



# Open Field Network CC-Link Troubleshooting Guide

## CC-Link



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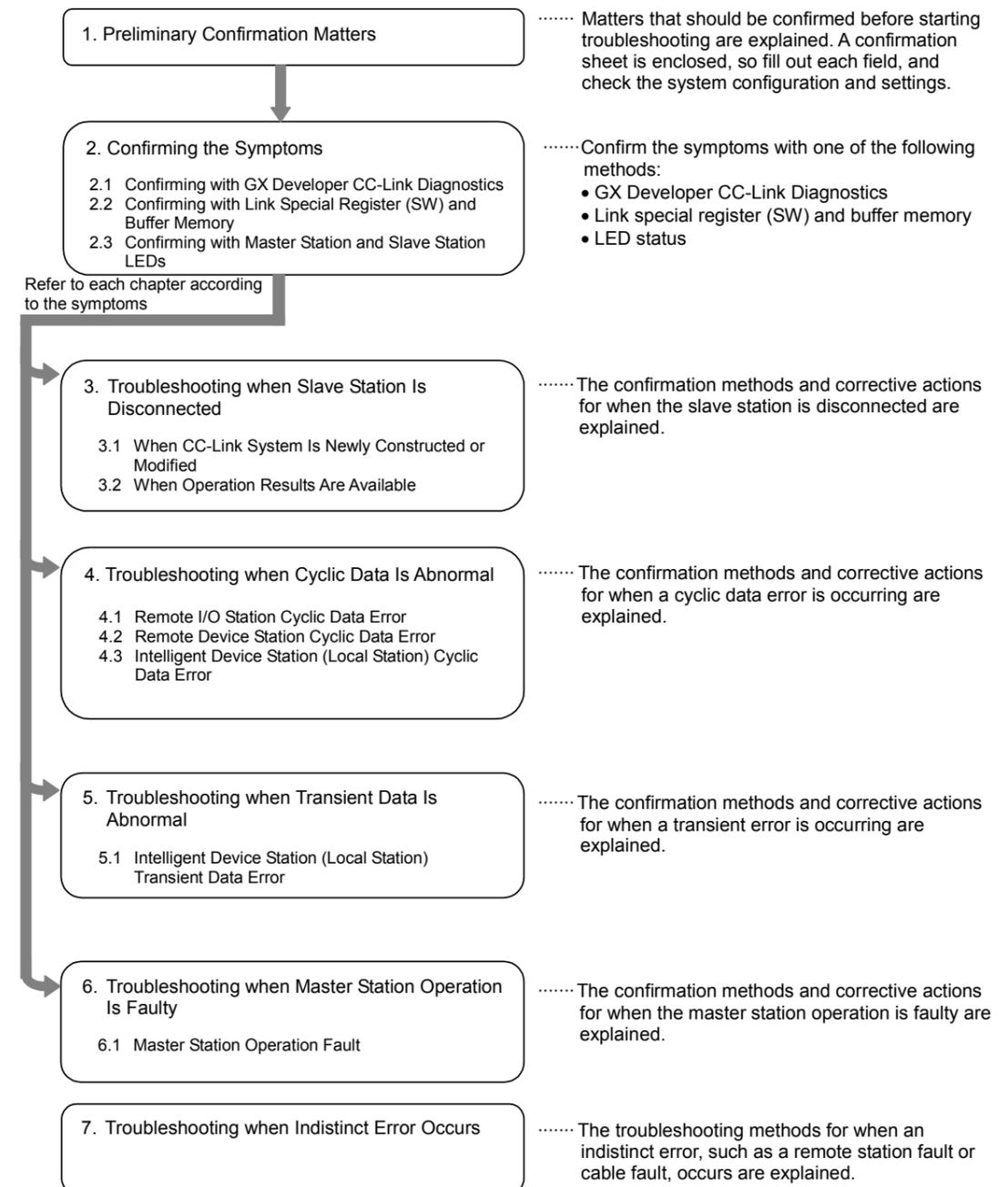
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## Introduction

Use of CC-Link has spread in FA applications due to its outstanding high-speed performance and fixed performance. The release of products compatible with "CC-Link Ver. 2", having a further expanded data amount, has made it possible to answer various needs. A troubleshooting guide has been prepared for users of CC-Link.

Follow the procedures below when troubleshooting. This guide includes the preliminary confirmation matters, such as the system configuration, and the methods for confirming the trouble symptoms, to further clarify the troubleshooting procedures. CC-Link diagnostics using GX Developer is an easy way to confirm the symptoms. The methods for confirming with the link special register (SW) and buffer memory, and simple confirmation methods based on the LED status are also explained for cases when CC-Link diagnostics cannot be used.



## Related Manuals

Always prepare the manual for the applicable master module when troubleshooting so that the CC-Link specifications, error codes and link special relay and register contents can be confirmed.

The master module manuals are listed below.

PLC CPU	Manual name	Manual No. (Model code)
Q Series	CC-Link System Master/Local Module Users' Manual QJ61BT11	SH-080016 (13JL91)
	CC-Link System Master/Local Module Users' Manual QJ61BT11N	SH-080394E (13JR64)
QnA Series	Control & Communication Link System Master/Local Module type AJ61QBT11/A1SJ61QBT11 Users' Manual	IB66722 (13J873)
A Series	Control & Communication Link System Master/Local Module type AJ61BT11/A1SJ61BT11 Users' Manual	IB66721 (13J872)
FX Series	FX2N-16CCL-M CC-Link System Master Block Users' Manual	JY992D93101 (09R710)
Personal computer board	Type A80BDE-J61BT11 CC-Link System Master/Local Interface Board User's Manual	IB-0800175 (13JR28)

Refer to the respective slave station manuals as necessary.

## 1. Preliminary Confirmation Matters

Items which should be confirmed with the designs before starting troubleshooting are explained in this section. Fill in each item following the confirmation items given in Appendix 4. Confirmation Sheet. An example of filling in the confirmation sheet is shown below.

### Confirmation sheet

Confirmation item	Details														
1. Master station	[1] Master type	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>PLC CPU</td> <td>Q02HCPU</td> </tr> <tr> <td>Master module</td> <td>QJ61BT11N</td> </tr> </table>	PLC CPU	Q02HCPU	Master module	QJ61BT11N									
	PLC CPU	Q02HCPU													
	Master module	QJ61BT11N													
	[2] Master version	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>PLC CPU</td> <td>050320000 000000C</td> </tr> <tr> <td>Master module</td> <td>050320000 000000-B</td> </tr> </table>	PLC CPU	050320000 000000C	Master module	050320000 000000-B									
	PLC CPU	050320000 000000C													
	Master module	050320000 000000-B													
	[3] Module mounting state	I/O address: 0000													
	[4] Other network module	Other network module: None													
	[5] Mode	[a] Mode setting: Remote net mode (Ver. 1 / Additional <u>Ver.2</u> Remote I/O net mode) [b] Scan mode: Synchronous mode <del>Asynchronous mode</del> [c] Module mode: I/O mode / Intelligent mode (SW8: A Series only)													
	[6] Parameters	Confirm that parameters in the designs and actual machine match <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th>Parameter</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Number of modules</td> <td>Five modules</td> </tr> <tr> <td>Standby master station setting</td> <td>None</td> </tr> <tr> <td>Operation designation at CPU down</td> <td>Stop / <u>Continue</u></td> </tr> <tr> <td>Reserved station</td> <td>Station number 8</td> </tr> <tr> <td>Error invalid station</td> <td>None</td> </tr> <tr> <td>Station information</td> <td>Indicated in system configuration</td> </tr> </tbody> </table>	Parameter	Setting	Number of modules	Five modules	Standby master station setting	None	Operation designation at CPU down	Stop / <u>Continue</u>	Reserved station	Station number 8	Error invalid station	None	Station information
Parameter	Setting														
Number of modules	Five modules														
Standby master station setting	None														
Operation designation at CPU down	Stop / <u>Continue</u>														
Reserved station	Station number 8														
Error invalid station	None														
Station information	Indicated in system configuration														
[7] Parameter setting	<u>GX Developer</u> Dedicated instructions / FROM/TO instructions														
[8] Link startup method	Start up with buffer memory: Y6 / Start up with EEPROM: Y8 (QnA, A, FX Series only)														
[9] Link data access	<u>Auto refresh</u> / Dedicated instructions / FROM/TO instructions														
[10] Transmission speed	<u>10M</u> / 5M / 2.5M / 625k / 156kbps														
2. Slave station <small>* Indicate the details in 6. System configuration</small>	[11] Number of connected modules	5 modules													
	[12] Station type*	Remote I/O station: 2 stations, Remote device station: 1 station, Intelligent device station: 2 stations													
	[13] Occupied station number	<input checked="" type="checkbox"/> Station number occupied by each station (Check after confirming)													
	[14] CC-Link version	<u>Ver.1</u> / <u>Ver.2</u> (Expanded cyclic setting 1-fold <u>2-fold</u> <u>4-fold</u> 8-fold setting) Confirm setting													
	[15] Transmission speed	<u>10M</u> / 5M / 2.5M / 625k / 156kbps													
3. Transmission cable	[16] Cable type	Cable type: FANC-110SBH													
	[17] Transmission distance	Overall length: 50m													
	[18] Station-to-station distance	Shortest station-to-station distance: 0.2m													
4. Terminator	[19] Resistance value	<u>110Ω</u> / 130Ω													
	[20] Connection terminal	<input checked="" type="checkbox"/> Connection between terminator DA-DB (Check after confirming)													
5. Grounding	[21] FG terminal	<input checked="" type="checkbox"/> Grounding of each station's FG terminal (Check after confirming) If not grounded at each station, indicate the grounding state in 6. System Configuration.													
6. System configuration	[22]	<div style="border: 1px solid black; padding: 5px;"> <p>Station number, station type, occupied station number, cable length</p> </div>													

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### Explanation of each Confirmation Sheet Item

- [1] Master type: Confirm the PLC CPU and master module types  
The number of attached master modules is restricted according to PLC CPU.
- [2] Master version: Confirm the PLC CPU and master module version

Master module	Confirming the version
QJ61BT11/QJ61BT11N	Function version, serial number: "SERIAL field on rating nameplate" on side of module, or Using GX Developer (When using QJ61BT11 (N) with function version B or higher and SW6D5C-GPPW or higher) Select "Diagnostics" → "System Monitor", select the module [Module Details Information] button, and display product information in Module field by clicking [H/W information] button
AJ61BT11/A1SJ61BT11 AJ61QBT11/A1SJ61QBT11	Hardware, software version: Indicated with seal on front of module (Left side is hardware, right side is software) Function version: Date and symbol in DATE field on rating nameplate
FX2N-16CCL-M	"SERIAL field on rating nameplate" on side of module
A80BDE-J61BT11	Software version: ROM version in Utility "Card List"

The functions may not be compatible depending on the master module version.

- [3] Unit mounting state: Confirm the arrangement (I/O address) of the master modules on the PLC base  
This is required when setting the parameters or designating the master module in the program.
- [4] Other network module: Confirm the mounting state of other special modules  
The number of mountable special modules is restricted.
- [5] Mode:
  - [a] Mode setting: Confirm the network parameter or switch settings (Remote net mode (Ver. 1 mode / Additional mode / Ver. 2 mode) / remote I/O net mode)  
The Ver. 1 master station cannot be linked with the Ver. 2 slave station. Master station can not be linked to slave station other than remote I/O station in case of I/O net mode.
  - [b] Scan mode: Confirm the parameters  
When using the synchronous mode, make sure that the link scan time does not exceed the allowable range.
  - [c] Module mode: Confirm the SW8 switch settings (I/O mode / intelligent mode) (A PLC)  
When using an intelligent device station such as GOT, the mode must be set to the intelligent mode.
- [6] Parameters: Confirm that the parameters in the designs and actual machine match, and record the setting values

Master	Parameter confirmation method	
Q, QnA	When setting with GX Developer	GX Developer's "Network Parameter" → [CC-Link] button
Q, QnA, A, FX	When setting with dedicated instructions or TO instructions	Monitor 01 to 5Fh with GX Developer's "Online" → "Monitor" → "Buffer Memory Batch"
Personal computer board	Utility	Utility's "Card Information" → [Parameter Setting] button

Correct operation will not take place if the parameters mismatch.

- [7] Parameter setting: Confirm whether the parameters are set with the GX Developer network parameters, dedicated instructions or FROM/TO instructions  
Various restrictions apply according to the setting method.
- [8] Link startup method: Confirm the link start program (QnA, A, FX PLC)  
For Y6 and Y8, the CC-Link Diagnostics screen will not open properly unless the station information is in order of station numbers.
- [9] Link data access method: Confirm which link data access method, auto refresh, dedicated instruction or FROM/TO instruction, is in use.  
The auto refresh area must not overlap the area for other processes in the program.

- [10] Communication speed: Check the master station's communication speed switch setting.  
Set all stations to the same communication speed.
- [11] Number of connected modules: Confirm the number of connected modules  
The number of connectable modules is restricted by the station type, number of occupied stations and version (Ver. 2 expanded cyclic setting).
- [12] Type: Confirm the number of remote I/O station, remote device station and intelligent device station (local station) modules. (Record each station's type in 6. System configuration.)
- [13] Number of occupied stations: Confirm the occupied station number listed in the instruction manual for each station. (Record the number of stations occupied by each station in 6. System configuration.)
- [14] CC-Link version: There is "CC-Link" logo type in case of Ver. 1.10 compatible product. There is "V2" logo type in case of Ver. 2 compatible product. CC-Link version must match up to parameter. (Record the version of each station in 6. System configuration.)
- [15] Communication speed: Confirm the communication speed setting for each slave station  
10M/5M/2.5M/625k/156kbps
- [16] Cable type: Record the cable type. Confirm the cable's compatible version (Ver. 1.00/1.10), and whether the cable is a dedicated, high-performance or movable section type.  
The station-to-station distance and cable minglation (Ver. 1.00 compatible products cannot be mingled basically) are restricted according to the cable type.
- [17] Transmission distance: Confirm the transmission distance (overall length)  
The distance may be restricted according to the transmission speed, etc.
- [18] Station-to-station distance: Confirm the shortest cable length within the station-to-station distances.  
The length may be restricted according to the CC-Link version, etc.
- [19] Resistance value: Confirm the terminal resistance value. (110Ω, 130Ω)
- [20] Connection terminal: Confirm that the terminal resistor is connected between the DA-DB connectors at both ends of the CC-Link system.
- [21] Grounding: Confirm that each station's FG is grounded. (Record in 6. System configuration if each station is not grounded.)  
Connect the CC-Link dedicated cable's shield wire to "SLD" on each module, and ground both ends with Class D grounding (Class 3 grounding) via "FG".
- [22] System configuration: Indicate the system configuration  
Indicate the station number, station type, occupied station number and cable length.

**Points for setting the parameters**

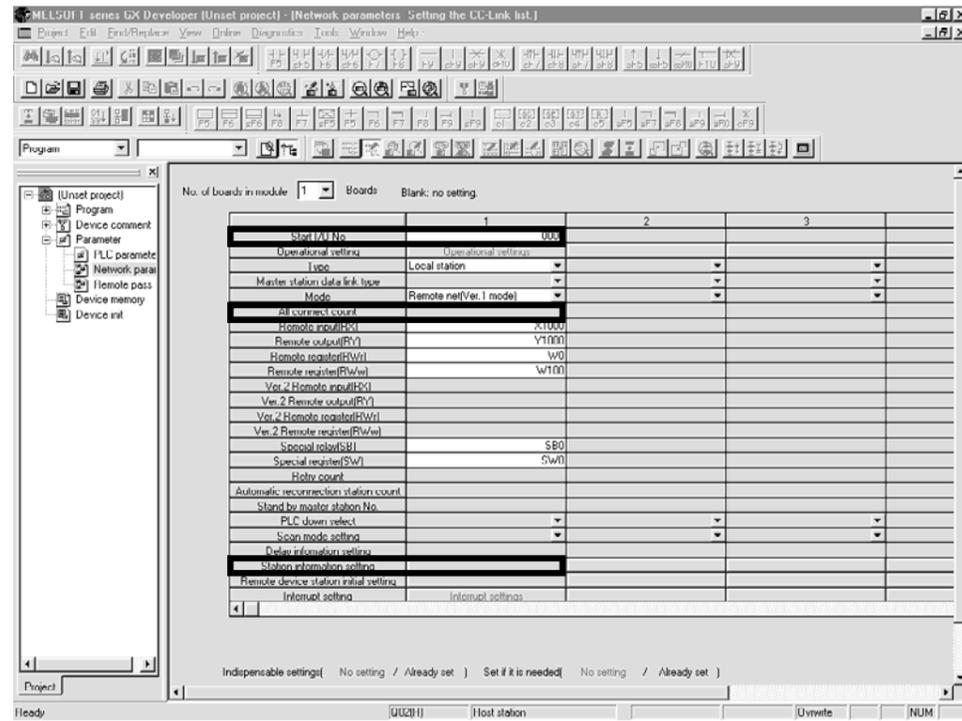
There are various items that must be set for the parameters. The head I/O number, number of connected modules and station information settings are mandatory. A setting error will not occur if these mandatory items are set correctly.

The parameter settings for the Q Series PLC are shown in the following setting example. The setting methods differ for the other PLC CPUs, but the corresponding items must be set in the same manner.

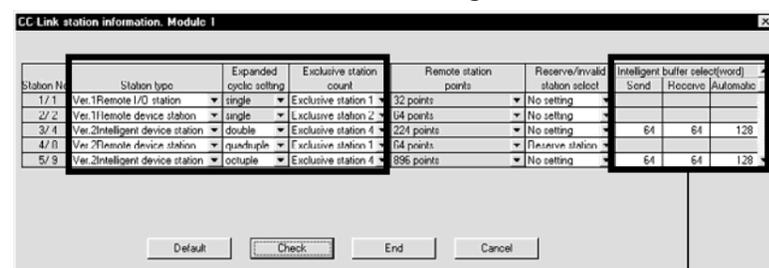
The parameters enclosed with a bold line below are the mandatory items.

**(Example)** Network Parameters Setting the CC-Link list screen

**Items set on Network Parameters Setting the CC-Link list screen**



**Items set on Station information setting screen**



When using transient transmission with the intelligent device station (local station), set these fields according to the transmission amount.

**2. Confirming the Symptoms**

GX Developer's CC-Link Diagnostics function is a convenient method to confirm the symptoms when trouble occurs.

When using a PLC CPU, such as the FX PLC, which is incompatible with the GX Developer CC-Link Diagnostics function, or when using GPPA or GPPQ for the peripheral device, use the method to monitor with the link special register and buffer memory. If a peripheral device cannot be prepared, confirm the symptoms with a simple method by checking the LED ON state.

These following three methods are explained below.

**Confirmation method 1. GX Developer CC-Link Diagnostics**

Start up GX Developer (SW3D5C/F-GPPW or later) with the personal computer connected to the master station, and execute CC-Link Diagnostics.

In addition to CC-Link diagnostics, check the symptom with the LED ON status and link data communication status.

**Confirmation method 2. Monitoring with the link special register (SW) and buffer memory**

Connect a peripheral device compatible with the buffer memory's monitor function to the master station, and monitor the master module's link special register and buffer memory.

A confirmation, equivalent to CC-Link Diagnostics, can be completed by monitoring the link special register and buffer memory corresponding to CC-Link Diagnostics.

Check the symptoms with the link special register and buffer memory as well as the LED ON status and link data communication status.

**Confirmation method 3. LED status**

Check the link status by the ON state of the master station and slave station LEDs.

A simple confirmation can be made with the LED status when a peripheral device is not available.

The peripheral devices and master modules corresponding to the confirmation methods are shown below.

