

AnyWireASLINK System
Ethernet Gateway
B2G78-E1

User's Manual

Ver. 3.0 Jan. 22, 2024

Precautions

● Notes on this Manual

1. Please forward this Manual to end users.
2. Before operation of this product, please read this Manual thoroughly to understand the contents of this Manual.
3. This Manual is intended to describe the functions included in this product, not to guarantee conformity to customer's specific purpose.
4. A part or the whole of this Manual is prohibited from reprinting or reproduction without our permission.
5. 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 damage only.

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.
- To prevent leak or falsification of the information on this product due to third party's unauthorized access, provide thorough security measures such as firewall. We shall not be liable for any trouble with the system caused by unauthorized access.

[Precautions for design]

CAUTION

- The AnyWire 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. 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]

WARNING

- 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.
- If the system shall conform to the UL standard, install the Gateway unit in a housing that ensures the degree of protection suitable for the final product, according to the regulations of NEC, CEC or the competent authorities.

[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 cable 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 unit may become insufficient due to voltage drop. Therefore, connect an external power source to ensure the specified voltage.
- Do not turn on the 24V DC power source before completing wiring and connections of the whole AnyWire system.
- Use a 24V 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]

WARNING

- 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.

CAUTION

- 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.
- Do not turn off the power supply to the main body, press the RESET button, or reboot the system when the system is in any of the following status. Doing so may cause unforeseen problems such as crashes of settings and system data that are stored to occur.
 - [1] Over the period from the start of power feeding to the completion of startup steps at which RDY lights up and LINK flashes.
 - [2] Over the period for which SET is flashing when the system is being returned to the factory-shipped settings
 - [3] Over the period for which SET stays on during the automatic address recognition
 - [4] Over the period for which you are opening and logging onto the browser, performing operations to change displayed contents on the browser, or performing operations to change browser settings

[Precautions for disposal]

CAUTION

- Dispose of this product as industrial waste.
- This product includes button batteries (CR2032).

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1. Overview

B2G78-E1 is the gateway unit for the Ethernet and AnyWireASLINK systems. Using this gateway enables the AnyWireASLINK system to be connected to Ethernet.

The AnyWireASLINK system is a Sho-Haisen (wiring saving) system equipped with small and fewer-point and 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 BOX is not placed.

In addition, "Digital Link Sensor" in which AnyWireASLINK sensing function and wiring saving function are incorporated is proposed.

This is a sensor directly connectable to the transmission line, and offers ultimate wiring saving without using a remote terminal.

And, not only ON/OFF information, but also information such as sensing level and disconnection are transmitted to the controller side.

It is possible to monitor the operating state, prevent momentary stop and significantly reduce cause investigation time at the time of failure.

2. Specifications

2.1 General specifications

Items	Specifications
Operating ambient temperature/humidity	0 to +55°C, 10 to 90% RH, No condensation
Storing ambient temperature/humidity	-20 to +75°C, 10 to 90% RH, No condensation
Vibration resistance	Conforming to JIS B 3502
Impact resistance	Conforming to JIS B 3502
Atmosphere	No corrosive gas
Rated altitude ^{*1}	0 – 2000m
Pollution degree ^{*2}	2 or less

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

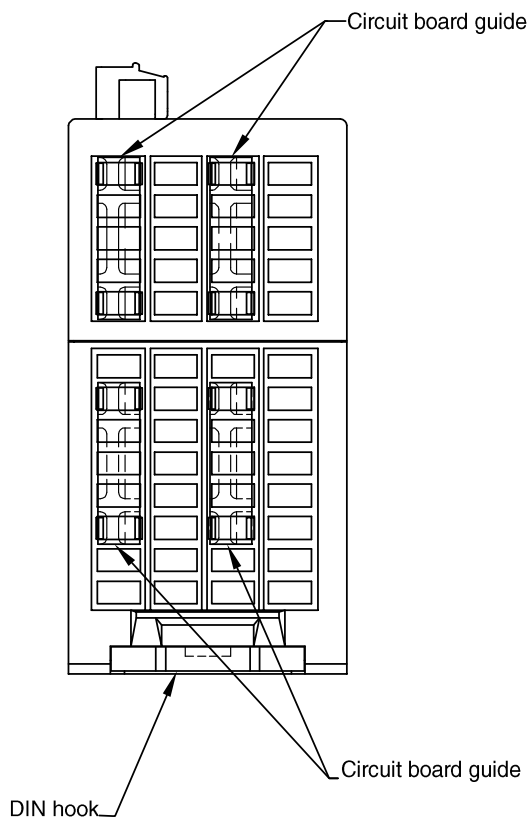
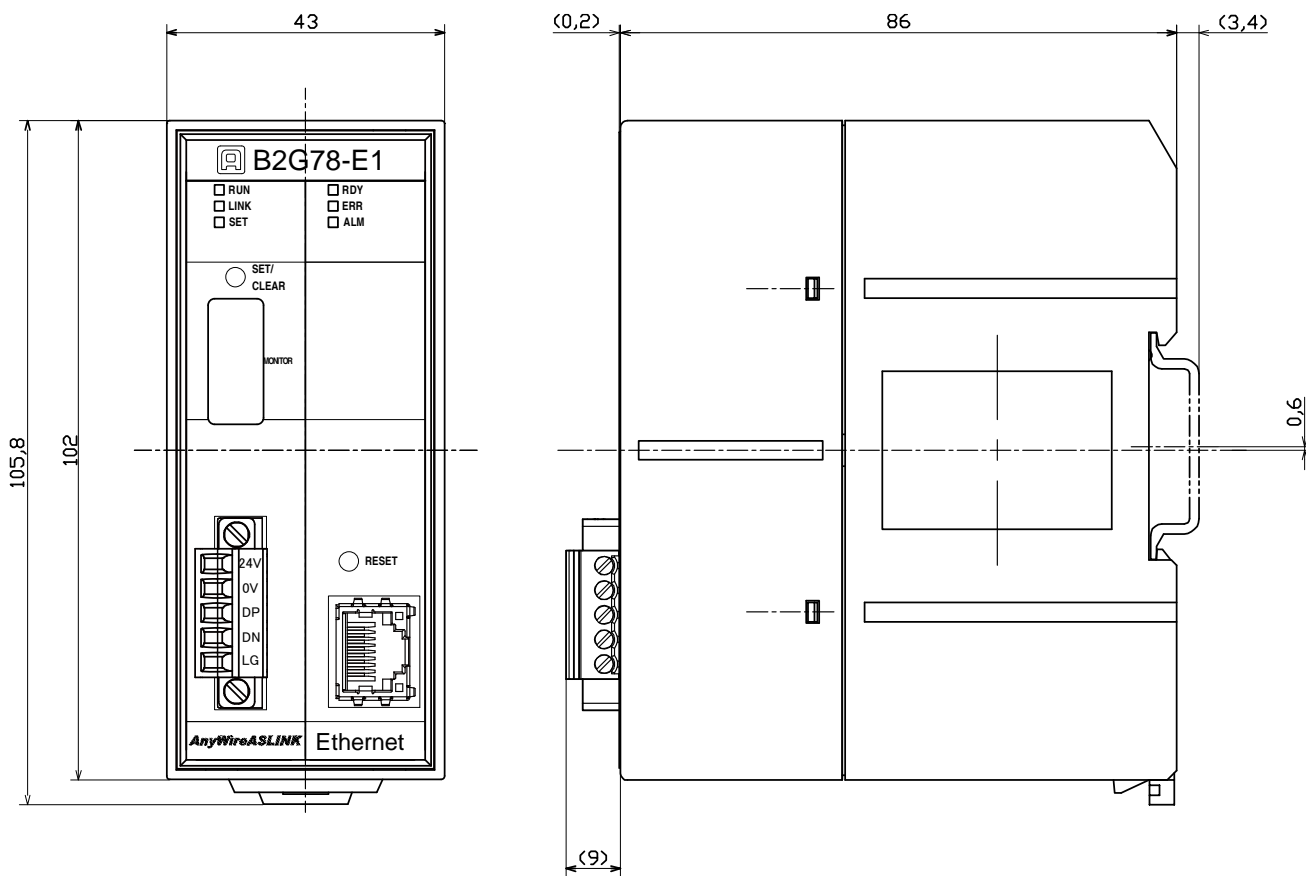
*2 Index indicating a degree of conductive substance generation under the equipment operating environment.
 "Pollution degree 2" indicates generation of nonconductive substance only. However, temporary conduction may occur in the environment due to accidental coagulation.

2.2 Performance specifications

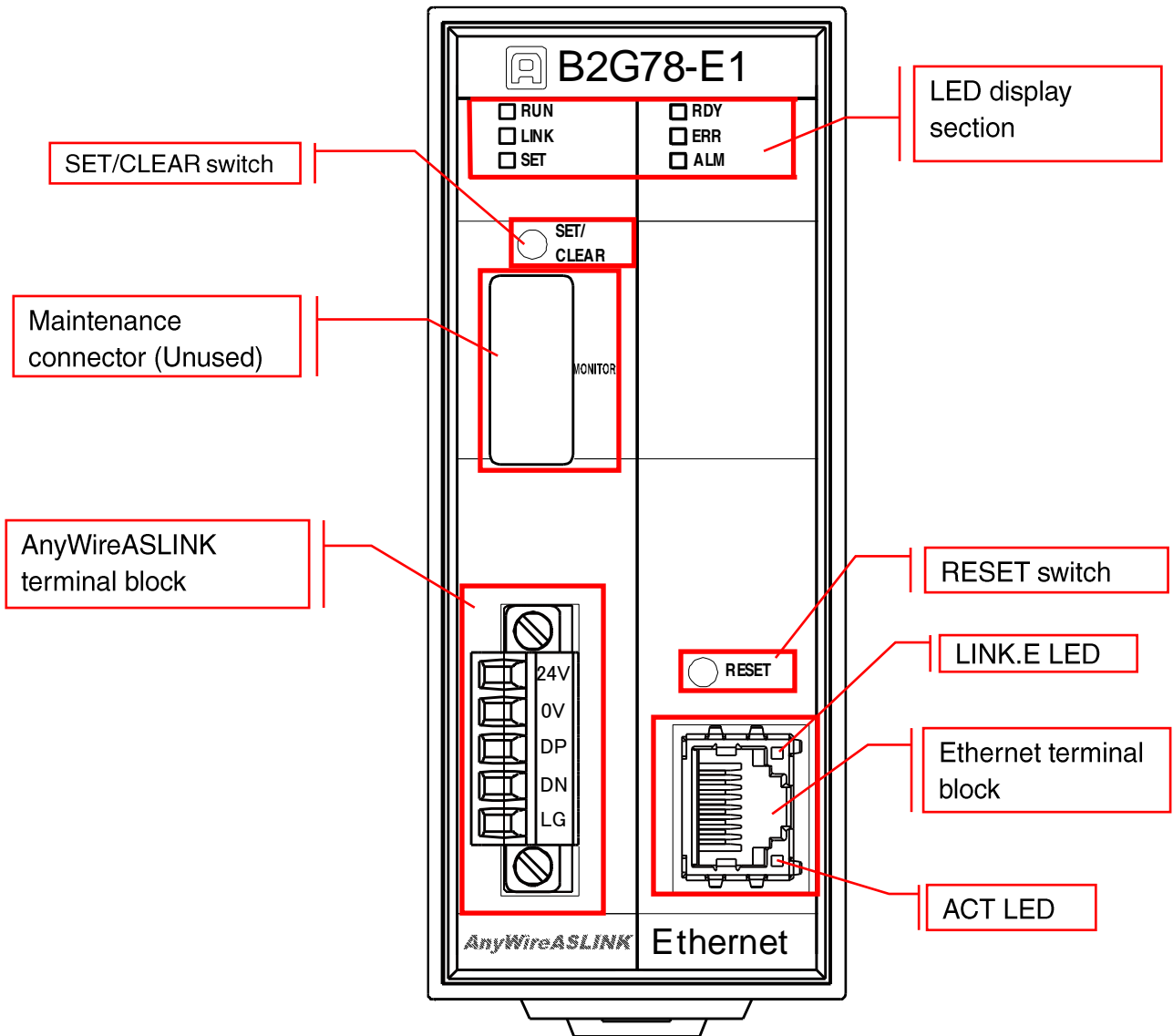
Items	Specifications			
Transmission clock	27kHz (37μs)			
Transmission method	DC power supply superimposed total frame, cyclic method			
Synchronization method	Frame/bit synchronization			
Transmission protocol	AnyWireASLINK protocol			
Maximum number of bits	512 points (256 inputs, 256 outputs)			
Number of connectable units	128 units max.			
Transmission distance / Supply current	Cable diameter	Transmission distance		DP, DN allowable supply current
	1.25mm ²	50m or less		MAX 2A
		Over 50m, 100m or less		MAX 1A
		Over 100m, 200m or less		MAX 0.5A
	0.75mm ²	50m or less		MAX 1.2A
		Over 50m, 100m or less		MAX 0.6A
		Over 100m, 200m or less		MAX 0.3A
	0.5mm ²	50m or less		MAX 0.8A
		Over 50m, 100m or less		MAX 0.4A
		Over 100m, 200m or less		MAX 0.2A
Error correction	Double check, checksum			
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	<ul style="list-style-type: none"> • General-purpose, 2-core/4-core cable (VCTF, VCT 0.75 to 1.25mm², Rated temperature: 70°C) • General-purpose cable (0.75 to 1.25mm², Rated temperature: 70°C) • Dedicated flat cable (0.75mm² / 1.25mm², Rated temperature: 90°C) 			
Connection method	T-branching, multi-drop, star-branching, Tree-branching			
Power supply	Voltage: 21.6 to 27.6V DC (24V DC -10 to +15%) Ripple: 0.5V p-p or less Recommended voltage: 26.4V DC (24V DC +10%) For conformity to the UL standards, be sure to use a 24V DC stabilized power supply with NEC Class 2 output.			
Bit transmission cycle time	32 inputs	64 inputs	128 inputs	256 inputs
	32 outputs	64 outputs	128 outputs	256 outputs
	2.4ms	3.6ms	6.0ms	10.7ms
Power consumption	150mA (not including the load)			
Weight	190g			

2.3 Dimensional outline drawing

Unit: mm



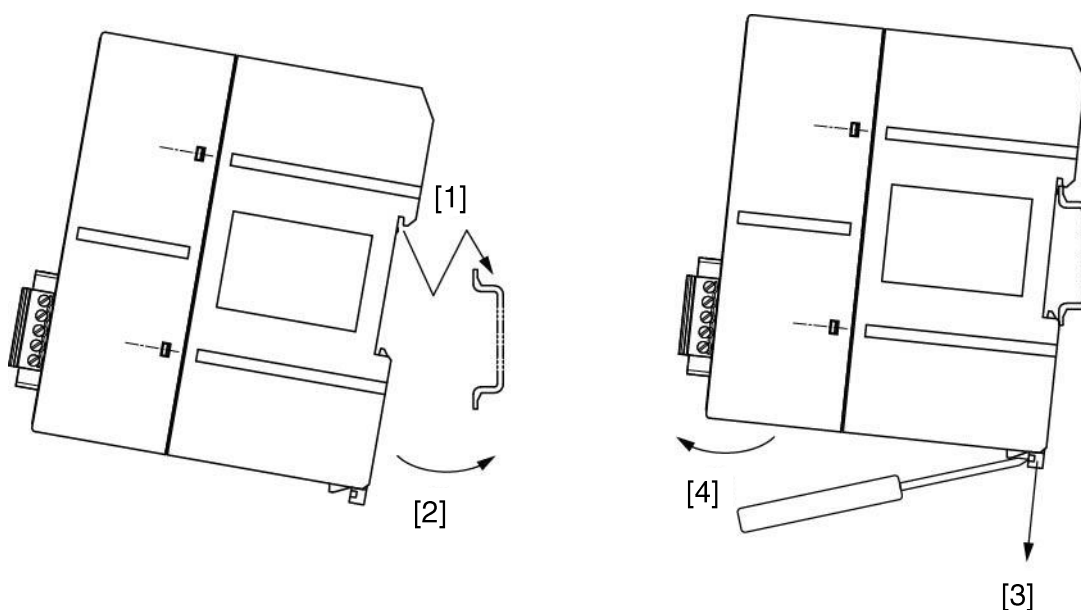
2.4 Name of each part



2.5 Attaching to/detaching from DIN rail

Install B2G78-E1 to the DIN rail and use it.

1. How to attach to the DIN rail
 - [1] Hang the fixed hook on the upper part of the bottom surface on the DIN rail.
 - [2] Snap in B2G78-E1 by pressing it against the DIN rail.
2. How to detach from the DIN rail
 - [3] Using a screwdriver or similar tool, loosen the DIN hook on the lower part of the bottom surface by pulling it downward.
 - [4] Remove B2G78-E1 from the DIN rail.



CAUTION

Do not install B2G78-E1 upside-down (with the fixed hook down).
B2G78-E1 may be detached from the DIN rail due to vibration, etc.

3. Switch setting

3.1 SET/CLEAR switch

The SET/CLEAR switch is used to execute the following functions:

- Automatic address recognition (p. 7-16, p. 8-1)
- Error clear (p. 7-16)
- Factory-setting (p. 7-43)

3.1.1. Automatic address recognition procedure

- [1] Make sure that the “LINK” LED of B2G78-E1 is flashing.
- [2] Make sure that the remote unit connected to B2G78-E1 is normally operating.
- [3] Keep the SET/CLEAR switch pressed (for two seconds or longer).
- [4] After the “SET” LED turns on, release the SET/CLEAR switch.
- [5] After a while, the “SET” LED turns off, and automatic address recognition is completed.

Automatic address recognition can be executed with the control command from the host system (see p. 7-16).



CAUTION

Do not turn off the power supply to the main body, press the RESET button, or reboot the system when SET LED stays on. Doing so may cause unforeseen problems such as crashes of settings and system data that are stored to occur.

3.1.2. Error clear procedure

- [1] Press the SET/CLEAR switch (shorter than two seconds).
- [2] Make sure that the intended error has been cleared.

Error clear can be executed with the error clear procedure from the host system (see p. 7-16).

3.1.3. Factory-setting procedure

- [1] Turn OFF the power supply for B2G78-E1.
- [2] With the SET/CLEAR switch pressed, turn ON the power supply for B2G78-E1.
- [3] At the lapse of approx. 20 seconds, the “SET” LED starts flashing.
- [4] After the “SET” LED is brought into flashing status, release the SET/CLEAR switch.
- [5] The “SET” LED turns off, and the “LINK” LED flashes.
- [6] This completes the factory-setting procedure. (The unit will start up with the factory-set IP address temporarily.)

