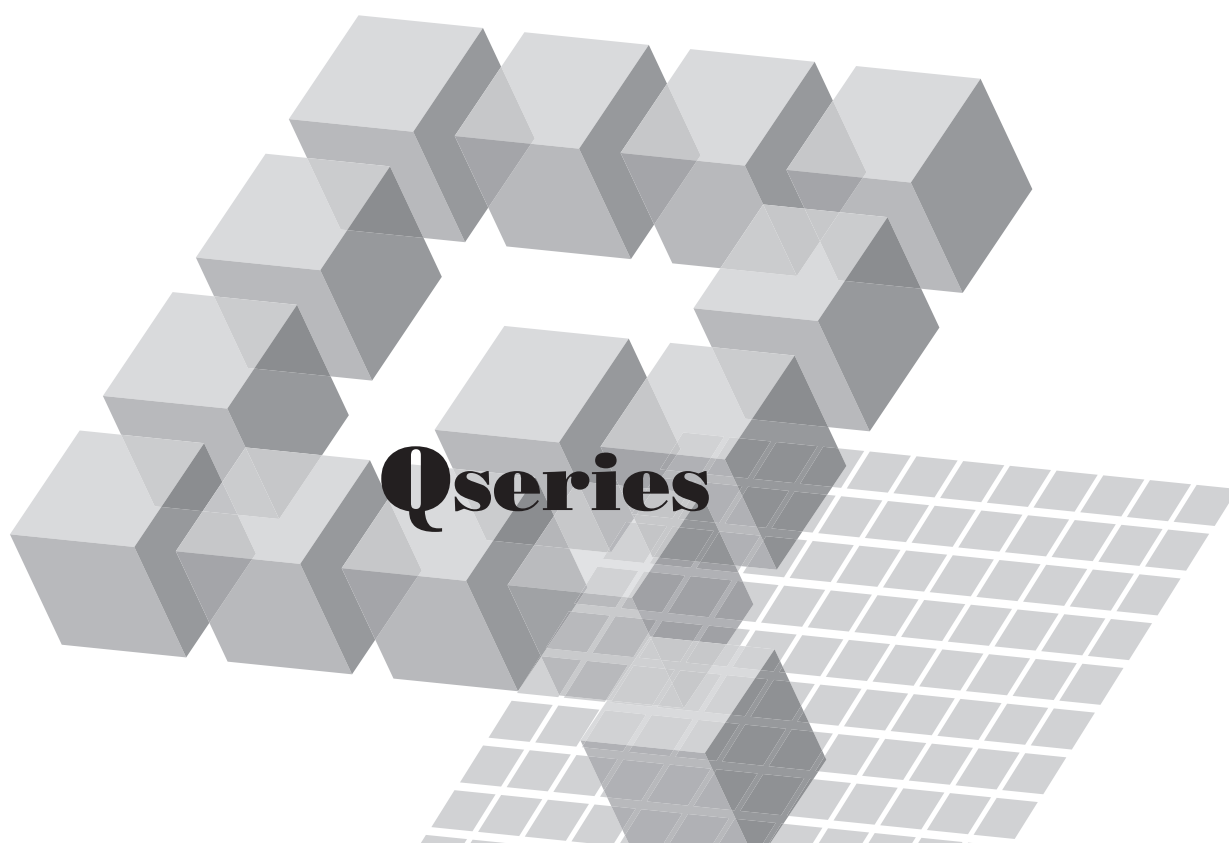


MITSUBISHI

Mitsubishi Programmable Controller

MELSEC **Q** series

MELSEC-Q AnyWire DB A20 Master Module User's Manual



Powered by



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

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

AnyWire DB A20

-QJ51AW12D2

MODEL

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PRECAUTIONS REGARDING WARRANTY AND SPECIFICATIONS

The QJ51AW12D2 is jointly developed and manufactured by Mitsubishi and Anywire Corporation.

Note that there are some precautions regarding warranty and specifications of this product.

<Warranty>

Item	QJ51AW12D2	Other programmable controller products (e.g. MELSEC-Q series)
Repair term after discontinuation of production	1 year	7 years

<Specifications>

The general specifications of the QJ51AW12D2 are the same as those of other MELSEC-Q series except under the following condition.

- When setting the transmission clock at 125kHz, apply the following specifications:
 - Voltage range of external power supply : 21.6 to 25.2VDC
 - Operating ambient temperature : 0 to 50°C

<Application of the EMC Directive>

Item	QJ51AW12D2	Other programmable controller products (e.g. MELSEC-Q series)
Applicable EMC standard	Not applied	EN61131-2

<Application of the UL/cUL standards>

Item	QJ51AW12D2	Other programmable controller products (e.g. MELSEC-Q series)
Applicable UL standard/cUL standard	Not applied	UL508 CSA22.2

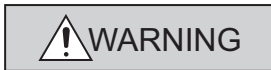
● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

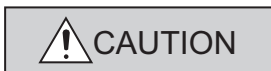
Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

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

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



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



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

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

Observe the precautions of both levels because they are important for personal and system safety.

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

[Design Precautions]

⚠ WARNING

- An AnyWire DB A20 system has no control function for ensuring safety.
- When connecting a peripheral with the programmable controller CPU or a personal computer with an intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the sequence program to ensure that the entire system will always operate safely. For other forms of control (such as program modification or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding.
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 sequence 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" of the buffer memory in the intelligent function module. Also, do not use any "use prohibited" signals as an output signal from the programmable controller CPU to the intelligent function module. Doing so may cause malfunction of the programmable controller system.

[Design Precautions]

CAUTION

- Although an AnyWire DB A20 system features high noise immunity, keep a distance of 100mm or more between the transmission cables or I/O cables and the high-voltage cables or power cables. Failure to do so may cause malfunction.
- Configure safety circuits, such as an emergency stop circuit and interlock circuit, external to the AnyWire DB A20 system.

[Installation Precautions]

CAUTION

- Use the programmable controller in an environment that meets the general specifications in the user's manual for the CPU module used.
Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it 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 screw within the specified torque range.
Undertightening can cause drop of the screw, short circuit or malfunction.
Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module.
Failure to do so may result in damage to the product.
- Do not directly touch any conductive parts or electronic components of the module.
Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

CAUTION

- Tighten the terminal screw within the specified torque range.
Undertightening can cause short circuit, fire or malfunction.
Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module.
Such foreign matter can cause a fire, failure, or malfunction.
- 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.
- Incorrect wiring may damage modules and external devices. Adjust a cable length and a module position to prevent disconnection of a connector or a cable.
- Do not solder stranded wires of a cable when connecting them to the terminal block. Doing so may cause poor contact.
- The power supply voltage of remote slave modules may be insufficient due to a voltage drop in the power supply line. Connect an external power supply so that the voltage of remote slave modules is ensured.
- Do not apply the 24VDC power before wiring the entire AnyWire DB A20 system.
- Use 24VDC stabilized power supplies for devices in the AnyWire DB A20 system.
- Do not install the control lines or communication cables together with the main circuit lines or power cables.
Failure to do so may result in malfunction due to noise.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- When disconnecting the cable from the module, do not pull the cable by the cable part. 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.

[Startup and Maintenance Precautions]

WARNING

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

[Startup and Maintenance Precautions]

CAUTION

- Do not disassemble or modify the modules.
Doing so may cause failure, malfunction, injury, or a fire.
- Shut off the external power supply (all phases) used in the system before mounting or removing a module.
Failure to do so may cause the module to fail or malfunction.
- 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 more than 50 times (IEC 61131-2 compliant) respectively.
Exceeding the limit of 50 times may cause malfunction.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

CAUTION

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

● CONDITIONS OF USE FOR THE PRODUCT ●

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

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

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

("Prohibited Application")

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

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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

Memo

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TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
QJ51AW12D2	The abbreviation for the AnyWire DB A20 master module, QJ51AW12D2
MELSEC-Q series	The abbreviation for the Mitsubishi programmable controller MELSEC-Q series
Programmable controller CPU	The abbreviation for the MELSEC-Q series CPU module
Intelligent function module	A Q-series module other than CPU modules, power supply modules, and I/O modules, which is mounted on a base unit
Master module	A module that controls a data link system. One master module is required for one system.
Remote I/O module	A module that communicates I/O data with a master module
Programming tool	A generic term for GX Works2 and GX Developer
GX Works2	The product name of the software package for the MELSEC programmable controllers
GX Developer	
AnyWire DB A20	An original transmission system provided by Anywire Corporation. The full-duplex transmission mode enables a high-speed and long-distance communication. This system provides a high-speed and highly-reliable sensor network.
Slave module	A generic term for modules that communicate data with a master module
Bridge module	A module that serves as a master module in a transmission system such as OpenBus
Terminating resistor	A waveform shaper
Transmission cycle time	A data sampling interval
Buffer memory	A memory in an intelligent function module, where data (such as setting values and monitoring values) exchanged with a CPU module are stored

CHAPTER 1 OVERVIEW

This manual describes the specifications, part names, and settings of the QJ51AW12D2 AnyWire DB A20 master module (hereafter abbreviated as the QJ51AW12D2).

This module, a product of the joint development project with Anywire Corporation, allows the AnyWire sensor network system to be constructed in a MELSEC-Q series programmable controller system.

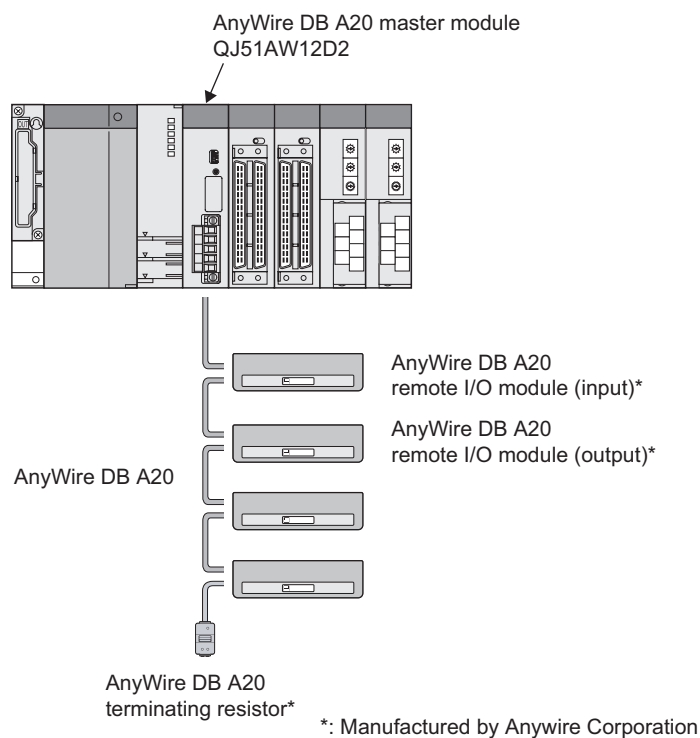
The AnyWire DB A20 system is a high-speed and highly reliable sensor network system.