Confirmation method	Peripheral device	Master module	Reference section
CC-Link Diagnostics	When compatible with GX Developer's CC-Link Diagnostics	GX Developer	A, QnA, Q PLC
Monitoring with SW and buffer memory	When incompatible with GX Developer CC-Link Diagnostics, or When GX Developer is not available	Peripheral device capable of monitoring SW and buffer memory (GPPA, GPPQ, etc.)	FX PLC
	Utility	Personal computer board	A, QnA PLC
LED status	When peripheral device is not available	-	All master modules

## 2.1 Confirming with GX Developer CC-Link Diagnostics

This section explains the GX Developer CC-Link Diagnostics screen (section 2.1.1) and the Symptom confirmation flow chart (section 2.1.2).

Users familiar with the CC-Link Diagnostics screen should proceed to section 2.1.2 Symptom confirmation flow chart.

### 2.1.1 CC-Link Diagnostics screen

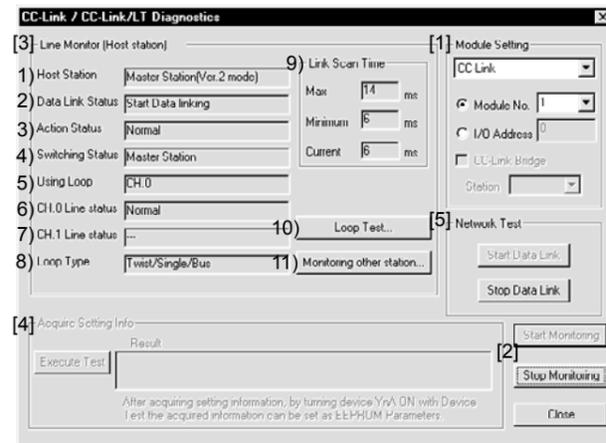
The CC-Link Diagnostics screen used to confirm the symptoms is explained in this section.

#### (1) CC-Link diagnosis

GX Developer operation procedures

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

1. Select "CC-Link" for "Module Setting".
2. Designate the module to be monitored by the host station using "Module No." or "I/O Address".
3. Click the Start Monitoring button.



#### Explanation of each item

- [1] Module Setting  
Select the "CC-Link" to be monitored.  
Module No.  
Designate the CC-Link master module to be monitored.  
I/O Address  
Designate the I/O address of the CC-Link master module to be monitored.
- [2] Start/Stop Monitoring buttons  
Use this buttons to start or stop the host station monitoring.
- [3] Line Monitor (Host station)  
This indicates the status of the host station.  
With this troubleshooting, the symptoms are confirmed with the shaded items. The other items are not used.

Item	Details	Remarks (SB/SW)
1) Host Station	The type of station (master station, local station, standby master station) being monitored and the CC-Link mode are displayed.	SW0061
2) Data Link Status	The host station's data link status is displayed.	SW006C
3) Action Status	The host station's operation status is displayed.	SW006B
4) Switching Status	Whether the master station or standby station is being used to control the data link is displayed.	SB0070
5) Using Loop	The loop "CH0" being used is displayed.	SW00B0~B3
6) CH.0 Line status	The status of loop CH0 is displayed.	SB0091
7) CH.1 Line status	The status of loop CH1 (not used) is displayed.	SB0092
8) Loop Type	The loop type "Twist/Single/Bus" is displayed.	SW0063
9) Link Scan Time	The maximum, minimum and current values for the link scan time are displayed.	SW006D (Maximum) SW006F (Minimum) SW006E (Current)
10) Loop Test	This tests all stations or the designated station. This is valid only when the master station is designated for the connection destination.	
11) Monitoring other station	The other CC-Link station loops connected to the PLC CPU are monitored. This can be executed only during data link.	Refer to the next page for details.

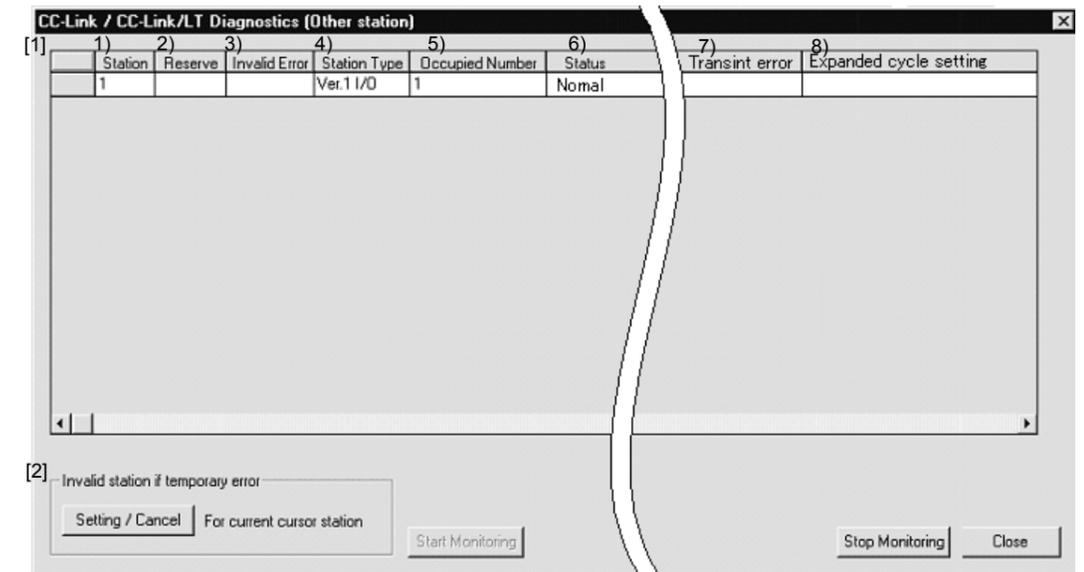
- [4] Acquire Setting Info (A/QnA Series only): Not used with this troubleshooting.  
When this item is executed, the CC-Link mounting state will be set to the CC-Link module work area.
- [5] Network Test: Not used with this troubleshooting.  
The data link is started and stopped for the CC-Link module set with Module Setting.

#### (2) Other station

GX Developer operation procedures

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

1. Select "CC-Link" for "Module Setting".
2. Designate the master module to be monitored by the other station using "Module No." or "I/O Address".
3. Click the Start Monitoring button.
4. Click the Monitoring other station button.



#### Explanation of each item

- [1] List of other station information  
Information on the other station is displayed.  
With this troubleshooting, the symptoms are confirmed with the shaded items. The other items are not used.

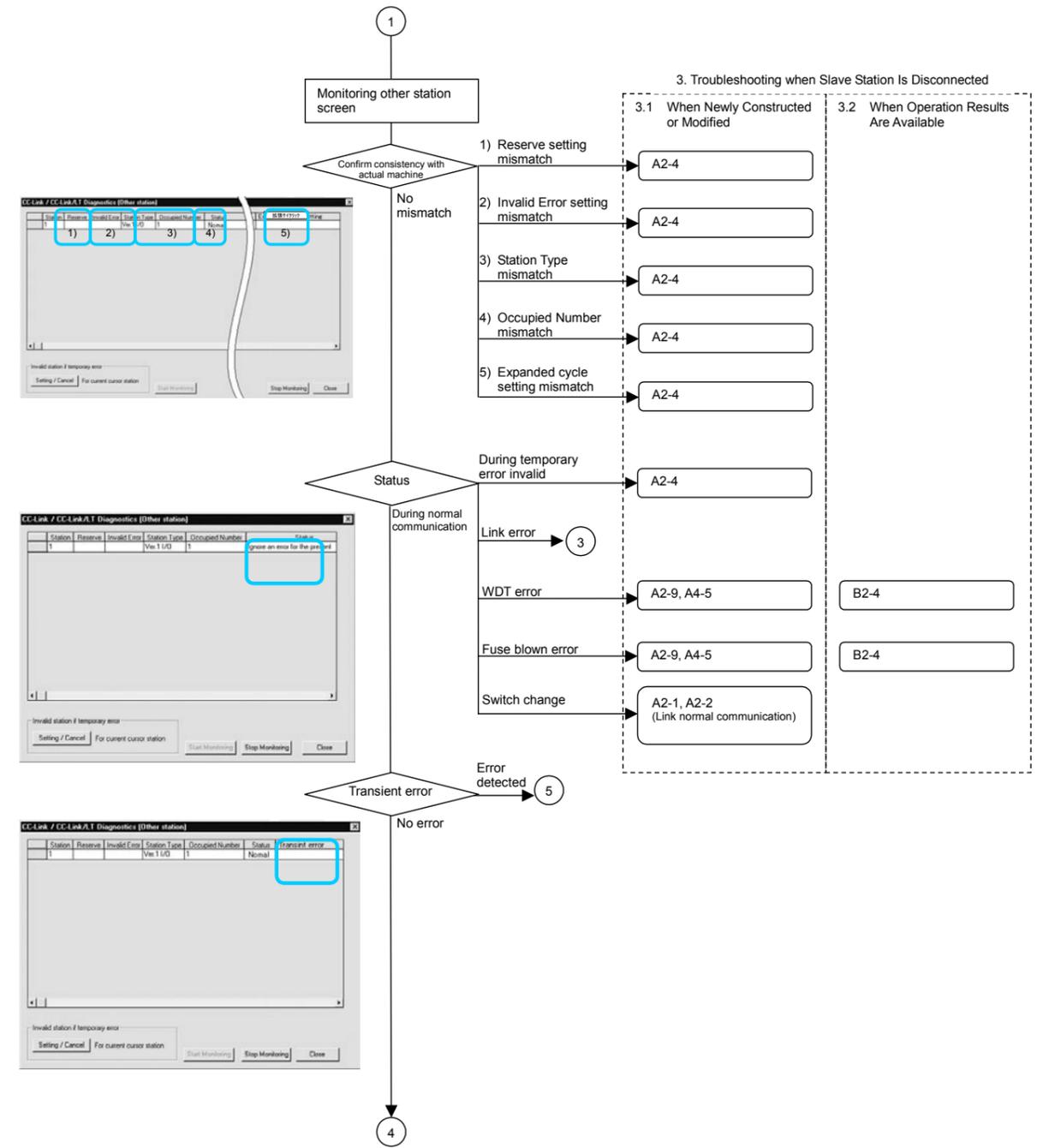
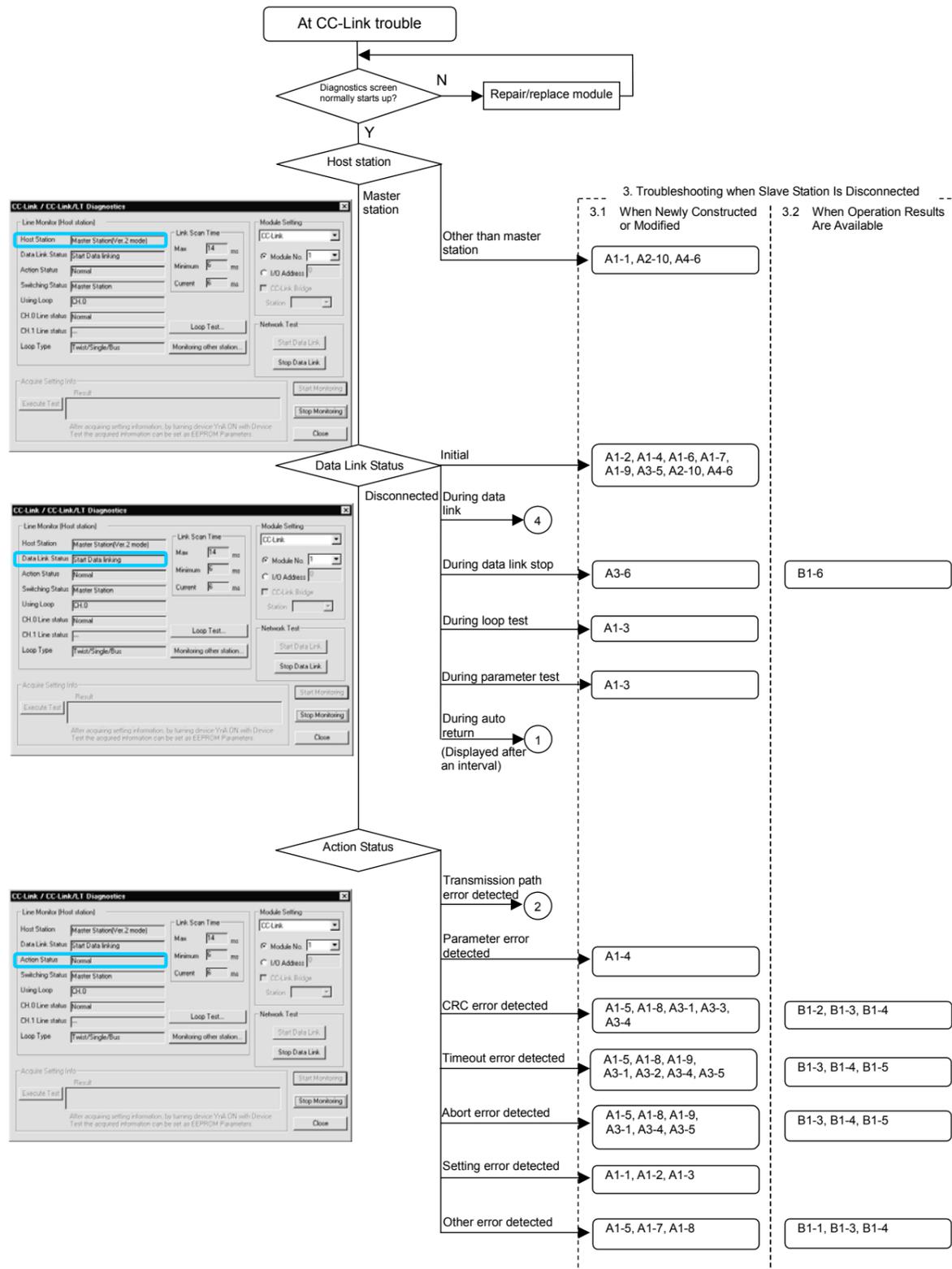
Item	Details	Remarks (SW, Buffer memory)
1) Station	The head number of each station is displayed.	—
2) Reserve	The presence of reserved station settings is displayed.	SW0074 to 77
3) Invalid Error	The presence of stations with invalid errors is displayed.	SW0078 to 7B
4) Station Type	The station type is displayed.	Buffer memory 20H to 5FH
5) Occupied Number	The number of occupied stations is displayed.	Buffer memory 20H to 5FH
6) Status	The module link status is displayed: Error temporarily invalid Link error WDT error Fuse blown error Switch change	SW007C to 7F SW0080 to 83 SW0084 to 87 SW0088 to 8B SW008C to 8F The higher the item is displayed, the higher the priority is.
7) Transient error	The presence of an error during transient transmission is displayed.	SW0094 to 97
8) Expanded cycle setting	The expanded cycle setting is displayed.	Buffer memory 20H to 5FH
No. of Input/Output Points	This is calculated from the Occupied Number and Expanded cycle setting.	—
Company name	The device's company name is displayed.	—

- [2] Invalid station if temporary error: Not used with this troubleshooting.  
To execute an invalid station at a temporary error, select the station number with the cursor.

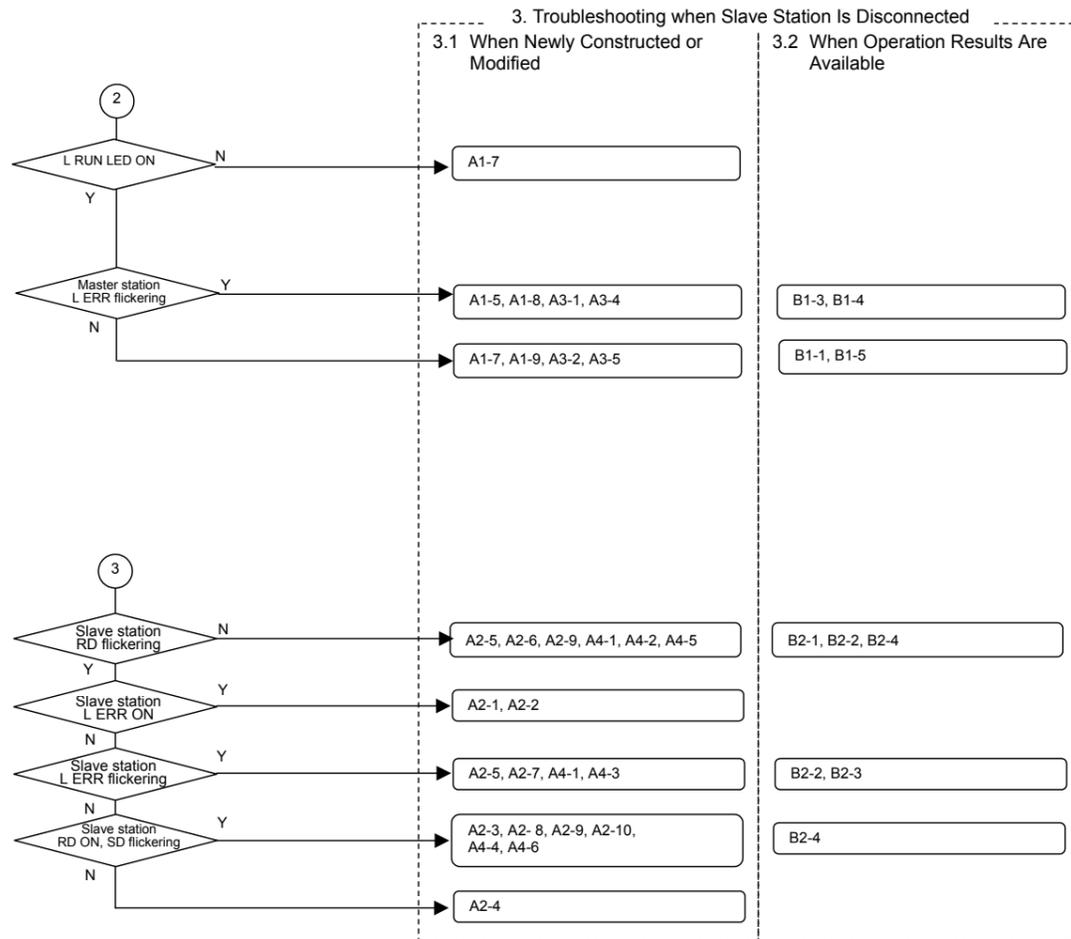
### 2.1.2 Symptom confirmation flow chart

This section explains the procedures for confirming the symptoms when the GX Developer CC-Link Diagnostics screen is executed using a peripheral device connected to the master station. Confirming the symptoms with the following flow chart will lead to the number of a confirmation item in Chapters 3 to 5. Check the cause of the trouble with the confirmation method indicated with the corresponding confirmation item number, and process the state.