- [7] After accessing the IP address for checking, changing etc., be sure to turn OFF the power supply for B2G78-E1.
- [8] When the power supply is turned ON again, B2G78-E1 will normally start up with the IP address that has been originally registered.

**CAUTION**

Do not turn off the power supply to the main body, press the RESET button, or reboot the system when SET LED is flashing. Doing so may cause unforeseen problems such as crashes of settings and system data that are stored to occur.

3.2 RESET switch

This switch is used to reset the unit.

(This switch provides the same function as the operation of turning OFF the power supply and then turning it ON again.)

**CAUTION**

After a setting is changed on the Web setting screen, execute reboot by selecting "Reboot" in the Web setting menu. If you reset B2G78-E1 with the RESET switch or turn OFF the power supply for the unit immediately after a change of setting, it may result in corruption of internal data of B2G78-E1.

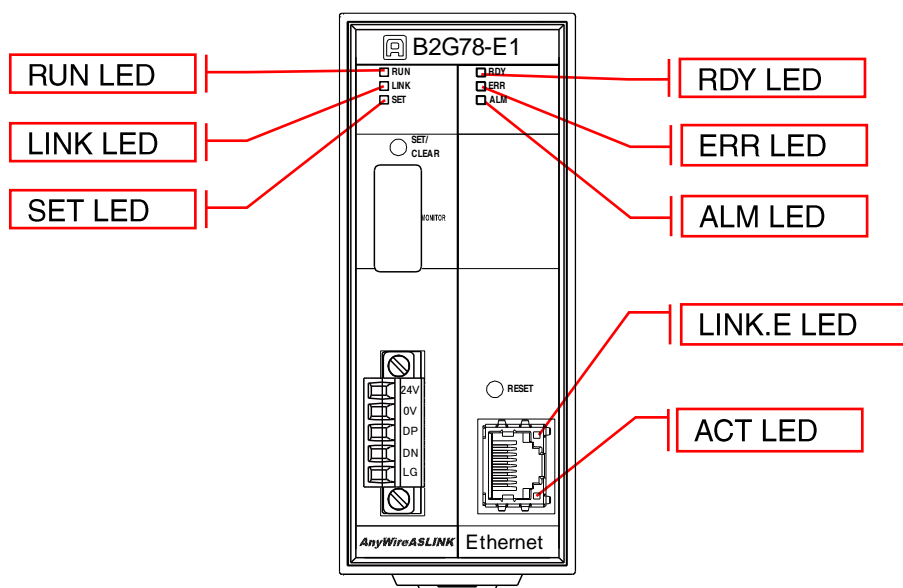
4. LED indication

Name	Color	Contents	■: Lit or flashing		□: OFF
RUN	Green	B2G78-E1 status	Lit	Normal operation	Hardware error, or watchdog timer error
LINK	Green	Transmission active	Flashing	Normal operation	
SET	Green	Automatic address recognition	Lit	Automatic address recognition	Normal operation
		Factory-setting	Flashing	Factory-setting	
RDY	Green	B2G78-E1 status	Lit ³	Normal operation	
ERR	Red	Master unit alarm status	Lit ¹	DP, DN disconnection No response from remote unit	Normal operation
			Slowly flashing ² (1-sec. interval)	DP-DN short-circuit	
			Fast flashing ² (0.2-sec. interval)	Low voltage on the 24V DC power supply	
ALM	Orange	Remote unit status	Lit ¹	Detection of I/O disconnection, I/O short-circuit, address duplication, sensing level low error, etc.	Normal operation
LINK.E	Orange	Ethernet link status	Lit	LAN cable is normally connected.	
ACT	Green	Ethernet BUS status	Flashing	Packet detection	

*1 The LED turns off when the power supply is reset or the error is cleared after the problem is solved.

*2 The LED turns off when the problem is solved.

*3 RDY stays off during the startup of the system following the turning on of the power supply. Do not turn off the power supply to the main body, press the RESET button, or reboot the system while RDY stays off. Doing so may cause unforeseen problems such as crashes of settings and system data that are stored to occur.



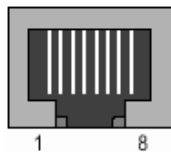
5. Connection

5.1 Connector

5.1.1. LAN connector

RJ45 connector to connect 10BASET or 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 24V DC power supply, and AnyWireASLINK transmission lines (DP, DN).

The following shows the terminal arrangement.

Signal name	Dedicated flat cable line color	
	0.75mm ²	1.25mm ²
24V	Green	Brown
0V	White	White
DP	Red	Red
DN	Black	Black
LG	--	--
Connector type: MC1, 5/5-STF-3,81 (manufactured by PHOENIX CONTACT)		

Ground the LG terminal via a low-impedance cable (50cm or shorter).

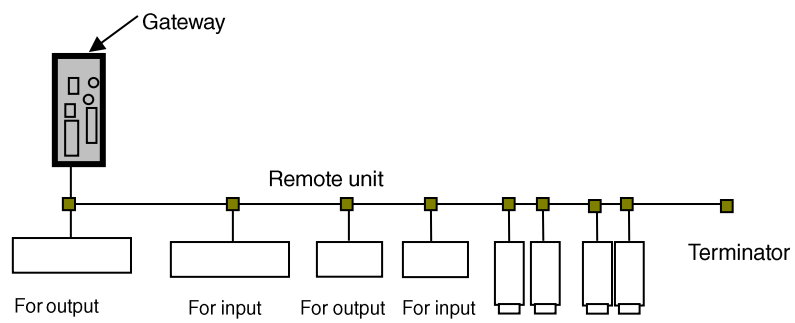
For fastening, a screwdriver having a tip of approximately 0.4 × 2.5mm is required.

Tightening torque: 0.22–0.3N•m

6. AnyWireASLINK

6.1 System configuration

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



6.2 Remote units

■ Types of remote units

Remote units for the AnyWireASLINK system shall be used for B2G78-E1.

Type of unit	Remote units
I/O terminal	ASLINK terminal, etc.
Analog terminal	Analog input unit, etc.
Sensor/Amplifier	ASLINK sensor, etc.
Other	Small display unit*, etc.

* The adjustment mode of the small display unit (B287-74DP01-C20, B287-74DP01-220) cannot be used for B2G78-E1. For details, refer to the instruction manual for the small display unit.

■ Number of remote units connected

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

(It is necessary that the following two conditions are simultaneously satisfied: The total number of points occupied by the remote units does not exceed the maximum number of transmission I/O points, and the total current consumption for the transmission lines does not exceed the maximum allowable supply current.)

■ Connection of remote units

There are roughly two types of methods for connection of AnyWireASLINK remote units. One is “2-wire (non-insulated) type” and the other is “4-wire (insulated) type.”

Classification	Operation
2-wire (non-insulated) type	Remote units and connected loads are driven by two transmission lines.
4-wire (insulated) type	Two of the transmission lines drive the transceiver section only while remote units and connected loads are driven by two external power supply lines. This connection method shall be selected if the allowable supply current for the 2-wire transmission line is insufficient or to isolate the transmission line from the power supply system for the loads.

Any combination of these two connection methods, 2-wire only, 4-wire only or combination of 2- and 4-wire systems, may be used.

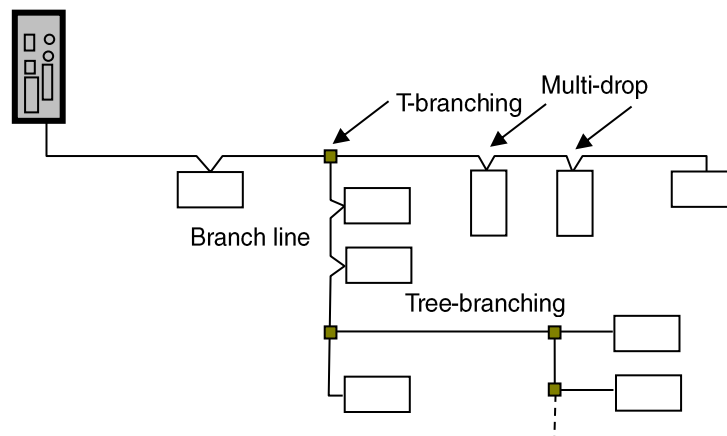
The selection of the 2-wire or 4-wire system depends on the remote units used.

6.3 Transmission line (DP, DN)

“AnyWireASLINK protocol,” which is a low speed transmission clock, however, realizes a high speed effective transmission rate, is compatible with broad cable characteristics, therefore, various transmission cables and general-purpose electric wires can be used as a transmission channel.

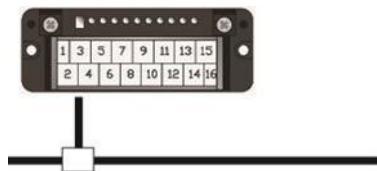
6.4 Connection mode

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



■ T-Branching Method

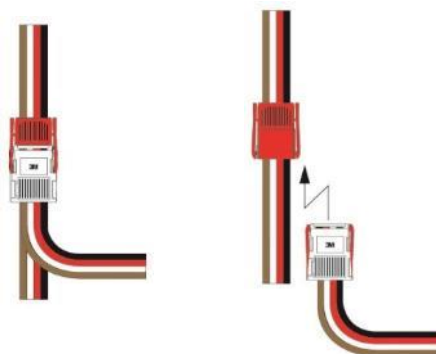
The T-branching method is a connection method to branch out a cable from an insulation displacement connector or terminal block to connect the remote unit.



Actual wiring is shown below.

● When an insulation displacement connector is used

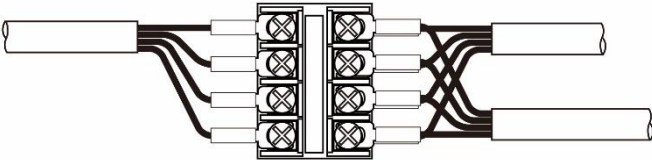
A flat cable is branched using an insulation displacement connector as shown.



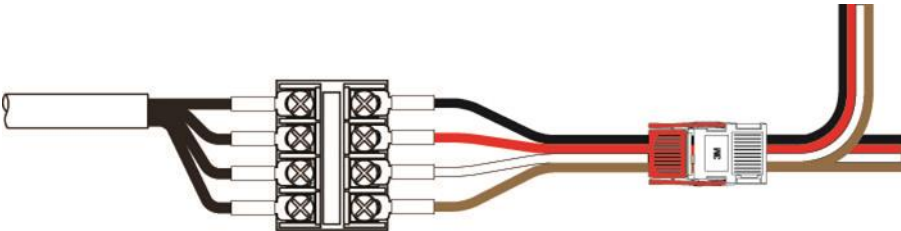
● **When a terminal block is used**

A cable can be branched as follows using a store-bought terminal block (a terminal block with which terminals face to face are internally connected).

● **Branching between cabtyre cables**



● **Conversion to a dedicated flat cable**



■ **Multi-drop method**

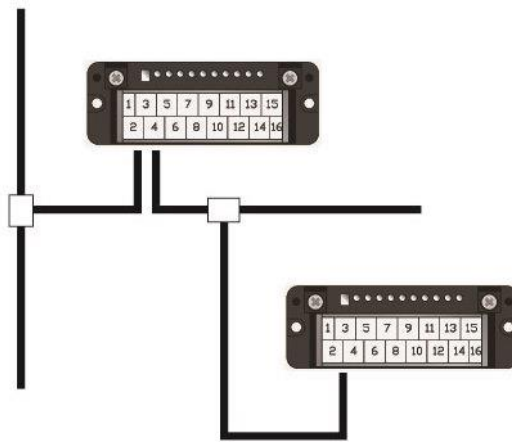
The multi-drop method is a way to connect remote units directly to cables. When applying this method, neither new cables nor non-cable connecting equipment is required.



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 remote unit.

■ Tree-Branching method

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

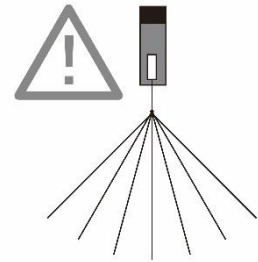


Actual wiring will be the same as the T-branching method or multi-drop method.

■ 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 remote unit.

This method allows for bundling transmission channels easily. On the other hand, it tends to cause reflection easily. AnyWireASLINK is not susceptible to reflection by a transmission method with a low-speed transmission clock, however, lay cables at the shortest distance with the minimum number of branches as much as possible.

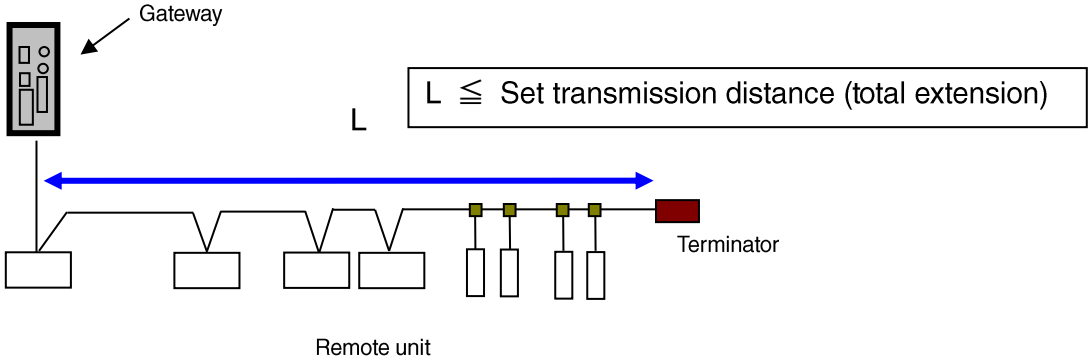


6.5 Transmission distance

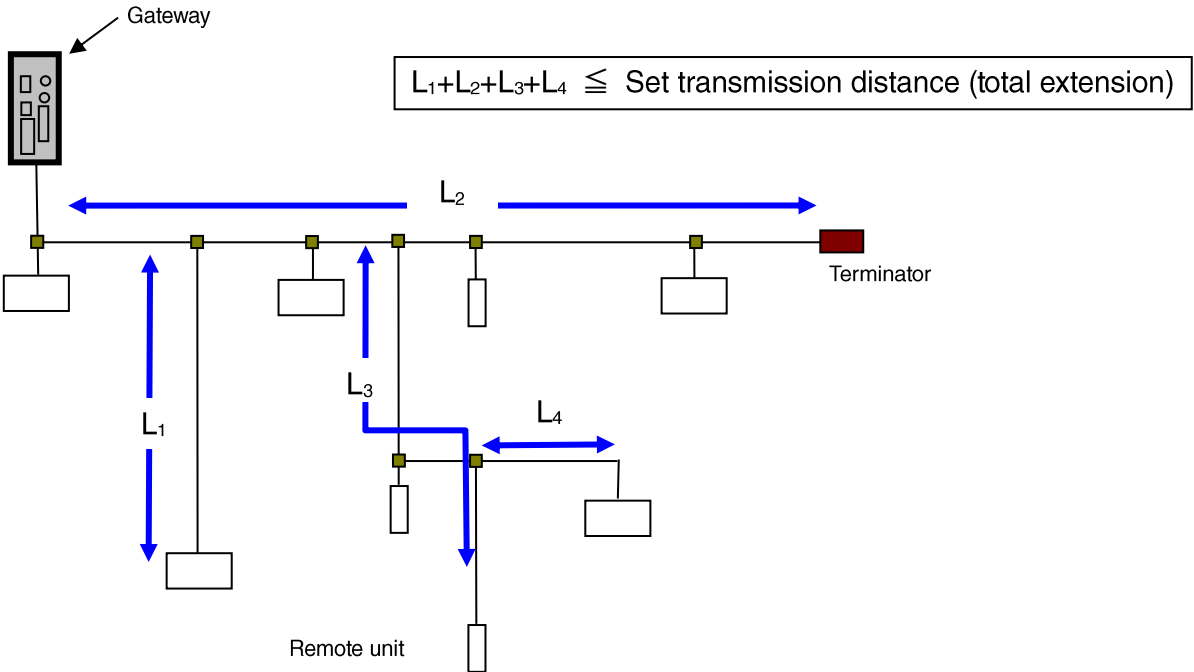
All transmission distances described for AnyWireASLINK refer to the “total extension” of a cable. Total extension is the total cable length to be used including branches.

Wiring of the AnyWireASLINK system can be established with only 2 transmission lines (DP, DN). The 2 transmission lines (DP, DN) support a maximum 200m length as a total extension. (See p. 2-1.) This total extension also includes the length of the cable coming out of the remote unit.

● In the case of basic type



● In the case of branch



6.6 Transmission cable type and precautions

General-purpose cable type cables, twist pair cables and dedicated flat cables, etc., 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 1.25mm², 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)



Shield cable




- Since AnyWire has high noise resistance, it is unnecessary to use a shield cable.
Note that an improperly grounded shield cable shielding may result in trouble at the time of use.



Transmission cable

- Be careful to prevent the voltage from lowering below the lower limit of the allowable voltage range due to voltage drop by the cable.
Lowering below the lower limit may result in malfunction.
If the voltage drops significantly, install a local power supply.
- Do not connect soldered wire directly to a terminal. Looseness may result in contact failure.

■ Reference Example of Electric Wire

Type	Photo	Specifications
300V vinyl Cabtyre Cable (VCTF)		JIS C3306 Cross section area: 0.75mm ² Allowable power 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 power current: 7A Maximum conductor resistance: 25Ω/km
Dedicated flat cable (HKV) Model: FK4-125-100 (100m winding)		Cross section area: 1.25mm ² Allowable power current: 15A Maximum conductor resistance: 15Ω/km

6.7 Transmission line supply current value

AnyWireASLINK system can be established with two wires.

Not only transmission signals but also power for the remote unit and whatever is connected to the load side of the remote unit are superimposed on these two wires.

Allowable supply current (transmission line supply current value) from the transmission line varies depending on wire diameter and total wiring distance, therefore, it is necessary that the total consumption current of the connected DP, DN (consumption current of the remote unit itself + consumption current on the load side connected to the 2-wire type remote unit) does not exceed this allowable power 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 extension: 50m or less	MAX 2.0A	MAX 1.2A	MAX 0.8A
Total extension: Over 50m, no longer than 100m	MAX 1.0A	MAX 0.6A	MAX 0.4A
Total extension: Over 100m, no longer than 200m	MAX 0.5A	MAX 0.3A	MAX 0.2A

6.8 Terminator

The terminator is intended to modify shape of transmission waveforms of the AnyWireASLINK system. This unit serves to relieve a condition that transmission waveforms are disturbed under influence of external environment.

