section 2.3.
VCTF cable	
High flexible cable	

4.4.2 Selection of connectors

The table below shows the specifications of the VCTF cable connector and high flexible cable connector.

For details on selection of connectors, refer to the homepage of the CC-Link Association or CC-Link/LT catalogs.

Connector	Model name (manufacturer name)	Cover color*1	Cable insulator outside diameter
Dedicated flat cable connector	CL-9-CNF-18 (Mitsubishi Electric System & Service Co.Ltd)	Light blue	—
VCTF Cable Connector	CL9-CNR-23 (Mitsubishi Electric System & Service Co.Ltd)	Green	φ2.1 to 2.4
High Flexible Cable Connector	CL9-CNR-20 (Mitsubishi Electric System & Service Co.Ltd)	Yellowish green	φ1.8 to 2.1

*1 The body color is light blue.

4.4.3 Selection of terminal resistors

Use the CL9-TERM (gray). When only dedicated flat cables are used in the system, the CL9-RYVK (black) is also available.

Make sure to use the terminal resistors having the same model name at the both ends of the trunk line.

For details on terminal resistors, refer to the homepage of the CC-Link Association or CC-Link/LT catalogs.

4.5 Combination and mixed use of cables

4.5.1 Combination of trunk line cable and drop line cables

The table below shows the combination of cables for the trunk line and drop line. "Flat" indicates dedicated flat cable. "VCTF" indicates VCTF cable. "Flexible" indicates high flexible cable. "/" indicates mixed use of cables in the drop line. For example, "Flat/VCTF" indicates mixed use of dedicated flat cable and VCTF cable in the drop line.

Trunk line	Drop line						
	No mixed use of cables in drop line			Mixed use of cables in drop line			
	Flat	VCTF	Flexible	Flat/VCTF	Flat/flexible	VCTF/flexible	Flat/VCTF/flexible
Dedicated flat cable	✓	✓	✓	✓	✓	✓	✓
VCTF cable	✓	✓	✓	✓	✓	✓	✓
High flexible cable	✓	✓	✓	✓	✓	✓	✓

4.5.2 When using different cables together

1) Trunk line

Different cables are not available.

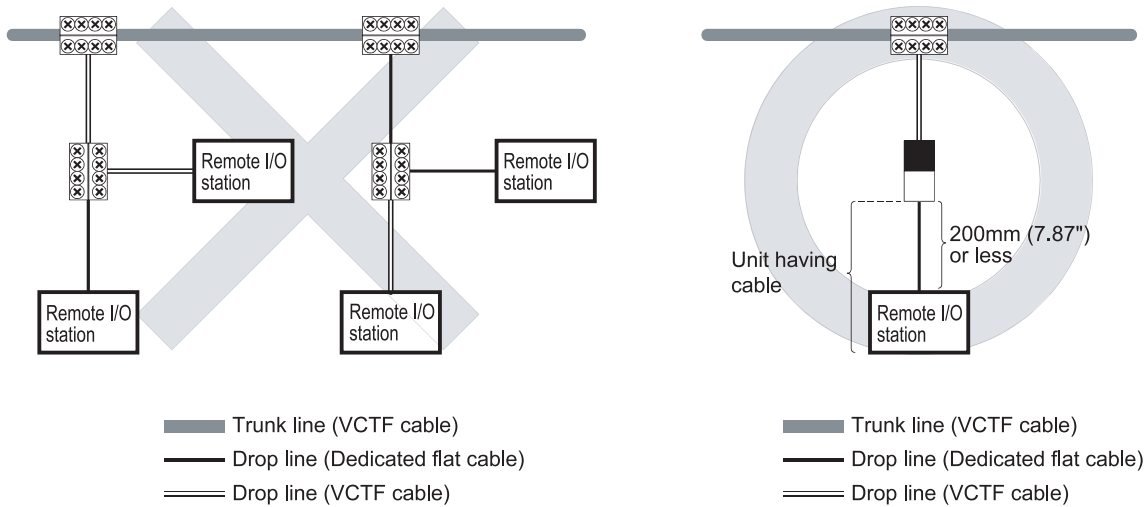
2) Drop line

a) Different cables are available.

b) Different cables are not available in one drop line. (Refer to the left side of the figure below.)

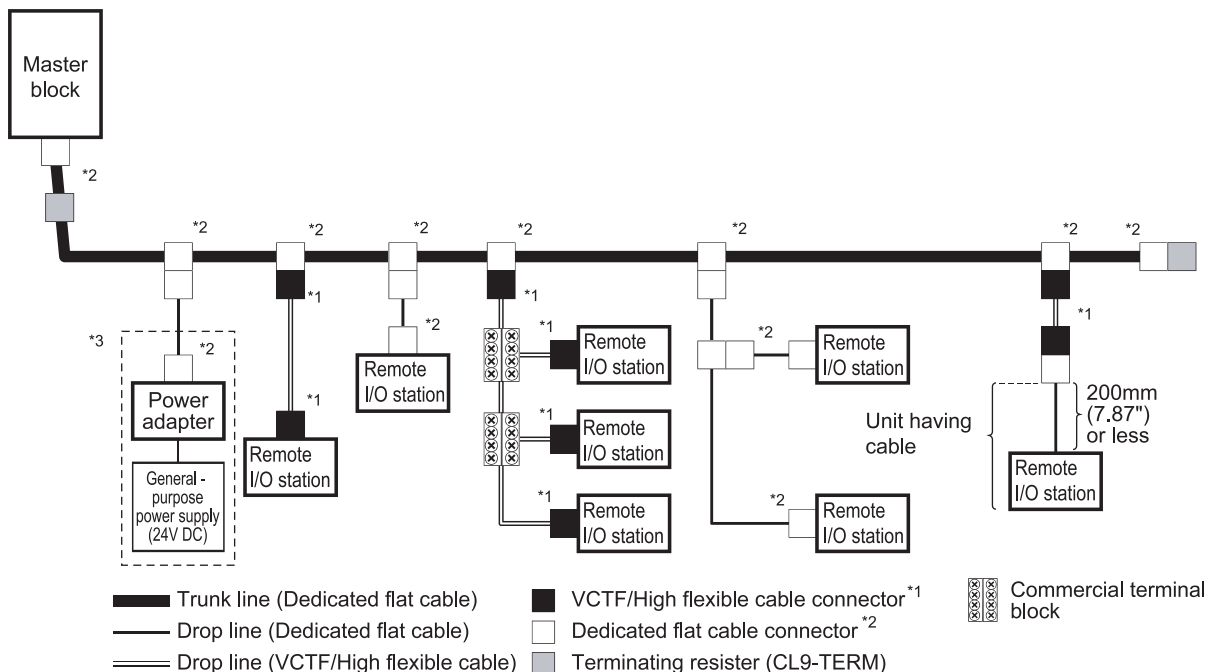
In the case of unit having cable (such as CL1Y2-T1D2S), however, a different type of cable can be connected only when the dedicated flat cable of the unit is 200mm (7.87") or less. (Refer to the right side of the figure below.)

Example:



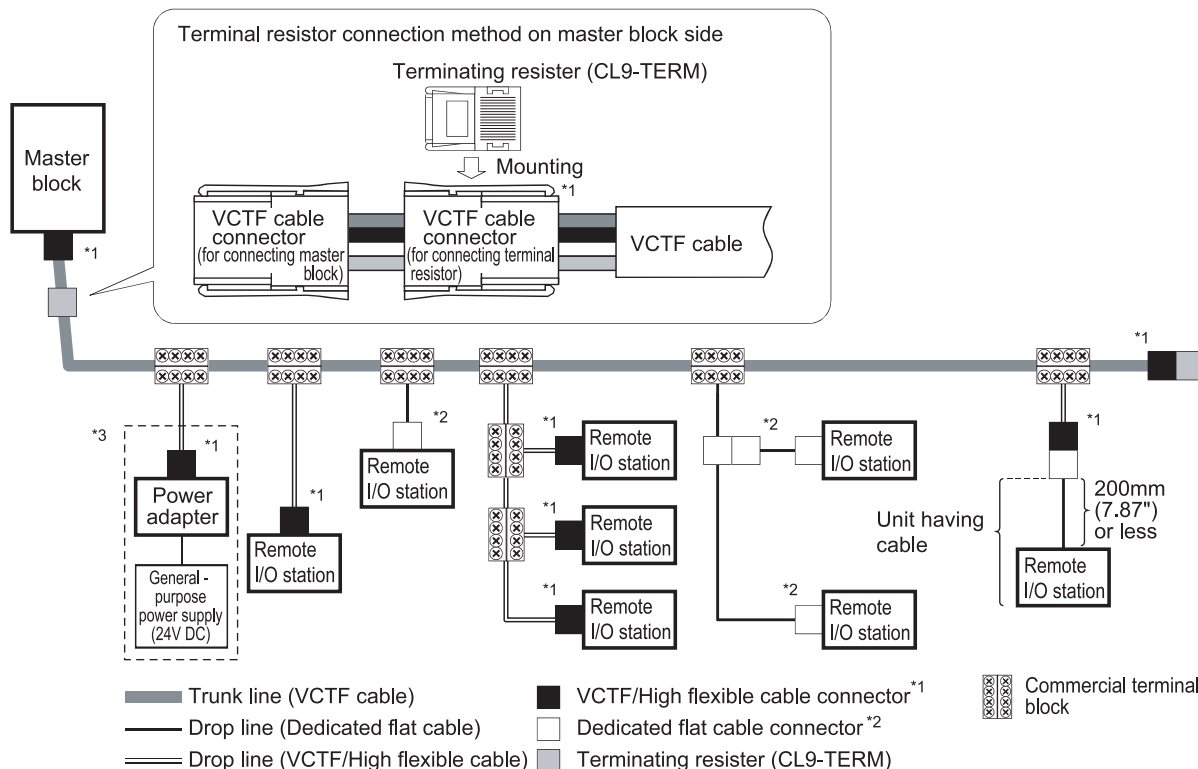
4.5.3 System configuration examples

1) When the dedicated flat cable is used as the trunk line



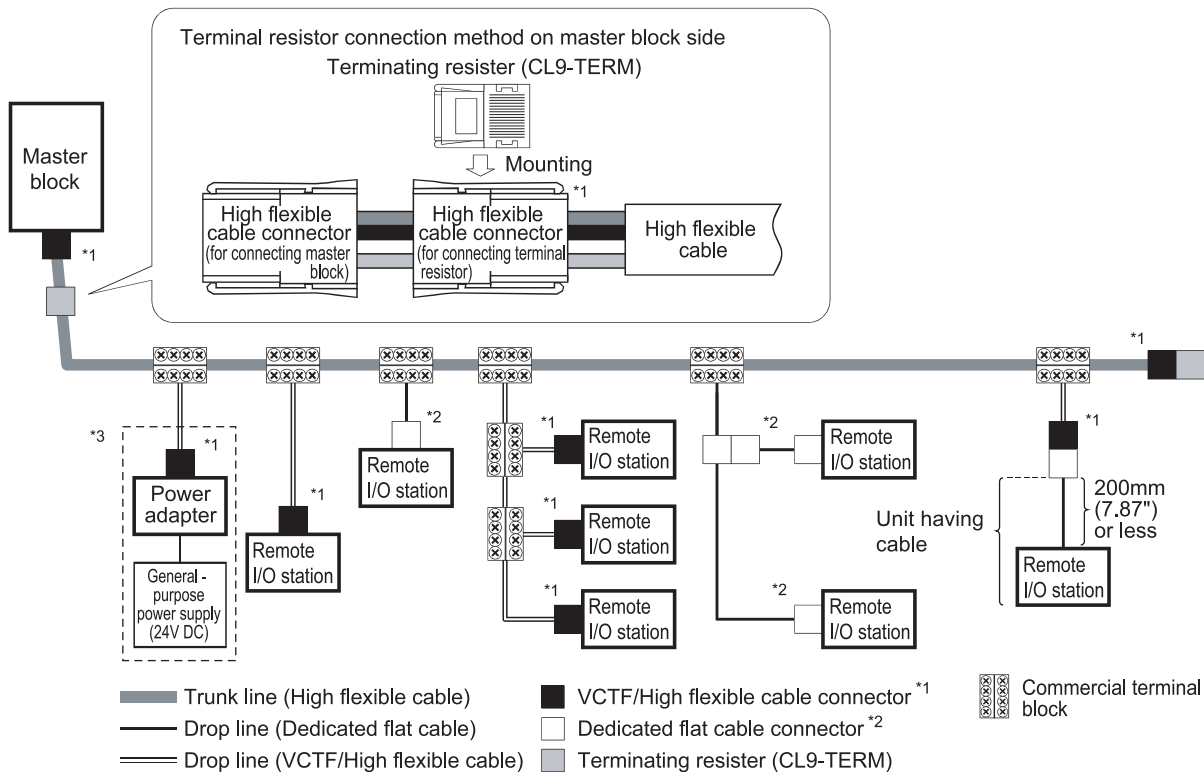
- *1 For the processing procedure of the VCTF cable connector (for connecting the terminal resistor), refer to "6.4 How to attach connectors used for VCTF cable/high flexible cable".
- *2 For the processing procedure of the dedicated flat cable connector (for connecting the terminal resistor), refer to "6.3 How to attach connectors used for dedicated flat cable".
- *3 The dedicated power supply is also available.

2) When the VCTF cable is used as the trunk line



- *1 For the processing procedure of the VCTF cable connector (for connecting the terminal resistor), refer to "6.4 How to attach connectors used for VCTF cable/high flexible cable".
- *2 For the processing procedure of the dedicated flat cable connector (for connecting the terminal resistor), refer to "6.3 How to attach connectors used for dedicated flat cable".
- *3 The dedicated power supply is also available.

3) When the high flexible cable is used as the trunk line



*1 For the processing procedure of the VCTF cable connector (for connecting the terminal resistor), refer to "6.4 How to attach connectors used for VCTF cable/high flexible cable".

*2 For the processing procedure of the dedicated flat cable connector (for connecting the terminal resistor), refer to "6.3 How to attach connectors used for dedicated flat cable".

*3 A dedicated power supply is also available.

5. Handling Cautions



INSTALLATION PRECAUTIONS

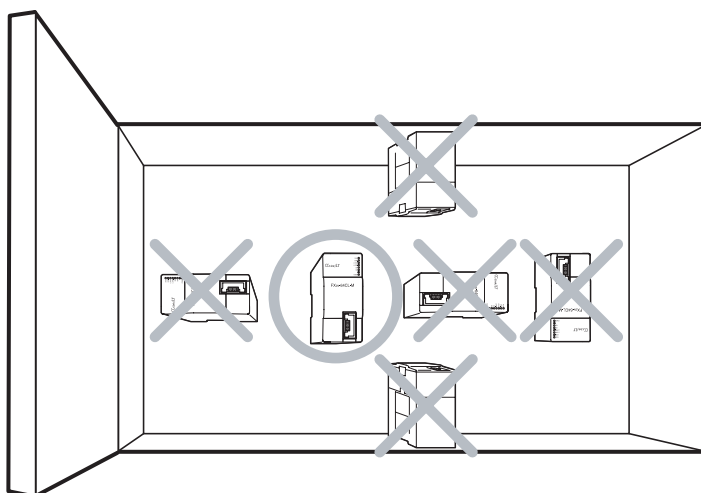
- Use the FX_{2N}-64CL-M in an environment with the general specifications described in this manual.
Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl₂, H₂S, SO₂ or NO₂), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.
- Do not directly touch the conductive area of the FX_{2N}-64CL-M, otherwise, the FX_{2N}-64CL-M may malfunction or fail.
- Shut down all phases of the power supplies before attaching/removing the FX_{2N}-64CL-M to/from the panel, otherwise, the FX_{2N}-64CL-M may fail or malfunction.
- Securely fix the FX_{2N}-64CL-M with DIN rail or mounting screws. When using mounting screws, securely tighten them within the specified torque range.
(Refer to Subsection 5.1.3)
If the screws are too loose, the module may detach from its installed position, short circuit, or malfunction. If the screws are too tight, the screws may be damaged, which may cause the module to detach from its installed position or short circuit.
- Install the FX_{2N}-64CL-M on to a flat surface.
If the installation surface is not flat, an excessive force may be applied on the PCBs, leading to nonconformity.

