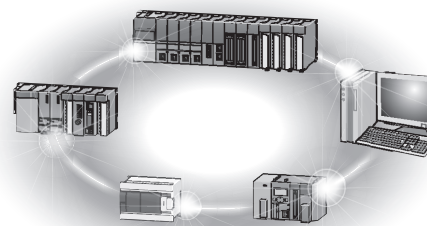




Mitsubishi Programmable Controller

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

-NZ2AW1C1BY



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

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PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS

The NZ2AW1C2D2 was 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	EN61131-2 ^{*1}	EN61131-2

^{*1} The bridge module with a serial number where the sixth digit is "3" or later complies with this standard.

<Application of the UL/cUL standards>

Item	NZ2AW1C1BY	Other programmable controller products (e.g.: MELSEC-Q series)
Applicable UL standard/cUL standard	UL508 ^{*2} CSA22.2 ^{*2}	UL508 CSA22.2

^{*2} The bridge module with a serial number where the sixth digit is "3" or later complies with this standard.

● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

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

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

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



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



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

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

Observe the precautions of both levels because they are important for personal and system safety. Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

WARNING

- 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 and electronic components of the module. Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

CAUTION

- Shut off the external power supply (all phases) used in the system before wiring. Failure to do so may cause the module to fail or malfunction.
- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms 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.
- Tighten the terminal screw within the specified torque range. Undertightening can cause short circuit 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 type terminal block 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. If the power is applied before wiring, normal data transmission is not guaranteed.
- 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.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part. 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.

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 the following.

 Page 63, Appendix 1

Memo

CONTENTS

COPYRIGHT	1
PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS	1
SAFETY PRECAUTIONS	2
CONDITIONS OF USE FOR THE PRODUCT	5
COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES	6
TERMS	10
CHAPTER 1 OVERVIEW	11
CHAPTER 2 SPECIFICATIONS	13
2.1 General Specifications	13
2.2 Performance Specifications	14
2.2.1 Performance specifications	14
2.2.2 Scope of the power supply for the transmission cable	16
2.2.3 Power supply sequence and handling of I/O data	19
2.3 Applicable System	20
2.3.1 Applicable master module	20
2.3.2 Differences in parameter settings depending on the CC-Link versions	20
2.3.3 CC-Link dedicated instruction	21
2.4 External Dimensions	22
2.5 Part Names	23
2.6 Checking Function Version and Serial Number	24
CHAPTER 3 MODULE MOUNTING	25
CHAPTER 4 CONNECTIONS	27
4.1 CC-Link Side Terminal Block	27
4.1.1 Connecting a CC-Link dedicated cable	28
4.1.2 Cable processing	28
4.2 AnyWire Bitty Side Terminal Block	29
4.2.1 Description of the terminals of an AnyWire Bitty side terminal block	29
4.2.2 Cable processing	30
4.3 Terminating Unit	31
CHAPTER 5 SWITCH SETTING	32
5.1 CC-Link Side	32
5.2 AnyWire Bitty Side	34
CHAPTER 6 MEMORY MAPS	35
6.1 Remote I/O Signal List	35
6.2 Remote Register List	36
6.3 Correspondence Between the Remote Register and Address	38
6.4 Error Reset	39

CHAPTER 7 PREPARATION FOR OPERATION	40
7.1 Setting by the Parameter	40
7.2 Setting on the Program	43
CHAPTER 8 POWER-ON AND PART INDICATION	45
8.1 LED Indication Specification	46
CHAPTER 9 MONITORING FUNCTION	48
9.1 Automatic Address Detection	48
9.1.1 Performing the automatic address detection	48
9.2 Monitoring Operation	49
CHAPTER 10 CC-LINK I/O RESPONSE TIME	50
CHAPTER 11 TRANSMISSION TIME	52
11.1 Transmission Cycle Time	52
11.1.1 Transmission cycle time of the NZ2AW1C1BY	52
11.1.2 Effects of the double check system	52
11.2 Transmission Delay Time	53
11.2.1 Slave module (input) to bridge module	53
11.2.2 Bridge module to slave module (output)	54
CHAPTER 12 TROUBLESHOOTING	55
12.1 Troubleshooting Flow	56
12.1.1 When transmission does not start	56
12.1.2 When the ERR.LED on the CC-Link master station is flashing	57
12.1.3 When the LINK LED on the bridge module does not flash	59
12.1.4 When the LINK LED on the slave module does not flash	59
12.1.5 When the slave module does not operate as expected	60
12.2 Symptom checklist	61
APPENDICES	63
Appendix 1 EMC and Low Voltage Directives	63
Appendix 1.1 Requirements for compliance with the EMC Directive	63
Appendix 1.2 Requirements for compliance with the Low Voltage Directive	66
Appendix 2 Functions Added and Modified with Version Upgrade	67
REVISIONS	68
WARRANTY	69
TRADEMARKS	70

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
AnyWire Bitty	This system provides a high-speed and highly-reliable sensor network. An original transmission system provided by Anywire Corporation. This module supplies power using a transmission line, minimizing wiring for machines and equipment.
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
GX Developer	The product name of the software package for the MELSEC programmable controllers
GX Works2	
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.
NZ2AW1C1BY	The abbreviation for the CC-Link-AnyWire Bitty bridge module, NZ2AW1C1BY
Programming tool	A generic term for GX Works2 and GX Developer
Remote I/O module	A remote module that exchanges I/O signals (bit data) with an external device
RWr	Remote register (read area for CC-Link). Information input in 16-bit units from the slave station to the master station.
RWw	Remote register (write area for CC-Link). Information output in 16-bit units from the master station to the slave station.
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.
Slave module	A generic term for modules that communicate data with a bridge module
Terminating unit	A waveform shaper
Transmission cycle time	A data sampling interval

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.

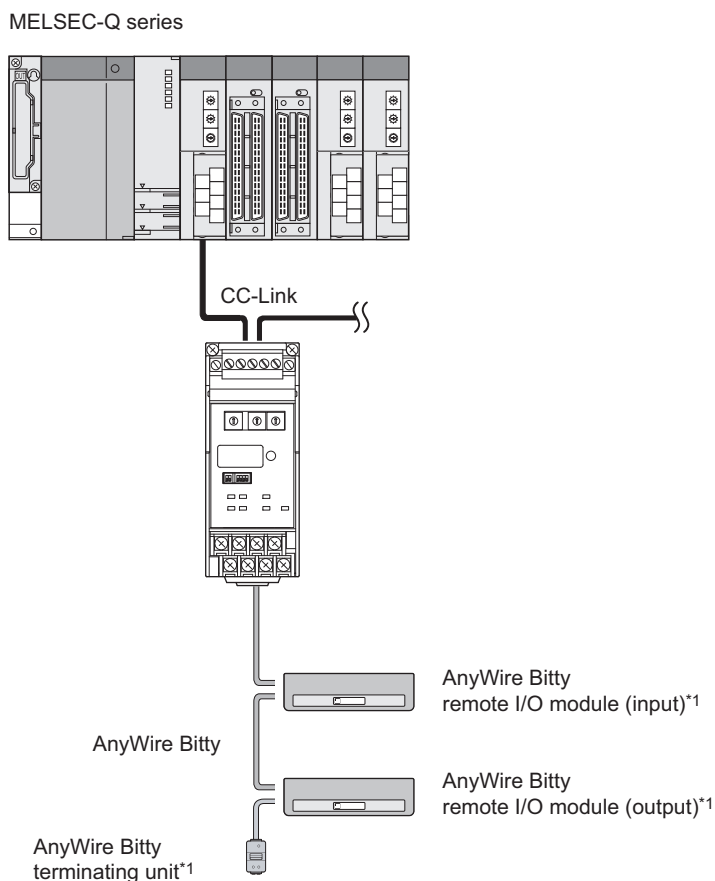
The AnyWire Bitty system provides a high-speed and highly reliable sensor network system.

(1) Features of the NZ2AW1C1BY

The NZ2AW1C1BY is the bridge module used for the connection between AnyWire Bitty having the DC transmission cable 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

(2) Configuration of the AnyWire Bitty system

For the number of connectable slave modules, refer to the following.

➡ Page 14, Section 2.2.1

Memo

CHAPTER 2 SPECIFICATIONS

2.1 General Specifications

2

Item	Specifications					
Operating ambient temperature	0 to 55°C					
Storage ambient temperature	-25 to 75°C					
Operating ambient humidity	10 to 90%RH, non-condensing					
Storage ambient humidity						
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	—	Frequency	Constant acceleration	Half amplitude	No. of sweeps
		Under intermittent vibration	5 to 8.4Hz	—	3.5mm	10 times each in X, Y, and 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 X, Y, and Z directions)					
Operating atmosphere	No corrosive gas					
Operating altitude*1	0 to 2000m					
Installation location	Inside the 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 at sea level. 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. In pollution degree 2, only non-conductive pollution occurs. A temporary conductivity caused by an accidental condensation may also occur occasionally.

2.1 General Specifications

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/RX number of occupied points: 32 points) (RWr/RWw 4/4) 2 stations (RX/RX number of occupied points: 64 points) (RWr/RWw 8/8) 3 stations (RX/RX number of occupied points: 96 points) (RWr/RWw 12/12) 4 stations (RX/RX 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 slave modules		Up to 128 (varies depending on the current consumption of each slave module)
	Transmission system		DC power supply transmission total frame cyclic system
	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 cable location detection function, transmission cable short detection function, transmission cable voltage drop detection function
	Transmission cable (DP, DN) ^{*2}		<ul style="list-style-type: none"> UL-compliant general-purpose 2-wire cable (VCTF, VCF 1.25mm², 0.75mm², temperature rating 70°C or higher) UL-compliant general-purpose wire (1.25mm², 0.75mm², temperature rating 70°C or higher)
	Power cable (24V, 0V)		<ul style="list-style-type: none"> UL-compliant general-purpose 2-wire cable (VCTF, VCT 0.75mm² to 2.0mm², temperature rating 70°C or higher) UL-compliant general-purpose wire (0.75mm² to 2.0mm², temperature rating 70°C or higher)
	Maximum number of writes to EEPROM		Up to 100000 times
Common	Power supply	Voltage	21.6 to 27.6VDC (24VDC -10 to +15%), ripple voltage 0.5Vp-p or lower 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 cable 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 the relationship between the total length, the diameter of transmission cable (DP, DN), and the transmission cable supply current.
- When a total length exceeds 50m, use isolated slave modules. For some slave modules with cables, the wire diameter of module-integrated transmission cable (DP, DN) may be 0.75mm² or less. However, they can be used without any problem, provided that the diameter of transmission cable (DP, DN) meets the following requirements.

Diameter of transmission cable (DP, DN)	Supply current for transmission cable	
	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).

2.2.2 Scope of the power supply for the transmission cable

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

Item	Description
Calculation formula 1)	$I(A) = (I_{hin} \times m) + (I_{ho} \times n) + (I_{zdin} \times p) + (I_{zdo} \times q) \leq$ The maximum value of the transmission cable supply current The number of connected modules by type: m, n, p, q
Calculation formula 2)	$V_m(V) - \Delta V(V) \geq 20V$
Calculation formula 3)	$V_m(V) - \Delta V(V) \geq$ The lowest limit of the allowable voltage range for connected load

(1) Description of calculation formula 1)

(a) Related constant of non-isolated slave modules (I_{hin} , I_{ho})

For non-isolated slave modules, current required for the internal control circuit and connected load is supplied through the transmission cable (DP, DN).

