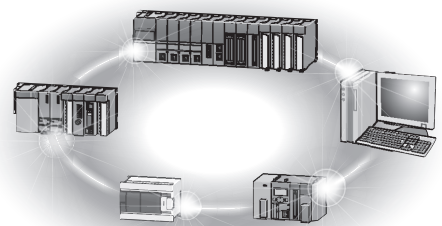# MITSUBISHI ELECTRIC

# Programmable Controller

## CC-Link Remote I/O Module (With Diagnostic Functions)
## User's Manual

-AJ65ABTP3-16D
-AJ65ABTP3-16DE

# ●SAFETY PRECAUTIONS●

(Read these precautions before using this product.)

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

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

| ⚠WARNING | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
|---|---|
| ⚠CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage. |

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.

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

## [Design Precautions]

### ⚠WARNING

● In the case of a communication failure in the network, the status of the error station will be as follows:
   (1) All inputs from remote I/O stations are turned off.
   (2) All outputs from remote I/O stations are turned off.
   Check the communication status information and configure an interlock circuit in the sequence program to ensure that the entire system will operate safely. Incorrect output or malfunction due to a communication failure may result in an accident.
● Outputs may remain on or off due to a failure of a remote I/O module. Configure an external circuit for monitoring output signals that could cause a serious accident.
● Do not use any "use prohibited" signals as a remote input or output signal. These signals are reserved for system use. Also do not write any data to the "use prohibited" of the remote register. If such operations are performed, correct operation of the module cannot be guaranteed.

## [Design Precautions]

### ⚠CAUTION

● Use the module in an environment that meets the general specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
● Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.

# [Installation Precautions]

| ⚠CAUTION |
| --- |
| ● Do not directly touch any conductive parts of the module. Doing so can cause malfunction or failure of the module. |
| ● Securely fix the module with a DIN rail or mounting screws. Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. |
| ● Securely connect the cable connectors. Poor contact may cause malfunction. |

# [Wiring Precautions]

| ⚠WARNING |
| --- |
| ● Shut off the external power supply (all phases) used in the system before wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction. |

# [Wiring Precautions]

| ⚠CAUTION |
| --- |
| ● Individually ground the FG terminal of the programmable controller with a ground resistance of 100Ω or less. Failure to do so may result in electric shock or malfunction. |
| ● Tighten any unused terminal screws within the specified torque range (0.42 to 0.50N•m). Failure to do so may cause a short circuit due to contact with a solderless terminal. |
| ● Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure. |
| ● Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure. |
| ● Tighten the terminal screw within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction. |
| ● Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction. |
| ● Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact. |
| ● Attach an unwired connector plug to an unused one-touch connector for power supply and FG. Failure to do so may cause failure or malfunction. |
| ● Do not install the control lines together with the communication cables, or bring them close to each other. Failure to do so may result in malfunction due to noise. |

# [Wiring Precautions]

| ⚠CAUTION |
|---|
| ● Do not pull the cable part by hand when removing a communication cable and power supply cable from a module. For a cable with connector, remove it while holding the connector by hand. For a cable with no connector, loosen the screw securing the cable to the module and then remove it. Pulling a cable with connected to the module may damage the module or cable, or result in malfunction due to cable poor connection.<br>● When an overcurrent caused by an error of an external device or a failure of the programmable controller flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.<br>● If a short-circuit occurs, remove the cause immediately. If the short-circuit remains, the internal temperature of the module rises, resulting in malfunction or failure. |

# [Startup and Maintenance Precautions]

| ⚠WARNING |
|---|
| ● Do not touch any terminal or connector while power is on. Doing so will cause electric shock.<br>● Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws or module mounting screws. Failure to do so may cause the module to fail or malfunction. |

# [Startup and Maintenance Precautions]

| ⚠CAUTION |
|---|
| ● Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.<br>● Do not loosen or tighten the screws on the back of the module. Doing so may disassemble the module and cause failure, resulting in malfunction, injury, or a fire.<br>● Do not drop or apply strong shock to the module. Doing so may damage the module.<br>● Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may cause the module to fail or malfunction.<br>● After the first use of the product, do not mount/remove the terminal block to/from the module more than 50 times (IEC 61131-2 compliant).<br>● Before handling the module, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction. |

# [Disposal Precautions]

| ⚠CAUTION |
|---|
| ● When disposing of this product, treat it as industrial waste. |

# ●CONDITIONS OF USE FOR THE PRODUCT●

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;

i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and

ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

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

("Prohibited Application")

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

• Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.

• Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.

• Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

# INTRODUCTION

Thank you for purchasing the Mitsubishi programmable controllers.

This manual describes the specifications, handling, and programming of the CC-Link remote I/O module with diagnostic functions, which is used as a remote device station in a CC-Link system.
The CC-Link remote I/O module with diagnostic functions is an input module equipped with functions that detect disconnection (no connection) or a short-circuit (ground fault) of sensor power supplies.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the programmable controller to handle the product correctly.
When applying the program examples introduced in this manual to the actual system, ensure the applicability and confirm that it will not cause system control problems.

# COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

## (1) Method of ensuring compliance

To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- User's manual for the CPU module or head module used
- Safety Guidelines
  (This manual is included with the CPU module, base unit, or head module.)

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

## (2) Additional measures

To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

# RELEVANT MANUALS

The following manuals are relevant to this product.

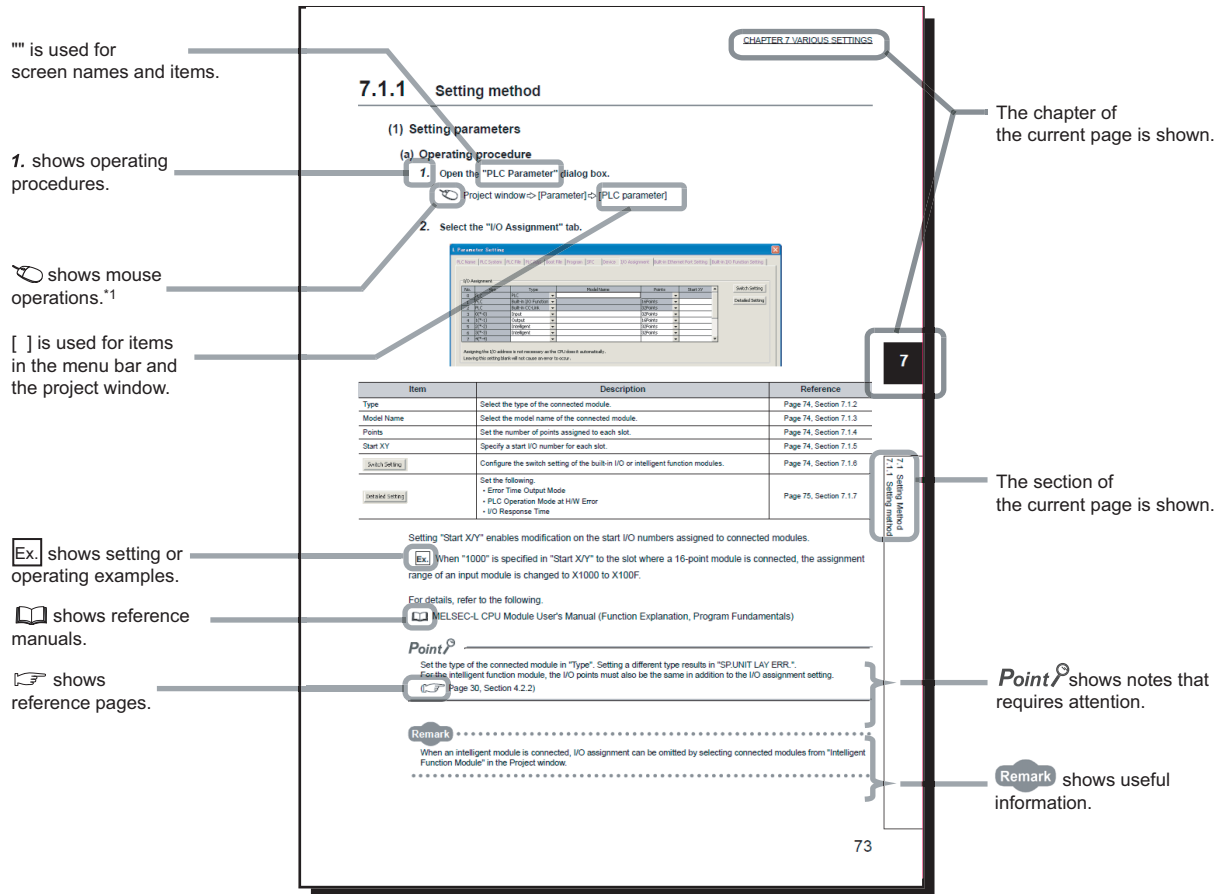| Manual name<br><manual number> | Description |
|---|---|
| MELSEC-Q CC-Link System Master/Local Module User's Manual <SH-080394E> | System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the CC-Link module |
| MELSEC-L CC-Link System Master/Local Module User's Manual <SH-080895ENG> | System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the LCPU with built-in CC-Link and LJ61BT11 |
| MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application) <SH-081270ENG> | Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of the CC-Link system master/local module |
| CC-Link System Master/Local Module Type AJ61BT11/A1SJ61BT11 User's Manual <IB-66721> | System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the AJ61BT11 and A1SJ61BT11 |
| CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11 User's Manual <IB-66722> | System configuration, performance specifications, functions, handling, wiring, and troubleshooting of the AJ61QBT11 and A1SJ61QBT11 |
| Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions) <IB-66251> | Instructions extended for the AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) |

# CONTENTS

# MANUAL PAGE ORGANIZATION

In this manual, pages are organized and the symbols are used as shown below.
The following page illustration is for explanation purpose only, and is different from the actual pages.

"" is used for
screen names and items.

*1.* shows operating
procedures.

✎ shows mouse
operations.*1

[ ] is used for items
in the menu bar and
the project window.

Ex. shows setting or
operating examples.

📖 shows reference
manuals.

☞ shows
reference pages.



The chapter of
the current page is shown.

The section of
the current page is shown.

*Point* shows notes that
requires attention.

Remark shows useful
information.

*1    The mouse operation example is provided below. (For GX Works2)

Menu bar

Ex.    ✎ [Online] ▷ [Write to PLC...]
          Select [Online] on the menu bar,
          and then select [Write to PLC...].

A window selected in the view selection area is displayed.

Ex.    ✎ Project window ▷ [Parameter]
          ▷ [PLC Parameter]
          Select [Project] from the view selection
          area to open the Project window.
          In the Project window, expand [Parameter] and
          select [PLC Parameter].

View selection area
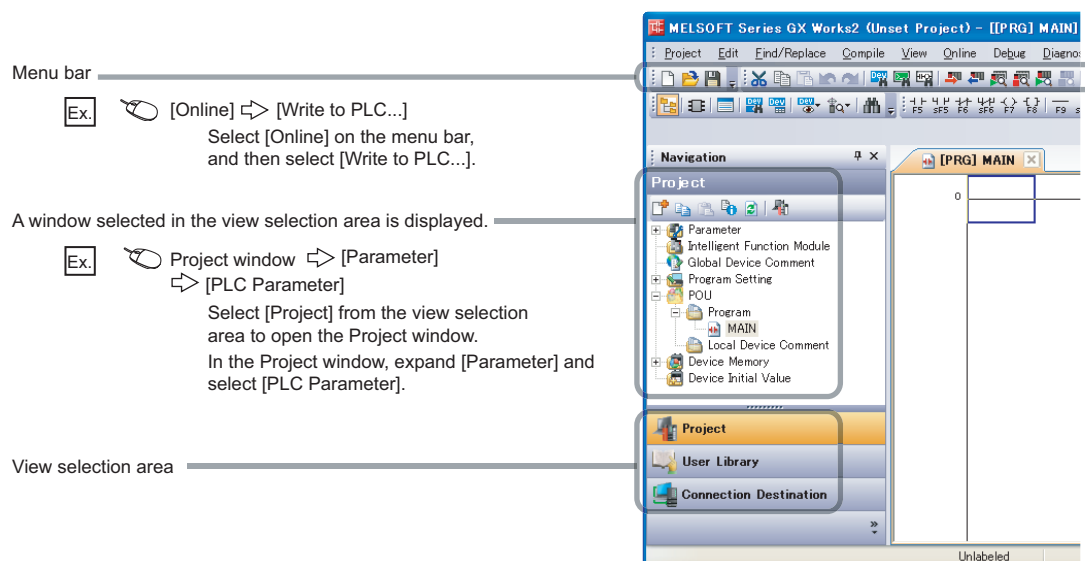
# TERMS

This manual uses the following generic terms and abbreviations to describe the CC-Link remote I/O module with diagnostic functions, unless otherwise specified.

| Term | Description |
|---|---|
| CC-Link remote I/O module with diagnostic functions | A generic term for the CC-Link remote I/O module equipped with input diagnostic functions. The functions are used to detect disconnection (no connection) or a short-circuit (ground fault) of sensor power supplies. |
| GX Developer | The product name of the software package for the MELSEC programmable controllers |
| GX Works2 | |
| QCPU (Q mode) | A generic term for the following CPU modules: Q00JCPU, Q00CPU, Q00UJCPU, Q00UCPU, Q01CPU, Q01UCPU, Q02CPU, Q02HCPU, Q02PHCPU, Q02UCPU, Q03UDCPU, Q03UDVCPU, Q03UDECPU, Q04UDHCPU, Q04UDVCPU, Q04UDEHCPU, Q06HCPU, Q06PHCPU, Q06UDHCPU, Q06UDVCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q12HCPU, Q12PHCPU, Q12PRHCPU, Q13UDHCPU, Q13UDVCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q25HCPU, Q25PHCPU, Q25PRHCPU, Q26UDHCPU, Q26UDVCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU |
| QCPU (A mode) | A generic term for the Q02CPU-A, Q02HCPU-A, and Q06HCPU-A |
| LCPU | A generic term for the following CPU modules: L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, and L26CPU-PBT |
| RCPU | A generic term for R04CPU, R08CPU, R16CPU, R32CPU, and R120CPU |
| QnACPU | A generic term for the following CPU modules: Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, and Q4ARCPU |
| ACPU | A generic term for the following CPU modules: A0J2CPU, A0J2HCPU, A1CPU, A2CPU, A2CPU-S1, A3CPU, A1SCPU, A1SCPUC24-R2, A1SHCPU, A1SJCPU, A1SJCPU-S3, A1SJHCPU, A1NCPU, A2NCPU, A2NCPU-S1, A3NCPU, A3MCPU, A3HCPU, A2SCPU, A2SHCPU, A2ACPU, A2ACPU-S1, A3ACPU, A2UCPU, A2UCPU-S1, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A3UCPU, and A4UCPU |
| Master station | A station that controls a data link system<br>One master station is required for one system. |
| Local station | A station that includes a CPU module and can communicate with the master station and other local stations |
| Remote I/O station | A station that exchanges I/O signals (bit data) and I/O data (word data) with an external device, and converts analog data into digital data |
| Remote device station | A station that exchanges I/O signals (bit data) and I/O data (word data) with an external device, and converts analog data into digital data |
| Remote station | A generic term for a remote I/O station and a remote device station |
| Intelligent device station | A station, such as the AJ65BT-R2N, that can perform transient transmission. (Local stations are included.) |
| Master module | A generic term for modules that can serve as a master station |
| SB | Link special relay (for CC-Link)<br>Bit data that indicates the operating status and data link status of modules on the master and local stations |
| SW | Link special register (for CC-Link)<br>Word data that indicates the operating status and data link status of modules on the master and local stations |
| RX | Remote input (for CC-Link)<br>Bit data input from a remote station to the master station |
| RY | Remote output (for CC-Link)<br>Bit data output from the master station to a remote station |

| Term | Description |
|---|---|
| RWw | Remote register (write area for CC-Link) |
| | Word data output from the master station to a remote device station |
| RWr | Remote register (read area for CC-Link) |
| | Word data input from a remote device station to the master station |

# PACKING LIST

The items in the following tables are included in the package of each product.

### (1) AJ65ABTP3-16D

| Product name | Quantity |
|---|---|
| AJ65ABTP3-16D 24VDC input module with diagnostic functions (positive common/sink type) | 1 |
| AJ65ABTP3-16D 24VDC Input Module With Diagnostic Functions (Positive Common/Sink Type) User's Manual | 1 |
| Mounting bracket | 2 |

### (2) AJ65ABTP3-16DE

| Product name | Quantity |
|---|---|
| AJ65ABTP3-16DE 24VDC input module with diagnostic functions (negative common/source type) | 1 |
| AJ65ABTP3-16DE 24VDC Input Module With Diagnostic Functions (Negative Common/Source Type) User's Manual | 1 |
| Mounting bracket | 2 |

# CHAPTER 1  OVERVIEW

# 1.1  Features

This section describes the features of the CC-Link remote I/O module with diagnostic functions.

## (1) Increasing maintainability by using diagnostic functions

The disconnection (no connection) or short-circuit (ground) of an input wiring (sensor power supply) can be detected by each point.

### (a) Check for disconnections (no connections) or short-circuits (ground) with LED indications

The LEDs of the module indicate the disconnections (no connections) or short-circuits (grounds).
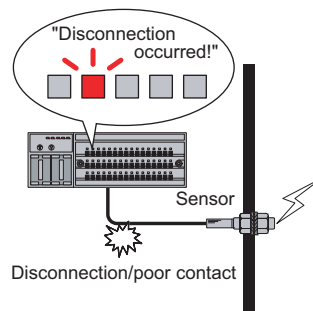


### (b) Notification of disconnections (no connections) or short-circuits (ground) to the master module

The locations and the causes are notified to the master station. The disconnections (no connections) or short-circuits (ground) can be checked by using the module in combination with HMI (Human Machine Interface) such as GOT.
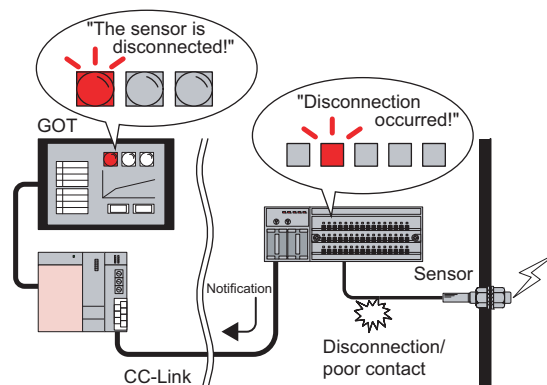
**(2) Enabling/disabling of the disconnection (no connection) detection function can be set.**

Whether to enable or disable the disconnection (no connection) detection function can be set by each point. By using this setting, the detection function of the disconnection (no connection), where the input point is not used, can be disabled.

Note that the detection function of the short-circuit (ground) is always enabled at all points.

**(3) Check for wiring errors by monitoring an external power supply**

An input common power supply status (whether the power is on or off) can be checked.

**(a) Check of the power supply status of an external power supply with LED indications**

The LEDs of the module indicate the power supply status of an external power supply.
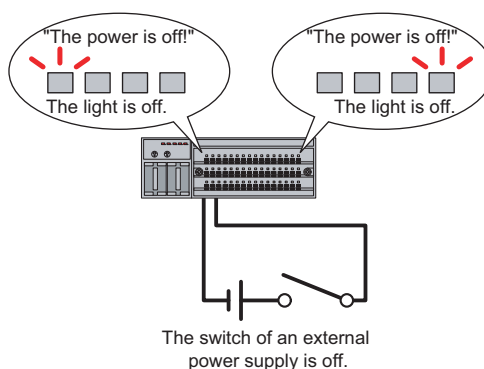


**(b) Notification of the power supply status of an external power supply to the CPU module**

The power supply status of an external power supply is notified to the CPU module. The status can be checked by using the module in combination with HMI (Human Machine Interface) such as GOT.
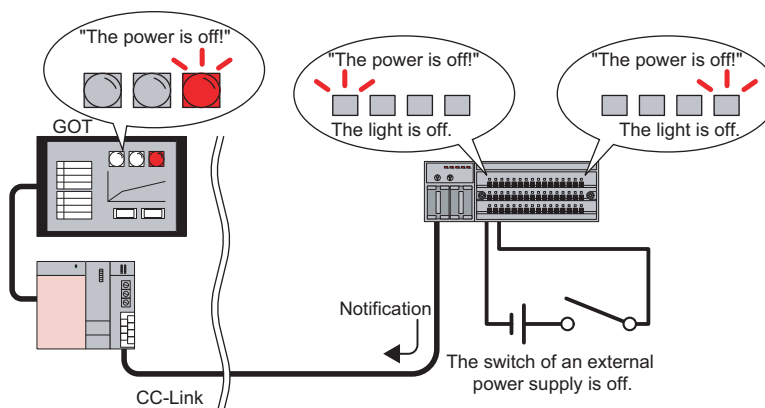


**(4) Visualization of the wiring status by using a sequence program**

By counting the number of disconnections, wiring disconnections (no connections) or poor contacts can be visualized. This visualization enables to detect wiring errors early and perform preventive maintenance.

### (5) Capable of preventing the misjudgment of the module when a ground occurs (AJ65ABTP3-16DE only)

Because the input type of the AJ65ABTP3-16DE is negative common (source type), the module's misjudgment (mistaking the ground of an input signal for a normal status) can be prevented.

### (6) A variety of installation methods

The way of the module installation can be chosen between "installation using a DIN rail" and "installation using screws", depending on the installation environment. The location of the screws can be chosen from three patterns.

Also, the module can be installed in six different orientations as shown below.



Horizontal installation          Horizontal installation (reverse)          Upward installation

Vertical installation (reverse)          Vertical installation          Downward installation
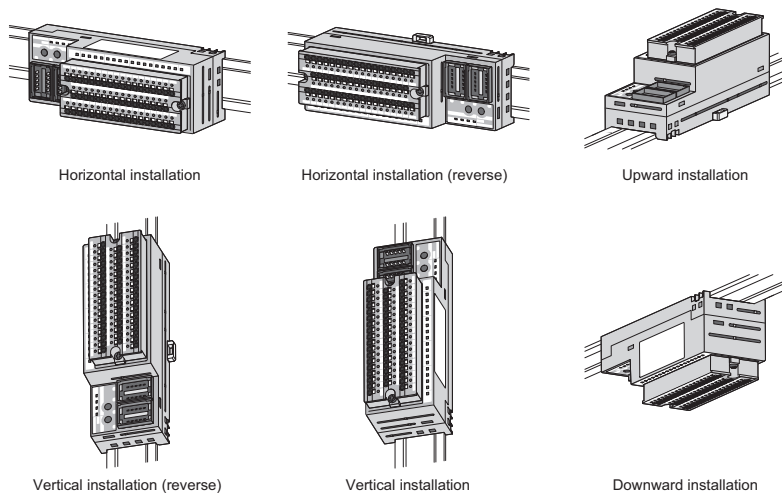
### (7) The switch setting of the transmission speed is not required.

After the power is supplied, the module senses a transmission speed in network communications and set the transmission speed automatically. Due to this function, the switch settings of the transmission speed at remote stations are not required and therefore the man-hour for starting the system can be reduced.

### (8) Easy setting of the station number

The station number can be set easily with a rotary switch.

### (9) Man-hour reduction for wiring

- Because a terminal block of the module has a spring clamp structure (push-in type), a solderless terminal can be connected by inserting it in the pin. Therefore tightening screws is not required at the time of maintenance.
- Because one-touch connectors (pressure-displacement wire-connection method) are used to connect communication cables or power cables, soldering, stripping wires, and tightening screws are not required.

16

**1**

### (10)Simplifying wiring procedures

- Because separate one-touch connectors are used for IN side connection and OUT side connection, transition wiring in the panel can be configured easily.
- I/O power terminals for transition wiring are installed on both ends of the terminal block. Therefore, to connect multiple numbers of the CC-Link remote I/O modules with diagnostic functions, installation of a relay terminal block between the modules is not required.
- A 2-wire or 3-wire sensor can be directly connected to the terminal block. Therefore, installation of a relay terminal block between the CC-Link remote I/O module with diagnostic functions and the sensor is not required.
- Because a 2-piece structure is used for an input wiring part, the module can be changed with the input wiring connected to the terminal block. The 2-piece terminal block can be easily removed by loosing the fixing screws, because the terminal block is lifted by doing so.

### (11)Wiring check can be done easily.

Wiring check can be done easily by using the conduction check hole on the 2-piece terminal block. Incorrect wiring can be detected early.

# 1.2 Identifying the Type

This section shows how to identify the type of a CC-Link remote I/O module with diagnostic functions.

AJ65ABTP3-16☐ ☐

| I/O specifications | D : 24VDC input (positive common input) |
| | DE: 24VDC input (negative common input) |

| Number of I/O points | 16: 16 points |

| External load connection method | P3: 3-wire, spring clamp terminal block push-in type |

| Cable specification | BT: Bus twisted pair cable (CC-Link dedicated cable) |

| Module type | A : With diagnostic functions |
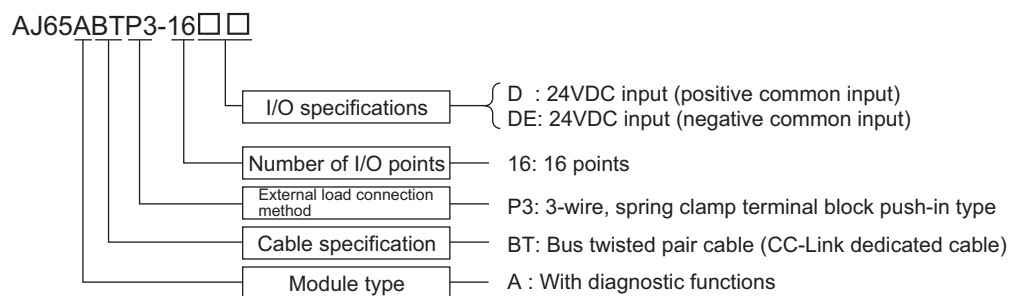
# CHAPTER 2 SYSTEM CONFIGURATION

This chapter explains the system configuration when the CC-Link remote I/O module with diagnostic functions is used.

## 2.1 Overall Configuration

This section shows the overall configuration when the CC-Link remote I/O module with diagnostic functions is used.

CC-Link system master/local module (master station)

(Remote I/O station)

(Remote I/O station)

Terminating resistor

Ver.1.10-compatible
CC-Link dedicated cable

CC-Link remote I/O module
with diagnostic functions

(Remote device station)
Exclusive station 1.

*1

The object to be checked for
disconnection (no connection)/
short-circuit (ground) such as
a sensor
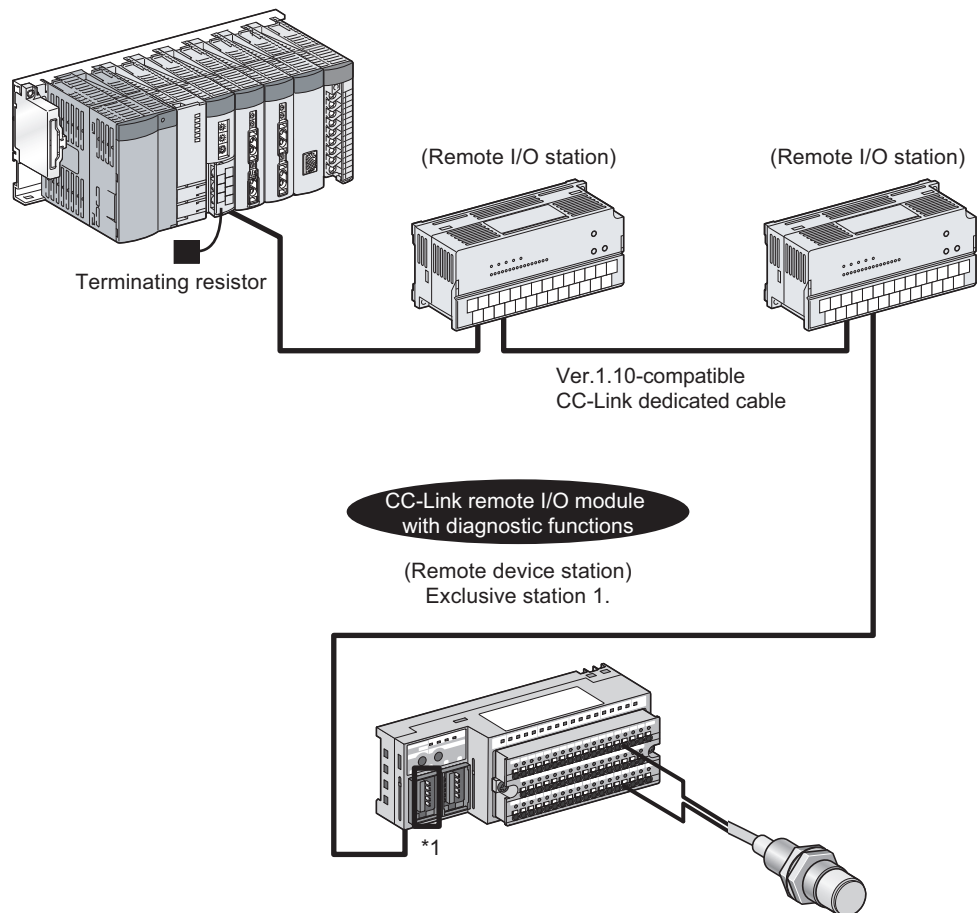
*1     When the module is used at the end of the CC-Link system, attach an one-touch connector plug with terminating resistor
(A6CON-TR11(N)) to the module. (Page 68, Section 5.5.4)

# 2.2 Applicable Systems

Master modules listed on the website of CC-Link Partner Association (CLPA) are applicable to the system.

For more details, visit the following URL.

CC-Link Partner Association: www.cc-link.org

**Remark** • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

Check the specifications of master modules of each manufacturer before using them.

• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

## (1) Precautions for setting parameters

Because the CC-Link remote I/O module with diagnostic functions is used as a remote device station, its parameter settings are different from those of a CC-Link remote I/O module.

For the parameter settings of a remote device station, refer to the user's manual for the master module to be used.

## (2) Restrictions when using the CC-Link dedicated instructions (RLPA, RRPA)

The CC-Link dedicated instructions (RLPA, RRPA) might not be able to use depending on the CPU module or master module to be used.

