

Mitsubishi Programmable Controller

MELSEC iQ-R
series

MELSEC iQ-R AnyWireASLINK Master Module User's Manual (Application)

-RJ51AW12AL

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.)

AnyWireASLINK

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PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS

The RJ51AW12AL was jointly developed and manufactured by Mitsubishi and Anywire Corporation. Note that there are differences in warranty.

- Warranty

Item	RJ51AW12AL	Other programmable controller products (e.g. MELSEC iQ-R series)
Repair term after discontinuation of production	1 year	7 years

- Application of the EMC Directive

Item	RJ51AW12AL	Other programmable controller products (e.g. MELSEC iQ-R series)
Applicable EMC standard	EN61131-2	EN61131-2

- Application of the UL/cUL standards

Item	RJ51AW12AL	Other programmable controller products (e.g. MELSEC iQ-R series)
Applicable UL standard/cUL standard	UL508 CSA22.2	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 MELSEC iQ-R Module Configuration Manual.

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

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
 - (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
 - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
 - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
 - (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to "General Safety Requirements" in the MELSEC iQ-R Module Configuration Manual.
 - (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
-

[Design Precautions]

WARNING

- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
 - For the operating status of each station after a communication failure, refer to manuals relevant to the network. Incorrect output or malfunction due to a communication failure may result in an accident.
 - When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
 - Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
 - Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used.
 - If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures. To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.
 - An AnyWireASLINK system has no control function for ensuring safety.
-

[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.
 - During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
 - After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
 - Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM undefined. The values need to be set in the buffer memory and written to the flash ROM again. Doing so also may cause malfunction or failure of the module.
 - When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not OPEN in Program" for "Open Method Setting" of "Module Parameter". If "OPEN in Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the line, and external devices cannot execute the remote RUN function.
-

[Installation Precautions]

WARNING

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

[Installation Precautions]

CAUTION

- Use the programmable controller in an environment that meets the general specifications in the Safety Guidelines included with the base unit. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
 - To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
 - When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
 - Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
 - When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.
 - When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
 - Securely insert an extended SRAM cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.
 - Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, or connector. Doing so can cause malfunction or failure of the module.
-

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
 - After installation and wiring, attach the included terminal cover to the module before turning it on for operation. Failure to do so may result in electric shock.
-

[Wiring Precautions]

CAUTION

- 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.
 - Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
 - Check the rated voltage and signal 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 fire or failure.
-

[Wiring Precautions]

CAUTION

- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
 - Securely connect the connector to the module. Poor contact may cause malfunction.
 - 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.
 - 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. Do not clamp the extension cables with the jacket stripped.
 - Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
 - Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
 - When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
 - Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
 - A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
 - Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
 - For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.
 - Do not apply the 24VDC power before wiring the entire AnyWireASLINK system. If the power is applied before wiring, normal data transmission is not guaranteed.
 - Connect a 24VDC external power supply to the device(s) in an AnyWireASLINK system.
-

[Startup and Maintenance Precautions]

WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
 - Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so will cause the battery to produce heat, explode, ignite, or leak, resulting in injury and fire.
 - Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock.
-

[Startup and Maintenance Precautions]

CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
 - Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
 - Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
 - Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.
 - Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
 - Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
 - After the first use of the product, do not mount/remove the module to/from the base unit, and the terminal block to/from the module, and do not insert/remove the extended SRAM cassette to/from the CPU module more than 50 times (IEC 61131-2 compliant) respectively. Exceeding the limit may cause malfunction.
 - After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
 - Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
 - Do not touch the integrated circuits on the circuit board of an extended SRAM cassette. Doing so may cause malfunction or failure of the module.
 - Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
 - Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
 - Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.
-

[Operating Precautions]

CAUTION

- When changing data and operating status, and modifying program of the running programmable controller from an external device such as a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
 - Do not power off the programmable controller or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the module. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so can cause malfunction or failure of the module.
-

[Disposal Precautions]

CAUTION

- When disposing of this product, treat it as industrial waste.
 - When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.
-

[Transportation Precautions]

CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
 - The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.
-

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.

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("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.

INTRODUCTION

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

This manual describes the functions, programming, and troubleshooting of the relevant product listed below.

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

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

Please make sure that the end users read this manual.

This module was jointly developed by Mitsubishi and Anywire Corporation. The module allows the AnyWireASLINK[®] system to be connected to a MELSEC iQ-R series programmable controller system.

Relevant product

RJ51AW12AL

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
MELSEC iQ-R AnyWireASLINK Master Module User's Manual (Application) [SH-081585ENG] (this manual)	Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of the AnyWireASLINK master module	Print book e-Manual PDF
MELSEC iQ-R AnyWireASLINK Master Module User's Manual (Startup) [SH-081584ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of the AnyWireASLINK master module	Print book e-Manual PDF



e-Manual refers to the Mitsubishi FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Address	A parameter assigned to a slave module to identify each node on the AnyWireASLINK network
Address writer	A hand-held device to read/write parameters (including addresses) from/to a slave module
AnyWireASLINK	A reduced wiring network where sensors at the end of a control system are connected to a programmable controller. This network enables a master module to detect sensor disconnection and enables a user to set the I/O operations of an AnyWireASLINK system on the RJ51AW12AL from the upper system without using the I/O areas of the CPU module.
AnyWireASLINK bridge module	A generic term for the NZ2AW1C2AL and NZ2AW1GFAL
AnyWireASLINK master module	A generic term for the RJ51AW12AL, QJ51AW12AL, and LJ51AW12AL
ASLINKAMP	A generic term for sensor amplifiers that have an AnyWireASLINK interface
ASLINKER	A generic term for I/O devices that have an AnyWireASLINK interface
Buffer memory	Memory in an intelligent function module for storing data such as setting values and monitored values.
CC-Link IE Field Network master/local module	A generic term for the RJ71GF11-T2, QJ71GF11-T2, QS0J71GF11-T2, LJ71GF11-T2 CC-Link IE Field Network master/local module and the following modules when the CC-Link IE Field Network function is used: <ul style="list-style-type: none"> • RJ71EN71 • RnENCPU
CPU module	A generic term for the MELSEC iQ-R series CPU modules
Data link	A generic term for cyclic transmission and transient transmission
Device	A device (X, Y, M, D, or others) in a CPU module
Engineering tool	Another term for the software package for the MELSEC programmable controllers
ID	A parameter to identify whether the module is an input module or output module based on its address Output slave module ID: Address ID of the input slave module or I/O combined slave module: Address + 200H
Intelligent device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station and also issues a transient transmission request to another station.
Intelligent function module	A module that has functions other than input and output, such as an A/D converter module and D/A converter module
Label	A label that represents a device in a given character string
Link device	A device (RX, RY, RWr, or RWw) in a module on CC-Link IE Field Network
Master station	A station that controls the entire network. This station can perform cyclic transmission and transient transmission with all stations. Only one master station can be used in a network.
Module label	A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. For the module used, GX Works3 automatically generates this label, which can be used as a global label.
Power cable (24V, 0V)	A cable that connects a 24VDC external power supply to the RJ51AW12AL. This cable is also used when the isolation (4-line) type slave module and RJ51AW12AL are connected.
Remote head module	The abbreviation for the RJ72GF15-T2 CC-Link IE Field Network remote head module
Slave module	A generic term for modules that communicate data with the RJ51AW12AL
Terminating unit	A waveform shaper
Transmission cable (DP, DN)	A signal cable that connects between a slave module and the RJ51AW12AL
Transmission cycle time	A data sampling interval

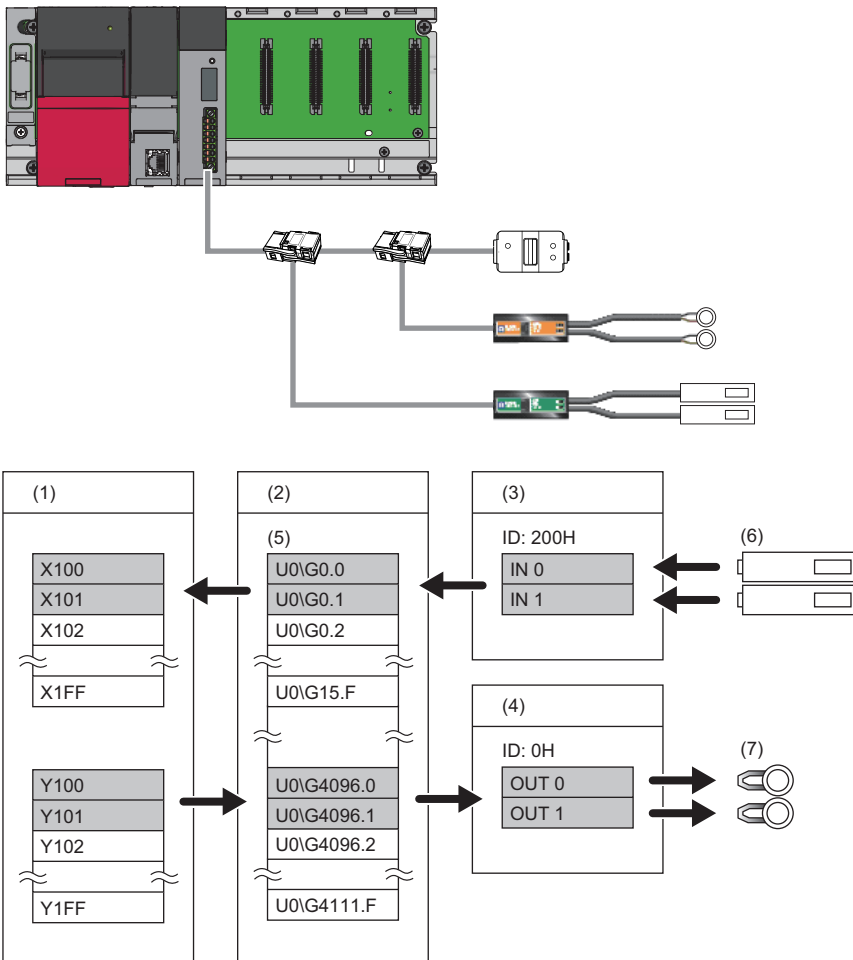
1 FUNCTIONS

1.1 AnyWireASLINK Transmission

The AnyWireASLINK is a high-speed and highly reliable system which releases the work site from complicated and incorrect wiring.

In AnyWireASLINK, the RJ51AW12AL communicates with slave modules using IDs (addresses) of the slave modules.

The IDs (addresses) of the slave modules are stored in the buffer memory of the RJ51AW12AL.



- (1) CPU module
- (2) RJ51AW12AL
- (3) Input slave module (ASLINKER): Address 0
- (4) Output slave module (ASLINKER): Address 0
- (5) Buffer memory
- (6) Sensor switch
- (7) LED

Bit transmission

A maximum of 512 I/O data points (input 256 points, output 256 points) can be exchanged between the RJ51AW12AL and a slave module.

1.2 Double Verification

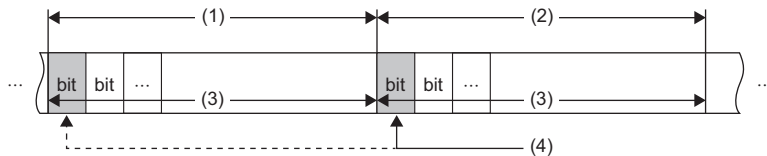
A double check is an error control system. In this system, cycle data in AnyWireASLINK transmission is recognized as valid data if the data matches with the data of the last transmission or is ignored as invalid data if the data does not match with the last data. The double verification ensures reliability of communication.

The double verification is classified into a bit double verification and word double verification.

Overview

■Bit double verification

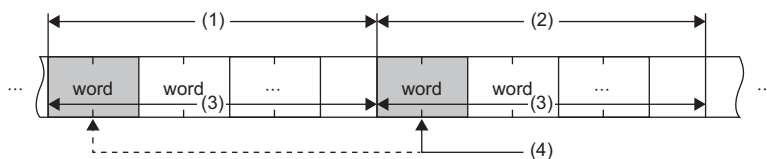
If one bit of data is the same between two successive transmission cycles, the data is valid and I/O data is communicated.



- (1) Transmission cycle (last)
- (2) Transmission cycle (current)
- (3) I/O data
- (4) This data is compared with the verification data (one bit) of the last transmission cycle.

■Word double verification

If one word (16 bits) of data is the same between two successive transmission cycles, the data is valid and I/O data is communicated.



- (1) Transmission cycle (last)
- (2) Transmission cycle (current)
- (3) I/O data
- (4) The data is compared with the verification data (one word) of the last transmission cycle.

Point

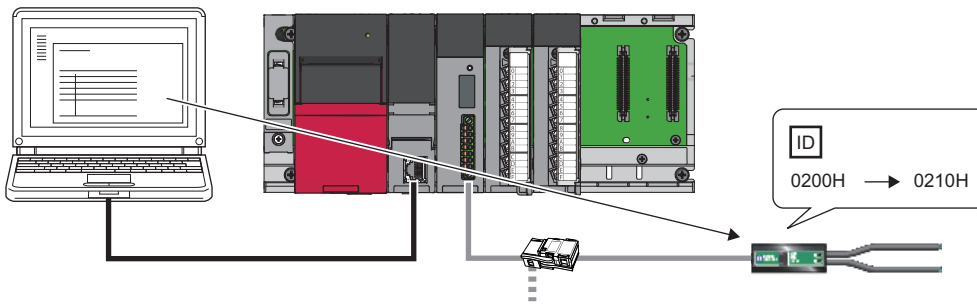
The bit double verification is suitable for digital I/O type slave modules, which use information in units of bits. The word double verification is suitable for analog I/O type slave modules, which use information in units of words.

Setting method

Set the double verification in "Double verification" of "Basic setting". (☞ Page 35 Double verification)

1.3 Remote Address Change Function

With this function, an ID (address) of a slave module can be changed using the buffer memory area without an address writer.



Applicable slave module

For the slave modules that support the remote address change function, refer to the following.

www.anywire.jp

Operating procedure

1. Execute automatic address detection to check that no error has occurred in the AnyWireASLINK system. (☞ Page 39 Automatic Address Detection Function)

2. Specify an access method to a slave module.

Store 0002H (address change) in 'Parameter access setting' (Un\G10320).

3. Specify an ID of the slave module to be accessed.

Store the ID to be changed (old ID) in 'Parameter access target module ID specification' (Un\G10321).

ID	Description
0000H to 00FFH	ID of the output slave module
0200H to 02FFH	ID of the input slave module or I/O combined slave module

4. Specify a new ID of the slave module.

Store the new ID in 'Change ID specification' (Un\G10323).

ID	Description
0000H to 00FFH	ID of the output slave module
0200H to 02FFH	ID of the input slave module or I/O combined slave module

If the specified ID has already been used or is out of the allowable specification range, an error occurs.

5. Turn on and off 'Parameter access request command for the slave module' (Y10).

At this time, 'Parameter access completion flag' (X11) turns off. When the parameter access is completed, 'Parameter access completion flag' (X11) automatically turns on.

6. After changing the IDs of all the target slave modules, execute automatic address detection. (☞ Page 39 Automatic Address Detection Function)

Precautions

- Before executing this function, make sure to execute automatic address detection to check that no error has occurred in the AnyWireASLINK system. (☞ Page 39 Automatic Address Detection Function)
- This function cannot be executed for slave modules separated from the RJ51AW12AL because of disconnection or slave modules having the same ID. Use an address writer to change the IDs of such slave modules.
- This function can be executed if only one slave module having no ID exists within one AnyWireASLINK line. If IDs of multiple slave modules are not set, it is recognized as an ID duplication. Thus, the IDs cannot be changed.

1.4 Same ID Used Detection Function

This function checks whether the same ID is used for multiple slave modules through automatic address detection or same address used check. The LEDs of the relevant slave modules are forcibly turned on.

Point

- ID duplications are detected through automatic address detection or same address used check. If the CPU module is reset or the power is turned off after ID duplication detection, the same ID used status cannot be checked until automatic address detection or same address used check is executed again.
- Even if an ID is assigned to multiple modules, a single ID is stored in 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112). For example, even when multiple modules have an ID 10, "1" is stored in 'Number of the alarm IDs' (Un\G9984) and "10" is stored in 'Alarm ID information storage area' (Un\G9985 to Un\G10112).

How to execute automatic address detection

For details on automatic address detection, refer to the following.

 Page 39 Automatic Address Detection Function

How to execute same address used check

Turn off and on 'Overlap address inspection command' (Y2). If 'Overlap address inspection flag' (X15) turns on and off, it indicates that the same address used check is completed.

The same address used check cannot be executed under any of the following conditions.


- When an error occurs in the AnyWireASLINK system (Example: Short circuit, 24VDC external power supply voltage drop)
- Within approximately five seconds after the AnyWireASLINK system is powered on or system is reset
- When automatic address detection is in progress (While 'Automatic address detection flag' (X14) is on)
- When the same address used check is in progress (While 'Overlap address inspection flag' (X15) is on)
- When the parameter access is in progress (While 'Parameter access request command for the slave module' (Y10), 'Parameter batch read command for the slave module' (Y11), or 'Parameter batch write command for the slave module' (Y12) is on)
- When any of the following errors has occurred

Error code	Error description
0CC8H	Transmission cable voltage drop error
0CC9H	DP/DN short error
0CCBH	24V/DP short error
3064H	RJ51AW12AL hardware failure
3065H	
3066H	

How to check the same ID used status

When the AnyWireASLINK system is in the following status, the same ID is used for multiple modules.

Even in the same ID used status, the AnyWireASLINK bit transmission does not stop.

- 'Slave module alarm signal' (X10) turns on.
- Same ID used error (error code: 0D90H) is stored in 'Latest error code storage area' (Un\G10256) and the duplicate ID is stored in 'Latest error ID storage area' (Un\G10257). *1
- An error (error code: 0D90H) is displayed on an engineering tool. ( Page 54 Checking with the "Module Diagnostics" window)*1
- The relevant ID is stored in 'Alarm ID information storage area' (Un\G9985 to Un\G10112).

*1 If multiple errors occur simultaneously, the latest error is displayed.

How to recover from same ID used status

Check 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112). Then set a unique ID (address) in all the slave modules. (☞ Page 70 Number of the alarm IDs, Page 70 Alarm ID information storage area)

Set IDs (addresses) of slave modules and execute automatic address detection of the RJ51AW12AL. Then, the IDs of the slave modules are stored in the RJ51AW12AL and the error is cleared. (☞ Page 39 Automatic Address Detection Function)

Precautions

While an ID (address) is used for multiple slave modules, executing either of the following can eliminate the same ID used error. However, the address is still used for the multiple slave modules.

- Powering off and on the AnyWireASLINK system
- Turning off and on 'Error flag clear command' (Y0)

1.5 Module with No ID Setting Detection Function

This function detects modules with no ID assigned (default ID) through automatic address detection or same address used check.

Module	Default ID
Input slave module, I/O combined slave module	767
Output slave module	255

Point

- Modules with no ID set are detected through automatic address detection or same address used check. If the CPU module is reset or the power is turned off after a module with no ID set is detected, the no ID number setting status cannot be checked until automatic address detection or same address used check is executed again.
- Even if no ID is assigned to modules, a single ID is stored in 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112). For example, even when multiple modules have an ID 255, "1" is stored in 'Number of the alarm IDs' (Un\G9984) and "255" is stored in 'Alarm ID information storage area' (Un\G9985 to Un\G10112).

How to execute automatic address detection

For details on automatic address detection, refer to the following.

 Page 39 Automatic Address Detection Function

How to execute same address used check

Turn off and on 'Overlap address inspection command' (Y2). If 'Overlap address inspection flag' (X15) turns on and off, it indicates that the same address used check is completed.

The same address used check cannot be executed under any of the following conditions.

- When an error occurs in the AnyWireASLINK system (Example: Short circuit, 24VDC external power supply voltage drop)
- Within approximately five seconds after the AnyWireASLINK system is powered on or system is reset
- When automatic address detection is in progress (While 'Automatic address detection flag' (X14) is on)
- When the same address used check is in progress (While 'Overlap address inspection flag' (X15) is on)
- When the parameter access is in progress (While 'Parameter access request command for the slave module' (Y10), 'Parameter batch read command for the slave module' (Y11), or 'Parameter batch write command for the slave module' (Y12) is on)
- When any of the following errors has occurred

Error code	Error description
0CC8H	Transmission cable voltage drop error
0CC9H	DP/DN short error
0CCBH	24V/DP short error
3064H	RJ51AW12AL hardware failure
3065H	
3066H	

How to check the no ID number setting status

When the AnyWireASLINK system is in the following status, no ID number setting status is detected.

Even in the no ID number setting status, the AnyWireASLINK bit transmission does not stop.

- 'Slave module alarm signal' (X10) turns on.
- No ID setting error (error code: 0D91H) is stored in 'Latest error code storage area' (Un\G10256) and unset ID is stored in 'Latest error ID storage area' (Un\G10257). *1
- An error (error code: 0D91H) is displayed on an engineering tool. (☞ Page 54 Checking with the "Module Diagnostics" window)*1
- Unset IDs are stored in 'Alarm ID information storage area' (Un\G9985 to Un\G10112).

*1 If multiple errors occur simultaneously, the latest error is displayed.

How to recover from the no ID number setting status

Check 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112). Then set addresses to slave modules. (☞ Page 70 Number of the alarm IDs, Page 70 Alarm ID information storage area)

Check that "255" is not set as the address of the slave module.

