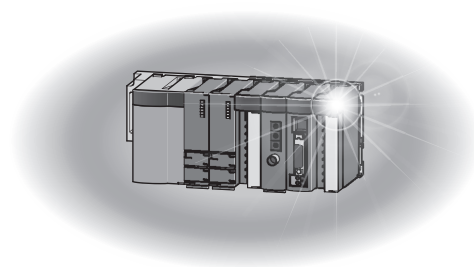


Mitsubishi Programmable Controller

MELSEC **Q** series

CC-Link/LT Master Module User's Manual

-QJ61CL12



● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".



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



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

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠ WARNING

- For the operating status of each station after a communication failure in the data link, refer to Page 64, Section 6.1 in this manual.
- When connecting peripheral devices to the CPU module, create interlock circuits in the sequence programs so that the safety of the whole system will be ensured.
For other forms of control (such as program modification or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding.
Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure.
To prevent this, configure an interlock circuit in the sequence program, and determine corrective actions to be taken between the external device and programmable controller CPU in case of a communication failure.
- Do not write data to "Prohibited area" of the buffer memory.
Doing so may cause malfunction of the programmable controller system.

[Design Precautions]

CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables.
Keep a distance of 100mm or more between them.
Failure to do so may result in malfunction due to noise.

[Installation Precautions]

CAUTION

- Use the programmable controller in an environment that meets the general specifications in the user's manual for the CPU module used.
Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place.
Incorrect mounting may cause malfunction, failure or drop of the module.
When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
Tighten the screw within the specified torque range.
Undertightening can cause drop of the screw, short circuit or malfunction.
Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module.
Failure to do so may result in damage to the product.
- Do not directly touch any conductive parts and electronic components of the module.
Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before wiring.
Failure to do so may result in electric shock or damage to the product.

[Wiring Precautions]

CAUTION

- Prevent foreign matter such as dust or wire chips from entering the module.
Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
Do not remove the film during wiring.
Remove it for heat dissipation before system operation.
- Use cables specified by CC-Link Partner Association for a CC-Link/LT system.
If not, the performance of the CC-Link/LT system is not guaranteed.
Also, observe the network wiring specifications given in Page 28, Section 3.1.1.
If not, normal data transmission is not guaranteed.
- Place the cables in a duct or clamp them.
If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting a communication cable or power cable from the module, do not hold and pull the cable portion by hand.
For the cable with connector, hold the connector part of the cable.
For the cable connected to the terminal block, loosen the terminal screw.
Pulling the cable connected to the module may result in malfunction or damage to the module or cable.

[Startup and Maintenance Precautions]

CAUTION

- Do not disassemble or modify the modules.
Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller.
Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module.
Failure to do so may cause the module to fail or malfunction.
- Do not touch any terminal while power is on. Doing so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws or module mounting screws.
Failure to do so may cause the module to fail or malfunction.
Undertightening can cause drop of the screw, short circuit or malfunction.
Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module more than 50 times (IEC 61131-2 compliant) respectively.
Exceeding the limit of 50 times may cause malfunction.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

CAUTION

- When disposing of this product, treat it as industrial waste.

● CONDITIONS OF USE FOR THE PRODUCT ●

- (1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
- i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
 - ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.
- (2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.

("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTS are required. For details, please contact the Mitsubishi representative in your region.

REVISIONS

*The manual number is given on the bottom left of the back cover.

Print date	*Manual number	Revision
Sep., 2002	SH(NA)-080351E-A	First edition
Feb., 2003	SH(NA)-080351E-B	Correction Section 2.1, 2.2.2, 3.1.1, 4.5.2, 6.6
Mar., 2004	SH(NA)-080351E-C	Addition Section 4.5.2, 4.5.3 Partial correction Section 1.2, 3.1, 4.1, 4.2.3, 4.5, 4.5.4, 6.7
Jan., 2005	SH(NA)-080351E-D	Partial correction SAFETY PRECAUTIONS, Generic Terms and Abbreviations, Section 1.1, 2.1, 2.2.2, 2.2.3, 3.1, 3.1.1, 3.3.2, 4.1, 4.2.1, Chapter 5, Section 6.2, 6.3.1 to 6.3.4, 6.4, 6.4.1 to 6.4.5, 6.6, 6.7
Mar., 2006	SH(NA)-080351E-E	Partial correction SAFETY PRECAUTIONS, Conformation to the EMC Directive and Low Voltage Instruction, Section 2.2.1, 2.2.2, 3.1.1
Nov., 2006	SH(NA)-080351E-F	Partial correction INDEX
Oct., 2008	SH(NA)-080351E-G	Partial correction SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directives, Generic Terms and Abbreviations, Section 2.2.1, 2.2.3, 4.1, 4.2.1, 4.3, 4.5, 6.7, Appendix 1
Sep., 2010	SH(NA)-080351E-H	Change "PLC" was changed to "programmable controller". Addition CONDITIONS OF USE FOR THE PRODUCT, Partial correction SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directive, Generic Terms and Abbreviations, Section 2.2.1, 2.2.2, 2.2.3, 4.4, 4.5.1, 4.5.5, 6.6, WARRANTY
Oct., 2011	SH(NA)-080351E-I	The manual layout was wholly changed.

Japanese manual version SH-080344-K

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INTRODUCTION

Thank you for purchasing the Mitsubishi MELSEC-Q series programmable controllers.

This manual describes the functions and programming of the QJ61CL12 CC-Link/LT master module (hereafter abbreviated as QJ61CL12).

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC-Q series programmable controller to handle the product correctly.

When applying the program examples introduced in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.

Please make sure that the end users read this manual.

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) Method of ensuring compliance

To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to the manual included with the CPU module or base unit.

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures

To ensure that this product maintains EMC and Low Voltage Directives, please refer to the manual included with the CPU module or base unit.

RELEVANT MANUALS

(1) CPU module user's manual

Manual name <manual number (model code)>	Description
QCPU User's Manual (Hardware Design, Maintenance and Inspection) <SH-080483ENG, 13JR73>	Specifications of the hardware (CPU modules, power supply modules, base units, batteries, and memory cards), system maintenance and inspection, and troubleshooting
QnUCPU Users Manual (Function Explanation, Program Fundamentals) <SH-080807ENG, 13JZ27>	Functions and devices of the CPU module, and programming
Qn(H)/QnPH/QnPRHCPU User's Manual (Function Explanation, Program Fundamentals) <SH-080808ENG, 13JZ28>	Functions and devices of the CPU module, and programming

(2) Operating manual

Manual name <manual number (model code)>	Description
GX Developer Version 8 Operating Manual <SH-080373E, 13JU41>	Operating methods of GX Developer, such as programming, printing, monitoring, and debugging

Memo

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MANUAL PAGE ORGANIZATION

In this manual, pages are organized and the symbols are used as shown below.

The following illustration is for explanation purpose only, and should not be referred to as an actual documentation.

Annotations on the left side of the page:

- "" is used for screen names and items.
- 1. shows operating procedures.
- ☞ shows mouse operations.*1
- [] is used for items in the menu bar and the project window.
- Ex. shows setting or operating examples.
- 📖 shows reference manuals.
- 📄 shows reference pages.

Annotations on the right side of the page:

- CHAPTER 7 VARIOUS SETTINGS (The chapter of the current page is shown.)
- 7 (The section of the current page is shown.)
- Point (Point shows notes that requires attention.)
- Remark (Remark shows useful information.)

Content of the manual page (73):

7.1.1 Setting method

(1) Setting parameters

(a) Operating procedure

1. Open the "PLC Parameter" dialog box.
Project window ⇨ [Parameter] ⇨ [PLC parameter]
2. Select the "IO Assignment" tab.

Item	Description	Reference
Type	Select the type of the connected module.	Page 74, Section 7.1.2
Model Name	Select the model name of the connected module.	Page 74, Section 7.1.3
Points	Set the number of points assigned to each slot.	Page 74, Section 7.1.4
Start XY	Specify a start I/O number for each slot.	Page 74, Section 7.1.5
Switch Setting	Configure the switch setting of the built-in I/O or intelligent function modules.	Page 74, Section 7.1.6
Default Setting	Set the following: - Error Time Output Mode - PLC Operation Mode at HW Error - I/O Response Time	Page 75, Section 7.1.7

Setting "Start XY" enables modification on the start I/O numbers assigned to connected modules.

Ex. When "1000" is specified in "Start XY" to the slot where a 16-point module is connected, the assignment range of an input module is changed to X1000 to X100F.

For details, refer to the following:
MELSEC-L CPU Module User's Manual (Function Explanation, Program Fundamentals)

Point
Set the type of the connected module in "Type". Setting a different type results in "SPUNIT LAY ERR".
Enabling intelligent function module, the I/O points must also be the same in addition to the I/O assignment setting.
Page 30, Section 4.2.2)

Remark
When an intelligent module is connected, I/O assignment can be omitted by selecting connected modules from "Intelligent Function Module" in the Project window.

*1 The mouse operation example is provided below.

Annotations on the left side of the screenshot:

- Menu bar: Ex. [Online] ⇨ [Write to PLC...]
Select [Online] on the menu bar, and then select [Write to PLC...].
- Project data list: Ex. Project data list ⇨ [Parameter] ⇨ [PLC parameter]
In the project data list, expand [Parameter] and select [PLC parameter].

The screenshot shows the MELSOFT series GX Developer (Unset project) - [LD(Edit mode)] window. The menu bar includes Project, Edit, Find/Replace, Convert, View, Online, Diagnostics, and Tools. The Project data list on the left shows a tree structure with (Unset project) expanded to show Program, MAIN, Device comment, COMMENT, Parameter, PLC parameter (selected), Network param, Remote pass, Device memory, and Device init.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
QJ61CL12	The abbreviation for the QJ61CL12 CC-Link/LT master module
Master station	A station that controls a data link system One master station is required for one system.
Remote I/O station	A remote station, such as CL2X8-D1B2 and CL2Y8-TP1B2, that exchanges I/O signals (bit data) with an external device
Remote device station	A remote station that exchanges I/O signals (bit data) and I/O data (word data) with an external device, and converts analog data into digital data
Remote station	A generic term for a remote I/O station and a remote device station This station is controlled by the master station.
Master module	A module that controls a data link system One master module is required for one system.
Remote I/O module	A remote module that exchanges I/O signals (bit data) with an external device
Remote device module	A remote module that exchanges I/O signals (bit data) and I/O data (word data) with an external device, and converts analog data into digital data
Remote module	A generic term for a remote I/O module and a remote device module
CPU module	Another term for the MELSEC-Q series CPU module
GX Developer	The product name of the software package for the MELSEC programmable controllers
GX Works2	
Intelligent function module	A MELSEC-Q series module that has functions other than input and output, such as an A/D converter module and D/A converter module
Dedicated power supply	Devices that supply power to a CC-Link/LT system
Power supply adapter	One or more devices are required for a system.

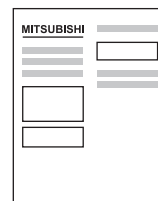
PACKING LIST

The following items are included in the package of this product. Before use, check that all the items are included.

QJ61CL12



QJ61CL12



Before Using the Product

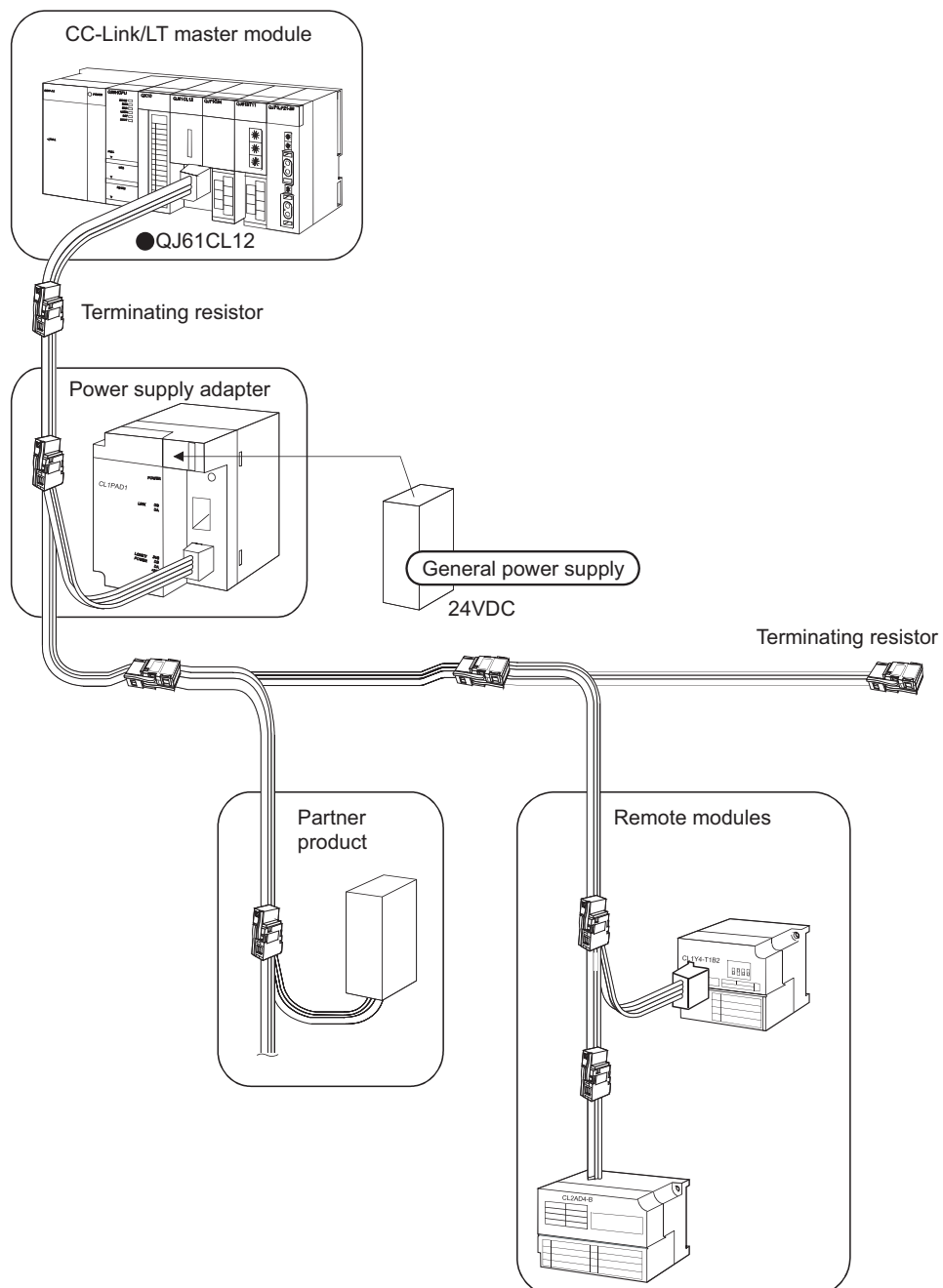
CHAPTER 1 CHARACTERISTICS OF CC-Link/LT SYSTEM

This chapter describes the features and application of a CC-Link/LT system.

1.1 CC-Link/LT System

A CC-Link/LT system is a wire-saving network system used inside a control panel and equipment, making complex wiring unnecessary and preventing incorrect wiring.

This system simplifies wiring among sensor, actuator, and controller, providing advanced functionalities such as high-speed response time.



1.2 Features

This section describes features of CC-Link/LT.

(1) Easy connection/disconnection of communication cable

By using dedicated connectors, communication cables can be connected/disconnected with one simple motion. This allows modules to be easily extended, added, and changed.

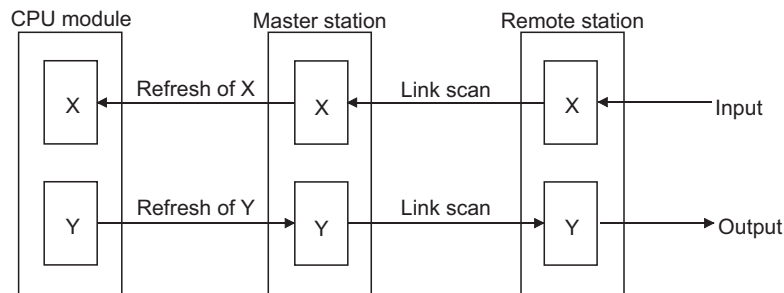
Using dedicated flat cables, VCTF cables, and flexible cables leads to reduction in wiring work and cable cost.

(2) No parameter settings

Network parameters for operating a CC-Link/LT system need not to be set.

(3) Simplified programming

CC-Link/LT link devices are assigned for X/Y devices of the CPU module. This allows creating programs using only X/Y devices without considering the network.



(4) Transmission speed auto-tracking function

Transmission speed setting is required for the master module only and is not required for remote stations.

(5) Slave station cutoff function

Even if a module goes down due to an error, communications among the other modules will continue.

Note if the cable on the trunk line is disconnected, data link among all stations will fail.

(6) Automatic return function

When a disconnected module recovers from an error, it automatically returns to the network and restarts data link.

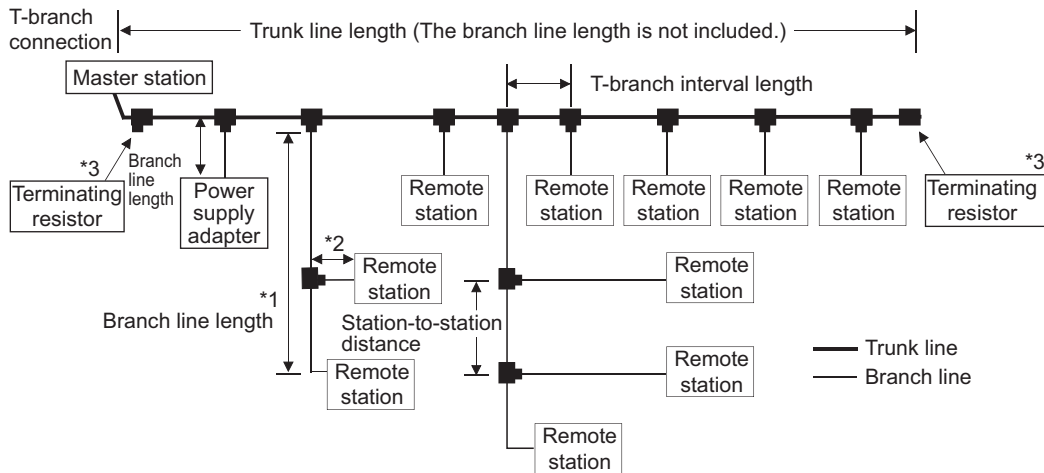
CHAPTER 2 SYSTEM CONFIGURATION

This chapter describes a CC-Link/LT system configuration.

2.1 Overall Configuration

To one master station, up to 64 remote stations can be connected when the following conditions are met.

Item	Specifications			Remarks
Transmission speed	2.5Mbps	625kbps	156kbps	—
Station-to-station distance	No limit			—
Maximum number of modules on a branch line	8			—
Trunk line length	35m	100m	500m	The cable length between terminating resistors at both ends (The branch line length is not included.)
T-branch interval	No limit			—
Maximum length of a branch line	4m	16m	60m	The cable length per branch line
Overall branch line length	15m	50m	200m	Total length of all branch lines



*1 The branch line length includes the length of *2.

*2 The maximum length of the branch line and overall branch line length include the length of this item.

*3 For the terminating resistor connection method, Page 59, Section 4.5.4.

Point

- Remote stations need not to be connected in station number order.
- Remote station numbers are not necessarily consecutive. (Leaving any station number out does not cause a data link error.)

2.2 Applicable System

This section provides information on the available CPU module and notes on system configuration.

2.2.1 Applicable Modules and the Number of Available Modules

(1) Applicable modules and base units, and No. of modules

(a) When mounted with a CPU module

The table below shows the CPU modules and base units applicable to the QJ61CL12 and quantities for each CPU model.

Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient.

Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

Applicable CPU module		No. of modules (*1)	Base unit (*2)	
CPU type	CPU model		Main base unit	Extension base unit
Basic model QCPU	Q00JCPU	Up to 16	○	○
	Q00CPU	Up to 24		
	Q01CPU			
High Performance model QCPU	Q02CPU	Up to 64	○	○
	Q02HCPU			
	Q06HCPU			
	Q12HCPU			
Process CPU	Q02PHCPU	Up to 64	○	○
	Q06PHCPU			
	Q12PHCPU			
	Q25PHCPU			
Redundant CPU	Q12PRHCPU	Up to 53	×	○
	Q25PRHCPU			
Universal model QCPU	Q00UJCPU	UP to 16	○	○
	Q00UCPU	Up to 24		
	Q01UCPU	Up to 36		
	Q02UCPU			
	Q03UDCPU	Up to 64		
	Q04UDHCPU			
	Q06UDHCPU			
	Q10UDHCPU			
	Q13UDHCPU			
	Q20UDHCPU			
Q26UDHCPU				

○: Applicable, ×: N/A

Applicable CPU module		No. of modules (*1)	Base unit (*2)	
CPU type	CPU model		Main base unit	Extension base unit
Universal model QCPU	Q03UDECPU	Up to 64	○	○
	Q04UDEHCPU			
	Q06UDEHCPU			
	Q10UDEHCPU			
	Q13UDEHCPU			
	Q20UDEHCPU			
	Q26UDEHCPU			
	Q50UDEHCPU			
	Q100UDEHCPU			
Safety CPU	QS001CPU	N/A	×	× (*3)
C Controller module	Q06CCPU-V	Up to 64	○	○
	Q06CCPU-V-B			
	Q12DCCPU-V			

○: Applicable, ×: N/A


*1 The number varies depending on the I/O points of the CPU module and the number of occupied I/O points set in QJ61CL12.

*2 Can be installed to any I/O slot of a base unit.

*3 Connection of extension base units is not available with any safety CPU.

Remark

When using a C Controller module, refer to the following.

 C Controller Module User's Manual (Hardware Design, Function Explanation)

(b) Mounting to a MELSECNET/H remote I/O station

The table below shows the network modules and base units applicable to the QJ61CL12 and quantities for each network module model.

Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient.

Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

Applicable CPU module	No. of modules (*1)	No. of modules (*2)	
		Main base unit of remote I/O station	Extension base unit of remote I/O station
QJ72LP25-25	Up to 64	○	○
QJ72LP25G			
QJ72LP25GE			
QJ72BR15			

○: Applicable, ×: N/A

*1 Limited within the range of I/O points for the network module.


*2 Can be installed to any I/O slot of a base unit.

Remark

The Basic model QCPU or C Controller module cannot create the MELSECNET/ H remote I/O network.

(2) Application to multiple CPU system

When using the QJ61CL12 in a multiple CPU system, refer to the following.

 QCPU User's Manual (Multiple CPU System)

(a) QJ61CL12 available for multiple CPU system

The function version of the first released QJ61CL12 is B, and it supports multiple CPU systems.

(b) Parameters of intelligent function modules

Write the parameters of intelligent function modules to only the control CPU of QJ61CL12.

(3) Applicable software package

The systems and software packages available for the QJ61CL12 are shown below.

When using the QJ61CL12, GX Developer is indispensable.

When using the QJ61CL12, GX Developer or GX Works2 is required.

		Software version	
		GX Developer	GX Works2
Q00J/Q00/Q01CPU	Single CPU system	Version 7 or later	Version 1.15R or later
	Multiple CPU system	Version 8 or later	
Q02/Q02H/Q06H/Q12H/Q25HCPU	Single CPU system	Version 4 or later	Version 1.15R or later
	Multiple CPU system	Version 6 or later	
Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later	Not supported
	Multiple CPU system		
Q12PH/Q25PHCPU	Single CPU system	Version 7.10L or later	Not supported
	Multiple CPU system		
Q12PRH/Q25PRHCPU	Redundant system	Version 8.45X or later	
Q00UJ/Q00U/Q01UCPU	Single CPU system	Version 8.76E or later	Version 1.15R or later
	Multiple CPU system		
Q02U/Q03UD/Q04UDH/Q06UDHCPU	Single CPU system	Version 8.48A or later	Version 1.15R or later
	Multiple CPU system		
Q10UDH/Q20UDHCPU	Single CPU system	Version 8.76E or later	Version 1.15R or later
	Multiple CPU system		
Q13UDH/Q26UDHCPU	Single CPU system	Version 8.62Q or later	Version 1.15R or later
	Multiple CPU system		
Q03UDE/Q04UDEH/Q06UDEH/ Q13UDEH/Q26UDEHCPU	Single CPU system	Version 8.68W or later	Version 1.15R or later
	Multiple CPU system		
Q10UDEH/Q20UDEHCPU	Single CPU system	Version 8.76E or later	Version 1.15R or later
	Multiple CPU system		
Q50UDEH/Q100UDEHCPU	Single CPU system	Not supported	Version 1.31H or later
	Multiple CPU system		
When installing to MELSECNET/H remote I/O station		Version 6 or later	Version 1.40S or later
When executing CC-Link/LT diagnosis		Version 7.17T or later	Version 1.12N or later

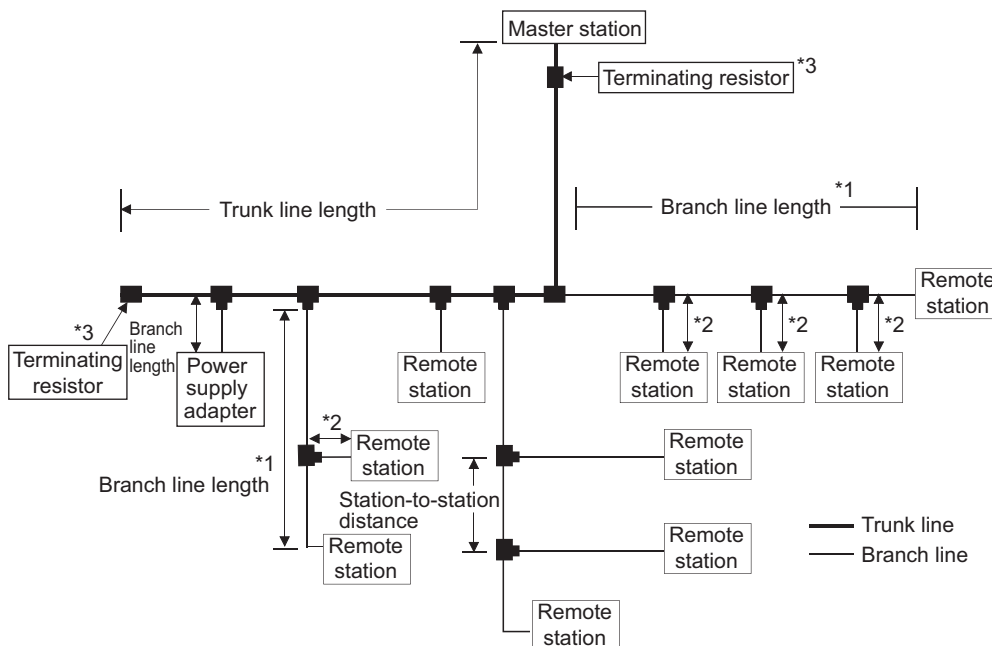
2.2.2 Precautions for system configuration

(1) QJ61CL12 position

Install the QJ61CL12 on either end of the trunk line.

Since T-branch connection is available, the module can be apparently installed on any position on the trunk line.

However, the trunk line length is defined as the length between the terminating resistors.



*1 The branch line length includes the length of *2.

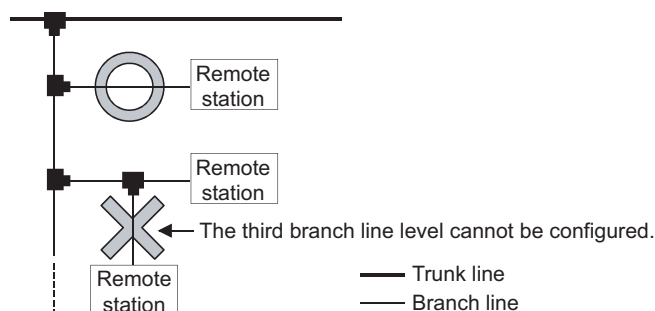
*2 The maximum length of the branch line and overall branch line length include the length of this item.

*3 For the terminating resistor connection method, Page 59, Section 4.5.4.

(2) Number of branch line levels

Up to two branch line levels can be configured in a CC-Link/LT system.

Three or more branch line levels cannot be configured.



(3) Installation conditions of a dedicated power supply and a power supply adapter

The installation conditions of the power supplies depend on the connected devices and wiring length. For the conditions, refer to the user's manual for the dedicated power supply or the power supply adapter.

Point

Always connect a dedicated power supply or a power supply adapter to the trunk line. (Connection to branch lines is not allowed.)

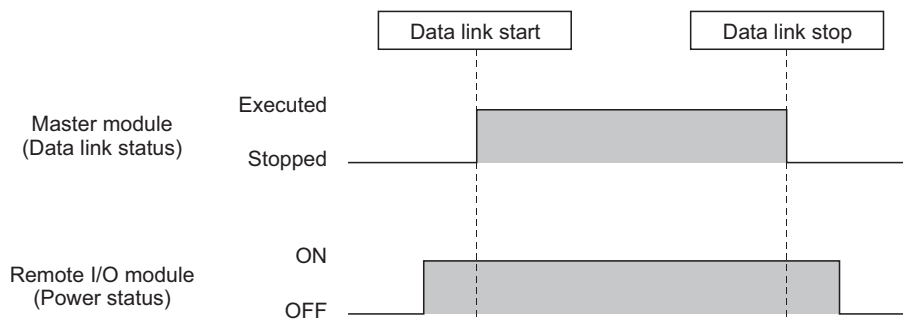
(4) Preventing incorrect input/output from remote I/O modules

To prevent incorrect input/output from remote I/O modules, design a system with considering the following:

(a) At power-on and power-off

Turn on the power of remote I/O modules (dedicated power supply or power supply adapter), then start data link.

Also, stop data link then turn off the power of remote I/O modules.



(b) At momentary power failure of remote I/O modules

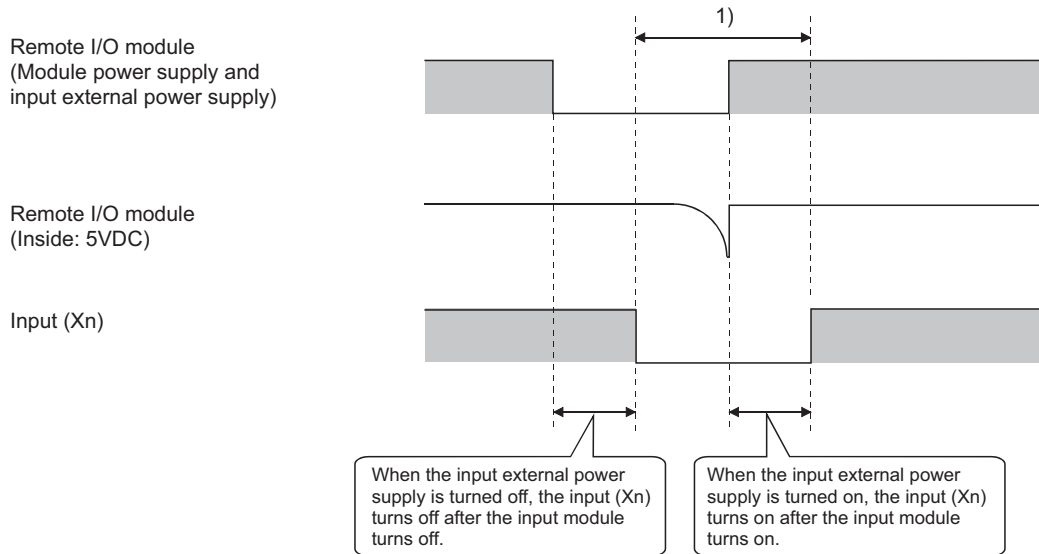
If momentary power failure occurs in the power supplied to remote I/O modules (24VDC), incorrect input may occur.

- Cause

The hardware of a remote I/O module internally converts 24VDC (module power supply) into 5VDC.

If momentary power failure occurs in a remote I/O module, (Time until the internal power of the remote I/O module (5VDC) turns off) > (Time until the input module turns off) is met.

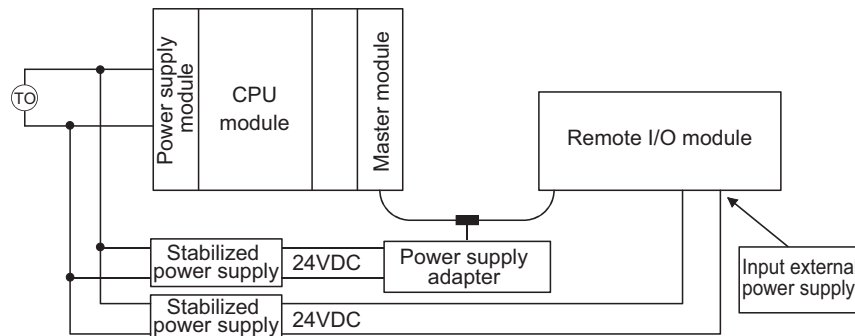
Therefore, if data are refreshed within the time shown in 1) in the figure below, incorrect input may occur (This situation especially occurs when the input response time is set to high-speed response).



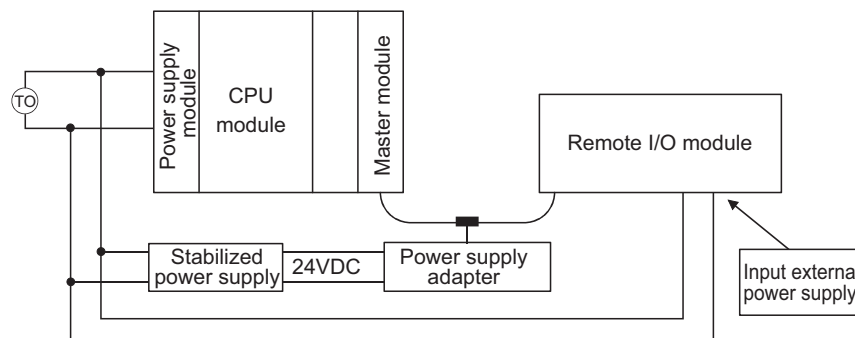
- Measures against incorrect input

Use the same power supply for a power supply module, stabilized power supply, and input external power supply (AC input).

DC input

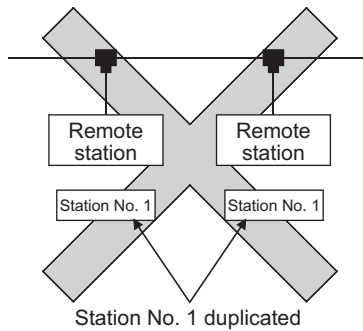


AC input



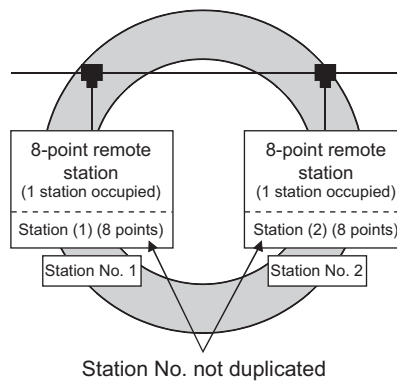
(5) Duplication of a remote station number

- If remote station numbers are duplicated, the duplicating stations may cause malfunction (incorrect input/output). Check that the remote station numbers are not duplicated before powering on the system.

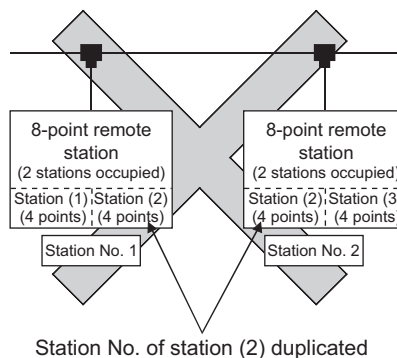


- A remote station may occupy multiple station numbers depending on the point mode setting and the number of I/O points of the remote station. When using a remote station having the number of I/O points of eight or more, check that the station number of the remote station is not duplicated with that of the next station.

- Ex.** 8-point remote stations are numbered as station numbers 1 and 2
- Point mode setting: 8-point mode (8 points/station)



- Point mode setting: 4-point mode (4 points/station)



(6) Connecting a remote station for CC-Link to CC-Link/LT

A CC-Link remote station cannot be connected to the QJ61CL12. Doing so may cause system malfunction.

(7) Connecting a remote station for CC-Link/LT to CC-Link

A CC-Link/LT remote station cannot be connected to the master station on CC-Link. Doing so may cause system malfunction.

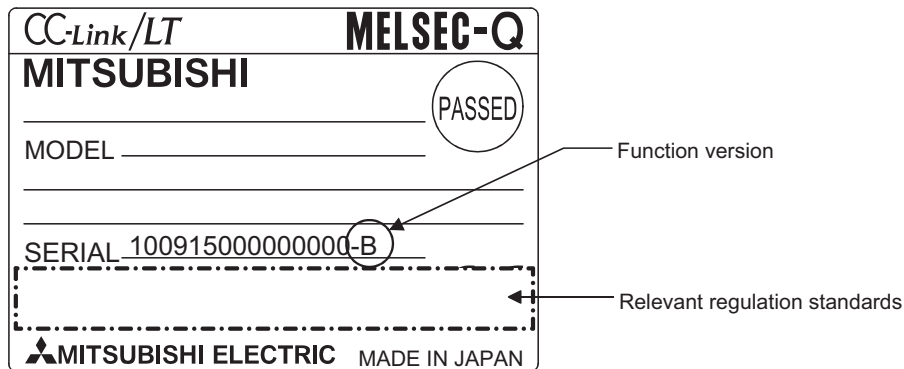
2.3 Check Methods of Serial Number and Function Version

The serial No. and function version of the QJ61CL12 can be confirmed on the rating plate, the front of the module and GX Developer's system monitor.

(1) How to check function version and serial No. of QJ61CL12

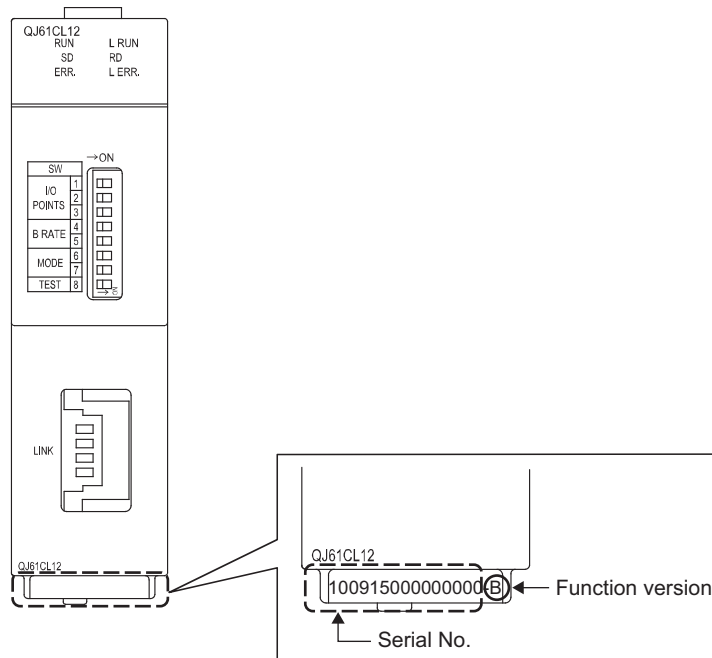
(a) Confirming the serial number on the rating plate

The rating plate is situated on the side face of the QJ61CL12.



(b) Checking on the front of the module

The serial No. on the rating plate is also indicated on the front of the module (lower part).





Remark

Serial No. labeling on the front of the module was started from August in 2008.

Note that, however, some of the modules manufactured around the time of change may not have the serial No. label attached.

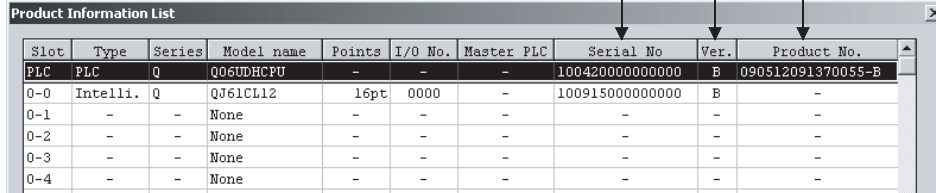
(c) Confirming the serial number on the system monitor (Product Information List)

Open the monitor window in GX Developer.