$I_{hin}(A)$

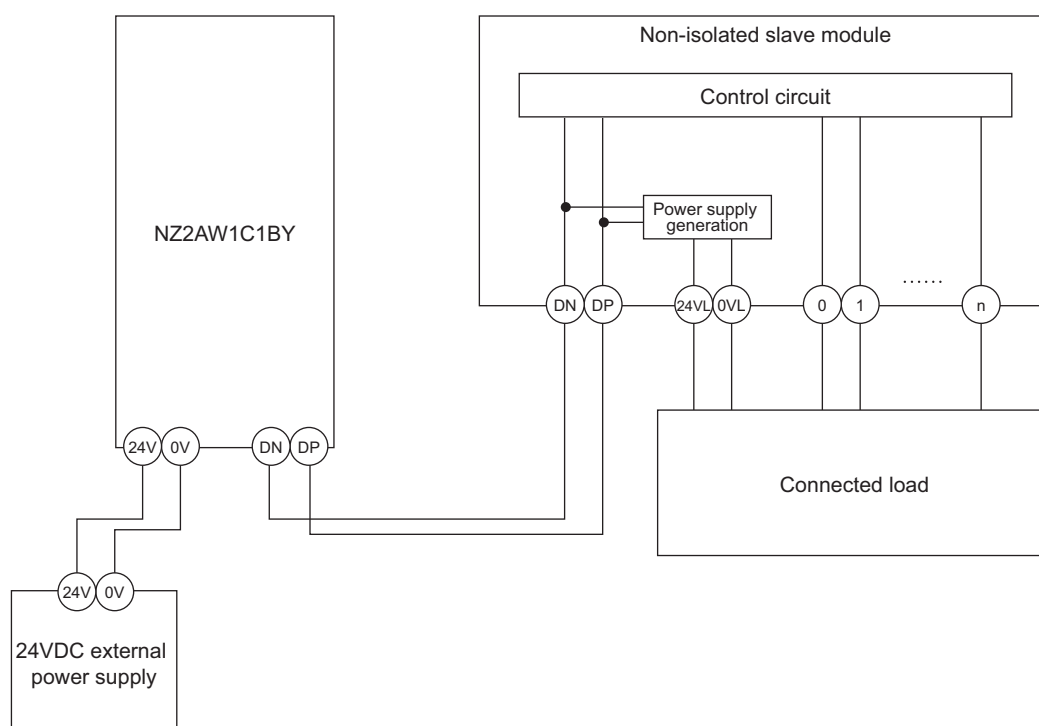
= Current consumption of non-isolated input slave module/I/O combined slave module

= Current consumption of non-isolated input slave module/I/O combined slave module + Current consumption of connected load (three-wire sensor) \times Number of points

$I_{ho}(A)$

= Current consumption of non-isolated output slave module

= Current consumption of non-isolated output slave module + Current consumption of connected load \times Number of points



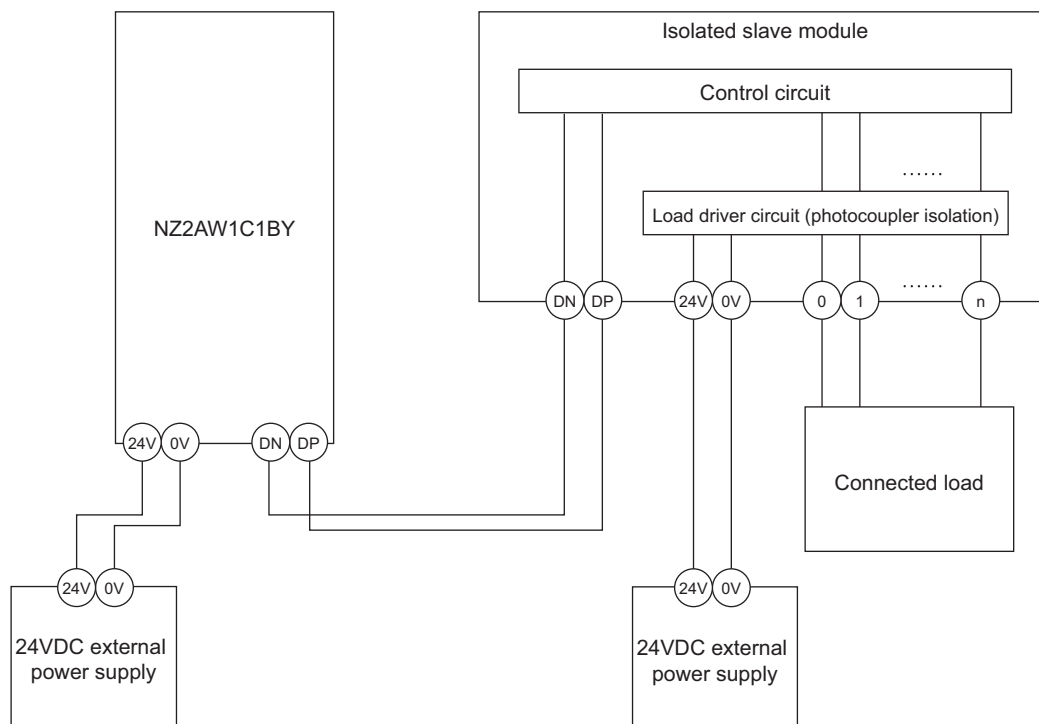
- The 24VL and 0VL terminals of a slave module are used to supply the power to the connected load. For details, refer to the manual for the slave module used.
- For the current consumption of non-isolated slave modules, refer to the manual for the slave module used.

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

For isolated slave modules, only the current required for the internal control circuit is supplied through the transmission cable (DP, DN), whereas that for the connected load is supplied from a 24VDC external power supply.

Izdin(A) = Internal current consumption of isolated input slave module/I/O combined slave module

Izdo(A) = Internal current consumption of isolated output slave 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 the current consumption of isolated slave modules, refer to the manual for the slave module used.

(c) Supply current for transmission cable (I (A))

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

$$I(A) = (I_{hin} \times m) + (I_{ho} \times n) + (I_{zdin} \times p) + (I_{zdo} \times q)$$

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

(d) Maximum value of transmission cable supply current

For the maximum value of transmission cable supply current, refer to the following.

📖 Page 14, Section 2.2.1

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

(a) Vm: Supply voltage to bridge module

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

Recommended voltage: 26.4V

(b) $\Delta V(V)$: Voltage drop between lines

$\Delta V(V) = \text{Transmission cable supply current } I(A) \times \text{Line resistance } R(\Omega)$

Line resistance $R(\Omega) = \text{Line length (m)} \times \text{Conductor resistance } (\Omega/m) \times 2$

- Line diameter 1.25mm² → Conductor resistance 0.015 Ω /m
- Line diameter 0.75mm² → Conductor resistance 0.025 Ω /m

(3) Calculation example

The example shows how to check whether the total length of 50m is sufficient for configuring the system with the following conditions.

(a) Condition

Item	Condition
Non-isolated remote I/O module (input)	<ul style="list-style-type: none">• Number of I/O points: 4 points• Module current consumption: 29mA• Number of modules: 12
Connected load (three-wire sensor)	<ul style="list-style-type: none">• Three-wire sensor current consumption: 13mA• Number of sensors: 4• Power voltage: 24V $\pm 10\%$
Diameter of transmission cable (DP, DN)	Cable diameter: 0.75mm ²
Power supply for the NZ2AW1C1BY	Power voltage: 24V

(b) Calculation result

Item	Condition
Calculation formula 1)	$(I_{in}(A) \times m) = I(A) \leq \text{Maximum value of transmission cable supply current}$ $(0.029 + (0.013 \times 4)) \times 12 = 0.972A \leq 1A$ → Satisfied
Calculation formula 2)	$V_m(V) - \Delta V(V) \geq 20V$ $24 - (0.972 \times 50 \times 0.025 \times 2) = 24 - 2.43 = 21.57V \geq 20V$ → Satisfied
Calculation formula 3)	$V_m(V) - \Delta V(V) \geq \text{The lowest limit of the allowable voltage range for connected load}$ The lowest limit of the allowable voltage range for connected load = $24 - 24 \times 0.1 = 21.6V$ $21.57V < 21.6V$ → Not satisfied

Based on the above calculation results of calculation formulas 1) through 3), system configuration is 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.

www.cc-link.org

2.3.2 Differences in parameter settings depending on the CC-Link versions

The NZ2AW1C1BY is a remote device station supporting CC-Link Ver1.10.

For the setting of "Mode" and "Station Information (Station Type)" of a Mitsubishi master module to which the NZ2AW1C1BY is connected, use any of the following combinations.

(1) Parameter settings of the master module for CC-Link Ver1.10 and earlier versions

Master module	Parameter setting item	
	Mode setting ^{*1}	Station Information (Station Type)
QJ61BT11	Remote Net(Ver.1 Mode)	Remote Device Station
AJ61BT11, AJ61QBT11, A1SJ61BT11, A1SJ61QBT11	Online (remote net mode)	
FX2N-16CCL-M	Online	

^{*1} For the mode setting, refer to the user's manual of the master station used.

(2) Parameter settings of the master module for CC-Link Ver2.00

Master module	Parameter setting item	
	Mode setting ^{*1}	Station Information (Station Type)
QJ61BT11N, L26CPU-BT, L26CPU-PBT, LJ61BT11, RJ61BT11, Q80BD-J61BT11N, Q81BD-J61BT11	Remote Net(Ver.1 Mode)	Remote Device Station
	Remote Net(Ver.2 Mode)	Ver.1 Remote Device Station
	Remote Net(Additional Mode) ^{*2}	Ver.1 Remote Device Station
FX3U-16CCL-M	Remote Net(Ver.1 Mode)	Ver.1-compatible remote device station
	Remote Net(Ver.2 Mode)	
	Remote Net(Additional Mode) ^{*2}	

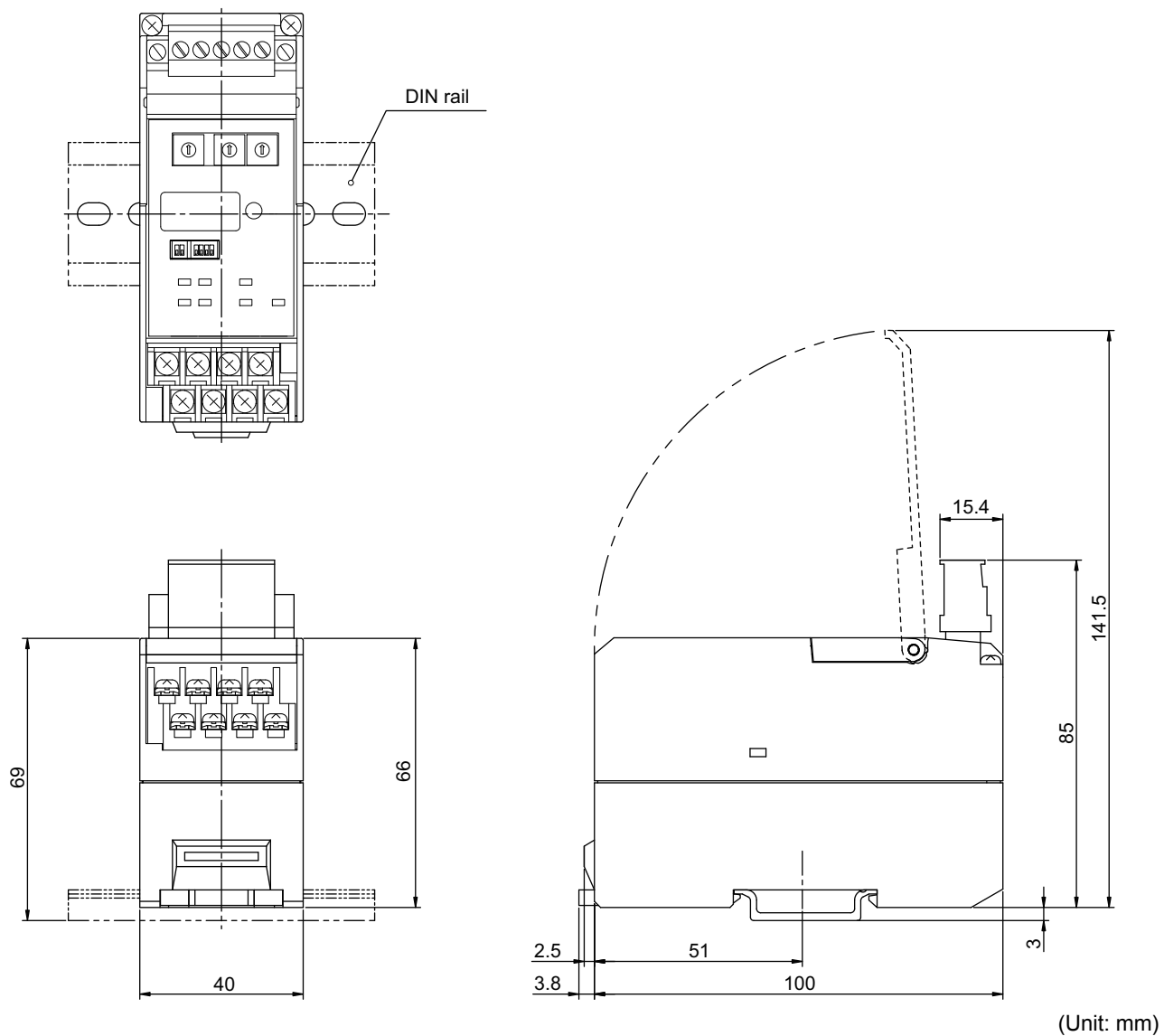
^{*1} For the mode setting, refer to the user's manual of the master station used.

^{*2} 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".