For details on the restrictions, refer to the user's manuals for the A series master modules, and Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions).

The dedicated instructions except RLPA and RRPA cannot be used for the CC-Link remote I/O module with diagnostic functions.

For the program examples when the dedicated instructions (RLPA, RRPA) are used, refer to the "Program Example When the ACPU/QCPU (A Mode) is Used (Dedicated Instructions)" section. (☞ Page 104, Section 6.6)

# 2.3　How to Check the Version

The hardware version and the software version of the CC-Link remote I/O module with diagnostic functions can be checked on the rating plate ("DATE").
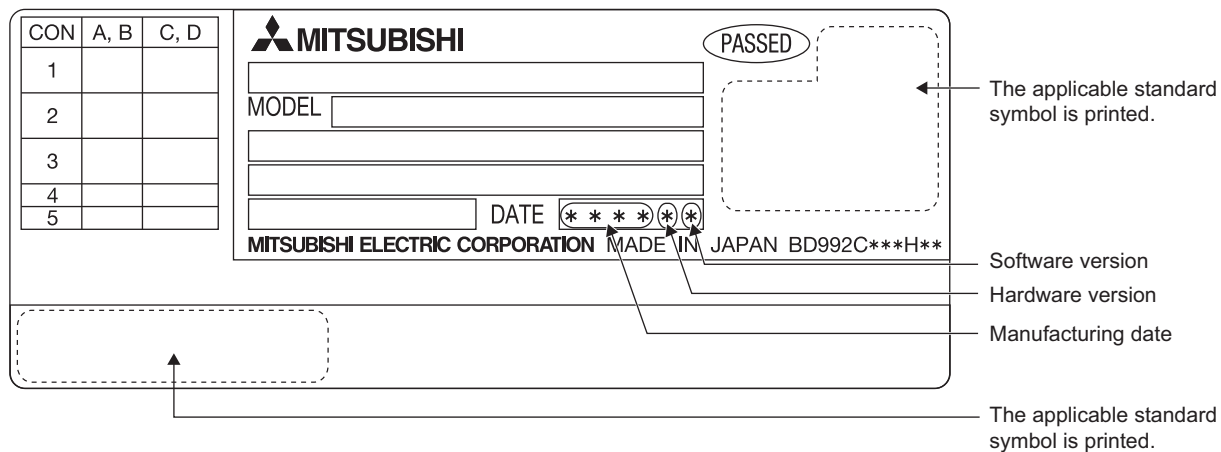


# 2.4　How to Check the Serial Number ("SERIAL")

The serial number of the CC-Link remote I/O module with diagnostic functions can be checked on the rating plate ("SERIAL").
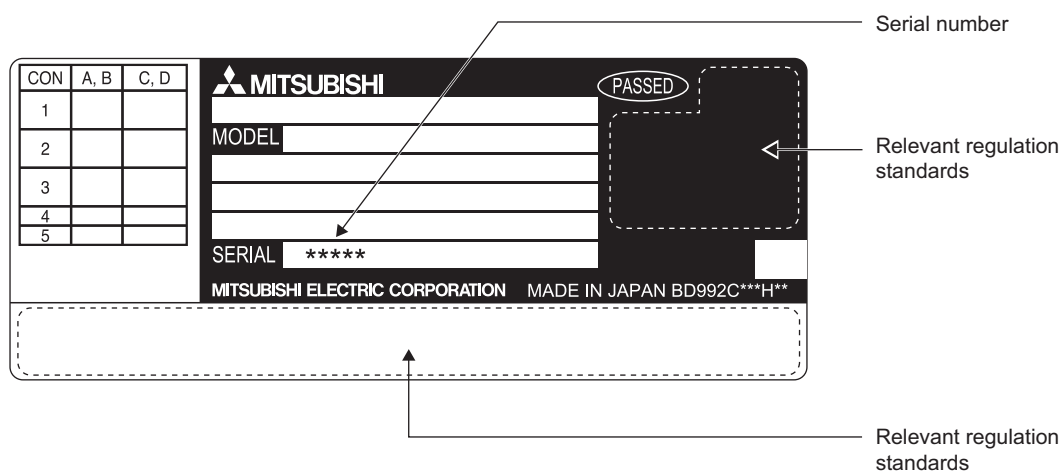
# CHAPTER 3  PART NAMES

This chapter lists the components of the CC-Link remote I/O module with diagnostic functions.



| No. | Item | | | Description |
|---|---|---|---|---|
| 1) | Operating status indication LED | PW LED | Green | Indicates the power supply status of the module.<br>ON:  Power being supplied<br>OFF: No power supplied |
| | | RUN LED | Green | Indicates the operating status of the remote I/O module.<br>ON:  Normal operation<br>OFF: A watchdog timer error occurs. |
| | | L RUN LED | Green | Indicates the status of data communication between the remote I/O module and the master module.<br>ON:  Normal communication<br>OFF: No communication (timeout error) |
| | | L ERR. LED | Red | Indicates the status of data communication error between the remote I/O module and the master module.<br>ON:  The station number is set outside the range.<br>Flashing regularly:<br>The station number is changed during the operation.[1]<br>Flashing irregularly:<br>A terminating resistor is not installed.<br>The module or CC-Link dedicated cable is affected by noise.<br>OFF: Normal communication |
| | | I/O PW LED | Green | Indicates the status of the external power supply.<br>ON:  Supplying power<br>OFF: Not supplying power |
| | | X0 to XF | Green[2] | Indicates the ON/OFF status of input.<br>ON:  Input ON<br>OFF: Input OFF |
| | | | Red[3] | Indicates the disconnection, no connection, short-circuit, or ground of the input.<br>Flashing:<br>Disconnection or no connection occurs.[4]<br>ON:  A short-circuit or a ground occurs.[4] |
| 2) | Station number setting switch | | | A rotary switch to set a station number<br>If a number other than 1 to 64 is set, an error occurs and "L ERR." LED turns on. Note that a unique station number should be set.<br>• Set the tens place of the number to x10.<br>• Set the ones place of the number to x1. |

| No. | Item | Description |
|---|---|---|
| 3) | One-touch connector for communication | One-touch connector for communication line<br>When the module is used at the end of the CC-Link system, attach a one-touch connector plug with terminating resistor (A6CON-TR11(N)) to the module. |
| 4) | One-touch connector for power supply and FG | One-touch connector for module power supply line and FG |
| 5) | Spring clamp terminal block (push-in type) | 2-piece spring clamp terminal block (push-in type) for input signals<br>To install or remove the terminal block, refer to the "Installation and removal of the spring clamp terminal block (push-in type)" section. ( Page 78, Section 5.6.2)<br>For terminal layout of the AJ65ABTP3-16D, refer to the "AJ65ABTP3-16D" in the "Performance Specifications" section. ( Page 26, Section 4.2.1)<br>For terminal layout of the AJ65ABTP3-16DE, refer to the "AJ65ABTP3-16DE" in the "Performance Specifications" section. ( Page 30, Section 4.2.2) |
| 6) | Pin | A bar solderless terminal is connected by inserting it into the pin.<br>For applicable wire size, refer to the "Performance Specifications" section. ( Page 26, Section 4.2) |
| 7) | Open/close button | A bar solderless terminal can be pulled out by pressing this button using a commercially available tool. (A dedicated tool is not required.) |
| 8) | Conduction check hole | The connection of a wire can be checked by inserting a tester in this hole. (Applicable check pin size of the tester: $\phi$2mm, sharp angle) |
| 9) | 2-piece terminal block fixing screw | Used to fix the terminal block to a module.<br>M3 screw (tightening torque range: 0.42 to 0.57N·m) |
| 10) | Mounting bracket (accessory) | Used to install the module to a control panel.<br>The bracket can be removed.<br>M4 screw (tightening torque range: 0.82 to 1.11N·m) |
| 11) | DIN rail hook | Used to mount the module to a DIN rail. |

*1　If the station number is changed while communication is disconnected, the LED starts flashing irregularly.

*2　If the disconnection (no connection) or the short-circuit (ground) occurs, the red LED (indication of abnormal status) preferentially turns on. Therefore, the green LED (indication of ON/OFF status of input) does not turn on.

*3　The red LED is flashing/on during the occurrence of the disconnection (no connection) or the short-circuit (ground). To keep the LED flashing/on, set Disconnection indication command (RWwm + $2_H$) and Short-circuit indication command (RWwm + $3_H$).

*4　If "Turn on the LED (1)" is set to Short-circuit indication command (RWwm + $3_H$) while "Flash the LED regularly (1)" is set to Disconnection indication command (RWwm + $2_H$), Short-circuit indication command (RWwm + $3_H$) is prioritized and the red LED turns on.

**3**

# 3.1 Transmission Speed Auto-tracking Function

The transmission speed setting to the CC-Link remote I/O module with diagnostic functions is not required because the speed is automatically set according to the setting of the master module.

# CHAPTER 4 SPECIFICATIONS

This chapter lists the specifications of the CC-Link remote I/O module with diagnostic functions.

# 4.1 General Specifications

The following table lists the general specifications of the CC-Link remote I/O module with diagnostic functions.
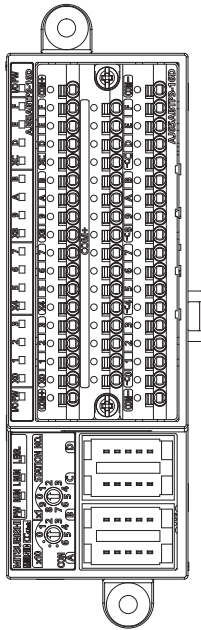
| Item | Specifications | | | | |
|------|------|------|------|------|------|
| Operating ambient temperature | 0 to 55°C | | | | |
| Storage ambient temperature | -20 to 75°C | | | | |
| Operating ambient humidity | 10 to 90% RH, No-condensing | | | | |
| Storage ambient humidity | | | | | |
| Vibration resistance | Compliant with JIS B 3502 and IEC 61131-2 | | Frequency | Constant acceleration | Half amplitude | Sweep count |
| | | Under intermittent vibration | 5 to 8.4Hz | - | 3.5mm | 10 times each in X, Y, Z directions. |
| | | | 8.4 to 150Hz | $9.8m/s^2$ | - | |
| | | Under continuous vibration | 5 to 8.4Hz | - | 1.75mm | - |
| | | | 8.4 to 150Hz | $4.9m/s^2$ | - | |
| Shock resistance | Compliant with JIS B 3502 and IEC 61131-2 ($147m/s^2$, 3 times each in 3 directions X, Y, Z) | | | | |
| Operating atmosphere | No corrosive gases | | | | |
| Operating altitude[1] | 0 to 2000m | | | | |
| Installation location | Inside a control panel | | | | |
| Overvoltage category[2] | II or less | | | | |
| Pollution degree[3] | 2 or less | | | | |

[1]  Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction. When using the programmable controller under pressure, please consult your local Mitsubishi representative.

[2]  This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300V is 2500V.

[3]  This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

## 4.2 Performance Specifications

This section lists the performance specifications of the CC-Link remote I/O module with diagnostic functions.

## 4.2.1 AJ65ABTP3-16D

| Item | | AJ65ABTP3-16D | Appearance |
|---|---|---|---|
| CC-Link Ver. | | CC-Link Ver.1.10 | |
| CC-Link station type | | Remote device station | |
| Number of input points | | 16 points | |
| Isolation method | | Photocoupler | |
| Rated input voltage | | 24VDC (ripple ratio: within 5%) | |
| Rated input current | | Approx. 6mA | |
| Operating voltage range | | 20.4 to 28.8VDC | |
| Max. number of simultaneous input points | | 100% | |
| ON voltage/ON current | | 14V or higher/3.5mA or higher | |
| OFF voltage/OFF current | | 6V or lower/1.7mA or lower | |
| Input resistance | | Approx. 3.8kΩ | |
| Response time | OFF→ON | 1.5ms or less (at 24VDC) | |
| | ON→OFF | 1.5ms or less (at 24VDC) | |
| Wiring method for common | | 16 points/common (3-wire, spring clamp terminal block push-in type) | |
| Input type | | Positive common (sink type) | |
| Number of occupied stations | | 32-point assignment/station (16 points used) | |
| Internal circuit power supply for input part | Voltage | 24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 28.8VDC) | |
| | Current | 30mA or lower (at 24VDC and all points ON), excluding external load current | |
| I/O power supply current | | 8A or lower/common[1] | |
| Short-circuit (ground) detection current | | 50mA or higher/point | |
| Disconnection (no connection) detection current | | 0.3mA or lower/point | |
| Module power supply | Voltage | 24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 26.4VDC) | |
| | Current | 55mA or lower (at 24VDC and all points ON) | |
| Noise immunity | | Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition) | |
| Withstand voltage | | 500VAC for 1 minute between all DC external terminals and ground | |
| Insulation resistance | | 10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester) | |
| Protection degree | | IP1XB | |
| External dimensions | | 50(H)×145(W)×57.5(D)mm | |
| Weight | | 0.31kg | |

*1    When supplying the power to multiple modules in a transition wiring system, calculate the current consumption by referring to the "How to Calculate the Current Consumption" section. (⇨ Page 34, Section 4.3)

| Item | | AJ65ABTP3-16D |
|---|---|---|
| External connection system | Communication part | One-touch connector for communication [Transmission circuit]<br>5-pin IDC plug is sold separately: A6CON-L5P<br><Optional>Online connector for communication: A6CON-LJ5P |
| | Power supply part | One-touch connector for power supply and FG [Module power supply, FG]<br>5-pin IDC plug is sold separately: A6CON-PW5P, A6CON-PW5P-SOD<br><Optional>Online connector for power supply: A6CON-PWJ5P |
| | Input part | 2-piece spring clamp terminal block push-in type<br>[I/O power supply, I/O signals] |
| Module mounting screw | | 2-M4 screw (tightening torque range: 0.82 to 1.11 N·m)<br>Mountable with a DIN rail in 6 orientations |
| Applicable DIN rail | | TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715) |
| Applicable wire size | Connector for communication | Applicable cable: FANC-110SBH, CS-110 |
| | Connector for power supply and FG | 0.66 to 0.98mm$^2$ (18 AWG)<br>[$\phi$2.2 to 3.0mm (A6CON-PW5P), $\phi$2.0 to 2.3mm (A6CON-PW5P-SOD)]<br>Wire diameter: 0.16mm or more<br>Insulating coating material: PVC (heat-resistant)<br>Maximum rated current: 7A[*2] |
| | Spring clamp terminal block for input | Stranded wire 0.08 to 1.5mm$^2$ (28 to 16 AWG)[*3] |
| | Applicable solderless terminal | TE 0.5-8, TE 0.5-10 [Applicable wire size: 0.5mm$^2$] (NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>TE 0.75-8, TE 0.75-10 [Applicable wire size: 0.75mm$^2$]<br>(NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>TE 1.0-8, TE 1.0-10 [Applicable wire size: 0.9 to 1.0mm$^2$]<br>(NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>TE 1.5-8, TE 1.5-10 [Applicable wire size: 1.25 to 1.5mm$^2$]<br>(NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>AI 0.25-12BU [Applicable wire size: 0.25mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 0.34-8TQ, AI 0.34-12TQ [Applicable wire size: 0.34mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 0.5-8WH, AI 0.5-10WH [Applicable wire size: 0.5mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 0.75-8GY, AI 0.75-10GY [Applicable wire size: 0.75mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 1-8RD, AI 1-10RD [Applicable wire size: 1.0mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 1.5-8BK, AI 1.5-10BK [Applicable wire size: 1.5mm$^2$] (PHOENIX CONTACT GmbH & Co. KG) |

*2 Keep the current within the allowable range of the connected cable.
*3 Insert only one wire into the pin of the spring clamp terminal block.
Inserting two or more wires may result in a poor contact to the terminal.

4

4.2 Performance Specifications
4.2.1 AJ65ABTP3-16D

## External connection

<Module power supply and data link cable>

AJ65ABTP3-16D

**CON A**

| Pin number | Signal name |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

LINK CABLE (IN)

One-touch connector for communication

**CON B**

| Pin number | Signal name |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

LINK CABLE (OUT)

**CON C**

| Pin number | Signal name |
|---|---|
| 1 | FG |
| 2 | +24V(UNIT) |
| 3 | 24G(UNIT) |
| 4 | Empty |
| 5 | Empty |

UNIT POWER CABLE (IN)

Module power supply

Insulation

One-touch connector for power supply and FG[*2]

**CON D**

| Pin number | Signal name |
|---|---|
| 1 | FG |
| 2 | +24V(UNIT) |
| 3 | 24G(UNIT) |
| 4 | Empty |
| 5 | Empty |

UNIT POWER CABLE (OUT)

Module power supply

<When using online connectors>

Online connector for communication

AJ65ABTP3-16D

LINK CABLE (IN)

**CON A**

| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

LINK CABLE (OUT)

**CON B**

| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

Online connector for power supply and FG

UNIT POWER CABLE (IN)

**CON C**

| 1 | FG |
| 2 | +24V |
| 3 | 24G |
| 4 | Empty |
| 5 | Empty |

UNIT POWER CABLE (OUT)

**CON D**

| 1 | FG |
| 2 | +24V |
| 3 | 24G |
| 4 | Empty |
| 5 | Empty |

<External power supply and input signal>

AJ65ABTP3-16D

Terminal block[*1]

| Pin number | Signal name |
|---|---|
| TB 1A | COM+ |
| TB 1C | COM- |
| TB 2A | X0 |
| TB 2B | COM+ |
| TB 2C | -C0 |
| TB 3A | X1 |
| TB 3B | COM+ |
| TB 3C | -C1 |
| TB 4A | X2 |
| TB 4B | COM+ |
| TB 4C | -C2 |
| TB 5A | X3 |
| TB 5B | COM+ |
| TB 5C | -C3 |
| TB 6A | X4 |
| TB 6B | COM+ |
| TB 6C | -C4 |
| TB 7A | X5 |
| TB 7B | COM+ |
| TB 7C | -C5 |
| TB 8A | X6 |
| TB 8B | COM+ |
| TB 8C | -C6 |
| TB 9A | X7 |
| TB 9B | COM+ |
| TB 9C | -C7 |
| TB 10A | X8 |
| TB 10B | COM+ |
| TB 10C | -C8 |
| TB 11A | X9 |
| TB 11B | COM+ |
| TB 11C | -C9 |
| TB 12A | XA |
| TB 12B | COM+ |
| TB 12C | -CA |
| TB 13A | XB |
| TB 13B | COM+ |
| TB 13C | -CB |
| TB 14A | XC |
| TB 14B | COM+ |
| TB 14C | -CC |
| TB 15A | XD |
| TB 15B | COM+ |
| TB 15C | -CD |
| TB 16A | XE |
| TB 16B | COM+ |
| TB 16C | -CE |
| TB 17A | XF |
| TB 17B | COM+ |
| TB 17C | -CF |
| TB 18A | COM+ |
| TB 18C | COM- |

I/O power supply

3-wire sensor (sink output)

Detection circuit

2-wire sensor (sink output)

Detection circuit

Detection circuit

Constant-voltage circuit

*1     Insert only one wire into the pin of the spring clamp terminal block.
Inserting two or more wires may result in a poor contact to the terminal.

*2     Attach an unwired connector plug to an unused one-touch connector for power supply and FG.

## External connection

■ Signal array of connector

| Pin number | Connector | | | |
|---|---|---|---|---|
| | CON A | CON B | CON C | CON D |
| 1 | DA | | FG | |
| 2 | DB | | +24V(UNIT) | |
| 3 | DG | | 24G(UNIT) | |
| 4 | Empty | | Empty | |
| 5 | SLD | | Empty | |



Column A
Column B
Column C

CON A, CON B    CON C, CON D

■ Terminal layout of terminal block

| Terminal block | Pin number | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Column A | COM+ *3 | X0 | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | XA | XB | XC | XD | XE | XF | COM+ *3 |
| Column B | | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | COM+ | |
| Column C | COM- *3 | -C0 | -C1 | -C2 | -C3 | -C4 | -C5 | -C6 | -C7 | -C8 | -C9 | -CA | -CB | -CC | -CD | -CE | -CF | COM- *3 |

*3    For I/O power supply, use 1A and 1C pins of a spring clamp terminal block for input. For transition wiring of I/O power supply, use the 18A and 18C pins.

# 4.2.2  AJ65ABTP3-16DE

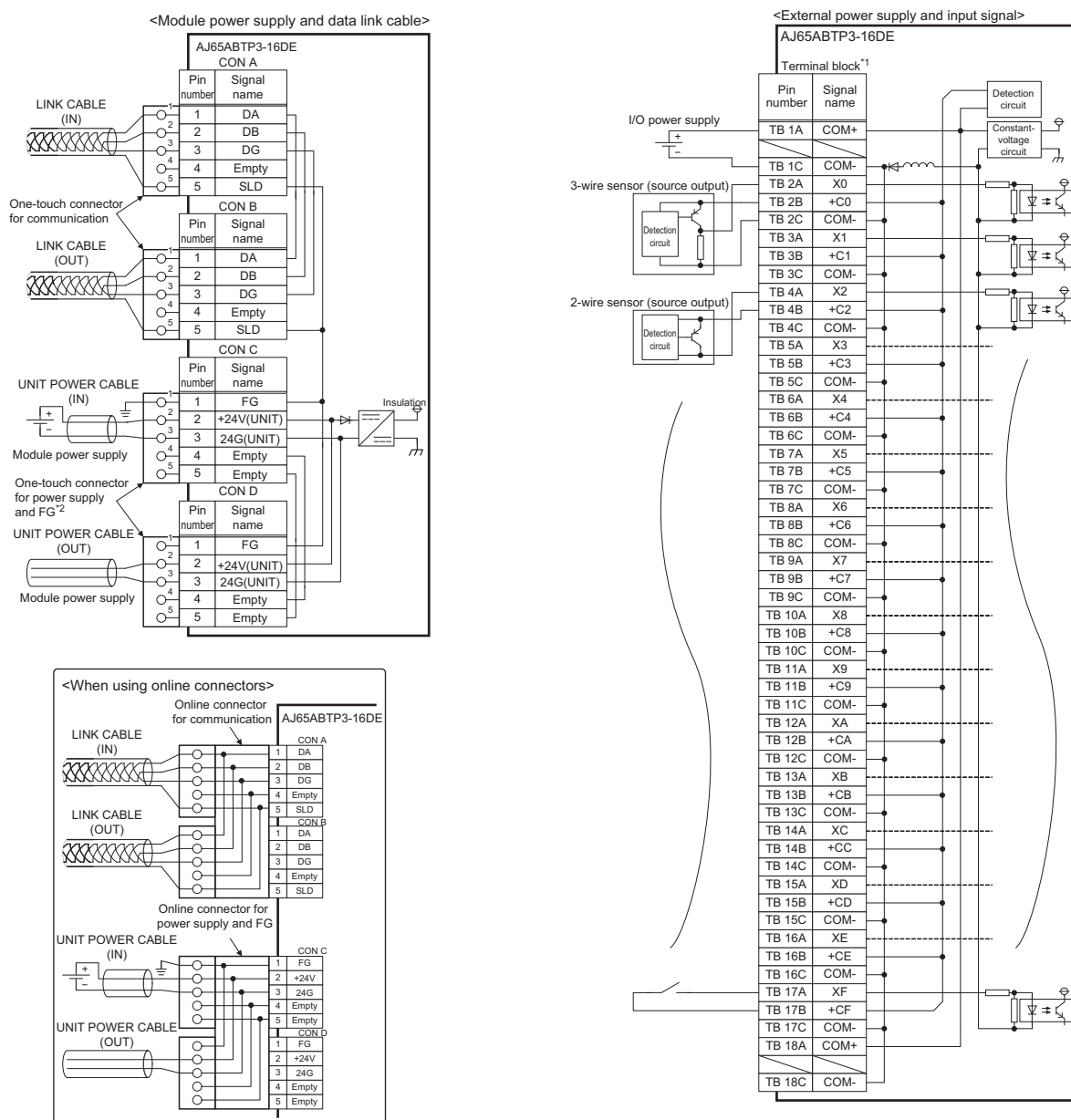| Item | | AJ65ABTP3-16DE | Appearance |
|---|---|---|---|
| CC-Link Ver. | | CC-Link Ver.1.10 | |
| CC-Link station type | | Remote device station | |
| Number of input points | | 16 points | |
| Isolation method | | Photocoupler | |
| Rated input voltage | | 24VDC (ripple ratio: within 5%) | |
| Rated input current | | Approx. 6mA | |
| Operating voltage range | | 20.4 to 28.8VDC | |
| Max. number of simultaneous input points | | 100% | |
| ON voltage/ON current | | 14V or higher/3.5mA or higher | |
| OFF voltage/OFF current | | 6V or lower/1.7mA or lower | |
| Input resistance | | Approx. 3.8kΩ | |
| Response time | OFF→ON | 1.5ms or less (at 24VDC) | |
| | ON→OFF | 1.5ms or less (at 24VDC) | |
| Wiring method for common | | 16 points/common (3-wire, spring clamp terminal block push-in type) | |
| Input type | | Negative common (source type) | |
| Number of occupied stations | | 32-point assignment/station (16 points used) | |
| Internal circuit power supply for input part | Voltage | 24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 28.8VDC) | |
| | Current | 30mA or lower (at 24VDC and all points ON), excluding external load current | |
| I/O power supply current | | 4A or lower/common[*1] | |
| Short-circuit (ground) detection current | | 50mA or higher/point | |
| Disconnection (no connection) detection current | | 0.3mA or lower/point | |
| Module power supply | Voltage | 24VDC (ripple ratio: within 5%) (allowable voltage range: 20.4 to 26.4VDC) | |
| | Current | 60mA or lower (at 24VDC and all points ON) | |
| Noise immunity | | Noise voltage 500Vp-p, noise width 1μs, noise frequency 25 to 60Hz (DC type noise simulator condition) | |
| Withstand voltage | | 500VAC for 1 minute between all DC external terminals and ground | |
| Insulation resistance | | 10MΩ or higher between all DC external terminals and ground (500VDC insulation resistance tester) | |
| Protection degree | | IP1XB | |
| External dimensions | | 50(H)×145(W)×57.5(D)mm | |
| Weight | | 0.31kg | |

*1    When supplying the power to multiple modules in a transition wiring system, calculate the current consumption by referring to the "How to Calculate the Current Consumption" section. (<span>☞</span> Page 34, Section 4.3)

| Item | | AJ65ABTP3-16DE |
|---|---|---|
| External connection system | Communication part | One-touch connector for communication [Transmission circuit]<br>5-pin IDC plug is sold separately: A6CON-L5P<br><Optional>Online connector for communication: A6CON-LJ5P |
| | Power supply part | One-touch connector for power supply and FG [Module power supply, FG]<br>5-pin IDC plug is sold separately: A6CON-PW5P, A6CON-PW5P-SOD<br><Optional>Online connector for power supply: A6CON-PWJ5P |
| | Input part | 2-piece spring clamp terminal block push-in type<br>[I/O power supply, I/O signals] |
| Module mounting screw | | 2-M4 screw (tightening torque range: 0.82 to 1.11 N·m)<br>Mountable with a DIN rail in 6 orientations |
| Applicable DIN rail | | TH35-7.5Fe, TH35-7.5Al (compliant with IEC 60715) |
| Applicable wire size | Connector for communication | Applicable cable: FANC-110SBH, CS-110 |
| | Connector for power supply and FG | 0.66 to 0.98mm$^2$ (18 AWG)<br>[$\phi$2.2 to 3.0mm (A6CON-PW5P), $\phi$2.0 to 2.3mm (A6CON-PW5P-SOD)]<br>Wire diameter: 0.16mm or more<br>Insulating coating material: PVC (heat-resistant)<br>Maximum rated current: 7A[*2] |
| | Spring clamp terminal block for input | Stranded wire 0.08 to 1.5mm$^2$ (28 to 16 AWG)[*3] |
| | Applicable solderless terminal | TE 0.5-8, TE 0.5-10 [Applicable wire size: 0.5mm$^2$] (NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>TE 0.75-8, TE 0.75-10 [Applicable wire size: 0.75mm$^2$]<br>(NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>TE 1.0-8, TE 1.0-10 [Applicable wire size: 0.9 to 1.0mm$^2$]<br>(NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>TE 1.5-8, TE 1.5-10 [Applicable wire size: 1.25 to 1.5mm$^2$]<br>(NICHIFU TERMINAL INDUSTRIES CO., LTD.)<br>AI 0.25-12BU [Applicable wire size: 0.25mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 0.34-8TQ, AI 0.34-12TQ [Applicable wire size: 0.34mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 0.5-8WH, AI 0.5-10WH [Applicable wire size: 0.5mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 0.75-8GY, AI 0.75-10GY [Applicable wire size: 0.75mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 1-8RD, AI 1-10RD [Applicable wire size: 1.0mm$^2$] (PHOENIX CONTACT GmbH & Co. KG)<br>AI 1.5-8BK, AI 1.5-10BK [Applicable wire size: 1.5mm$^2$] (PHOENIX CONTACT GmbH & Co. KG) |

*2 Keep the current within the allowable range of the connected cable.

*3 Insert only one wire into the pin of the spring clamp terminal block.
Inserting two or more wires may result in a poor contact to the terminal.