 [Diagnostics] ⇨ [System monitor] ⇨  button

Function version

Serial No. Production number



Slot	Type	Series	Model name	Points	I/O No.	Master PLC	Serial No.	Ver.	Product No.
PLC	PLC	Q	QJ61CL12	-	-	-	100420000000000	B	090512091370055-B
0-0	Intelli. Q	QJ61CL12	QJ61CL12	16pt	0000	-	100915000000000	B	-
0-1	-	-	None	-	-	-	-	-	-
0-2	-	-	None	-	-	-	-	-	-
0-3	-	-	None	-	-	-	-	-	-
0-4	-	-	None	-	-	-	-	-	-

- Production number display

Since the QJ61CL12 does not support the production number display, "-" is displayed.

Point

The serial No. displayed in the Product Information List of GX Developer may be different from the one on the rating plate and the front of the module.

- The serial No. on the rating plate and the front of the module indicates the management information on the product.
- The serial No. in the Product Information List of GX Developer indicates the functional information on the product, which is updated when a new function is added.

CHAPTER 3 SPECIFICATIONS

This chapter describes specifications of the QJ61CL12.

For the general specifications of the QJ61CL12, refer to the following.

 QCPU User's Manual (Hardware Design, Maintenance and Inspection)

3.1 Performance Specifications

The following table lists the performance specifications of the QJ61CL12.

Item		Specifications				
Point mode		4-point mode	8-point mode	16-point mode		
Control specifications	Maximum link points (the same I/O address used)		256 points (512 points)	512 points (1024 points)	1024 points (2048 points)	
	Link points per station (the same I/O address used)		4 points (8 points)	8 points (16 points)	16 points (32 points)	
	Link scan time	32 stations connected	Points	128 points	256 points	512 points
			2.5Mbps	0.7ms	0.8ms	1.0ms
			625kbps	2.2ms	2.7ms	3.8ms
	64 stations connected	Points	256 points	512 points	1024 points	
		2.5Mbps	1.2ms	1.5ms	2.0ms	
		625kbps	4.3ms	5.4ms	7.4ms	
		156kbps	15.6ms	20.0ms	27.8ms	
	Communication specifications	Transmission speed		2.5Mbps/625kbps/156kbps		
Communication method		BITR method (Broadcastpolling + Interval Timed Response)				
Network topology		T-branch type				
Error control system		CRC				
Number of connectable modules		64				
Remote station number		1 to 64				
Installation position of master station		End of a trunk line				
RAS function		Network diagnostics, internal loopback diagnostics, slave station cutoff function, automatic return function				
Connection cable *1		Dedicated flat cable (0.75mm ² × 4)* ⁵ , VCTF cable* ⁴ , flexible cable* ⁵				
Number of occupied I/O points* ²		16, 32, 48, 64, 128, 256, 512, or 1024 points (I/O assignment: Intelli.)				
Internal current consumption (5VDC)		0.13A				
24VDC power supply * ³	Voltage		20.4 to 28.8VDC			
	Current consumption		0.028A			
	Current on startup		0.070A			
Weight		0.09kg				

*1 When the cables other than dedicated flat cables, VCTF cables, and flexible cables are used, performance of CC-Link/LT is not guaranteed.

*2 Set the number of occupied I/O points using the operation setting switch. (☞ Page 45, Section 4.3)

*3 24VDC power supply is supplied through the dedicated power supply or power supply adapter.

*4 For the specifications of the VCTF cable, refer to the following table.

(Extract from JIS C 3306)

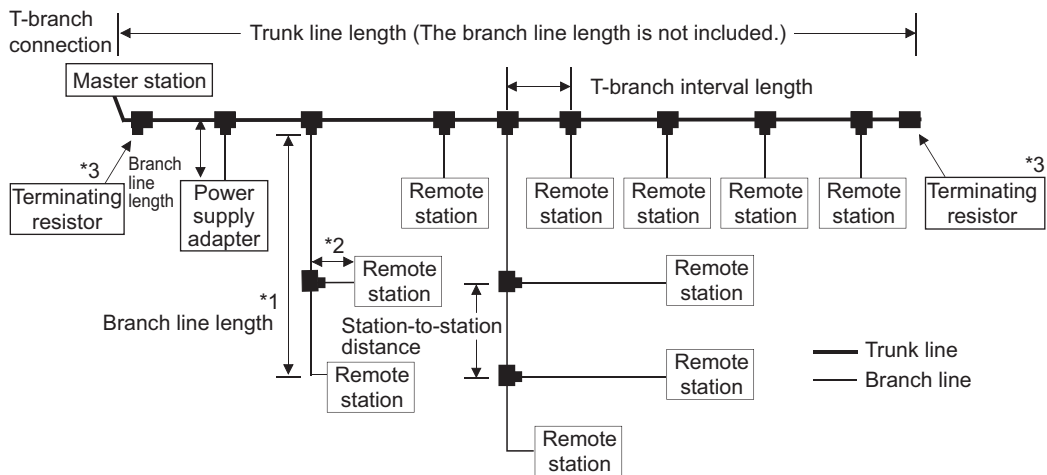
Type	No. of cores	Conductor			Insulator thickness	Sheath thickness	Conductor resistance (20°C)
		Nominal cross section	Configuration No. of wires/wire diameter	Outside diameter			
Vinyl cabtyre round code	4	0.75mm ²	30/0.18mm	1.1mm	0.6mm	1.0mm	25.1Ω/km

*5 Use the dedicated flat cables and flexible cables accredited by CC-Link Partner Association.
CC-Link Partner Association website: <http://www.cc-link.org/>

3.1.1 Network wiring specifications

The following table lists the network wiring specifications of CC-Link/LT.

Item	Specifications			Remarks
Transmission speed	2.5Mbps	625kbps	156kbps	—
Station-to-station distance	No limit			—
Maximum number of modules on a branch line	8			—
Trunk line length	35m	100m	500m	The cable length between terminating resistors at both ends (The branch line length is not included.)
T-branch interval	No limit			—
Maximum length of a branch line	4m	16m	60m	The cable length per branch line
Overall branch line length	15m	50m	200m	Total length of all branch lines



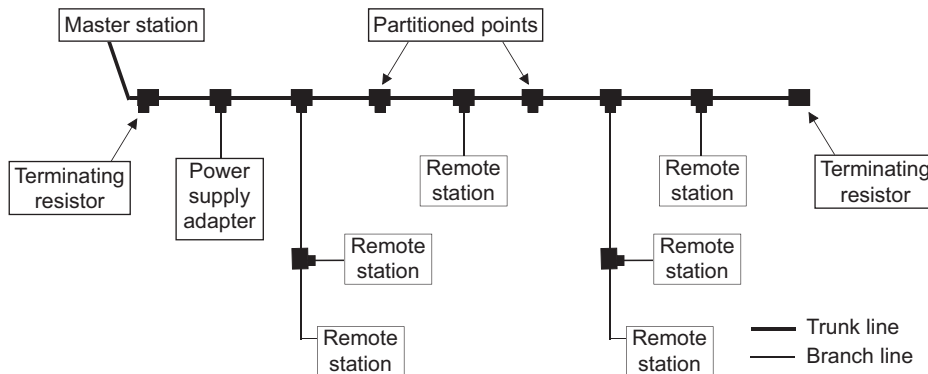
*1 The branch line length includes the length of *2.

*2 The maximum length of the branch line and overall branch line length include the length of this item.

*3 For the terminating resistor connection method, see Page 59, Section 4.5.4.

Point

A trunk line can be partitioned using up to 10 dedicated connectors.



3.2 I/O Signals to/from CPU Module

This section describes I/O signals of the QJ61CL12 for the CPU module.

Input signals (X) are assigned to the remote input area, and output signals (Y) are assigned to the remote output area.

No special I/O signal is required to operate the QJ61CL12.

I/O assignments vary depending on the point mode setting.

In the tables in Page 29, Section 3.2.1 to Page 30, Section 3.2.3, "n" indicates the start I/O number of the QJ61CL12.

Ex. When the start I/O number of the QJ61CL12 is "X/Y30"
 Xn0 to XnF → X30 to X3F
 Yn0 to YnF → Y30 to Y3F

Point

- If the number of occupied I/O points is set larger than the maximum number of link points in the 4-point mode or 8-point mode, the excessive I/O points cannot be used.

Ex. When the point mode is in the 4-point mode and the number of occupied I/O points is set to 1024
 According to the setting, the QJ61CL12 can occupy 1024 I/O points in the CPU module.
 However, the number of actual link points is 256 (the maximum link points when the 4-point mode is set).
 The rest of I/O points (768) cannot be used.

- If remote station numbers are duplicated, the duplicating stations may cause malfunction (incorrect input/output). Check that the remote station numbers are not duplicated before powering on the system.
- A remote station may occupy multiple station numbers depending on the point mode setting and the number of I/O points of the remote station.
 When using a remote station having the number of I/O points of eight or more, check that the station number of the remote station is not duplicated with that of the next station.

3.2.1 I/O signals in 4-point mode setting

The following tables list I/O signals in 4-point mode.

Input number	Remote input (X)															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
XnF to Xn0	Station No.4				Station No.3				Station No.2				Station No.1			
⋮	⋮															
X(n+F)F to X(n+F)0	Station No.64				Station No.63				Station No.62				Station No.61			
Output number	Remote output (Y)															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
YnF to Yn0	Station No.4				Station No.3				Station No.2				Station No.1			
⋮	⋮															
Y(n+F)F to Y(n+F)0	Station No.64				Station No.63				Station No.62				Station No.61			

3.2.2 I/O signals in 8-point mode setting

The following tables list I/O signals in 8-point mode.

Input number	Remote input (X)															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
XnF to Xn0	Station No.2								Station No.1							
⋮	⋮								⋮							
X(n+1F)F to X(n+1F)0	Station No.64								Station No.63							
Output number	Remote output (Y)															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
YnF to Yn0	Station No.2								Station No.1							
⋮	⋮								⋮							
Y(n+1F)F to Y(n+1F)0	Station No.64								Station No.63							

3.2.3 I/O signals in 16-point mode setting

The following tables list I/O signals in 16-point mode.

Input number	Remote input (X)															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
XnF to Xn0	Station No.1															
⋮	⋮															
X(n+3F)F to X(n+3F)0	Station No.64															
Output number	Remote output (Y)															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
YnF to Yn0	Station No.1															
⋮	⋮															
Y(n+3F)F to Y(n+3F)0	Station No.64															

3.3 Buffer Memory

The buffer memory is used for data communication between the QJ61CL12 and the CPU module and is read or written by GX Developer or sequence programs.

When the system is powered off or the CPU module is reset, the contents of the buffer memory will return to the default setting.

3.3.1 List of buffer memory areas

The following table lists the buffer memory areas of the QJ61CL12.

Address		Item	Availability	Reference
DEC	HEX			
0 to 3	0 _H to 3 _H	Remote station connection information	Read-only	Page 31, Section 3.3.2 (1)
4 to 7	4 _H to 7 _H	Faulty station information	Read-only	Page 32, Section 3.3.2 (2)
8 to 11	8 _H to B _H	Remote I/O error information	Read-only	Page 32, Section 3.3.2 (3)
12 to 15	C _H to F _H	Use prohibited*1	—	—
16	10 _H	Detailed error information	Readable/ Writable	Page 32, Section 3.3.2 (4)
17	11 _H	External switch information	Read-only	Page 33, Section 3.3.2 (5)
18	12 _H	Operating status information	Read-only	Page 33, Section 3.3.2 (6)
19	13 _H	Data link stop/restart instruction	Write-only	Page 33, Section 3.3.2 (7)
20	14 _H	Data link last station information	Read-only	Page 34, Section 3.3.2 (8)
21 to 31	15 _H to 1F _H	Use prohibited*1	—	—
32 to 95	20 _H to 5F _H	Detailed remote station information (Station No. 1) to Detailed remote station information (Station No.64)	Read-only	Page 34, Section 3.3.2 (9)
96 to	60 _H to	Use prohibited*1	—	—

*1 Do not write data to the use prohibited area. Doing so may cause errors.

3.3.2 Details of buffer memory areas

This section describes the details of each item given in Page 28, Section 3.1.1.

(1) Remote station connection information (buffer memory address: 0 to 3 (Un\G0 to 3))

Remote stations on the network are detected, and connection status of the stations is stored.

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

0: No remote station connected
1: Remote station connected

(2) Faulty station information (buffer memory address: 4 to 7 (Un\G4 to 7))

The data link status of remote stations is stored.

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

0: Normal

1: Data link error

(3) Remote I/O error information (buffer memory address: 8 to 11 (Un\G8 to 11))

The remote I/O error status of remote stations during data link is stored.

For error details, refer to the manual for each remote station.

Address (decimal)	b15	b14	b13	to	b2	b1	b0
8	Station No.16	Station No.15	Station No.14	to	Station No.3	Station No.2	Station No.1
9	Station No.32	Station No.31	Station No.30	to	Station No.19	Station No.18	Station No.17
10	Station No.48	Station No.47	Station No.46	to	Station No.35	Station No.34	Station No.33
11	Station No.64	Station No.63	Station No.62	to	Station No.51	Station No.50	Station No.49

0: No remote I/O error

1: Remote I/O error

(4) Detailed error information (buffer memory address: 16 (Un\G16))

The details of errors detected by the master station are stored.

If "Error of station outside control range" is detected, b3 will be latched.

Writing "1" to b3 will clear the "Error of station outside control range" information.

Bit	Name	Description
b0	Data link error	0: Data link normal 1: One or more data link faulty stations
b1	Error (all stations)	0: One or more normal data link stations 1: All stations faulty
b2	Remote I/O error	0: No remote I/O error 1: One or more faulty remote I/O stations
b3	Error of station outside control range	0: No error 1: Remote station connected to the station whose number is greater than the last station number in refresh range
b4	Point mode setting error	0: Normal 1: Point mode setting switch configured outside the range
b5	Transmission speed setting error	0: Normal 1: Transmission speed setting switch configured outside the range
b6	Switching during operation	0: No switching 1: Switched
b14 to b7	Empty	—
b15	Hardware failure	0: Normal 1: Failure identified by self-loopback test

(5) External switch information (buffer memory address: 17 (Un\G17))

The switch status of the number of occupied I/O points setting, transmission speed setting, point mode setting, and test mode are stored.

Bit	Name	Description
b2 to b0	Number of occupied I/O points setting	Status of operation setting switch SW3 to SW1 000: 16 pts. 001: 32 pts. 010: 48 pts. 011: 64 pts. 100: 128 pts. 101: 256 pts. 110: 512 pts. 111:1024 pts
b4, b3	Transmission speed setting	Status of operation setting switch SW5 and SW4 00: 156kbps 01: 625kbps 10: 2.5Mbps 11: Setting not allowed
b6, b5	Point mode setting	Status of operation setting switch SW7 and SW6 00: 8-point mode 01: 4-point mode 10: 16-point mode 11: Setting not allowed
b7	Test mode	Status of the operation setting switch SW8 0: Normal 1: Self-loopback test being executed
b15 to b8	Empty	—

0: Switch off

1: Switch on

(6) Operating status information (buffer memory address: 18 (Un\G18))

The operating status of the QJ61CL12 is stored.

Bit	Name	Description
b0	Data link status	0: Data link stopped 1: Data link being executed
b1	Initial communication status	0: Initial communication not complete 1: Initial communication completed
b15 to b2	Empty	—

(7) Data link stop/restart instruction (buffer memory address: 19 (Un\G19))

Data link stop and data link restart are controlled. When data link stop and data link restart are simultaneously requested, the stop request takes priority.

Bit	Name	Description	Initial value
b0	Data link stop	0: Data link stop not requested 1: Data link stop requested	0
b14 to b1	Empty	—	—
b15	Data link restart	0: Data link restart not requested 1: Data link restart requested	0

(8) Data link last station information (buffer memory address: 20 (Un\G20))

The last station number of data-link-available remote stations is stored.

Bit	Name	Description
b6 to b0	Data link last station number	The last station number of data-link-available remote stations is stored.
b15 to b7	Empty	—

Point

- The value stored in this buffer memory area depends on the number of occupied I/O points setting, point mode setting, and last station number setting configured using intelligent function module switches.
- When a remote station for which a station number greater than the value stored in this buffer memory area is set is connected, "Error of station outside control range" occurs.

(9) Detailed remote station information (Buffer memory address 32 to 95: Un\G32 to 95)

Information on each remote station is stored.

Bit	Name	Description
b2 to b0	Number of I/O points ^{*1}	000: 1 pt. 001: 2 pts. 010: 4 pts. 011: 8 pts. 100: 16 pts.
b3	Output flag ^{*2}	0: No output 1: Data being output
b4	Input flag ^{*2}	0: No input 1: Data being input
b5	Remote device station flag	0: Remote I/O station 1: Remote device station
b6	Start station flag ^{*3}	0: Station other than the start station 1: Start station
b7	Input filter setting	0: Standard input (No setting) 1: High-speed input
b8	Output clear/hold setting	0: Clear (No setting) 1: Hold
b15 to b9	Empty	—

*1 For I/O modules, the number of input or output points is stored.

Ex. For the CL1XY2-DT1D5S, 1 point is stored.

*2 b4 and b3 indicate the presence of the remote input signal and remote output signal of the connected remote station.

Ex. For a remote I/O station used for input and output, both b4 and b3 store 1. For the one used for input, b4 and b3 store 1 and 0, respectively.

*3 For a module having two or more occupied stations, only the bit of the buffer memory area in the start station will turn on.

3.4 Point Mode Setting and the Number of Occupied I/O Points Setting

This section describes concepts of the point mode setting and the number of occupied I/O points setting required for system configuration.

The number of points that the master station can control per remote station occupying one station is set for the point mode setting.

Three point modes are available: 4-point mode, 8-point mode, and 16-point mode. Even if the number of occupied I/O points setting is the same, the number of controllable remote stations varies depending on the point mode setting.

Note when connecting a remote device station, use 16-point mode.

(1) Simple setting

The following table lists simple setting for the point mode and the number of occupied I/O points.

According to the number of I/O points of the remote station, set the point mode and the number of occupied I/O points with reference to the following table.

Number of I/O points of remote station	Number of occupied I/O points setting of the QJ61CL12	Point mode setting of the QJ61CL12
256 points or less	16 points	4-point mode
	32 points	
	64 points	
	128 points	
	256 points	
257 to 512 points	512 points	8-point mode
513 to 1024 points	1024 points	16-point mode

(2) Advanced setting

This section describes the advanced setting method of the point mode and the number of occupied I/O points.

- Even if the number of occupied I/O points is the same, the number of controllable remote stations varies depending on the point mode setting.

The following table lists the number of connectable stations according to the number of occupied I/O points and point mode settings.

Number of occupied I/O points setting		16 pts.	32 pts.	48 pts.	64 pts.	128 pts.	256 pts.	512 pts.	1024 pts.
Point mode setting	4-point mode	4 stations	8 stations	12 stations	16 stations	32 stations	64 stations	64 stations	64 stations
	8-point mode	2 stations	4 stations	6 stations	8 stations	16 stations	32 stations	64 stations	64 stations
	16-point mode	1 stations	2 stations	3 stations	4 stations	8 stations	16 stations	32 stations	64 stations

Point

If the number of occupied I/O points is set larger than the maximum number of link points in the 4-point mode or 8-point mode, the excessive I/O points cannot be used.

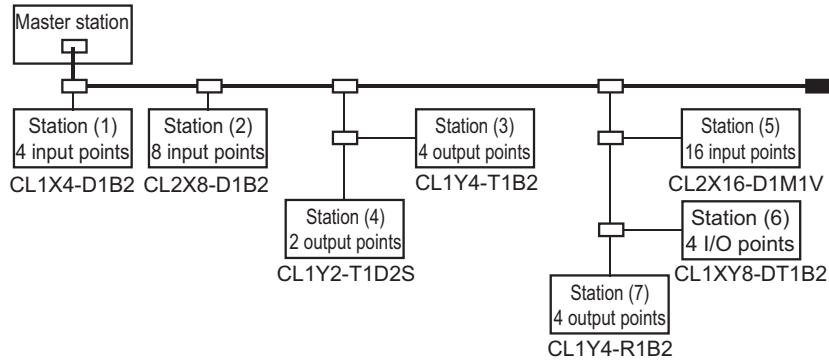
- Ex.** When the point mode is in the 4-point mode and the number of occupied I/O points is set to 1024 According to the setting, the QJ61CL12 can occupy 1024 I/O points in the CPU module. However, the number of actual link points is 256 (the maximum link points when the 4-point mode is set). The rest of I/O points (768) cannot be used.