Set IDs (addresses) of slave modules and execute automatic address detection of the RJ51AW12AL. Then, the IDs of the slave modules are stored in the RJ51AW12AL and the error is cleared. (☞ Page 39 Automatic Address Detection Function)

Precautions

While an ID (address) of a slave module is not set, executing either of the following can eliminate the no ID setting error.

However the address of the slave module is still not set.

- Powering off and on the AnyWireASLINK system
- Turning off and on 'Error flag clear command' (Y0)

1.6 Transmission Cable Short Detection Function

This function protects the system by detecting the current out of the specifications of the AnyWireASLINK system across DP-DN or 24V-DP and stopping the transmission.

How to check the transmission cable short status

When the AnyWireASLINK system is in the following status, a transmission cable short has occurred.

- The LINK LED turns off and the ALM LED flashes repeatedly at one second intervals. *1
- When any of the transmission cables (DP, DN) is short-circuited, 'DP/DN short error' (X1) turns on.
- When any of the transmission cables (24V, DP) is short-circuited, '24V/DP short error' (X2) turns on.
- A DP/DN short error (error code: 0CC9H) or 24V/DP short error (error code: 0CCBH) is stored in 'Latest error code storage area' (Un\G10256) and 0FFFH is stored in 'Latest error ID storage area' (Un\G10257). *1
- An error (error code: 0CC9H or 0CCBH) is displayed on an engineering tool. (🖱️ Page 54 Checking with the "Module Diagnostics" window)*1
- The AnyWireASLINK bit transmission stops.

*1 If multiple errors occur simultaneously, the latest error is displayed.

How to recover from the transmission cable short status

How to recover from the transmission cable short status is as follows.

- 1.** Eliminate the short circuit in the AnyWireASLINK system.

When the short status is exited, AnyWireASLINK bit transmission resumes automatically.

If the status does not change, the short circuit has not been eliminated. Check it again.

- 2.** Power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).


The following status is resulted:

- 'DP/DN short error' (X1) and '24V/DP short error' (X2) turn off.
- The ALM LED turns off.
- The data in 'Latest error code storage area' (Un\G10256) and 'Latest error ID storage area' (Un\G10257) are cleared.

1.7 Disconnected Transmission Cable Location Detection Function


This function notifies the ID of a slave module that has been separated from the RJ51AW12AL because of disconnection in the transmission cables (DP, DN) between the RJ51AW12AL and the slave module, to locate the disconnection in the transmission cables (DP, DN) from the upper system.

Point

- To enable the disconnected transmission cable location detection function, execute automatic address detection when configuring, modifying, or expanding the system. ( Page 39 Automatic Address Detection Function)
- After a system is configured, the disconnection detection may work when a slave module is disconnected from the system. Execute automatic address detection after modifying the system.
- Even if disconnection in the transmission cable (DP, DN) is detected, the AnyWireASLINK bit transmission does not stop.

How to check the transmission cable disconnection status

When the AnyWireASLINK system is in the following status, the transmission cable (DP, DN) have been disconnected or a slave module error has occurred.

- The ALM LED turns on. *1
- 'DP/DN disconnection error' (X4) turns on.
- The number of error IDs is stored in 'Number of the error IDs' (Un\G8192).
- The disconnected ID (address) is stored in 'Error ID information storage area' (Un\G8193 to Un\G8320).
- The bits of 'Error ID information bit area (output)' (Un\G8704 to Un\G8719) and 'Error ID information bit area (input)' (Un\G8736 to Un\G8751) corresponding to the disconnected ID (address) turn on.
- DP/DN disconnection error (error code: 0CCA) is stored in 'Latest error code storage area' (Un\G10256) and the disconnected ID is stored in 'Latest error ID storage area' (Un\G10257). *1
- An error (error code: 0CCA) is displayed on an engineering tool. ( Page 54 Checking with the "Module Diagnostics" window) *1


*1 If multiple errors occur simultaneously, the latest error is displayed.

How to recover from the transmission cable disconnection status

How to recover from the transmission cable disconnection status is as follows.

1. Eliminate the disconnection in the AnyWireASLINK system.

When the disconnection status is exited, AnyWireASLINK bit transmission resumes automatically.

When the slave module has been disconnected from the system, execute automatic address detection. ( Page 39 Automatic Address Detection Function)

2. Power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

The following status is resulted:

- 'DP/DN disconnection error' (X4) turns off.
- The ALM LED turns off.
- The data in 'Latest error code storage area' (Un\G10256) and 'Latest error ID storage area' (Un\G10257) are cleared.

Point

- When the automatic address detection is executed in the step 1, the operation in the step 2 is not necessary.
- If the error status automatic recovery mode is set in "Error status automatic recovery" of "Basic setting", the error status is automatically cleared after the disconnection status is exited.

1.8 Transmission Cable Voltage Drop Detection Function

This function detects a voltage drop in the 24VDC external power supply, enabling the RJ51AW12AL to detect a failure in the 24VDC external power supply or a wiring error from the upper system.


Point

For the specifications of the 24VDC external power supply to the RJ51AW12AL, refer to the following.

 MELSEC iQ-R AnyWireASLINK Master Module User's Manual (Startup)

How to check the transmission cable voltage drop status

When the AnyWireASLINK system is in the following status, a voltage drop in the 24VDC external power supply has been detected.

- The ALM LED flashes at 0.2 second intervals. *1
- 'Transmission cable voltage drop error' (X3) turns on.
- Transmission cable voltage drop error (error code: 0CC8H) is stored in 'Latest error code storage area' (Un\G10256) and 0FFFH is stored in 'Latest error ID storage area' (Un\G10257). *1
- An error (error code: 0CC8H) is displayed on an engineering tool. ( Page 54 Checking with the "Module Diagnostics" window)*1
- The AnyWireASLINK bit transmission stops.

*1 If multiple errors occur simultaneously, the latest error is displayed.

How to recover from the transmission cable voltage drop status

How to recover from the transmission cable voltage drop status is as follows.

- 1.** Check the voltage of the 24VDC external power supply and replace the power supply or check the wiring, as necessary. When the transmission cable voltage drop is corrected, AnyWireASLINK bit transmission resumes automatically.
- 2.** Power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

The following status is resulted:

- 'Transmission cable voltage drop error' (X3) turns off.
- The ALM LED turns off.
- The data in 'Latest error code storage area' (Un\G10256) and 'Latest error ID storage area' (Un\G10257) are cleared.

1.9 Parameter Access Error Detection Function

This function allows parameter access errors to be detected.

- Slave module hardware error (error code: 0D2CH, 0D2DH)
- Parameter access target module ID error (error code: 0D2EH)
- Parameter value error (error code: 0D2FH)
- Parameter access error (error code: 0D30H)
- Slave module status error (error code: 0D31H)
- Same ID used error (error code: 0D90H)
- No ID setting error (error code: 0D91H)
- New ID error (error code: 0D92H)

How to check the parameter access error status

The following table lists parameter access error statuses.

Error description	Status when an error occurred			
	I/O signal	Buffer memory area	Engineering tool	
Slave module hardware error	'Slave module alarm signal' (X10) turns on.	■'Latest error code storage area' (Un\G10256) The error code is stored.* ¹	The error code is displayed in the Module Diagnostics" window. (Page 54 Checking with the "Module Diagnostics" window)* ¹	
Parameter access target module ID error		■'Latest error ID storage area' (Un\G10257) The IDs corresponding to the error codes are stored.		
Parameter value error	'Parameter access error' (X12) turns on.	■'Number of the alarm IDs' (Un\G9984)* ² The number of IDs relevant to alarm occurrence is stored.		
Parameter access error		■'Alarm ID information storage area' (Un\G9985 to Un\G10112)* ² The IDs relevant to alarm occurrence are stored.		
Slave module status error				'Slave module alarm signal' (X10) turns on.
Same ID used error				
No ID setting error				
New ID error				

*1 If multiple errors occur simultaneously, the latest error is displayed.

*2 If an error occurs in parameter access, data are stored in 'Number of the error IDs' (Un\G8192) and 'Error ID information storage area' (Un\G8193 to Un\G8320).

How to recover from the parameter access error status

How to recover from the parameter access error status is as follows.

■Slave module hardware error

Take measures such as those against noise to remove factors causing errors. Then power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

■Parameter access target module ID error, parameter value error

Remove factors causing errors (for example, parameter access program). Then power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

■Parameter access error

If any of the following errors has occurred, eliminate the error cause.

- Slave module hardware error (error code: 0D2CH, 0D2DH)
- Slave module status error (error code: 0D31H)
- Same ID used error (error code: 0D90H)

When an error occurs in a parameter access due to a cause other than the above errors, the possible cause is noise. Take measures such as those against noise to remove factors causing errors. Then power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

Point


If the error status automatic recovery mode is set in "Error status automatic recovery" of "Basic setting", the error is automatically cleared after recovery from the parameter access error status.

■Slave module status error

Check the status details of the target slave module to remove factors causing errors. Then power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

The status details of the slave module can be checked with the AnyWireASLINK parameter in 'Parameter storage area' (Un\G12288 to Un\G12335). *1

*1 Buffer memory addresses when one slave module is connected. For details, refer to the following.

 Page 73 Parameter storage area

■Same ID used error, no ID setting error

Remove factors causing errors (for example, one ID is assigned to multiple modules or a module has no ID). Then power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

■New ID error

Check 'Connected module ID information storage area' (Un\G9217 to Un\G9344) and set a new ID. Then power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).

Status after recovery

After recovery from parameter access error status, the following status is resulted:

Error description	Signal status
Slave module hardware error	<ul style="list-style-type: none"> • 'Slave module alarm signal' (X10) turns off. • The data in 'Latest error code storage area' (Un\G10256) is cleared. • The data in 'Latest error ID storage area' (Un\G10257) is cleared. • The data in 'Number of the alarm IDs' (Un\G9984) is cleared. • The data in 'Alarm ID information storage area' (Un\G9985 to Un\G10112) is cleared.
Parameter access target module ID error	
Parameter value error	
Slave module status error	
Same ID used error	
No ID setting error	
New ID error	
Parameter access error	<ul style="list-style-type: none"> • 'Parameter access error' (X12) turns off. • The data in 'Latest error code storage area' (Un\G10256) is cleared. • The data in 'Latest error ID storage area' (Un\G10257) is cleared. • The data in 'Number of the error IDs' (Un\G8192) is cleared. • The data in 'Error ID information storage area' (Un\G8193 to Un\G8320) is cleared. • The data in 'Error ID information bit area (output)' (Un\G8704 to Un\G8719) and 'Error ID information bit area (input)' (Un\G8736 to Un\G8751) are cleared.

1.10 Error Status Automatic Recovery Function

This function allows for automatic error reset for DP/DN disconnection errors and parameter errors after the error status is cleared.

(Usually, if an error has occurred, eliminate the error cause, and power off and on the AnyWireASLINK system or turn on and off 'Error flag clear command' (Y0).)

Error that can be automatically recovered

The following shows the errors that can be automatically recovered.

Error code	Error description	Status when an error occurred	Status when an error is cleared
0CCA H	DP/DN disconnection error	<ul style="list-style-type: none">'DP/DN disconnection error' (X4) turns on.Error ID information is registered in the buffer memory address. (☞ Page 22 How to check the transmission cable disconnection status)	<ul style="list-style-type: none">'DP/DN disconnection error' (X4) turns off.*1The error ID information registered in the buffer memory address is cleared. (corresponding ID only)*2
0D30 H	Parameter access error	<ul style="list-style-type: none">'Parameter access error' (X12) turns on.Error ID information is registered in the buffer memory address. (☞ Page 24 How to check the parameter access error status)	<ul style="list-style-type: none">'Parameter access error' (X12) turns off.*1The error ID information registered in the buffer memory address is cleared. (corresponding ID only)*2

*1 The error causes must be eliminated from all the slave modules in which errors have occurred.

*2 If the errors 0CCA H and 0D30 H have occurred in one slave module, the causes of both the errors must be eliminated.

Setting method


Set the error status automatic recovery function in "Error status automatic recovery" of "Basic setting". (☞ Page 35 Error status automatic recovery)

1.11 Slave Information Acquisition at Start-up Function

This function allows for automatic acquisition of information of slave modules when the CPU module is reset or the power is turned off and on.

The slave information acquisition at start-up function eliminates the needs for reading parameters from slave modules.

For the parameters of the slave module stored, refer to the following.

 Page 28 Slave Module Parameter Read/Write

Setting method

Set the slave information acquisition at start-up function in "Startup operating mode" of "Basic setting". ( Page 34 Startup operating mode)

Operation at start-up





When communication of the RJ51AW12AL is normally established after the CPU module is reset or the power is turned off and on, the parameters of all the registered slave modules are read at a time. The read parameters are then stored in the buffer memory.

1.12 Slave Module Parameter Read/Write

In AnyWireASLINK, parameter information of a slave module and the AnyWireASLINK system in addition to I/O information are sent and received between the RJ51AW12AL and a slave module.

Use this function to check or change parameter information of a slave module.

For details on the parameter information to be communicated, refer to the following.

-  Page 71 Parameter access setting
-  Page 71 Parameter access target module ID specification
-  Page 72 Parameter storage location memory number
-  Page 73 Parameter storage area

Parameter reading and writing methods

There are four methods as follows to read or write the parameter information from or to a slave module.

Type	Description
Automatic update	The current status of all slave modules and the current values of the sensors are read at regular intervals. (Setting values are excluded.)
Parameter access	All the parameter values of the slave modules are read or written individually in accordance with the setting of reading or writing and the target slave module.
Parameter batch read	All the parameter values of all slave modules are read out into the buffer memory of the RJ51AW12AL.
Parameter batch write	Values set in the buffer memory of the RJ51AW12AL are written to all the parameter of all slave modules.

The following shows the readable/writable parameters.

○: Possible, ×: Impossible

Parameter name	Read/write	Parameter read and write methods					
		Automatic update	Parameter access		Parameter batch read	Parameter batch write	
			Read	Write			
Device parameter*1	Read/write	×	○	○	○	○	
AnyWireASLINK parameter	Module ID	Read/write	×	○	○	○	○
	Status details	Read	○	○	×	○	×
	Sensing level	Read	○	○	×	○	×

*1 The device parameter name differs depending on the slave module to be used.

Point

Even when the parameter access, parameter batch read, or parameter batch write is executed, the bit transmission speed of AnyWireASLINK is not reduced.

Automatic update

No special operation is required because data are automatically updated. To check the parameter information, refer to the corresponding buffer memory address.

Parameter access

The operating procedure for parameter access is as follows.

■To read parameters

1. Set the access method.

Store 0000H (read) in 'Parameter access setting' (Un\G10320).

2. Set the access target ID.

Store the access target ID in 'Parameter access target module ID specification' (Un\G10321).

ID	Description
0000H to 00FFH	ID of the output slave module
0200H to 02FFH	ID of the input slave module or I/O combined slave module

3. Turn on and off 'Parameter access request command for the slave module' (Y10).

At this time, 'Parameter access completion flag' (X11) turns off. When the parameter access is completed, 'Parameter access completion flag' (X11) automatically turns on.

4. The read parameters are stored in the following location of each ID.

Device parameter in 'Parameter storage area' (Un\G12288 to Un\G12335) *1

*1 Buffer memory addresses when one slave module is connected. For details, refer to the following.

☞ Page 73 Parameter storage area

■To write parameters

1. Set the access method.

Store 0001H (write) in 'Parameter access setting' (Un\G10320).

2. Set the access target ID.

Store the access target ID in 'Parameter access target module ID specification' (Un\G10321).

ID	Description
0000H to 00FFH	ID of the output slave module
0200H to 02FFH	ID of the input slave module or I/O combined slave module

3. Store the parameters to be written in the following location.

Device parameter read/write areas in 'Parameter storage area' (Un\G12288 to Un\G12335) *1

*1 Buffer memory addresses when one slave module is connected. For details, refer to the following.

☞ Page 73 Parameter storage area

4. Turn on and off 'Parameter access request command for the slave module' (Y10).

At this time, 'Parameter access completion flag' (X11) turns off. When the parameter access is completed, 'Parameter access completion flag' (X11) automatically turns on.

5. Turn off and on 'Parameter access request command for the slave module' (Y10) or 'Parameter batch read command for the slave module' (Y11) to check that the settings have been saved in the slave module.

Parameter batch read

The procedure for parameter batch read is as follows.

1. Turn on and off 'Parameter batch read command for the slave module' (Y11).

At this time, 'Parameter access completion flag' (X11) turns off. When the parameter access is completed, 'Parameter access completion flag' (X11) automatically turns on.

2. The read parameters are stored in the following location of each ID.

Device parameter in 'Parameter storage area' (Un\G12288 to Un\G12335) *1

*1 Buffer memory addresses when one slave module is connected. For details, refer to the following.

 Page 73 Parameter storage area


Parameter batch write

The operating procedure for parameter batch write is as follows.

1. Store the parameters to be written in the following location.

Device parameter read/write areas in 'Parameter storage area' (Un\G12288 to Un\G12335) *1

*1 Buffer memory addresses when one slave module is connected. For details, refer to the following.

 Page 73 Parameter storage area

2. Turn on and off 'Parameter batch write command for the slave module' (Y12).

At this time, 'Parameter access completion flag' (X11) turns off. When the parameter access is completed, 'Parameter access completion flag' (X11) automatically turns on.

3. Turn off and on 'Parameter batch read command for the slave module' (Y11) to check that the settings have been saved in the slave module.

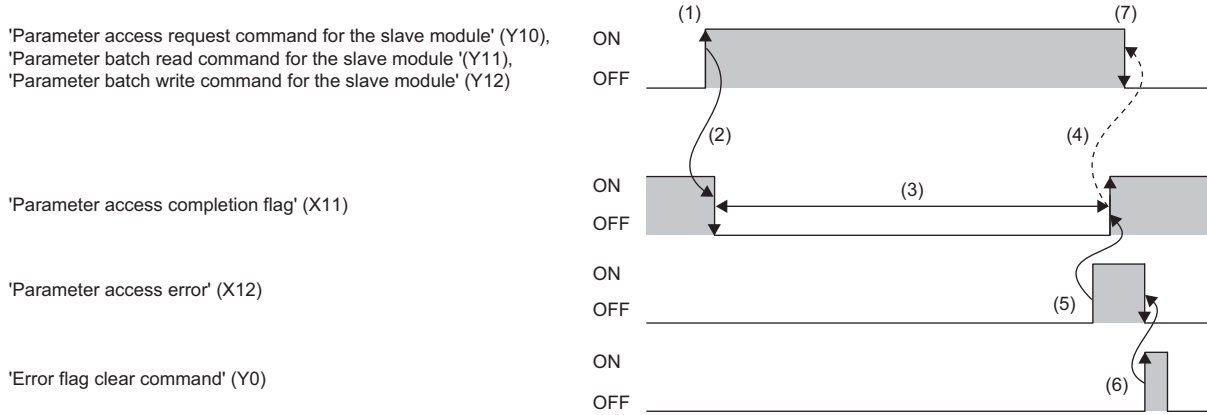
Point

- During the parameter access, parameter batch read, and parameter batch write, 'Parameter access completion flag' (X11) is off. When 'Parameter access completion flag' (X11) is off, the parameter access, parameter batch read, and parameter batch write cannot be executed.
- Upon parameter batch read or parameter batch write, the values stored in 'Parameter access setting' (Un\G10320) and 'Parameter access target module ID specification' (Un\G10321) are ignored.
- The buffer memory areas Un\G10496 to Un\G10751 store the start address of the buffer memory area that stores parameters of output slave modules with the IDs. The 48 words from the buffer memory start address is the parameter information of each ID.
- The buffer memory areas Un\G11008 to Un\G11263 store the start address of the buffer memory area that stores parameters of input slave modules or I/O combined slave modules with the IDs. The 48 words from the buffer memory start address is the parameter information of each ID.

Parameter access timing

The parameter access timing is as follows.

- ▶ Executed in the program
- ▶ Executed by the RJ51AW12AL



No.	Description
(1)	Turn off and on any of the signals below with a program to start parameter access.*1 • 'Parameter access request command for the slave module' (Y10) • 'Parameter batch read command for the slave module' (Y11) • 'Parameter batch write command for the slave module' (Y12)
(2)	The operation in (1) turns off 'Parameter access completion flag' (X11).
(3)	The parameter access is in progress.
(4)	When parameter access (read/write) is completed, 'Parameter access completion flag' (X11) automatically turns off and on.
(5)	If parameter access has an error, 'Parameter access error' (X12) turns off and on and 'Parameter access completion flag' (X11) automatically turns off and on.*2
(6)	Turning off and on 'Error flag clear command' (Y0) with a program turns on and off 'Parameter access error' (X12).
(7)	Turn on and off the signal that has been turned off and on in the step (1) with a program.

*1 Before the start of parameter access from the RJ51AW12AL to the slave module, apply the access method, access target ID, and parameter data to the buffer memory.

*2 Error codes are stored in 'Latest error code storage area' (Un\G10256) and the target IDs are stored in 'Latest error ID storage area' (Un\G10257). (The latest information is overwritten.)

Precautions

■Parameter setting

Parameters cannot be set in the following cases.