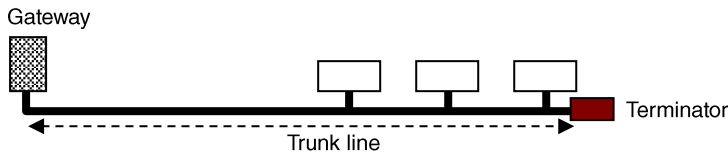
For one Gateway unit, it is necessary that one terminator should be connected to the farthest end of the trunk cable of the transmission line.

To extend a stay line through branching, one terminator should be connected to the end of the stay line, if the stay line is 40m or longer.

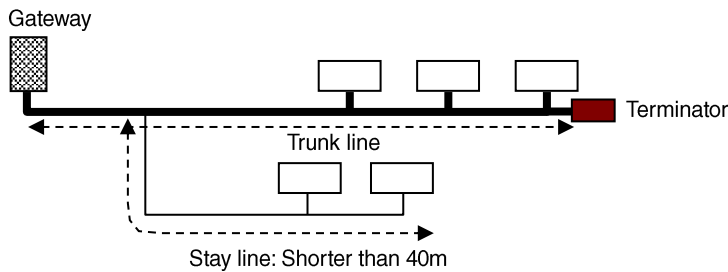
Up to three terminators can be connected to the AnyWireASLINK system.

The terminator has polarity (DP: Red, DN: Black). Ensure correct wiring to the transmission line. Improper wiring may cause transmission failure, resulting in unexpected operation.

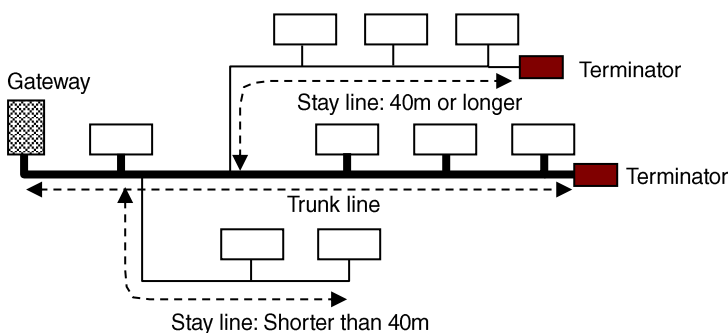
■ Connection of the terminator



■ Branching of transmission line



When the system has no stay line of 40m or longer



When the system has a stay line of 40m or longer

6.9 ASLINK filter

If any of the side-by-side lines of DP, DN, 24V and 0V exceeds the total length of 50m in a power supply system to be supplied, serially connect the “ASLINK filter [Type ANF-01]” or “filter of COSEL Co., Ltd. [Type EAC-06-472]” to 24V and 0V in the starting position of the side-by-side lines. This will improve noise resistance, reduce the impact of crosstalk by transmission signals and stabilize the signals.

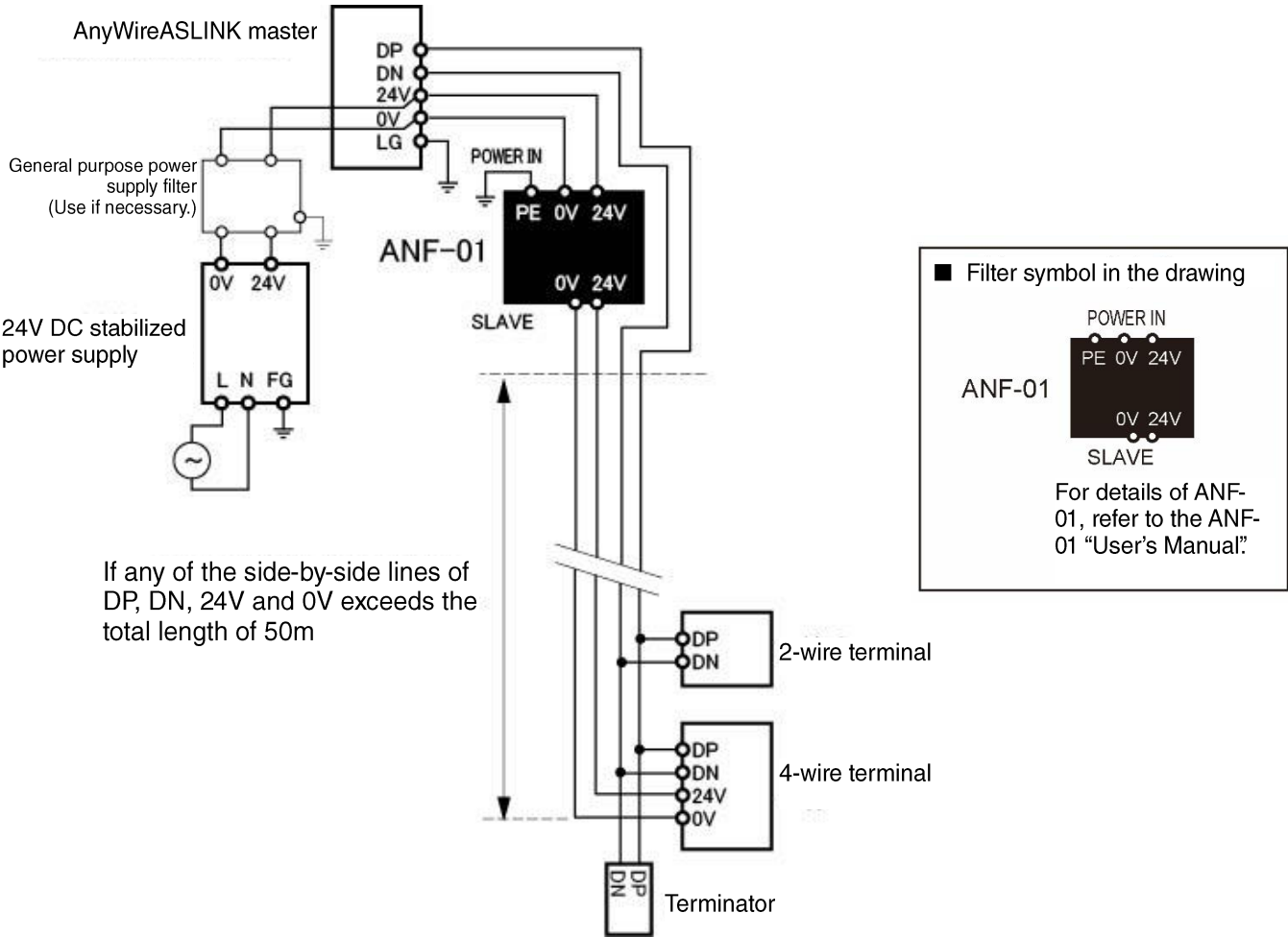
In any case of power supply to the entire system from the master driving power supply or power supply from the local power supply, insert a filter.

Insert the “ANF-01” regardless of installation method and distance when complying with CE Standards.

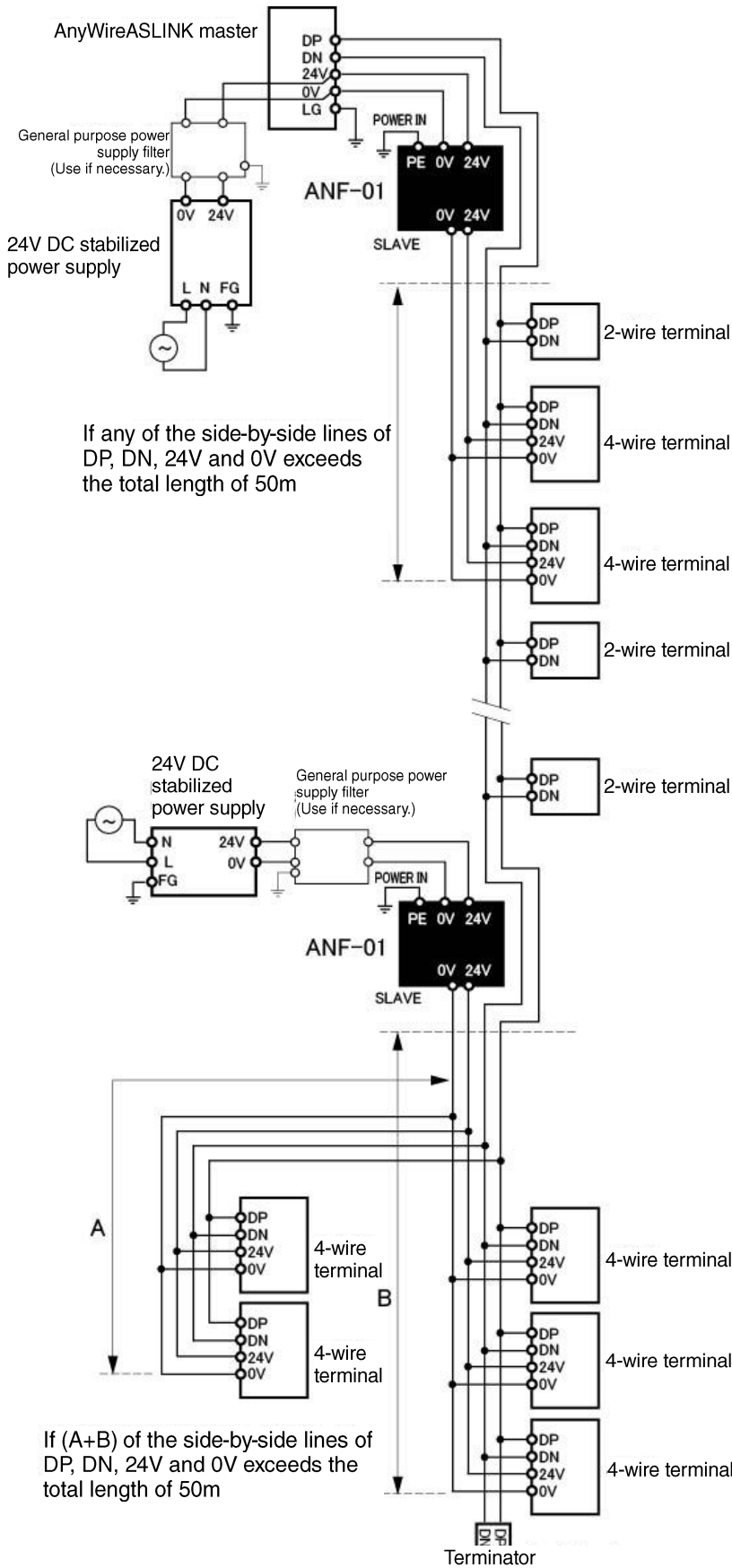
■ Filter allowable power current

Model	Type	Allowable power current
ASLINK filter	ANF-01	MAX 5A/24V DC
Filter of COSEL Co., Ltd.	EAC-06-472	MAX 6A/24V DC

■ Connection example of ASLINK filter (ANF-01) for power supply to the entire system



■ Connection example of ASLINK filter (ANF-01) for local power supply



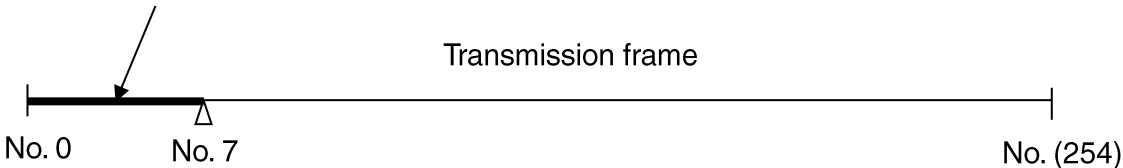
6.10 Address setting (reference)

The "Address setting" of a remote unit **determines from what number of bit in AnyWireASLINK transmission frame each remote unit is associated.**

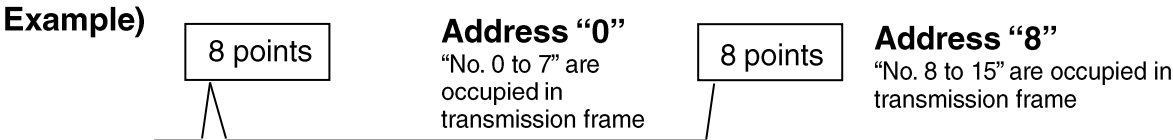
Each remote unit occupies the area of its own point number (with the set address number placed at the head) from the position.

Address can be freely set from "0 to 254" respectively for input and output.

Example) 8 point terminal: When address is "0" "0 to 7 bits" are occupied in transmission frame.



Set address so as to avoid bit interference.



Address of remote unit is handled by decimal number.

The value to be set shall be written in the remote unit by using a dedicated address writer (ARW-04 or ARW-03).

Factory-setting is "Bit address 255" or "Bit address 511", which means "no address setting". The factory-set address varies depending on the remote unit being used.

With the factory-set address, input/output operation is disabled.

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

Example) Set address "254" to 2 point occupied terminal and use "254" and "255."

It is necessary to take into consideration so that the area which the remote unit occupies does not exceed the transmission I/O setting set on the master side.

7. Software function

This chapter describes the application-layer software incorporated in B2G78-E1.

7.1 Modbus/TCP

Modbus/TCP is communication protocol incorporated in this board. B2G78-E1 is used as the server. In principle, the memory map is configured with Modbus addresses.

7.1.1. Input memory map

The memory map for access to B2G78-E1 via Modbus/TCP is shown below:

Function code	Modbus/TCP				Occupied [Word]	Type	Item
	Memory address		Offset address ¹				
	Start address	End address	Start address	End address			
02/--	10001	10256	0	255	16	bit	Input memory map (bit type) (bit 0–bit 255) ²
02/--	10257	10512	256	511	16	bit	System reservation
04/--	30001	30016	0	15	16	word	Input memory map (word type) (bit 0–bit 255)
04/--	30017	30032	16	31	16	word	System reservation
04/--	30033	30160	32	159	128	word	System reservation
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	Number of error IDs
04/--	30167	30182	166	181	16	word	Error ID 1–Error ID 16
04/--	30183	30253	182	252	71	word	System reservation
04/--	30254	30254	253	253	1	word	Number of transmission points setting check
04/--	30255	30255	254	254	1	word	ASLINK communication flag
04/--	30256	30256	255	255	1	word	System reservation
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 reservation
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	Duplicated ID 1–Duplicated ID 12
04/--	30321	30321	320	320	1	word	Number of duplicated IDs ³
04/--	30322	30832	321	831	511	word	System reservation
04/--	30833	30835	832	834	3	word	Error/alarm history No. 1: Year/Month/Day/Time
04/--	30836	30836	835	835	1	word	Error/alarm history No. 1: Target ID

Modbus/TCP					Occupied [Word]	Type	Item
Function code	Memory address		Offset address ^{*1}				
	Start address	End address	Start address	End address			
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 reservation
04/--	31891	35730	1890	5729	3840	word	R/O parameter storage area (30 × 128)
04/--	35731	39570	5730	9569	3840	word	System reservation
04/--	39571	39871	9570	9870	301	word	System reservation
04/--	39872	39872	9871	9871	1	word	Number of registered IDs
04/--	39873	40000	9872	9999	128	word	Registered ID 1–Registered ID 128

*1 For the actual start address specified for Modbus/TCP communication, “offset address” is used.

*2 Accessible with Modbus/TCP protocol.

Not accessible with SLMP (MC) protocol or EtherNet IP protocol.

*3 Available with 000B or later system version. → p. 7-42

7.1.1.1 Details of input memory map

Input signals of the AnyWireASLINK system are stored in this memory map.

When Modbus/TCP function code 02 (Input reading) is used for designation, corresponding memory addresses are 0 to 255 (bit type). When function code 04 (Input register reading) is used, corresponding memory addresses are 0 to 15 (word type).

The difference between these function codes is data type only. You can use either code according to user’s 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

Indicates ON/OFF status of the input signal corresponding to the 0th bit of the input unit specified in address 2.

Indicates ON/OFF status of the input signal corresponding to the 0th bit of the input unit specified in 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 and clock are assigned to Modbus/TCP addresses 160 to 163. Current year, month, day and time are specified.

The relationship between memory address and input address is as follows:

Modbus/TCP address		Data	
Memory address	Offset address	High-order byte	Low-order byte
30161	160	Year (Christian era: 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 (Error flag + Number of error IDs + Error address)

You can check hardware status of the ASLINK transmission line.

Error status comprises error flag, number of error IDs, and disconnection error IDs (up to 16 items) (in the ascending order of ID).

The relationship between error flag 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	Contents of error	Error LED status	Remarks
0	ON: DP–DN short-circuit OFF: Normal	Slowly flashing	This bit turns ON when DP and DN are short-circuited. This bit turns OFF when error is reset. Not retained.
1	Reservation	-	-
2	ON: 24V voltage drop OFF: Normal	Fast flashing	This bit turns ON at supply voltage falls below 24V (approx. 19V). This bit turns OFF when error is reset. Not retained.
3	ON: Disconnection or fault of unit OFF: Normal	Lit	Retained until power supply is turned OFF or error is cleared.
4–15	Reservation	-	-

At occurrence of disconnection or fault of a unit, the number of error IDs is written in Modbus/TCP (offset address) 165, and up to 16 error IDs (addresses) are written in Modbus/TC address (offset address) 166 to 181.

The ID format is as follows:

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

Type 00: Output, 01: Input (I/O mixture)

ID	Address	Contents
0x000–0x0FE	0–254	Output remote unit
0x200–0x2FE	0–254	Input (I/O mixture) remote unit
0x0FF or 0x2FF	255	Factory-set address (Address is not specified.)

Example: Address 3 of output remote unit = 0x0003
 Address 10 of input remote unit = 0x020A

7.1.1.4 Checking number of transmission points setting

You can check a current setting of number of transmission points of the AnyWireASLINK system. Number of transmission points can be set via the browser.

Modbus/TCP address		Data	Setting
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 ASLINK communication flag

Each flag indicates ASLINK communication status. The relationship between error flag 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	Contents of error	LED status	Remarks
0	ON: Alarm is activated. OFF: Normal	-	The alarm is activated under the following conditions: 1) Occurrence of remote unit status error (including I/O disconnection status, short-circuit status, etc.) 2) Occurrence of remote unit address setting error
1	ON: ASLINK interrupt communication is enabled. OFF: ASLINK interrupt communication is disabled.	-	When this bit is ON, reading or writing of parameter settings for a remote unit is enabled.
2	ON: Occurrence of ASLINK communication error OFF: Normal	-	Occurrence of parameter communication error due to noise, etc.
3	Reservation	-	-
4	ON: Execution of automatic address recognition OFF: Normal	“SET” LED is lit.	When this bit is ON, B2G78-E1 is executing automatic address recognition.
5–13	Reservation	-	-
14	Remote unit replacement execution flag	-	When this bit is ON, single unit simplified replacement is being executed.
15	Remote unit replacement completion flag	-	This bit turns ON for 5 seconds after completion of single unit simplified replacement.

7.1.1.6 Error history

You can check up to eight errors that occurred in the past.
The error history can be cleared by resetting the power supply.