5.1 Installation

The FX_{2N}-64CL-M can be attached via DIN rail or attached directly with screws.
The installation procedure in each case is described below.

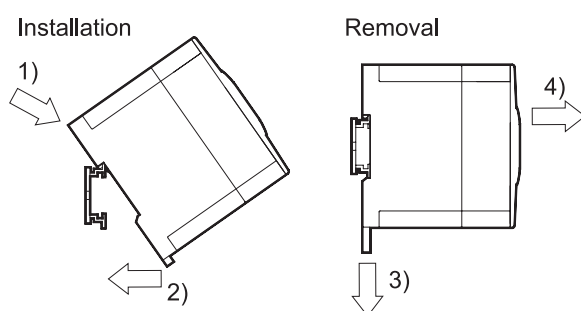
5.1.1 Installation direction

- Do not install the master block on floor surfaces, ceiling surfaces or in a horizontal direction. If the master block is installed in such a way, its temperature may rise. Install the master block vertically on wall surfaces as shown in the figure below.
- Secure a space of 50 mm (1.96") or more between the master block and other equipment or structures. Keep the master block off high voltage cables, high voltage equipment and power equipment as much as possible.



5.1.2 DIN rail installation

Align the upper DIN rail installation groove in the module with the DIN rail 1), and press the module in that position 2).
When removing the module, pull the installation hook downwards 3), then remove the module 4).



Applicable DIN rail	TH35-7.5Fe and TH35-7.5Al
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5.1.3 Direct installation

Fix the FX_{2N}-64CL-M on to the panel surface by tightening M4 screws inserted in two (upper and lower) mounting holes provided on the master block.
Install the FX_{2N}-64CL-M and other units so that a clearance of 1 to 2 mm is assured among each unit.

Applicable screw	M4 height: 16mm(0.63") or more (Tightening torque range: 0.78 to 1.08 N·m)
------------------	--

6. Connection of Cables, Connectors and Terminating Resistors

Connect the master station, power adapter / dedicated power supply and remote stations with connection cables and connectors.

It is necessary to connect terminal resistors at the both ends of the trunk line in the CC-Link/LT system.



WIRING PRECAUTIONS

- Shut down all phases of the power supplies before starting installation or wiring work. If the power is not disconnected from all sources an electric shock or serious product damage may occur.



WIRING PRECAUTIONS

- Correctly wire the master block while confirming the rated voltage and terminal arrangement of the FX_{2N}-64CL-M. If a power supply different from the rated supply is connected or wiring is performed incorrectly, fire or failure may be caused.
- Pay attention to foreign objects such as cuttings or wiring chips do not enter the FX_{2N}-64CL-M, otherwise, fire, product failure or malfunction may occur.

6.1 Connection cable/connector/terminal resistor connection procedure

Connect cables, connectors and terminal resistors as follows:

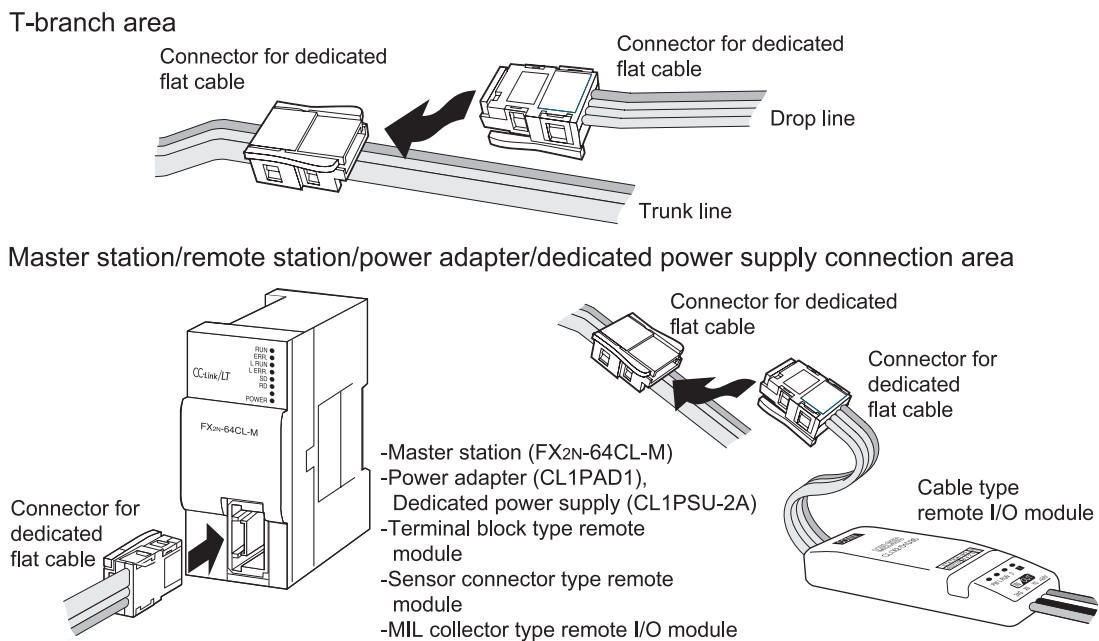
Procedure

- 1) Make sure that the PLC power is OFF before wiring.
- 2) Attach connectors at the ends of cables and T-branch portions.
- 3) Connect dedicated flat cables, VCTF cables and high flexible cables.
- 4) Connect one side of the trunk line cable with connector to the CC-Link/LT interface connector on the master side.
- 5) Connect a terminal resistor to each end of the system.
Connect a terminal resistor in an area within 200mm (7.87") from the interface connector of the master station.

6.2 Connection of units using connection cables to CC-Link/LT (in case of dedicated flat cable)

This paragraph explains the connection method using flat cables dedicated to CC-Link/LT.

- 1) The connection order of dedicated flat cables has no relevance to the station number.
 - 2) Lay out the FX2N-64CL-M at either end of the trunk line.
Connect a terminating resistor on the FX2N-64CL-M side in a position that is within 200mm (7.87") from the FX2N-64CL-M.
 - 3) Make sure to connect a terminating resistor to each end of the trunk line the CC-Link/LT.
- Connect T-branches and remote modules using the connectors for dedicated flat cable.

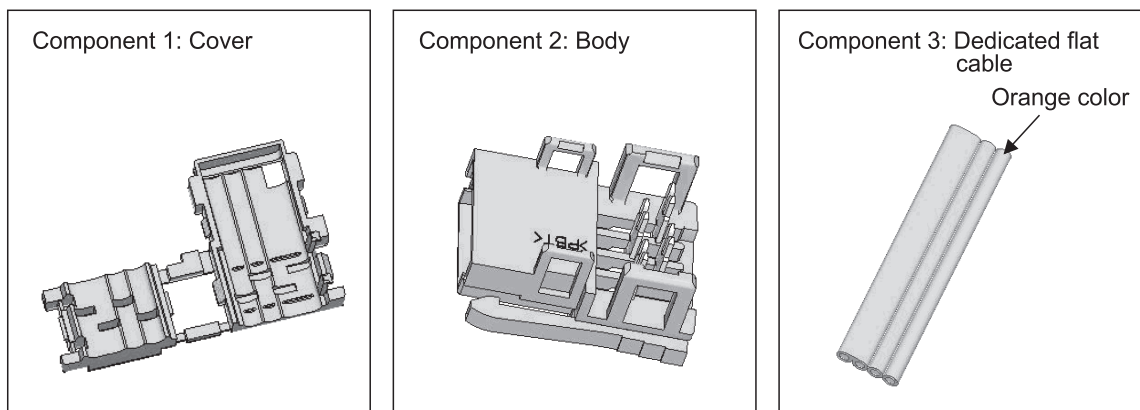


6.3 How to attach connectors used for dedicated flat cable (terminal/T-branch processing)

This paragraph explains how to attach connectors used for the dedicated flat cable.

- 1) Components

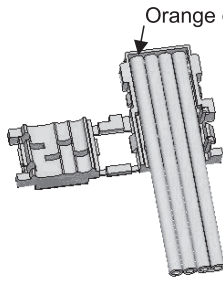
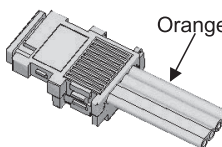
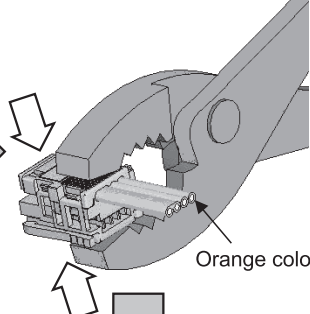
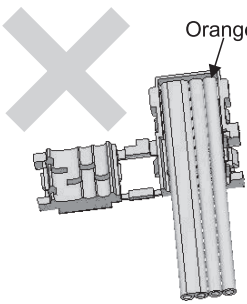
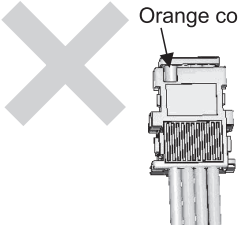
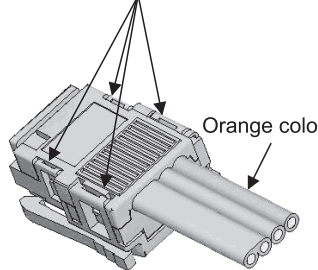
The components are as shown below.



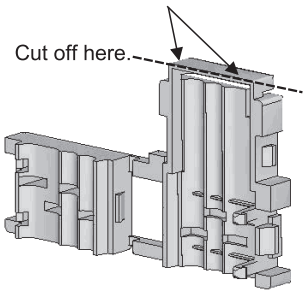
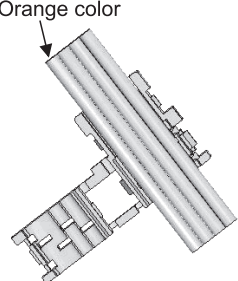
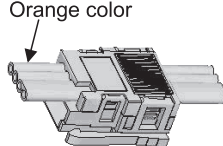
2) Attachment procedure

The procedure is shown below.

a) Terminal processing procedure

<p>1) Correctly set the dedicated flat cable on the cover. (Pay attention to the orange color location of the dedicated flat cable.)</p>  <p>Orange color</p>	<p>2) Close the cover to firmly hold the dedicated flat cable.</p>  <p>Orange color</p>	<p>3) Combine the body with the cover, and press-fit them with pliers, etc.</p>  <p>Orange color</p>
<p>Note 1: This direction is wrong.</p>  <p>Orange color</p>	<p>Note 2: If the orange dedicated flat cover can be seen from the notched window in the front, the wiring is wrong. Open the cover, and correctly set the dedicated flat cover.</p>  <p>Orange color</p>	<p>4) Confirm that the latch is engaged in four positions. Now, press-fitting is finished.</p>  <p>Orange color</p>

b) T-branch processing procedure

<p>5) Cut off two positions at the root of the tip of the cover with nippers, etc., and remove the tip.</p>  <p>Cut off here.</p>	<p>6) Set the cover to the position in which T-branch will be set.</p>  <p>Orange color</p>	<p>7) Execute press-fitting in the same way as in steps 3) and 4) above.</p>  <p>Orange color</p>
--	--	--

6.4 How to attach connectors used VCTF cable/high flexible cable (terminal/T-branch processing)

This section explains how to attach VCTF cable connectors and high flexible cable connectors.

1) Components

The component is shown below.

Component 1: Cover
VCTF cable connector: Green
Flexible cable connector: Yellowish green

Component 2: Body (light blue)

Component 1: VCTF cable/
High Flexible cable

Relationship between wire color and signal

Signal name	Wire color
+24V	Red
DA	White
DB	Black
24G	Green

2) Attachment procedure

The procedure is as follows.

a) Terminal processing procedure

Applicable attachment: Terminal resistor attachment at the trunk line end and terminal processing

① Correctly set the VCTF cable/high flexible cable to the same color cover.

② Close the cover to firmly hold the VCTF cable/high flexible cable. When the cable is correctly wired, the green wire can be seen from the notched window. If the red, white or black wire is seen from the notched window, the wiring is wrong. Open the cover, and correctly set the cable. Wrong wiring causes failures in the unit.

③ Combine the body with the cover, and press-fit them with pliers, etc.

④ Confirm that the latch is engaged in four positions. Now, press-fitting is finished.

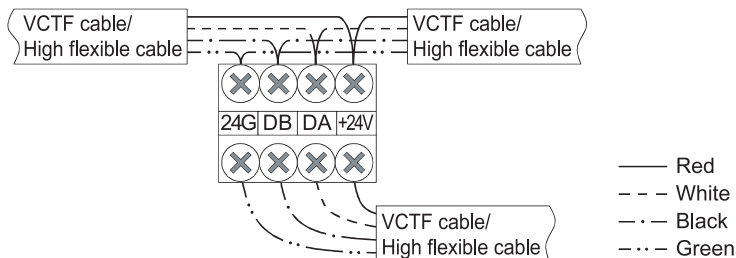
b) T-branch processing procedure

- When using the terminal block

Applicable attachment: T-branch processing

When wiring the VCTF cable/high flexible cable to the terminal block, connect the same color cables together.

Applicable cable: Dedicated flat cable, VCTF cable and high flexible cable



Cautions on use

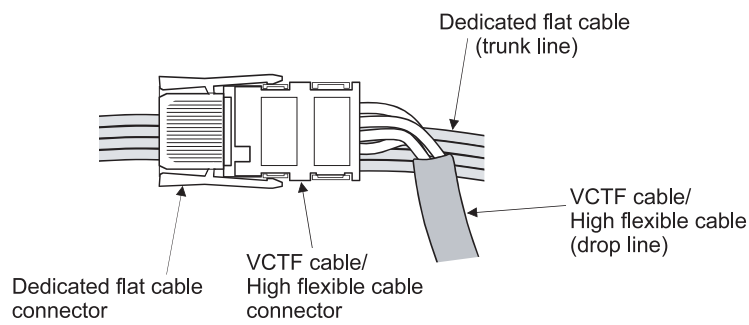
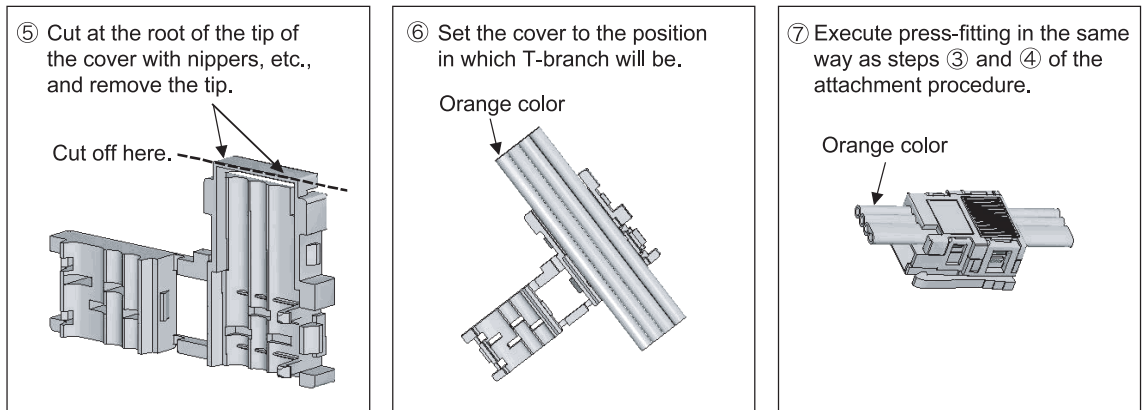
Align the symbols "+24V", "DA", "DB" and "24G" printed on the dedicated flat cable with the wire colors of the VCTF cable / high flexible cable as shown in the table below when wiring the dedicated flat cable to the terminal block "trunk line = VCTF cable, drop line = dedicated flat cable".