<Features of AnyWire DB A20>

The transmission distance can be selected from 50m/200m/1km/3km using the dip switch.

Up to 512 remote input points and 512 remote output points can be controlled by one QJ51AW12D2 (in the standard setting).

Disconnections can be detected even when the wiring is branched.



Memo

CHAPTER 2 SPECIFICATIONS

2.1 General Specifications

Item	Specifications					
Operating ambient temperature	0 to 55°C *7					
Storage ambient temperature	-25 to 75°C *3					
Operating ambient humidity	5 to 95%RH *4, non-condensing					
Storage ambient humidity	5 to 95%RH *4, non-condensing					
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2 *6	Under intermittent vibration	Frequency	Constant acceleration	Half amplitude	No. of sweeps
			5 to 9 Hz	–	3.5 mm	10 times each in X, Y, and Z directions
		9 to 150 Hz	9.8 m/s ²	–		
		Under continuous vibration	5 to 9 Hz	–	1.75 mm	–
9 to 150 Hz	4.9 m/s ²	–				
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147 m/s ² , 3 times each in X, Y, and Z directions)					
Operating atmosphere	No corrosive gas					
Operating altitude *5	2000 m or less					
Installation location	Inside the control panel					
Overvoltage category *1	II or less					
Pollution degree *2	2 or less					
Equipment class	Class I					

- *1 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.
Category II applies to equipment for which electrical power is supplied from fixed facilities.
The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.
- *2 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
Pollution level 2 is applied in the case that only non-conductive pollution occurs. A temporary conductivity caused by an accidental condensing can be expected occasionally.
- *3 The storage ambient temperature is -20 to 75°C when an AnS/A series module is included in the system.
- *4 The operating ambient humidity and storage ambient humidity are 10 to 90%RH when an AnS/A series module is included in the system.
- *5 Do not use or store the programmable controller under pressure higher than the atmospheric pressure at sea level.
Doing so may cause malfunction.
When using the programmable controller under pressure, please consult your local Mitsubishi representative.
- *6 When complying with IEC 61131-2 (2007 edition), the frequency range is as shown below.
- Under intermittent vibration: 5 to 8.4 Hz, 8.4 Hz to 150 Hz
- Under continuous vibration: 5 to 8.4 Hz, 8.4 Hz to 150 Hz
- *7 When the transmission clock is set to 125 kHz, use the product under the following conditions.
- External power supply voltage range: 21.6 V DC to 25.2 V DC
- Operating ambient temperature: 0 to 50°C

2.2 Performance Specifications

2.2.1 Performance Specifications

Item	Specifications			
Transmission clock	125 kHz ^{*3}	31.3 kHz	7.8 kHz	2 kHz
Maximum transmission distance (Total length)	50 m	200 m	1 km	3 km
Number of connected modules	Up to 128	Up to 128	Up to 128	Up to 32 ^{*1}
Transmission system	Cyclic transmission with full-duplex mode			
Connection type	Bus topology (Multidrop system, T-branch system, tree branch system)			
Transmission protocol	Dedicated protocol (AnyWire DB A20)			
Error control	Double check system			
Number of connected I/O points	Up to 1024 points (512 input points/512 output points) (However, up to 1024 input points/1024 output points can be set) ^{*2}			
Number of connected modules	Up to 128 nodes			
RAS function	Disconnected transmission line location detection function, transmission line short detection function, transmission line power supply voltage drop detection function			
Connection cable	<ul style="list-style-type: none"> • General-purpose 2-/4-wire cable (VCTF, VCF 0.75 to 1.25 mm², rated temperature 60°C) • General-purpose wire (0.75 to 1.25 mm², rated temperature 60°C) • Dedicated flat cable (0.75 mm², rated temperature 70°C) (If the transmission distance exceeds 200 m, use wires with a diameter of 0.9 to 1.25 mm ² .)			
Power supply ^{*3}	Circuit: (Supplied from the Q bus side) Voltage +5 [V] ±5% Current 0.5 [A] max. Transmission line: Voltage 24 V DC +15 to -10% (21.6 to 27.6 V DC) Ripple 0.5 Vp-p or less Current 0.5 [A] (When 128 slave modules are connected and the load current is not included)			
Number of I/O occupied points	32 points (I/O assignment: intelligent 32 points)			
Number of writes to EEPROM	100000 times (maximum)			
External dimensions	98 mm (H) × 27.4 mm (W) × 100 mm (D)			
Weight	0.11 kg			

*1 Up to 64 modules can be connected within 2km.

*2 Used when required in special situations.

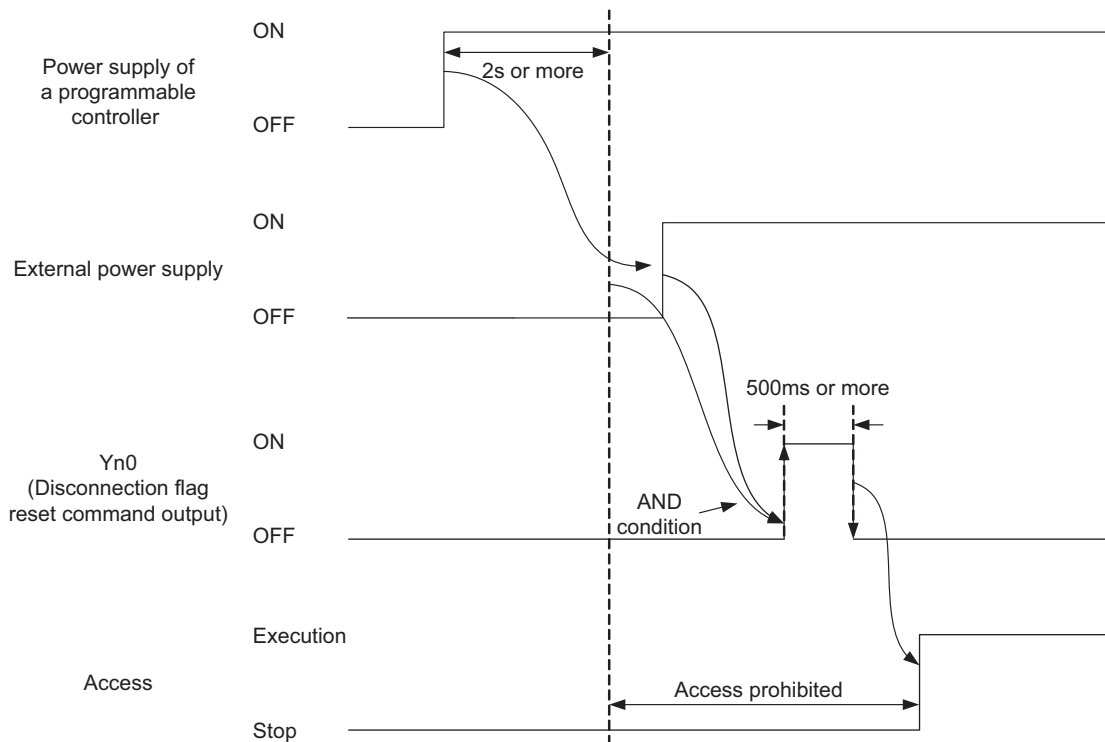
*3 When the transmission clock is set to 125 kHz, use under the following conditions.

- External power supply voltage range: 21.6 V DC to 25.2 V DC
- Operating ambient temperature: 0 to 50°C

2.2.2 Power Supply Sequence and Handling of I/O Data

An incorrect input/output may occur depending on the supply procedure of the power of the QJ51AW12D2, the external power supply for transmission line, and the external power supply for slave module. Pay attention to the following points.

- The QJ51AW12D2 requires 2 seconds of elapsed time after power-on (the power supply of the programmable controller). Therefore, do not make any access related to this module (X, Y, or FROM/ TO) for 2 seconds after the programmable controller is powered on.
- Follow the procedure of powering on the programmable controller. Power on the programmable controller, then power on the external power supply.
- Depending on how to supply the external power supply, Disconnection flag (Xn4) may turn on (the "ALM" LED may turn on) during initial processing. Therefore, change Disconnection flag reset (Yn0) from ON (500ms or more) to OFF at the start of access.



2.3 Applicable System

(1) Mountable modules and the number of mountable modules

The applicable CPU module, network module, and the number of mountable modules for the QJ51AW12D2 are shown below.

Insufficient power capacity may occur depending on the combination of other modules and the number of mountable modules.

When mounting the modules, consider the power capacity.

If the power capacity is insufficient, reconsider the combination of the mounted modules.

