

AnyWireASLINK System
Ethernet Gateway
B2G28-E1

User's Manual

Version 1.3 July 18, 2017

Precautions

● Precautions related to this manual

1. This manual describes the overall concepts of the AnyWireASLINK system.
Make sure to read each individual "Products Guide" for handling of the respective products.
2. Reproduction or duplication of part or all of this Manual without permission is prohibited.
3. Contents of this Manual may be subject to future changes 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. Refer to the User's Manual of the CPU unit for safety precautions as a sequencer system.

The "Safety precautions" rank safety precaution items into "⚠️WARNING" and "⚠️CAUTION" categories.



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 damage only.

In addition, matters described in ⚠️CAUTION may lead to serious consequences depending on the situation.

All of these describe important contents, therefore, make sure to observe the cautions and warnings. Carefully store this Manual so that it can be accessed whenever necessary, and also deliver this Manual to the end user.

[Precautions for design]



CAUTION

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

[Precautions for installation]



CAUTION

- Use the sequencer in an environment described in the general specifications in the User's Manual of the CPU unit.
Use in any environment out of the range of the general specifications may result in electric shock, fire, malfunction, damage or deterioration of the product.
- Improper mounting of the unit may result in malfunction, failure or the unit falling down.
- During installation and removal of the unit, make sure to shut off all phases of the external power supply used in the system.
Unless all phases are shut off, the product may be damaged.
- Do not directly touch the conductive sections and electronic components of the unit. This may result in malfunction or failure of the unit.

[Precautions for wiring]



- Tighten the terminal screws within the specified torque range. Loose tightening of the terminal screws may result in a short-circuit, fire or malfunction. Excessive tightening of the terminal screws may cause damage to the screws or unit, resulting in the unit falling down, short-circuit or malfunction.
- Be careful to prevent foreign matter such as cutting chips and wiring offcuts from entering into the unit.
Failure to do so may result in fire, failure or malfunction.

[Precautions for wiring]



- Miswiring 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 stranded wires with terminal blocks, do not use solder. Doing so may result in a contact failure.
- If wiring for the power line is too long, the voltage of the power supply to the remote slave unit may become insufficient due to the voltage drop. Therefore, please connect an external power source to ensure the specified voltage.
- Do not turn on the 24V DC power source before completing wiring and connections throughout the whole AnyWireASLINK system.
- Use a 24V DC stabilized power supply for all AnyWireASLINK system devices.
- Do not bind control wires or communication cables along with the main circuit or power line, and ensure that they are not held close together.
Excess noise generated may result in malfunction.
- Make sure to insert electric wires and cables to be connected to the unit into ducts or fix them with clamps. Failure to put cables into ducts or fix them with clamps may cause drift, movement, or careless tensioning which can lead to damage to the unit or cable, or a cable connection failure which can lead to malfunction.
- When removing cables connected to the unit, do not hold the cable and pull them out by hand.
Remove cables equipped with a connector by gripping the connector part of the unit.
To remove cables connected to the terminal blocks, first loosen the terminal screws on the terminal block. If cables are pulled on while they are connected to the unit, it may result in malfunction or damage of the unit or cable.

[Precautions for startup and maintenance]

WARNING

- Do not touch the terminals while the power is on. Doing so may result in electric shock or malfunction.
- When cleaning or re-tightening 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. Failure to shut off all phases may result in electric shock. Insufficient 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 it falling down, a short-circuit, or malfunction.

CAUTION

- Do not disassemble or modify each unit. Doing so may result in failure, malfunction, injury, or fire.
- During installation and removal of the unit, make sure to shut off all phases of the external power supply used in the system.
Failure to shut off all phases may result in failure or malfunction of the unit.
- Before touching the unit, make sure you first touch grounded metal to discharge any static charge present in your body. Failure to discharge static electricity may result in failure or malfunction of the unit.

[Precautions for disposal]

CAUTION

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

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1. Overview

B2G28-E1 operates as a gateway unit for the Ethernet and AnyWireASLINK. The AnyWireASLINK system can be connected to the Ethernet by using this gateway.

The AnyWireASLINK system is a "Sho-Haisen" (wiring saving) system consisting of compact and fewer-point/multiple-distribution units suitable for wire saving on the sensor level.

This system covers bundling of a minimum 1 point to 16 points in a compact unit, therefore, it can bundle even in a narrow device in which a BOX is not placed.

In addition, this system also proposes "Digital Link Sensors" that incorporate the AnyWireASLINK sensing function and wiring saving function.

This is a sensor able to be directly connected to the transmission line, and offers excellent wiring saving without using a remote terminal.

In addition to ON/OFF information, information such as sensing level and disconnections are also transmitted to the controller side.

It is possible to monitor the operating state, prevent momentary stoppages, and significantly reduce cause investigation time during a failure.

2. Specifications

2.1 General specifications

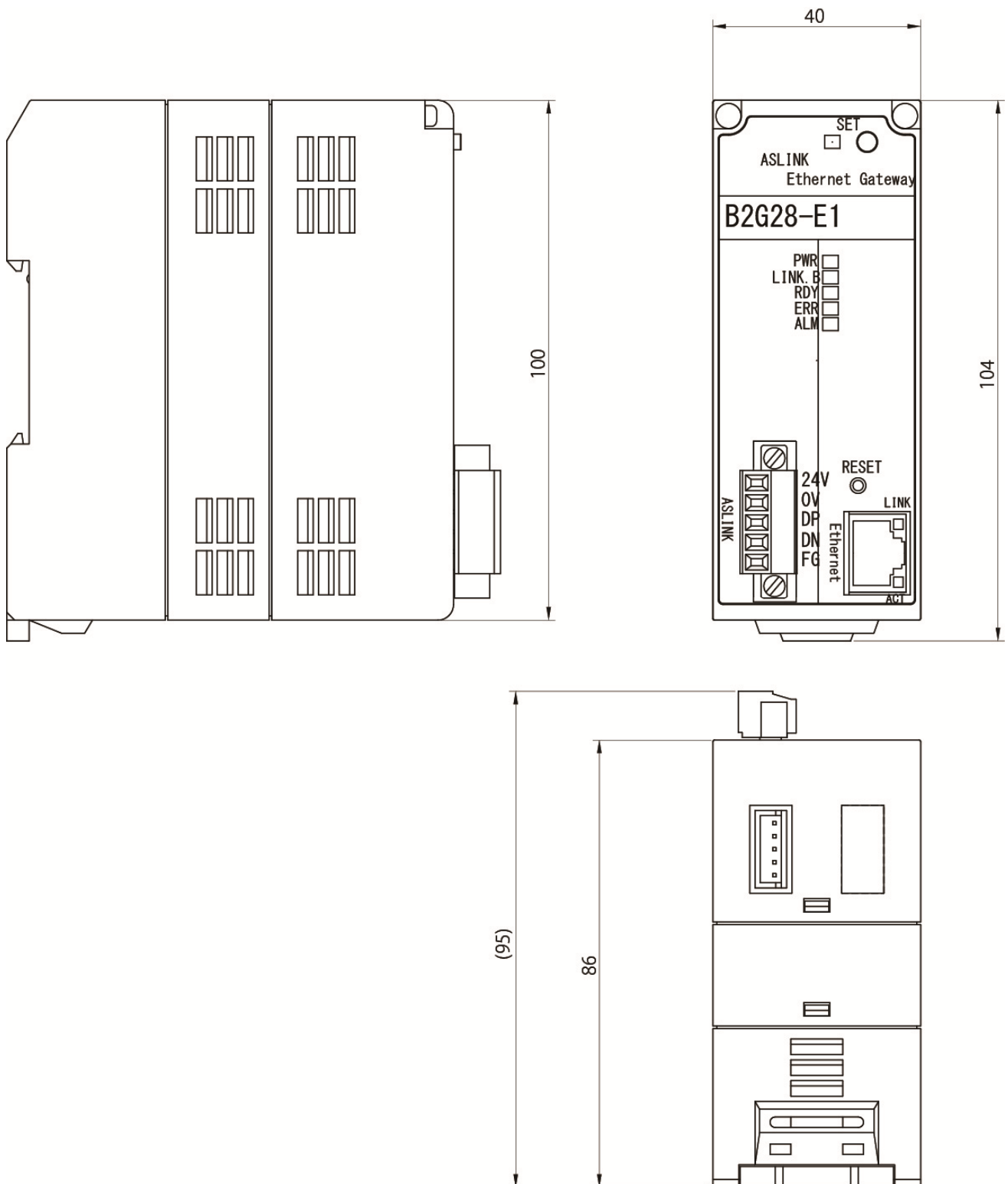
Items	Specifications
Ambient temperature for use	0 to +55°C
Storage temperature	-20 to +75°C
Ambient humidity for use	10 to 90%RH (No condensation)
Atmosphere	No corrosive or flammable gas

2.2 Performance specifications

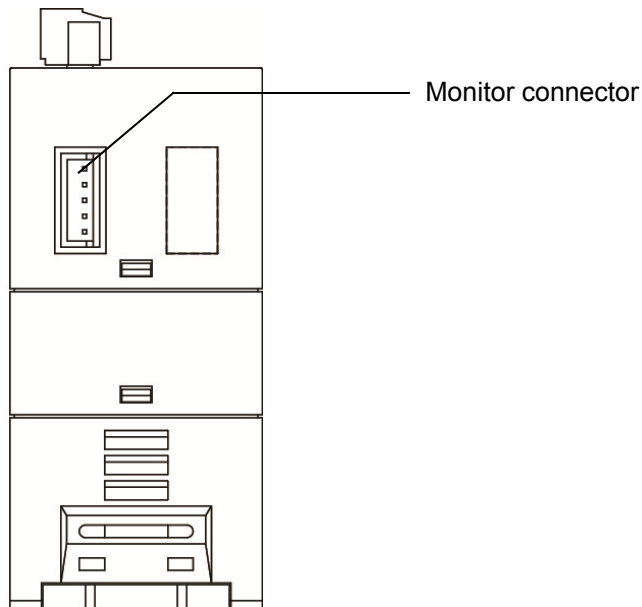
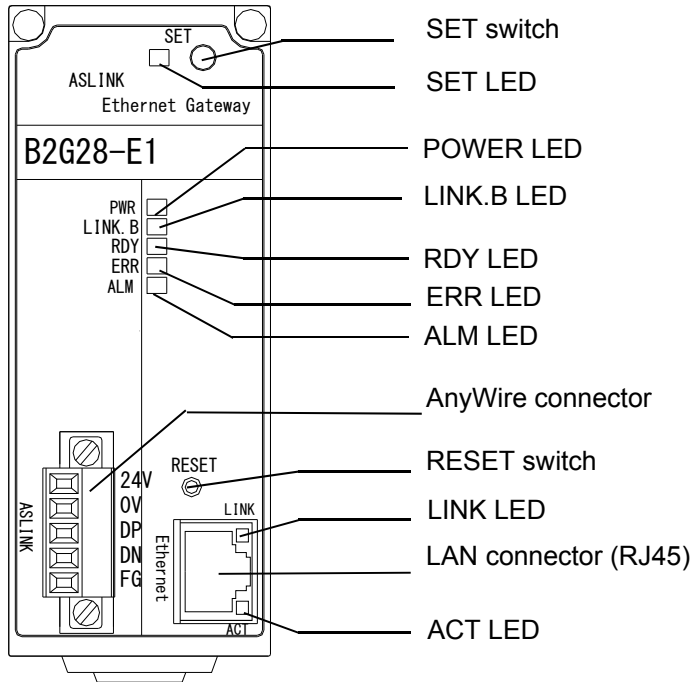
Items	Specifications			
Transmission clock	27kHz (37μs)			
Transmission distance/supply current	Wire diameter 1.25mm ²	Transmission distance	DP-DN allowable supply current	
		Shorter than 50m	Less than 2A	
		Exceeding 50m, shorter than 100m	Less than 1A	
	0.75mm ²	Exceeding 100m, shorter than 200m	Less than 0.5A	
		Shorter than 50m	Less than 1.2A	
		Exceeding 50m, shorter than 100m	Less than 0.6A	
	0.5mm ²	Exceeding 100m, shorter than 200m	Less than 0.3A	
		Shorter than 50m	Less than 0.8A	
		Exceeding 50m, shorter than 100m	Less than 0.4A	
Exceeding 100m, shorter than 200m	Less than 0.2A			
Number of units connected	Up to 128 units			
Transmission method	DC power supply superimposed total frame/cyclic method			
Connection mode	T-branch method, multi-drop method, star-branch method, tree-branch method			
Transmission protocol	AnyWireASLINK protocol			
Error control	Double check, checksum			
Connection I/O points	Up to 512 points (Input 256 points/output 256 points)			
RAS function	Transmission line disconnection detection function, transmission line short-circuit detection function, transmission circuit drive power voltage drop detection function, ID (address) redundancy/not set detection function			
Electric wire used	General-purpose two-wire/four-wire cable (VCTF, VCT0.75 to 1.25mm ² , rated temperature 70°C) General-purpose electric wire (0.75 to 1.25mm ² , rated temperature 70°C) Dedicated flat cable (0.75mm ² /1.25mm ² , rated temperature 90°C)			
Power supply	Voltage 24[V] DC +15 to -10% (21.6 to 27.6[V] DC) Ripple 0.5[V]p-p max. Current 150[mA] (when 128 slave units are connected, load current is not included)			
Transmission I/O point number setting	Input 32 points	Input 64 points	Input 128 points	Input 256 points
	Output 32 points	Output 64 points	Output 128 points	Output 256 points
Transmission cycle time	2.4ms	3.6ms	6.0ms	10.7ms
Rated voltage	24V DC (21.6V~27.6V)			
Communication power supply	Superimposed on transmission line			
Load power supply	Local power supply or collective power supply			
Vibration resistance	Conform to JIS C 0040			
Withstand voltage	1,000V between external terminal and outer box for one minute			
Noise resistance	1,000 Vp-p, pulse width 1μs			