- Even if the same remote module is used, the number of occupied stations varies depending on the point mode setting.

Ex. When 4-point mode is set for a 16-point module, four stations are occupied. In the same way, two stations are occupied in 8-point mode and one station is occupied in 16-point mode.

- The optimal mode depends on the number of points of remote modules. The number of points of remote modules, which are used most in the system, should be set for the point mode. This usually minimizes the number of unused points.

Ex. The system including: 2-point remote station: 1, 4-point remote station: 4, 8-point remote station: 1, 16-point remote station: 1



4-point mode (4 pts./station)
 8-point mode (8 pts./station)
 16-point mode (16 pts./station)

Number of occupied I/O points: 48

Number of occupied I/O points: 64

Number of occupied I/O points: 128

Total no. of stations : 12

X/Y0	(1) 4 pts.	1 station
	(2) 8 pts.	2 stations
	(3) 4 pts.	1 station
X/Y10	(4) 2 pts.	1 station
	Empty: 2 pts.	
	(5) 16 pts.	4 stations
X/Y20		
X/Y23	(6) 4 pts.	1 station
	(7) 4 pts.	1 station
	Empty: 4 pts.	1 station

Total no. of stations : 8

X/Y0	(1) 4 pts.	1 station
	Empty: 4 pts.	
	(2) 8 pts.	1 station
X/Y10	(3) 4 pts.	1 station
	Empty: 4 pts.	
	(4) 2 pts.	1 station
	Empty: 6 pts.	
X/Y20		
	(5) 16 pts.	2 stations
X/Y30		
	(6) 4 pts.	1 station
	Empty: 4 pts.	
	(7) 4 pts.	1 station
	Empty: 4 pts.	

Total no. of stations : 7

X/Y0	(1) 4 pts.	1 station
	Empty: 12 pts.	
X/Y10		
	(2) 8 pts.	1 station
	Empty: 8 pts.	
X/Y20		
	(3) 4 pts.	1 station
	Empty: 12 pts.	
X/Y30		
	(4) 2 pts.	1 station
	Empty: 14 pts.	
X/Y40		
	(5) 16 pts.	1 station
X/Y50		
	(6) 4 pts.	1 station
	Empty: 12 pts.	
X/Y60		
	(7) 4 pts.	1 station
	Empty: 12 pts.	
X/Y70		
	Empty: 16 pts.	

- I/O number assignment is described using the I/O assignment table in APPENDICES.

The following table lists the I/O number assignment when 8-point mode is set and 64 points is set for the number of occupied I/O points in the system shown in the example on the previous page.

Station No.	Model	Input	Output	Station No.	Model	Input	Output
1	CL1X4-D1B2	X 00	Y 0	5	CL2X16-D1M1V (Two stations occupied)	X 20	Y 0
		01	1			21	1
		02	2			22	2
		03	3			23	3
		4	4			24	4
		5	5			25	5
		6	6			26	6
		7	7			27	7
2	CL2X8-D1B2	X 08	Y 8	6	CL2X16-D1M1V (Two stations occupied)	X 28	Y 8
		09	9			29	9
		0A	A			2A	A
		0B	B			2B	B
		0C	C			2C	C
		0D	D			2D	D
		0E	E			2E	E
		0F	F			2F	F
3	CL1Y4-T1B2	X 0	Y 10	7	CL1XY8-DT1B2	X 30	Y 30
		1	11			31	31
		2	12			32	32
		3	13			33	33
		4	4			4	4
		5	5			5	5
		6	6			6	6
		7	7			7	7
4	CL1Y2-T1D2S	X 8	Y 18	8	CL1Y4-R1B2	X 8	Y 38
		9	19			9	39
		A	A			A	3A
		B	B			B	3B
		C	C			C	C
		D	D			D	D
		E	E			E	E
		F	F			F	F

3

3.4 Point Mode Setting and the Number of Occupied I/O Points Setting

3.5 Last Station Number Setting

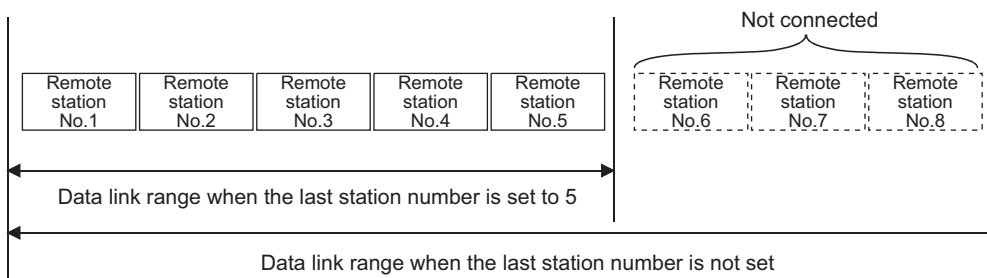
The last station number is set to perform data link up to the last remote station in connection with the network and not to perform data link with unconnected stations.

This setting is optional but useful to optimize link scan time.

For the setting,  Page 47, Section 4.4.

Ex. When 16-point mode is set, the number of occupied I/O points is set to 128 points, and the last remote station in connection with the network is numbered as "5"

By setting "5" as the last station number, the link scan time is optimized.



3.6 Station Status if an Error Occurs

The following table lists station status if an error occurs.

Data link status	Master station		Remote station	
	Remote input	Remote output	Input	Output
The CPU module on the master station is faulty and stopped (data link stopped).	Maintained	Maintained	Continued ^{*1}	Maintained/OFF ^{*2}
A remote station is faulty due to an error such as data link error (data link continued).	Input data from the faulty remote station are cleared.	Continued	Continued ^{*1}	Maintained/OFF ^{*2}
Power of a remote station is shut off (data link continued).	Input data from the de-energized remote station are cleared.	Continued	Depends on external signals.	All OFF

*1 Although external data are input (The input LED turns on.), the data are not sent to the master station.

*2 The status depends on the output hold setting of the remote station.

3.7 Data Link Processing Time

This section describes the link scan time, transmission delay time, and automatic return time.

3.7.1 Link scan time

The link scan time of CC-Link/LT is described as below.

[Link scan time (LS)]

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

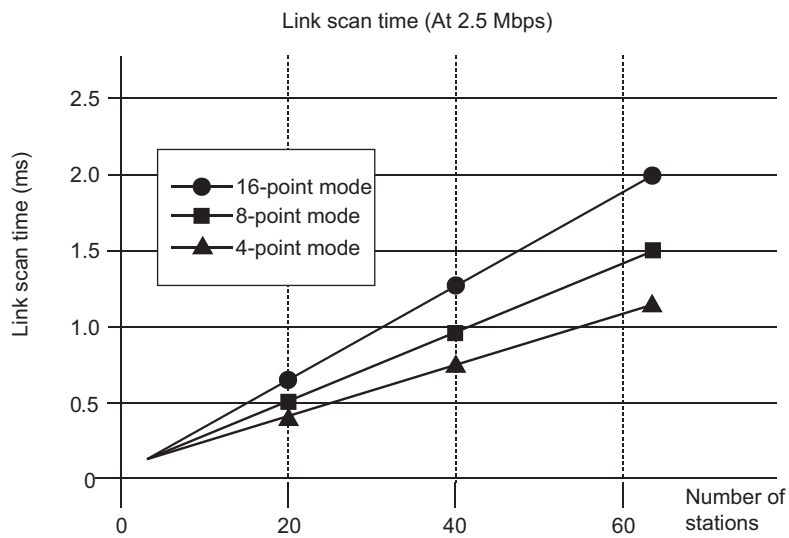
a: Constant

b: Constant

c: Constant

N: Last station number

Transmission speed		2.5Mbps	625kbps	156kbps
a		22	88	353
b	4-point mode	46	41	37
	8-point mode	56	51	47
	16-point mode	76	71	67
c		0.4	1.6	6.4



3.7.2 Transmission delay time

The transmission delay time (time that data reaches to a destination) is described as below.

(1) Master station ← Remote station (Input)

The following formula calculates the time after a signal is input to a remote station until the CPU module device (X) turns on (off).

[Calculation formula]

$$SM \times 2 + (2 - n)^{*1} \times LS + \text{Input response time of remote station (ms)}$$

SM: Sequence scan time of master station

LS: Link scan time (☞ Page 39, Section 3.7.1)

n: $SM \div LS$ (Round off the calculated value to the nearest integer.)

*1 Regarded as "0" when 0 or less is calculated

Ex. When the sequence scan time of the master station is 5ms, the link scan time is 1.2ms, and the input response time of the remote station is 1.5ms:

$$SM \times 2 + (2 - n)^{*1} \times LS + \text{Input response time of remote station (ms)}$$

$$= 5 \times 2 + (2 - 4)^{*1} \times 1.2 + 1.5 \quad [n = 4 \text{ (} 5/1.2 = 4.16\dots, \text{ Round off the calculated value to the nearest integer.)}]$$

$$= 11.5 \text{ [ms]}$$

(2) Master station → Remote station (Output)

The following formula calculates the time after the CPU module device (Y) is turned on (off) until a remote station output turns on (off).

[Calculation formula]

$$SM + LS \times 2 + \text{Output response time of remote station (ms)}$$

SM: Sequence scan time of master station

LS: Link scan time (☞ Page 39, Section 3.7.1)

Ex. When the sequence scan time of the master station is 5ms, the link scan time is 1.2ms, and the output response time of the remote station is 0.5ms:

$$SM + LS \times 2 + \text{Output response time of remote station (ms)}$$

$$= 5 + 1.2 \times 2 + 0.5$$

$$= 7.9 \text{ [ms]}$$

3.7.3 Automatic return time

The automatic return time is the time taken for a module recovered from an error to automatically restart data link.

[Calculation formula]

$37401 + A + B + C + LS$ [μ s]

A: Constant

B: Constant

C: Constant

LS: Link scan time (☞ Page 39, Section 3.7.1)

Transmission speed		2.5Mbps	625kbps	156kbps
A		274526.4	458605.6	1157823.07
B		$22.4 \times N$	$81.6 \times N$	$300.8 \times N$
C	4-point mode	$19.2 + (1.6 \times N)$	$76.8 + (6.4 \times N)$	$307.69 + (25.64 \times N)$
	8-point mode	$19.2 + (3.2 \times N)$	$76.8 + (12.8 \times N)$	$307.69 + (51.28 \times N)$
	16-point mode	$19.2 + (6.4 \times N)$	$76.8 + (25.6 \times N)$	$307.69 + (102.56 \times N)$

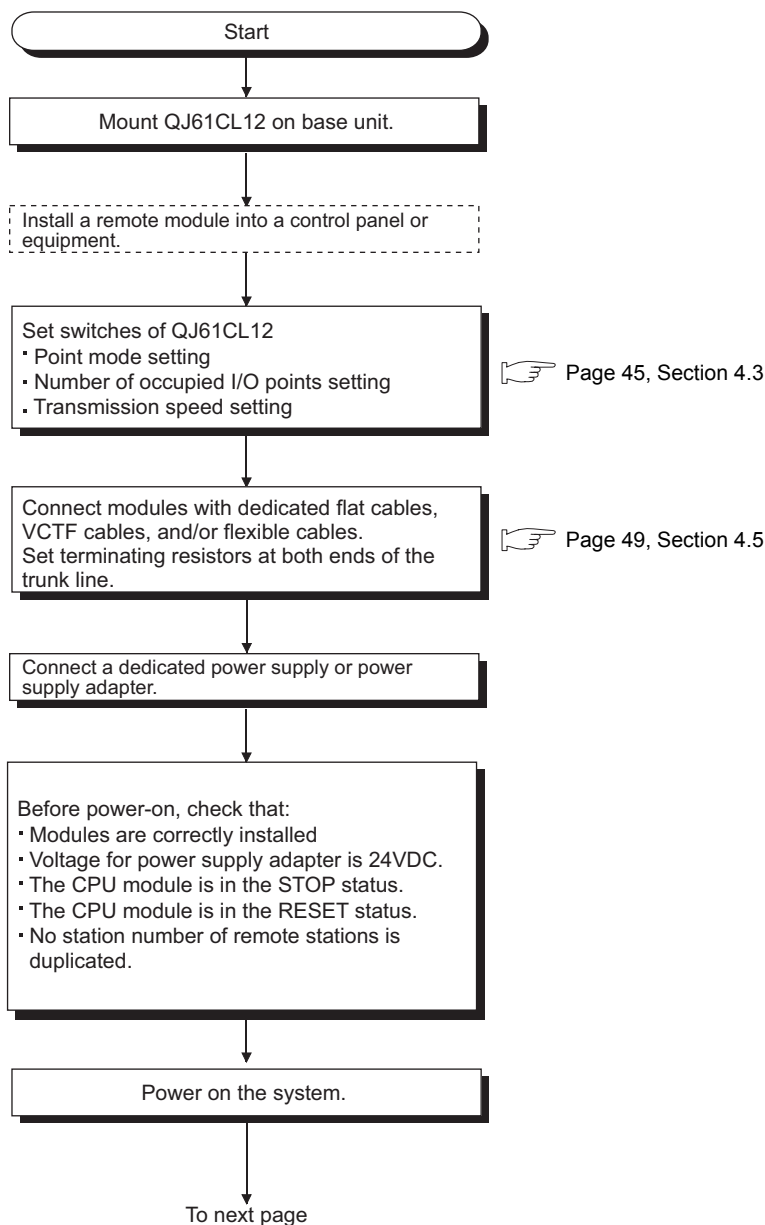
N: Last station number

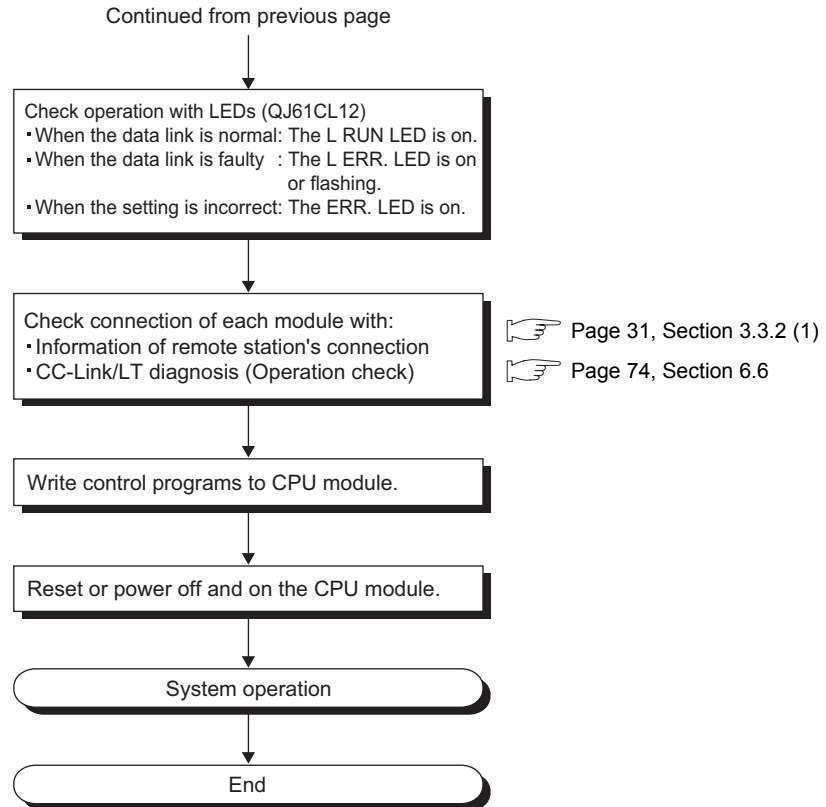
CHAPTER 4 PROCEDURE BEFORE OPERATION

This chapter describes a procedure from module installation to a data link start.

4.1 Procedure Before Operation

The following steps should be performed for data link of the CC-Link/LT.





Point


- If remote station numbers are duplicated, the duplicating stations may cause malfunction (incorrect input/ output). Check that the remote station numbers are not duplicated before powering on the system.
- A remote station may occupy multiple station numbers depending on the point mode setting and the number of I/O points of the remote station.
When using a remote station having the number of I/O points of eight or more, check that the station number of the remote station is not duplicated with that of the next station.
- When changing the setting of the operation setting switch of the master station or a remote station while the system is on, power off and on the system.

4.2 Installation

This section describes handling precautions on the steps from the unpacking to the installation of the QJ61CL12.

(1) Setting method

For details on the implementation of the module, refer to the following.

 QCPU User's Manual (Hardware Design, Maintenance and Inspection)

(2) Handling precautions

- Do not drop or apply strong shock to the module case since it is made from resin.
- Do not remove the printed-circuit board of the module from the case. Doing so may cause failure.
- Prevent foreign matter such as dust or wire chips from entering the module. If such matter is entered, remove it.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
Do not remove the film during wiring.
Remove it for heat dissipation before system operation.
- Tighten the screws such as module fixing screws within the following range.

Screws	Tightening torque range
Module fixing screws (M3 screws)*1	0.36 to 0.48 N•m

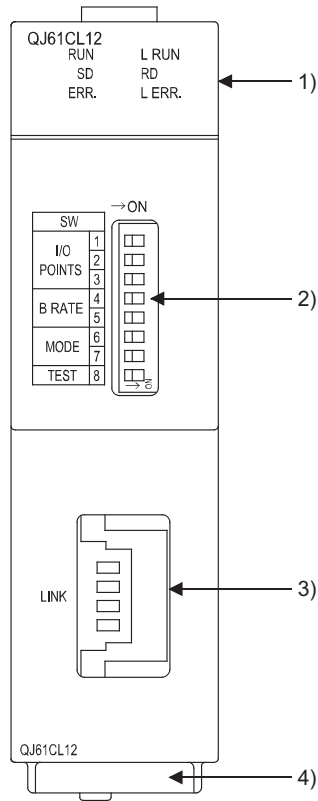
*1 The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

Point

When removing the terminating resistor due to any system modification, be sure to power off the system. Removing/Installing the terminating resistor with the power on may cause malfunctions (faulty input/output).

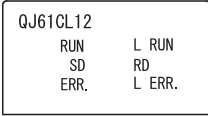
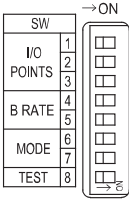
4.3 Part Names

This section describes the names of the parts, LED indications and setting methods of the switches.



