

# AnyWireASLINK System

# Technical Manual

Ver. 1.2 Jun. 28, 2021

## Precautions

### ● Precautions related to this user's manual

1. This manual describes general concept of the AnyWireASLINK system.  
During use of the AnyWireASLINK system, be sure to read "User's Manual" for each product to understand specifications and handling of the product.
2. The contents of this manual, a part or whole, are prohibited from reprinting or reproduction without our permission.
3. The contents of this manual are subject to change in the future without prior notice.

### ● Safety precautions (Make sure to read before use)

When using this product, please carefully read this Manual and the related Manuals introduced in this Manual and pay sufficient attention to safety in order to handle this product properly.

The precautions in this Manual describe only matters related to this product.

For safety precautions as a system, refer to User's Manuals for controllers, such as the CPU unit.

"Safety precautions" ranks the safety precaution items into "⚠ WARNING" and "⚠ CAUTION."



#### **WARNING**

Improper handling may cause a dangerous situation and can result in death or serious injury.



#### **CAUTION**

Improper handling may cause a dangerous situation and can result in moderate injury or minor injury or is assumed to result in property

In addition,

Matters described in ⚠ CAUTION may lead to serious consequences depending on the situation.

All describe important contents, therefore, make sure to observe the cautions and warnings.

Carefully store this Manual so as to access it whenever necessary, and deliver this Manual to the end user.

## [Application of the product]



#### **WARNING**

- Application of the AnyWire system is limited to areas in which any failure and/or problem of the product shall not result in serious consequences and in systems with fail-safe and backup functions are provided externally.
- The AnyWire system is designed for applications in general industrial purposes and does not come with control features designed for mission critical purposes.  
Therefore, the product is not applicable in areas like medical equipment, nuclear power plants, railroad, aviation, safety devices, in which extreme safety is the priority.

## [Precautions for design]



- The AnyWire system has high noise resistance, however, keep transmission lines and input/output cables 100 mm or more (as a guide) away from high-voltage cables or power lines. A malfunction may result.
- Incorporate an emergency stop circuit and an interlock circuit for safety into an external circuit other than the AnyWire system.

## [Precautions for installation]



- AnyWire products should be used in environments that meet the general specifications presented in the User's Manual.  
Using them in environments outside the general specifications may result in injuries due to electric shock, fire, malfunctions and/or damage to or degradation of the products.
- Install respective products properly. Improper installations may cause malfunctions, failures and/or falls. If they are to be installed on a DIN rail, ensure to orient the products so that the fixed hooks would be on top.  
Holding them with the movable hooks on top may cause devices to fall due to vibrations or the weight of cables.  
It is strongly recommended to use DIN rail stoppers for secure installation.  
If screws were used to install them, fasten screws within the torque specified for respective screws. Loose screws or screws fastened too tight may cause damage, dropout and/or malfunction of the devices.
- To install and remove the devices, always ensure that all phases of external power supplies used in the system are shut down.  
Failing to do so may result in damages and/or malfunctions due to sneak current.
- Do not touch energized parts and electronic components with a bare hand. Doing so may cause malfunctions and/or failures.

## [Precautions for wiring]



- Tighten the terminal screws within the specified torque range. Loose tightening of the terminal screws may result in short-circuit, fire or malfunction. Excessive tightening of the terminal screws may cause damage to the screws or unit, resulting in dropping, short-circuit or malfunction.
- Be careful to prevent foreign matter such as cutting chips and wiring offcuts from entering into the unit. Fire, failure or malfunction may result.
- Incorrect wiring may damage the equipment. Be careful with regard to the label length and layout so that connectors and electric wires are not disconnected.
- When connecting wires with terminal blocks, do not solder. A contact failure may result.
- If wiring for the power line is long, power voltage for the remote slave unit may become insufficient due to voltage drop. Therefore, connect an external power source to ensure the specified voltage.
- Do not turn on the 24 V DC power source before completing wiring and connections of the whole Anywire system.
- Use a 24 V DC direct current stabilized power supply for Anywire system devices.
- Do not bind the control wire and communication cable with the main circuit or power line, or do not bring them close to each other. Noise may result in malfunction.
- Make sure to put electric wires and cables to be connected to the unit into ducts or fix them with clamps. Unless cables are put into ducts or fixed with clamps, drift, movement or careless tensioning of a cable may result in damage to the unit or cable, and a connection failure of a cable may result in malfunction.
- When removing cables connected to the unit, do not hold the cable section by hand when pulling. Remove the cable equipped with a connector by holding the connector on the connection part of the unit.  
To remove cables connected to the terminal blocks, loosen the terminal screws on the terminal block. When cables are pulled while they are connected to the unit, malfunction or damage of the unit or cable may result.

## [Precautions for startup and maintenance]



- Do not touch the terminals while the power is on. Electric shock or malfunction may result.
- To clean or to re-tighten the screws on the terminal block and the unit mounting screws, make sure to shut off all phases of the external supply power used in the system. Unless all phases are shut off, electric shock may result. Loose tightening of the screws may result in short-circuit or malfunction. Excessive tightening of the screws may cause damage to the screws or unit, resulting in dropping, short-circuit or malfunction.



- Do not disassemble or remodel each unit. Failure, malfunction, injury or fire may result.
- Make sure to shut off all phases of the external supply power source used in the system for installation and removal of the unit.  
Unless all phases are shut off, failure or malfunction of the unit may result.
- Before touching the unit, make sure to touch grounded metal to discharge static electricity charged to the human body. Unless static electricity is discharged, failure or malfunction of the unit may result.

## [Precautions for disposal]



- Dispose of this product as industrial waste.

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## Introduction

Thank you for considering adoption of the AnyWireASLINK system.

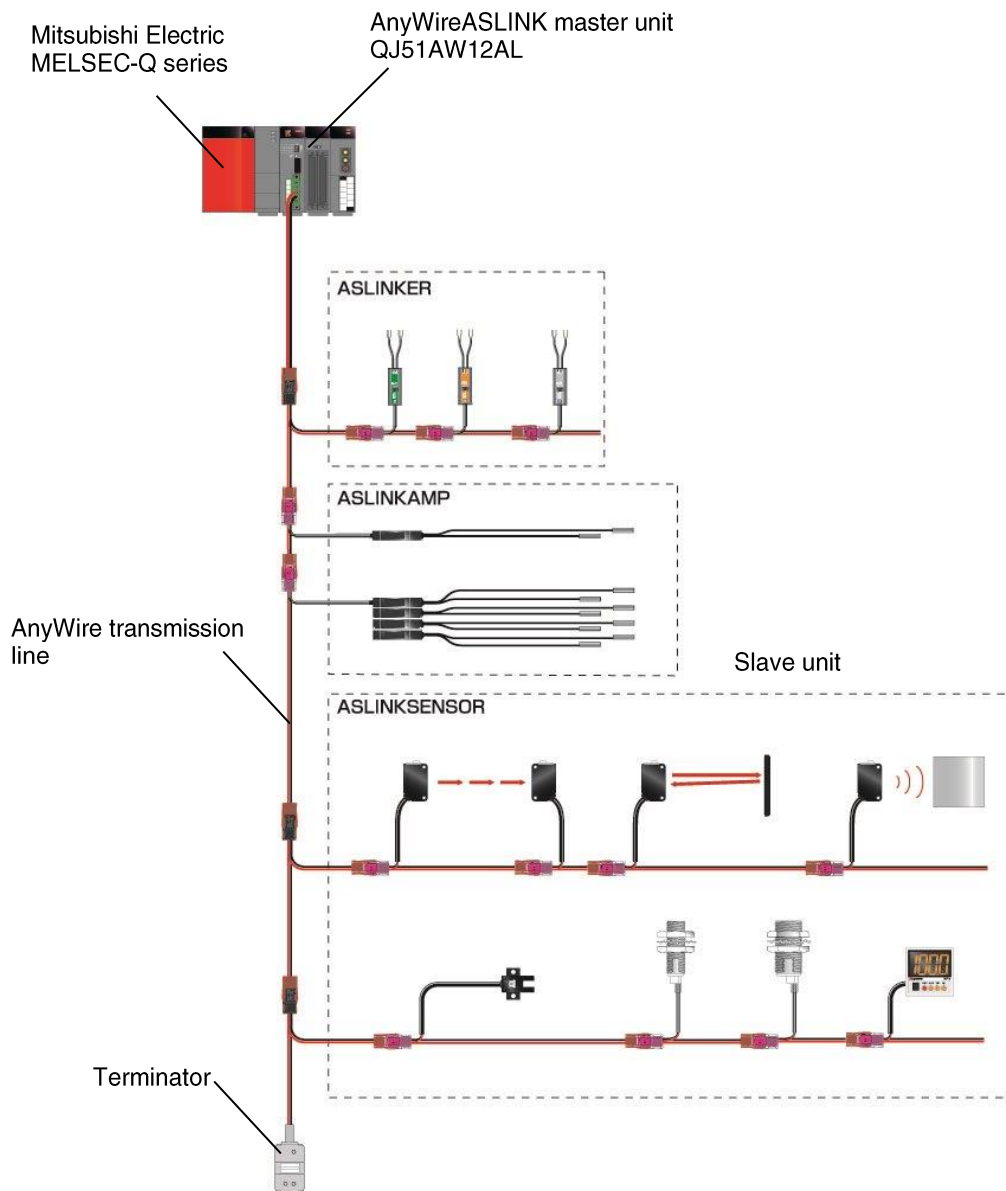
The AnyWireASLINK system features a system configuration enabling multiple distributions with small number of points by using the original full-duplex transmission method. You can build a simple-wiring system (at least one input and one output) unlike conventional systems.

With the “transmission chip” that Anywire Corporation originally developed, the AnyWireASLINK system ensures high noise immunity and reliability.

This system has been designed to be suitable for use in sensor level bus.

We hope you use the AnyWire products to build your sensor network system with thorough understanding of the functions and performance of each product.

### [Example of system configuration]





## Terms

In this manual, the following terms are used in description, unless otherwise specified.

Terms	Description
QJ51AW12AL	Abbreviation of AnyWireASLINK master unit QJ51AW12AL
MELSEC-Q series	Abbreviation of Mitsubishi Electric MELSEC-Q series PLC
PLC CPU	Abbreviation of MELSEC-Q series CPU
Intelligent function module	MELSEC-Q series module to be mounted to the base unit, other than CPU, power supply unit and I/O units
Master unit	Unit to control a data link system. One master unit is required for one system.
Slave unit	Unit to communicate input/output data with the master unit
Engineering tool	General term indicating GX Works2 and GX Developer
GX Works2	Product names of MELSEC series PLC software packages
GX Developer	
Bridge/gateway	AnyWire master unit for OpenBus connection
Terminator	Waveform shaping module
Transmission cycle time	Actual data transmission repetition time
Transmission delay time	Time delay until data updating after transmission
Buffer memory	Memory of intelligent function module, for storing data (set values, monitor values, etc.) to be transmitted to, or received from CPU
ASLINKER	Remote I/O unit (with 2 points) of AnyWireASLINK system
ASLINKTERMINAL	Remote I/O unit (with 4 to 32 points) of AnyWireASLINK system
ASLINKAMP	Sensor amplifier (manufactured by Anywire Corporation) used for AnyWireASLINK system
ASLINKSENSOR	Sensor (manufactured by Anywire Corporation) used for AnyWireASLINK system
DP-DN	Transmission line of AnyWireASLINK system (power supply line superimposed)



## Precautions for use

### 1. Types of cables for transmission signal (DP, DN)

- General-purpose cable: **Wire size 0.75 mm<sup>2</sup> to 1.25 mm<sup>2</sup>**
- AnyWire-dedicated flat cable

Cable diameter	Cable diameter	Type	Usage (example)
1.25 mm <sup>2</sup>	2	FK2-125-100	DP, DN
	4	FK4-125-100	DP, DN, 24V, 0V
0.75 mm <sup>2</sup>	2	FK2-075-100	DP, DN
	4	FK4-075-100	DP, DN, 24V, 0V

The above cables are available.

In principle, unshielded cables should be used.

### 2. Transmission line and power supply

- To send transmission signal (DP, DN) only  
→ Use a 2-wire cable.
- To send transmission signal (DP, DN) and DC power supply for driving a module and connected load together  
→ Use a 4-wire cable.

Either of the above methods is available.

For 24 V DC power supply, use a stabilized power supply unit.

Provide a power supply unit dedicated to the AnyWire system, or a line to directly supply power from a power supply terminal.

To ensure conformity to the UL standard, be use to use a 24 V DC stabilized power supply unit (NEC Class 2).

Voltage applied to all AnyWire modules should be adjusted in a range of **21.6V to 27.6V**.

### 3. Transmission distance, wire size and allowable supply current

This system uses the power supply superimposed transmission method.

Current applicable to the DP and DN lines varies depending on the wire size and total extension length of the transmission line.

This system should be used under the conditions given in the table.

Size of the transmission line (DP, DN)	Supply current on the transmission line (DP, DN)		
	Total length: 50 m or less	Total length: Over 50 m, no longer than 100 m	Total length: Over 100 m, no longer than 200 m
1.25 mm <sup>2</sup>	MAX 2 A	MAX 1 A	MAX 0.5 A
0.75 mm <sup>2</sup>	MAX 1.2 A	MAX 0.6 A	MAX 0.3 A
0.5 mm <sup>2</sup>	MAX 0.8 A	MAX 0.4 A	MAX 0.2 A

Transmission distance should be considered as **total extension length (total cable length including branch cable)**.

The length of cable extending from each unit should be included in the total extension length.

“Total extension length” means total length of cable used for a transmission line.

### 4. Number of connection units

128 units max.

However, it is necessary that the following conditions are satisfied:

- The total DP-DN current consumption of the slave units being connected does not exceed the allowable supply current
- The total number of input/output points of the slave units being connected does not exceed the number of transmission points specified with the master unit.