2.3 Outside dimensions

Unit: mm



2.4 Name of each part



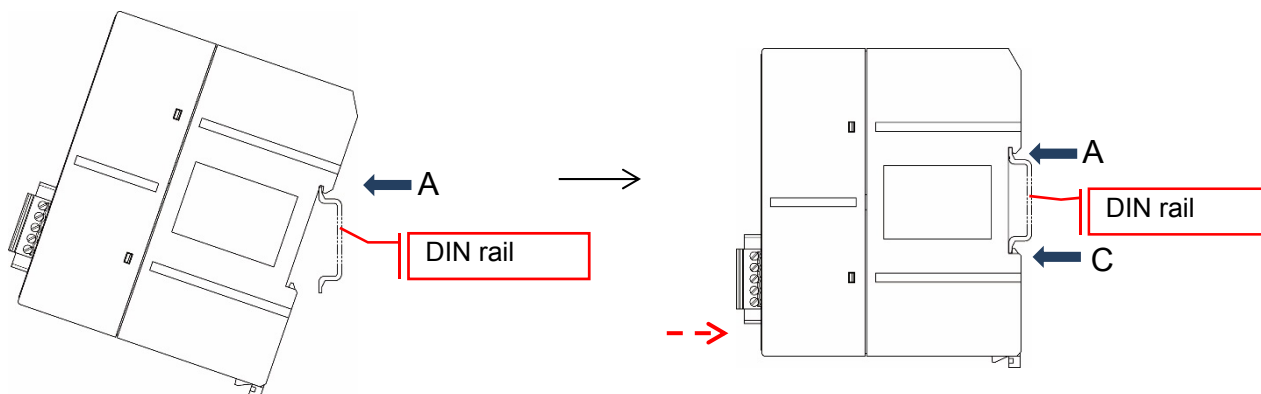
2.5 Attaching to/detaching from DIN rail

Please install this device to the DIN rail before use.

Vertical installation

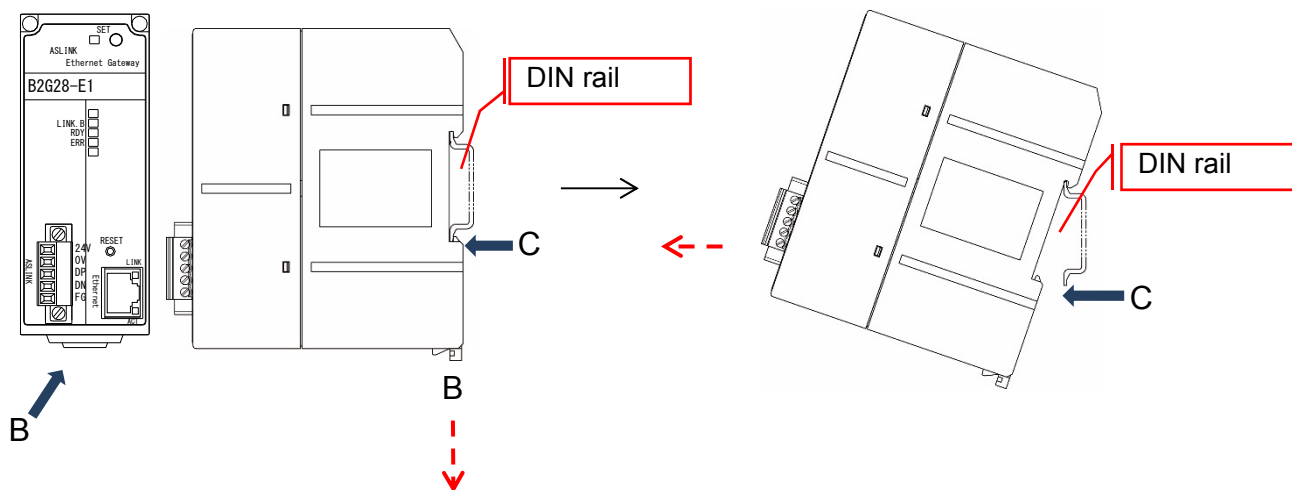
1. DIN rail attachment procedure

- ① Hook the spring pin A on the center of the back face onto the DIN rail.
- ② Fit C into the DIN rail while pressing this device upward from underneath.



2. DIN rail detachment procedure

When the knob B is pulled downward with a flat-blade screwdriver, C is removed, and then this system can be detached.



CAUTION

Do not install in the reverse direction (with A on the bottom side).

This device may become detached from the DIN rail due to vibration, etc.

3. Switch settings

3.1 SET switch

This is a switch for carrying out automatic address recognition for the AnyWireASLINK slave unit.

Pressing the SET switch for approximately two seconds or more lights up the "SET" LED to start automatic address recognition.

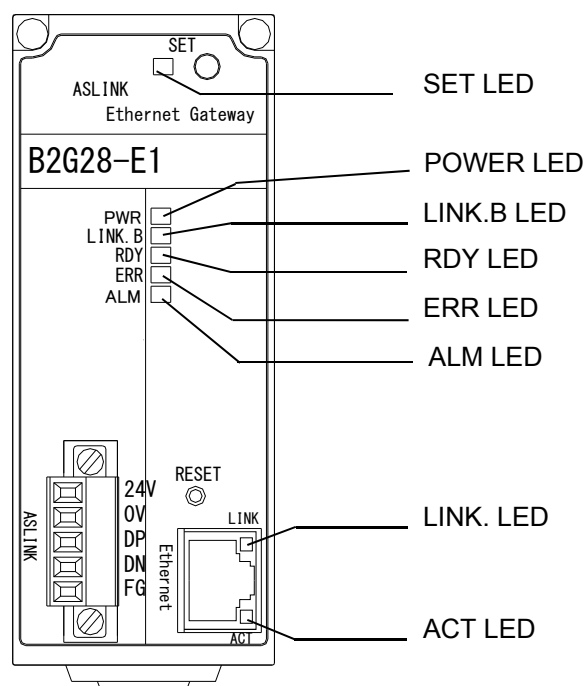
In addition, when the B2G28-E1 is turned on (or reset) while the SET switch is being held down, the system starts up in the default setting mode. → P7-19

3.2 RESET switch

Resets the main unit.

4. LED display

LED symbol	Color	Name	■: Lit/flashing		□: Unlit
PWR	Green	B2G28-E1 status	Lit	Normally operating	Hardware error or watchdog timer error has occurred
LINK.B	Green	Transmission active	Flashing	Normally operating	
SET	Green	Automatic address recognition operating	Lit	Automatic address recognition operating	Normally operating
RDY	Green	B2G28-E1 status	Lit	Normally operating	
ERR	Red	Master unit alarm status	Lit	DP, DN disconnection No slave unit response	Normally operating
			Slow flashing (every second)	Short-circuit between DP-DN	
			Quick flashing (every 0.2 seconds)	24V DC is not supplied or voltage is low.	
ALM	Orange	Slave unit status	Lit	I/O disconnection, I/O short-circuit, address redundancy, sensing level drop etc., are detected	Normally operating
LINK	Orange	Ethernet link status	Lit	LAN cable is correctly connected	
ACT	Green	Ethernet BUS status	Flashing	Packet detection	



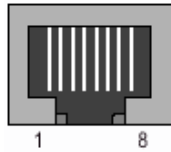
5. Connections

5.1 Connectors

5.1.1. LAN connector

This is an RJ45 connector for connecting a 10BASET/100BASETX cable.

Ethernet port



Pin	Signal
1	TxD+
2	TxD-
3	RxD+
4	Termination
5	Termination
6	RxD-
7	Termination
8	Termination

5.1.2. Connector terminal block

This is a connector terminal block for connecting a 24V DC power supply and AnyWireASLINK transmission lines (DP, DN).

The following shows the terminal arrangement.

Signal name	Dedicated flat cable wire color		Link connector	
	0.75sq	1.25sq	Pin number	Type
24V	Green	Brown	4	0.75sq: LP2-BK-10P (For two-wire) LP4-BK-10P (For four-wire) LP4-WR-10P (For four-wire, pin protector type) 1.25sq: LP2-BR-10P (For two-wire) LP4-WR-10P (For four-wire)
0V	White	White	3	
DP	Red	Red	2	
DN	Black	Black	1	
FG	--	--		
Connector type: MC1, 5/5-STF-3,81 (manufactured by Phoenix Contact)				

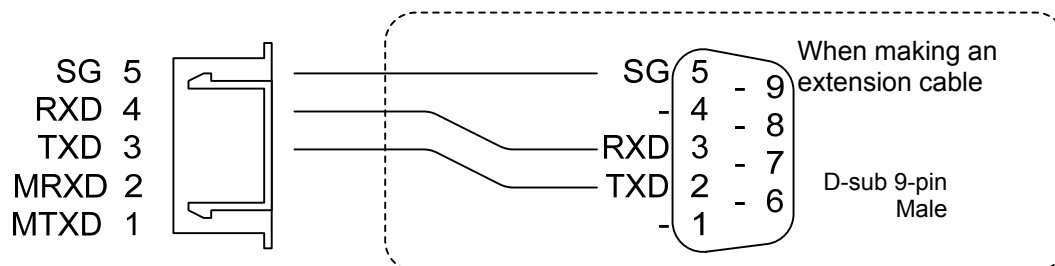
5.1.3. Monitor connector

This is a connector for connecting a debugging monitor. Signals are RS232 compatible.

Connector: Manufactured by JST

Housing: XHP-5

Contact: BXH-001T-P0.6

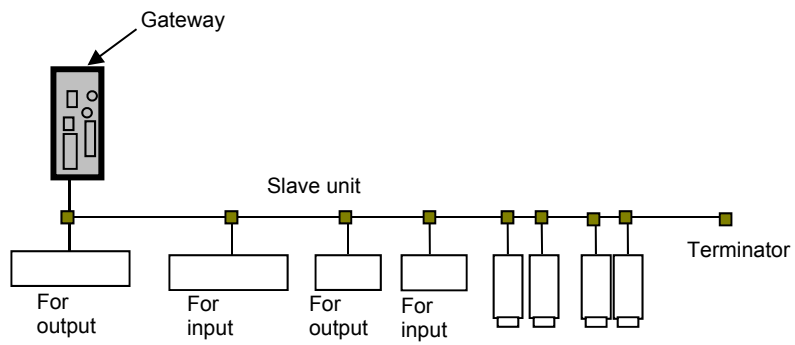


* Connect the above extension cable and the personal computer with a cross cable.

6. AnyWireASLINK

6.1 System configuration

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



6.2 Slave units

■ Types of slave units

This product uses slave units for the AnyWireASLINK system.
The following types of slave units can be used.

Name	Example of devices to be connected
Input/output unit	General-purpose switches, sensors, LEDs, solenoid valves, relays, etc.
Relay output terminal	AC drive load, etc.
Manifold driver	Dedicated manifold
Digital link sensor	Integrated transmission/sensing functions
	General-purpose input head
Dedicated function device	ASLINK POKAYOKE terminals, ASLINK mapping terminals

- ◆ Confirm the model name and type of the slave unit by using the separate AnyWireASLINK system catalog.

■ 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.)

■ Connection of slave units

There are roughly two types of methods for the connection of AnyWireASLINK slave units.
One is the "two-wire (non-isolated) type" method and the other is the "four-wire (isolated) type" method.

Classification	Operation
Two-wire (non-isolated) type	Slave units and connection loads are driven with just two transmission lines.
Four-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.