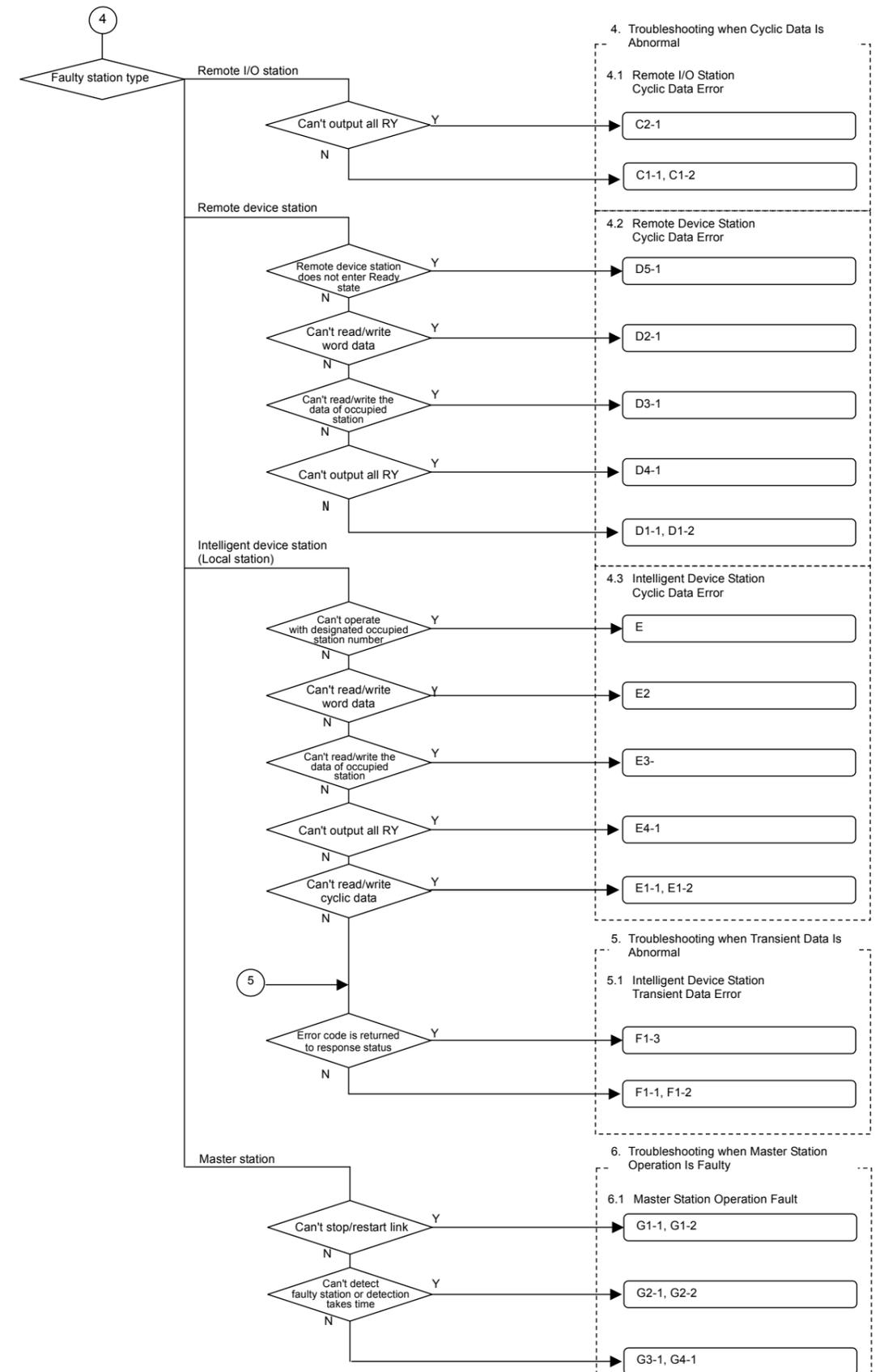
The flow chart branches according to the details displayed in the shaded section of the screen.



Judge the following state with the LED ON status.



Judge the following state with the link data communication state.



## 2.2 Confirming with Link Special Register (SW) and Buffer Memory

Use this confirmation method when the GX Developer CC-Link Diagnostics function cannot be used. A confirmation, equivalent to CC-Link Diagnostics, can be completed by monitoring the link special register and buffer memory corresponding to each item of the CC-Link Diagnostics function.

### 2.2.1 Link special register (SW) and buffer memory

The link special register (SW) and buffer memory used to confirm the symptoms are explained below. Refer to the master module's manual for details on the link special register (SW) and buffer memory.

#### (1) Host station

		SW	Details
Host Station	The type of station (master station, local station, standby master station) being monitored.	SW0061 (Buffer memory: 0661H)	Station type
		0	Master station
		1 to 64	Local station
		128	Standby master station
Data Link Status	The host station's data link status is displayed.	SW006C (Buffer memory: 066CH)	Status
		0	Initial
		2	During data link
		3	During data link stop
		4 to 6	Disconnected
		7, 8, 9	During loop test, During parameter test, During auto return
Action Status	The host station's operation status is displayed.	SW006B (Buffer memory: 066BH)	Status
		0	Normal
		1	Transmission path error
		2	Parameter error
		3	CRC error
		4	Timeout error
		5	Abort error
		6, 7	Setting error, Other error

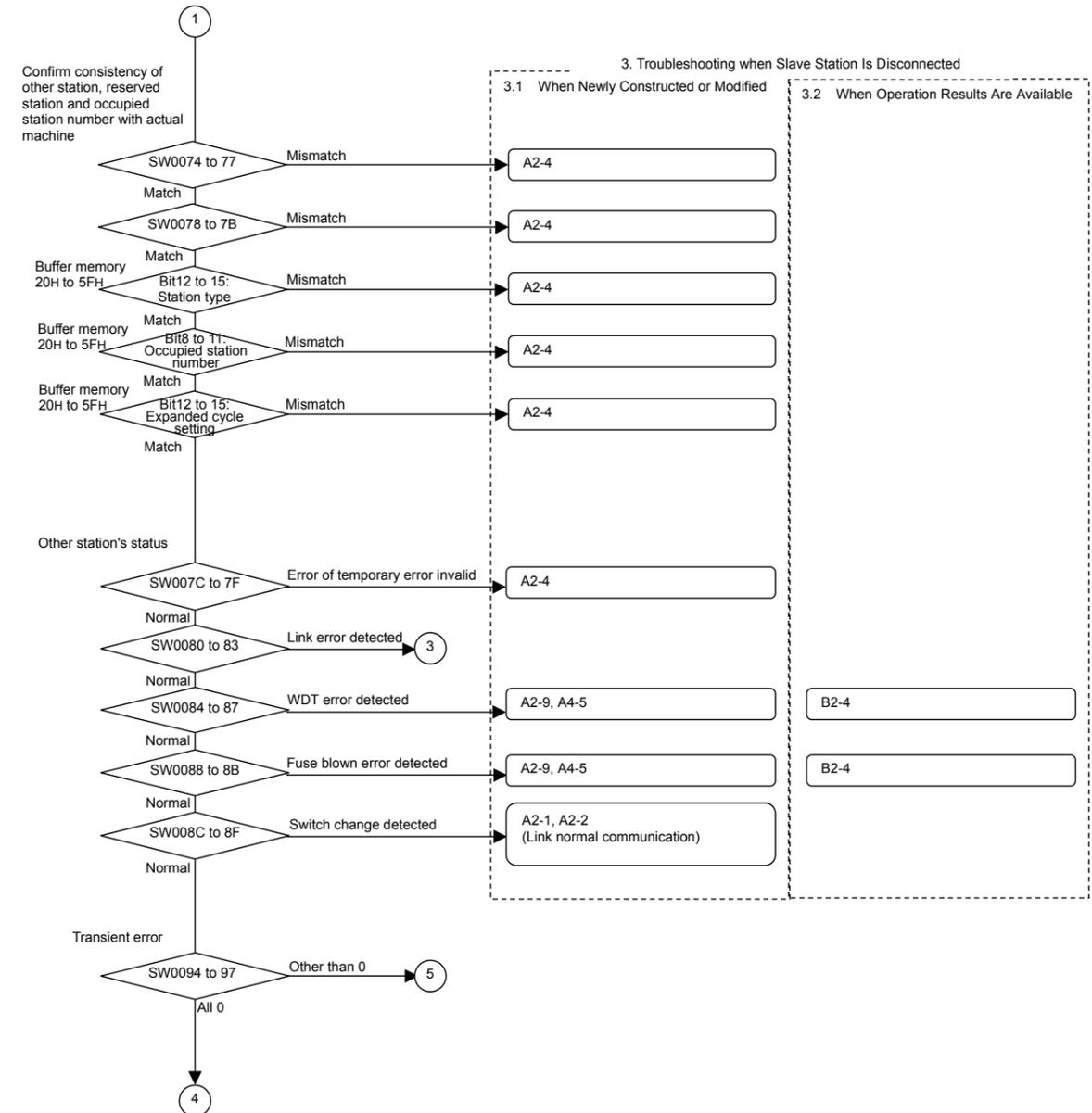
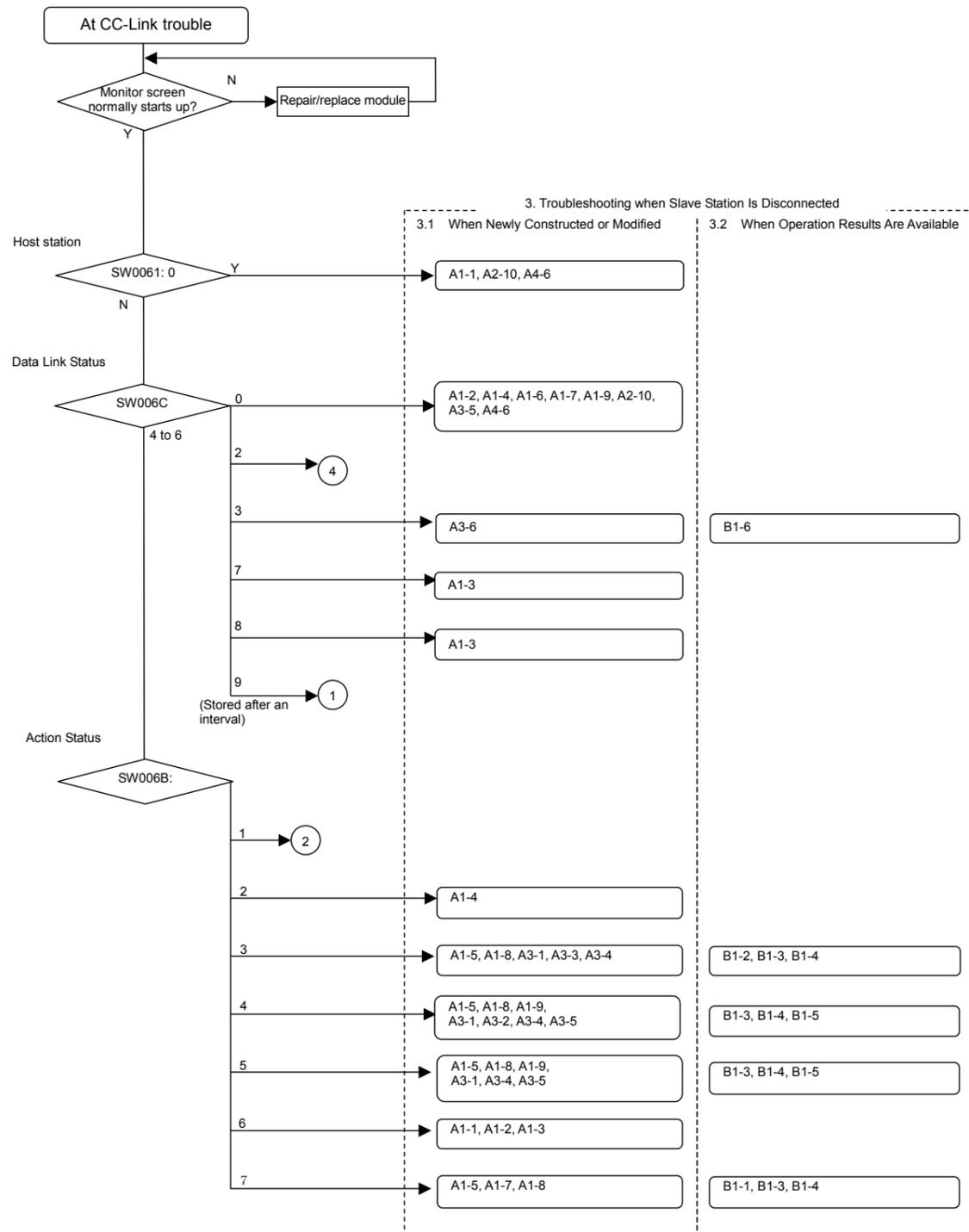
#### (2) Other station

		SW, Buffer memory	Details	
Reserve	The presence of reserved station settings is displayed.	SW		Setting
		SW0074 to 77 (Buffer memory: 0674H to 0677H)	Corresponding bit ON Corresponding bit OFF	Set Not set
Invalid Error	The presence of stations with invalid errors is displayed.	SW		Setting
		SW0078 to 7B (Buffer memory: 0678H to 067BH)	Corresponding bit ON Corresponding bit OFF	Set Not set
Station number, occupied station number, station type, expanded cyclic setting	The setting status of the connected remote I/O station, remote device station and intelligent device station (local station) type is displayed.	Buffer memory	Details	
		20H (Station number 1) to 5FH (Station number 64)		
Status	The module link status is displayed:	SW (Buffer memory)		Status
		SW007C to 7F (067CH to 067FH)	Corresponding bit ON	Error temporarily invalid
		SW0080 to 83 (0680H to 0683H)	Corresponding bit ON	Link error
		SW0084 to 87 (0684H to 0687H)	Corresponding bit ON	WDT error
		SW0088 to 8B (0688H to 068BH)	Corresponding bit ON	Fuse blown error
		SW008C to 8F (068CH to 068FH)	Corresponding bit ON	Switch change
Transient error	The presence of an error during transient transmission is displayed.	Above SW	All OFF	During normal communication
		SW (Buffer memory)		Status
		SW0094 to 97 (0694H to 0697H)	Corresponding bit ON Corresponding bit OFF	Error No error

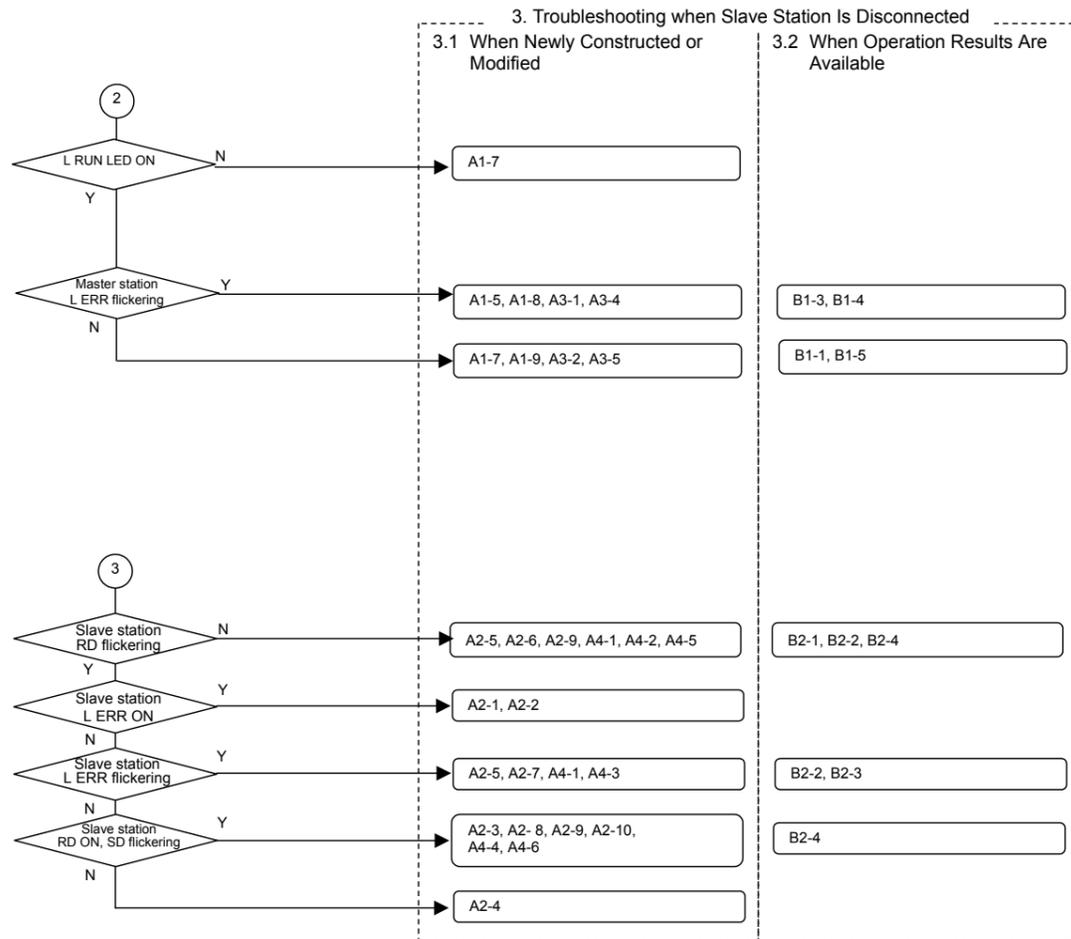
The link special register SW assigns one bit per station.

### 2.2.2 Symptom confirmation flow chart

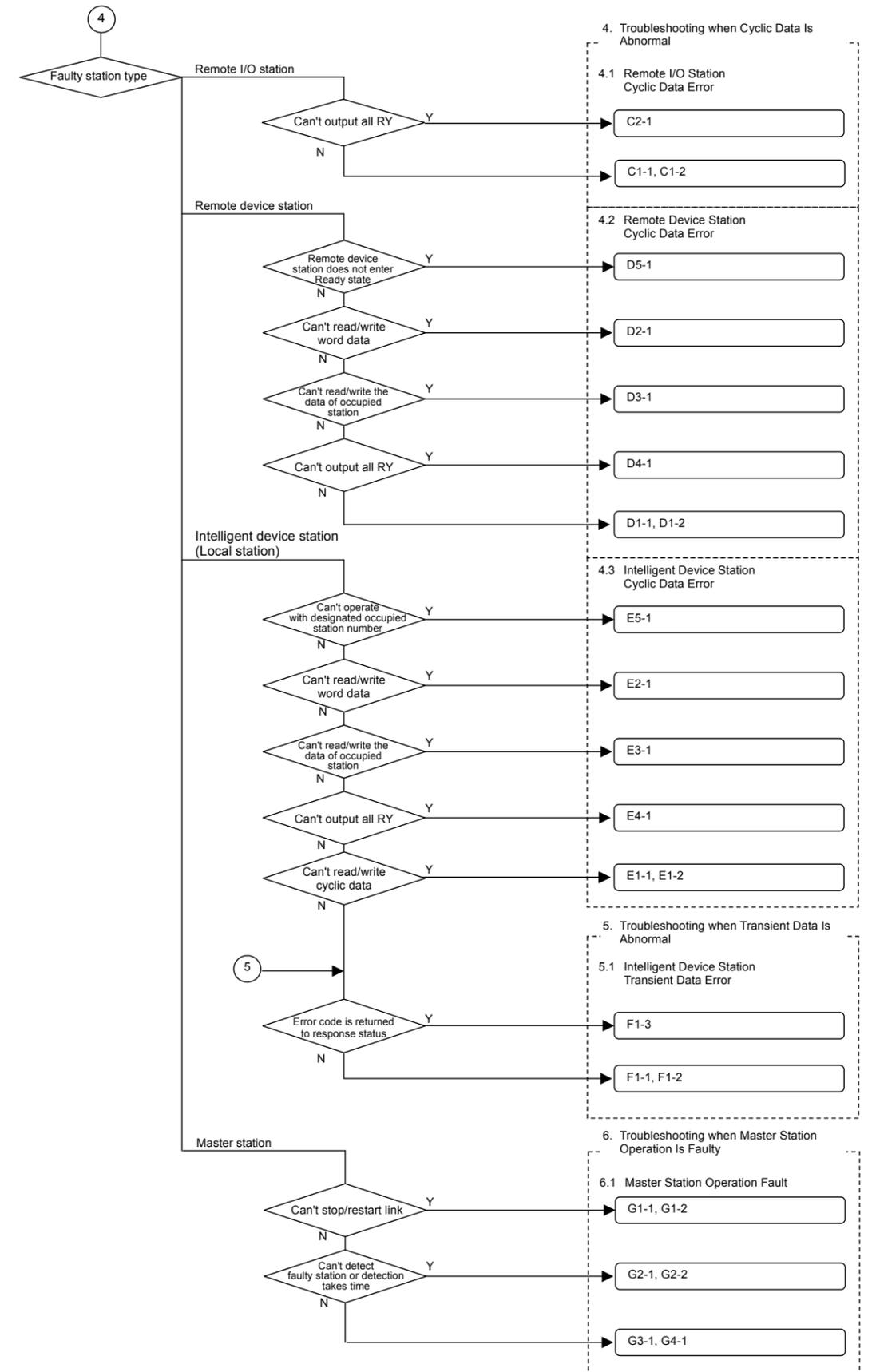
This section explains the procedures for confirming the symptoms when the link special register (SW) and buffer memory are monitored using a peripheral device connected to the master station. Confirming the symptoms with the following flow chart will lead to the number of a confirmation item in Chapters 3 to 5. Check the cause of the trouble with the confirmation method indicated with the corresponding confirmation item number, and process the state.