### 5. Voltage drop (Reference)

To send transmission signal and power supply with the same line, consider a voltage drop, and check if the condition specified by the following formula is satisfied.

$$R (\Omega) \times 2 \times L (m) \times I (A) \leq 2.4 (V)$$

R: Resistance of wire

L: Maximum wire length

I: Required current

Resistance of wire (0.75 mm<sup>2</sup>): 0.025  $\Omega$ /m

Resistance of wire (1.25 mm<sup>2</sup>): 0.015  $\Omega$ /m

**If the specified condition is not satisfied, provide a local power supply.**

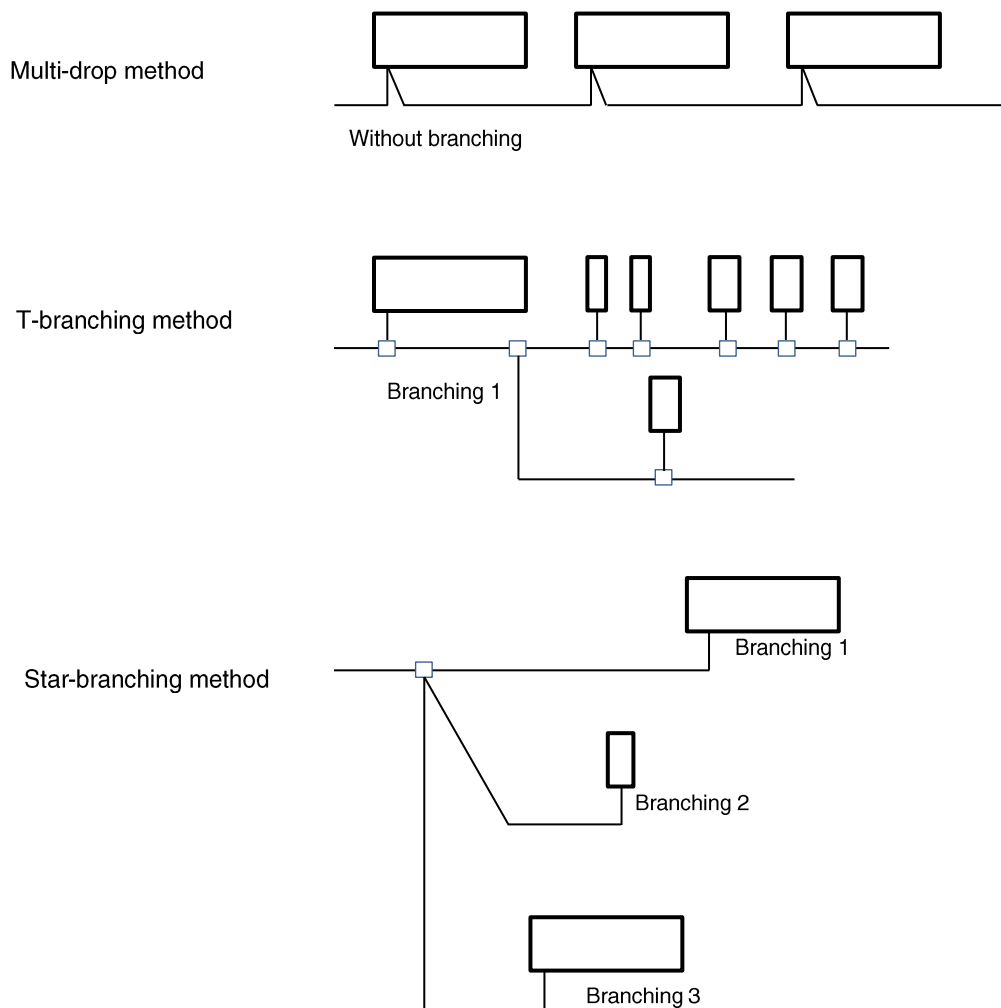
## 6. Transmission line connection methods

For connection of a master unit of the AnyWireASLINK system, use one cable per master unit.

**Do not use a multi-wire cable to bundle several transmission lines.**

The AnyWire transmission line provides high noise immunity. However, to ensure more stable transmission quality, it is recommended that the transmission line should be placed away from a noise source (inverter drive line, etc.) as far as possible.

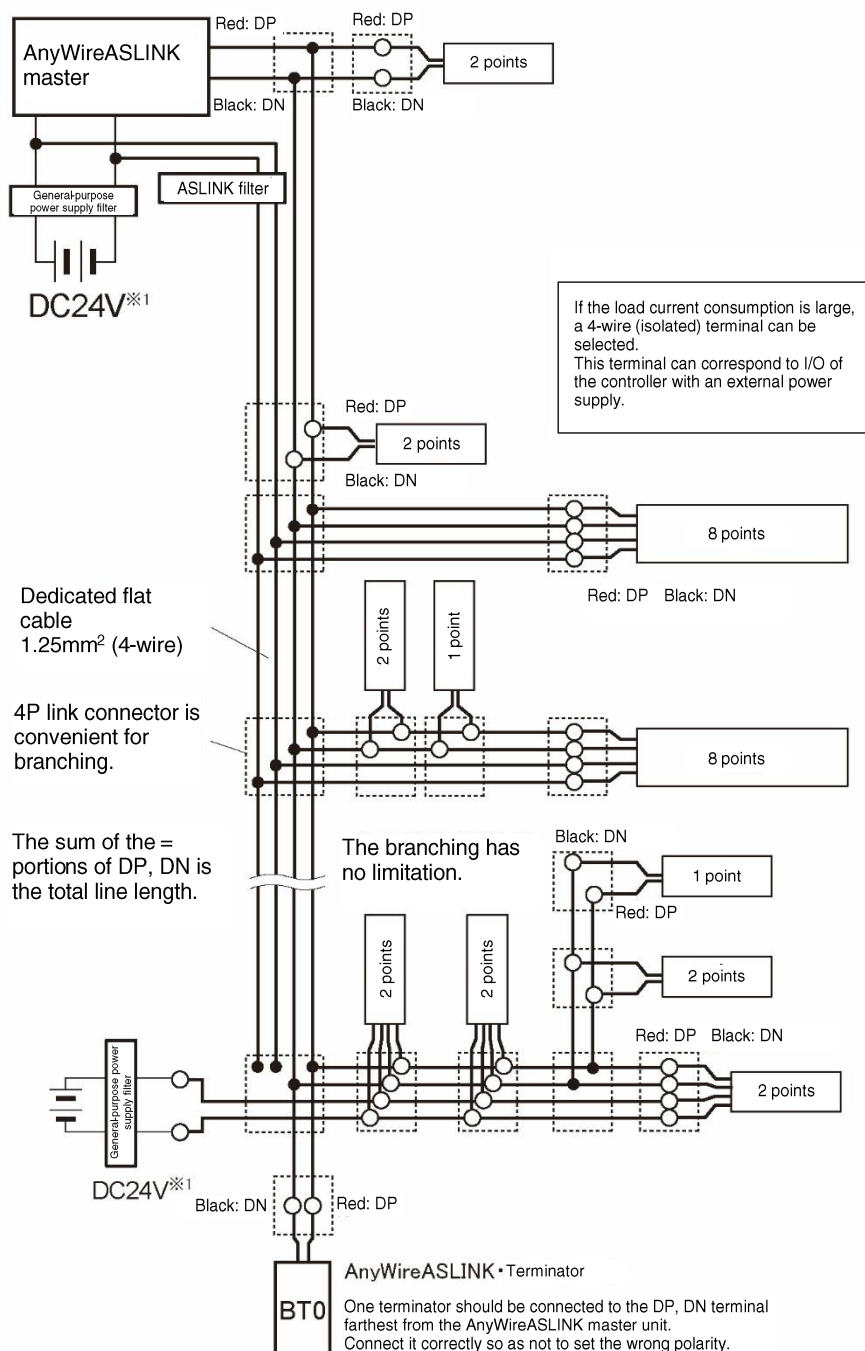
Multi-drop method, T-branching method and star-branching method can be used.



## 7. Configuration of transmission line

The following example shows a case where 4-wire terminal block modules and 2-wire terminal block modules are connected to a transmission line.

In this case, the 4-wire trunk line (with transmission lines and power supply lines) is 50 m or longer.



\*1 To connect a power supply, be sure to use a 24 V DC stabilized power supply unit. To ensure conformity to the UL standard, be use to use a 24 V DC stabilized power supply unit (NEC, Class 2 output).

## **8. ASLINK filter**

In the power supply line, if the parallel run distance of DP, DN, 24 V and 0 V lines exceeds 50 m (total extension length), “ASLINK filter [model: ANF-01]” or “COSEL filter [model: EAC-06-472]” should be connected to the 24 V and 0 V lines in series at the parallel run starting position.

The maximum allowable current for the filter is 5 A.

To ensure conformity to the CE standard, insert the “ASLINK filter [model: ANF-01] regardless of the connection method and distance.

## **9. Address writer**

For address and parameter settings and teaching operation with AnyWireASLINK slave units, use the dedicated writer (address writer).

As a typical model, ARW-04 (Ver. 04-1.01) is available.

**When you use ARW-04 for the first time after purchase, initial check and settings are required.**

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## 1. Quick start

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This chapter describes outline of the procedure for using the AnyWireASLINK system and the conditions recommended for more stable operation.

For details of each section, refer to the contents of Chapter 2 and subsequent chapters.

### [Example] To use the “QJ51AW12AL” interface for Mitsubishi Electric Q-series PLC

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#### 1.1. Installation

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1. Transmission line wire type ⇒ (Refer to “2.4.3 Types of transmission cables and precautions” on p. 2-9.)  
For installation of this system, general-purpose 2-wire VCTF cabtyre cable (for transmission line only) or 4-wire cable (for transmission line + power supply line) are available.
2. Transmission line wire size ⇒ (Refer to “2.4.3 Types of transmission cables and precautions” on p. 2-9.)  
0.75 mm<sup>2</sup> to 1.25 mm<sup>2</sup>
3. Number of connectable slaves units ⇒ (Refer to “2.3.4 Number of connectable slaves units” on p. 2-4.)  
Up to 128 units
4. Power supply ⇒ (Refer to p. 3-3.)  
Provide a power supply unit dedicated to the AnyWire system (or a power supply line directly branched from a power supply unit.  
Transmission signal and power supply lines can be placed in different cables, or bundled in the same cable.  
In consideration of a voltage drop, it is recommended that a local power supply should be provided.  
Power supply voltage to QJ51AW12AL: Within 24 V ± 0.5 V (recommended)  
Power supply voltage to slave unit: 21.6 V to 27.6 V
5. Settings for PLC  
Mount QJ51AW12AL in a specified PLC slot, and set a number of transmission points.  
To set a number of transmission points. use “Intelligent function module switch setting” for QJ51AW12AL on the “GX Developer” or “GX Works2” software.  
Also, system information on this module and I/O data assignment areas should be specified.
6. Address setting ⇒ (Refer to p. 2-12.)  
For each slave unit, address setting (address = first number assigned to this unit in the transmission frame) is required.  
For address setting, use the dedicated address writer.  
Starting from the specified address number, the number of points used for each slave unit are occupied in the transmission frame.

(This setting specifies which areas in the buffer memory of the master unit are assigned to the relevant slave unit.)

Make sure that the occupied area does not exceed the number of transmission points specified in “5”.

## 7. Wiring

Connect the DP and DN terminals of the transmission lines between the master unit and slave units.

Although branch-wiring is enabled, the cable length should be as short as possible.

## 8. Terminator ⇒ (Refer to p. 2-11.)

Be sure to connect a terminator at the farthest position from the master unit on the transmission line. If the branch line is 40 m or longer, a terminator should be also connected at the end of the branch line.

The terminator incorporates a transmission waveform shaping circuit, which provides polarities (DP and DN). During connection, ensure correct polarities.

## 1.2. Test operation (When you turn ON the power supply for the first time)

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### 1. The master unit is classified by the purpose of use of PLC.

QJ51AW12AL is classified as “Q bus intelligent function module”.

Make sure that the “I/O unit/intelligent function module switch setting” in the PLC is correct relative to the QJ51AW12AL being used.

### 2. Turn ON the external power supply and the power supply for the PLC in this sequence, according to the power supply turning ON procedure.

Then, handle data with the FROM/TO command, automatic refresh function, etc.

### 3. Check the following items. ⇒ (Refer to p. 6-4.)

Indicator lamps on QJ51AW12AL	“RUN”: Lit, “LINK”: Flashing, “SET”: Unlit, “ALM”: Lit
Indicator lamps on each slave unit	“LINK”: Flashing, “ALM”: Unlit
Terminator (with polarities)	LED indicator lamp: Lit (low brightness)

### 4. Automatic address recognition procedure ⇒ (Refer to p. 2-13.)

Press the “SET” switch of QJ51AW12AL for a while, and release the switch after the “SET” LED lamp lights.

When the “SET” LED lamp turns off, the automatic address recognition procedure is completed.

Note: I/O transmission is enabled without this procedure.

### 5. I/O check

Check if there is no difference in I/O mapping between the PLC and slave units.

When handling I/O, follow the power supply sequence described below. Otherwise, incorrect input/output may occur.

#### 5-1. QJ51AW12AL takes a transition time of one second until handling of input/output data after the PLC power supply is turned ON.

Therefore, do not execute operation to access this unit (X, Y, FROM/TO, etc.) for two seconds after PLC power supply is turned ON. ⇒ (Refer to p. 3-1.)



- 5-2. Turn ON the external power supply and the PLC power supply in this sequence, according to the PLC power supply turning ON procedure. ⇒ (Refer to p. 3-1.)
- 5-3. During initialization, it is possible that the transmission line power supply voltage drop error (Xn3) or the DP-DN disconnection error (Xn4) signal turns ON and the corresponding alarm is activated depending on the external power supply connection method. ⇒ (Refer to Section 3.1.)

### 1.3. Actual operation

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If there is no problem in the test operation, proceed to actual operation.

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## 2. AnyWireASLINK

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### 2.1. Features

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The AnyWireASLINK system is a “Sho-Haisen” (wiring-saving) system comprising compact, multiple distribution modules with a small number of points, which is suitable for simple-wiring configuration on sensor level.

Various combinations of transmission points from 1 to 32 points (max.) can be covered with the compact modules. Therefore, the AnyWireASLINK system can be installed even in a limited space of small equipment where a box cannot be installed.

Furthermore, we propose “digital link sensors” in which sensing functions and wire-saving functions are integrated.

The digital link sensors can be directly connected to a transmission line, enabling excellent wiring-saving configuration without using a remote terminal block. Also, the digital link sensors can send information on sensing level, disconnection, etc. to the controller. as well as ON/OFF status.

With these functions, you can monitor operation status, resulting in momentary stop prevention and considerable reduction in troubleshooting time at occurrence of a fault.

Since various settings of the digital link sensors can be read or written by a host system, you can remarkably reduce the number of steps required for adjustment of each unit.

### 2.2. Specifications

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#### 2.2.1. General specifications

Operating ambient temperature	0°C to +55°C
Storing ambient temperature	-25°C to +75°C
Operating ambient humidity	10–90%RH, No condensation
Storing ambient humidity	
Operating atmosphere	No corrosive gas
Rated altitude <sup>*1</sup>	0-2000 m
Pollution degree <sup>*2</sup>	2 or less

\*1 Do not use or store the AnyWire ASLINK equipment in an environment pressurized more than the atmospheric pressure at 0 m altitude. Failure to observe this instruction causes malfunction of the equipment.

\*2 Index indicating a degree of conductive substance generation under the equipment operating environment.

“Pollution degree 2” indicates generation of nonconductive substance only. However, temporary conduction may occur in the environment due to accidental coagulation.