- When an error occurs in the AnyWireASLINK system (Example: Short circuit, 24VDC external power supply voltage drop)
- Within approximately five seconds after the AnyWireASLINK system is powered on or system is reset
- When automatic address detection is in progress (While 'Automatic address detection flag' (X14) is on)
- When the same address used check is in progress (While 'Overlap address inspection flag' (X15) is on)
- When the parameter access is in progress (While 'Parameter access request command for the slave module' (Y10), 'Parameter batch read command for the slave module' (Y11), or 'Parameter batch write command for the slave module' (Y12) is on.)
- When any of the following errors has occurred

Error code	Error description
0CC8H	Transmission cable voltage drop error
0CC9H	DP/DN short error
0CCBH	24V/DP short error
3064H	RJ51AW12AL hardware failure
3065H	
3066H	

■Parameter reading and writing

- If parameters are not read after being written, the contents of the parameters do not match between the RJ51AW12AL and slave module. Make sure to read parameters after writing them.
- When parameter read or write is in progress, 'Parameter access completion flag' (X11) turns off. Refer to the section describing the parameter access timing, and adjust the access timing. (👉 Page 31 Parameter access timing)
- When parameter read or write is in progress, do not execute re-access to the parameters and automatic address detection. Doing so can cause a malfunction of the module.

■Parameter access, parameter batch read, and parameter batch write

- These operations cannot be performed to a slave module whose ID has not been registered in the RJ51AW12AL.
- Remove a same ID used error or a no ID setting error of the slave module. Then perform the operations.

■Others




- When the automatic address detection is executed, the parameter batch read is executed simultaneously.
- Note that the RJ51AW12AL may communicate with a slave module and output parameters even if no parameters are set.

2 PARAMETER SETTINGS

This chapter describes the parameter setting required for the RJ51AW12AL.

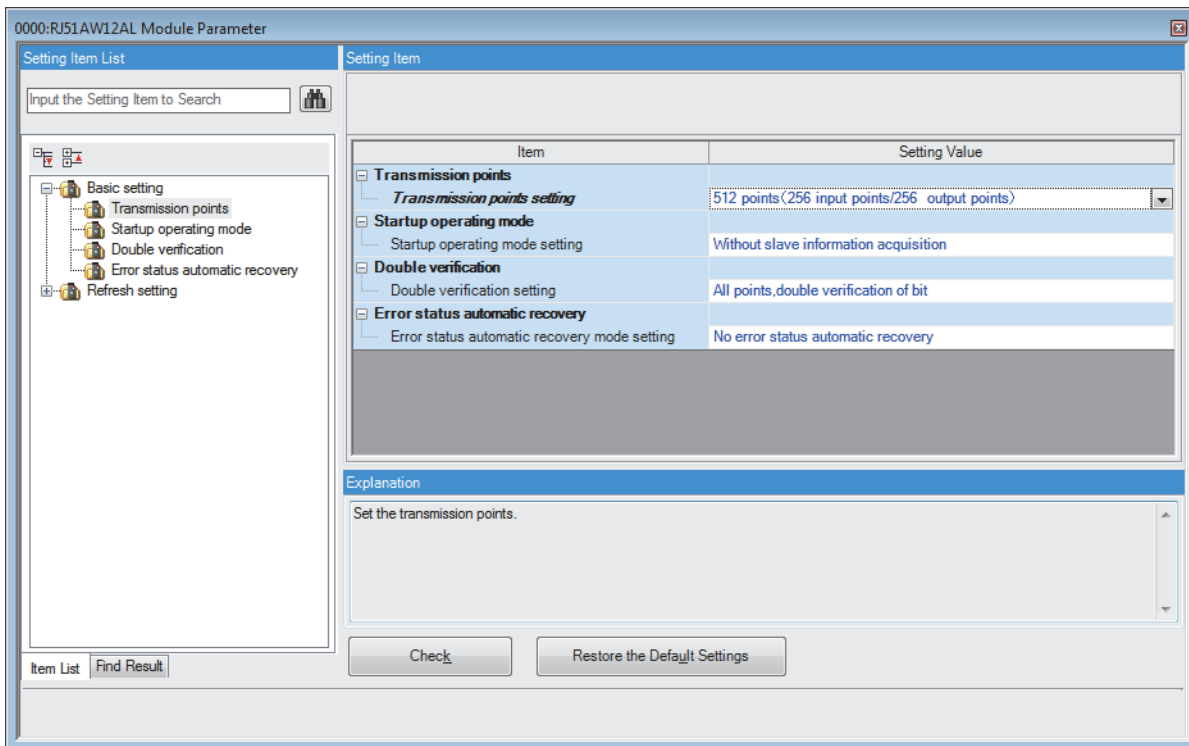
2.1 Parameter Setting Procedure

2

1. Add the RJ51AW12AL to an engineering tool.
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right click ⇒ [Add New Module]
2. The parameter setting includes a basic setting and refresh setting. Select the settings in the tree and set the items in the following window.
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ51AW12AL] ⇒ [Module Parameter]
3. Write the setting to the CPU module with the engineering tool.
 [Online] ⇒ [Write to PLC]
4. Reset the CPU module or power off and on the system to apply the setting.

2.2 Basic Setting

Set the number of transmission points of the RJ51AW12AL and others.



Transmission points

Set the number of transmission points of AnyWireASLINK.

Item	Description	Setting range
Transmission points setting	Set the number of transmission points. One transmission cycle time is determined by setting the number of transmission points. (Page 76 Transmission cycle time)	<ul style="list-style-type: none"> • 64 points (32 input points/32 output points) • 128 points (64 input points/64 output points) • 256 points (128 input points/128 output points) • 512 points (256 input points/256 output points) (Default: 512 points (256 input points/256 output points))

Startup operating mode

Set whether to read the parameters of slave modules at start-up of the RJ51AW12AL.

Item	Description	Setting range
Startup operating mode setting	Set the operation mode at start-up. (Page 27 Slave Information Acquisition at Start-up Function)	<ul style="list-style-type: none"> • Without slave information acquisition • Get slave information acquisition (Default: Without slave information acquisition)

Double verification

Set the double verification of the RJ51AW12AL.

Item	Description	Setting range
Double verification mode setting	Set the double verification mode. (☞ Page 15 Double Verification)	<ul style="list-style-type: none">• All points, double verification of bit• Double verification of the Word (16 bit) until the 1st word*¹• All points, double verification of Word (16 bit) (Default: All points, double verification of bit)

*1 The word double verification can target 1st word to 15th word.

Error status automatic recovery

Set whether to automatically recover the RJ51AW12AL from the error status.

Item	Description	Setting range
Error status automatic recovery mode setting	Set the error status automatic recovery mode. (☞ Page 26 Error Status Automatic Recovery Function)	<ul style="list-style-type: none">• No error status automatic recovery• Error status automatic recovery (Default: No error status automatic recovery)


2.3 Refresh Setting

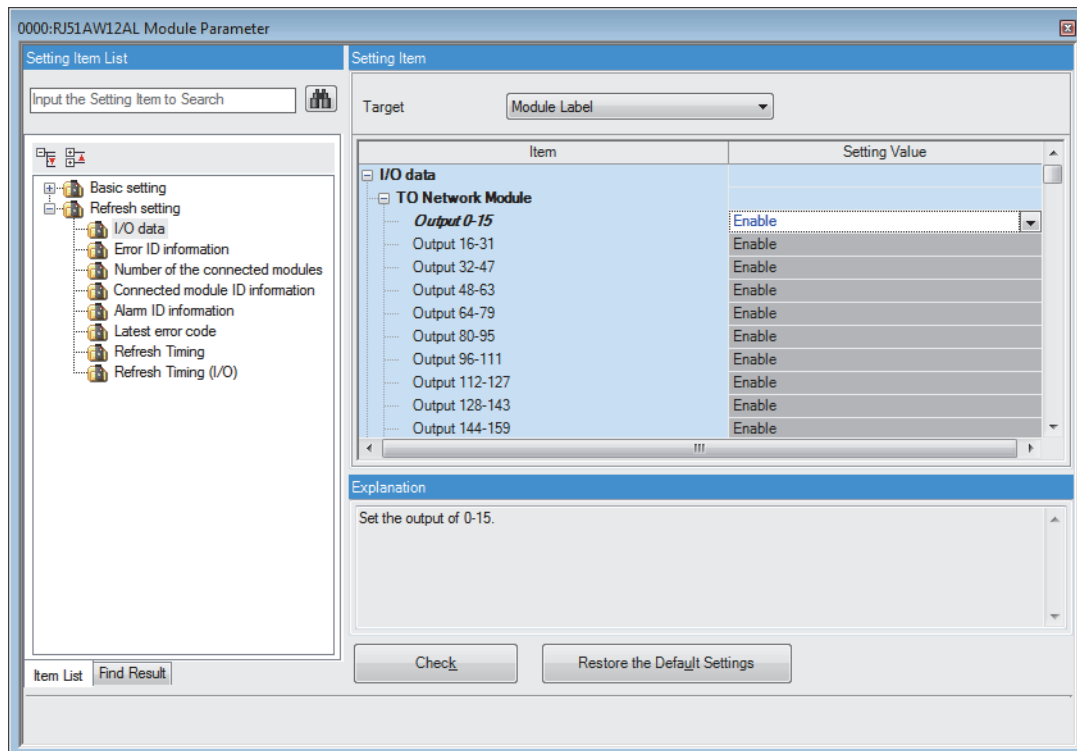
Setting method

Set buffer memory areas of the RJ51AW12AL to refresh.

This refresh setting eliminates the needs for reading or writing with a program.

1. Start a module parameter.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ51AW12AL] ⇒ [Module Parameter] ⇒ [Refresh Setting]



2. Click "Target" and set a refresh target.

- When "Target" is "Module Label"

Enable or disable "Output 0-15" to enable or disable the refresh.

- When "Target" is "Refresh Data Register (RD)"

Set a start device in "Start Device Name" to set transfer destinations of all the items automatically.

- When "Target" is "Device"

Double-click the item to set and enter a refresh target device.

3. Click "Refresh Timing" and set refresh timing.

Set "Refresh Timing" to "At the Execution Time of END Instruction" or "At the Execution Time of Specified Program".


If "At the Execution Time of Specified Program" is set, double-click "Refresh Group [n] (n: 1-64)" and set 1 to 64.

Point

When refresh is enabled, the values of refresh targets become effective at the refresh timing set with an engineering tool. At this time, buffer memory areas are overwritten with the values of the refresh targets. To change the values of the buffer memory areas to be refreshed, create a program that modifies module labels and device values of the refresh targets.

2.4 Refresh Processing Time

The refresh processing time [μs] is an element of the scan time of the CPU module. For the scan time, refer to the following.

 MELSEC iQ-R CPU Module User's Manual (Application)

The following shows the refresh processing time [μs] taken for refresh settings.

- Refresh processing time [μs] = Refresh read (refresh of transfer to the CPU) time + Refresh write (refresh of transferred to intelligent function modules) time

The refresh read time and refresh write time vary depending on refresh targets.


When the refresh target is a module label or refresh data register (RD)

The following shows the refresh read time and refresh write time when a CPU module is used.

Classification	Refresh processing time
Refresh read time	21.8 μs
Refresh write time	0.16 μs

When the refresh target is a specified device

The refresh read time and refresh write time are calculated according to the number of refresh-target items and the number of the items to be transferred (words). For the calculation method, refer to the following.

 MELSEC iQ-R CPU Module User's Manual (Application)

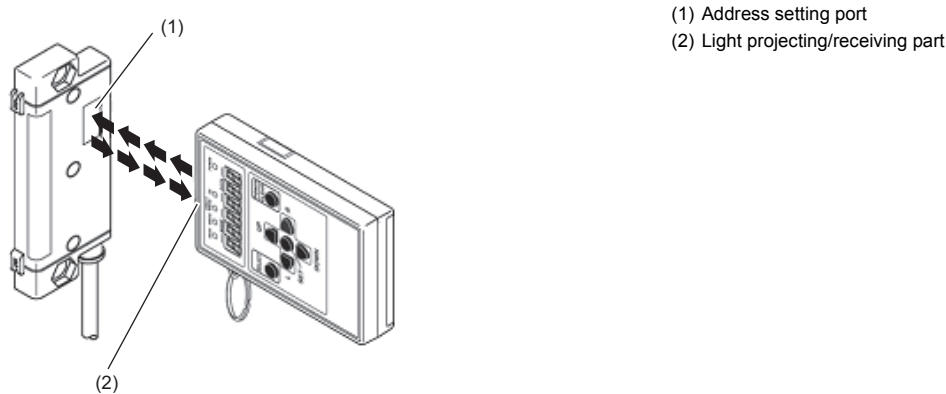
2.5 Slave Module Address Setting

Setting a start number of the address assigned for data communication is required for slave modules.

An address can be written to a slave module or the address assigned to a slave module can be read through infrared communications using an address writer (manufactured by Anywire Corporation).

For details, refer to the manual of the address writer.

■ Image of address read/write



Address setting example

When 0 is set for the input slave module address, and 0 and 2 for the output slave module address, bits are occupied as follows.

■ Buffer memory address of the input slave module

Buffer memory address	Bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Un\G0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

- Areas occupied by the address 0: Un\G0.0, Un\G0.1

■ Buffer memory address of the output slave module

Buffer memory address	Bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Un\G4096	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

- Areas occupied by the address 0: Un\G4096.0, Un\G4096.1
- Areas occupied by the address 2: Un\G4096.2, Un\G4096.3

Precautions

- A slave module address is not deleted even when the power supply of a programmable controller or a 24VDC external power supply is turned off. The address is retained until a new address is set when a system is configured.
- In the address setting, ensure that the address occupied by the slave module does not exceed the number of transmission points set in the RJ51AW12AL. For the operation mode setting of the RJ51AW12AL, refer to the following.

☞ Page 34 Transmission points

- In the slave module, a value between 0 and 254 can be written. (This value is not an ID.) Note that 255 cannot be set. Doing so will cause a No ID setting error.

Model	Address	ID
Output slave module	0 to 254	0 to 254 (0000H to 00FEH)
Input slave module or I/O combined slave module	0 to 254	512 to 766 (0200H to 02FEH)

2.6 Automatic Address Detection Function

Automatic address detection refers to a function that stores the IDs (addresses) of the connected slave modules in the EEPROM of the RJ51AW12AL.

Pressing the SET switch on the RJ51AW12AL enables this function and enables the RJ51AW12AL to detect and store IDs (addresses) of connected slave modules.

The ID (address) information stored in the EEPROM is held even when the power is turned off. However, information about unset IDs, the same IDs, and the parameter information of each slave module are not held.

Whenever starting the system or changing the system configuration, set the correct addresses to all the slave modules and execute the automatic address detection.

Executing the automatic address detection

To execute the automatic address detection, use the SET switch or 'Automatic address detection command' (Y1).

Using the SET switch

1. Check that all of the slave modules are operating normally.
2. Keep pressing the SET switch on the RJ51AW12AL until the SET LED turns on.
At this time, 'Automatic address detection flag' (X14) turns on.
3. When the SET LED flashes for a while and turns off, the ID (address) has been stored.
4. When 'Automatic address detection flag' (X14) turns off, the automatic address detection is completed.

Using 'Automatic address detection command' (Y1)

1. Check that all of the slave modules are operating normally.
2. Turn on and off 'Automatic address detection command' (Y1).
At this time, 'Automatic address detection flag' (X14) turns on.
3. When the SET LED flashes for a while and turns off, the ID (address) has been stored.
4. When 'Automatic address detection flag' (X14) turns off, the automatic address detection is completed.

Precautions

■ Situations in which automatic address detection cannot be executed

Automatic address detection cannot be executed in the following cases.

- When an error occurs in the AnyWireASLINK system (Example: Short circuit, 24VDC external power supply voltage drop)
- Within approximately five seconds after the AnyWireASLINK system is powered on or system reset recovery
- When automatic address detection is in progress (While 'Automatic address detection flag' (X14) is on)
- When the same address used check is in progress (While 'Overlap address inspection flag' (X15) is on)
- When the parameter access is in progress (While 'Parameter access request command for the slave module' (Y10), 'Parameter batch read command for the slave module' (Y11), or 'Parameter batch write command for the slave module' (Y12) is on)
- When any of the following errors has occurred

Error code	Error description
0CC8H	Transmission cable voltage drop error
0CC9H	DP/DN short error
0CCBH	24V/DP short error
3064H	RJ51AW12AL hardware failure
3065H	
3066H	

■ Situations in which automatic address detection is required

Execute automatic address detection in the following cases.

- When starting the system operation (when all of the slave modules are connected and operating normally)
- When adding a slave module after starting the system operation
- When removing a slave module after starting the system operation
- When changing the address of a slave module after starting the system operation

■ Check after execution of automatic address detection

After executing automatic address detection, check that there is no inconsistency between the actual system configuration and the IDs registered in the RJ51AW12AL, referring to the value stored in 'Number of the IDs of the connected modules' (Un\G9216) and values stored in 'Connected module ID information storage area' (Un\G9217 to Un\G9344).

■ Executing automatic address detection again

Use an address writer to set the ID (address) in a slave module that has the same ID as other slave modules or where an ID is not set. Then execute automatic address detection again.


■ When non-processing is executed even after automatic address detection is executed

Do not execute automatic address detection in any of the following cases. Automatic address detection is not processed if executed.

- When 'Parameter access completion flag' (X11) is off
- When 'Automatic address detection flag' (X14) is on

Create an interlock program to ensure a proper execution of automatic address detection.

For the interlock program of automatic address detection, refer to the following.

 Page 42 Interlock program of automatic address detection

Automatic address detection execution timing

The following shows automatic address detection execution timing.

Turning on 'Automatic address detection command' (Y1)^{*1}
(or long press of the SET switch)

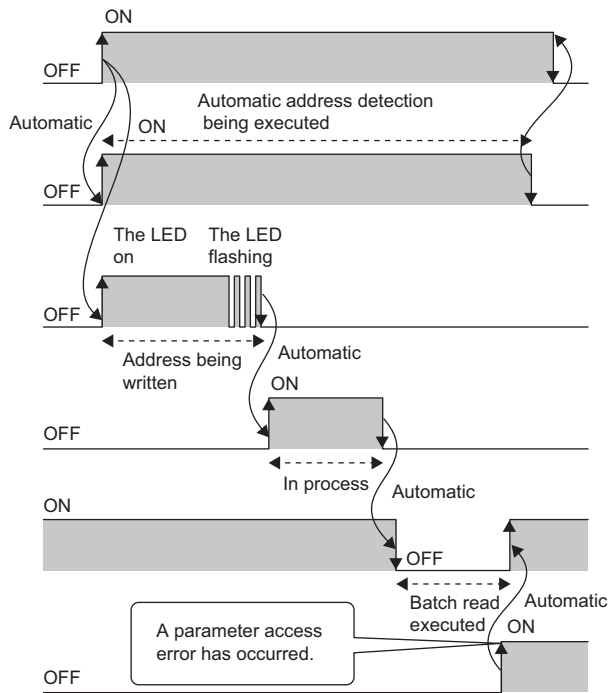
'Automatic address detection flag' (X14)

SET LED

'Overlap address inspection flag' (X15)

'Parameter access completion flag' (X11)

'Parameter access error' (X12)



*1 After turning on 'Automatic address detection command' (Y1), check that 'Automatic address detection flag' (X14) is on or check the SET LED status. Then, turn off 'Automatic address detection command' (Y1) with a program.

3 PROGRAMMING

This chapter describes programming for the RJ51AW12AL.

For communication between the RJ51AW12AL and slave modules, refer to the following.

 MELSEC iQ-R AnyWireASLINK Master Module User's Manual (Startup)

3.1 Precautions on Programming

This section describes precautions on programming on the RJ51AW12AL.

Interlock program of automatic address detection

The interlock program described here prevents 'Automatic address detection command' (Y1) from being turned on during a parameter access*¹ or during automatic address detection*¹, allowing proper automatic address detection.

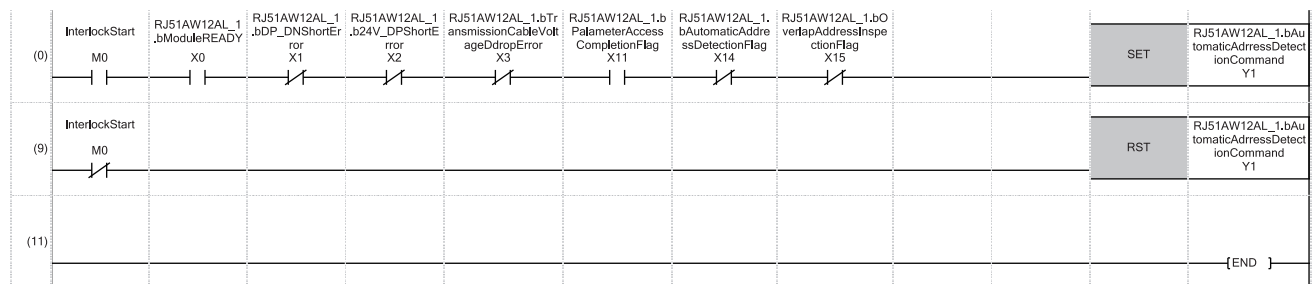
The following shows an interlock program in which the start I/O number of the RJ51AW12AL is assigned to X/Y00 to X/Y1F.

*¹ Indicates that 'Parameter access completion flag' (X11) is off or 'Automatic address detection flag' (X14) is on.

Ex.