Modbus/TCP address			Data	
Memory address	Offset address		High-order byte	Low-order byte
30257	256	No. 1	Year (Lower two digits of year, 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 (Lower two digits of year, 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 (Lower two digits of year, 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 flag 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
(Corresponding bit)	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Bit	Contents of error	Error LED status	Remarks
0	ON: DP-DN short-circuit OFF: Normal	Slowly flashing	This bit turns ON when DP and DN are short-circuited. This bit turns OFF when error is reset. Not retained.
1	Reservation	-	-
2	ON: 24V voltage drop OFF: Normal	Fast flashing	This bit turns ON at supply voltage falls below 24V (approx. 19V). This bit turns OFF when error is reset. Not retained.
3	ON: Disconnection or fault of unit OFF: Normal	Lit	Retained until power supply is turned OFF or error is cleared.
4–15	Reservation	-	-

7.1.1.7 MAC address

You can check the MAC address of the Ethernet port.

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

7.1.1.8 Latest error code, latest error occurrence ID

You can check the latest error code detected by B2G78-E1 and the target ID.

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

Provided below is the latest error code list. Part of information is also included in other error diagnosis data.

Error code		Name	Error occurrence ID	Countermeasures taken by customer
DEC	HEX			
200	C8	Transmission power supply drop error	"0x0FFF" is stored.	<p>The cause may be insufficient voltage of the external power supply. Carry out the following:</p> <ul style="list-style-type: none"> • Adjust the power voltage of the external power supply so that it will be within the rating (21.6V–27.6V). (Recommended voltage is 26.4V.) • Check that the power supply lines (24V, 0V) are not disconnected or short-circuited. Also 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 pay attention to short-circuit, incorrect wiring, and insufficient tightening of the screws.
201	C9	DP-DN short-circuit error	"0x0FFF" 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. Carry out the following:</p> <ul style="list-style-type: none"> • Check that the transmission lines are not short-circuited. Also check that the pin assignment was correct when the link connector was crimped. • Check that there is no contact between each transmission line, or there is no incorrect wiring in the terminal block. • Modify the cable (line diameter, total length), units (types, number of connected units) so that the consumption current of all remote units will 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 the remote units. There may be a remote unit failure, or the system configuration may have been changed after automatic address recognition. After narrowing down the disconnected area, using error ID information, etc., carry out the following:</p> <ul style="list-style-type: none"> • Check that there is no disconnection for all transmission lines. Also check that the link connector which is appropriate for the line diameter is used and it is crimped with correct pin assignment. • Check that signal lines are correctly connected to the terminal block. Also check that there is no incorrect wiring or insufficient tightening of the screws. • When newly creating a system or alternating the system (adding or eliminating remote units, changing addresses), perform automatic address recognition operation. Then, check that the number of remote units and addresses are the same as those of the actual system. • If the remote unit "LINK" LED is not flashing, check the transmission line for disconnection, short-circuit, incorrect wiring, or contact failure near the unit.
302	12E	Parameter access target ID error	"0x0FFF" is stored.	<p>Parameter access has been carried out for an ID whose address has not been automatically recognized. Narrow down error IDs by checking the alarm ID information in the memory. Then carry out the following:</p> <ul style="list-style-type: none"> • Check if the remote unit ID of the parameter access target in the program matches the ID of the actual system. Note that the ID of the input remote unit and the ID of the input/output mixed remote unit are their addresses +200H. • When newly creating a system, adding or eliminating remote units, or changing addresses, perform automatic address recognition operation. Then, check that the number of remote units and addresses match those of the actual system.
304	130	Parameter access error	Occurrence ID is stored.	Check for any effects by noise.
305	131	Remote unit status error	Occurrence ID is stored.	The remote unit is notifying error status. Check the details of the target unit status and remove obstacles.

Error code		Name	Error occurrence ID	Countermeasures taken by customer
DEC	HEX			
384	180	Single unit simplified replacement error (alarm) * Available with 0009 or later system version ("7.4.9 Equipment information")	Occurrence ID is stored.	During single unit simplified replacement, if you connect a remote unit of a model different from the remote unit subject to disconnection error (factory-set address), the alarm is output. Disconnect the remote unit of the different model, and reconnect the same model (factory-set address). After single unit simplified replacement is completed, the alarm output will be automatically reset.
400	190	ID duplication error	Occurrence ID is stored.	A duplicate address (ID) is set for a connected remote unit. After narrowing down error IDs, check the setting of the remote unit address (ID), and set the ID so that there will be no duplication.
401	191	ID no setting error	Occurrence ID is stored. (255 or 767)	A remote unit of the factory-set address is detected. Carry out the following: <ul style="list-style-type: none"> • Set the remote unit address. • Check that the remote unit address is not set at 255.
402	192	Change target ID error	"0x0FFF" is stored.	The specified remote unit ID is out of the registration range, or it has already been registered. <ul style="list-style-type: none"> • Specify a remote unit whose ID has not been registered. • For input remote unit, specify an input ID. For output remote unit, specify an output ID.

7.1.1.9 Duplicated address (ID)

During automatic address recognition, registered IDs (addresses) are checked for duplication, and the check result is stored. Up to twelve duplicated IDs can be displayed.

Duplicated IDs (addresses) are listed 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	Duplicated ID 1															
30310	309	Duplicated ID 2															
⋮	⋮	⋮															
30319	318	Duplicated ID 11															
30320	319	Duplicated ID 12															

The ID format is as follows:

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

Type 00: Output, 01: Input (I/O mixture)

ID	Address	Contents
0x000–0x0FE	0–254	Output remote unit
0x200–0x2FE	0–254	Input (I/O mixture) remote unit
0x0FF or 0x2FF	255	Factory-set address (Address is not specified)

Example: Address 3 of output remote unit = 0x0003

Address 10 of input remote unit = 0x020A

7.1.1.10 Number of duplicated IDs

* Available with 000B or later system version. → p. 7-42

During automatic address recognition, the system checks for duplication of registered IDs (addresses), and stores the number of duplicated IDs.

Example)

When ID: 0x001 and ID: 0x202 are duplicated, “2” is stored.

When ID: 0x001, ID: 0x202 and ID: 0x213 are duplicated, “3” is stored.

* The stored value is not the number of duplicated units relative to a duplicated ID.

7.1.1.11 Error/Alarm history

You can check up to 128 errors and alarms that occurred in the past.
The error and alarm history can be cleared by resetting the power supply.

Modbus/TCP address			Data	
Memory address	Offset address		High-order byte	Low-order byte
30833	832	No. 1	Year (Lower two digits of year, 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 (Lower two digits of year, 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 (Lower two digits of year, 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	

For contents of error codes, refer to the description of “Latest error code/latest error occurrence ID”.

7.1.1.12 R/O parameter storage area (30 × 128)

Blocks that store parameter and status information read from remote units are arranged in the ascending order of ID.

Modbus/TCP address			
Memory address	Offset address		
31891	1890	Parameter area 1 (30 words)	The parameter area of each ID comprises 30 words. Up to 128 pieces of information can be stored. The first word out of 30 words indicates ID. Data are arranged in the ascending order of ID by the unit of 30 words.
⋮	⋮		
31920	1919		
31921	1920	Parameter area 2 (30 words)	When a remote unit is added, or when a remote unit ID is changed, it is necessary that automatic address recognition should be executed again. After a change of remote address (ID), automatic address recognition need not be executed again. However, if the main unit is reset or the power supply is turned OFF and then turned ON again after change of remote address (ID), the data are re-arranged in the ascending order of ID.
⋮	⋮		
31950	1949		
⋮	⋮	⋮	
⋮	⋮	⋮	
⋮	⋮	⋮	
35701	5700	Parameter area 128 (30 words)	
⋮	⋮		
35730	5729		

Contents of each parameter area block are as follows:

Offset	Parameter	Parameter name	R/W	Classification
0	-	Remote unit address (ID)	R/W	Access to ASLINK is not required. To be viewed from internal memory
1	0 × 01	Equipment parameter 1	R/W	Interrupt access, Initial access
2	0 × 02	Equipment parameter 2	R/W	Interrupt access, Initial access
3	0 × 03	Equipment parameter 3	R/W	Interrupt access, Initial access
4	0 × 04	Equipment parameter 4	R/W	Interrupt access, Initial access
⋮		⋮	⋮	⋮
⋮		⋮	⋮	⋮
15	0 × 0F	Equipment parameter 15	R/W	Interrupt access, Initial access
16	0 × 10	Equipment parameter 16	R/W	Interrupt access, Initial access
17	0 × 11	Equipment parameter 17	R/W	Interrupt access, Initial access
18	0 × 12	Equipment parameter 18	R/W	Interrupt access, Initial access
19	0 × 13	Equipment parameter 19	R/W	Interrupt access, Initial access
20	0 × 20	Status detail	R/O	Cyclic access
21	0 × 21	Sensing level	R/O	Cyclic access
22	-	System reservation	-	-

The format of status details is as follows:

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

[1] Unit power supply status (Status of the DP/DN line)

Bit status	Meaning
ON	Remote unit voltage drop
OFF	No error

[2] Sensing level status

Bit status	Meaning
ON	Sensing level drop
OFF	No error

[3] I/O disconnection

Bit status	Meaning
ON	I/O disconnection
OFF	No error

[4] I/O short-circuit

Bit status	Meaning
ON	I/O short circuit
OFF	No error

[6] Voltage drop on I/O power supply side

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

Contents of [5] and [7] to [16] vary depending on the model of each remote unit.

7.1.1.13 Registered ID

You can check the remote unit ID information that have been registered in this unit through automatic address recognition.

- Number of registered IDs
- List of registered IDs (up to 128 units)

With the registered ID list, you can check if each remote unit is in error status or not.

* The error subject to check is “DP/DN disconnection error”

Number of registered IDs and list of IDs 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	Number of registered IDs															
39873	9872	Registered ID 1															
39874	9873	Registered ID 2															
39875	9874	Registered ID 3															
⋮	⋮	⋮															
39999	9998	Registered ID 127															
40000	9999	Registered ID 128															

The ID format is as follows:

* The highest-order bit of the ID format serves as error check bit.

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

Type 00: Output, 01: Input (I/O mixture)

ID	Address	Contents
0x000–0x0FE	0–254	Output remote unit
0x200–0x2FE	0–254	Input (I/O mixture) remote unit
0x0FF or 0x2FF	255	Factory-set address (Address is not specified.)

Example: Address 3 of output remote unit = 0x0003

Address 10 of input remote unit = 0x020A

7.1.2. Output memory map

Output memory map for access from Modbus/TCP is given below.

Modbus/TCP					Occupied [Word]	Type	Item
Function code	Memory address		Offset address*1				
	Start address	End address	Start address	End address			
01/05	1	256	0	255	16	bit	Output memory map (bit type) (bit 0–bit 255) ^{*2}
01/05	257	512	256	511	16	bit	System reservation
03/06,16	41025	41040	1024	1039	16	word	Output area map (word type) (bit 0–bit 255)
03/06,16	41041	41056	1040	1055	16	word	System reservation
03/06,16	41057	41184	1056	1183	128	word	System reservation
03/06,16	41185	41188	1184	1187	4	word	Year/Month/Day/Hour/Minute setting
03/06,16	41189	41189	1188	1188	1	word	Time setting flag
03/06,16	41190	41202	1189	1201	13	word	System reservation
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	41821	1204	1820	617	word	System reservation
03/06,16	41822	41822	1821	1821	1	word	Change target ID designation
03/06,16	41823	41824	1822	1823	2	word	System reservation
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 (20 × 128)
03/06,16	44387	46946	4386	6945	2560	word	System reservation
03/06,16	46947	49744	6946	9743	2798	word	System reservation
03/06,16	49745	50000	9744	9999	256	word	User available area ^{*3}

*1: For the actual start address specified for Modbus/TCP communication, “offset address” is used.

*2: Accessible with Modbus/TCP protocol.

Not accessible with SLMP (MC) protocol or EtherNet IP protocol.

*3: This area can be specified as OFF-delay setting transfer destination.

7.1.2.1 Output area

AnyWireASLINK output signals are stored in this memory map.

When Modbus/TCP function code 01/05 is used for designation, corresponding memory addresses are 1 to 256 (bit type). When function code 03/06 or 16 is used, corresponding memory addresses are 41025 to 41040 (word type).

The difference between these function codes is data type only. You can use either code according to user's 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

Indicates ON/OFF status of the input signal corresponding to the 0th bit of the input unit specified in address 2.

Indicates ON/OFF status of the input signal corresponding to the 0th bit of the input unit specified in 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
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 and clock

The calendar and clock are assigned to Modbus/TCP addresses 1184 to 1188. Used for year, month, day and time settings.

Modbus/TCP address		Byte	
Memory address	Offset address	High-order byte	Low-order byte
41185	1184	Year (Christian era, Ex. 2012)	
41186	1185	Month	Day
41187	1186	Hour	Minute
41188	1187	Second	-
41189	1188	Set at 0 ⇒ 1	

7.1.2.3 Error clear

Writing “1” in Modbus/TCP address 1202 resets the disconnection flag and the number of error IDs to “0, if the error status (disconnection, etc.) is eliminated. (With a push of the SET/CLEAR switch, the error can be also cleared.)

If the error status persists, the error flag, number of error IDs and the error IDs are set again.

The error can be also cleared by turning OFF the power supply once and then turning it ON again.

The error flag and number of error IDs can be read.

Modbus/TCP address		Contents
Memory address	Offset address	
41203	1202	Error clear at 0 ⇒ 1

7.1.2.4 Control command

Used to issue a control command to B2G78-E1.

Modbus/TCP address		Value	Contents	Details
Memory address	Offset address			
41204	1203	0x0000	OFF	Control command OFF
		0x0001	Remote reset	Used to reset B2G78-E1 through remote control. This command provides the same effect as power supply reset.
		0x0002	Automatic address recognition	Used to execute automatic address recognition. For details, refer to description of the SET/CLEAR switch in “Switch functions”
		0x0003	Address duplication check	Used to check for duplicated address of currently connected units. This command executes address duplication check only, without execution of automatic address recognition.
		0x0004	Parameter access command	Used to reflect a parameter access method and parameter access target ID in the ASLINK system, and to execute operation of the ASLINK parameter for a single unit. This command is also used to change a remote address (ID).
		0x0005	Parameter access batch read command	Used to read parameters of all units. (Recognized IDs only, except for disconnection error ID, duplicated ID and unspecified ID) Parameter access method and parameter access target ID are ignored.
		0x0006	Parameter access batch write command	Used to write parameters of all units. (Recognized IDs only, except for disconnection error ID, duplicated ID and unspecified ID) Parameter access method and parameter access target ID are ignored.

7.1.2.5 Parameter access method / Parameter access target ID / Change target ID

This area is used to store the access method (Read/Write/Remote address (ID) change), access target ID, change target ID (for remote address (ID) change only), when the parameter access command (value: 4) is executed with the control command.

After the data are stored in this area, execute the parameter access command.

<Change target ID>

The remote address (ID) change function is used to change addresses (IDs) of the remote units whose connections have been registered.

To execute this function, follow the procedure below:

1. Register connections of remote units through automatic address recognition.
2. Set the current address (ID) of the remote unit subject to change in Modbus/TCP address (offset address) 1825 for parameter access target ID.
3. Set the address (ID) to be changed in Modbus/TCP address (offset address) 1821 for change target ID.
4. Set "2" in Modbus/TCP address (offset address) 1824 for parameter access method.
5. Set "4" in Modbus/TCP address (offset address) 1203 for control command. Then, the address is changed.

(Note) The parameter areas (R/O parameter storage area and R/W parameter storage area) are arranged in the ascending order of ID. Therefore, the parameter areas (R/O parameter storage area and R/W parameter storage area) immediately after ID change are the same as those before ID change.

However, after restart of the B2G78-E1 main unit, or after execution of automatic address recognition, the parameter areas will be re-arranged in the ascending order of ID.

To use the remote address change function, it is necessary that the remote unit of the access target ID should support this function. If the remote unit of the access target ID does not support the remote address change function, only the list of IDs registered in this unit will be changed.

Modbus/TCP address		Contents
Memory address	Offset address	
41822	1821	Change target ID
41823	1822	System reservation
41824	1823	System reservation

(Supplementary information)

- For designation of change target ID, only unregistered ID is available. (ID whose connection has been registered cannot be designated.)
- Change of output ID relative to designation of input ID, or change of input ID relative designation of output ID is not allowed.

<Parameter access method>

Modbus/TCP address		Value	Contents
Memory address	Offset address		
41825	1824	0x0000	Read
		0x0001	Write
		0x0002	Remote address (ID) change

<Parameter access target ID>

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

7.1.2.6 Parameter storage area (20 × 128)

Blocks that store equipment parameter to be written into remote units are arranged in the ascending order of ID.

Modbus/TCP address		Contents	
Memory address	Offset address		
41827	1826	Parameter area 1 (20 words)	The parameter area of each ID comprises 20 words. Up to 128 pieces of information can be stored. The first word out of 20 words indicates ID. Data are arranged in the ascending order of ID by the unit of 20 words.
:	:		
:	:		
41846	1845	Parameter area 2 (20 words)	When a remote unit is added, or when a remote unit ID is changed, it is necessary that automatic address recognition should be executed again. After a change of remote address (ID), automatic address recognition need not be executed again. However, if the main unit is reset or the power supply is turned OFF and then turned ON again after change of remote address (ID), the data are re-arranged in the ascending order of ID.
41847	1846		
:	:		
41866	1865	:	
:	:	:	
:	:	:	
44367	4366	Parameter area 128 (20 words)	
:	:		
:	:		
44386	4385		

Contents of each parameter area block are as follows:

Offset	Parameter	Parameter name	R/W	Classification
0	-	Remote unit address (ID)	R/W	Access to ASLINK is not required. To be viewed from internal memory
1	0x01	Equipment parameter 1	R/W	Interrupt access, Initial access
2	0x02	Equipment parameter 2	R/W	Interrupt access, Initial access
3	0x03	Equipment parameter 3	R/W	Interrupt access, Initial access
4	0x04	Equipment parameter 4	R/W	Interrupt access, Initial access
:		:	:	:
:		:	:	:
15	0x0F	Equipment parameter 15	R/W	Interrupt access, Initial access
16	0x10	Equipment parameter 16	R/W	Interrupt access, Initial access
17	0x11	Equipment parameter 17	R/W	Interrupt access, Initial access
18	0x12	Equipment parameter 18	R/W	Interrupt access, Initial access
19	0x13	Equipment parameter 19	R/W	Interrupt access, Initial access

7.1.2.7 User available area

Modbus/TCP address		Contents
Memory address	Offset address	
49745	9744	This area serves as user's work are, enabling R/W processing. This area can be specified as OFF-delay setting transfer target address.
:	:	
:	:	
50000	9999	

7.2 SLMP (MC protocol)

SLMP (MC protocol) is communication protocol incorporated in this board. B2G78-E1 serves as a client to communicate with the MELSEC series PLC (manufactured by Mitsubishi Electric).