## 2.2.2. Performance specifications

Transmission clock	27 kHz			
Transmission distance / Supply current	Size of the transmission line (DP, DN)	Supply current on the transmission line (DP, DN)		
		Total length: 50 m or less	Total length: Over 50 m, no longer than 100 m	Total length: Over 100 m, no longer than 200 m
	1.25 mm <sup>2</sup>	MAX 2 A	MAX 1 A	MAX 0.5 A
	0.75 mm <sup>2</sup>	MAX 1.2 A	MAX 0.6 A	MAX 0.3 A
	0.5 mm <sup>2</sup>	MAX 0.8 A	MAX 0.4 A	MAX 0.2 A
Transmission method	DC power supply superimposed total frame, cyclic method			
Connection method	Type of bus (multi-drop method, T-branching method, Tree-branching method, etc.)			
Transmission protocol	AnyWireASLINK protocol			
Error correction	Double check, chuck sum			
Number of connectable I/O points	512 points (max.)* <sup>1</sup> (Input: 256 points, Output: 256 points)			
RAS functions	Transmission cable disconnection detecting function Transmission cable short-circuit detecting function, Transmission circuit drive power supply voltage drop detecting function, ID (address) duplication/no setting detecting function			
Applicable cable	General-purpose, 2-core/4-core cable (VCTF, VCT 0.75 to 1.25 mm <sup>2</sup> , Rated temperature: 70°C) General-purpose cable (0.75 to 1.25 mm <sup>2</sup> , Rated temperature: 70°C) Dedicated flat cable (0.75 mm <sup>2</sup> / 1.25 mm <sup>2</sup> , Rated temperature: 90°C)			
Power supply for master unit* <sup>1</sup>	Circuit: (Supplied from PLC or bus) Voltage: +5 [V] ±5%, Current: 0.2 [A] max. Transmission line driver: (Supplied to front panel terminals) Voltage: 24 [V] DC + 15%/-10% (21.6 to 27.6 [V] DC) ripple: 0.5 [V] p-p max. Current: 0.1 [A] (Excluding current consumption for slave unit and load current)			
Power supply for bridge unit* <sup>2</sup>	Voltage: 24 [V] DC + 15%/-10% (21.6 to 27.6 [V] DC) ripple: 0.5 [V] p-p max. Current: 0.2 [A] (Excluding current consumption for slave unit and load current)			

\*1: For QJ51AW12AL

\*2: For NZ2AW1C2AL

◆ For details of specifications, refer to User's Manual.

## 2.2.3. Cycle time

Number of transmission I/O points	64 points (Input: 32 points) (Output: 32 points)	128 points (Input: 64 points) (Output: 64 points)	256 points (Input: 128 points) (Output: 128 points)	512 points (Input: 256 points) (Output: 256 points)
Transmission cycle time	2.4 ms	3.6 ms	6.0 ms	10.7 ms

Transmission cycle time means a time for updating I/O data of the master unit and all slave units. Actually, "transmission delay time" (= transmission cycle time × 2) is required due to influence of the double collation function.

**To make response to a signal securely, input the signal for 2-cycle time or longer.**

The setting range of the transmission frame varies depending on the master unit being used. For details, refer to User's Manual for each master unit.

The transmission speed of the AnyWireASLINK system is fixed.

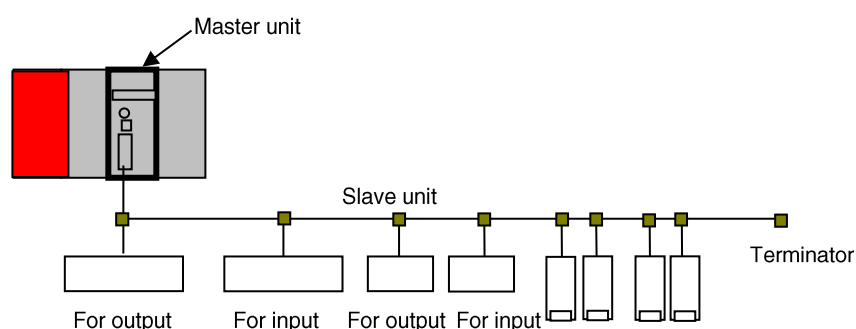
### 2.2.4. RAS functions

Transmission line disconnection detection	When there is no response from a slave unit whose ID is stored in the master unit, disconnection is detected. The error status is notified, and the ALM lamp of the master unit lights.
Transmission line short-circuit detection	When short-circuit occurs with the transmission lines, the master unit detects it, and stops transmission immediately. The error status is notified, and the ALM lamp of the master unit flashes.
Transmission circuit drive power supply voltage drop detection	When the 24 V DC power supply voltage to the master unit lowers, the master unit detects it, and stops transmission immediately. The error status is notified, and the ALM lamp of the master unit flashes.
ID (address) duplication/no address setting detection	This function recognizes address (ID) settings for the slave units being connected, and notifies error status if “address duplication” or “no address setting” error occurs.

## 2.3. Outline of products

### 2.3.1. System configuration

The AnyWireASLINK system consists of a master unit, slave units and their peripheral devices.



### 2.3.2. Types of master units

Use a master unit for the AnyWireASLINK system.

For the master unit, the following types are available.

Name	Applicable model
Master unit for PLC	MELSEC R, Q, L, F
Bridge for field bus connection	CC-Link, CC-Link IE Field
Gateway for field bus connection	DeviceNet, PROFIBUS, PROFINET, Ethernet
PC interface	PCI Express

The master unit for PLC and the bridge unit are co-developed products of Mitsubishi Electric Corporation.

With these units, the AnyWireASLINK system can be built under the MELSEC Q-series PLC and CC-Link.

- ◆ For applicable models and types, refer to the catalog for AnyWireASLINK system in the separate volume.

### 2.3.3. Types of slave units

Connect slave units for the AnyWireASLINK system to the above master unit.

The following types of slave units can be used.

Name	Example of connection
I/O module	General-purpose switch, sensor, LED, solenoid valve, relay, etc.
Relay output terminal block module	AC drive load, etc.
Manifold driver	Dedicated manifold
Digital link sensors	Transmission/sensing function integrated type
Dedicated function module	ASLINKPOKAYOKE terminal block module

- ◆ For models and types of master and slave units, refer to the catalog for the AnyWireASLINK system in the separate volume.

### 2.3.4. Number of slave units connected

The maximum number of slave units that can be connected to one line of the AnyWireASLINK system is 128 units.

(\* It is necessary that both the total number of points occupied by slave units and the total consumption current of the transmission line do not exceed the maximum number of transmission points and the allowable supply current.)

### 2.3.5. Connection of slave units

There are roughly two types of methods for the connection of AnyWireASLINK slave units.

One is “2-wire (non-isolated) type”, and the other is “4-wire (isolated) type”.

The connection method depends on the slave units being connected.

As combinations of slave units, any configuration of “2-wire type only”, “4-wire type only”, or combination of 2-wire type and 4-wire type” is available.

Classification	Operation
2-wire (non-isolated) type	Slave units and connection loads are driven with just two transmission lines.
4-wire (isolated) type	Two transmission lines are used to drive the transceivers. Slave units and connection loads are driven by two external power supply lines. This is selected when the allowable supply current via two transmission lines is insufficient, or when you wish to separate the power supply to the load.

As basic configuration, “2-wire type” is assumed.

The transmission line of 2-wire type incorporates power supply to drive modules and load device in addition to transmission signals.

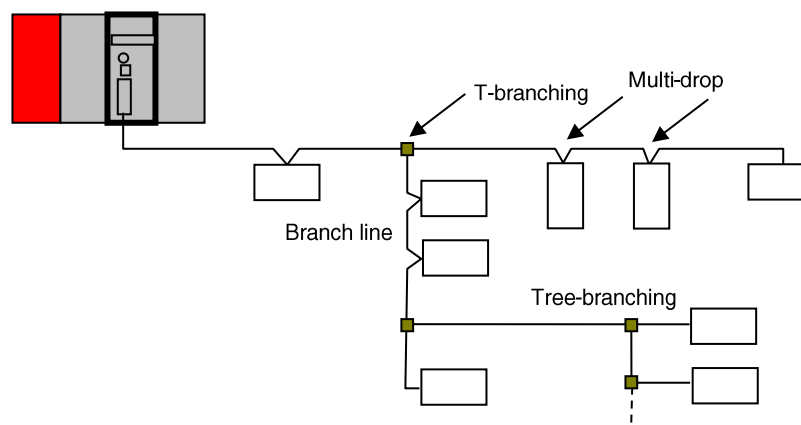
If current capacity of load exceeds the upper limit of the allowable supply current for the transmission line in the AnyWireASLINK system configured by the 2-wire type connection method, 4-wire type should be used.

## 2.4. Transmission line (DP-DN)

The “AnyWireASLINK Protocol” is a low speed transmission clock that can also achieve effective high-speed transmission making it compatible with a wide range of cable characteristics, and therefore allows for various transmission cables and general-purpose electric wires to be used as transmission channels.

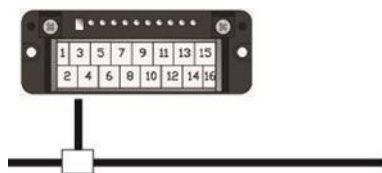
### 2.4.1. Connection method

For connection of AnyWireASLINK Bus, various connection methods (T-branching, multi-drop, tree-branching, etc.) are available.



#### ■ T-branching method

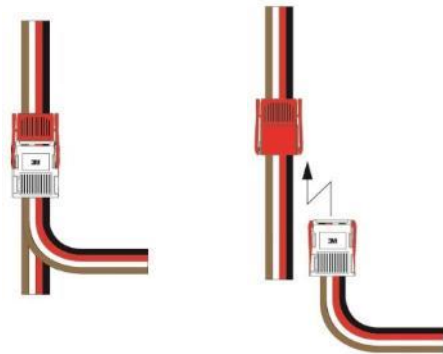
The T-branching method is a connection method to branch off a cable from an insulation displacement connector or terminal block and connect to the slave unit.



The actual wiring is shown below.

- **When an insulation displacement connector is used**

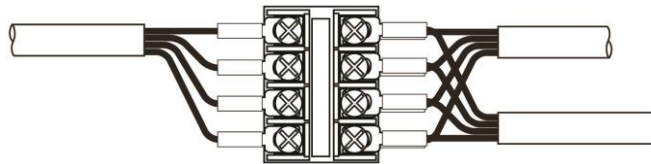
A flat cable is branched using an insulation displacement connector as described below.



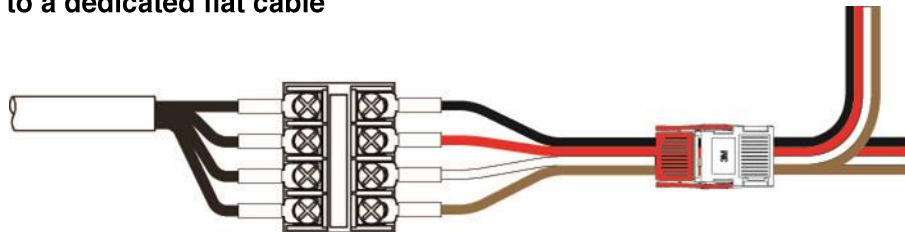
- **When a terminal block is used**

A cable can be branched as follows using a commercially available terminal block (a terminal block in which terminals that face each other are internally connected).

- **Branching between cabletyre cables**



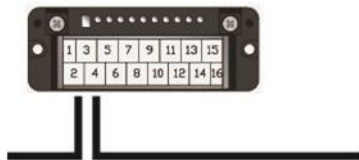
- **Conversion to a dedicated flat cable**



### ■ Multi-drop method

The multi-drop method is a way to connect slave units directly to cables.

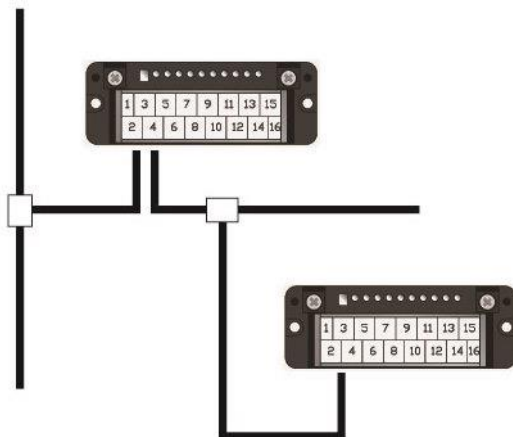
Use of this method eliminates the need for new cables or other connecting devices other than cables.



In the actual wiring, as shown in the image above, the signal lines of transmission cables from one side and those of transmission cables from the other side are integrated and connected to the slave unit.

### ■ Tree-branching method

The tree-branching method is a way to re-connect a T-branched branch line using the T-branching method or multi-drop method.



Actual wiring is the same as the T-branching method and the multi-drop method.

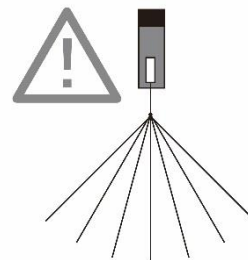
### ■ Star-branching method

The star-branching method is a way to connect the master unit and lay cable radially from a certain branching point to connect the slave unit.

This method makes it easy to bundle transmission channels.

However, it also tends to easily cause reflection.

Although the AnyWire is not susceptible to reflection by a transmission method with a low-speed transmission clock, lay cables at the shortest distance with the minimum number of branches possible.



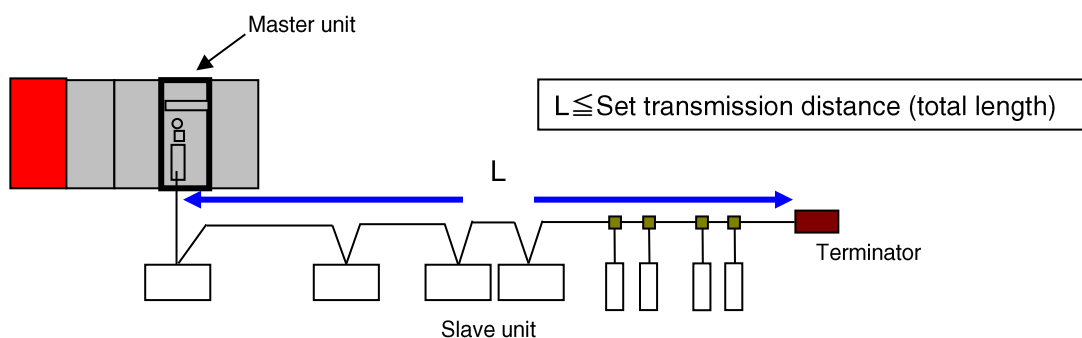


### 2.4.2. Transmission distance

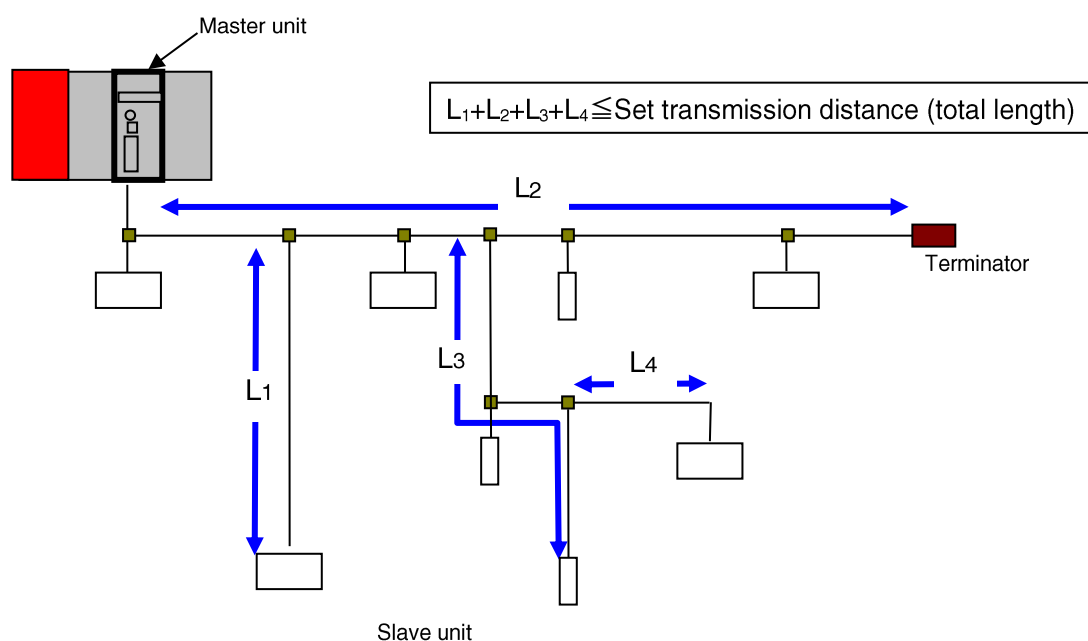
Transmission distance for the AnyWire system means “total extension length” of all cables.  
Total length is the total cable length to be used including branches.