Interlock example

Classification	Label name	Description	Device								
Module label	RJ51AW12AL_1.bModuleREADY	Module READY	X0								
	RJ51AW12AL_1.bDP_DNShortError	DP/DN short error	X1								
	RJ51AW12AL_1.b24V_DPShortError	24V/DP short error	X2								
	RJ51AW12AL_1.bTransmissionCableVoltageDdropError	Transmission cable voltage drop error	X3								
	RJ51AW12AL_1.bPalameterAccessCompletionFlag	Parameter access completion flag	X11								
	RJ51AW12AL_1.bAutomaticAddressDetectionFlag	Automatic address detection flag	X14								
	RJ51AW12AL_1.bOverlapAddressInspectionFlag	Overlap address inspection flag	X15								
	RJ51AW12AL_1.bAutomaticAddressDetectionCommand	Automatic address detection command	Y1								
Label to be defined	Define global labels as shown below:										
	<table border="1"> <thead> <tr> <th>Label Name</th> <th>Data Type</th> <th>Class</th> <th>Assign (Device/Label)</th> </tr> </thead> <tbody> <tr> <td>InterlockStart</td> <td>Bit</td> <td>VAR_GLOBAL</td> <td>M0</td> </tr> </tbody> </table>			Label Name	Data Type	Class	Assign (Device/Label)	InterlockStart	Bit	VAR_GLOBAL	M0
Label Name	Data Type	Class	Assign (Device/Label)								
InterlockStart	Bit	VAR_GLOBAL	M0								



3.2 Communication Example When the Slave Module is Added or Deleted

The parameter of the slave module is moved over in order of ID and stored in 'Parameter storage area' (Un\G12288 to Un\G18431) after the automatic address detection function is executed.

Because of this, the address of the parameter storage area for the slave module later than the ID where the slave module is added or deleted in the AnyWireASLINK system is changed. (The parameter of a non-existing ID is deleted and displayed.) Therefore, the address of the slave module later than the ID where the slave module is added or deleted must be changed when a program is created with buffer memory addresses directly specified. (This also applies if the ID is changed and sorting order is switched.)

To create a program that reads/writes the parameter without considering the addition or deletion of slave modules, use 'Parameter storage location memory number (output)' (Un\G10496 to Un\G10751) and 'Parameter storage location memory number (input)' (Un\G11008 to Un\G11263).

After automatic address detection, the start address of the buffer memory that stores the parameter of the ID is stored in these areas. (☞ Page 72 Parameter storage location memory number)

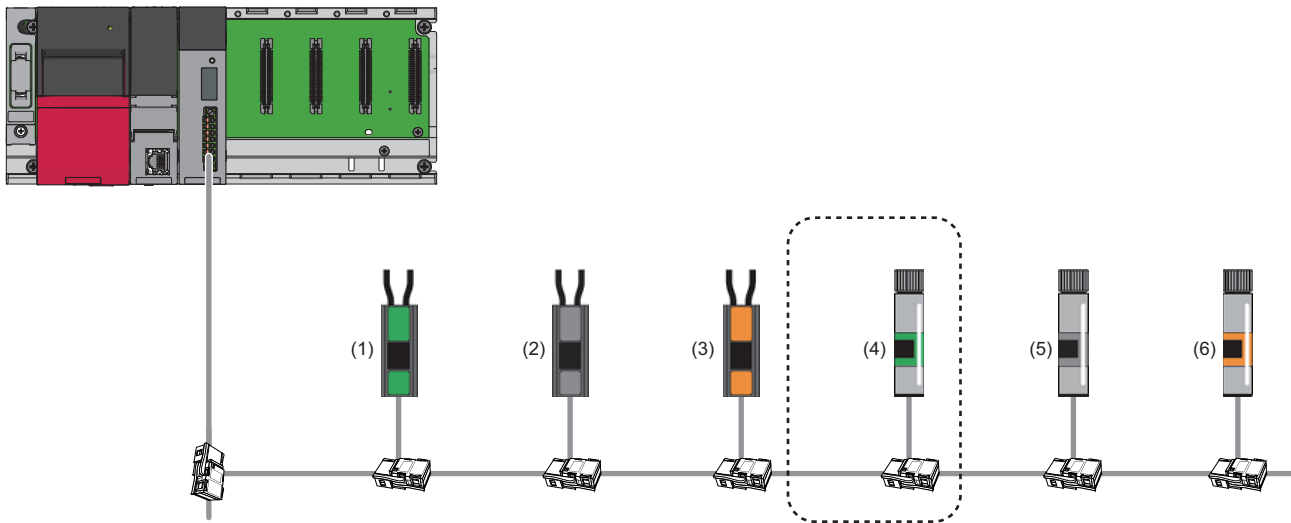
System configuration example

This section describes when the ASLINKER M12 connector type (input type) is added with address 10.

A slave module (address 10) of (4) is added in the following system configuration.

System configuration

- Power supply module: R61P
- CPU module: R04CPU
- AnyWireASLINK master module: RJ51AW12AL (start I/O number: 0000H to 001FH)



No.	Slave module		Address	ID
(1)	ASLINKER cable type	Input type	0	200H
(2)		Mixed type	2	202H
(3)		Output type	4	004H
(4)	ASLINKER M12 connector type	Input type	10	20AH
(5)		Mixed type	20	214H
(6)		Output type	22	016H

Buffer memory

■Change of 'Parameter storage area' (Un\G12288 to Un\G18431)

The parameter storage area of the ASLINKER M12 connector type (mixed type) with address 20 (ID: 214H) moves from the parameter storage area 5 to the parameter storage area 6, because the ASLINKER M12 connector type (input type) with address 10 (ID: 20AH) is added.

Buffer memory address	Parameter storage area	Before the slave module (address 10) is added	After the slave module (address 10) is added
Un\G12288 to Un\G12335	Parameter storage area 1	ASLINKER cable type (output type) parameter Address 4 (ID: 004H)	ASLINKER cable type (output type) parameter Address 4 (ID: 004H)
Un\G12336 to Un\G12383	Parameter storage area 2	ASLINKER M12 connector type (output type) parameter Address 22 (ID: 016H)	ASLINKER M12 connector type (output type) parameter Address 22 (ID: 016H)
Un\G12384 to Un\G12431	Parameter storage area 3	ASLINKER cable type (input type) parameter Address 0 (ID: 200H)	ASLINKER cable type (input type) parameter Address 0 (ID: 200H)
Un\G12432 to Un\G12479	Parameter storage area 4	ASLINKER cable type (mixed type) parameter Address 2 (ID: 202H)	ASLINKER cable type (mixed type) parameter Address 2 (ID: 202H)
Un\G12480 to Un\G12527	Parameter storage area 5	ASLINKER M12 connector type (mixed type) parameter Address 20 (ID: 214H)* ²	ASLINKER M12 connector type (input type) parameter Address 10 (ID: 20AH)* ¹
Un\G12528 to Un\G12575	Parameter storage area 6	No data	ASLINKER M12 connector type (mixed type) parameter Address 20 (ID: 214H)* ¹
⋮	⋮	⋮	⋮
Un\G18384 to Un\G18431	Parameter storage area 128	No data	No data

*1 The parameter of the slave module with address 10 (ID: 20AH), which has been added, is stored.

*2 The parameter moves from the parameter storage area 5 to the parameter storage area 6.

■ Values stored in 'Parameter storage location memory number (output)' (Un\G10496 to Un\G10751) and 'Parameter storage location memory number (input)' (Un\G11008 to Un\G11263)

After the ASLINKER M12 connector type (input type) with address 10 (ID: 20AH) is added and then automatic address detection is executed, the values stored in 'Parameter storage location memory number (output)' (Un\G10496 to Un\G10751) and 'Parameter storage location memory number (input)' (Un\G11008 to Un\G11263) change as follows.

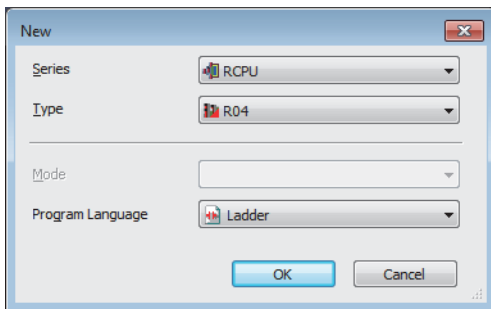
Buffer memory address	Data	Details	Slave module
Un\G10496	0000H	Output slave module ID 000H buffer memory start address	—
Un\G10497	0000H	Output slave module ID 001H buffer memory start address	—
Un\G10498	0000H	Output slave module ID 002H buffer memory start address	—
Un\G10498	0000H	Output slave module ID 003H buffer memory start address	—
Un\G10500	3000H	Output slave module ID 004H buffer memory start address	ASLINKER cable type (output type) Address 4 (ID: 004H)
Un\G10501	0000H	Output slave module ID 005H buffer memory start address	—
⋮	⋮	⋮	—
Un\G10518	3030H	Output slave module ID 016H buffer memory start address	ASLINKER M12 connector type (output type) Address 22 (ID: 016H)
⋮	⋮	⋮	—
Un\G10751	0000H	Output slave module ID 0FFH buffer memory start address	—
Un\G11008	3060H	Input/mixed slave module ID 200H buffer memory start address	ASLINKER cable type (input type) Address 0 (ID: 200H)
Un\G11009	0000H	Input/mixed slave module ID 201H buffer memory start address	—
Un\G11010	3090H	Input/mixed slave module ID 202H buffer memory start address	ASLINKER cable type (mixed type) Address 2 (ID: 202H)
Un\G11011	0000H	Input/mixed slave module ID 203H buffer memory start address	—
⋮	⋮	⋮	—
Un\G11018	0000H (before addition) → 30C0H (after addition)	Input/mixed slave module ID 20AH buffer memory start address	ASLINKER M12 connector type (input type) Address 10 (ID: 20AH)
⋮	⋮	⋮	—
Un\G11028	30C0H (before addition) → 30F0H (after addition)	Input/mixed slave module ID 214H buffer memory start address	ASLINKER M12 connector type (mixed type) Address 20 (ID: 214H)
⋮	⋮	⋮	—
Un\G11263	0000H	Input/mixed slave module ID 2FFH buffer memory start address	—

Setting in the RJ51AW12AL

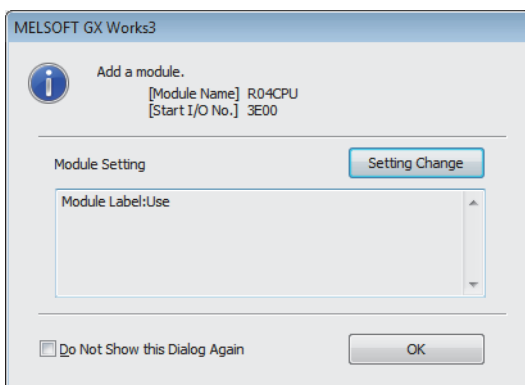
Connect an engineering tool to the CPU module and set parameters.

1. Set the CPU module as follows.


 [Project] ⇒ [New]

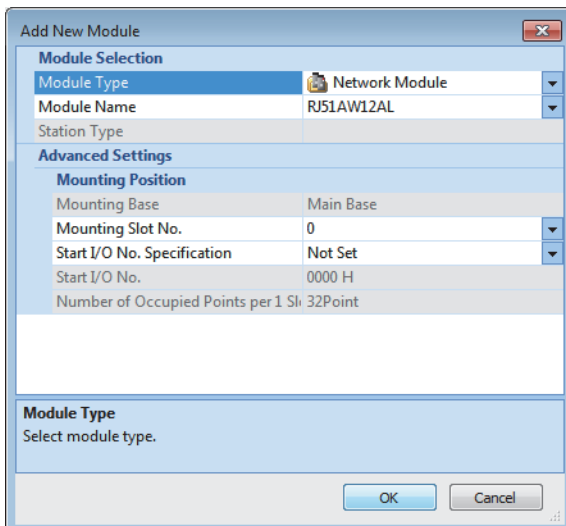


2. Click the [OK] button to add the module labels of the CPU module.

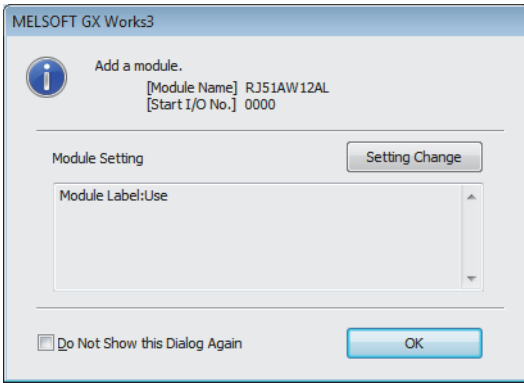


3. Set the RJ51AW12AL as follows.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right click ⇒ [Add New Module]



4. Click the [OK] button to add the module labels of the RJ51AW12AL.



5. Set the items in "Basic setting" as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ51AW12AL] ⇒ [Module Parameter] ⇒ [Basic setting]

Item	Setting Value
Transmission points	
Transmission points setting	512 points (256 input points/256 output points)
Startup operating mode	
Startup operating mode setting	Without slave information acquisition
Double verification	
Double verification setting	All points, double verification of bit
Error status automatic recovery	
Error status automatic recovery mode setting	No error status automatic recovery

6. Write the set parameters into the CPU module, and reset the CPU module or power off and on the system.

[Online] ⇒ [Write to PLC]

Point

In this example, default values were used for parameters that are not shown above. For the parameters, refer to the following.


Page 33 PARAMETER SETTINGS

Settings in the slave modules

Write addresses to slave modules and register them with the RJ51AW12AL.

Address setting

Write addresses to slave modules with an address writer.

 Page 43 System configuration example

Automatic address detection

Keep pressing the SET switch on the RJ51AW12AL until the SET LED turns on.

When the SET LED flashes and then turns off, it indicates that the registration of IDs (addresses) has been completed.

Checking the system status

Check whether the RJ51AW12AL can communicate with the slave modules normally.

The following LED statuses indicate that the communication is established normally.

- LED of the RJ51AW12AL

LED	Status
RUN LED	On
ERR LED	Off
LINK LED	Flashing
SET LED	Off
ALM LED	Off

- LED of the ASLINKER

LED	Status
LINK LED	Flashing
Other than the LINK LED	Off

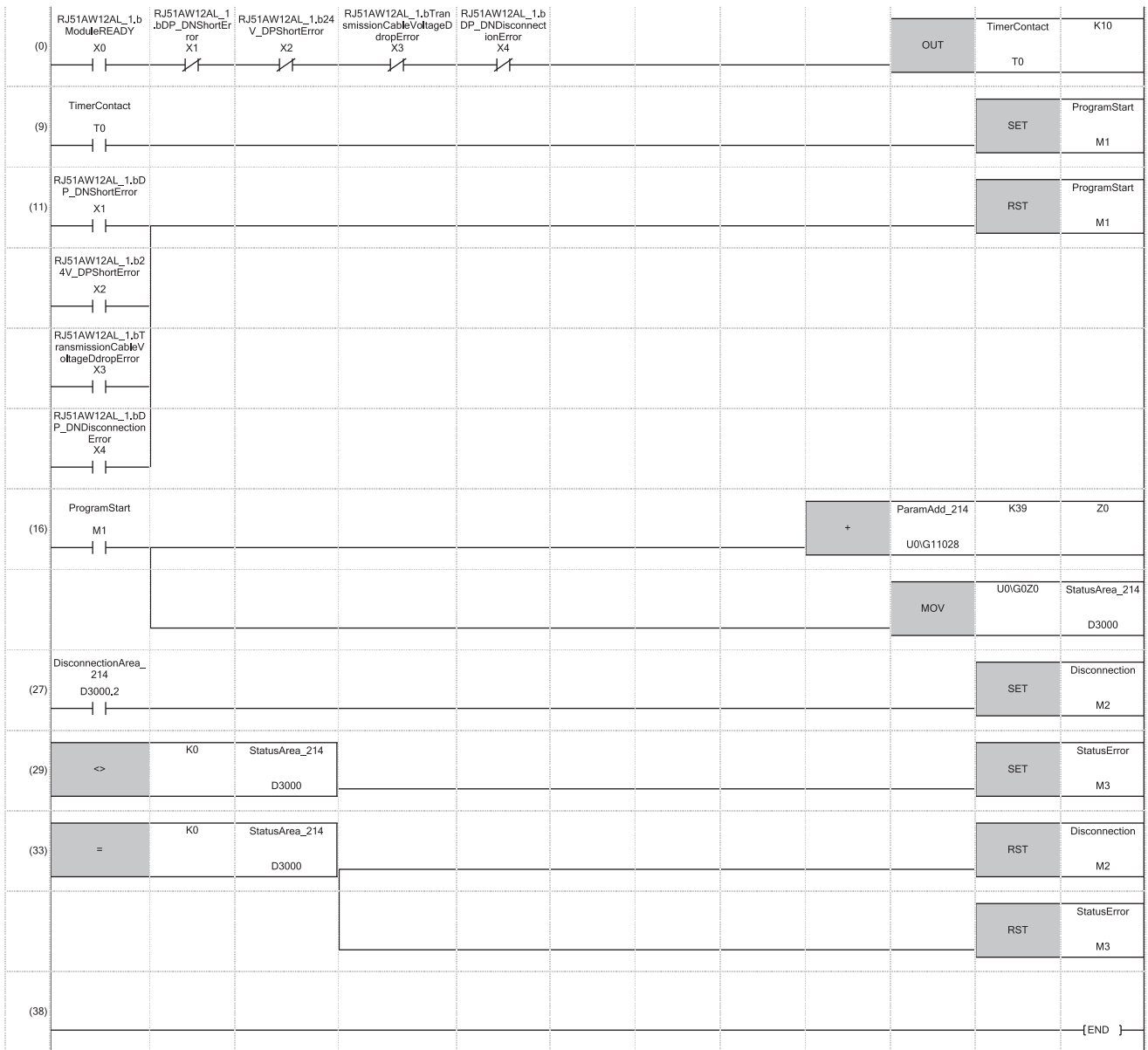
Program example

This section provides examples of programs that read the status details and sensing level information. Parameters of a threshold value can be written in the same way as parameter read.

Reading the status details (I/O disconnection)

The following shows a program example that reads the status details of the slave module (address: 20) when the start I/O number of the RJ51AW12AL is assigned to X/Y00 to X/Y1F.

Classification	Label name	Description	Device																																
Module label	RJ51AW12AL_1.bModuleREADY	Module READY	X0																																
	RJ51AW12AL_1.bDP_DNShortError	DP/DN short error	X1																																
	RJ51AW12AL_1.b24V_DPShortError	24V/DP short error	X2																																
	RJ51AW12AL_1.bTransmissionCableVoltageDdropError	Transmission cable voltage drop error	X3																																
	RJ51AW12AL_1.bDP_DNDisconnectionError	DP/DN disconnection error	X4																																
Label to be defined	Define global labels as shown below:																																		
	<table border="1"> <thead> <tr> <th>Label Name</th> <th>Data Type</th> <th>Class</th> <th>Assign (Device/Label)</th> </tr> </thead> <tbody> <tr> <td>TimerContact</td> <td>Timer</td> <td>VAR_GLOBAL</td> <td>T0</td> </tr> <tr> <td>ProgramStart</td> <td>Bit</td> <td>VAR_GLOBAL</td> <td>M1</td> </tr> <tr> <td>ParamAdd_214</td> <td>Word [Signed]</td> <td>VAR_GLOBAL</td> <td>U0\G11028</td> </tr> <tr> <td>StatusArea_214</td> <td>Word [Signed]</td> <td>VAR_GLOBAL</td> <td>D3000</td> </tr> <tr> <td>DisconnectionArea_214</td> <td>Bit</td> <td>VAR_GLOBAL</td> <td>D3000.2</td> </tr> <tr> <td>Disconnection</td> <td>Bit</td> <td>VAR_GLOBAL</td> <td>M2</td> </tr> <tr> <td>StatusError</td> <td>Bit</td> <td>VAR_GLOBAL</td> <td>M3</td> </tr> </tbody> </table>	Label Name	Data Type	Class	Assign (Device/Label)	TimerContact	Timer	VAR_GLOBAL	T0	ProgramStart	Bit	VAR_GLOBAL	M1	ParamAdd_214	Word [Signed]	VAR_GLOBAL	U0\G11028	StatusArea_214	Word [Signed]	VAR_GLOBAL	D3000	DisconnectionArea_214	Bit	VAR_GLOBAL	D3000.2	Disconnection	Bit	VAR_GLOBAL	M2	StatusError	Bit	VAR_GLOBAL	M3		
Label Name	Data Type	Class	Assign (Device/Label)																																
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DisconnectionArea_214	Bit	VAR_GLOBAL	D3000.2																																
Disconnection	Bit	VAR_GLOBAL	M2																																
StatusError	Bit	VAR_GLOBAL	M3																																



- (16) Once 'ProgramStart' (M1) turns on, the buffer memory address determined by adding 39 to 'ParamAdd_214' (U0G11028) of the slave module (ID: 214H) with the address 20 is stored in 'StatusArea_214' (D3000).
- (27) 'I/O disconnection detection flag' (M2) turns on when a disconnection of the slave module (ID: 214H) with the address 20 is detected.
- (29) 'Status details error detection flag' (M3) turns on when an error of the slave module (ID: 214H) with the address 20 is detected.

The status details of the slave module (address 20) are stored in 40th (UnG12567) of 48 words of the parameter storage area 6 (UnG12528 to UnG12575). (Page 75 Parameters)

Reading the sensing level information

The sensing level is a device parameter for the ASLINKAMP or ASLINKSENSOR only.