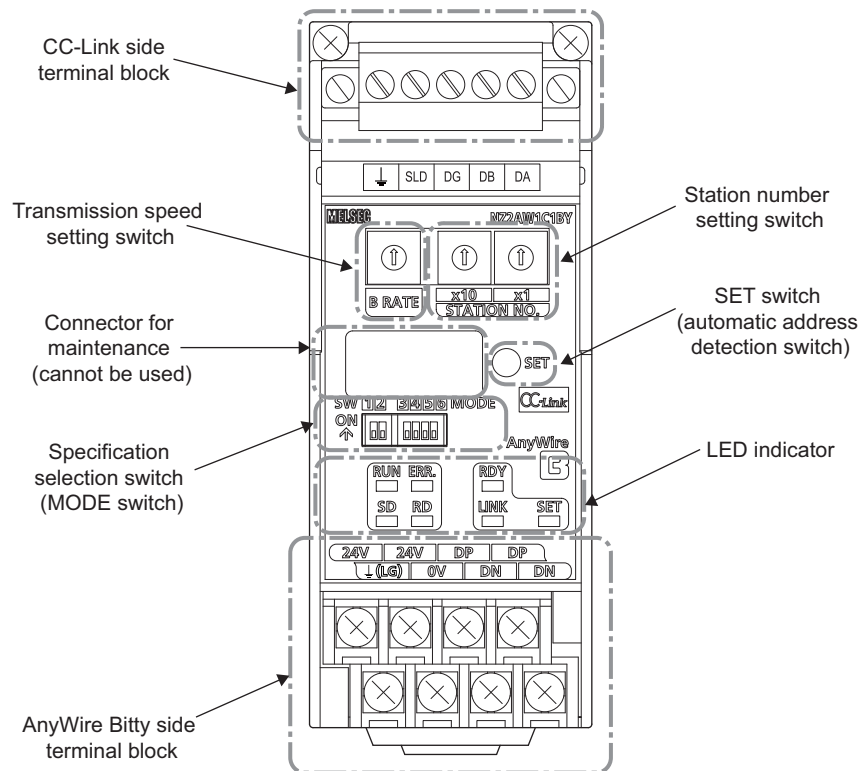
2.3.3 CC-Link dedicated instruction

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

2.4 External Dimensions



2.5 Part Names



For details on each part, refer to the following.

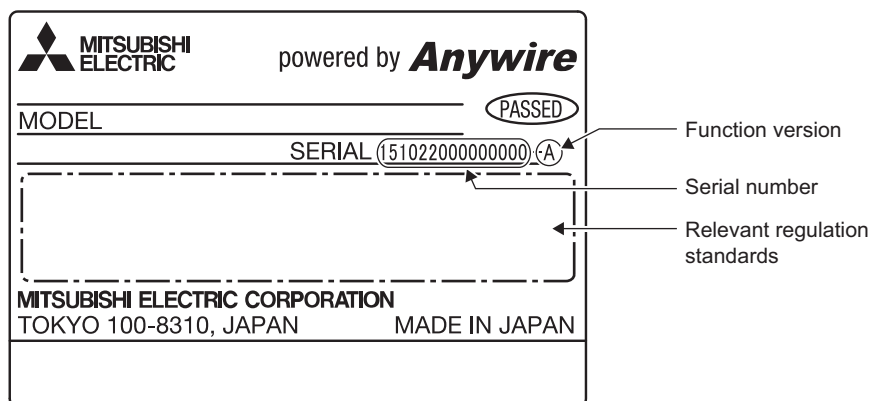
- CC-Link side terminal block: Page 27, Section 4.1
- AnyWire Bitty side terminal block: Page 29, Section 4.2
- Station number setting switch: Page 32, Section 5.1 (1)
- Transmission speed setting switch: Page 33, Section 5.1 (2)
- Specification selection switch: Page 34, Section 5.2 (1)
- SET switch: Page 48, CHAPTER 9
- LED indicator: Page 45, CHAPTER 8

2.6 Checking Function Version and Serial Number

The serial number and function version of the NZ2AW1C1BY can be checked on the rating plate.

(1) Checking on the rating plate

The rating plate is located at the top of the NZ2AW1C1BY.

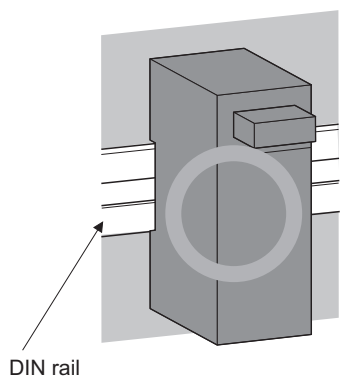


CHAPTER 3 MODULE MOUNTING

Mount this module on a DIN rail before use.

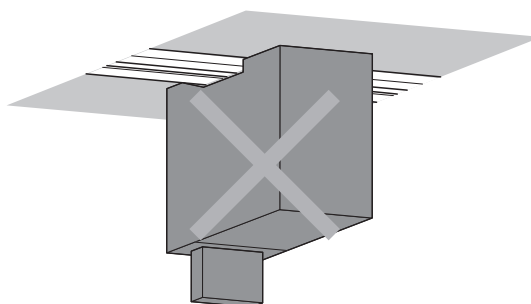
(1) Direction of mounting a module

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

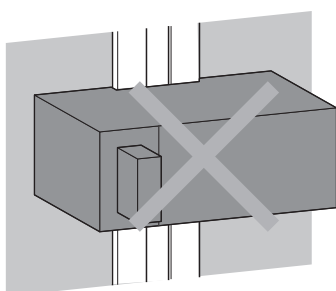


Vertical installation (basic)

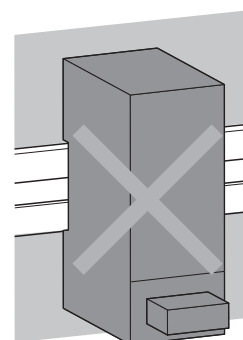
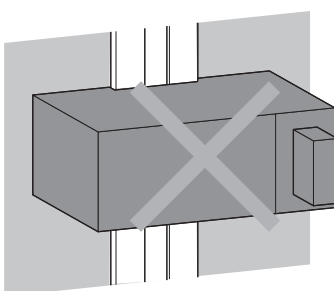
Do not place the module in the directions shown below.



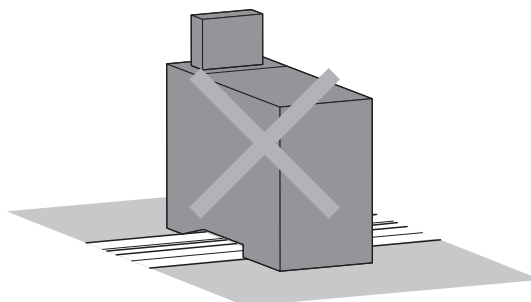
Downward installation



Horizontal installation

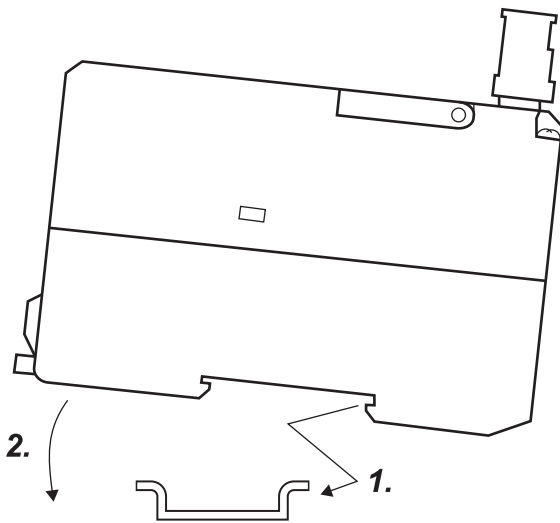


Vertical installation
(upside down)



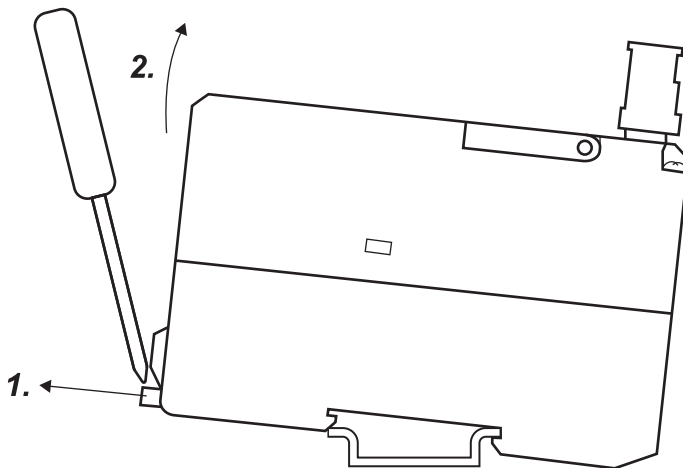
Upward installation

(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

Point

For compliance with the EMC and Low Voltage Directives, refer to the following.

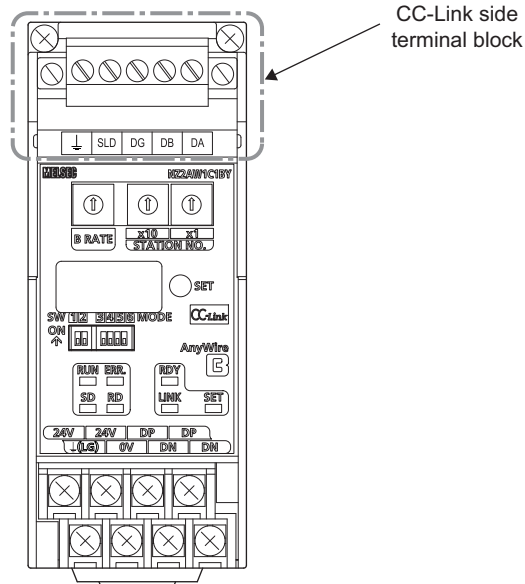
☞ Page 63, Appendix 1

Even when the compliance with the EMC and Low Voltage Directives is not required, use of an EMC-compliant configuration may reduce the influence from external noise.

4.1 CC-Link Side Terminal Block

4

The NZ2AW1C1BY is handled as a remote device station on CC-Link. The CC-Link side terminal block is a connector-type terminal block which is easily connected and disconnected.



Manufacturer: PHOENIX CONTACT GmbH & Co. KG (Contact: www.phoenixcontact.com)

Model: MSTB2,5/5-STF-5,08AU

Tightening torque: 0.2 to 0.3N·m

To tighten the connector, a flathead screwdriver having a tipped size of $0.6 \times 3.5\text{mm}$ is required.

Before removing the CC-Link side terminal block, check that the fixing screws on both sides are completely loosened (removed from the socket).

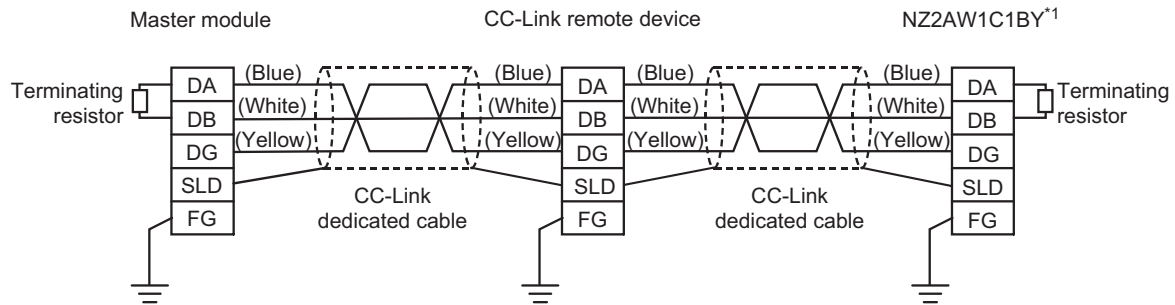
Pulling with excessive force while the fixing screws on both sides are still tightened may cause damage to the devices. Before connecting the connector, check that there are no short circuits due to the disconnected or frayed wires. Then tighten the screws at both sides securely. (Tightening torque: 0.2 to 0.3N·m)

Point

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

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 catalog or website of PHOENIX CONTACT GmbH & Co. KG.

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 terminal block; however, for safety reasons, it is recommended to connect cables using the bar solderless terminals.

For wiring, use the connection cables listed in the performance specifications in this manual and tighten them within the applicable tightening torque range. (Page 14, Section 2.2.1)

Use UL-listed solderless terminals and, for processing, use a tool recommended by their manufacturer.

For processing and installing the CC-Link dedicated cables, refer to "CC-Link Cable Wiring Manual" published by CC-Link Partner Association.