The AnyWireASLINK system wiring can be configured by two transmission lines (DP, DN) only.  
The two transmission lines (DP, DN) support a maximum total length of 200m. (See P2-2)  
This total length also includes the length of the cable coming out of the slave unit.

#### ● In the case of the basic type



#### ● In the case of a branch



### 2.4.3. Types of transmission cables and precautions

General-purpose cable type cables, twisted pair cables and dedicated flat cables, and similar cables can be used for the transmission cable.

Use the following for electric wires.

- General-purpose 2-wire/4-wire cable (VCTF, VCT 0.75 to 1.25mm<sup>2</sup>, rated temperature 70°C)
- General-purpose electric wire (0.75 to 1.25mm<sup>2</sup>, rated temperature 70°C)
- Dedicated flat cable (0.75mm<sup>2</sup>, 1.25mm<sup>2</sup>, rated temperature 90°C)



#### CAUTION

##### Shielded cable

Since AnyWire has high noise resistance, it is unnecessary to use shielded cable.

Please note that if the shielded cable shielding is not properly grounded, it may result in problems during use.






#### CAUTION

##### Transmission cable

- Be careful to prevent the voltage from dropping below the lower limit of the allowable voltage range due to voltage drop caused by the cable.  
Dropping below the lower limit may result in malfunction.  
Install a local power supply if the voltage drops significantly.
- Do not connect soldered wire directly to a terminal. Looseness may result in contact failure.

### ■ Electric wiring example

Type	Image	Specifications
300V vinyl cabtyre cable (VCTF)		JIS C3306 Cross-section area: 0.75mm <sup>2</sup> Allowable current: 7A (30°C) Conductor resistance: 25.1Ω/km (20°C) or less Insulation resistance: 5MΩ/km (20°C) or more
Dedicated flat cable (HKV) Model: FK4-075-100 (100m winding)		Cross-section area: 0.75mm <sup>2</sup> Allowable current: 7A Maximum conductor resistance: 25Ω/km
Dedicated flat cable (HKV) Model: FK4-125-100 (100m winding)		Cross-section area: 1.25mm <sup>2</sup> Allowable current: 12.7A Maximum conductor resistance: 15Ω/km

#### 2.4.4. Transmission line supply current

The AnyWireASLINK system can be constructed with two wires.

Transmission signals as well as power for the slave unit and whatever is connected to the load side of the slave unit are superimposed on these two wires.

The allowable supply current (transmission line supply current value) from the transmission line varies depending on wire diameter and total wiring distance. It is therefore necessary that the total consumption current of the connected DP-DN (consumption current of the slave unit itself + consumption current on the load side connected to the 2-wire type slave) does not exceed this allowable current value.

### ■ Transmission distance, wire size and allowable supply current

Size of the transmission line (DP, DN)	Supply current on the transmission line (DP, DN)		
	Total length: 50 m or less	Total length: Over 50 m, no longer than 100 m	Total length: Over 100 m, no longer than 200 m
1.25 mm <sup>2</sup>	MAX 2 A	MAX 1 A	MAX 0.5 A
0.75 mm <sup>2</sup>	MAX 1.2 A	MAX 0.6 A	MAX 0.3 A
0.5 mm <sup>2</sup>	MAX 0.8 A	MAX 0.4 A	MAX 0.2 A

### 2.4.5. Terminator

The terminator is a module intended for shaping transmission waveforms of the AnyWireASLINK system.

This module serves to relieve the condition that transmission waveforms are disordered under influence of external environment.

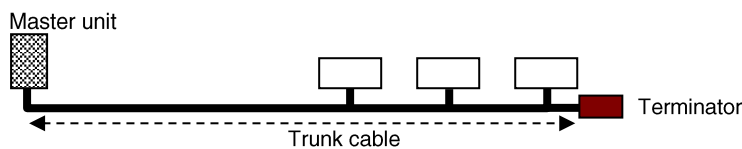
Be sure to connect one terminator at the farthest position on the transmission line trunk cable per master unit.

When the transmission line is extended by branching, another terminator should be connected at the end of the branch line, if the branch line is 40 m or longer.

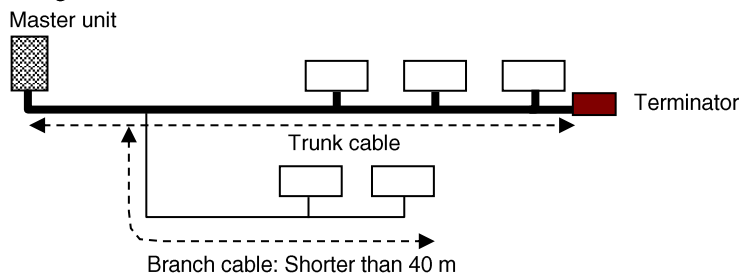
For the AnyWireASLINK system, up to three terminators can be connected.

**Make sure to properly connect it to the transmission line as it has a polarity. (DP: Red, DN: Black)**  
**Incorrect connection causes a transmission failure, which may result in unexpected operation.**

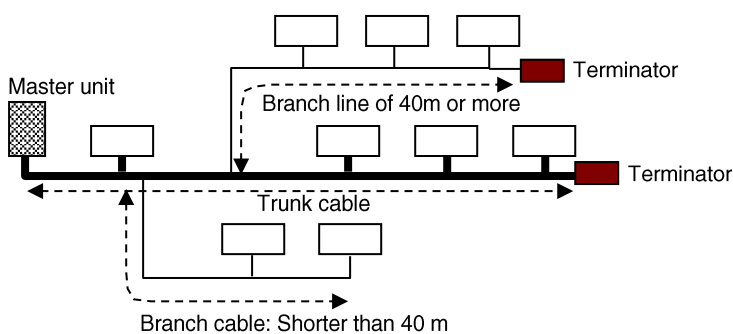
#### ■ Connection of terminator



#### ■ Branching the transmission line



When 40 m or longer  
branch cable is not  
provided



When 40 m or longer  
branch cable is  
provided

## 2.5. AnyWire filter

If any of the parallel lines of DP, DN, 24V, or 0V exceeds the total length of 50m in a power supply system to be supplied, connect in series the “ASLINK filter [Type ANF-01]” or a “COSEL filter [Type EAC-06-472]” to 24V and 0V in the starting position of the parallel lines.

Insert a filter whether using a master power supply for the entire system or using a local power supply.

**When complying with CE Standards, insert the “ANF-01” regardless of installation method and distance.**

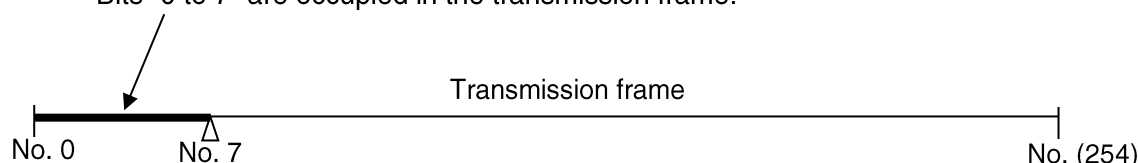
For details, refer to p. 3-6.

## 2.6. Address setting (reference)

The “Address setting” of a slave unit is determined by which number bit (in order) in the AnyWireASLINK transmission frame the slave unit is associated with.  
Each terminal occupies the location of its own point number (with the set address number placed at the beginning) from that position.  
Addresses can be freely set from “0 to 254” for both input and output.

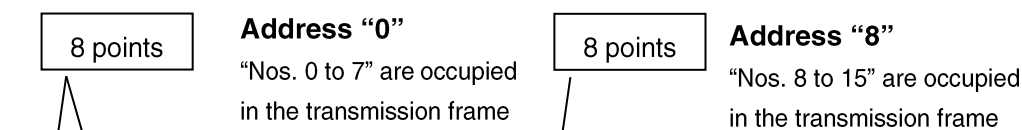
**Example:** Eight-point terminal: When address is “0”

Bits “0 to 7” are occupied in the transmission frame.



Set addresses so as to avoid bit interference.

**Example:**



**The address of a slave unit is processed as a decimal number.**

Write the value that you want to set to the slave unit, using a dedicated address writer.

Before shipment, “255” has been set for each slave unit.

**In this status, the unit does not operate.**

To use a slave unit for the first time after turning ON the power supply, write a value other than “255”.

There is no problem if “255” is included in the occupied numbers.

**Example:** Set address “254” to a two-point occupied terminal, and use “254” and “255.”

It is necessary to be careful that the area which the slave unit occupies does not exceed the setting for the number of transmission point that is set on the master side.

## 2.7. Monitoring function

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When specific addresses are set for slave units in the AnyWireASLINK system, the master unit sends an address to the slave units, and the slave unit with the relevant address makes response to the master unit. Thus, the master unit can detect disconnection, and check if the slave unit is present or not.

Through automatic address recognition (described later), addresses of the slave units being connected are stored in the EEPROM of the master unit. This information will be stored in the memory even after the power supply is turned OFF.

Then, the master unit sends registered addresses in sequence. If there is no response from the slave units with the relevant addresses, it is judged as a disconnection error, which is indicated with the "ERR" LED of the master unit.

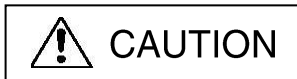
## 2.8. Automatic address recognition

---

The operation to register addresses of connected slave units in the EEPROM of the master unit is called "automatic address recognition".

### Procedure

- 1 Check that all of the slave units operate normally.
- 2 Keep pressing the "SET" switch of the master unit until the "SET" LED (green) lamp lights.
- 3 After a while, the "SET" LED will turn off. Then, address registration is completed.



- Signals may not be inputted or outputted while an address is automatically recognized. To execute automatic address recognition, perform it in a condition not hampering the operation of the device, for instance, with the execution of a PLC program suspended.
- It is not possible to perform the automatic address recognition if there was an error in the AnyWireASLINK system, such as a short circuit, and for about five seconds after turning on the power or a reset operation.
- Do not execute automatic address recognition carelessly, except for during system startup, or for a purpose of changing the slave unit configuration. Otherwise, normal ID information will be overwritten.
- If automatic address recognition is executed in an error status (incorrect wiring, etc.), unexpected operation may occur (for example, ID cannot be normally registered, ID that does not exist is registered).

## 2.9. ID duplication detection

The AnyWireASLINK master unit recognizes ID (addresses) specified for slave units being connected, and notifies “ID duplication” or “no ID setting” error.

ID (addresses) is controlled in the master unit, as 3-digit hexadecimal numbers together with the input/output classification number.

The first digit indicates the type of each unit (input/output).

### ■ Classification of input and output and corresponding ID

ID	Description
0000H-00FFH	ID of output slave unit
0200H-02FFH	ID of input slave unit or input/output combination slave unit

Also, the ID duplication error is indicated on the relevant slave unit. (The “ALM” and “LINK” indicator lamps alternately flash.)

### [Details]

### [Example] To use the “QJ51AW12AL” interface for Mitsubishi Electric Q-series PLC

If a slave unit subject to the “ID duplication” or “no ID setting” error is connected during automatic address recognition with the master unit, this function detects the error.

This function is active only during automatic address recognition with the master unit.

If “ID duplication” or “no ID setting” error is detected, the alarm signal of the slave unit X(n+1)2 turns ON.

The detected error code (ID duplication error: 0190H, No ID setting error: 0191H) and the error ID are stored in the buffer memory. (Related items)

Buffer memory address		Item
Decimal	Hexadecimal	
9984	2700H	Alarm ID quantity information
9985-10112	2701H-2780H	Alarm ID information storage area
10256	2810H	Latest error code storage area <sup>*1</sup>
10257	2811H	Latest error ID storage area

<sup>\*1</sup> When several errors simultaneously occur, the error code with higher priority will be stored in the memory.

The error status can be cleared by turning OFF → ON the power supply for the AnyWireASLINK system, or by turning OFF → ON → OFF the error flag clear command (Yn0).

On the relevant slave unit, the “LINK” LED and “ALM” LED alternately flash.

This status will be retained until the relevant address is changed, or until the power supply is turned OFF. Even if ID duplication error is detected, there is no limitation in the slave unit operation. (Input and output operations will be executed as usual.)

The slave unit subject to the “No ID setting” error does not operate.

The memory area that stores the above alarm ID information varies depending on the model of the master unit. Refer to the manual for each master unit.