Mountable modules		Mountability	Number of mountable modules	
Programmable controller CPU	Basic model QCPU	Q00JCPU	Up to 8	
		Q00CPU Q01CPU	Up to 24	
	High performance model QCPU	Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	○	Up to 64
	Universal model QCPU	Q00UJCPU	○	Up to 8
		Q00UCPU Q01UCPU		Up to 24
		Q02UCPU		Up to 36
		Q03UDCPU Q04UDHCPU Q06UDHCPU Q10UDHCPU Q13UDHCPU Q20UDHCPU Q26UDHCPU		Up to 64
		Q03UDECPU Q04UDEHCPU Q06UDEHCPU Q10UDEHCPU Q13UDEHCPU Q20UDEHCPU Q26UDEHCPU Q50UDEHCPU Q100UDEHCPU		Up to 64
	Process CPU	Q02PHCPU Q06PHCPU Q12PHCPU Q25PHCPU	○	Up to 64
	Redundant CPU	Q12PRHCPU Q25PRHCPU	△	Up to 53
C controller module	Q06CCPU-V-B Q06CCPU-V Q12DCCPU-V	○	Up to 64	
Network module	QJ72LP25-25 QJ72LP25G QJ72BR15	○	Up to 64	

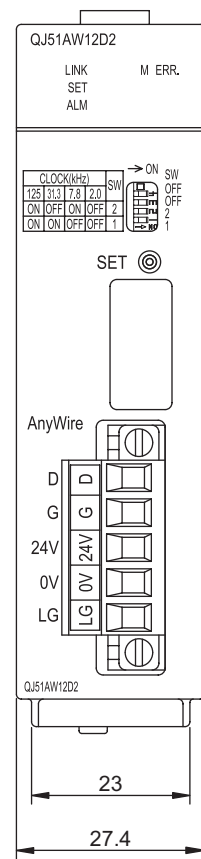
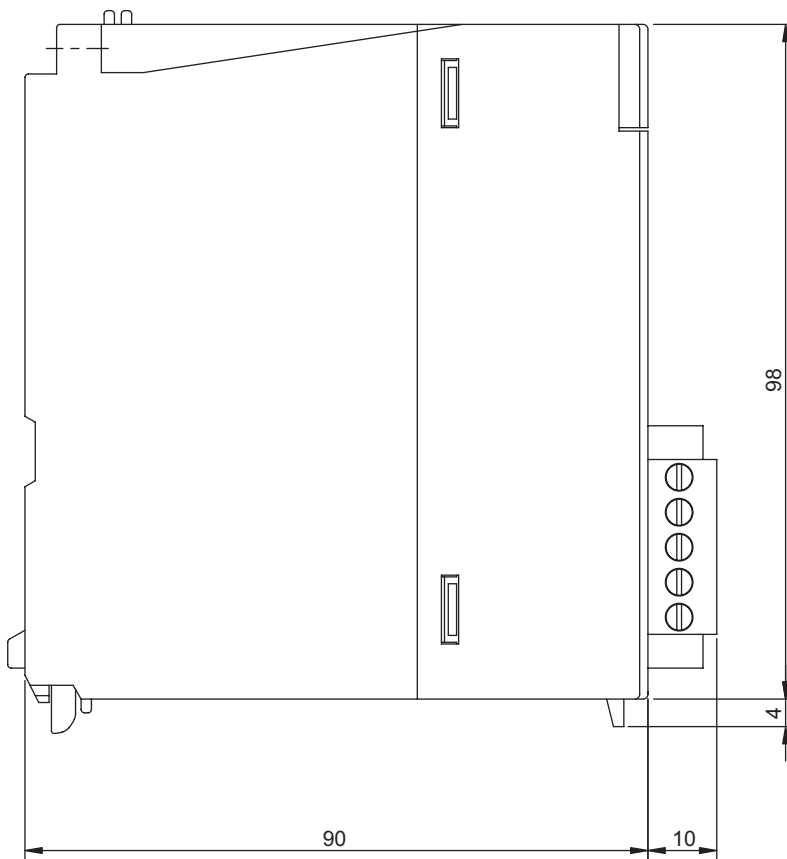
○: Can be mounted, △: Cannot be mounted to the main base unit, can be mounted to the extension base unit

(2) Compatibility with multiple CPU system

The QJ51AW12D2 is a function version B compatible and supports the multiple CPU system. When using the QJ51AW12D2 in the multiple CPU system, refer to the following manual.

- QCPU User's Manual (Multiple CPU System)

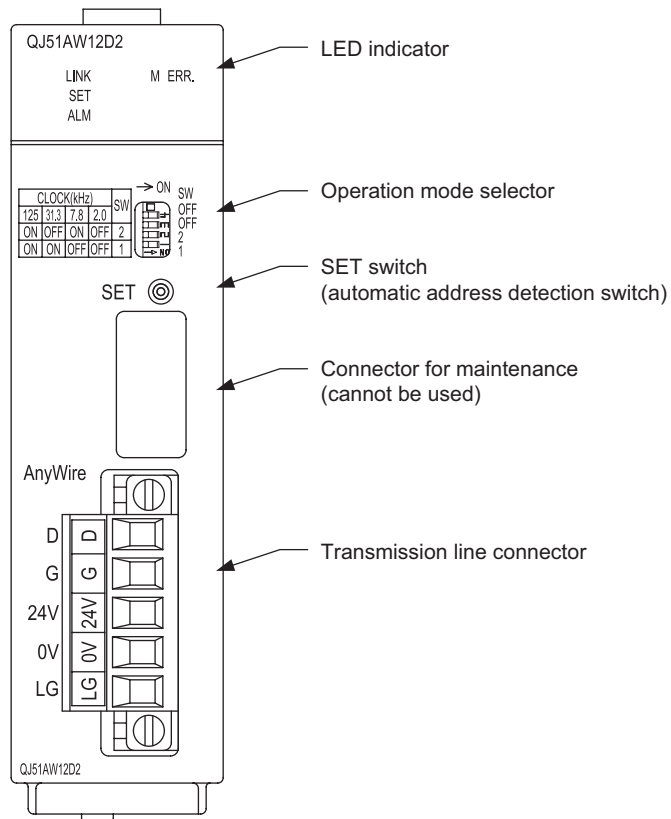
2.4 External Dimensions







(Unit: mm)

2.4 External Dimensions

2.5 Part Names



For details on each part, refer to the following.

- LED indicator :  Page 33, CHAPTER 6
- Operation mode selector :  Page 20, Section 3.1
- SET switch :  Page 31, Section 5.1
- Transmission line connector :  Page 35, CHAPTER 7

2.6 Module Mounting

1. To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection(s) into the hole(s) in the base unit and press the module until it snaps into place.
Incorrect interconnection may cause malfunction, failure, or drop of the module.
2. When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
Screw type : Module fixing screw (M3x12 screws)
Tightening torque : 0.36 to 0.48 N·m

Point

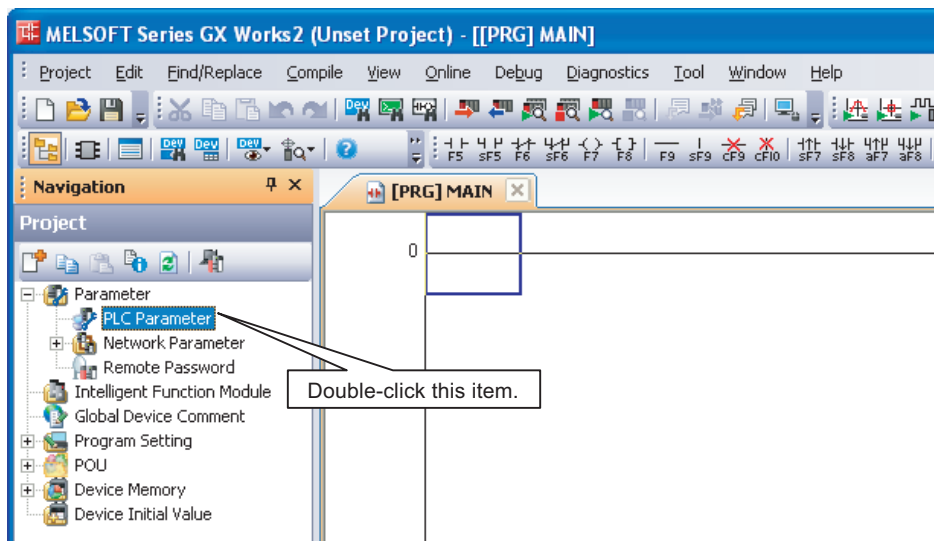
- Do not drop the module or expose it to stronger vibrations than those in the general specifications. Doing so may damage the case or cause the malfunction of the module.
 - Do not remove the printed-circuit board of the module from the case. Doing so may cause failure.
 - Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause failure or malfunction.
-

3.2 Number of Transmission Points Setting

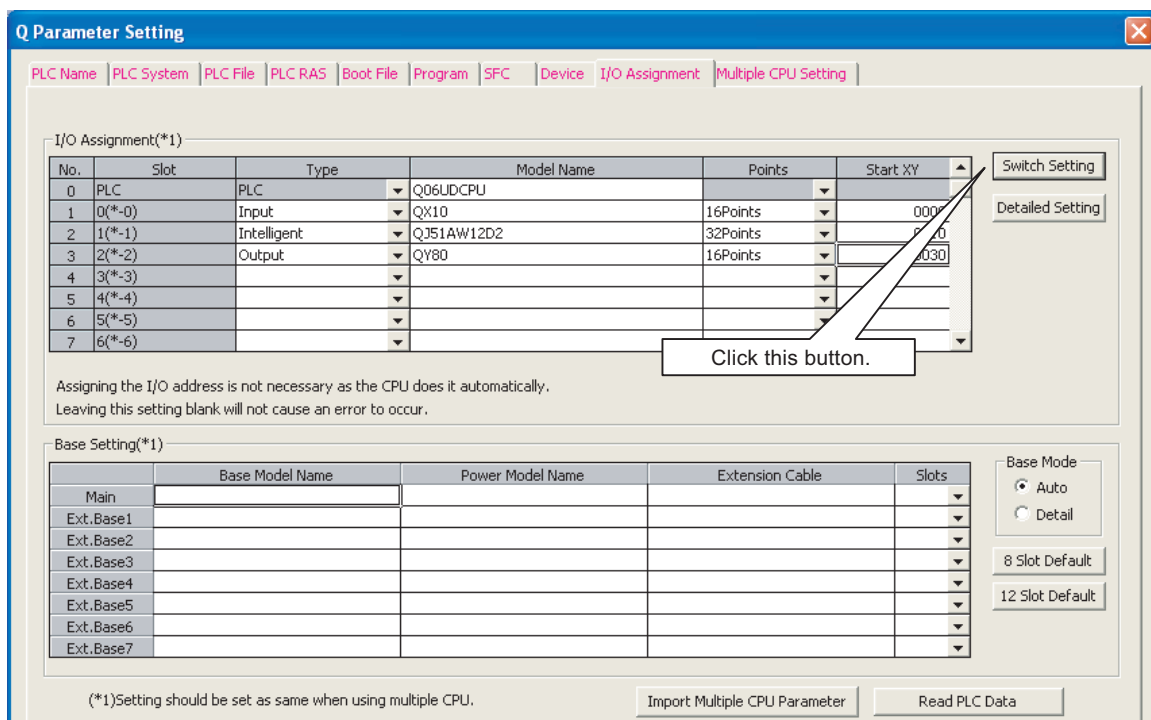
Configure the number of transmission points using the switch 1 of "Switch Setting for I/O and Intelligent Function Module".