**4**

<Module power supply and data link cable>

**AJ65ABTP3-16DE**

CON A

| Pin number | Signal name |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

LINK CABLE (IN)

One-touch connector for communication

CON B

| Pin number | Signal name |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

LINK CABLE (OUT)

CON C

| Pin number | Signal name |
|---|---|
| 1 | FG |
| 2 | +24V(UNIT) |
| 3 | 24G(UNIT) |
| 4 | Empty |
| 5 | Empty |

UNIT POWER CABLE (IN)

Module power supply

Insulation

One-touch connector for power supply and FG*2

CON D

| Pin number | Signal name |
|---|---|
| 1 | FG |
| 2 | +24V(UNIT) |
| 3 | 24G(UNIT) |
| 4 | Empty |
| 5 | Empty |

UNIT POWER CABLE (OUT)

Module power supply

<When using online connectors>

Online connector for communication

**AJ65ABTP3-16DE**

LINK CABLE (IN)

CON A

| | |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

LINK CABLE (OUT)

CON B

| | |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | Empty |
| 5 | SLD |

Online connector for power supply and FG

UNIT POWER CABLE (IN)

CON C

| | |
|---|---|
| 1 | FG |
| 2 | +24V |
| 3 | 24G |
| 4 | Empty |
| 5 | Empty |

UNIT POWER CABLE (OUT)

CON D

| | |
|---|---|
| 1 | FG |
| 2 | +24V |
| 3 | 24G |
| 4 | Empty |
| 5 | Empty |

<External power supply and input signal>

**AJ65ABTP3-16DE**

Terminal block*1

I/O power supply

3-wire sensor (source output) — Detection circuit

2-wire sensor (source output) — Detection circuit

Detection circuit / Constant-voltage circuit

| Pin number | Signal name |
|---|---|
| TB 1A | COM+ |
| TB 1C | COM- |
| TB 2A | X0 |
| TB 2B | +C0 |
| TB 2C | COM- |
| TB 3A | X1 |
| TB 3B | +C1 |
| TB 3C | COM- |
| TB 4A | X2 |
| TB 4B | +C2 |
| TB 4C | COM- |
| TB 5A | X3 |
| TB 5B | +C3 |
| TB 5C | COM- |
| TB 6A | X4 |
| TB 6B | +C4 |
| TB 6C | COM- |
| TB 7A | X5 |
| TB 7B | +C5 |
| TB 7C | COM- |
| TB 8A | X6 |
| TB 8B | +C6 |
| TB 8C | COM- |
| TB 9A | X7 |
| TB 9B | +C7 |
| TB 9C | COM- |
| TB 10A | X8 |
| TB 10B | +C8 |
| TB 10C | COM- |
| TB 11A | X9 |
| TB 11B | +C9 |
| TB 11C | COM- |
| TB 12A | XA |
| TB 12B | +CA |
| TB 12C | COM- |
| TB 13A | XB |
| TB 13B | +CB |
| TB 13C | COM- |
| TB 14A | XC |
| TB 14B | +CC |
| TB 14C | COM- |
| TB 15A | XD |
| TB 15B | +CD |
| TB 15C | COM- |
| TB 16A | XE |
| TB 16B | +CE |
| TB 16C | COM- |
| TB 17A | XF |
| TB 17B | +CF |
| TB 17C | COM- |
| TB 18A | COM+ |
| TB 18C | COM- |

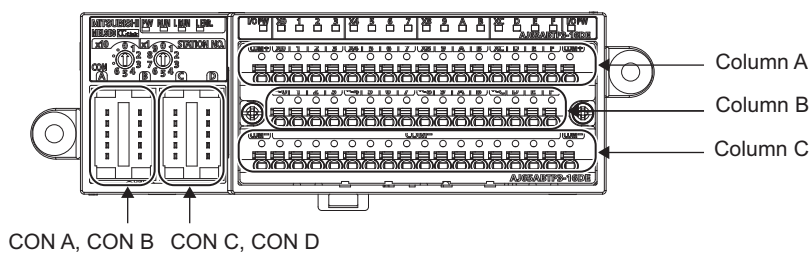*1　Insert only one wire into the pin of the spring clamp terminal block.
Inserting two or more wires may result in a poor contact to the terminal.

*2　Attach an unwired connector plug to an unused one-touch connector for power supply and FG.

**External connection**

■ Signal array of connector

| Pin number | Connector | | | |
|---|---|---|---|---|
| | CON A | CON B | CON C | CON D |
| 1 | DA | | FG | |
| 2 | DB | | +24V(UNIT) | |
| 3 | DG | | 24G(UNIT) | |
| 4 | Empty | | Empty | |
| 5 | SLD | | Empty | |



CON A, CON B    CON C, CON D

Column A
Column B
Column C

■ Terminal layout of terminal block

| Terminal block | Pin number | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| Column A | COM+ *3 | X0 | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | XA | XB | XC | XD | XE | XF | COM+ *3 |
| Column B | | +C0 | +C1 | +C2 | +C3 | +C4 | +C5 | +C6 | +C7 | +C8 | +C9 | +CA | +CB | +CC | +CD | +CE | +CF | |
| Column C | COM- *3 | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- | COM- *3 |

*3      For I/O power supply, use 1A and 1C pins of a spring clamp terminal block for input. For transition wiring of I/O power supply, use the 18A and 18C pins.

# 4.3 How to Calculate the Current Consumption

When supplying the power to multiple modules in a transition wiring system, configure the system so that the current consumption does not exceed the maximum rated current for the system.
This section shows how to calculate the current consumption using the example of the system shown below.
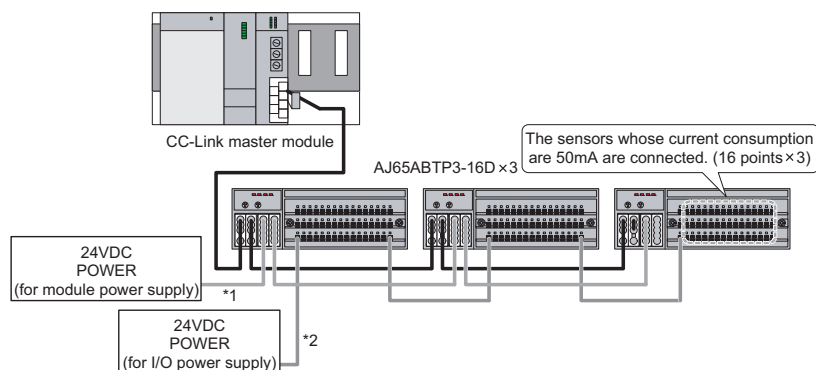


*1    The current, which flows in the cable connecting the power (for module power supply) and the CC-Link remote I/O module with diagnostic functions, must be 7A or lower.
*2    The current, which flows in the cable connecting the power (for I/O power supply) and the AJ65ABTP3-16D, must be 8A or lower.
      When the power is connected to the AJ65ABTP3-16DE, the current must be 4A or lower.

## (1) Current consumption in the system

The table below shows the current consumption of each part in the above system.

| Module | Number of the module | Module power supply current | I/O power supply current | | | |
|---|---|---|---|---|---|---|
| | | | Input current | Internal circuit current for input part | Externally connected device (sensor) | |
| | | | | | Current consumption | Number of connection points |
| AJ65ABTP3-16D | 3 | 55mA | 6mA | 30mA | 50mA | 16 points |

## (2) Maximum rated current for the system

### (a) Maximum rated current for the one-touch connector plug for power supply and FG: 7A

### (b) Maximum rated current for the I/O power supply current: 8A (4A when the AJ65ABTP3-16DE is connected)

## (3) Calculation of the current consumption at each power port

Conduct the calculation using the current values in (1) and (2), and check whether the current consumption in this system does not exceed the maximum rated current.

### (a) Module power supply current

= (Total of the module power supply current value for the AJ65ABTP3-16D)
= 55mA × 3 = 165mA < 7A (Maximum rated current for the one-touch connector plug for power supply and FG)

### (b) I/O power supply current

= (Total current consumption for sensors) + (Total value of the input current for the AJ65ABTP3-16D) + (Total value of the internal circuit current for input part of the AJ65ABTP3-16D)

= 50mA × 16 points × 3 + 6mA × 16 points × 3 + 30mA × 3

= 2.778A < 8A (Maximum rated current for the I/O power supply current)

## (4) Calculation result

This system can be operated because the module power supply current and the I/O power supply current do not exceed the respective maximum rated currents.

**4**

35

# 4.4 Function

This chapter describes the functions of the CC-Link remote I/O module with diagnostic functions.

## 4.4.1 Function list

This section lists the functions of the CC-Link remote I/O module with diagnostic functions.

| Item | Description | Reference |
|---|---|---|
| Input function | Notifies the remote input (RX) of the ON/OFF status of an input. The remote input (RX) is the buffer memory of the master station on CC-Link. | - |
| Input diagnostic function | Detects disconnection (no connection) or a short-circuit (ground) of an input wiring (sensor power supply). | Page 37, Section 4.4.2 |
| Sensor power supply disconnection (no connection) detection function | Monitors the current of the common terminal (-Cn/+Cn), which corresponds to the input terminal (Xn), by using a disconnection detection circuit. If the current value becomes 0.3mA or lower, the function regards it as an occurrence of disconnection (no connection). | Page 40, Section 4.4.2 (2) |
| Sensor power supply short-circuit (ground) detection function | Monitors the current of the common terminal (-Cn/+Cn), which corresponds to the input terminal (Xn), by using a short-circuit detection circuit. If the current value becomes 50mA or higher, the function regards it as an occurrence of a short-circuit (ground). | Page 43, Section 4.4.2 (3) |
| Detection status hold function | Used to select whether to hold or not to hold the detection status of disconnection (no connection) or a short-circuit (ground) of an input wiring (sensor power supply). | Page 44, Section 4.4.3 |
| Check function of the power supply status of an external power supply | Monitors the power supply status of an external power supply for an input. | Page 46, Section 4.4.4 |
| Transmission speed auto-tracking function | Used to set the transmission speed automatically according to the setting of the master module. | - |

# 4.4.2 Input diagnostic function

This function is to detect disconnection (no connection) or a short-circuit (ground) of an input wiring (sensor power supply).

The occurrence or no occurrence of disconnection (no connection) or a short-circuit (ground) is indicated with the LED on the module.
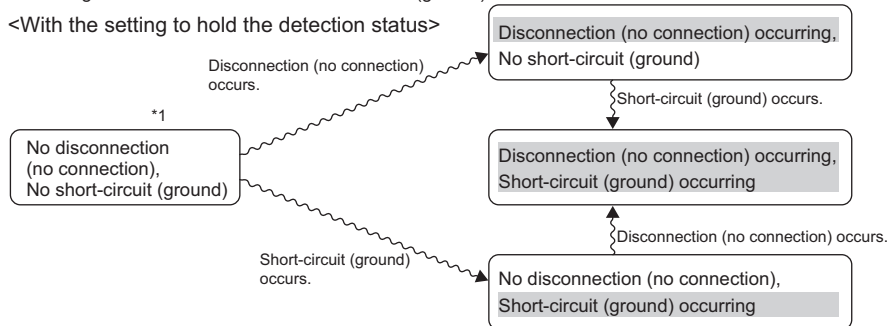
Also, the occurrence of disconnection (no connection) or a short-circuit (ground) is notified to the CPU module by Disconnection detection status (RWrn + $2_H$) or Short-circuit detection status (RWrn + $3_H$).
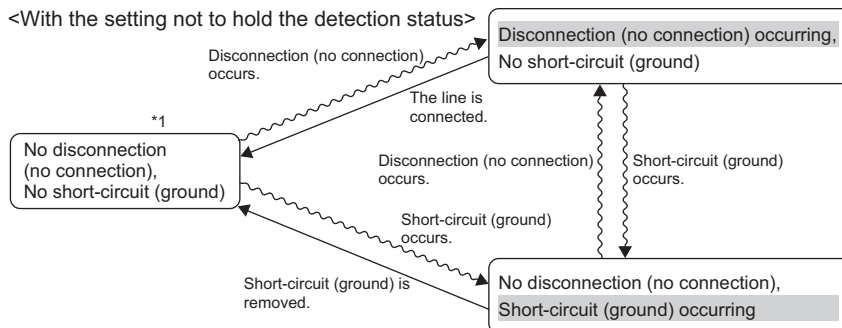
## Overview of input diagnostic functions

● Disconnection (no connection) and short-circuit (ground) detection

· When the current value of common terminal (-Cn/+Cn) is 0.3mA or lower,
  it is regarded as an occurrence of disconnection (no connection).
· When the current value of common terminal (-Cn/+Cn) is 50mA or higher,
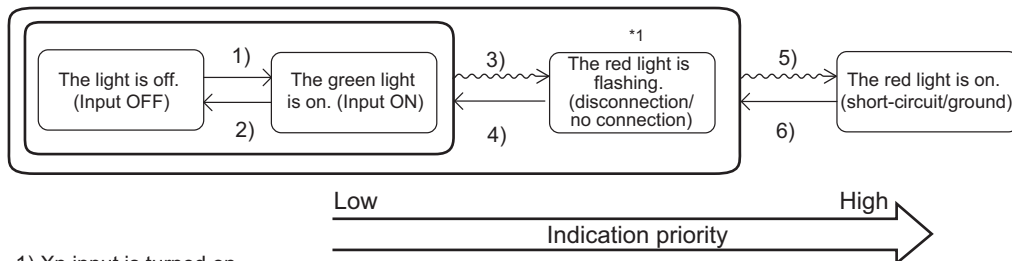  it is regarded as an occurrence of short-circuit (ground).

<With the setting to hold the detection status>

No disconnection (no connection), No short-circuit (ground) *1

→ Disconnection (no connection) occurs. → Disconnection (no connection) occurring, No short-circuit (ground)

Short-circuit (ground) occurs. → Disconnection (no connection) occurring, Short-circuit (ground) occurring

Disconnection (no connection) occurs.

No disconnection (no connection), Short-circuit (ground) occurring

Short-circuit (ground) occurs.

<With the setting not to hold the detection status>

No disconnection (no connection), No short-circuit (ground) *1

Disconnection (no connection) occurs. → Disconnection (no connection) occurring, No short-circuit (ground)

The line is connected.

Disconnection (no connection) occurs.

Short-circuit (ground) occurs.

Short-circuit (ground) occurs.

No disconnection (no connection), Short-circuit (ground) occurring

Short-circuit (ground) is removed.

*1 Set "Detect disconnection (1)" to Disconnection detection enable/disable setting (RWwm + $0_H$).

● Input error indication (Xn LED indication)

The light is off. (Input OFF)
1) → The green light is on. (Input ON)
2) ←
3) → The red light is flashing. (disconnection/ no connection) *1
4) ←
5) → The red light is on. (short-circuit/ground)
6) ←

Low ——— Indication priority ——→ High

1) Xn input is turned on.
2) Xn input is turned off.
3) The disconnection (no connection) occurs, or "Flash the LED regularly (1)" is set to Disconnection indication command (RWwm + $2_H$).
4) The line is connected, and "Do not flash the LED (0)" is set to Disconnection indication command (RWwm + $2_H$).
5) The short-circuit (ground) occurs, or "Turn on the LED (1)" is set to Short-circuit indication command (RWwm + $3_H$).
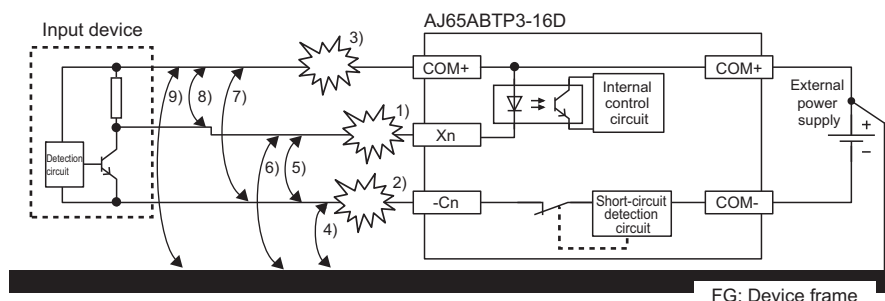6) The short-circuit (ground) is removed, and "Do not turn on the LED (0)" is set to Short-circuit indication command (RWwm + $3_H$).
*1 Set "Detect disconnection (1)" to Disconnection detection enable/disable setting (RWwm + $0_H$).

## (1) The list of the conditions to detect disconnection (no connection) or a short-circuit (ground) of a sensor power supply

The locations where the detection is possible (1) to 9)) and the detection conditions are shown below.

### (a) AJ65ABTP3-16D



| Connected device | Condition | Disconnection (no connection) | | | Short-circuit (ground) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Xn 1) | -Cn 2) | COM+ 3) | -Cn⇔FG 4) | Xn⇔-Cn 5) | Xn⇔FG 6) | -Cn⇔COM+ 7) | Xn⇔COM+ 8) | COM+⇔FG 9) |
| 2-wire input device | Leakage current (higher than 0.3mA) | ◎ | ◎ | - | ○ *2 | × | ○ *2*3*4 | - | - | - |
| | Leakage current (0.3mA or lower) | ○ *1 | ○ *1 | - | | | | | | |
| 3-wire input device | Holding current (higher than 0.3mA) | × | ◎ | ◎ | ○ *2 | × | ○ *2*3*4 | ◎ | ○ *3*4 | × |
| | Holding current (0.3mA or lower) | × | ○ *1 | ○ *1 | | | | | | |

◎ : Detection is possible,  ○ : Detection is possible depending on conditions,  × : Detection is not possible

*1  Bleeder resistances must be connected in parallel just proximal to the input device. (Allowable bleeder resistance: 56kΩ)
*2  The positive common (COM+) of the external power supply must be connected to the device frame.
*3  The detection is possible when the connected input device is turned on.
*4  For some input devices, the short-circuit cannot be detected because the short-circuit current does not flow due to the short-circuit protection function.

### Point

If a short-circuit occurs, remove the cause immediately. If the short-circuit remains, the internal temperature of the module rises, resulting in malfunction or failure.

### (b) AJ65ABTP3-16DE



| Connected device | Condition | Disconnection (no connection) | | | Short-circuit (ground) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Xn 1) | +Cn 2) | COM- 3) | +Cn⇔FG 4) | Xn⇔+Cn 5) | Xn⇔FG 6) | +Cn⇔COM- 7) | Xn⇔COM- 8) | COM-⇔FG 9) |
| 2-wire input device | Leakage current (higher than 0.3mA) | ◎ | ◎ | - | ○*2 | × | ○*2*3*4 | - | - | - |
| | Leakage current (0.3mA or lower) | ○*1 | ○*1 | - | | | | | | |
| 3-wire input device | Holding current (higher than 0.3mA) | × | ◎ | ◎ | ○*2 | × | ○*2*3*4 | ◎ | ○*3*4 | × |
| | Holding current (0.3mA or lower) | × | ○*1 | ○*1 | | | | | | |

◎ : Detection is possible,　○ : Detection is possible depending on conditions,　×: Detection is not possible

*1　Bleeder resistances must be connected in parallel just proximal to the input device. (Allowable bleeder resistance: 56kΩ)
*2　The negative common (COM-) of the external power supply must be connected to the device frame.
*3　The detection is possible when the connected input device is turned on.
*4　For some input devices, the short-circuit cannot be detected because the short-circuit current does not flow due to the short-circuit protection function.

*Point*

If a short-circuit occurs, remove the cause immediately. If the short-circuit remains, the internal temperature of the module rises, resulting in malfunction or failure.

## (2) Sensor power supply disconnection (no connection) detection function

This function is to monitor the current of the common terminal (-Cn/+Cn), which corresponds to the input terminal (Xn), by using a disconnection detection circuit. If the current value becomes 0.3mA or lower, the function regards it as an occurrence of disconnection (no connection).

### (a) How to detect disconnection (no connection)

For each input terminal, set "Detect disconnection (1)" or "Do not detect disconnection (0)" to Disconnection detection enable/disable setting (RWwm + $0_H$).

The setting is enabled by turning on Initial data setting request flag (RY(n + 1)9).

For an unused input terminal (Xn), set "Do not detect disconnection (0)" to Disconnection detection enable/disable setting (RWwm + $0_H$).

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Disconnection detection enable/disable setting (RWwm + $0_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Detect disconnection
0: Do not detect disconnection (default)

### (b) How to check disconnection (no connection)

The occurrence or no occurrence of disconnection (no connection) can be checked in Disconnection detection status (RWrn + $2_H$) or with the LED.

• Check by using Disconnection detection status (RWrn + $2_H$)

Disconnection detection status (RWrn + $2_H$) indicates the occurrence or no occurrence of disconnection (no connection) of each input terminal.

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Disconnection detection status (RWrn + $2_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Disconnection (no connection) occurring
0: No disconnection (no connection)

• Check with the LED

The red LED is flashing only during the occurrence of the disconnection (no connection).

The LED turns off when the line is connected.

To keep the red LED flashing even after the line is connected, create the sequence program as follows:

• Set "Flash the LED regularly (1)" to Disconnection indication command (RWwm + $2_H$) while "Disconnection (no connection) occurring (1)" is set to Disconnection detection status (RWrn + $2_H$).[1]

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Disconnection indication command (RWwm + $2_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Flash the LED regularly
0: Do not flash the LED (default)

[1] If "Turn on the LED (1)" is set to Short-circuit indication command (RWwm + $3_H$) while "Flash the LED regularly (1)" is set to Disconnection indication command (RWwm + $2_H$), Short-circuit indication command (RWwm + $3_H$) is prioritized and the red LED turns on.

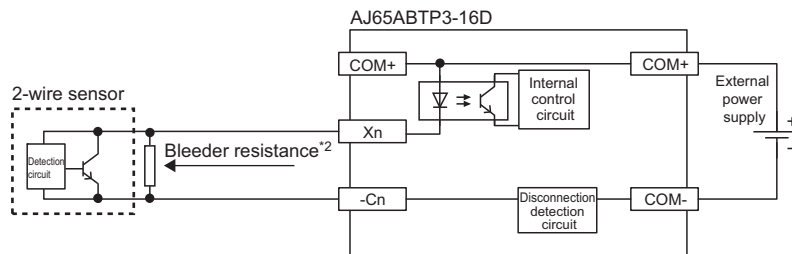### (c) Holding the detection status of disconnection (no connection)

The indication of Disconnection detection status (RWrn + $2_H$) changes depending on the setting of Detection status hold command (RWwm + $1_H$). For details, refer to the "Indication change according to the detection status hold function" section. (

### (d) False detection of disconnection (no connection) when the input device whose current consumption is 0.3mA or lower is used

Disconnection (no connection) might be mistakenly detected if the current consumption of the input device is 0.3mA or lower when it is connected.

- Not to use the disconnection (no connection) detection function
  Set "Do not detect disconnection (0)" to Disconnection detection enable/disable setting (RWwm + $0_H$).
- To use the disconnection (no connection) detection function (When the AJ65ABTP3-16D is used)
  Connect bleeder resistances in parallel just proximal to the input device as shown below. (Allowable bleeder resistance: 56kΩ[1])
  - When a 2-wire sensor is connected: Connect the bleeder resistance between Xn and -Cn as shown below.



- When a 3-wire sensor is connected: Connect the bleeder resistances between COM+ and -Cn as shown below.



[1]  The formula to check the allowable bleeder resistance is shown below.

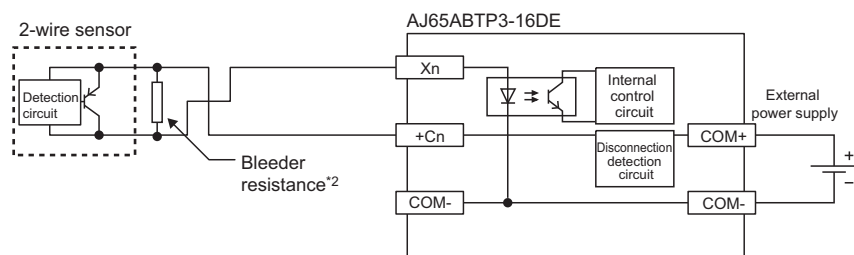$$\frac{\text{Input voltage (V)}}{\text{Bleeder resistance (k}\Omega) \times \text{Tolerance}} > 0.3 \text{ (mA)}$$

$$\frac{20.4 \text{ (V)}}{56 \text{ (k}\Omega) \times 1.1} = 0.331 \text{ (mA)} > 0.3 \text{ (mA)}$$

As proved with the formula above, by connecting the bleeder resistance of 56kΩ, the current consumption of the input device becomes higher than 0.3mA when it is connected.
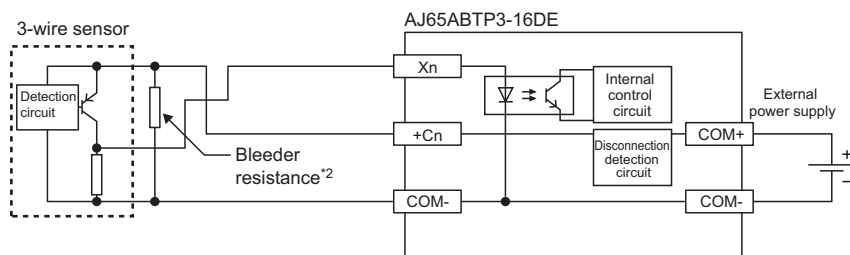
[2]  Connect the bleeder resistance just proximal to the input device. If not, disconnection (no connection) between the bleeder resistance and the input device cannot be detected.

- To use the disconnection (no connection) detection function (When the AJ65ABTP3-16DE is used)

  Connect bleeder resistances in parallel just proximal to the input device as shown below. (Allowable bleeder resistance: 56k$\Omega$[*1])

  - When a 2-wire sensor is connected: Connect the bleeder resistance between Xn and +Cn as shown below.



  - When a 3-wire sensor is connected: Connect the bleeder resistances between COM- and +Cn as shown below.
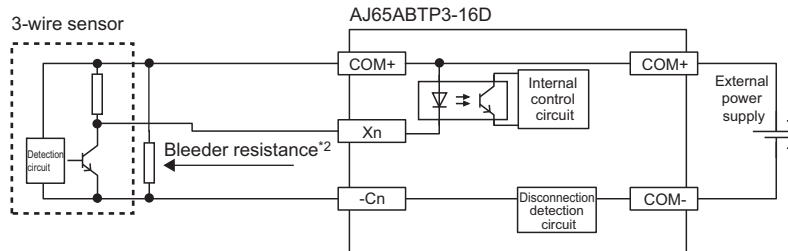


*1    The formula to check the allowable bleeder resistance is shown below.

$$\frac{\text{Input voltage (V)}}{\text{Bleeder resistance (k}\Omega) \times \text{Tolerance}} > 0.3 \text{ (mA)}$$

$$\frac{20.4 \text{ (V)}}{56 \text{ (k}\Omega) \times 1.1} = 0.331 \text{ (mA)} > 0.3 \text{ (mA)}$$

As proved with the formula above, by connecting the bleeder resistance of 56k$\Omega$, the current consumption of the input device becomes higher than 0.3mA when it is connected.

*2    Connect the bleeder resistance just proximal to the input device. If not, disconnection (no connection) between the bleeder resistance and the input device cannot be detected.

## (e) Counting the number of disconnection (no connection) detections

The detection number of disconnection (no connection) of an input wiring (sensor power supply) can be counted by using the sequence program. For details on the sequence program, refer to "PROGRAMMING".

### (3) Sensor power supply short-circuit (ground) detection function

This function is to monitor the current of the common terminal (-Cn/+Cn), which corresponds to the input terminal (Xn), by using a short-circuit detection circuit. If the current value becomes 50mA or higher, the function regards it as an occurrence of a short-circuit (ground).

Also, when a short-circuit (ground) occurs, the common terminal (-Cn/+Cn) for the power supply line, which is connected to the input device, is forced to be turned off in units of contact.

When the short-circuit is removed, the I/O control is automatically restored, and the common terminal (-Cn/+Cn) is turned on.

#### (a) How to detect a short-circuit (ground)

The occurrence or no occurrence of a short-circuit (ground) can be checked in Short-circuit detection status (RWrn + $3_H$) or with the LED.

The setting by a user is not required.

#### (b) How to check a short-circuit (ground)

The occurrence or no occurrence of a short-circuit (ground) can be checked in Short-circuit detection status (RWrn + $3_H$) or with the LED.

- Check by using Short-circuit detection status (RWrn + $3_H$)

Short-circuit detection status (RWrn + $3_H$) indicates the occurrence or no occurrence of a short-circuit (ground) of each input terminal.

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Short-circuit detection status (RWrn + $3_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Short-circuit (ground) occurring
0: No short-circuit (ground)

- Check with the LED

The red LED is on only during the occurrence of a short-circuit (ground).

The LED turns off when the short-circuit (ground) is removed.

To keep the red LED on even after the short-circuit (ground) is removed, create the sequence program as follows:

- Set "Turn on the LED (1)" to Short-circuit indication command (RWwm + $3_H$) while "Short-circuit (ground) occurring (1)" is set to Short-circuit detection status (RWrn + $3_H$).[*1]

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Short-circuit indication command (RWwm + $3_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Turn on the LED
0: Do not turn on the LED (default)

*1    If "Turn on the LED (1)" is set to Short-circuit indication command (RWwm + $3_H$) while "Flash the LED regularly (1)" is set to Disconnection indication command (RWwm + $2_H$), Short-circuit indication command (RWwm + $3_H$) is prioritized and the red LED turns on.

#### (c) Holding the detection status of a short-circuit (ground)

The indication of Short-circuit detection status (RWrn + $3_H$) changes depending on the setting of Detection status hold command (RWwm + $1_H$). For details, refer to the "Indication change according to the detection status hold function" section. ()

#### (d) Precautions for ground detection

To detect a ground occurring between the input terminal (Xn) and the device frame, or between the common terminal (-Cn/+Cn) and the device frame, connect the common (COM+/COM-) of the external power supply to the device frame.

# 4.4.3 Detection status hold function

This function is used to select whether to hold or not to hold the detection status of disconnection (no connection) or a short-circuit (ground) of an input wiring (sensor power supply).

The function enables the CC-Link remote I/O module with diagnostic functions to keep reporting a temporary occurrence of disconnection (no connection) or a short-circuit (ground).

With the setting not to hold the detection status, the temporary occurrence of disconnection (no connection) or a short-circuit (ground) might not be notified to the master module depending on the link scan timing.

To keep the LED indication, set Disconnection indication command (RWwm + $2_H$) and Short-circuit indication command (RWwm + $3_H$).

## (1) How to set the detection status hold function

By setting "Hold the detection status (0)" or "Do not hold the detection status (1)" to Detection status hold command (RWwm + $1_H$), select whether to hold the value in Disconnection detection status (RWrn + $2_H$) and Short-circuit detection status (RWrn + $3_H$) for each input terminal.

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detection status hold command (RWwm + $1_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Do not hold the detection status
0: Hold the detection status (default)

## (2) Indication change according to the detection status hold function

- If "Hold the detection status (0)" is set, "Disconnection (no connection) occurring (1)" and "Short-circuit (ground) occurring (1)" remain in Disconnection detection status (RWrn + $2_H$) and Short-circuit detection status (RWrn + $3_H$) respectively even after the error causes are removed.