Recommended bar solderless terminals (manufactured by PHOENIX CONTACT GmbH & Co. KG)

- For crimping one wire to any of the DA, DB, or DG terminal: AI 0,5-8 WH
- For crimping one wire to either SLD or FG terminal: AI 2,5-8 BU^{*1}
- For crimping two wires collectively to any of the DA, DB, or DG terminal: AI-TWIN 2×0,5-8 WH^{*2}
- For crimping two wires collectively to the SLD terminal: AI-TWIN 2×1,5-8 BK^{*2*3}

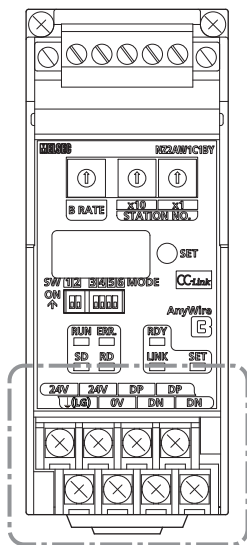
*1 When crimping one SLD cable to the solderless terminal, twist the shield mesh and the drain wires together.

*2 When connecting two cables to one terminal, crimp the two cables together to the TWIN bar solderless terminal.

*3 When crimping the SLD cable to the TWIN bar solderless terminal, twist the drain wires only.

4.2 AnyWire Bitty Side Terminal Block

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



AnyWire Bitty side 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
DN	DP: Transmission cable (+), DN: Transmission cable (–) Connect the DP and DN terminals to those on the slave module and terminating unit.
24V	Power supply for the NZ2AW1C1BY
0V	Connect these terminals to a 24VDC external power supply.
LG	Connect the LG terminal to the neutral point of the noise filter inserted between the 24V and 0V terminals. Ground the LG terminal at a single point along with the FG terminal.

4.2.2 Cable processing

Following are recommended solderless terminals for the transmission cables and power cables.

- V1.25-3 (JST Mfg. Co., Ltd.)
- TG1.25-3, TG1.25-3N (Nichifu Terminal Industries Co.,Ltd.)
- V1.25-3 (Fuji Terminal Industry Co. Ltd.)
- 170780-1 (Tyco Electronics AMP K.K.)

The following terminals can be also used for a power cable with a diameter of 2mm².

- V2-MS3 (JST Mfg. Co., Ltd.)
- TG2-3N (Nichifu Terminal Industries Co., Ltd.)

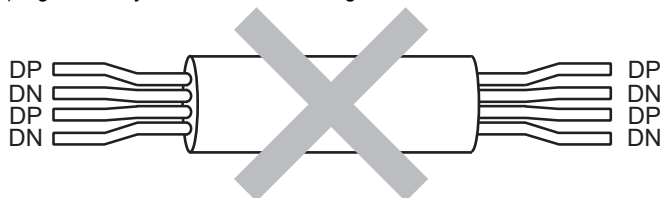
For wiring, use wires that meet the specifications of the transmission cable and power cable in the performance specifications, and tighten them within the applicable tightening torque range. (☞ Page 14, Section 2.2)

Use UL-listed solderless terminals and, for processing, use a tool recommended by their manufacturer.

Tightening torque: 0.5 to 0.8N·m

Point

- Do not run multiple transmission cables (DP, DN) using a multicore cable. Running multiple transmission cables (DP, DN) together may cause noise, resulting in a malfunction.

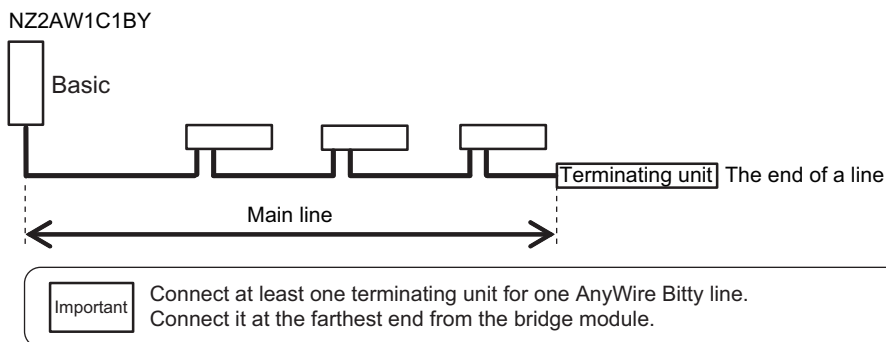


- The voltage should not fall below the lower limit of the allowable voltage range due to the voltage drop caused by the cable. If the voltage falls below the lower limit, malfunctions may occur.
 - Do not connect soldered cables directly to the terminals. Doing so may loosen the screws, resulting in a poor contact.
 - Use a crimping tool to connect a cable to a bar solderless terminal.
 - Before inserting a bar solderless terminal, check the shapes of the wire insertion opening and bar solderless terminal. Then, insert the terminal in the correct orientation. Inserting a bar solderless terminal wider than the wire insertion opening may damage the terminal block.
-

4.3 Terminating Unit

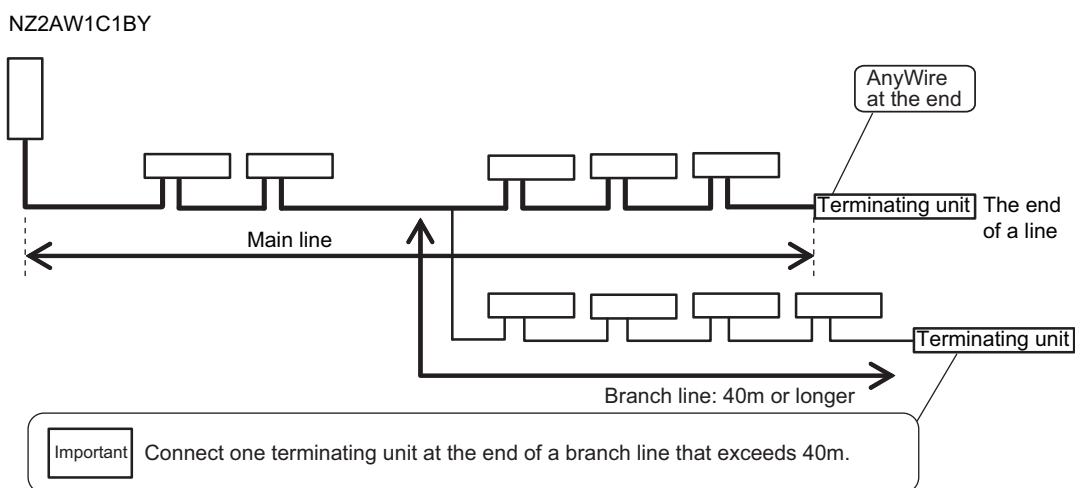
To ensure more stable transmission quality, connect a terminating unit to the end of the transmission cable (DP, DN).

■ Terminating unit connection

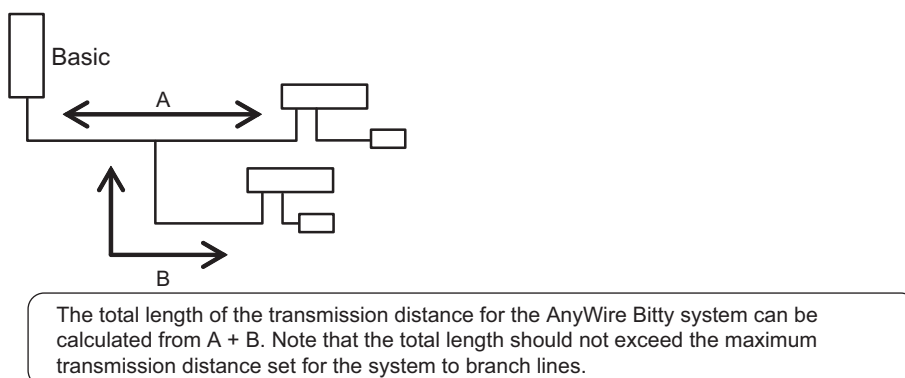


■ Branch of transmission cables (DP, DN)

[Example]



■ Total length

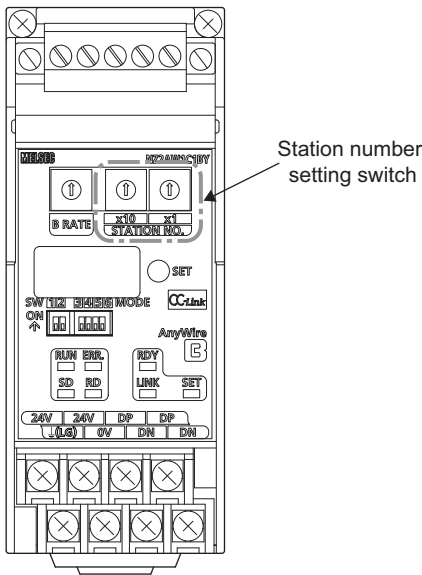


CHAPTER 5 SWITCH SETTING

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).

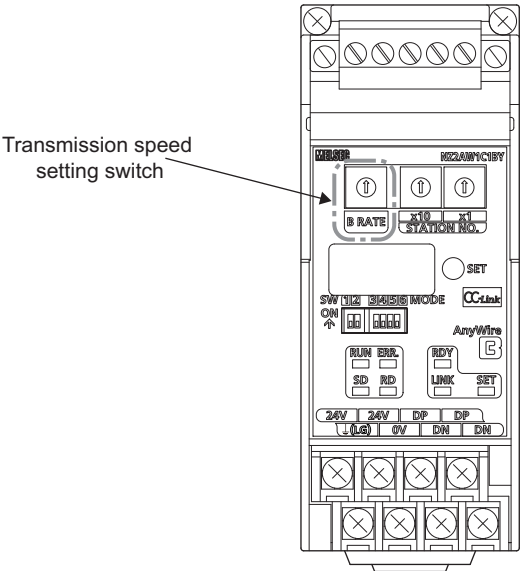


Station number ^{*1}	Station number setting switch	
	x10	x1
1	0	1
2	0	2
3	0	3
4	0	4
⋮	⋮	⋮
61 (The largest station number when 4 stations are occupied.)	6	1
62 (The largest station number when 3 stations are occupied.)	6	2
63 (The largest station number when 2 stations are occupied.)	6	3
64 (The largest station number when 1 station is occupied.)	6	4

^{*1} All the switch positions are zero (0) when the product is shipped. The ERR.LED turns on when a station number is set to zero (0) or a 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.



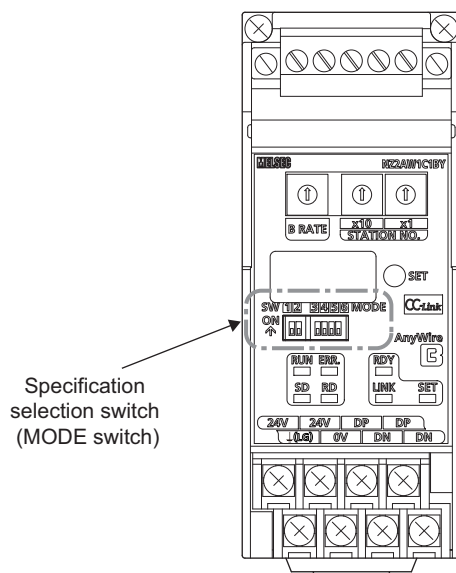
Setting value of the transmission speed setting switch	Communication speed
0 ^{*1}	156Kbps
1	625Kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
5 to F	Unable to set ^{*2}

^{*1} The switch is set to zero (0) when the product is shipped.
^{*2} The ERR.LED turns on when the speed 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.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RW _{rn} +0H	0 to 15	RW _{wm} +0H	0 to 15
RW _{rn} +1H	16 to 31	RW _{wm} +1H	16 to 31
RW _{rn} +2H	32 to 47	RW _{wm} +2H	32 to 47
RW _{rn} +3H	48 to 63	RW _{wm} +3H	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.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RW _{rn} +0H	0 to 15	RW _{wm} +0H	0 to 15
RW _{rn} +1H	16 to 31	RW _{wm} +1H	16 to 31
RW _{rn} +2H	32 to 47	RW _{wm} +2H	32 to 47
⋮	⋮	⋮	⋮
RW _{rn} +5H	80 to 95	RW _{wm} +5H	80 to 95
RW _{rn} +6H	96 to 111	RW _{wm} +6H	96 to 111
RW _{rn} +7H	112 to 127	RW _{wm} +7H	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.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RWr _n +0H	0 to 15	RWw _m +0H	0 to 15
RWr _n +1H	16 to 31	RWw _m +1H	16 to 31
RWr _n +2H	32 to 47	RWw _m +2H	32 to 47
⋮	⋮	⋮	⋮
RWr _n +9H	144 to 159	RWw _m +9H	144 to 159
RWr _n +10H	160 to 175	RWw _m +10H	160 to 175
RWr _n +11H	176 to 191	RWw _m +11H	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.