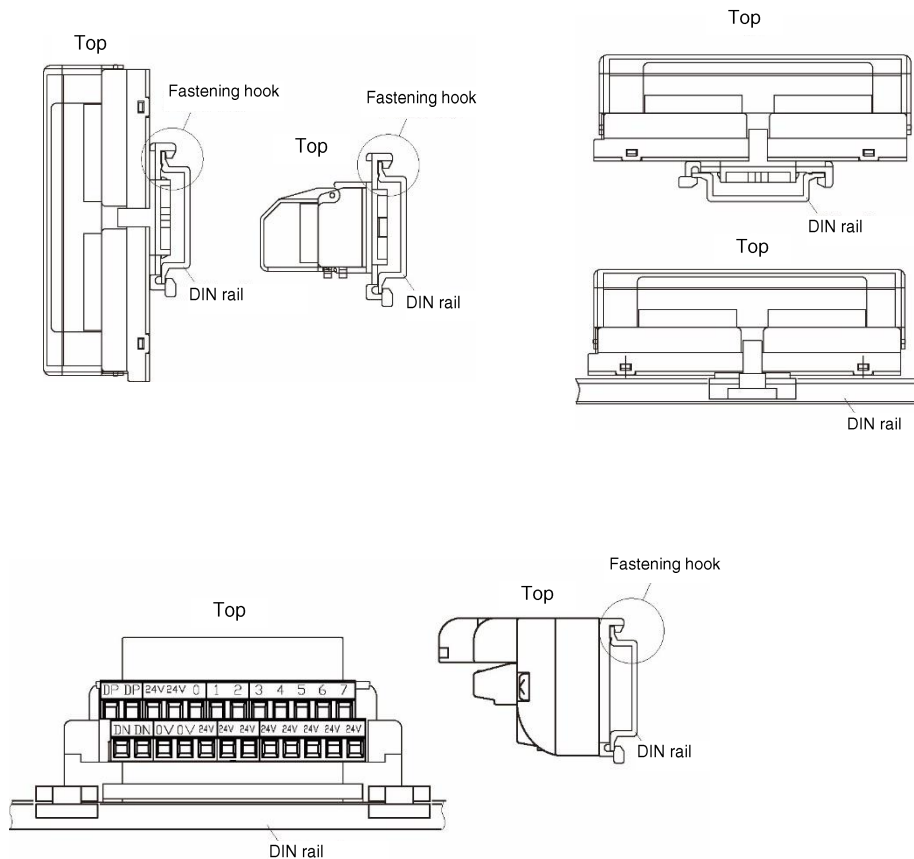
## 2.10. Installation of equipment

(1) The AnyWireASLINK master unit should be used according to the installation standard for each PLC.

(2) The AnyWireASLINK equipment is as follows:

[1] ASLINKER, ASLINKTERMINAL (without relays)

- For direct mounting, there is no limitation in mounting direction.
- For DIN-rail mounting, place the equipment horizontal on the DIN rail, or set up the fastening hook at the upper position of the DIN rail.

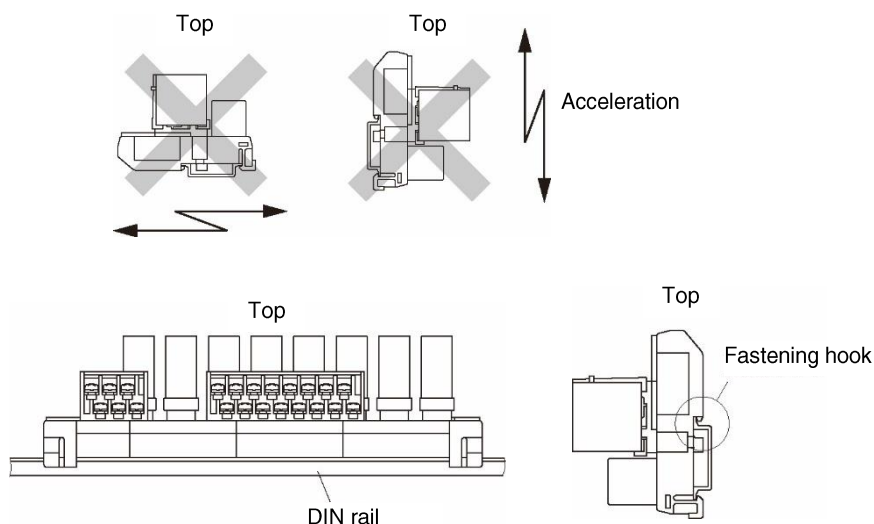




## [2] ASLINKTERMINAL (with relays)

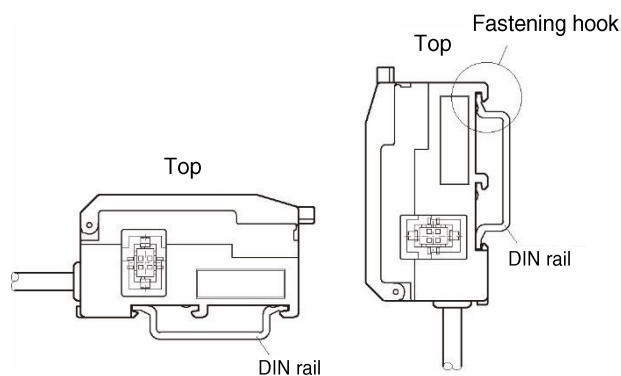
- For direct mounting, there is no limitation in mounting direction.
- For DIN-rail mounting, set up the fastening hook at the upper position of the DIN rail.

Note: With either method, make sure that acceleration is not applied in the contact opening/closing direction.



## [3] ASLINKAMP

- For DIN-rail mounting, place the equipment horizontal on the DIN rail, or set up the fastening hook at the upper position of the DIN rail.

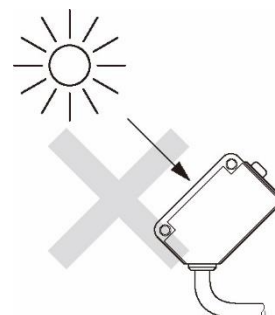


## [4] ASLINKSENSOR (except for photoelectric sensor)

- There is no limitation in mounting direction.

## [5] ASLINKSENSOR (photoelectric sensor)

- Mount the sensor so that the light transmitting/receiving surface is not exposed to direct sunlight.



## 2.11. 2-wire type and 4-wire type slave units

Generally, the AnyWireASLINK slave unit connection methods are classified into two types: **“2-wire (non-isolated) type”**, and **“4-wire (isolated) type”**.

The AnyWireASLINK system uses the “power supply superimposed transmission” method that allows power supply to be superimposed on transmission signals.

Slave units connected to this system can receive and transmit power to drive the relevant unit and load via the transmission signal line, in addition to transmission signals, which is the principal operation of this system.

The “2-wire (non-isolated) type” slave units are used to receive/transmit power to drive each unit and load to control the equipment via the transmission signal line, in addition to transmission signals.

With the “4-wire (isolated) type” slave units, transmission signals and power to control each unit are received and transmitted via the transmission signal line, and the power to drive the I/O circuit and load can be received from a local power supply unit.

In the AnyWireASLINK system configured with the 2-wire (non-isolated) type slave units, if the current capacity of the connected load exceeds the upper limit of the allowable supply current for the transmission line, or if a power supply unit is provided for the connected load, the “4-wire (isolated) type” should be used.

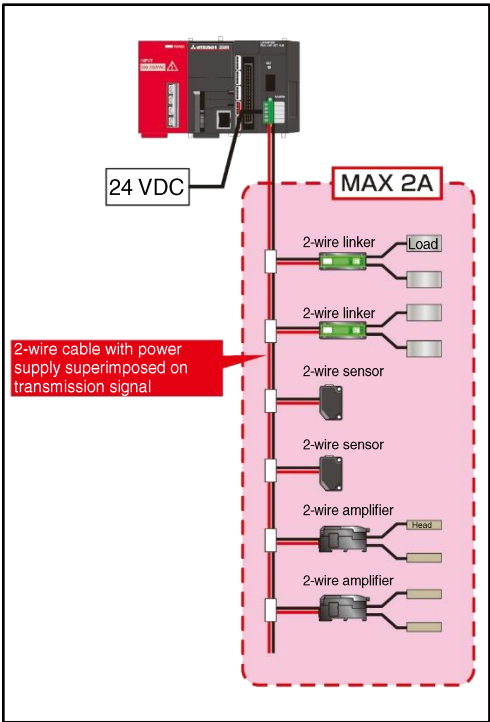
As combination of slave units, any configuration of “2-wire type only”, “4-wire type only” or “combination of 2-wire type and 4-wire type” is available.

### ■ Power supply for AnyWireASLINK slave unit

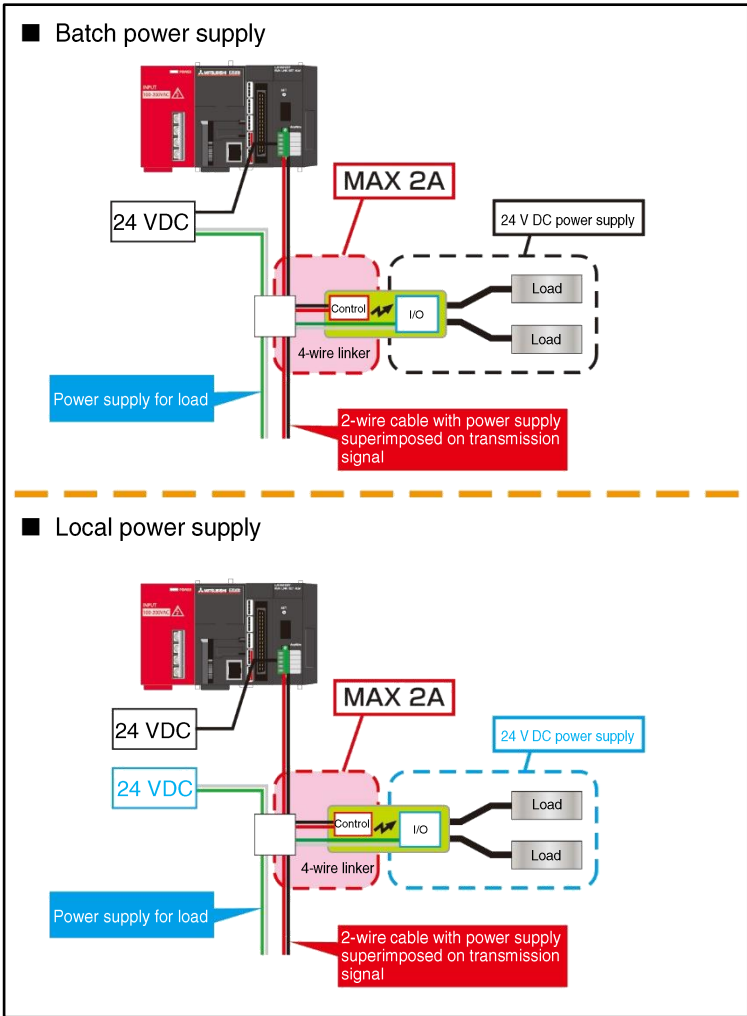
Type	Control power supply	Power supply for connected load	Load connected (example)
2-wire type (non-isolated)	DP-DN	DP-DN	Equipment for closed circuit (sensor, switch, relay, LED, etc.)
4-wire type (isolated)	DP-DN	24V-0V	Load with large current consumption, I/O circuit with additional power supply

■ Conceptual image of power supply

[2-wire (non-isolated) type]



[4-wire (isolated) type]



### 3. Design

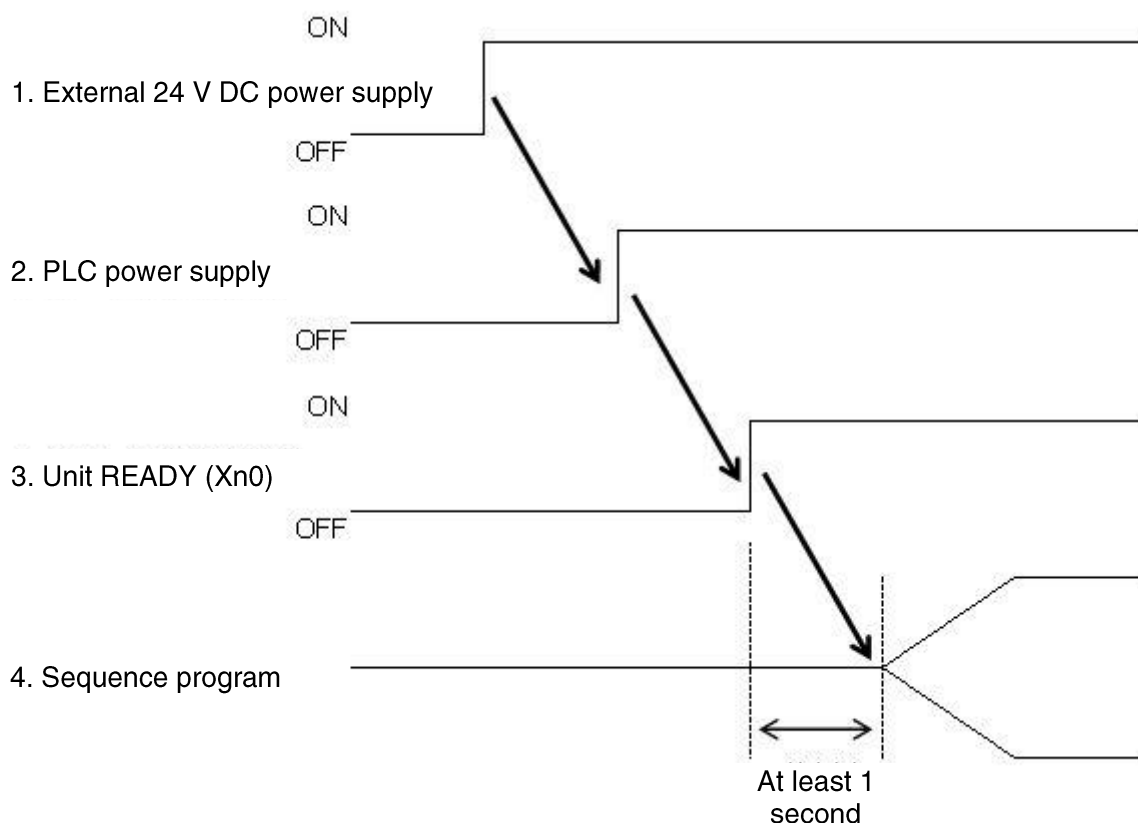
#### 3.1. Procedure for turning ON power supply and I/O data handing

To prevent incorrect input/output when handing input/output data, we have determined the procedure for turning ON power supplies.

Follow the specified procedure by reading User's Manual for the master unit being used.