Double-click the "PLC Parameter" in the Project window of the programming tool, and perform the following operations.

- Click the "I/O Assignment" tab.
- Click the "Switch Setting" button.
- Open the "Switch Setting for I/O and Intelligent Function Module" dialog box.
- Set any value from 0 to 9 for "Switch 1".



"Q Parameter Setting" Dialog Box



"Switch Setting for I/O and Intelligent Function Module" Dialog Box

Input Format: HEX

	Slot	Type	Model Name	Switch1	Switch2	Switch3	Switch4	Switch5
0	PLC	PLC	Q06UDCPU					
1	0(*-0)	Input	QX10					
2	1(*-1)	Intelligent	QJ51AW12D2	0009				
3	2(*-2)	Output	QY80					
4	3(*-3)							
5	4(*-4)							
6	5(*-5)							
7	6(*-6)							
8	7(*-7)							
9	8(*-8)							
10	9(*-9)							
11	10(*-10)							
12	11(*-11)							
13	12(*-12)							
14	13(*-13)							
15	14(*-14)							

Enter a value from 0 to 9 in this column.

End Cancel

Point

Configure the setting for "Switch 1".

Furthermore, set the correct and suitable value for the slot position of the QJ51AW12D2.

If the settings are not configured, or if the setting position or the switch selection value is incorrect, AnyWire DB A20 transmission does not operate normally.

- Correspondence between the value from 0 to 9 set for "Switch 1" and the number of connected I/O points

Number of connected I/O points		Switch 1
Input	Output	
512	512	0
448	448	1
384	384	2
320	320	3
256	256	4
192	192	5
128	128	6
64	64	7
32	32	8
1024	1024	9 ^{*4}

A to F of "Switch 1" are reserved by the system. Do not change the settings.

- *4 Used when required in special situations.
Transmission also can be made for normal use. However, the address after the "Maximum address setting–Number of self occupied points" of the slave module for AnyWire DB A20 becomes unassigned, and the transmission cycle time becomes slower.

Ex. For 32-Point Remote I/O Module

- Maximum address setting: 510
- Number of self occupied points: 32 points

According to the details above, up to 510 to 541 points are used as the maximum address that is occupied by the remote I/O module.

Addresses of 541 to 1023 points become unassigned, and cannot be assigned.

Point

If the switch settings are changed using the programming tool, write the parameters and supply the power again or reset the system.

Without these operations, transmission points are not configured.

CHAPTER 4 PROGRAMMING

This chapter explains the program of the QJ51AW12D2.

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

4.1 I/O Signals with CPU Module

The QJ51AW12D2 is an intelligent function module. Thirty-two input points and 32 output points are used for the data communication with the CPU module.

System status information is stored in this area.

The "buffer memory area" is used to input/output the signal to/from the remote I/O module.

4.1.1 I/O Signal List

The "n" in the table below is the start I/O number of the QJ51AW12D2 which is determined according to the installation position and modules installed before the QJ51AW12D2.

Ex. If the start I/O number of the QJ51AW12D2 is "X/Y10"

Xn0 to X(n+1)F → X10 to X2F

Yn0 to Y(n+1)F → Y10 to Y2F

Input number	Signal name	Output number	Signal name
Xn0	Module READY	Yn0	Disconnection flag reset command output
Xn1	Short between D and G terminals	Yn1	Automatic address detection command output
Xn2	Short between D and 24 V terminals	Yn2 to YnF	Use prohibited
Xn3	24 V not applied		
Xn4	D/G line disconnection		
Xn5 to Xn7	Use prohibited		
Xn8 to XnB	"Switch Setting for I/O and Intelligent Function Module" Switch 1 setting value*		
XnC to XnF	Use prohibited		
X(n+1)0 to X(n+1)F	Use prohibited	Y(n+1)0 to Y(n+1)F	Use prohibited

* When 8 is set for "Switch 1", the settings are as follows.
Xn8: OFF, Xn9: OFF, XnA: OFF, XnB: ON

4.1.2 Details of the Input Signal

The input signal "Xn0" is the "Module READY" flag, and it turns "ON" while the QJ51AW12D2 is operating normally. (It does not turn OFF with Xn1 to Xn4 errors.)

If the input signal is "Xn1 to Xn4", an "Error Flag" that shows the condition of the AnyWire DB A20 transmission line turns on.

If normal, the corresponding input signal switches to "OFF", and if an error occurs, it switches to "ON".

Xn1 to Xn3 flags turn "OFF" when the error is removed and then maintain the OFF status.

Xn4 maintains the ON status even when the error is removed.

Xn4 turns "OFF" by resetting the power or outputting the signal to Yn0. (☞ Page 25, Section 4.1.3)

The ON/OFF status is also indicated depending on whether the "ALM" LED is ON or how the "ALM" LED flashes.

Input signal No.	Description	Normal	Error
Xn0	Module READY (Turns OFF when a watchdog timer error occurs)	ON	OFF
Xn1	Short between D and G terminals	OFF	ON
Xn2	Short between D and 24 V terminals	OFF	ON
Xn3	24VDC is not being supplied to the QJ51AW12D2 or the voltage is low.	OFF	ON
Xn4	D/G line disconnection, a slave module error, or power is not being supplied	OFF	ON

For Xn8 to XnB, enter the value set for switch 1 of the "Switch setting for I/O and Intelligent Function Module". Xn8 to XnB are used to check the settings.

4.1.3 Details of the Output Signal

(1) Disconnection flag reset command output

When output signal Yn0 is turned from OFF to ON and the disconnection error has been removed, the abnormal address information can be cleared by turning "OFF" the disconnection flag (Xn4) and resetting the number of the error addresses to "0".

If the error has not been removed, the error flag, the number of the error addresses, and error address are set. Abnormal address information can also be cleared by supplying the power again.

(2) Automatic address detection command output

Turning the output signal Yn1 from OFF to ON starts the automatic detection of the address. (☞ Page 30, CHAPTER 5) (The "Automatic address detection" function can be also operated using the SET switch.)

4.2 Buffer Memory Area

This area is for data communication between the QJ51AW12D2 and CPU module.

Buffer memory address	Description
100 _H to 13F _H * ⁵	Input (1024 points): The lowest bit of 100 _H is the 0th data, and the highest bit of 13F _H is the 1023rd data.
1100 _H to 113F _H * ⁵	Output (1024 points): The lowest bit of 1100 _H is the 0th data, and the highest bit of 113F _H is the 1023rd data.
2000 _H	Number of error IDs (1 word)
2001 _H to 2080 _H	Error ID information

*⁵ The buffer memory address occupies a 64-word sized area, irrespective of the number of I/O points set for "Switch 1" setting on Page 21, Section 3.2.

Ex. Correspondence between the buffer memory address and AnyWire DB A20 input address

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

AnyWire input address: 0

4.2.1 I/O Area

The slave module requires "Address setting" which specifies the start number assigned in the transmission frame. The settings are configured in 2-point units. The addresses of both input slave module (e.g. input remote I/O module) and output slave module (e.g. output remote I/O module) start from 0, and the area later than that number is occupied corresponding to the number of module points.

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

Buffer memory address	Bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
100 _H (input)	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

AnyWire address: 15 AnyWire address: 0
 Occupied area by the address 8 on the 8-point input remote I/O module Occupied area by the address 0 on the 8-point input remote I/O module

4.2.2 Number of Error Addresses

The number of error IDs (addresses) is entered in 2000_H. (☞ Page 30, CHAPTER 5)
Any value from 0 to 128 is entered.

4.2.3 Value of Error Addresses

If a disconnection or a slave module error is occurred, the error address is written to 2001_H to 2080_H in the order from the lowest address up to 128 addresses.

This value is maintained until the disconnection error is reset or until the power is turned off.

Buffer memory address	Description
2001 _H	Error address 1
2002 _H	Error address 2
2003 _H	Error address 3
⋮	⋮
⋮	⋮
207F _H	Error address 127
2080 _H	Error address 128

The detected error address is classified and displayed in the memory and on the monitor according to the table below.

Hexadecimal display address	Description
000 _H to 1FF _H	Slave module output address
200 _H to 3FF _H	Slave module input address

The lower 2 digits indicate the address set for the slave module.

The uppermost digit indicates the type of the slave module.

4.3 Program Example

The configuration of the programmable controller is as shown below.