CC-Link side remote register input	AnyWire Bitty side input address	CC-Link side remote register output	AnyWire Bitty side output address
RWr _n +0H	0 to 15	RWw _m +0H	0 to 15
RWr _n +1H	16 to 31	RWw _m +1H	16 to 31
RWr _n +2H	32 to 47	RWw _m +2H	32 to 47
⋮	⋮	⋮	⋮
RWr _n +13H	208 to 223	RWw _m +13H	208 to 223
RWr _n +14H	224 to 239	RWw _m +14H	224 to 239
RWr _n +15H	240 to 255	RWw _m +15H	240 to 255

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

6.3 Correspondence Between the Remote Register and Address

This section describes the correspondence between the remote register and address of slave modules.

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 = Address: 31
D1000.0 = 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

Address: 15
Address: 0

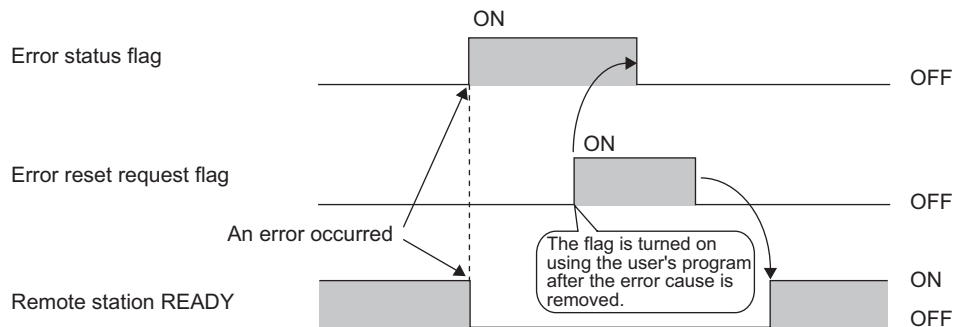
Occupied area by the address 8 on the 8-point input remote I/O module
Occupied area by the address 0 on the 8-point input remote I/O module

6.4 Error Reset

Remote station READY is turned on after the reset by supplying the power.

Error status flag is set (turns on) when an error occurs. Error status flag is reset (turns off) by turning on Error reset request flag from off, provided that the error cause has been eliminated.

Remote station READY is reset (turns off) when an error has occurred. Remote station READY remains reset (remains off) until Error reset request flag is turned off.



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

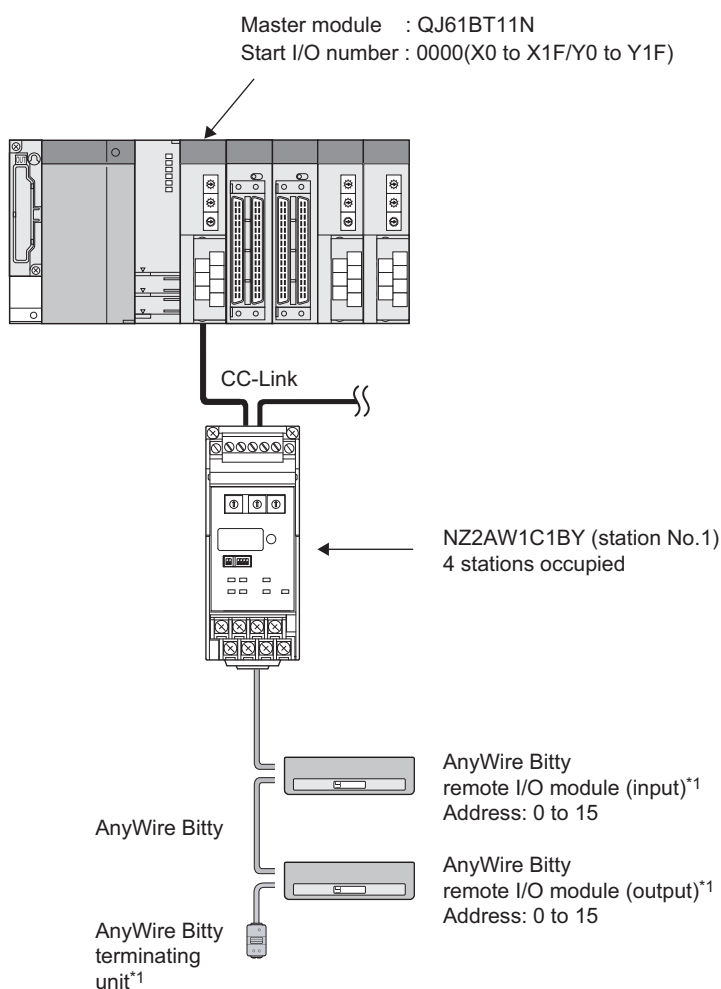
This section provides an example of the parameter setting for the MELSEC-Q series systems.

Point

In the MELSEC-A/QnA series systems, settings cannot be configured by the network parameters. Configure the setting on the program. (☞ Page 43, Section 7.2)

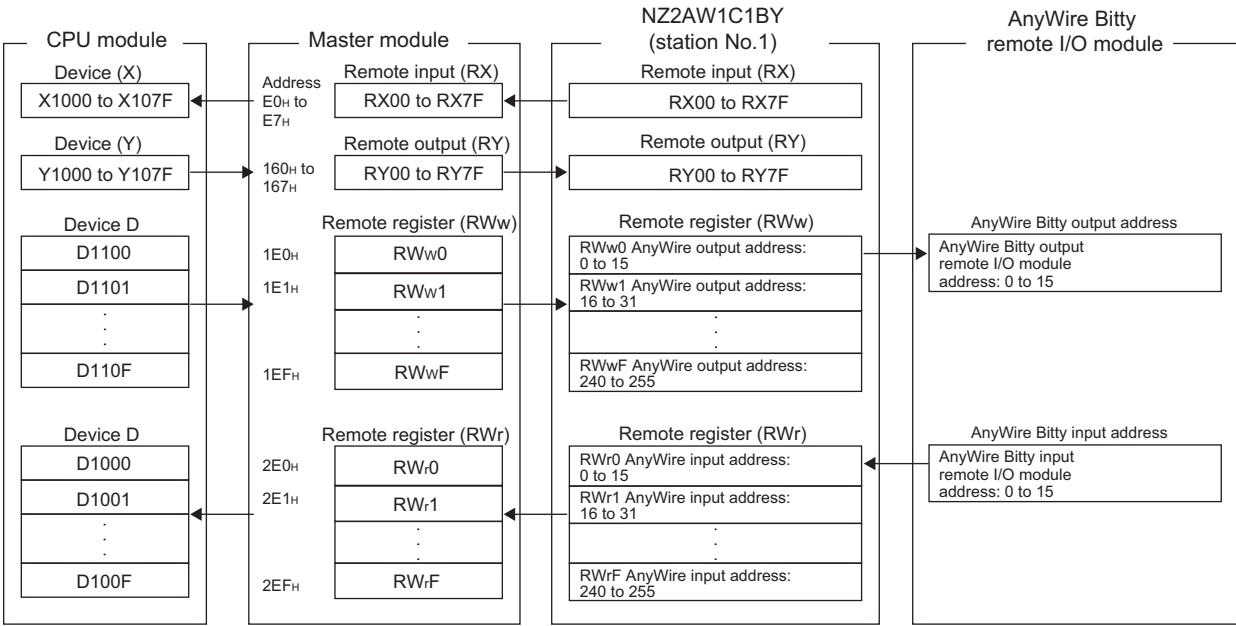
When applying the program examples introduced in this manual to the actual system, ensure the applicability and confirm that it does not cause system control problems.

(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.

(a) Setting example

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

Start I/O No.	1
Operation Setting	0000
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

Click "Station Information" to open the 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

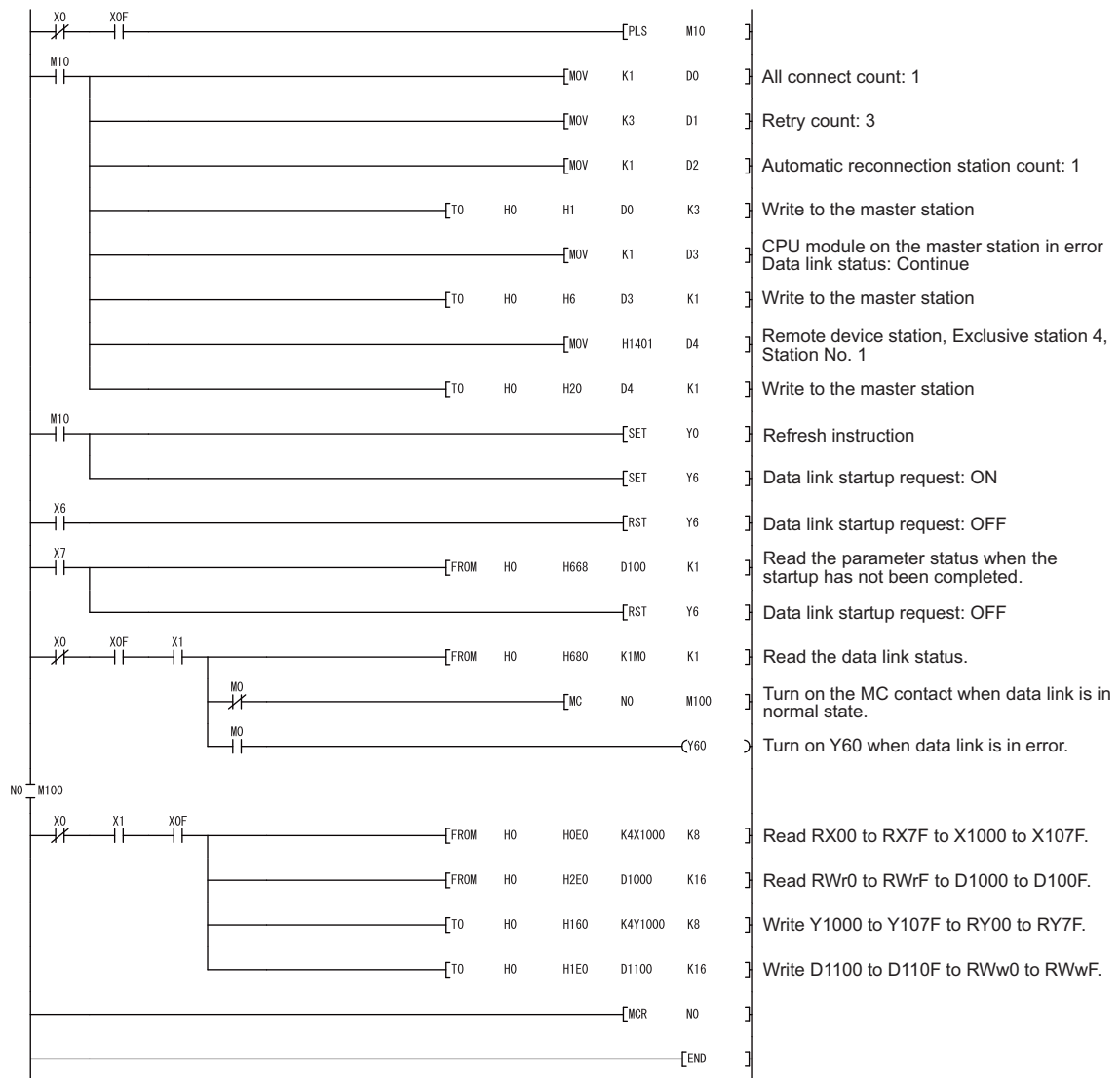
7.2 Setting on the Program

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

(1) List of devices used in the program example

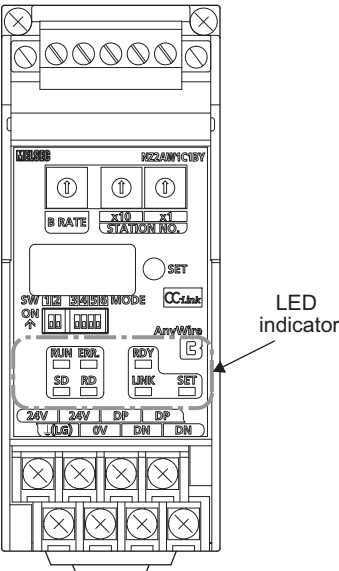
Device	Description
X0	Module failure
X1	Data link status of the host station
X6	Successful completion of data link startup by parameters of the buffer memory
X7	Data link startup error by parameters of the buffer memory
XF	Module READY
X1000 to X107F	Remote device RX
Y0	Refresh instruction
Y6	Data link 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.