- If "Do not hold the detection status (1)" is set, "Disconnection (no connection) occurring (1)" and "Short-circuit (ground) occurring (1)" are stored in Disconnection detection status (RWrn + $2_H$) and Short-circuit detection status (RWrn + $3_H$) only during the occurrence of the errors.

  After the error causes are removed, "No disconnection (no connection) (0)" and "No short-circuit (ground) (0)" are stored.

- The values in Disconnection detection status (RWrn + $2_H$) and Short-circuit detection status (RWrn + $3_H$) are erased by turning off the power, even though "Hold the detection status (0)" is set to Detection status hold command (RWwm + $1_H$).

### (3) Clearing the detection status when the detection status hold function is used

When the values in Disconnection detection status (RWrn + 2$_H$) and Short-circuit detection status (RWrn + 3$_H$) are hold with the detection status hold function, the detection status can be cleared by changing the bit of Detection status hold command (RWwm + 1$_H$) from "Hold the detection status (0)" to "Do not hold the detection status (1)".
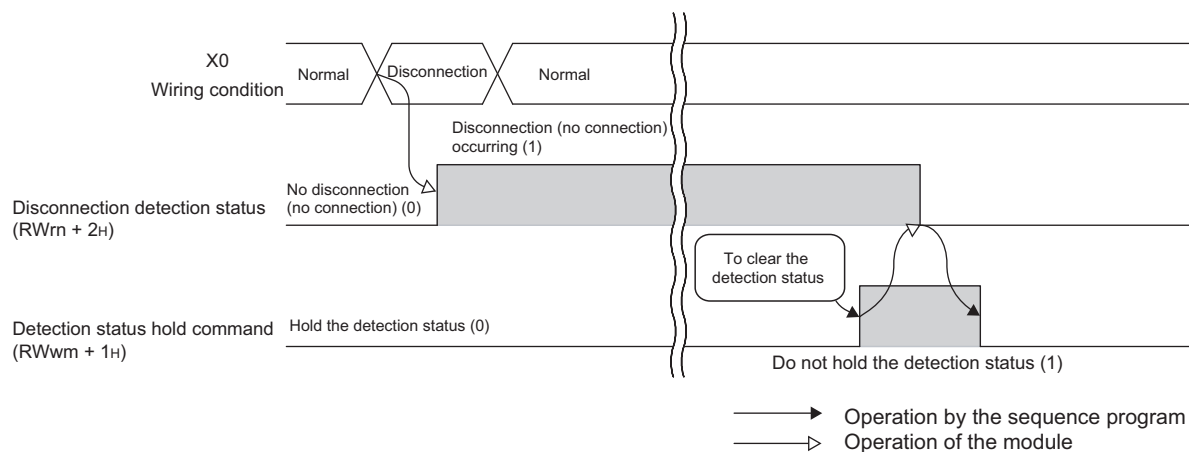
# 4.4.4 Checking of the power supply status of an external power supply

This section describes how to monitor the power supply status of an external power supply for an input.

## (1) Check of the power supply status

### (a) Check with SW (link special registers) of the master module

The power supply status is stored in Other station fuse blown status (SW0088 to SW008B) of the master module.

| Item | | Description |
|---|---|---|
| SW0088 to SW008B | Other station fuse blown status | The fuse blown status at each station is stored.<br><br>|  | b15 | b14 | b13 | to | b2 | b1 | b0 |<br>|---|---|---|---|---|---|---|---|<br>| SW0088 | 16 | 15 | 14 | to | 3 | 2 | 1 |<br>| SW0089 | 32 | 31 | 30 | to | 19 | 18 | 17 |<br>| SW008A | 48 | 47 | 46 | to | 35 | 34 | 33 |<br>| SW008B | 64 | 63 | 62 | to | 51 | 50 | 49 |<br><br>0: Normal<br>1: Error (The external power supply is off.)<br><br>Numbers 1 to 64 in the above table indicate the station numbers.<br>• SW0088 to SW008B are updated independently of SB.<br>• Reserved stations and any station with the number higher than the max. are excepted. |

### (b) Check with the LED

The power supply status can be checked with the I/O PW LED on the CC-Link remote I/O module with diagnostic functions.

• I/O PW LED is on: Supplying power (The module power supply must be on.)
• I/O PW LED is off: Not supplying power

# 4.5 Remote I/O Signal

This chapter describes the assignments and the functions of the remote I/O signals.
The remote input (RX) means the input signal from the CC-Link remote I/O module with diagnostic functions to the master module. Also, the remote output (RY) means the output signal from the master module to the CC-Link remote I/O module with diagnostic functions. The CC-Link remote I/O module with diagnostic functions uses 32 points for the remote input (RX) and 32 points for the remote output (RY) to communicate with the master station.

**4**

# 4.5.1 List of remote I/O signals

This section lists remote I/O signals.

| Signal direction: CC-Link remote I/O module with diagnostic functions to Master module | | | Signal direction: Master module to CC-Link remote I/O module with diagnostic functions | | |
|---|---|---|---|---|---|
| Remote input (RX) | Name | Reference | Remote output (RY) | Name | Reference |
| RXn0 | External input signal | Page 49, Section 4.5.2 (1) | RYn0 | Use prohibited | - |
| RXn1 | | | RYn1 | | |
| RXn2 | | | RYn2 | | |
| RXn3 | | | RYn3 | | |
| RXn4 | | | RYn4 | | |
| RXn5 | | | RYn5 | | |
| RXn6 | | | RYn6 | | |
| RXn7 | | | RYn7 | | |
| RXn8 | | | RYn8 | | |
| RXn9 | | | RYn9 | | |
| RXnA | | | RYnA | | |
| RXnB | | | RYnB | | |
| RXnC | | | RYnC | | |
| RXnD | | | RYnD | | |
| RXnE | | | RYnE | | |
| RXnF | | | RYnF | | |
| RX(n + 1)0 | Use prohibited | - | RY(n + 1)0 | | |
| RX(n + 1)1 | | | RY(n + 1)1 | | |
| RX(n + 1)2 | | | RY(n + 1)2 | | |
| RX(n + 1)3 | | | RY(n + 1)3 | | |
| RX(n + 1)4 | | | RY(n + 1)4 | | |
| RX(n + 1)5 | | | RY(n + 1)5 | | |
| RX(n + 1)6 | | | RY(n + 1)6 | | |
| RX(n + 1)7 | | | RY(n + 1)7 | | |
| RX(n + 1)8 | Initial data processing request flag | Page 49, Section 4.5.2 (2) | RY(n + 1)8 | Initial data processing completion flag | Page 52, Section 4.5.2 (5) |
| RX(n + 1)9 | Initial data setting completion flag | Page 51, Section 4.5.2 (3) | RY(n + 1)9 | Initial data setting request flag | Page 52, Section 4.5.2 (6) |
| RX(n + 1)A | Use prohibited | - | RY(n + 1)A | Use prohibited | - |
| RX(n + 1)B | Remote READY | Page 52, Section 4.5.2 (4) | RY(n + 1)B | | |
| RX(n + 1)C | Use prohibited | - | RY(n + 1)C | | |
| RX(n + 1)D | | | RY(n + 1)D | | |
| RX(n + 1)E | | | RY(n + 1)E | | |
| RX(n + 1)F | | | RY(n + 1)F | | |

n: the address assigned to the master station by the station number setting

*Point*

Do not use any "use prohibited" signals as a remote input or output signal. These signals are reserved for system use. If they are used (turned on and off) by users, the performance of the module cannot be guaranteed.

# 4.5.2 Details of remote I/O signals

This section describes the function of each remote I/O signal of the CC-Link remote I/O module with diagnostic functions.

## (1) External input signals (RXn0 to RXnF)

These signals indicate the ON/OFF status of external input signals (X0 to XF).

## (2) Initial data processing request flag (RX(n + 1)8)

This flag turns on when the power is turned on. Create the sequence program by using this flag so that the CC-Link remote I/O module with diagnostic functions requests the CPU module to do the initial data setting.

This flag turns off by turning on Initial data processing completion flag (RY(n + 1)8).

### (a) Doing the initial data setting when staring up the module
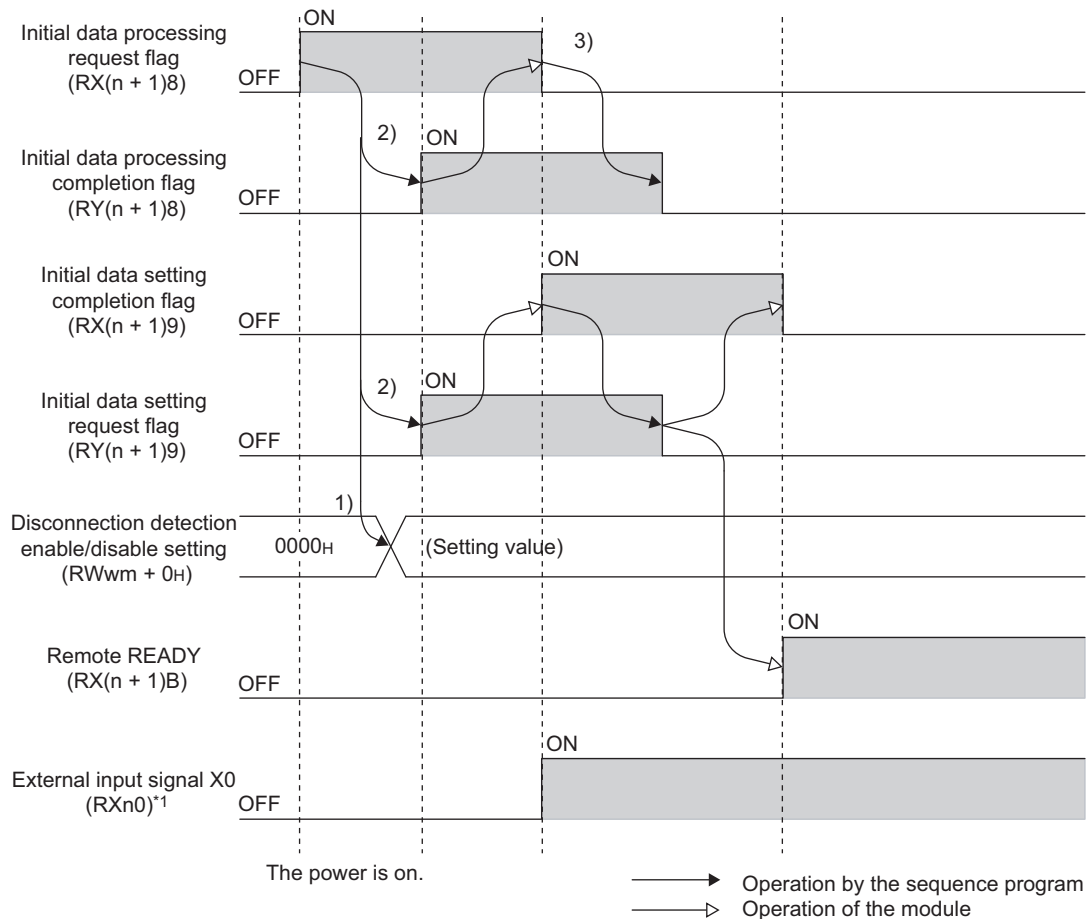


*1    When the sensor connected to X0 is on

1) Set the value to Disconnection detection enable/disable setting (RWwm + 0$_H$) when Initial data processing request flag (RX(n + 1)8) is on.

2) At the same time, turn on Initial data processing completion flag (RY(n + 1)8) and Initial data setting request flag (RY(n + 1)9).

3) External input signals (RXn0 to RXnF) are refreshed when Initial data processing request flag (RX(n + 1)8) turns off.
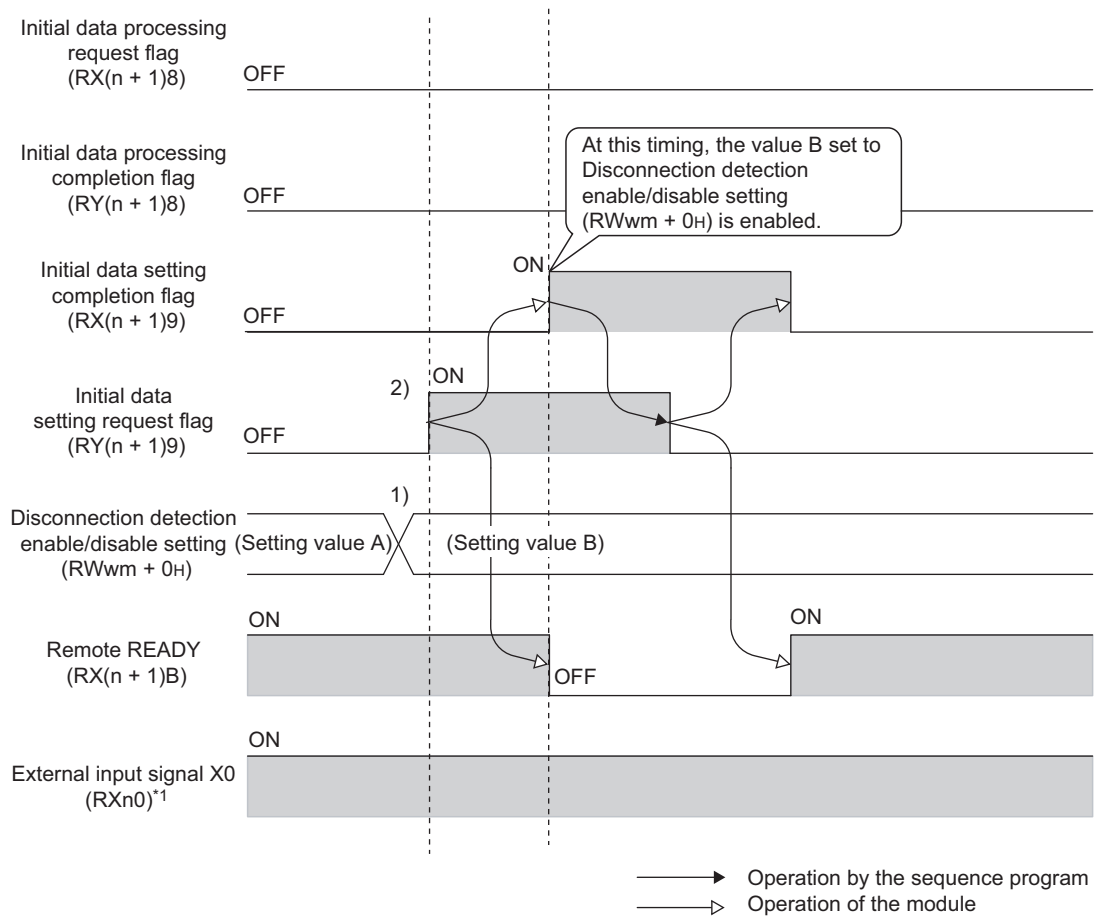
### (b) Doing the initial data setting when the module is operating



*1    When the sensor connected to X0 is on

1)  Set the value B to Disconnection detection enable/disable setting (RWwm + $0_H$).

2)  Turn on Initial data setting request flag (RY(n + 1)9).

### (c) Not doing the initial data setting



Initial data processing request flag (RX(n + 1)8)

Initial data processing completion flag (RY(n + 1)8)

Initial data setting completion flag (RX(n + 1)9)

Initial data setting request flag (RY(n + 1)9)

Disconnection detection enable/disable setting (RWwm + 0H)  0000H

Remote READY (RX(n + 1)B)

External input signal X0 (RXn0)*1

The power is on.

Operation by the sequence program
Operation of the module
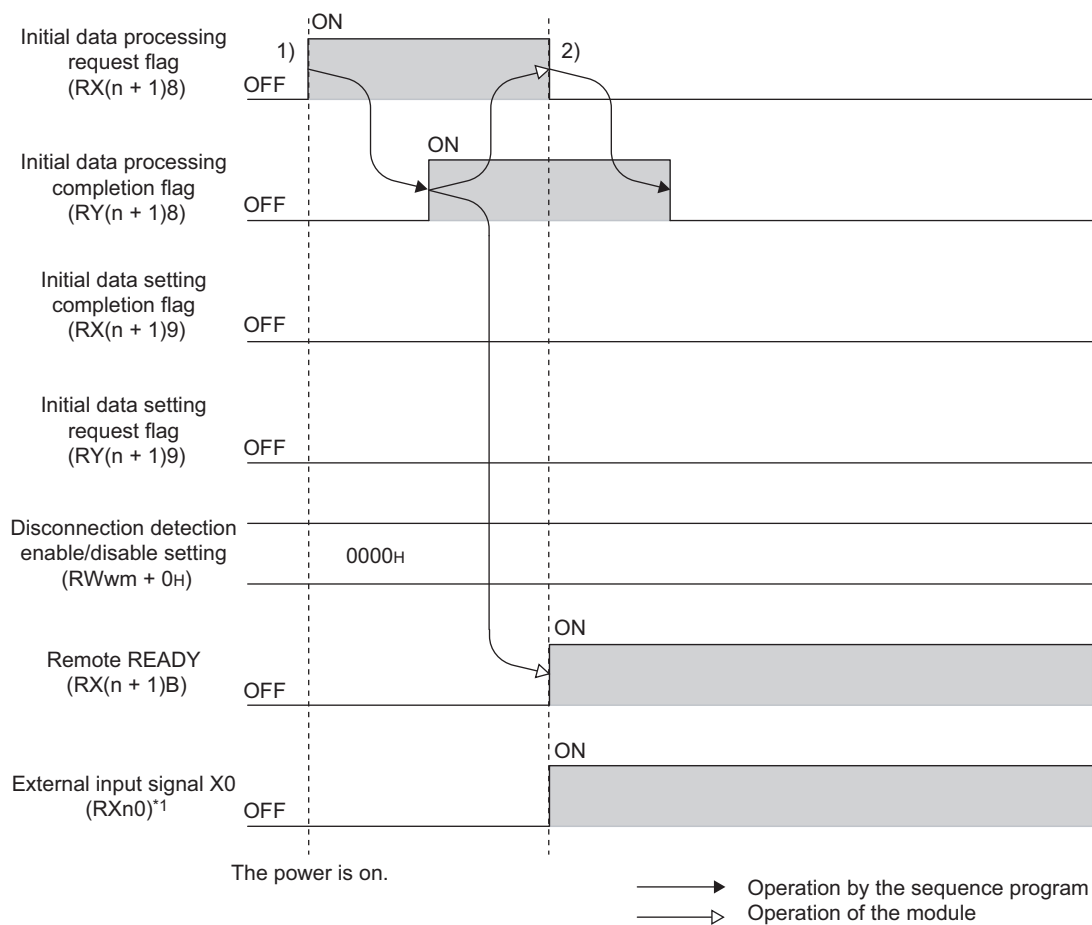
*1      When the sensor connected to X0 is on

1)   Turn on Initial data processing completion flag (RY(n + 1)8) when Initial data processing request flag (RX(n + 1)8) is on.

2)   External input signals (RXn0 to RXnF) are refreshed when Initial data processing request flag (RX(n + 1)8) turns off.

## (3) Initial data setting completion flag (RX(n + 1)9)

This flag turns on when the initial data setting is completed.

Turn on Initial data setting request flag (RY(n + 1)9) to do the initial data setting.

This flag turns off by turning off Initial data setting request flag (RY(n + 1)9).

For ON/OFF timings of the remote I/O signals for the initial data setting, refer to the "Initial data processing request flag (RX(n + 1)8)" section. ( )

### (4) Remote READY (RX(n + 1)B)

This flag is used as an interlock for reading/writing from the master module.

This flag turns on when the initial data processing is completed after the power is supplied.

Turn on Initial data processing completion flag (RY(n + 1)8) to complete the initial data processing.

This flag turns off by turning on Initial data setting request flag (RY(n + 1)9). This flag turns on by turning off Initial data setting request flag (RY(n + 1)9).

For the ON/OFF timing, refer to the "Initial data processing request flag (RX(n + 1)8)" section.

### (5) Initial data processing completion flag (RY(n + 1)8)

When the initial data processing is requested after the power is turned on, do the processing and turn on this flag when it is completed.

For ON/OFF timings of the remote I/O signals for the initial data setting, refer to the "Initial data processing request flag (RX(n + 1)8)" section. ()

### (6) Initial data setting request flag (RY(n + 1)9)

Turn on this flag at initial data setting.

The following data is subjected to the setting.

- Disconnection detection enable/disable setting (RWwm + $0_H$)

For ON/OFF timings of the remote I/O signals for the initial data setting, refer to the "Initial data processing request flag (RX(n + 1)8)" section. ()

# 4.6 Remote Register

This section describes the assignments of the remote registers.
The CC-Link remote I/O module with diagnostic functions has the remote registers for data communication with the master module.

## 4.6.1 List of remote registers

This section lists remote registers.

| Communication direction | Address | Description | Default value | Reference |
|---|---|---|---|---|
| Master module to CC-Link remote I/O module with diagnostic functions | $RWwm + 0_H$ | Disconnection detection enable/disable setting | $0000_H$ | Page 54, Section 4.6.2 (1) |
| | $RWwm + 1_H$ | Detection status hold command | $0000_H$ | Page 54, Section 4.6.2 (2) |
| | $RWwm + 2_H$ | Disconnection indication command | $0000_H$ | Page 54, Section 4.6.2 (3) |
| | $RWwm + 3_H$ | Short-circuit indication command | $0000_H$ | Page 55, Section 4.6.2 (4) |
| CC-Link remote I/O module with diagnostic functions to Master module | $RWrn + 0_H$ | Use prohibited | - | - |
| | $RWrn + 1_H$ | | | |
| | $RWrn + 2_H$ | Disconnection detection status | $0000_H$ | Page 55, Section 4.6.2 (5) |
| | $RWrn + 3_H$ | Short-circuit detection status | $0000_H$ | Page 55, Section 4.6.2 (6) |

m, n: the address assigned to the master station by the station number setting

**Point**

Do not write any data to the "use prohibited" of the remote register. If the data are written to the "use prohibited", correct operation of the module cannot be guaranteed.

# 4.6.2 Details of remote registers

## (1) Disconnection detection enable/disable setting (RWwm + 0$_H$)

For each input terminal, set "Detect disconnection (1)" or "Do not detect disconnection (0)" to Disconnection detection enable/disable setting (RWwm + 0$_H$).

The setting is enabled by turning on Initial data setting request flag (RY(n + 1)9).

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Disconnection detection enable/ disable setting (RWwm + 0$_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Detect disconnection
0: Do not detect disconnection (default)

## (2) Detection status hold command (RWwm + 1$_H$)

By setting "Hold the detection status (0)" or "Do not hold the detection status (1)" to Detection status hold command (RWwm + 1$_H$), select whether to hold the value in Disconnection detection status (RWrn + 2$_H$) and Short-circuit detection status (RWrn + 3$_H$) for each input terminal.

If "Hold the detection status (0)" is set, "Disconnection (no connection) occurring (1)" and "Short-circuit (ground) occurring (1)" remain in Disconnection detection status (RWrn + 2$_H$) and Short-circuit detection status (RWrn + 3$_H$) respectively even after the error causes are removed.

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Detection status hold command (RWwm + 1$_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Do not hold the detection status
0: Hold the detection status (default)

## (3) Disconnection indication command (RWwm + 2$_H$)

The red LED, which indicates the abnormal status of external input signals (X0 to XF), can be forced to be flashing with Disconnection indication command (RWwm + 2$_H$).

By using this remote register, keeping indicating the detection of disconnection (no connection) with the LED is possible even after the error cause is removed.

For details, refer to the "How to check disconnection (no connection)" section. ( )

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Disconnection indication command (RWwm + 2$_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Flash the LED regularly
0: Do not flash the LED (default)

## (4) Short-circuit indication command (RWwm + 3$_H$)

The red LED, which indicates the abnormal status of external input signals (X0 to XF), can be forced to be on with Short-circuit indication command (RWwm + 3$_H$).

By using this remote register, keeping indicating the detection of a short-circuit (ground) with the LED is possible even after the error cause is removed.

For details, refer to the "How to check a short-circuit (ground)" section. (☞ Page 43, Section 4.4.2 (3) (b))

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Short-circuit indication command (RWwm + 3$_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Turn on the LED
0: Do not turn on the LED (default)

## (5) Disconnection detection status (RWrn + 2$_H$)

Disconnection detection status (RWrn + 2$_H$) indicates the occurrence or no occurrence of disconnection (no connection) of each input terminal.

If "Hold the detection status (0)" is set to Detection status hold command (RWwm + 1$_H$), "Disconnection (no connection) occurring (1)" remains in Disconnection detection status (RWrn + 2$_H$) even after the error cause is removed.

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Disconnection detection status (RWrn + 2$_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Disconnection (no connection) occurring
0: No disconnection (no connection)

## (6) Short-circuit detection status (RWrn + 3$_H$)

Short-circuit detection status (RWrn + 3$_H$) indicates the occurrence or no occurrence of a short-circuit (ground) of each input terminal.

If "Hold the detection status (0)" is set to Detection status hold command (RWwm + 1$_H$), "Short-circuit (ground) occurring (1)" remains in Short-circuit detection status (RWrn + 3$_H$) even after the error cause is removed.

| | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Short-circuit detection status (RWrn + 3$_H$) | XF | XE | XD | XC | XB | XA | X9 | X8 | X7 | X6 | X5 | X4 | X3 | X2 | X1 | X0 |

1: Short-circuit (ground) occurring
0: No short-circuit (ground)

**4**

4.6 Remote Register
4.6.2 Details of remote registers

# CHAPTER 5   PROCEDURES AND SETTINGS BEFORE SYSTEM OPERATION

## 5.1   Procedures Before Operation

This section describes the procedures required before operating the CC-Link remote I/O module with diagnostic functions.

```
┌─────────────────────────────┐
│           Start             │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Set the station number.         │
│   (Set the station number of    │    . . .  ☞ Page 22, CHAPTER 3
│   the CC-Link remote I/O module  │
│   with diagnostic functions.)   │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Install the module.             │
│   (Install the CC-Link remote   │    . . .  ☞ Page 60, Section 5.4
│   I/O module with diagnostic     │
│   functions to a control panel,  │
│   or mount it to a DIN rail.)   │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Wire the module.                │
│   (Wire the CC-Link dedicated   │
│   cable and external devices to  │
│   the CC-Link remote I/O module  │   . . .  ☞ Page 64, Section 5.5, Page 75, Section 5.6
│   with diagnostic functions.     │
│   When using the module at either│
│   end of the network system,     │
│   attach the one-touch connector │
│   plug with terminating resistor.)│
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Create a program.               │   . . .  ☞ Page 81, CHAPTER 6
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│            End              │
└─────────────────────────────┘
```

# 5.2    Handling and Installation Precautions

This section lists the precautions for handling and installing the CC-Link remote I/O module with diagnostic functions.

| ⚠ WARNING |
|---|
| ● Do not touch any terminal or connector while power is on. Doing so will cause electric shock. |

| ⚠ CAUTION |
|---|
| ● Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction. |
| ● Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire. |
| ● Do not directly touch any conductive part of the module. Doing so can cause malfunction or failure of the module. |
| ● Do not drop or apply strong shock to the module. Doing so may damage the module. |
| ● Tighten the terminal screw within the specified torque range. Undertightening can cause short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction. |
| ● When disposing of this product, treat it as industrial waste. |
| ● Use the module in an environment that meets the general specifications in this manual. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product. |
| ● Securely fix the module with a DIN rail or mounting screws. Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. |
| ● Shut off the external power supply (all phases) used in the system before mounting or removing a module. Failure to do so may cause the module to fail or malfunction. |

**5**

**(1)** **Tighten the module mounting screws or terminal block screws within the following range. Overtightening can damage the module case.**

| Screw | Tightening torque range |
|---|---|
| Mounting bracket (M4) | 0.82 to 1.11N•m |
| 2-piece terminal block fixing screw (M3) | 0.42 to 0.57N•m |

**(2)** **A scratch-resistant film is attached on the surface of the module during transportation.**
**Remove the film before operation.**

**(3)** **Do not install the CC-Link remote I/O module with diagnostic functions to the place where:**
- an ambient temperature is outside the range of 0 to 55°C,
- ambient humidity is outside the range of 10 to 90%RH,
- condensation occurs due to a sudden temperature change,
- corrosive gas or combustible gas is present,
- conductive powder (such as dust and iron powder), oil mist, salinity, or organic solvent is filled,
- the module is exposed to direct sunlight,
- a strong electric field or strong magnetic field is generated, and
- the module is subject to vibration or shock.

**(4)** **When installing the CC-Link remote I/O module with diagnostic functions into a control panel, provide clearance of 60mm or more between the top and bottom of the module and other structures or parts so that good ventilation is secured and the module is easily replaced.**

**(5)** **Install a CC-Link remote I/O module with diagnostic functions on a level surface.**
**If the surface is uneven, unnecessary force is applied to the printed circuit board, causing malfunction.**

# 5.3 Station Number

Buffer memory addresses of the master module, where remote I/O signals and read/write data are stored, are determined by setting station numbers to each CC-Link remote I/O module with diagnostic functions. Because the station number that was set is enabled by turning on the power of the module, set station numbers while the power is off. For details, refer to the user's manual for the master module used.
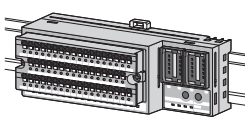
**5**

# 5.4 Module Installation

## 5.4.1 Installation orientation of the module

The CC-Link remote I/O module with diagnostic functions can be installed in six orientations.
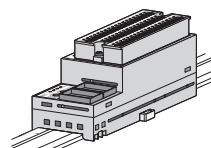The module can be installed using mounting brackets and module mounting screws. The module can also be installed using a DIN rail.
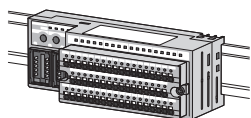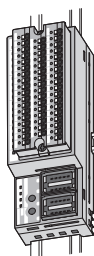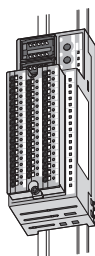


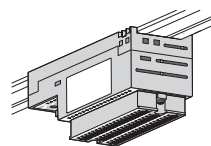Horizontal installation



Horizontal installation (reverse)



Upward installation



Vertical installation (reverse)



Vertical installation



Downward installation

# 5.4.2 Installation using a DIN rail

This section describes the procedures for installing the CC-Link remote I/O module with diagnostic functions to a control panel using a DIN rail.