Judge the following state with the LED ON status.



Judge the following state with the link data communication state.



### 2.3 Confirming with Master Station and Slave Station LEDs

A peripheral device such as GX Developer is required to complete troubleshooting when the parameter setting or communication data is faulty. Even if a peripheral device cannot be prepared, when the cable, etc., is faulty, the symptoms can be easily confirmed with the LED ON states.

The procedures are explained below.

#### 2.3.1 LED displays

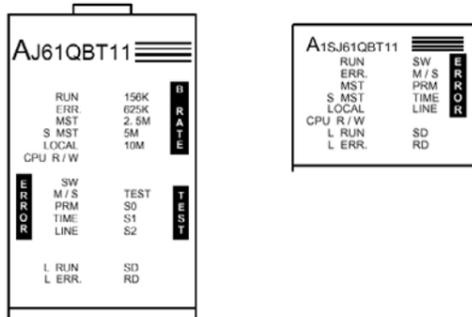
An LED is mounted on the master module and slave station. Basic examples of mounting the LED on each master module and slave station are shown below. Refer to the manual for each device for details.

##### Master module LED

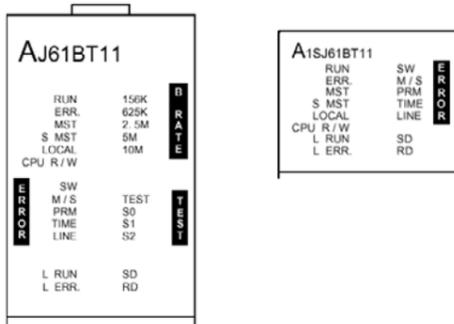
###### Q PLC



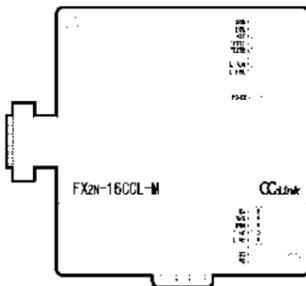
###### QnA PLC



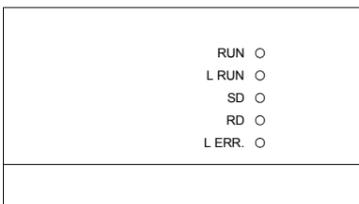
###### A PLC



###### FX PLC



##### Slave station LED

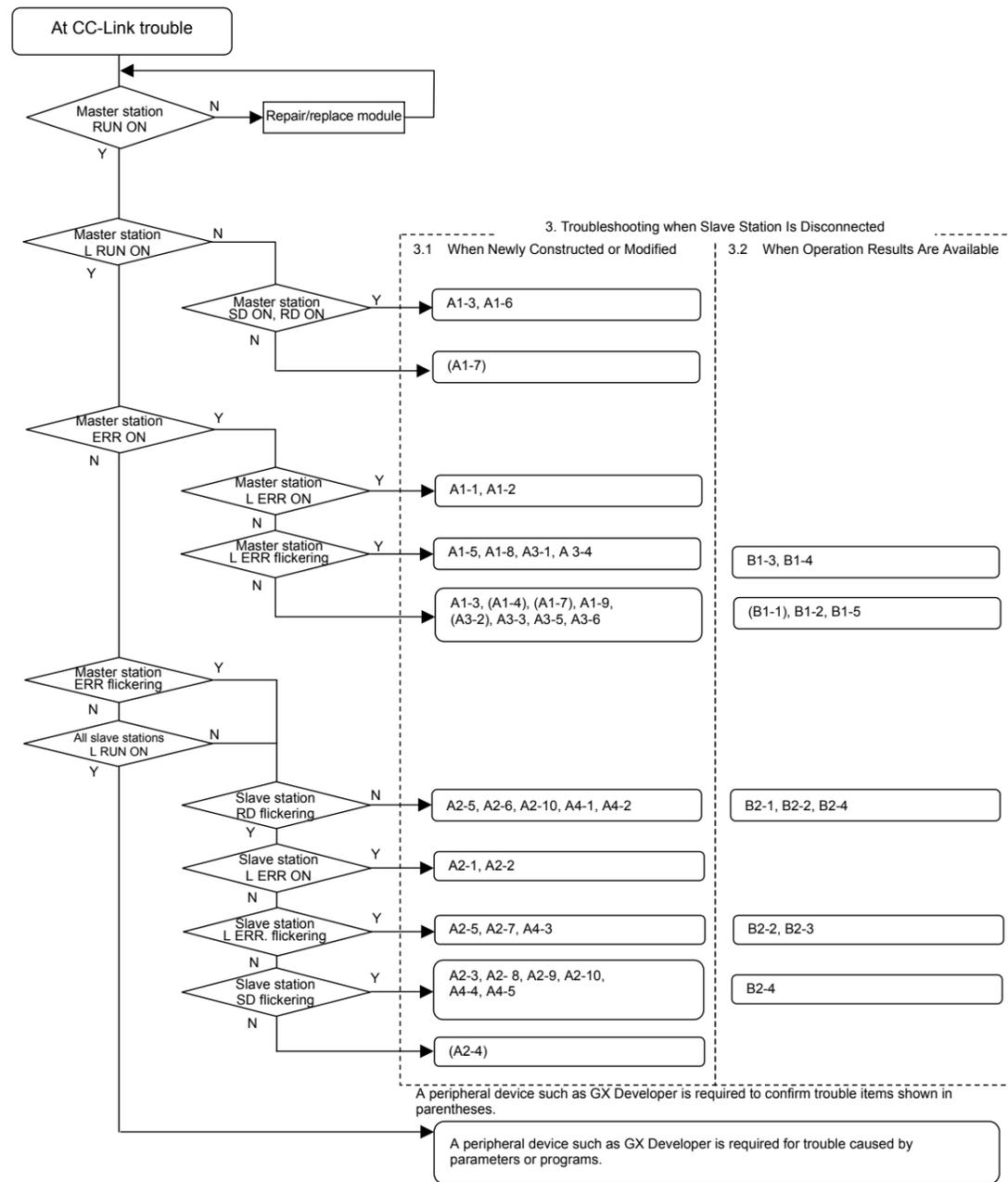


In this section, the symptoms are confirmed with the shaded LEDs mounted commonly for each station. The other LEDs are not used.

LED name	Details	Remarks
RUN	ON : When module is normal OFF : At watch dog timer error	
ERR.	ON: Communication fault in all stations Flickering: Communication fault in some station	QJ61BT11(N) also turns ON when the following types of error occur: <ul style="list-style-type: none"> <li>• Incorrect switch setting</li> <li>• Duplicate master station in same cable</li> <li>• Incorrect parameter setting</li> <li>• Expiration of data link monitor timer</li> <li>• Broken cable</li> </ul> The transmission path is affected by noise, etc.
MST	ON: Operating as master station (in data link control)	
S MST	ON: Operating as standby master station (standing by)	
LOCAL	ON: Set as local station	
CPU R/W	ON: Communicating with PLC CPU	Mounted on AJ61QBT11, A1SJ61QBT11, AJ61BT11, A1SJ61BT11 and FX2N-16CCL-M
SW	ON: Switch setting is incorrect	
M/S	ON: Master station already exists on same cable Flicker: Occupied station number duplicated (Excluding duplication of head station No.)	
PRM	ON: Parameter setting is incorrect	
TIME	ON: No response from any station because cable is disconnected or transmission path is affected by noise	
LINE	ON: Cable is disconnected, or transmission path is affected by noise, etc.	
L RUN	ON: Executing data link	
L ERR.	ON: Communication error (host station) Flickering at regular interval: Switch setting was changed during power ON Flickering at irregular interval: Terminator is not attached, or module or CC-Link dedicated cable is affected by noise	
156K	ON: When transmission speed is set to "156kbps"	Mounted only on AJ61QBT11 and AJ61BT11
625K	ON: When transmission speed is set to "625kbps"	
2.5M	ON: When transmission speed is set to "2.5Mbps"	
5M	ON: When transmission speed is set to "5Mbps"	
10M	ON: When transmission speed is set to "10Mbps"	
TEST	ON: Executing offline test	Mounted only on AJ61QBT11 and AJ61BT11
TEST1, 2	Display of test results	Mounted only on FX2N-16CCL-M
S0 to 2	(Not used)	
SD	ON: Sending data	
RD	ON: Receiving data	

### 2.3.2 Symptom confirmation flow chart

This section explains the procedures for confirming the symptoms with the master station and slave stations' LEDs. Confirming the symptoms with the following flow chart will lead to the number of a confirmation item in Chapters 3 to 5. Check the cause of the trouble with the confirmation method indicated with the corresponding confirmation item number, and process the state. Confirmation item numbers in parentheses in the flow chart require a peripheral device such as GX Developer to confirm the trouble.



## 3. Troubleshooting when Slave Station Is Disconnected

This section explains the troubleshooting methods for when the slave station is disconnected. The details to check, the confirmation methods and the remedies correspond to the confirmation item number found with the symptom confirmation flow chart in Chapter 2 are given.

The methods are divided into section 3.1 When CC-Link system Is Newly Constructed or Modified and section 3.2 When Operation Results Are Available according to the system operation state.

### 3.1 When CC-Link System Is Newly Constructed or Modified

Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
A1 The entire system cannot be linked.	A1-1	Station number Is the master station number set to a number other than 0? (Excluding when using A, QnA PLC remote I/O net mode.)	Check the station number switch for the master station. Check that the MST LED is ON.	Set the master station number to 0.	
	A1-2	Transmission speed Is the transmission speed outside of the setting range or different for the master station and slave station?	Check the transmission speed set for each station.	Correctly set the transmission speed.	
	A1-3	Mode, switch Is the master station mode other than the online mode? Is the master station switch setting correct? Is there an error at the master station?	Check the master station mode setting.	Set to the online mode.	
			Check the switch setting status (SW006A).	Correctly set the switch.	
	A1-4	Parameter setting Is the parameter information area being used correct? Are the network parameters (number of modules, station information, etc.) correct? Is there an error at the master station? • GX Developer network parameters (Q PLC) • Dedicated instructions (Q, A, QnA PLC) • Buffer memory/EEPROM (A, QnA, FX PLC) • Utility (Personal computer board)	Check the parameter information (SW0067).	Use the correct parameter information area.	
			• Check the master station's PLC CPU network parameters with the GX Developer. (Q PLC) (Cannot be set for Q4ARCPU) • Check the values set in the parameter area on the buffer memory. (A, QnA PLC) • Check the parameter setting with the Utility. (Personal computer board.)	Correctly set the network parameters. Write the parameters after formatting the PLC memory once.	
			Check the host station parameter status (SW0068). Check the mounting state (SW0069). Check the total number of stations (SW0070). Check the maximum number of communicating stations (SW0071). Check the number of connected modules (SW0072). Check whether the station numbers are duplicated. (SW0098 to 9B). Check the mounting and parameter consistency state (SW009C to 9F). Check the CC-Link Ver. mounting/parameter consistency state (SW0144 to 147). Check the reserved station state (SW0074 to 77).		
			Are the settings correct? (Q PLC: Automatic CC-Link start)	Is a value set for the intelligent function module switch?	Invalidate the GX Developer's intelligent function module switch setting.
			Are the settings correct? (Q PLC: When executing dedicated instruction RLPASET)	Is the intelligent function module switch 4 setting correct?	Set the GX Developer intelligent function module switch 4 to 0100H.
Are the various settings for the RLPASET instruction correct?				Correctly set the network parameters.	
Do the connections or settings exceed the master station's specifications? (FX PLC)			Was the parameter setting method changed without turning the PLC system power OFF and ON or resetting the CPU?	Turn the PLC system power OFF and ON or reset the PLC CPU.	
Registering parameters to EEPROM	Check the contents of the buffer memory (BFM#1DH). "1": The settings exceed the connectable specifications range.	Set within the specified range.			
	Is the parameter registration request (YnA) to the EEPROM ON? Has an error occurred? (A, QnA, FX PLC)	Check the PLC program. Check the EEPROM registration status (SW0090).	Correctly set the network parameters, and turn the parameter registration request (YnA) to the EEPROM ON.		

Trouble	Confirmation item	Details to check	Confirmation method	Remedy
A1 The entire system cannot be linked.	A1-5 Cables, etc.	Check the cables for disconnections, short-circuits, incorrect wiring, connection faults, noncompliance with specifications (transmission distance, station-to-station distance, transmission cable, use of different cable types, FG connection).	Check whether the cable between the master station and slave station is disconnected. *	Correctly connect the cable.
		Terminator	Check that the terminator is connected the both ends of the CC-Link system.	Connect to both ends of the CC-Link system.
			Check that the terminator matching the applicable cable type is correctly connected.	Connect a terminator that matches the applicable cable type.
	A1-6 Starting the link	Is the PLC in the RESET state? (When setting GX Developer network parameters)	Check whether the PLC's RESET switch is set to RESET.	Set the RESET switch to the middle.
		Is CC-Link started up automatically?	Is a value set for the intelligent function module switch?	Invalidate the GX Developer's intelligent function module switch setting.
		Is a program running (dedicated instruction, buffer memory: Yn6, EEPROM: Yn8)?	Check the PLC stop, error, program operation (dedicated instruction, Yn6/Yn8 startup).	Set the PLC to RUN and correctly start up.
	A1-7 PLC CPU/ controller confirmation	Is there an error in the master station's PLC CPU?	Check the PLC CPU error code.	Process the PLC CPU error. Refer to the PLC Manual.
		Is the module recognized?	Make sure that the CC-Link module is correctly recognized. Refer to the PLC Manual.	
		Is the personal computer (personal computer board) faulty?	Is the board recognized?	Make sure that the CC-Link board is recognized. Refer to the Personal Computer Manual.
		Remove the other option boards, and check whether operation starts up normally with just the CC-Link personal computer board.	Review the settings for the other option board's I/O, IRQ and memory address.	
		Is there a driver message in the control tool's event viewer?	Process the error event message. Refer to the Personal Computer Board Manual.	
		Is the sequence scan long? (Synchronous mode)	Does the sequence scan time exceed the allowable value? 10Mbps : 50ms 5Mbps : 50ms 2.5Mbps : 100ms 625kbps : 400ms 156kbps : 800ms	Set to the asynchronous mode, or delay the transmission speed.
	A1-8 Noise	Is noise imposed on the transmission cable?	Is the power cable laid near the transmission cable?	Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)
			Is the FG separated from the power system GND?	Separate the FG and power system GND.
			Lower the transmission speed and confirm the frequency of occurrence.	Provide measures against noise. Lower the transmission speed.
A1-9 Master station fault	Is the master module faulty?	Are normal operations restored when master module is replaced?	Repair or replace the master station.	

\* If the cause cannot be pinpointed with a visual check, refer to Chapter 7 Troubleshooting when Indistinct Error Occurs.

Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
A2 There is a station that cannot be linked.	A2-1 Station number	Is the faulty station's station number setting correct?	Check the station number setting for the corresponding station.	Correctly set the station number.	
	A2-2 Transmission speed	Is the transmission speed setting for the faulty station correct?	Check the corresponding station's transmission speed setting.	Set the transmission speed correctly.	
	A2-3 Online status (slave station)	Is the faulty station's CC-Link interface set to the online status?	Check the status of the faulty station.	Set to the online status.	
	A2-4 Parameter setting	Is the parameter information area being used correct?	Check the parameter information (SW0067).	Use the correct parameter information area.	
		Are the network parameters (number of modules, station information, etc.) correct?	<ul style="list-style-type: none"> <li>Check the master station's PLC CPU network parameters with the GX Developer. (Q PLC) (Cannot be set for Q4ARCPU)</li> <li>Check the values set in the parameter area on the buffer memory. (A, QnA PLC)</li> <li>Check the parameter setting with the Utility. (Personal computer board.)</li> </ul>	Correctly set the network parameters. Write the parameters after formatting the PLC memory once.	
		Are the settings correct? (Q PLC: Automatic CC-Link start)	<ul style="list-style-type: none"> <li>Check the GX Developer network parameters (Q PLC)</li> <li>Dedicated instructions (Q, A, QnA PLC)</li> <li>Buffer memory/EEPROM (A, QnA, FX PLC)</li> <li>Utility (Personal computer board)</li> </ul>	<ul style="list-style-type: none"> <li>Check the master station's PLC CPU network parameters with the GX Developer. (Q PLC) (Cannot be set for Q4ARCPU)</li> <li>Check the values set in the parameter area on the buffer memory. (A, QnA PLC)</li> <li>Check the parameter setting with the Utility. (Personal computer board.)</li> </ul>	
		Are the settings correct? (Q PLC: When executing dedicated instruction RLPASET)	<ul style="list-style-type: none"> <li>Check the host station parameter status (SW0068).</li> <li>Check the mounting state (SW0069).</li> <li>Check the total number of stations (SW0070).</li> <li>Check the maximum number of communicating stations (SW0071).</li> <li>Check the number of connected modules (SW0072).</li> <li>Check whether the station numbers are duplicated. (SW0098 to 9B).</li> <li>Check the mounting and parameter consistency state (SW009C to 9F).</li> <li>Check the CC-Link Ver. mounting/parameter consistency state (SW0144 to 147).</li> <li>Check the reserved station state (SW0074 to 77).</li> </ul>	<ul style="list-style-type: none"> <li>Check the host station parameter status (SW0068).</li> <li>Check the mounting state (SW0069).</li> <li>Check the total number of stations (SW0070).</li> <li>Check the maximum number of communicating stations (SW0071).</li> <li>Check the number of connected modules (SW0072).</li> <li>Check whether the station numbers are duplicated. (SW0098 to 9B).</li> <li>Check the mounting and parameter consistency state (SW009C to 9F).</li> <li>Check the CC-Link Ver. mounting/parameter consistency state (SW0144 to 147).</li> <li>Check the reserved station state (SW0074 to 77).</li> </ul>	
		Are the settings correct? (Q PLC: Automatic CC-Link start)	Is a value set for the intelligent function module switch?	Invalidate the GX Developer's intelligent function module switch setting.	
		Are the settings correct? (Q PLC: When executing dedicated instruction RLPASET)	Is the intelligent function module switch 4 setting correct?	Set the GX Developer intelligent function module switch 4 to 0100H.	
			Are the various settings for the RLPASET instruction correct?	Correctly set the network parameters.	
			Was the parameter setting method changed without turning the PLC system power OFF and ON or resetting the CPU?	Turn the PLC system power OFF and ON or reset the PLC CPU.	
			Do the connections or settings exceed the master station's specifications? (FX PLC)	Check the contents of the buffer memory (BFM#1DH).	Set within the specified range.
		Registering parameters to EEPROM	Is the parameter registration request (YnA) to the EEPROM ON? Has an error occurred? (A, QnA, FX PLC)	Check the PLC program. Check the EEPROM registration status (SW0090).	Correctly set the network parameters, and turn the parameter registration request (YnA) to the EEPROM ON.
	A2-5 Cables, etc.	Check the cables for disconnections, short-circuits, incorrect wiring, connection faults, noncompliance with specifications (transmission distance, station-to-station distance, transmission cable, use of different cable types, FG connection).	Check the faulty station's cable? * Check whether the faulty station's SD and RD LEDs are flickering.	Correctly connect the cable.	
			If there are several faulty stations up to the end of the transmission path, check the cable of the station closest to the master station. (Several stations) *	Correctly connect the cable.	
A2-6 Supply power (for communication)	Power OFF, outside of voltage working range	Is the power for the faulty station ON?	Turn the power ON.		
		Is the supplied voltage within the specified range?	Set the supplied voltage within the specified range.		

\* If the cause cannot be pinpointed with a visual check, refer to Chapter 7 Troubleshooting when Indistinct Error Occurs.

	Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
A2	There is a station that cannot be linked.	A2-7	Noise	Is noise imposed on the transmission cable?	Is the power cable laid near the transmission cable? Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)	
				Is the FG separated from the power system GND?	Separate the FG and power system GND.	
				Lower the transmission speed and confirm the frequency of occurrence.	Provide measures against noise. Lower the transmission speed.	
		A2-8	Start up	Is the startup order correct?	Change the start up order of the faulty station, and check.	Start up following the procedures given in the manual for the corresponding station.
		A2-9	Slave station fault	Is the slave station faulty?	Is normal operation possible when faulty slave station is replaced? *	Repair or replace the faulty slave station.
A2-10	Standby master station	Is the standby master station controlling the data link?	Use the master station's CC-Link Diagnostics to check whether the master station switching status is set to the standby station.	Startup the system again and control with the master station.		
A3	The entire system cannot be linked sometimes.	A3-1	Cables, etc.	Is there a cable/connector contact fault? Is the specified range exceeded?	Check the cable between the master station and slave station. *	Correctly connect the corresponding cable.
				A3-2	Parameter setting	Is the sequence scan long? (Synchronous mode)
		A3-3	Supply power (for communication)	Is the power OFF or outside of the voltage working range?	Check the power for the master station and all slave stations.	Set the supplied voltage within the specified range.
		A3-4	Noise	Is noise imposed on the transmission cable?	Is the power cable laid near the transmission cable? Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)	Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)
				Is the FG separated from the power system GND?	Separate the FG and power system GND.	
				Lower the transmission speed and confirm the frequency of occurrence.	Provide measures against noise. Lower the transmission speed.	
		A3-5	Master station fault	Is the master module faulty?	Are normal operations restored when master module is replaced?	Repair or replace the master station.
		A3-6	Link stop	Was the data link stop instruction inadvertently executed?	Is data link stop (SB0002) ON?	Do not turn data link stop (SB0002) ON. Make sure that multiple devices do not read out SB0002.
		A4	There are stations that cannot be linked sometimes.	A4-1	Cables, etc.	Check the cables for disconnections, short-circuits, incorrect wiring, connection faults, noncompliance with specifications (transmission distance, station-to-station distance, transmission cable, use of different cable types, terminator, FG connection).
If there are several faulty stations up to the end of the transmission path, check the cable of the station closest to the master station. *	Correctly connect the corresponding cable.					
Is the correct terminator connected? *	Connect terminators that match the applicable cable type to both ends of the CC-Link system.					
A4-2	Supply power (for communication)			Is the power OFF or outside of the voltage working range?	Check the faulty station's power.	Set the supplied voltage within the specified range.
A4-3	Noise			Is noise imposed on the transmission cable?	Is the power cable laid near the transmission cable? Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)	Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)
				Is the FG separated from the power system GND?	Separate the FG and power system GND.	
				Lower the transmission speed and confirm the frequency of occurrence.	Provide measures against noise. Lower the transmission speed.	
A4-4	Start up			Is the startup order correct?	Change the start up order of the faulty station, and check.	Start up following the procedures given in the manual for the corresponding station.
A4-5	Slave station fault	Is the slave station faulty?	Is normal operation possible when faulty slave station is replaced? *	Repair or replace the faulty slave station.		
A4-6	Standby master station	Is the standby master station controlling the data link?	Use the master station's CC-Link Diagnostics to check whether the master station switching status is set to the standby station.	Startup the system again and control with the master station.		

\* If the cause cannot be pinpointed with a visual check, refer to Chapter 7 Troubleshooting when Indistinct Error Occurs.

### 3.2 When operation results are available

	Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
B1	The entire system cannot be linked.	B1-1	PLC CPU/controller	Is there an error in the master station's PLC CPU?	Check the PLC CPU error code. Process according to the PLC CPU error code. Refer to the PLC Manual.	
				Is the module recognized?	Make sure that the CC-Link module is correctly recognized. Refer to the PLC Manual.	
				Is the personal computer (personal computer board) faulty?	Is the board recognized?	Make sure that the CC-Link board is recognized. Refer to the Personal Computer Manual.
					Remove the other option boards, and check whether operation starts up normally with just the CC-Link personal computer board.	Review the settings for the other option board's I/O, IRQ and memory address.
				Is there a driver message in the control tool's event viewer?	Process the error event message. Refer to the Personal Computer Board Manual.	
				B1-2	Supply power (for communication)	Has the voltage dropped?
		B1-3	Cables, etc.	Is the cable disconnected, short-circuit or have a connection fault?	Check whether the cable connected between the master station and slave station is disconnected, etc.	Correctly connect the cable.
		B1-4	Noise	Is noise imposed on the power cable?	Is the power cable laid near the transmission cable?	Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)
					Is the FG separated from the power system GND?	Separate the FG and power system GND.
					Lower the transmission speed and confirm the frequency of occurrence.	Provide measures against noise. Lower the transmission speed.
Are normal operations restored when master module is replaced?	Repair or replace the master station.					
B1-5	Master station fault	Is the master module faulty?	Are normal operations restored when master module is replaced?	Repair or replace the master station.		
B1-6	Link stop	Was the data link stop instruction inadvertently executed?	Is data link stop (SB0002) ON?	Do not turn data link stop (SB0002) ON. Make sure that multiple devices do not read out SB0002.		
B2	There are stations that cannot be linked sometimes.	B2-1	Supply power (for communication)	Has the voltage dropped?	Check the faulty station's power.	Set the supplied voltage within the specified range.
				B2-2	Cables, etc.	Is there a cable/connector contact fault?
		B2-3	Noise	Is noise imposed on the power cable?	Is the power cable laid near the transmission cable?	Separate the transmission cable and power cable as far as possible when wiring. (Recommendation: Separate by 10cm or more)
					Is the FG separated from the power system GND?	Separate the FG and power system GND.
B2-4	Slave station fault	Is the slave station faulty?	Is normal operation possible when faulty slave station is replaced?	Repair or replace the faulty slave station.		

\* If the cause cannot be pinpointed with a visual check, refer to Chapter 7 Troubleshooting when Indistinct Error Occurs.

## 4. Troubleshooting when Cyclic Data Is Abnormal

This section explains the troubleshooting methods for when a cyclic data error occurs. The details to check, the confirmation methods and the remedies correspond to the confirmation item number found with the symptom confirmation flow chart in Chapter 2 are given.

### 4.1 Remote I/O Station Cyclic Data Error

	Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
C1	The cyclic data cannot be read/written	C1-1	Refresh data area	Is auto refresh correctly set? (RX, RY, SB, SW)	Is the auto refresh setting range correct?	Correctly set the auto refresh parameter.
				Are the devices duplicated with those used in the sequence programs or other networks? (The 8-point or 16-point I/O module is also 32 points (fixed) per station: Excluding when QJ61BT11N remote I/O station is set.)	Set the refresh device so that it is not duplicated with devices used in the sequence program or other networks.	
				Are refresh using the auto refresh parameter setting and refresh using the FROM/TO instruction executed simultaneously?	Check the sequence program. Check the auto refresh parameter setting.	Execute refresh only with the auto refresh parameter setting or FROM/TO instruction.
		C1-2	Parameter setting	Is the correct address in the buffer memory read/written? (RX, RY, SB, SW)	Check the sequence program. (The 8-point or 16-point I/O module is also 32 points (fixed) per station: Excluding when QJ61BT11N remote I/O station's number of points is set.)	Access the address for the corresponding station. Set the refresh device so that it is not duplicated with devices used in the sequence program or other networks.
				Is the reserved station setting correct?	Is the bit set to "1" for the corresponding station which cannot read/write the reserved station designation status (SW0074 to 77).	Cancel the reserved station setting.
				Do the connections or settings exceed the master station's specifications? (FX PLC)	Check the contents of the buffer memory (BFM#1DH).	Set within the specified range.
C2	RY is not output	C2-1	Refresh instruction	Is a refresh instruction (Yn0) issued? (When setting parameters with A/QnA PLC FROM/TO instruction)	Check whether the refresh instruction Yn0 is "ON".	Turn the refresh instruction Yn0 "ON".
				Is a refresh instruction (SB0003) issued? (Q PLC)	Check whether the refresh instruction SB0003 is "ON".	Turn the refresh instruction SB0003 "ON".

### 4.2 Remote Device Station Cyclic Data Error

	Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
D1	The cyclic data cannot be read/written	D1-1	Refresh data area	Is auto refresh correctly set? (RX, RY, RWw, RWr, SB, SW)	Are the devices duplicated with those used in the sequence programs or other networks?	Set the refresh device so that it is not duplicated with devices used in the sequence program or other networks.
				Is buffer memory correctly accessed? (RX, RY, RWw, RWr, SB, SW)	Are the devices duplicated with those used in the sequence programs or other networks?	Access the address for the corresponding station. Set the refresh device so that it is not duplicated with devices used in the sequence program.
		D1-2	Parameter setting	Is the reserved station setting correct?	Check whether the reserve station is not set, or whether the bit is set to "1" for the station corresponding to SW0074 to 77.	Cancel the reserved station setting.
D2	The word data cannot be read/written	D2-1	Parameter setting	Is the consistency with the parameters correct?	Is remote I/O station mounted in the corresponding station number?	Match the parameters with the actually mounted model.
				Do the connections or settings exceed the master station's specifications? (FX PLC)	Check the contents of the buffer memory (BFM#1DH).	Set within the specified range.
D3	Cannot read/write the lower area of the cyclic data	D3-1	Parameter setting	Is the consistency with the parameters correct?	Is a device with a small occupied station number mounted in the corresponding station number?	Match the parameters with the actually mounted occupied station number.
D4	RY is not output	D4-1	Refresh instruction	Is a refresh instruction (Yn0) issued? (When setting parameters with A/QnA PLC FROM/TO instruction)	Check whether the refresh instruction Yn0 is "ON".	Turn the refresh instruction Yn0 "ON".
				Is a refresh instruction (SB0003) issued? (Q PLC)	Check whether the refresh instruction SB0003 is "ON".	Turn the refresh instruction SB0003 "ON".
D5	Remote device station does not enter Ready (Xn1B: ON) state	D5-1	Initial setting	Are the initial settings (Xn18) completed?	Is the initial data process request (Xn18) OFF?	Execute the initial data process.
				Is the remote device station's initialization procedure registration correctly completed? (Q PLC)	Check whether the remote device station initialization procedure registration is being executed (SB000D is ON). Check the remote device station initialization procedure registration results (SW005F).	Review the remote device station initialization procedure registration.
				Are the remote device station's initial settings correct?	Check the parameters. Check the sequence program.	Correctly set the initial settings for the remote device station.

### 4.3 Intelligent Device Station (Local Station) Cyclic Data Error

Trouble	Confirmation item	Details to check	Confirmation method	Remedy
E1 The cyclic data cannot be read/written	E1-1 Refresh data area	Is auto refresh correctly set? (RX, RY, RWw, RWr, SB, SW)	Are the devices duplicated with those used in the sequence programs or other networks?	Set the refresh device so that it is not duplicated with devices used in the sequence program or other networks.
		Is buffer memory correctly accessed? (RX, RY, RWw, RWr, SB, SW)	Are the devices on the master station side duplicated with those used in the sequence programs or other networks?	Access the address for the corresponding master station. Set the refresh device so that it is not duplicated with devices used in the sequence program.
		Are the devices on the local station side duplicated with those used in the sequence programs or other networks?	Access with the correct address on the local station side. Set the refresh device so that it is not duplicated with devices used in the sequence program.	
	E1-2 Parameter setting	Is the reserved station setting correct?	Check whether the reserve station is not set, or whether the bit is set to "1" for the station corresponding to SW0074 to 77.	Cancel the reserved station setting.
E2 The word data cannot be read/written	E2-1 Parameter setting	Is the consistency with the parameters correct?	Is remote I/O station mounted in the corresponding station number?	Match the parameters with the actually mounted model.
E3 Cannot read/write the lower area of the cyclic data	E3-1 Parameter setting	Is the consistency with the parameters correct?	Is a device with a small occupied station number mounted in the corresponding station number?	Match the parameters with the actually mounted occupied station number.
E4 RY is not output (A/QnA PLC)	E4-1 Refresh instruction	Is a refresh instruction (Yn0) issued? (When setting parameters with A/QnA PLC FROM/TO instruction)	Check whether the refresh instruction Yn0 is "ON".	Turn the refresh instruction Yn0 "ON".
E5 The local station is not running with the designated occupied station number	E5-1 Function version	Is the module version compatible with a 2 or 3 station occupation setting?	Is a master module other than the following being used? <ul style="list-style-type: none"> <li>• QJ61BT11N</li> <li>• QJ61BT11 (Function version B or above)</li> <li>• AJ61BT11, AJ61QBT11 (Hardware version F or above)</li> <li>• A1SJ61BT11, A1SJ61QBT11 (Hardware version G or above)</li> </ul>	Use a master module with a compatible version. Set to 1 station occupation or 4 station occupation.

### 5. Troubleshooting when Transient Data Is Abnormal

This section explains the troubleshooting methods for when a transient data error occurs. The details to check, the confirmation methods and the remedies correspond to the confirmation item number found with the symptom confirmation flow chart in Chapter 2 are given.

#### 5.1 Intelligent Device Station (Local Station) Transient Data Error

Trouble	Confirmation item	Details to check	Confirmation method	Remedy
F1 Transient error	F1-1 Refresh data area	Is there an error in the transient transmission (dedicated instruction)?	Is the correct address accessed?	Access the address for the corresponding station.
		Is the consistency with the parameters correct?	Is a remote I/O station or remote device station mounted?	Match the parameters with the actually mounted model.
		Is the mode (condition setting switch SW8) correct? (A PLC)	Is the mode set to the intelligent mode?	Set the condition setting switch (SW8) to the intelligent mode.
	F1-2 Parameter setting	Is the mode (condition setting switch SW8) correct? (A PLC)	Is the mode set to the intelligent mode?	Set the condition setting switch (SW8) to the intelligent mode.
		Is the consistency with the parameters correct?	Is the mode set to the intelligent mode?	Set the condition setting switch (SW8) to the intelligent mode.
		Is the mode (condition setting switch SW8) correct? (A PLC)	Is the mode set to the intelligent mode?	Set the condition setting switch (SW8) to the intelligent mode.
F1-3 Response status	Error code 4B00H (handshake error)	Were the last two bits of RY accessed while executing the dedicated instruction?	Do not use the last two bits of RY.	
	Error code B404H (response time up)	Check whether the response was returned from the request destination station within the monitor time.	Lengthen the monitor time setting value. If the error still occurs, check the request destination module, and check the cable.	
	Are the transient transmission (dedicated instruction) contents correct?	Check the completion status error code when the dedicated instruction is executed.	Process according to the error code in the completion status.	
	Is the automatic refresh parameter set? (A, QnA PLC)	Is the auto refresh parameter set with the RLPA instruction (A PLC) or GX Developer (QnA).	Set the auto refresh parameter with the RLPA instruction (A PLC) or GX Developer (QnA).	
	Is there an error in the master station or intelligent device station?	Check the PLC CPU error code. Check the master station error code. Check the operation status of the master station and target intelligent device station.	Process according to the error code.	

## 6. Troubleshooting when Master Station Operation Is Faulty

This section explains the troubleshooting methods for when the master station operation is faulty. The details to check, the confirmation methods and the remedies correspond to the confirmation item number found with the symptom confirmation flow chart in Chapter 2 are given are given.

### 6.1 Master Station Operation Fault

Confirmation item	Trouble	Confirmation item	Details to check	Confirmation method	Remedy	
G1	The data link cannot be stopped or started.	G1-1	Data link stop	Is data link stop (SB0002) ON?	Check the sequence program. Check the auto refresh parameter.	Correctly set the SB area. Turn data link stop (SB0002) ON.
			Is an error occurring?	Check the data link stop results (SW0045).	Remedy according to the error code.	
		G1-2	Data link restart	Is data link restart (SB0000) ON?	Check the sequence program. Check the auto refresh parameter.	Correctly set the SB area. Turn data link restart (SB0000) ON?
			Is an error occurring?	Check the data link restart results (SW0041).	Process according to the error code.	
		Is the corresponding station disconnected?	Check the cable state visually or with a loop test. Check the parameters. (For local station) Check the operation status of the corresponding station's PLC CPU.	Review the corresponding station's cable and settings, and correctly start up.		
G2	The faulty station cannot be detected.	G2-1	Faulty station detection	Is an error invalid station set?	Check the error invalid station status (SW0078 to 7B).	Disable the error invalid station setting.
			Are the station numbers duplicated?	Check the station number setting.	Correctly set the station number.	
		G2-2	Sequence program	Was the FROM/TO instruction executed in succession?	Does the program execute the FROM/TO instruction multiple times in one sequence scan? When the program contains the FROM/TO instruction, is the sequence scan time much shorter than the link scan time?	Access the buffer memory as a batch, and reduce the number of FROM/TO instructions. Add XnC as the b contact to the start contact of the FROM/TO instruction.
	Detecting the faulty station takes time Xn1 (host station data link status) does not turn ON, or the link special relay (SB)/link special register (SW) are not updated correctly (A PLC)					
G3	A faulty station occurs depending on the transmission speed	G3-1	Transmission speed, cable, etc.	Can the faulty station be pinpointed with the other station communication status (SW0080 to SW0083)?	Check the faulty station's switch settings.	Set the transmission speed setting to the master station.
				Is correct communication possible when speed is set to slow transmission speed such as 156kbps?	Check whether the cable is correctly wired.	Correctly wire the cable.
					Check whether the cable shield is grounded.	Ground the shield.
					Are terminators matching the applicable cable type connected to the last station at both ends of the CC-Link system?	Connect terminators that match the applicable cable type to both ends of the CC-Link system.
G4	When the power for multiple remote stations is turned OFF at 156kbps, the "L RUN" LED turns OFF temporarily	G4-1	Transmission speed, parameter setting	Number of retry setting	What is the number of retry setting?	Increase the transmission speed. Reduce the number of retries.

## 7. Troubleshooting when Indistinct Error Occurs

This section explains the troubleshooting methods for when the trouble cannot be pinpointed with the previous sections, such as when an error such as a communication failure in all slave stations or a specific station occurs during system operation.

### 7.1 Cause of Faults

The following errors can cause a communication failure in all slave stations or a specific station during system operation.

#### [Causes of faults when communication fails with all slave stations]

Faulty symptom	Possible fault cause	Others
Communication fails with all slave stations	Slave station is down in the active state *1	<ul style="list-style-type: none"> <li>Master station reset → M/S error occurs.</li> <li>Reset faulty slave station → Data link resumes.</li> </ul>
	Slave station hardware fault	<ul style="list-style-type: none"> <li>Master station reset → M/S error occurs.</li> <li>Remove communication terminal block from faulty slave station → Data link resumes.</li> </ul>
	Short-circuit between communication terminals (DA-DB) Terminator is disconnected	A fault in the communication terminal section is the same as a communication path error, so the network status will not change even if the master station or slave station is reset.

\*1: An active state refers to the state in which the slave station is sending data. If the slave station fails in the active state, junk data will constantly flow to the network.