This example uses a system configuration in which an ASLINKAMP or ASLINKSENSOR is used as a slave module with address 20 instead of the ASLINKER M12 connector type (mixed type) in the system configuration above.

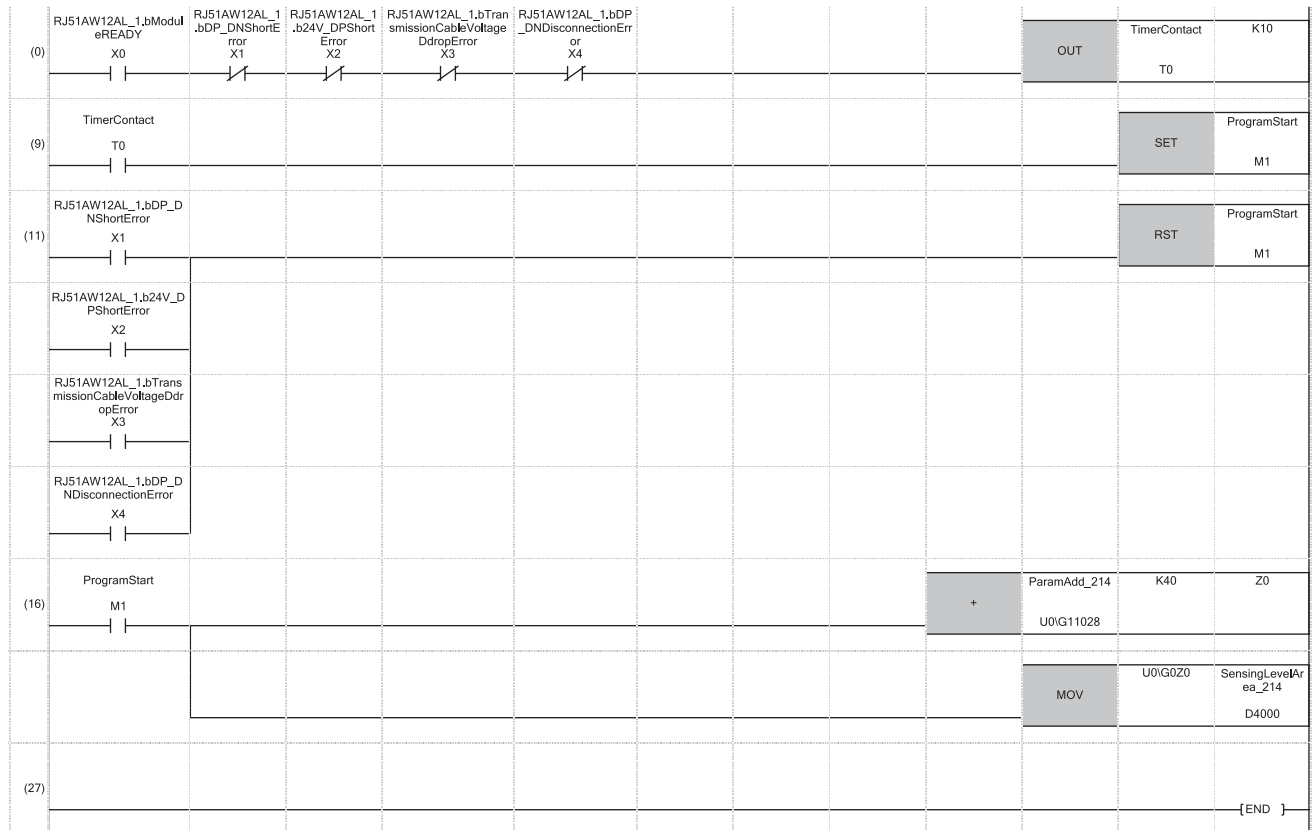
This section describes an example of a program in which the photoelectric transmission type ASLINKSENSOR is used.

The photoelectric transmission type operates based on the combination of the two types: "Transmission floodlight type" and "Transmission light receiving type".

If the slave module with address 20 is replaced with the ASLINKSENSOR, two slave modules, "Transmission floodlight type" and "Transmission light receiving type" (both have address 20.), will be added. Thus, the system is configured with seven slave modules.

The following shows a program example that reads the sensing level of the slave module (address: 20) when the start I/O number of the RJ51AW12AL is assigned to X/Y00 to X/Y1F.

Classification	Label name	Description	Device	
Module label	RJ51AW12AL_1.bModuleREADY	Module READY	X0	
	RJ51AW12AL_1.bDP_DNShortError	DP/DN short error	X1	
	RJ51AW12AL_1.b24V_DPShortError	24V/DP short error	X2	
	RJ51AW12AL_1.bTransmissionCableVoltageDdropError	Transmission cable voltage drop error	X3	
	RJ51AW12AL_1.bDP_DNDisconnectionError	DP/DN disconnection error	X4	
Label to be defined	Define global labels as shown below:			
	Label Name	Data Type	Class	Assign (Device/Label)
	TimerContact	Timer	VAR_GLOBAL	T0
	ProgramStart	Bit	VAR_GLOBAL	M1
	ParamAdd_214	Word [Signed]	VAR_GLOBAL	U0\G11028
	SensingLevelArea_214	Word [Signed]	VAR_GLOBAL	D4000



- (16) Once 'ProgramStart' (M1) turns on, the buffer memory address determined by adding 40 to 'ParamAdd_214' (U0\G11028) of the slave module (ID: 214H) with the address 20 is stored in 'SensingLevelArea_214' (D4000).

The sensing level of the slave module (address 20) is stored in 41st (Un\G12616) of 48 words of the parameter storage area 7 (Un\G12576 to Un\G12623). (Page 75 Parameters)

4 TROUBLESHOOTING

This chapter describes the troubleshooting of the RJ51AW12AL.

4.1 Checking with LED

This section describes troubleshooting using LED.

When the RUN LED turns off

When the RUN LED turns off after powering on the RJ51AW12AL, check the following.

Check item	Action
Is the RJ51AW12AL mounted correctly?	Securely mount the RJ51AW12AL on the base unit.

When the ERR LED turns on

When the ERR LED turns on, check the following.

Check item	Action
Does any error occur in the module diagnostics?	Take the actions displayed on the window.

When the LINK LED turns on or off

When the LINK LED turns on or off, check the following.

Check item	Action
Does a programmable controller error occur in the engineering tool?	Check the error with the engineering tool and correct the error.


When the ALM LED is flashing at 0.2 second intervals

When the ALM LED is flashing at 0.2 second intervals, check the following.

Check item	Action
Is the power supply voltage of the 24VDC external power supply within the rated value?	Adjust the power supply voltage of the 24VDC external power supply within the rated value (21.6 to 27.6VDC). (The recommended voltage is 26.4VDC.)
Is any power cable short-circuited?	<ul style="list-style-type: none">• Check that the power cables (24V, 0V) are not disconnected or short-circuited.• When crimping the link connector, check that the pin layout is correct.
Is the terminal block properly wired?	<ul style="list-style-type: none">• Check that the 24VDC external power supply is properly connected to the terminal blocks of the RJ51AW12AL and the slave module.• Check that there is no short circuit or incorrect wiring and screws are tightened sufficiently.


When the ALM LED is flashing at 1 second intervals

When the ALM LED is flashing at 1 second intervals, check the following.

Check item	Action
Is any transmission cable (between DP and DN, between 24V and DP, or between 0V and DP) short-circuited?	<ul style="list-style-type: none"> • Check that the transmission cables (between DP and DN, between 24V and DP, or between 0V and DP) are not short-circuited. • When crimping the link connector, check that the pin layout is correct.
Is the terminal block properly wired?	Check that the transmission cables (DP, DN) are not in contact with each other and that there is no incorrect wiring in the terminal block wiring of the RJ51AW12AL and the slave module.
Is the current consumption of the AnyWireASLINK system within the specified range?	Correct the cables (wire diameter, total length) and modules (type, the number of connected modules) so that the current consumption of all the slave modules does not exceed the transmission cable supply current of the RJ51AW12AL.  MELSEC iQ-R AnyWireASLINK Master Module User's Manual (Startup)

When the ALM LED is on

When the ALM LED is on, check the following.

Check item	Action
Is any transmission cable (DP, DN) disconnected?	<ul style="list-style-type: none"> • Check that the transmission cables (DP, DN) are free from disconnection. • Check that the cables are crimped with proper pin layout using link connectors appropriate to the wire diameter.
Is the terminal block properly wired?	<ul style="list-style-type: none"> • Check that the transmission cables (DP, DN) and power cables (24V, 0V) are properly connected to the terminal block of the RJ51AW12AL. • Check that there is no incorrect wiring and that screws are tightened sufficiently.
Has the automatic address detection been executed?	When creating a new system, adding or removing a slave module, or changing the address of the slave module, execute the automatic address detection. ( Page 39 Automatic Address Detection Function) After executing the automatic address detection function, check that the number of slave modules and the address are consistent with those of the actual system.
Does the slave module exist?	When the LINK LED of the slave module does not flash, check that there is no disconnection, short circuit, incorrect wiring, or poor contact in the transmission cables (DP, DN) around the module.

When the SET LED is flashing and does not turn off

When the SET LED is flashing and does not turn off, check the following.

Check item	Action
Is 'Parameter access completion flag' (X11) off or is 'Automatic address detection flag' (X14) on?	<ul style="list-style-type: none"> • Reset the CPU module or power off and on the system. • Check that automatic address detection is not executed while parameter access is in progress.

4.2 Checking Module Status

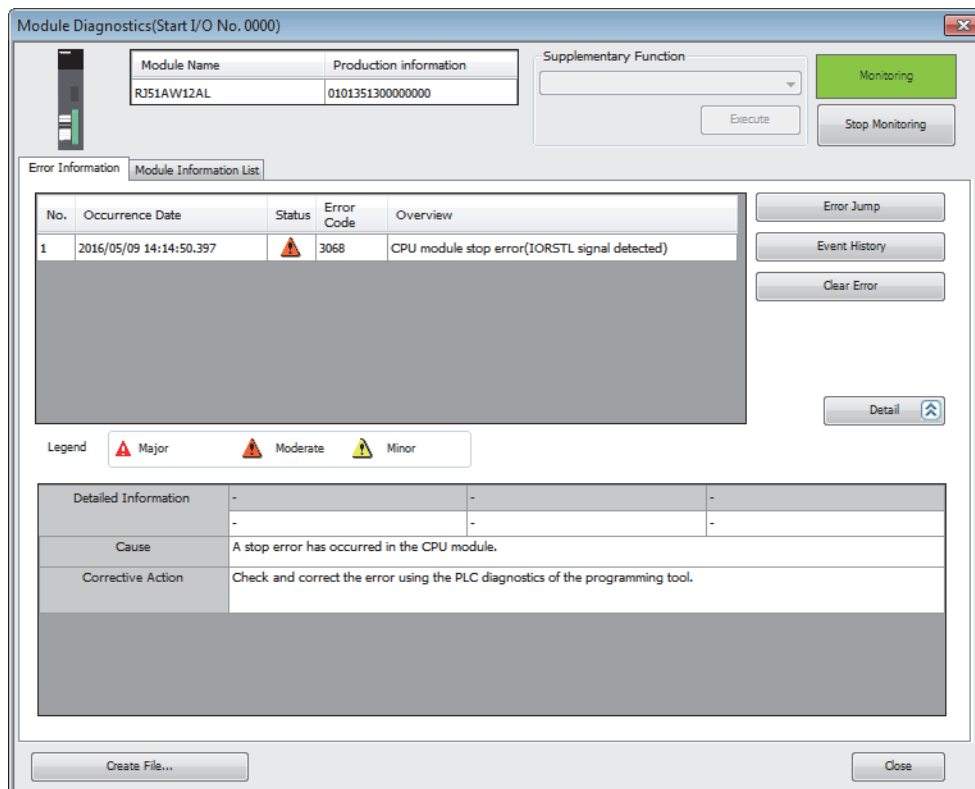
Checking with the "Module Diagnostics" window

The following items can be checked in the "Module Diagnostics" window of the RJ51AW12AL.

Item	Description
Error Information	Displays the details of the errors currently occurring. Clicking the [Event History] button will display the history of errors that occurred in AnyWireASLINK and errors that occurred and operations that were performed in modules.
Module Information List	This item does not support the RJ51AW12AL.

Error Information

Check the details of errors that have occurred and actions for the errors.



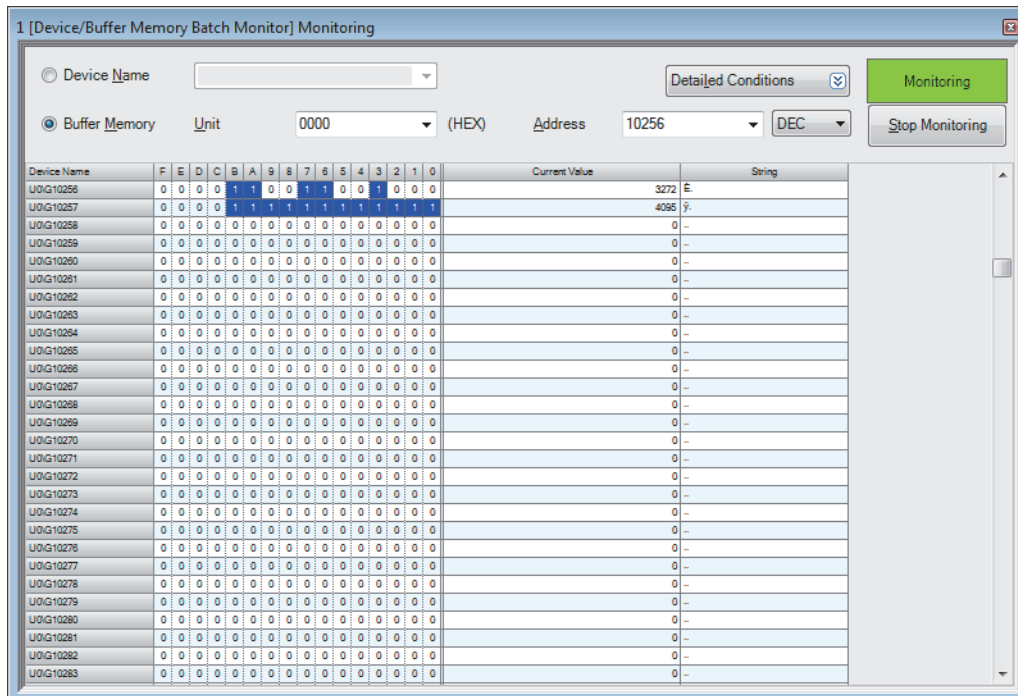
Item	Description
Detailed Information	Displays detailed information about each error (maximum of 3 pieces).
Cause	Displays the detailed error causes.
Corrective Action	Displays the actions to eliminate the error causes.

Checking with the buffer memory

The following shows the check method with the buffer memory.

Check method

[Online] ⇒ [Monitor] ⇒ [Device/Buffer Memory Batch Monitor]



Check item

For details on the buffer memory, refer to the following.

☞ Page 66 Buffer Memory

■Check of the error details

The error code of the RJ51AW12AL is stored in 'Latest error code storage area' (Un\G10256).

■Check of the error ID area

The number of error IDs is stored in 'Number of the error IDs' (Un\G8192) and the ID information is stored in 'Error ID information storage area' (Un\G8193 to Un\G8320).

■Check of the alarm signal area

The number of slave modules having an error is stored in 'Number of the alarm IDs' (Un\G9984) and the ID information is stored in 'Alarm ID information storage area' (Un\G9985 to Un\G10112).

■Check of the error details of the slave module

The details of errors in the slave module are stored in the status details in 'Parameter storage area' (Un\G12288 to Un\G12335). *1

*1 Buffer memory addresses when one slave module is connected. For details, refer to the following.

☞ Page 73 Parameter storage area

4.3 Troubleshooting by Symptom

This section describes troubleshooting method by symptom. If an error has occurred in the RJ51AW12AL, identify the error cause with an engineering tool. (🔍 Page 54 Checking Module Status)

AnyWireASLINK transmission is not available

When AnyWireASLINK transmission is not available, check the following.

Check item	Action
Is the LINK LED of the RJ51AW12AL on or off?	Perform the troubleshooting for when the LINK LED is on or off. (🔍 Page 52 When the LINK LED turns on or off)
Are the number of transmission points of the RJ51AW12AL and the address setting of the slave module correct?	<ul style="list-style-type: none"> • Check that the address of the slave module is within the number of transmission points of the RJ51AW12AL. • Check that the ID of the slave module is not the same as the IDs of other slave modules.
Does the total length of the transmission cables (DP, DN) exceed 200m?	When the total length exceeds 200m, adjust the total length within 200m.
Do the wires or cables used satisfy standards?	When they do not satisfy the standards, change the wires or cables with the ones that satisfy the standards.

When communication is unstable

When communications are unstable, check the following.

Check item	Action
Is the ambient temperature for the module within the specified range?	Keep the ambient temperature within the specified range by taking action such as removing heat source.
Is there any noise affecting the system?	Check the wiring condition.
Is the terminating unit connected properly?	Pay attention to the polarities of the terminating unit and connect it properly.
Does the total length of the transmission cables (DP, DN) exceed the specified range?	Adjust the total length of the AnyWireASLINK system within the specified range.
Do the transmission cables (DP, DN) satisfy the specifications?	<ul style="list-style-type: none"> • Use transmission cables (DP, DN) that satisfy the specifications such as the type and wire diameter, and tightening torque to the terminal block. • Do not run multiple transmission cables (DP, DN) using a multicore cable.
Does the power supply voltage of the 24VDC external power supply satisfy the specifications?	Adjust the power supply voltage of the 24VDC external power supply within the rated value (21.6 to 27.6VDC). (The recommended voltage is 26.4VDC.)
Are two or more RJ51AW12AL modules connected within one AnyWireASLINK line?	Connect only one RJ51AW12AL module within one AnyWireASLINK line.
Are there AnyWireASLINK master modules of different series connected within one AnyWireASLINK line?	Connect only one AnyWireASLINK master module within one AnyWireASLINK line.
Are the RJ51AW12AL module and AnyWireASLINK bridge module connected within one AnyWireASLINK line?	Connect only one RJ51AW12AL module or AnyWireASLINK bridge module within one AnyWireASLINK line.


When data of the slave module cannot be checked

When I/O data and parameter data of the slave module cannot be checked, check the following.

Check item	Action
Is the I/O information of the slave module stored in the following buffer memory addresses in the program? <ul style="list-style-type: none"> • 'Input information area' (Un\G0 to Un\G15) • 'Output information area' (Un\G4096 to Un\G4111) 	Check that information regarding the slave module has been properly assigned and that the commands written in the program are free from mistakes.
Are the I/O LEDs of the slave module normal?	Check the I/O LED status of the slave module and check that there is no disconnection, short circuit, or poor contact in the wiring on the load side.
Are two or more RJ51AW12AL modules connected within one AnyWireASLINK line?	Connect only one RJ51AW12AL module within one AnyWireASLINK line.

4.4 List of Error Codes

This section describes errors that occur in processing for data communication between the RJ51AW12AL and slave modules and in processing requests from the CPU module, and error codes, error definitions, and causes of the errors, and actions against the errors.