**[Example] To use the “QJ51AW12AL” interface for Mitsubishi Electric Q-series PLC**

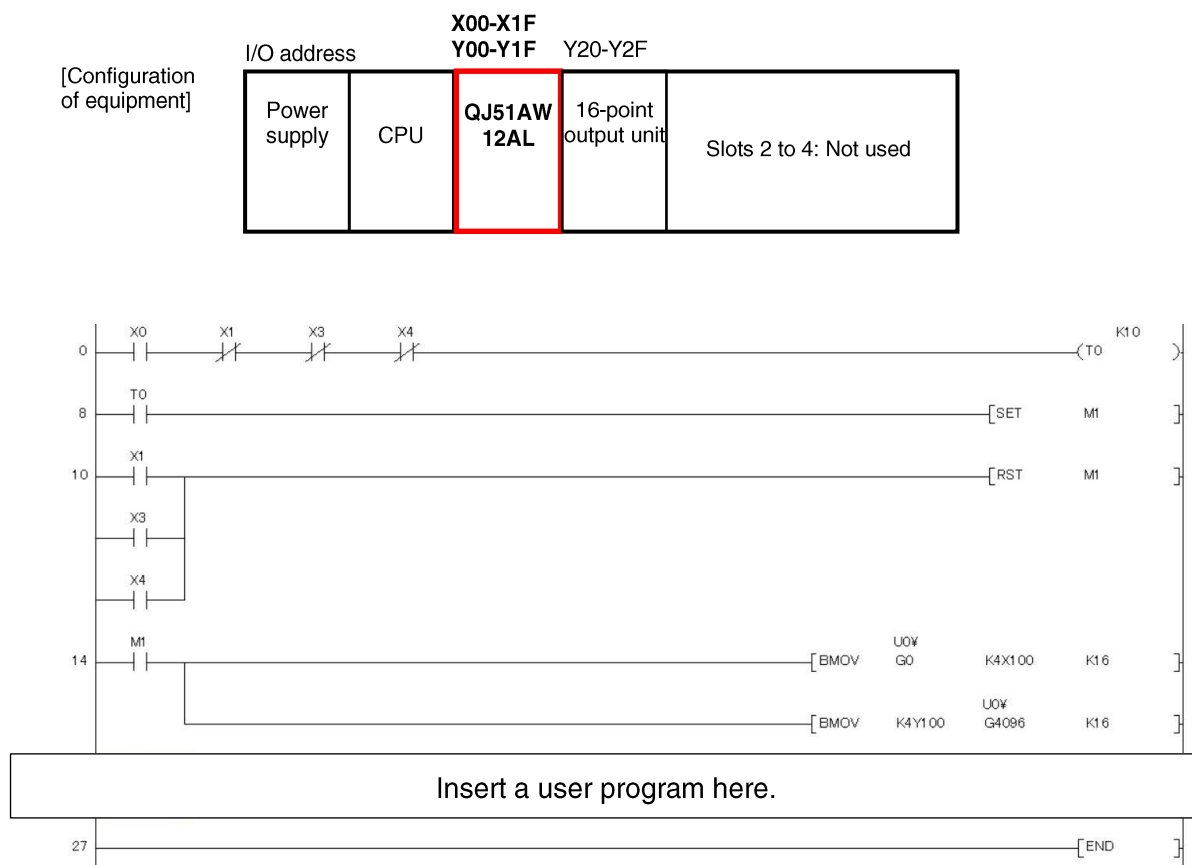
1. When turning ON the power supplies for the AnyWireASLINK system, follow the procedure below:  
Turn ON an external 24 V DC power supply for the AnyWireASLINK system. Turn ON the PLC power supply.  
To turn OFF the power supplies, follow the above procedure in reverse.
2. If the PLC power supply is turned ON before the external 24 V DC power supply for the AnyWireASLINK system, an error (transmission circuit drive power supply voltage drop detection error, etc.) may occur.
3. QJ51AW12AL takes a transition time of one second until handling of input/output data after the READY (Xn0) signal for the unit turns ON.  
Before starting the program, wait for one second after the READY (Xn0) signal for the unit turns ON.



### 3.2. Example of program

The following is an example of a program that assigns inputs and outputs of the AnyWireASLINK system to the PLC devices with the FROM/TO command.

**[Example] To use the “QJ51AW12AL” interface for Mitsubishi Electric Q-series PLC**



In the above program, each signal and corresponding device are as follows:

Type of signal	Corresponding device
Input (256 points)	X100-X1FF
Output (256 points)	Y100-Y1FF

**[Reference]**

**BMOV command**

Format [BMOV A B C]

- A: First I/O number of QJ51AW12AL (High-order 2 digits of first I/O number expressed as 3-digit hexadecimal number) and first address of data to read = Buffer memory address
- B: First number of the device that stores read data
- C: Transmitted data quantity

Function: 16-bit data is transmitted from the device specified by A to the device specified by B by the quantity specified by C.

### 3.3. Power supply

The AnyWireASLINK system uses a 24 V DC stabilized power supply.

Required power supply conditions are as follows:

- Ripple  $\Rightarrow$  within 0.5 V p-p
- Power supply to drive transmission circuit of master unit  $\Rightarrow$  Supply voltage: 21.6 to 27.6 V DC (24 V DC -10% to +15%)  
Recommended voltage: 26.4 V DC (24 V DC +10%)
- Power supply to drive slave unit of isolated type  $\Rightarrow$  Allowable voltage range: 21.6 to 27.6 V DC (24 V DC -10% to +15%)
- Power supply for load connected to slave unit

To ensure conformity to the UL standard, be sure to use a NEC Class 2-conformable stabilized power supply unit.

#### 3.3.1. Power supply method

For the AnyWireASLINK system, both the following power supply methods are available: One is to use different power supplies to drive the master and slave units (isolated type) individually, and the other is to use the same power supply to drive the master and slave units.

When the master and slave units are driven with a batch power supply, the transmission lines and power supply lines can be bundled by a 4-wire cable. \*

- \* **When a 4-wire cable is used, the wire size and length of the power supply lines are the same as those of the transmission lines.**

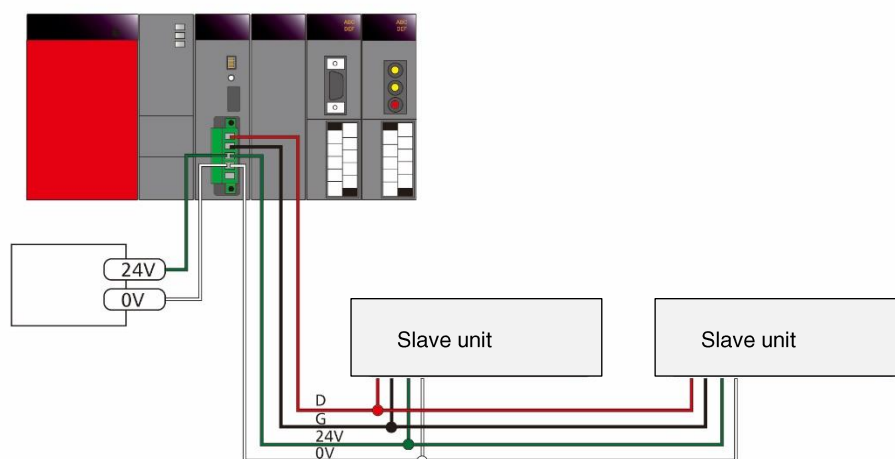
**In consideration of a voltage drop, make sure that the supply voltage applied to the slave units is not lower than the lower limit (21.6 V) of the allowable voltage range.**

[Example] To use the “QJ51AW12AL” interface for Mitsubishi Electric Q-series PLC

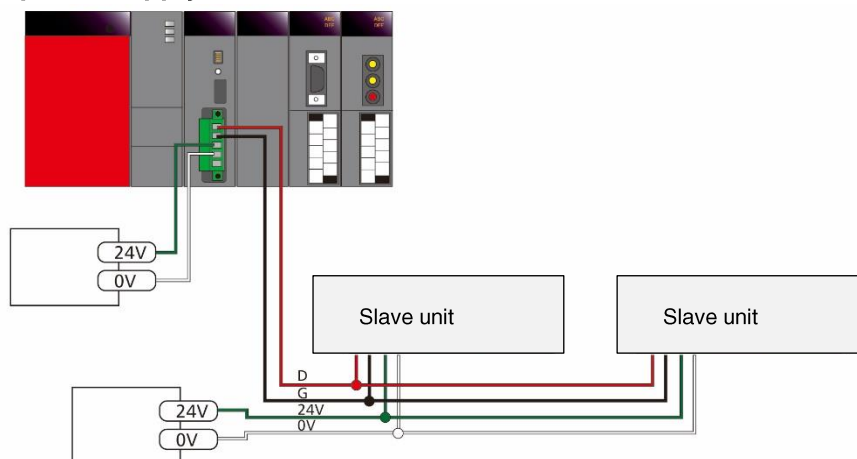
#### ■ Capacities of batch power supply and local power supply

	Power supply conditions	Applicable cable
Batch power supply	Power supply for master unit: 0.1 A, 24 V DC + Total load current for slave units (drive circuit): 24 V DC + Total external load current: 24 V DC, 100 V AC, etc.	4-wire cable Dedicated flat cable
Local power supply	Power supply for master unit: 0.1 A, 24 V DC	2-wire cable (power supply cable)
	Total load current for slave units (drive circuit): 24 V DC + Total external load current: 24 V DC, 100 V AC, etc.	2-wire cable (power supply cable)

### ■ Example of batch power supply



### ■ Example of local power supply



The signals of the terminal block are as follows:

D: Signal transmission line

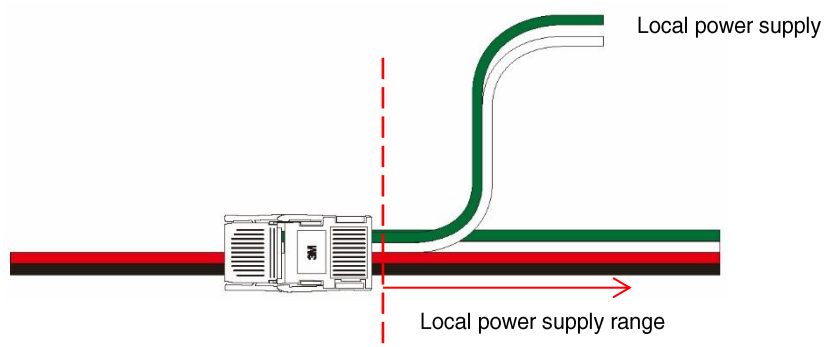
G: Signal transmission line

24 V: Connect the +24 V line of the 24 V DC stabilized power supply.

0 V: Connect the 0 V line of the 24 V DC stabilized power supply.

The D, G, 24 V and 0 V lines should be connected to the D, G, 24 V and 0 V terminals of a slave unit, respectively.

\* Example) When a local power supply is connected with the dedicated flat cable



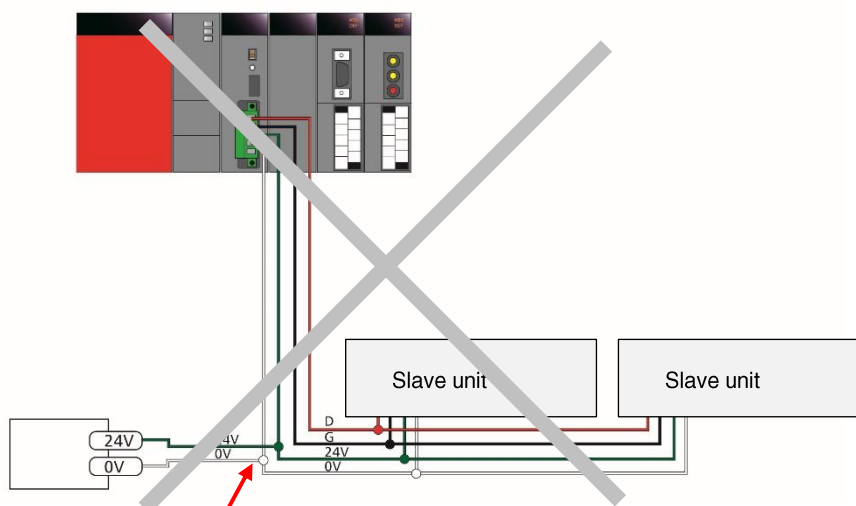
**CAUTION****Position of power supply unit**

Do not supply power to the master unit from a power supply unit installed at a local position (outside the panel), as shown in “Example) Improper power supply method for master unit”.

Otherwise, the reference voltage of transmission signals does not become an appropriate condition, causing a transmission failure.

To supply power to the master unit, use a cable directly branched from a power supply terminal so as to set the distance between the power supply unit and the master as short as possible (for example, supply power from a power supply unit located in the same panel).

■ **Example) Improper power supply method for master unit**



### 3.3.2. Power supply COM terminals

The pins of each slave unit and the terminals of the same symbol on the terminal block are internally connected.

The “COM” terminals are prepared as substitution for power supply jumper lines for input/output load being connected, which. The “COM” terminals may have been connected to the power supply terminals before shipment.

For details, refer to the instruction manual for each product.

**Example)** The “COM” and “24 V” terminals of the screw terminal block for output are internally short-circuited for NPN output.

For slave units (relay output terminal block, etc.), the total allowable current for the “24 V”, “0 V” and “COM” terminals should be 1 A max. unless otherwise specified.

If the total allowable current is exceeded, connect the terminals directly via jumper lines, or provide separate terminals.



### 3.4. AnyWire filter

If any of the parallel lines of DP, DN, 24V, or 0V exceeds the total length of 50m in a power supply system to be supplied, connect in series the “ASLINK filter [Type ANF-01]” or a “COSEL filter [Type EAC-06-472]” to 24V and 0V in the starting position of the parallel lines.

This will improve noise resistance, reduce the impact of crosstalk by transmission signals, and stabilize the signals.

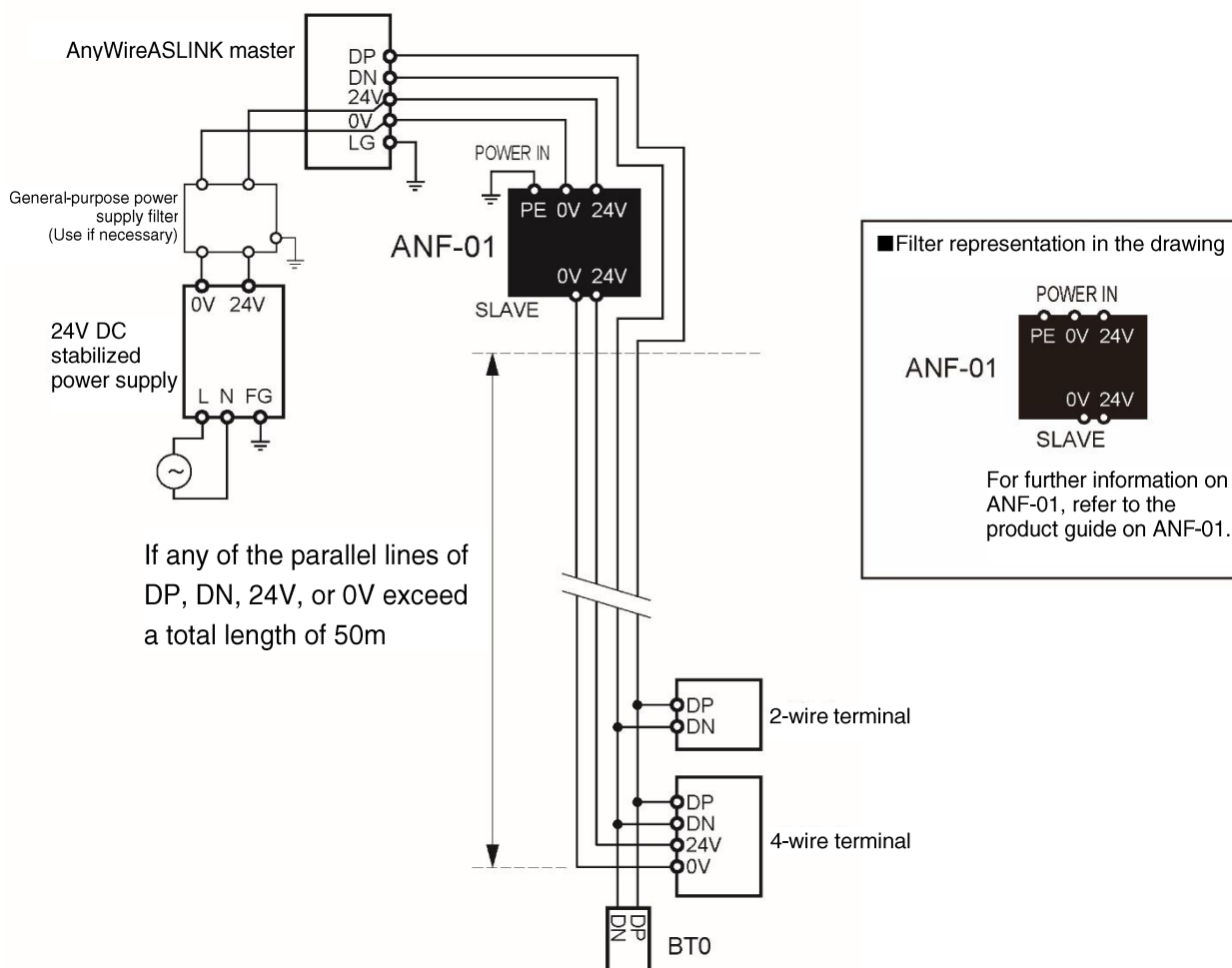
Insert a filter whether using a master power supply for the entire system or using a local power supply.