4

4.3 Part Names

No.	Name	Description																																																																																																																											
1)	LED indicator 	An indicator to check the module status																																																																																																																											
		LED	Description																																																																																																																										
		RUN	ON: Normal module operation OFF: Hardware failure																																																																																																																										
		ERR.	ON: Incorrect switch setting Flashing: Switch setting changed during operation																																																																																																																										
		L RUN	<Normal operation> ON: Data link being executed OFF: Data link stopped <In test mode> ON: Normal self-loopback test OFF: Self-loopback test error																																																																																																																										
		L ERR.	<Normal operation> ON: Data link faulty station or station outside control range detected Flashing: Data link error in all stations <In test mode> ON: Self-loopback test error OFF: Normal self-loopback test																																																																																																																										
		SD	ON: Data being sent																																																																																																																										
	RD	ON: Data being received																																																																																																																											
2)	Operation setting switch 	A switch to configure settings including the number of occupied I/O points, the transmission speed, and the point mode of the QJ61CL12 (default: OFF)																																																																																																																											
		<table border="1"> <thead> <tr> <th colspan="2"></th> <th>Number of occupied I/O points</th> <th>16 pts.</th> <th>32 pts.</th> <th>48 pts.</th> <th>64 pts.</th> <th>128 pts.</th> <th>256 pts.</th> <th>512 pts.</th> <th>1024 pts.</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1</td> <td rowspan="3">I/O POINTS</td> <td>1</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>2</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> </tr> <tr> <td>3</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> </tr> <tr> <td colspan="2">Transmission speed setting</td> <td></td> <td colspan="2">156kbps</td> <td colspan="2">625kbps</td> <td colspan="2">2.5Mbps</td> <td colspan="2">Setting prohibited^{*1}</td> </tr> <tr> <td rowspan="2">4</td> <td rowspan="2">B RATE</td> <td>4</td> <td colspan="2">OFF</td> <td colspan="2">ON</td> <td colspan="2">OFF</td> <td colspan="2">ON</td> </tr> <tr> <td>5</td> <td colspan="2">OFF</td> <td colspan="2">OFF</td> <td colspan="2">ON</td> <td colspan="2">ON</td> </tr> <tr> <td colspan="2">Point mode setting</td> <td></td> <td colspan="2">8-point mode</td> <td colspan="2">4-point mode</td> <td colspan="2">16-point mode</td> <td colspan="2">Setting prohibited^{*1}</td> </tr> <tr> <td rowspan="2">6</td> <td rowspan="2">MODE</td> <td>6</td> <td colspan="2">OFF</td> <td colspan="2">ON</td> <td colspan="2">OFF</td> <td colspan="2">ON</td> </tr> <tr> <td>7</td> <td colspan="2">OFF</td> <td colspan="2">OFF</td> <td colspan="2">ON</td> <td colspan="2">ON</td> </tr> <tr> <td colspan="2">Test mode</td> <td></td> <td colspan="9"></td> </tr> <tr> <td>8</td> <td>TEST</td> <td colspan="9">OFF: ONLINE (Normal operation) ON : TEST mode (Self-loopback test)</td> </tr> </tbody> </table> <p>^{*1} When the switch is set to "Setting prohibited", the ERR. LED turns on.</p>			Number of occupied I/O points	16 pts.	32 pts.	48 pts.	64 pts.	128 pts.	256 pts.	512 pts.	1024 pts.	1	I/O POINTS	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	Transmission speed setting			156kbps		625kbps		2.5Mbps		Setting prohibited ^{*1}		4	B RATE	4	OFF		ON		OFF		ON		5	OFF		OFF		ON		ON		Point mode setting			8-point mode		4-point mode		16-point mode		Setting prohibited ^{*1}		6	MODE	6	OFF		ON		OFF		ON		7	OFF		OFF		ON		ON		Test mode												8	TEST	OFF: ONLINE (Normal operation) ON : TEST mode (Self-loopback test)						
		Number of occupied I/O points	16 pts.	32 pts.	48 pts.	64 pts.	128 pts.	256 pts.	512 pts.	1024 pts.																																																																																																																			
1	I/O POINTS	1	OFF	ON	OFF	ON	OFF	ON	OFF	ON																																																																																																																			
		2	OFF	OFF	ON	ON	OFF	OFF	ON	ON																																																																																																																			
		3	OFF	OFF	OFF	OFF	ON	ON	ON	ON																																																																																																																			
Transmission speed setting			156kbps		625kbps		2.5Mbps		Setting prohibited ^{*1}																																																																																																																				
4	B RATE	4	OFF		ON		OFF		ON																																																																																																																				
		5	OFF		OFF		ON		ON																																																																																																																				
Point mode setting			8-point mode		4-point mode		16-point mode		Setting prohibited ^{*1}																																																																																																																				
6	MODE	6	OFF		ON		OFF		ON																																																																																																																				
		7	OFF		OFF		ON		ON																																																																																																																				
Test mode																																																																																																																													
8	TEST	OFF: ONLINE (Normal operation) ON : TEST mode (Self-loopback test)																																																																																																																											
3)	CC-Link/LT interface connector	A connector to connect a communication cable in a CC-Link/LT system																																																																																																																											
4)	Serial number display	Indicates the serial No. of the QJ61CL12.																																																																																																																											



The setting of the operation setting switch is enabled when the QJ61CL12 is powered off and on or the CPU module is reset. If the setting is changed while the module is on, the ERR. LED starts flashing. (Page 67, Section 6.3.3)

4.4 Switch Setting of Intelligent Function Module

The switch setting of the intelligent function module is performed in "I/O assignment settings" of GX Developer.

(1) Setting Item

Set the intelligent function module switches in 16-bit data.

When the switches are not set, Switch 1 is set to "0" (default), and data link is performed among stations within the range of the number of connectable stations.

Intelligent function module switch	Setting item	
Switch 1	Last station number setting	Set the last station number among stations that perform data link. This setting disables data link with unconnected stations, reducing link refresh time. (☞ Page 38, Section 3.5) When a station number exceeding the number of connectable stations (☞ Page 35, Section 3.4 (2)) is set, the setting is ignored. <Setting range> 1 to 64 When 0 or more than 64 is set, data link is performed among stations within the number of connectable stations.
Switch 2	No setting (blank)	
Switch 3	No setting (blank)	
Switch 4	No setting (blank)	
Switch 5	No setting (blank)	

Point

Do not set Switch 2 through Switch 5. Doing so may result in malfunction.

(2) Operating procedure

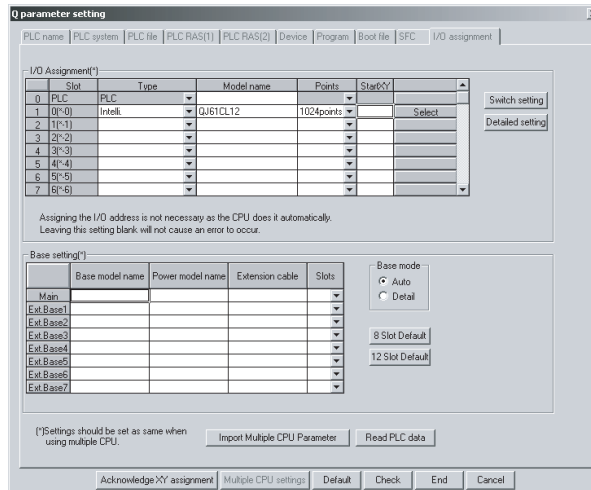
Start settings on the I/O assignment setting window of GX developer.

 [Parameter] ⇨ [PLC Parameter] ⇨ [I/O Assignment]

(a) I/O assignment setting window

Set the following to the slot where QJ61CL12 is installed.

The "Type" setting is indispensable; set other items as needed.



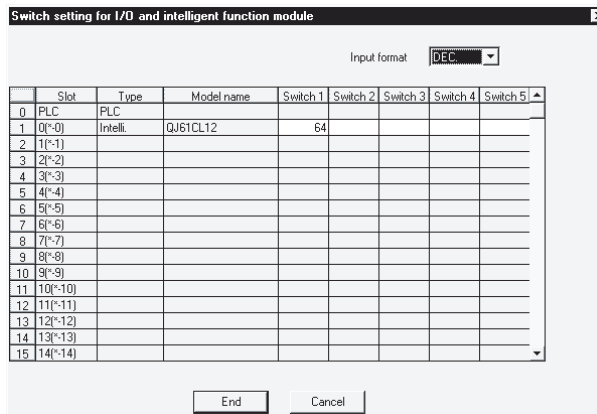
Item	Description
Type	Select "Intelli".
Model	Enter the model name of the module.
Points	Select the number of occupied I/O points.
Start XY	Enter the start I/O number of QJ61CL12.
Detailed setting	Specify the control CPU of QJ61CL12. Because "Error time output mode" or "H/W error time Programmable controller operation mode" are invalid for QJ61CL12, these settings are not required.

(b) Intelligent function module switch setting window

Open the following window to set "Switch 1".

 [I/O Assignment] ⇨ **Switch Setting** button

The setting can easily be made if the value is entered in decimal. Change the entry format to decimal notation.



4.5 Connecting Modules Using Connection Cables

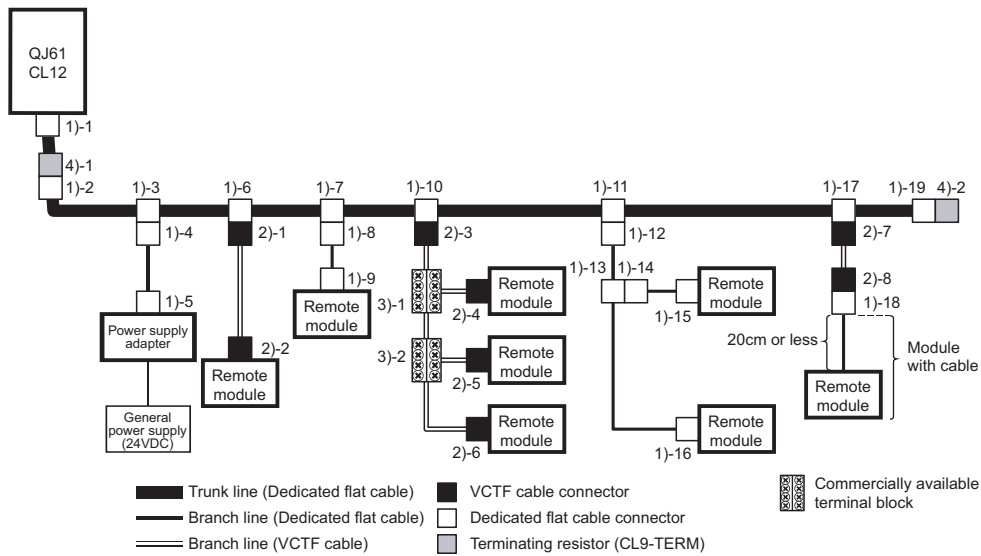
This section describes how to connect modules using connection cables in a CC-Link/LT system.

- The cables can be wired regardless of station number order.
- Install the QJ61CL12 on either end of the trunk line.
Connect a terminating resistor on the QJ61CL12 side within 20cm from the module.
- Connect terminating resistors to the both ends of the trunk line in a CC-Link/LT system.
- For contact information on connection cables, connectors, and terminating resistors, visit:
CC-Link Partner Association website: <http://www.cc-link.org/>

Point

Calculate the number of required connectors with reference to the following example.

Ex. When using a dedicated flat cable for a trunk line and VCTF cables for branch lines



The number of required connectors are as follows:

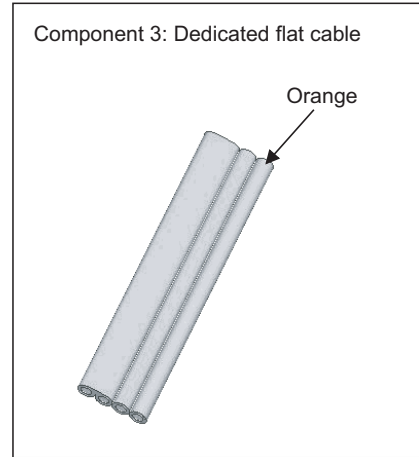
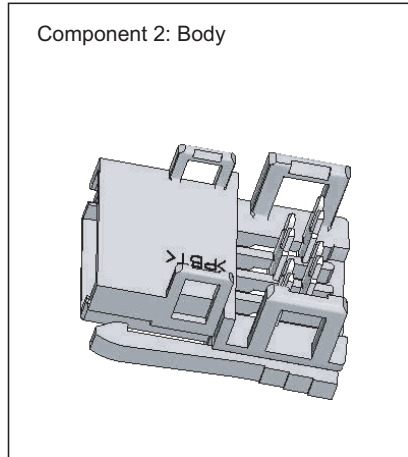
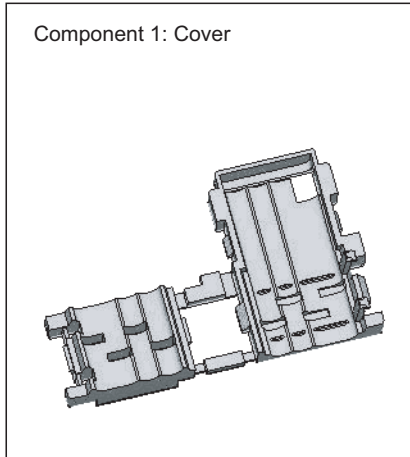
- 1) Dedicated flat cable connectors (number of □): 19 (1)-1 to 1)-19)
- 2) VCTF cable connectors (number of ■): 8 (2)-1 to 2)-8)
- 3) Terminal blocks (number of ⊞): 2 (3)-1 and 3)-2)
- 4) Terminating resistors (number of ▣): 2 (4)-1 and 4)-2)

4.5.1 Connecting a dedicated flat cable connector

This section describes how to connect a dedicated flat cable connector.

(1) Components

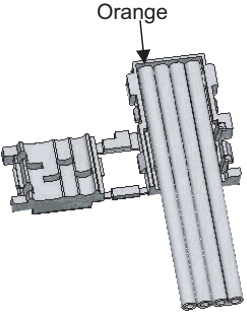
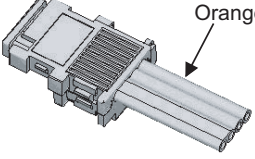
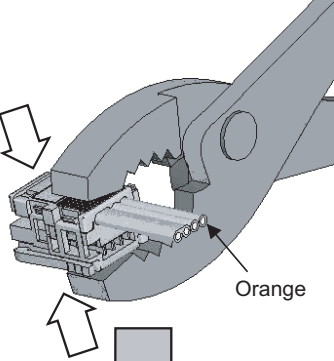
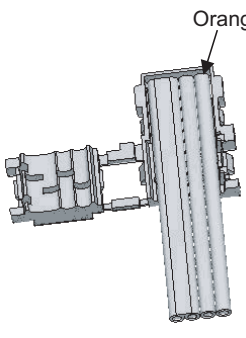

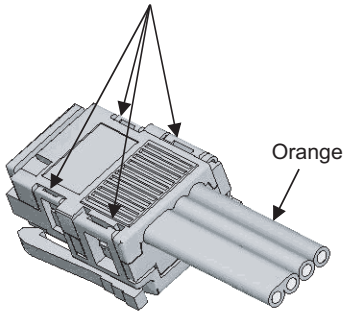
The components are shown below.



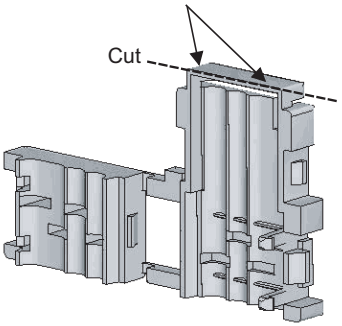
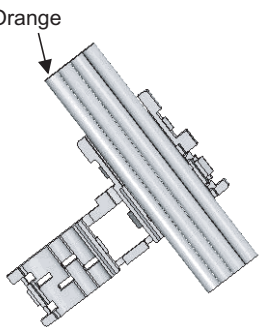
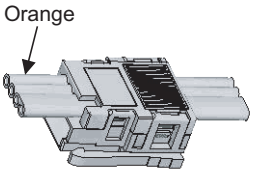
(2) Procedures

The procedures are as illustrated below.

(a) Processing cable end

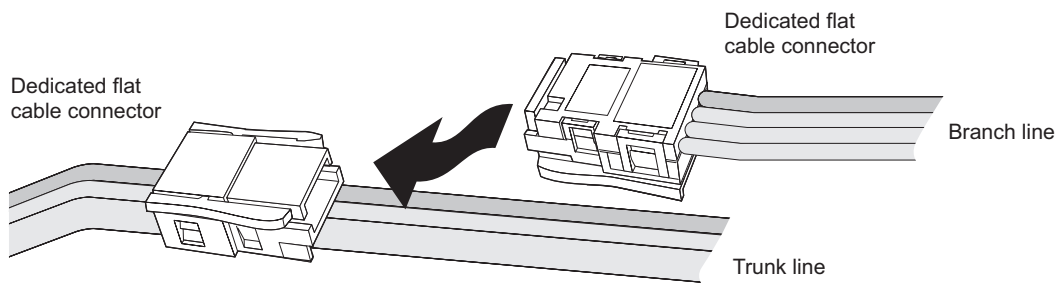
<p>1) Correctly place the end of the dedicated flat cable in the cover. (Check that the position of the orange part is correct.)</p> 	<p>2) Close the cover so that the flat cable may be held between both sides of the cover.</p> 	<p>3) Assemble the cover with the body and press them using pliers.</p> 
<p>Note 1) This orientation is incorrect.</p> 	<p>Note 2) If the orange part is visible through the notch window on the front cover, open the cover and correct the wiring.</p> 	<p>4) Check that all of four latches are engaged. Press-fitting is completed.</p> 

(b) Processing for T-branch connection

<p>5) Cut the cover edge at the two roots using a nipper and remove the edge.</p> 	<p>6) Attach the cover to the part from where T-branch connection is to be built.</p> 	<p>7) Follow the steps 3) and 4) shown above.</p> 
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(c) Building T-branch connection

8) Connect dedicated flat cable connectors from where T-branch connection is to be built as illustrated below.

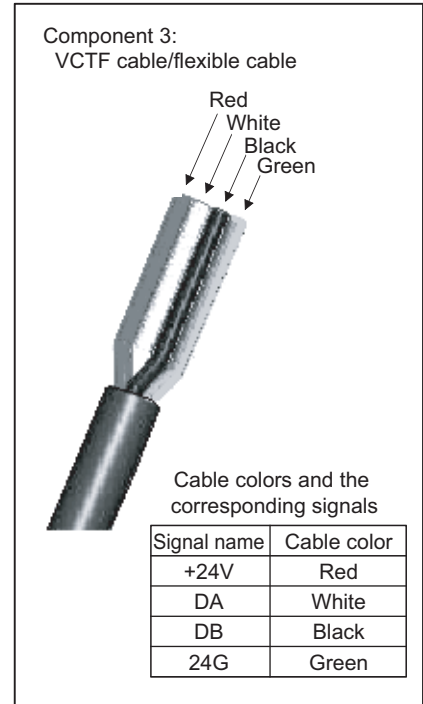
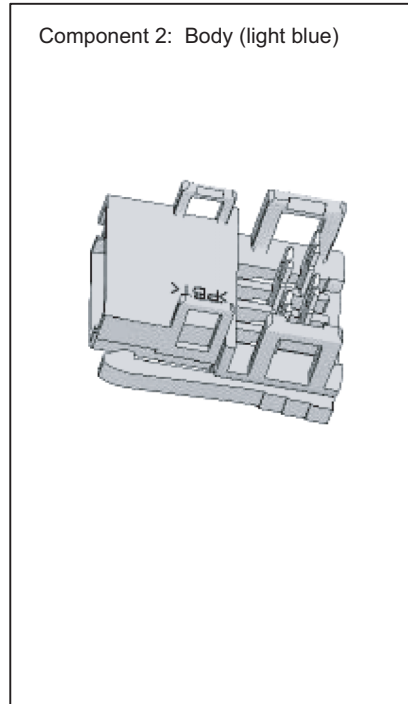
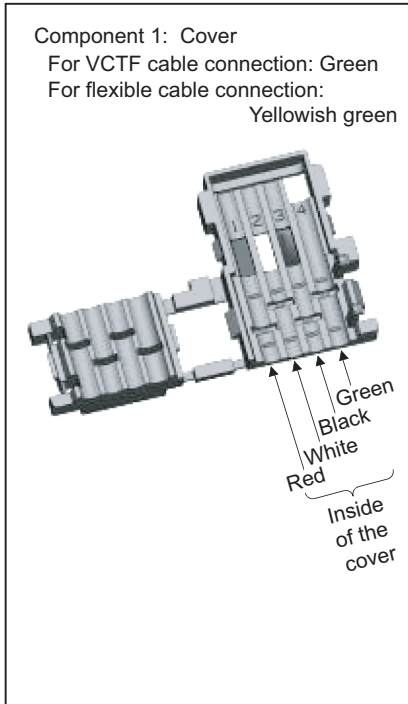


4.5.2 Connecting a VCTF cable connector/flexible cable connector

This section describes how to connect a VCTF cable connector/flexible cable connector.

(1) Components

The components are shown below.

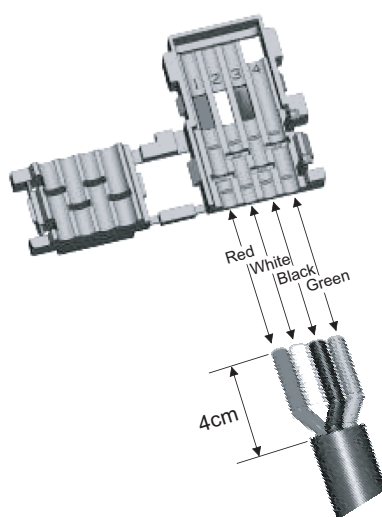


(2) Procedures

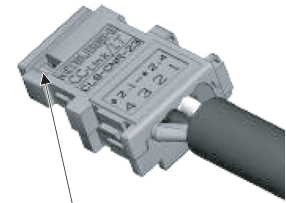
The procedures are as illustrated below.

(a) Processing cable end

1) Place each wire end of the VCTF cable/flexible cable on the guide having the same color as the wire.