Error codes can be checked in the [Error Information] tab of the "Module Diagnostics" window of the RJ51AW12AL. ( Page 54 Error Information)

Error code	Error details and causes	Action	Detailed information
0CC8H	Transmission cable voltage drop error	<p>The voltage of the 24VDC external power supply may be insufficient. Perform the following:</p> <ul style="list-style-type: none"> Adjust the power supply voltage of the 24VDC external power supply within the rated value (21.6 to 27.6VDC). (The recommended voltage is 26.4VDC.) Check that the power cables (24V, 0V) are not disconnected or short-circuited. When crimping the link connector, check that the pin layout is correct. Check that the 24VDC external power supply is properly connected to the terminal blocks of the RJ51AW12AL and the slave module. Check that there is no short circuit or incorrect wiring and screws are tightened sufficiently. 	—
0CC9H	DP/DN short error	<p>A short-circuit may be occurring in the transmission cables (DP, DN) or the maximum supply current of the transmission cables (DP, DN) may be exceeded. Perform the following:</p> <ul style="list-style-type: none"> Check that the transmission cables (DP, DN) are not short-circuited. When crimping the link connector, check that the pin layout is correct. Check that the transmission cables (DP, DN) are not in contact with each other and that there is no incorrect wiring in the terminal block wiring of the RJ51AW12AL and the slave module. Correct the cables (wire diameter, total length) and modules (type, the number of connected modules) so that the current consumption of all the slave modules does not exceed the transmission cable supply current of the RJ51AW12AL. 	—
0CCA H	DP/DN disconnection error	<p>The transmission cables (DP, DN) may be disconnected, or there may be no response from the slave module. The slave module may be in failure or the system configuration may have been changed after the automatic address detection. Check 'Number of the error IDs' (Un\G8192) and 'Error ID information storage area' (Un\G8193 to Un\G8320), find out the disconnected area, and perform the following:</p> <ul style="list-style-type: none"> Check that the transmission cables are free from disconnection. Check that the cables are crimped with proper pin layout using link connectors appropriate to the wire diameter. Check that the transmission cables (DP, DN) are properly connected to the terminal block of the RJ51AW12AL. Check that there is no incorrect wiring and that screws are tightened sufficiently. When creating a new system, adding or removing a slave module, or changing the address of the slave module, execute the automatic address detection. After executing the automatic address detection function, check that the number of slave modules and the address are consistent with those of the actual system. If the LINK LED of the slave module does not flash, check that there is no disconnection, short circuit, incorrect wiring, or poor contact in the transmission cables (DP, DN) around the module. 	—

Error code	Error details and causes	Action	Detailed information
0CCBH	24V/DP short error	A short-circuit may be occurring in the transmission cables (24V, DP). Perform the following: <ul style="list-style-type: none"> • Check that the transmission cables (24V, DP) are not short-circuited. When crimping the link connector, check that the pin layout is correct. • Check that the transmission cables (24V, DP) are not in contact with each other and that there is no incorrect wiring in the terminal block wiring of the RJ51AW12AL and the slave module. 	—
0D2CH	Slave module hardware error	A malfunction has been detected in the slave module hardware. Perform either of the following operations: <ul style="list-style-type: none"> • Reset the CPU module or power off and on the system. • Power off and on the slave module. Check that there is no influence from noise.	—
0D2DH	Slave module hardware error	A malfunction has been detected in the slave module hardware. Perform either of the following operations: <ul style="list-style-type: none"> • Reset the CPU module or power off and on the system. • Power off and on the slave module. Check that there is no influence from noise.	—
0D2EH	Parameter access target module ID error	The RJ51AW12AL accessed the parameter of the ID where the automatic address detection has not been executed. Check 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112), find out the error ID, and perform the following: <ul style="list-style-type: none"> • Check that the slave module ID for parameter access in the actual system matches that of the program. Especially note that the input slave module ID is the input slave module address + 200H and that the I/O combined slave module ID is the I/O combined slave module address + 200H. • When creating a new system, adding or removing a slave module, or changing the address of the slave module, execute the automatic address detection. After executing the automatic address detection function, check that the number of slave modules and the address are consistent with those of the actual system. 	—
0D2FH	Parameter value error	The slave module has detected a signal of writing a parameter that cannot be set to the slave module itself. Check 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112) to find out the error ID. Then check that the slave module parameter setting value is within the allowable setting range.	—
0D30H	Parameter access error	The parameter access signal sent by the RJ51AW12AL is corrupt. Check that none of the following errors have occurred. (☞ Page 25 Parameter access error) <ul style="list-style-type: none"> • Slave module hardware error • Slave module status error • Same ID used error When none of the above have occurred, check that there is no influence from noise.	—
0D31H	Slave module status error	The slave module has notified of error status. Check the target module's status details and solve the problem.	—
0D90H	Same ID used error	The same ID (address) has been set to some of the connected slave modules. Check 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112) to find out the error ID. Check the ID (address) of the slave module, and then set a unique number.	—
0D91H	No ID setting error	There is a slave module with no address setting. Perform the following: <ul style="list-style-type: none"> • Set the address of the slave module. • Set the address of the slave module to a value other than 255. 	—
0D92H	New ID error	The new ID (address) of the slave module may be in the following condition. <ul style="list-style-type: none"> • The ID has already been used. • The ID exceeds the allowable specification range. Check 'Connected module ID information storage area' (Un\G9217 to Un\G9344) and set another new ID (address).	—

Error code	Error details and causes	Action	Detailed information
0DF4H	Backup data error	The data backed up in the SD memory card of the CPU module is broken. Check that there is no influence from noise, and perform the following: <ul style="list-style-type: none"> • Reset the CPU module or power off and on the system, and then set the switch to RUN status again. • Use normal backup data, and restore the data. • Set the write protect switch of the SD memory card to off (writable). If the error occurs again, the SD memory card may be in failure. Please consult your local Mitsubishi representative.	—
1867H	RJ51AW12AL hardware failure	A malfunction has been detected in the RJ51AW12AL hardware. Reset the CPU module or power off and on the system. If the error occurs again, the RJ51AW12AL may be in failure. Please consult your local Mitsubishi representative.	—
3064H to 3066H	RJ51AW12AL hardware failure	A malfunction has been detected in the RJ51AW12AL hardware. Reset the CPU module or power off and on the system. If the error occurs again, the RJ51AW12AL may be in failure. Please consult your local Mitsubishi representative.	—
3068H	CPU module stop error (IORSTL signal detection)	A stop error has occurred in the CPU module. Check the error in the "Module Diagnostics" window of an engineering tool and correct the error.	—
3069H	System error (NMI signal detection)	An internal control power supply error or watchdog timer error has occurred. Check the error in the "Module Diagnostics" window of an engineering tool and correct the error.	—
306BH	CPU module error (ITERR signal detection)	The RJ51AW12AL cannot receive signals from the CPU module. Check the error in the "Module Diagnostics" window of an engineering tool and correct the error.	—
306CH	ASIC access error (library I/F function access error)	A malfunction (ASIC access error) has been detected in the RJ51AW12AL hardware. Reset the CPU module or power off and on the system. If the error occurs again, the RJ51AW12AL may be in failure. Please consult your local Mitsubishi representative.	—

4.5 Event List

This section lists the events which occur in the RJ51AW12AL.

The events are classified into three types: system, error, and operation.

System		
Event code	Overview	Cause
00CC8	Transmission cable voltage drop error	The voltage of the 24VDC external power supply may be insufficient.
00CC9	DP/DN short error	A short-circuit may be occurring in the transmission cables (DP, DN) or the maximum supply current of the transmission cable (DP, DN) may be exceeded.
00CCA	DP/DN disconnection error	The transmission cable (DP, DN) may be disconnected, or there may be no response from the slave module.
00CCB	24V/DP short error	A short-circuit may be occurring in the transmission cables (24V, DP).
00D2C	Slave module hardware error (write to read only)	Writing data to read only areas in the slave module was attempted.
00D2D	Slave module hardware error (read from write only)	Reading data from write only areas in the slave module was attempted.
00D2E	Parameter access target module ID error	The parameter access is executed to the ID not detected by the automatic address detection.
00D2F	Parameter value error	The slave module has detected a signal of writing a parameter that cannot be set to the slave module itself.
00D30	Parameter access error	The sent parameter access signal is corrupt.
00D31	Slave module status error	The slave module is in the error state.
00D90	Same ID used error	The same ID (address) has been set to some of the connected slave modules.
00D91	No ID setting error	There is a slave module with no address setting.
00D92	New ID error	The new ID (address) of the slave module may be in the following condition. <ul style="list-style-type: none"> • The ID has already been used. • The ID exceeds the allowable specification range.
00DF4	Backup data error	The data backed up in the SD memory card of the CPU module is broken.

Error		
Event code	Overview	Cause
01867	RJ51AW12AL hardware failure (EEPROM error)	A malfunction has been detected in the RJ51AW12AL hardware.
03064	RJ51AW12AL hardware failure (internal ROM error)	A malfunction has been detected in the RJ51AW12AL hardware.
03065	RJ51AW12AL hardware failure (internal RAM error)	A malfunction has been detected in the RJ51AW12AL hardware.
03066	RJ51AW12AL hardware failure (module initialization error)	A malfunction has been detected in the RJ51AW12AL hardware.
03068	CPU module stop error (IORSTL signal detection)	A stop error has occurred in the CPU module.
03069	System error (NMI signal detection)	An error of the power supply or watchdog timer controlled internally has occurred.
0306B	CPU module error (ITERR signal detection)	The RJ51AW12AL cannot receive signals from the CPU module.
0306C	ASIC access error (library I/F function access error)	A malfunction (ASIC access error) has been detected in the RJ51AW12AL hardware.

Operation		
Event code	Overview	Cause
24000	Error flag clear command	Error flag clear command was turned off and on.
24001	Automatic address detection command	Automatic address detection command was turned off and on.
24002	Overlap address inspection command	Overlap address inspection command was turned off and on.
24010	Parameter access request command for the slave module	Parameter access request command for the slave module was turned off and on.
24011	Parameter batch read command for the slave module	Parameter batch read command for the slave module was turned off and on.
24012	Parameter batch write command for the slave module	Parameter batch write command for the slave module was turned off and on.

APPENDICES

Appendix 1 Module Label

The I/O signals and buffer memory of the RJ51AW12AL can be set using module label.

Structure of the module label

The module label name is defined with the following structure.

"Instance name"_"Module number"."Label name"

"Instance name"_"Module number"."Label name"_D

Ex.

RJ51AW12AL_1.bModuleREADY

■ Instance name

The following is the instance name of the RJ51AW12AL.

Model	Instance name
RJ51AW12AL	RJ51AW12AL

■ Module number

A sequential number starting with "1" for identifying a module from the one with the same instance name.

■ Label name

A label name unique to the module.

■ _D

This symbol indicates that the module label is for direct access. The label without "_D" is for refresh. The following are the differences between refresh and direct access.

Type	Description	Access timing
Refresh	The values read/written from/to the module labels are reflected to the module at refresh. The execution time of the program can be shortened.	At refresh
Direct access	The values read/written from/to the module labels are reflected to the module immediately. Although the execution time of the program is longer than the one at the refresh, the responsiveness is improved.	At writing to or reading from the module label

Appendix 2 I/O Signals

This section describes the I/O signals for the CPU module. The assignment of the I/O signals when the start I/O number of the RJ51AW12AL is 0 is shown.

List of I/O signals

The following table lists I/O signals. Device X is an input signal from the RJ51AW12AL to the CPU module. Device Y is an output signal from CPU module to the RJ51AW12AL.

Input signal	
Device No.	Signal name
X0	Module READY
X1	DP/DN short error
X2	24V/DP short error
X3	Transmission cable voltage drop error
X4	DP/DN disconnection error
X5 to XF	Use prohibited
X10	Slave module alarm signal
X11	Parameter access completion flag
X12	Parameter access error
X13	Use prohibited
X14	Automatic address detection flag
X15	Overlap address inspection flag
X16 to X1F	Use prohibited

Output signal	
Device No.	Signal name
Y0	Error flag clear command
Y1	Automatic address detection command
Y2	Overlap address inspection command
Y3 to YF	Use prohibited
Y10	Parameter access request command for the slave module
Y11	Parameter batch read command for the slave module
Y12	Parameter batch write command for the slave module
Y13 to Y1F	Use prohibited

Point

Do not use (turn on) any "use prohibited" signals as an input or output signal to the CPU module. Doing so may cause malfunction of the programmable controller system.

Details of the input signal

The following shows the on/off timing or condition of the input signal.

Module READY: X0

When the CPU module is reset or powered on, this signal turns on as soon as the RJ51AW12AL is completely ready to be processed.

DP/DN short error: X1

This signal turns on when a short circuit occurs in the transmission cables (DP, DN) or the maximum supply current is exceeded.

■Turning off of 'DP/DN short error' (X1)

After removing the short circuit in the transmission cables (DP, DN) or adjusting the current within the specification range, perform either of the following operations. Until then, 'DP/DN short error' (X1) remains on.

- Reset the CPU module or power off and on the system.
- Turn on and off 'Error flag clear command' (Y0).

For how to remove the short circuit in the transmission cables (DP, DN) or adjust the current within the specification range, refer to the following.

 Page 57 List of Error Codes

24V/DP short error: X2

This signal turns on when any of the transmission cables (24V, DP) is short-circuited.

■Turning off of '24V/DP short error' (X2)

After removing the short circuit in the transmission cables (24V, DP), perform either of the following operations. Until then, '24V/DP short error' (X2) remains on.

- Reset the CPU module or turn off and on the power.
- Turn on and off 'Error flag clear command' (Y0).

For how to remove the short circuit in the transmission cables (24V, DP), refer to the following.

 Page 57 List of Error Codes

Transmission cable voltage drop error: X3

This signal turns on when the 24VDC external power supply voltage drops.

■Turning off of 'Transmission cable voltage drop error' (X3)

After removing the drop of the 24VDC external power supply voltage, perform either of the following operations. Until then, 'Transmission cable voltage drop error' (X3) remains on.

- Reset the CPU module or power off and on the system.
- Turn on and off 'Error flag clear command' (Y0).

For how to remove the drop of the 24VDC external power supply voltage, refer to the following.

 Page 57 List of Error Codes

DP/DN disconnection error: X4

This signal turns on when the transmission cables (DP, DN) or a slave module is disconnected.

■Turning off of 'DP/DN disconnection error' (X4)

After removing the short circuit in the transmission cables (DP, DN) or reconnecting the slave module, perform either of the following operations. Until then, 'DP/DN disconnection error' (X4) remains on. *1

- Reset the CPU module or power off and on the system.
- Turn on and off 'Error flag clear command' (Y0).


For how to remove the short circuit in the transmission cables (DP, DN) or reconnect the slave module, refer to the following.

 Page 57 List of Error Codes

*1 If the error status automatic recovery function is enabled, this signal turns automatically off.

Slave module alarm signal: X10

This signal turns on when a status error of a slave module occurs or an error occurs in the address setting of a slave module. (The status error includes an I/O disconnection and short circuit.)

For details on the target slave module's addresses and alarms, refer to 'Number of the alarm IDs' (Un\G9984) and 'Alarm ID information storage area' (Un\G9985 to Un\G10112). ( Page 70 Number of the alarm IDs, Page 70 Alarm ID information storage area)

■Turning off of 'Slave module alarm signal' (X10)

After eliminating the status error of the slave module or setting the address of the slave module again, perform either of the following operations. Until then, 'Slave module alarm signal' (X10) remains on.

- Reset the CPU module or power off and on the system.
- Turn on and off 'Error flag clear command' (Y0).

For how to eliminate the status error in the slave module, refer to the following.

 Page 57 List of Error Codes


Parameter access completion flag: X11

This signal turns on when the parameter access is completed.

Parameter access error: X12

This signal turns on when an error occurs in the parameter access.

The latest error codes are stored in 'Latest error code storage area' (Un\G10256) and the target IDs of the error codes are stored in 'Latest error ID storage area' (Un\G10257).

The error address is stored in 'Alarm ID information storage area (Un\G9985 to Un\G10112)' as the alarm information. ( Page 70 Alarm ID information storage area)

■Turning off of 'Parameter access error' (X12)

After eliminating the error, perform either of the following operations. Until then, 'Parameter access error' (X12) remains on. *1

- Reset the CPU module or power off and on the system.
- Turn on and off 'Error flag clear command' (Y0).

For how to eliminate the parameter access error, refer to the following.

 Page 57 List of Error Codes

*1 If the error status automatic recovery function is enabled, this signal turns automatically off.

Automatic address detection flag: X14

The signal remains on from a start of execution of automatic address detection to the end of the execution.

Overlap address inspection flag: X15

The signal remains on from a start of execution of same address used check to the end of the execution.

Details of the output signal

The following shows the on/off timing or condition of the output signal.

Error flag clear command: Y0

Turn on this signal to turn off the following input signals that are on.

- 'DP/DN short error' (X1)
- '24V/DP short error' (X2)
- 'Transmission cable voltage drop error' (X3)
- 'DP/DN disconnection error' (X4)
- 'Slave module alarm signal' (X10)
- 'Parameter access error' (X12)
- 'Number of the error IDs' (Un\G8192)
- 'Error ID information storage area' (Un\G8193 to Un\G8320)
- 'Number of the alarm IDs' (Un\G9984)
- 'Alarm ID information storage area' (Un\G9985 to Un\G10112)

Resetting the CPU module or turning on the power supply also turns off the input signals above and the buffer memory.

Automatic address detection command: Y1

Turn on this signal to execute automatic address detection.

Overlap address inspection command: Y2

Turn on this signal to execute same address used check.

Parameter access request command for the slave module: Y10

Turn on this signal to perform the following operations from the RJ51AW12AL to a slave module.

- Read and write the parameter of the slave module.
- Execute the remote address change function.

When this signal is turned on, 'Parameter access completion flag' (X11) turns off.

Parameter batch read command for the slave module: Y11

Turn on this signal to collectively read parameters from all slave modules that the RJ51AW12AL recognizes.

Parameter batch write command for the slave module: Y12

Turn on this signal to collectively write parameters to all slave modules that the RJ51AW12AL recognizes.

Appendix 3 Buffer Memory

Buffer memory is for data communications between the RJ51AW12AL and the CPU module or the RJ51AW12AL and slave modules.

When the CPU module is reset or the system is powered off and on, the data in the buffer memory are set back to the default (initial values).

List of buffer memory addresses

Address (decimal)	Address (hexadecimal)	Name	Initial value	Read/write
0 to 15	0H to FH	Input information area	0	Read
16 to 4095	10H to FFFH	System area		
4096 to 4111	1000H to 100FH	Output information area	0	Read/write
4112 to 8191	1010H to 1FFFH	System area		
8192	2000H	Number of the error IDs	0	Read
8193 to 8320	2001H to 2080H	Error ID information storage area	0	Read
8321 to 8703	2081H to 21FFH	System area		
8704 to 8719	2200H to 220FH	Error ID information bit area (output)	0	Read
8720 to 8735	2210H to 221FH	System area		
8736 to 8751	2220H to 222FH	Error ID information bit area (input)	0	Read
8752 to 8959	2230H to 22FFH	System area		
8960	2300H	Number of the connected modules	0	Read
8961 to 9215	2301H to 23FFH	System area		
9216	2400H	Number of the IDs of the connected modules	0	Read
9217 to 9344	2401H to 2480H	Connected module ID information storage area	0	Read
9345 to 9983	2481H to 26FFH	System area		
9984	2700H	Number of the alarm IDs	0	Read
9985 to 10112	2701H to 2780H	Alarm ID information storage area	0	Read
10113 to 10255	2781H to 280FH	System area		
10256	2810H	Latest error code storage area	0	Read
10257	2811H	Latest error ID storage area	0	Read
10258 to 10319	2812H to 284FH	System area		
10320	2850H	Parameter access setting	0	Read/write
10321	2851H	Parameter access target module ID specification	0	Read/write
10322	2852H	System area		
10323	2853H	Change ID specification	0	Read/write
10324 to 10495	2854H to 28FFH	System area		
10496 to 10751	2900H to 29FFH	Parameter storage location memory number (output)	0	Read
10752 to 11007	2A00H to 2AFFH	System area		
11008 to 11263	2B00H to 2BFFH	Parameter storage location memory number (input)	0	Read
11264 to 12287	2C00H to 2FFFH	System area		
12288 to 18431	3000H to 47FFH	Parameter storage area	0	Read/write
18432 to 32767	4800H to 7FFFH	System area		



Do not write data to "System area".
Doing so may cause malfunction of the programmable controller system.

Details of buffer memory addresses

Input information area

This buffer memory area automatically stores the on/off status of the input signal of the slave module.

■ Input information area (Un\G0 to Un\G15)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Un\G1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Un\G2	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Un\G3	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Un\G4	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Un\G5	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Un\G6	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Un\G7	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
Un\G8	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
Un\G9	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
Un\G10	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
Un\G11	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
Un\G12	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
Un\G13	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
Un\G14	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
Un\G15	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

Ex.

If a 2-point input slave module (address 10) is connected, the 2 bits from Un\G0.A are occupied for the input signal because the setting address is 10. (b10 and b11 of Un\G0 turn on or off.)

Output information area

When the on/off data of an output signal of a slave module is written from the CPU module, the slave module automatically outputs a signal.

■Output information area (Un\G4096 to Un\G4111)

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G4096	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Un\G4097	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Un\G4098	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Un\G4099	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Un\G4100	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Un\G4101	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Un\G4102	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Un\G4103	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
Un\G4104	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
Un\G4105	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
Un\G4106	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
Un\G4107	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
Un\G4108	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
Un\G4109	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
Un\G4110	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
Un\G4111	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

Ex.

If a 2-point output slave module (address 30) is connected, the 2 bits from Un\G4097.E are occupied for the output signal because the setting address is 30. (b14 and b15 of Un\G4097 turn on or off.)

Number of the error IDs

■Number of the error IDs (Un\G8192)

This buffer memory area stores the number of error IDs that send no response due to disconnection of the transmission cable (DP, DN) or a failure in the slave module alone among the IDs of the connected modules. (Up to 128 IDs)

The stored values are retained until the power is turned off and on or 'Error flag clear command' (Y0) is turned off and on after the error is cleared.

However, if the error status automatic recovery function is enabled, the number of slave modules (number of error IDs) from which errors are cleared automatically decreases.

Data update timing

After automatic address detection, the data are updated as soon as a response error is detected.

Error ID information storage area

■Error ID information storage area (Un\G8193 to Un\G8320)

When the transmission cables (DP, DN) are disconnected or an error in a slave module or an error (error code: 0CCA H, 0D30 H) occurs, this buffer memory area stores all the error IDs in the ascending order. (Up to 128 IDs)

The IDs to be stored are as follows.

- 0000H to 00FFH: ID of an output slave module
- 0200H to 02FFH: ID of an input slave module or I/O combined slave module

The stored values are retained until the power is turned off and on or 'Error flag clear command' (Y0) is turned off and on after the error is cleared.

However, if the error status automatic recovery function is enabled, the ID of a slave module from which an error is cleared turns off automatically.

Data update timing

After automatic address detection, the data are updated as soon as a response error is detected.

Error ID information bit area

These buffer memory areas show error IDs in units of bits for reference. These areas are used in the same manner as 'Error ID information storage area' (Un\G8193 to Un\G8320).

■Error ID information bit area (output) (Un\G8704 to Un\G8719)

The bits corresponding to error IDs of an output slave module turn on.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G8704	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Un\G8705	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Un\G8706	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Un\G8707	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Un\G8708	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Un\G8709	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Un\G8710	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Un\G8711	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
Un\G8712	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
Un\G8713	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
Un\G8714	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
Un\G8715	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
Un\G8716	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
Un\G8717	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
Un\G8718	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
Un\G8719	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

■Error ID information bit area (input) (Un\G8736 to Un\G8751)

The bits corresponding to error IDs of an input slave module or I/O combined slave module turn on.