SLMP (MC protocol) can be used by setting link between the PLC memory and the memory of B2G78-E1. The PLC can handle I/O data of the AnyWire system without being aware of communication.

SLMP (MC protocol) supports the 3E frame/binary format. Start/Stop selection is enabled.

7.3 EtherNet/IP

EtherNet/IP is communication protocol incorporated in this board.

It is used for communication with EtherNet/IP-compatible equipment (OMRON CJ2 series PLC, etc.).

Start/Stop selection is enabled.

* It is not possible to connect to multiple EtherNet/IP masters.

7.3.1. Function

Implicit and Explicit message communication functions* are available: The former executes communication at a constant interval, and the latter executes communication at arbitrary timing.

* Available with 0009 or later system version (Lot No. 18H or later)

→ Pages 7-42 and 12-1

7.3.2. Implicit message communication

Communication of I/O (input and output data) and other various information is executed at a constant interval.

You can select items subject to communication on the Web screen.

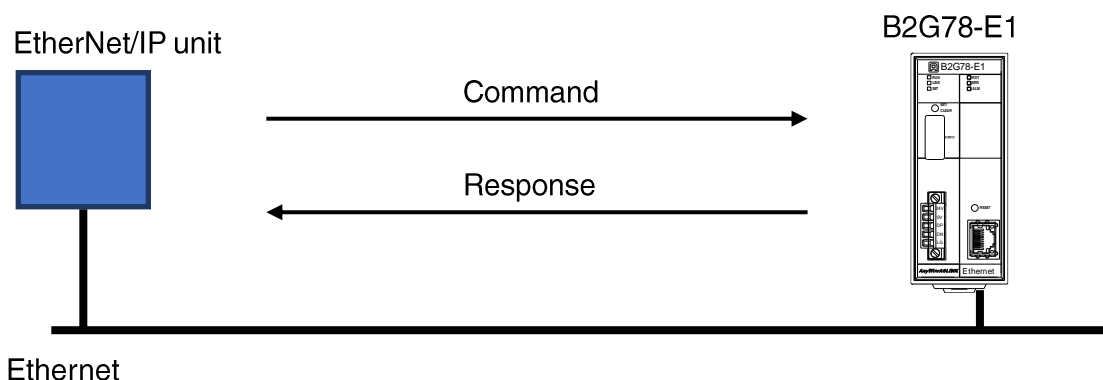
Input area	Size (word)	Reference: Modbus/TCP memory address (offset address)
Input data 0–127	8	10001-10128 (0–127) 30001-30008 (0–7)
Input data 128–255	8	10129-10256 (128–255) 30009-30016 (8–15)
Error status	1	30165 (164)
Number of error IDs	1	30166
Error ID	16	30167-30182 (166–181)
Number of registered IDs	1	39872 (9871)
Registered ID	128	39873-40000 (9872–9999)
Duplicated address	12	30309-30320 (308–319)
ASLINK communication flag	1	30255 (254)
Number of duplicated IDs ^{*1}	1	30321 (320)
Max.	177	
Output area	Size (word)	
Output data 0–127	8	1-128 (0–127)
Output data 128–255	8	129-256 (128–255)
Control	1	41204 (1203)
Error reset	1	41203 (102)
Max.	18	

*1: Available with 000B or later system version. → p. 7-42

7.3.3. Explicit message communication

You can access ASLINK parameters through message communication by defining Class: ASLINK (Class ID 0x65).

* Available with 0009 or later system version (Lot No. 18H or later)
→ Pages 7-42 and 12-1



7.3.3.1 Class (ASLINK)

Item		Contents	
Service Code	Service Code	Get_Attribute_Single	0x0E
		Set_Attribute_Single	0x10
Class ID	Class ID	0x65	
Instance ID	Instance ID	0x01	
Attribute ID	Attribute ID	Status	0x01
		Command	0x02
		Data	0x03
		Data type: Word	
Service Data (Word type)	Service Data	Variable (Byte array of Little-Endian format) Ex.) Data of 0x1234 and 0x5678 are set in the following order. Byte array [0] 0x34 Byte array [1] 0x12 Byte array [2] 0x78 Byte array [3] 0x56	

Memory read/write processing is enabled through message communication according to the following procedure.

- 1) Reading
 1. "Status" check
 2. "Data" set (Reading target, Length of data to read)
 3. "Command" set (Execution of reading)
 4. "Status" check
 5. "Data" get (Data reading)
- 2) Writing
 1. "Status" check
 2. "Data" set (Writing target, Length of data to write, Data to write)
 3. "Command" set (Execution of writing)
 4. "Status" check

For an example of Explicit communication, refer to "7.3.4 Access procedure."

7.3.3.2 Status

Status can be obtained by setting “0x01 (status)” in attribute ID.

Response (Designation of “Get_Attribute_Single”)

No.	Value (Word type)	Contents
1	0x0000	Command receiving is enabled. (No parameter access)
2	0x0001	Command receiving is disabled. (During automatic address recognition/parameter access)

7.3.3.3 Command

Parameter access is enabled by setting “0x02 (command)” in attribute ID and setting the following command in service data.

No.	Value (Word type)	Command	Contents
1	0x0000	None	-
2	0x0001	ASLINK memory reading	Reads data from designated memory address in the memory map.
3	0x0002	ASLINK memory writing	Writes data in designated memory address in the memory map.
6	0x0005	Parameter reading (designated ID, all parameters)	Reads all parameters of designated remote unit ID.
7	0x0006	Parameter writing (designated ID, all parameters)	Write all parameters of designated remote unit ID.
8	0x0007	Address (ID) change	Changes address (ID) of designated remote unit.

(*) The memory map is the same as the Modbus/TCP memory map (memory addresses).

7.3.3.4 Data

Data to read/write can be designated by setting “0x03 (data)” in attribute ID and setting the following command in service data.

1) ASLINK memory reading (Command 0x001)

Service data

Data offset (Word type)	Designation of “Set_Attribute_Single”	Designation of “Get_Attribute_Single”
Data [0]	Memory address in memory map	(No designation)
Data [1]	Length of data to read (N word)	-

Response (Designation of “Get_Attribute_Single”)

Data offset (Word type)	Contents
Data [0]	Memory address in memory map
Data [1]	Length of data to read (N word)
Data [2]	Data 0
Data [3]	Data 1
...	...
Data [N+1]	Data N-1

2) ASLINK memory writing (Command 0x002)

Service data

Data offset (Word type)	Designation of “Set_Attribute_Single”	Designation of “Get_Attribute_Single”
Data [0]	Memory address in memory map	(No designation)
Data [1]	Length of data to write (N word)	-
Data [2]	Data 0	-
Data [3]	Data 1	-
...	...	-
Data [N+1]	Data N-1	-

Response (Designation of “Get_Attribute_Single”)

Data offset (Word type)	Contents
Data [0]	Memory address in memory map
Data [1]	Length of data to write (N word)

3) Parameter reading (Designated ID, All parameters) (Command: 0x0005)

Service data

Data offset (word D type)	Designation of "Set_Attribute_Single"	Designation of "Get_Attribute_Single"
Data [0]	Unit ID	(No designation)

Response (Designation of "Get_Attribute_Single")

Data offset (Word type)	Contents
Data [0]	Unit ID
Data [1]	Equipment parameter 1
Data [2]	Equipment parameter 2
Data [3]	Equipment parameter 3
Data [4]	Equipment parameter 4
Data [5]	Equipment parameter 5
Data [6]	Equipment parameter 6
Data [7]	Equipment parameter 7
Data [8]	Equipment parameter 8
Data [9]	Equipment parameter 9
Data [10]	Equipment parameter 10
Data [11]	Equipment parameter 11
Data [12]	Equipment parameter 12
Data [13]	Equipment parameter 13
Data [14]	Equipment parameter 14
Data [15]	Equipment parameter 15
Data [16]	Equipment parameter 16
Data [17]	Equipment parameter 17
Data [18]	Equipment parameter 18
Data [19]	Equipment parameter 19
Data [20]	Status detail
Data [21]	Sensing level
Data [22]-[48]	System reservation

4) Parameter writing (Designated ID, All parameters) (Command: 0x0006)

Service data

Data offset (Word type)	Designation of "Set_Attribute_Single"	Designation of "Get_Attribute_Single"
Data [0]	Unit ID	(No designation)
Data [1]	Equipment parameter 1	-
Data [2]	Equipment parameter 2	-
Data [3]	Equipment parameter 3	-
Data [4]	Equipment parameter 4	-
Data [5]	Equipment parameter 5	-
Data [6]	Equipment parameter 6	-
Data [7]	Equipment parameter 7	-
Data [8]	Equipment parameter 8	-
Data [9]	Equipment parameter 9	-
Data [10]	Equipment parameter 10	-
Data [11]	Equipment parameter 11	-
Data [12]	Equipment parameter 12	-
Data [13]	Equipment parameter 13	-
Data [14]	Equipment parameter 14	-
Data [15]	Equipment parameter 15	-
Data [16]	Equipment parameter 16	-
Data [17]	Equipment parameter 17	-
Data [18]	Equipment parameter 18	-
Data [19]	Equipment parameter 19	-
Data [20]–[38]	System reservation	-

- (*) Parameter write processing updates all parameters of a target remote unit. Therefore, all parameters other than those subject to change must be set correctly. Immediately before writing parameters, be sure to execute reading to obtain latest parameter data, and then set them in the service data designated for write processing. After changing values of relevant parameters, execute write processing.
If you execute write processing without reading parameters, it causes malfunction.

Response (Designation of "Get_Attribute_Single")

Data offset (Word type)	Contents
Data [0]	Unit ID

5) Address (ID) change (Command: 0x0007)

Service data

Data offset (Word type)	Designation of "Set_Attribute_Single"	Designation of "Get_Attribute_Single"
Data [0]	Unit ID before change	(No designation)
Data [1]	Unit ID after change	-

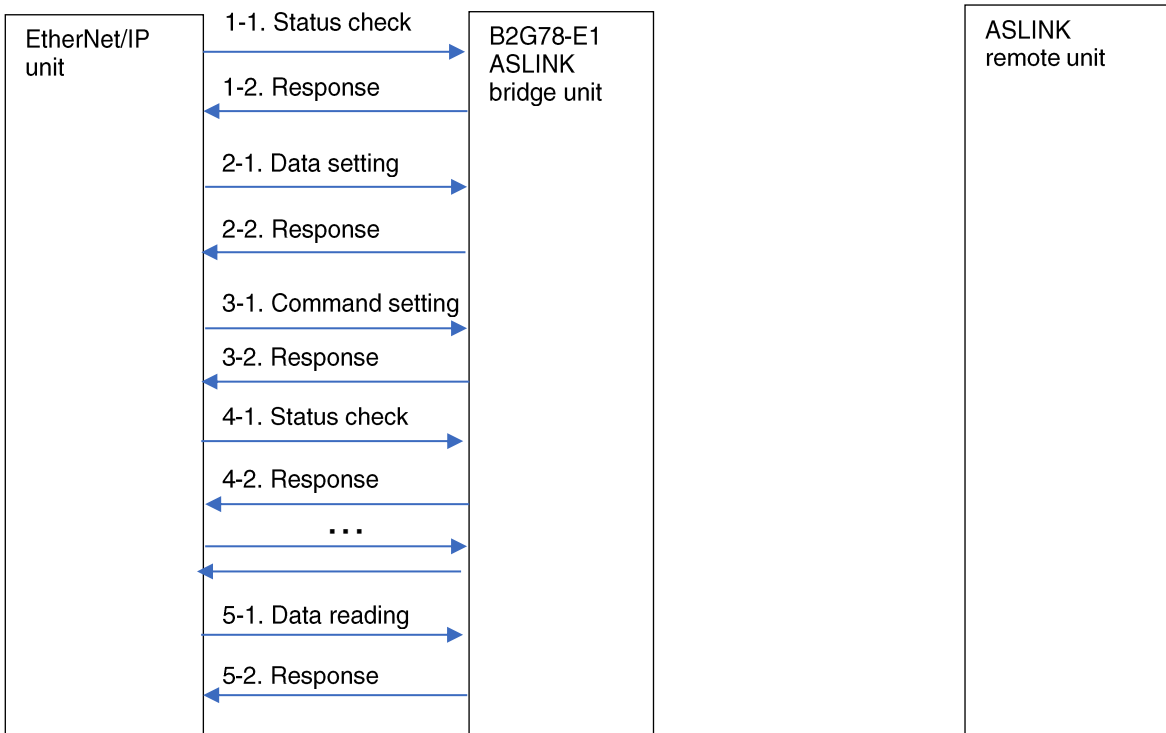
Response (Designation of "Get_Attribute_Single")

Data offset (Word type)	Contents
Data [0]	-

7.3.4. Access procedure

* Available with 0009 or later system version (Lot No. 18H or later)
 → Pages 7-42 and 12-1

7.3.4.1 ASLINK memory reading access



Ex.) Reading memory addresses 30001 and 30002

1. Checking status

Item	Value	Remarks
ServiceCode	0x0E	Designation of "Get_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x01	Status designation
ServiceData	None	

Status response by one word. B2G78-E1 waits until command receiving is enabled (0x0000).

2. Designation of memory address to read

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x03	Data designation
ServiceData	0x31	Memory address 30001 (0x7531)
	0x75	
	0x02	Length of data to read 2 words (0x0002)
	0x00	

3. Execution of memory reading command

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x02	Command designation
ServiceData	0x01	ASLINK memory reading (0x0001)
	0x00	

4. Status check

Waiting until command receiving is enabled (0x0000).

5. Data reading

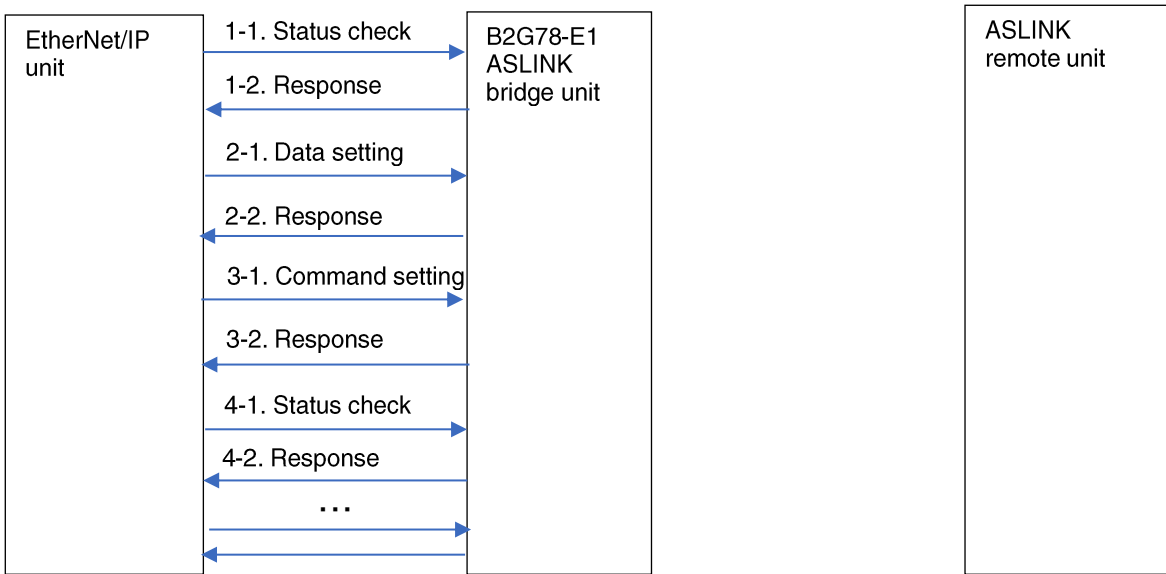
Item	Value	Remarks
ServiceCode	0x0E	Designation of "Get_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x03	Data designation
ServiceData	None	

Response of data by the designated data length (the data length specified in 2 "Designation of memory address to read")

Response

Data offset (Word type)	Value	Contents
Data [0]	0x31	Memory address in memory map 30001 (0x7531)
	0x75	
Data [1]	0x02	Length of data to read 2 words
	0x00	
Data [2]	Low-order byte	Data 0
	High-order byte	
Data [3]	Low-order byte	Data 1
	High-order byte	

7.3.4.2 ASLINK memory writing access



Ex.) Writing value “0x1234” in memory address 30001

1. Checking status

Item	Value	Remarks
ServiceCode	0x0E	Designation of “Get_Attribute_Single”
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x01	Status designation
ServiceData	None	

Status response by one word. B2G78-E1 waits until command receiving is enabled (0x0000).

2. Designation of memory address and data to write

Item	Value	Remarks
ServiceCode	0x10	Designation of “Set_Attribute_Single”
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x03	Data designation
ServiceData	0x31	Memory address 30001 (0x7531)
	0x75	
	0x01	Length of data to write 1 word (0x0001)
	0x00	
	0x34	
0x12		

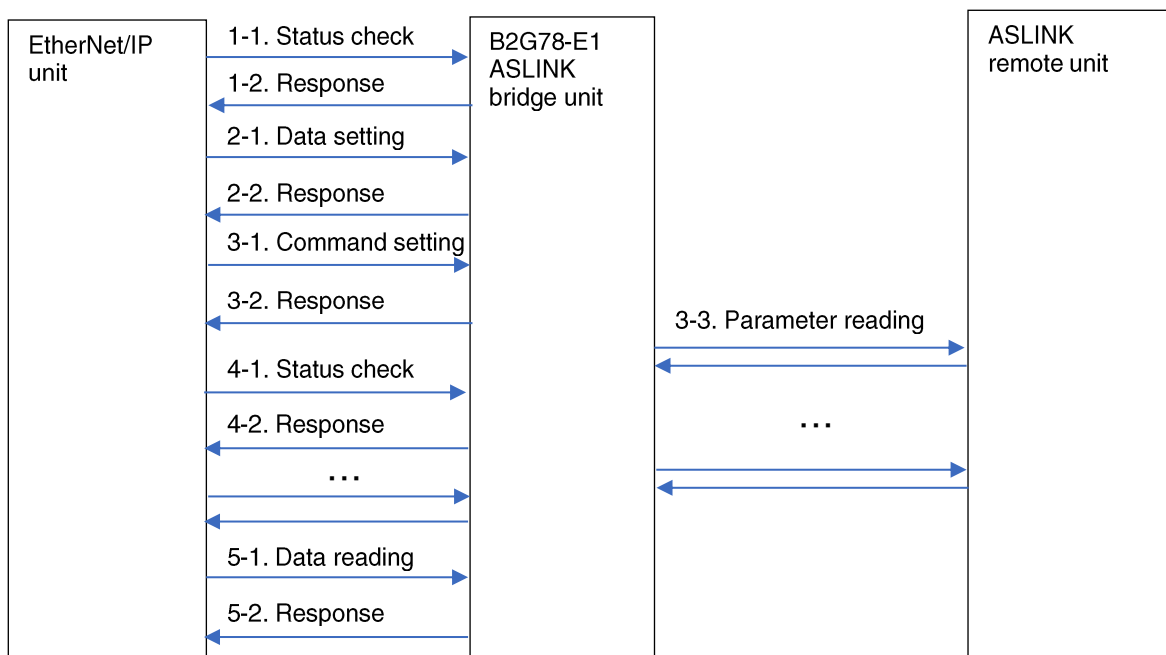
3. Execution of ASLINK memory writing

Item	Value	Remarks
ServiceCode	0x10	Designation of “Set_Attribute_Single”
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x02	Command designation
ServiceData	0x02	ASLINK memory writing (0x0002)
	0x00	

4. Status check

Waiting until command receiving is enabled (0x0000).