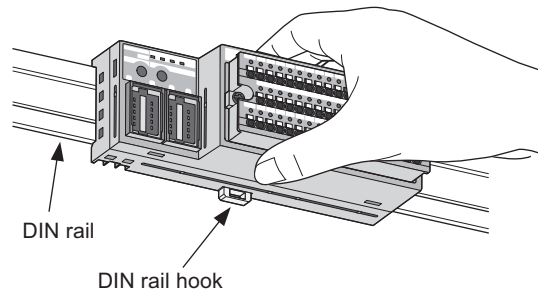**(1) Observe the following points when using a DIN rail.**

### (a) Applicable DIN rail (compliant with IEC 60715)

- TH35-7.5Fe
- TH35-7.5Al

### (b) Mounting pitch

When installing a DIN rail to a control panel, keep mounting pitches 200mm or less.

**(2) When mounting the module to a DIN rail, hold the center of the module, press it to the DIN rail until it clicks.**



DIN rail

DIN rail hook

**5**

# 5.4.3 Installation using screws

This section describes the procedures for directly installing the CC-Link remote I/O module with diagnostic functions to a control panel using mounting brackets and screws. If the module is not fixed securely, it may drop.
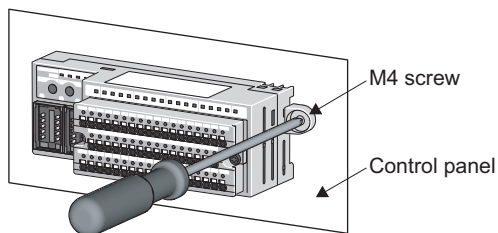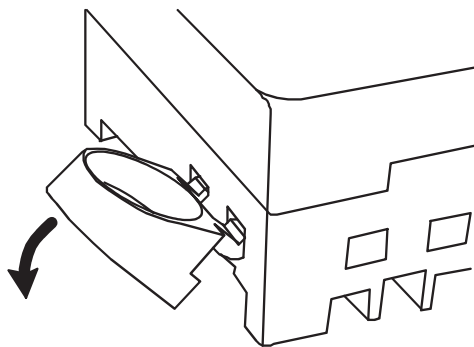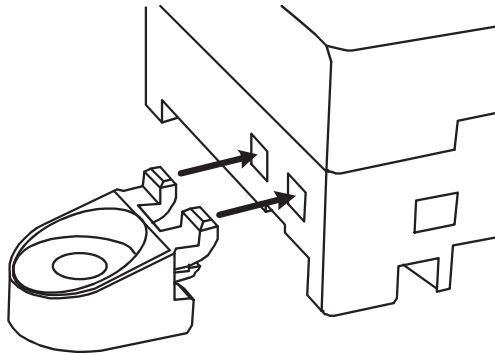


*1.* **Align the projections of a mounting bracket with the corresponding slots of the module.**

↓

*2.* **With the mounting bracket obliquely upward, insert its projections to the slots, and press down in the direction of the arrow until they click into place.**

↓

*3.* **Screw the mounting bracket to a control panel. (Tightening torque range: 0.82 to 1.11N•m)**

M4 screw

Control panel

# 5.4.4 Precautions for attaching mounting brackets

Mounting brackets can be attached to the module in three different ways.
Wrong combination may cause drop of the module.
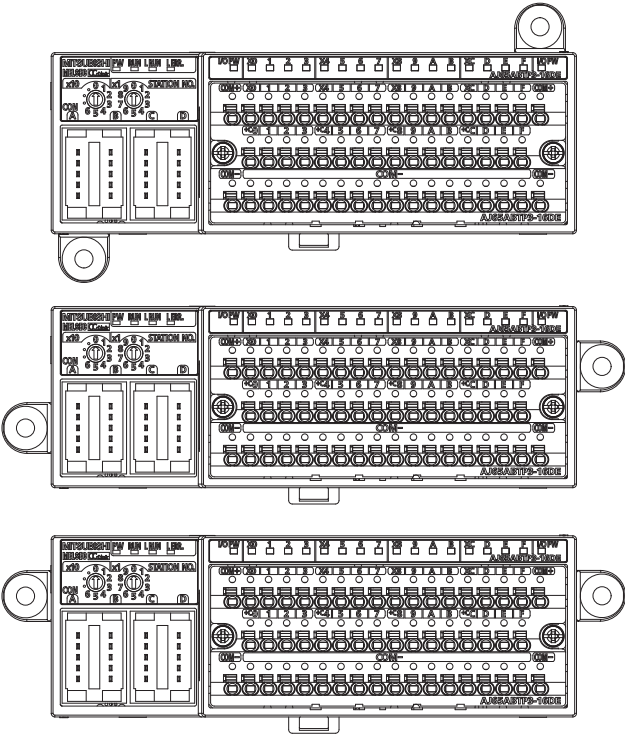
# 5.5 Wiring to the Module Power Supply and Data Link Cables

This section describes module power supplies for the master module and the CC-Link remote I/O module with diagnostic functions, and connection between modules using CC-Link dedicated cables.

## 5.5.1 Wiring precautions

### ⚠ WARNING

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

### ⚠ CAUTION

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

● Individually ground the FG terminal of the programmable controller with a ground resistance of 100Ω or less. Failure to do so may result in electric shock or malfunction.

● Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.

● Securely connect the cable connectors. Poor contact may cause malfunction.

● Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.

● Attach an unwired connector plug to an unused one-touch connector for power supply and FG. Failure to do so may cause failure or malfunction.

● Do not install the control lines together with the communication cables, or bring them close to each other. Failure to do so may result in malfunction due to noise.

● Do not pull the cable part by hand when removing a communication cable and power supply cable from a module. For a cable with connector, remove it while holding the connector by hand. Pulling a cable with connected to the module may damage the module or cable, or result in malfunction due to cable poor connection.

# 5.5.2    Connection using CC-Link dedicated cables

This section shows how to connect the CC-Link remote I/O module with diagnostic functions to the master module.
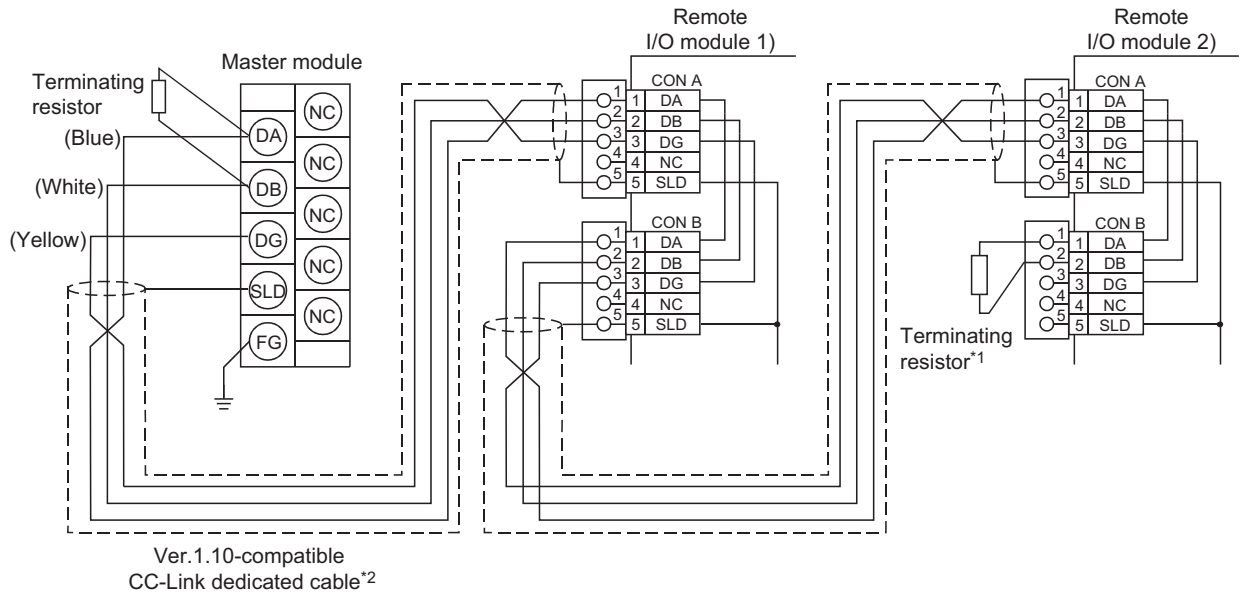


Simplified diagram
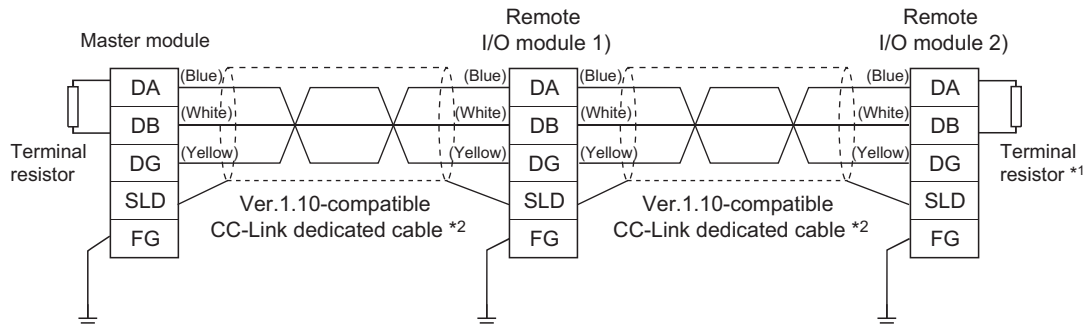


*1    When the CC-Link remote I/O module with diagnostic functions is used as a terminal station, connect an optional one-touch connector plug with terminating resistor (A6CON-TR11(N)).

*2    Use CC-Link dedicated cables in the CC-Link system.
Performance of the CC-Link system cannot be guaranteed if any cables other than the CC-Link dedicated cables are used.
For the specifications and any inquiries on the CC-Link dedicated cables, refer to the following:
CC-Link Partner Association: www.cc-link.org

# 5.5.3　Connection to the module power supply and data link cables

A one-touch connector is required to connect the CC-Link remote I/O module with diagnostic functions.
For handling of one-touch connectors, refer to the following.

For applicable one-touch connector models, refer to the following.
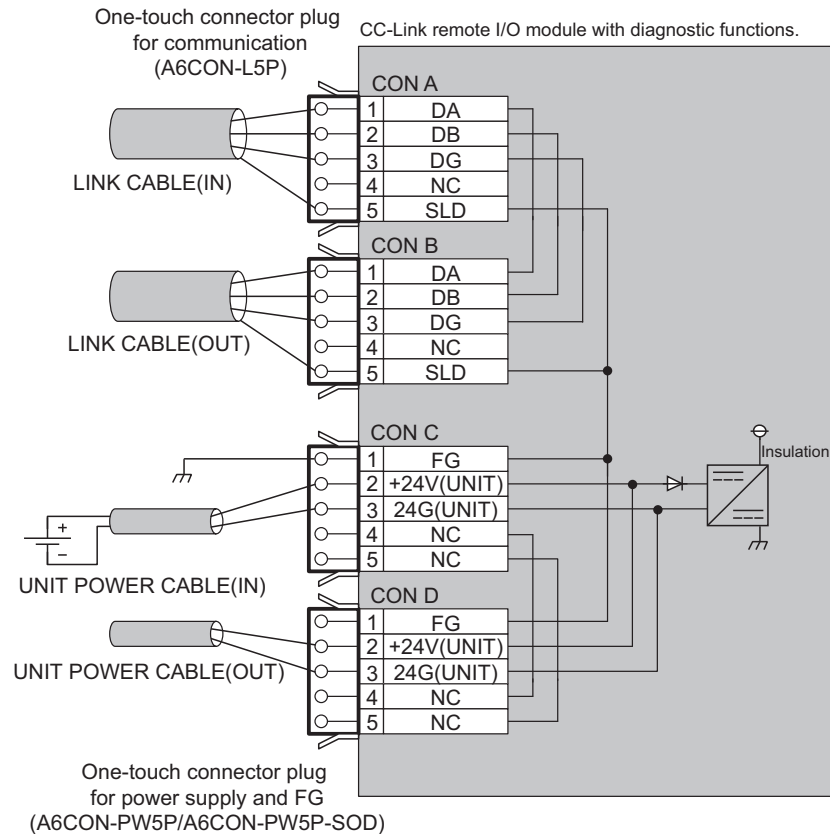
If online module change is desired, connect an optional online connector between the plug and the connector.
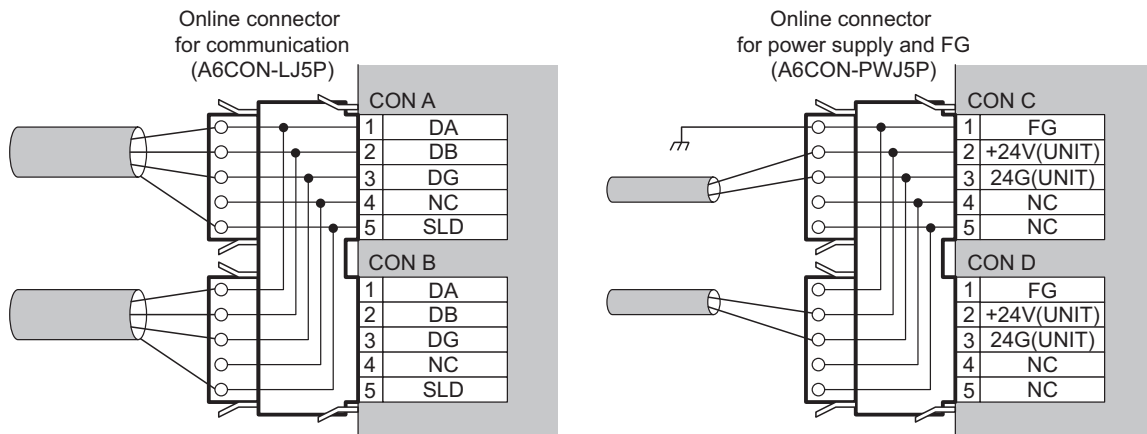
When the module is used at the end of the CC-Link system, attach a one-touch connector plug with terminating resistor (A6CON-TR11(N)) to the module.
When transition wiring is not configured, attach an unwired connector plug to the module for safety and dust prevention.

| CON A | |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | NC |
| 5 | SLD |

LINK CABLE(IN)

| CON B | |
|---|---|
| 1 | DA |
| 2 | DB |
| 3 | DG |
| 4 | NC |
| 5 | SLD |

One-touch connector plug with terminating resistor (A6CON-TR11(N))

| CON C | |
|---|---|
| 1 | FG |
| 2 | +24V(UNIT) |
| 3 | 24G(UNIT) |
| 4 | NC |
| 5 | NC |

UNIT POWER CABLE(IN)

Attach an unwired connector plug for safety.

| CON D | |
|---|---|
| 1 | FG |
| 2 | +24V(UNIT) |
| 3 | 24G(UNIT) |
| 4 | NC |
| 5 | NC |

5

5.5 Wiring to the Module Power Supply and Data Link Cables
5.5.3 Connection to the module power supply and data link cables

# 5.5.4 List of one-touch connector plugs

The following table lists one-touch connector plugs applicable to the CC-Link remote I/O module with diagnostic functions.

| Product name | Mitsubishi model name | Part model name (manufacturer) | Specifications | | | Color of the cover |
|---|---|---|---|---|---|---|
| | | | Applicable cable size (core) | Applicable cable size (diameter) | Maximum rated current | |
| One-touch connector plug for communication [*1][*3] | A6CON-L5P | 35505-6000-B0M GF (Sumitomo 3M Limited) | Communication line 0.5mm$^2$ (20 AWG) | φ2.2 to 3.0mm | - | Red |
| | | | Shielded cable (drain wire) 0.5mm$^2$ (20 AWG) | - | | |
| One-touch connector plug for power supply and FG[*1][*2][*3] | A6CON-PW5P | 35505-6080-A00 GF (Sumitomo 3M Limited) | 0.75mm$^2$ (0.66 to 0.98mm$^2$) (18 AWG) Wire diameter: 0.16mm or more Insulating coating material: PVC (heat-resistant) | φ2.2 to 3.0mm | 7A[*5] | Gray |
| | A6CON-PW5P-SOD | 35505-6180-A00 GF (Sumitomo 3M Limited) | | φ2.0 to 2.3mm | | Blue |
| Online connector for communication[*4] | A6CON-LJ5P | 35720-L200-B00 AK (Sumitomo 3M Limited) | - | - | - | - |
| Online connector for power supply and FG[*4] | A6CON-PWJ5P | 35720-L200-A00 AK (Sumitomo 3M Limited) | - | - | - | - |
| One-touch connector plug with terminating resistor | A6CON-TR11 | - | With terminating resistor (110Ω) | | | - |
| | A6CON-TR11N | | With terminating resistor (110Ω) (built-in type) | | | |

*1 The A6CON-□5P (manufactured by Mitsubishi) is available in packs of 10 pieces.
*2 One-touch connector plugs can no longer be used once crimped.
*3 Check the outside diameter of an applicable cable and select a connector.
*4 The A6CON-□J5P (manufactured by Mitsubishi) is available in packs of 5 pieces.
*5 Keep the current within the allowable range of the connected cable.

# 5.5.5    Wiring procedures for the one-touch connector for communication

This section describes the wiring procedures for the one-touch connector for communication.

Plug body    Plug cover

Metal contact

↓

Cut the shield wire, aluminum tape and braid.

DA (Blue)
DB (White)
DG (Yellow)
Drain wire (20 AWG)

Stretch the drain wire and twist it from the base.
(3cm in length, 7 times or more)

↓

5 4 3 2 1

⇧

Signal name
DA (Blue)
DB (White)
DG (Yellow)
NC
SLD

Metal contacts

↓

Metal contact

↓

(To the next page)
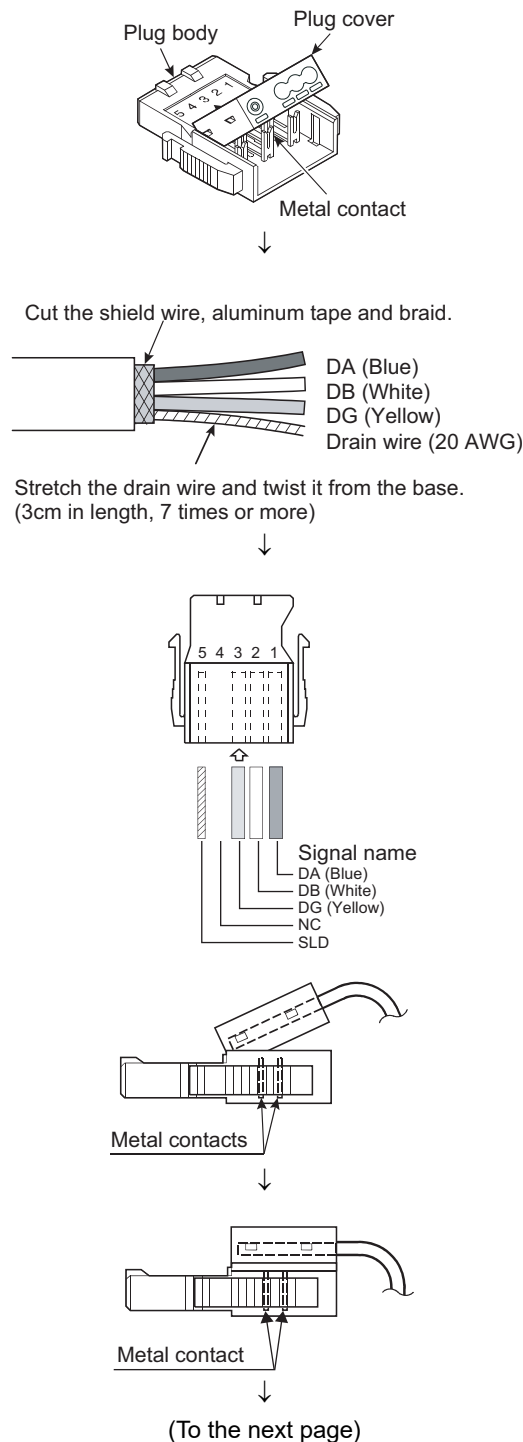
**1.** **Check the connector.**

Check that a plug cover is attached to the plug.

Note:    Do not press the plug cover firmly into the plug before a cable is inserted.
Once crimped, the plug can no longer be used.

**2.** **Prepare a communication cable for connection.**

Strip the cable jacket 3cm or more and perform the processing described on the left.
If the wire lengths are not even, trim their ends with nippers to the same length.

**3.** **Insert a cable.**

Lift the end of the plug cover and insert a cable until it reaches the other end of the cover.
Failure to do so may cause an improper crimping.

**4.** **Set the plug cover.**

After the cable is inserted, put down the plug cover and set it to the position where the metal contacts fit into the cover.

5

5.5 Wiring to the Module Power Supply and Data Link Cables
5.5.5 Wiring procedures for the one-touch connector for communication

Pliers

↓



Pliers

Latches

↓

[Correct example]



Within 0.2mm
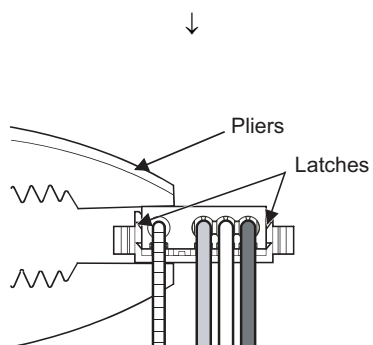
[Wrong example]

**5.** **Crimp the plug cover into the plug.**

Hold the center of the plug cover with pliers and press it vertically into the plug.

Then, press the latches located at both ends of the plug cover into the plug.
Check that the cover is fixed to the plug with the latches.

**6.** **Check the crimped state from the side.**

Check that the plug cover is horizontally-embedded to the plug.
Check also that the floating part of the cover is within 0.2mm.

Note: As shown in the wrong example on the left, if the cover is not horizontally-embedded or the floating part is more than 0.2mm, it may result in improper crimping.
Press the plug cover firmly into the plug with pliers. (Refer to the correct example.)

(From the previous page)

↓
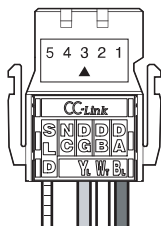
[Correct example]

[Wrong example]

↓

Wiring completed

**7.** **Check the crimped state from the top.**

Check that there is no clearance between the plug and the cover.

Note: As shown in the wrong example on the left, if the latch is not securely engaged, clearance occurs between the plug and the cover.
Press the plug cover firmly into the plug with pliers. (Refer to the correct example.)

**5**
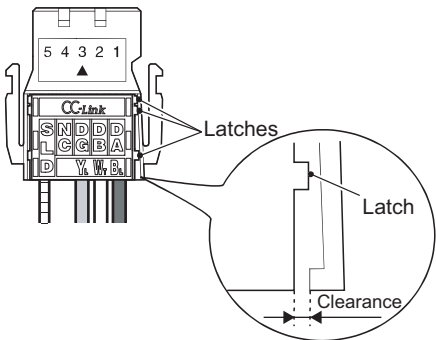
# 5.5.6 Wiring procedures for the one-touch connector for power supply and FG

This section describes the wiring procedures for the one-touch connector for power supply and FG.
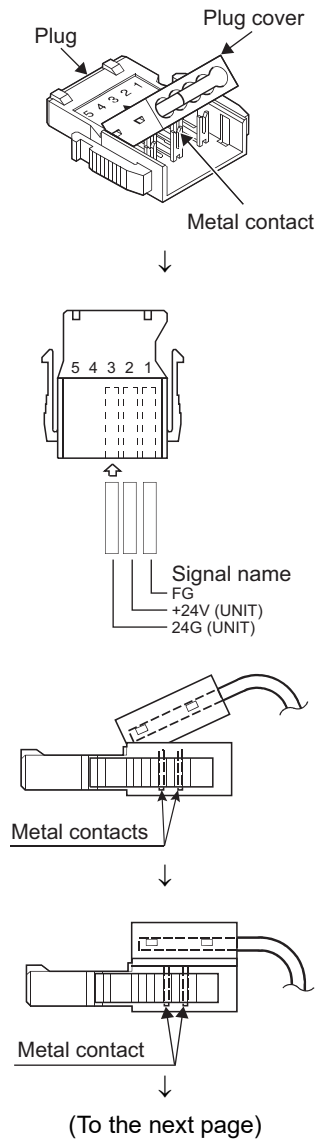
**1.  Check the connector.**

Check that a plug cover is attached to the plug.

Note: Do not press the plug cover firmly into the plug before a cable is inserted.

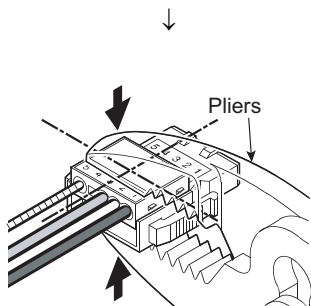Once crimped, the plug can no longer be used.

**2.  Insert a cable.[*1]**

Lift the end of the plug cover and insert a cable until it reaches the other end of the cover.

Failure to do so may cause an improper crimping.
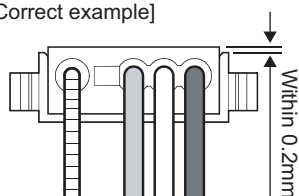
Note: Use cables applicable to the module.

**3.  Set the plug cover.**

After the cable is inserted, put down the plug cover and set it to the position where the metal contacts fit into the cover.
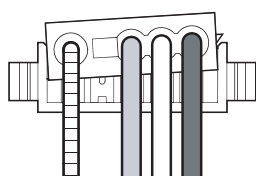
(To the next page)

(From the previous page)
↓

Pliers

↓

Pliers
Latches

↓

[Correct example]
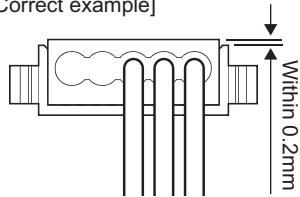
Within 0.2mm

[Wrong example]

↓

(To the next page)

**4.** **Crimp the plug cover into the plug.**

Hold the center of the plug cover with pliers and press it vertically into the plug

Then, press the latches located at both ends of the plug cover into the plug.
Check that the cover is fixed to the plug with the latches.

**5.** **Check the crimped state from the side.**

Check that the plug cover is horizontally-embedded to the plug.
Check also that the floating part of the cover is within 0.2mm.

Note: As shown in the wrong example on the left, if the cover is not horizontally-embedded or the floating part is more than 0.2mm, it may result in improper crimping.
Press the plug cover firmly into the plug with pliers.
(Refer to the correct example.)

5

↓

[Correct example]

**6.** **Check the crimped state from the top.**

Check that there is no clearance between the plug and the cover.

Note: As shown in the wrong example on the left, if the latch is not securely engaged, clearance occurs between the plug and the cover.

Press the plug cover firmly into the plug with pliers. (Refer to the correct example.)

[Wrong example]

Latches

Latch

Clearance

↓

Wiring completed

*1　When a cabtyre cable is used:

Strip the cable jacket 2cm or more.

If the wire lengths are not even, trim their ends with nippers to the same length.

2cm or more

Trim the wire ends to the same length.
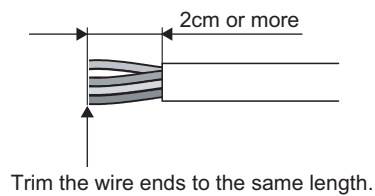
# 5.6 Wiring to the External Power Supply and Input Signals

### (1) Connection of cables

Fully insert a cable, which is inserted to a bar solderless terminal, into the pin of the terminal block.

Then, slightly pull the cable to check that it is securely clamped.

### (2) Disconnection of cables

Fully press the open/close button where the disconnection-target power cable or input signal cable is connected using a flathead screwdriver.

Disconnect the cable while the open/close button is pressed.

*Point*

● Use an applicable bar solderless terminal when connecting an external power supply cable or input signal cable to a spring clamp terminal block (push-in type).
  If the striped part of the cable is directly inserted to a pin, the cable cannot be clamped securely.

● As for the wire strip length, follow the specifications of the bar solderless terminal used.
  Also, use a crimp tool to attach a bar solderless terminal to a cable.

● Check the size of a pin and a bar solderless terminal before connection, and insert the terminal in the correct orientation.
  Inserting the terminal whose size is larger than the pin size may damage the terminal block.
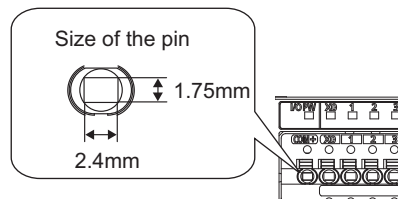


● Use a flathead screwdriver (blade width: 3.5mm or less) to press each open/close button.

## (3) External connection example

The following figure shows an external connection example of the CC-Link remote I/O module with diagnostic functions.