#### [Causes of faults when communication fails with specific stations]

Faulty symptom	Possible fault cause	Others
Communication fails with specific station	Slave station hardware fault	Remove communication terminal block from faulty slave station → Data link resumes.
	Short-circuit between communication terminal and ground terminal (DA-DG)	A fault in the communication terminal section is the same as a communication path error, so the network status will not change even if the master station or slave station is reset.
	Short-circuit between communication terminals (DA-DB)	
	Terminator is disconnected	
	Use of cable exceeding restriction range	If a fault occurs in the communication path, the state will not change even if the master station or slave station is reset.
Use of T-branch exceeding restriction range		
Internal disconnection of communication cable		

## 7.2 Pinpointing the Detailed Cause of the Fault

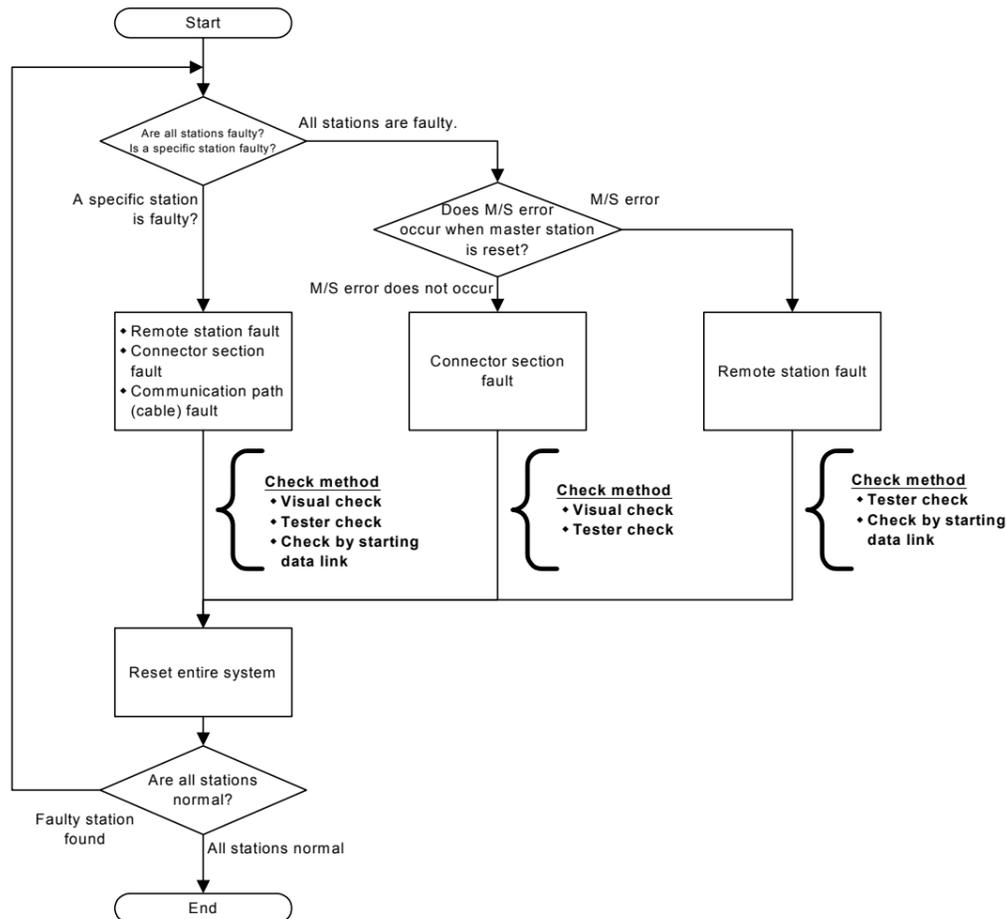
Check the state with the following method to pinpoint the detailed cause listed in the previous section.

1. Visual check
2. Check using tester
3. Check using data link

The relation of these detailed causes and the check method for pinpoint the cause is given below.

Outline cause	Detailed cause	Check method
Slave station fault	Down in active state	Check with data link
	Hardware fault	Check using tester Check with data link
Fault in communication terminal block section (wiring work fault)	Short-circuit between communication terminal and ground terminal (DA-DG, etc.).	Check using tester
	Short-circuit between communication terminals (DA-DB)	
	Disconnected terminator	
Communication path (cable) fault	Use of cable exceeding restriction range (use of different cable types, distance restrictions)	Visual check
	Use of T-branch exceeding restriction range (distance restrictions, transmission speed restrictions)	
	Internal disconnection of communication cable	Check using tester

The outline procedure flow for this troubleshooting is shown below.



\* If a specific station is faulty, check all items. The loop status must be correct to check using the data link, so check starting with 1. Visual check. The checking methods given in the procedure outline are explained on the following pages.

## 7.3 Checking Methods

### 7.3.1 Visual check

The visual check methods are explained in this section.

**CAUTION**

Turn the power for the master station and all slave stations OFF before checking the CC-Link system.

Check item	Check details	Remedy
Check the cable laying state.	Does the overall length within the specified range?	Adjust the overall length according to the system configuration.
	Is the station-to-station distance within the specified range?	Adjust the station-to-station distance according to the system configuration.
	Are different types of cables used?	Do not use different brands or types of Ver. 1.00 compatible cables with the CC-Link 1 system. Use only CC-Link dedicated cables, CC-Link dedicated high-performance cables or Ver. 1.10 compatible CC-Link dedicated cables.
	Are the T-branch connection main line/branch line distance restrictions within the specified range?	Refer to the manual and adjust the distance.
	Are the T-branch connection transmission speed restrictions within the specified range?	Construct the system with a speed of 625kbps or less.
Check the terminator.	Is the terminator connected between DA-DB? <sup>*2</sup>	Connect the terminator between DA-DB.
	Is there a disconnection at the base of the terminator?	Replace with a new terminator.
	Is a terminator connected to the stations at both ends of the system?	Connect a terminator to the stations at both ends of the system. If a terminator is connected to a station midway, remove it.
	Does the resistance value match the cable type?	Connect a terminator that matches the cable type.
	Is a terminator connected to the end of the T-branch's branch line?	Remove the terminator from the end of the T-branch's branch line.

Cable type	Resistance value
CC-Link dedicated cable Ver. 1.10 compatible CC-Link dedicated cable	110Ω
CC-Link dedicated high-performance cable	130Ω

\*2. "Measurement of resistance value between communication terminals" by checking with a tester on the next page can also be used to confirm that the terminator is connected between DA-DB.

### 7.3.2 Checking with a tester

The methods for checking with a tester are explained in this section.

⚠ **CAUTION**

**Turn the power for the master station and all slave stations OFF before checking the CC-Link system.**

Check item	Check details	Remedy												
Measurement of resistance value between communication terminal and DG	(1) Measure between DA and DG with the master station.	Replace the short-circuited communication terminal block or the faulty module. Pinpoint the faulty module <b>by visually checking for incorrect wiring</b> . If incorrect wiring between the communication terminal and DG cannot be visually confirmed, the module is probably faulty. In this case, pinpoint the module with <b>the check using the method of bisection</b> <sup>*4</sup> .												
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Measurement of resistance value between communication terminals.	(5) Measure between DA and DB with the master station. [When terminating resistance is 110Ω]	Replace the short-circuited communication terminal block or the faulty module. Pinpoint the faulty module using <b>the method of bisection</b> .												
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\*3: The resistance value above will increase or decrease according to the measurement point and system scale.

\*4: Refer to the following page for details on the method of bisection.

### Method of bisection

The method of bisection is a procedure used to pinpoint the faulty device by reducing the system configuration.

First split the entire system into half (first half, second half), and check whether there is a fault.

Then, split the system in half (actually quarters) and again in half (actually eighths), and ultimately pinpoint the slave station where there is a fault.

As an example, the method to pinpoint the slave station using this method of bisection with a system having 20 CC-Link slave stations connected is explained. In this network configuration, the slave stations are connected adjacent to the master station in descending order from station number 1 to station number 20.

- (1) Split the system in half. Disconnect the communication cable connected between station number 10 and station number 11, and connect a terminator to the station number 10 slave station. Then measure the master station's terminal block with a tester.
- (2) If the state is okay with step 1, the master station to station number 10 is normal. Disconnect the communication cable connected between station number 15 and station number 16 to split the system in half again. Connect a terminator to the station number 11 and station number 15 at each end. Measure the terminal block at station number 11 with a tester.
- (3) If the state is not okay (N.G.) with step 1, there is a faulty station between the master station and station number 10. Disconnect the communication cable connected between station number 5 and station number 6 to split the system in half, and connect the terminator to station number 5. Measure the master station's terminal block with a tester.
- (4) Repeat steps 1 to 3 to pinpoint the faulty slave station.
- (5) If the slave station cannot be pinpointed with the above procedure (if a proper data link is established with fewer stations), pinpoint the faulty station with the check method using data link explained on the next page.

When this procedure is used, a measurement must be made six times for a system having 64 slave stations. Structuring a system by separating the CC-Link network using repeater modules is recommended as a method to shorten this investigation procedure.

### 7.3.3 Checking with a data link

The method for checking with a data link is explained in this section. The investigation is carried out with data link running, so the user system parameters must be registered in the CPU.

**⚠ CAUTION**

**After the data link is started up, stop the PLC CPU to prevent incorrect outputs to the slave station during this investigation.**

Check item	Check details	Remedy																														
Turn entire systems' power OFF and turn master station's power ON.	Check the LED status. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Station type</th> <th>LED ON status</th> <th>Status</th> <th>Cause</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Master station</td> <td>RUN ON L RUN ON ERR ON</td> <td>Normal</td> <td>—</td> </tr> <tr> <td>Other than the above</td> <td>Faulty</td> <td>Unit fault</td> </tr> </tbody> </table>	Station type	LED ON status	Status	Cause	Master station	RUN ON L RUN ON ERR ON	Normal	—	Other than the above	Faulty	Unit fault	The master station's module may be faulty. Replace the master station's module.																			
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Master station	RUN ON L RUN ON ERR ON	Normal	—																													
	Other than the above	Faulty	Unit fault																													
Turn ON the power for all slave stations.	Check the LED status. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Station type</th> <th>LED ON status</th> <th>Status</th> <th>Cause</th> </tr> </thead> <tbody> <tr> <td>Master station</td> <td>RUN ON L RUN ON ERR OFF</td> <td rowspan="2">Normal</td> <td rowspan="2">—</td> </tr> <tr> <td>Slave station</td> <td>PW/RUN ON L RUN ON</td> </tr> </tbody> </table> <p>(A) When fault occurs in all stations</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Station type</th> <th>LED ON status</th> <th>Status</th> <th>Cause</th> </tr> </thead> <tbody> <tr> <td>Master station</td> <td>RUN ON L RUN ON <b>ERR ON</b></td> <td rowspan="2">Faulty</td> <td rowspan="2"> <ul style="list-style-type: none"> <li>Down in active state</li> <li>Hardware fault</li> </ul> </td> </tr> <tr> <td>Slave station</td> <td>PW/RUN ON <b>L RUN OFF</b></td> </tr> </tbody> </table> <p>(B) When faulty station is found</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Station type</th> <th>LED ON status</th> <th>Status</th> <th>Cause</th> </tr> </thead> <tbody> <tr> <td>Master station</td> <td>RUN ON L RUN ON <b>ERR flicker</b></td> <td rowspan="2">Faulty</td> <td rowspan="2"> <ul style="list-style-type: none"> <li>Hardware fault</li> </ul> </td> </tr> <tr> <td>Slave station</td> <td>PW/RUN ON <b>L RUN ON</b></td> </tr> </tbody> </table>	Station type	LED ON status	Status	Cause	Master station	RUN ON L RUN ON ERR OFF	Normal	—	Slave station	PW/RUN ON L RUN ON	Station type	LED ON status	Status	Cause	Master station	RUN ON L RUN ON <b>ERR ON</b>	Faulty	<ul style="list-style-type: none"> <li>Down in active state</li> <li>Hardware fault</li> </ul>	Slave station	PW/RUN ON <b>L RUN OFF</b>	Station type	LED ON status	Status	Cause	Master station	RUN ON L RUN ON <b>ERR flicker</b>	Faulty	<ul style="list-style-type: none"> <li>Hardware fault</li> </ul>	Slave station	PW/RUN ON <b>L RUN ON</b>	Replace the slave station that failed in the active station or the slave station with faulty hardware. The methods for pinpointing the faulty station are explained on the next pages.
Station type	LED ON status	Status	Cause																													
Master station	RUN ON L RUN ON ERR OFF	Normal	—																													
Slave station	PW/RUN ON L RUN ON																															
Station type	LED ON status	Status	Cause																													
Master station	RUN ON L RUN ON <b>ERR ON</b>	Faulty	<ul style="list-style-type: none"> <li>Down in active state</li> <li>Hardware fault</li> </ul>																													
Slave station	PW/RUN ON <b>L RUN OFF</b>																															
Station type	LED ON status	Status	Cause																													
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Slave station	PW/RUN ON <b>L RUN ON</b>																															

### (1) Pinpointing the faulty station when all stations are faulty

Pinpointing procedure	Check details																				
Turn the power for the slave stations OFF one station at a time.	Check the LED status.																				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Station type</th> <th>LED ON status</th> <th>Status</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>Master station</td> <td>RUN ON L RUN ON <b>ERR. flicker</b></td> <td rowspan="2">Normal</td> <td rowspan="2">The slave station for which the power was turned OFF last is faulty. Replace the slave station for which the power was turned OFF last, and then carry out "Checking with a data link" again.</td> </tr> <tr> <td>Slave station (power ON)</td> <td>PW/RUN ON <b>L RUN ON</b></td> </tr> <tr> <td>Slave station (power OFF)</td> <td>PW/RUN OFF <b>L RUN OFF</b></td> <td rowspan="4">Faulty</td> <td rowspan="4">There is a faulty station in the powered slave stations. Turn the power for the next slave station OFF, and check the LED status.</td> </tr> <tr> <td>Master station</td> <td>RUN ON L RUN ON <b>ERR. ON</b></td> </tr> <tr> <td>Slave station (power ON)</td> <td>PW/RUN ON <b>L RUN OFF</b></td> </tr> <tr> <td>Slave station (power OFF)</td> <td>PW/RUN OFF <b>L RUN OFF</b></td> </tr> </tbody> </table>	Station type	LED ON status	Status	Explanation	Master station	RUN ON L RUN ON <b>ERR. flicker</b>	Normal	The slave station for which the power was turned OFF last is faulty. Replace the slave station for which the power was turned OFF last, and then carry out "Checking with a data link" again.	Slave station (power ON)	PW/RUN ON <b>L RUN ON</b>	Slave station (power OFF)	PW/RUN OFF <b>L RUN OFF</b>	Faulty	There is a faulty station in the powered slave stations. Turn the power for the next slave station OFF, and check the LED status.	Master station	RUN ON L RUN ON <b>ERR. ON</b>	Slave station (power ON)	PW/RUN ON <b>L RUN OFF</b>	Slave station (power OFF)	PW/RUN OFF <b>L RUN OFF</b>
	Station type	LED ON status	Status	Explanation																	
	Master station	RUN ON L RUN ON <b>ERR. flicker</b>	Normal	The slave station for which the power was turned OFF last is faulty. Replace the slave station for which the power was turned OFF last, and then carry out "Checking with a data link" again.																	
	Slave station (power ON)	PW/RUN ON <b>L RUN ON</b>																			
	Slave station (power OFF)	PW/RUN OFF <b>L RUN OFF</b>	Faulty	There is a faulty station in the powered slave stations. Turn the power for the next slave station OFF, and check the LED status.																	
Master station	RUN ON L RUN ON <b>ERR. ON</b>																				
Slave station (power ON)	PW/RUN ON <b>L RUN OFF</b>																				
Slave station (power OFF)	PW/RUN OFF <b>L RUN OFF</b>																				
If a normal state is not attained when the power is turned OFF one station at a time with the above procedure (When all stations are faulty even with a one-on-one connection), the slave station may be faulty because of a hardware fault. In this case, pinpoint the faulty station with method (B) Pinpoint the faulty station when there is a faulty station.																					

### (2) Pinpoint the faulty station when there is a faulty station

The CC-Link module's buffer memory must be monitored to pinpoint the faulty station when there is a faulty station. Connect a peripheral device, such as GX Developer, to the PLC CPU mounted on the master station, and carry out the following check while monitoring the buffer memory monitor.

Pinpointing procedure	Check details												
Separate the slave station module and slave station communication terminal block one station at a time.	Check the buffer memory.												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Buffer memory address</th> <th>Value</th> <th>Status</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>680H to 683H (other station data link status)</td> <td>The bit corresponding to the separated station number is ON.</td> <td>Normal</td> <td>The slave station separated last is faulty. Replace the slave station separated last, and then check with "Checking with a data link" again.</td> </tr> <tr> <td>680H to 683H (other station data link status)</td> <td>The bit for a station other than a separated station number is ON.</td> <td>Faulty</td> <td>There is a faulty station in the powered slave stations. Remove the communication terminal block for the next slave station, and check the buffer memory value.</td> </tr> </tbody> </table>	Buffer memory address	Value	Status	Explanation	680H to 683H (other station data link status)	The bit corresponding to the separated station number is ON.	Normal	The slave station separated last is faulty. Replace the slave station separated last, and then check with "Checking with a data link" again.	680H to 683H (other station data link status)	The bit for a station other than a separated station number is ON.	Faulty	There is a faulty station in the powered slave stations. Remove the communication terminal block for the next slave station, and check the buffer memory value.
	Buffer memory address	Value	Status	Explanation									
680H to 683H (other station data link status)	The bit corresponding to the separated station number is ON.	Normal	The slave station separated last is faulty. Replace the slave station separated last, and then check with "Checking with a data link" again.										
680H to 683H (other station data link status)	The bit for a station other than a separated station number is ON.	Faulty	There is a faulty station in the powered slave stations. Remove the communication terminal block for the next slave station, and check the buffer memory value.										

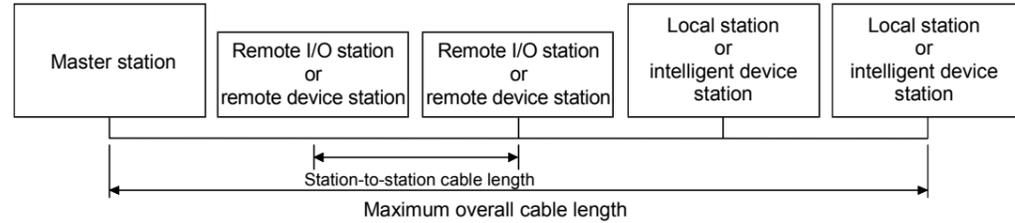
Appendix

Appendix 1 Restrictions According to CC-Link Version

Appendix 1.1 Maximum Overall Cable Distance

1) For Ver. 1.10

The relation of the transmission speed and maximum overall cable length when the entire system is configured of Ver. 1.10 compatible modules and cables is shown below.



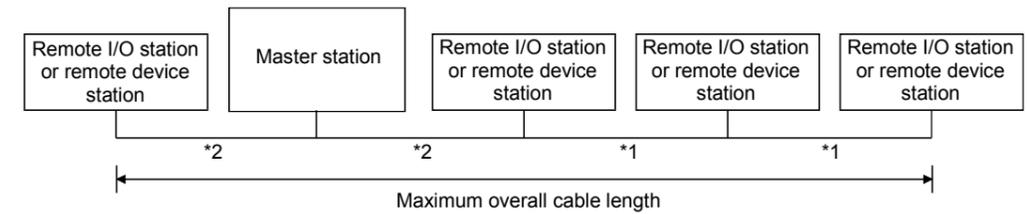
Ver. 1.10 compatible CC-Link dedicated cables (Using 110Ω terminator)

Transmission speed	Station-to-station cable length	Maximum overall cable length
156kbps	20cm or more	1200m
625kbps		900m
2.5Mbps		400m
5Mbps		160m
10Mbps		100m

2) For Ver. 1.00

The relation of the transmission speed and maximum overall cable length is shown below.

(1) When system is configured only of remote I/O stations and remote device stations



\*1 Station-to-station cable length for remote I/O station or remote device station

\*2 Station-to-station cable length between master station and previous/next stations

CC-Link dedicated cables (Using 110Ω terminator)

Transmission speed	Station-to-station cable length		Maximum overall cable length
	*1	*2	
156kbps	30cm or more	1m or more	1200m
625kbps			600m
2.5Mbps			200m
5Mbps	30cm to 59cm*	1m or more	110m
	60cm or more		150m
10Mbps	30cm to 59cm*		50m
	60cm to 99cm*		80m
	1m or more	100m	

CC-Link dedicated high-performance cable (Using 130Ω terminator)

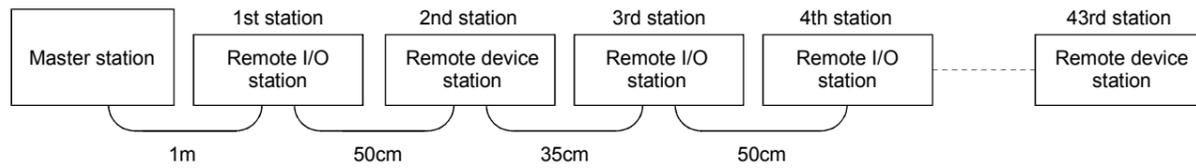
Transmission speed	Station-to-station cable length		Maximum overall cable length	
	*1	*2		
156kbps	30cm or more	1m or more	1200m	
625kbps			900m	
2.5Mbps			400m	
5Mbps			160m	
10Mbps	Number of connected stations 1 to 32 stations	1m or more	100m	
			30cm to 39cm*	80m
	Number of connected stations 33 to 48 stations		40cm or more	100m
			30cm to 39cm*	20m
	Number of connected stations 49 to 64 stations		40cm to 69cm*	30m
70cm or more		100m		

\* When wiring the station-to-station cable between the remote I/O station or remote device station with this length at any one point, the length will be the maximum overall cable length given above.

