MITSUBISHI

Mitsubishi Programmable Controller

CC-Link–AnyWire Bitty Bridge Module User's Manual

Powered by Anywire

This product was jointly developed and manufactured by Mitsubishi and Anywire Corporation.

*Note that the warranty on this product differs from that on other programmable controller products. (Refer to "WARRANTY" in this manual.)

AnyWire Bitty

MODEL

-NZ2AW1C1BY

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PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS

The NZ2AW1C1BY is jointly developed and manufactured by Mitsubishi and Anywire Corporation.
Note that there are some precautions regarding warranty and specifications of this product.

<Warranty>

Item	NZ2AW1C1BY	Other programmable controller products (e.g. MELSEC-Q series)
Repair term after discontinuation of production	1 year	7 years

<Application of the EMC Directive>

Item	NZ2AW1C1BY	Other programmable controller products (e.g. MELSEC-Q series)
Applicable EMC standard	Not applied	EN61131-2

<Application of the UL/cUL standards>

Item	NZ2AW1C1BY	Other programmable controller products (e.g. MELSEC-Q series)
Applicable UL standard/cUL standard	Not applied	UL508 CSA22.2

●SAFETY PRECAUTIONS●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.

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

⚠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

- An AnyWire Bitty system has no control function for ensuring safety.
- When a communication failure occurs in the network, data in the master module are held. Check the communication status information and configure an interlock circuit in the sequence program to ensure that the entire system will operate safely.

[Design Precautions]

⚠ CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- Configure safety circuits, such as an emergency stop circuit and interlock circuit, external to the AnyWire Bitty system.

[Installation 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.
- Securely fix the module with a DIN rail.
- Do not directly touch any conductive parts or electronic components of the module. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠ CAUTION

- Shut off the external power supply for the system in all phases before wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- Ground the FG terminals to the protective ground conductor dedicated to the programmable controller. 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.
- 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, 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.
- Incorrect wiring may damage modules and external devices. Adjust a cable length and a module position to prevent disconnection of a connector or a cable.
- Do not solder stranded wires of a cable when connecting them to the terminal block. Doing so may cause poor contact.
- The power supply voltage of remote slave modules may be insufficient due to a voltage drop in the power supply line. Connect an external power supply so that the voltage of remote slave modules is ensured.
- Do not apply the 24VDC power before wiring the entire AnyWire Bitty system.
- Use 24VDC stabilized power supplies for devices in the AnyWire Bitty system.
- Do not install the control lines or communication cables together with the main circuit lines or power cables.
  Failure to do so may result in malfunction due to noise.

[Wiring Precautions]

⚠ CAUTION

- Make sure to place the communication and power cables to be connected to the module in a duct or fasten them using a clamp. If the cables are not placed in a duct or fastened with a clamp, their positions may be unstable or moved, and they may be pulled inadvertently.
  This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- When disconnecting the communication and power cables from the module, do not pull the cables by hand. When disconnecting a cable with a connector, hold the connector to the module by hand and pull it out to remove the cable. When disconnecting a cable connected to a terminal block, loosen the screws on the terminal block first before removing the cable. If a cable is pulled while being connected to the module, it may cause the module to malfunction or damage the module and the cable.

[Startup and Maintenance Precautions]

⚠ WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws or module fixing screws.
  Failure to do so may result in electric shock.
  Undertightening the terminal screws can cause short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

[Startup and Maintenance Precautions]

⚠ CAUTION

- Do not disassemble or modify the modules.
  Doing so may cause failure, malfunction, injury, or a fire.
- 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.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION

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

●CONDITIONS OF USE FOR THE PRODUCT●

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

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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

CONTENTS

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
NZ2AW1C1BY	The abbreviation for the CC-Link–AnyWire Bitty bridge module, NZ2AW1C1BY
Intelligent function module	A Q-series module other than CPU modules, power supply modules, and I/O modules, which is mounted on a base unit
Master module	A module that controls a data link system. One master module is required for one system.
Remote I/O module	A module that communicates I/O data with a master module
Programming tool	A generic term for GX Works2 and GX Developer
GX Works2	The product name of the software package for the MELSEC programmable controllers
GX Developer	
AnyWire Bitty	An original transmission system provided by Anywire Corporation. This module supplies power using a transmission line, minimizing wiring for machines and equipment. This system provides a high-speed and highly-reliable sensor network.
Slave module	A generic term for modules that communicate data with a master module
Terminating resistor	A waveform shaper
Transmission cycle time	A data sampling interval
Buffer memory	A memory in an intelligent function module, where data (such as setting values and monitoring values) exchanged with a CPU module are stored
RX	Remote input (for CC-Link) Information input in bit units from the slave station to the master station.
RY	Remote output (for CC-Link) Information output in bit units from the master station to the slave station.
RWw	Remote register (Write area for CC-Link) Information output in 16-bit units from the master station to the slave station.
RWr	Remote register (Read area for CC-Link) Information input in 16-bit units from the slave station to the master station.

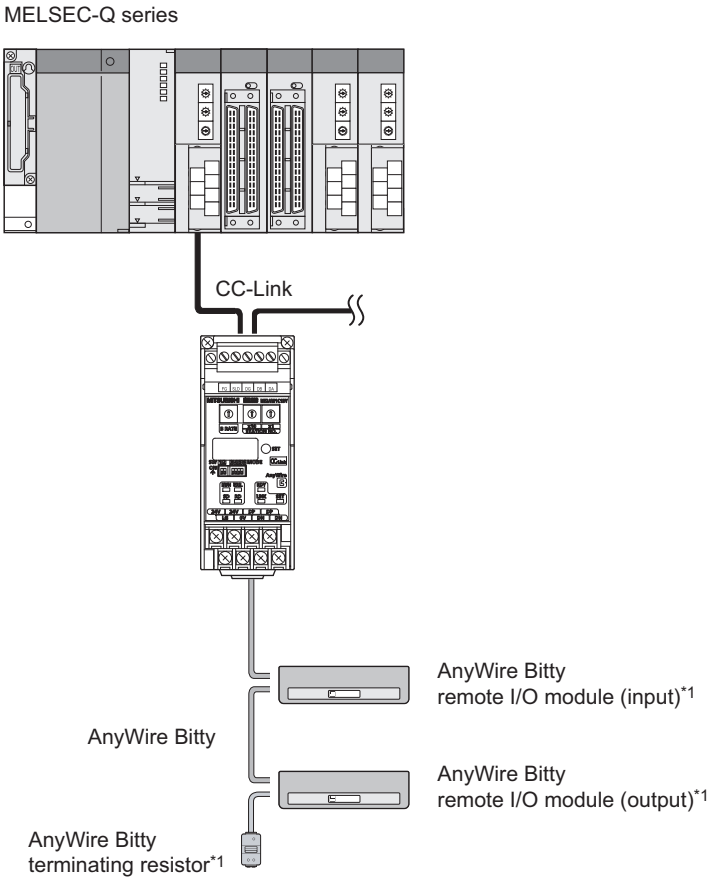
CHAPTER 1 OVERVIEW

This manual describes the specifications, part names, and settings of the NZ2AW1C1BY CC-Link–AnyWire Bitty bridge module (hereafter abbreviated as the NZ2AW1C1BY) used as a remote device station in the CC-Link system.

This module, a product of the joint development project with Anywire Corporation, allows the AnyWire Bitty system to be connected with CC-Link.
The AnyWire Bitty system provides a high-speed and highly reliable sensor network system.

<Features of the NZ2AW1C1BY>

The NZ2AW1C1BY is the bridge module used for the connection between AnyWire Bitty having the DC transmission line system and CC-Link.
Disconnections can be detected even when the wiring is branched.
Up to 256 remote input points and 256 remote output points can be connected to one NZ2AW1C1BY module.



*1: Manufactured by Anywire Corporation

Memo

CHAPTER 2 SPECIFICATIONS

2.1 General Specifications

<table>
<tr><th>Item</th><th colspan="6">Specifications</th></tr>
<tr><td>Operating ambient temperature</td><td colspan="6">0 to 55°C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="6">–25 to 75°C</td></tr>
<tr><td>Operating ambient humidity</td><td colspan="6">10 to 90%RH, non-condensing</td></tr>
<tr><td>Storage ambient humidity</td><td colspan="6">10 to 90%RH, non-condensing</td></tr>
<tr><td rowspan="5">Vibration resistance</td><td rowspan="5">JIS B 3502, Compliant with IEC 61131-2*5</td><td></td><td>Frequency</td><td>Constant acceleration</td><td>Half amplitude</td><td>The number of sweeps</td></tr>
<tr><td rowspan="2">Under intermittent vibration</td><td>5 to 9Hz</td><td>—</td><td>3.5mm</td><td rowspan="2">10 times each in X, Y, and Z directions</td></tr>
<tr><td>9 to 150Hz</td><td>9.8m/s^2</td><td>—</td></tr>
<tr><td rowspan="2">Under continuous vibration</td><td>5 to 9Hz</td><td>—</td><td>1.75mm</td><td rowspan="2">—</td></tr>
<tr><td>9 to 150Hz</td><td>4.9m/s^2</td><td>—</td></tr>
<tr><td>Shock resistance*5</td><td colspan="6">Compliant with JIS B 3502 and IEC 61131-2 (147m/s^2, 3 times each in X, Y, and Z directions)</td></tr>
<tr><td>Operating atmosphere</td><td colspan="6">No corrosive gas</td></tr>
<tr><td>Operating altitude*4</td><td colspan="6">2000m or less</td></tr>
<tr><td>Installation location</td><td colspan="6">Inside a control panel*3</td></tr>
<tr><td>Overvoltage category*1</td><td colspan="6">II or less</td></tr>
<tr><td>Pollution degree*2</td><td colspan="6">2 or less</td></tr>
</table>

*1 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.

*2 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
In pollution degree 2, only non-conductive pollution occurs. A temporary conductivity caused by an accidental condensation may also occur occasionally.

*3 The equipment can also be used outside the control panel, provided that environmental conditions such as operating ambient temperature and operating ambient humidity are met.

*4 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.

*5 In IEC 61131-2 (2007 edition), the output frequency range is defined as shown below.
- Under intermittent vibration: 5 to 8.4Hz, 8.4Hz to 150Hz
- Under continuous vibration: 5 to 8.4Hz, 8.4Hz to 150Hz

2.2 Performance Specifications

2.2.1 Performance specifications

Classification	Item	Specifications
CC-Link side	Station type	Remote device station
	CC-Link version	Ver. 1.10
	Communication speed	10M/5M/2.5M/625K/156Kbps (switching by transmission speed setting switch)
	Number of occupied stations	Remote device stations 1 to 4 are occupied according to the setting of the specification selection switch. 1 station (RX/RY number of occupied points: 32 points) (RWr/RWw 4/4) 2 stations (RX/RY number of occupied points: 64 points) (RWr/RWw 8/8) 3 stations (RX/RY number of occupied points: 96 points) (RWr/RWw 12/12) 4 stations (RX/RY number of occupied points: 128 points) (RWr/RWw 16/16)
	Number of connectable modules	Up to 42
	Connection location of NZ2AW1C1BY	No restriction
	Connection cable*1	CC-Link dedicated cable/High-performance CC-Link dedicated cable/ Ver.1.10- compatible CC-Link dedicated cable
AnyWire Bitty side	Transmission clock	27.0kHz
	Maximum transmission distance (total length) *2	100m
	Number of connectable modules	Up to 128 (varies depending on the current consumption of each slave module)
	Transmission system	DC transmission line total frame cyclic transmission
	Connection type	Bus topology (multidrop system, T-branch system, tree branch system)
	Transmission protocol	Dedicated protocol (AnyWire Bitty)
	Error control	Double-check system
	Number of connected I/O points	Up to 512 points (256 input points/256 output points)
	RAS function	Disconnected transmission line location detection function, transmission line short detection function
	Connection cable*2	• General-purpose 2-wire cable (VCTF, VCF 1.25mm^2, 0.75mm^2, rated temperature 60°C) • General-purpose wire (1.25mm^2, 0.75mm^2, rated temperature 60°C)
	Power supply for transmission line*2	When using 1.25mm^2 cable: Up to 2A When using 0.75mm^2 cable: Up to 1A
	Maximum number of writes to EEPROM	Up to 100000 times
Common	Power supply	Voltage 21.6 to 27.6VDC (24VDC -10 to +15%), Ripple 0.5Vp-p or less Recommended voltage 26.4V (24VDC +10%) Current Module current consumption: 0.2[A] (When 128 slave modules are connected, the load current is not included.) Transmission line supply current: Up to 2[A] *2
	External dimensions	100mm(H)×40mm(W)×66mm(D)
	Weight	0.16kg

*1 Ver.1.10- compatible CC-Link dedicated cable, CC-Link dedicated cable (Ver.1.00), and high-performance CC-Link dedicated cable cannot be used at the same time. If those cables are used at the same time, normal transmission is not guaranteed.
In addition, use the terminating resistor according to the type of cable used.

*2 Refer to the table below for information about the relationship among the total length, the diameter of connection cable, and the supply current for transmission line.

Diameter of connection cable	Supply current for transmission line	
	Total length of 50m or less	Total length of 50m to 100m
1.25mm^2	Up to 2A	Up to 0.7A Non-isolated slave modules cannot be used.
0.75mm^2	Up to 1A	Only a fool-proof terminal can be connected (manufactured by Anywire Corporation).

When a total length exceeds 50m, use isolated slave modules.

On some slave modules with cables, the diameter of module-integrated cables may be less than 0.75mm^2. However, they can be used without any problem, provided that the diameter of connection cables meets the requirement above.

2.2.2 Scope of the power supply for the transmission line

To implement the AnyWire Bitty system, all conditions specified by the following calculation formulas (1) to (3) have to be met.