Any configuration consisting of the two-wire type only, the four-wire type only, or a mixture of two-wire and four-wire types can be used.

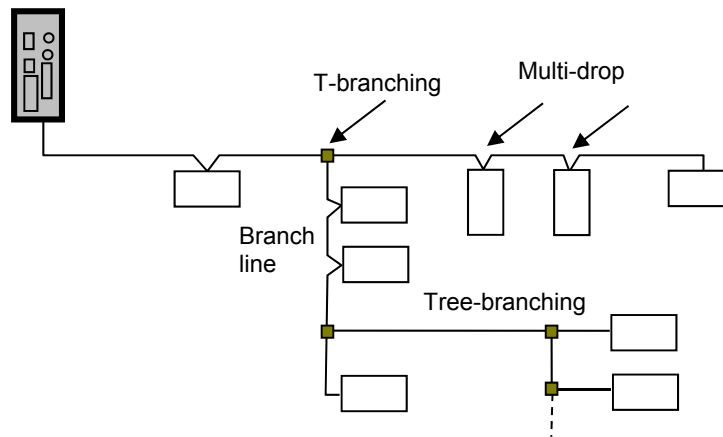
The choice whether to use a two-wire type or a four-wire type depends on the slave unit.

6.3 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.

6.4 Connection mode

The AnyWireASLINK system allows for various connections such as T-branching, multi-drop, tree-branching, and star-branching.



■ **T-branching method**

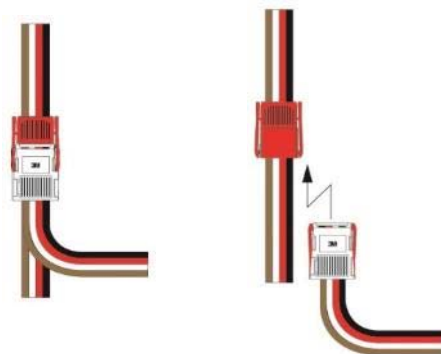
The T-branching method is a connection method to branch off a cable from an insulation displacement connector or terminal block and connect to the slave unit.



The actual wiring is shown below.

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

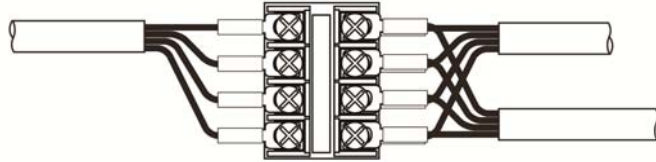
A flat cable is branched using an insulation displacement connector as described below.



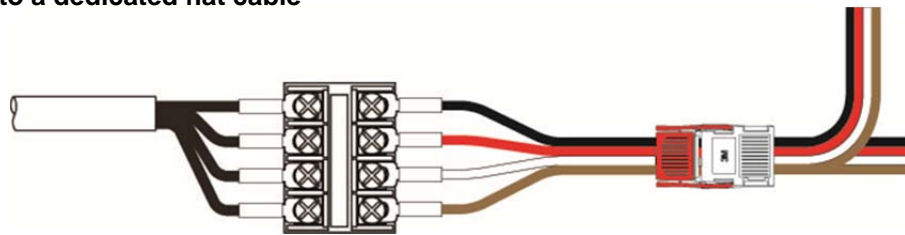
- **When a terminal block is used**

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 cable cables**



- **Conversion to a dedicated flat cable**



- **Multi-drop method**

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

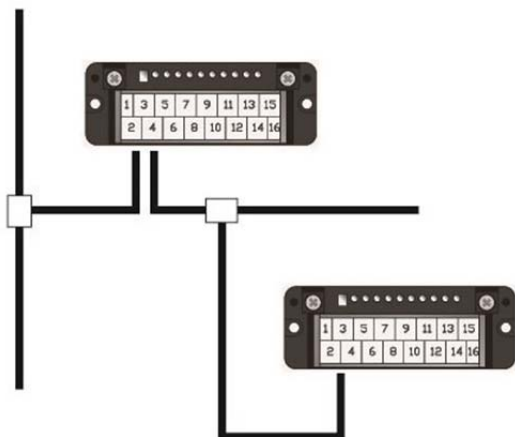
Use of this method eliminates the need for new cables or other connecting devices other than cables.



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**

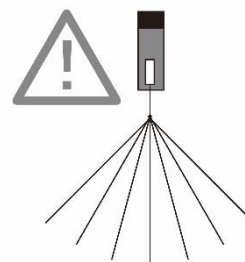
The tree-branching method is a way to re-connect a T-branched branch line using the T-branching method or multi-drop method.



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 AnyWireASLINK 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.

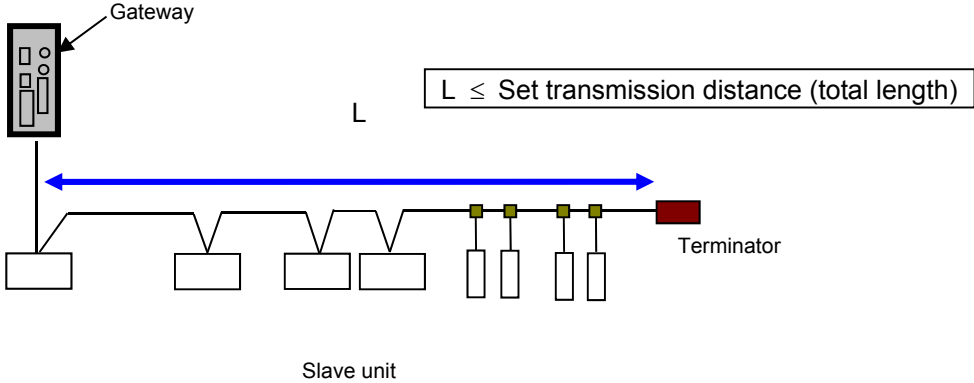


6.5 Transmission distance

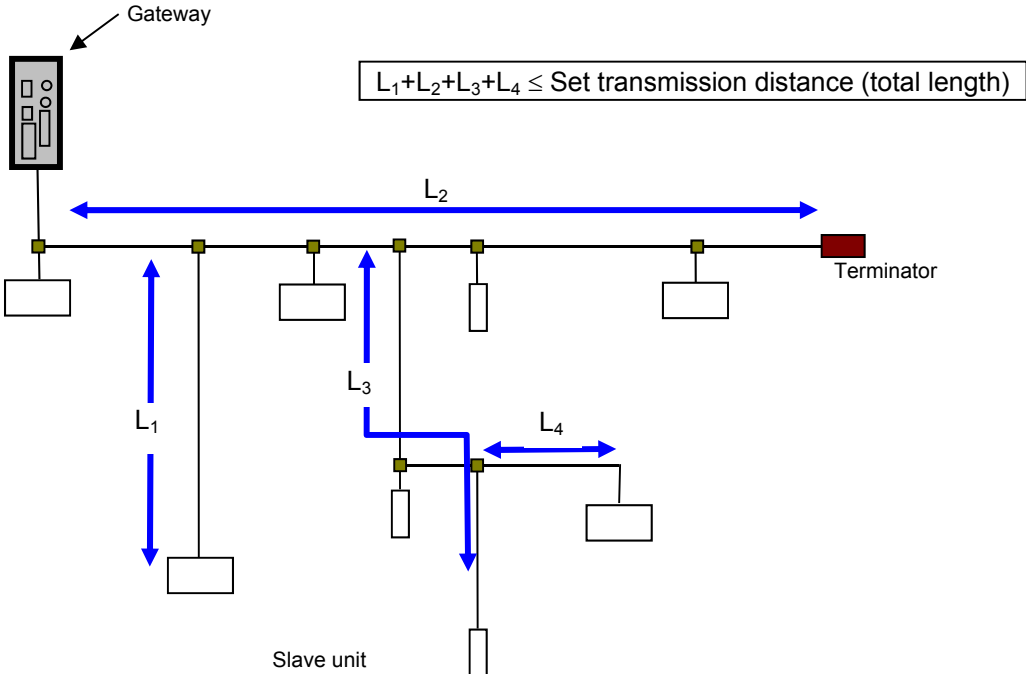
All transmission distances described for AnyWireASLINK refer to the "total length" of a cable. Total length is the total cable length to be used including branches.

Wiring of the AnyWireASLINK system can be established with only two transmission lines (DP, DN). The two transmission lines (DP, DN) support a maximum total length of 200m. (See P2-1) 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



6.6 Transmission cable type 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 two-wire/four-wire cable (VCTF, VCF 0.75 to 1.25mm², rated temperature 70°C)
- General-purpose electric wire (0.75 to 1.25mm², rated temperature 70°C)
- Dedicated flat cable (0.75mm², 1.25mm², 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 ² 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 ² Allowable current: 5A Maximum conductor resistance: 25Ω/km
Dedicated flat cable (HKV) Model: FK4-125-100 (100m winding)		Cross-section area: 1.25mm ² Allowable current: 5A Maximum conductor resistance: 15Ω/km

6.7 Transmission line supply current value

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 two-wire type slave) does not exceed this allowable current value.

■ Transmission line supply current value

Length of transmission line	Wire diameter of transmission line (DP-DN)		
	1.25mm ²	0.75mm ²	0.5mm ²
Total length: 50m or less	MAX 2.0A	MAX 1.2A	MAX 0.8A
Total length: Over 50m, no longer than 100m	MAX 1.0A	MAX 0.6A	MAX 0.4A
Total length: Over 100m, no longer than 200m	MAX 0.5A	MAX 0.3A	MAX 0.2A

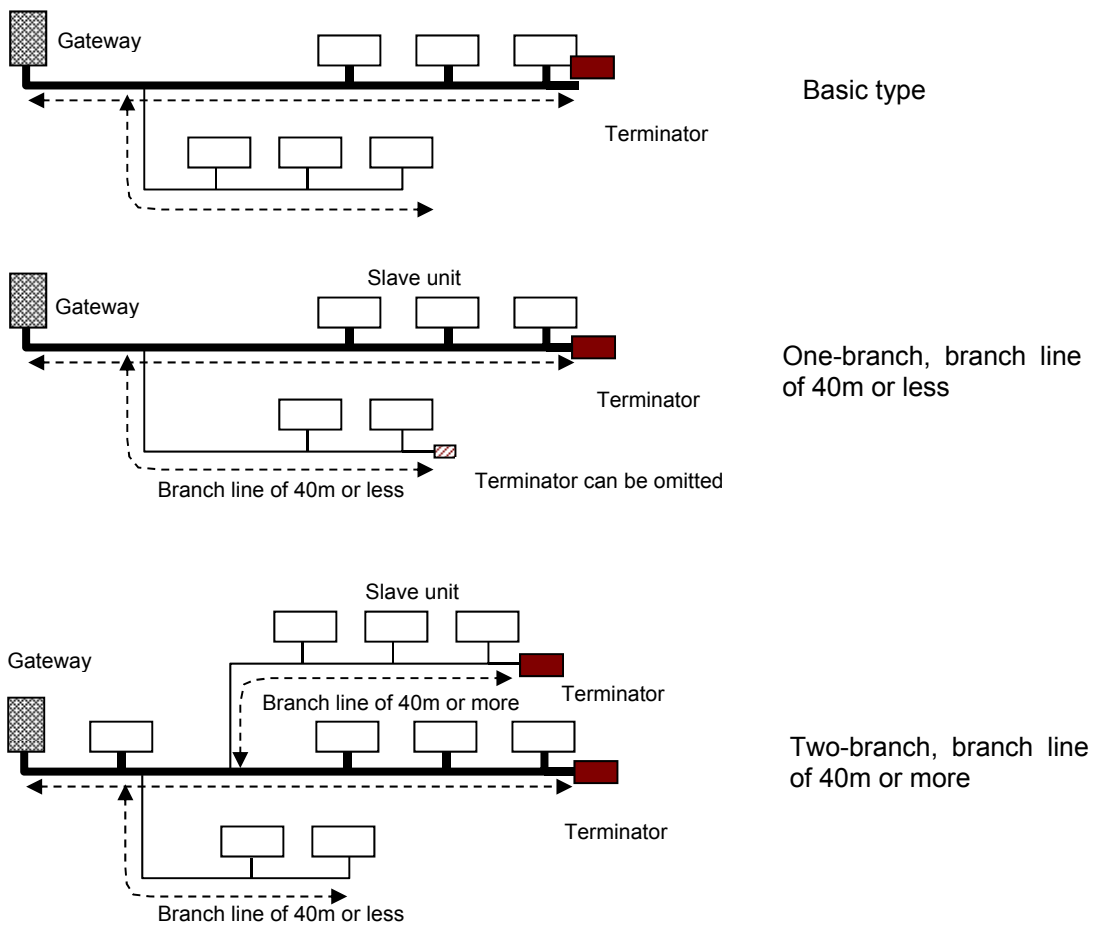
6.8 Terminator

This unit incorporates a circuit which shapes the transmission waveform, and functions to avoid situations where the transmission waveform is disturbed by the external environment.