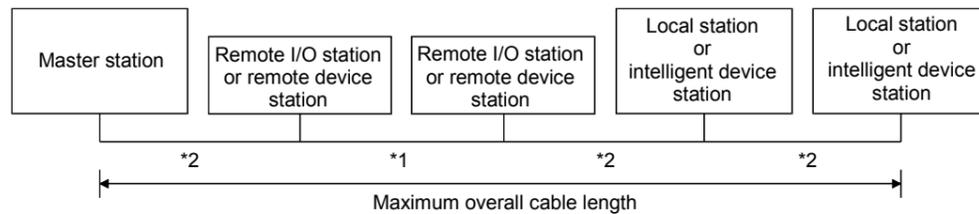
**CAUTION**

Different brands and types of Ver. 1.00 compatible cables cannot be used. Contact the cable manufacturer for details on the relation of the transmission speed and maximum overall cable length for cables used at moving parts.

**(Example)** When 43 remote I/O stations and remote device stations are connected with a CC-Link dedicated high-performance cable at a transmission speed of 10Mbps  
The cable connecting the second and third stations is "35cm", so the maximum overall cable length is "80" cm.



**(2) When system is configured of remote I/O stations, remote device stations, local stations and intelligent device stations**



- \*1 Station-to-station cable length for remote I/O station or remote device station
- \*2 Station-to-station cable length between master/local station or intelligent device station and previous/next stations

**CC-Link dedicated cables (Using 110Ω terminator)**

Transmission speed	Station-to-station cable length		Maximum overall cable length
	*1	*2	
156kbps	30cm or more	2m or more	1200m
625kbps			600m
2.5Mbps			200m
5Mbps	30cm to 59cm*	2m or more	110m
	60cm or more		150m
10Mbps	30cm to 59cm*	2m or more	50m
	60cm to 99cm*		80m
	1m or more		100m

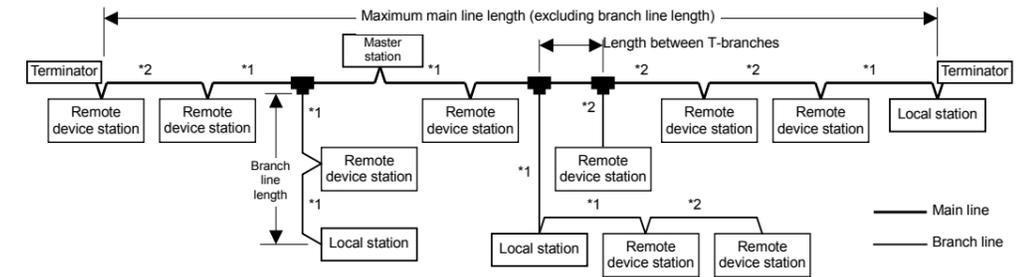
**CC-Link dedicated high-performance cable (Using 130Ω terminator)**

Transmission speed	Station-to-station cable length		Maximum overall cable length
	*1	*2	
156kbps	30cm or more	2m or more	1200m
625kbps			600m
2.5Mbps			200m
5Mbps	30cm to 59cm*	2m or more	110m
	60cm or more		150m
10Mbps	70cm to 99cm*	2m or more	50m
	1m or more		80m

\* When wiring the station-to-station cable between the remote I/O station or remote device station with this length at any one point, the length will be the maximum overall cable length given above.

**3) T-branch connection**

**When not using repeater**



Communication speed	156kbps	625kbps	10M, 5M and 2.5Mbps cannot be used
	Station-to-station cable length	1m or more	2m or more
Maximum number of stations connected with branch line (per branch)	6		Refer to communication specifications for total number of connected stations
Maximum main line length	500m	100m	Cable length between terminators; excludes branch line length
T-branch interval	Not limited		
Maximum branch line length	8m		Cable length per branch; cables cannot be branched from branch lines
Total branch line length	200m	50m	Total of branch line lengths

Use the CC-Link dedicated cable (110Ω terminator) for the connection cable. The CC-Link dedicated high-performance cable (130Ω terminator) cannot be used.

**CC-Link versions**

**(1) Ver. 1.00 and Ver. 1.10**

- With Ver. 1.10, the conventional restrictions on the station-to-station cable length have been improved. The station-to-station cable length is uniformly 20cm or longer. Conversely, the conventional parts are defined as Ver. 1.00. The conditions for using a uniform 20cm or longer station-to-station cable are given below.
- All modules configuring the CC-Link system must be compatible with Ver. 1.10.
  - All data link cables must be Ver. 1.10 compatible CC-Link dedicated cables.

Point
If the system contains both Ver. 1.00 and Ver. 1.10 compatible modules and cables, the maximum overall cable length and station-to-station cable length will follow the Ver. 1.00 specifications.

**(2) Ver. 2**

The module compatible with the expanded number of cyclic points is defined as the Ver. 2 compatible module. The improvements to the station-to-station cable length restrictions made with Ver. 1.10 also apply to Ver. 2. The station-to-station length is uniformly 20cm or more.

## Appendix 1.2 Possibilities of Cyclic Transmission

The restrictions for using cyclic transmission are given below.

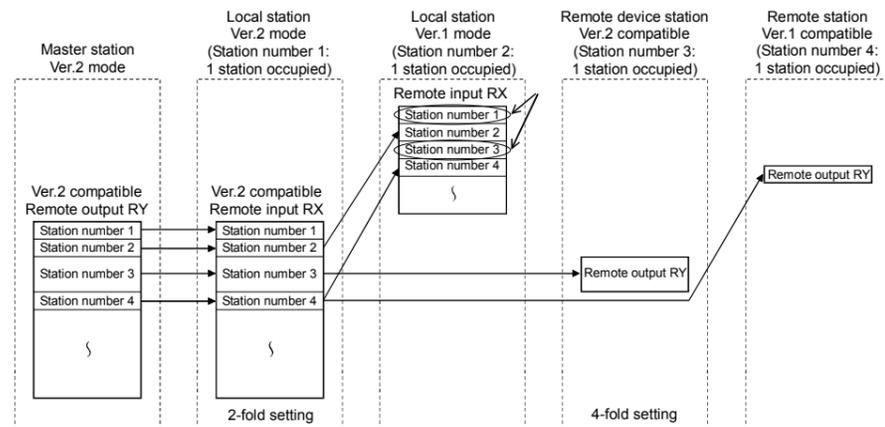
The Ver. 2 compatible master station (QJ61BT11N) has the following three modes.

- Remote Net Ver. 2 mode ..... This mode is used to newly construct a system.
- Remote Net additional mode ..... This mode is used when adding slave stations, including Ver. 2 compatible stations to an existing system structured with Ver. 1. The programs for the existing system can be used.
- Remote Net Ver. 1 mode ..... This mode is compatible with the conventional module QJ61BT11.

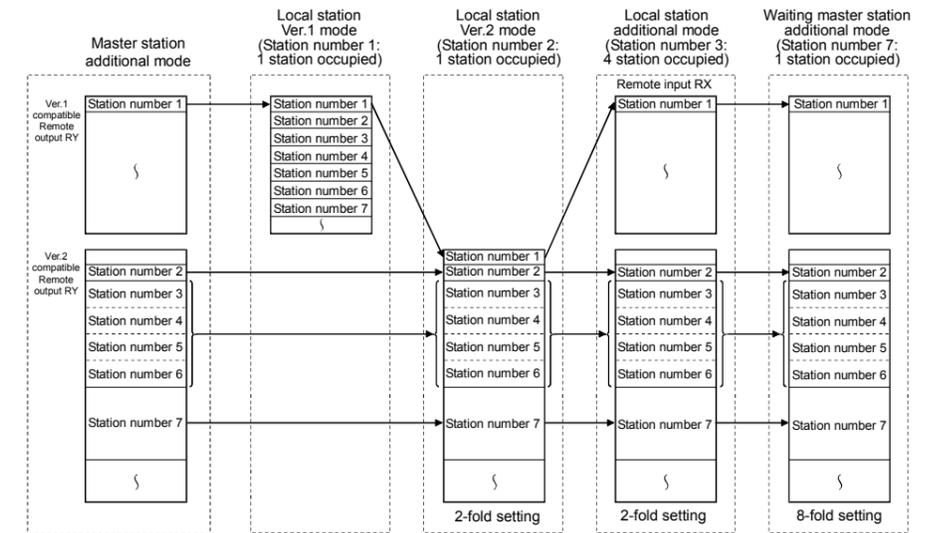
Slave station		QJ61BT11N						QJ61BT11, etc		Intelligent device station		Remote station		
		Local station			Standby master station			Local station	Standby master station	Remote device station		Remote I/O station		
		Ver.2 mode	Additional mode	Ver.1 mode	Ver.2 mode	Additional mode	Ver.1 mode	Ver.1 compatible	Ver.1 compatible	Ver.2 compatible	Ver.1 compatible	Ver.2 compatible	Ver.1 compatible	Ver.1 compatible
Master station	QJ61BT11N	○	×	△ <sup>*1</sup>	○	×	×	△ <sup>*1</sup>	×	○	○	○	○	○
	Additional mode	○ <sup>*2</sup>	○	△ <sup>*1</sup>	×	○	×	△ <sup>*1</sup>	×	○	○	○	○	○
	Ver.1 mode	×	×	○	×	×	○	○	○	×	○	×	○	○
	QJ61BT11, etc.	×	×	○	×	×	○	○	○	×	○	×	○	○

○: Cyclic transmission possible △: Cyclic transmission conditionally possible X: Cyclic transmission not possible

\*1 When using the master station QJ61BT11N Ver. 2 mode or additional mode, and the local station is the QJ61BT11N Ver. 1 mode or Ver. 1 compatible master station, the local station can communicate with the master station, but the Ver. 2 compatible station's data cannot be confirmed.



\*2 The stations are linked within the following range when the master station is the QJ61BT11N additional mode and the local station is the QJ61BT11N Ver. 2 mode.



### (3) Confirming the version

The Ver. 1.10 compatible module has the "CC-Link" logo on the "Rating nameplate".



The Ver. 2 compatible module has the "V2" logo on the "Rating nameplate".



## Appendix 2 Special Relays/Registers for Related Links

The link special relays and registers related to troubleshooting are shown below.

### Link special relay (SB)/link special register (SW)

Name	Details	SB/SW (Buffer memory)	Applicability (Applicable: O, Not applicable: x)					
			Q	QnA	A	FX	Personal computer	
Data link status	Host station operation status	Indicates the host station's data link operation status. OFF: In execution ON: Not in execution	SB006E (05E6H:bit11)	○	○	○	○	○
	Host station number	Stores the currently running host station's number. 0: Master station 1 to 64: Local station	SW0061 (0661H)	○	○	○	○	○
	Host station operation status	Stores host station's data link status. 0: Initial status 1: Waiting for parameter reception (only local station) 2: In data link 3: Data link stopped 4: Disconnected (no polling request) 5: Disconnected (loop fault) 6: Disconnected (others) 7: Executing loop test 8: Executing parameter setting test 9: Executing automatic return process FF: Resetting	SW006B (066BH)	○	○	○	○	○
	Host station data link status	Stores host station operation status. 0: Normal 1: Transmission path error detected 2: Parameter error detected 3: CRC error detected 4: Timeout error detected 5: Abort error detected 6: Setting error detected 7: Other error detected	SW006C (066CH)	○	○	○	○	○
	Other station data link status	Stores each station's data link status. 0: Normal 1: Data link error detected	SW0080 to 0083 (0680 to 0683H)	○	○	○	○ <sup>1</sup>	○
Parameter	Parameter area (master only)		— (0001 to 005FH)	○	○	○	○	○
	Parameter information (master only)	Stores parameter information area to be used. 0H: CPU internal parameter 1H: Buffer memory (Start data link with Yn6) 2H: EEPROM (Start data link with Yn8) 3H: Dedicated instruction (Set parameters and start data link with dedicated instructions) DH: Default parameters (Automatic CC-Link start)	SW0067 (0677H)	○	○	○	○	○
	Total number of stations (master only)	Stores final station number set with parameters. 1 to 64 (stations)	SW0070 (0670H)	○	○	○	○	○
	Maximum number of communicating stations (master only)	Stores the maximum number of stations connected with data link.	SW0071 (0671H)	○	○	○	○	○
	Number of connected modules (master only)	Stores the number of modules connected with data link. 1 to 64 (modules)	SW0072 (0672H)	○	○	○	○	○
	Status of each station	Reserved station designation status	Stores designation status of reserved station. 0: Not reserved station 1: Reserved station	SW0074 to 0077 (0674 to 0677H)	○	○	○	○ <sup>1</sup>
Error invalid station status		Stores designation status of error invalid station. 0: Not error invalid station 1: Error invalid station	SW0078 to 007B (0678 to 067BH)	○	○	○	○ <sup>1</sup>	○
Temporary error invalid station status		Stores designation status of temporary error invalid station. 0: Not temporary error invalid station 1: Temporary error invalid station	SW007C to 007F (067C to 067FH)	○	○	○	○ <sup>1</sup>	○
Station number duplication status (master only)		Stores duplication status when head station number of each module is not duplicated. 0: Normal 1: Station number duplicated (head station number only)	SW0098 to 009B (0698 to 069BH)	○	○	○	○ <sup>1</sup>	○
Mounting/parameter consistency state (master only)		Stores state of parameter consistency. 0: Normal 1: Consistency error	SW009C to 009F (069C to 069FH)	○	○	○	○ <sup>1</sup>	○
Transient transmission error status		Stores state of transient transmission error occurrence at each station. 0: Normal 1: Transient transmission error detected	SW0094 to 0097 (0694 to 0697H)	○	○	○	x	○
CC-Link Ver. mounting/parameter consistency status (Only Ver. 2 master)		Indicates slave station compatible with CC-Link Ver. 2. 0: Ver. 1 compatible slave station 1: Ver. 2 compatible slave station	SW0144 to 0147 (0744 to 0747H)	○ <sup>2</sup>	x	x	x	x

\*1: The FX PLC uses only the one word at the head.

\*2: Acceptable only with QJ61BT11N.

Name	Details	SB/SW (Buffer memory)	Applicability (Applicable: O, Not applicable: x)					
			Q	QnA	A	FX	Personal computer	
Error code	Module status	Indicates the module status.	SW0020 (0620H)	○	○	○	○	○
	Host station parameter status (master only)	Stores the parameter setting status.	SW0068 (0668H)	○	○	○	○	○
	Mounting state (master only)	Stores the duplicate station numbers and parameter consistency for each module.	SW0069 (0669H)	○	○	○	○	○
	Switch setting status	Stores the setting status of each switch.	SW006A (066AH)	○	○	○	○	○
	Data link stop results	Stores the results of executing the data link stop instruction with SB0002.	SW0045 (0645H)	○	○	○	○	○
	Data link restart results	Stores the results of executing the data link restart instruction with SB0000.	SW0041 (0641H)	○	○	○	○	○
	Refresh instruction results at standby master station switching (standby master only)	Indicates the results of executing the refresh instruction at standby master switching.	SW0043 (0643H)	○	○	○	x	○
	Temporary error invalid station setting (master only)	Indicates the results of setting the temporary error invalid station designation.	SW0049 (0649H)	○	○	○	○	○
	Temporary error invalid station cancel (master only)	Indicates the results of canceling the temporary error invalid station designation.	SW004B (064BH)	○	○	○	○	○
	Automatic CC-Link start execution results (master only)	Stores the results of the system configuration check when a new station is added to the system with automatic CC-Link start.	SW0052 (0652H)	○	x	x	x	x
	Forced master switching instruction results (master only)	Stores the results of executing the forced master switching instruction with SB000C.	SW005D (065DH)	○	x	x	x	x
	Remote device station initialize procedures registration instruction results (master only)	Stores the results of executing the initialize procedures registration instructions with SB000D.	SW005F (065FH)	○	x	x	x	x

\*1: The FX PLC uses only the one word at the head.

\*2: Acceptable only with QJ61BT11N.

### Appendix 3 Preventive Maintenance and Quick Solutions

Effective matters to consider when constructing the system to prevent trouble and provide quick solutions are introduced in this section.

#### Appendix 3.1 Separation of CC-Link System Using AJ65SBT-RPT CC-Link System Repeater

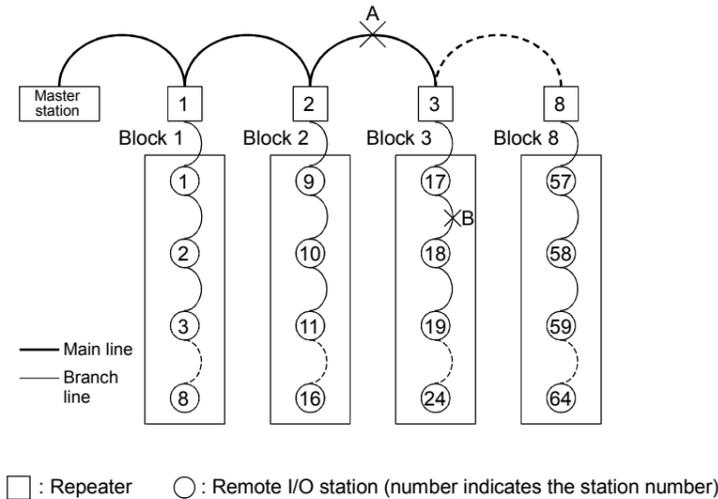
The method for separating the CC-Link system using the AJ65SBT-RPT type CC-Link system repeater (T-branch) module (hereinafter, repeater) is explained below.

##### Separating the system with repeaters

The repeater is used to extend the CC-Link system's transmission distance and to provide T-branch wiring. When repeaters are used in the CC-Link system, the system can be separated, and faulty sections can be pinpointed easily.

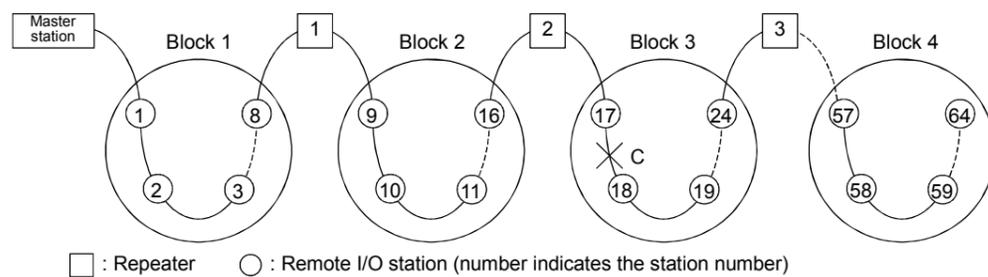
When the system is separated and a fault does occur, the effect onto the entire system can be reduced. The repeater can be connected to separate the system parallelly or to separate the system in serially. The effect onto the system when a fault occurs differs depending on which method is used. (The fault may extend to all stations if repeaters are not used.)

##### [Separating system parallelly by connecting repeaters]



\* Prepare a layout drawing of the modules and material indicating the station number so that the module layout is easy to see. The station numbers should be arranged in order of the wiring to make it easier to pinpoint the faulty section (faulty block) when the CC-Link Diagnostics loop test or other station monitoring is executed.