Calculation formula 1)
I (A) = (Ihin × m) + (Iho × n) + (Izdin × p) + (Izdo × q) ≤ the maximum value of the transmission line supply current
The number of connected modules by type: m, n, p, q

Calculation formula 2)
Vm (V) - Δ V (V) ≥ 20V

Calculation formula 3)
Vm (V) - Δ V (V) ≥ the lowest allowable voltage of the connected load

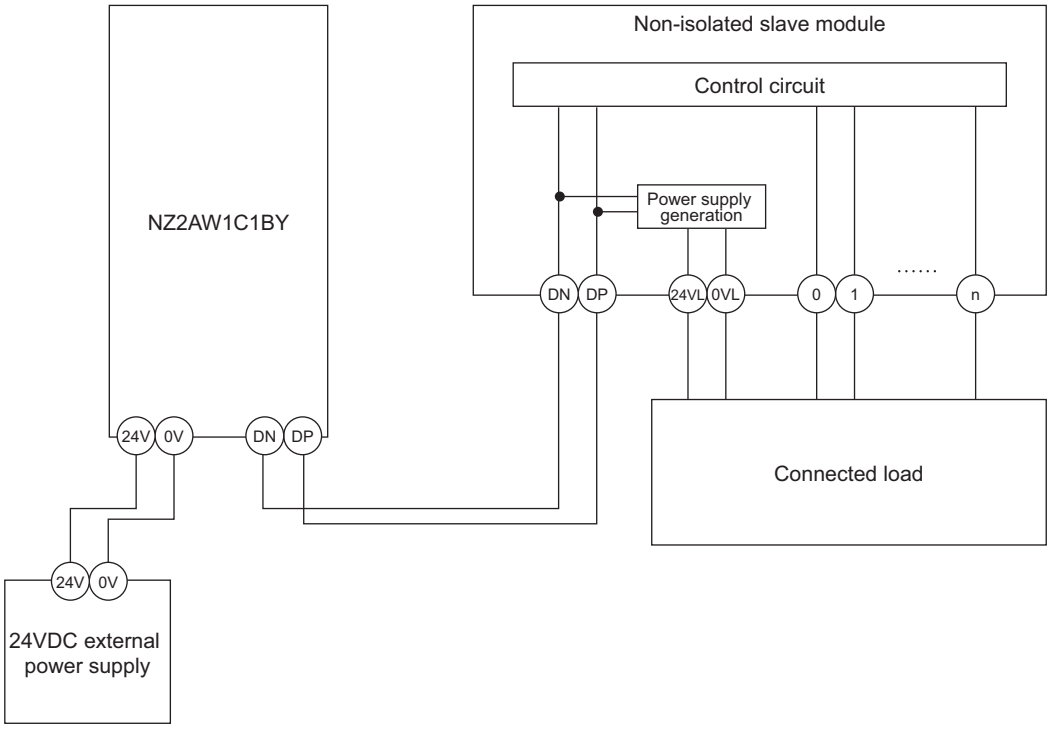
■ Description of calculation formula (1)

(1) Related constant of non-isolated slave modules (Ihin, Iho)

In non-isolated slave modules, current required for the control circuit and connection load is supplied through the transmission line (DP and DN).

Ihin(A) = Current consumption of non-isolated input module
= Internal current consumption of non-isolated input module + Current consumption of connected load (three-wire sensor) × Number of points

Iho(A) = Current consumption of non-isolated output module
= Internal current consumption of non-isolated output module + Current consumption of connected load × Number of points



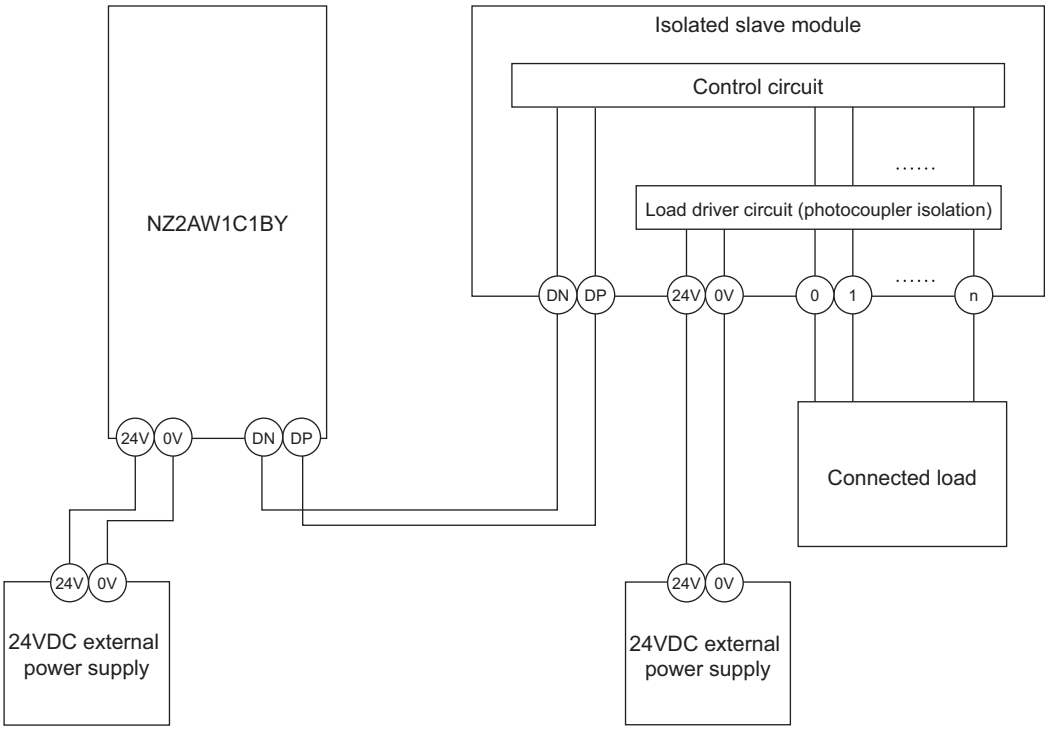
Point

- 24VL and 0VL terminals are used to supply the power to the connected load. For details, refer to the manual for the slave module used.
- For information about the current consumption of slave modules, refer to the manual for the slave module used.

(2) Related constant of isolated slave modules (Izdin, Izdo)

In isolated slave modules, current required for the control circuit is supplied through the transmission line (DP and DN), whereas that for the connected load is supplied through an external power supply.

Izdin(A) = Internal current consumption of isolated input module
Izdo(A) = Internal current consumption of isolated output module



Point

- In isolated slave modules, current consumption of the connected load is not subject to the current restriction condition for the AnyWire Bitty system.
- For information about the current consumption of isolated slave modules, refer to the manual for the slave module used.

(3) Supply current for transmission line (I (A))

The supply current for the transmission line of the AnyWire Bitty system is determined by the following formula.

I(A) = (Ihin×m) + (Iho×n) + (Izdin×p) + (Izdo×q)

Number of connectable modules: m, n, p, q

(4) Maximum value of supply current for transmission line

For information about the maximum value of the supply current for the transmission line, refer to ☞ Page 12, Section 2.2.1.

■ Description of calculation formulas (2) and (3)

(1) Vm: Supply voltage to master module (bridge module)

Voltage 24VDC -10 to +15% (21.6 to 27.6VDC), Ripple 0.5Vp-p or less
Recommended voltage 26.4V

(2) ∆V (V): Voltage drop between lines

∆V (V) = Supply current for transmission line I (A) x Line resistance R (Ω)
Line resistance R (Ω) = Line length (m) x Conductor resistance (Ω/m) x 2

- Line diameter 1.25mm^2→ Conductor resistance 0.015Ω/m
- Line diameter 0.75mm^2→ Conductor resistance 0.025Ω/m

■ Calculation example

The example shows how to check whether the total length of 50m is sufficient for the implementation in the following system.

Condition

- Non-isolated remote I/O module (input)
  Number of I/O points : 4 points
  Module current consumption : 29mA
  Number of modules : 12
- Connected load (three-wire sensor)
  Three-wire sensor current consumption : 13mA
  Number of sensors : 4 per module
  Power voltage : 24V ±10%
- Diameter of connection cable
  Cable diameter : 0.75mm^2
- Power supply for the NZ2AW1C1BY
  Power voltage : 24V

Calculation result

Calculation formula (1) (Ihin(A) × m) = I(A) ≤ Available supply current value for transmission line (maximum)
(0.029 + (0.013 × 4)) × 12 = 0.972A ≤ 1A → OK

Calculation formula (2) Vm(V) – ∆V(V) ≥ 20V
24V – (0.972 × 50 × 0.025 × 2) = 24V – 2.43V = 21.57V ≥ 20V → OK

Calculation formula (3) Vm(V) – ∆V(V) ≥ Lower limit of allowable voltage range for connected load
21.57V < 21.6V → NG

Based on the above calculation results (1) through (3), system implementation has been found impossible. However, changing the diameter of the connection cable and the power supply for the NZ2AW1C1BY enables the system to be configured.

2.2.3 Power supply sequence and handling of I/O data

An incorrect input/output may occur depending on the supply procedure of the power of the NZ2AW1C1BY and the power supply for slave module. Pay attention to the following points.

- Do not make the access related to this module until the remote station READY signal turns on after powering on the NZ2AW1C1BY.
- Supply the power according to the steps below.
  (1) Turn on the programmable controller (CC-Link master module).
  (2) Turn on the bridge module (NZ2AW1C1BY).
  (3) Turn on the slave module (when isolated I/O module is used).
  (4) Turn on (for 500ms or longer) and off Error reset request flag before accessing the slave module.

2.3 Applicable System

2.3.1 Applicable master module

Master modules that can be used are listed on the website of CC-Link Partner Association (CLPA).
For the website of CC-Link Partner Association (CLPA), refer to the following.
http://www.cc-link.org/

2.3.2 Applicable CC-Link version

The combination of the master module of CC-Link and the network parameter of the programming tool is shown in the following table.

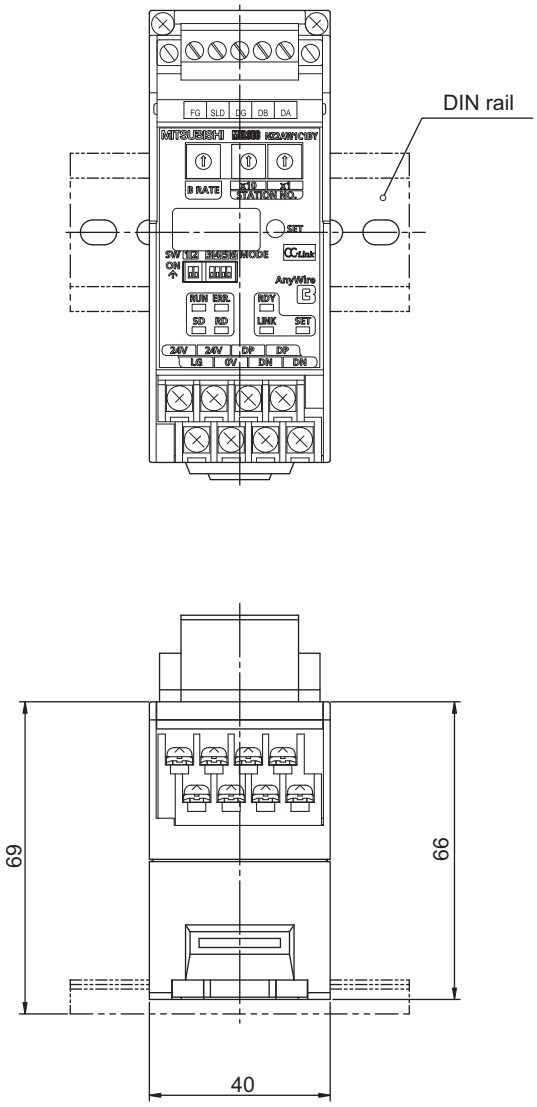
Master module	Network parameter setting of the programming tool		NZ2AW1C1BY
	Mode setting	Station information (station type)	
QJ61BT11 AJ61BT11 A1SJ61BT11 AJ61QBT11 A1SJ61QBT11	Remote network-Ver.1 mode	Remote device station	○
	Remote network-Ver.2 mode	Ver.1 remote device station	×
		Ver.2 remote device station	×
	Remote network-addition mode	Ver.1 remote device station	×
		Ver.2 remote device station	×
	Remote I/O network mode	—	×
QJ61BT11N L26CPU-BT LJ61BT11	Remote network-Ver.1 mode	Remote device station	○
	Remote network-Ver.2 mode	Ver.1 remote device station	○
		Ver.2 remote device station	×
	Remote network-addition mode	Ver.1 remote device station	○*1
		Ver.2 remote device station	×
	Remote I/O network mode	—	×

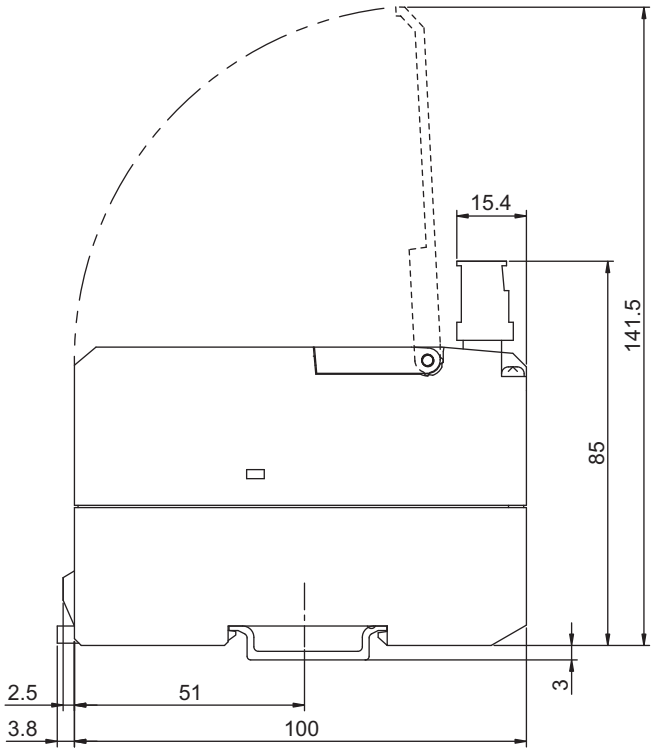
*1 When there is a station number used as "Ver.2 remote device station" in the existing system, specify the station number of additional "Ver.1 remote device station" before specifying that of "Ver.2 remote device station".