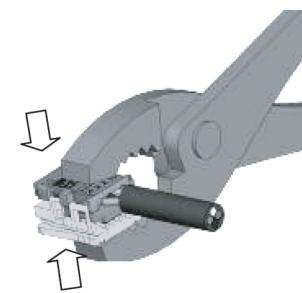


2) Close the cover so that the VCTF cable/flexible cable may be held between both sides of the cover. When the wiring is correct, the green wire is visible through the notch window. If a red, white, or black wire is visible through the window, open the cover and correct the wiring. Incorrect wiring may cause failure of the module.

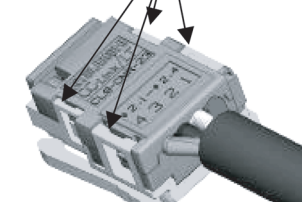


Green: Correct wiring
Red, white, or black: Incorrect wiring

3) Assemble the cover with the body and press them using pliers.



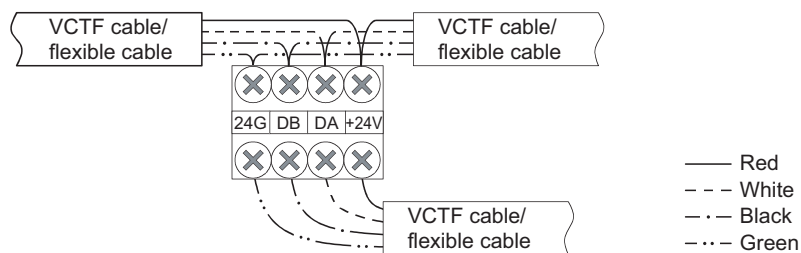
4) Check that all of four latches are engaged. Press-fitting is completed.



(b) Building T-branch connection (VCTF cable/flexible cable)

5)-1 When using a terminal block for T-branch connection

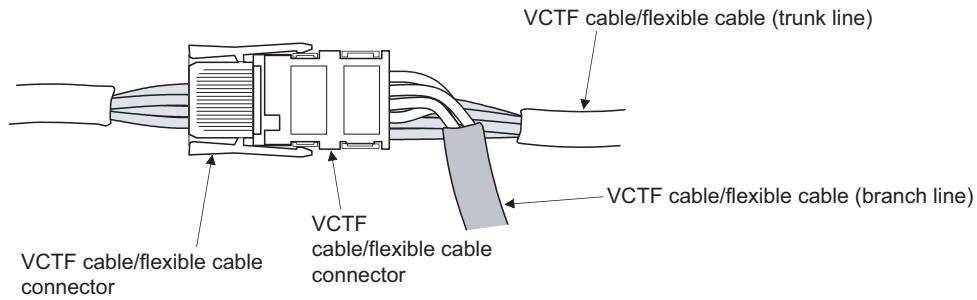
When connecting a VCTF cable/flexible cable to a terminal block, connect the wires so that the wire colors match with the corresponding terminals.*1



*1 When connecting a dedicated flat cable to a terminal block (e.g. Using a VCTF cable for the trunk line and dedicated flat cables for branch lines), match "+24V", "DA", "DB", and "24G" printed on the dedicated flat cable with the corresponding colors of the VCTF cable (flexible cable) as shown in the table to right. Split the dedicated flat cable so that "+24V", "DA", "DB", and "24G" cables may be independent.

Dedicated flat cable	VCTF cable/flexible cable color
+24V	Red
DA	White
DB	Black
24G	Green

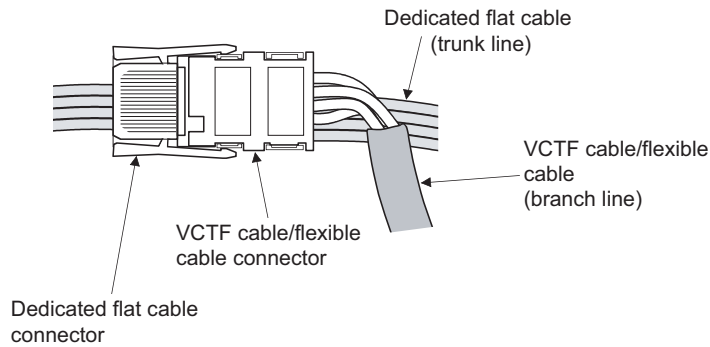
5)-2 When using a connector for T-branch connection
 After removing the sheath by 7cm or more, branch the cable using a connector in the same way as the T-branch connection method for a dedicated flat cable.



(c) Building T-branch connection

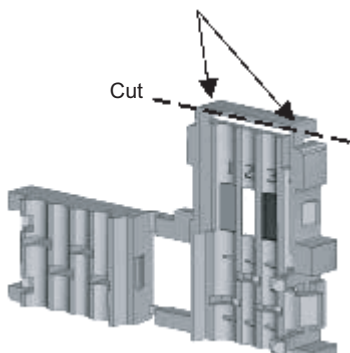
(Trunk line: Dedicated flat cable, branch line: VCTF cable/flexible cable)

6) Branch the cable using a connector in the same way as the T-branch connection method for a dedicated flat cable.

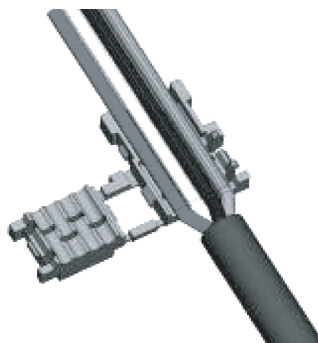


(d) Processing the VCTF cable connector/flexible cable connector (for terminating resistor)

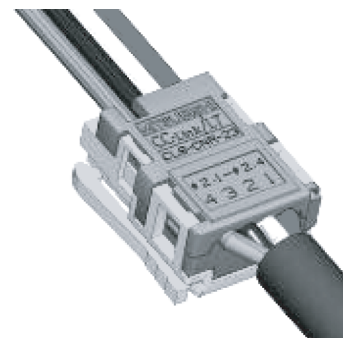
7) Cut the cover edge at the two roots using a nipper and remove the edge.



8) Place the cover at the point where the terminating resistor is to be connected.



9) Follow the steps (a) 3) and 4).



(3) Precautions for use of flexible cables

Prevent an excessive load from being applied to the connector when moving flexible cables.

4.5.3 Using cables of different types together

This section describes use of cables of different types.

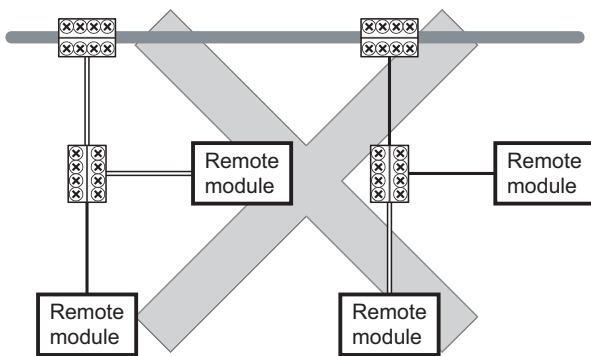
(1) Trunk line

Cables of different types cannot be used together.

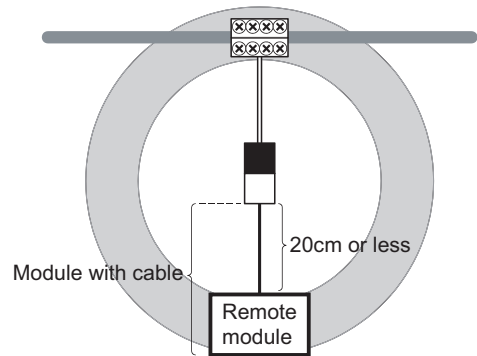
(2) Branch line

Cable types can be different only if the cables are used on different branches.

When a module with cable (e.g. CL1Y2-T1D2S) is used, however, cables of different types can be used together by shortening the length of the dedicated flat cable to 20cm or less. (Refer to the figures below.)

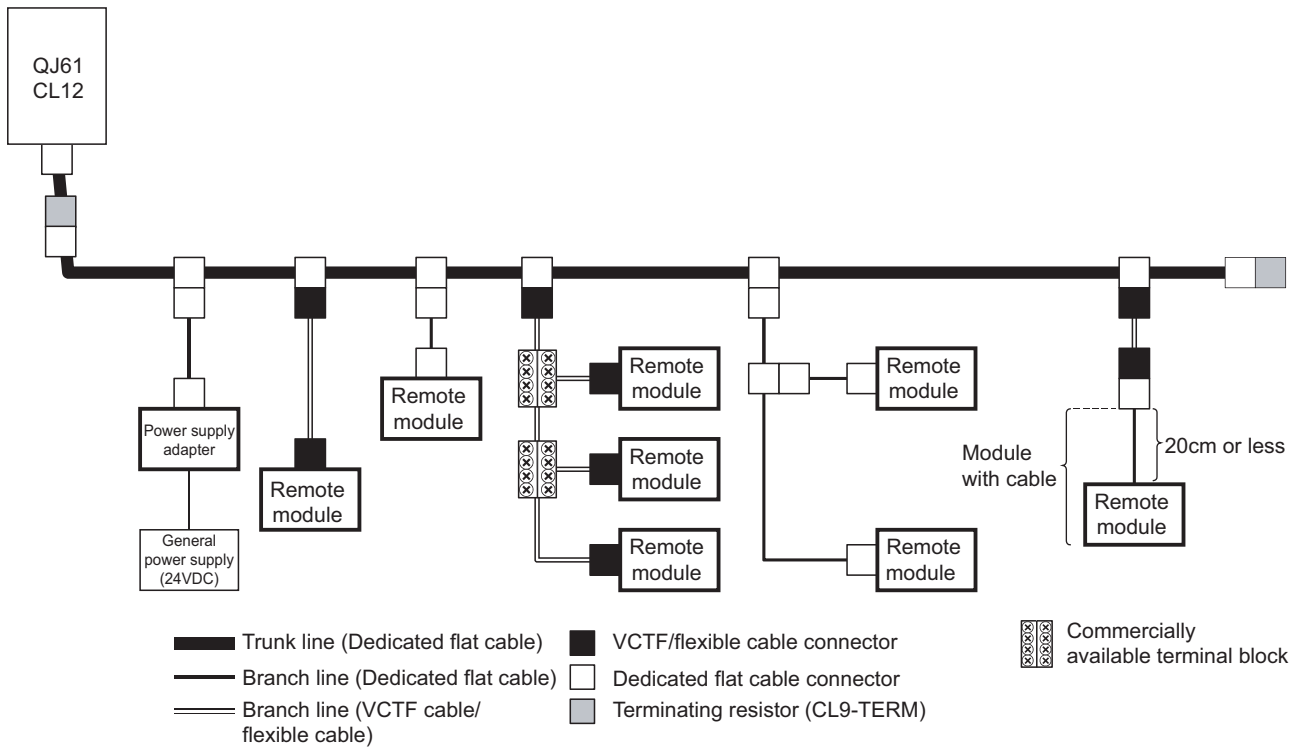


— Trunk line (VCTF cable)
— Branch cable (Dedicated flat cable)
— Branch cable (VCTF cable)

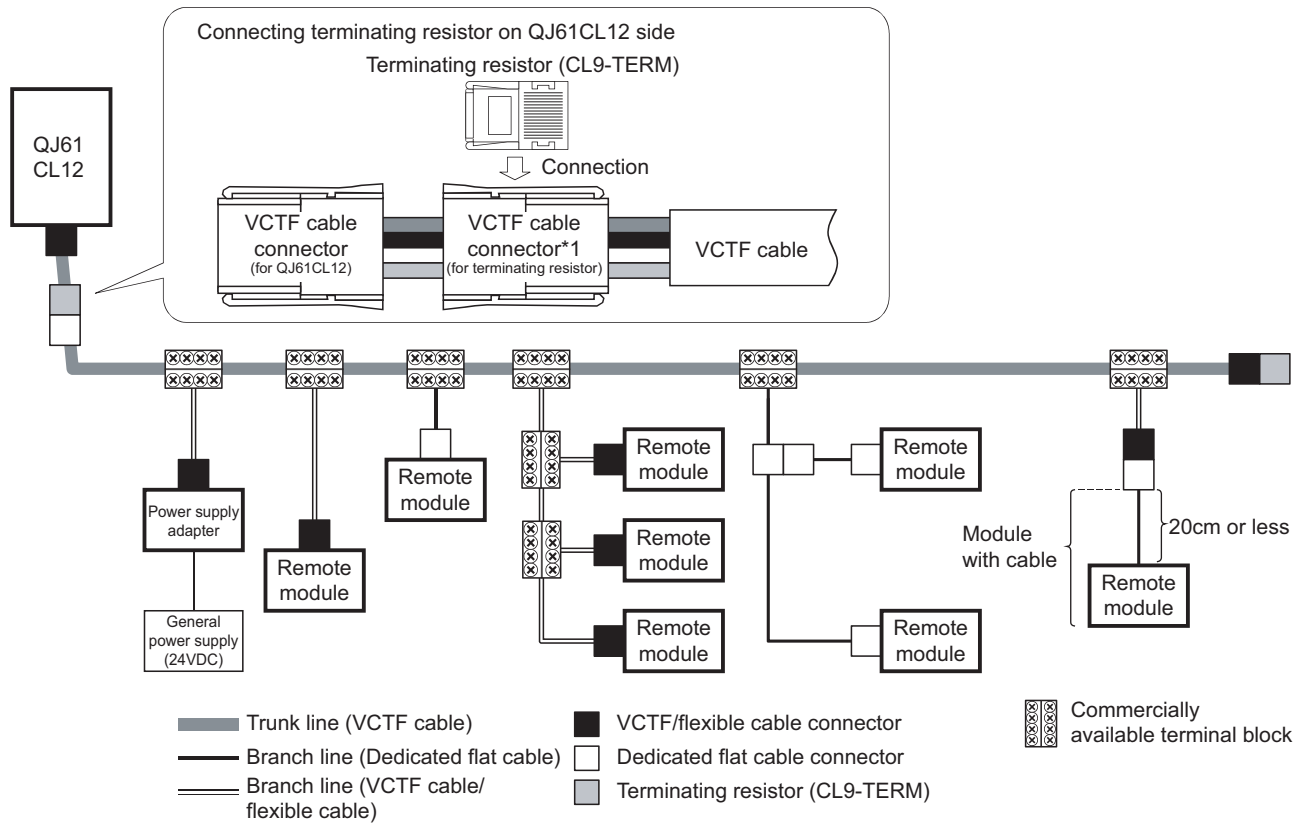


— Trunk line (VCTF cable)
— Branch cable (Dedicated flat cable)
— Branch cable (VCTF cable)

(3) System configuration example of when a dedicated flat cable is used for the trunk line



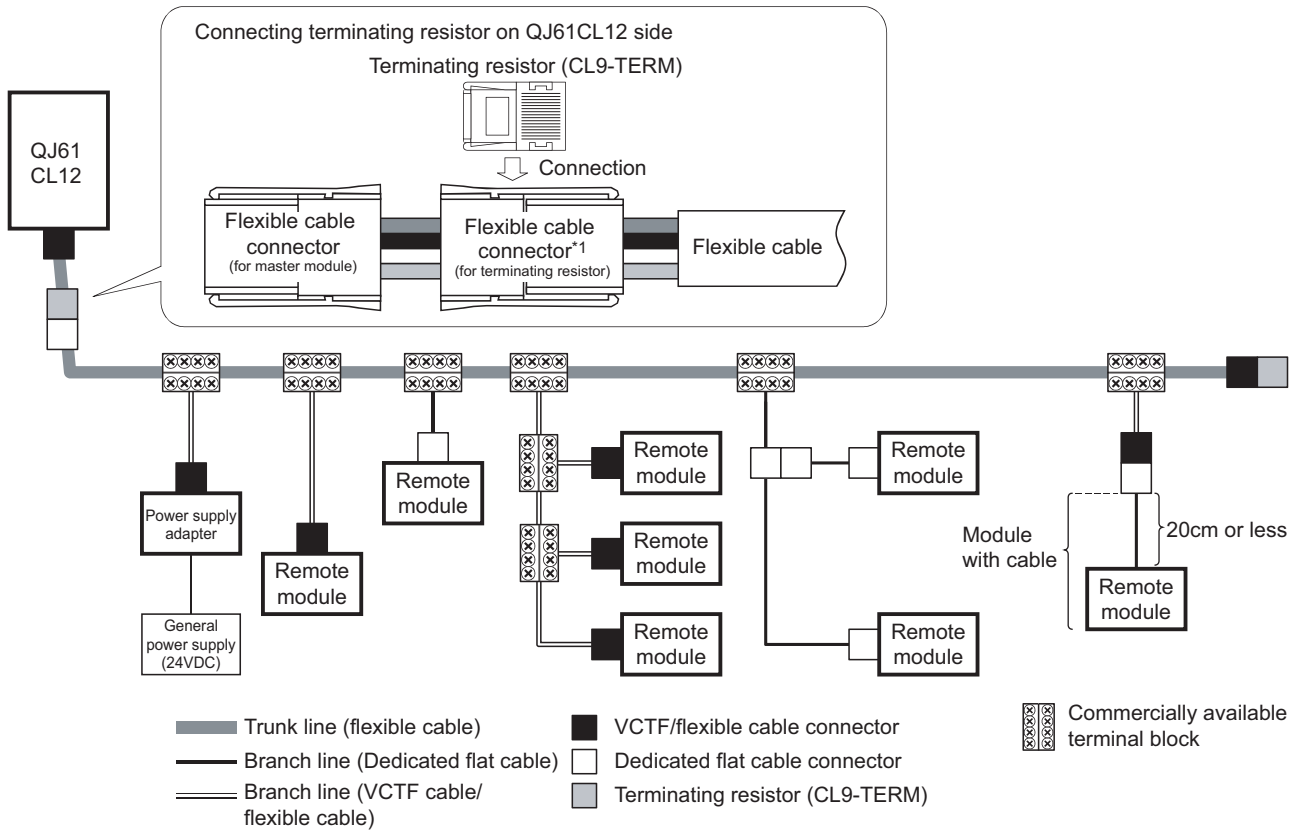
(4) System configuration example of when a VCTF cable is used for the trunk line



*1 For a processing procedure for the VCTF cable connector (for terminating resistor), see Page 53, Section 4.5.2.

4.5 Connecting Modules Using Connection Cables
4.5.3 Using cables of different types together

(5) System configuration example of when a flexible cable is used for the trunk line



*1 For a processing procedure for the flexible cable connector (for terminating resistor), Page 53, Section 4.5.2.

4.5.4 Connecting terminating resistors

Use the CL9-TERM (gray) for the terminating resistors.

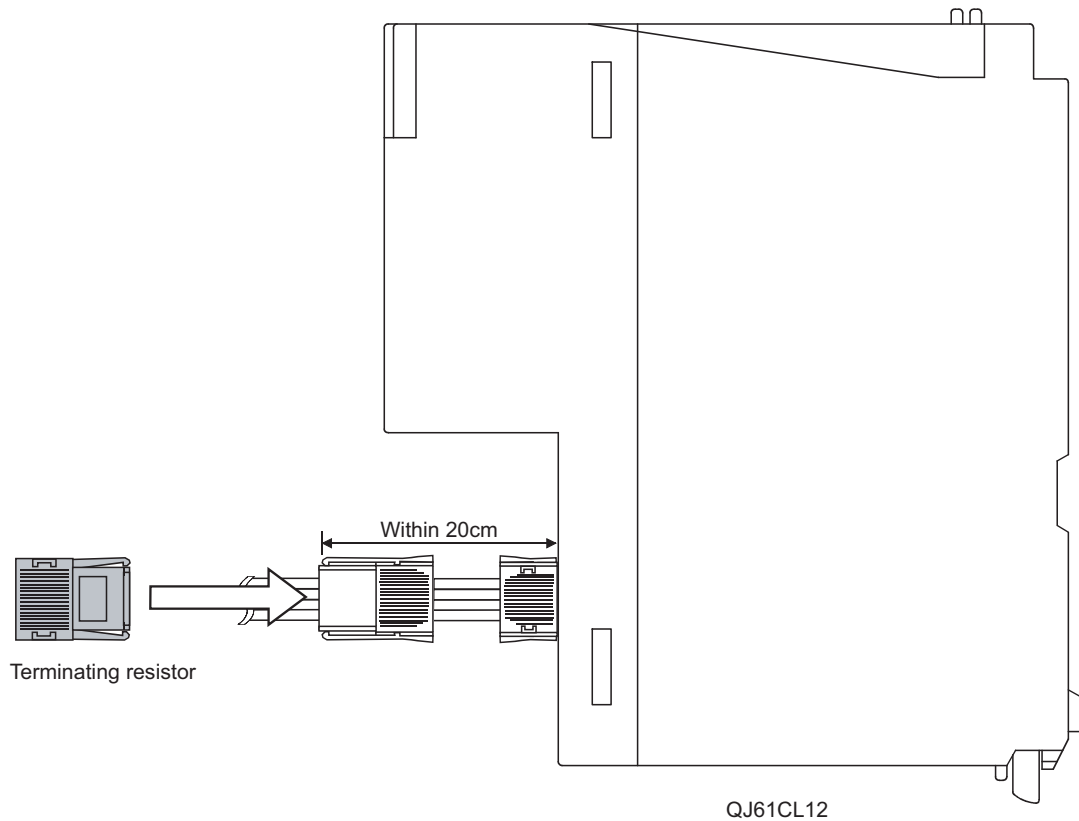
For a system configuration using dedicated flat cables only, the CL9-RYVK (black) can also be used.