(1) 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	—	—

(2) 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 48, Section 9.1)

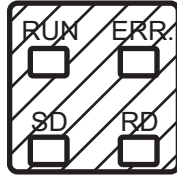
When the indication is different from the information above, check the indication condition and possible cause, and then eliminate the problem according to the troubleshooting steps. (Page 55, CHAPTER 12)

Point

- Registering a slave module by performing the automatic address detection enables the disconnected transmission cable location detection function.
- Data is transmitted regardless of whether the automatic address detection is performed.
- The LINK LED is turned on in red at the initial power-on because the connection terminal is not registered. Press the SET switch to perform the automatic address detection. (Page 48, Section 9.1)

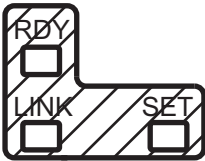
8.1 LED Indication Specification

(1) LED on the CC-Link side



Indicator	Name	Color	Description	
RUN	CC-Link communication status	Green	On	Normal communication
			Off	<ul style="list-style-type: none"> • Transmission cable disconnected • Transmission cable connected incorrectly • Wrong transmission speed set • Hardware reset under way
ERR.	CC-Link error display	Red	On	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Normal communication • Hardware reset under way
			Flashing	<ul style="list-style-type: none"> • Flashing regularly (At every 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 cable, or no response from the slave module.
				The SET LED is flashing. (At every 1 second)	The DP-DN line short-circuited or low supply voltage
SET	Automatic address detection display	Orange	On	Automatic address detection in progress	
			Off	Before or after automatic address detection	
			Fast flashing (At every 0.2 second)	Address write in progress	
			Slow flashing (At every 1 second)	The DP-DN line short-circuited or low supply voltage	

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.

Perform the automatic address detection in the following cases.

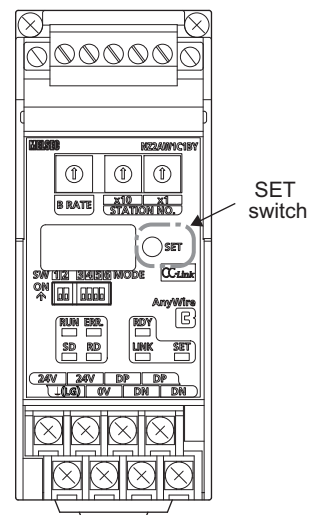
- When starting system operation with all the slave modules connected to the bridge module
- When adding a slave module
- When deleting a slave module
- When changing the address of a slave module

9.1.1 Performing the automatic address detection

Use the SET switch to perform the automatic address detection.

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, flashes, and turns off, the ID (address) has been stored.



Point

- During automatic address detection, input or output may not be accepted. Perform automatic address detection in the status that does not affect the operation of the equipment, such as while the program execution of the programmable controller is being stopped.
- 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 performed.
- Do not perform the 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, eliminate the error cause and turn off and on the NZ2AW1C1BY or turn on Error reset request flag (RY**).

Performing the automatic address detection also clears the indication 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

10



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 the slave modules to update I/O data.

11.1.1 Transmission cycle time of the NZ2AW1C1BY

The transmission cycle time of the NZ2AW1C1BY is listed 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

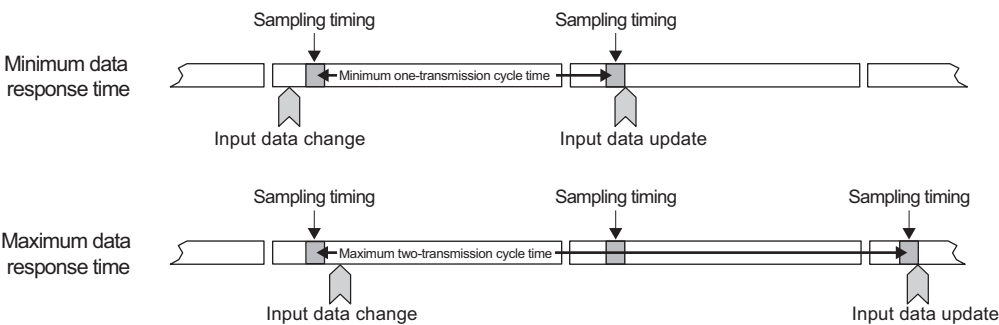
11.1.2 Effects of the double check system

(1) Input

Unless the same data is received twice successively on the NZ2AW1C1BY side, the input area data is not updated. Therefore, a minimum of one-transmission cycle time and a maximum of two-transmission cycle time are required as the data response time.

Therefore, when a signal is shorter than two-transmission cycle time, the input data may not be captured depending on the timing.

To ensure the response, provide an input signal that is longer than two-transmission cycle time.



(2) Output

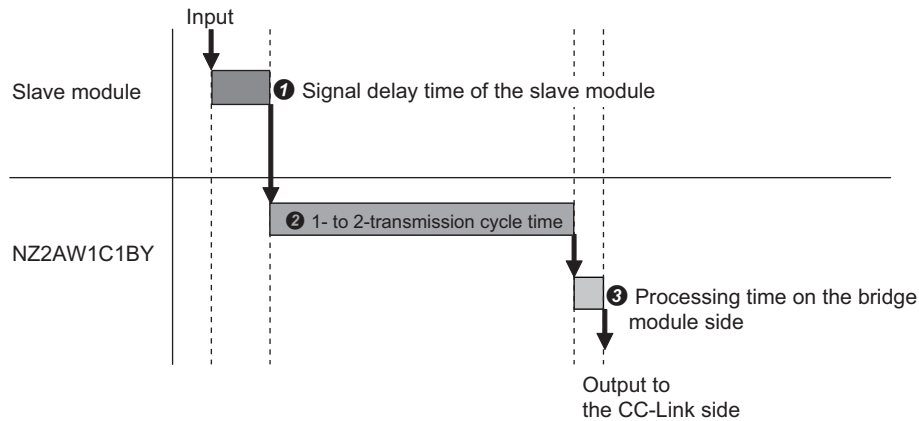
As the double check is performed on the slave module side, the time required is the same as that for input, namely a minimum of one-transmission cycle time and a maximum of two-transmission cycle time.

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 \times 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 \times 2

Number of transmission points is set to 512 points: $10.2 \times 2 = 20.4$ [ms]

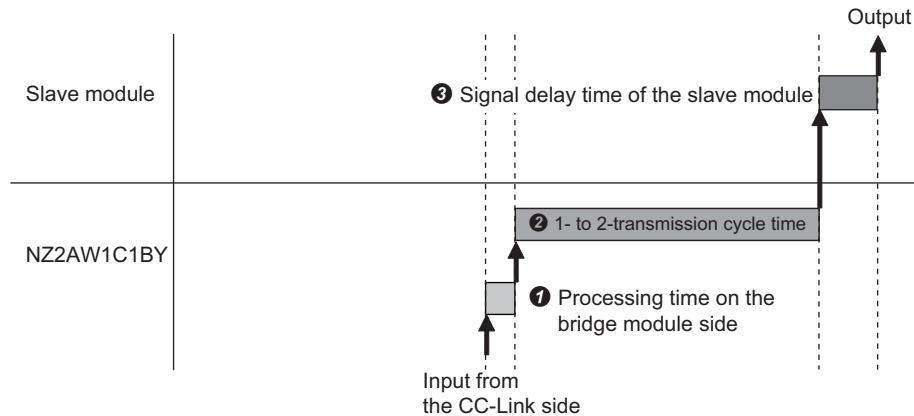
③ Processing time on the bridge module side

Processing time of the NZ2AW1C1BY is 0.592ms. : 0.592 [ms]

Therefore, the transmission delay time is $0.17 + 20.4 + 0.592 \approx 21$ [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 $\times 2$ + 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 $\times 2$

Number of transmission points is set to 512 points: $10.2 \times 2 = 20.4$ [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 $0.592 + 20.4 + 0.01 \approx 21$ [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.
- A unique station number has been set for each station on CC-Link.
- AnyWire Bitty devices are being supplied with 24VDC power.
- The LINK LED on the slave module of AnyWire Bitty is flashing.
- The address settings of AnyWire Bitty are correct and unique.

Remark

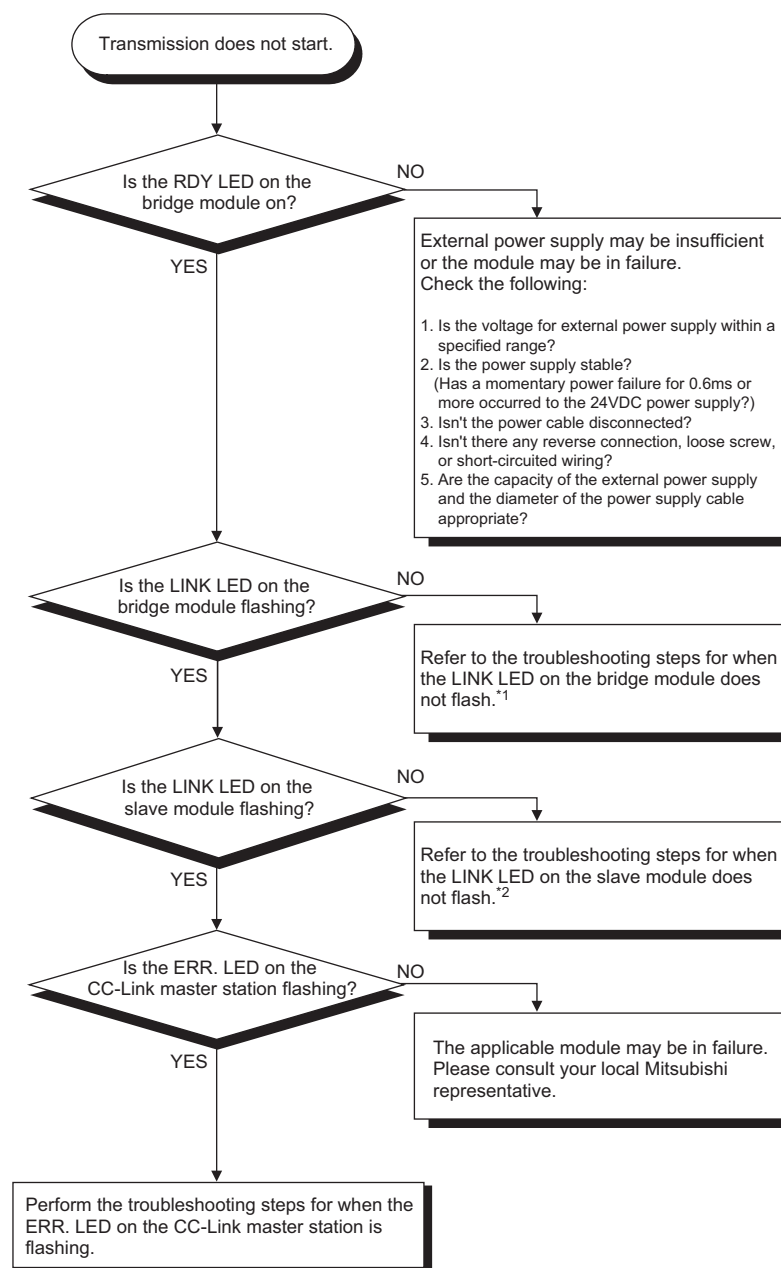
The reference pages for each specification required during troubleshooting are listed below.