2.3.3 CC-Link dedicated instruction

In the NZ2AW1C1BY, dedicated instructions accessing the NZ2AW1C1BY from a CC-Link master module cannot be used.

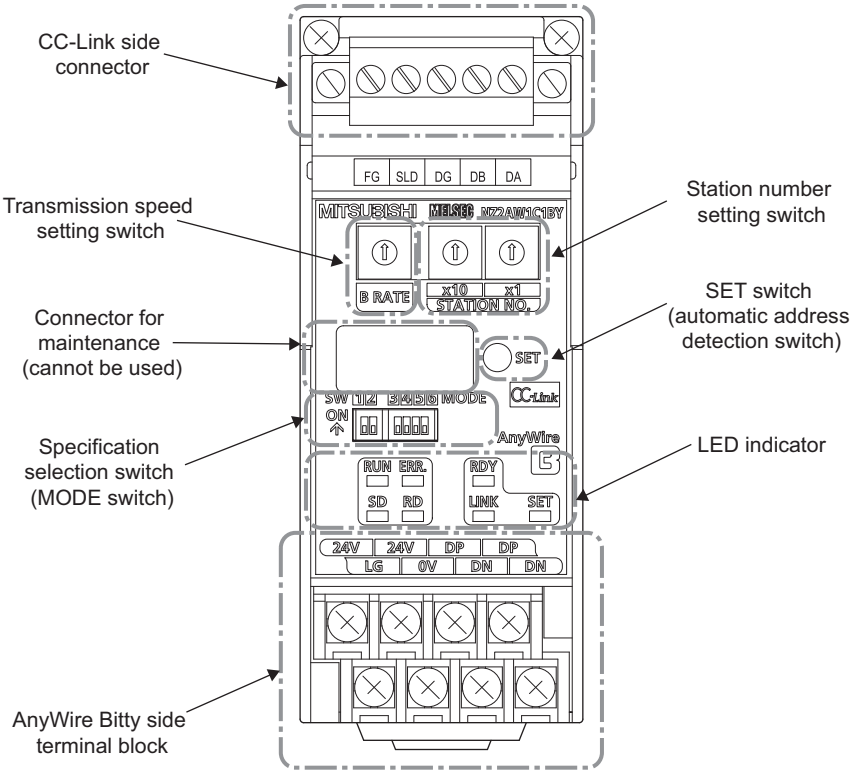
2.4 External Dimensions





(Unit: mm)

2.5 Part Names



For details on each part, refer to the following.

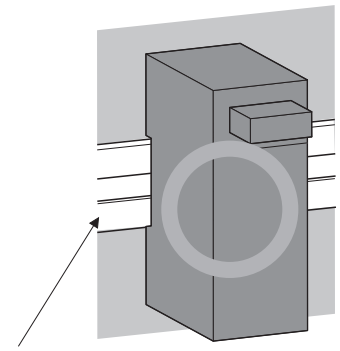
- CC-Link side connector : Page 23, Section 4.1
- AnyWire Bitty side terminal block : Page 25, Section 4.2
- Station number setting switch : Page 28, Section 5.1 (1)
- Transmission speed setting switch : Page 29, Section 5.1 (2)
- Specification selection switch : Page 30, Section 5.2 (1)
- SET switch : Page 44, CHAPTER 9
- LED indicator : Page 41, CHAPTER 8

CHAPTER 3 MODULE MOUNTING

Mount this module on a DIN rail before use.

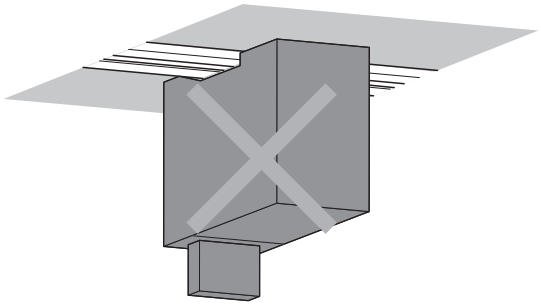
(1) Direction of mounting a module

Since the NZ2AW1C1BY radiates heat, place it in an airy place in the direction shown below.

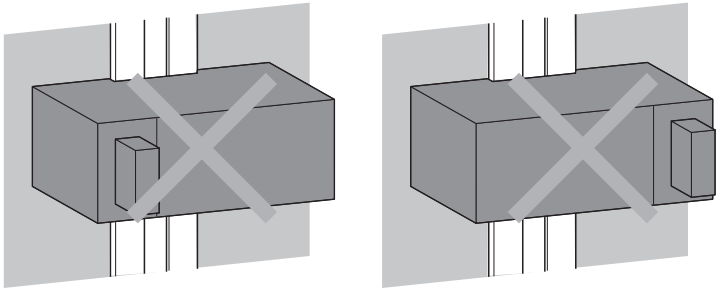


Vertical installation (basic)

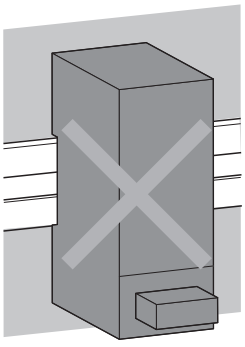
Do not place the module in the directions shown below.



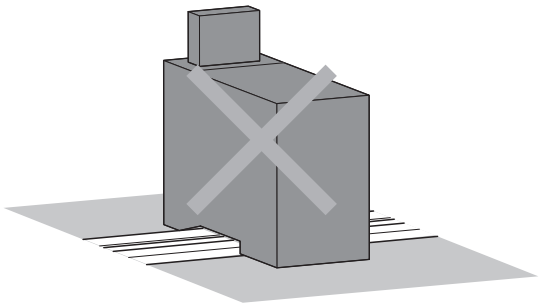
Downward installation



Horizontal installation

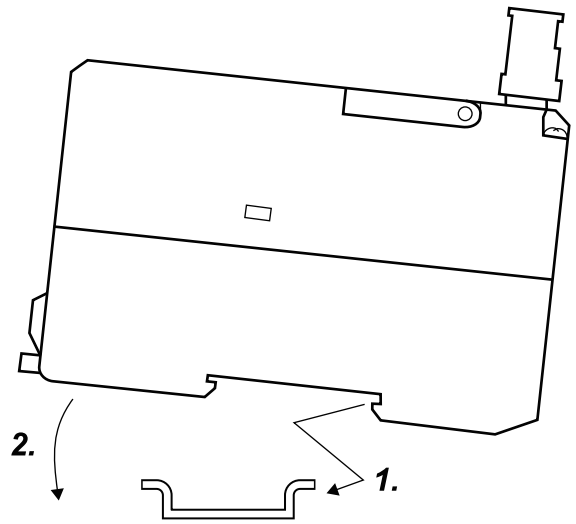


Vertical installation (upside down)



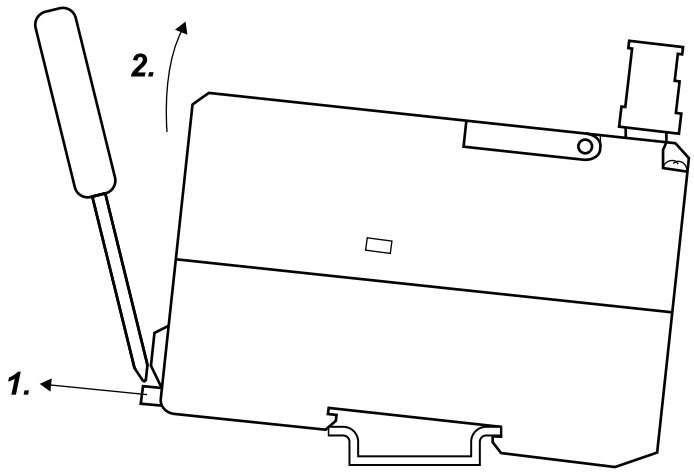
Upward installation

(2) Mounting a module on a DIN rail



1. **Hook the upper fixing tab on the bottom of the module to the DIN rail.**
2. **Push and engage the NZ2AW1C1BY in the DIN rail.**

(3) Removing a module from a DIN rail

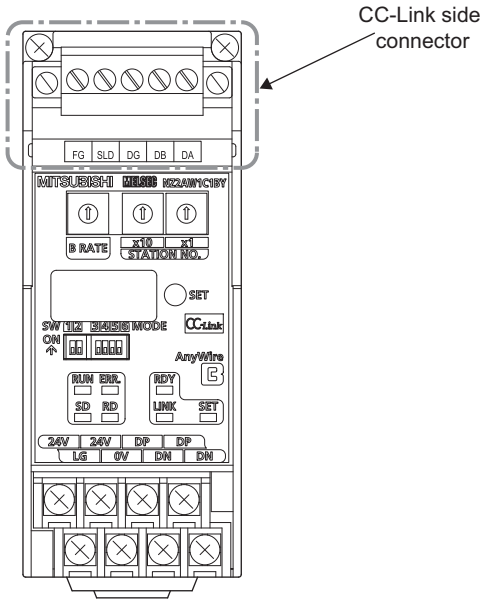


1. **Insert a flathead screwdriver into the hook and pull the hook to remove from the DIN rail.**
2. **Lift the module on the hook side and remove it using the fixing tab as the supporting point.**

CHAPTER 4 CONNECTIONS

4.1 CC-Link Side Connector

The NZ2AW1C1BY is handled as a remote device station of CC-Link. The CC-Link side connector is the connection terminal which is easy to connect/disconnect.



Manufacturer : Phoenix Contact Co., Ltd. (Contact: http://www.phoenixcontact.com/)
Model : MSTB2,5/5-STF-5.08AU
Tightening torque : 0.5 to 0.6N•m

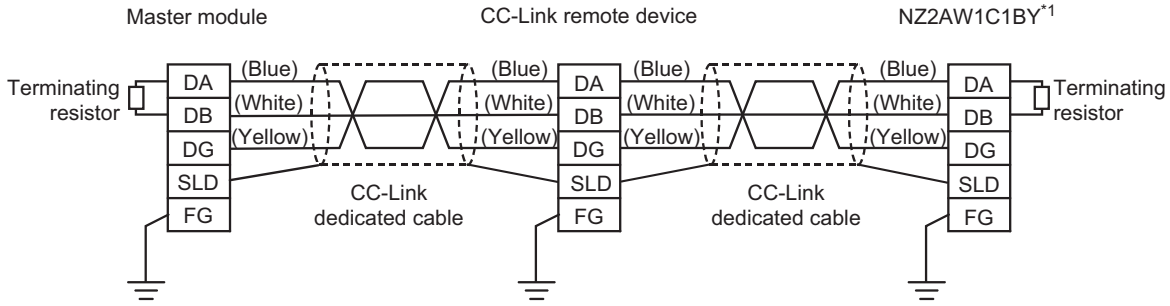
To connect the connector, a flathead screwdriver having a tipped size of 0.6 × 3.5mm is required.
Before removing the CC-Link side connector, check that the fixing screws on both sides are completely loosened (removed from the socket).
Pulling with excessive force while the fixing screws on both sides are still tightened may cause damage to the devices.
Before connecting the connector, check that there are no short circuits due to the disconnected or frayed wires, and tighten the screws at both sides securely. (Tightening torque: 0.5 to 0.6N•m)

Point

The fixing screws are not tightened when shipped. Securely tighten the screws on both sides when connecting the connector.

4.1.1 Connecting a CC-Link dedicated cable

The connection example of the CC-Link dedicated cable is shown below.



*1 SLD and FG are connected inside the module.

When the NZ2AW1C1BY is the last station, mount a terminating resistor between DA and DB.
Users need to process the terminating resistor to be mounted on the NZ2AW1C1BY. Refer to the catalogue or website of Phoenix Contact Co., Ltd.
If the terminating resistor is not mounted, communication on CC-Link side may fail.

4.1.2 Cable processing

Bare cables can be connected to the CC-Link side connector; however, for safety reasons, it is recommended to connect the crimped bar terminals.
Recommended manufacturer: Phoenix Contact Co., Ltd.

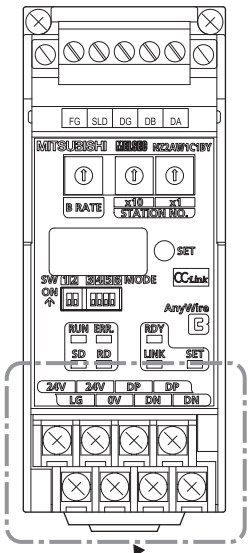
Reference example of the bar terminal)

When processing a 0.75mm^2 cable : Model AI0. 75-8GY
When processing two 1.25mm^2 cables : Model AI-TWIN2 × 0.75-8GY

When connecting two cables to one terminal, connect the two cables together to the TWIN bar terminal.
For details on sizes other than those described above and crimping tools, refer to the catalogue or website of Phoenix Contact Co., Ltd.

4.2 AnyWire Bitty Side Terminal Block

The AnyWire Bitty side terminal block is the eight-point screw terminal block.