I/O address		X0 to XF	X10 to X2F	Y10 to Y2F	
Power supply Q62P	CPU Q06UDCPU	16-point input module	QJ51 AW12D2	16-point output module	Vacant

• Used device

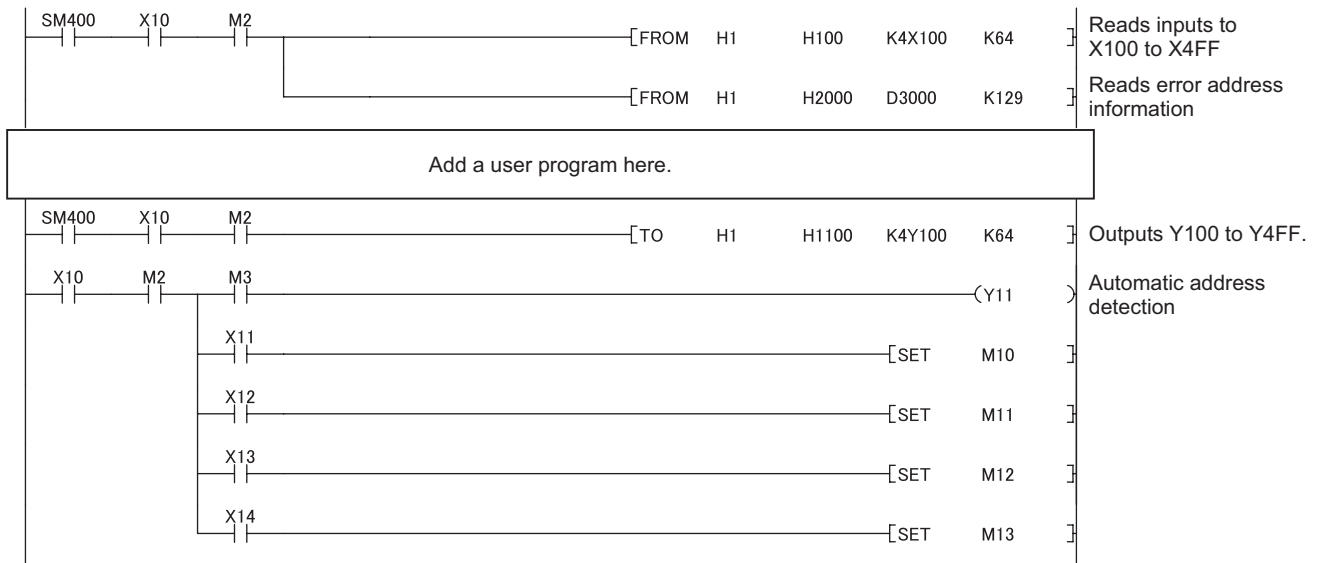
Device No.	Application
SM400	Always ON
X10	Module READY
X11	Short flag between D and G terminals
X12	D-24 V short flag
X13	24 V low flag
X14	Disconnection flag between D and G terminals
Y10	Disconnection flag reset command output
Y11	Automatic address detection command output
M1	Disconnection flag reset command input
M2	Access start flag
M3	Automatic address detection command input
M10	Short display between D and G terminals
M11	D-24 V short display
M12	24 V low display
M13	D, G disconnection display
T1	Disconnection flag output ON time (500 ms)

• Program

<Disconnection flag clear>



Input is output by the FROM instruction, and output is output by the TO instruction.
 A user program is added between the FROM and TO instructions.



The correspondence between each signal and the device in the program above is as shown below.

Signal type	Corresponding device
Input (1024 points)	X100 to X4FF
Output (1024 points)	Y100 to Y4FF
Error address information	D3000 to D3128

4

4.3 Program Example

CHAPTER 5 MONITORING FUNCTION

The AnyWire DB A20 slave module has the specific ID (address). When the QJ51AW12D sends the ID (address), the disconnection and the existence of slave modules are detected by receiving a reply from the slave module having the corresponding ID (address).

The QJ51AW12D2 uses the automatic address detection operation to store the addresses of the currently connected slave modules in the EEPROM.

This information is stored even when the power is turned off.

The QJ51AW12D2 sends the registered addresses in order. If the corresponding slave module does not reply, the "ALM" LED displays that a disconnection occurred. Then an error flag is returned to the memory area on the host side. Furthermore, this slave module address can be checked.

5.1 Automatic Address Detection

Automatic address detection is a function to store the ID (address) of the connected slave module in the EEPROM of the QJ51AW12D2.

In the initial system startup, the module ID is not registered. Therefore, when the power is on, the "ALM" LED and the "D/G line disconnection" flag are turned on. (☞ Page 24, CHAPTER 4, Page 33, CHAPTER 6)
I/O data can be transmitted in this state. However, to use the disconnected branch line detection function, operate "automatic address detection" at this point.

Operate the automatic address detection in the following situations.

- When starting the system operation after confirming that all the slave modules connected to the master modules are operating normally
- When adding a slave module after starting the system operation
- When deleting a slave module after starting the system operation
- When changing the address of a slave module after starting the system operation

Two procedures are available for this operation.

Using the "SET" switch

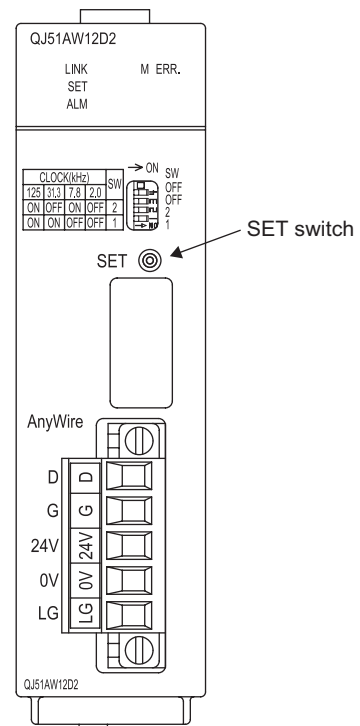
Procedure

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

Using "automatic address detection command output"

Procedure

1. Check that all of the slave modules are operating normally.
2. Turn the "automatic address detection command output" (Yn1) from OFF to ON.
(For details on the automatic address detection command output, refer to Page 24, CHAPTER 4.)
3. When the "SET" LED turns on and turns off after flashing, the ID (address) has been stored.



Point

When an error such as a short occurs in AnyWire DB A20, when the power is turned on, or when the module is reset, the automatic address detection cannot be operated for approximately 5 seconds.

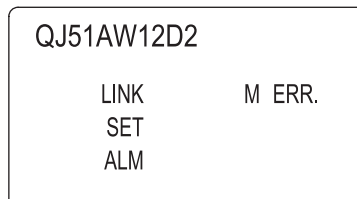
5.2 Monitoring Operation

Registered IDs (addresses) are sent in order. If the slave module does not reply, a disconnection is notified. The "ALM" LED turns on and the input Xn4 turns on when a disconnection occurs. This error information is maintained until the power is turned off or until the error reset (Yn0) is performed.

Point

To reset the "ALM" LED lighting and disconnection detected (Xn4: ON) which are detected during operation, after removing the fault, reset the power supply of the QJ51AW12D2 or turn on the disconnection flag clear command output (Yn0). The automatic address detection also clears the display and the flag. However, if an unresponding module exists, its ID (address) is not registered; therefore, it is not monitored.

CHAPTER 6 LED DISPLAY



Display	Name	Color	Meaning	
LINK	Transmission status	Green	Flashing	Module operating status
			Off	Module error
SET	Address detection in progress	Green	On	During automatic address detection operation
			Flashing	During EEPROM write
			Off	During normal transmission
ALM	Transmission alarm	Red	On	AnyWire DB A20 D/G line disconnection, or no reply from the slave module
			Slow flashing *1	Short between D and G terminals, short between D and 24V terminals, or the equivalent status
			Fast flashing *2	24 V DC is not being supplied, or the supply voltage is too low
			Off	During normal transmission
M ERR.	Hardware failure	Red	On	Turns on when an error occurs in the QJ51AW12D2 or the programmable controller. In this case, all functions are stopped. The error LED for the applicable CPU flashes. (Excluding EEPROM errors)
			Off	Module normal

*1 "Slow flashing": at approximately one-second intervals

*2 "Fast flashing": at approximately 0.2-second intervals

For details on the display when M ERR. is on, see the table below.

No.	On/Off status				Main Causes
	M ERR.	ALM	LINK	SET	
1	●	●	●	●	Internal ROM error
2	●	●	●	○	Internal RAM error
3	●	*1	*1	●	EEPROM error
4	●	○	○	○	Module initialization error
5	●	○	●	○	Watchdog timer error
6	●	○	○	●	Programmable controller CPU error (ITWDT)
7	●	○	●	●	Software error (IORSTL)

●:On, ○:Off

*1 These LEDs turn on, turn off, or flash according to the operating status.

No. 1 to 4 are checked only at the time of the reset.

Transmission is performed only when an EEPROM error occurs.

Memo

CHAPTER 7 CONNECTIONS

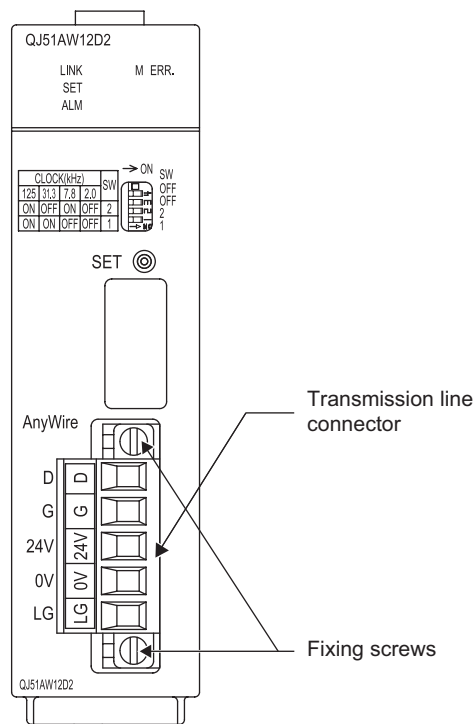
The connection terminals (transmission line connectors) for the AnyWire DB A20 transmission line can be connected and disconnected easily.

The transmission lines and power supply lines are connected using the common connection terminals.

7.1 Description of Terminals

Terminal	Description
D	This is the QJ51AW12D2 AnyWire DB A20 transmission signal terminal. D: Transmission line (+), G: Transmission line (-)
G	Connect to the D and G terminals on the slave module or terminating resistor.
24V	This is the power supply terminal for driving the transmission circuit for the QJ51AW12D2. Connect to a 24VDC stabilized power supply.
0V	
LG	Connected to the neutral point of the noise filter inserted between the 24V and 0V terminals. If malfunctions occur due to the power noise in the 24 V DC system, ground with 1 point along with the functional ground terminal (FG terminal) on the programmable controller.

For details on connections to the D and G terminals on the slave module and terminating resistor, refer to the relevant manuals of each product.



7.2 Cables Used

Use either 2-core or 4-core VCTF or VCT (rated temperature 60°C) cable or dedicated flat cable (FK4-075-100: rated temperature 70°C).

For the transmission line, use a cable having a suitable wire diameter according to the transmission distance.

For the power supply cable, use a cable having a suitable wire diameter (between 0.2 and 2.5 mm²) in consideration of the voltage reduction.