Note that terminating resistors of the same model must be used for both ends of the trunk line.

(1) Connecting a terminating resistor on the QJ61CL12 side

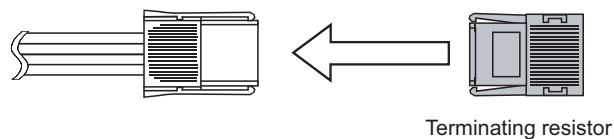
The following figure illustrates how to connect a terminating resistor.

Connect the terminating resistor within 20cm from the QJ61CL12.



(2) Connecting a terminating resistor on the end of the trunk line

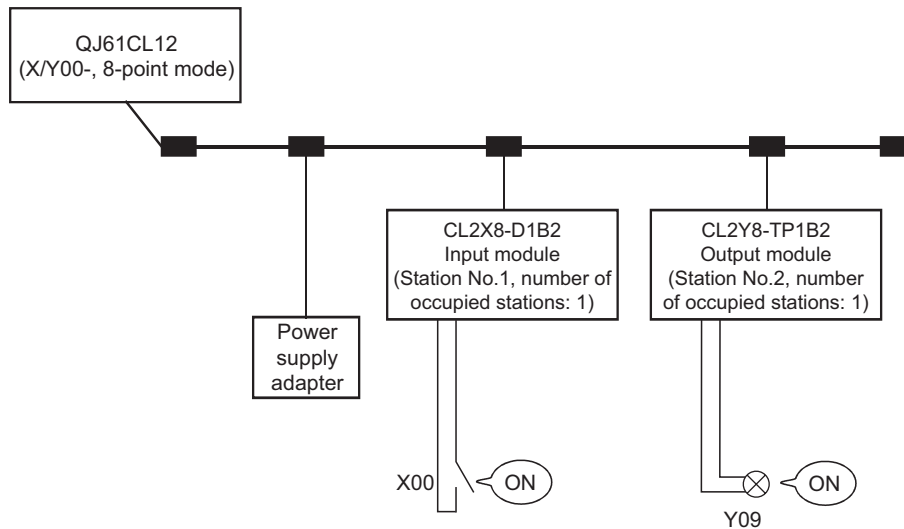
The following figure illustrates how to connect a terminating resistor to the opposite end of the QJ61CL12.



4.5.5 Checking wiring

Check wiring between remote I/O stations and external devices.

Ex. For the QJ61CL12, the start I/O number is set to X/Y00 and the point mode is set to 8-point mode.



(a) Checking wiring between the input module and the external device

1. Turn on the switch corresponding to X00 of the external device connected to the input module on station No. 1.
2. Open the setting window in GX Developer.

[Online] ⇨ [Monitor] ⇨ [Device batch]

3. Set "X00" to [Device].
4. Click the button.

If "X00" is on, it means that the input module and the external device are normally linked.

(b) Checking wiring between the output module and the external device

1. Open the setting window in GX Developer.

[Online] ⇨ [Debug] ⇨ [Device test]

2. Set "Y09" to [Device] of [Bit Device].
3. Click the button.

If the output module and the external device are correctly linked, the lamp corresponding to "Y09" will light up.

4.6 Installing/Removing a Remote Station

A remote station on CC-Link/LT cannot be installed or removed while the CPU module is in the RUN status.

Install or remove a remote station in either of the following status:

- The system is powered off.
- The CPU module is in the STOP status.

Point

- If a remote station is installed/removed while the CPU module is in the RUN status, it may cause system failure or incorrect input/output.
 - When a remote station is installed while the CPU module is in the STOP status, whether the remote station performs data link or not can be checked by any of the following operations:
 - Execute CC-Link/LT diagnostics.
 - Check that the bit of Remote station connection information (buffer memory address: 0 to 3 (Un/G0 to 3)) corresponding to the remote station is on.
 - Check that the PW LED and L RUN LED of the remote station are on.
-

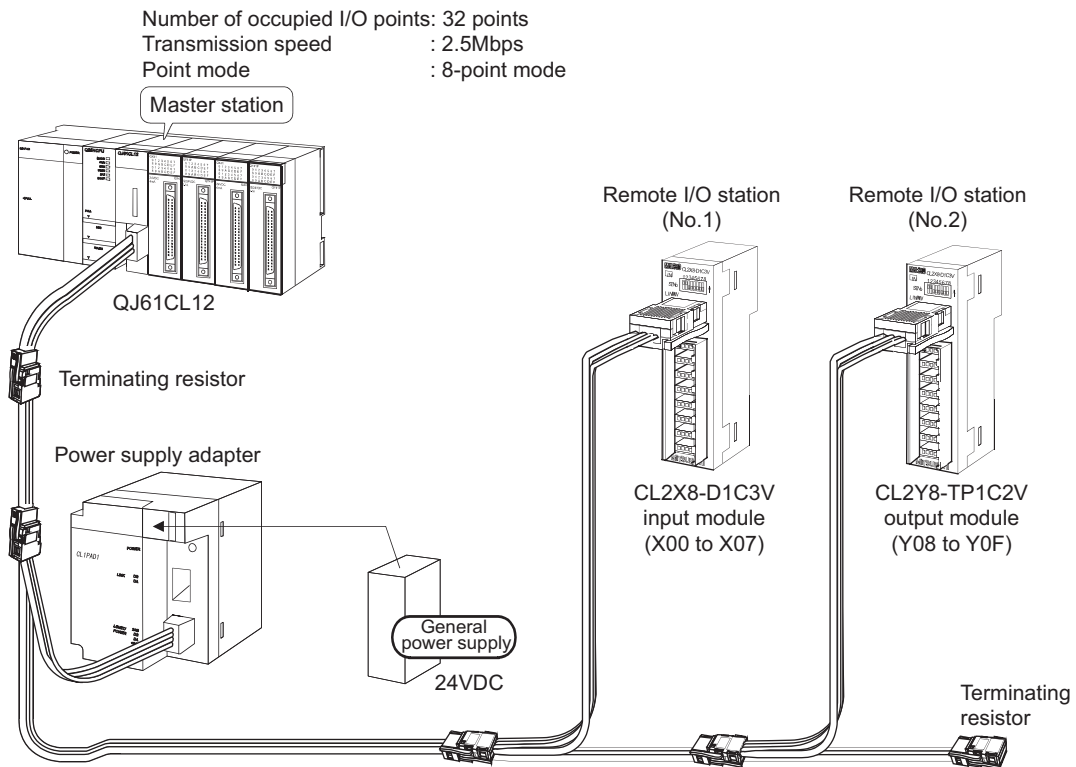
CHAPTER 5 PROGRAMMING

This section describes the programming of the QJ61CL12.

When applying the program example introduced in this chapter to an actual system, ensure the applicability and confirm that it will not cause system control problems.

5.1 System Configuration Example

The system in which two remote I/O stations are connected is used as an example in this section.



CHAPTER 6 TROUBLESHOOTING

This chapter describes troubleshooting of CC-Link/LT.

6.1 Station Status if an Error Occurs

The following table lists station status if an error occurs.

Data link status	Master station		Remote station	
	Remote input	Remote output	Input	Output
The CPU module on the master station is faulty and stopped (data link stopped).	Maintained	Maintained	Continued ^{*1}	Maintained/OFF ^{*2}
A remote station is faulty due to an error such as data link error (data link continued).	Input data from the faulty remote station are cleared.	Continued	Continued ^{*1}	Maintained/OFF ^{*2}
Power of a remote station is shut off (data link continued).	Input data from the de-energized remote station are cleared.	Continued	Depends on external signals.	All OFF

*1 Although external data are input (The input LED turns on.), the data are not sent to the master station.


*2 The status depends on the output hold setting of the remote station.

6.2 Visual Check

Check the following:


(1) Checking LEDs of the master station

Check that no error occurs in the module using LEDs by the following procedure.

For LED indication and module status,  Page 45, Section 4.3.


1. Power on the system and check the RUN LED of the master station.

If the RUN LED does not turn on, troubleshoot with reference to the following.

 Page 66, Section 6.3.1


2. Check the L RUN LED of the master station.

If the L RUN LED of the master station does not turn on, troubleshoot with reference to the following.

 Page 66, Section 6.3.2


3. Check the ERR. LED of the master station.

If the ERR. LED of the master station is on or flashing, troubleshoot with reference to the following.

 Page 67, Section 6.3.3

4. Check the L ERR. LED of the master station.


If the L ERR. LED of the master station is on or flashing, troubleshoot with reference to the following.

 Page 68, Section 6.3.4

(2) Checking LEDs of a remote I/O station


Check that no error occurs in a remote I/O station using LEDs by the following procedure.

For troubleshooting of a remote device station, refer to the following.

 User's manual for the remote device station used


1. Check the PW LED of the remote I/O station.

If the PW LED of the remote I/O station does not turn on, troubleshoot with reference to the following.

 Page 70, Section 6.4.1


2. Check the L RUN LED of the remote I/O station.

If the L RUN LED of the remote I/O station does not turn on, troubleshoot with reference to the following.


 Page 71, Section 6.4.2

3. Check the L ERR. LED of the remote I/O station.

If the L ERR. LED of the remote I/O station is on or flashing, troubleshoot with reference to the following.

 Page 71, Section 6.4.3

(3) Checking communication cables and wiring


Check that no error occurs in the communication cables, the connectors and terminating resistors are securely connected, and the system is correctly wired. ( Page 49, Section 4.5)

6.3 Troubleshooting of the Master Station

The troubleshooting procedures for the master station are shown according to the LED status.

6.3.1 The RUN LED does not turn on



Check the following.

Check item	Action
The module is incorrectly mounted.	Remove the module and mount it again.
The internal current consumption of the entire system exceeds the rated output current of the power supply module.	Change the system configuration so that the internal current consumption may be within the rated output current. For how to calculate current consumption of the entire system, refer to the following.  QCPU User's Manual (Hardware Design, Maintenance and Inspection)

If the RUN LED does not turn on even after the above actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.3.2 The L RUN LED does not turn on

Check the following.

Check item	Action
The CPU module has just exited from reset status.	It takes time for the L RUN LED to turn on after the CPU module exits from reset status. Wait for a while.
The test mode switch is on.	<ul style="list-style-type: none"> When the L ERR. LED is on, troubleshoot with reference to the following.  Page 68, Section 6.3.4 When the L ERR. LED is not on, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
Data link stop (bit 0) of Data link stop/restart instruction (buffer memory address: 19 (Un/G19)) is on.	Turn off the Data link stop then turn on Data link restart (bit 15). ^{*1}
The number of occupied I/O points set using the switch exceeds the number of occupied I/O points of the CPU module.	Correct the setting then power off and on the system or reset the CPU module.  Page 45, Section 4.3)



*1 When Data link stop and Data link restart are simultaneously turned on, the instruction of Data link stop takes priority. Turn off Data link stop before turning on Data link restart.

If the L RUN LED does not turn on even after the above actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.3.3 The ERR. LED is on or flashing

Check the following.

(1) The ERR. LED is on

Check item	Action
The transmission speed setting switch is incorrectly set.	Correct the setting then power off and on the system or reset the CPU module.  Page 45, Section 4.3)
The point mode setting switch is incorrectly set.	Correct the setting then power off and on the system or reset the CPU module.  Page 35, Section 3.4)

If the ERR. LED remains on even after the above actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

(2) The ERR. LED is flashing

When the operation setting switch is switched after power-on, the ERR. LED starts flashing. Reset the switch to the status before the switching.

If the ERR. LED remains flashing even after that, the possible cause is a hardware failure.

Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.3.4 The L ERR. LED is on or flashing

Check the following.

(1) The L ERR. LED is on

Check item	Action
The test mode switch is on.	Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
A remote station is connected outside the control range.	<ul style="list-style-type: none"> • Remove the remote station connected outside the control range. • Increase the number of occupied I/O points. • Set a greater value for the last station number. After taking the above actions, power off and on the system or reset the CPU module.
A faulty remote station is detected by Faulty station information (buffer memory address: 4 to 7 (Un/G4 to 7)). (☞ Page 31, Section 3.3.2)	Troubleshoot the faulty remote station. Remote I/O station: (☞ Page 70, Section 6.4) Remote device station: (📖 User's manual for the remote device station used)
A communication cable is incorrectly wired.	Correct the wiring.*1 (☞ Page 49, Section 4.5)

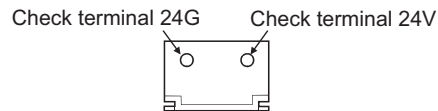
*1 Check for short circuit, reverse connection, disconnection, excessive pressure, terminating resistors, overall cable distance, branch line distance (overall branch line length, maximum branch line length), and surrounding environment such as a noise.

If the L ERR. LED remains on even after the above actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

(2) The L ERR. LED is flashing

Check item	Action
Error (all stations) (bit 1) of Detailed error information (buffer memory address: 16 (Un/G16)) is not on.	Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.
A 24VDC supply voltage is outside the specified range.	Reduce the supply voltage within the specified range.*1
A faulty remote station is detected by Faulty station information (buffer memory address: 4 to 7 (Un/G4 to 7)). (☞ Page 31, Section 3.3.2)	Troubleshoot the faulty remote station. Remote I/O station: ☞ Page 66, Section 6.3 Remote device station: 📖 User's manual for the remote device station used
A communication cable is incorrectly wired.	Correct the wiring.*2 (☞ Page 49, Section 4.5)

*1 Measure a voltage using check terminals on the terminating resistor.




*2 Check for short circuit, reverse connection, disconnection, excessive pressure, terminating resistors, overall cable distance, branch line distance (overall branch line length, maximum branch line length), and surrounding environment such as a noise.

If the L ERR. LED remains flashing even after the above actions are taken, the possible cause is a hardware failure.

Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.4 Troubleshooting of Remote I/O Stations

The troubleshooting procedures for the remote I/O stations are shown according to the LED status.
For troubleshooting of a remote device station, refer to the following.

 User's manual for the remote device station used

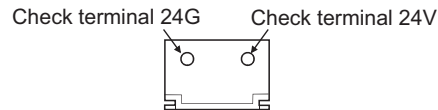
6.4.1 The PW LED does not turn on

Check the following.

Check item	Action
The communication cable connected to the power supply is incorrectly wired.	Correct the wiring.*1
A communication cable is connected to the LINK connector of the dedicated power supply or power supply adapter.	Connect the cable to the LINK/POWER connector.
A 24VDC supply voltage is outside the specified range.	Reduce the supply voltage within the specified range.*2

*1 Check for short-circuit, reverse connection, disconnection, and excessive pressure.

*2 Measure a voltage using check terminals on the terminating resistor.



If the PW LED does not turn on even after the above actions are taken, the possible cause is a hardware failure.
Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.4.2 The L RUN LED does not turn on

Check the following.

After changing a remote station number, power off and on the system.

Check item	Action
After data link is established, the transmission speed setting of the master station was changed.	Power off and on the system.
A communication cable is incorrectly wired.	Correct the wiring.* ¹ (☞ Page 49, Section 4.5)
The station number setting switch is incorrectly set.	Correct the station number with meeting the following: <ul style="list-style-type: none"> • The number is 1 to 64. • The ones digit is 0 to 9. • Do not set the number using the output hold setting switch and response speed setting switch. After changing a remote station number, power off and on the system.
A station number is set outside the control range of the master station.	<ul style="list-style-type: none"> • Check that the numbers of remote stations occupied by the master station are 1 to 64. • Check that station numbers set on remote stations are within the control range of the master station. After changing a remote station number, power off and on the system.
The operation setting switch of the master station is incorrectly set.	Correct the setting. (☞ Page 45, Section 4.3) After correcting the setting, power off and on the system or reset the CPU module.

*1 Check for short circuit, reverse connection, disconnection, excessive pressure, terminating resistors, overall cable distance, branch line distance (overall branch line length, maximum branch line length), and surrounding environment such as a noise.

If the L RUN LED does not turn on even after the above actions are taken, the possible cause is a hardware failure. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.4.3 The L ERR. LED is on or flashing

Check the following.

Check item	Action
Switch setting is changed after power-on.	Return the switch setting to the status before the switching.
A communication cable is incorrectly wired.	Correct the wiring.* ¹ (☞ Page 49, Section 4.5)

*1 Check for short circuit, reverse connection, disconnection, excessive pressure, terminating resistors, overall cable distance, branch line distance (overall branch line length, maximum branch line length), and surrounding environment such as a noise.

If the L ERR. LED remains on or flashing even after the above actions are taken, the possible cause is a hardware failure.

Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.4.4 Input data cannot be read from a remote I/O station

Check the following.

Check item	Action
The master station does not recognize the relevant remote I/O station. (☞ Page 74, Section 6.6)	Correct the wiring of the communication cable. ^{*1} (☞ Page 49, Section 4.5)
The input LED of the relevant remote I/O station is not on.	Correct the wiring between the remote I/O station and the external device.
An incorrect remote input address is specified.	Correct the address.
A station number is duplicated.	Correct the station number. After changing a remote station number, power off and on the system.

*1 Check for short circuit, reverse connection, disconnection, excessive pressure, terminating resistors, overall cable distance, branch line distance (overall branch line length, maximum branch line length), and surrounding environment such as a noise.

If input data cannot be read from the remote I/O station even after the above actions are taken, the possible cause is a hardware failure.

Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.4.5 Data cannot be output from a remote I/O station

Check the following.

Check item	Action
The master station does not recognize the relevant remote I/O station. (☞ Page 74, Section 6.6)	Correct the wiring of the communication cable. ^{*1} (☞ Page 49, Section 4.5)
The output LED of the relevant remote I/O station is not on.	Correct the address.
Wiring between the remote I/O station and the external device is incorrect.	Correct the wiring.


*1 Check for short circuit, reverse connection, disconnection, excessive pressure, terminating resistors, overall cable distance, branch line distance (overall branch line length, maximum branch line length), and surrounding environment such as a noise.

If data cannot be output from the remote I/O station even after the above actions are taken, the possible cause is a hardware failure.

Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

6.5 Error Codes

If the QJ61CL12 detects an error, the error details are stored in Detailed error information (buffer memory address: 16 (UnG16)).

For error details,  Page 32, Section 3.3.2 (4).

6.6 CC-Link/LT Diagnostics Using GX Developer

After all modules are connected using connection cables, whether the modules are ready for data link or not can be checked.


This function is also available when the QJ61CL12 is installed to a remote I/O station of MELSECNET/H.

(1) Monitoring the own station

Monitor the own station (station connected to the peripheral) status.