Screw terminal : M3 × 4.5
Tightening torque : 0.5 to 0.8N•m

4.2.1 Description of the terminals of an AnyWire Bitty side terminal block

Terminal	Description
DP	AnyWire Bitty transmission signal terminals DP: Transmission line (+), DN: Transmission line (–) Connect to the DP and DN terminals on the slave module or terminating resistor.
DN	
24V	Power supplies for the NZ2AW1C1BY
0V	
LG	Connect to the neutral point of the noise filter inserted between the 24V and 0V terminals. Provide a single point grounding with the FG terminal on CC-Link side.

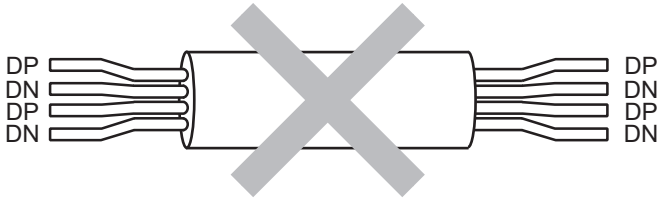
4.2.2 Cable processing

A solderless terminal with insulation sleeve cannot be used for a terminal block. The junction of a solderless terminal and a cable should be covered up with a mark tube or an insulation tube.

Use a wire having a core of 1.25mm^2 or 0.75mm^2 for the connection to the terminal block. (☞ Page 12, Section 2.2)

Point

- Do not send multiple transmission lines (DP and DN) using a multicore cable.

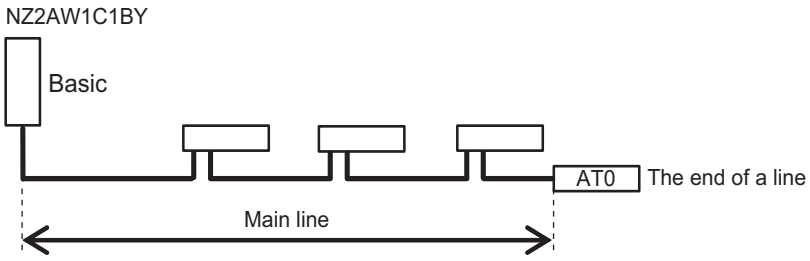


- The voltage should not fall below the lower limit of the allowable voltage range due to the voltage drop caused by the cable.
  If the voltage falls below the lower limit, malfunctions may occur.
- Do not connect soldered cables directly to the terminals. Doing so may loosen the screws, resulting in a poor contact.

4.3 Terminating Resistor

To ensure more stable transmission quality, connect the terminating resistor (AT0 manufactured by Anywire Corporation) at the end of the transmission line.

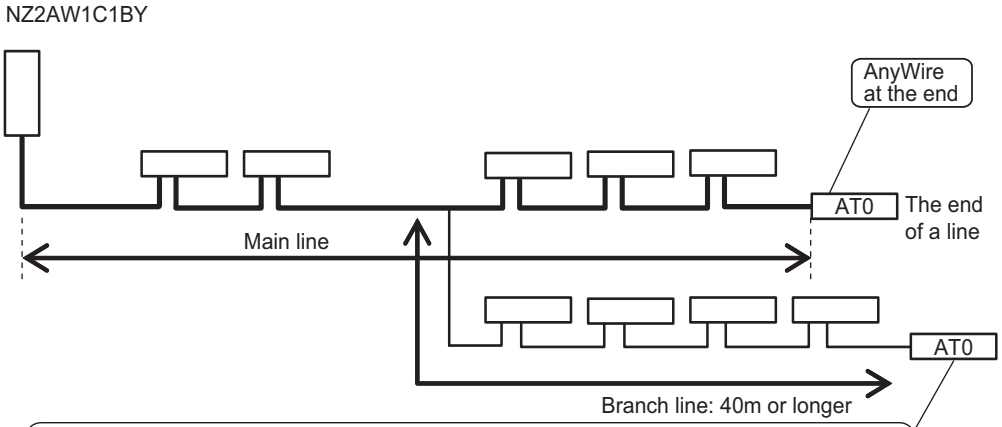
■ Terminating resistor connection



Important Connect a terminating resistor at the end of a line for one master module.

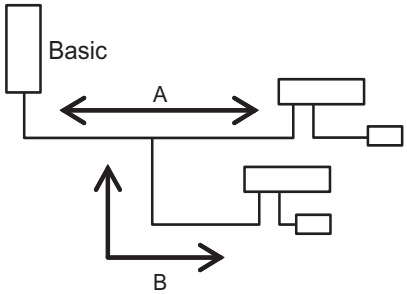
■ Branch of transmission lines

[Example]



Important Connect one terminating resistor at the end of a branch line that exceeds 40m.
Three terminating resistors can be connected in total in the AnyWire Bitty system.

■ Total length



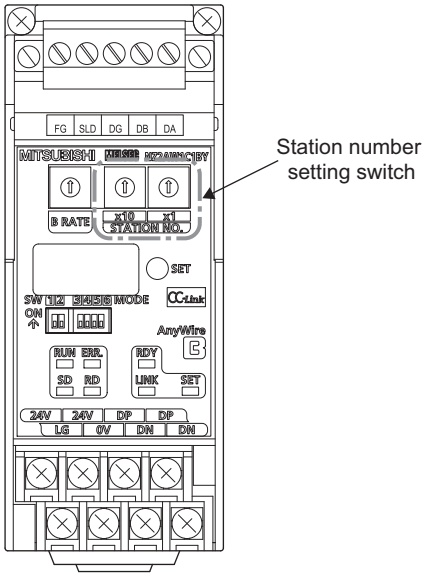
The total length of the transmission distance for the AnyWire Bitty system can be calculated from A + B. Note that the total length should not exceed the maximum transmission distance set for the system to branch lines.

CHAPTER 5 SWITCH SETTING

5.1 CC-Link Side

(1) Station number setting switch

Set the station number of CC-Link using the station number setting switch (STATION NO. switch).
The number of occupied stations is set by using the specification selection switch (MODE switch).

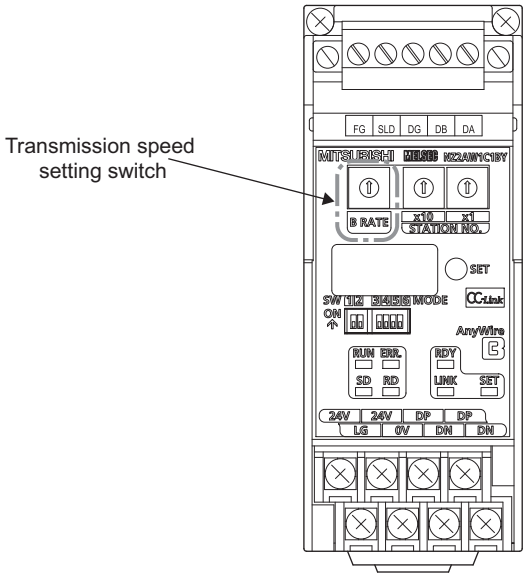


Station number[*1]	Station number setting switch	
	×10	×1
1	0	1
2	0	2
3	0	3
4	0	4
⋮	⋮	⋮
61 (The largest station number when 4 stations are occupied.)	6	1
62 (The largest station number when 3 stations are occupied.)	6	2
63 (The largest station number when 2 stations are occupied.)	6	3
64 (The largest station number when 1 station is occupied.)	6	4

*1 All the switch positions are set to zero (0) when the product is shipped.
The ERR. LED turns on when the switch is set to zero (0) or the number larger than the largest station number.

(2) Transmission speed setting switch

Set the communication speed of CC-Link using the transmission speed setting switch (B RATE switch).
Set it to the same setting as in the master station.



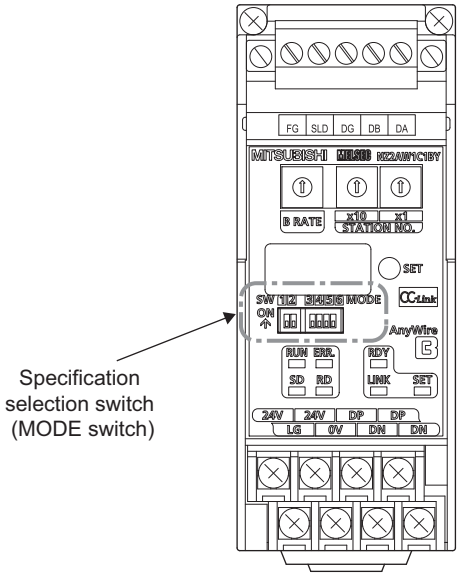
Setting value of the transmission speed setting switch	Communication speed
0*1	156Kbps
1	625Kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
5 to F	Unable to set*2

*1 The switch is set to zero (0) when the product is shipped.
*2 The ERR. LED turns on when the switch is set to five (5) or larger.

5.2 AnyWire Bitty Side

(1) Specification selection switch (MODE switch)

Set the number of occupied stations of CC-Link and that of transmission points of AnyWire Bitty using the specification selection switch (MODE switch).



SW-1, 2 Set the transmission specification using a combination of ON/OFF for 1 and 2.

SW-3 to 6 System reserve (Set the switch to OFF. Using the module with this switch set to ON may cause malfunction.)

Specification selection switch		Number of occupied stations of CC-Link	Number of transmission points of AnyWire Bitty	
1	2		Input	Output
OFF	OFF	4	256 points	256 points
ON	OFF	3	192 points	192 points
OFF	ON	2	128 points	128 points
ON	ON	1	64 points	64 points

Point

- Switch off the power supply before operating the specification selection switch.
- Always set the specification selection switch according to the number of transmission points being used.
- The specification selection switch is recessed from the front surface.
  When setting the switch, use a precision driver or a similar tool and be careful not to damage any of the internal boards.

CHAPTER 6 MEMORY MAPS

The NZ2AW1C1BY occupies 1 to 4 stations starting from the station number specified in the CC-Link system.
For information about the buffer memory address of master modules, refer to the user's manual of the master module used.

6.1 Remote I/O Signal List

(1) Remote I/O signal when 1 station is occupied

Signal direction: NZ2AW1C1BY to master module		Signal direction: Master module to NZ2AW1C1BY	
Remote input (RX)	Name	Remote output (RY)	Name
RXn0 to RX(n+1)9	Use prohibited	RYn0 to RY(n+1)9	Use prohibited
RX(n+1)A	Error status flag	RY(n+1)A	Error reset request flag
RX(n+1)B	Remote station READY	RY(n+1)B to RY(n+1)F	Use prohibited
RX(n+1)C to RX(n+1)F	Use prohibited		

n: Address assigned to the master station in the station number setting

(2) Remote I/O signal when 2 stations are occupied

Signal direction: NZ2AW1C1BY to master module		Signal direction: Master module to NZ2AW1C1BY	
Remote input (RX)	Name	Remote output (RY)	Name
RXn0 to RX(n+3)9	Use prohibited	RYn0 to RY(n+3)9	Use prohibited
RX(n+3)A	Error status flag	RY(n+3)A	Error reset request flag
RX(n+3)B	Remote station READY	RY(n+3)B to RY(n+3)F	Use prohibited
RX(n+3)C to RX(n+3)F	Use prohibited		

n: Address assigned to the master station in the station number setting

(3) Remote I/O signal when 3 stations are occupied

Signal direction: NZ2AW1C1BY to master module		Signal direction: Master module to NZ2AW1C1BY	
Remote input (RX)	Name	Remote output (RY)	Name
RXn0 to RX(n+5)9	Use prohibited	RYn0 to RY(n+5)9	Use prohibited
RX(n+5)A	Error status flag	RY(n+5)A	Error reset request flag
RX(n+5)B	Remote station READY	RY(n+5)B to RY(n+5)F	Use prohibited
RX(n+5)C to RX(n+5)F	Use prohibited		

n: Address assigned to the master station in the station number setting

(4) Remote I/O signal when 4 stations are occupied

Signal direction: NZ2AW1C1BY to master module		Signal direction: Master module to NZ2AW1C1BY	
Remote input (RX)	Name	Remote output (RY)	Name
RXn0 to RX(n+7)9	Use prohibited	RYn0 to RY(n+7)9	Use prohibited
RX(n+7)A	Error status flag	RY(n+7)A	Error reset request flag
RX(n+7)B	Remote station READY	RY(n+7)B to RY(n+7)F	Use prohibited
RX(n+7)C to RX(n+7)F	Use prohibited		

n: Address assigned to the master station in the station number setting

6.2 Remote Register List

Input or output of AnyWire Bitty uses the remote register of CC-Link.

(1) Remote register list when 1 station is occupied

Four words are used respectively for input and output of AnyWire Bitty.

Set the address for slave modules within the range from 0 to 63 for both input and output modules.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RWrn+0_H	0 to 15	RWwm+0_H	0 to 15
RWrn+1_H	16 to 31	RWwm+1_H	16 to 31
RWrn+2_H	32 to 47	RWwm+2_H	32 to 47
RWrn+3_H	48 to 63	RWwm+3_H	48 to 63

m, n: Address assigned to the master station in the station number setting

(2) Remote register list when 2 stations are occupied

Eight words are used respectively for input and output of AnyWire Bitty.

Set the address for slave modules within the range from 0 to 127 for both input and output modules.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RWrn+0_H	0 to 15	RWwm+0_H	0 to 15
RWrn+1_H	16 to 31	RWwm+1_H	16 to 31
RWrn+2_H	32 to 47	RWwm+2_H	32 to 47
⋮	⋮	⋮	⋮
RWrn+5_H	80 to 95	RWwm+5_H	80 to 95
RWrn+6_H	96 to 111	RWwm+6_H	96 to 111
RWrn+7_H	112 to 127	RWwm+7_H	112 to 127

m, n: Address assigned to the master station in the station number setting

(3) Remote register list when 3 stations are occupied

Twelve words are used respectively for input and output of AnyWire Bitty.