7.3.4.3 Parameter reading access (designated ID, all parameters)



Ex.) Reading parameter of unit ID 0x200

1. Checking status

Item	Value	Remarks
ServiceCode	0x0E	Designation of "Get_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x01	Status designation
ServiceData	None	

Status response by one word. B2G78-E1 waits until command receiving is enabled (0x0000).

2. Designation of unit ID to read (0x200)

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x03	Data designation
ServiceData	0x00	Unit ID (0x0200)
	0x02	

3. Execution of parameter reading command (designated ID, all parameters)

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x02	Command designation
ServiceData	0x05	Parameter reading (designated ID, all parameters) 0x0005
	0x00	

4. Status check

Waiting until command receiving is enabled (0x0000).

5. Data reading

Item	Value	Remarks
ServiceCode	0x0E	Designation of "Get_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x03	Data designation
ServiceData	None	

Response of parameter data of designated unit ID

Response

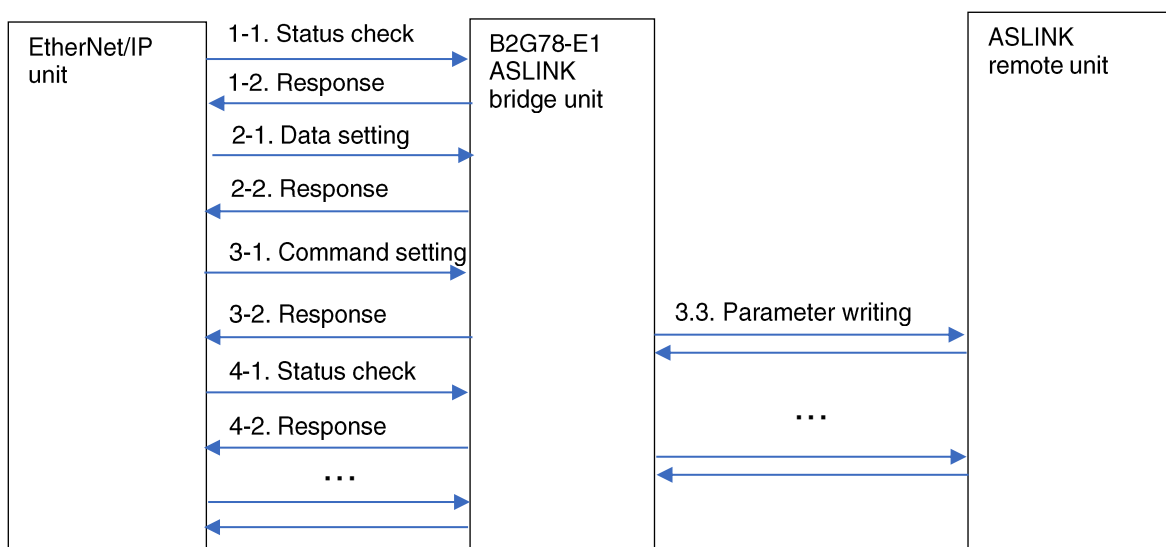
Data offset (Word type)	Value	Contents
Data [0]	0x00	Unit ID 0x200
	0x02	
Data [1]	Low-order byte	Equipment parameter 1
	High-order byte	
Data [2]	Low-order byte	Equipment parameter 2
	High-order byte	
Data [3]	Low-order byte	Equipment parameter 3
	High-order byte	
Data [4]	Low-order byte	Equipment parameter 4
	High-order byte	
Data [5]	Low-order byte	Equipment parameter 5
	High-order byte	
Data [6]	Low-order byte	Equipment parameter 6
	High-order byte	
Data [7]	Low-order byte	Equipment parameter 7
	High-order byte	
Data [8]	Low-order byte	Equipment parameter 8
	High-order byte	
Data [9]	Low-order byte	Equipment parameter 9
	High-order byte	
Data [10]	Low-order byte	Equipment parameter 10
	High-order byte	
Data [11]	Low-order byte	Equipment parameter 11
	High-order byte	
Data [12]	Low-order byte	Equipment parameter 12
	High-order byte	
Data [13]	Low-order byte	Equipment parameter 13
	High-order byte	
Data [14]	Low-order byte	Equipment parameter 14
	High-order byte	
Data [15]	Low-order byte	Equipment parameter 15
	High-order byte	
Data [16]	Low-order byte	Equipment parameter 16
	High-order byte	
Data [17]	Low-order byte	Equipment parameter 17
	High-order byte	
Data [18]	Low-order byte	Equipment parameter 18
	High-order byte	
Data [19]	Low-order byte	Equipment parameter 19
	High-order byte	

Data offset (Word type)	Value	Contents
Data [20]	Low-order byte	Status detail
	High-order byte	
Data [21]	Low-order byte	Sensing level
	High-order byte	
Data [22]	Low-order byte	System reservation
	High-order byte	
Data [23]	Low-order byte	System reservation
	High-order byte	
Data [24]	Low-order byte	System reservation
	High-order byte	
Data [25]	Low-order byte	System reservation
	High-order byte	
Data [26]	Low-order byte	System reservation
	High-order byte	
Data [27]	Low-order byte	System reservation
	High-order byte	
Data [28]	Low-order byte	System reservation
	High-order byte	
Data [29]	Low-order byte	System reservation
	High-order byte	
Data [30]	Low-order byte	System reservation
	High-order byte	
Data [31]	Low-order byte	System reservation
	High-order byte	
Data [32]	Low-order byte	System reservation
	High-order byte	
Data [33]	Low-order byte	System reservation
	High-order byte	
Data [34]	Low-order byte	System reservation
	High-order byte	
Data [35]	Low-order byte	System reservation
	High-order byte	
Data [36]	Low-order byte	System reservation
	High-order byte	
Data [37]	Low-order byte	System reservation
	High-order byte	
Data [38]	Low-order byte	System reservation
	High-order byte	
Data [39]	Low-order byte	System reservation
	High-order byte	
Data [40]	Low-order byte	System reservation
	High-order byte	
Data [41]	Low-order byte	System reservation
	High-order byte	
Data [42]	Low-order byte	System reservation
	High-order byte	
Data [43]	Low-order byte	System reservation
	High-order byte	
Data [44]	Low-order byte	System reservation
	High-order byte	

Software function

Data offset (Word type)	Value	Contents
Data [45]	Low-order byte	System reservation
	High-order byte	
Data [46]	Low-order byte	System reservation
	High-order byte	
Data [47]	Low-order byte	System reservation
	High-order byte	
Data [48]	Low-order byte	System reservation
	High-order byte	

7.3.4.4 Parameter writing access (designated ID, all parameters)



Ex.) Writing values of equipment parameters 1 to 19 in unit ID 0x200

1. Checking status

Item	Value	Remarks
ServiceCode	0x0E	Designation of "Get_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x01	Status designation
ServiceData	None	

Status response by one word. B2G78-E1 waits until command receiving is enabled (0x0000).

2. Writing unit ID to write (0x200) and values of equipment parameters 1 to 19

Item	Value	Remarks	
ServiceCode	0x10	Designation of "Set_Attribute_Single"	
ClassID	0x65	Fixed	
InstanceID	0x01	Fixed	
AttributeID	0x03	Data designation	
ServiceData	[0]	0x00	Unit ID 0x0200
		0x02	
	[1]	Low-order byte	Value of equipment parameter 1
		High-order byte	
	[2]	Low-order byte	Value of equipment parameter 2
		High-order byte	
	[3]	Low-order byte	Value of equipment parameter 3
		High-order byte	
	[4]	Low-order byte	Value of equipment parameter 4
		High-order byte	
	[5]	Low-order byte	Value of equipment parameter 5
		High-order byte	
	[6]	Low-order byte	Value of equipment parameter 6
		High-order byte	
	[7]	Low-order byte	Value of equipment parameter 7
		High-order byte	
	[8]	Low-order byte	Value of equipment parameter 8
		High-order byte	
	[9]	Low-order byte	Value of equipment parameter 9
	High-order byte		

Item	Value	Remarks
[10]	Low-order byte	Value of equipment parameter 10
	High-order byte	
[11]	Low-order byte	Value of equipment parameter 11
	High-order byte	
[12]	Low-order byte	Value of equipment parameter 12
	High-order byte	
[13]	Low-order byte	Value of equipment parameter 13
	High-order byte	
[14]	Low-order byte	Value of equipment parameter 14
	High-order byte	
[15]	Low-order byte	Value of equipment parameter 15
	High-order byte	
[16]	Low-order byte	Value of equipment parameter 16
	High-order byte	
[17]	Low-order byte	Value of equipment parameter 17
	High-order byte	
[18]	Low-order byte	Value of equipment parameter 18
	High-order byte	
[19]	Low-order byte	Value of equipment parameter 19
	High-order byte	
[20]	Low-order byte	System reservation
	High-order byte	
[21]	Low-order byte	System reservation
	High-order byte	
[22]	Low-order byte	System reservation
	High-order byte	
[23]	Low-order byte	System reservation
	High-order byte	
[24]	Low-order byte	System reservation
	High-order byte	
[25]	Low-order byte	System reservation
	High-order byte	
[26]	Low-order byte	System reservation
	High-order byte	
[27]	Low-order byte	System reservation
	High-order byte	
[28]	Low-order byte	System reservation
	High-order byte	
[29]	Low-order byte	System reservation
	High-order byte	
[30]	Low-order byte	System reservation
	High-order byte	
[31]	Low-order byte	System reservation
	High-order byte	
[32]	Low-order byte	System reservation
	High-order byte	
[33]	Low-order byte	System reservation
	High-order byte	
[34]	Low-order byte	System reservation
	High-order byte	
[35]	Low-order byte	System reservation
	High-order byte	

Item		Value	Remarks
	[36]	Low-order byte	System reservation
		High-order byte	
	[37]	Low-order byte	System reservation
		High-order byte	
	[38]	Low-order byte	System reservation
		High-order byte	

- (*) Parameter write processing updates all parameters of a target remote unit. Therefore, all parameters other than those subject to change must be set correctly. Immediately before writing parameters, be sure to execute reading to obtain latest parameter data, and then set them in the service data designated for write processing. After changing values of relevant parameters, execute write processing.
If you execute write processing without reading parameters, it causes malfunction.

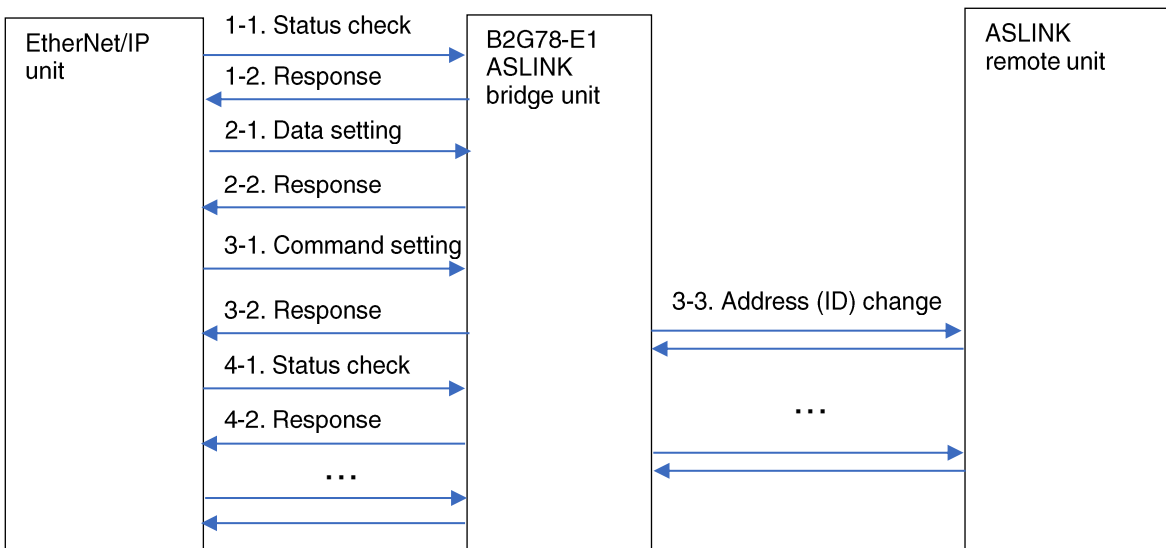
3. Execution of parameter writing command (designated ID, all parameters)

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x02	Command designation
ServiceData	0x06	Parameter writing (designated ID, all parameters) 0x0006
	0x00	

4. Status check

Waiting until command receiving is enabled (0x0000).

7.3.4.5 Remote unit ID change access



Ex.) Changing unit ID from 0x200 to 0x201

1. Checking status

Item	Value	Remarks
ServiceCode	0x0E	Designation of "Get_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x01	Status designation
ServiceData	None	

Status response by one word. B2G78-E1 waits until command receiving is enabled (0x0000).

2. Designation of unit ID before change (0x200) and unit ID after change (0x201)

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x03	Data designation
ServiceData	0x00	Unit ID before change 0x200
	0x02	
	0x01	Unit ID after change 0x201
	0x02	

3. Execution of remote unit ID change command

Item	Value	Remarks
ServiceCode	0x10	Designation of "Set_Attribute_Single"
ClassID	0x65	Fixed
InstanceID	0x01	Fixed
AttributeID	0x02	Command designation
ServiceData	0x07	Address (ID) change 0x0007
	0x00	

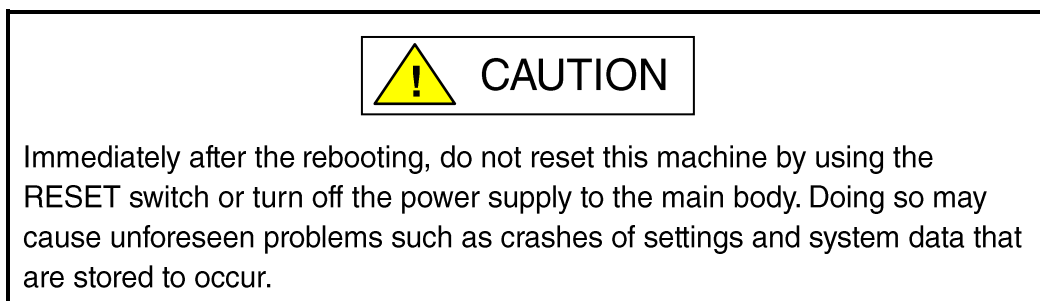
4. Status check

Waiting until command receiving is enabled (0x0000).

7.4 Web function

B2G78-E1 incorporates a Web server, enabling various settings via the Web browser.

- * To change settings, click on the “Registration” button, and execute “Reboot” to reflect the change in the system.



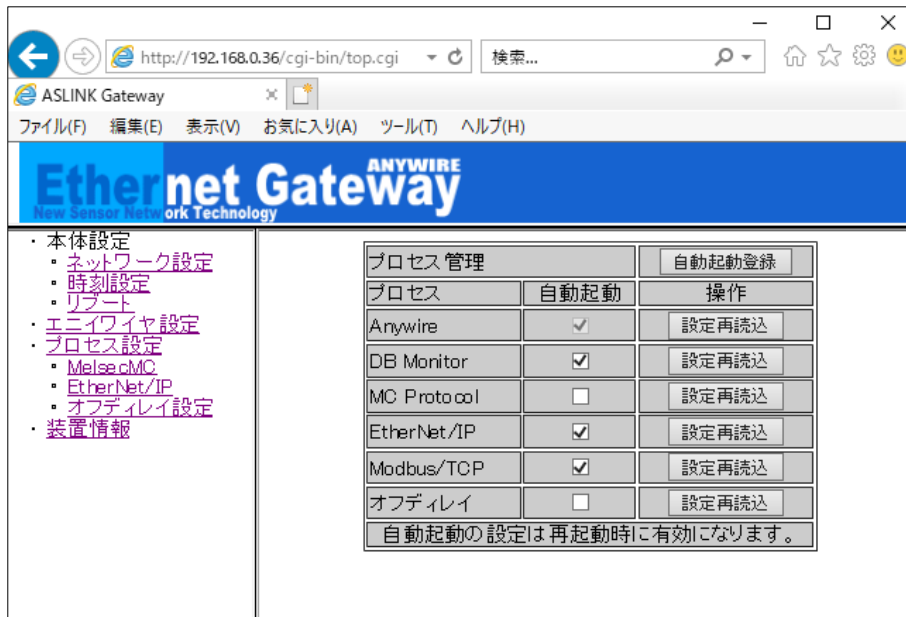
- [1] Connect the setting PC to B2G78-E1 directly with a LAN cable. For the LAN cable, either crossover or straight type can be used.
- [2] Set the LAN interface of the connected PC as follows:
IP address: 192.168.0xx (xx is any number except for 36, 0 and 255)
Subnet mask: 255.255.255.0
- [3] Turn ON the power supply for B2G78-E1. After the “RDY” LED lights and the “LINK” LED blinks, B2G78-E1 is ready for access.
- [4] Start up the Web browser (IE, etc.), and access the preset IP address. Type “http://192.168.0.36” (default IP address) in the address entry field of the browser, and press the ENTER key.

When you access the IP address via the browser, the following login screen appears.



For ID and password, type “anywire”

The following screen (process control screen) appears.