Address	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G8736	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Un\G8737	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Un\G8738	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Un\G8739	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
Un\G8740	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
Un\G8741	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
Un\G8742	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
Un\G8743	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
Un\G8744	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
Un\G8745	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
Un\G8746	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
Un\G8747	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
Un\G8748	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
Un\G8749	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208
Un\G8750	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
Un\G8751	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

Number of the connected modules

■Number of the connected modules (Un\G8960)

This buffer memory area stores the number of slave modules detected by automatic address detection. (Up to 128 modules)

Number of the IDs of the connected modules

■Number of the IDs of the connected modules (Un\G9216)

This buffer memory area stores the number of IDs of the connected modules through automatic address detection. (Up to 128 IDs)

The number of stored IDs is retained even after the power supply is turned off.

Data update timing

The data are updated at the time of power-on or automatic address detection.

Connected module ID information storage area

■Connected module ID information storage area (Un\G9217 to Un\G9344)

This buffer memory area stores the ID information of all the slave modules connected to the RJ51AW12AL in the ascending order.

The IDs to be stored are as follows.

- 0000H to 00FFH: ID of an output slave module
- 0200H to 02FFH: ID of an input slave module or I/O combined slave module

Information of a stored ID is retained even after the power supply is turned off.

Data update timing

The data are updated at the time of power-on or automatic address detection.

Number of the alarm IDs

■Number of the alarm IDs (Un\G9984)

When a status error occurs in a slave module or an ID or parameter setting error regarding a slave module occurs, this buffer memory area stores the number of IDs relevant to alarm occurrence. (Up to 128 IDs)

The stored values are retained until the power is turned off and on or 'Error flag clear command' (Y0) is turned off and on after the error is cleared.

Data update timing

The data are updated when the power is turned on or when an alarm has occurred after automatic address detection.

The following shows alarm target error codes.

Error code	Error description
0D2CH, 0D2DH	Slave module hardware error
0D2EH	Parameter access target module ID error
0D2FH	Parameter value error
0D31H	Slave module status error
0D90H	Same ID used error
0D91H	No ID setting error
0D92H	New ID error

Alarm ID information storage area

■Alarm ID information storage area (Un\G9985 to Un\G10112)

This buffer memory area stores the ID information of all the slave modules where an alarm has occurred in the ascending order.

The IDs to be stored are as follows.

- 0000H to 00FFH: ID of an output slave module
- 0200H to 02FFH: ID of an input slave module or I/O combined slave module

The stored values are retained until the power is turned off and on or 'Error flag clear command' (Y0) is turned off and on after the error is cleared.

Data update timing

The data are updated when the power is turned on or when an alarm has occurred after automatic address detection.

Latest error code storage area

■ Latest error code storage area (Un\G10256)

This buffer memory area stores the latest error code detected in the RJ51AW12AL. For details on the error codes, refer to the following.

☞ Page 57 List of Error Codes

Latest error ID storage area

■ Latest error ID storage area (Un\G10257)

This buffer memory area stores the IDs corresponding to the error codes stored in 'Latest error code storage area' (Un\G10256).

However, for the errors below, "0FFFH" is stored.

Error code	Error description
0CC8H	Transmission cable voltage drop error
0CC9H	DP/DN short error
0CCBH	24V/DP short error
0D2EH	Parameter access target module ID error
0D92H	New ID error
1867H, 3064H to 3066H	RJ51AW12AL hardware failure
3068H	CPU module stop error (IORSTL signal detection)
3069H	System error (NMI signal detection)
306BH	CPU module error (ITERR signal detection)
306CH	ASIC access error (library I/F function access error)

Parameter access setting

■ Parameter access setting (Un\G10320)

Specify the parameter access method. When a value other than those below is stored, the parameter is read.

- 0000H: Read (slave module → RJ51AW12AL → CPU module)
- 0001H: Write (CPU module → RJ51AW12AL → slave module)
- 0002H: Address change (CPU module → RJ51AW12AL → slave module)

However, when the output signals below are executed, the set value is ignored.

- 'Parameter batch read command for the slave module' (Y11)
- 'Parameter batch write command for the slave module' (Y12)

Parameter access target module ID specification

■ Parameter access target module ID specification (Un\G10321)

Specify the access ID for accessing the parameters of individual IDs.

Write one of the following to specify the ID.

- 0000H to 00FFH: ID of an output slave module
- 0200H to 02FFH: ID of an input slave module or I/O combined slave module

However, when the output signals below are executed, the set value is ignored.

- 'Parameter batch read command for the slave module' (Y11)
- 'Parameter batch write command for the slave module' (Y12)

Change ID specification

■Change ID specification (Un\G10323)

Specify a new ID (address) with the remote address change function.

Write one of the following to specify the ID.

- 0000H to 00FFH: ID of an output slave module
- 0200H to 02FFH: ID of an input slave module or I/O combined slave module

However, when the output signals below are executed, the set value is ignored.

- 'Parameter batch read command for the slave module' (Y11)
- 'Parameter batch write command for the slave module' (Y12)

Parameter storage location memory number

This buffer memory area stores the start addresses of the buffer memory areas of the parameter storage areas for each slave modules.

■Parameter storage location memory number (output) (Un\G10496 to Un\G10751)

Address	Details
Un\G10496	Buffer memory start address of the output slave module ID 0000H
Un\G10497	Buffer memory start address of the output slave module ID 0001H
⋮	⋮
Un\G10750	Buffer memory start address of the output slave module ID 00FEH
Un\G10751	Buffer memory start address of the output slave module ID 00FFH

■Parameter storage location memory number (input) (Un\G11008 to Un\G11263)

Address	Details
Un\G11008	Buffer memory start address of the input slave module or I/O combined slave module ID 0200H
Un\G11009	Buffer memory start address of the input slave module or I/O combined slave module ID 0201H
⋮	⋮
Un\G11262	Buffer memory start address of the input slave module or I/O combined slave module ID 02FEH
Un\G11263	Buffer memory start address of the input slave module or I/O combined slave module ID 02FFH

Ex.

The following table describes the buffer memory areas corresponding to the addresses of slave modules.

- Address 0: Input slave module
- Address 10: Output slave module
- Address 100: Output slave module

Address	Data*1	Description
Un\G10506	3000H (12288)	Parameter storage start address of the output slave module with the address 10 (ID: 0010H)
Un\G10596	3030H (12336)	Parameter storage start address of the output slave module with the address 100 (ID: 0100H)
Un\G11008	3060H (12384)	Parameter storage start address of the input slave module with the address 0 (ID: 0200H)

*1 Data stored in the buffer memory address

For example, when "3000H" is stored in the buffer memory address "Un\G10506", it indicates that parameters are stored in the buffer memory addresses "Un\G12288 to Un\G12335".

Point

For the parameter storage location memory number of a non-existing ID, 0000H is stored.

Parameter storage area

This buffer memory area stores parameters for slave modules with IDs.

■Parameter storage area (Un\G12288 to Un\G18431)

Address	Description	Details
Un\G12288 to Un\G12335	Parameter storage area 1 (48 words)	<ul style="list-style-type: none"> • The parameter storage area of each ID has 48 words. • Information of up to 128 parameters can be stored. • The ID is stored in the start address of each parameter area. • A single storage area has 48 words and the data are sorted in the ascending order of IDs. • When adding a slave module or changing the ID of a slave module, execute automatic address detection again.
Un\G12336 to Un\G12383	Parameter storage area 2 (48 words)	
⋮	⋮	
Un\G18336 to Un\G18383	Parameter storage area 127 (48 words)	
Un\G18384 to Un\G18431	Parameter storage area 128 (48 words)	

Ex.

When five slave modules are connected, the buffer memory addresses of the parameter storage areas are as follows.

Module	Parameter storage area	Device parameter read/write area
First slave module	Un\G12288 to Un\G12335	Un\G12289 to Un\G12307
Second slave module	Un\G12336 to Un\G12383	Un\G12337 to Un\G12355
Third slave module	Un\G12384 to Un\G12431	Un\G12385 to Un\G12403
Fourth slave module	Un\G12432 to Un\G12479	Un\G12433 to Un\G12451
Fifth slave module	Un\G12480 to Un\G12527	Un\G12481 to Un\G12499

Point

The parameter of the slave module is moved over in order of ID and stored in 'Parameter storage area' (Un\G12288 to Un\G18431) after the automatic address detection function is executed.

Because of this, the address of the parameter storage area for the slave module later than the ID where the slave module is added or deleted in the AnyWireASLINK system is changed. (The parameter of a non-existing ID is deleted and displayed.)

Therefore, the address of the slave module later than the ID where the slave module is added or deleted must be changed when a program is created with buffer memory addresses directly specified. (This also applies if the ID is changed and sorting order is switched.)

With 'Parameter storage location memory number (output)' (Un\G10496 to Un\G10751) or 'Parameter storage location memory number (input)' (Un\G11008 to Un\G11263), a program that reads/writes the parameter can be created without considering the addition or deletion of slave modules.

 Page 43 Communication Example When the Slave Module is Added or Deleted

■48-word structure (details on parameter storage area)

The parameter storage area 1 (Un\G12288 to Un\G12335) is given as an example of the 48-word structure below.

Address	Description	Read/write	Parameter name
Un\G12288	Module ID	Read/write (RJ51AW12AL to slave module)	AnyWireASLINK parameter
Un\G12289	Device parameter 1	Read/write (RJ51AW12AL to slave module)	Device parameter
Un\G12290	Device parameter 2		
Un\G12291	Device parameter 3		
Un\G12292	Device parameter 4		
Un\G12293	Device parameter 5		
Un\G12294	Device parameter 6		
Un\G12295	Device parameter 7		
Un\G12296	Device parameter 8		
Un\G12297	Device parameter 9		
Un\G12298	Device parameter 10		
Un\G12299	Device parameter 11		
Un\G12300	Device parameter 12		
Un\G12301	Device parameter 13		
Un\G12302	Device parameter 14		
Un\G12303	Device parameter 15		
Un\G12304	Device parameter 16		
Un\G12305	Device parameter 17		
Un\G12306	Device parameter 18		
Un\G12307	Device parameter 19		
Un\G12308	Device parameter 1	Read (Slave module to RJ51AW12AL)	
Un\G12309	Device parameter 2		
Un\G12310	Device parameter 3		
Un\G12311	Device parameter 4		
Un\G12312	Device parameter 5		
Un\G12313	Device parameter 6		
Un\G12314	Device parameter 7		
Un\G12315	Device parameter 8		
Un\G12316	Device parameter 9		
Un\G12317	Device parameter 10		
Un\G12318	Device parameter 11		
Un\G12319	Device parameter 12		
Un\G12320	Device parameter 13		
Un\G12321	Device parameter 14		
Un\G12322	Device parameter 15		
Un\G12323	Device parameter 16		
Un\G12324	Device parameter 17		
Un\G12325	Device parameter 18		
Un\G12326	Device parameter 19		
Un\G12327	Status details	Read (Slave module to RJ51AW12AL)	AnyWireASLINK parameter
Un\G12328	Sensing level		
Un\G12329 to Un\G12335	System area	—	—

■Parameters

Each slave module has the following types of parameters:

- Device parameter (19 types)

These parameters are unique to each slave module. The contents of the parameters vary depending on the types of slave modules. For details, refer to the specifications of the slave module.

- AnyWireASLINK parameter (3 types)

These parameters are common to all the slave modules connected to AnyWireASLINK.

Name	Read/write	Corresponding buffer memory area	Detailed description
Module ID	Read/write	Un\G12288+n × 30H (n: 0 to 255) 1st of 48 words	Indicates the slave module ID. <ul style="list-style-type: none"> • 0000H to 00FFH: ID of an output slave module • 0200H to 02FFH: ID of an input slave module or I/O combined slave module
Status details	Read	Un\G12327+n × 30H (n: 0 to 255) 40th of 48 words	Indicates the status of the slave module. The statuses of the slave modules can be checked with the on/off status of each bit. <ul style="list-style-type: none"> ■b0: Module power supply status <ul style="list-style-type: none"> • On: Slave module voltage drop • Off: No error ■b1: Sensing level status <ul style="list-style-type: none"> • On: Sensing level drop • Off: No error ■b2: I/O disconnection (ASLINKER) <ul style="list-style-type: none"> • On: I/O disconnection • Off: No error ■b3: I/O short-circuit (ASLINKER) <ul style="list-style-type: none"> • On: I/O short-circuit • Off: No error ■b5: I/O power supply voltage drop (isolation slave module) <ul style="list-style-type: none"> • On: I/O power supply voltage drop • Off: No error ■b4, b6 to b15: System area
Sensing level	Read	Un\G12328+n × 30H (n: 0 to 255) 41th of 48 words	Indicates the value of a connected sensor. The value differs depending on the connected slave module. (Example: An analog value of 0 to 100% is indicated for an ON/OFF sensor.)

Appendix 4 Processing Time

This section describes the processing time related to the transmission of AnyWireASLINK.

Transmission cycle time

In the transmission cycle time, I/O data of the RJ51AW12AL and all the slave modules is updated.

The following table lists the transmission cycle times of the RJ51AW12AL.

Transmission points setting	64 points (32 input points/32 output points)	128 points (64 input points/64 output points)	256 points (128 input points/128 output points)	512 points (256 input points/256 output points)
One-transmission cycle time	2.3ms	3.5ms	5.9ms	10.6ms

Update timing of I/O data

Input

Unless the RJ51AW12AL receives the same data twice successively, data in the input area is not updated.

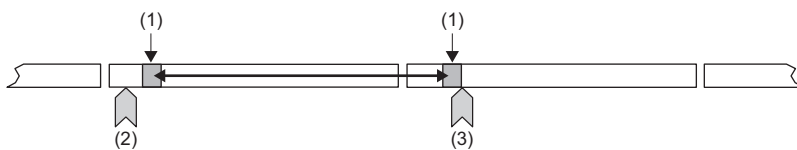
A minimum of one-transmission cycle time and a maximum of two-transmission cycle time are required as data response time.

Therefore, when input data 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.

■Case of minimum data response time

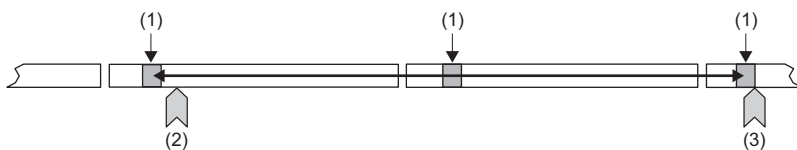
If no change is detected in input data between two sampling timings, communication in one-transmission cycle time is possible.



- (1) Sampling timing
- (2) Change of the input data
- (3) Update of the input data

■Case of maximum data response time

The input data is changed after a sampling, and thus the next sampling will be the first data reception. Time equivalent to two-transmission cycle time is required.



- (1) Sampling timing
- (2) Change of the input data
- (3) Update of the input data

Output

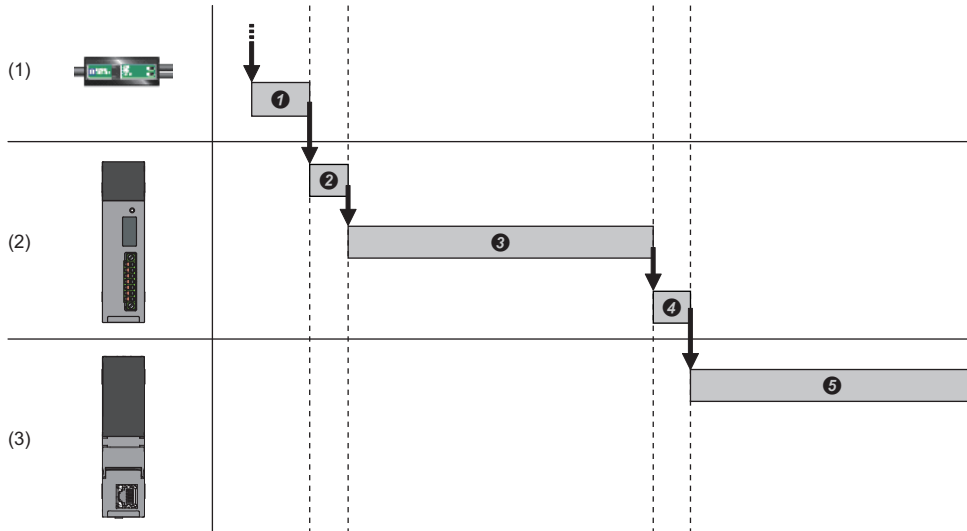
As the double verification is executed on the slave module side, the time required is the same as that for input, namely a minimum of one-transmission cycle time and a maximum of two-transmission cycle time.

Response delay time

The following shows the response delay time of input and output.

Input response delay time

The figure below shows the time from a signal input to the slave module to turning on or off of a device of the CPU module. The input response delay time is the total of ❶ to ❺ in the following figure.



- (1) Slave module
- (2) AnyWireASLINK
- (3) CPU module

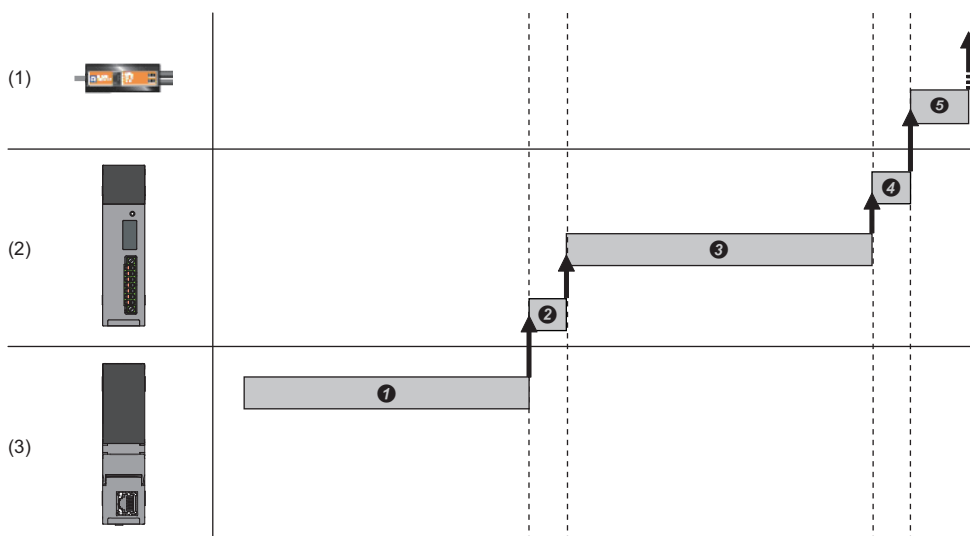
No.	Description	Required time
❶	Input response time on the slave module	Refer to the manual for the slave module connected to the system or the device connected to the slave module.
❷	Processing time on the slave module	Approx. 0.2ms (Differs depending on the slave module.)
❸	Transmission time	Transmission cycle time × 2 The transmission cycle time differs depending on the number of transmission points. (👉 Page 76 Transmission cycle time)
❹	Processing time on the RJ51AW12AL	0.6ms
❺	Processing time on the programmable controller	Sequence scan time × 2



Output response delay time

The figure below shows the time from turning on or off of a device of the CPU module to turning on or off of an output of a slave module.

The output response delay time is the total of ❶ to ❺ in the following figure.



- (1) Slave module
- (2) AnyWireASLINK
- (3) CPU module

No.	Description	Required time
❶	Processing time on the programmable controller	Sequence scan time
❷	Processing time on the RJ51AW12AL	0.6ms
❸	Transmission time	Transmission cycle time × 2 The transmission cycle time differs depending on the number of transmission points. (☞ Page 76 Transmission cycle time)
❹	Processing time on the slave module	Approx. 0.04ms (Differs depending on the slave module.)
❺	Output response time on the slave module	Refer to the manual for the slave module connected to the system or the device connected to the slave module.

Parameter access response time

The parameters of AnyWireASLINK provide monitoring information of slave modules or the entire system and setting information of the slave modules.

Parameter data is synchronized between the buffer memory of the RJ51AW12AL and slave modules at a cycle different from that of the I/O data.

Use the following calculation formulas to obtain the parameter access response time.

Item	Calculation formula
Update interval time of an automatically updated parameter	Number of AnyWireASLINK connection IDs × Transmission cycle time × 3
Time required for reading parameters	Number of target IDs × Transmission cycle time × 27
Time required for writing parameters	Number of target IDs × Transmission cycle time × 39

Appendix 5 When Connecting the Module to a Remote Head Module

This section describes the restrictions and communication example for when connecting the RJ51AW12AL to a remote head module.

Restricted functions and specifications

Function

There are no restrictions for when connecting the RJ51AW12AL to a remote head module.