Set the address for slave modules within the range from 0 to 191 for both input and output modules.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RWrn+0_H	0 to 15	RWwm+0_H	0 to 15
RWrn+1_H	16 to 31	RWwm+1_H	16 to 31
RWrn+2_H	32 to 47	RWwm+2_H	32 to 47
⋮	⋮	⋮	⋮
RWrn+9_H	144 to 159	RWwm+9_H	144 to 159
RWrn+10_H	160 to 175	RWwm+10_H	160 to 175
RWrn+11_H	176 to 191	RWwm+11_H	176 to 191

m, n: Address assigned to the master station in the station number setting

(4) Remote register list when 4 stations are occupied

Sixteen words are used respectively for input and output of AnyWire Bitty.

Set the address for slave modules within the range from 0 to 255 for both input and output modules.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RWrn+0_H	0 to 15	RWwm+0_H	0 to 15
RWrn+1_H	16 to 31	RWwm+1_H	16 to 31
RWrn+2_H	32 to 47	RWwm+2_H	32 to 47
⋮	⋮	⋮	⋮
RWrn+13_H	208 to 223	RWwm+13_H	208 to 223
RWrn+14_H	224 to 239	RWwm+14_H	224 to 239
RWrn+15_H	240 to 255	RWwm+15_H	240 to 255

m, n: Address assigned to the master station in the station number setting

6.3 Correspondence between the Remote Register and AnyWire Address

This section describes the correspondence between the remote register and AnyWire address.

Ex. When set with RWrn = D1000 and the network parameters of GX Works2

Remote register	Bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWrn + 0_H	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWrn + 1_H	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

D1001.F = AnyWire input address: 31

D1000.0 = AnyWire input address: 0

The slave module requires "Address setting" which specifies the start number assigned in the transmission frame. The settings are configured in 1-point unit. The addresses of both an input slave module (e.g. input remote I/O module) and an output slave module (e.g. output remote I/O module) start from 0, and the area later than that number is occupied corresponding to the number of module points.

Ex. Assignment of two 8-point input remote I/O modules

Remote register	Bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWrn + 0_H	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

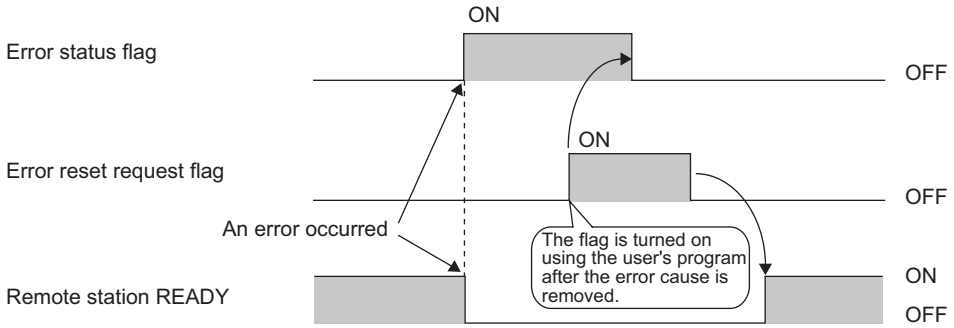
AnyWire address: 15 ---------- AnyWire address: 0

Occupied area by the address 8 on the 8-point input remote I/O module

Occupied area by the address 0 on the 8-point input remote I/O module

6.4 Error Reset

"Remote station READY" is turned on after the reset by supplying the power.
"Error status flag" is set (OFF to ON) when an error occurs. "Error status flag" is reset (ON to OFF) by turning on "Error reset request flag" from off, provided that the error cause has been removed.
"Remote station READY" is reset (ON to OFF) when an error has occurred. "Remote station READY" remains reset (OFF) until "Error reset request flag" is turned off from on.



The remote device values for "Remote station READY", "Error status flag", and "Error reset request flag" at each occupied station setting are shown in the table below.

Name	Number of occupied stations			
	1 station occupied	2 stations occupied	3 stations occupied	4 stations occupied
Remote station READY	RX(n+1)A	RX(n+3)A	RX(n+5)A	RX(n+7)A
Error status flag	RX(n+1)B	RX(n+3)B	RX(n+5)B	RX(n+7)B
Error reset request flag	RY(n+1)A	RY(n+3)A	RY(n+5)A	RY(n+7)A

n: Address assigned to the master station in the station number setting

CHAPTER 7 PREPARATION FOR OPERATION

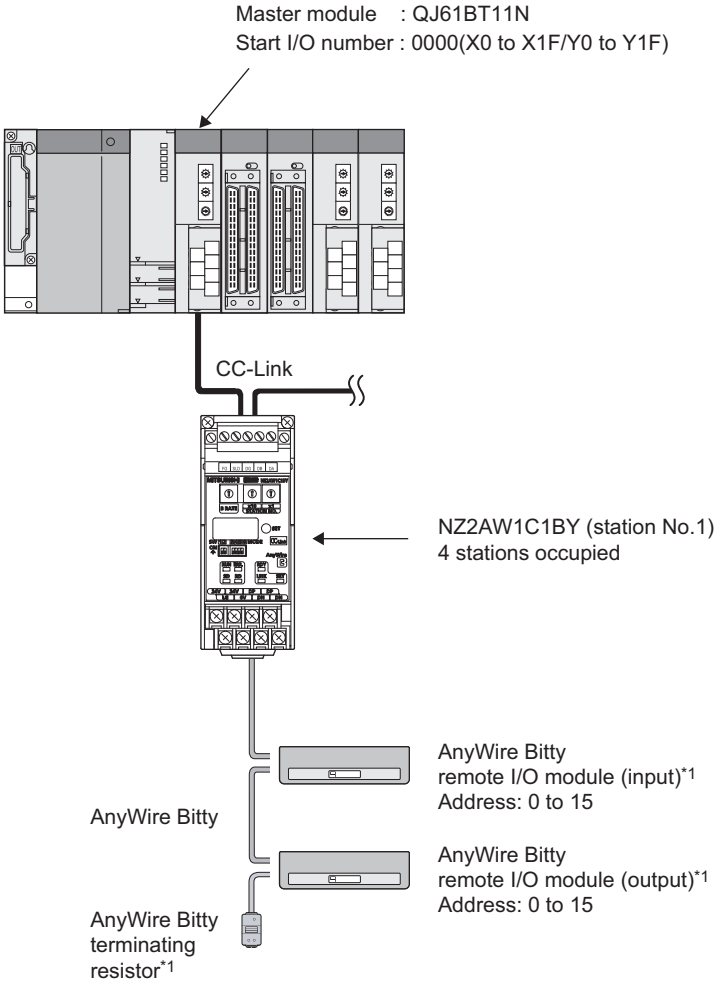
7.1 Setting by the Parameter

This section provides an example of the parameter setting for the MELSEC-Q series systems.

Point

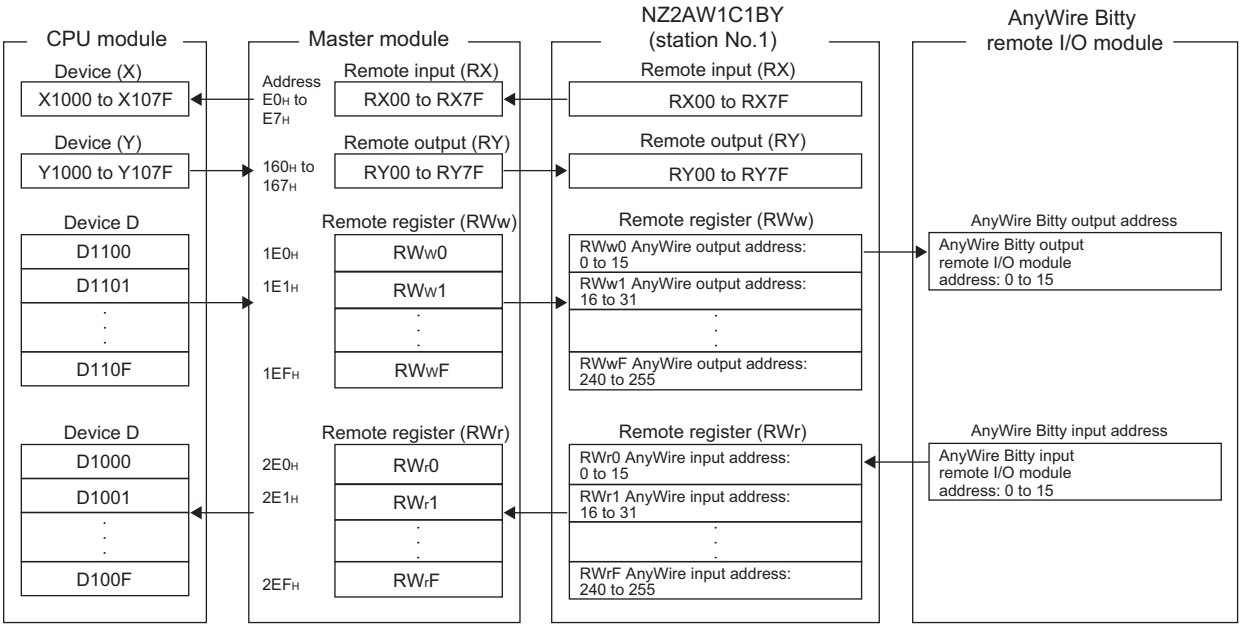
In the MELSEC-A/QnA series systems, settings cannot be configured by the network parameters. Configure the setting on the program. (Page 39, Section 7.2)
When applying the program examples introduced in this manual to the actual system, ensure the applicability and confirm that it does not cause system control problems.

(1) System configuration



*1: Manufactured by Anywire Corporation

(2) Correlation among the CPU module, master module, NZ2AW1C1BY, and AnyWire Bitty remote I/O module



(3) Parameter setting

Parameter setting is required for CC-Link communication between the master station and the NZ2AW1C1BY.
Parameter setting for CC-Link can be configured by the network parameter of the programming tool.
(Setting can be also configured on the program.)

Point

Configure the parameter setting using either the network parameter setting or program.
Redundant settings by different means may cause unstable output because of the overlapped access to the buffer memory.

[Setting example]

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

	1
Start I/O No.	0000
Operation Setting	Operation Setting
Type	Master Station
Master Station Data Link Type	PLC Parameter Auto Start
Mode	Remote Net(Ver.1 Mode)
Total Module Connected	1
Remote Input(RX)	X1000
Remote Output(RY)	Y1000
Remote Register(RWr)	D1000
Remote Register(RWw)	D1100
Ver.2 Remote Input(RX)	
Ver.2 Remote Output(RY)	
Ver.2 Remote Register(RWr)	
Ver.2 Remote Register(RWw)	
Special Relay(SB)	SB0
Special Register(SW)	SW0
Retry Count	3
Automatic Reconnection Station Count	1
Standby Master Station No.	
PLC Down Select	Stop
Scan Mode Setting	Asynchronous
Delay Time Setting	0
Station Information Setting	Station Information
Remote Device Station Initial Setting	Initial Setting
Interrupt Settings	Interrupt Settings

Double-click "Station Information" to open the "Station Information Setting" window as shown below.

Station No.	Station Type	Expanded Cyclic Setting	Exclusive Count	Remote Station Points	Reserve/Invalid Station Select	Intelligent Buffer Select(Word)		
						Send	Receive	Automatic
1/ 1	Remote Device Station	Single	Exclusive Station 4	128 Points	No Setting			

In this sample setting, the correspondence between each signal and device is as indicated in the following table.

Signal	Name	Corresponding device for station number 1
RX	Use prohibited	X1000 to X10D9
	Error status flag	X107A
	Remote station READY	X107B
	Use prohibited	X10DC to X10DF
RY	Use prohibited	Y1000 to Y10D9
	Error reset request flag	Y107A
	Use prohibited	Y10DB to Y10DF
RWr	Input address 0 for AnyWire Bitty	D1000.0
	Input address 1 for AnyWire Bitty	D1000.1
	⋮	⋮
	Input address 14 for AnyWire Bitty	D1000.E
	Input address 15 for AnyWire Bitty	D1000.F
RWw	Output address 0 for AnyWire Bitty	D1100.0
	Output address 1 for AnyWire Bitty	D1100.1
	⋮	⋮
	Output address 14 for AnyWire Bitty	D1100.E
	Output address 15 for AnyWire Bitty	D1100.F