### (a) AJ65ABTP3-16D
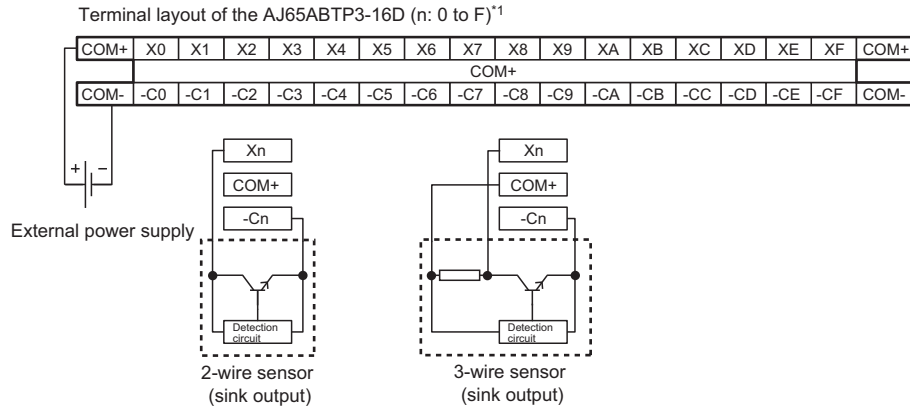
Terminal layout of the AJ65ABTP3-16D (n: 0 to F)[*1]

| COM+ | X0 | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | XA | XB | XC | XD | XE | XF | COM+ |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
| | | | | | | | | COM+ | | | | | | | | | |
| COM- | -C0 | -C1 | -C2 | -C3 | -C4 | -C5 | -C6 | -C7 | -C8 | -C9 | -CA | -CB | -CC | -CD | -CE | -CF | COM- |

External power supply

2-wire sensor
(sink output)

3-wire sensor
(sink output)

*1    Insert only one wire into the pin of the spring clamp terminal block.
Inserting two or more wires may result in a poor contact to the terminal.

| Terminal | Description |
|----------|-------------|
| X0 to XF | Input terminal |
| COM+ | External power supply terminal (24VDC) |
| COM- | External power supply terminal (0VDC) |
| -C0 to -CF | Common terminal (negative pole) |

### (b) AJ65ABTP3-16DE
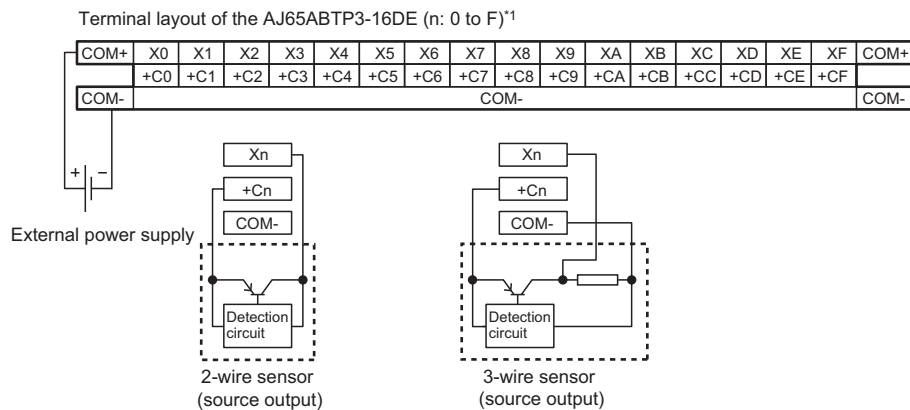
Terminal layout of the AJ65ABTP3-16DE (n: 0 to F)[*1]

| COM+ | X0 | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | XA | XB | XC | XD | XE | XF | COM+ |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|
| | +C0 | +C1 | +C2 | +C3 | +C4 | +C5 | +C6 | +C7 | +C8 | +C9 | +CA | +CB | +CC | +CD | +CE | +CF | |
| COM- | | | | | | | | COM- | | | | | | | | | COM- |

External power supply

2-wire sensor
(source output)

3-wire sensor
(source output)

*1    Insert only one wire into the pin of the spring clamp terminal block.
Inserting two or more wires may result in a poor contact to the terminal.

| Terminal | Description |
|----------|-------------|
| X0 to XF | Input terminal |
| COM+ | External power supply terminal (24VDC) |
| COM- | External power supply terminal (0VDC) |
| +C0 to +CF | Common terminal (positive pole) |

# 5.6.1 Wiring precautions

## (1) Precautions for input wiring

To maximize performance of the CC-Link remote I/O module with diagnostic functions and ensure high-reliability of the system, input wiring that is less susceptible to noise is required.

Observe the following wiring precautions.

- Do not install the cables together with the main circuit lines or power cables.
  Keep a distance of 100mm or more between them.
- Consider the use of shielded cables if the module is used in an environment that is susceptible to noise.

## (2) Restrictions on ground fault detection

### (a) AJ65ABTP3-16D

To detect a ground fault, the positive side of the external power supply must be connected to the device frame.
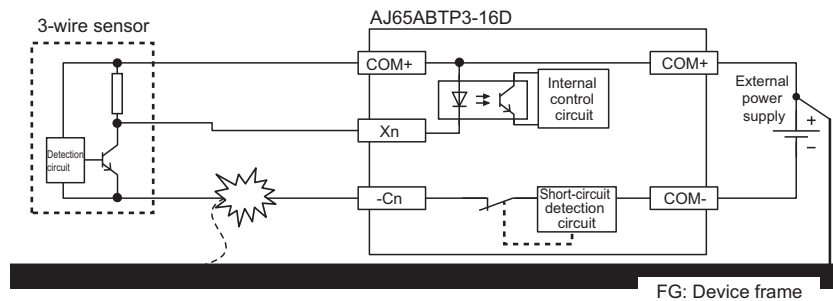


### (b) AJ65ABTP3-16DE

To detect a ground fault, the negative side of the external power supply must be connected to the device frame.
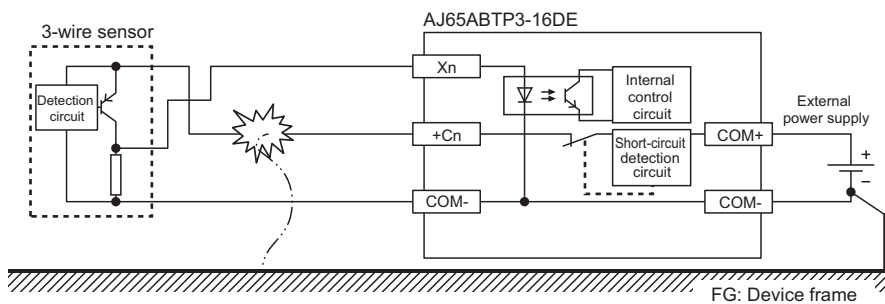
## 5.6.2 Installation and removal of the spring clamp terminal block (push-in type)

### (1) Installation of the spring clamp terminal block (push-in type)

Securely install a terminal block to the module using 2-piece terminal block fixing screws.

Undertightening can cause drop of the screw, short circuit or malfunction. (Tightening torque range: 0.42 to 0.57N•m)

M3 screw  Fix at 2 points.
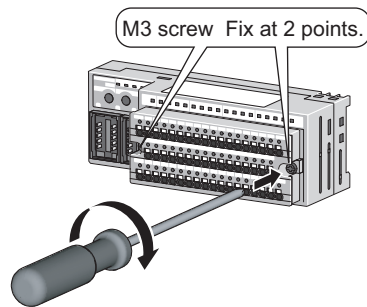
### (2) Removal of the spring clamp terminal block (push-in type)

The 2-piece terminal block can be easily removed by loosing the fixing screws, because the terminal block is lifted by doing so.

The terminal block is lifted up.
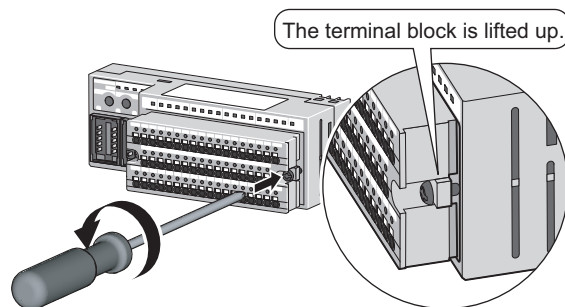
## (3) Recommended product list

The following table lists the products related to the spring clamp terminal block.

| Product name | Model name | Applicable wire size | Contact |
|---|---|---|---|
| Bar solderless terminal | TE 0.5-8, TE 0.5-10 | 0.5mm$^2$ | NICHIFU TERMINAL INDUSTRIES CO., LTD. |
| | TE 0.75-8, TE 0.75-10 | 0.75mm$^2$ | |
| | TE 1.0-8, TE 1.0-10 | 0.9 to 1.0mm$^2$ | |
| | TE 1.5-8, TE 1.5-10 | 1.25 to 1.5mm$^2$ | |
| Tool dedicated for bar solderless terminal | NH79 | - | |
| Bar solderless terminal | AI 0.25-12BU | 0.25mm$^2$ | PHOENIX CONTACT GmbH & Co. KG |
| | AI 0.34-8TQ, AI 0.34-12TQ | 0.34mm$^2$ | |
| | AI 0.5-8WH, AI 0.5-10WH | 0.5mm$^2$ | |
| | AI 0.75-8GY, AI 0.75-10GY | 0.75mm$^2$ | |
| | AI 1-8RD, AI 1-10RD | 1.0mm$^2$ | |
| | AI 1.5-8BK, AI 1.5-10BK | 1.5mm$^2$ | |
| Tool dedicated for bar solderless terminal | CRIMPFOX6 | - | |

5

5.6 Wiring to the External Power Supply and Input Signals
5.6.2 Installation and removal of the spring clamp terminal block (push-in type)

# 5.7 Maintenance and Inspection

There is no special inspection item for the CC-Link remote I/O module with diagnostic functions. However, to use the programmable controller system in normal and optimal condition at all times, conduct inspections according to the items listed in the user's manual for the CPU module used.

# CHAPTER 6 PROGRAMMING

This chapter describes the programming procedure, basic programs for reading/writing data, and program examples for the CC-Link remote I/O module with diagnostic functions.

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

For the master module, refer to the user's manual for the master module used.

# 6.1 Programming Procedure

Create a program to detect a disconnection in the CC-Link remote I/O module with diagnostic functions, according to the following procedure.
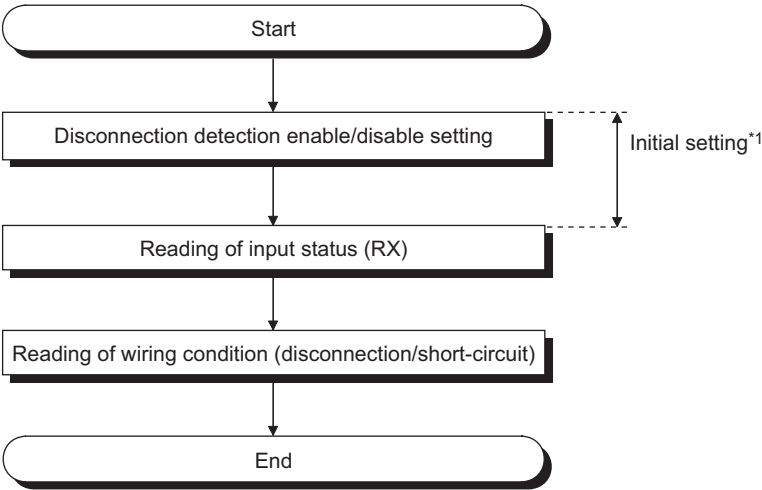


*1    The setting can be configured using the remote device station initialization procedure registration function when the QCPU (Q mode) or LCPU is used. On the other hand, configure the setting with a sequence program when the ACPU, QCPU (A mode), or QnACPU is used.

# 6.2 Conditions Used for Program Examples

The program examples introduced in this chapter are created under the following conditions.

## (1) Use conditions of the CC-Link remote I/O module with diagnostic functions

- Lamp (Y61) turns on/off according to the on/off status of Sensor input (RX0).
- Lamp (Y62) turns on/off according to the disconnection/short-circuit detection status of Sensor input (RX0).
- The number of disconnection detections of Sensor input (RX0) is counted and stored in D device. (This processing is performed on the condition that "Do not hold the detection status (1)" is set to Detection status hold command (RWw1).)

## (2) System configuration
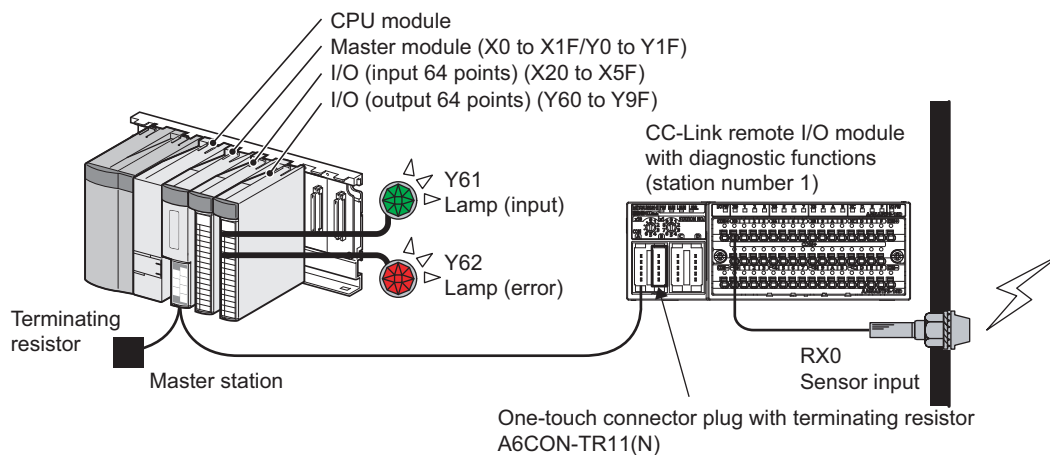


## (3) Relationship between remote I/O signals and remote register assignments

### (a) For the QCPU (Q mode), LCPU, and QnACPU
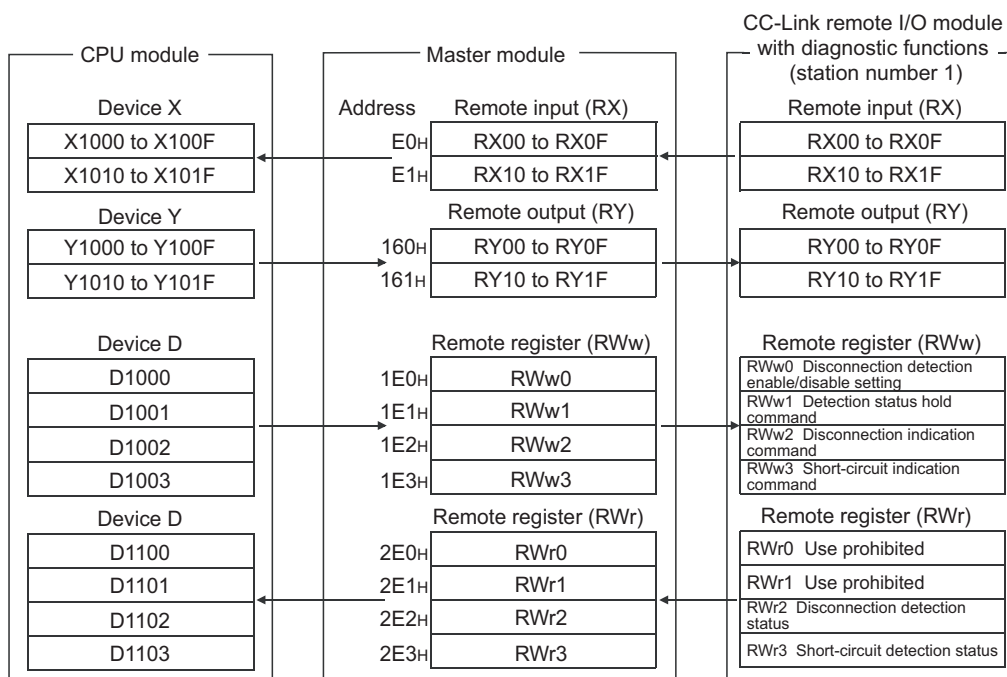
### (b) For the ACPU and QCPU (A mode)
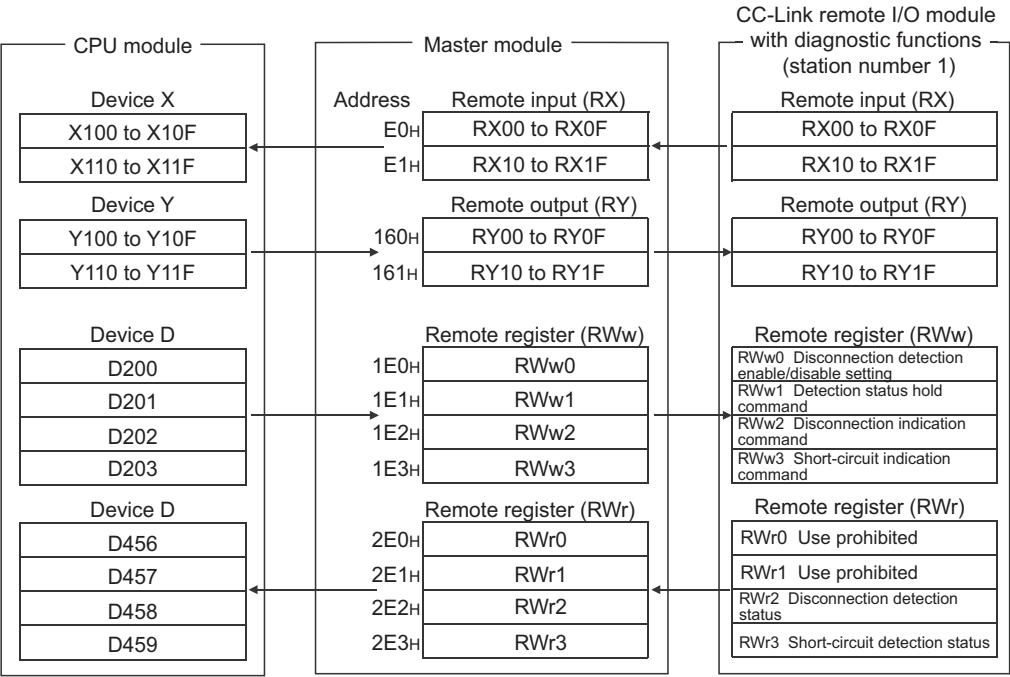


*Point*

The devices used in the program examples introduced in this chapter may not be available depending on the CPU module used.

For the available device setting ranges, refer to the user's manual for the CPU module used.

For example, X100 or Y100 and the subsequent devices are not available for the A1SCPU. Use other devices such as B and M.

### (4) Initial setting item

| Item | Description |
|------|-------------|
| Disconnection detection enable/disable setting (RWw0) | Disconnection detection is enabled only for X0. |

# 6.3 Program Example When the QCPU (Q Mode) is Used

Parameters can be set in "Network Parameter" of GX Works2.
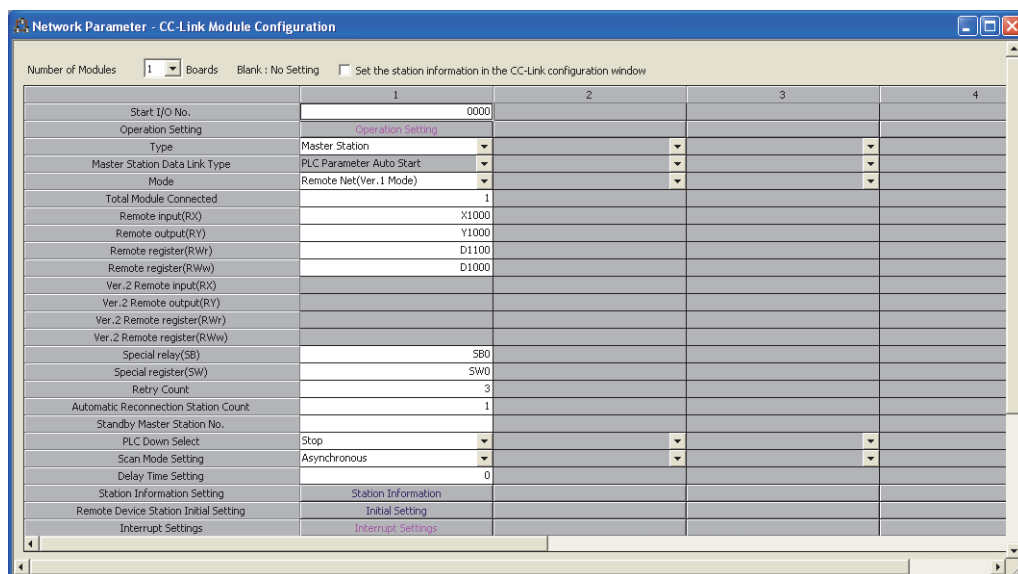
Initial setting can be easily configured using the remote device station initialization procedure registration function.

## (1) Parameter settings

### (a) Network parameter setting

**1.** Open the Network Parameter setting window and set parameters as follows.

✍ Project window ⇨ [Parameter] ⇨ [Network Parameter] ⇨ [CC-Link]

| Item | Setting value |
|---|---|
| Number of Modules | 1 (Boards) |
| Start I/O No. | 0000 |
| Operation Setting | No Setting |
| Type | Master Station |
| Mode | Remote Net (Ver.1 Mode) |
| Total Module Connected | 1 |
| Remote Input (RX) | X1000 |
| Remote Output (RY) | Y1000 |
| Remote Register (RWr) | D1100 |
| Remote Register (RWw) | D1000 |
| Special Relay (SB) | SB0 |
| Special Register (SW) | SW0 |
| Retry Count | 3 |
| Automatic Reconnection Station Count | 1 |
| Standby Master Station No. | No Setting |
| PLC Down Select | Stop |
| Scan Mode Setting | Asynchronous |
| Delay Time Setting | 0 |
| Station Information Setting | ☞ Page 85, Section 6.3 (1) (b) |

| Item | Setting value |
|---|---|
| Remote Device Station Initial Setting | ☞ Page 86, Section 6.3 (2) |
| Interrupt Settings | No Setting |

### (b) Station information setting

*1.* **Open the Station Information setting window and set parameters as follows.**

🖰 Project window ⇨ [Parameter] ⇨ [Network Parameter] ⇨ [CC-Link] ⇨ [Station Information]



| Item | Setting value |
|---|---|
| Station Type | Remote Device Station |
| Number of Occupied Stations | Occupied Station 1 |
| Reserve/Invalid Station Select | No Setting |

**(2) Initial setting using the remote device station initialization procedure registration function**

**1.** **Open the Remote Device Station Initial Setting window and set parameters as follows.**

 Project window ➯ [Parameter] ➯ [Network Parameter] ➯ [CC-Link] ➯ [Initial Setting]

**Remote Device Station Initial Setting Target Station Number Setting Module 1**

| | Target Station No. | No. of Registered Procedures | | | Target Station No. | No. of Registered Procedures | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 0 | Regist Procedure | 9 | | | Regist Procedure |
| 2 | | | Regist Procedure | 10 | | | Regist Procedure |
| 3 | | | Regist Procedure | 11 | | | Regist Procedure |
| 4 | | | Regist Procedure | 12 | | | Regist Procedure |
| 5 | | | Regist Procedure | 13 | | | Regist Procedure |
| 6 | | | Regist Procedure | 14 | | | Regist Procedure |
| 7 | | | Regist Procedure | 15 | | | Regist Procedure |
| 8 | | | Regist Procedure | 16 | | | Regist Procedure |

Clear    Check    End    Cancel

**2.** **Open the Procedure Registration setting window and set parameters as follows.**

 Project window ➯ [Parameter] ➯ [Network Parameter] ➯ [CC-Link] ➯ [Initial Setting] ➯ [Regist Procedure]

**Remote Device Station Initial Setting Procedure Registration Module 1 Target S...**

Input Format HEX

| Execute Flag | Operational Condition | Executional Condition | | | Details of Execution | | |
|---|---|---|---|---|---|---|---|
| | | Condition Device | Device No. | Execute Condition | Write Device | Device No. | Write Data |
| Execute | Set New | RX | 18 | ON | RWw | 00 | 0001 |
| Execute | Same as Prev.Set | RX | 18 | ON | RY | 18 | ON |
| Execute | Same as Prev.Set | RX | 18 | ON | RY | 19 | ON |
| Execute | Set New | RX | 18 | OFF | RY | 18 | OFF |
| Execute | Set New | RX | 19 | ON | RY | 19 | OFF |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |
| Execute | Set New | | | | | | |

Default    Check    End    Cancel

- When Initial data processing request flag (RX18) turns on and Remote device station initialization procedure registration command (SB0D) subsequently turns on, the following operations are registered to the CC-Link remote I/O module with diagnostic functions.

| Condition | Operation |
|---|---|
| Initial data processing request flag (RX18) turns on. | Disconnection detection enable/disable setting: Enabled only for X0 (RWw0: 0001$_H$) |
| | Turns on Initial data processing completion flag (RY18). |
| | Turns on Initial data setting request flag (RY19). |
| Initial data processing request flag (RX18) turns off. | Turns off Initial data processing completion flag (RY18). |
| Initial data setting completion flag (RX19) turns on. | Turns off Initial data setting request flag (RY19). |

**Remark** • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

The master module can perform initial processing only for the specified remote device stations.
For details, refer to the following.
📖 MELSEC-Q CC-Link System Master/Local Module User's Manual

• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

**6**

6.3 Program Example When the QCPU (Q Mode) is Used

## (3) Devices used in the program example

| Device | Description |
|---|---|
| X0 | Module error |
| X1 | Data link status of host station |
| XF | Module READY |
| X20 | LED disconnection/short-circuit indication hold reset command |
| X22 | Signal that is turned on to change the initial settings |
| X23 | Disconnection detection number reset command for an external input signal, X0 |
| X1000 | External input signal, X0, for the CC-Link remote I/O module with diagnostic functions |
| X1018 | Initial data processing request flag |
| X1019 | Initial data setting completion flag |
| X101B | Remote READY |
| Y60 | Signal that is output when a data link error occurs |
| Y61 | Signal that is output when an external input signal, X0, is on |
| Y62 | Signal that is output when an external input signal, X0, is disconnected or shorted |
| Y1019 | Initial data setting request flag |
| M0 | Signal that stores the data link status of the CC-Link remote I/O module with diagnostic functions<br>• 0 (OFF): Data link is normal.<br>• 1 (ON): A data link error occurs. |
| M1 to M3 | Not used (data link status of Station 2 to Station 4) |
| M100 | Master control contact |
| D42 | Result of disconnection detections |
| D43 | Result of short-circuit detections |
| D60 | Number of disconnection detections for an external input signal, X0 |
| D1000 | Disconnection detection enable/disable setting |
| D1001 | Detection status hold command |
| D1002 | Disconnection indication command |
| D1003 | Short-circuit indication command |
| D1102 | Disconnection detection status |
| D1103 | Short-circuit detection status |
| SW80 | Data link status of other stations |
| SB0D | Remote device station initialization procedure registration command |
| SB5F | Remote device station initialization procedure execution completion status |

88

## (4) Program example

| Ladder | Description |
|---|---|
| X0  X0F  X1 ──[MOV SW80 K1M0] | Read data link status. |
| M0 ──[MC N0 M100] | Turn on MC contact (M100) when data link is normal. |
| M0 ──(Y60) | Turn on Y60 when a data link error occurs. |

N0 ─┤ M100

1)*1*2

| SB5F ──[RST SB0D] | Turn off Initialization procedure registration command. |
| X1018 ──[SET SB0D] | Turn on Initialization procedure registration command. |

2)*3

| X22 ──[MOV H0 D1000] | Disconnection detection enable/disable setting (RWw0) |
| ──[SET Y1019] | Turn on Initial data setting request flag (RY19). |
| X1019 ──[RST Y1019] | Turn off Initial data setting request flag (RY19). |

| X1018 ──[MOV H0FFFF D1001] | Detection status hold command (RWw1) |
| X101B  X20 ──[WOR D1102 D1002] | Update Disconnection indication command (RWw2). |
| ──[WOR D1103 D1003] | Update Short-circuit indication command (RWw3). |
| X20 ──[MOV H0 D1002] | Clear Disconnection indication command (RWw2). |
| ──[MOV H0 D1003] | Clear Short-circuit indication command (RWw3). |
| X101B  X1000 ──(Y61) | Turn on Y61 when X0 is on. |
| D1102.0 ──(Y62) | Turn on Y62 when disconnection/short-circuit occurs at X0. |
| D1103.0 | |
| X23  X101B ──[MOV K0 D60] | Reset the number of disconnection detections at X0. |
| D1102.0  X101B ─[< D60 K32767]──[INCP D60] | Count the number of disconnection detections at X0. |
| A | |
| ──[MCR N0] | |
| ──[END] | |

*1  To perform a remote device station initialization procedure registration to multiple stations, refer to the following and correct the program in the dotted-line area 1).

&#x261E; Page 91, Section 6.3 (5)

*2  The program in the dotted-line area 1) enables the initial settings that are done by using the following devices, before the master station executes a communication program with remote device stations. Initial processing is not performed only with the parameter settings of GX Works2.

• Remote device station initialization procedure registration command (SB0D)

• Remote device station initialization procedure execution completion status (SB5F)

*3  Use the program in the dotted-line area 2) only to change the initial settings.

## (a) When "Hold the detection status (0)" is set to Detection status hold command (RWw1)

Add the following program to the part A in the program shown on Page 89, Section 6.3 (4).

In the following program, use Result of disconnection detections (D42) and Result of short-circuit detections (D43) to check the disconnection or short-circuit status.

```
X101B
 ─┤├──────────────────────────────────[MOV   H0     D1001 ]   Detection status hold command
  │                                                            (RWw1)
  │                                    [WOR   D1102  D1001 ]   Change the setting not to hold the
  │                                                            location of disconnection detection.
  │                                    [WOR   D1103  D1001 ]   Change the setting not to hold the
  │                                                            location of short-circuit detection.
  │                                    [WOR   D1102  D42   ]   Update Result of disconnection
  │                                                            detections (D42).
  │                                    [WOR   D1103  D43   ]   Update Result of short-circuit
  │                                                            detections (D43).
```
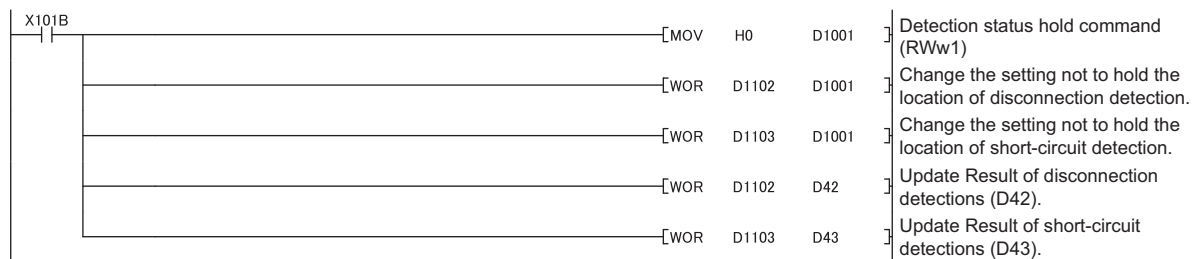
## (5) Performing a remote device station initialization procedure registration to multiple stations

Correct the program described in Page 89, Section 6.3 (4), the part enclosed by the dotted line 1), as shown below.