Make sure to separate the dedicated flat cable into four independent wires having the marks "+24V", "DA", "DB" and "24G".

Dedicated flat cable	Wire colors in VCTF cable or high flexible cable
+24V	Red
DA	White
DB	Black
24G	Green

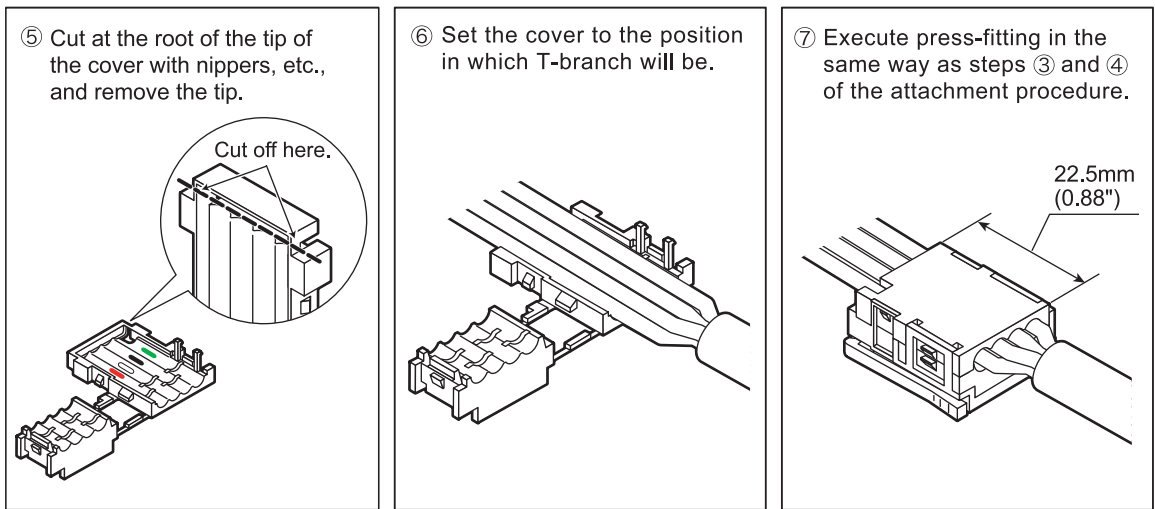
- When the dedicated flat cable is used as the trunk line
 Branch the trunk line using connectors in the same way as the T-branch processing method for the dedicated flat cable.

Trunk line: Dedicated flat cable
 Drop line: VCTF cable or high flexible cable

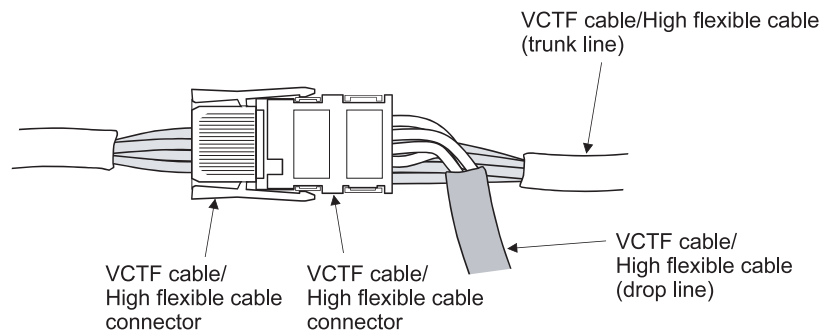


- When the VCTF cable/high flexible cable is used as the trunk line

Trunk line, Drop line: VCTF cable, High flexible cable



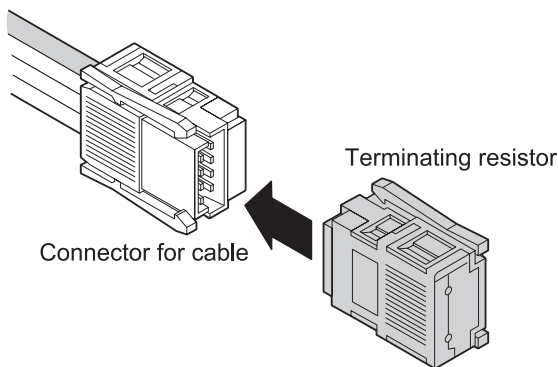
After stripping the sheath by 70mm (2.75") or more, perform the procedure for the dedicated flat cable in the same way as the T-branch.



6.5 How to attach terminating resistor

This paragraph explains how to attach terminating resistors to either end of the CC-Link/LT system.

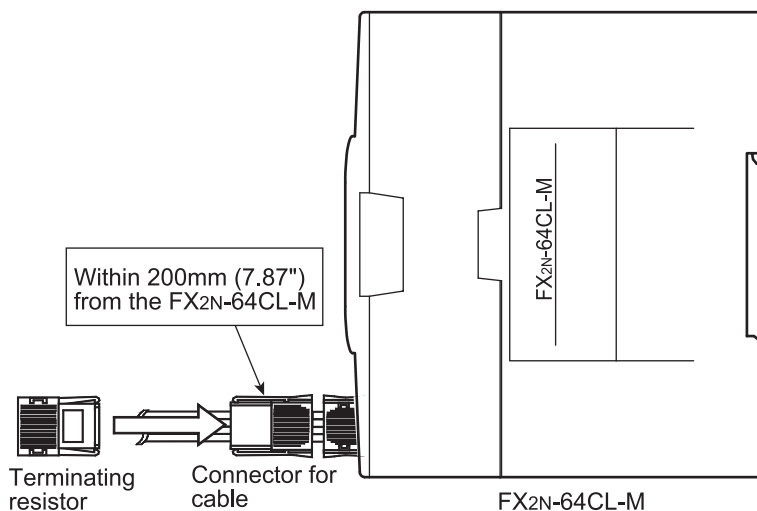
Attach the terminal resistor to the cable connector.



1) How to attach a terminating resistor on the FX2N-64CL-M side

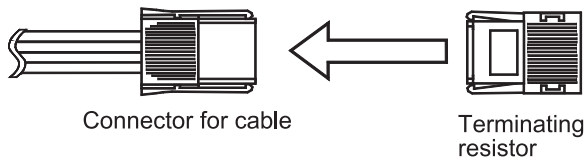
The method to attach a terminating resistor on the FX2N-64CL-M side is shown below.

Connect a terminating resistor in a position within 200mm (7.87") from the FX2N-64CL-M.



2) How to attach a terminating resistor on the trunk line side

The method to attach a terminating resistor on the opposite side of the FX2N-64CL-M is shown below.

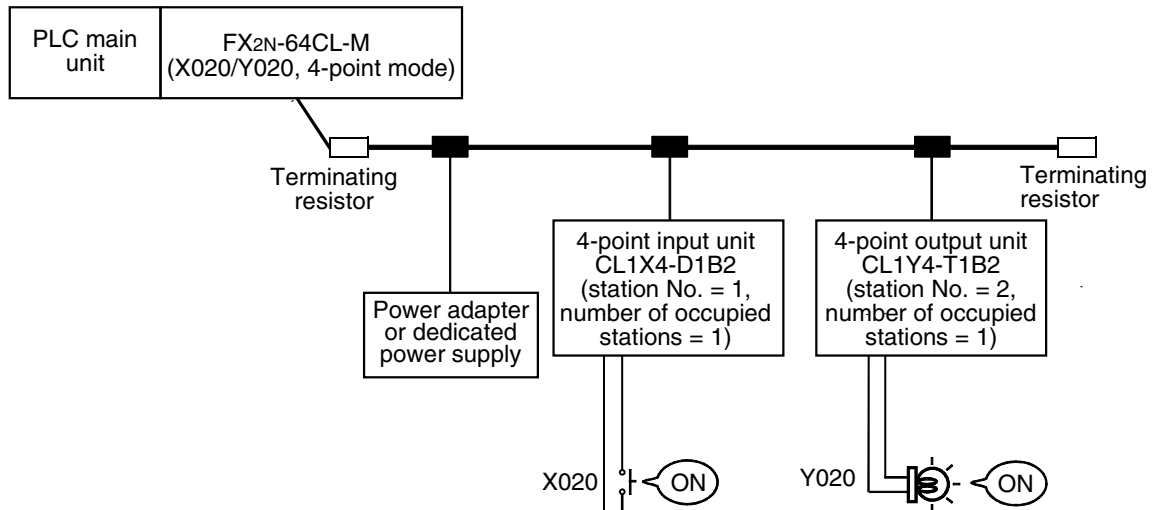


6.6 Wiring check

Confirm the wiring between remote modules and external equipment.

Example of wiring check

The figure below shows an example in which the head I/O number in the FX_{2N}-64CL-M is X020/Y020 and 4-point mode is selected.



Operating procedure

- 1) Connect the FX_{2N}-64CL-M, power adapter / dedicated power supply and remote modules using cables, and then set the transmission speed, point mode, station number, etc. using the DIP switches in the FX_{2N}-64CL-M and remote modules.
At this time, select the CONFIG mode in the FX_{2N}-64CL-M (by setting bit 6 ON and setting bit 7 OFF).
- 2) Turn ON the power to the power adapter or dedicated power supply, and then turn ON the power to the PLC.
- 3) When the acquisition of remote module information is completed in the CONFIG mode (that is, when b4 of the BFM #28 (1Ch) turns ON), turn the power OFF.
- 4) Set the FX_{2N}-64CL-M to ONLINE mode (by setting bits 6 and 7 to OFF in the DIP switch). Turn ON the power again to the power adapter or dedicated power supply, and then turn ON the power to the PLC. Perform the operation a) or b) below.
 - a) Checking the wiring between the input unit and external equipment
 - Turn ON the switch corresponding to "X020" of the external equipment connected to the input unit with station number is 1.
 - Monitor X020 from peripheral equipment.
 - If X020 is ON, connection between the input unit and external equipment is normal.
 - b) Check the wiring between the output unit and external equipment
 - Turn Y020 ON/OFF from peripheral equipment using the forced ON/OFF operation.
 - If the connection between the output unit and external equipment is normal, a lamp corresponding to "Y020" in the external equipment will light.

MEMO

7. Various Modes

The FX_{2N}-64CL-M has ONLINE, CONFIG and TEST modes. Each mode can be selected using the appropriate DIP switch. (Turn OFF the power to the PLC before setting the DIP switches.)

7.1 ONLINE mode (DIP switch bit 6 = OFF, bit 7 = OFF)

In ONLINE mode, the FX_{2N}-64CL-M will execute the data link in the CC-Link/LT system. Select this mode for normal use.

7.2 CONFIG mode (DIP switch bit 6 = ON, bit 7 = OFF)

In CONFIG mode, the FX_{2N}-64CL-M assigns the station number and I/O numbers for remote stations.

The FX_{2N}-64CL-M acquires the information (I/O type and number of points) on the connected remote stations, then stores it to the buffer memory [BFM #32 (20h) to #95 (5Fh)] and built-in memory (EEPROM).

After constructing the CC-Link/LT system, execute the CONFIG mode to automatically assign the I/O numbers.

(After constructing the CC-Link/LT system, assign the I/O numbers by executing the CONFIG mode.)

If remote stations are to be extended in the future, the I/O numbers can be assigned while skipping some I/O numbers.

For the details on assignment of the I/O numbers, refer to "8. Assignment of I/O numbers."

7.3 TEST mode (self-loop-back test) (DIP switch bit 6 = OFF, bit 7 = ON)

In TEST mode (for the self-loop-back test), the FX_{2N}-64CL-M checks whether it is fully functional by receiving data sent by itself.

In this test, it is not necessary to connect remote stations.

(Connect the FX_{2N}-64CL-M to the power adapter or dedicated power supply, and then turn ON the power for communication.)

For details on the self-loop-back test, refer to "12.4 Self-loop-back test".

- When the FX_{2N}-64CL-M is set to TEST mode while it is connected to an FX_{1N} Series PLC, the PLC does not start up.
(The self-loop-back test will be executed normally, and the test result will be indicated by the status indicator LEDs.)

MEMO

8. Assignment of I/O numbers

The FX_{2N}-64CL-M assigns I/O information for remote I/O modules to devices X (input) and Y (output) in the PLC.

The I/O numbers are assigned in CONFIG mode.

At this time, the I/O numbers are assigned in octal serial numbers following the I/O number occupied by the PLC while eight points are handled as one block.

(For further details, refer to "8.2 Example of I/O number assignment")

For a station number to which a remote module will be connected to in the future, the I/O number can be secured by "specifying it as a reserved station" and "editing the detailed remote station information on it".

8.1 Relationship between I/O number and point mode

The I/O number is equivalent between the 4-point mode and 16-point mode, but the station number of each remote station is different between 4-point mode and 16-point mode.

For the remote module with 4 I/O points or more, more I/O points are available with the 16-point mode since a maximum of 64 remote stations are connectable.

Example: When sixty-three CL1XY2-DT1D5S units (cable type remote unit having 1 input point and 1 output point) (station number: 1 to 63) and one CL2X8-D1B2 unit (terminal block type remote I/O module having 8 input points) are to be connected to the FX_{2N}-16MR, a system can be constructed in the 16-point mode, but cannot be constructed in the 4-point mode due to the CL2X8-D1B2 unit occupying two stations and the number of remote stations exceeds 64.

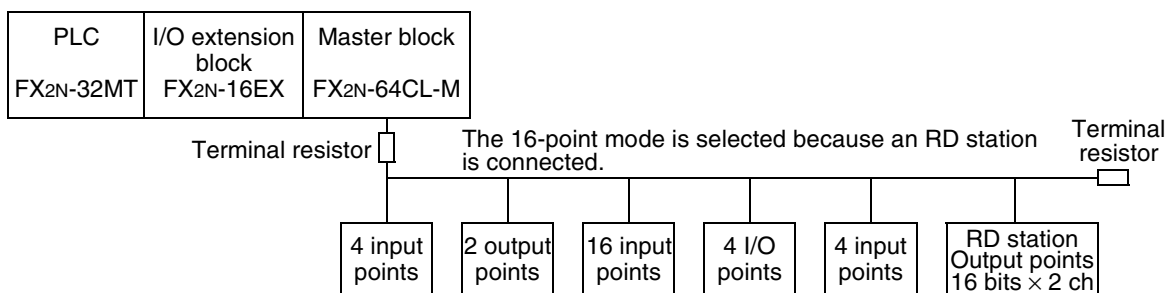
However, if the number of stations is equivalent, the link scan time is longer in the 16-point mode than in the 4-point mode.

(For further details on the link scan, refer to "9. Data Link Processing Time".)

- 1) When connecting all remote modules and assigning their I/O numbers, refer to "8.3 Automatic I/O number assignment".
 - 2) When assigning the I/O numbers without connecting remote modules and preparing a sequence program or connecting additional remote modules in the future, refer to "8.3 Automatic I/O number assignment" and "8.4 Specification of reserved station" and "8.5 Edition of detailed remote station information".
- In CONFIG mode, the FX_{2N}-64CL-M does not occupy I/O points for remote stations. (It occupies only 8 points as a special block.)
Extension blocks/units of the PLC connected after the FX_{2N}-64CL-M do not operate.

8.2 Example of I/O number assignment

This paragraph describes I/O number assignment in the configuration example shown below.