Make sure to properly connect it to the transmission line as it has a polarity. (DP: Red, DN: Black)
Reverse connection may result in transmission fault.

The line extended from the master unit (line wired to the very end) is called the trunk line, and the line wired and branched from the trunk line is called a branch line.
A terminator for one master unit must be connected at the farthest end of the trunk line.

When extending branch lines out from the trunk line, one terminator must be connected at the end of the branch line if the length of the branch lines is more than 40m.
Although it is possible to omit terminators if the length of the branch line of the transmission line is less than 40m, it is recommended to connect a terminator to any long branch lines of the system.



The AnyWireASLINK system allows up to three terminators to be connected.

6.9 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.

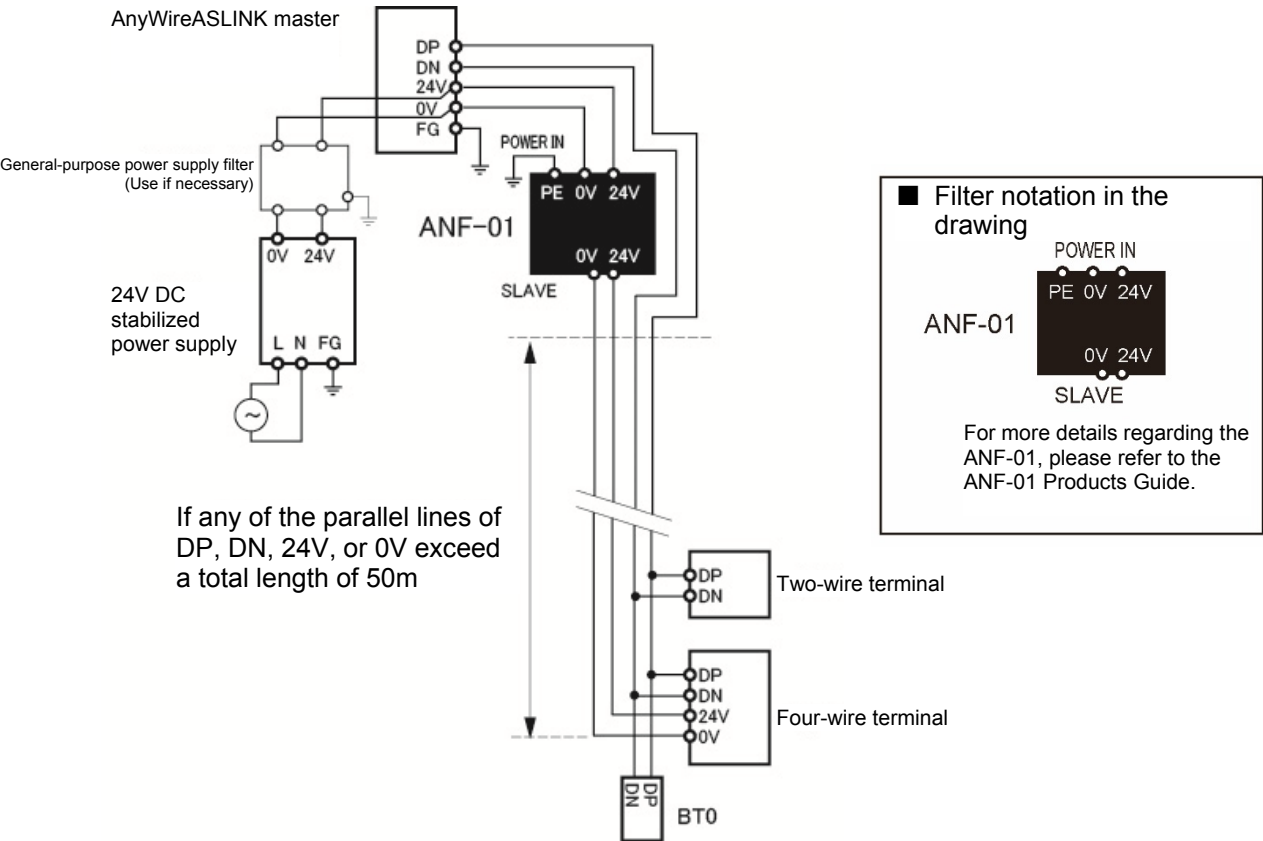
Insert a filter whether using a master power supply for the entire system or using a local power supply.

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

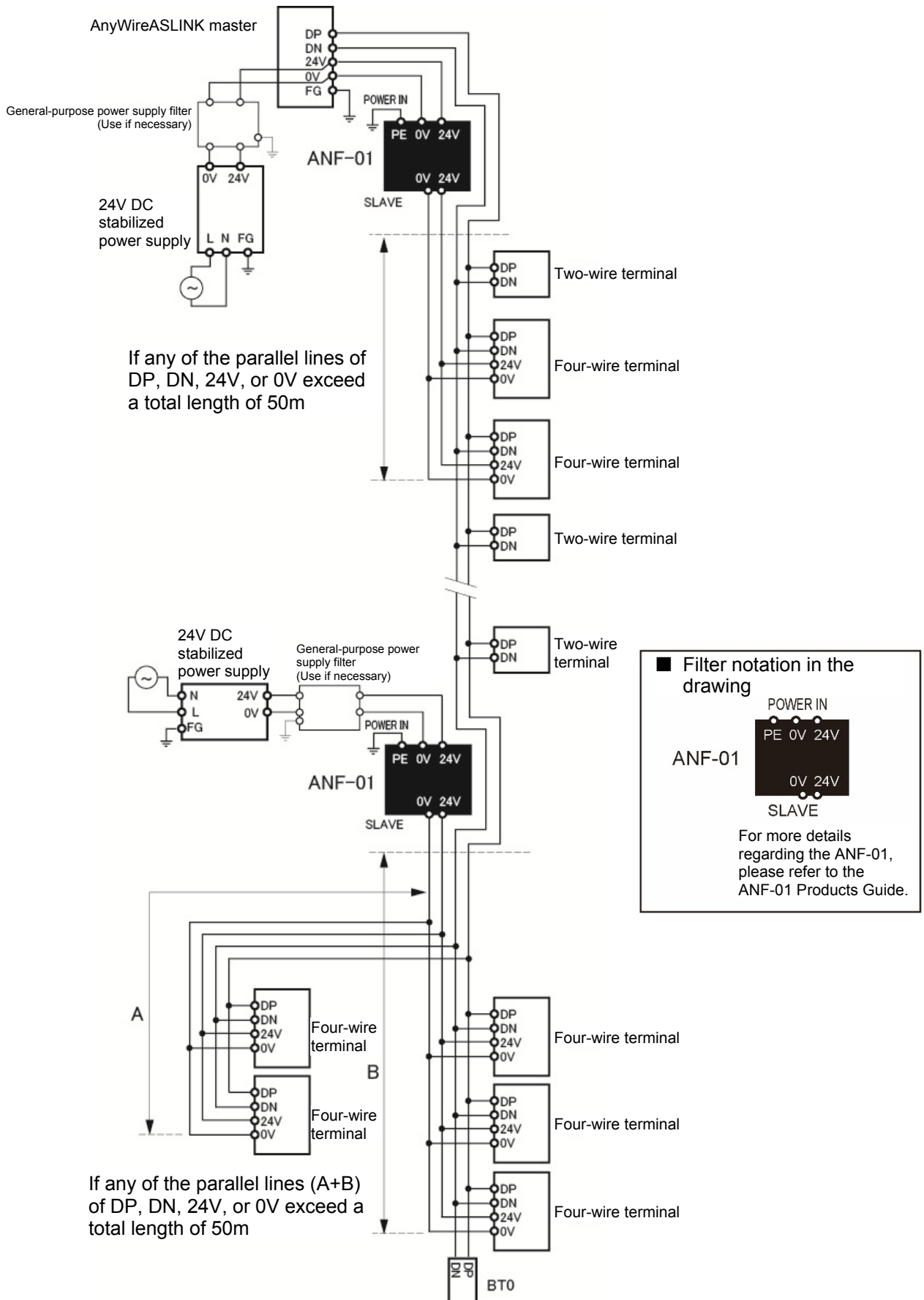
■ Filter allowable current

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



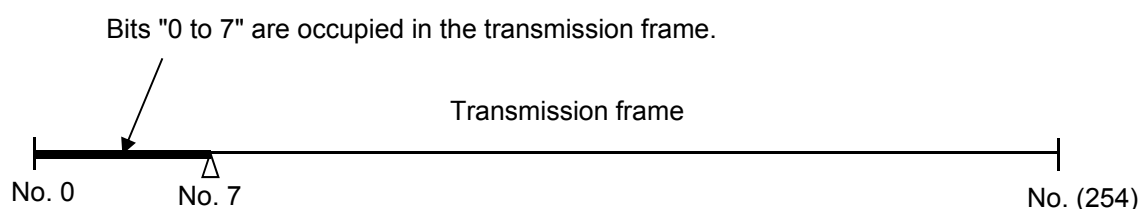
■ ASLINK filter (ANF-01) connection example when there is a local power supply



6.10 Address setting (reference)

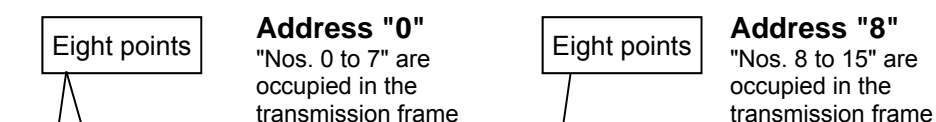
The "Address setting" of a slave unit is **determined by which number bit (in order) in the AnyWireASLINK transmission frame the slave unit is associated with.**
Each terminal occupies the location of its own point number (with the set address number placed at the beginning) from that position.
Addresses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

Example: Eight-point terminal: When address is "0"



Set addresses so as to avoid bit interference.

Example:



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

Write the value you want to set in the slave unit using the dedicated address writer (ARW-04, ARW-03).

The address of the slave unit is set to "255" before shipment.

The slave unit does not operate in this state.

Before use, write any address other than "255" when turning on the power for the first time.

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.

7. Software functions

This section contains an explanation of the application layer software installed in B2G28-E1.

7.1 Modbus/TCP

Modbus/TCP is a communication protocol that is incorporated into this board and made available. In this protocol, this device becomes a server.

The foundation of the memory map is the Modbus address.

7.1.1. Input memory map

The memory map list when accessing from Modbus/TCP is shown below.

Modbus/TCP							
Function code	Memory address		Offset address		Occupied [Word]	Type	Items
	Start address	End address	Start address	End address			
02/--	10001	10256	0	255	16	bit	Input memory map (bit)
04/--	30001	30016	0	15	16	word	Input memory map (word type)
04/--	30017	30160	16	159	144	word	System reserved
04/--	30161	30164	160	163	4	word	Calendar clock
04/--	30165	30165	164	164	1	word	Error flag
04/--	30166	30166	165	165	1	word	Error ID number
04/--	30167	30182	166	181	16	word	Error ID1 to Error ID16
04/--	30183	30253	182	252	71	word	System reserved
04/--	30254	30254	253	253	1	word	Check setting for number of transmission points
04/--	30255	30255	254	254	1	word	Flag for ASLINK communication
04/--	30256	30256	255	255	1	word	System reserved
04/--	30257	30259	256	258	3	word	Error history No.1 year, month, day, time
04/--	30260	30260	259	259	1	word	Error history No.1 target ID
04/--	30261	30261	260	260	1	word	Error history No.1 error flag
04/--	30262	30291	261	290	30	word	~
04/--	30292	30294	291	293	3	word	Error history No.8 year, month, day, time
04/--	30295	30295	294	294	1	word	Error history No.8 target ID
04/--	30296	30296	295	295	1	word	Error history No.8 error flag
04/--	30297	30299	296	298	3	word	MAC address
04/--	30300	30306	299	305	7	word	System reserved
04/--	30307	30307	306	306	1	word	Latest error code
04/--	30308	30308	307	307	1	word	Latest error occurrence ID
04/--	30309	30320	308	319	12	word	Redundant ID1 to redundant ID12
04/--	30321	30832	320	831	512	word	System reserved
04/--	30833	30835	832	834	3	word	Error/alarm history No.1 year, month, day, time

Modbus/TCP					Occupied [Word]	Type	Items
Function code	Memory address		Offset address				
	Start address	End address	Start address	End address			
04/--	30836	30836	835	835	1	word	Error/alarm history No.1 target ID
04/--	30837	30837	836	836	1	word	Error/alarm history No.1 error code
04/--	30838	31467	837	1466	630	word	~
04/--	31468	31470	1467	1469	3	word	Error/alarm history No.128 year, month, day, time
04/--	31471	31471	1470	1470	1	word	Error/alarm history No.128 target ID
04/--	31472	31472	1471	1471	1	word	Error/alarm history No.128 error code
04/--	31473	31890	1472	1889	418	word	System reserved
04/--	31891	35730	1890	5729	3840	word	R/O parameter storage area (30x128)
04/--	35731	39871	5730	9870	4141	word	System reserved
04/--	39872	39872	9871	9871	1	word	Registration ID number
04/--	39873	40000	9872	9999	128	Word	Registration ID

* When using Modbus/TCP communication, the actual specified start address is the offset address.