- Connections:  Page 27, CHAPTER 4
- Operation mode:  Page 32, CHAPTER 5
- Data I/O:  Page 35, CHAPTER 6, Page 40, CHAPTER 7
- Details of the LED display:  Page 45, CHAPTER 8

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

12.1 Troubleshooting Flow

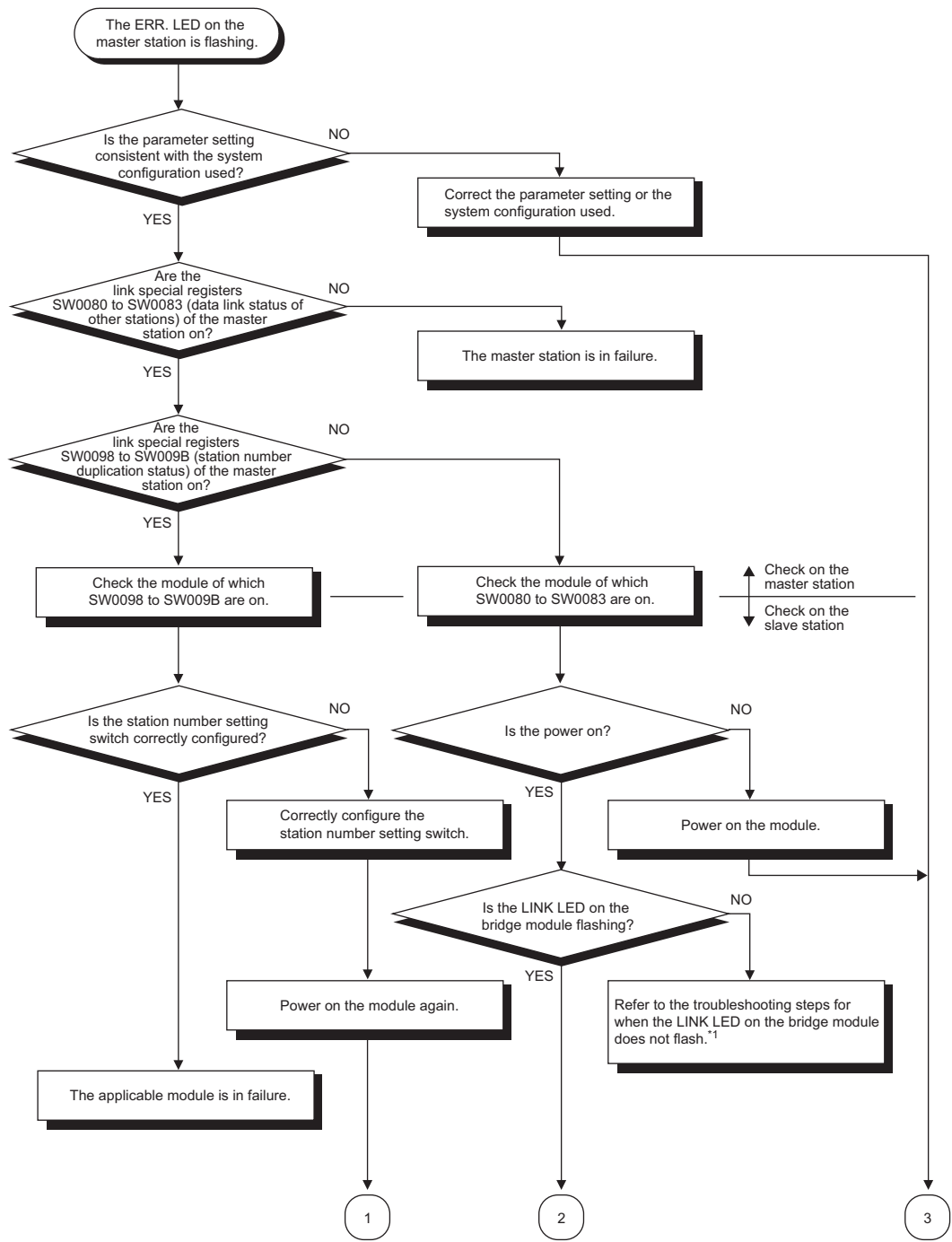
12.1.1 When transmission does not start



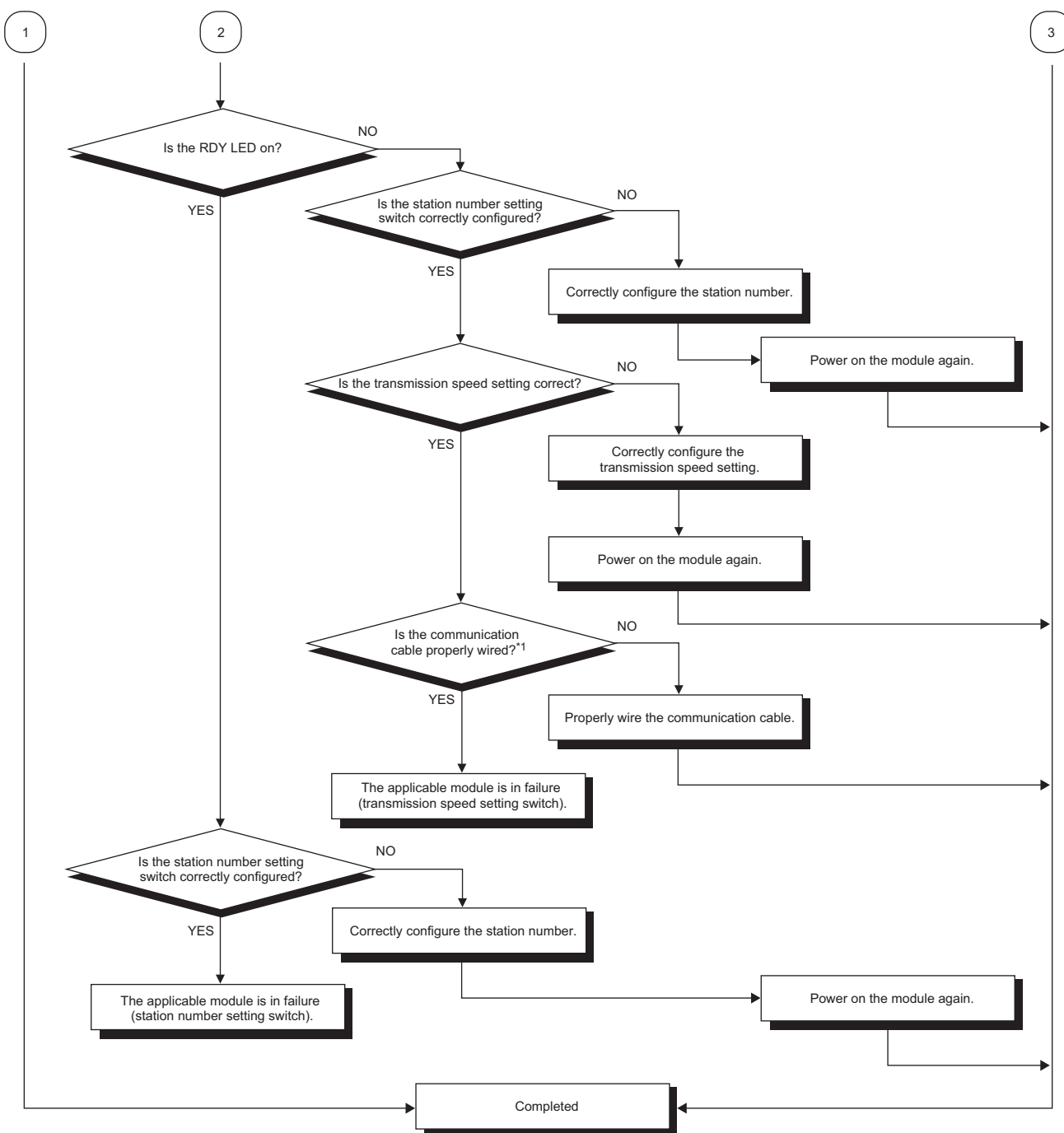
*1 Page 59, Section 12.1.3

*2 Page 59, Section 12.1.4

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

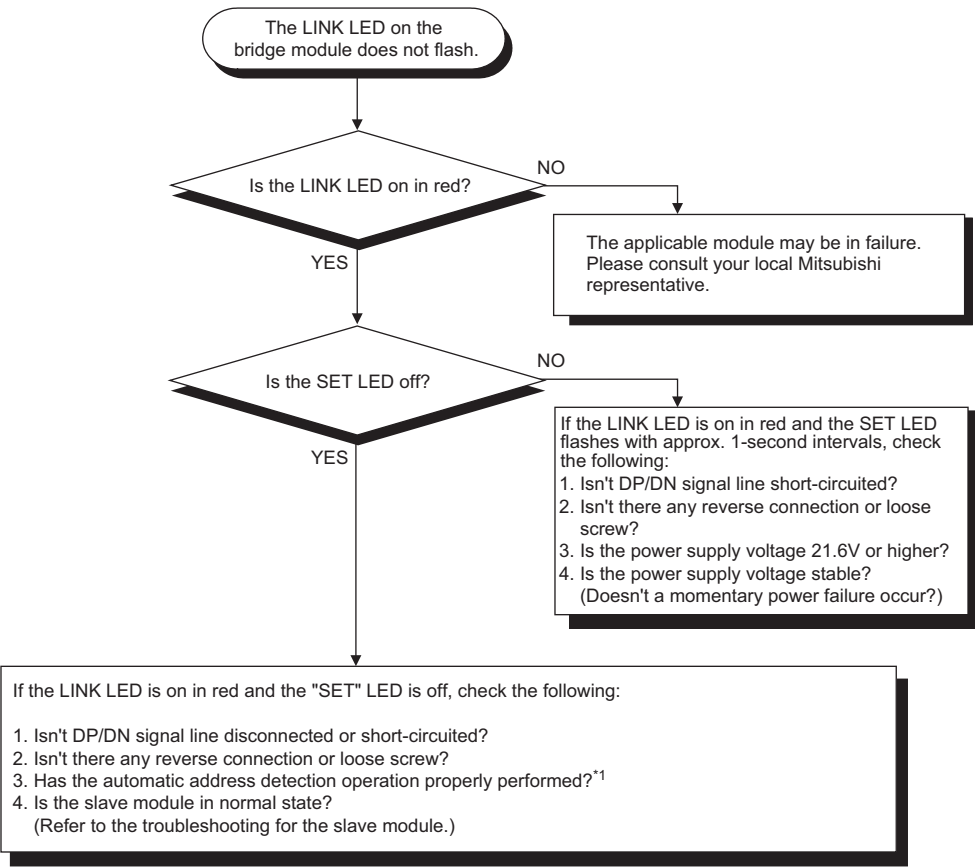


*1 Page 59, Section 12.1.3



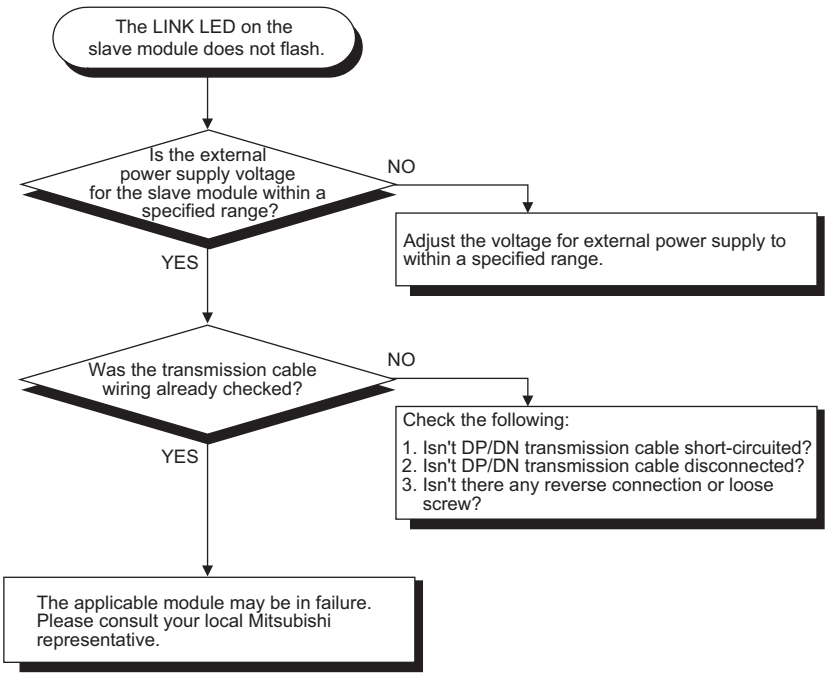
*1 Check the short circuit, reverse connection, disconnection, terminating resistor, FG connection, total length, and distance between stations.