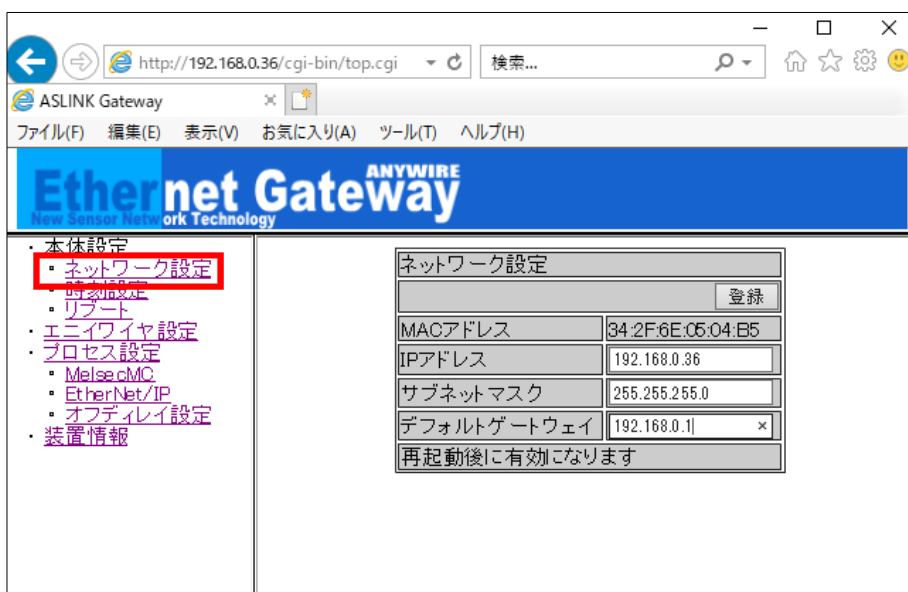


7.4.1. Network setting

Set IP address, port, gateway and subnet mask.
To set these items, access B2G78-E1 via the browser.

7.4.2. Master station information

Setting item	Factory-setting
IP address	192.168.0.36
Subnet mast	255.255.255.0
Default gateway address	192.168.0.1



If you do not intend to set default gateway address, enter “..” (three dots).

7.4.3. Connection target information

- ◆ When SLMP (MC protocol) is used
The following window shows information on the MC protocol server to connect (socket settings).
Up to 8 sockets are available.

Setting item	Setting
IP address	IP address of PLC to connect
Port No.	Port No. of PLC to connect (400H or subsequent)
Basic protocol	UDP or TCP
Tag information (4 pairs)	Source/destination address, device type, device address (decimal number), quantity
Start/Stop	Start or stop

The screenshot shows the 'Melsec MC プロトコル設定' (Melsec MC Protocol Settings) page. The 'MelsecMC' option is selected in the left-hand menu. The main content area is titled 'Melsec MC プロトコル設定' and shows settings for 'ソケット0' (Socket 0). The settings include:

- ソケットタイプ: TCP/UDP
- MelsecMC 接続設定:
 - IPアドレス: 192.168.0.98
 - ポート番号: 5010
- 接続設定:
 - UDPポート番号: 5010
- ◆ブロック転送0 (Block Transfer 0):
 - 入力エリア (Input Area):
 - 転送元アドレス: 30001
 - 転送元ワード数: 16
 - MELSECへ転送 (Transfer to MELSEC):
 - デバイスタイプ: M*
 - デバイスアドレス: 0
 - 出力エリア (Output Area):
 - 転送元アドレス: 41025
 - 転送元ワード数: 16
 - MELSECから転送 (Transfer from MELSEC):
 - デバイスタイプ: M*
 - デバイスアドレス: 300
- ◆ブロック転送1 (Block Transfer 1):
 - 入力エリア (Input Area):
 - 転送元アドレス: 30165
 - 転送元ワード数: 18
 - MELSECへ転送 (Transfer to MELSEC):
 - デバイスタイプ: D*
 - デバイスアドレス: 0
 - 出力エリア (Output Area):
 - 転送元アドレス: 41203
 - 転送元ワード数: 2
 - MELSECから転送 (Transfer from MELSEC):
 - デバイスタイプ: D*
 - デバイスアドレス: 100
- ◆ブロック転送2 (Block Transfer 2):

For transfer destination address, type the Modbus address.

Example)

Block transfer 0

Input area → Input information on 256 points (16 words)

Output area → Output information on 256 points (16 words)

Block transfer 1

Input area → Error flag (1 word)

Number of error addresses (1 word)

Error address information (16 words)

Output area → Error clear (1 word)

Control command (1 word)

* Set the device address in decimal.

Example: When transferring to MELSEC X100h, set as follows.

Device type: X

Device address: 256

I/O of up to 4 blocks can be set per socket. When the number of transfer word is "0", transfer of the relevant block is disabled. The maximum number of transfer words is "512". With the communication timeout setting (unit: 100ms), output will be reset at occurrence of communication timeout.

When SLMP (MC protocol) is not used, set all sockets (socket 0 to socket 7) as “Not used”, or uncheck the “MC Protocol Automatic Startup” checkbox on the process setting screen. If connection is not established when the socket type is “UDP” or “TCP,” output is cleared.

◆ When EtherNet/IP is used

The following screen enables you to select an area to transfer via EtherNet/IP.

Note: The transfer length setting for B2G78-E1 (adaptor) must be reflected in the setting for the scanner.

For the scanner setting procedure, refer to each manufacturer’s scanner manual, or the engineering tool operation manual.* It is not possible to connect to multiple EtherNet/IP masters.

Input area → Input data (Unit: 8 words) p. 7-1
 Error status (1 word) p. 7-3
 Number of error IDs (1 word) p. 7-3
 Error ID (16 words) p. 7-3
 Number of registered IDs (1 word) p. 7-13
 Registered ID (128 words) p. 7-13
 Duplicated address (12 words) p. 7-9
 ASLINK communication flag (1 word) p. 7-4
 Number of duplicated IDs^{*1} (1 word) p. 7-9
 Output area → Output data (Unit: 8 words) p. 7-14
 Control (1 word) p. 7-16
 Error reset (1 word) p. 7-16

*1 Available with 000B or later system version.

[I/O communication format] * Available with 000F or later system version.

Select an I/O communication format according to specifications of the equipment to connect (scanner).

The type of EDS file that can be downloaded varies depending on the setting of the I/O communication format.

To download the EDS file, select an I/O communication format, and then press the [Register] button.

When 32 Bit Header is selected: BSG78-E1.eds^{*2*3}

When Pure Data is selected: B2G78-E1_S.eds^{*3}

- *2 System version 000E and former version do not support the communication settings.
The EDS file that can be downloaded is fixed at B2G78-E1. eds (32 Bit Header).
- *3 Even when Pure Data is selected, the file name of the downloaded EDS file may be expressed as “B2G78-E1.eds” depending on the type of browser being used. Before you download the EDS file, check the file name included in the URL as the link target, and then execute downloading.

System version 000E and former version do not support the communication settings.

The EDS file that can be downloaded is fixed at B2G78-E1. eds (32 Bit Header).

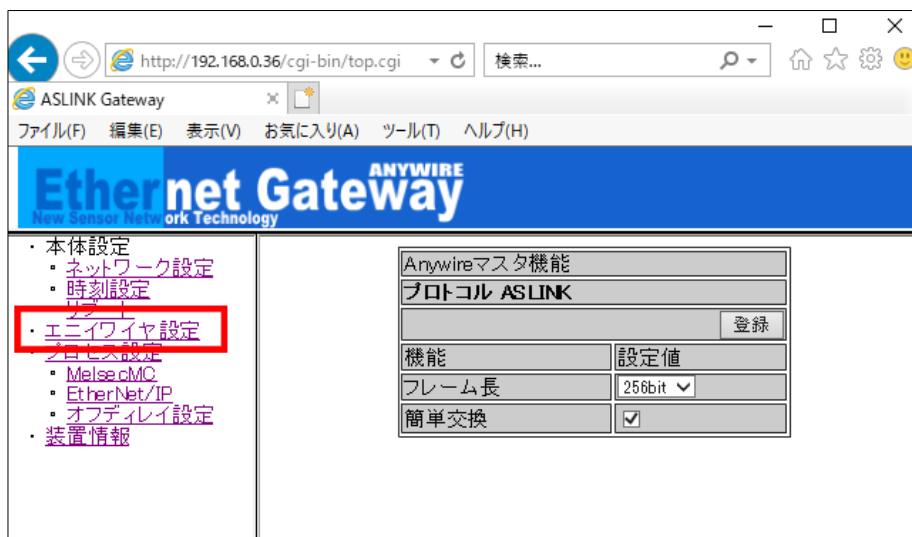
7.4.4. AnyWire setting

This screen allows the user to set up the frame length (number of transmission points) and enable or disable the simplified replacement function.

Frame length: 32 bits (32 inputs, 32 outputs)
 64 bits (64 inputs, 64 outputs)
 128 bits (128 inputs, 128 outputs)
 256 bits (256 inputs, 256 outputs)

Simplified replacement: With a check (single unit simplified replacement function enabled)

Without a check (single unit simplified replacement function disabled)

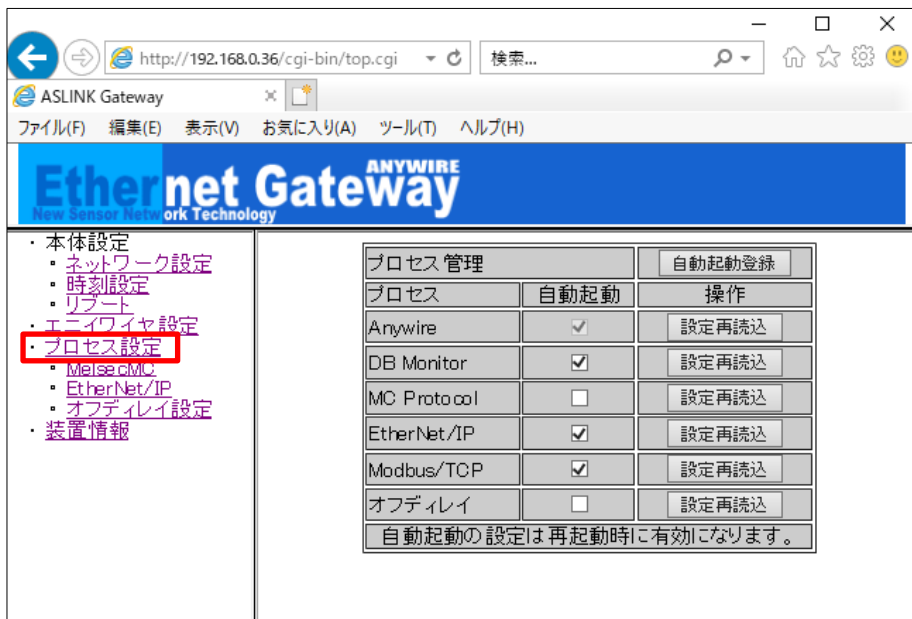


7.4.5. Time setting

This screen is used to set a system time.



7.4.6. Process setting



The number of points setting in the AnyWireASLINK system, SLMP (MC protocol) setting and EtherNet IP setting can be reflected from this screen.

Check the “Automatic startup” checkbox for the protocol to start, and press the “Automatic Startup Registration” button. Then, the relevant protocol will automatically start next time.

7.4.7. OFF-delay setting

This screen is used to set an OFF-delay time of specified input/output signal.

The screenshot shows a web browser window with the URL `http://192.168.0.36/cgi-bin/top.cgi`. The page title is "Ethernet Gateway ANYWIRE New Sensor Network Technology". The left sidebar contains a menu with "オフディレイ設定" (OFF-delay setting) highlighted in red. The main content area is titled "オフディレイ設定" and contains a table for configuration.

オフディレイ設定		
		登録
転送元アドレス	30033	30001 - 40000
転送先アドレス	49998	41025 - 50000
転送ワード数	2	0 - 64
オフディレイ時間	0	0: デレイ無し 1-15: x100ms 9999: OFFしない

For transfer destination address, Modbus/TCP memory addresses 49745 to 50000 (User available area) can be used.

7.4.8. Reboot

This screen is used to restart B2G78-E1.

The screenshot shows the same web browser window as in the previous image. The left sidebar menu has "リポート" (Reboot) highlighted in red. The main content area is titled "リポート" and contains a button labeled "リポート" with the text "本体を再起動します" (Restart the device).

7.4.9. Equipment information

This screen is used to view information on the equipment (FPGA version information, etc.).



7.4.10. Factory-setting

If the IP address of this unit is unknown, you can forcibly start up this unit with the factory-set IP address by following the procedure below:

- [1] Turn OFF the power supply for B2G78-E1.
- [2] With the SET/CLEAR switch pressed, turn ON the power supply for B2G78-E1.
- [3] At the lapse of approx. 20 seconds, the “SET” LED starts flashing.
- [4] After the “SET” LED is brought into flashing status, release the SET/CLEAR switch.
- [5] The “SET” LED turns off, and the “LINK” LED flashes.
- [6] This completes the factory-setting procedure. (The unit will start up with the factory-set IP address temporarily.)
- [7] After accessing the IP address for checking, changing etc., be sure to turn OFF the power supply for B2G78-E1.
- [8] When the power supply is turned ON again, the unit will normally start up with the IP address that has been originally registered.

In the above condition, the IP address is “192.168.0.36”. You can access it on the browser for checking, changing, etc.



CAUTION

Do not turn off the power supply to the main body, press the RESET button, or reboot the system when SET LED is flashing. Doing so may cause unforeseen problems such as crashes of settings and system data that are stored to occur.

8. Monitoring function

8.1 Overview

With address settings specific to AnyWireBus remote units, a remote unit corresponding to an address sent from B2G78-E1 makes a response, so that the system can detect disconnection and confirm presence of the remote unit.

B2G78-E1 stores the addresses of the remote units that are connected at the time via the automatic address recognition operation (described later) into EEPROM. This information is memorized even if the power is turned off.

Then, the registered addresses are sent out sequentially, and if there is no response, it is displayed by B2G78-E1's "ERR" LED as a disconnection.

8.2 Automatic address recognition

Storing addresses of the connected remote units into the EEPROM of B2G78-E1 is called "Automatic address recognition."

Procedure

- 1 Make sure that the "LINK" LED of B2G78-E1 is flashing to indicate normal operation.
- 2 Check that all of the remote units operate normally.
- 3 Keep the SET/CLEAR switch of B2G78-E1 pressed until the "SET" LED (green) turns on.
- 4 After the "SET" LED turns on, release the SET/CLEAR switch.
- 5 After a while, the "SET" LED turns off, and automatic address recognition is completed.



CAUTION

- During execution of automatic address recognition, input and output may not be activated. To execute automatic address recognition, make sure that automatic address recognition does not affect system operation (stop execution of PLC program, etc.).
- 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.
- During startup of the system, do not execute automatic address recognition for any purpose other than remote unit configuration change. Otherwise, normally registered ID information will be overwritten.
- If automatic address recognition is executed in a condition that the system has an error (incorrect wiring, etc.), it may result in unexpected operation. For example, ID cannot be normally registered, invalid ID is registered, etc.
- Do not turn off the power supply to the main body, press the RESET button, or reboot the system when SET LED stays on. Doing so may cause unforeseen problems such as crashes of settings and system data that are stored to occur.

8.3 Monitoring operation

Registered addresses are sequentially sent out, and if there is no response, it is displayed by the machine's "ALM" LED as a disconnection.

This error information is retained until the power supply is turned OFF, or until the alarm is reset. (Refer to the description of "LED indication".)

9. Single unit simplified replacement function

This function enables automatic address and parameter settings for a remote unit after replacement, so that the settings of the remote unit can be restored to the conditions before replacement. When you replace a remote unit due to a fault, etc., the setting procedure using an address writer is not required.

* Available with 0009 or later system version (Lot No. 18H or later)
 → Pages 7-42 and 12-1

9.1 Specifications

Through the automatic address recognition, B2G78-E1 registers address and parameter settings of remote units currently connected. When you connect a remote unit (of factory-set address) to the AnyWireASLINK system under normal operation for the purpose of replacement of a remote unit, the system checks if the newly connected remote unit is the same model as that before replacement. If the remote unit is recognized as the same model, the address and parameter settings of the remote unit before replacement will be automatically set in the new remote unit.

9.2 Replacement procedure

Preconditions	
•	Before replacing a remote unit, thoroughly check for any hazardous condition (short-circuit, etc.). Be sure to turn OFF the 24V power supply.
•	Automatic address recognition is executed, with the single unit simplified replacement function is activated with B2G78-E1.
•	The new remote unit supports the single unit simplified replacement function*1.
•	The new remote unit corresponds to the factory-set address.
Procedure	
1	Turn OFF the 24V power supply for B2G78-E1, and disconnect the remote unit (ID “X”) to be replaced.
2	Connect a remote unit of the same type (factory-set address). After turning ON the power supply, B2G78-E1 detects DP and DN wire break errors. (The error ID is “X” only.)
3	B2G78-E1 automatically checks if the new remote unit is the same model as that before replacement. If the remote unit is not recognized as the same model, the alarm is activated. (Error code “180H”: Model mismatching error*2)
4	If the remote unit after replacement is the same model as that before replacement, the address and parameter settings before replacement are automatically set in the new remote unit. At completion of the settings of the new remote unit, the DP/DN disconnection error will be reset. * To replace several remote units, repeat this replacement procedure for each unit.

*1 To check if a remote unit supports this function, see the product guide of the remote unit.

*2 If the model mismatching error occurs, disconnect the remote unit once, and then connect a remote unit of the same model (factory-set address).

Conditions to disable replacement processing:	
•	A case where two or more units are under fault.
•	A case where a disconnected unit is re-connected before an undesignated ID is detected.
•	A case where an unidentified ID is included in the IDs that have been registered in B2G78-E1 through automatic address recognition.
•	A case where the newly connected remote unit does not support the single unit simplified replacement function.
•	A case where the address of the connected remote unit does not conform to the factory-set address.
•	A case where several remote units are connected.

10. Transmission required time

10.1 Double collation

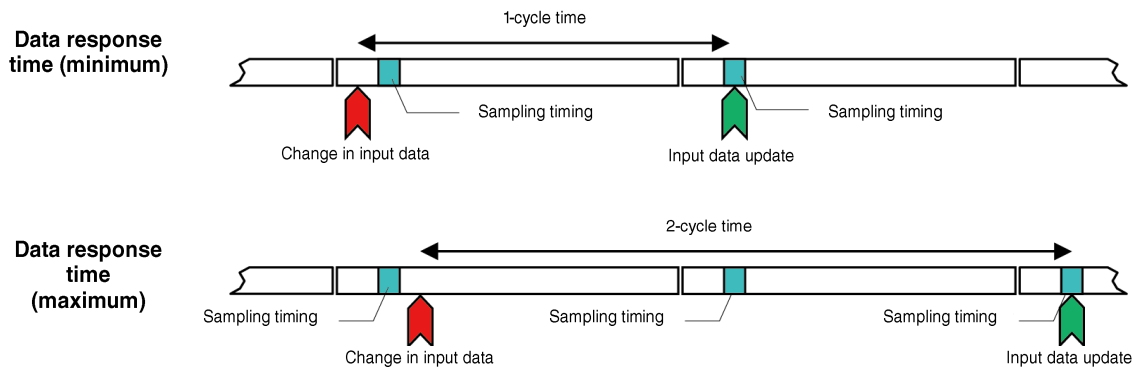
The AnyWireASLINK system will not update data in the input area unless the same data continues twice (double collation). Therefore, a transmission time of one-cycle time (at the minimum) to two-cycle time (at the maximum) is required to update data.