7.1.1.1 Input memory map details

The AnyWireASLINK input signal is stored in this memory map.

When the input signal is specified with Modbus/TCP function code 02 (input reading), the corresponding memory addresses are 0~255 (bit type), and when the input signal is specified with function code 04 (input register reading), the corresponding memory addresses are 0~15 (word type).

Since the only difference is the data type, please choose according to your particular application.

<Function code 02 (input reading)>

Modbus/TCP address		Corresponding bit/input address
Memory address	Offset address	
10001	0	0
10002	1	1
10003	2	2
10004	3	3
⋮	⋮	⋮
10255	254	254
10256	255	255

This indicates the state (ON/OFF) of the 0 bit input signal of the input unit set to address 2.

This indicates the state (ON/OFF) of the 0 bit input signal of the input unit set to address 2.

<Function code 04 (input register reading)>

Modbus/TCP address		Corresponding bit/input address															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
30001	0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
30002	1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
30003	2	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
30004	3	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
30015	14	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
30016	15	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

7.1.1.2 Calendar clock

The calendar clock is assigned to Modbus/TCP addresses 160 to 163.

Enter the current year, month, day, and time.

The relationship between the memory address and input address are as follows.

Modbus/TCP address		Data	
Memory address	Offset address	Upper byte	Lower byte
30161	160	Year (Western year format ex: 2013 = 2013(DEC))	
30162	161	Month (ex: August = 0x08 (HEX))	Day (ex: 30th day = 0x1E (HEX))
30163	162	Hour (ex: 13:00 = 0x0D (HEX))	Minute (ex: 26 minutes = 0x1A (HEX))
30164	163	Second (ex: 21 seconds = 0x15 (HEX))	-

7.1.1.3 Error status

The H/W status indicates the status of the ASLINK transmission line.

The error status consists of error flags, number of error IDs, and 16 error IDs (in ID ascending order) in which disconnection is detected.

The relationship between error flags and data memory is as follows.

Modbus/TCP address		Data															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
30165	164	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Error content	"ERR" LED status	Remarks
0	ON: Short-circuit between DP and DN OFF: Normal	Slow flashing	Turns ON when there is a short-circuit between DP-DN. Turns OFF when the erroneous state is canceled. This state is not retained.
1	Reserved	-	-
2	ON: 24V voltage drop OFF: Normal	Quick flashing	Turns ON when 24V voltage drops (approx. 19V). Turns OFF when the erroneous state is canceled. This state is not retained.
3	ON: Disconnection or failure of the unit OFF: Normal	Lit	This state is retained until the power is turned off or the error is cleared.
4 to 15	Reserved	-	-

If disconnection or a unit failure occurs, the number of error IDs is written to 165, and up to 16 error IDs (addresses) are written to addresses 166 to 181.

Modbus/TCP address		Data															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
30166	165	Error ID number															
30167	166	Error ID1															
30168	167	Error ID2															
30169	168	Error ID3															
⋮	⋮	⋮															
30181	180	Error ID15															
30182	181	Error ID16															

The ID format is as follows:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
							Type	Address (0x00 to 0xFF)							

Type: 00: Output, 01: Input (input/output mixed)

	Description
0x000 to 0x0FF	Output slave unit
0x200 to 0x2FF	Input (input/output mixed) slave unit

Example: Output slave unit address 3 = 0x0003

Input slave unit address 10 = 0x020A

7.1.1.4 Check setting for number of transmission points

You can check the setting for the current number of AnyWireASLINK transmission points.

You can specify the setting of the number of transmission points itself from a browser.

Modbus/TCP address		Data	Set content
Memory address	Offset address		
30254	253	0x0000	Input 32 points/Output 32 points
		0x0001	Input 64 points/Output 64 points
		0x0002	Input 128 points/Output 128 points
		0x0003	Input 256 points/Output 256 points

7.1.1.5 AnyWireASLINK communication flag

Each AnyWireASLINK communication status is shown.

The relationship between error flags and data memory is as follows.

Modbus/TCP address		Data															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
30255	254	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Error content	State of each LED	Remarks
0	ON: Alarm OFF: Normal	-	An alarm occurs in the following states. 1) When a slave unit status error (including I/O disconnection and short-circuit) occurs 2) When an error occurs in the address setting of the slave unit
1	ON: ASLINK interrupt communication enabled OFF: ASLINK interrupt communication disabled	-	You can read or write each parameter setting when this bit is on.
2	ON: An ASLINK communication error has occurred OFF: Normal	-	A parameter communication error has occurred due to a problem such as noise.
3	Reserved	-	-
4	ON: Automatic address recognition operating OFF: Normal	SET LED is lit up	When this bit is ON, it indicates that B2G28-E1 is carrying out automatic address recognition.
5 to 15	Reserved	-	-

7.1.1.6 Error history

Up to eight entries of error history that occurred in the past are displayed.
 Error history can be cleared by resetting the power.

Modbus/TCP address			Data	
Memory address	Offset address		Upper byte	Lower byte
30257	256	No.1	Year (Last two digits of Western year format ex: 13 = 0x0D)	Month (ex: August = 0x08)
30258	257		Day (ex: 30th day = 0x1E)	Hour (ex: 13:00 = 0x0D)
30259	258		Minute (ex: 26 minutes = 0x1A)	Second (ex: 21 seconds = 0x15)
30260	259		Error history No.1 target ID	
30261	260		No.1 error flag	
30262	261	No.2	Year (Last two digits of Western year format ex: 13 = 0x0D)	Month (ex: August = 0x08)
30263	262		Day (ex: 30th day = 0x1E)	Hour (ex: 13:00 = 0x0D)
30264	263		Minute (ex: 26 minutes = 0x1A)	Second (ex: 21 seconds = 0x15)
30265	264		Error history No.2 target ID	
30266	265		No.2 error flag	
:	:	:	:	:
30292	291	No.8	Year (Last two digits of Western year format ex: 13 = 0x0D)	Month (ex: August = 0x08)
30293	292		Day (ex: 30th day = 0x1E)	Hour (ex: 13:00 = 0x0D)
30294	293		Minute (ex: 26 minutes = 0x1A)	Second (ex: 21 seconds = 0x15)
30295	294		Error history No.8 target ID	
30296	295		No.8 error flag	

The relationship between error flags and data memory is as follows.

Modbus/ TCP address	Data															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
(Applicable locations)	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Error content	"ERR" LED status	Remarks
0	ON: Short-circuit between DP and DN OFF: Normal	Slow flashing	Turns ON when there is a short-circuit between DP-DN. Turns OFF when the erroneous state is canceled. This state is not retained.
1	Reserved	-	-
2	ON: 24V voltage drop OFF: Normal	Quick flashing	Turns ON when 24V voltage drops (approx. 19V). Turns OFF when the erroneous state is canceled. This state is not retained.
3	ON: Disconnection or failure of the unit OFF: Normal	Lit	This state is retained until the power is turned off or the error is cleared.
4 to 15	Reserved	-	-

7.1.1.7 MAC address

The MAC address of the Ethernet port can be checked.

Modbus/TCP address		Description
Memory address	Offset address	
30297	296	H
30298	297	M
30299	298	L

7.1.1.8 Latest error code/Latest error occurrence ID

It is possible to check the latest error code and target ID that the B2G28-E1 detected.

Modbus/TCP address		Description
Memory address	Offset address	
30307	306	Latest error code
30308	307	Latest error occurrence ID

The latest error code list is as follows: Some information is redundant in other error diagnoses.

Error code		Name	Error occurrence ID	Countermeasures taken by customer
DEC	HEX			
200	C8	Transmission power supply voltage drop error	As this error is not dependent on individual slave units, the "0x0FFF" value is stored.	<p>The cause may be insufficient voltage of the external power supply. Perform the following:</p> <ul style="list-style-type: none"> • Adjust the voltage of the external power supply to lie within the rated range (21.6 to 27.6V). (Recommended voltage is 26.4V.) • 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 that external power supply is correctly connected to the terminal block. Also check that there are no short-circuits, miswiring, or insufficient tightening of screws.
201	C9	DP-DN short-circuit error	As this error is not dependent on individual slave units, the "0x0FFF" value is stored.	<p>The transmission lines (DP-DN) may be short-circuited or a current exceeding the maximum allowable supply current may be flowing through them. Perform the following:</p> <ul style="list-style-type: none"> • Check that the transmission line is not short-circuited. Check that the pin assignment was correct when the link connector was crimped. • In addition, check the contact of each transmission line and that there is no improper wiring in the terminal wiring. • Modify the cable (line diameter and total length) and units (type and number of units connected) so that the consumption current of all slave units does not exceed the supply current.

Error code		Name	Error occurrence ID	Countermeasures taken by customer
DEC	HEX			
202	CA	DP, DN disconnection error	Error ID is stored.	<p>The DP, DN signal lines may be disconnected, or there may be no response from slave units. The system configuration may have been changed after slave unit failure or automatic address recognition. Narrow down the disconnected area by using error ID information or similar method, and then perform the following:</p> <ul style="list-style-type: none"> • Check that there are no disconnections in any transmission line. Also check that a link connector that is appropriate for the particular wire diameter is used and it is crimped with the correct pin assignment. • Check that signal lines are correctly connected to the terminal block. Also check that there is no miswiring or insufficient tightening of screws. • When newly creating a system or altering the system (adding or eliminating slave units, changing addresses), please carry out automatic address recognition. Then, check that the number of slave units and addresses are the same as those of the actual system. • If the slave unit "LINK" LED is not flashing, check the transmission line for disconnection, short-circuit, miswiring, or contact failure near the unit.
300 301	12C 12D	Slave unit hardware error	Occurrence ID is stored.	<p>Slave unit hardware malfunction has been detected. Turn the power of the slave unit off and on. Also, check for any problems due to noise.</p>
302	12E	Parameter access target ID error	As this error is not dependent on individual slave units, the "0x0FFF" value is stored.	<p>Parameter access has been performed for an ID whose address has not been automatically recognized. Narrow down error IDs by checking the alarm ID information in the memory.</p> <ul style="list-style-type: none"> • Next, perform the following: Check if the slave unit ID of the parameter access target in the program matches the ID of the actual system. Note that the ID of the input slave unit and the ID of the input/output mixed slave unit are their addresses +200H. • Carry out automatic address recognition when newly creating a system or altering the system (adding or eliminating slave units, changing addresses). Then, check that the number of slave units and addresses are the same as those of the actual system.
303	12F	Parameter set value error	Occurrence ID is stored.	<p>The slave unit has detected a signal for writing a parameter which cannot be set to itself. After narrowing down error IDs, check that the set value of the slave unit parameter is within the settable range.</p>

Error code		Name	Error occurrence ID	Countermeasures taken by customer
DEC	HEX			
304	130	Parameter access error	Occurrence ID is stored.	Check for any problems due to noise.
305	131	Slave unit status error	Occurrence ID is stored.	The slave unit provides notification of error status. Check the details of the target unit status and remove the cause of the fault.
400	190	ID redundancy error	Occurrence ID is stored.	A redundant address (ID) is set for a connected slave unit. After narrowing down error IDs, check the setting of the slave unit address (ID), and set the ID so that there will be no redundancy.
401	191	ID not set error	Occurrence ID is stored. (255 or 767)	There is a slave unit whose address has not been set (default setting). Perform the following: <ul style="list-style-type: none"> • Set the slave unit address. • Check that the slave unit address is not set to 255.

7.1.1.9 Redundant address (ID)

During automatic address recognition, a redundancy check is carried out on the registered connection IDs (addresses) and the results are saved.

Up to 12 redundant IDs can be displayed.

The redundant ID (address) list is as follows.

Modbus/TCP address		Data															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
30309	308	Redundant ID1															
30310	309	Redundant ID2															
⋮	⋮	⋮															
30319	318	Redundant ID11															
30320	319	Redundant ID12															

The ID format is as follows:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
					Type										

Type: 00: Output, 01: Input (input/output mixed)

	Description
0x000 to 0x0FF	Output slave unit
0x200 to 0x2FF	Input (input/output mixed) slave unit

Example: Output slave unit address 3 = 0x0003

Input slave unit address 10 = 0x020A

7.1.1.10 Error/alarm history

Up to 128 entries of error/alarm history that occurred in the past are displayed.
 Error/alarm history can be cleared by resetting the power.