**When complying with CE Standards, insert the “ANF-01” regardless of installation method and distance.**

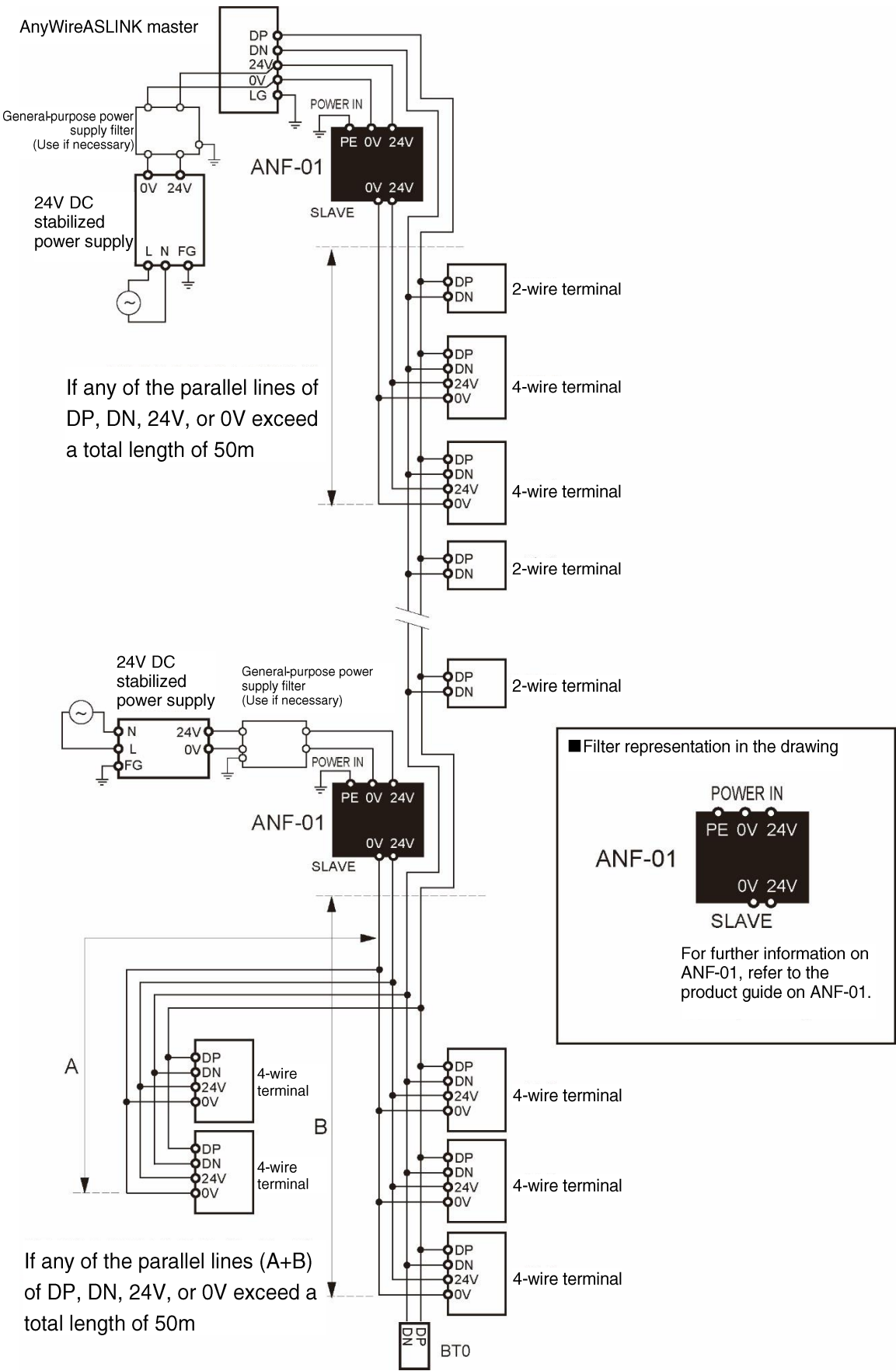
■ Filter allowable current

Model	Type	Allowable current
ASLINK filter	ANF-01	MAX 5A/24V DC
COSEL filter	EAC-06-472	MAX 6A/24V DC

■ ASLINK filter (ANF-01) connection example when there is a power supply to the entire system



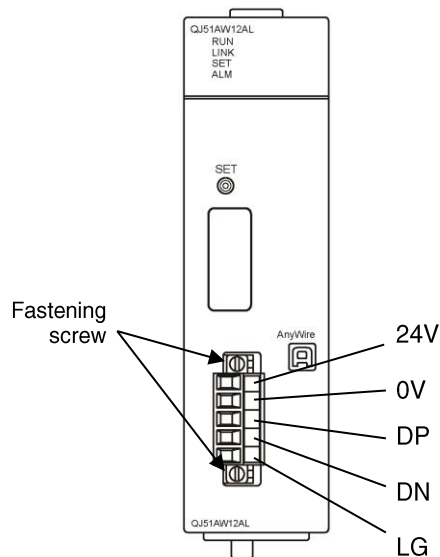
■ ASLINK filter (ANF-01) connection example when there is a local power supply



## 4. Connection of transmission line

### 4.1. Connecting/disconnecting the connector

Before disconnecting the connector from the AnyWireBus line, make sure that the fastening screws on both sides have been securely loosened (the connector has been released from the socket). If the connector is forcibly pulled in engaged status, it may cause damage to the equipment. When connecting the connector, check for a missing wire or short-circuit due to loose wires. After connection, fasten the screws on both sides securely. (Tightening torque: 0.5 N•m)



#### [Connector for AnyWireBus]

The AnyWireBus transmission line connector of this unit provides connection terminals that can be easily connected/disconnected.

Model: MSTB2.5/5-STF-5.08AU (manufactured by Phoenix Contact)

Connectable wire size: 0.2 to 0.25 mm<sup>2</sup> (AWG24 to 12)

Tightening torque: 0.5 to 0.6 N•m

Terminal name	Signal type
24V	Used to supply 24 V DC from an external stabilized power supply.
0V	
DP	Transmission signal (+)
DN	Transmission signal (-)
LG	Connected to the neutral point of the noise filter. Connect the LG terminal when malfunction occurs due to noise on the 24 V power supply line. Connect the LG terminal together with the functional ground terminal (FG) of the PLC. (One-point grounding)

Configuration of the terminal block varies depending on the model of the master unit. Refer to the manual for each unit.

The DP and DN terminals of the connector should be connected to the DP and DN terminals of each module. (Refer to the product manual for each module.)

#### MONITOR connector



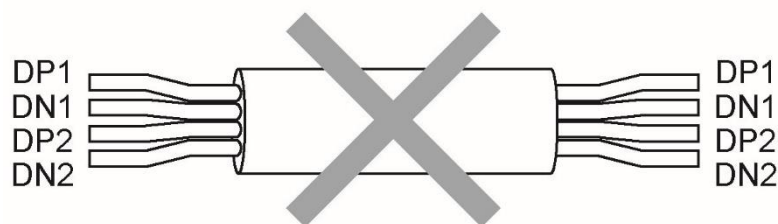
#### CAUTION

This connector is used to connect the dedicated maintenance monitor.  
Do not connect any other device.  
The rubber cap prepared before shipment should be left attached.



#### CAUTION

- Do not bundle several transmission lines (DP and DN) in a multiple-wire cable.  
Bundling several transmission lines in a cable may cause malfunction of the equipment by crosstalk.



- The wire size of the transmission line should be 0.75 mm<sup>2</sup> or 1.25 mm<sup>2</sup>.
- The lower limit of power supply voltage should be 21.6 V (when the transmission distance is shorter than 200 m), or 24 V (when the transmission distance is 200 m or longer).
- Use caution about a voltage drop through the cable. Voltage drop may cause malfunction of the equipment. If large voltage drop is expected, provide an external power supply for the terminal block module. (Local power supply)
- Do not solder the wires during connection to the connector terminals. Soldering the wires causes loose connection, which may result in a contact failure.

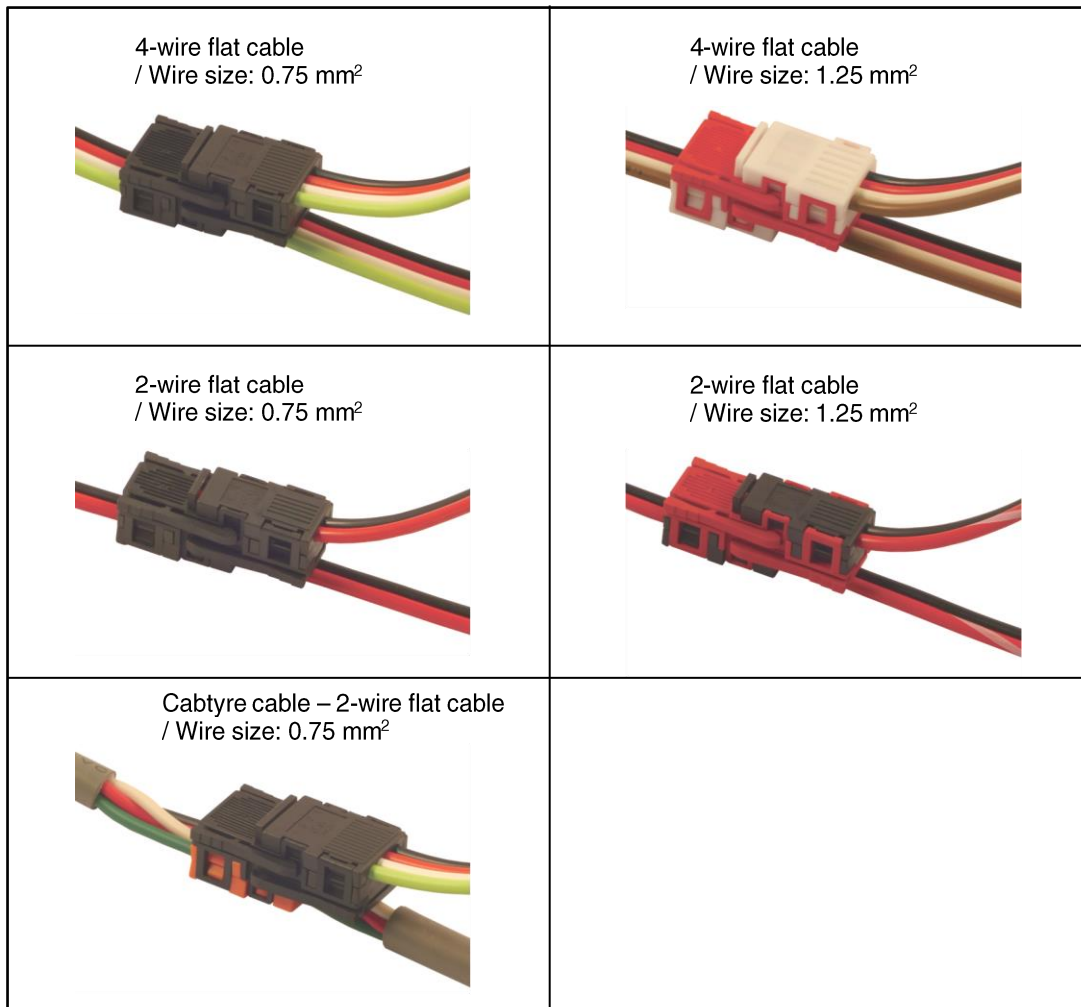
## 4.2. Transmission line configuration using link connector

With the flat cable and link connector dedicated to the AnyWireASLINK system, branching of the transmission line and installation/removal of modules can be easily conducted.

The link connector is a unique, pressure-contact connector, in which male and female connectors are integrated. This structure enables connection of the connectors with the same shape.

By cutting a part of the connector, you can pressure-connect the connector to a cable end or an intermediate position of a cable.

### ■ Branching a cable with the link connector (Examples)



When the link  
connector is used  
at cable end



When the link  
connector is used at  
cable end



For details of the link connector pressure-connection procedure, refer to “Pressure-connecting the link connect to flat cable/cabtyre cable” at the end of this manual.

## 5. Transmission required time

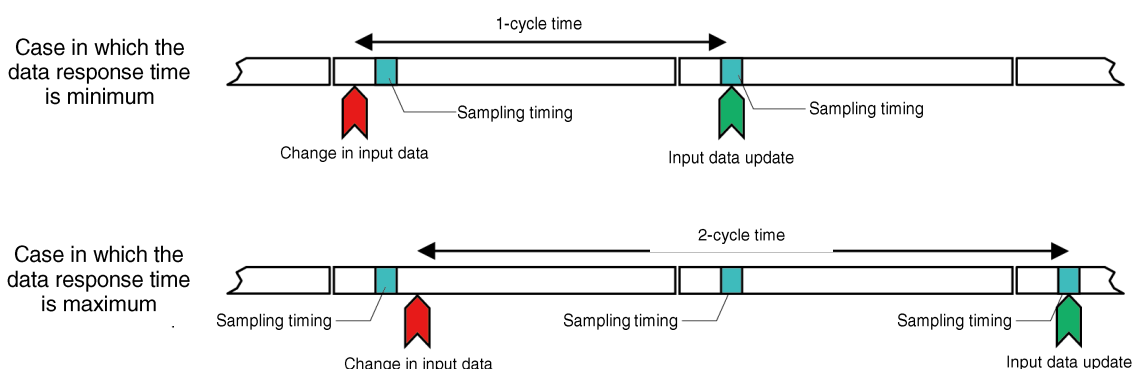
### 5.1. Double check

AnyWireASLINK does not update input area data unless it receives the same data consecutively twice (double check). For data update, therefore, it needs a transmission cycle time of one cycle at least and of two cycles at maximum.