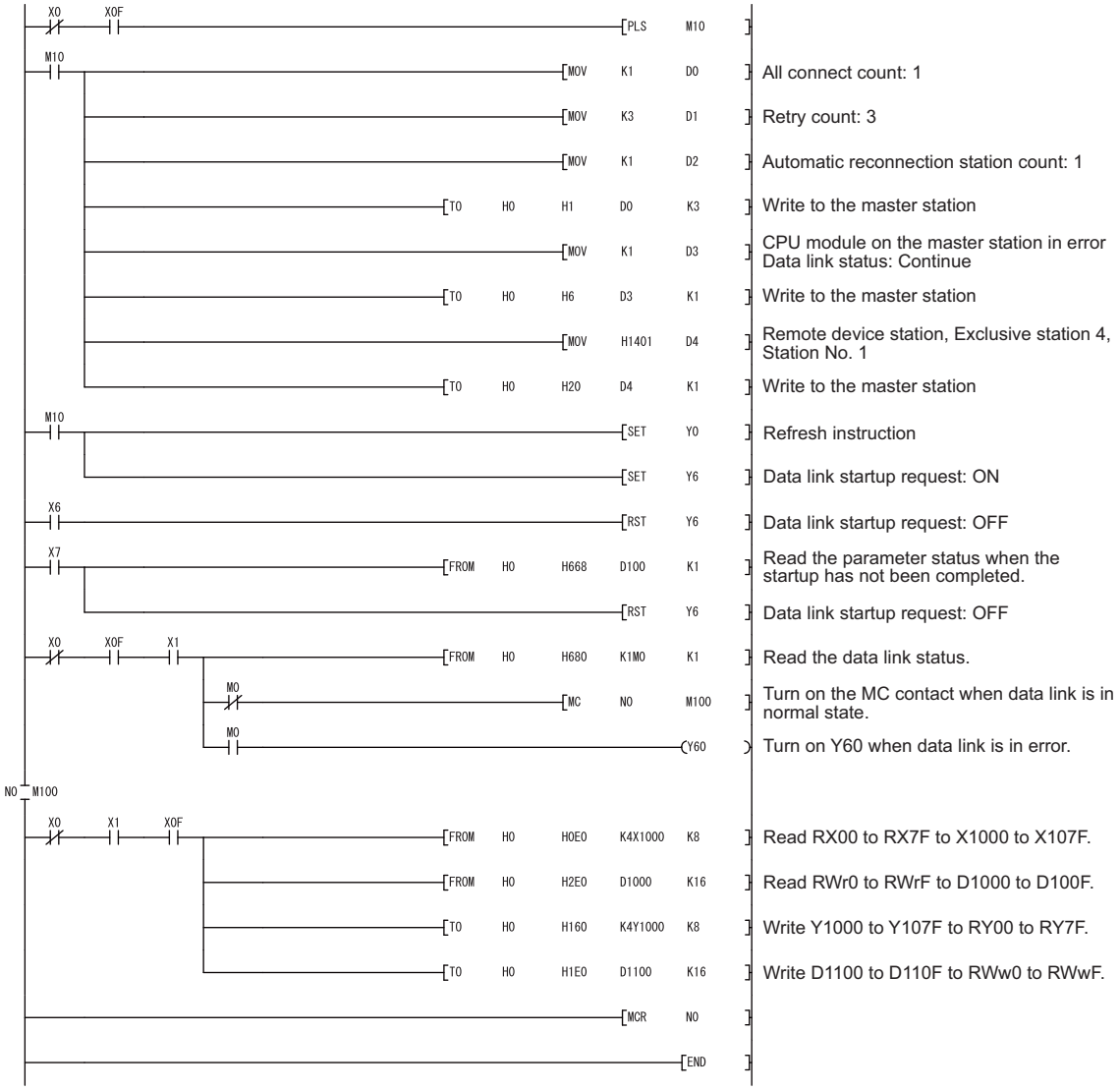
7.2 Setting on the Program

This section provides an example of the setting for MELSEC-QnA series systems.

(1) List of devices used in the program example

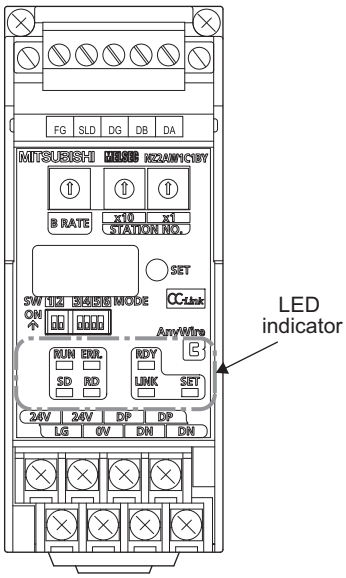
Device	Description
X0	Module failure
X1	Data link status of the host station
X6	Successful completion of data link startup by parameters of the buffer memory
X7	Data link startup error by parameters of the buffer memory
XF	Module READY
X1000 to X107F	Remote device RX
Y0	Refresh instruction
Y6	Data link startup request by parameters of the buffer memory
Y60	Signal output when data link has an error
Y1000 to Y107F	Remote device RY
M0	Signal in which data link status is stored
M10	Pulse signal to start the network parameter setting
M100	Master control contact
D0 to D4	Device for setting the network parameter
D1000 to D100F	Remote register (input from the AnyWire Bitty side)
D1100 to D110F	Remote register (output to the AnyWire Bitty side)

(2) Program example



CHAPTER 8 POWER-ON AND PART INDICATION

Check each connection before turning the power on.
The status of the indicator is as shown below when each setting and connection are correct.



■ LED indication on the NZ2AW1C1BY

LED on the CC-Link side		LED on the AnyWire Bitty side	
Indicator	**Status**	**Indicator**	**Status**
RUN	On	LINK	Flashing
ERR.	Off	SET	Off
SD	On	RDY	On
RD	On		

■ LED indication on the slave module

LED on the AnyWire Bitty side	
Indicator	**Status**
LINK	Flashing

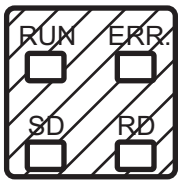
Check the LED indication mentioned above before performing the automatic address detection. (☞ Page 44, Section 9.1)
When the indication is different from the information above, check the indication condition and possible cause, and then eliminate the problem according to the troubleshooting steps. (☞ Page 51, CHAPTER 12)

Point

- Registering a slave module by the automatic address detection operation enables the disconnected transmission line location detection function.
- Data is transmitted regardless of the automatic address detection operation.
- The LINK LED is turned on in red at the initial power-on because the connection terminal is not registered by the automatic address detection operation. Press the "SET switch" to enable the automatic address detection. (☞ Page 44, Section 9.1)

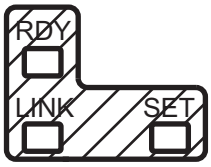
8.1 LED Indication Specification

(1) LED on the CC-Link side



Indicator	Name	Color	Description	
RUN	CC-Link communication status	Green	On	Normal communication
			Off	• Transmission cable disconnected • Transmission cable connected incorrectly • Wrong transmission speed set • Hardware reset under way
ERR.	CC-Link error display	Red	On	• CRC error • Incorrect setting of the station number setting switch (set to zero or 62 or larger) • Incorrect setting of the transmission speed setting switch (set to 5 or larger)
			Off	• Normal communication • Hardware reset under way
			Flashing	• Flashing regularly (0.4 second): Setting for the station number or transmission speed setting switch has been changed while the power is on. • Flashing irregularly: A terminating resistor has not been connected. The module or CC-Link dedicated cable is affected by noise.
SD	CC-Link data transmission display	Yellow	On	Data transmission under way
			Off	• Transmission cable disconnected • Transmission cable connected incorrectly • Wrong transmission speed set • Hardware reset under way
			Flashing	A terminating resistor has not been inserted on the CC-Link master module and the last station module.
RD	CC-Link data reception display	Yellow	On	Data reception under way
			Off	• Transmission cable disconnected • Transmission cable connected incorrectly • Hardware reset under way
			Flashing	A terminating resistor has not been inserted on the CC-Link master module and the last station module.

(2) LED on the AnyWire Bitty side



Indicator	Name	Color	Description		
RDY	Module READY	Green	On	Module operating status	
			Off	Power is not being supplied or the module is in failure.	
LINK	AnyWire Bitty transmission status/ alarm display	Green	Flashing	During normal transmission	
		Red	On	The SET LED is off.	Disconnection of the DP or DN transmission line, or no response from the slave module.
				The SET LED is flashing. (At every 1 second)	The DP/DN signal line short-circuited
SET	Automatic address detection display	Orange	On	During automatic address detection operation	
			Off	During normal transmission	
			Flashing (at every 20ms)	The detected address is being written on EEPROM.	
			Flashing (at every 1 second)	The DP/DN signal line short-circuited (the LINK LED turns on in red).	

CHAPTER 9 MONITORING FUNCTION

The slave module of AnyWire Bitty has a specific ID (address). When the NZ2AW1C1BY sends an ID (address), the disconnection and the existence of slave modules are detected by receiving a reply from the slave module having the corresponding ID (address).
The NZ2AW1C1BY uses the automatic address detection operation to store the addresses of the currently connected slave modules in the EEPROM.
This information is stored even when the power is turned off.
Then registered IDs (addresses) are sent in order. If the slave module does not reply, the LINK LED notifies of the disconnection.

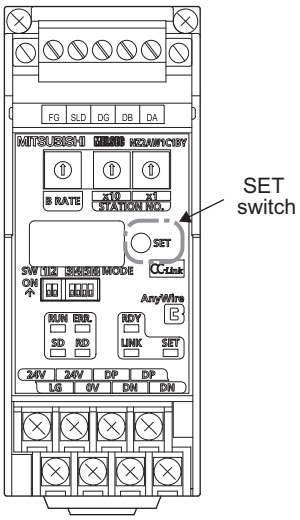
9.1 Automatic Address Detection

Automatic address detection is a function to store the ID (address) of the connected slave module in the EEPROM of the NZ2AW1C1BY.
Operate the automatic address detection in the following situations.

- When starting system operation with all the slave modules connected to the bridge module
- When adding a slave module
- When deleting a slave module
- When changing the address of a slave module

Procedure

1. **Check that all of the slave modules are operating normally.**
2. **Keep pressing the "SET switch" until the SET LED (orange) turns on.**
3. **When the SET LED turns on and off after flashing, the ID (address) has been stored.**



Point

- During automatic address detection, input or output may not be accepted. Operate an automatic address detection in the status that does not affect the operation of the equipment, such as while stopping the program execution of the programmable controller.
- When an error such as a short circuit occurs in the AnyWire Bitty bridge module, or for approximately five seconds after the module is turned on or reset, the automatic address detection cannot be operated.
- Do not operate an automatic address detection when a disconnection error has occurred while in operation. Otherwise, disconnection information may be lost.

9.2 Monitoring Operation

Registered IDs (addresses) are sent in order. If the slave module does not reply, a disconnection is notified.

The LINK LED turns on when a disconnection occurs.

This error information is retained until the power is turned off or the error is reset.

Point

To reset the LINK LED indication detected during operation, remove the error cause and turn off and on the NZ2AW1C1BY or turn on Error reset (RX**).

The automatic address detection operation also clears the display and the flag. However, if a non-responding module exists, its ID (address) is not registered; therefore, it is removed from the monitoring target.

CHAPTER 10 CC-LINK I/O RESPONSE TIME

For information about the transmission delay time on the CC-Link side, refer to the user's manual of the master module used.

Memo

CHAPTER 11 TRANSMISSION TIME

This section describes the transmission cycle time and transmission delay time of AnyWire Bitty.

11.1 Transmission Cycle Time

The transmission cycle time is the time required for a bridge module and all slave modules to update I/O data.

11.1.1 Transmission cycle time of the NZ2AW1C1BY

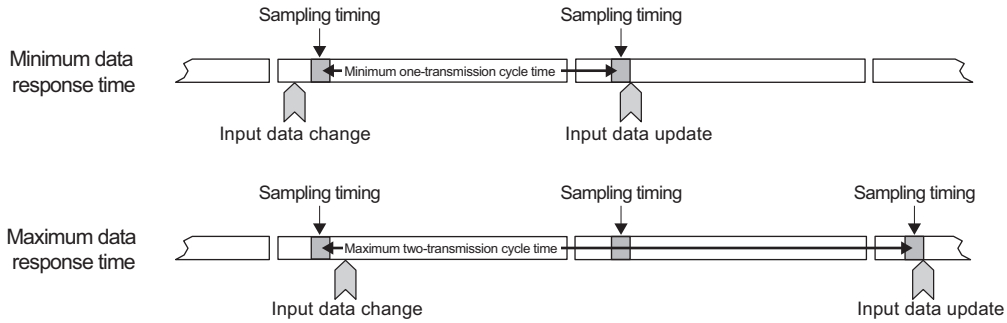
The transmission cycle time of the NZ2AW1C1BY is as shown in the table below.

Number of occupied stations	Transmission cycle time
1 station occupied	3.2ms
2 stations occupied	5.5ms
3 stations occupied	10.2ms
4 stations occupied	10.2ms

11.1.2 Effects of the double check system

(1) Input

Unless the same data is received twice successively on the NZ2AW1C1BY side, the input area data is not updated (double check). Therefore, a minimum of one-transmission cycle time and a maximum of two-transmission cycle time are required as the data response time.
Signals of two-transmission cycle time or less may not be captured depending on the timing.
Therefore, to ensure the response, provide an input signal that is longer than two-transmission cycle time.



(2) Output

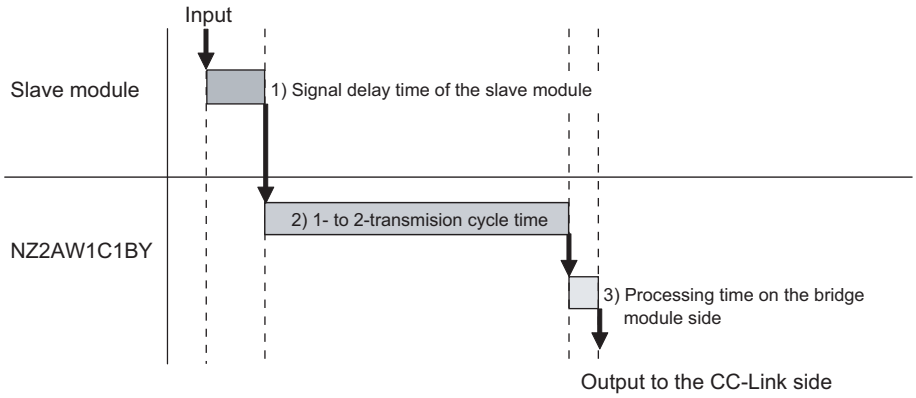
As the double check is performed on the slave module side, the time required is the same as that for input, namely a minimum of one-transmission cycle time and a maximum of two-transmission cycle time.

11.2 Transmission Delay Time

This section describes the transmission delay time (time until data is transmitted).

11.2.1 Slave module (input) to bridge module

The figure below shows the time between a signal input to the slave module and the bridge module remote device (RX) turning on/off.