Modbus/TCP address			Data	
Memory address	Offset address		Upper byte	Lower byte
30833	832	No.1	Year (Last two digits of Western year format ex: 13 = 0x0D)	Month (ex: August = 0x08)
30834	833		Day (ex: 30th day = 0x1E)	Hour (ex: 13:00 = 0x0D)
30835	834		Minute (ex: 26 minutes = 0x1A)	Second (ex: 21 seconds = 0x15)
30836	835		Error/alarm history No.1 target ID	
30837	836		No.1 error code	
30838	837	No.2	Year (Last two digits of Western year format ex: 13 = 0x0D)	Month (ex: August = 0x08)
30839	838		Day (ex: 30th day = 0x1E)	Hour (ex: 13:00 = 0x0D)
30840	839		Minute (ex: 26 minutes = 0x1A)	Second (ex: 21 seconds = 0x15)
30841	840		Error/alarm history No.2 target ID	
30842	841		No.2 error flag	
:	:	:	:	:
31468	1467	No.128	Year (Last two digits of Western year format ex: 13 = 0x0D)	Month (ex: August = 0x08)
31469	1468		Day (ex: 30th day = 0x1E)	Hour (ex: 13:00 = 0x0D)
31470	1469		Minute (ex: 26 minutes = 0x1A)	Second (ex: 21 seconds = 0x15)
31471	1470		Error/alarm history No.128 target ID	
31472	1471		No.128 error flag	

Refer to the Latest error code/Latest error occurrence ID chapter for error code details

7.1.1.11 R/O parameter storage area (30x128)

Blocks in which parameters and statuses that were read from a slave are stored are arranged in ID ascending order.

Modbus/TCP address			
Memory address	Offset address		
31891	1890	Parameter area 1 (30 words)	The parameter area of each ID has 30 words and can store a maximum 128 pieces of information.
-	-		
-	-		
31920	1919	Parameter area 2 (30 words)	The header of the 30 words indicates the ID, and data is arranged in 30-word units in ID ascending order.
31921	1920		
-	-		
31950	1949	-	It is necessary to perform automatic address recognition again when a slave unit is added or the ID of a unit is changed.
-	-		
-	-		
35701	5700	Parameter area 128 (30 words)	
-	-		
-	-		
35730	5729		

The content of each parameter area block is as follows.

Offset	Parameter name	R/W	Classification
0	Slave unit ID	R/W	ASLINK access not required, refer from internal memory
1	Device parameter 1	R/W	Interrupt access, initial access
2	Device parameter 2	R/W	Interrupt access, initial access
3	Device parameter 3	R/W	Interrupt access, initial access
4	Device parameter 4	R/W	Interrupt access, initial access
:	:	:	:
:	:	:	:
15	Device parameter 15	R/W	Interrupt access, initial access
16	Device parameter 16	R/W	Interrupt access, initial access
17	Device parameter 17	R/W	Interrupt access, initial access
18	Device parameter 18	R/W	Interrupt access, initial access
19	Device parameter 19	R/W	Interrupt access, initial access
20	Status details	R/O	Cyclic access
21	Sensing level	R/O	Cyclic access
22	System reserved		
23	System reserved		
24	System reserved		
25	System reserved		
26	System reserved		
27	System reserved		
28	System reserved		
29	System reserved		

Software functions

Status detail words are in the following format.

The relationship between error flags and data memory is as follows.

Modbus/ TCP address	Data															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
(Applicable locations)	⑯	⑮	⑭	⑬	⑫	⑪	⑩	⑨	⑧	⑦	⑥	⑤	④	③	②	①

①: Unit power supply status (common)

Bit status	Meaning
ON	Slave unit voltage drop
OFF	No error

②: Sensing level status (link amplifier, link sensor)

Bit status	Meaning
ON	Sensing level drop
OFF	No error

③: I/O disconnection (non-isolated linker, non-isolated I/O)

Bit status	Meaning
ON	I/O disconnection
OFF	No error

④: I/O short-circuit (non-isolated linker, non-isolated I/O)

Bit status	Meaning
ON	I/O disconnection
OFF	No error

⑤: Reserved

⑥: Voltage drop on I/O power supply side (isolated linker, isolated I/O)

Bit status	Meaning
ON	Voltage drop on I/O power supply side
OFF	No error

⑦ to ⑯: Reserved

7.1.1.12 Registration ID

You can check the IDs of units that were registered by automatic address recognition. You can view up to 128 registration ID numbers and registration ID lists, and also check whether each ID has any error. The registration ID number and ID list are as follows.

Modbus/TCP address		Data															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
39872	9871	Registration ID number															
39873	9872	Registration ID1															
39874	9873	Registration ID2															
39875	9874	Registration ID3															
⋮	⋮	⋮															
39999	9998	Registration ID127															
40000	9999	Registration ID128															

The ID format is as follows:

* The most significant bit of the ID format is also used as the error check bit.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Error					Type			Address (0x00 to 0xFF)							

Type: 00: Output, 01: Input (input/output mixed)

	Description
0x000 to 0x0FF	Output slave unit
0x200 to 0x2FF	Input (input/output mixed) slave unit

Example: Output slave unit address 3 = 0x0003
 Input slave unit address 10 = 0x020A

7.1.2. Output memory map

The memory map list when accessing from Modbus/TCP is shown below.

Modbus/TCP					Occupied [Word]	Type	Items
Function code	Memory address		Offset address				
	Start address	End address	Start address	End address			
01/05	1	256	0	255	16	bit	Output area
03/06,16	41025	41040	1024	1039	16	word	Output area
03/06,16	41041	41184	1040	1183	144	word	System reserved
03/06,16	41185	41188	1184	1187	4	word	Set year, month, day, hour, minute, second
03/06,16	41189	41189	1188	1188	1	word	Time setting flag
03/06,16	41190	41202	1189	1201	13	word	System reserved
03/06,16	41203	41203	1202	1202	1	word	Error clear
03/06,16	41204	41204	1203	1203	1	word	Control command
03/06,16	41205	41824	1204	1823	620	word	System reserved
03/06,16	41825	41825	1824	1824	1	word	Parameter access method
03/06,16	41826	41826	1825	1825	1	word	Parameter access target ID
03/06,16	41827	44386	1826	4385	2560	word	R/W Parameter storage area (20x128)
03/06,16	44387	46626	4386	6625	2240	word	System reserved

* When using Modbus/TCP communication, the actual specified start address is the offset address.

7.1.2.1 Output area

Output signals of AnyWireASLINK are stored in this memory map.

When output area is specified with a Modbus/TCP function code 01/05, the corresponding memory address is 1 to 256 (bit type), and when output area is specified with a function code 03/06,16, the corresponding memory address is 41025 to 41040 (word type).

Since the only difference is the data type, please choose according to your particular application.

<Function code 01/05>

Modbus/TCP address		Corresponding bit/ input address
Memory address	Offset address	
1	0	0
2	1	1
3	2	2
4	3	3
⋮	⋮	
255	254	254
256	255	255

This indicates the state (ON/OFF) of the 0 bit input signal of the input unit set to address 2.

<Function code 03/06,16>

Modbus/TCP address		Corresponding bit/input address															
Memory address	Offset address	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
41025	1024	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
41026	1025	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
41027	1026	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
41028	1027	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
⋮	⋮																
41039	1038	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
41040	1039	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

7.1.2.2 Calendar clock settings

The calendar clock is assigned to Modbus/TCP addresses 1184 to 1188. Year, month, day, and time can be set.

Modbus/TCP address		Byte	
Memory address	Offset address	Upper byte	Lower byte
41185	1184	Year (Western year format Ex: 2012)	
41186	1185	Month	Day
41187	1186	Hour	Minute
41188	1187	Second	-
41189	1188	Set with 0 ⇒ 1	

7.1.2.3 Error clear

If an error such as wire disconnection is resolved, the disconnection flag and number of error IDs are both reset to "0" by writing "1" in Modbus/TCP address 1202. (Briefly pressing the SET switch also clears errors.) If the error status has not been resolved, the error flag, the number of error IDs and the error IDs are set again.

Turning the power on again will also clear errors. Flags and the number of error IDs can be read.

Modbus/TCP address		Description
Memory address	Offset address	
41203	1202	Clear errors by 0 ⇒ 1

7.1.2.4 Control command

Control command is carried out on B2G28-E1.

Modbus/TCP address		Value	Description	Details
Memory address	Offset address			
41204	1203	0	Invalid	-
		1	Remote reset	Resets the B2G28-E1 by remote operation. Provides the same effect as resetting the power.
		2	Automatic address recognition	Carries out automatic address recognition. Refer to SET switch of "Switch functions" for details.
		3	Address redundancy check	Carries out address redundancy check for the currently connected device. Even if automatic address recognition is not carried out, only the redundancy check is carried out.
		4	Parameter access command	Applies the parameter access method and parameter access target to ASLINK, and carries out ASLINK parameter operation for one unit.
		5	Parameter access collective reading command	Reads parameters of all units (only recognized IDs; not carried out for disconnection IDs, redundant IDs, and default setting ID (255)).
		6	Parameter access collective writing command	Writes parameters of all units (only recognized IDs; not carried out for disconnection IDs, redundant IDs, and default setting ID (255)).

7.1.2.5 Parameter access method/Parameter access target ID

This becomes the area to store the access method (Read/Write) and access target ID when a parameter access command (value 4) is carried out by control command.
 After storing data in this area, perform the parameter access command.

<Parameter access method>

Modbus/TCP address		Value	Description
Memory address	Offset address		
41825	1824	0	Read
		1	Write

<Parameter access target ID>

Modbus/TCP address		Value
Memory address	Offset address	
41826	1825	Access target ID

The ID format is as follows:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Type								Address (0x00 to 0xFF)							

Type: 00: Output, 01: Input (input/output mixed)

	Description
0x000 to 0x0FF	Output slave unit
0x200 to 0x2FF	Input (input/output mixed) slave unit

Example: Output slave unit address 3 = 0x0003
 Input slave unit address 10 = 0x020A

7.1.2.6 Parameter storage area (20x128)

Blocks in which device parameters written to a slave are arranged ID ascending order.

Modbus/TCP address			
Memory address	Offset address		
41827	1826	Parameter area 1 (20 words)	The parameter area of each ID has 20 words and can store a maximum 128 pieces of information. The header of the 20 words indicates the ID, and data is arranged in 20-word units in ID ascending order.
.	.		
.	.		
41846	1845	Parameter area 2 (20 words)	It is necessary to perform automatic address recognition again when a slave unit is added or the ID of a unit is changed.
41847	1846		
.	.		
41866	1865	.	.
.	.	.	.
44367	4366	Parameter area 128 (20 words)	
.	.		
.	.		
44386	4385		

The content of each parameter area block is as follows.

Offset	Parameter name	R/W	Classification
0	Slave unit ID	R/W	ASLINK access not required, refer from internal memory
1	Device parameter 1	R/W	Interrupt access, initial access
2	Device parameter 2	R/W	Interrupt access, initial access
3	Device parameter 3	R/W	Interrupt access, initial access
4	Device parameter 4	R/W	Interrupt access, initial access
:	:	:	:
:	:	:	:
15	Device parameter 15	R/W	Interrupt access, initial access
16	Device parameter 16	R/W	Interrupt access, initial access
17	Device parameter 17	R/W	Interrupt access, initial access
18	Device parameter 18	R/W	Interrupt access, initial access
19	Device parameter 19	R/W	Interrupt access, initial access

7.2 SLMP (MC protocol)

SLMP (MC protocol) is a communication protocol that is incorporated into this board and made available. This device becomes a client and communicates with the Mitsubishi Electric MELSEC sequencer. Memory of the sequencer and memory of this device are linked by settings and used. I/O on AnyWire can be processed without knowledge of communication on the sequencer side. 3E frame binary type is supported. Start and stop can be selected.

7.3 EtherNet/IP

EtherNet/IP is a communication protocol that is incorporated into this board and made available. This communicates with EtherNet/IP support devices such as the OMRON CJ2 Series sequencer (PLC). Start and stop can be selected.

7.4 Web functions

The B2G28-E1 is equipped with a web server and various settings can be carried out through a web browser.

The following login screen appears when accessed with a browser.

Basic setting of the B2G28-E1 can be carried out via the web server.

The default IP address is 192.168.0.36.