[Input signal]

A signal shorter than two-cycle time may not be captured depending on sampling timing. **The system should be given an input single longer than two-cycle time to make response to the input securely.**

* Data will be updated by the unit of 16 bits between B2G78-E1 and a host controller.

However, double collation is executed by the unit of one bit. Strictly, data by 16-bit unit cannot be guaranteed.

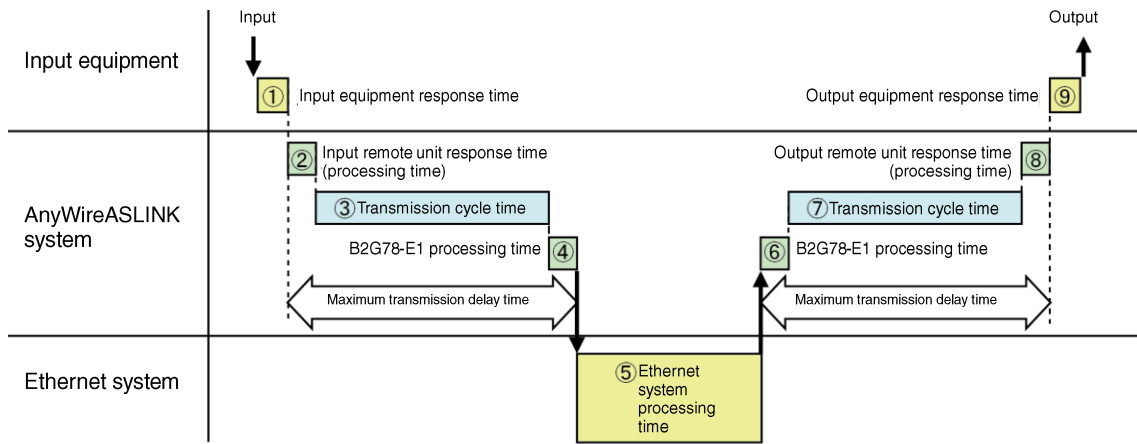


[Output signal]

Since double collation of data is also executed in the output remote unit, a transmission delay time of one-cycle time to two-cycle time is required until output from the controller is received and reflected. Therefore, **controller's output signal must be retained for two-cycle time or longer.**

10.2 Maximum transmission delay time

Transmission delay time from input to output is as shown below:



No	Description	Required time
① ⑨	Response time of input/output equipment	Refer to specifications of the input/output equipment being used.
② ⑧	Response time of AnyWireASLINK remote unit (Processing time)	Response time varies depending on the remote unit being used. * Refer to the manual for each remote unit.
③ ⑦	Transmission cycle time	Delay time of one transmission cycle to two transmission cycles occurs. Transmission cycle time varies depending on the number of transmission I/O setting. For details, refer to “2.2 Performance specifications”
④ ⑥	B2G78-E1 processing time	0.6 (ms)
⑤	Controller processing time	Processing time of the controller (Ethernet communication time, program scan time, etc.)

11. Troubleshooting

11.1 Visual check

Each unit has a status display function via LED, and errors related to the operating state of the unit or communication can be narrowed down by checking this LED.

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

(1) Gateway LED status check

1. LED display on the Ethernet side

The "LINK.E" LED is lit. ⇒ The LAN cable is normally connected.

When this LED is unlit, the power supply is OFF, or a fault occurred. Check connection of the LAN cable. → P. 4-1

The "ACT" LED is flashing. ⇒ Packet detection

When this LED is not flashing, the power supply is OFF, or a fault occurred. Check connection of the LAN cable, and IP address settings. → P. 4-1

2. LED display on the AnyWireASLINK side

Check the "LINK" LED.

The "LINK" LED is flashing ⇒ Normal operation status

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

If power is being supplied, or if the LED is lit, replace B2G78-E1. → P. 4-1

Check the "ERR" LED.

The "ERR" LED is unlit ⇒ Normal operation status

If it is flashing or lit, refer to P. 11-3 and P. 11-4, and eliminate the cause. → P. 11-3, P. 11-4

Check the "ALM" LED.

The "ALM" LED is unlit ⇒ Normal operation status

When this LED is lit, a fault occurred with a remote unit. Eliminate a cause of the fault by referring to P. 11-5. → P. 11-5

(2) Check the LED state of the remote unit

1. Check the "LINK" LED.

The "LINK" LED is flashing ⇒ Normal operation status

If the LED is not flashing, refer to P. 11-5 to remove the cause of the error. → P. 11-5

2. Check the "ALM" LED.

The "ALM" LED is unlit ⇒ Normal operation status

If the LED is not unlit, refer to P. 11-5 to remove the cause of the alarm. → P. 11-5

11.2 Check using input/output data

For Modbus/TCP or SLMP, you can check error status with input/output data.

(1) Checking the error flag

Information of error flag is stored in Modbus address 30165.

→ P. 7-3

(2) Checking number of error IDs and error ID information

Information on number of error IDs is stored in Modbus address 30166.

Eliminate a problem until the number of error IDs becomes "0".

→ P. 7-3

(3) Checking the error occurrence ID information

Error ID information is stored in Modbus addresses 30167 to 30182. (Up to 16 units)

→ P. 7-3

(4) Checking detailed status information (remote unit)

If a status error occurred with a remote unit, you can check detailed status of the relevant ID (corresponding Modbus address), by specifying the target ID and turning ON the parameters access required command.

→ P. 7-6–P. 7-8, P. 7-12

(5) Checking output data

If output data immediately turns OFF after it turns ON once, check if socket type "UDP" or "TCP" is selected on the Melsec MC protocol setting window.

If SLMP (MC protocol) connection has not been established, specify all socket types as "Not used", or uncheck the "MC Protocol Automatic Startup" checkbox.

→ P. 7-38

11.3 Gateway LED status

(1) When the “ERR” LED is lit or is flashing

[1] The “ERR” LED flashes slowly (one second cycle): DP-DN short-circuit error

Check items	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 for a contact of transmission line (DP/DN) or incorrect wiring of the master unit or remote unit terminal block.
Check that the consumption current of the AnyWireASLINK system meets the specification.	Correct the cable (wire diameter and total extension length), and units (types and number of connected units) so that the current consumption of all remote units does not exceed the current supplied to the master unit transmission line.

[2] The “ERR” LED flashes quickly (0.2 second cycle): Transmission circuit drive voltage drop error

Check items	Description of measures
Check the voltage of the 24V DC external supply power.	Make adjustments so that the power voltage of the 24V DC external supply power does not exceed the rating (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 machine and the remote unit terminal block. Also pay attention to short-circuit, incorrect wiring and insufficient tightening of the screws.

[3] The “ERR” LED is lit: DP, DN (transmission line) disconnection error

Check items	Description of measures
Check the latest error ID.	Identify a remote unit subject to the DP, DN disconnection error.
<ul style="list-style-type: none"> • Check operation of the remote unit corresponding to identified error ID. • Check for disconnection of the transmission line (DP, DN). • Check if the terminal block and connector are normally connected. 	<p>If disconnection or incorrect connection is found, eliminate the cause of the problem.</p> <p>In case where operation of a remote unit is stopped although transmission and power supply lines are normally connected to the remote unit, it is possible that the unit has a fault.</p>
If this error occurs during system startup, check if automatic address recognition has been executed.	If the factory-set address remains, the ALM LED is lit regardless of whether the system has disconnection or not. If automatic address recognition has not been executed, execute it.

11.4 LED state of the remote unit

The remote unit also has a status display function via LED.
The display status and primary causes are described respectively.

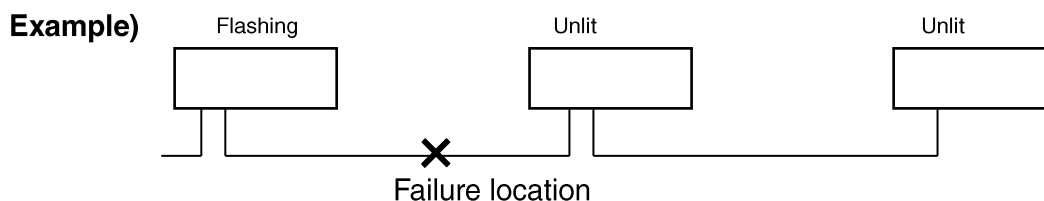
(1) When “LINK” is lit

The remote unit is not receiving transmission signals. (Transmission waveform error)
Under normal conditions, a voltage of approximately 17V to 18V is observed when measurement is made between transmission lines (DP, DN) in the DC mode of a tester.
If the measured voltage is the same as the power voltage, check that there is no incorrect wiring of the transmission line.
Also check that there is no error in the master unit.

(2) When “LINK” is unlit

The remote 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 in the DC mode of a tester.

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



(3) When “ALM” is lit

A remote unit status error has occurred. Check the status details and remove the cause of the failure.

(4) When “ALM” is flashing

The signal voltage of the transmission line (DP, DN) is in a low state.
Check if the power supply voltage for the gateway is within the allowable voltage range.
Check that the connection unit and load capacity are appropriate for total extension of the transmission line and allowable supply current.

(5) When “LINK/ALM” alternately flashes

The gateway has detected that the ID (address) of relevant unit is either duplicated or unregistered.
Check if there is a duplicate of the address or if the ID has been set or not, then set again.

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

The connection cable for the 2-wire type sensor connected to this unit is disconnected.
* Detection of cable disconnection is enabled for the 2-wire type sensor only.

11.5 Communication failure or unstable communication

If communication failure occurs, or if communication is unstable, check the following:

(1) Checking the port number (SLMP (MC protocol) communication)

If you designate a port number that has been assigned to other communication in your environment, it may cause communication failure or unstable communication (communication interruption, etc.).

Try to change the port number to 49152-65535 that can be freely used.

(2) Checking the multicast communication environment (EtherNet/IP communication)

When EtherNet/IP communication is used, multicast communication is enabled for input data depending on setting.

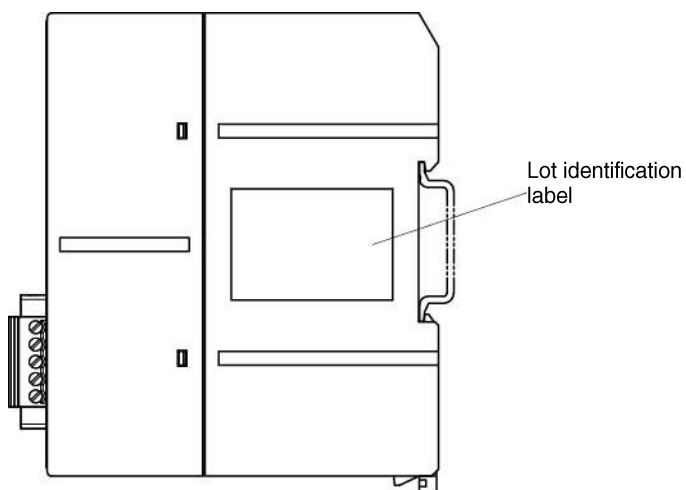
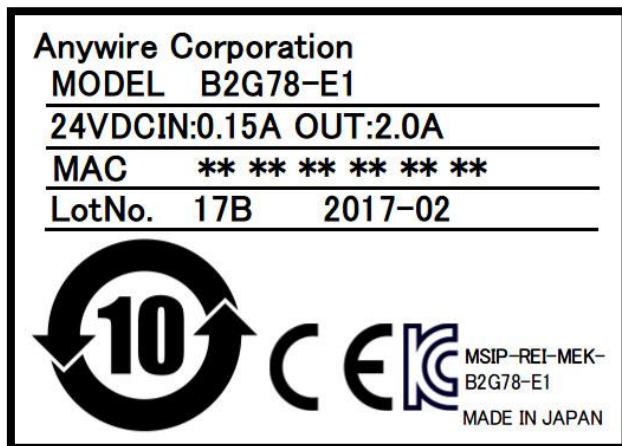
Multicast communication is subject to control with IGMP protocol, depending on system configuration. If multicast communication setting is improper, the master unit for EtherNet/IP communication is temporarily disconnected from multicast communication, and then reconnected. At the time of disconnection, implicit communication timeout occurs, resulting in temporary interruption of communication.

In this case, the problem may be solved by checking the multicast communication settings, for example, by appropriately setting multicast communication parameters for the master unit, router, network switch and other equipment for EtherNet/IP communication other than B2G78-E1, or by disabling the multicast communication control system itself.

12. Lot identification label

Lot No. of this product can be identified with this label.

The design and contents of the lot label may vary depending on the model or lot number.



13. Function compatibility by lot No.

B2G78-E1 has undergone addition of functions and change of specifications according to version upgrading. Available functions and specifications of the unit vary depending on the lot No. and version.

Functions	Lot No. and version
EtherNet/IP Explicit message communication	Available with 0009 or later system version.
Single unit simplified replacement function	
Memory map Number of duplicated IDs: Added	Available with 000B or later system version.
EtherNet/IP protocol setting Selection of I/O communication format	Available with 000F or later system version.

14. Warranty

■ Warranty period

The warranty period of delivered products is for one year after they are delivered at the place specified by the purchaser.

■ Scope of Warranty

If a fault occurs with the product under the normal operating conditions assumed in the product specifications and according to the instructions of this manual within the above warranty period, faulty parts shall be replaced or repaired free of charge.

However, in the event of any of the following, the failure is out of warranty.

- (1) Any failure caused by the user's improper handling and use.
- (2) Any failure caused by a reason other than delivered products.
- (3) Any failure caused by modification or repair by a person other than the deliverer.
- (4) Any failure caused by a natural disaster, major accident, etc., and the deliverer side has no responsibility for it.

The warranty described here means a warranty for a single delivered product and any damage caused by a failure of the delivered product is out of warranty.

■ Repair at user's cost

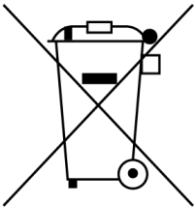
After expiration of the warranty period, we shall take all investigation and repair orders at user's cost. Also, even during the warranty period, we shall take orders to repair a fault attributable to a reason out of the above scope of warranty, and to investigate a cause of fault at user's cost.

■ Change in product specifications and contents of the manual

The contents of this manual are subject to change without prior notice.

15. Battery directive

for battery
EU



Note: This symbol mark is valid in EU countries only.

This symbol mark is prescribed in Article 20 “Information for end-users” and Annex II of EU Directive 2006/66/EC.

Anywire products have been designed and manufactured by using high-quality materials and parts, in consideration of their recycling and reuse.

This mark means that batteries and storage batteries must be separated from general refuse for disposal.

When a symbol of element is shown under this mark, it means that the relevant batteries or storage batteries contain heavy metal at the standard or higher concentration.

The standard of concentration is as follows:

Hg: mercury (0.0005%), Cd: cadmium (0.002%), Pb: lead (0.004%)

For disposal of used batteries and storage batteries, separate collecting systems are established in EU. Dispose of batteries and storage batteries properly at collecting/recycling facilities in each district.

We ask for your cooperation to protect the global environment.

■ Type of battery

Name of applicable battery	CR2032
Type of applicable battery	Coin-shaped lithium primary battery

16. 中国版 RoHS 指令

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	×	○	○	○	○	○
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。
 ×：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。



基于中国标准法的参考规格：GB/T15969.2

17. Change history

Ver.	Date	Change Description
First edition	Feb. 2, 2015	Release
1.0	Jul. 27, 2016	Change of allowable current value for filter (p. 6-10): 10A → 5A
1.1	Nov. 30, 2016	Addition of description of Chinese version of RoHS Directive, Change of outline drawing and other expressions
1.2	May 26, 2017	Correction of cycle time in 2.2 Performance specifications, Unification of other expresses
1.3	Jul. 19, 2017	Correction of 7.1 Memory map
1.4	Sep. 14, 2017	Correction of 2.3 Outer dimensions New address of East Japan office
1.5	Nov. 15, 2017	Correction of 7. Software function, 8.2 SET LED: yellow → green, Deletion of 10. Device profile, New address to contact
1.6	Oct. 3, 2018	Correction of precautions, Change of 2.3 Dimensional outline drawing, Change of 2.4 Part names, Addition of supplementary description of 4. LED indication, Correction of 7. Software functions, Addition of 9. Single unit simplified replacement function, Addition of 12. Lot identification label, Unification of other expressions
1.7	Feb. 1, 2019	Correction in 2. Specifications
1.8	May 23, 2019	Correction in 7. Software function
1.9	Jun. 5, 2019	Correction in 6.2 Slave units
2.0	Sep. 3, 2019	Updating of product applications Updating of 2. Specifications Updating of 6. AnyWireASLINK Addition of description on case where default gateway address is not to be set, in 7.4.2 Master station information Updating of 10 Transmission required time Updating of 13. Warranty
2.1	Feb. 20, 2020	Correction in Precautions for wiring Correction in 6.8 Terminator Correction in 8. Monitoring function Correction in 11. Troubleshooting Updating of contact address Unification of other expressions
2.2	May 9, 2020	Change of image for 7.4 Web function Addition of EtherNet/IP communication setting function in 7.4.3 Connection target information Addition of 13. Functional compatibility by lot No.
2.3	Jul. 12, 2021	Correction in 2.4 Name of each part Updating of 3. Switch setting Updating of 4. LED indication Updating of 7.4.10 Factory-setting Updating of 8.2 Automatic address recognition Unification of other expressions
2.4	Oct. 22, 2021	Addition of 15. Battery directive
2.5	Dec. 16, 2021	Correction in 5.1.2 Connector terminal block
2.6	Mar. 30, 2022	Correction in 7. Software function Unification of other expressions
2.7	Jun. 22, 2022	Correction of precautions Correction in 3. Switch setting Correction in 4. LED indication Modification in 7. 4. Web function Correction in 8. Monitoring function Correction in 12. Lot identification label
2.8	Mar. 30, 2023	Correction in 4. LED indication Correction in 7. Software function Updating of 16. Chinese RoHS Directive
2.9	Jun. 7, 2023	Updating of [Precautions for installation]
3.0	Jan. 22, 2024	Correction in 7. Software function

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