##### [Separating system serially by connecting repeaters]



\* Prepare a layout drawing of the modules and material indicating the station number so that the module layout is easy to see. The station numbers should be arranged in order of the wiring to make it easier to pinpoint the faulty section (faulty block) when the CC-Link Diagnostics loop test or other station monitoring is executed.

System separation method	Faulty section	Remote I/O station communication status				Effect on system when fault occurs
		Station number 1 to 8 (Block 1)	Station number 9 to 16 (Block 2)	Station number 17 to 24 (Block 3)	Station number 25 to 64 (Block 4 to 8)	
Parallel	A (Main line)	Faulty (nonspecific*)		Faulty		Affects all blocks
	B (Branch line)	Normal		Station number 17: Faulty (nonspecific*) Station number 18 to 24: Faulty	Normal	Affects only faulty block
Serial	C	Normal		Station number 17: Faulty (nonspecific*) Station number 18 to 24: Faulty	Faulty	Affects all blocks after faulty block

\* May be normal or faulty depending on communication status.

##### [1] Separating system parallelly by connecting repeaters

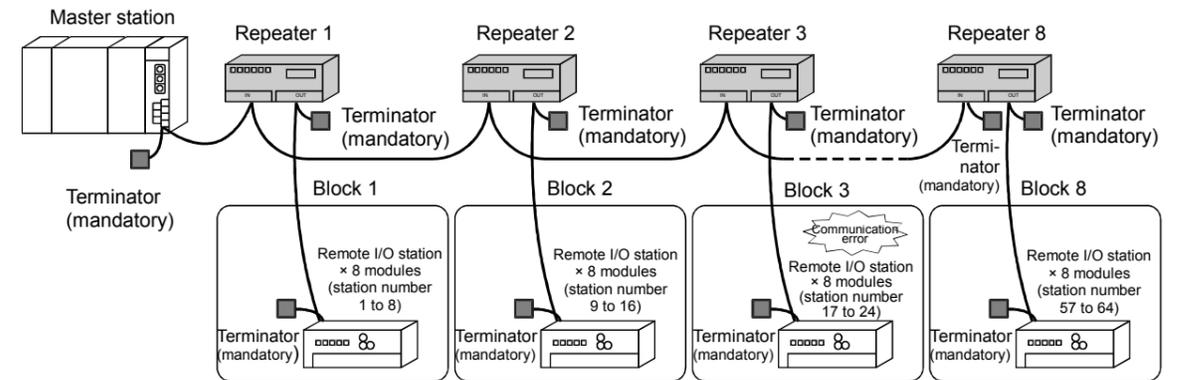
The following table shows a comparison of the troubleshooting details when the system does not have repeaters and when the system has repeaters (T-branch connection of remote I/O stations with repeater).

Number of connected repeaters	Number of connected remote I/O stations	CC-Link Diagnostics loop test	Number of method of bisection times <sup>1</sup>
Not used	64 modules	Faulty section cannot be pinpointed	6 times
Used	8 modules <sup>*2</sup>	Possible (pinpoint faulty block)	3 times
	11 modules	Possible (pinpoint faulty block)	3 times
	44 modules (4 modules/block)	Possible (pinpoint faulty block)	2 times

<sup>1</sup> Refer to example (3) (b) below for details on the method of bisection.

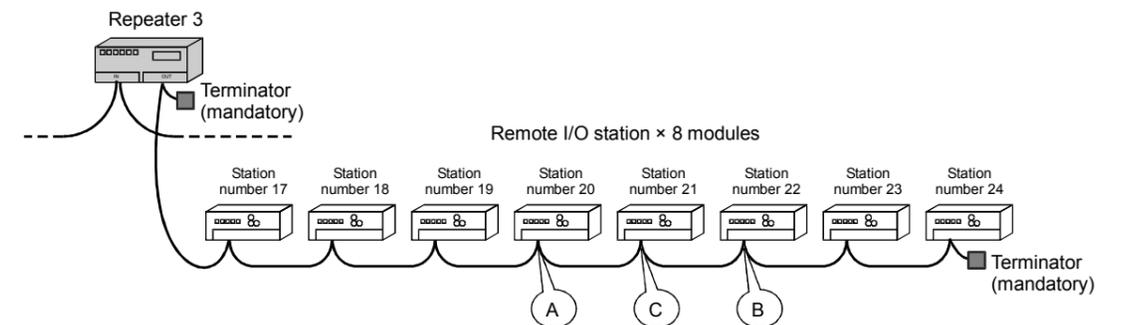
(Example) When eight repeaters are used  
The method for pinpointing the faulty section using the system indicated with \*2 above is shown below.

System configuration drawing 1



\* If a communication error is occurring in multiple blocks, check whether the main line cable is disconnected.

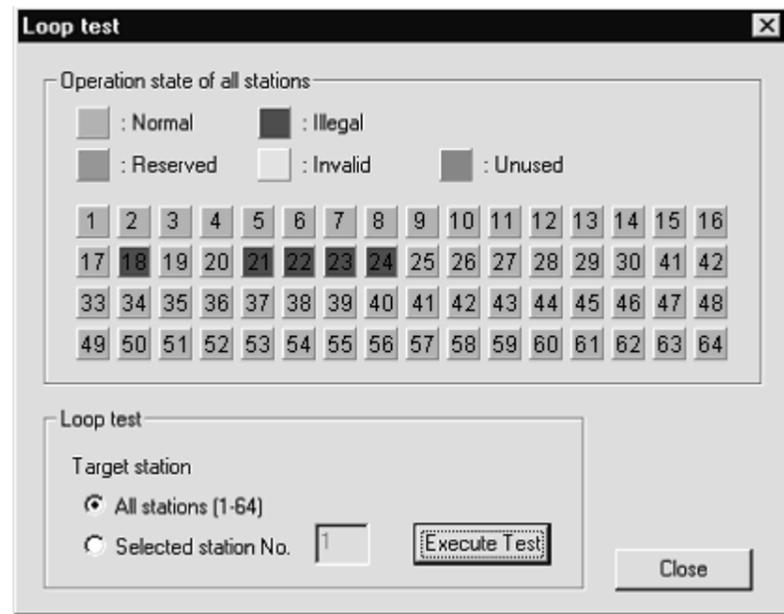
Block 3 configuration drawing 1



- System configuration
  - Connect remote I/O stations with T-branch using repeater
  - Use eight repeaters
  - Connect eight remote I/O stations per block

- Faulty section
  - Assume that the block 3 module or cable is faulty

- (3) Pinpointing the fault  
 (a) Pinpoint in which block the fault is occurring during the CC-Link Diagnostics loop test or other station monitor. (Refer to system configuration Fig. 1.)



A communication error is shown at the remote I/O station in block 3, indicating that there is a fault in block 3.

- (b) Pinpoint the faulty section in the faulty block using the method of bisection. (Refer to block 3 configuration Fig. 1)  
 Method of bisection
- 1) Disconnect the cable at section A (station number 20 remote I/O station), and connect a terminator.
  - 2) If there is no fault in section A, connect the section A cable, and disconnect the cable at section B (station number 22 remote I/O station), and connect a terminator.
  - 3) If a fault is found in section B, connect the section B cable, and disconnect the section C (station number 21 remote I/O station) cable. Connect a terminator.
  - 4) If no fault is found, the section B module or the cable between C and B is faulty.
  - 5) If a fault is found, the section C module or the cable between A and C is faulty.

**POINT**  
 Always connect a terminator to the end of the branch line.

[2] Separating system serially by connecting repeaters

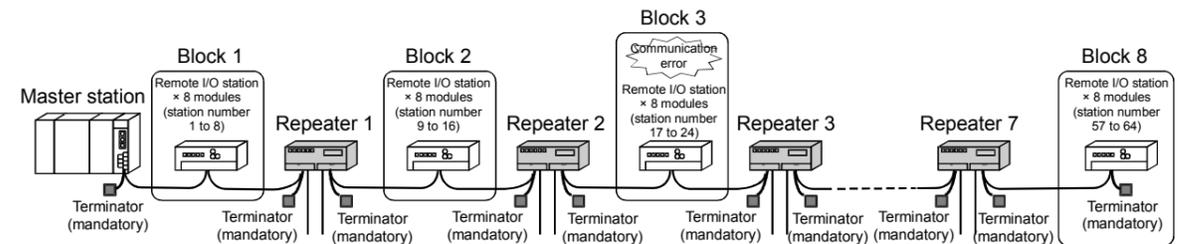
The following table shows a comparison of the troubleshooting details when the system does not have repeaters and when the system has repeaters (connect the repeater between the remote I/O stations).

Number of connected repeaters	Number of connected remote I/O stations	CC-Link Diagnostics loop test	Number of method of bisection times <sup>1</sup>
Not used	64 modules	Faulty section cannot be pinpointed	6 times
Used	7 modules <sup>*2</sup>	Possible (pinpoint faulty block)	3 times
	10 modules	Possible (pinpoint faulty block)	3 times
	10 modules	Possible (pinpoint faulty block)	2 times

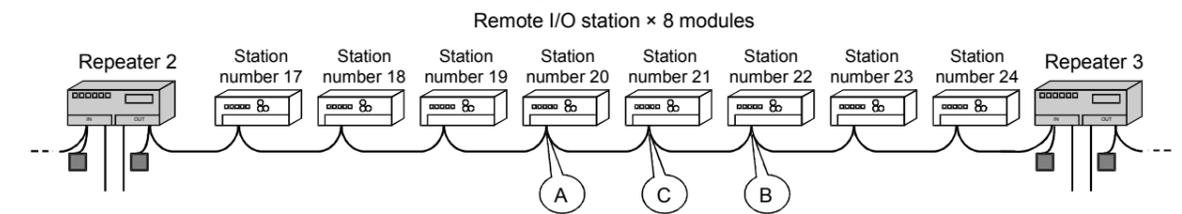
\*1 Refer to example (3) (b) below for details on the method of bisection.

(Example) When seven repeaters are used  
 The method for pinpointing the faulty section using the system indicated with \*2 above is shown below.

System configuration drawing 2

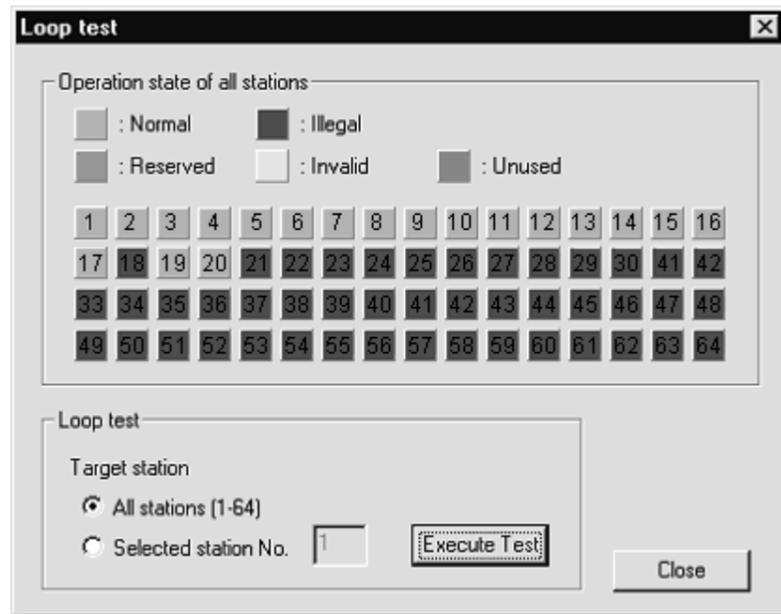


Block 3 configuration drawing 2



- (1) System configuration
  - Connect the repeater between the remote I/O stations
  - Use seven repeaters
  - Connect eight remote I/O stations per block
- (2) Faulty section  
 Assume that the block 3 module or cable is faulty.

- (3) Pinpointing the fault
  - (a) Pinpoint in which block the fault is occurring during the CC-Link Diagnostics loop test or other station monitor. (Refer to system configuration Fig. 2.)



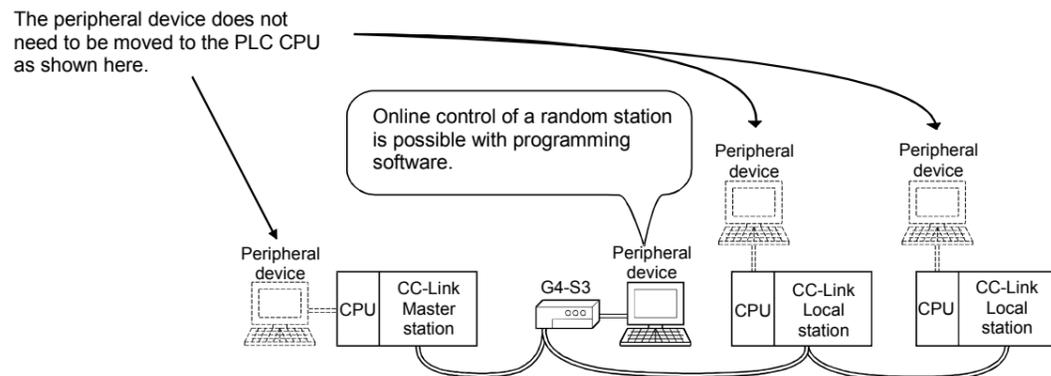
After repeater 2, a fault in all stations or multiple faults are displayed. However, block 3 and block 4 are separated with repeater 3 so it can be seen that block 3 is faulty.

- (b) Pinpoint the faulty section in the faulty block using the method of bisection. (Refer to block 3 configuration Fig. 2)
  - Method of bisection
  - 1) Disconnect the cable at section A (station number 20 remote I/O station), and connect a terminator.
  - 2) If there is no fault in section A, connect the section A cable, and disconnect the cable at section B (station number 22 remote I/O station), and connect a terminator.
  - 3) If a fault is found in section B, connect the section B cable, and disconnect the section C (station number 21 remote I/O station) cable. Connect a terminator.
  - 4) If no fault is found, the section B module or the cable between C and B is faulty.
  - 5) If a fault is found, the section C module or the cable between A and C is faulty.

**POINT**  
Always connect a terminator to the end of the branch line.

### Appendix 3.2 Remote Controls with AJ65BT-G4-S3

The various PLCs can be remotely controlled via CC-Link. When the CC-Link data link is correctly established, online operations of the Q, QnA and A Series PLC CPU on the CC-Link, including PC write, PC read, monitor and test can be carried out from a peripheral device. The data and program can be confirmed easily even when the master station is at a remote location.



## Appendix 4 Confirmation Sheet

Confirmation item		Details	
1. Master station	Master type	PLC CPU	
		Master module	
	Master version	PLC CPU	
		Master module	
	Unit mounting state	I/O address:	
	Other network module	Other network module:	
	Mode	Mode setting: Remote Net mode (Ver. 1 / Additional / Ver.2) / Remote I/O net mode	
		Scan mode: Synchronous mode / Asynchronous mode	
	Parameters	Module mode: I/O mode / Intelligent mode (SW8: A Series only)	
		Confirm that parameters in the designs and actual machine match	
	<b>Parameter</b>	<b>Setting</b>	
	Number of modules	modules	
	Standby master station setting		
	Operation designation at CPU down	Stop / Continue	
	Reserved station		
	Error invalid station		
	Station information	Indicated in system configuration	
	Parameter setting	GX Developer / Dedicated instructions / FROM/TO instructions	
	Link startup method	Start up with buffer memory: Y6 / Start up with EEPROM: Y8 (QnA, A, FX Series only)	
	Link data access	Auto refresh / Dedicated instructions / FROM/TO instructions	
	Transmission speed	10M / 5M / 2.5M / 625k / 156kbps	
2. Slave station	Number of connected modules	modules	
		*: Indicate the details in 6. System Configuration	
	Station type*	Remote I/O station:       stations, Remote device station:       stations, Intelligent device station:       stations	
	Occupied station number*	<input type="checkbox"/> Station number occupied by each station (Check after confirming)	
	CC-Link version*	Ver. 1 / Ver. 2 (Expanded cyclic setting 1-fold / 2-fold / 4-fold / 8-fold setting) Confirm setting	
Transmission speed	10M / 5M / 2.5M / 625k / 156kbps		
3. Transmission cable	Cable type	Cable type:	
	Transmission distance	Overall length:	
	Station-to-station distance	Shortest station-to-station distance:	
4. Terminator	Resistance value	110Ω / 130Ω	
	Connection terminal	<input type="checkbox"/> Connection between terminator DA-DB (Check after confirming)	
5. Grounding	FG terminal	<input type="checkbox"/> Grounding of each station's FG terminal (Check after confirming) If not grounded at each station, indicate the grounding state in 6. System Configuration.	
6. System configuration	Station number, station type, occupied station number, cable length		

# Open Field Network CC-Link Troubleshooting Guide

## Precautions for Choosing the Products

This catalog explains the typical features and functions of the CC-Link and does not provide restrictions and other information on usage and module combinations. When choosing the products, always check the detailed specifications, restrictions, etc. of the products in the user's manuals. When using the products, always read the user's manuals of the products.

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

## ⚠ For safe use

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

Country/Region	Sales office	Tel/Fax
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, USA	Tel : +1-847-478-2100 Fax : +1-847-478-2396
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias,184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil	Tel : +55-11-3262-4759 Fax : +55-11-288-3047
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY	Tel : +49-2102-486-0 Fax : +49-2102-486-1120
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire., AL10 8XB,UK	Tel : +44-1707-276100 Fax : +44-1707-278695
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo - Ingr.2 Via Paracelso 12, I-20041 Agrate B., Milano, Italy	Tel : +39-039-60531 Fax : +39-039-6053312
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80 E-08190 Sant Cugat del Valles, Barcelona, Spain	Tel : +34-93-565-3131 Fax : +34-93-589-2948
France	Mitsubishi Electric Europe B.V. French Branch 225 Boulevard des Bouvets, F-92741 Nanterre Cedex, France	Tel : +33-1-5568-5568 Fax : +33-1-5568-5685
South Africa	Circuit Breaker Industries Ltd. Private Bag 2016, 1600 Isando, South Africa	Tel : +27-11-928-2000 Fax : +27-11-392-2354
Hong Kong	Mitsubishi Electric Automation (Hong Kong) Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, HongKong	Tel : +852-2887-8870 Fax : +852-2887-7984
China	Mitsubishi Electric Automation (Shanghai) Ltd. 1-3/F., Block5, Automation Instrumentation Plaza, 103 Cao Bao Road, Shanghai 200233, China	Tel : +86-21-6120-0808 Fax : +86-21-6121-2424
Taiwan	Setsuyo Enterprise Co., Ltd. 6F., No.105 Wu-Kung 3rd.RD, Wu-Ku Hsiang, Taipei Hsine, Taiwan	Tel : +886-2-2299-2499 Fax : +886-2-2299-2509
Korea	Mitsubishi Electric Automation Korea Co., Ltd. 1480-6, Gayang-dong, Gangseo-gu, Seoul 157-200, Korea	Tel : +82-2-3660-9552 Fax : +82-2-3664-8372
Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 Alexandra Road #05-01/02, Mitsubishi Electric Bulding Singapore 159943	Tel : +65-6470-2460 Fax : +65-6476-7439
Thailand	F.A. Tech Co., Ltd. 898/28,29,30, S. V. City Building, Office Tower 2, Floor 17-18 Rama III Rd, Bangpongpan, Yannawa, Bangkok 10120, Thailand	Tel : +66-2-682-6522 Fax : +66-2-682-6020
Indonesia	Indonesia P.T. Autoteknindo Sumber Makmur Muara Karang Selatan Block A/Utara No.1 Kav. No.11 Kawasan Industri/Pergudangan Jakarta-Utara P.O Box5045 Jakarta 11050, Indonesia	Tel : +62-21-663-0833 Fax : +62-21-663-0832
India	Messung Systems Pvt, Ltd. Electronic Sadan NO:III Unit No15, M.I.D.C Bhosari, Pune-411026, India	Tel : +91-20-2712-3130 Fax : +91-20-2712-8108
Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, Rydalme, N.S.W 2116, Australia	Tel : +61-2-9684-7777 Fax : +61-2-9684-7245



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