• System configuration
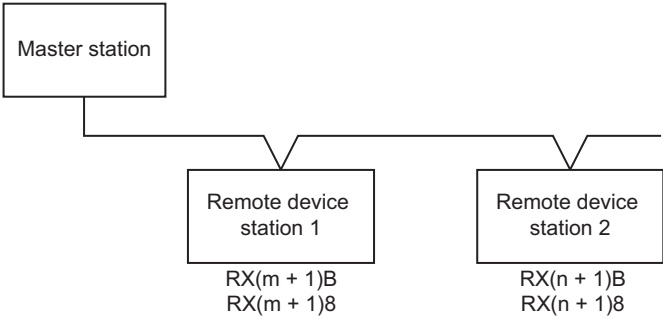


• Correction program
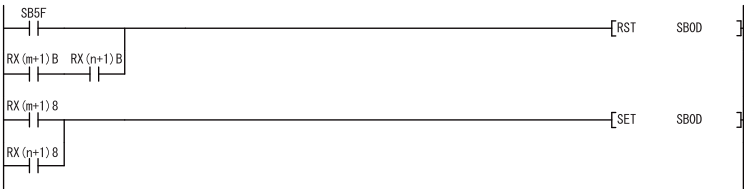


| Device | Description |
|---|---|
| RX(m + 1)B | Remote READY |
| RX(n + 1)B | |
| RX(m + 1)8 | Initial data processing request flag |
| RX(n + 1)8 | |

Add Remote READY and Initial data processing request flag for all the stations, to which the remote device station initialization procedure registration has been made, to the program as an interlock.

If the following modules are used as remote device stations, configure initial settings of these stations using a sequence program.

• AJ65BT-64AD analog-digital converter module
• AJ65BT-68TD thermocouple temperature input module
• AJ65BT-64RD3 platinum temperature-measuring resistor Pt100 temperature input module
• AJ65BT-64RD4 platinum temperature-measuring resistor Pt100 temperature input module

The above correction program does not apply to these stations because the condition where Remote READY turns on differs between the CC-Link remote I/O module with diagnostic functions and these remote device stations.

### (6) Application program (program for storing disconnection/short-circuit detection history)

#### (a) Programming conditions

- Adding this program to the program shown on Page 89, Section 6.3 (4) enables users to check the history of disconnection/short-circuit detection at X0.
- A file register needs to be set for this program. For the setting method, refer to the user's manual for the CPU module used.
- The disconnection/short-circuit detection history area, which is used in a program example, has a ring buffer structure for storing 10 logs. The data structure is shown below.

| | b15　　　　　　　　　　b0 |
|---|---|
| R0 | Number of disconnection detections |
| R1 | Number of short-circuit detections |
| R2 | History index |
| R3 | (Empty) |
| R4 | (Empty) |
| R5 to R9 | History information 1 |
| R10 to R14 | History information 2 |
| R15 to R19 | History information 3 |
| R20 to R24 | History information 4 |
| R25 to R29 | History information 5 |
| R30 to R34 | History information 6 |
| R35 to R39 | History information 7 |
| R40 to R44 | History information 8 |
| R45 to R49 | History information 9 |
| R50 to R54 | History information 10 |

| | b15 | b0 |
|---|---|---|
| Rn + 0 | Year | Month |
| Rn + 1 | Day | Hour |
| Rn + 2 | Minute | Second |
| Rn + 3 | Detection type | Station number |
| Rn + 4 | Detection status | |

| Item | Description |
|---|---|
| Number of disconnection detections | The number of disconnection detections (accumulated total) is stored. |
| Number of short-circuit detections | The number of short-circuit detections (accumulated total) is stored. |
| History index | The index is used to decide the storage location of the detection history when disconnection/short-circuit is detected. |
| Year/Month/Day/Hour/ Minute/Second | The detection date is stored in BCD. These data are stored by using clock information of the CPU module. |
| Detection type | · If disconnection is detected, 01H is stored.<br>· If short-circuit is detected, 02H is stored. |
| Station number | The station number of CC-Link remote I/O module with diagnostic functions, which detected disconnection/short-circuit, is stored. |
| Detection status | · If disconnection is detected, the value of Disconnection detection status (RWr2) is stored.<br>· If short-circuit is detected, the value of Short-circuit detection status (RWr3) is stored. |

#### (b) Device list

The following table lists devices used only in this program.

For details on other devices, refer to the following.

| Device | Description |
|---|---|
| X21 | Clear request of disconnection/short-circuit detection history |
| M31 | Write request of disconnection/short-circuit detection history |
| D30 | Data for writing history information (detection type/station number) |
| D31 | Data for writing history information (detection status) |
| Z0 | Index register for writing disconnection/short-circuit detection history |
| R0 to R54 | Disconnection/short-circuit detection history |

## (c) Program example

| | | | | |
|---|---|---|---|---|
| SM402 | | [MOV | R2 | Z0 ] | Read the history index. |
| X21 | | [FMOV | K0 | R0 K55 ] | Clear the file register. |
| | | [MOV | K0 | Z0 ] | Clear the index register. |
| M31 | | [BMOV | SD210 | R5Z0 K3 ] | Write the detection date (BCD) to the file register. |
| | | [BMOV | D30 | R8Z0 K2 ] | Write the detection data to the file register. |
| | | [+ | K5 | Z0 ] | Update the index register. |
| [= Z0 K50 ] | | [MOV | K0 | Z0 ] | Processing for 10 ring buffers |
| | | [MOV | Z0 | R2 ] | Update the history index. |
| | | [RST | | M31 ] | Turn off History write request flag. |
| X101B D1102.0 | | [INC | | R0 ] | Add 1 to the number of disconnection detections in the history data. |
| | | [MOV | H101 | D30 ] | Create detection data. Detection type = Disconnection, Station number = 1 |
| | | [MOV | D1102 | D31 ] | Create detection data. Detection status = Disconnection detection status (RWr2) |
| | | [SET | | M31 ] | Turn on History write request flag. |
| D1103.0 | | [INC | | R1 ] | Add 1 to the number of short-circuit detections in the history data. |
| | | [MOV | H201 | D30 ] | Create detection data. Detection type = Short-circuit, Station number = 1 |
| | | [MOV | D1103 | D31 ] | Create detection data. Detection status = Short-circuit detection status (RWr3) |
| | | [SET | | M31 ] | Turn on History write request flag. |
| M31 | | [PLS | | SM213 ] | Set Clock data read request. |

**6**

# 6.4　Program Example When the LCPU is Used

When the LCPU is used, the program example for the QCPU can be used. Set parameters according to the descriptions in this section and apply the following program example.

⟳ Page 89, Section 6.3 (4)

Parameters can be set in "Network Parameter" of GX Works2.
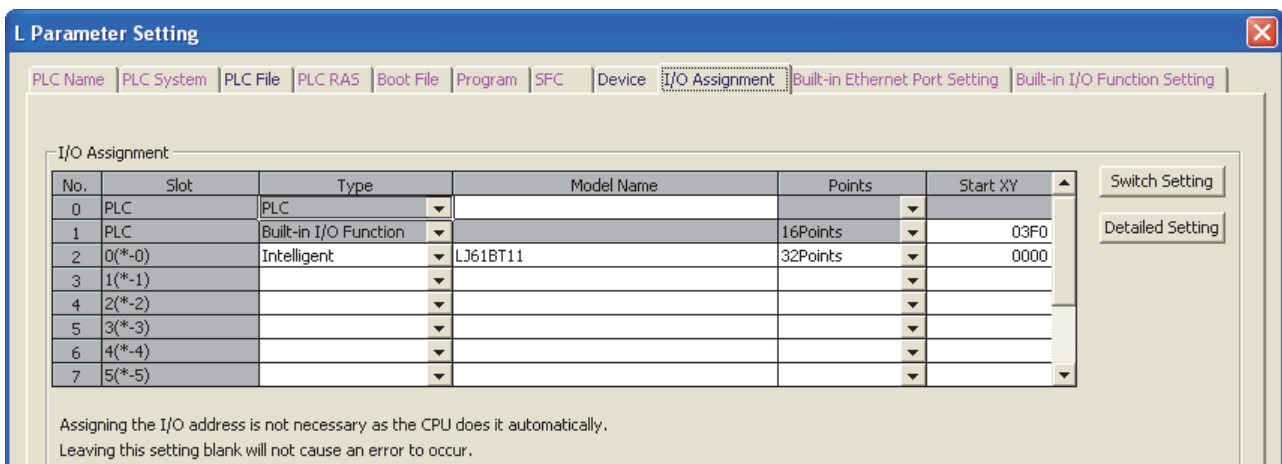
## (1) Parameter settings

### (a) PLC parameter

Change the I/O assignment setting of the built-in I/O function according to the program example for the QCPU. In the "I/O Assignment" tab from "PLC Parameter", assign a start I/O address that is not used in the system. The following shows an example of I/O assignment for the L02CPU.

| No. | Slot | Type | Model Name | Points | Start XY |
|---|---|---|---|---|---|
| 0 | PLC | PLC | | | |
| 1 | PLC | Built-in I/O Function | | 16Points | 03F0 |
| 2 | 0(*-0) | Intelligent | LJ61BT11 | 32Points | 0000 |
| 3 | 1(*-1) | | | | |
| 4 | 2(*-2) | | | | |
| 5 | 3(*-3) | | | | |
| 6 | 4(*-4) | | | | |
| 7 | 5(*-5) | | | | |

Assigning the I/O address is not necessary as the CPU does it automatically.
Leaving this setting blank will not cause an error to occur.

When the LCPU with the built-in CC-Link function is used, set the start I/O address for the built-in CC-Link function to "0000" and assign a start I/O address that is not used in the system for the built-in I/O function.

94

**(b) Network parameter setting**

***1.*** **Open the Network Parameter setting window and set parameters as follows.**
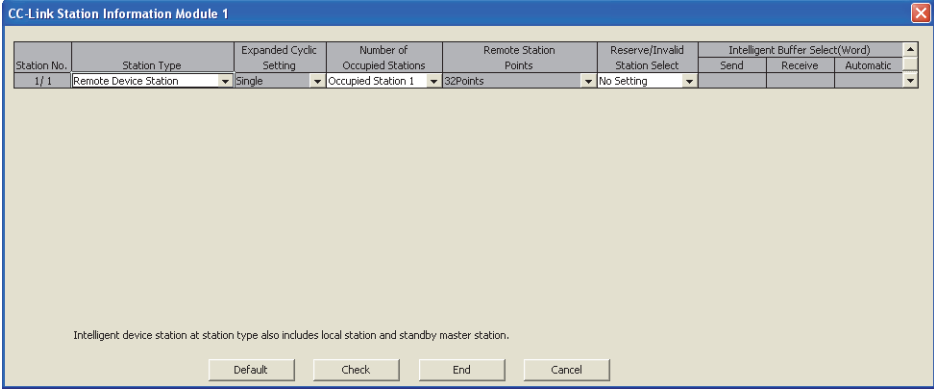
Project window ➪ [Parameter] ➪ [Network Parameter] ➪ [CC-Link]



| Item | Setting value |
|---|---|
| Number of Modules | 1 (Boards) |
| Start I/O No. | 0000 |
| Operation Setting | No Setting |
| Type | Master Station |
| Mode | Remote Net (Ver.1 Mode) |
| Transmission Speed | 156kbps |
| Total Module Connected | 1 |
| Remote Input (RX) | X1000 |
| Remote Output (RY) | Y1000 |
| Remote Register (RWr) | D1100 |
| Remote Register (RWw) | D1000 |
| Special Relay (SB) | SB0 |
| Special Register (SW) | SW0 |
| Retry Count | 3 |
| Automatic Reconnection Station Count | 1 |
| Standby Master Station No. | No Setting |
| PLC Down Select | Stop |
| Scan Mode Setting | Asynchronous |
| Delay Time Setting | 0 |
| Station Information Setting | Page 96, Section 6.4 (1) (c) |
| Remote Device Station Initial Setting | Page 97, Section 6.4 (2) |
| Interrupt Settings | No Setting |

## (c) Station information setting

**1.** **Open the Station Information setting window and set parameters as follows.**

🖰 Project window ⇨ [Parameter] ⇨ [Network Parameter] ⇨ [CC-Link] ⇨ [Station Information]



| Item | Setting value |
|---|---|
| Station Type | Remote Device Station |
| Number of Occupied Stations | Occupied Station 1 |
| Reserve/Invalid Station Select | No Setting |

### (2) Initial setting using the remote device station initialization procedure registration function

***1.*** **Open the Remote Device Station Initial Setting window and set parameters as follows.**

🖱 Project window ▷ [Parameter] ▷ [Network Parameter] ▷ [CC-Link] ▷ [Initial Setting]



***2.*** **Open the Procedure Registration setting window and set parameters as follows.**

🖱 Project window ▷ [Parameter] ▷ [Network Parameter] ▷ [CC-Link] ▷ [Initial Setting] ▷ [Regist Procedure]



**6**

- When Initial data processing request flag (RX18) turns on and Remote device station initialization procedure registration command (SB0D) subsequently turns on, the following operations are registered to the CC-Link remote I/O module with diagnostic functions.

| Condition | Operation |
|---|---|
| Initial data processing request flag (RX18) turns on. | Disconnection detection enable/disable setting: Enabled only for X0 (RWw0: $0001_H$) |
| | Turns on Initial data processing completion flag (RY18). |
| | Turns on Initial data setting request flag (RY19). |
| Initial data processing request flag (RX18) turns off. | Turns off Initial data processing completion flag (RY18). |
| Initial data setting completion flag (RX19) turns on. | Turns off Initial data setting request flag (RY19). |

**Remark** • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

The master module can perform initial processing only for the specified remote device stations.
For details, refer to the following.
📖 MELSEC-L CC-Link System Master/Local Module User's Manual

• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

## (3) Program example

Refer to the following and apply the program example.

**Remark** • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

To configure the system with the default I/O assignment of the LCPU, change some devices listed on Page 88, Section 6.3 (3) and Page 92, Section 6.3 (6), Section 6.3 (6) to the ones in the following table.

| Device | Alternative device | Description |
|---|---|---|
| X0 | X10 | Module error |
| X1 | X11 | Data link status of host station |
| XF | X1F | Module READY |
| X20 | X30 | LED disconnection/short-circuit indication hold reset command |
| X21 | X31 | Clear request of disconnection/short-circuit detection history |
| X22 | X32 | Signal that is turned on to change the initial settings |
| X23 | X33 | Disconnection detection number reset command for an external input signal, X0 |

• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

# 6.5 Program Example When the QnACPU is Used
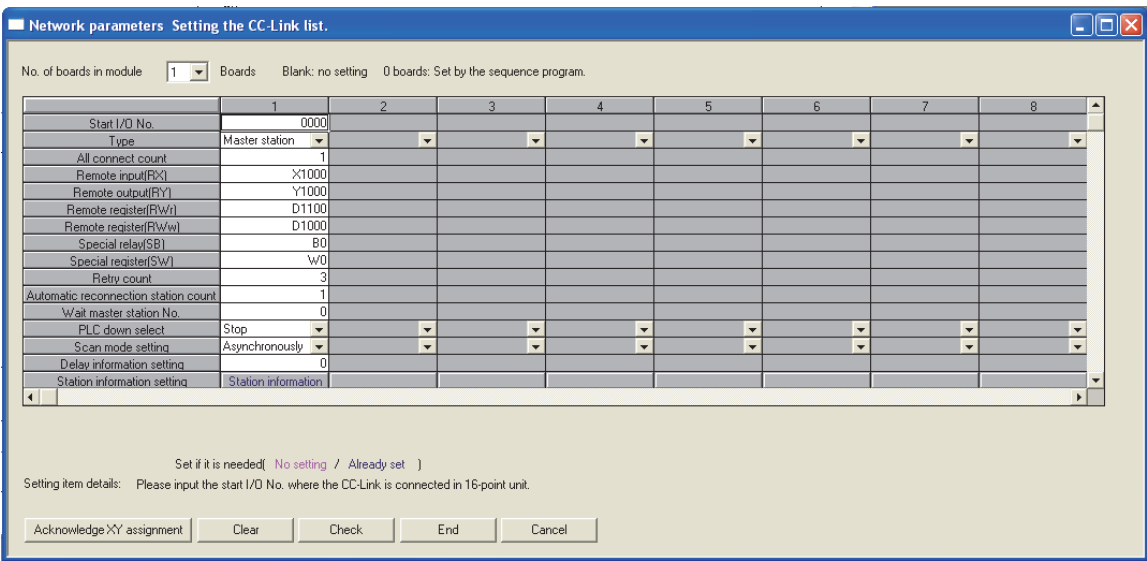
Parameters can be set in "Network parameter" of GX Developer.

## (1) Parameter settings

### (a) Network parameter setting

*1.* **Open the Network parameters setting window and set parameters as follows.**

✎ Project data list ➪ [Parameter] ➪ [Network parameter] ➪ [CC-Link]



| Item | Setting value |
|---|---|
| No. of boards in module | 1 (Boards) |
| Start I/O No. | 0000 |
| Type | Master station |
| All connect count | 1 |
| Remote input (RX) | X1000 |
| Remote output (RY) | Y1000 |
| Remote register (RWr) | D1100 |
| Remote register (RWw) | D1000 |
| Special relay (SB) | B0 |
| Special register (SW) | W0 |
| Retry count | 3 |
| Automatic reconnection station count | 1 |
| Wait master station No. | 0 |
| PLC down select | Stop |
| Scan mode setting | Asynchronously |
| Delay information setting | 0 |
| Station information setting | ☞ Page 100, Section 6.5 (2) |

### (2) Station information setting

***1.*** **Open the station information setting window and set parameters as follows.**

👌 Project data list ⇨ [Parameter] ⇨ [Network parameter] ⇨ [CC-Link] ⇨ [Station information]

| Item | Setting value |
|---|---|
| Station type | Remote device station |
| Exclusive station count | Exclusive station 1 |
| Reserve/invalid station select | No setting |

## (3) Devices used in the program example

| Device | Description |
|---|---|
| X0 | Module error |
| X1 | Data link status of host station |
| XF | Module READY |
| X20 | LED disconnection/short-circuit indication hold reset command |
| X22 | Signal that is turned on to change the initial settings |
| X23 | Disconnection detection number reset command for an external input signal, X0 |
| X1000 | External input signal, X0, for the CC-Link remote I/O module with diagnostic functions |
| X1018 | Initial data processing request flag |
| X1019 | Initial data setting completion flag |
| X101B | Remote READY |
| Y60 | Signal that is output when a data link error occurs |
| Y61 | Signal that is output when an external input signal, X0, is on |
| Y62 | Signal that is output when an external input signal, X0, is disconnected or shorted |
| Y1018 | Initial data processing completion flag |
| Y1019 | Initial data setting request flag |
| M0 | Signal that stores the data link status of the CC-Link remote I/O module with diagnostic functions<br>• 0 (OFF): Data link is normal.<br>• 1 (ON): A data link error occurs. |
| M1 to M3 | Not used (data link status of Station 2 to Station 4) |
| M100 | Master control contact |
| D42 | Result of disconnection detections |
| D43 | Result of short-circuit detections |
| D60 | Number of disconnection detections for an external input signal, X0 |
| D1000 | Disconnection detection enable/disable setting |
| D1001 | Detection status hold command |
| D1002 | Disconnection indication command |
| D1003 | Short-circuit indication command |
| D1102 | Disconnection detection status |
| D1103 | Short-circuit detection status |
| W80 | Data link status of other stations |

6

## (4) Program example

| | | | | |
|---|---|---|---|---|
| X0  X0F  X1 | | [MOV  W80  K1M0] | Read data link status. |
| M0 | [MC  N0  M100] | Turn on MC contact (M100) when data link is normal. |
| MO | (Y60) | Turn on Y60 when a data link error occurs. |

N0  M100

| | | |
|---|---|---|
| X1018 | [MOV  H1  D1000] | Disconnection detection enable/disable setting (RWw0) |
| | [MOV  H0FFFF  D1001] | Detection status hold command (RWw1) |
| | [SET  Y1018] | Turn on Initial data processing completion flag (RY18). |
| | [SET  Y1019] | Turn on Initial data setting request flag (RY19). |
| X1018 | [RST  Y1018] | Turn off Initial data processing completion flag (RY18). |
| X1019 | [RST  Y1019] | Turn off Initial data setting request flag (RY19) |

*1
| | | |
|---|---|---|
| X22 | [MOV  H0  D1000] | Disconnection detection enable/disable setting (RWw0) |
| | [SET  Y1019] | Turn on Initial data setting request flag (RY19). |

| | | |
|---|---|---|
| X101B  X20 | [WOR  D1102  D1002] | Update Disconnection indication command (RWw2). |
| | [WOR  D1103  D1003] | Update Short-circuit indication command (RWw3). |
| X20 | [MOV  H0  D1002] | Clear Disconnection indication command (RWw2). |
| | [MOV  H0  D1003] | Clear Short-circuit indication command (RWw3). |
| X101B  X1000 | (Y61) | Turn on Y61 when X0 is on. |
| D1102.0 | (Y62) | Turn on Y62 when disconnection/ short-circuit occurs at X0. |
| D1103.0 | | |
| X23  X101B | [MOV  K0  D60] | Reset the number of disconnection detections at X0. |
| D1102.0  X101B  [<  D60  K32767] | [INCP  D60] | Count the number of disconnection detections at X0. |

A

| | |
|---|---|
| | [MCR  N0] |
| | [END] |

*1    Use the program in the dotted-line area only to change the initial settings.

102

## (a) When "Hold the detection status (0)" is set to Detection status hold command (RWw1)

Add the following program to the part A in the program shown on Page 102, Section 6.5 (4).

In the following program, use Result of disconnection detections (D42) and Result of short-circuit detections (D43) to check the disconnection or short-circuit status.

| X101B | | | | |
|---|---|---|---|---|
| ⊣⊢ | [MOV | H0 | D1001 ] | Detection status hold command (RWw1) |
| | [WOR | D1102 | D1001 ] | Change the setting not to hold the location of disconnection detection. |
| | [WOR | D1103 | D1001 ] | Change the setting not to hold the location of short-circuit detection. |
| | [WOR | D1102 | D42 ] | Update Result of disconnection detections (D42). |
| | [WOR | D1103 | D43 ] | Update Result of short-circuit detections (D43). |
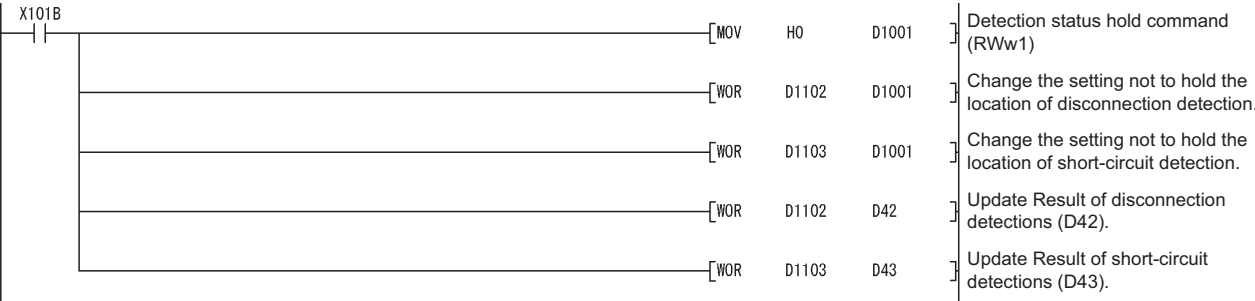
# 6.6 Program Example When the ACPU/QCPU (A Mode) is Used (Dedicated Instructions)

Parameters can be set with a sequence program.

For details on dedicated instructions, refer to the following.

📖 Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions)

## (1) Devices used in the program example

| Device | Description |
|---|---|
| X0 | Module error |
| X1 | Data link status of host station |
| XF | Module READY |
| X20 | LED disconnection/short-circuit indication hold reset command |
| X22 | Signal that is turned on to change the initial settings |
| X23 | Disconnection detection number reset command for an external input signal, X0 |
| X100 | External input signal, X0, for the CC-Link remote I/O module with diagnostic functions |
| X118 | Initial data processing request flag |
| X119 | Initial data setting completion flag |
| X11B | Remote READY |
| Y60 | Signal that is output when a data link error occurs |
| Y61 | Signal that is output when an external input signal, X0, is on |
| Y62 | Signal that is output when an external input signal, X0, is disconnected or shorted |
| Y118 | Initial data processing completion flag |
| Y119 | Initial data setting request flag |
| M0 | Network parameter setting start pulse signal |
| M1 | Signal that turns on when the parameter setting is completed normally |
| M2 | Signal that turns on when the parameter setting is completed in error |
| M3 | Auto refresh parameter setting start pulse signal |
| M4 | Signal that stores the data link status of the CC-Link remote I/O module with diagnostic functions<br>• 0 (OFF): Data link is normal.<br>• 1 (ON): A data link error occurs. |
| M5 to M7 | Not used (data link status of Station 2 to Station 4) |
| M8 | Initial setting change command pulse signal |
| M9 | Pulse signal (Disconnection detection number reset command for an external input signal, X0) |
| M100 | Master control contact |
| M300 to M315 | Disconnection detection status |
| M400 to M415 | Short-circuit detection status |
| D0 to D2 | Device for network parameter settings |
| D3 | Device where the parameter status of host station is stored when the instruction is completed in error |
| D10 to D29 | Device for auto refresh parameter settings |
| D42 | Result of disconnection detections |
| D43 | Result of short-circuit detections |
| D60 | Number of disconnection detections for an external input signal, X0 |
| D200 | Disconnection detection enable/disable setting |

| Device | Description |
|--------|-------------|
| D201 | Detection status hold command |
| D202 | Disconnection indication command |
| D203 | Short-circuit indication command |
| D458 | Disconnection detection status |
| D459 | Short-circuit detection status |
| W80 | Data link status of other stations |

**6**

## (2) Program example

```
  X0   X0F
──┤/├──┤├──────────────────────────────────────────────────[PLS    M0    ]

  M0
──┤├───────────────────────────────────────────────┌[MOV    K1     D0    ]   Synchronous mode: Disabled

        ├──────────────────────────────────────────[MOV    K1     D1    ]   Number of connected modules: 1

        │                                                                    Station information of CC-Link remote
        ├──────────────────────────────────────────[MOV    H1101  D2    ]   I/O module with diagnostic functions
        │                                                                    (remote device station, exclusive
        │                                                                    station 1, station number 1)

        ├──────────────────────────────────────────────[LEDA   RLPA  ]   Dedicated instruction (RLPA)

        ├──────────────────────────────────────────────[SUB    H0    ]   Start I/O No. of master module

        ├──────────────────────────────────────────────[LEDC   D0    ]   Start device for parameter storage

        ├──────────────────────────────────────────────[LEDC   M1    ]   Device that turns on for one scan
        │                                                                    when the processing are completed

        └─────────────────────────────────────────────────[LEDR  ]

  M2                                                                         Read the status of host station
──┤├─────────────────────────────────[FROM   H0    H668   D3    K1    ]   parameters when the processing
                                                                            is not completed.

  X0   X0F   M2
──┤/├──┤├───┤/├─────────────────────────────────────────────[PLS    M3    ]

  M3
──┤├───────────────────────────────────────────────┌[MOV    H0     D10   ]   Set the start number of RX00.

        ├──────────────────────────────────────────[MOV    H1     D11   ]   Set "X".

        ├──────────────────────────────────────────[MOV    H100   D12   ]   Set X100.

        ├──────────────────────────────────────────[MOV    K32    D13   ]   Set 32 points.

        ├──────────────────────────────────────────[MOV    H0     D14   ]   Set the start number of RY00.

        ├──────────────────────────────────────────[MOV    H2     D15   ]   Set "Y".

        ├──────────────────────────────────────────[MOV    H100   D16   ]   Set Y100.

        ├──────────────────────────────────────────[MOV    K32    D17   ]   Set 32 points.

        ├──────────────────────────────────────────[MOV    H0     D18   ]   Set the start number of RW.

        ├──────────────────────────────────────────[MOV    H7     D19   ]   Set "D".

        ├──────────────────────────────────────────[MOV    K200   D20   ]   Set D100.

        └──────────────────────────────────────────[MOV    K512   D21   ]   Set 512 points
```

106

| Ladder | Instruction | Operand 1 | Operand 2 | Description |
|---|---|---|---|---|
| M3 | MOV | H0 | D22 | Set the start number of SB. |
| | MOV | H4 | D23 | Set "B". |
| | MOV | K0 | D24 | Set B0. |
| | MOV | K512 | D25 | Set 512 points. |
| | MOV | H0 | D26 | Set the start number of SW. |
| | MOV | H8 | D27 | Set "W". |
| | MOV | H0 | D28 | Set W0. |
| | MOV | K256 | D29 | Set 256 points. |
| | LEDB | RRPA | | Dedicated instruction (RRPA) |
| | SUB | H0 | | Start I/O No. of master module |
| | LEDC | D10 | | Start device for parameter storage |
| | LEDR | | | |

| X0 X0F X1 | MOV | W80 | K1M4 | Read data link status. |
| M4 | MC | N0 | M100 | Turn on MC contact (M100) when data link is normal. |
| M4 | | | (Y60) | Turn on Y60 when a data link error occurs. |

N0 — M100

| X118 | MOV | H1 | D200 | Disconnection detection enable/disable setting (RWw0) |
| | MOV | H0FFFF | D201 | Detection status hold command (RWw1) |
| | SET | Y118 | | Turn on Initial data processing completion flag (RY18). |
| | SET | Y119 | | Turn on Initial data setting request flag (RY19). |
| X118 | RST | Y118 | | Turn off Initial data processing completion flag (RY18). |
| X119 | RST | Y119 | | Turn off Initial data setting request flag (RY19). |

| Rung | Instruction | Comment |
|------|-------------|---------|
| X22 —[PLS M8] | | |
| M8 —[MOV H0 D200] | | Disconnection detection enable/disable setting (RWw0) |
| —[SET Y119] | | Turn on Initial data setting request flag (RY19). |
| X11B —[MOV D458 K4M300] | | |
| —[MOV D459 K4M400] | | |
| X11B X20 —[WOR D458 D202] | | Update Disconnection indication command (RWw2). |
| —[WOR D459 D203] | | Update Short-circuit indication command (RWw3). |
| X20 —[MOV H0 D202] | | Clear Disconnection indication command (RWw2). |
| —[MOV H0 D203] | | Clear Short-circuit indication command (RWw3). |
| X11B X100 (Y61) | | Turn on Y61 when X0 is on. |
| M300 / M400 (Y62) | | Turn on Y62 when disconnection/short-circuit occurs at X0. |
| X23 —[PLS M9] | | |
| M9 —[MOV K0 D60] | | Reset the number of disconnection detections at X0. |
| M300 X11B [< D60 K32767] —[INCP D60] | | Count the number of disconnection detections at X0. |
| A | | |
| —[MCR N0] | | |
| —[END] | | |

*1    Use the program in the dotted-line area only to change the initial settings.