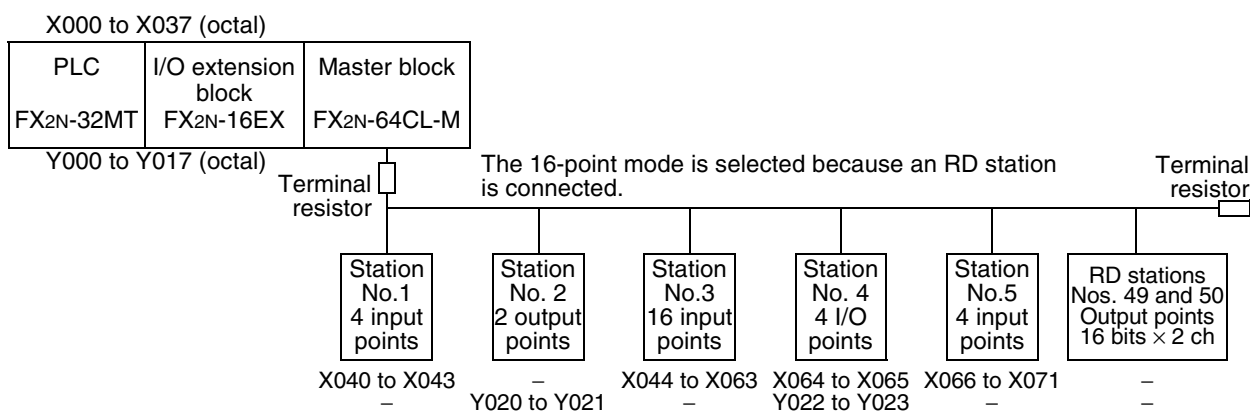
The CC-Link/LT master function for the FX Series checks connected remote stations in the CONFIG mode. At the next power ON, this master function assigns the I/O numbers to each connected remote station. RD stations do not give any effect on assignment of the I/O numbers because buffer memories (BFM) are assigned to RD stations in accordance with the station number.

Assignment result

	Station type	Number of points	I/O assignment (X)	I/O assignment (Y)	BFM #
Station No.1	Remote I/O station (input)	4 points	X040 to X043	--	--
Station No.2	Remote I/O station (output)	2 points	--	Y020, Y021	--
Station No.3	Remote I/O station (input)	16 points	X044 to X063	--	--
Station No.4	Remote I/O station (input/output)	4 points	X064, X065	Y022, Y023	--
Station No.5	Remote I/O station (input)	4 points	X066 to X071	--	--
Station No.49	RD station (output)	16 points	--	--	208
Station No.50	RD station (output)	16 points	--	--	209
Unused I/O*1			X072 to X077	Y024 to Y027	--

*1 With regard to X and Y, 8 points are occupied as 1 block. As a result, if the number of I/O points occupied by a station is a number which cannot be divided by "8", unused numbers are generated.

In the configuration example above, the I/O numbers are assigned as shown below.



8.3 Automatic I/O numbers assignment

The I/O numbers can be assigned automatically in the CONFIG mode. Parameter settings and sequence programs are not necessary for this assignment.

8.3.1 Automatic I/O numbers assignment procedure

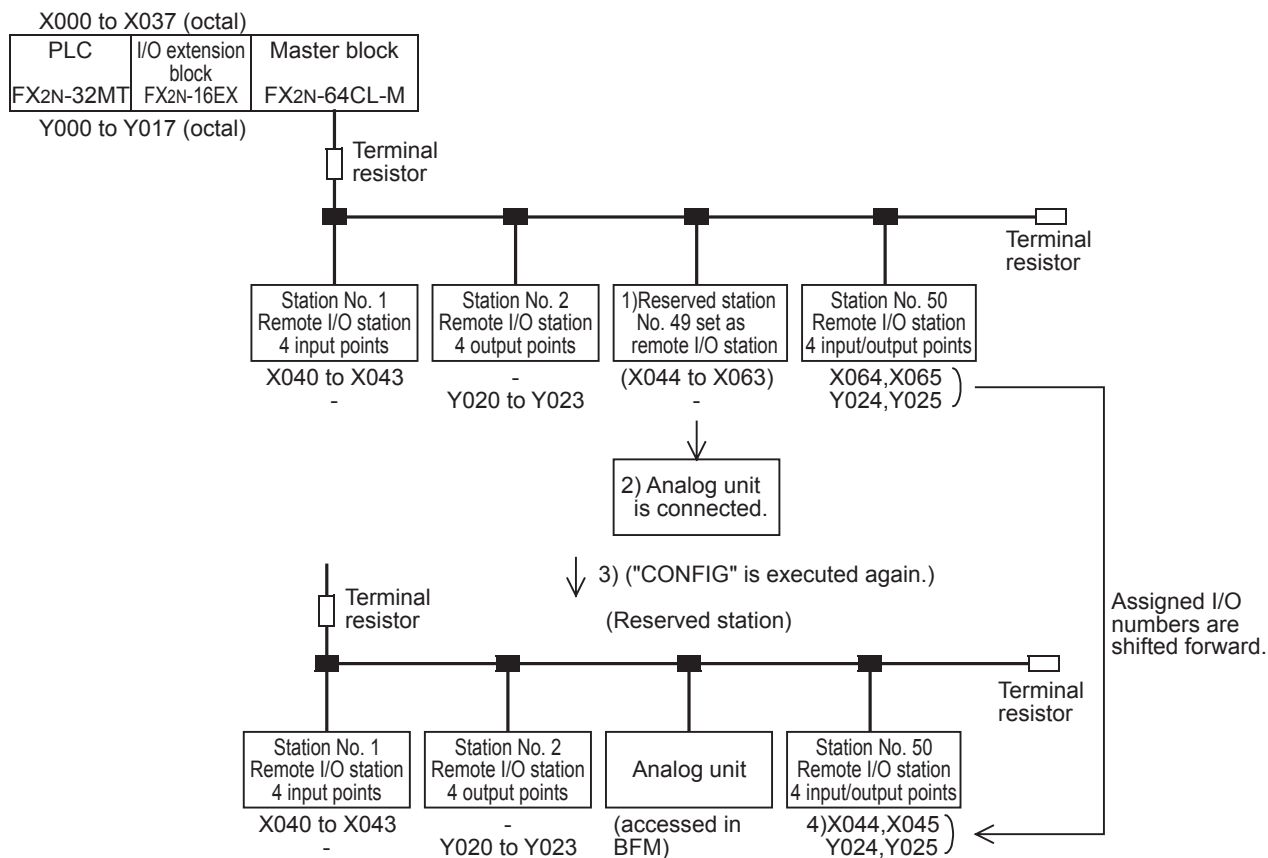
Execute the steps 1) to 3) below to automatically assign the I/O numbers.

- 1) Connect each remote I/O module to the FX_{2N}-64CL-M.
In the FX_{2N}-64CL-M, set bit 6 of the DIP switch to ON, and set bit 7 to OFF (to select the CONFIG mode). Turn ON the power to the power adapter or dedicated power supply, and then turn ON the power to the PLC.
The FX_{2N}-64CL-M acquires the information (I/O type and number of points) on connected remote stations, and stores it to the buffer memory [BFM #32 (20h) to #95 (5Fh)] and built-in memory (EEPROM).
- 2) Confirm that the contents of the buffer memory [BFM #32 (20h) to #95 (5Fh)] are consistent with the actual system configuration.
- 3) Set bit 6 of the DIP switch in the FX_{2N}-64CL-M to OFF. Reset the power to the PLC.
The FX_{2N}-64CL-M reads the information on connected remote stations from the built-in memory (EEPROM), and assigns the I/O number.

8.3.2 Cautions on I/O number assignment when remote device stations are used

Note that the I/O numbers are shifted forward if the following setting is performed by mistake in specifying a reserved station:

- 1) The reserved station is set to an I/O station instead of a remote device station (analog unit) by mistake.
- 2) An analog unit is connected, and X/Y numbers are used.
By operations 1) and 2), an analog unit is activated.
- 3) "CONFIG" is executed again.
- 4) The I/O number assignment shifts backward.
The analog unit is accessed in the BFM.



8.4 Specification of reserved station

The FX_{2N}-64CL-M assigns the I/O number in the CONFIG mode. If remote stations will be added in the future, temporary I/O numbers can be assigned (specification of reserved stations).

By this function, even if remote stations are added, it is not necessary to change the I/O numbers assigned to other remote stations and extension blocks/units connected to the PLC. If remote stations are connected in places for reserved station, the connected remote stations can operate with the existing setting, but errors such as wire breakage cannot be detected. After connecting remote additional stations, execute automatic I/O number assignment in the CONFIG mode again. The system will update the detailed remote station information, and the new remote stations will be able to be used normally (errors will be detected).

8.4.1 Reserved station setting method

Set reserved stations using the steps 1) to 4) below.

- 1) Set the FX_{2N}-64CL-M to the CONFIG Mode (by setting bit 6 of the DIP switch to ON and setting bit 7 to OFF). Power up the FX_{2N}-64CL-M.
(The FX_{2N}-64CL-M will assign the I/O numbers.)
- 2) Write the information (station type and number of I/O points) for the station to be added in the detailed remote station information buffers [BFM #32 (20h) to #95 (5Fh)]. Set the reserved station flag (bit 15) to ON in the appropriate BFM.
(If the bit for reserved station is set to OFF, errors such as wire breakage are detected when a remote station is not connected.)
- 3) Give the information on remote station and set to ON the reserved station flag bit in the detailed remote station information for all remote stations to be added in the future, and then give the instruction to write to the EEPROM [by rebooting the bit 4 of BFM #27 (1Bh)].
- 4) After setting the reserved station, confirm by checking bit 4 of BFM #28 (1Ch) that write to the EEPROM is completed. After that, reboot the FX_{2N}-64CL-M in the ONLINE mode (by setting the DIP switch 6 to OFF), and then confirm that the detailed remote station information [BFM #32 (20Ch) to #95 (5Fh)] indicates the changed contents.

Buffer memory No.	Description
BFM #32(20h)	Remote station information area for the station No.1
BFM #33(21h)	Remote station information area for the station No.2
⋮	⋮
BFM #95(5Fh)	Remote station information area for the station No.64

Configuration of detailed remote station information

Bit	Function	1(ON)		0(OFF)
b0	Number of I/O points ^{*1}	00001:1point	00101:5points	01001: 9points
b1		01101:13points	00010:2points	00110:6points
b2		01010:10points	01110:14points	00011:3points
b3		00111:7points	01011:11points	01111:15points
b4		00100:4points	01000:8points	01100:12points
		10000:16points The bits above are in the order "b4, b3, b2, b1, b0".		
b5 to b7	(Setting prohibited)	Set these bits to 0.		
b8	Input flag ^{*2}	Input is given.		Input is not given.
b9	Output flag ^{*2}	Output is given.		Output is not given.
b10	RD station flag	RD station.		Not RD station.
b11	Head station flag ^{*3}	Head station.		Not a head station.
b12	Input filter setting	High-speed input		General-purpose input
b13	Output hold/clear setting	HOLD		CLEAR
b14	(Setting prohibited)	Set these bits to 0.		
b15	Reserved station flag	Reserved station.		Not a reserved station.

*1 In the case of an I/O (composite) module, the number of inputs or the number of outputs becomes the number of I/O points.

Ex.) In the case of the CL1XY2-DT1D5S I/O module, I/O points become "one point".

*2 In the case of an I/O (composite) module, input flag (b8) and output flag (b9) are set to 1 (on).

*3 When there are two or more units, only the bit of the head station is set to 1 (on).

8.5 Editing the detailed remote station information

After assigning the I/O numbers in the CONFIG mode, the I/O number assignment in each station number can be edited.

With this function, the number of I/O points can be changed, and the I/O numbers can be assigned to unconnected station numbers for future use. If remote stations are added in the future, it is not necessary to change the I/O numbers in other remote stations and extension blocks/units connected to the PLC.

If a remote station is not connected to an edited station number, errors such as wire breakage error will occur.

If a remote station is connected to an edited station number the remote station will operate with the existing setting.

8.5.1 How to edit detailed remote station information

Edit the detailed remote station information using the steps 1) to 4) below.

- 1) Set the FX_{2N}-64CL-M to the CONFIG Mode (by setting bit 6 of the DIP switch to ON and setting bit 7 to OFF). Set the power of the FX_{2N}-64CL-M to ON.
(The FX_{2N}-64CL-M will assign the I/O numbers.)
- 2) Write the information (station type and number of I/O points) for the station to be added in the detailed remote station information buffers [BFM #32 (20h) to #95 (5Fh)]. Set the reserved station flag (bit 15) to OFF in the appropriate BFM.
(If the bit for reserved station is set to ON, the station is regarded as a reserved one, and errors such as wire breakage error cannot be detected.)
- 3) To the detailed remote station information on every remote station to be edited, write the information on the remote station. Then, give the instruction for write to the EEPROM [by setting b4 of the BFM #27 (1Bh) from OFF to ON].
- 4) After editing the remote station information, confirm that write to the EEPROM is completed by checking b4 of the BFM #28 (1Ch). Then, set the power of the FX_{2N}-64CL-M to ON using the normal procedure (by setting bit 6 of the DIP switch to OFF), and confirm that the detailed remote station information [BFM #32 (20h) to BFM #95 (5Fh)] is updated.

Buffer memory No.	Description
BFM #32(20h)	Remote station information area for the station No.1
BFM #33(21h)	Remote station information area for the station No.2
⋮	⋮
BFM #95(5Fh)	Remote station information area for the station No.64

Configuration of detailed remote station information

Bit	Function	1(ON)		0(OFF)
b0	Number of I/O points ^{*1}	00001:1point	00101:5points	01001: 9points
b1		01101:13points	00010:2points	00110:6points
b2		01010:10points	01110:14points	00011:3points
b3		00111:7points	01011:11points	01111:15points
b4		00100:4points	01000:8points	01100:12points
		10000:16points	The bits above are in the order "b4, b3, b2, b1, b0".	
b5 to b7	(Setting prohibited)	Set these bits to 0.		
b8	Input flag ^{*2}	Input is given.		Input is not given.
b9	Output flag ^{*2}	Output is given.		Output is not given.
b10	RD station flag	RD station.		Not RD station.
b11	Head station flag ^{*3}	Head station.		Not a head station.
b12	Input filter setting	High-speed input		General-purpose input
b13	Output hold/clear setting	HOLD		CLEAR
b14	(Setting prohibited)	Set these bits to 0.		
b15	Reserved station flag	Reserved station.		Not a reserved station.

*1 In the case of an I/O (composite) module, the number of inputs or the number of outputs becomes the number of I/O points.

Ex.) In the case of the CL1XY2-DT1D5S I/O module, I/O points become "one point".

*2 In the case of an I/O (composite) module, input flag (b8) and output flag (b9) are set to 1 (on).

*3 When there are two or more units, only the bit of the head station is set to 1 (on).

9. Data Link Processing Time

This section explains the link scan time and transmission delay time.

9.1 Link scan time

This paragraph explains the link scan time for the CC-Link/LT network.

9.1.1 Link scan time calculation formula

$$\text{Link scan time} = a + (b \times N) \times c \text{ [\mu s]}$$

a: Constant (depends on the transmission speed)

Transmission speed	2.5Mbps	625kbps	156kbps
Value a	22	88	353

b: Constant (depends on the transmission speed and point mode)

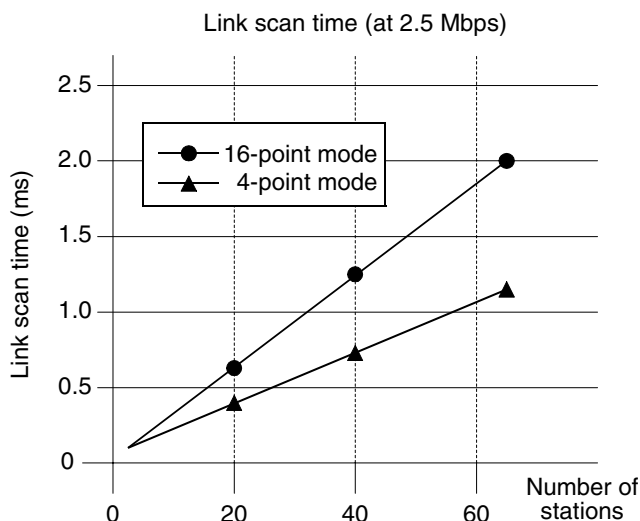
Transmission speed		2.5Mbps	625kbps	156kbps
Value b	4-point mode	46	41	37
	16-point mode	76	71	67

c: Constant (depends on the transmission speed)

Transmission speed	2.5Mbps	625kbps	156kbps
Value c	0.4	1.6	6.4

N: Final station number

As shown in the formula above, if the number of stations is held constant, the link scan time is shorter in the 4-point mode than in the 16-point mode.