[Calculation formula]

1) Signal delay time of the slave module + 2) Transmission cycle time × 2 + 3) Processing time on the bridge module side [ms]

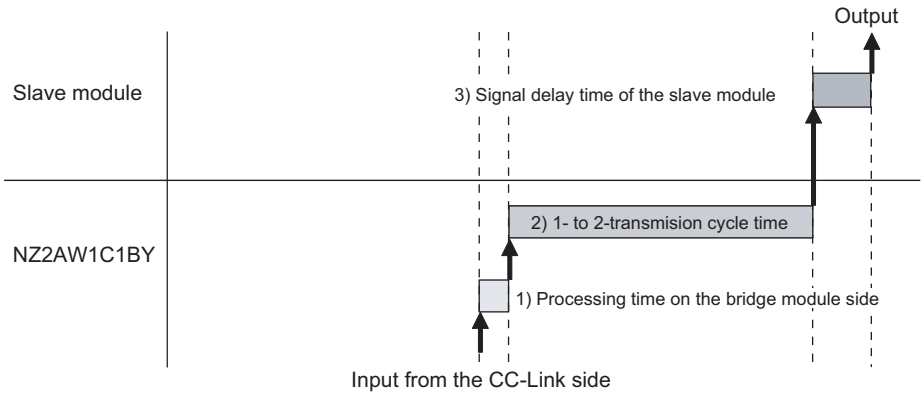
[Calculation example]

1) Signal delay time of the slave module
   Signal delay time of the slave module is 0.17ms.: 0.17[ms]
2) Transmission cycle time × 2
   Number of transmission points is set to 512 points: 10.2 × 2 = 20.4[ms]
3) Processing time on the bridge module side
   Processing time of the NZ2AW1C1BY is 0.592ms.: 0.592[ms]

Therefore, the transmission delay time is 0.17 + 20.4 + 0.592 ≒ 21[ms]

11.2.2 Bridge module to slave module (output)

The figure below shows the time between the bridge module remote device (RY) turning on/off and the slave module output turning on/off.



[Calculation formula]

1) Processing time on the bridge module side + 2) Transmission cycle time × 2 + 3) Signal delay time of the slave module [ms]

[Calculation example]

1) Processing time on the bridge module side
   Processing time of the NZ2AW1C1BY is 0.592ms. : 0.592[ms]
2) Transmission cycle time × 2
   Number of transmission points is set to 512 points: 10.2 × 2 = 20.4[ms]
3) Signal delay time of the slave module
   Signal delay time of the slave module is 0.01ms.: 0.01[ms]

Therefore, the transmission delay time is 0.592 + 20.4 + 0.01 ≒ 21[ms]

CHAPTER 12 TROUBLESHOOTING

If the transmission does not start normally, check the following items and perform the troubleshooting.

- The CC-Link cable is properly connected.
- The terminating resistor of CC-Link is properly connected.
- The station numbers of CC-Link are not duplicated.
- AnyWire devices are being supplied with 24VDC power.
- The LINK LED on the slave module of AnyWire is flashing.
- The address settings of AnyWire are correct and are not duplicated.

Remark

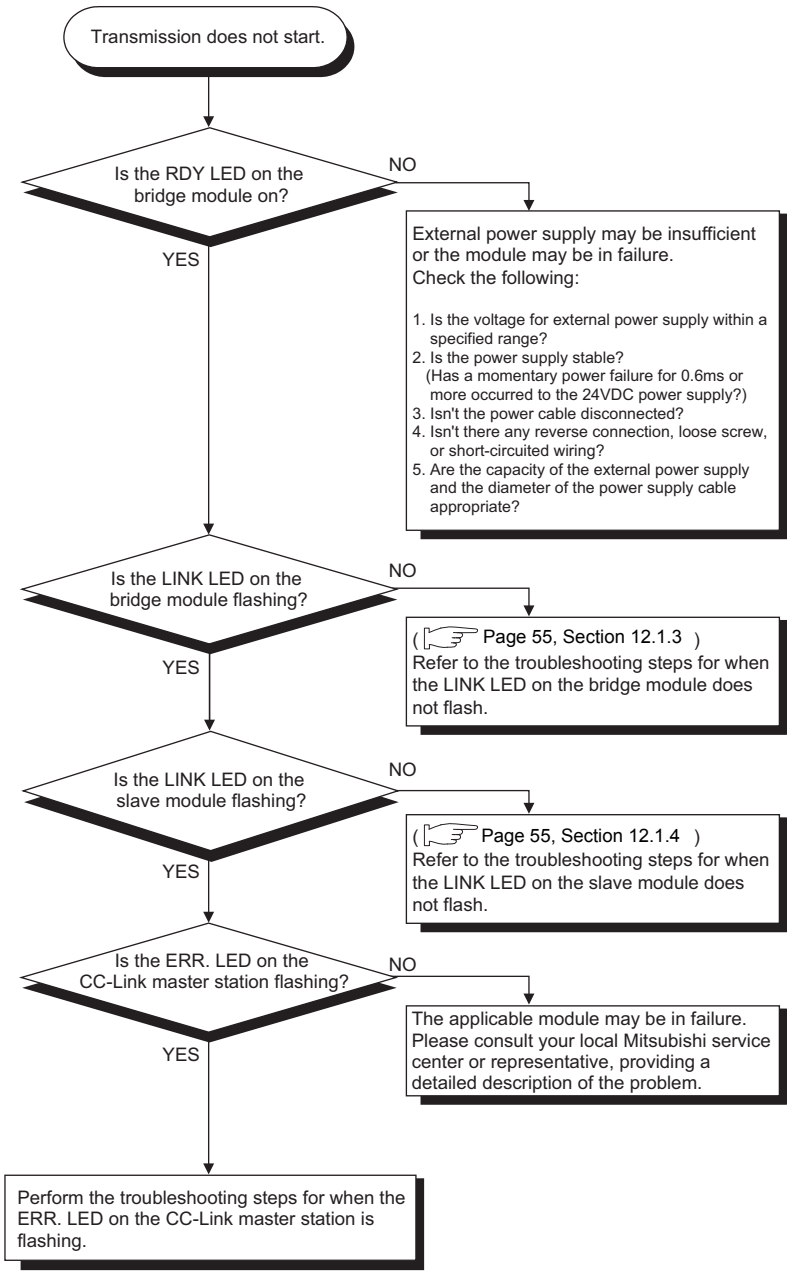
The reference pages for each specification required during troubleshooting are shown below.

- Connections : ☞ Page 23, CHAPTER 4
- Operation mode : ☞ Page 28, CHAPTER 5
- Data I/O : ☞ Page 31, CHAPTER 6, Page 36, CHAPTER 7
- Details of the LED display : ☞ Page 41, CHAPTER 8

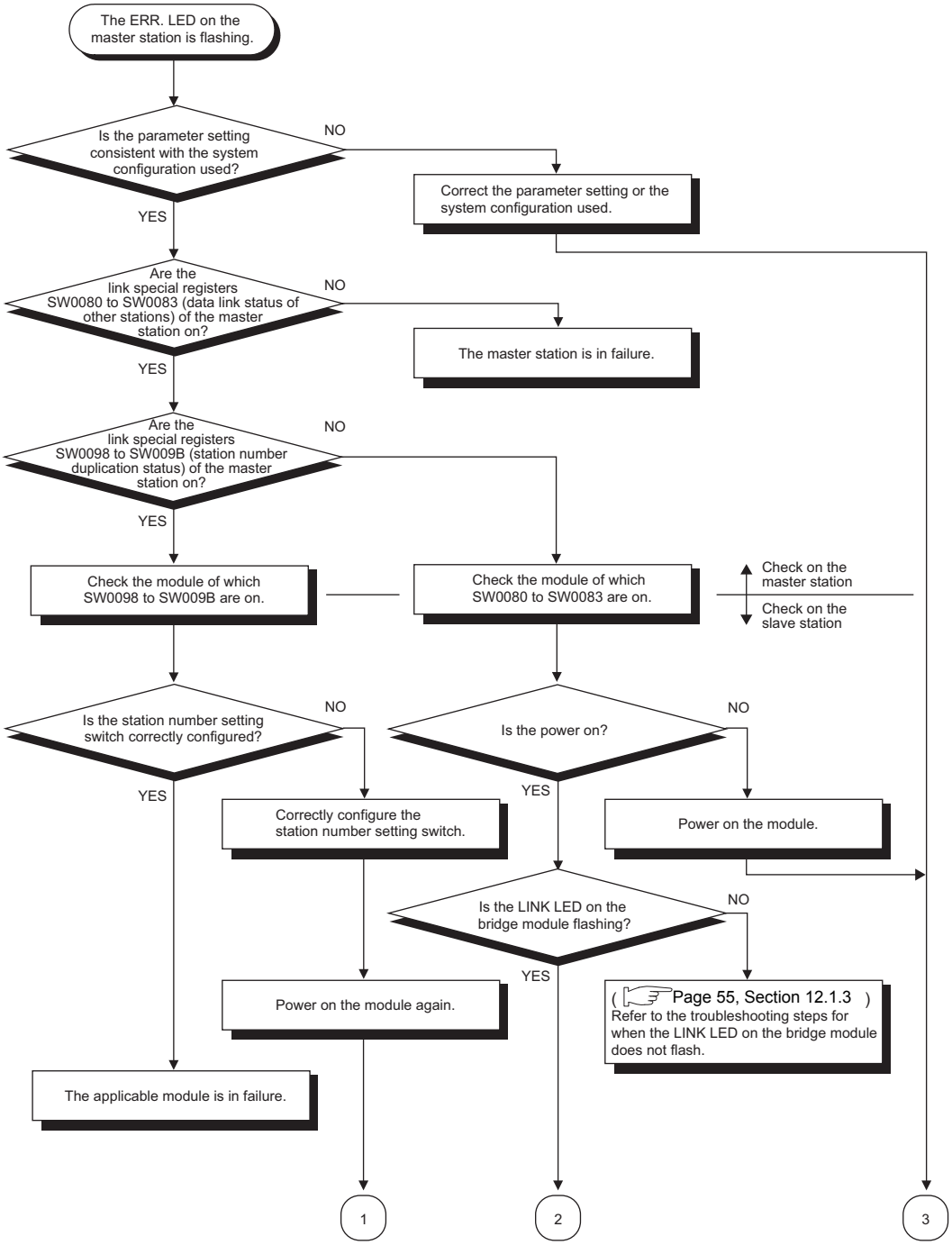
For details on the entire AnyWire system, refer to the "AnyWire Bitty Series Technical Manual" (manufactured by AnyWire Corporation).