### (a) When "Hold the detection status (0)" is set to Detection status hold command (RWw1)

Add the following program to the part A in the program shown on Page 106, Section 6.6 (2).

In the following program, use Result of disconnection detections (D42) and Result of short-circuit detections (D43) to check the disconnection or short-circuit status.

| Rung | Comment |
|------|---------|
| X11B —[MOV H0 D201] | Detection status hold command (RWw1) |
| —[WOR D458 D201] | Change the setting not to hold the location of disconnection detection. |
| —[WOR D459 D201] | Change the setting not to hold the location of short-circuit detection. |
| —[WOR D458 D42] | Update Result of disconnection detections (D42). |
| —[WOR D459 D43] | Update Result of short-circuit detections (D43). |
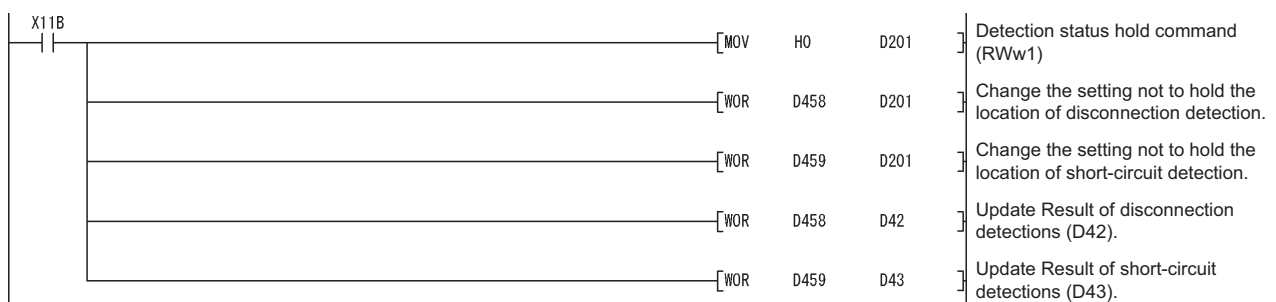
# 6.7 Program Example When the ACPU/QCPU (A Mode) is Used (FROM/TO Instructions)

Parameters can be set with a sequence program.

## (1) Devices used in the program example

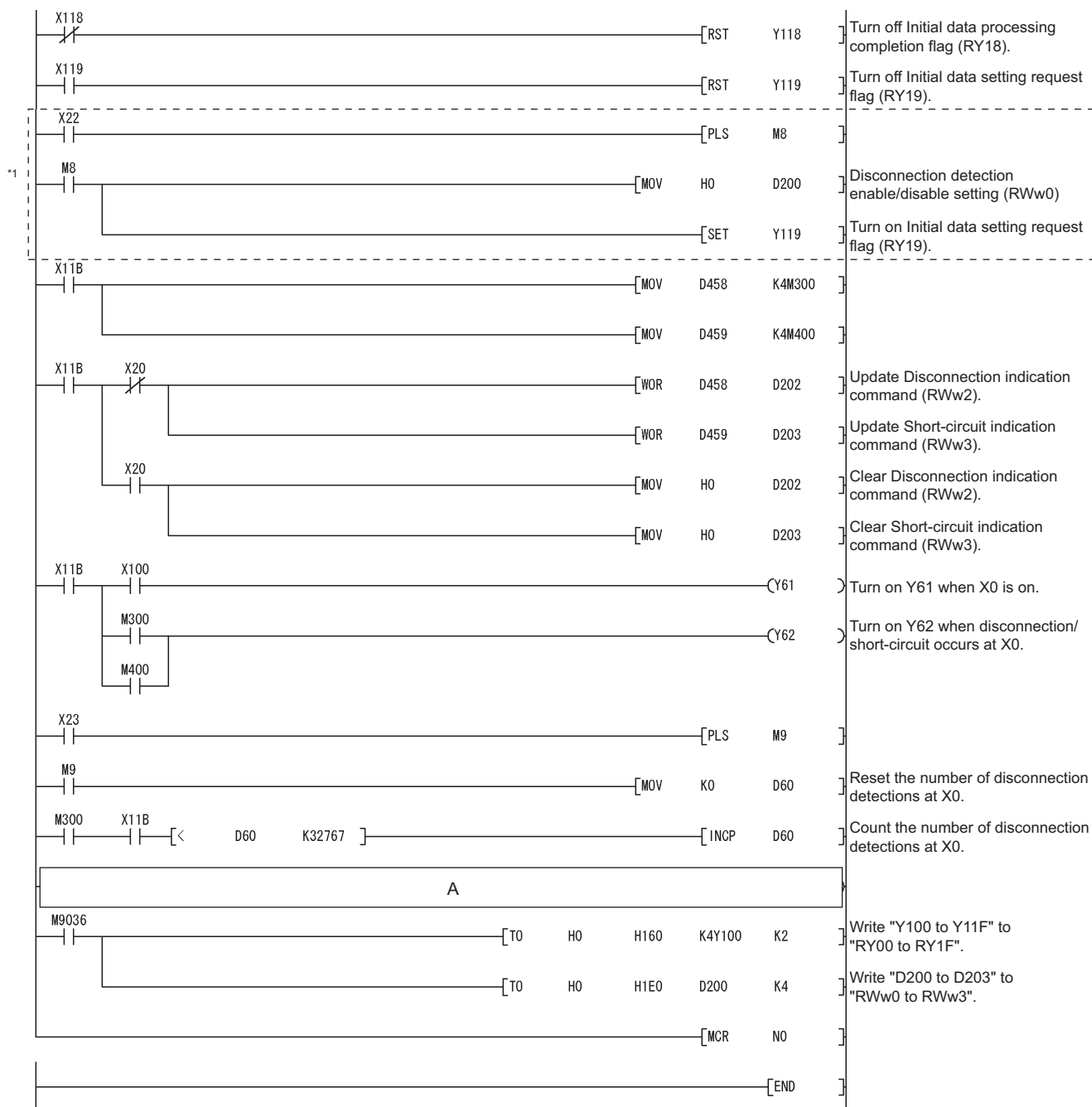| Device | Description |
|---|---|
| X0 | Module error |
| X1 | Data link status of host station |
| X6 | Data link startup with parameters in buffer memory normally completed |
| X7 | Data link startup with parameters in buffer memory completed in error |
| XF | Module READY |
| X20 | LED disconnection/short-circuit indication hold reset command |
| X22 | Signal that is turned on to change the initial settings |
| X23 | Disconnection detection number reset command for an external input signal, X0 |
| X100 | External input signal, X0, for the CC-Link remote I/O module with diagnostic functions |
| X118 | Initial data processing request flag |
| X119 | Initial data setting completion flag |
| X11B | Remote READY |
| Y0 | Refresh instruction |
| Y6 | Request for data link startup with parameters in buffer memory |
| Y60 | Signal that is output when a data link error occurs |
| Y61 | Signal that is output when an external input signal, X0, is on |
| Y62 | Signal that is output when an external input signal, X0, is disconnected or shorted |
| Y118 | Initial data processing completion flag |
| Y119 | Initial data setting request flag |
| M0 | Network parameter setting start pulse signal |
| M4 | Signal that stores the data link status of the CC-Link remote I/O module with diagnostic functions<br> • 0 (OFF): Data link is normal.<br> • 1 (ON): A data link error occurs. |
| M5 to M7 | Not used (data link status of Station 2 to Station 4) |
| M8 | Initial setting change command pulse signal |
| M9 | Pulse signal (Disconnection detection number reset command for an external input signal, X0) |
| M100 | Master control contact |
| M300 to M315 | Disconnection detection status |
| M400 to M415 | Short-circuit detection status |
| D0 to D2 | Device for network parameter settings |
| D42 | Result of disconnection detections |
| D43 | Result of short-circuit detections |
| D60 | Number of disconnection detections for an external input signal, X0 |
| D112 | Device where the parameter status of host station is stored when the instruction is completed in error |
| D200 | Disconnection detection enable/disable setting |
| D201 | Detection status hold command |
| D202 | Disconnection indication command |

| Device | Description |
| --- | --- |
| D203 | Short-circuit indication command |
| D458 | Disconnection detection status |
| D459 | Short-circuit detection status |

## (2) Program example

| | | |
|---|---|---|
| X0  X0F ──┤/├──┤├── | ─[PLS  M0]─ | |
| M0 ──┤├── | ─[MOV  K1    D0]─ | Number of connected modules: 1 |
| | ─[MOV  K3    D1]─ | Retry count |
| | ─[MOV  K1    D2]─ | Automatic reconnection station count: 1 |
| | ─[TOP  H0  H1   D0   K3]─ | Write to master station. |
| | ─[TOP  H0  H6   K1   K1]─ | When an error occurs in the CPU module of the master station Data link status: Continue |
| | ─[TOP  H0  H20  H1101  K1]─ | Station information of CC-Link remote I/O module with diagnostic functions (remote device station, exclusive station 1, station number 1) |
| | ─[SET  Y0]─ | Refresh command |
| | ─[SET  Y6]─ | Turn on Data link start request (Y06) by using parameters of buffer memory. |
| X6 ──┤├── | ─[RST  Y6]─ | Turn off Data link start request (Y06) by using parameters of buffer memory when the data link starts normally. |
| X7 ──┤├── | ─[FROM  H0  H668  D112  K1]─ | Read the status of parameters when the data link does not start normally. |
| | ─[RST  Y6]─ | Turn off Data link start request (Y06) by using parameters of buffer memory when the data link starts normally. |
| X0  X0F  X1 ──┤/├──┤├──┤├── | ─[FROM  H0  H680  K1M4  K1]─ | Read data link status. |
| M4 ──┤/├── | ─[MC  N0  M100]─ | Turn on MC contact (M100) when data link is normal. |
| M4 ──┤├── | ─(Y60)─ | Turn on Y60 when a data link error occurs. |
| N0  M100 | | |
| M9036 ──┤├── | ─[FROM  H0  H0E0  K4X100  K2]─ | Read "RX00 to RX1F" to "X100 to X11F". |
| | ─[FROM  H0  H2E0  D456  K4]─ | Read "RWr0 to RWr3" to "D456 to D459". |
| X118 ──┤├── | ─[MOV  H1    D200]─ | Disconnection detection enable/disable setting (RWw0) |
| | ─[MOV  H0FFFF  D201]─ | Detection status hold command (RWw1) |
| | ─[SET  Y118]─ | Turn on Initial data processing completion flag (RY18). |
| | ─[SET  Y119]─ | Turn on Initial data setting request flag (RY19). |

| Ladder | Description |
|---|---|
| X118 [RST Y118] | Turn off Initial data processing completion flag (RY18). |
| X119 [RST Y119] | Turn off Initial data setting request flag (RY19). |
| *1 X22 [PLS M8] | |
| M8 [MOV H0 D200] | Disconnection detection enable/disable setting (RWw0). |
| [SET Y119] | Turn on Initial data setting request flag (RY19). |
| X11B [MOV D458 K4M300] | |
| [MOV D459 K4M400] | |
| X11B X20 [WOR D458 D202] | Update Disconnection indication command (RWw2). |
| [WOR D459 D203] | Update Short-circuit indication command (RWw3). |
| X20 [MOV H0 D202] | Clear Disconnection indication command (RWw2). |
| [MOV H0 D203] | Clear Short-circuit indication command (RWw3). |
| X11B X100 (Y61) | Turn on Y61 when X0 is on. |
| M300 / M400 (Y62) | Turn on Y62 when disconnection/ short-circuit occurs at X0. |
| X23 [PLS M9] | |
| M9 [MOV K0 D60] | Reset the number of disconnection detections at X0. |
| M300 X11B [< D60 K32767] [INCP D60] | Count the number of disconnection detections at X0. |
| A | |
| M9036 [TO H0 H160 K4Y100 K2] | Write "Y100 to Y11F" to "RY00 to RY1F". |
| [TO H0 H1E0 D200 K4] | Write "D200 to D203" to "RWw0 to RWw3". |
| [MCR N0] | |
| [END] | |

*1    Use the program in the dotted-line area only to change the initial settings.

112

**(a) When "Hold the detection status (0)" is set to Detection status hold command (RWw1)**

Add the following program to the part A in the program shown on Page 111, Section 6.7 (2).

In the following program, use Result of disconnection detections (D42) and Result of short-circuit detections (D43) to check the disconnection or short-circuit status.

| X11B | | | | | |
|------|------|------|------|------|------|
| | | | MOV | H0 | D201 | Detection status hold command (RWw1) |
| | | | WOR | D458 | D201 | Change the setting not to hold the location of disconnection detection. |
| | | | WOR | D459 | D201 | Change the setting not to hold the location of short-circuit detection. |
| | | | WOR | D458 | D42 | Update Result of disconnection detections (D42). |
| | | | WOR | D459 | D43 | Update Result of short-circuit detections (D43). |
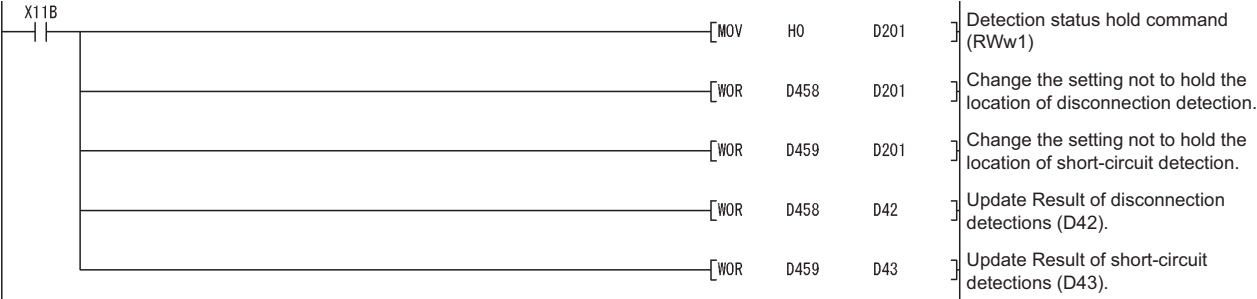
# CHAPTER 7   TROUBLESHOOTING

This chapter describes errors that may occur in the use of the CC-Link remote I/O module with diagnostic functions, and the troubleshooting.

## 7.1   How to Check for Errors with LED Indications

This section describes how to check for errors with the LED indications of the CC-Link remote I/O module with diagnostic functions.
For errors related to the CPU module and the master module, refer to the user's manuals for the CPU module and the master module used.

### (1) When the "PW" LED does not turn on

| Check item | Corrective action |
|---|---|
| Are LEDs other than the "PW" LED on? | The possible cause is a hardware failure. Please consult your local Mitsubishi representative. |
| Is the module power supply (24VDC) wired? | Wire the module power supply (24VDC). |
| Is the module power supply (24VDC) on? | Turn on the module power supply (24VDC). |
| Is the voltage of the module power supply (24VDC) within the specified range? | Supply the voltage within the range specified in the "Performance Specifications" section.  (☞ Page 26, Section 4.2) |

### (2) When the "I/O PW" LED does not turn on

| Check item | Corrective action |
|---|---|
| Is the external power supply (24VDC) wired? | Wire the external power supply (24VDC). |
| Is the external power supply (24VDC) on? | Turn on the external power supply (24VDC). |
| Is the voltage of the external power supply (24VDC) within the specified range? | Supply the voltage within the range specified in the "Performance Specifications" section. (☞ Page 26, Section 4.2) |

### (3) When the "RUN" LED does not turn on

| Check item | Corrective action |
|---|---|
| Has a watchdog timer error occurred? | Check whether a watchdog timer error occurred or not with the link special registers (SW0084 to SW0087) of the master module, and turn off and on the power of the CC-Link remote I/O module with diagnostic functions. If the "RUN" LED does not turn on by turning off and on the power, the possible cause is a hardware failure. Please consult your local Mitsubishi representative. |

### (4) When the "L RUN" LED turns off

| Check item | Corrective action |
|---|---|
| Is the communication stopped? | Refer to the troubleshooting described in the user's manual for the master module used, and take the action. |

### (5) When the "L ERR." LED turns on

| Check item | Corrective action |
|---|---|
| Is the number other than 1 to 64 set as a station number? | Set 1 to 64 for the station number. |

### (6) When the "L ERR." LED flashes regularly

| Check item | Corrective action |
|---|---|
| Has the station number been changed while the module was operating normally? | Turn off the power of the CC-Link remote I/O module with diagnostic functions and set the station number properly. Then turn on the power. |
| Has the station number setting switch failed? | If the "L ERR." LED starts flashing even though the station number has not been changed during the operation, the possible cause is a hardware failure. Please consult your local Mitsubishi representative. |

### (7) When the "L ERR." LED flashes irregularly

| Check item | Corrective action |
|---|---|
| Is the module or a CC-Link dedicated cable affected by noise? | Ground the both ends of the shielded cable (CC-Link dedicated cable) with a ground resistance of 100Ω or less with the cable connected to both SLD and FG of each module.<br>Securely ground the FG terminal of the module. When putting the wires in a tube, ground the tube securely. |
| Has the station number been changed while the communication was disconnected? | Turn off the power of the CC-Link remote I/O module with diagnostic functions and set the station number properly. Then turn on the power. |
| Has the station number setting switch failed? | If the "L ERR." LED starts flashing even though the station number has not been changed during the operation, the possible cause is a hardware failure. Please consult your local Mitsubishi representative. |
| Is a terminating resistor attached to it even when the CC-Link remote I/O module with diagnostic functions is not used at the end of the network system? | Remove the terminating resistor from the CC-Link remote I/O module with diagnostic functions. |
| Isn't a terminating resistor attached to it when the CC-Link remote I/O module with diagnostic functions is used at the end of the network system? | Attach the terminating resistor to the CC-Link remote I/O module with diagnostic functions. |

# 7.2 Troubleshooting by Situation

### (1) When an external input cannot be read

| Check item | Corrective action |
|---|---|
| Is Initial data processing request flag (RX(n + 1)8) off? | Turn on Initial data processing completion flag (RY(n + 1)8). |
| Is the setting of a refresh device correct? | Correct the setting so that the setting of the refresh device is the same as that of the sequence program. |
| Are the red LEDs of X0 to XF flashing? | Correct the input wiring where disconnection (no connection) occurred. |
| Are the red LEDs of X0 to XF on? | Correct the input wiring where a short-circuit (ground) occurred. |

### (2) When the data link takes longer time

| Check item | Corrective action |
|---|---|
| Is smaller value set to "Automatic Reconnection Station Count" of the master module? | Set larger value to "Automatic Reconnection Station Count" in Network Parameter of GX Works2 or GX Developer. For details on the settings, refer to the user's manual for the master module used. |

### (3) When disconnection cannot be detected

| Check item | Corrective action |
|---|---|
| Is Initial data processing request flag (RX(n + 1)8) off? | Turn on Initial data processing completion flag (RY(n + 1)8). |
| Is the setting of a refresh device correct? | Correct the setting so that the setting of the refresh device is the same as that of the sequence program. |
| Is Disconnection detection enable/disable setting (RWwm + $0_H$) correctly set? | Set "Detect disconnection (1)" to the appropriate bit of Disconnection detection enable/disable setting (RWwm + $0_H$), and turn on Initial data setting request flag (RY(n + 1)9). |
| Is the value of disconnection (no connection) detection current within the range described in the specification? | Check that the disconnection (no connection) detection current is 0.3mA or lower per point. |
| Is the condition of the location to detect disconnection (no connection) correct? | Check that the location to detect disconnection (no connection) satisfies the detection condition. (Page 38, Section 4.4.2 (1)) |

### (4) When a short-circuit cannot be detected

| Check item | Corrective action |
|---|---|
| Is Initial data processing request flag (RX(n + 1)8) off? | Turn on Initial data processing completion flag (RY(n + 1)8). |
| Is the setting of a refresh device correct? | Correct the setting so that the setting of the refresh device is the same as that of the sequence program. |
| Is the value of short-circuit (ground) detection current within the range described in the specification? | Check that the short-circuit (ground) detection current is 50mA or higher per point. |
| Is the condition of the location to detect a short-circuit (ground) correct? | Check that the location to detect a short-circuit (ground) satisfies the detection condition. (Page 38, Section 4.4.2 (1)) |

# 7.3 Troubleshooting When the "ERR." LED of the Master Station Flashes

The "ERR." LED of the master station is flashing.

Are the parameter setting and the system configuration consistent? — No → Correct the parameter setting or the system configuration.

Yes ↓

Are the link special registers of the master station, SW0080 to SW0083 (Other station data link status), on? — No → Master station failure*1

Yes ↓

Are the link special registers of the master station, SW0098 to SW009B (Station number overlap status), on? — No → Check the module where any of SW0080 to SW0083 is on.

Yes ↓

Check the module where any of SW0098 to SW009B is on.

Are the station number setting switches properly set? — No → Set the station number setting switches properly.

Yes ↓

Failure of the relevant module*1

Power off and on the module.

Is the module on? — No → Power on the module.

Yes ↓

Is the "PW" LED on? — No → Is the supplied voltage within the specified range? — No → Set the supplied voltage within the specified range.

Yes ↓

Failure of the relevant module*1

1)          2)          3)

Check on the master station side

Check on the device station side

**7**

117

1)

2)

3)

Is the "L RUN" LED on? — No →

Yes ↓

Are the station number setting switches properly set (no overlap with those of other stations)? — No →

Yes ↓

Set the station number setting switches properly.

Power off and on the module.

Are the communication cables properly wired?[*2] — No →

Yes ↓

Wire the communication cables properly.

Failure of the relevant module[*1]

Are the station number setting switches properly set (no overlap with those of other stations)? — No →

Yes ↓

Failure of the relevant module[*1]

Set the station number setting switches properly.

Power off and on the module.

End

Check on the device station side

*1    If the master station or the modules have failed, please consult your local Mitsubishi representative.
*2    Check a short-circuit, reverse connection, disconnection, a terminating resistor, FG connection, overall distance, and the distance between stations.
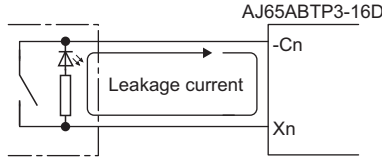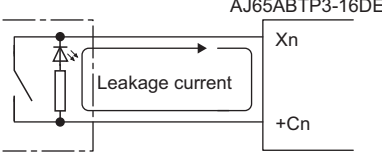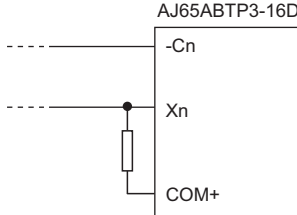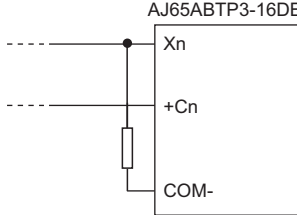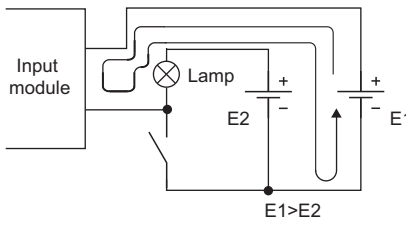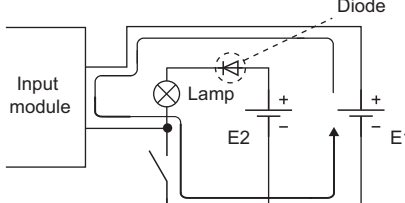
# 7.4 Examples of Errors for the CC-Link Remote I/O Module with Diagnostic Functions

This section lists errors of the CC-Link remote I/O module with diagnostic functions and the corrective actions.

## 7.4.1 Errors that may occur in the input circuit and the corrective actions

Examples of errors that may occur in the input circuit and the corrective actions are listed below:

| | Error status | Cause | Corrective action |
|---|---|---|---|
| Example 1 | Input signals do not turn off. | Activation via the LED indication switch.<br>• When the AJ65ABTP3-16D is used<br><br>• When the AJ65ABTP3-16DE is used<br> | • When the AJ65ABTP3-16D is used<br>Connect an appropriate resistor as shown below so that the voltage between the input terminal (Xn) and the common terminal (-Cn) becomes lower than the value of OFF voltage.<br><br>• When the AJ65ABTP3-16DE is used<br>Connect an appropriate resistor as shown below so that the voltage between the input terminal (Xn) and the common terminal (+Cn) becomes lower than the value of OFF voltage.<br><br>• For a calculation to obtain the resistance value, refer to the following.<br>(☞Page 121, Section 7.4.1 (1)) |
| Example 2 | Input signals do not turn off. | Sneak path due to the use of two power supplies.<br> | • Use one power supply only.<br>• Connect a diode as shown below to prevent sneak path.<br> |

| | Error status | Cause | Corrective action |
|---|---|---|---|
| Example 3 | An incorrect signal is input. | Noise is input as a signal. | • Do not install the power cables together with the I/O cables to prevent excessive noise.<br>• When using a relay and a conductor (a possible cause of noise) on the same line, take noise reduction measures such as connecting a surge absorber. |

## (1) Sample calculation for Example 1

When the power, which makes 24VDC output from the common terminal (-Cn/+Cn), is supplied from an external power supply to the CC-Link remote I/O module with diagnostic functions on the condition the switch with LED indicator with maximum leakage current of 3mA is connected

| When the AJ65ABTP3-16D is used | When the AJ65ABTP3-16DE is used |
|---|---|
|  |  |

***1.*** **The circuit does not satisfy the condition that the OFF current of the CC-Link remote I/O module with diagnostic functions is 1.7mA or lower. Therefore, connect a resistor as shown below.**

| When the AJ65ABTP3-16D is used | When the AJ65ABTP3-16DE is used |
|---|---|
|  |  |

***2.*** **To satisfy the above condition, connect resistor R through which the current of 1.3mA or higher flows.**

$$I_R: I_Z = Z \text{ (Input impedance)}: R$$

$$R \le \frac{I_Z}{I_R} \times Z \text{ (Input impedance)} = \frac{1.7}{1.3} \times 3.8 = 5.0 \text{ [k}\Omega\text{]}$$

**Assuming that resistance R is 3.9k$\Omega$, the power capacity W of resistor R is:**

$$W = \text{(Input voltage)}^2 \div R = 28.8^2 \div 3900 = 0.213 \text{ [W]}$$

***3.*** **Connect a resistor of 3.9k$\Omega$ and 2 to 3W to a terminal that may cause an error, because the power capacity of a resistor is selected so that the capacity will be 3 to 5 times greater than the actual power consumption.**

***4.*** **Also, the OFF voltage when resistor R is connected will be as follows.**

$$\frac{1}{\frac{1}{3.9\text{[k}\Omega\text{]}} + \frac{1}{3.8\text{[k}\Omega\text{]}}} \times 3\text{[mA]} = 5.77\text{[V]}$$

**This satisfies that the OFF voltage of the CC-Link remote I/O module with diagnostic functions is 6V or lower.**

7

7.4 Examples of Errors for the CC-Link Remote I/O Module with Diagnostic Functions
7.4.1 Errors that may occur in the input circuit and the corrective actions

121

# APPENDIX

## Appendix 1   External Dimensions

This section shows the external dimensions of the CC-Link remote I/O module with diagnostic functions.

### (1)  AJ65ABTP3-16D



Unit: mm

## (2)  AJ65ABTP3-16DE



2-M4 mounting hole

DIN rail center

Unit: mm

# INDEX

# REVISIONS

| Revision date | *Manual number | Description |
|---|---|---|
| September 2011 | SH(NA)-080998ENG-A | First edition |
| December 2011 | SH(NA)-080998ENG-B | Descriptions regarding the AJ65ABTP3-16D are added. |
| June 2012 | SH(NA)-080998ENG-C | Partial correction<br><br>COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES, RELEVANT MANUALS, Chapter 3, Section 2.1, 4.1, 5.5.2, 5.5.3, 5.5.4, 7.2, 7.3 |
| January 2014 | SH(NA)-080998ENG-D | Partial correction<br><br>RELEVANT MANUALS, TERMS, Section 4.2.1, 4.2.2, 5.4.3, 6.3, 6.4, 7.1, 7.3, 7.4.1 |
| October 2014 | SH(NA)-080998ENG-E | Partial correction<br><br>RELEVANT MANUALS, TERMS, Section 2.2, 2.3, 5.5.2<br><br>Addition<br><br>GENERIC TERMS AND ABBREVIATIONS, Section 2.4 |
| October 2024 | SH(NA)-080998ENG-F | Partial correction<br><br>CONDITIONS OF USE FOR THE PRODUCT, RELEVANT MANUALS, Section 7.3 |

Japanese manual version SH-080997-G

# WARRANTY

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

## 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion.  Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.
[Gratis Warranty Term]
The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.
[Gratis Warranty Range]
(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
   1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
   2. Failure caused by unapproved modifications, etc., to the product by the user.
   3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
   4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
   5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
   6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
   7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

## 2. Onerous repair term after discontinuation of production

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

## 3. Overseas service

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

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

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

## 5. Changes in product specifications

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

# INFORMATION AND SERVICES

For further information and services, please contact your local Mitsubishi Electric sales office or representative.

Visit our website to find our locations worldwide.

MITSUBISHI ELECTRIC Factory Automation Global Website

Locations Worldwide

www.MitsubishiElectric.com/fa/about-us/overseas/

# TRADEMARKS

The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.

In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

# MITSUBISHI ELECTRIC CORPORATION

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.