9.1.2 Transmission delay time

The transmission delay time (the time until data is received) (including the time for communication between the main unit and FX_{2N}-64CL-M) can be calculated by the following formula.

1) Master station ← Remote station (input)

Time until a device (X) in the main unit turns ON or OFF after a signal is input to the remote station

Calculation formula

$$SM \times 2 + (2 - n)^{*1} \times LS + \text{Remote station input response time [ms]}$$

SM: Scan time of master station PLC

LS: Link scan time

n: SM/LS (whose decimals are omitted)

*1: 0 if the value "2-n" is 0 or less

Example:

The scan time of the master station PLC is 5 ms, the link scan time is 1.2 ms, and the input response time of the remote I/O station is 1.5 ms

$$\begin{aligned} & SM \times 2 + (2 - n)^{*1} \times LS + \text{Remote station input response time [ms]} \\ & = 5 \times 2 + (2 - 4) \times 1.2 + 1.5 \quad [n = 4 \text{ (} 5/1.2 = 4.16\dots, \text{ then decimals are omitted)}] \\ & = 11.5 \text{ [ms]} \end{aligned}$$

2) Master station → Remote station (output)

Time until an output in the remote station turns ON or OFF after a device (Y) in the main unit is set to ON or OFF

Calculation formula

$$SM + LS \times 2 + \text{Remote station output response time [ms]}$$

SM: Scan time of master station PLC

LS: Link scan time

Example:

The scan time of the master station PLC is 5 ms, the link scan time is 1.2 ms, and the output response time of the remote I/O station is 0.5 ms

$$\begin{aligned} & SM + LS \times 2 + \text{Remote station output response time [ms]} \\ & = 5 + 1.2 \times 2 + 0.5 \\ & = 7.9 \text{ [ms]} \end{aligned}$$

10. Assignment of Buffer Memory

Data transfer between the PLC main unit and FX2N-64CL-M is executed by a program in the PLC.

Use the FROM instruction or direct specification of buffer memory^{*1} to read data saved in the FX2N-64CL-M to the main unit.

The FROM instruction reads the data saved in the buffer memory (BFM) in the FX2N-64CL-M to devices (such as D and M) in the main unit.

Use the TO instruction or direct specification of buffer memory^{*1} to write data from the main unit to the FX2N-64CL-M.

The TO instruction writes data from devices (such as D and M) in the main unit to the buffer memory (BFM) in the FX2N-64CL-M.

*1 This function is supported only in FX3U/FX3UC PLCs.

10.1 Buffer memory list

Buffer memory No.		Name	Description	R: Read W: Write
DEC	HEX			
0 to 3	0h to 3h	Remote station connection information	Stores the connection status of each remote station. (When a remote station is connected, a corresponding bit is ON.)	R
4 to 7	4h to 7h	Link error station information	Stores the data link status of each remote station.	R
8 to 11	8h to Bh	Remote I/O error information	Stores the I/O error occurrence status of each remote station. For the contents of error, refer to the instruction manual of each remote station.	R
12 to 15	Ch to Fh	(Prohibited to use)	--	--
16 to 19	10h to 13h	Reserved station information	Stores the reserved station setting status.	R
20	14h	Number of required input blocks	Stores the number of input blocks (in the unit of 8 points) required to assign the I/O numbers.	R
21	15h	Number of required of output blocks	Stores the number of output blocks (in the unit of 8 points) required to assign the I/O numbers.	R
22	16h	Data link final station information	Stores the final station number available in the data link. (This information is set according to the station information stored in the EEPROM.)	R
23 to 25	17h to 19h	(Prohibited to use)	--	--
26	1Ah	External switch information	Stores the DIP switch setting status.	R
27	1Bh	Command	Gives instructions to the FX2N-64CL-M for stopping or starting up again the data link and writing data to the EEPROM.	R/W
28	1Ch	Status information	Stores the status information such as RUN and data link.	R
29	1Dh	Detailed error information	Stores the detailed information on errors detected by the FX2N-64CL-M.	R
30	1Eh	Model code	K7120	R
31	1Fh	(Prohibited to use)	--	--
32	20h	Detailed remote station information (station No.1)	Stores the information (I/O type and number of points) on the remote station No.1. The information can be edited in the CONFIG mode.	R/W*2
⋮	⋮	⋮	⋮	⋮

*2 "W" is enabled only in the CONFIG mode.

Buffer memory No.		Name	Description	R: Read W: Write
DEC	HEX			
95	5Fh	Detailed remote station information (station No.64)	Stores the information (I/O type and number of points) on the remote station No.64. The information can be edited in the CONFIG mode.	R/W*2
96 to 143	60h to 8Fh	(Prohibited to use)	--	--
144	90h	Remote input area (station No. 49)	Access the input data from the remote device station.	R
145	91h	Remote input area (station No. 50)		
⋮	⋮	⋮	⋮	⋮
158	9Eh	Remote input area (station No. 63)	Access the input data from the remote device station.	R
159	9Fh	Remote input area (station No. 64)		
160 to 207	A0h to CFh	(Prohibited to use)	--	--
208	D0h	Remote output area (station No. 49)	Access the output data from the remote device station.	R/W
209	D1h	Remote output area (station No. 50)		
⋮	⋮	⋮	⋮	⋮
222	DEh	Remote output area (station No. 63)	Access the output data from the remote device station.	R/W
223	DFh	Remote output area (station No. 64)		

*2 "W" is enabled only in the CONFIG mode.

10.2 Details of buffer memory

10.2.1 Remote station connection information [BFM #0 (0h) to #3 (3h)]

The connection status of remote stations connected in the system are stored in BFM #0 to BFM #3 (bits for connected stations are ON).

Once a bit for a remote station turns ON, it remains ON even if communication error occurs in the remote station due to wire breakage, etc (this information cannot be used to confirm the communication).

The station number of each remote station is assigned to each bit of the buffer memory [BFM #0 (0h) to #3 (3h)]. Connection/disconnection is indicated by the 0 (OFF)/1 (ON) status of each bit.

0 (OFF): Corresponding remote station is not connected.

1 (ON): Corresponding remote station is connected.

Buffer memory No.	Bit						
	b15	b14	b13	...	b2	b1	b0
BFM #0 (0h)	Station No.16	Station No.15	Station No.14	...	Station No.3	Station No.2	Station No.1
BFM #1 (1h)	Station No.32	Station No.31	Station No.30	...	Station No.19	Station No.18	Station No.17
BFM #2 (2h)	Station No.48	Station No.47	Station No.46	...	Station No.35	Station No.34	Station No.33
BFM #3 (3h)	Station No.64	Station No.63	Station No.62	...	Station No.51	Station No.50	Station No.49

10.2.2 Link error station information [BFM #4 (4h) to #7 (7h)]

The data link status of remote stations is stored here (bits for stations having link error are ON).

Among remote stations whose I/O numbers are written in the EEPROM (e.g. remote stations connected in the CONFIG mode or remote stations whose information is written by editing of the detailed remote station information), remote stations with which communication is disabled are regarded as data link error stations, and corresponding bits are set to ON. When communication with a remote station is restored, the ON status is cleared.

However, unused stations and reserved stations are not regarded as data link error stations.

If a remote station whose parameters are not written in the EEPROM gives a response, it is regarded as control disability (due to I/O non-assignment), and regarded as a data link error.

Inconsistency of the station type is not checked (even if the station type is inconsistent, it is not regarded as data link error).

The station number of each remote station is assigned to each bit of the buffer memory [BFM #4 (4h) to #7 (7h)]. Normal status/data link error is indicated by the 0 (OFF)/1 (ON) status of each bit.

0 (OFF): The station is normal.

1 (ON): Data link error has occurred in the station.

Buffer memory No.	Bit						
	b15	b14	b13	...	b2	b1	b0
BFM #4 (4h)	Station No.16	Station No.15	Station No.14	...	Station No.3	Station No.2	Station No.1
BFM #5 (5h)	Station No.32	Station No.31	Station No.30	...	Station No.19	Station No.18	Station No.17
BFM #6 (6h)	Station No.48	Station No.47	Station No.46	...	Station No.35	Station No.34	Station No.33
BFM #7 (7h)	Station No.64	Station No.63	Station No.62	...	Station No.51	Station No.50	Station No.49

Handling in the CONFIG mode

In the CONFIG mode, if the detailed remote station information [BFM #32 (20h) to #95 (5Fh)] is edited, and if the detailed remote station information is inconsistent with remote stations actually connected at the time of power ON as a result of the editing, there will be a data link error.

(When BFM #32 (20h) to #95 (5Fh) is edited, the station numbers are checked.)

If the power is set to ON while all remote stations are unconnected or if remote stations are disconnected after the power was set to ON, data link error is not detected, as far as the detailed remote station information is not edited.

(For the details on editing the detailed remote station information, refer to "8.5 Editing the detailed remote station information".)

10.2.3 Remote I/O error information [BFM #8 (8h) to #11 (Bh)]

The remote I/O error occurrence status is stored here. (Bits for stations having I/O error are ON.)

For the type of error, refer to the instruction manual of each remote station.

The station number of each remote station is assigned to each bit of the buffer memory [BFM #8 (8h) to #11 (Bh)]. The absence/presence of remote I/O errors are indicated by a 0 (OFF)/1 (ON) status of each bit.

0 (OFF): Remote I/O error is absent. 1 (ON): Remote I/O error is present. (Initial value: 0)

Buffer memory No.	Bit						
	b15	b14	b13	...	b2	b1	b0
BFM #8 (8h)	Station No.16	Station No.15	Station No.14	...	Station No.3	Station No.2	Station No.1
BFM #9 (9h)	Station No.32	Station No.31	Station No.30	...	Station No.19	Station No.18	Station No.17
BFM #10 (Ah)	Station No.48	Station No.47	Station No.46	...	Station No.35	Station No.34	Station No.33
BFM #11 (Bh)	Station No.64	Station No.63	Station No.62	...	Station No.51	Station No.50	Station No.49

10.2.4 Reserved station information [BFM #16 (10h) to #19 (13h)]

Station numbers specified as reserved stations are stored here.

(Bits for stations specified as reserved ones are ON.)

Specify reserved stations by editing the detailed remote station information [BFM #32 (20h) to 95 (5Fh)] in the CONFIG mode.

(For the details on specification of reserved station, refer to "8.4 Specification of reserved station".)

The station number of each remote station is assigned to each bit of the buffer memory [BFM #16 (10h) to #19 (13h)]. Whether or not a station is specified as a reserved one is indicated by the 0 (OFF)/1 (ON) status of each bit.

0 (OFF): The station is not specified as a reserved one.

1 (ON): The station is specified as a reserved one.

(Initial value: 0)

Buffer memory No.	Bit						
	b15	b14	b13	...	b2	b1	b0
BFM #16(10h)	Station No.16	Station No.15	Station No.14	...	Station No.3	Station No.2	Station No.1
BFM #17(11h)	Station No.32	Station No.31	Station No.30	...	Station No.19	Station No.18	Station No.17
BFM #18 (12h)	Station No.48	Station No.47	Station No.46	...	Station No.35	Station No.34	Station No.33
BFM #19 (13h)	Station No.64	Station No.63	Station No.62	...	Station No.51	Station No.50	Station No.49

10.2.5 Number of required input blocks [BFM #20 (14h)]

The number of input blocks (8 points/block) required to assign the I/O numbers of remote stations is stored here.

10.2.6 Number of required output blocks [BFM #21 (15h)]

The number of output blocks (8 points/block) required to assign the I/O numbers of remote stations is stored here.

10.2.7 Data link final station information [BFM #22 (16h)]

The final station number available in the data link is stored here.

(The available final station number is set by the station information stored in the EEPROM.)

If the final station number is specified as reserved station, the reserved station is included.

10.2.8 External switch information [BFM #26 (1Ah)]

The DIP switch setting (at the time of power ON) is stored here.

Each bit number of the DIP switch is assigned to each bit of the buffer memory [BFM #26 (1Ah)]. The ON/OFF status of each bit of the DIP switch is indicated by the 0 (OFF)/1 (ON) status of each bit of the buffer memory.

0 (OFF): The bit of the DIP switch is OFF. 1 (ON): The bit of the DIP switch is ON.

Bit	Bit No. of DIP switch	Description
b0	Bit 1	The setting of each bit of the DIP switch is stored. 0: The bit of the DIP switch is OFF. 1: The bit of the DIP switch is ON.
b1	Bit 2	
b2	Bit 3	
b3	Bit 4	
b4	Bit 5	
b5	Bit 6	
b6	Bit 7	
b7	Bit 8	
b8 to b15	(Prohibited to use)	--

10.2.9 Command [BFM #27 (1Bh)]

Command gives the FX_{2N}-64CL-M instructions to stop/restart the data link and write data to the EEPROM.

A function is assigned to each bit of the buffer memory [BFM #27 (1Bh)]. Each function is executed according to the 0 (OFF)/1 (ON) status of each bit.

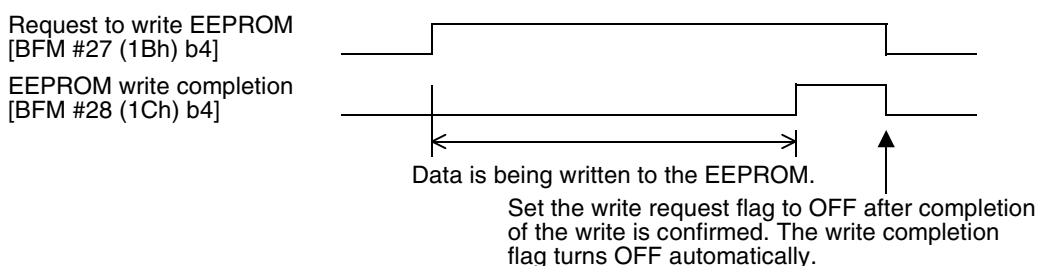
Bit	Function	Description
b0 to b3	(Prohibited to use)	--
b4	Request to write EEPROM	Writes the contents of the detailed remote station information [BFM #32 (20h) to #95 (F5h)] stored in the buffer memory to the built-in EEPROM when it is set from OFF to ON. After the write to the EEPROM is completed (completion is indicated by turning ON of b4 of the BFM #28), set this bit to OFF.
b5	Request to stop data link	Stops the data link when it is set from OFF to ON. Restarts the data link when it is set from ON to OFF.
b15 to b6	(Prohibited to use)	--

Request to write to EEPROM (b4)

When this bit is set to ON, the contents of the detailed remote station information [BFM #32 (20h) to #95 (F5h)] are written to the built-in EEPROM.

This write is unnecessary when reserved stations are not specified or when the detailed remote station information is not edited.

The operation is as shown below.

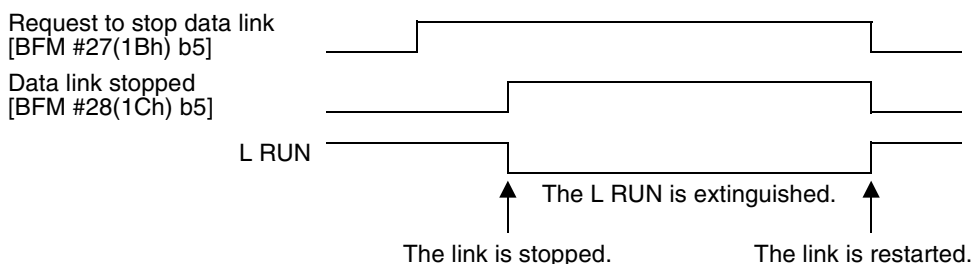


Request to stop data link (b5)

The data link is stopped when this bit [BFM #27 (1Bh) b5] is set to ON while the data link is being executed.

The data link is restarted when this bit is set to OFF.

The operation is as shown below.



10.2.10 Status information [BFM #28 (1Ch)]

Status information such as the RUN and link status is stored here.

Bits in the buffer memory contains status information for the FX_{2N}-64CL-M.