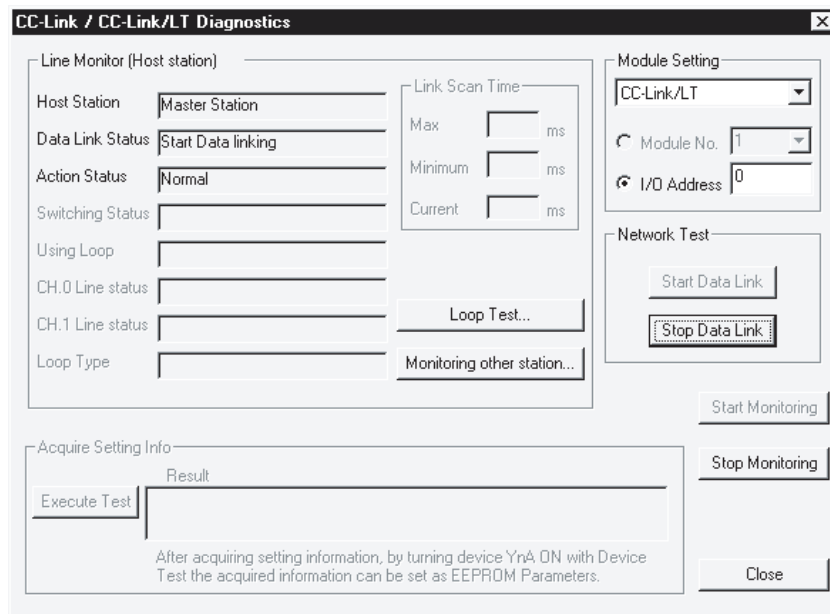
(a) Operating procedure

1. Open the diagnostics window in GX Developer.

 [Diagnostics] ⇔ [CC-Link / CC-Link/LT Diagnostics]

2. Select "CC-Link/LT" in "Module Setting", specify the start I/O number of QJ61CL12 in "I/O Address".

3. Click the **Start Monitoring** button.



(b) Monitored items

Item		Description
Line Monitor (Host station)	Host Station	Indicates that the master station is being monitored.
	Data Link Status	Displays the data link status of the own station. <ul style="list-style-type: none"> • Start Data linking: Data link is active. • Stop Data linking: Data link is stopped. • Initial comm. incomplete: Initial communication incomplete status
	Action Status	Displays the operating status of the own station. <ul style="list-style-type: none"> • Normal: All stations normally execute data link. • Data linking error: Faulty data link station(s) identified.

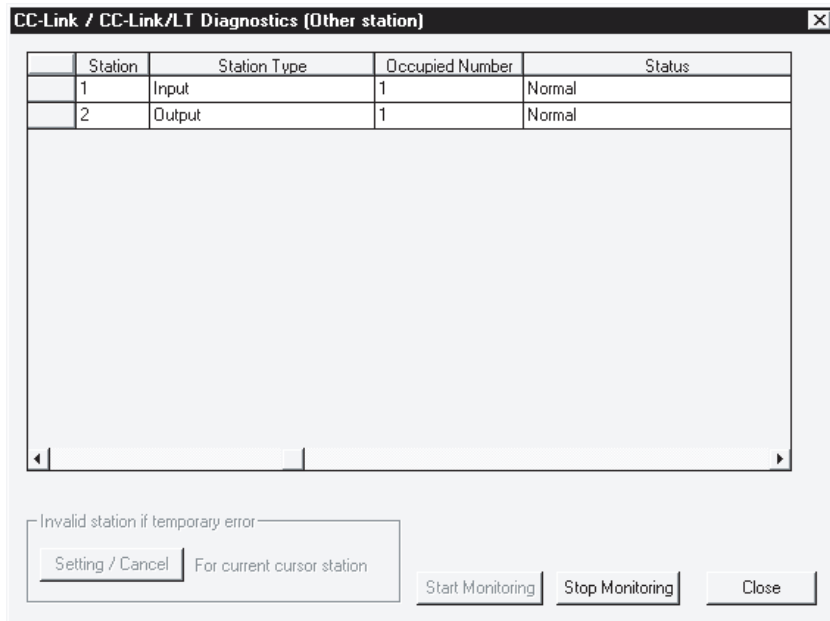
(2) Monitoring other stations

Monitor other stations (stations not connected to the peripheral) status.

(a) Operating procedure

Open the monitor window in GX Developer.

 [Diagnostics] ⇒ [CC-Link / CC-Link/LT Diagnostics] ⇒ Monitoring other station... button



(b) Monitored items

Item	Description
Station	Displays the start station number of each station.
Station Type	Displays a station type. <ul style="list-style-type: none"> • Input: Remote I/O station input type • Output: Remote I/O station output type • Input/Output: Remote I/O station Input/output type • Device: Remote device station
Occupied Number	Displays the number of occupied stations.
Status	Displays the link status of the module.

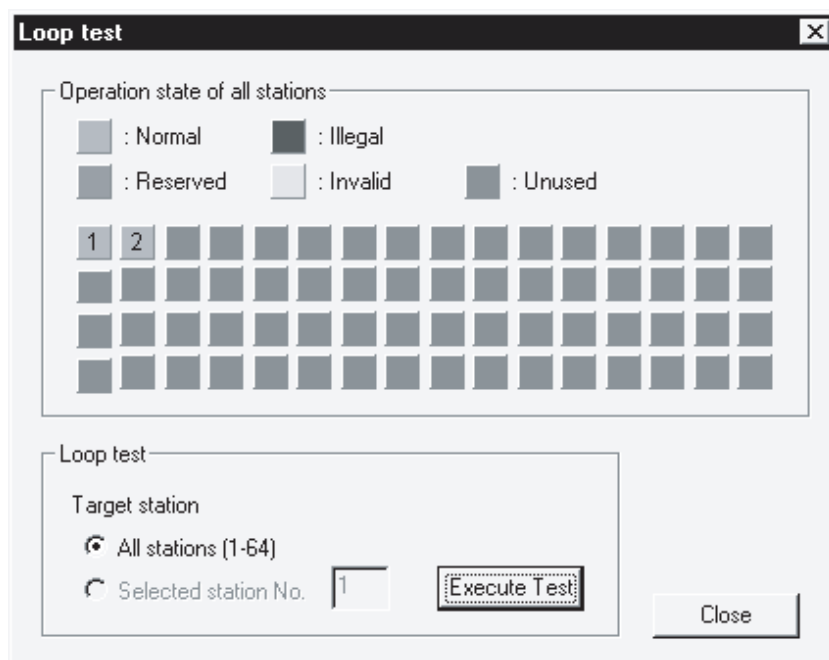
(3) Loop test


The operating states of connected remote stations are checked on the window.
Normally operating stations and abnormal stations are shown in "blue" and "red" respectively

(a) Operating procedure

Open the testing window in GX Developer.

 [Diagnostics] ⇨ [CC-Link / CC-Link/LT Diagnostics] ⇨  button



Click the  button to make test on all of the connected stations.

Point


- In the CC-Link/LT, "Reserved", "Invalid" and "Unused" stations are not displayed.
- If the station number is duplicated, the operating status may be displayed in "white".
Check the station number and the number of occupied stations for the remote station displayed in "white", and make the correct setting to eliminate the duplication.

(4) H/W information

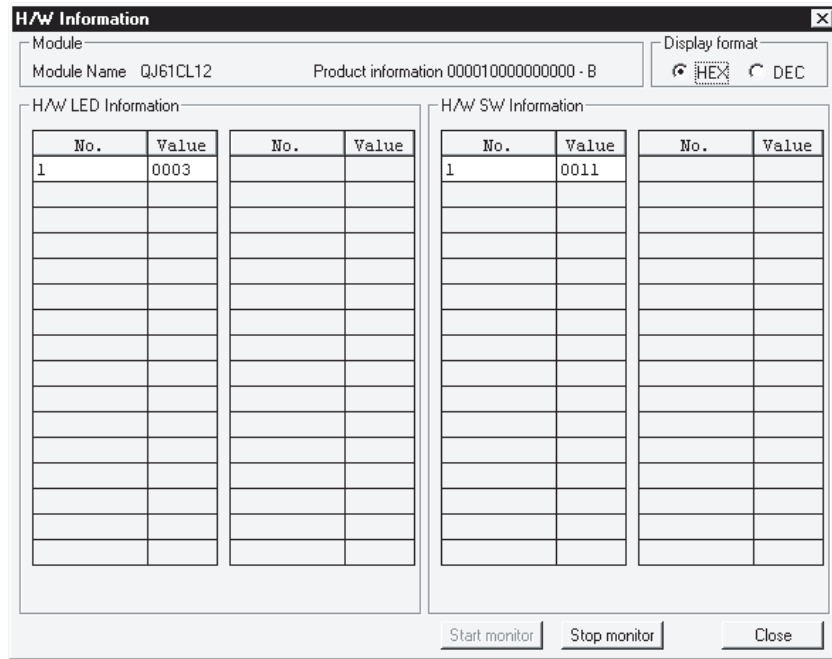
The operating status and the setting status of the QJ61CL12 are displayed.

(a) Operating procedure


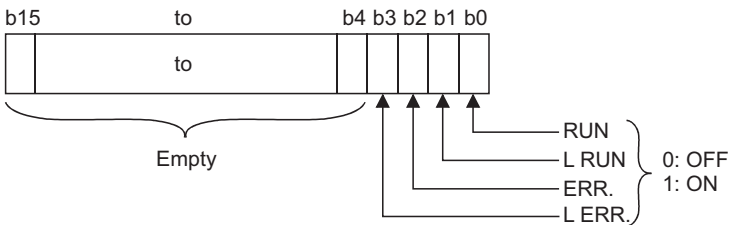
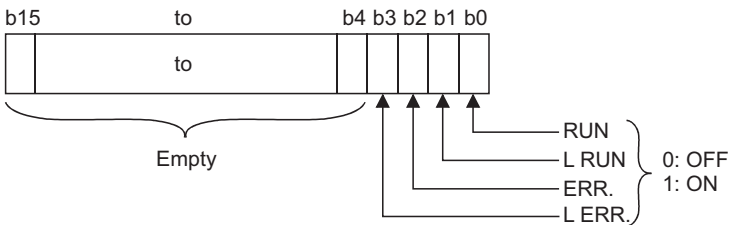
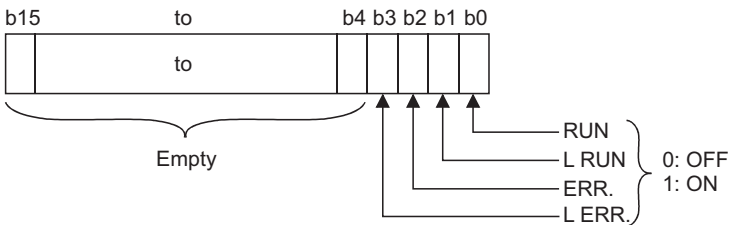

1. Open the "Module's Detailed Information" window in GX Developer.

 [Diagnostics] ⇒ [System monitor] ⇒ Module name
 Error history display is not available for CC-Link/LT.

2. Click the  button.

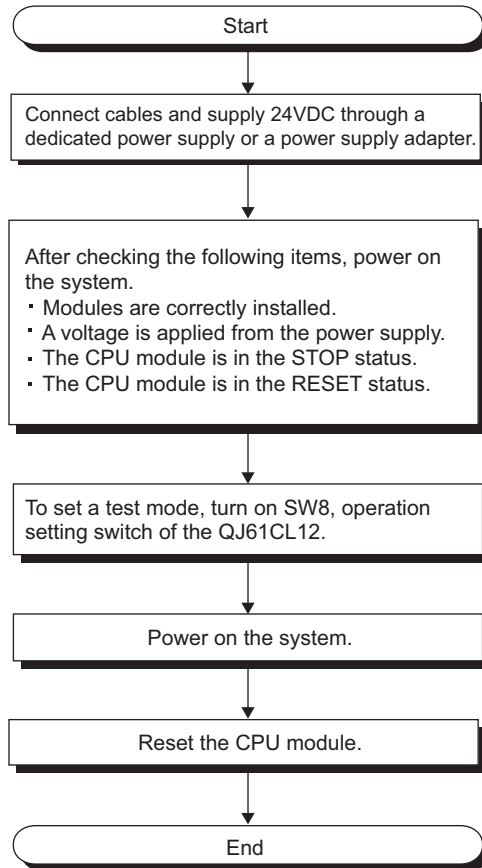


(b) Monitored items

Item		Description																					
Module	Module Name	Displays the module model.																					
	Product Information	Displays the function version. 0000100000000000-B <div style="text-align: right; margin-right: 50px;">  Function version B </div>																					
Display Format		Switch the display format of "H/W LED Information" and "H/W SW Information".																					
H/W LED Information		Displays the LED status as shown below. <div style="text-align: center;"> <table border="0" style="margin: auto;"> <tr> <td>b15</td> <td>to</td> <td>b4</td> <td>b3</td> <td>b2</td> <td>b1</td> <td>b0</td> </tr> <tr> <td colspan="6" style="text-align: center;">to</td> <td></td> </tr> <tr> <td colspan="6" style="text-align: center;">Empty</td> <td>  </td> </tr> </table> </div>	b15	to	b4	b3	b2	b1	b0	to							Empty						
b15	to	b4	b3	b2	b1	b0																	
to																							
Empty																							
H/W SW Information		Displays the value stored in External switch information (buffer memory address: 17 (Un/G17)). ( Page 33, Section 3.3.2 (5))																					

6.7 Self-loopback Test

This test checks whether the module alone operates normally or not.
Follow the steps shown below.



[Test results]

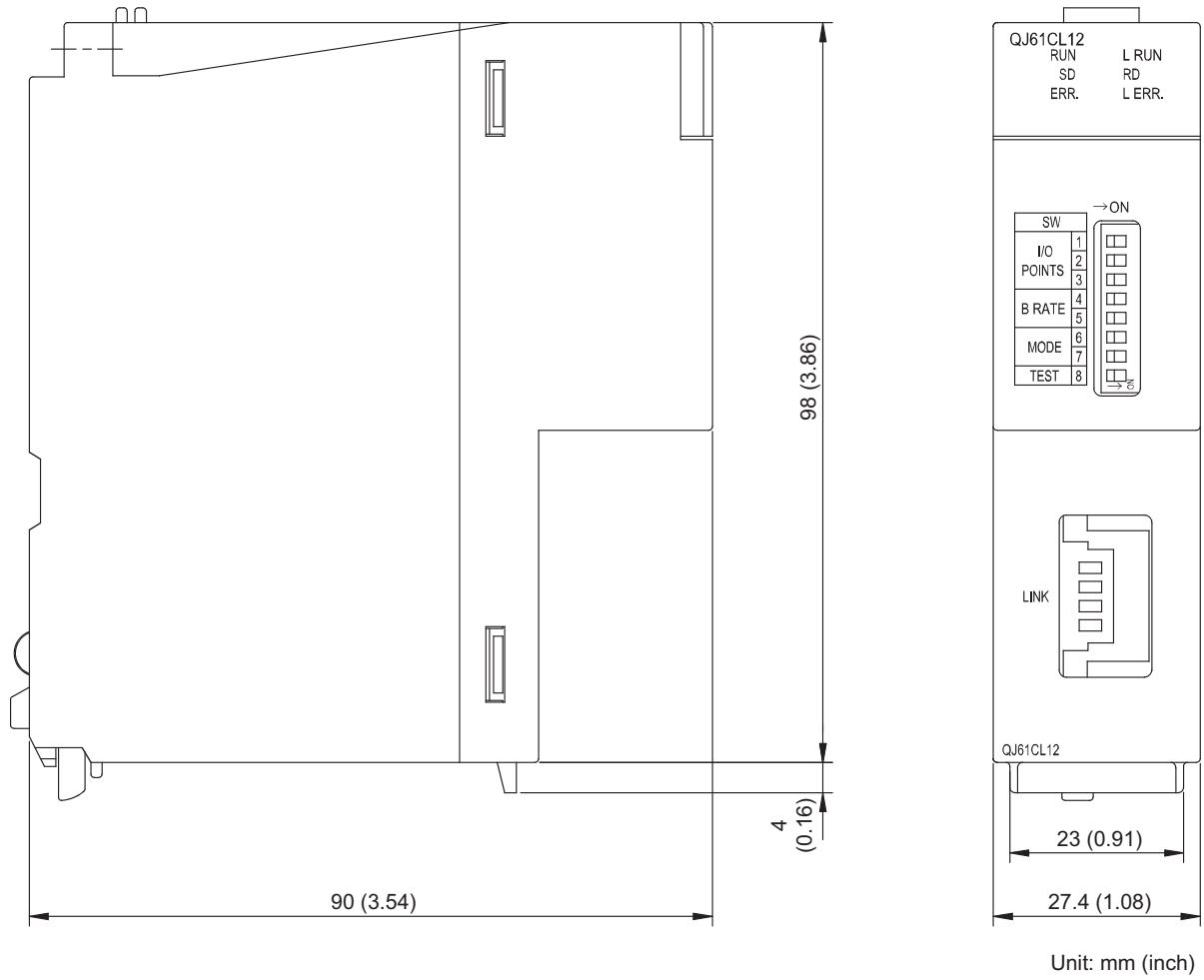
	LED indication						Action
	RUN	ERR.	SD	RD	L RUN	L ERR.	
When normal	ON	OFF	*1	*1	ON	OFF	—
When faulty	ON	OFF	OFF	OFF	OFF	ON	The hardware is faulty. Replace the module.
	OFF	OFF	OFF	OFF	OFF	OFF	
	ON	ON	OFF	OFF	OFF	OFF	Correct the operation setting switch configuration.

*1 Dimly lights or is flashing.

APPENDICES

Appendix 1 External Dimensions

The following figure shows the external dimensions of the QJ61CL12.



A

Appendix 1 External Dimensions

Appendix 2 I/O Assignment Tables

The following is the I/O Assignment Sheet for the case that the start I/O number of the QJ61CL12 is X/Y00.
Copy the following tables and use them for recording I/O assignment for a CC-Link/LT system.

Appendix 2.1 In 4-point mode

Station No.	Model	Input	Output	Station No.	Model	Input	Output
		X 0	Y 0			X 0	Y 0
		1	1			1	1
		2	2			2	2
		3	3			3	3
		X 4	Y 4			X 4	Y 4
		5	5			5	5
		6	6			6	6
		7	7			7	7
		X 8	Y 8			X 8	Y 8
		9	9			9	9
		A	A			A	A
		B	B			B	B
		X C	Y C			X C	Y C
		D	D			D	D
		E	E			E	E
		F	F			F	F
		X 0	Y 0			X 0	Y 0
		1	1			1	1
		2	2			2	2
		3	3			3	3
		X 4	Y 4			X 4	Y 4
		5	5			5	5
		6	6			6	6
		7	7			7	7
		X 8	Y 8			X 8	Y 8
		9	9			9	9
		A	A			A	A
		B	B			B	B
		X C	Y C			X C	Y C
		D	D			D	D
		E	E			E	E
		F	F			F	F

Appendix 2.2 In 8-point mode

Station No.	Model	Input	Output	Station No.	Model	Input	Output
		X 0	Y 0			X 0	Y 0
		1	1			1	1
		2	2			2	2
		3	3			3	3
		4	4			4	4
		5	5			5	5
		6	6			6	6
		7	7			7	7
		X 8	Y 8			X 8	Y 8
		9	9			9	9
		A	A			A	A
		B	B			B	B
		C	C			C	C
		D	D			D	D
		E	E			E	E
		F	F			F	F
		X 0	Y 0			X 0	Y 0
		1	1			1	1
		2	2			2	2
		3	3			3	3
		4	4			4	4
		5	5			5	5
		6	6			6	6
		7	7			7	7
		X 8	Y 8			X 8	Y 8
		9	9			9	9
		A	A			A	A
		B	B			B	B
		C	C			C	C
		D	D			D	D
		E	E			E	E
		F	F			F	F

A

Appendix 2 I/O Assignment Tables
Appendix 2.2 In 8-point mode

Appendix 2.3 In 16-point mode

Station No.	Model	Input	Output	Station No.	Model	Input	Output
		X 0	Y 0			X 0	Y 0
		1	1			1	1
		2	2			2	2
		3	3			3	3
		4	4			4	4
		5	5			5	5
		6	6			6	6
		7	7			7	7
		8	8			8	8
		9	9			9	9
		A	A			A	A
		B	B			B	B
		C	C			C	C
		D	D			D	D
		E	E			E	E
		F	F			F	F
		X 0	Y 0			X 0	Y 0
		1	1			1	1
		2	2			2	2
		3	3			3	3
		4	4			4	4
		5	5			5	5
		6	6			6	6
		7	7			7	7
		8	8			8	8
		9	9			9	9
		A	A			A	A
		B	B			B	B
		C	C			C	C
		D	D			D	D
		E	E			E	E
		F	F			F	F

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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.
 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 2. Failure caused by unapproved modifications, etc., to the product by the user.
 3. 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.
 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 5. 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.
 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 7. 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 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

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SH-080351E-I(1110)MEE

MODEL: QJ61CL12-U-SY-E

MODEL CODE: 13JR62

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