7.3 Transmission Line Connector

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

To connect the transmission line connector, a flathead screwdriver having a tipped size of 0.6 × 3.5 mm is required. Before removing the "transmission line connector", check that the fixing screws on both sides are completely loosened (removed from the socket).

Pulling with excessive force while the screws are still tightened may cause damage to the devices. When connecting the connector, check that there are no short circuits due to the disconnected or frayed wires before connecting, and tighten the screws at both sides securely. (Tightening torque: 0.5 to 0.6 N•m)

7.4 Cable Processing

Bare cables can be connected to the transmission line connectors; however, for safety reasons, it is recommended to connect the crimped bar terminals.

Recommended manufacturer: Phoenix Contact Co., Ltd.

Reference example of the bar terminal)

When processing 0.75 mm² cables Model AI0,75-8 GY

When processing 1.25 mm² cables Model AI1,5-8 BK, etc.

When connecting two cables to one terminal, connect the two cables together to the TWIN bar terminal.

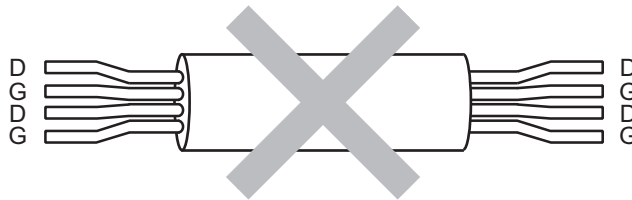
When processing two 0.75 mm² cables AI-TWIN 2 × 0,75-8 GY

When processing two 1.25 mm² cables AI-TWIN 2 × 1,5-8 BK, etc.

When TWIN bar terminals are used for these transmission line connectors, the maximum line diameter is 1.25 mm². For details on sizes other than those described above and crimping tools, refer to the Phoenix Contact catalogue or website.

Point

- Do not send multiple transmission lines (D, G) using a multicore cable.

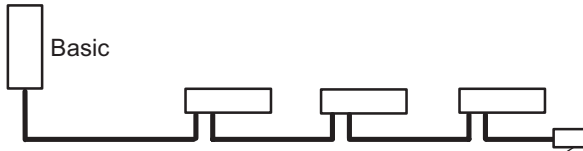


- Use the following line diameters for the transmission lines.
 - 200 m or less...0.75 mm² to 1.25 mm²
 - 200 m or more...0.9 mm² to 1.25 mm²
- Be careful that the voltage does not fall below the lower limit of the allowable voltage range due to the voltage drop caused by the cable. If the voltage falls below the lower limit, malfunctions may occur. If the voltage falls substantially, install the external power supply. For installing the external power supply, refer to the "AnyWire DB A20 Series Technical Manual" (manufactured by Anywire Corporation).
- Do not connect soldered cables directly to the terminals. Doing so may loosen the screws, resulting in a poor contact.

7.5 Terminating Resistor

To ensure more stable transmission quality, connect the terminating resistor (AT2 manufactured by Anywire Corporation) to the end of the transmission line.

Terminating resistor connection



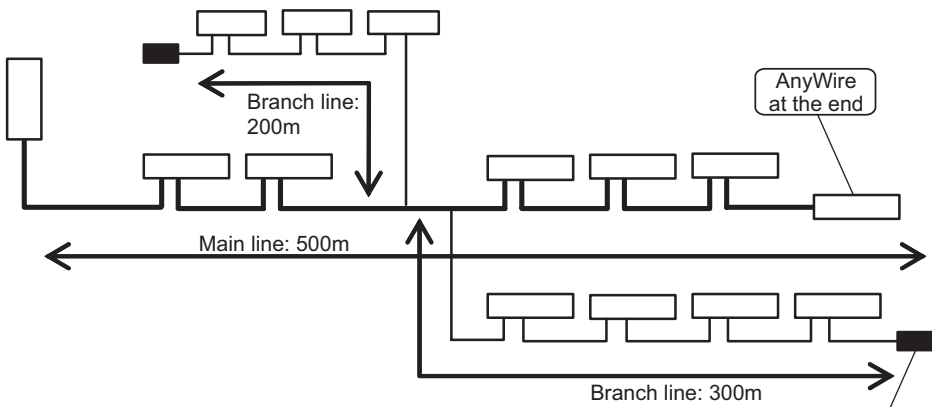
Important Connect a terminating resistor at the end of a line for one master module.

Transmission distance	50m (total length)
	200m (total length)
	1km (total length)
	3km (total length)

The setting applies to all the transmission speeds.

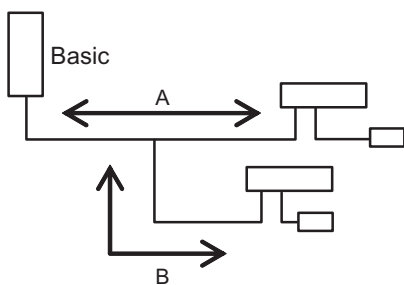
Branch of transmission lines (transmission distance: 1km)

[Example]



Important Connect one terminating resistor at the end of a branch line that exceeds 200m. Contact us if more than two branch lines exceed 200m.

Total length



The total length of the transmission distance for the AnyWire DB A20 can be calculated from A + B. Note that the total length should not exceed the maximum transmission distance set for the system to branch lines.

CHAPTER 8 TRANSMISSION TIME

This section describes the transmission cycle time and transmission delay time of AnyWire DB A20.

8.1 Transmission Cycle Time

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

8.1.1 QJ51AW12D2 Transmission Cycle Time

The transmission cycle time of the QJ51AW12D2 is as shown in the table below.

Maximum number of transmission points setting	Transmission cycle time (ms)			
	125 kHz	31.3 kHz	7.8 kHz	2 kHz
	(50 m)	(200 m)	(1 km)	(3 km)
64 points (32 points × 2)	0.42	1.7	6.8	24.8
128 points (64 points × 2)	0.7	2.7	10.9	40.7
256 points (128 points × 2)	1.2	4.8	19.1	72.4
384 points (192 points × 2)	1.7	6.8	27.3	104.2
512 points (256 points × 2)	2.2	8.9	35.5	135.9
640 points (320 points × 2)	2.7	10.9	43.6	167.6
768 points (384 points × 2)	3.2	13.0	51.8	199.4
896 points (448 points × 2)	3.8	15.0	60.0	231.1
1024 points (512 points × 2)	4.3	17.1	68.2	262.9
2048 points (1024 points × 2)	8.4	33.4	133.8	516.8

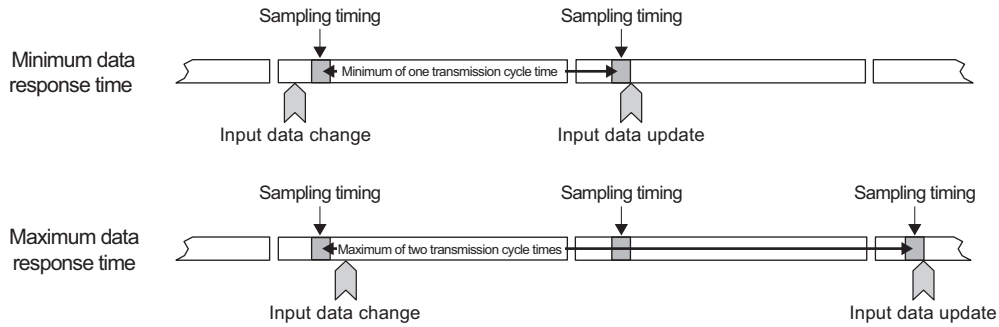
8.1.2 Effects of the Double Check System

(1) Input

On the QJ51AW12D2 side, if the same data is not repeated twice in continuance, the input area data is not updated (double check). Therefore, a minimum of one transmission cycle time and a maximum of two transmission cycle times are required for the data response time.

Signals of two transmission cycle times or less may not be captured depending on the timing.

Therefore, to ensure the response, provide an input signal that is longer than two transmission cycle times.



(2) Output

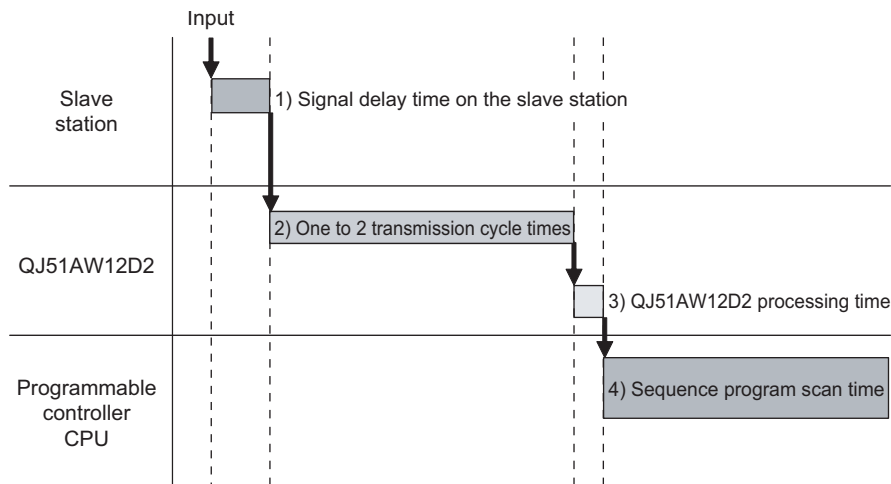
As the double check is performed on the slave module side, the time required is the same as that for input, namely a minimum of one transmission cycle time and a maximum of two transmission cycle times.