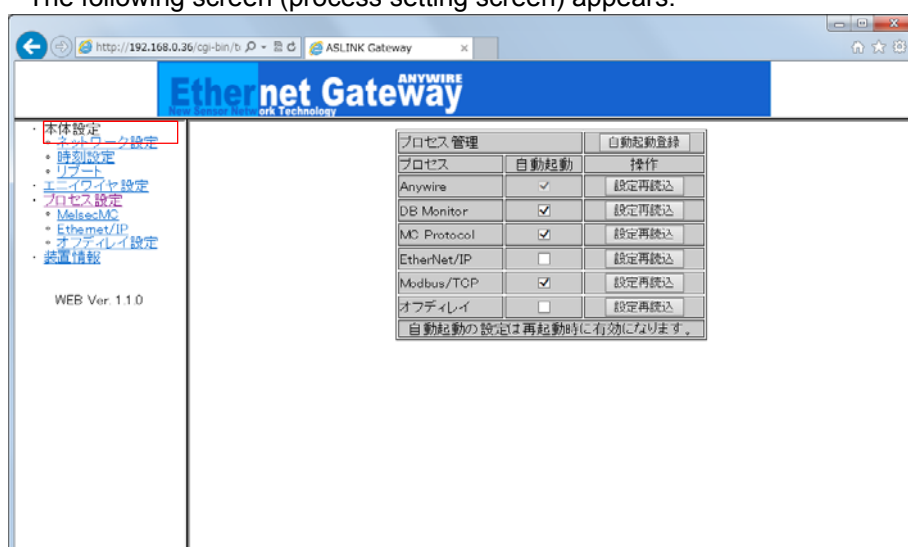
- ① Connect the PC to be used for setting directly to the B2G28-E1 with a LAN cable. Either a cross or straight LAN cable is acceptable.
- ② Set the connected LAN interface as follows.
IP address: 192.168.0.xx (Excluding 36, 0, and 255 for xx)
Sub-net mask: 255.255.255.0
- ③ Turn on the main unit power. It is accessible when the "RDY" LED lights up and "LINK.B" flashes.
- ④ Start a web browser (such as IE) and access the set IP address. Enter http://192.168.0.36 in the address bar of the browser and press the Enter key.

The following login screen appears.



Enter ID: "anywire", Password: "anywire".

The following screen (process setting screen) appears.



7.4.1. Network settings

Set the IP address, port, gateway, subnet mask, and similar items.
 Access this device with a web browser to specify settings.
 The gateway has the following setting items.

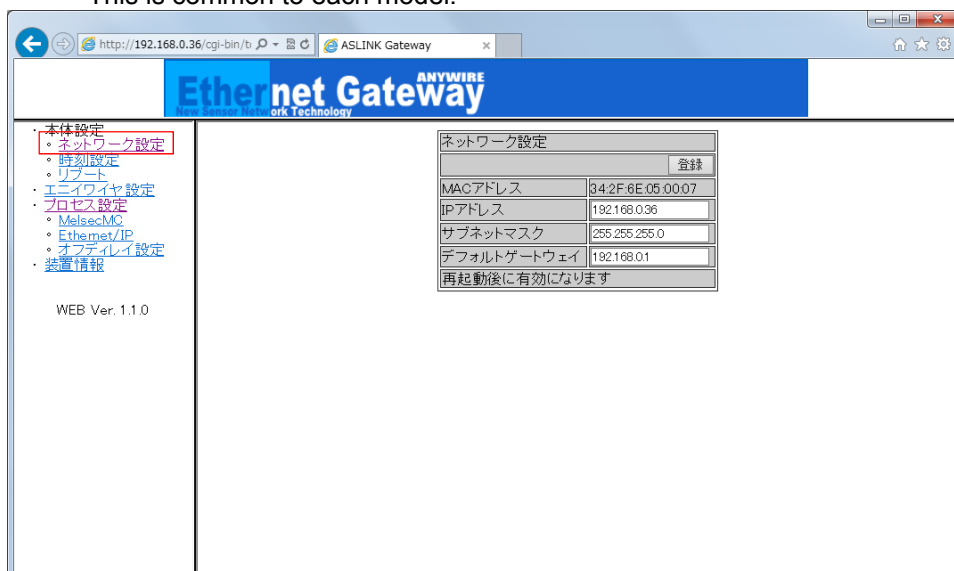
7.4.2. Own station information

Settings	Default setting
IP address	192.168.0.36
Sub-net mask	255.255.255.0
Default gateway address	192.168.0.1

⇒ Changes to settings are applied after they are written and the system is restarted.

☆ To start with the default setting, turn on the power while pressing the "SET" button.

* This is common to each model.



7.4.3. Connection destination information

This is the connection destination MC protocol server information (socket setting) when SLMP (MC protocol) is used.

A maximum of eight sockets can be used.

Settings	Set content
IP address	IP address of connection destination sequencer
Port number	Port number of connection destination sequencer (400H or higher)
Basic protocol	UDP or TCP
Tag information (4 pairs)	Source/destination address, device type, device address, quantity
Start/Stop	Start or stop

⇒ Changes to settings are applied after writing settings and restart, and "Stop" for the default setting.

Enter the Modbus address into the transfer source address.

Example:
 Block transfer 0
 Input area → Input information 256 points (16 words)
 Output area → Output information 256 points (16 words)

Block transfer 1
 Input area → Error flag (1 word)
 Error address number (1 word)
 Error address information (16 words)
 Output area → Error clear (1 word)
 Control command (1 word)

An I/O of a up to 4 blocks can be set for each socket. If the number of transfer words is set to "0," transfer of the block is not carried out. The largest number of transfer words is 512 words.

Output is reset when a communication timeout occurs after it has been set (in 100ms units).

This is the transfer area setting screen when EtherNet/IP is used.

⇒ Changes to settings are applied after writing settings and restart, and "Stop" for the default setting.



The area to be transferred with EtherNet/IP can be selected from this screen.

Note: This unit is an adapter.

It is necessary to also set the same content on the scanner side as the transfer length that was set here.

Refer to the scanner manual or engineering tool operation manual of each company for how to set the scanner side.

7.4.4. AnyWire settings

Point number setting (MODE) can be carried out.

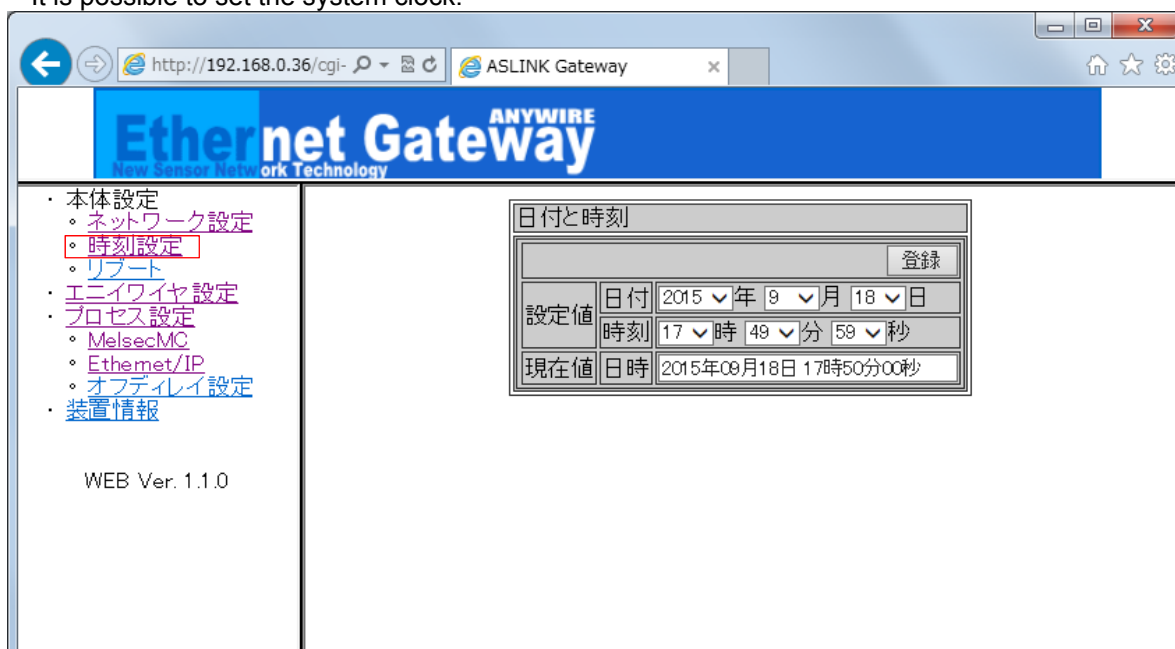
Frame length (32/64/128/256 clock) can be changed.

⇒ Changes to settings are applied immediately when settings are written. The default setting is "256."

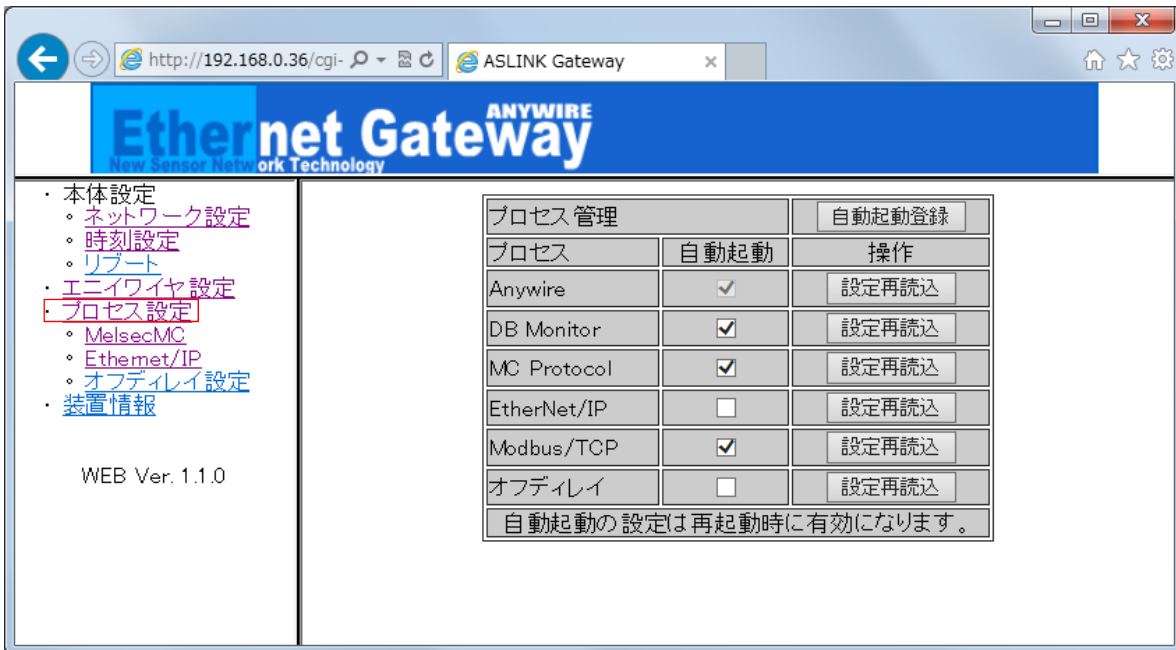


7.4.5. Clock settings

It is possible to set the system clock.



7.4.6. Process settings

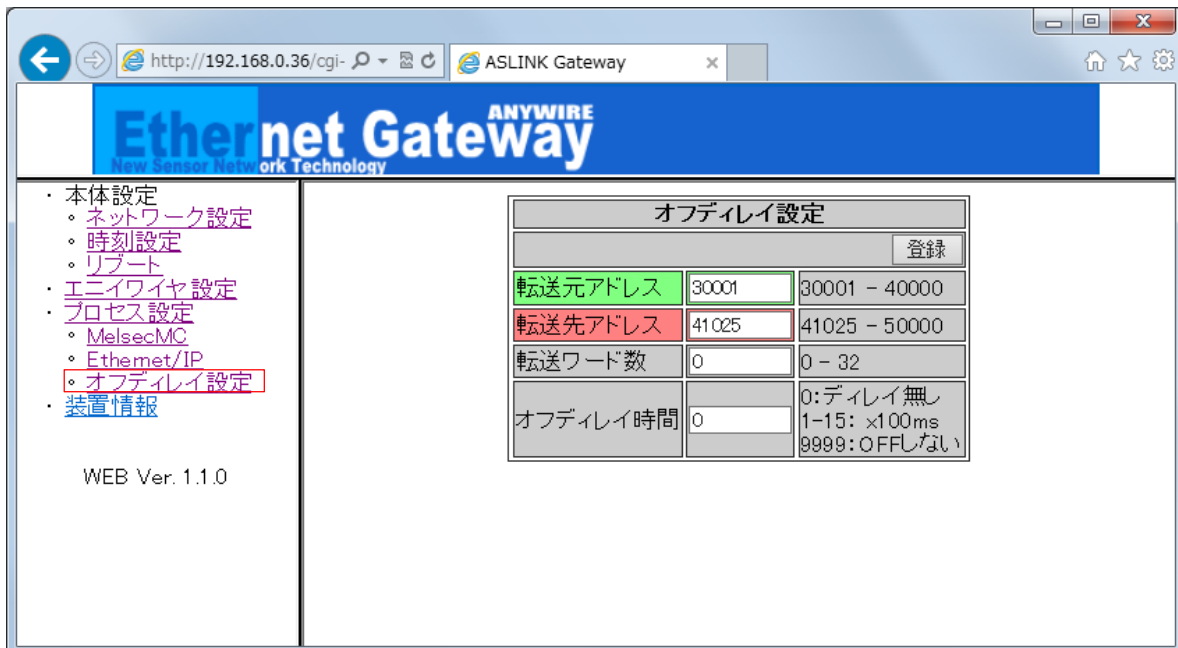


The point number setting for AnyWireASLINK, and SLMP (MC protocol) setting, EtherNet and IP settings can be applied in real time from this screen.