The status is indicated by the 0 (OFF)/1 (ON) status of each bit.

Bit	Function	Description
b0	Data link status	Remains ON while the I/O image in the FX _{2N} -64CL-M is updated by the data link.
b1	Initial communication status	Turns ON when acquisition of the remote station information is completed.
b2	RUN status	Remains ON while the unit is operating normally. (Indicates the same contents as the LED.)
b3	CONFIG mode	Remains ON while the CONFIG mode is selected.
b4	EEPROM write completion	Turns ON when write to the EEPROM is completed, then turns OFF when write is completed and the write request flag [BFM #27 (1Bh) b4] is set to OFF.
b5	Data link stopped	Remains ON while the data link is stopped by the request to stop data link.
b6 to b15	(Prohibited to use)	--

Initial communication: When the power to the PLC is set to ON, the PLC acquires the information on connected remote stations from the FX_{2N}-64CL-M.

10.2.11 Detailed error information [BFM #29 (1Dh)]

Each type of error is assigned to a bit of the buffer memory [BFM #29 (1Dh)]. The status is indicated by the 0 (OFF)/1 (ON) status of each bit.

Bit	Function	Description	Error flag restoration operation
b0	Link error in some stations	Turns ON when link error has occurred in some stations. [Turns ON when any bit in BFM #4 (4h) to 7 (7h) have turned ON.] For the station number in which error has occurred, refer to the link error station information [BFM #4 (4h) to 7 (7h)].	When the cause of the error is eliminated, the error flag is automatically restored.
b1	Link error in all stations	Turns ON when data link error has occurred in all stations.	
b2	Remote I/O error	Turns ON when remote I/O error has occurred. [Turns ON when any bit in BFM #8 (8h) to 11 (Bh) have turned ON.] For the station number, refer to the remote I/O error information [BFM #8 (8h) to 11 (Bh)]. For type of error, refer to the instruction manual of each remote station.	
b3	Out-of-control-range station error	Turns ON when a remote station not registered in the detailed remote station information [BFM #32 (20h) to #95 (5Fh)] is connected to the network.	When the station number of the connected remote station is smaller than the final station number, the error flag is automatically restored when the cause of the error is eliminated. When the station number of the connected remote station is larger than the final station number, the error flag is restored when the cause of the error is eliminated and is followed by a power reset.
b4	Transmission speed setting error	Turns ON when the transmission speed setting DIP switch is set to a incompatible position.	When the cause of the error is eliminated, and power is reset, the error flag is automatically restored.
b5	Communication power down	Turns ON at communication power down.	When the cause of the error is eliminated, the error flag is automatically restored.
b6	RD station setting error	<ul style="list-style-type: none"> Turns ON when the RD station is connected to a station number outside the range No. 49 to No. 64. Turns ON when the RD station is used in the 4-point mode. 	When the cause of the error is eliminated and the power is reset, the error flag is automatically restored.

Bit	Function	Description	Error flag restoration operation
b7	EEPROM error	Turns ON when EEPROM write error or read error has occurred or when the request to write EEPROM is given in any mode other than the CONFIG mode.	In the case that a request to write to the EEPROM is given in any mode other than the CONFIG mode, the error flag is automatically restored when the request to write EEPROM is cleared. In the case of EEPROM write error or read error, the error flag is not restored.
b8	DIP switch changed	Turns ON when the DIP switch setting is changed during operation.	When the DIP switch setting is returned to the status at the time of power ON, the error flag is automatically restored. If change of the DIP switch setting is necessary, set to OFF the power, then set it to ON again.
b9 to b14	(Prohibited to use)	--	--
b15	Hardware error	Turns ON when an abnormality is detected in the self-loop-back test. (When the FX2N-64CL-M is connected to the FX1N Series PLC, check for hardware errors in the status indicator LEDs.)	This error flag is not restored because something is wrong with the hardware.

10.2.12 Model code [BFM #30 (1Eh)]

The model code (K7120) of the FX2N-64CL-M is stored here.

10.2.13 Detailed remote station information [BFM #32 (20h) to #95 (5Fh)]

The information (I/O type, number of points) on remote stations is stored here.

In the CONFIG mode, the contents of these buffers can be changed.

(For the details on content changes, refer to "8.4 Specification of reserved station" and "8.5 Editing the detailed remote station information".)

Buffer memory assignment

Buffer memory No.	Description
BFM #32 (20h)	Remote station information area for the station No.1
BFM #33 (21h)	Remote station information area for the station No.2
⋮	⋮
BFM #95 (5Fh)	Remote station information area for the station No.64

Configuration of detailed remote station information

Bit	Function	1(ON)	0(OFF)
b0	Number of I/O points	00001:1point	00101:5points
b1		01101:13points	00010:2points
b2		01010:10points	01110:14points
b3		00111:7points	01011:11points
b4		10000:16points	01100:12points
b5 to b7	(Setting prohibited)	Set these bits to 0.	
b8	Input flag	Input is given.	Input is not given.
b9	Output flag	Output is given.	Output is not given.
b10	RD station flag	It is RD station.	It is not RD station.
b11	Head station flag	This is the head station.	This is not the head station.
b12	Input filter setting	High-speed input	General-purpose input
b13	Output hold/clear setting	HOLD	CLEAR
b14	(Setting prohibited)	Set these bits to 0.	
b15	Reserved station flag	This is specified as reserved station.	This is not specified as reserved station.

Details of each item of detailed remote station information

1) Number of I/O points (b4 to b0)

The number of I/O points used in each station number assigned to each buffer memory is stored here.

The maximum number of points is 4 or 16 in accordance with the number of points per station set by the DIP switch for operation setting.

When a remote I/O unit with 16 I/O points is used in the 4-point mode, the number of points per buffer memory is 4, and the I/O points of the remote I/O unit are assigned to four buffer memories.

In the case of a composite I/O unit, the larger one between the number of input points and the number of output points is stored here.

In the case of remote device station, 16 points are stored here.

2) Input flag (b8) and output flag (b9)

The type of the corresponding remote module (input unit, output unit, composite I/O unit or remote device station) is stored here.

b9: Output flag	b8: Input flag	Unit type
0	1	Input unit
1	0	Output unit
1	1	Composite I/O unit or remote device station

3) RD station flag (b10)

When the station is an RD station, "1 (ON)" is stored.

When one unit occupies two or more stations, this bit is set to ON in the corresponding stations.

b10	RD station flag
0	Not RD station.
1	RD station.

4) Head station flag (b11)

When the station is an head of a unit occupying two or more stations or when the unit occupies only one station, "1 (ON)" is stored.

When the station is not the head of a unit occupying two or more stations, "0 (OFF)" is stored.

b11	Head station flag
0	This is not the head station of a unit occupying two or more stations.
1	This is the head station of a unit occupying two or more stations, or a unit occupying only one station.

5) Input filter setting (b12)

When the remote station is an input type, the input filter setting status of the remote I/O module is stored here when the power is set to ON in the CONFIG mode.

(If the setting of the remote I/O module is changed after the power was set to ON in the CONFIG mode, the remote I/O module operates with the new setting, but the new setting is not reflected on the buffer memory in the master block.)

If the remote station is a remote I/O module not equipped with the input filter setting function, "0 (OFF)" is stored.

b12	Input filter setting
0	General-purpose input
1	High-speed input

6) Output clear/hold setting (b13)

When the remote station is an output unit or composite I/O unit, the output hold setting status of the remote I/O module is stored here when the power is set to ON in the CONFIG mode.

(If the setting of the remote I/O module is changed after the power was set to ON in the CONFIG mode, the remote I/O module operates with the new setting after change, but the new setting is not reflected on the buffer memory in the master block.)

If the remote station is a remote I/O module not equipped with the output clear/hold setting function, "0 (OFF)" is stored.

b13	Clear/hold setting
0	Clear
1	Hold

7) Reserved station flag (b15)

Specification as a reserved station is stored here.

When specifying the station as reserved in the CONFIG mode, write "1 (ON)".

(For the details on reserved stations, refer to "8.4 Specification of reserved station".)

b15	Reserved station flag
0	This station is not specified as a reserved one.
1	This station is specified as a reserved one.

**10.2.14 Remote device station input (output) data area
[BFM #144 (90h) to #159 (9Fh) and #208 (D0h) to #223 (DFh)]**

This area is used to access the input (output) data in the remote device station indirectly using the FROM and TO instructions or directly using the buffer memory specification*1.

Access is enabled to only BFM#s for which remote device stations are actually connected.

(The TO instruction is ignored and the FROM instruction returns "0" for a station number to which a remote I/O station is connected.)

Station No.	BFM #	
	Remote input area	Remote output area
Station No.49	144	208
Station No.50	145	209
⋮	⋮	⋮
Station No.63	158	222
Station No.64	159	223

*1 This function is supported only in FX3U/FX3UC PLCs.

MEMO

11. Program Example

This section describes a program in the PLC for the configuration shown in "11.2 System configuration".

In this example, the I/O numbers are assigned automatically in the CONFIG mode.

The specification as reserved station and the detailed remote station information are not changed. Parameter settings and programs for assigning the I/O numbers are not necessary.



DESIGN PRECAUTIONS

- When a remote module fails, outputs may randomly become ON or OFF, therefore an external monitoring circuit that will monitor any input signals that could cause a serious accident is necessary.



DESIGN PRECAUTIONS

- Do not bind control cables and connection cables to CC-Link/LT together with power cables.
Keep control cables and connection cables to CC-Link/LT away from major circuits and power cables by 100 mm (3.93") or more.
There may be malfunction due to noise interference.
- Install the FX_{2N}-64CL-M in such away that no force is applied to connectors on the CC-Link/LT interface and the connection cables to CC-Link/LT.
If any force is applied, wire breakage and failure may occur.



INSTALLATION PRECAUTIONS

- Use the FX_{2N}-64CL-M in an environment with the general specifications described in this manual.
Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl₂, H₂S, SO₂ or NO₂), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.
- Do not touch the conductive area of the FX_{2N}-64CL-M.
If the conductive area is touched directly, the FX_{2N}-64CL-M may malfunction or fail.
- Shut down all phases of the power supplies before attaching/removing the FX_{2N}-64CL-M to/from the panel.
If the power is not disconnected from all sources, the FX_{2N}-64CL-M may fail or malfunction.
- Securely fix the FX_{2N}-64CL-M with DIN rail or mounting screws. When using mounting screws, securely tighten them within the specified torque range.
(Refer to Subsection 5.1.3.)
If the screws are too loose, the module may detach from its installed position, short circuit, or malfunction. If the screws are too tight, the screws may be damaged, which may cause the module to detach from its installed position or short circuit.
- Install the FX_{2N}-64CL-M on a flat surface.
If the installation surface is not flat, an excessive force may be applied on the PCBs, leading to nonconformity.

**WIRING PRECAUTIONS**

- Make sure to shut down all phases of the power supplies before starting the installation or wiring work.
If the power is not disconnected from all sources an electric shock or serious product damage may occur.

**WIRING PRECAUTIONS**

- Correctly wire the master block while confirming the rated voltage and terminal arrangement of the FX_{2N}-64CL-M.
If a power supply different from the rating is connected or wiring is performed incorrectly, fire or failure may be caused.
- Correctly wire the master block while confirming the rated voltage and terminal arrangement of the FX_{2N}-64CL-M.
If a power supply different from the rating is connected or wiring is performed incorrectly, fire or failure may be caused.
- Pay attention that foreign objects such as cuttings or wiring chips do not enter the FX_{2N}-64CL-M.
It may cause fire, product failure or malfunction.

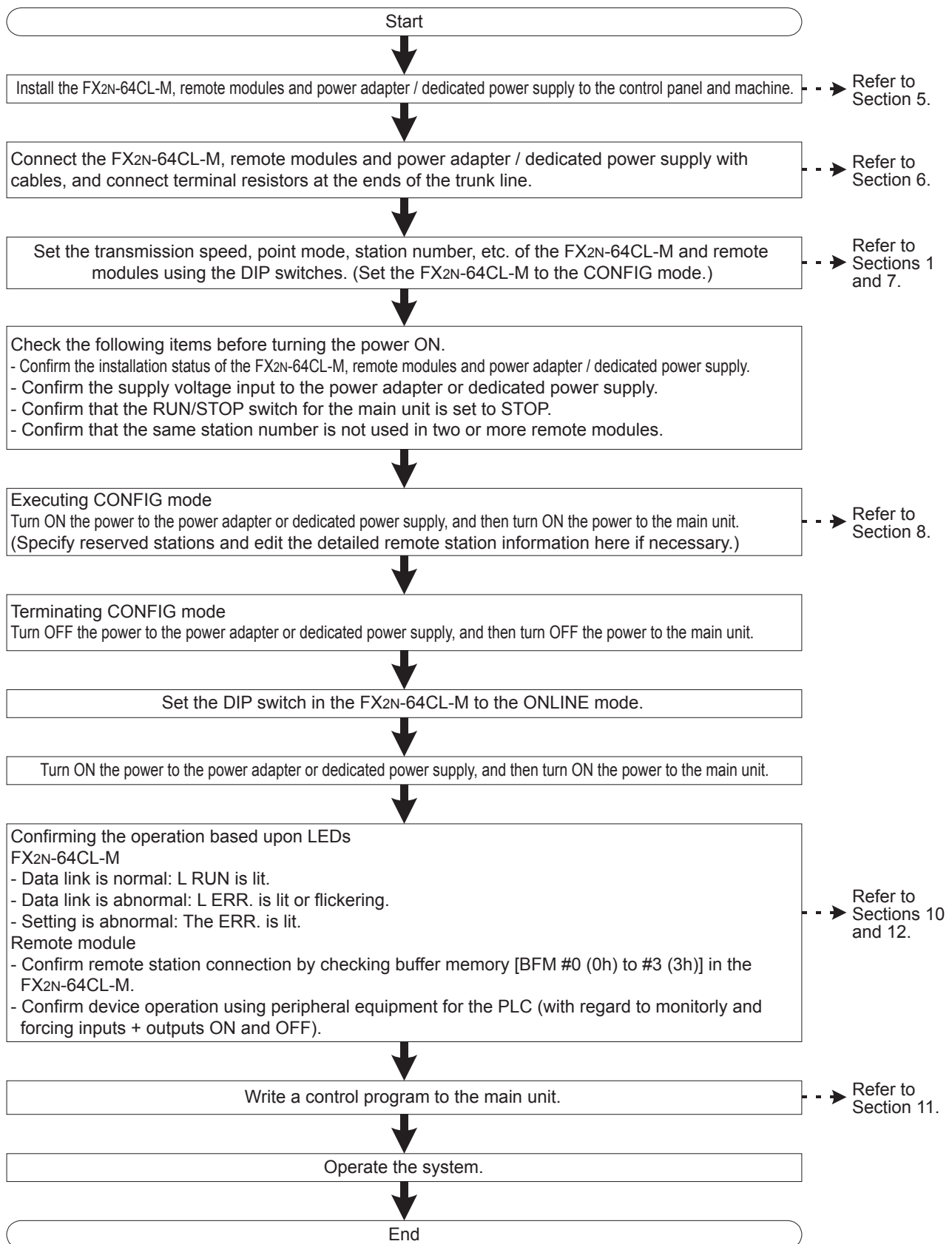
**STARTING AND MAINTENANCE PRECAUTIONS**

- Do not touch the terminals when the power is ON. It may cause an electric shock or malfunction.