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

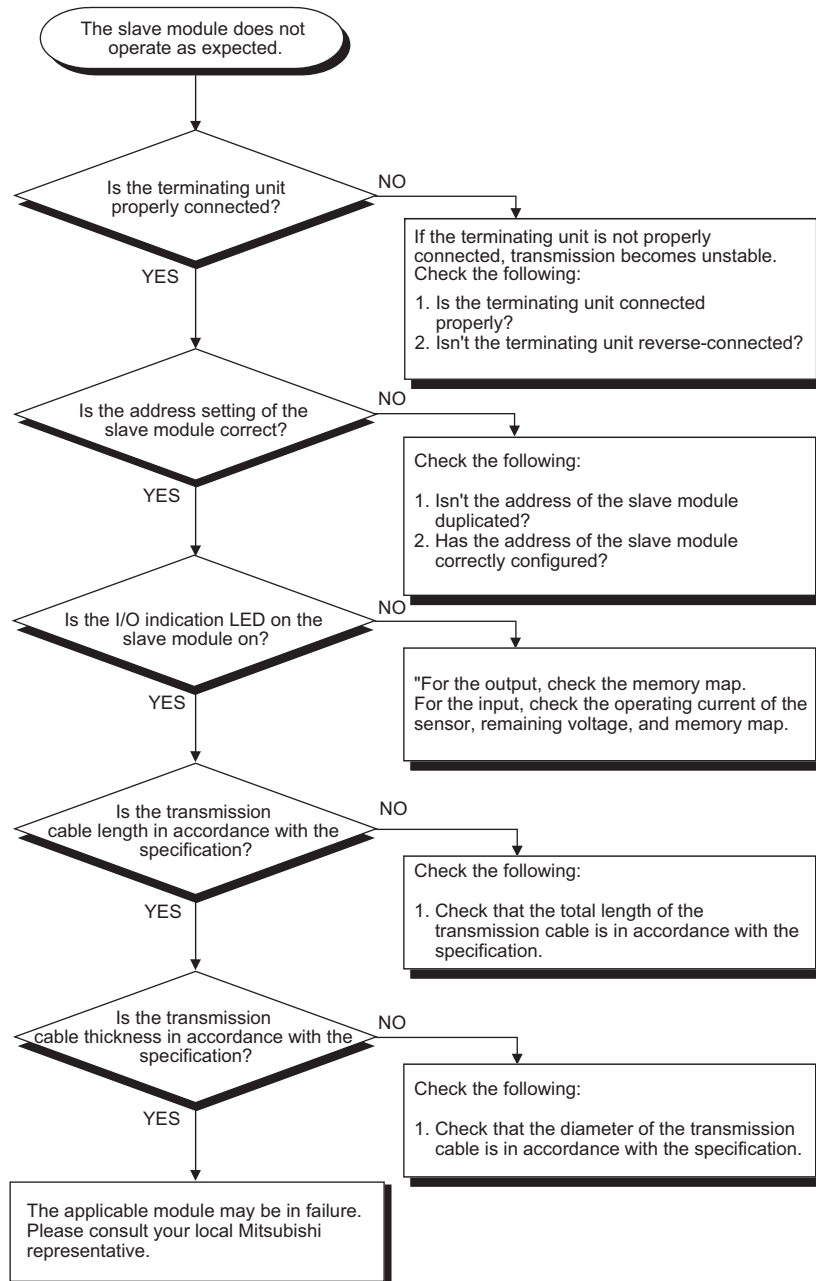


*1 Page 48, Section 9.1

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	Check 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).	<input type="checkbox"/>
	Are the terminating resistors (110Ω) connected to the stations on both ends?	Connect the terminating resistors included with the master/local modules to the stations on both ends.	<input type="checkbox"/>
	Is there an error in the CPU module of the master station?	Check the error code of the CPU module and take corrective actions.	<input type="checkbox"/>
	Were 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	<input type="checkbox"/>
	Is Data link startup request (Yn6 or Yn8) turned on?	Check the program.	<input type="checkbox"/>
	Is there an error in the master station?	Check the following. • Host parameter status (SW0068) • Switch setting status (SW006A) • Loading status (SW0069) • Whether the ERR LED on the master station is flashing or not.	<input type="checkbox"/>
	Does the scan time exceed the maximum value while the synchronous mode is selected?	Select the asynchronous mode or reduce the transmission speed.	<input type="checkbox"/>
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 of the module • Other station data link status (SW0080 to SW0083)	<input type="checkbox"/>
	Is the data being read from the correct address of the remote input (RX)?	Check the program.	<input type="checkbox"/>
	Was it set as a reserved station?	Check the parameters.	<input type="checkbox"/>
	Is the same station number used for multiple stations?	Check the station numbers.	<input type="checkbox"/>
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 of the module • Other station data link status (SW0080 to SW0083)	<input type="checkbox"/>
	Is Refresh instruction (Yn0) of the master station turned on?	Check the program.	<input type="checkbox"/>
	Is the data being written to the correct address of the remote output (RY)?	Check the program.	<input type="checkbox"/>
	Was it set as a reserved station?	Check the parameters.	<input type="checkbox"/>
	Is the same station number used for multiple stations?	Check the station numbers.	<input type="checkbox"/>
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 of the module • Other station data link status (SW0080 to SW0083)	<input type="checkbox"/>
	Is the data being read from the correct address of the remote register (RWr)?	Check the program.	<input type="checkbox"/>
	Was it set as a reserved station?	Check the parameters.	<input type="checkbox"/>
	Is the same station number used for multiple stations?	Check the station numbers.	<input type="checkbox"/>

Symptom	Check item	Check method	Check
Faulty stations cannot be detected.	Was it set as an error invalid station?	Check the parameters.	<input type="checkbox"/>
	Is the same station number used for multiple stations?	Check the station numbers.	<input type="checkbox"/>

(2) AnyWire Bitty side

Symptom	Check item	Check method	Check
Data I/O is impossible.	■ NZ2AW1C1BY side		
	Is 24VDC power being supplied appropriately?	Check the power voltage.	<input type="checkbox"/>
	Is the transmission cable (DP, DN) connected correctly?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
	Was the MODE switch set correctly?	Check the MODE switch setting.	<input type="checkbox"/>
	■ Slave module side		
	Is 24VDC power being supplied appropriately?	Check the power voltage.	<input type="checkbox"/>
	Is the transmission cable (DP, DN) connected correctly?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
	Was the address set correctly?	Check the address setting.	<input type="checkbox"/>
Data I/O is unstable.	Are terminating units connected? Are the poles connected in reverse?	Check that the terminating units are connected correctly.	<input type="checkbox"/>
	Does the total length of the transmission cable (DP, DN) exceed the specifications?	Check that the total length is correct.	<input type="checkbox"/>
	Is the shield line being used for multiple-point grounding?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
The LINK LED on the slave module does not flash.	Is the supply voltage within the allowable voltage range?	Check the power voltage.	<input type="checkbox"/>
	Is any power cable (24V, 0V) disconnected? Is the power supply terminal loose?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
	Are the screws on the terminal block loosened?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
	Is any transmission cable (DP, DN) disconnected?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
The LINK LED of the NZ2AW1C1BY turns on in red.	Is any transmission cable (DP, DN) disconnected?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
	At the startup, was the automatic address detection performed correctly?	Check the status of the slave module and the wiring for AnyWire Bitty, and perform the automatic address detection.	<input type="checkbox"/>
	Are the screws on the terminal block loosened?	Check the wiring for AnyWire Bitty.	<input type="checkbox"/>
The LINK LED of the NZ2AW1C1BY turns on in red and the SET LED flashes in orange (At every 1 second).	Is any transmission cable (DP, DN) short-circuited? Is the power supply voltage lower than 21.6V?	Check the wiring for AnyWire Bitty. Check the power voltage.	<input type="checkbox"/>

APPENDICES

Appendix 1 EMC and Low Voltage Directives

Compliance with the EMC Directive, which is one of the EU directives, has been mandatory for the products sold within EU member states since 1996 as well as compliance with the Low Voltage Directive since 1997.

To prove the compliance with these Directives, manufacturers must issue an EC Declaration of Conformity and the products must bear a CE marking.

(1) Sales representative in EU member states

The sales representative in EU member states will be:

Name: MITSUBISHI ELECTRIC EUROPE B.V.

Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

Appendix 1.1 Requirements for compliance with the EMC Directive

The EMC Directive sets two requirements for compliance: emission (conducted and radiated electromagnetic energy emitted by a product) and immunity (the ability of a product to function without being influenced by externally generated electromagnetic energy), and all applicable products are required to satisfy these requirements. This section summarizes the precautions for machinery constructed with this product to comply with the EMC Directive. These precautions are based on the requirements of the EMC Directive and the harmonized standards.

However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC Directive. The manufacturer of the machinery must determine the testing method for compliance and declare conformity to the EMC Directive.

(1) Installation in control panel

This product is an open type device and must be installed inside a control panel. *1

This ensures safety as well as effective shielding of electromagnetic noise emitted from this product.

*1 Modules on the remote station in each network must be also installed inside the control panel. However, waterproof modules on the remote station can be installed outside the control panel.

(a) Control panel

- Use a conductive control panel.
- Mask off the area used for grounding when securing the top or bottom plate to the control panel using bolts.
- To ensure electrical contact between the inner plate and the control panel, mask off the bolt installation areas of an inner plate so that conductivity can be ensured in the largest possible area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Keep the diameter of the holes in the control panel 10cm or less. If the diameter is larger than 10cm, electromagnetic wave may be emitted. In addition, because electromagnetic wave leaks through a clearance between the control panel and its door, reduce the clearance as much as possible. The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.
- The tests by Mitsubishi were conducted using a panel having the damping characteristics of 37dB (maximum) and 30db (average) (measured at 3m distance, 30 to 300MHz).

(b) Wiring a ground cable

Run the cable of this product as instructed below.

- Provide a ground point to the control panel near this product. Ground the LG terminal of this product to the ground point with the thickest and shortest ground cable possible (30cm or shorter).

(2) Cables

(a) CC-Link dedicated cable

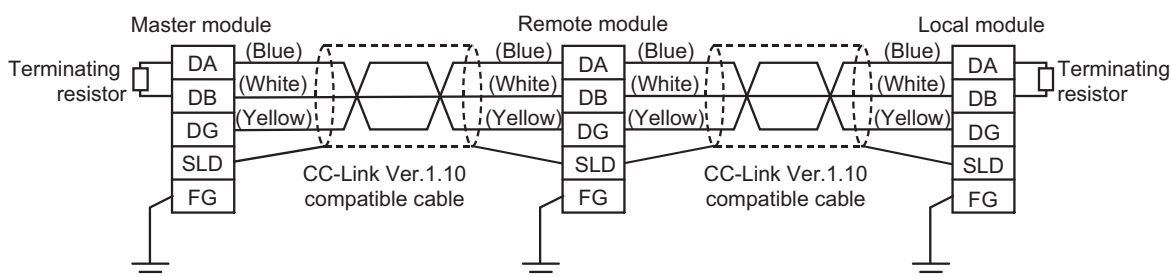
Use the AD75CK cable clamp (Mitsubishi) to shield the cable connected to the CC-Link module located close to the exit of the control panel or each CC-Link station, and ground the shielded part of the CC-Link dedicated cable to the control panel within 30cm from the module or station.

The Ver.1.10-compatible CC-Link dedicated cable is a shielded cable. Strip a part of the jacket of the cable as shown below and ground the exposed shield to the ground as much as possible.

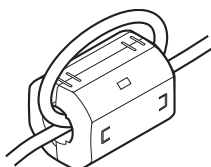


Use the specified Ver.1.10-compatible CC-Link dedicated cable.

Use the FG terminals of the CC-Link module and CC-Link stations as shown below to connect to the FG line inside the control panel.

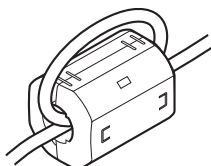


For the CC-Link dedicated cable, attach a ferrite core having the attenuation characteristics equivalent to that of ZCAT3035-1330 made by TDK Corporation as close to the CC-Link side terminal block of this product as possible. Use a ferrite core with two turns of wire as shown below.



(b) AnyWire Bitty cable

For the AnyWire Bitty cable, attach a ferrite core having the attenuation characteristics equivalent to that of ZCAT3035-1330 made by TDK Corporation as close to the AnyWire Bitty side terminal block of this product as possible. Use a ferrite core with two turns of wire as shown below.



(c) Power cable for the 24VDC power supply terminal

Use a CE-marked DC power supply. The DC power supply must be placed together with the module in the same control panel, and the power cable connected to the power terminal of this product should be 30cm or shorter.

(3) Power supply module

Use a CE-marked external power supply and ground the FG terminal.

(External power supply used for the tests conducted by Mitsubishi: PS5R-SF24 made by IDEC Corporation)

(4) Installation environment

Use this product in Zone A*¹.

- *1 Zone means a category determined according to the industrial environment conditions and defined by the harmonized standard EN61131-2 of the EMC and Low Voltage Directives.
 - Zone C: Main power supply insulated from the public power supply by a special transformer
 - Zone B: Special power supply with the secondary surge protector from the main power (Rated voltage is assumed to be 300V or less.)
 - Zone A: Local power supply protected by an AC-DC converter or an insulating transformer from the special power supply (Rated voltage is assumed to be 120V or less.)

Appendix 1.2 Requirements for compliance with the Low Voltage Directive

The Low Voltage Directive does not apply to this product because it operates on 24VDC power supply.

For making the PLC system used comply with the Low Voltage Directive, refer to the section about the EMC and Low Voltage Directives in the user's manual of the CPU module to be used.

Appendix 2 Functions Added and Modified with Version Upgrade

A

The NZ2AW1C1BY has additional functions and revised specifications due to upgrade.

Available functions and specifications of the NZ2AW1C1BY vary depending on the function version and the serial number.

Additional function	Supported function version	Sixth digit of the serial no. of the applicable product
Transmission cable voltage drop detection function	A	"3" and later

REVISIONS

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

Print date	*Manual number	Revision
June 2011	SH(NA)-080991ENG-A	First edition
March 2013	SH(NA)-080991ENG-B	Revision due to the addition of the transmission cable voltage drop detection function and compliance with EMC and UL/cUL
November 2016	SH(NA)-080991ENG-C	Revision due to changes in the rating plate and grounding mark

Japanese manual version SH-080990-C

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WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

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

[Gratis Warranty Range]

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

2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for one year 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 to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) 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.

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SH(NA)-080991ENG-C(1611)MEE
MODEL: NZ2AW1C1BY-U-E
MODEL CODE: 13JZ61

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