[Cautions in handling an input signal]

If the signal transmission time is shorter than two cycles, the signal may not be recognized depending on the input timing. Therefore, **signal input should be longer than a two-cycle time to obtain secure response time.**

- \* Although data updating is executed by the unit of 16 bits between the master unit and the hose controller, double check is executed by the unit of one bit. Strictly, the system does not guarantee data on 16-bit basis.

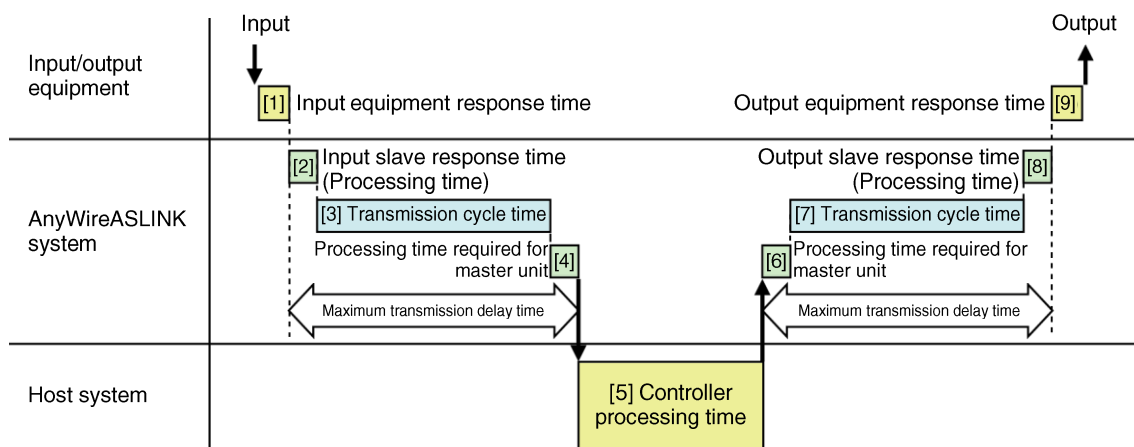


[Cautions in handling an output signal]

Data is double-checked within the output slave unit, too. For this reason, a transmission delay time of one to two cycles is needed to receive the output from the controller and to reflect that output. Therefore, **hold the output signal from the controller for at least two cycles.**

## 5.2. Maximum transmission delay time

The transmission delay time from the input to the output is as shown in the following illustration.



No	Content	Time required
[1] [9]	Input/output equipment response time	Check the specifications of the input/output equipment you use.
[2] [8]	AnyWireASLINK slave unit response time (Processing time)	The specifications differ by slave unit. * For more information, refer to the manual of each slave unit.
[3] [7]	Transmission cycle time	A delay time of the transmission cycle time multiplied by one to two will occur. The transmission cycle time differs depending on how the number of transmission I/O points is set up. For more information, refer to 2.2 Performance specifications.
[4] [6]	Processing time required for master unit	The required processing time varies depending on the model of the master unit. * Refer to the manual for each master unit.
[5]	Controller processing time	Processing time required for the controller (host communication time, program scan time, etc.)

## 6. Troubleshooting

### 6.1. Visual check

Each unit has an LED status display function so that errors related to the operating state of the unit or communication can be narrowed down by checking the LEDs.

When any LED displays an error, review the setting and wiring to correct the error.

#### (1) Checking LED status on master unit

1. Check the "RUN" LED on the master unit.

The "RUN" LED is lit ⇒ Normal

If the "RUN" LED is unlit, conduct the troubleshooting procedure described below.

→ P6-2

2. Check the "LINK" LED on the master unit.

The "LINK" LED is flashing ⇒ Normal

If the "LINK" LED does not flash, conduct the troubleshooting procedure described below.

→ P6-2

3. Check the "ALM" LED on the master unit.

The "ALM" LED is unlit ⇒ Normal

If the "ALM" LED is flashing or lit, conduct the troubleshooting procedure described below.

→ P6-2

#### (2) Check the LED state of the slave unit

1. Check the "LINK" LED on the slave unit.

The "LINK" LED is flashing ⇒ Normal

If the "LINK" LED does not flash, conduct the troubleshooting procedure described below.

→ P6-4

2. Check the "ALM" LED on the slave unit. (For 4-wire type slave unit)

The "ALM" LED is unlit ⇒ Normal

If the "ALM" LED is not unlit, conduct the troubleshooting procedure described below.

→ P6-4

### 6.2. Checking the buffer memory

**[Example] To use the "QJ51AW12AL" interface for Mitsubishi Electric Q-series PLC**

#### (1) Checking detailed error information

An error code of the master unit is stored in the latest error code storage area (Un#G10256).

#### (2) Checking error ID area

Error ID quantity is stored in error ID quantity information (Un#G8192), and ID information is stored in the error ID information storage area (Un#G8193 to Un#G8320).



**(3) Checking alarm ID area**

The number of slave units subject to error is stored in alarm ID quantity information (Un¥G9984), and alarm ID information is stored in the alarm ID information storage area (Un¥G9985 to Un¥G10112).

**(4) Checking detailed error information on slave unit**

Contents of slave unit error are stored in status details (Un¥G12327) of the parameter storage area. For details, refer to User's Manual for QJ51AW12AL.

**6.3. LED status on master unit****(1) When the "RUN" LED does not light even if power supply is turned ON**

Items to check	Description of measures
Check installation and connection status of the unit.	Remove the unit, and re-mount and re-connect the unit.
Check the internal current consumption of the whole system.	Review the system configuration to make sure that the internal current consumption does not exceed the rated output current of the power supply unit. For the method to calculate current consumption of the system, refer to the following manuals: * User's Manual for the CPU being used ("Hardware design and maintenance/inspection") * User's Manual for MELSEC-L CC-Link IE field network head unit.
Check for a PLC error with the programming tool.	Execute PC diagnosis with the programming tool to check the error condition, and take appropriate actions.

**(2) When the "LINK" LED on the master unit does not flash**

Items to check	Description of measures
Check for a PLC error with the programming tool.	Execute PC diagnosis with the programming tool to check the error condition, and take appropriate actions.

**(3) When the "ALM" LED on the master unit is lit or flashing****[1] "ALM" flashes slowly (every second): DP-DN short-circuit error**

Items to check	Description of measures
Check that transmission line (DP, DN) is not short-circuited	Check that the transmission line (DP, DN) is not short-circuited. Check that the pin assignment was correct when the link connector was crimped.
Check the wiring of the terminal block	Check that there is no contact of the transmission line (DP, DN) and no miswiring of the terminal block in the master or slave unit.
Check that the consumption current of the AnyWireASLINK system meets the specification	Modify cables (wire diameter, total length) and units (type, number of connections) so that the consumption current of all slave units does not exceed the transmission line supply current value of the master unit.

**[2] “ALM” flashes quickly (every 0.2 seconds): Transmission circuit drive power supply voltage drop error**

Items to check	Description of measures
Check the voltage of the 24V DC external supply power	Make adjustments so that the voltage of the 24V DC external supply power does not exceed the rating (21.6 to 27.6V DC). (Recommended voltage is 26.4V.)
Check that the power line (24V, 0V) is not short-circuited	Check that the power line (24V, 0V) is not disconnected or short-circuited. Check that the pin assignment was correct when the link connector was crimped.
Check the wiring of the terminal block	Check that the 24V DC external supply power is properly wired to the master unit and the slave unit terminal block. Also check that there is no short-circuit, miswiring, or insufficient tightening of the screws.

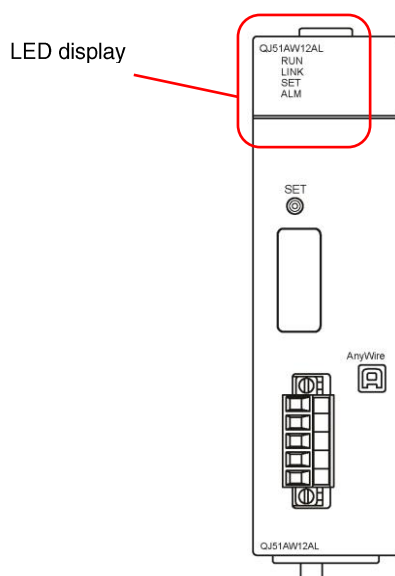
**[3] “ALM” is lit: DP-DN (transmission line) disconnection error**

Items to check	Description of measures
Read the data from the error ID information storage area, and check the error ID.	Identify the slave unit subject to the DP-DN disconnection error.
<ul style="list-style-type: none"> <li>Check operation status of the slave unit with the identified error ID.</li> <li>Check for disconnection of the transmission line (DP, DN).</li> <li>Check if the terminal block, connector, etc. are normally connected.</li> </ul>	<p>If disconnection or improper connection status is found, eliminate a cause of the problem.</p> <p>If a slave unit whose power supply and transmission lines are normally connected is not in operation, a fault of the slave unit can be considered.</p>
Check if automatic address recognition has been executed during startup.	With the factory-setting, the “ALM” LED lights regardless of whether disconnection has occurred or not. Execute automatic address recognition if it has not been executed.

**(4) When the “LINK” LED does not flash**

Execute PC diagnosis with the programming tool to check the error condition, and take appropriate actions.

**[Example] To use the “QJ51AW12AL” interface for Mitsubishi Electric Q-series PLC**



Contents and layout of the LED indications vary depending on the model of the master unit. Refer to the manual for each unit.

## 6.4. LED state of the slave unit

The slave unit also has a status display function using LEDs.  
The display status and primary causes are described respectively.

### (1) When “LINK” is lit

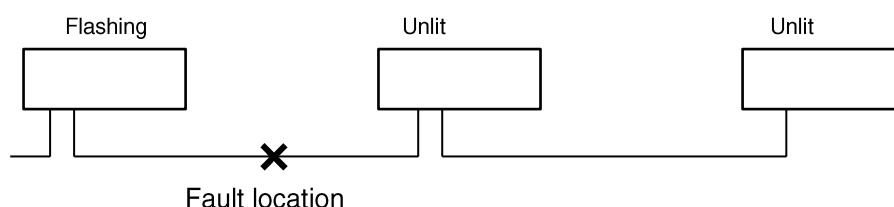
The slave unit is not receiving transmission signals. (Transmission waveform error)  
Under normal conditions, a voltage of approximately 17V to 18V is observed when measuring between transmission lines (DP-DN) using a tester in DC mode.  
If the measured voltage is the same as the power supply voltage, check that there is no miswiring of the transmission line.  
Also check that there are no master unit errors.

### (2) When “LINK” is not lit

The slave unit is not receiving transmission signals. (Transmission signal disconnection error)  
Check that there is no contact failure such as looseness in the connection parts of the transmission line (DP-DN).  
Check that power is being supplied to the master unit.  
Check that transmission signals are reaching the terminal of the transmission line (DP-DN).  
Under normal conditions, a voltage of approximately 17V to 18V is observed using a tester in DC mode.

When the transmission line is disconnected or suffers a similar fault, the position can also be identified by a difference in the “LINK” display of the terminal.

**Example:**



### (3) When “ALM” is lit

Short-circuit has occurred with the I/O circuit of the output slave unit. Eliminate a cause of the problem. The ALM indication will be automatically reset.

### (4) When “ALM” is flashing

The signal voltage of the transmission line (DP-DN) is in a low state.  
Check if the supply voltage to the master unit in this system is within the allowable voltage range.  
Check that the connection unit and load capacity are appropriate for the total length of the transmission line and allowable supply current.

### (5) When “LINK/ALM” alternately flashes

The ID (address) setting for the slave unit is duplicated by that for the master unit in this system, or the slave unit has not undergone initial setting. Check for duplication of the address setting and execution of initial setting for this unit, and correct the setting, or execute initial setting.

### (6) When “ALM” is lit, and “LINK, I/O” is flashing in synchronization

The connection cable of the 2-wire type sensor connected to this unit is disconnected.  
\* Disconnection can be detected for 2-wire type sensors only.  
Check the common and I/O wires for disconnection.

### Check list by problem

Problem	Check item	
Data input/output is disabled.	<b>Master unit</b> Is the master unit supplied with power? Are the contents of the program normally corresponding to the address assignment? Does the master unit access the buffer memory?	
	<b>Slave unit</b> Is the slave unit supplied with power? Is the slave unit address setting correct? Is the specifications and settings of the slave unit matched with the specifications (number of I/O points) of the master unit?	
"ALM" LED (red) is lit.	Check for disconnection of the DP/DN line. Check if automatic address recognition has been normally executed. Check of a loose screw on the terminal block.	
"ALM" LED (red) slowly flashes.	Check for short-circuit of the DP and DN Lines. Check for contact of the DP and 24 V lines.	
"ALM" LED (red) quickly flashes.	Is the voltage of the 24 V DC power supply unit supplied to the master unit normal?	

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## 7. Warranty

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### ■ Warranty period

The warranty on the delivered Product shall continue to be effective for one (1) year after the delivery thereof to a location as designated by the original owner.

### ■ Scope of warranty

Should a defect occur in any part of the Product during the foregoing warranty period when it is used normally in accordance with the specifications described in this User's Manual, the Company shall replace or repair the defect free of charge, except when it arises as a result of:

- (1) Misuse or abuse of the Product by the owner;
- (2) Faults due to a cause other than the delivered Product;
- (3) Unauthorized modification or repair of the Product by any party other than Anywire;
- (4) Any act of God, disaster, or other cause beyond the control of Anywire.

The term "warranty," as used herein, refers to the warranty applicable to the delivered product alone. The Company shall not be liable for any damages consequential or incidental to a malfunction of the delivered product.

### ■ Extra-cost repair

All investigation and repair after the warranty period are made for pay.

During the warranty period, we will accept, for pay, repair of a breakdown or investigation of the cause of a breakdown due to reasons outside the above scope of warranty.

### ■ Changes in the product specifications and the descriptions in the manual.

The descriptions in this user's manual may be subject to change without previous notice.

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## 8. Change history

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Version	Date	Description of changes
First edition	May 28, 2015	Released
1.0	Oct. 27, 2020	2.2.2 Performance specifications 2.7 Monitoring function 2.8 Automatic address recognition procedure 6.3 LED status on master unit 7. Warranty New contact organization, unification of other expressions
1.1	Mar. 24, 2021	3.2 Example of program
1.2	Jun. 28, 2021	3. Transmission distance, wire size and allowable supply current 2.2.2. Performance specifications 2.4.4. Transmission line supply current



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