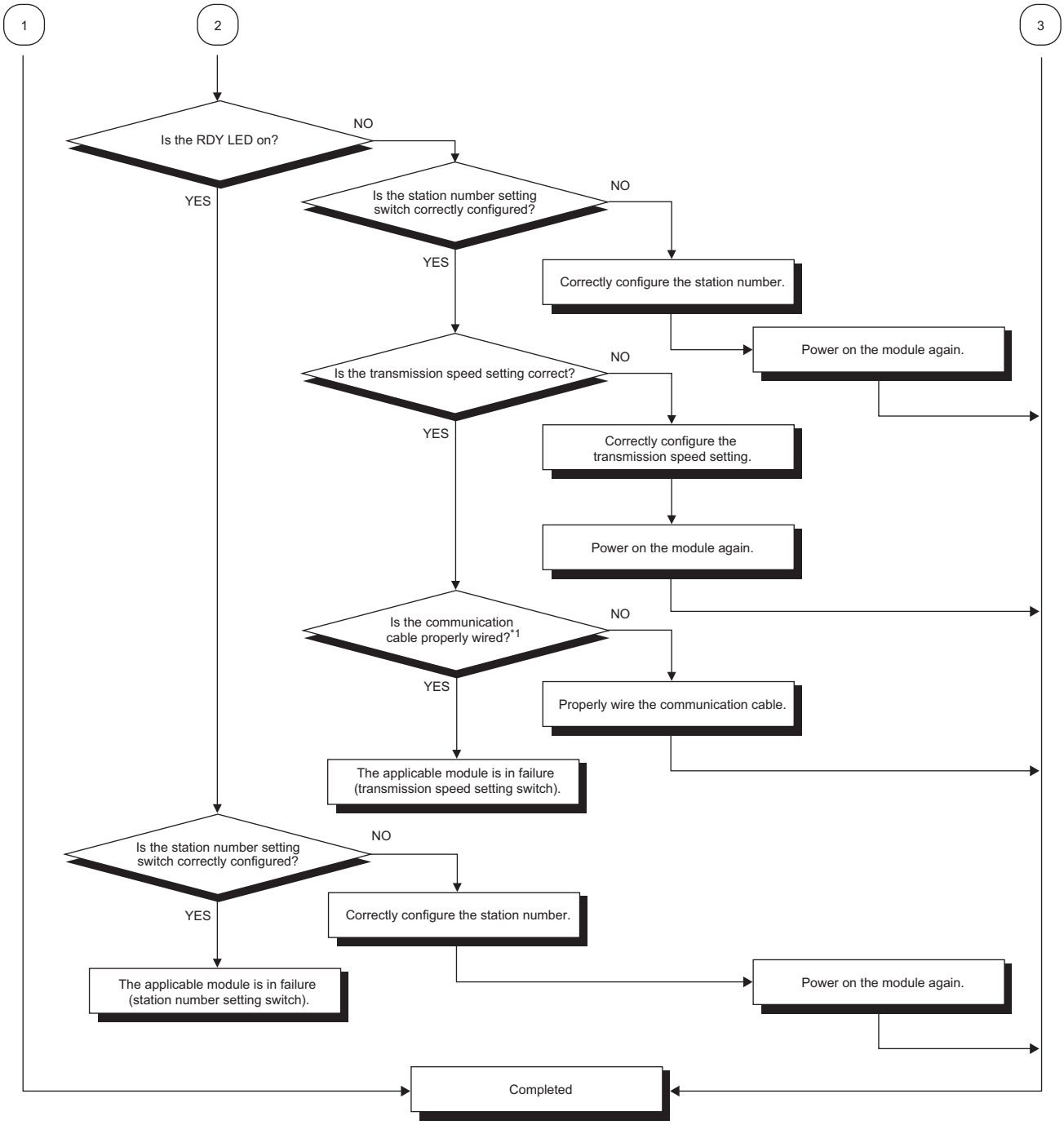
12.1 Troubleshooting Flow

12.1.1 When transmission does not start



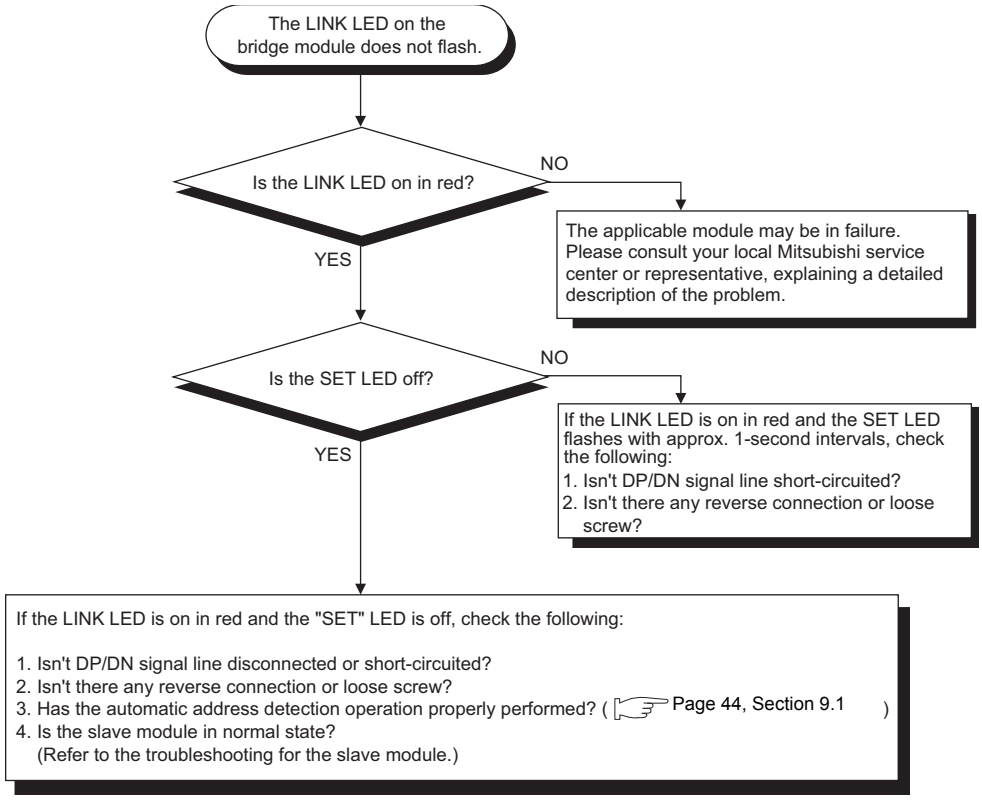
12.1.2 When the ERR. LED on the CC-Link master station is flashing



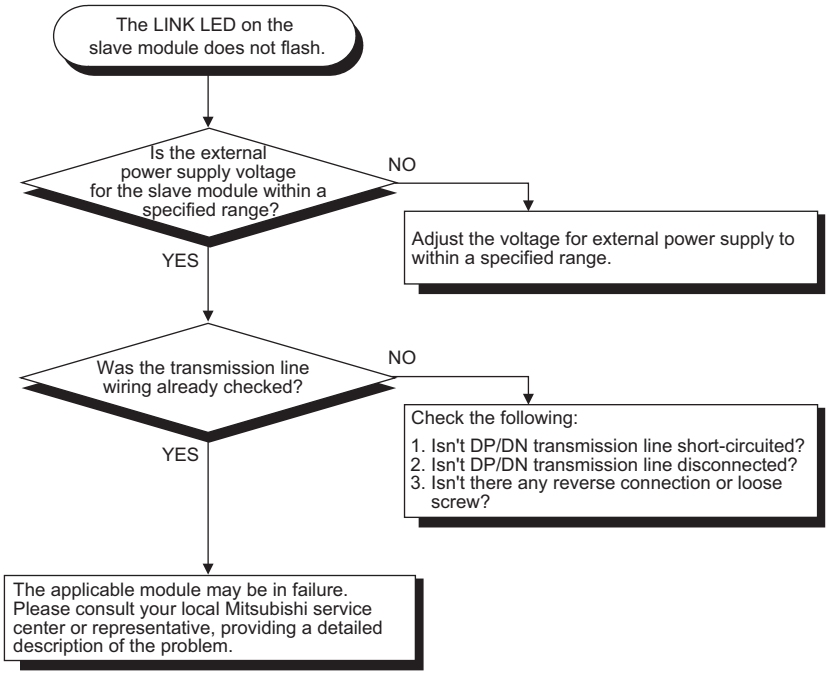


*1 Check the short circuit, reverse connection, disconnection, terminating resistor, FG connection, total length, and distance between stations.

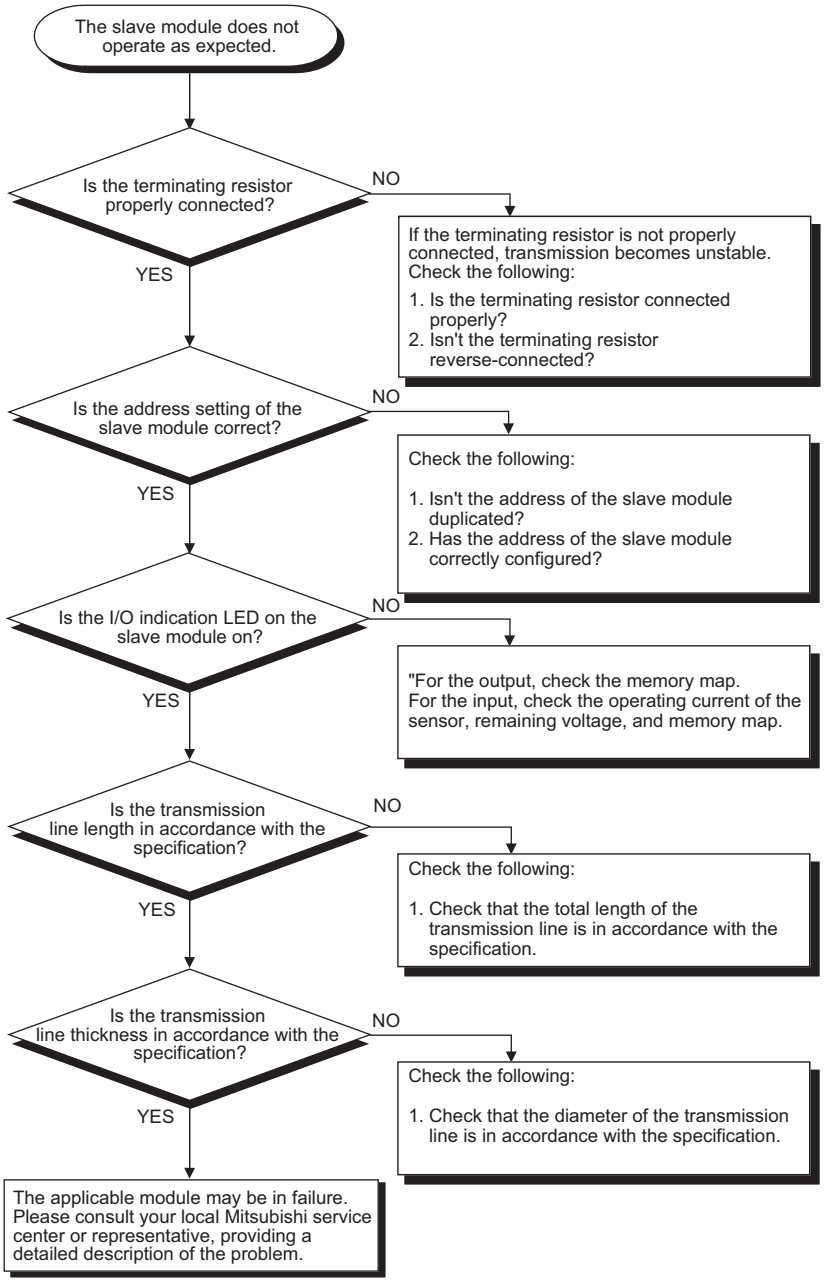
12.1.3 When the LINK LED on the bridge module does not flash



12.1.4 When the LINK LED on the slave module does not flash



12.1.5 When the slave module does not operate as expected



12.2 Symptom checklist

(1) CC-Link side

Symptom	Check Item	Confirmation Method	Check
The data link is failed in the entire system.	Is the cable disconnected?	Check the condition of the cable visually or by line test. Check Line status (SW0090).	☐
	Are the terminating resistors (110Ω) connected to the last stations on both sides?	Connect the terminating resistors provided with the master/local module to the last stations on both sides.	☐
	Is there an error in the CPU module of the master station?	Check the error code of the CPU module and take actions.	☐
	Are the parameters set in the master station?	Check the parameter settings. Remote network-Ver.2 mode or Remote network-addition mode Ver.2 remote device station Double, Exclusive Station 4	☐
	Is Data link startup request (Yn6 or Yn8) turned on?	Check the program.	☐
	Is there an error in the master station?	Check the following. • Host parameter status (SW0068) • Switch setting status (SW006A) • Loading status (SW0069) • Whether or not the ERR. LED on the master station is flashing.	☐
	Does the scan time exceed the maximum value while the synchronous mode is selected?	Select the asynchronous mode or reduce the transmission speed.	☐
The remote input (RX) of the NZ2AW1C1BY cannot be loaded.	Is the remote device station in the data link?	Check the status by the following methods. • LED indication status on the module • Other station data link status (SW0080 to SW0083)	☐
	Is it loaded from the correct address of the remote input RX (buffer memory)?	Check the program.	☐
	Is it set to the reserved station?	Check the parameters.	☐
	Is the station number duplicated?	Check the station number.	☐
The remote output (RY) of the NZ2AW1C1BY cannot be turned on/off.	Is the remote device station in the data link?	Check the status by the following methods. • LED indication status on the module. • Other station data link status (SW0080 to SW0083)	☐
	Is the refresh instruction (Yn0) of the master station turned on?	Check the program.	☐
	Is it loaded from the correct address of the remote output RY (buffer memory)?	Check the program.	☐
	Is it set to the reserved station?	Check the parameters.	☐
	Is the station number duplicated?	Check the station number.	☐
The data of the remote register (RWr) of the NZ2AW1C1BY cannot be loaded.	Is the remote device station in the data link?	Check the status by the following methods. • LED indication status on the module • Other station data link status (SW0080 to SW0083)	☐
	Is it loaded from the correct address of the remote register RWr (buffer memory)?	Check the sequence program.	☐
	Is it set to the reserved station?	Check the parameters.	☐
	Is the station number duplicated?	Check the station number.	☐

Symptom	Check Item	Confirmation Method	Check
Faulty stations cannot be detected.	Is the station disabled for error?	Check the parameters.	☐
	Is the station number duplicated?	Check the station number.	☐

(2) AnyWire Bitty side

Symptom	Check Item	Confirmation Method	Check
Data I/O is impossible.	■ NZ2AW1C1BY side		
	Is 24VDC being supplied appropriately?	Check the power voltage.	☐
	Is the DP/DN signal line connected correctly?	Check the wiring for AnyWire Bitty.	☐
	Is the MODE switch set correctly?	Check the MODE switch setting.	☐
	■ Slave module side		
	Is 24VDC power being supplied appropriately?	Check the power voltage.	☐
	Is the DP/DN signal line connected correctly?	Check the wiring for AnyWire Bitty.	☐
	Is the address set correctly?	Check the address setting.	☐
Data I/O is unstable.	Is AT0 (terminating resistor) connected? Are the poles connected in reverse?	Check whether the terminal resistors are connected correctly.	☐
	Does the actual transmission line length exceed the setting length?	Check whether the total length is proper.	☐
	Is the shield line being used for multiple-point grounding?	Check the wiring for AnyWire Bitty.	☐
The LINK LED on the slave module does not flash.	Is the supply voltage within the allowable voltage range?	Check the power voltage.	☐
	Is the power supply line disconnected? Is the power supply terminal loose?	Check the wiring for AnyWire Bitty.	☐
	Is the DP/DN signal terminal loose?	Check the wiring for AnyWire Bitty.	☐
	Is the DP/DN signal line disconnected?	Check the wiring for AnyWire Bitty.	☐
The LINK LED of the NZ2AW1C1BY turns on in red.	Is the DP/DN signal line disconnected?	Check the wiring for AnyWire Bitty.	☐
	At the startup, was the automatic address detection operated correctly?	Check the status of the slave module and the wiring for AnyWire Bitty, and operate the automatic address detection.	☐
	Are the screws on the terminal block loose?	Check the wiring for AnyWire Bitty.	☐
The LINK LED of the NZ2AW1C1BY turns off.	Is the DP/DN signal line short-circuited?	Check the wiring for AnyWire Bitty.	☐

Memo

REVISIONS

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

Print date	*Manual number	Revision
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The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
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(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
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CC-Link—AnyWire Bitty Bridge Module
User's Manual

Anywire Corporation http://www.anywire.jp

MODEL	NZ2AW1C1BY-U-E
MODEL CODE	13JZ61
SH(NA)-080991ENG-A(1106)MEE	

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