8.2 Transmission Delay Time

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

8.2.1 Slave Module (Input) to Master Module

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



[Calculation formula]

- 1) Signal delay time of the slave module + 2) Transmission cycle time \times 2 +
- 3) Processing time on the QJ51AW12D2 side + 4) Sequence program scan time \times 2 [ms]

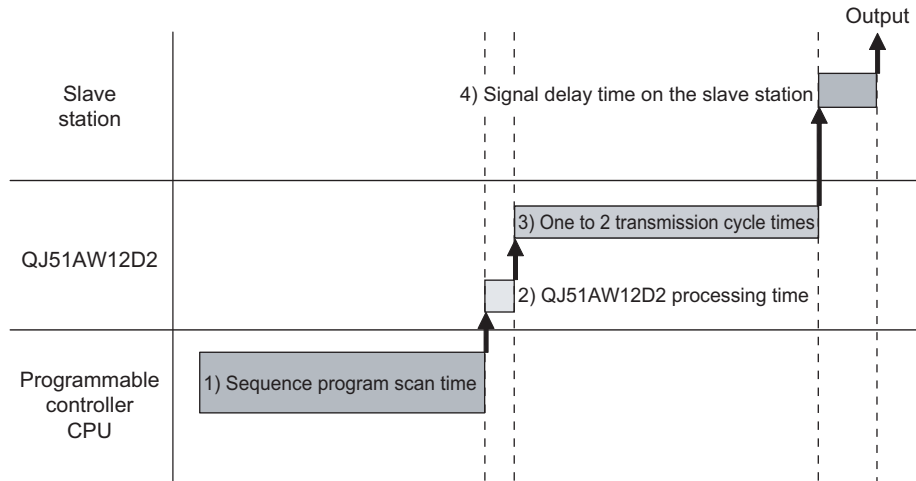
[Calculation example]

- 1) Signal delay time of the slave module
Signal delay time of the slave module is 0.17 ms: 0.17 [ms]
- 2) Transmission cycle time \times 2
When the transmission point is set to 1024 and the transmission speed is set to 31.3 kHz: $17.1 \times 2 = 34.2$ [ms]
- 3) Processing time on the QJ51AW12D2 side
Processing time on the QJ51AW12D2 side = Transmission speed clock width \times 16
When the transmission speed is set to 31.3 kHz: $(1 \div 31.3 \text{ k}) \times 16 = 0.511$ [ms]
- 4) Sequence program scan time \times 2
Set the sequence program scan time to 5 ms: $5 \times 2 = 10$ [ms]

Therefore, the transmission delay time is $0.17 + 34.2 + 0.511 + 10 = 44.88$ [ms]

8.2.2 Master Module to Slave Module (Output)

The figure below shows the time between the CPU module device (Y) turning on/off and a signal output from the slave module turning on/off.



[Calculation formula]

- 1) Sequence program scan time + 2) Processing time on the QJ51AW12D2 side + 3) Transmission cycle time × 2 +
- 4) Signal delay time of the slave module [ms]

[Calculation example]

- 1) Sequence program scan time
Set the sequence program scan time to 5 ms: 5 [ms]
- 2) Processing time on the QJ51AW12D2 side
Processing time on the QJ51AW12D2 side = Transmission speed clock width × 16
When the transmission speed is set to 31.3 kHz: $(1 \div 31.3 \text{ k}) \times 16 = 0.511$ [ms]
- 3) Transmission cycle time × 2
When the transmission point is set to 1024 and the transmission speed is set to 31.3 kHz: $17.1 \times 2 = 34.2$ [ms]
- 4) Signal delay time of the slave module
Signal delay time of the slave module is 0.01 ms: 0.01 [ms]

Therefore, the transmission delay time is $5 + 0.511 + 34.2 + 0.01 = 39.72$ [ms]





CHAPTER 9 TROUBLESHOOTING

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

- All devices are being supplied with 24VDC power supply.
- "LINK" LEDs of all the AnyWire DB A20 slave modules are flashing.
- Address settings are correct and are not duplicated.

Remark

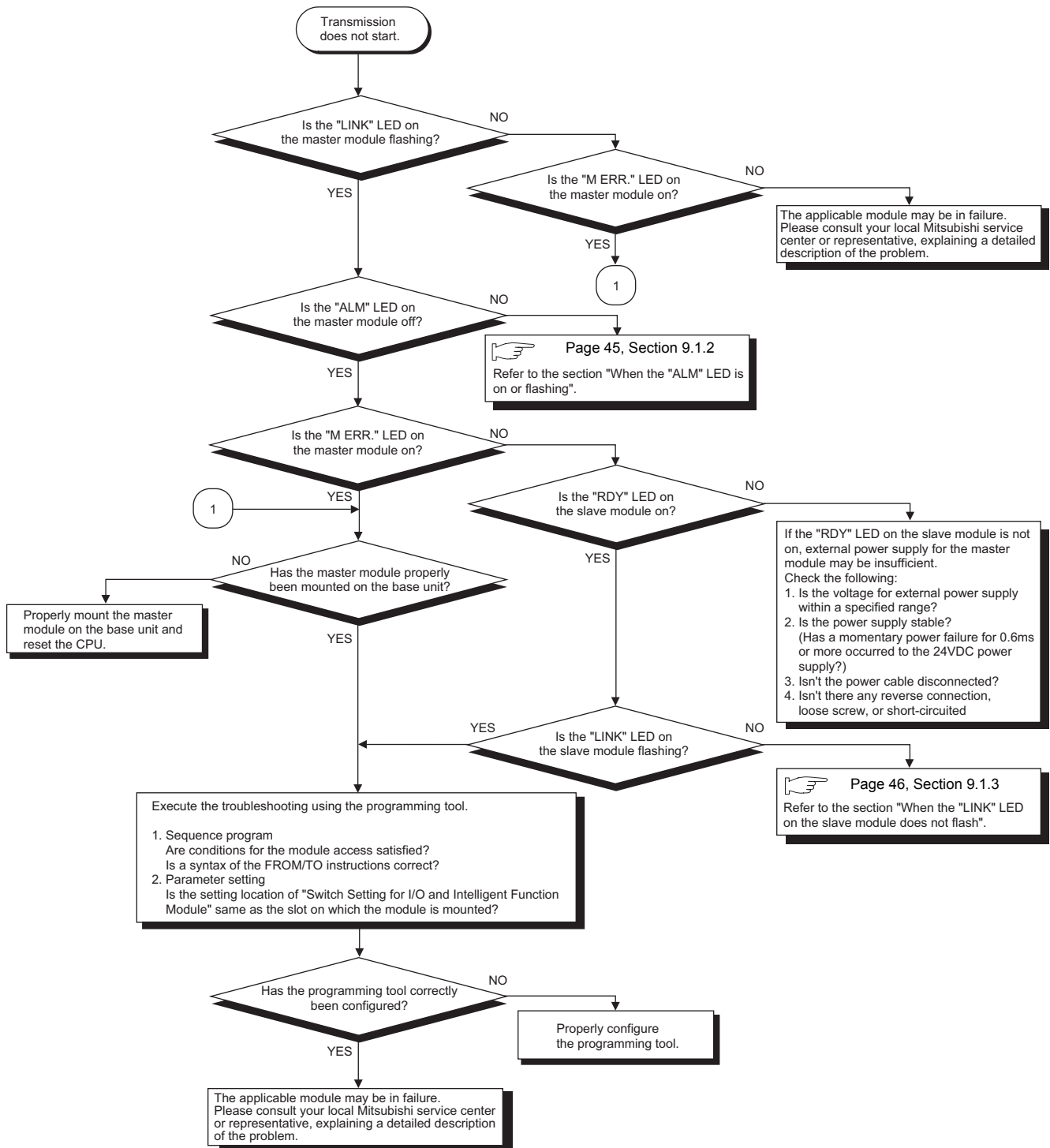
The reference pages for each specification required during troubleshooting are shown below.

- Operation mode :  Page 20, CHAPTER 3
- Data I/O :  Page 24, CHAPTER 4
- Details of the LED display :  Page 33, CHAPTER 6
- Connections :  Page 35, CHAPTER 7

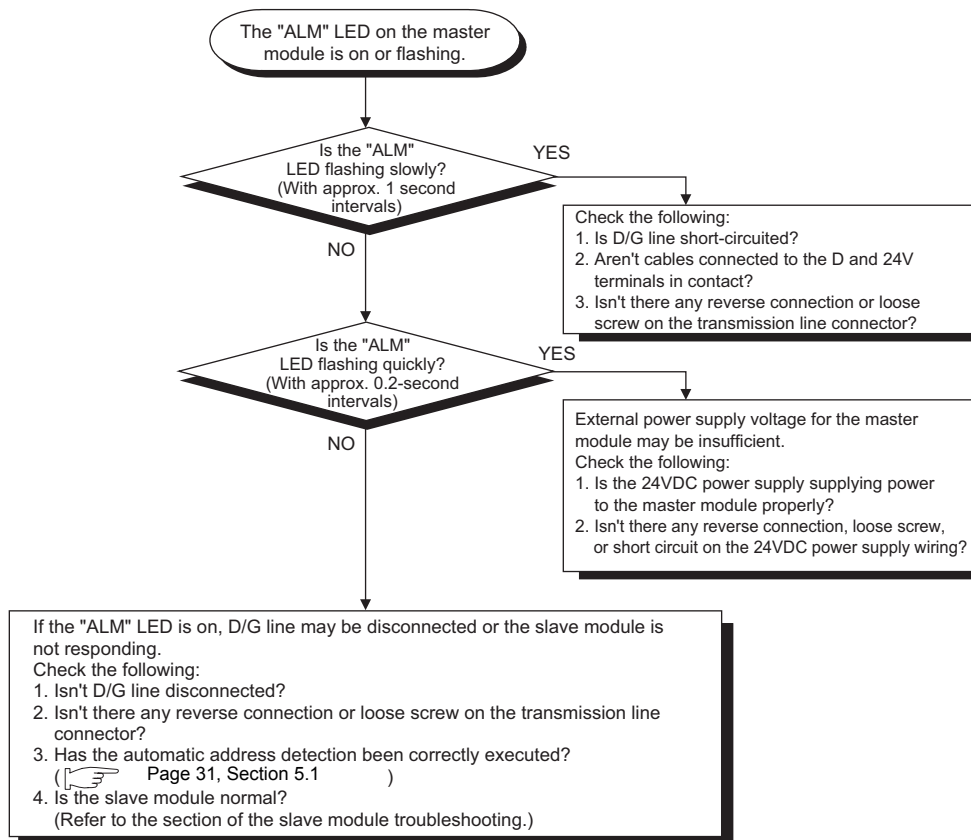
For details on the entire AnyWire DB A20 system, refer to the "AnyWire DB A20 Series Technical Manual" (manufactured by Anywire Corporation).