Module parameter

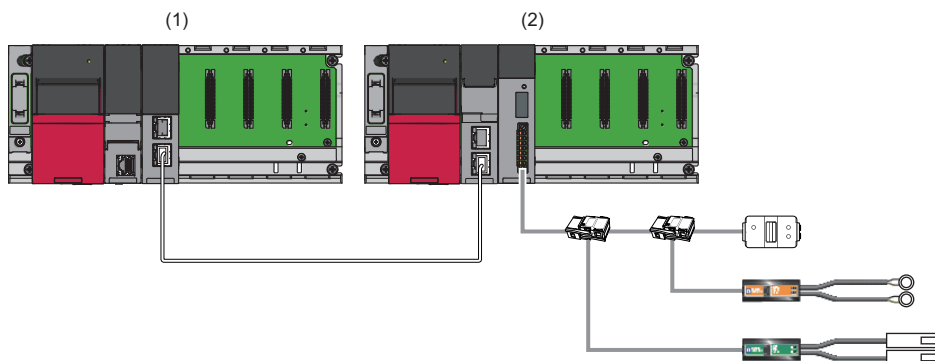
There are differences between when connecting the RJ51AW12AL to the CPU module and when connecting the RJ51AW12AL to the remote head module. For details, refer to the following.

📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

Communication example

This section describes the communication example for when connecting the RJ51AW12AL to a remote head module.

System configuration



(1) Master station (network No. 1, station No. 0)

- Power supply module: R61P
- CPU module: R04CPU
- CC-Link IE Field Network master/local module: RJ71GF11-T2 (start I/O number: 0000H to 001FH)

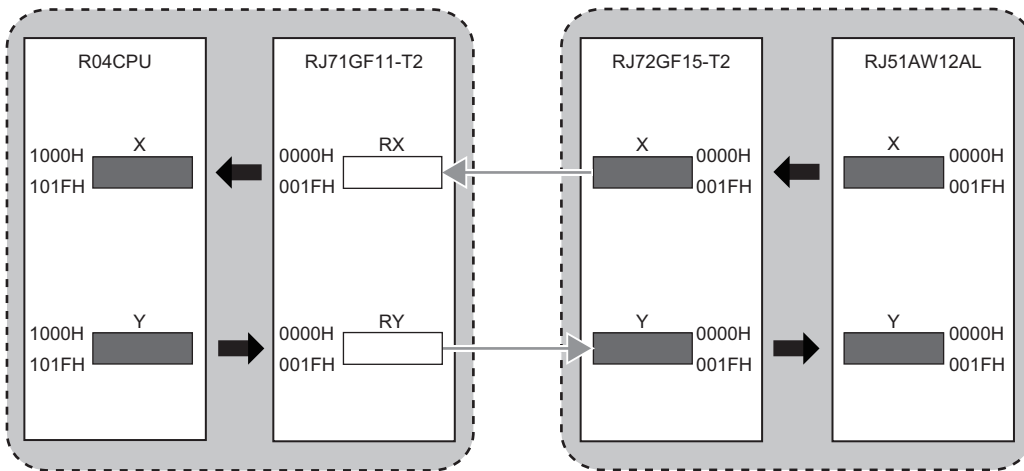
(2) Intelligent device station (network No. 1, station No. 1)

- Power supply module: R61P
- Remote head module: RJ72GF15-T2
- AnyWireASLINK master module: RJ51AW12AL (start I/O number: 0000H to 001FH)
- Output slave module (2-point output ASLINKER): Address 0
- Input slave module (2-point input ASLINKER): Address 0
- Terminating unit
- LED
- Sensor switch

Link device assignment

This section describes the RX/RX assignment of program example.

■RX/RX assignment



The following shows the correspondence between CPU module devices and I/O signals of the RJ51AW12AL.

CPU module		RJ51AW12AL	
Device		I/O signals	Device
X1000		Module READY	X0
X1001		DP/DN short error	X1
X1002		24V/DP short error	X2
X1003		Transmission cable voltage drop error	X3
X1004		DP/DN disconnection error	X4

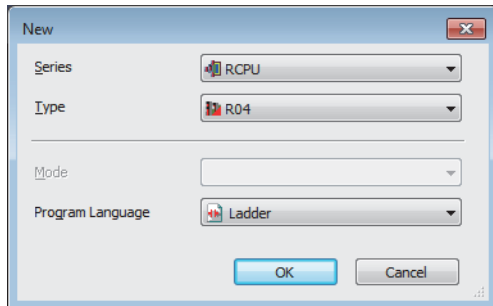
A

Setting in the master station

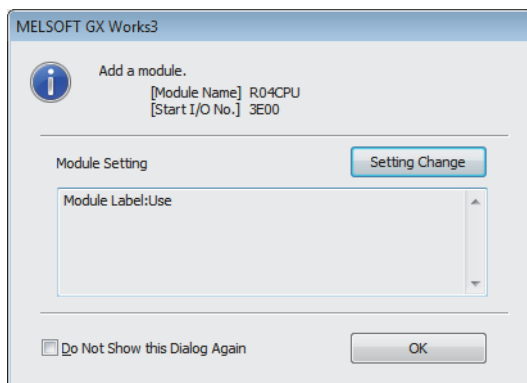
Connect the engineering tool to the CPU module on the master station and set parameters.

1. Set the CPU module as follows.


 [Project] ⇒ [New]

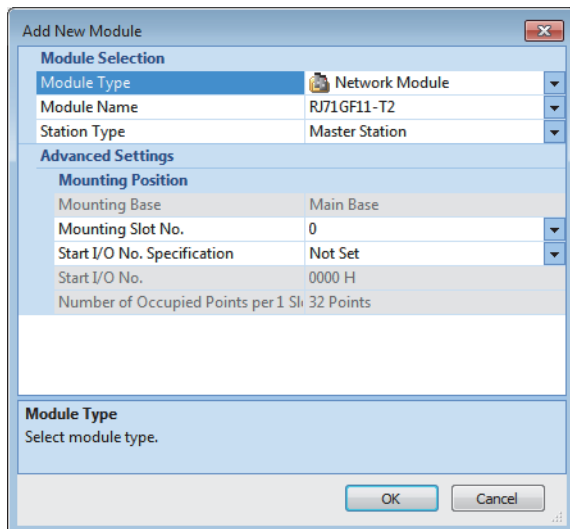


2. Click the [OK] button to add the module labels of the CPU module.

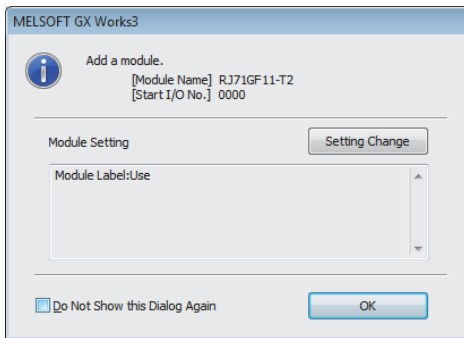


3. Set the CC-Link IE Field Network master/local module as follows.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right click ⇒ [Add New Module]



4. Click the [OK] button to add the module labels of the CC-Link IE Field Network master/local module.



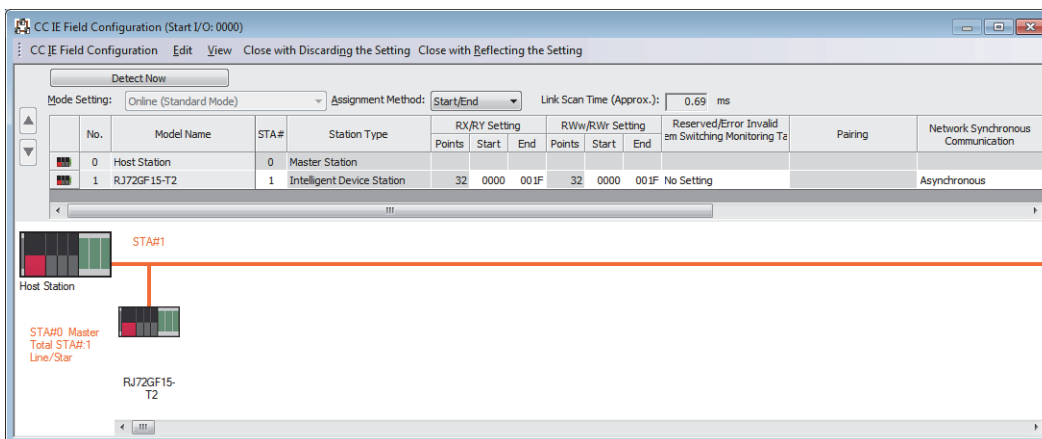
5. Set the items in "Required Settings" of "Module Parameter" as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Module Parameter] ⇒ [Required Settings]

Item	Setting
Station Type	
Station Type	Master Station
Network Number	
Network Number	1
Station Number	
Setting Method	Parameter Editor
Station No.	0
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

6. Set the network configuration as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Module Parameter] ⇒ [Basic Settings] ⇒ [Network Configuration Settings]



7. Set the refresh settings as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Module Parameter] ⇒ [Basic Settings] ⇒ [Refresh Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF	🔗	Module Label				
-	SW	512	00000	001FF	🔗	Module Label				
1	RX	32	00000	0001F	🔗	Specify Device	X	32	01000	0101F
2	RY	32	00000	0001F	🔗	Specify Device	Y	32	01000	0101F



- Write the set parameters to the CPU module on the master station. Then, reset the CPU module or power off and on the system.

[Online] ⇒ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

Setting in the intelligent device station

Connect the engineering tool to the remote head module on the intelligent device station and set the parameters.

- Set the remote head module as follows.

[Project] ⇒ [New]

- Set the items in "Network Required Setting" of "CPU Parameter" as follows.

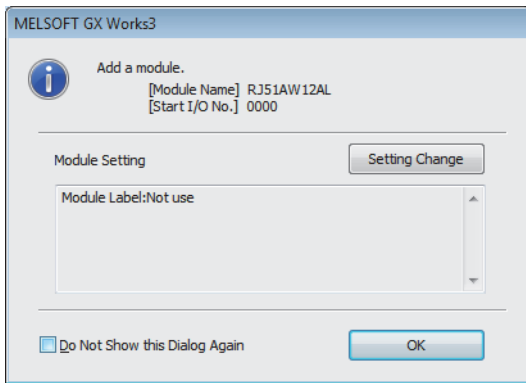
[Navigation window] ⇒ [Parameter] ⇒ [RJ72GF15-T2] ⇒ [CPU Parameter] ⇒ [Network Required Setting]

Setting Item	
Item	Setting
Network Number	
Network Number	1
Station Number	
Station No.	1

- Set the RJ51AW12AL as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right click ⇒ [Add New Module]

4. Click the [OK] button.



5. Set the items in "Basic setting" of "Module Parameter" as follows.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ51AW12AL] ⇒ [Module Parameter] ⇒ [Basic setting]

Item	Setting Value
Transmission points	
Transmission points setting	512 points(256 input points/256 output points)
Startup operating mode	
Startup operating mode setting	Without slave information acquisition
Double verification	
Double verification setting	All points,double verification of bit
Error status automatic recovery	
Error status automatic recovery	No error status automatic recovery

6. Write the set parameters to the remote head module on the intelligent device station. Then, reset the remote head module or power off and on the system.

[Online] ⇒ [Write to PLC]

Point

In this example, default values are used for parameters that are not shown above. For the parameters, refer to the following.

- MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)
- Page 33 PARAMETER SETTINGS

Settings in the slave modules

Write addresses to slave modules and register them with the RJ51AW12AL.

■Address setting

Write addresses to slave modules with an address writer.

- Output ASLINKER: Address 0 (ID: 0000H)
- Input ASLINKER: Address 0 (ID: 0200H)

■Automatic address detection

Keep pressing the SET switch on the RJ51AW12AL until the SET LED turns on.

When the SET LED flashes and then turns off, it indicates that the registration of IDs (addresses) has been completed.

Checking the system status

■Checking CC-Link IE Field Network

After setting parameters for the master station and intelligent device station, perform the CC-Link IE Field Network diagnostics of the engineering tool to check whether data link can normally be performed between the master station and intelligent device station.

1. Connect the engineering tool to the CPU module on the master station.
2. Start the CC-Link IE Field Network diagnostics.

 [Diagnostics] ⇒ [CC-Link IE Field Diagnostics]

For information on the CC-Link IE Field Network diagnostics from the master station, refer to the following.

 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

■Checking AnyWireASLINK

Check whether the RJ51AW12AL can communicate with the slave modules normally.

The following LED statuses indicate that the communication is established normally.

- LED of the RJ51AW12AL

LED	Status
RUN	On
ERR	Off
LINK	Flashing
SET	Off
ALM	Off

- LED of the ASLINKER

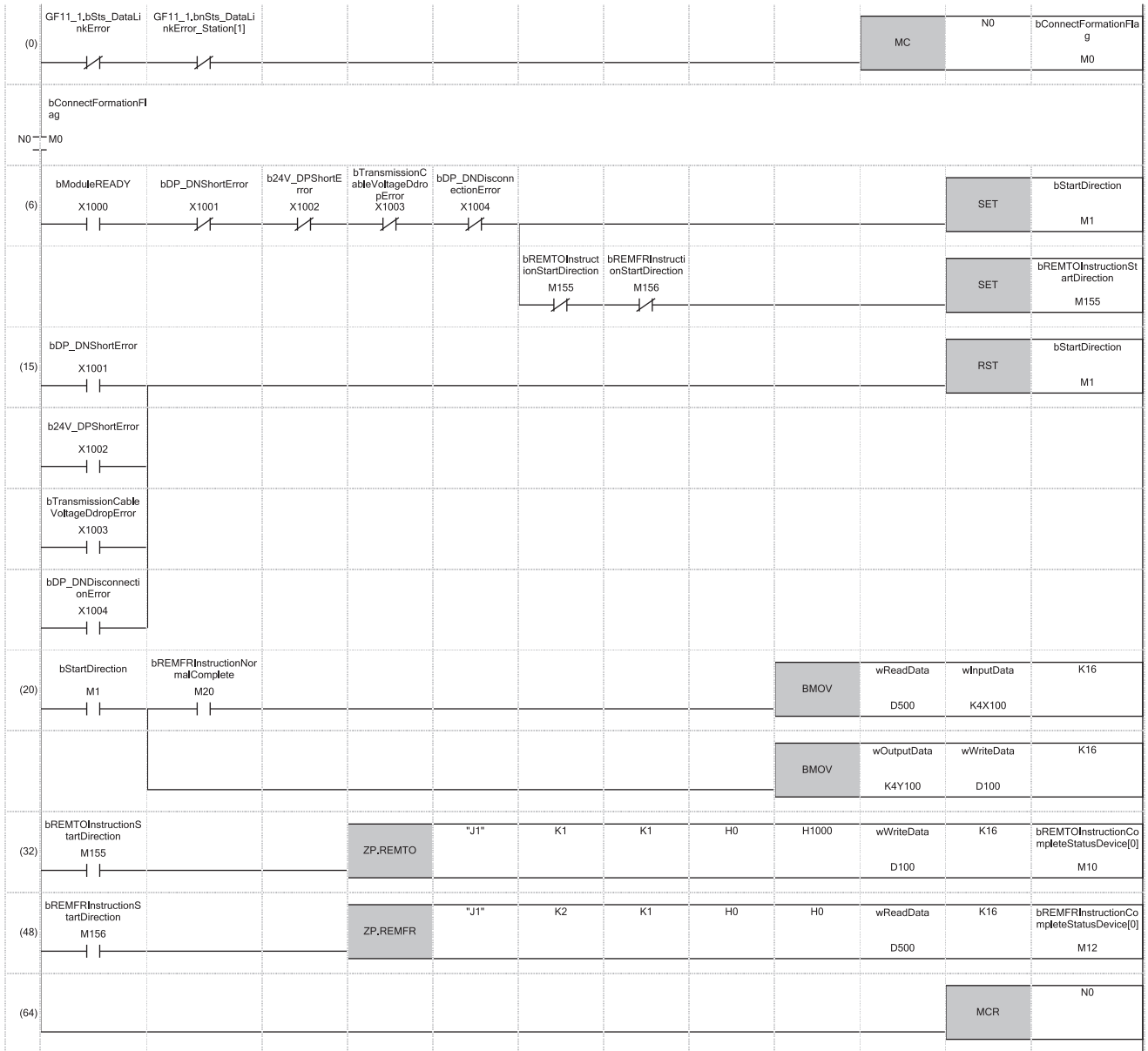
LED	Status
LINK LED	Flashing
Other than the LINK LED	Off

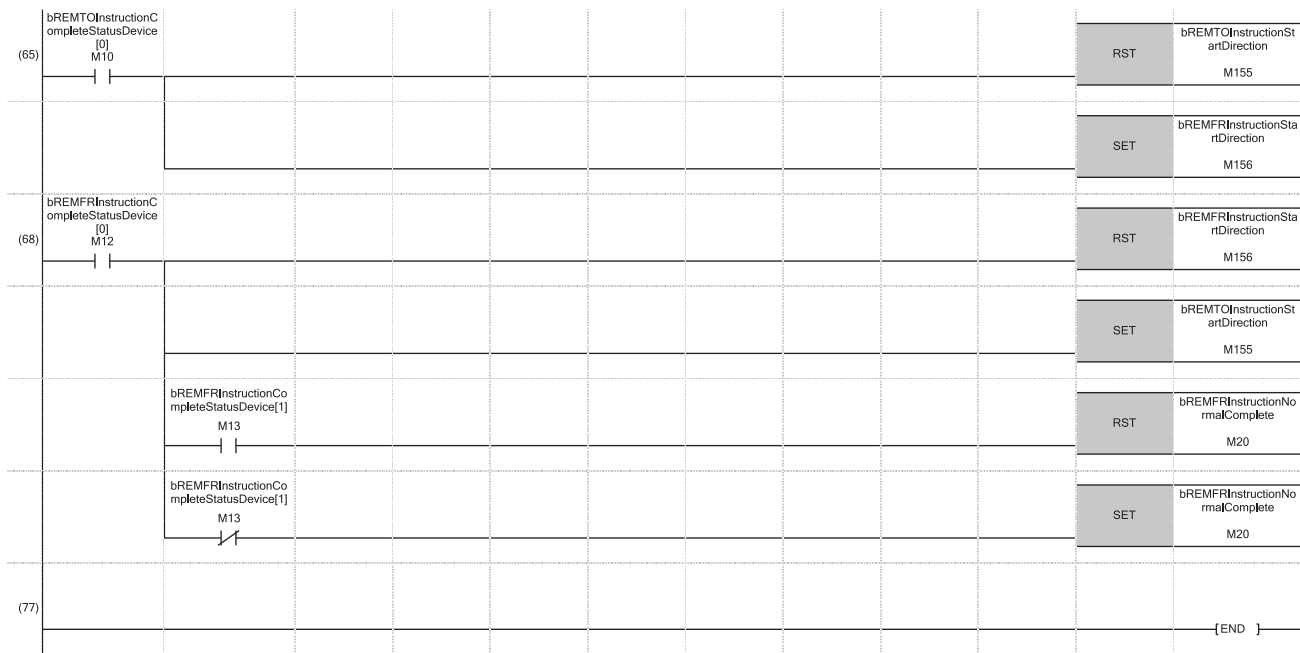
Program example

This program uses the module labels of the CC-Link IE Field Network master/local module.

Write the program to the CPU module on the master station.

Classification	Label name	Description	Device
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049
	GF11_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station No.1)	SW00B0.0
Label to be defined	Define global labels as shown below:		
	Label Name	Data Type	Class
	bModuleREADY	Bit	VAR_GLOBAL X1000
	bDP_DNShortError	Bit	VAR_GLOBAL X1001
	b24V_DPShortError	Bit	VAR_GLOBAL X1002
	bTransmissionCableVoltageDdropError	Bit	VAR_GLOBAL X1003
	bDP_DNDDisconnectionError	Bit	VAR_GLOBAL X1004
	bConnectFormationFlag	Bit	VAR_GLOBAL M0
	bStartDirection	Bit	VAR_GLOBAL M1
	bREMTOInstructionStartDirection	Bit	VAR_GLOBAL M155
	bREMFRIInstructionStartDirection	Bit	VAR_GLOBAL M156
	bREMTOInstructionCompleteStatusDevice	Bit(0..1)	VAR_GLOBAL M10
	bREMFRIInstructionCompleteStatusDevice	Bit(0..1)	VAR_GLOBAL M12
	wInputData	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL K4X100
	wOutputData	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL K4Y100
	wReadData	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL D500
	wWriteData	Word [Unsigned]/Bit String [16-bit]	VAR_GLOBAL D100
	bREMFRIInstructionNormalComplete	Bit	VAR_GLOBAL M20





- (0) Check the data link status of the remote head module (station No.1).
- (20) When 'bStartDirection' (M1) is turned on, the data stored in 16-point areas starting from 'wReadData' (D500) are transferred to 'wInputData' (K4X100). The data of 'wOutputData' (K4Y100) are transferred to 16-point areas starting from 'wWriteData' (D100).
- (32) Write the data stored in 16-point areas starting from 'wWriteData' (D100) to buffer memory areas of the RJ51AW12AL (U0\G4096 to U0\G4111) using the ZP.REMTO instruction.
- (48) Read the data stored in buffer memory areas of the RJ51AW12AL (U0\G0 to U0\G16) to 16-point areas starting from 'wReadData' (D500) using the ZP.REMFR instruction.
- (65) Perform the processing at end of the ZP.REMTO instruction.
- (68) Perform the processing at end of the ZP.REMFR instruction.

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REVISIONS

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

Revision date	*Manual number	Description
June 2016	SH(NA)-081585ENG-A	First edition

Japanese manual number: SH-081583-A

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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.

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- (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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Anywire Anywire Corporation www.anywire.jp

SH(NA)-081585ENG-A(1606)MEE

MODEL: R-ANYWIRE-U-OU-E

MODEL CODE: 13JX48

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Specifications subject to change without notice.