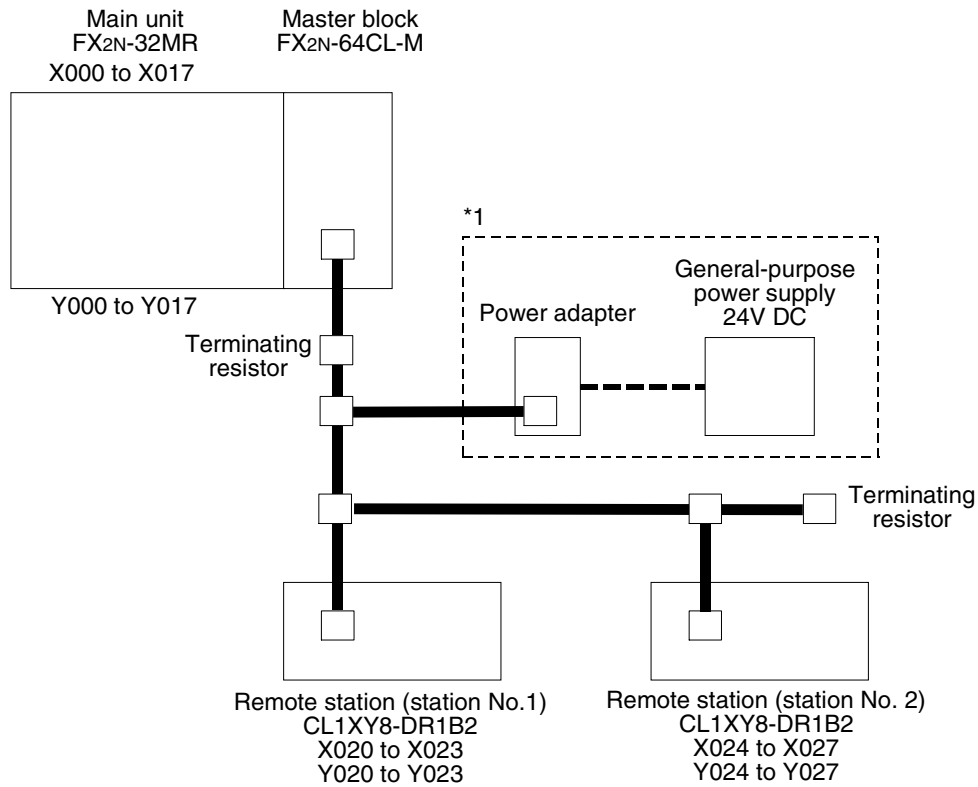
**STARTING AND MAINTENANCE PRECAUTIONS**

- Do not disassemble or modify the FX_{2N}-64CL-M. Doing so may cause failure, malfunction, injury, or fire.
- The case of the FX_{2N}-64CL-M is made of resin. Do not drop or apply strong impacts to the FX_{2N}-64CL-M.

11.1 System Startup Procedure



11.2 System configuration



- In the case of system configuration above, twelve connectors for connection cable are needed.

*1 The dedicated power supply is also available.

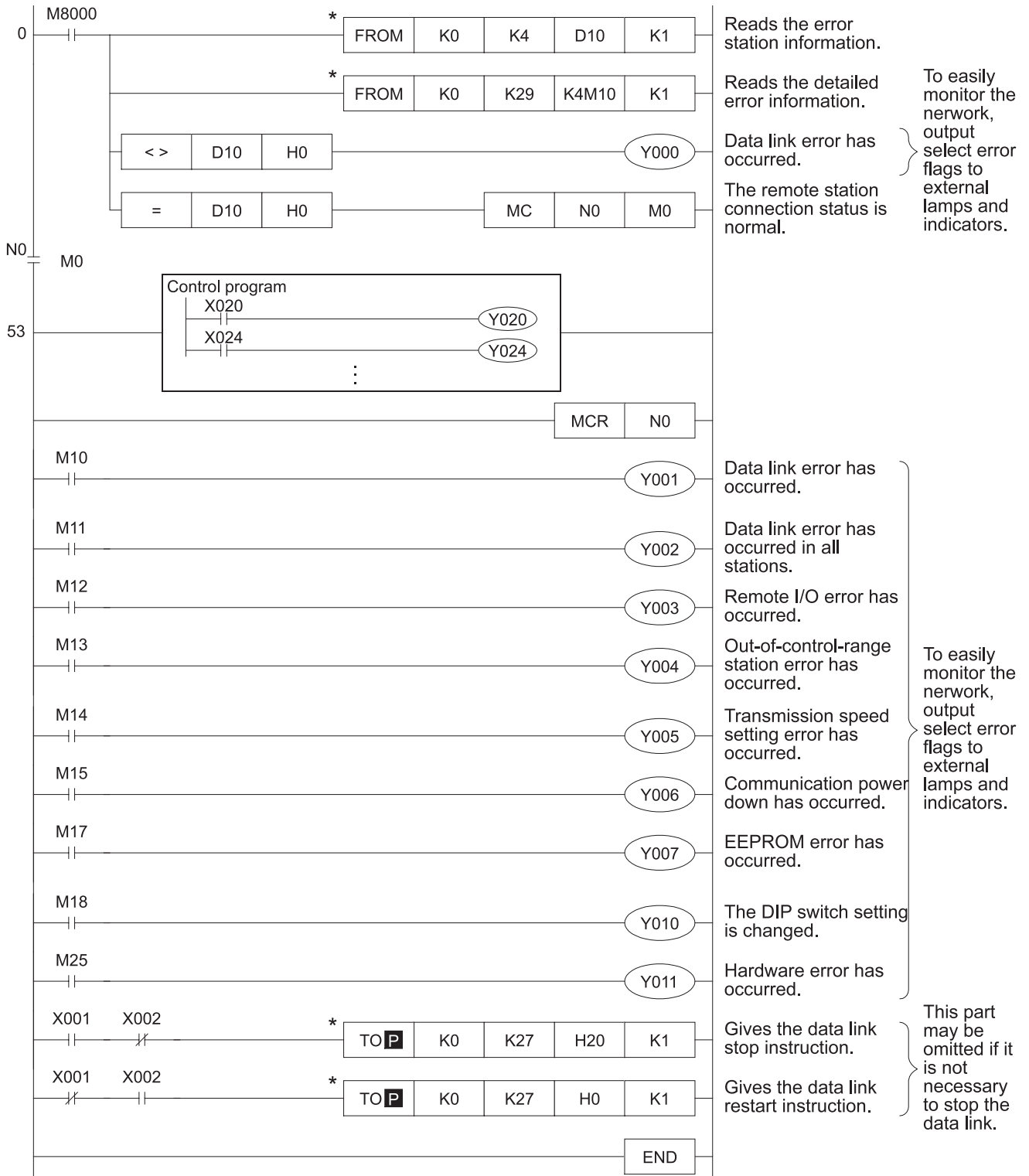
11.3 Device assignment

In this example, devices in the PLC are used as follows.

Device		Description
Input (X)	X001	Data link stop instruction signal
	X002	Data link restart instruction signal
Output (Y)	Y000	Remote station connection error occurrence
	Y001	Data link error occurrence
	Y002	All-station data link error occurrence
	Y003	Remote I/O error occurrence
	Y004	Out-of-control-range station error occurrence
	Y005	Transmission speed setting error occurrence
	Y006	Communication power down occurrence
	Y007	EEPROM error occurrence
	Y010	DIP switch changed
	Y011	Hardware error occurrence
	Auxiliary relay (M)	M0
M10 to M25		For reading the detailed error information
M10		Data link error occurrence
M11		All-station data link error occurrence
M12		Remote I/O error occurrence
M13		Out-of-control-range error occurrence
M14		Transmission speed setting error occurrence
M15		Communication power down occurrence
M17		EEPROM error occurrence
M18		DIP switch changed
M25	Hardware error occurrence	
Data register (D)	D10	Reads the error station information

11.4 Program example

Example using the FROM and TO instructions



* FX3U/FX3UC Series PLC can use direct specification of buffer memory. Refer to the FX3G/FX3U/FX3GC/FX3UC Series Programming Manual - Basic & Applied Instruction Edition for details.

- When preparing the control program above, pay attention not to use devices twice.
- When using the control program above for a PLC installed in a machine, confirm that the machine will operate safely, and not harm the user, others, or itself, before operating the program.

12. Troubleshooting

12.1 Status of each station during abnormal operation

The table below shows the status of each station when an abnormal operation has occurred.

Data link status			Status of each station			
			Master station		Remote station	
			Remote input	Remote output	Input	Output
When an abnormality has occurred in the master station PLC, the PLC is stopped. (The data link in the entire system is continued.)	Program error	FX1N	--	Holds the status.	Continues the operation. (Input LED is lit.)	Holds the status.
		FX2N, FX2NC, FX3G, FX3GC, FX3U, FX3UC	--	Clears.		Clears.
	CPU error	FX1N	--	Clears.		Clears.
		FX2N, FX2NC, FX3G, FX3GC, FX3U, FX3UC	--	Clears.		Clears.
When a remote station becomes abnormal (by data link error, etc.) (The data link in the entire system is continued.)			Clears inputs from a remote station in the abnormal status.	Continues the operation.	Continues the operation, but disables data transfer to the master station. (Input LED is lit.)	Depends on the DIP switch status.
When the power is interrupted in a remote station (The data link in the entire system is continued.)			Clears inputs from a remote station where the power is interrupted.	Continues the operation.	Depends on the external signal.	Turns OFF all points.

Holds the status.

Holds the ON/OFF status just before abnormality occurrence.

Continues the operation.

Executes the same operation as that in the normal status even if abnormality has occurred.

Clears.

Turns OFF inputs or outputs when abnormality has occurred.

If monitoring a remote station and a program error has occurred in the master station PLC, inputs on the monitoring device may turn ON and OFF repeatedly. When the program error is cleared, the inputs will return to their correct state.

12.2 Confirmation of status based on status indicator LEDs and countermeasures

12.2.1 ONLINE mode

The table below shows the descriptions of errors during in the ONLINE mode (bits 6 and 7 of the DIP switches are OFF in the FX_{2N}-64CL-M), indicated by the status indicator LEDs and their countermeasures.

		Name	Description	Countermeasures
Status indicator LEDs	POWER	Lit: Power is supplied Extinguished: Power is not supplied		Extinguished <ul style="list-style-type: none"> Confirm the capacity of the power for the PLC and the supplied 5V DC power.
		RUN	Lit: FX _{2N} -64CL-M is operating normally Extinguished: FX _{2N} -64CL-M is abnormal Power is interrupted EEPROM read error (sum mismatch) occurred	
	ERR.		Lit: Communication speed setting error occurred EEPROM read error (sum mismatch) occurred Flickering: Power supplied for communication is abnormal DIP switch for operation setting was changed during operation Extinguished: FX _{2N} -64CL-M is operating normally	
		L RUN	Lit: Data link is being executed Extinguished: Data link is stopped	
	L ERR.	Lit: Unit disconnection error Outside-control-range station error occurred RD station number setting error Flickering: Stations are abnormal Extinguished: Data link is being executed normally		Lit <ul style="list-style-type: none"> Securely connect the FX_{2N}-64CL-M and remote modules. Make sure that connected remote modules are consistent with the detailed remote station information. Confirm that the remote device station number is within the allowable range. Flickering <ul style="list-style-type: none"> Securely connect the FX_{2N}-64CL-M and remote modules. Make sure that connected remote modules are consistent with the detailed remote station information.

12.2.2 CONFIG mode

The table below shows the descriptions of errors during in the CONFIG mode (bit 6 of the DIP switches are ON and the bit 7 is OFF in the FX_{2N}-64CL-M) indicated by the status indicator LEDs and their countermeasures.

		Name	Description	Countermeasures
Status indicator LEDs	POWER	Lit: Power is supplied Extinguished: Power is not supplied	Extinguished	<ul style="list-style-type: none"> Confirm the capacity of the power for the PLC and the supplied 5V DC power.
	RUN	Lit: FX _{2N} -64CL-M is operating normally Extinguished: FX _{2N} -64CL-M is abnormal Power is interrupted	Extinguished	<ul style="list-style-type: none"> Confirm the capacity of the power for the PLC and the supplied 5V DC power. If there is no problem in the capacity of the power for the PLC and the supplied 5V DC power, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD.
	ERR.	Lit: Communication speed setting error occurred EEPROM write error occurred Flickering: Power supplied for communication is abnormal DIP switch for operation setting was changed during operation Extinguished: FX _{2N} -64CL-M is operating normally	Lit Flickering	<ul style="list-style-type: none"> Confirm the DIP switch setting, reset power. Return the DIP switch setting to the status at the time of power ON. If the DIP switch setting should be changed, change the DIP switch setting, then execute the CONFIG mode again. Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).")
	L RUN	Lit: Data link is being executed Extinguished: Data link is stopped	Extinguished	<ul style="list-style-type: none"> Take proper countermeasures according to the status of other LEDs.
	L ERR.	Lit: Use station number discrepancy Flickering: All stations are abnormal (when BFM#32(20h) to #95(5Fh) is edited, the station numbers are checked.) Extinguished: Data link is being executed normally	Flickering	<ul style="list-style-type: none"> Securely connect the FX_{2N}-64CL-M and remote modules.

- In the CONFIG mode, the L ERR. indicator LED lights or starts to flicker when the detailed remote station information becomes inconsistent with remote stations connected at the time of power ON due to a change in the detailed remote station information. If the power is set to ON while all remote stations are unconnected or if remote stations are disconnected after the power was set to ON, the L ERR. indicator LED does not light or start to flicker as far as the detailed remote station information is not edited.

12.2.3 TEST mode (self-loop-back test)

The table below shows the descriptions of errors during in the TEST mode (bit 6 of the DIP switches are OFF and the bit 7 is ON in the FX_{2N}-64CL-M) indicated by the status indicator LEDs and their countermeasures.

		Name	Description	Countermeasures
Status indicator LEDs	POWER	Lit: Power is supplied Extinguished: Power is not supplied	Extinguished • Confirm the capacity of the power for the PLC and the supplied 5V DC power.	
		Lit: FX _{2N} -64CL-M is operating normally Extinguished: FX _{2N} -64CL-M is abnormal Power is interrupted	Extinguished • Confirm the capacity of the power for the PLC and the supplied 5V DC power. • If there is no problem in the capacity of the power for the PLC and the supplied 5V DC power, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD.	
	ERR.	Lit: Communication speed setting error occurred Flickering: Power supplied for communication is abnormal DIP switch for operation setting was changed during operation Extinguished: FX _{2N} -64CL-M is operating normally	Lit • Confirm the operation setting switch setting, reset power. Flickering • Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).) • Return the DIP switch setting to the status at the time of power ON.	
	L RUN	Lit: Self-loop back Test was finished normally Extinguished: Self-loop back Test was finished abnormally (Extinguished while the self-loop back Test is being executed)	Extinguished • Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).) • If the system is not restored even after confirming the item above, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD.	
	L ERR.	Lit: Self-loop back Test was finished abnormally Extinguished: Self-loop back Test was finished normally (Extinguished while the self-loop back Test is being executed)	Lit • Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).) • If the system is not restored even after confirming the item above, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD.	

- When the FX_{2N}-64CL-M is set to TEST mode while it is connected to an FX_{1N} Series PLC, the PLC does not start up.
(The self-loop-back test will be executed normally, and the test result will be indicated by the status indicator LEDs.)

12.3 Countermeasures based on detailed error information

The contents of error flags indicated by the BFM #29 (1Dh) and countermeasures against them are as shown below.

Bit	Description	Countermeasures
b0	Turns ON when link error has occurred in some stations. [Turns ON when either or some bits among BMF #4 (4h) to 7 (7h) have turned ON.] For the station number in which error has occurred, refer to the link error station information [BFM #4 (4h) to 7 (7h)].	<ul style="list-style-type: none"> Securely connect the FX2N-64CL-M and remote modules. Make the detailed remote station information consistent with connected remote modules. Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).)
b1	Turns ON when data link error has occurred in all stations.	<ul style="list-style-type: none"> Securely connect the FX2N-64CL-M and remote modules. Make the detailed remote station information consistent with connected remote modules. Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).)
b2	Turns ON when remote I/O error has occurred. [Turns ON when either or some bits among BMF #8 (8h) to 11 (Bh) have turned ON.] For the station number, refer to the remote I/O error information [BFM #8 (8h) to 11 (Bh)]. For the description of error, refer to the instruction manual of each remote station.	<ul style="list-style-type: none"> Refer to the instruction manual of each remote station.
b3	Turns ON when a remote station not registered in the detailed remote station information [BFM #32 (20h) to #95 (5Fh)] is connected to the network.	<ul style="list-style-type: none"> Make the detailed remote station information consistent with connected remote modules.
b4	Turns ON when the transmission speed setting DIP switch is set to an incompatible position.	<ul style="list-style-type: none"> Confirm the transmission speed, then correctly set the DIP switch.
b5	Turns ON when the power for communication is downed.	<ul style="list-style-type: none"> Confirm that the power is correctly turned ON in the power adapter or dedicated power supply. Securely connect the FX2N-64CL-M, remote modules and power adapter or dedicated power supply.