Put a tick in the "Auto start" check box of a protocol that you want to start and press the "Auto start register" button. Each protocol can be started automatically from the next time it is used.

7.4.7. Off delay settings

Off delay time for the designated input and output signal can be set.



7.4.8. Reboot

It is possible to reboot the main unit.



7.4.9. Default setting

The device can be temporarily started using the default setting if you cannot remember the IP address.

The procedure is as follows.

- ① Turn off the power.
- ② Turn on the power while holding the SET button. Place your finger so that the LED on the side of the button is visible at this time.
- ③ The LED on the side of the SET button flashes after approximately 20 seconds.
- ④ Release your finger from the button.

The IP address is "192.168.0.36" in this state. Access the device from a browser to check or change the IP address.

8. Monitoring function

8.1 Overview

AnyWireBus slave units have their own addresses, and when this device sends out an address, a response from the slave unit with that address allows for disconnection detection and verifies the existence of the slave unit.

This device stores the addresses of the slave units that are connected at that time via the automatic address recognition operation (described later) onto the E²PROM. This information is stored in memory even if the power is turned off.

Next, the registered addresses are sent out sequentially, and if there is no response, the "ERR" LED lights up to indicate a disconnection.

8.2 Automatic address recognition

Storing addresses of the connected slave units onto the E²PROM of this device is called "Automatic address recognition."

Procedure

- 1 Check that all of the slave units are operating normally.
- 2 Press and hold the "SET" switch of this device until the "SET" LED (yellow) lights up.
- 3 The "SET" LED lights up for a while and then turns off when address storage has been completed.

* This can be also carried out by a control command. → P7-15



- Input/output may not be carried out during automatic address recognition. When carrying out the automatic address recognition operation, stop execution of any PLC programs or execute in a manner that does not interfere with the operation of the equipment.
- The automatic address recognition operation cannot be carried out if there is an error in the AnyWireBus D2 such as a short-circuit, after the power is turned on, or for approximately five seconds after resetting.
- Do not perform automatic address recognition if a disconnection error is detected during operation. Doing so will result in the loss of disconnection information.

8.3 Monitoring operation

The registered addresses are sent out sequentially, and if there is no response, the "ALM" LED lights up to indicate a disconnection.

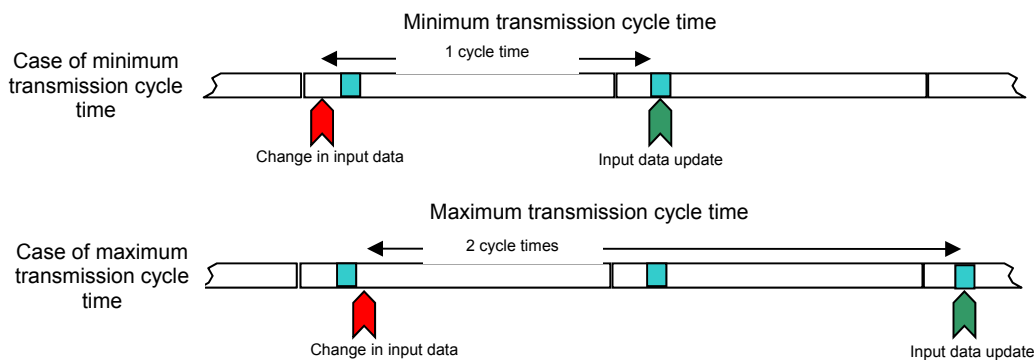
This error information is retained until the power is turned off or the alarm is reset.

(Refer to the section "LED display.")

9. Required transmission time

9.1 Input

The transmission cycle time requires a minimum amount of time equal to one transmission cycle and a maximum amount of time equal to two transmission cycles because input area data is not updated on the master side (double-check) unless the same data is received two consecutive times. Signals of two cycle times or less may not be captured depending on the timing. Therefore, in order to ensure a response, provide an input signal longer than two cycle times.



9.2 Output

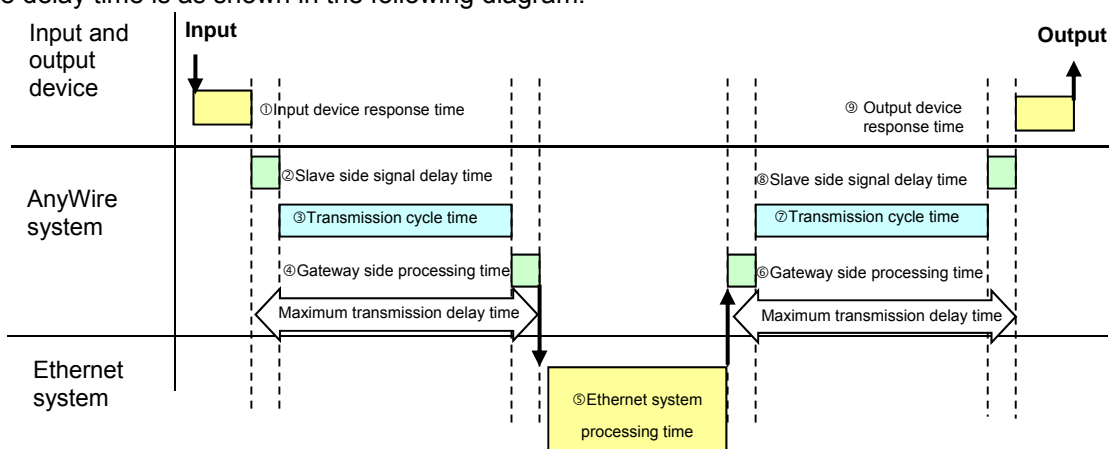
A transmission time of a minimum of one cycle time and a maximum of two cycle times is required on the slave unit side, similar to input, because a double-check is performed on that side.

Terminology

Cycle time: Repeated transmission time of actual data transmitted

Maximum transmission delay time: Processing time on master side + Refresh time + Signal delay time on slave side

Response delay time is as shown in the following diagram.



10. Device profile

Use the following EDS file.

- B2G28-E1.eds

EDS files can be downloaded from the AnyWire Homepage.

<http://www.anywire.jp>

Top page>Support & Download>Download>Software

11. Troubleshooting

11.1 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) Check the LED state of the gateway

1. LED display on the Ethernet side

The "LINK" LED is lit ⇒ Normal

If the LED is unlit, this may be due to the power being off or an error. Check the LAN cable connection.
→ P4-1

The "ACT" LED is flashing ⇒ Normal

If the LED is not flashing, this may be due to the power being OFF or an error. Check the LAN cable connection or the IP address setting.

The "ACT" LED is unlit ⇒ Normal (or the power is off)

→ P4-1

2. LED display on the AnyWireASLINK side

Check the "LINK.B" LED.

The "LINK.B" LED is flashing ⇒ Normal

If the LED is unlit, check that 24V power is being supplied.

Replace this device if 24V power is being supplied or if the LED is lit.

→ P4-1

Check the "ERR" LED.

The "ERR" LED is unlit ⇒ Normal

If the LED is flashing or is lit, refer to P11-3 to remove the cause of the error.

→ P11-3

Check the "ALM" LED.

The "ALM" LED is unlit ⇒ Normal

If the LED is lit, refer to P11-2 and P11-4 to remove the cause of the alarm.

→ P11-2, P11-4

(2) Check the LED state of the slave unit

1. Check the "LINK" LED.

The "LINK" LED is flashing ⇒ Normal

If the LED is not flashing, refer to P11-2 and P11-4 to remove the cause of the error.

→ P11-2, P11-4

2. Check the "ALM" LED.

The "ALM" LED is unlit ⇒ Normal

If the LED is not unlit, refer to P11-2 and P11-4 to remove the cause of the alarm.

→ P11-2, P11-4

11.2 Check using input/output data

For Modbus/TCP and SLMP, errors can be checked using input/output data.

(1) Check error flags

Error flag information is stored in Modbus address 30165.

→ P7-3

(2) Check error address number information and error address information

Error address number information is stored in Modbus address 30166.

Remove any problems until the error number or alarm number becomes "0."

→ P7-3

(3) Check error occurrence ID information

Error address information is stored in Modbus addresses 30166 to 30182. (Max. 16 units)

→ P7-3 to P7-4

(4) Check status detail information (slave unit)

If the occurring error is a slave unit status error, status details (the associated Modbus address) of the target ID can be checked by specifying the target ID and turning on the slave access request command.

→ P7-10, P7-11, P7-15

11.3 LED state of the gateway

(1) When the "ERR" LED is lit or is flashing

① "ERR" 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 "ERR" flashes quickly (every 0.2 seconds): Transmission circuit drive 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 rated range (21.6 to 27.6V DC). (Recommended voltage is 26.4V DC.)
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 "ERR" is lit: DP-DN (transmission line) disconnection error

Items to check	Description of measures
Check that the transmission line (DP, DN) is not disconnected	Check connection parts and continuity between lines.
Check the wiring of the terminal block	Check that there is no miswiring.
Carry out automatic address recognition	ALM lights up at initial continuity. Carry out automatic address recognition.

11.4 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

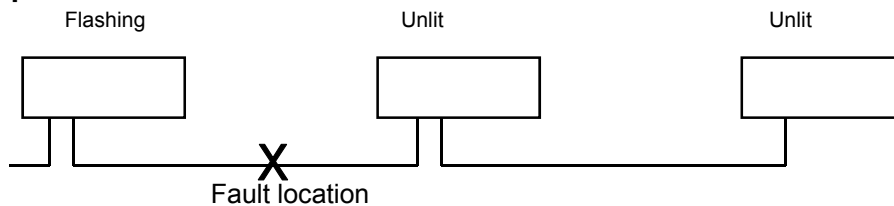
The slave unit is not receiving transmission signals. (Transmission waveform error)
 Under normal conditions, a voltage of approximately 17V to 18V is observed when measuring between transmission lines (DP-DN) using a tester in DC mode.
 If the measured voltage is the same as the power supply voltage, 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

A slave unit status error has occurred. Check the status details and remove the cause of the fault.

(4) When "ALM" is flashing

The signal voltage of the transmission line (DP-DN) is in a low state.
 Check that the supply voltage of the gateway 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 gateway has detected that there is a redundant ID (address) of the applicable unit or the ID is not set.
 Check if there is a redundant address or if the ID has been set, and then set again.

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

The connection cable of the two-wire type sensor connected to this unit is disconnected.
 * Disconnection can be detected for two-wire type sensors only.

12. Warranty

■ 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.

13. RoHS Directive for the Chinese version

电子信息产品上所示标记是依据 SJ/T11364-2006 规定，按照电子信息产品污染控制标识要求制定。

本产品的环保使用期限为 10 年。如果遵守产品说明书中的操作条件使用电子信息产品，不会发生因产品中的有害物质泄漏或突发异变而引发严重的环境污染，人身事故，或损坏财产等情况。

的产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 [Cr(VI)]	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
安装基板	x	○	○	○	○	○
框架	○	○	○	○	○	○



本表格依据 SJ/T11364 的规定编制。

○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。

x：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 规定的限量要求。

14. Change history

Version	Date	Description of changes
First edition	10/19/2015	Released
Version 1.0	4/21/2016	Standardization of structure, additions
Version 1.1	8/24/2016	"6.9 AnyWire filter" Corrected allowable current from 10A to 5A
Version 1.2	5/25/2017	"2.2 Performance specifications" Corrected the transmission cycle time "6.2 Slave units" Updated content Added Chinese RoHS Directive, unified other expressions
Version 1.3	7/18/2017	"7.1 Memory map" Made corrections

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