9.1 Troubleshooting Flow

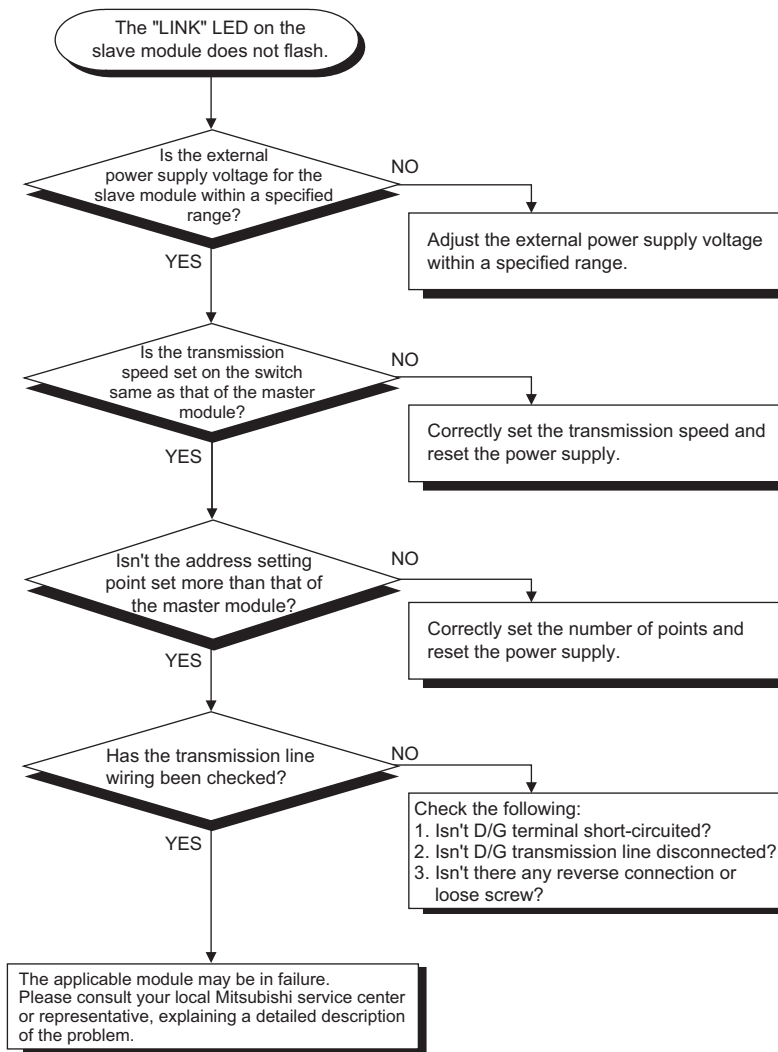
9.1.1 When transmission does not start



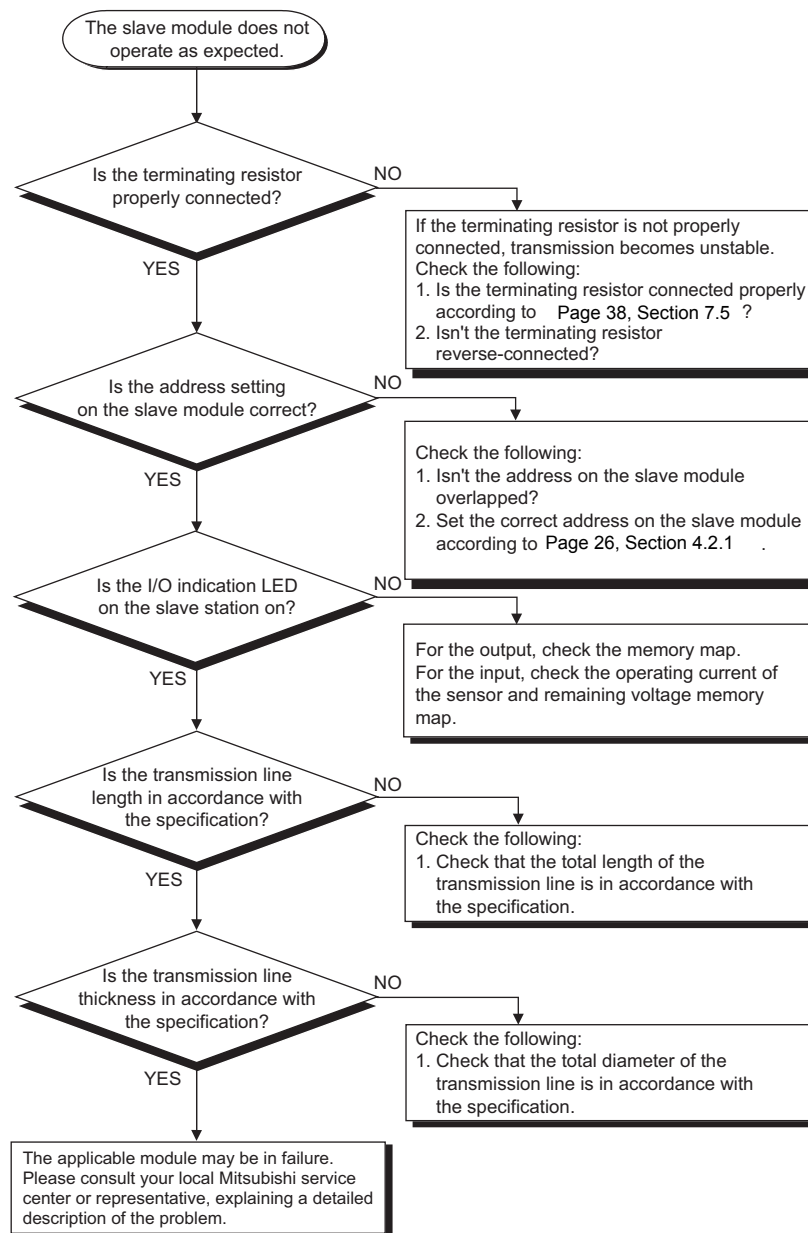
9.1.2 When the "ALM" LED on the master module is on or flashing



9.1.3 When the "LINK" LED on the slave module is not flashing



9.1.4 When the slave module does not operate as expected



9.2 Symptom Checklist

Symptom	Check Item	Check
Data I/O is impossible.	■ QJ51AW12D2 side	
	Is 24 V DC being supplied appropriately?	<input type="checkbox"/>
	Is the D/G line connected correctly?	<input type="checkbox"/>
	Is the operation mode selector set correctly?	<input type="checkbox"/>
	Does the number of connected I/O points set for switch 1 in "Switch Setting for I/O and Intelligent Function Module" match the number of I/O points specified in the program?	<input type="checkbox"/>
	■ Slave module side	
	Is 24 V DC power being supplied appropriately?	<input type="checkbox"/>
	Is the D/G line connected correctly?	<input type="checkbox"/>
	Is the address set correctly?	<input type="checkbox"/>
	Does the transmission speed match that of the master module?	<input type="checkbox"/>
	Does the slave module have the same specifications (such as the transmission clock and number of I/O points) or the same settings as the master module?	<input type="checkbox"/>
	■ CPU module side	
	Is I/O data enabled after 2 seconds or more since the programmable controller is powered on?	<input type="checkbox"/>
	Do the setting location and slot location of the "Switch Setting for I/O and Intelligent Function Module" match?	<input type="checkbox"/>
	Are the transmission setting values correct?	<input type="checkbox"/>
Data I/O is unstable.	Is AT2 (terminating resistor) connected? Are the poles connected in reverse?	<input type="checkbox"/>
	Does the actual transmission line length exceed the setting length?	<input type="checkbox"/>
	Is a shield line being used for multiple-point grounding?	<input type="checkbox"/>
The "RDY" LED on the slave module is flashing.	Is the supply voltage within the allowable voltage range (21.6 V to 27.6 V)?	<input type="checkbox"/>
	Is the power supply line disconnected? Or is the power supply terminal loose?	<input type="checkbox"/>
The "LINK" LED on the slave module does not flash.	Does the address setting value exceed the number of transmission points?	<input type="checkbox"/>
	Does the transmission speed setting match that of the master module?	<input type="checkbox"/>
	Is D/G terminal loose?	<input type="checkbox"/>
	Is D/G line disconnected?	<input type="checkbox"/>
The "ALM" LED on the QJ51AW12D2 is on.	Is D/G line disconnected?	<input type="checkbox"/>
	At the startup, was the automatic address detection operated correctly?	<input type="checkbox"/>
	Are the terminal block screws loose?	<input type="checkbox"/>
The "ALM" LED on the QJ51AW12D2 is flashing slowly *1.	Is D/G line disconnected?	<input type="checkbox"/>
	Are cables connected to the D and 24V terminals in contact?	<input type="checkbox"/>
The "ALM" LED on the QJ51AW12D2 is flashing quickly *2.	Is 24 V DC power being supplied to the QJ51AW12D2? Isn't the voltage too low?	<input type="checkbox"/>
The "M ERR." LED on the QJ51AW12D2 is on.	Is the QJ51AW12D2 installed correctly on the base unit?	<input type="checkbox"/>
	Were the parameter settings on the CPU module configured correctly?	<input type="checkbox"/>
	Were the parameters written and was the CPU module reset?	<input type="checkbox"/>
The "ERR." LED on the CPU module is flashing.	Is the CPU module installed correctly on the base unit?	<input type="checkbox"/>
	Were the parameter settings on the applicable CPU module configured correctly?	<input type="checkbox"/>

*1 "Slow flashing": at approximately one-second intervals

*2 "Fast flashing": at approximately 0.2-second intervals

Memo

WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

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

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

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

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

2. Onerous repair term after discontinuation of production

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

3. Overseas service

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

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

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

5. Changes in product specifications

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

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MELSEC-Q AnyWire DB A20 Master Module User's Manual

 Anywire Corporation <http://www.anywire.jp>

MODEL	QJ51AW12D2-U-E
MODEL CODE	13JZ52
SH(NA)-080968ENG-B(1105)MEE	

 **MITSUBISHI ELECTRIC CORPORATION**

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

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Specifications subject to change without notice.