Bit	Description	Countermeasures
b6	<ul style="list-style-type: none"> Turns ON when the RD station is connected to a station number outside the range from No. 49 to No. 64. Turns ON when the RD station is used in the 4-point mode. 	When the cause of the error is eliminated and power is reset, the error flag is automatically restored.
b7	Turns ON when EEPROM write error or read error has occurred or when the request to write EEPROM is given in any mode other than the CONFIG mode.	<ul style="list-style-type: none"> Set the FX2N-64CL-M to the CONFIG mode, and write data to the EEPROM again.
b8	Turns ON when the DIP switch setting is changed during operation.	<ul style="list-style-type: none"> Return the DIP switch setting to the status at the time of power ON. If the DIP switch setting should be changed, change the DIP switch setting, reset power.
b9 to b14	--	--
b15	Turns ON when abnormality is detected in the self-loop-back test. (When the FX2N-64CL-M is connected to the FX1N Series PLC, check for hardware errors in the status indicator LEDs.)	<ul style="list-style-type: none"> Refer to "12.4 Self-loop-back test".

12.4 Self-loop-back test

In the self-loop-back test, the FX_{2N}-64CL-M checks whether it is operating normal by receiving data sent by itself.

In this test, it is not necessary to connect remote stations.

(Connect the FX_{2N}-64CL-M to the power adapter or dedicated power supply, and turn ON the power for communication.)

- When the FX_{2N}-64CL-M is set to TEST mode while it is connected to an FX_{1N} Series PLC, the PLC does not start up.
(The self-loop-back test will be executed normally, and the test result will be indicated by the status indicator LEDs.)

12.4.1 Operating procedure

The operating procedure is as described below.

- 1) Set the FX_{2N}-64CL-M to TEST mode (by setting bit 7 of the DIP switch to ON). Set the power of the PLC to ON.
At this time, turn ON the power for communication (power adapter or dedicated power supply).
- 2) The system automatically starts the self-loop-back test.
- 3) When the self-loop-back test is completed, the result is indicated by the status indicator LEDs.
If the FX_{2N}-64CL-M is operating normally, the L RUN LED lights. If it is not the L ERR. LED lights.
- 4) For returning to the normal operation, return the FX_{2N}-64CL-M to ONLINE mode (by setting the bit 7 of the DIP switch to OFF), reset power.

Status indicator LEDs when the self-loop-back test is completed

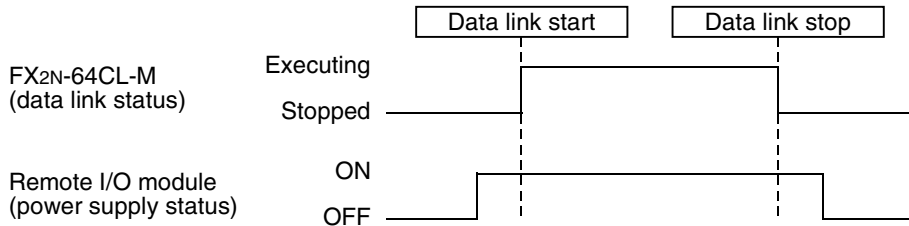
		Name	Description	Countermeasures against abnormality
Status indicator LEDs	POWER	Lit	:Power is supplied	Extinguished <ul style="list-style-type: none"> • Confirm the capacity of the power for the PLC and the supplied 5V DC power.
		Extinguished	:Power is not supplied	
	RUN	Lit	:FX2N-64CL-M is operating normally	Extinguished <ul style="list-style-type: none"> • Confirm the capacity of the power for the PLC and the supplied 5V DC power. • If there is no problem in the capacity of the power for the PLC and the supplied 5V DC power, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD.
		Extinguished	:FX2N-64CL-M is abnormal Power is interrupted	
	ERR.	Lit	:Communication speed setting error occurred	Lit <ul style="list-style-type: none"> • Confirm the operation setting switch setting, reset power. Flickering <ul style="list-style-type: none"> • Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).) • Return the DIP switch setting to the status at the time of power ON.
		Flickering	:Power supplied for communication is abnormal DIP switch for operation setting was changed during operation	
Extinguished		:FX2N-64CL-M is operating normally		
L RUN	Lit	:Self-loop back Test finished normally	Extinguished <ul style="list-style-type: none"> • Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).) • If the system is not restored even after confirming the item above, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD. 	
	Extinguished	:Self-loop back Test finished abnormally (Extinguished while the self-loop back Test is being executed)		
L ERR.	Lit	:Self-loop back Test finished abnormally	Lit <ul style="list-style-type: none"> • Check the connection or power supply to the power adapter or dedicated power supply. (For details on the power adapter or dedicated power supply, refer to "CC-Link/LT : Power Adapter · Dedicated Power Supply USER'S MANUAL (Detailed Volume).) • If the system is not restored even after confirming the item above, contact an office of MITSUBISHI ELECTRIC SYSTEM & SERVICE, CO., LTD. 	
	Extinguished	:Self-loop back Test finished normally (Extinguished while the self-loop back Test is being executed)		
	SD	Lit: Data is being sent.	--	
	RD	Lit: Data is being received.	--	

12.5 Prevention of erroneous inputs to and outputs from remote I/O module

In order to prevent erroneous inputs to and outputs from remote I/O modules, design the system under consideration of the contents described below.

1) When setting the power to ON or OFF

Turn ON the power to remote I/O modules (power adapter or dedicated power supply) first, and then start the data link.
 Stop the data link first, and then turn OFF the power to remote I/O modules (power adapter or dedicated power supply).



2) When the power is interrupted instantaneously in a remote I/O module

When the power (24V DC) supplied to a remote I/O module is interrupted instantaneously, erroneous inputs may occur.

a) Cause of erroneous inputs due to instantaneous power interruption

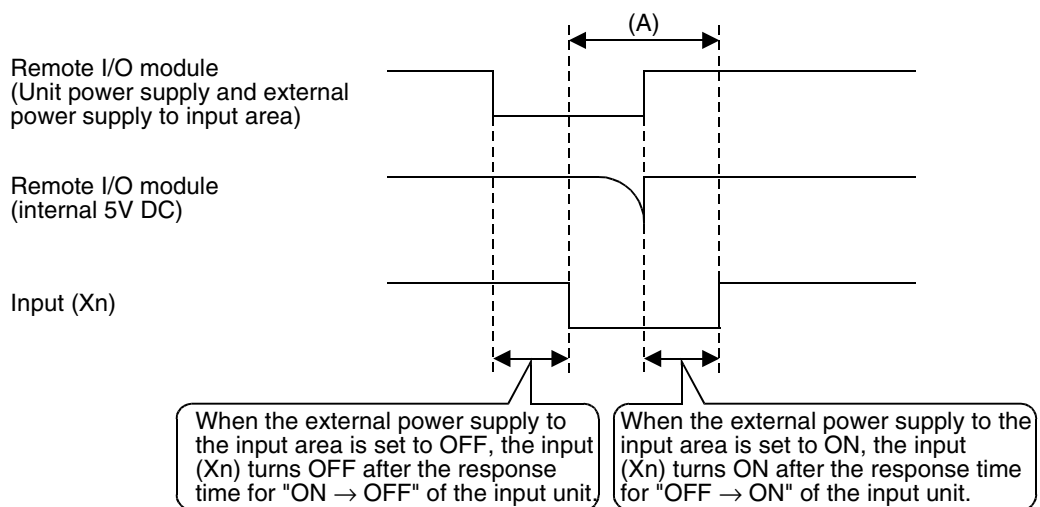
The hardware of a remote I/O module converts the unit power (24 VDC) into 5V DC inside, then uses it.

If instantaneous power interruption occurs in a remote I/O module,

$$\begin{aligned}
 & \text{(Time until 5V DC inside remote I/O module turns OFF)} \\
 & > \text{(Response time for "ON \to OFF" of input unit)}
 \end{aligned}$$

As a result, if refresh is executed in the period shown in (A) below, erroneous inputs occur.

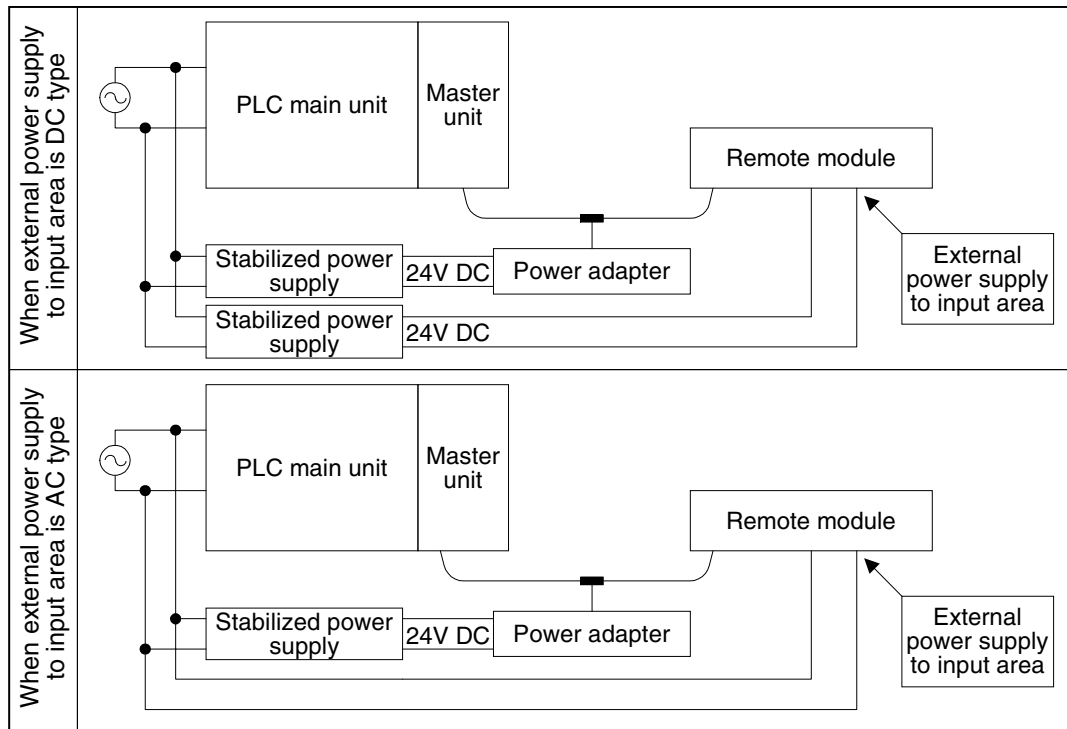
(Erroneous inputs may occur especially while the input response time is set to high-speed input type.)



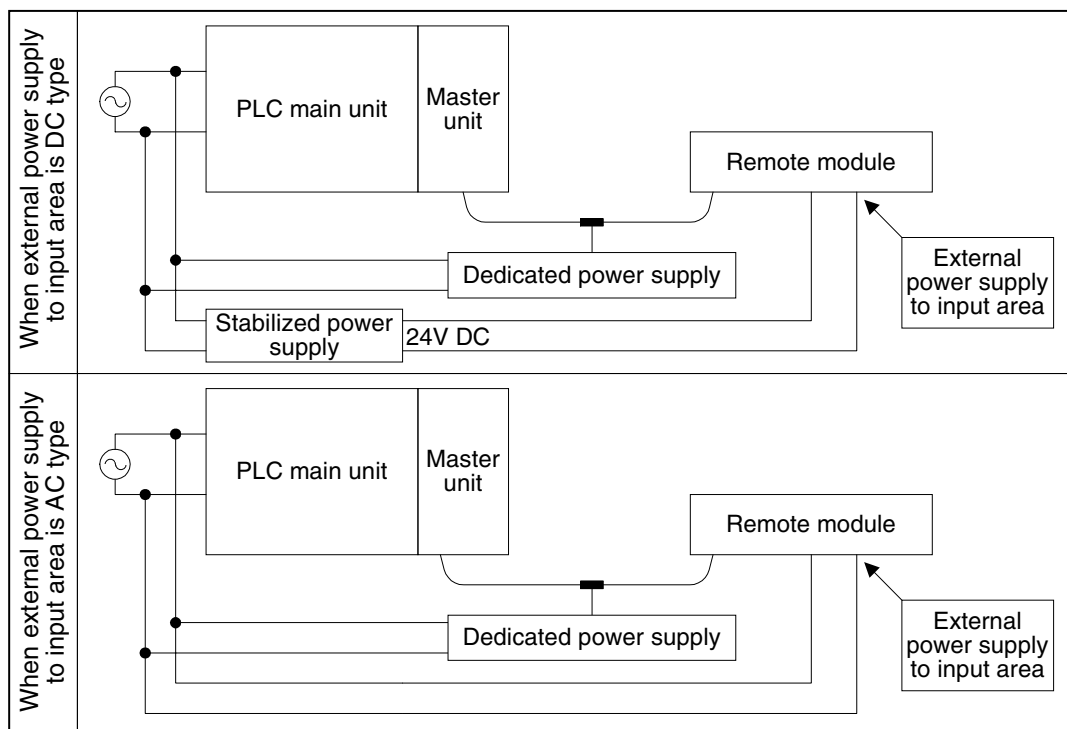
b) Countermeasures against erroneous input

From the same power supply, wire the power supply unit, the stabilized power supply and the external power supply to the input area for AC inputs.

- In the case of power adapter



- In the case of dedicated power supply



12.6 When using high flexible cable

Make sure that stress is not applied on the connector when the high flexible cable is moved.

Warranty

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company. However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- 1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- 2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 - a) Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 - b) Failure caused by unapproved modifications, etc., to the product by the user.
 - c) When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 - d) Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 - e) Relay failure or output contact failure caused by usage beyond the specified Life of contact (cycles).
 - f) Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 - g) Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 - h) Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

- 1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- 2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user or third person by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

- 1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- 2) The Mitsubishi programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable logic controller applications. In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable logic controller range of applications. However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

Revision History

Date	Revision	Description
7/2005	A	First Edition
1/2006	B	<ul style="list-style-type: none"> • FX3U series added • "Compliance with directive" is added. • VCTF cables and high flexible cables are added for CC-Link/LT. • VCTF cable connectors and high flexibility cable connectors are added for CC-Link/LT. • Dedicated power supply is added for supplying power to the CC-Link/LT system. • Remote device stations are added as connectable equipment compatible with CC-Link/LT.
5/2006	C	<ul style="list-style-type: none"> • EN61131-2:2003 added to EMC directive.
9/2007	D	<ul style="list-style-type: none"> • FX3UC series added
9/2008	E	<ul style="list-style-type: none"> • Clerical error correction
12/2010	F	<ul style="list-style-type: none"> • Content corrections for correspondence of EMC directive. <ul style="list-style-type: none"> - Added addresses. - The year of correspondence with standard EN61131-2 is updated. - The note regarding the installation zone and the power cable is added. • Content corrections for general specifications.
2/2012	G	<ul style="list-style-type: none"> • The contents of cautions on installation are changed. • The connectable number of FX3UC-32MT-LT-2 is added. • FX3G series added. • FX3GC series added. • Direct specification of buffer memory is added. • Content corrections for correspondence of EMC directive. <ul style="list-style-type: none"> - The year of correspondence with standard EN61000-4 is updated. • Part change of the DIP switch for operation setting is added.
4/2015	H	<ul style="list-style-type: none"> • A part of the cover design is changed.

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USER'S MANUAL (Detailed Volume)

FX₂N-64CL-M CC-Link/LT Master Block

mitsubishi **Electric Corporation**

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