

AnyWire DB A20 Series
CC-Link/AnyWireBus DB Gateway
AG22-C1

User's Manual

Ver. 1.9 Nov. 19, 2021

High speed transmission wiring saving system
by full-duplex transmission method

AnyWire **DB A20** series

Precautions

Instructions about this document

1. Please deliver this manual to end users.
2. Read this manual thoroughly to understand the contents before operating this product.
3. This manual explains the details of functions equipped with this product, and does not guarantee that the product will match a customer's particular purpose.
4. Any reproduction or copying of this manual in whole or in part is expressly prohibited without permission.
5. Information in this manual may be subject to change without notice in the future.

Warning indication



A "WARNING" indicates a potentially hazardous situation which, if not handled correctly, could result in personal serious injury or death.



A "CAUTION" indicates a potentially hazardous situation which, if not handled correctly, could result in personal injury or property damage.

Safety precautions



- ◆ The AnyWire system does not include any control functions to ensure safety.
- ◆ In any of the following cases, pay special attention to use with appropriate allowance for ratings and functions and implement safety measures such as a fail-safe design and consult us for:
 - (1) Applications which require a high degree of safety
 - Applications predicted to have a great impact on human life or property
 - Medical equipment, safety equipment, etc.
 - (2) When used in systems which require a higher degree of reliability
 - Use in vehicle control, combustion control equipment, etc.
- ◆ Make sure to turn off the system power before installation or replacement work.
- ◆ Use the AnyWire system within the range of specifications and conditions defined in this manual.



- ◆ Do not turn on the 24V power supply before completing wiring and connection of the entire AnyWire system.
- ◆ Use a stable, 24V DC power supply for AnyWire system equipment.
- ◆ Although the AnyWire system has high noise resistance, keep transmission cables and I/O cables away from high-voltage and power cables.
- ◆ Be careful to prevent any waste metal from entering inside of units or connector parts, especially during wiring.
- ◆ Mis-wiring may damage equipment. Pay attention to the cable length and layout in order to prevent connectors and cables from being removed.
- ◆ Do not solder a stranded wire to be connected to the terminal block; otherwise a contact failure may occur.
- ◆ If the wiring length of the power cable is long, voltage drops will occur and may cause shortages of the power voltage of remote slave units. In that case, connect local power supply units to ensure the specified voltage.
- ◆ Install the product by avoiding the following places:
 - Where exposed to direct sunlight or the ambient operating temperature exceeds the range of 0°C to + 55°C
 - Where the operating relative humidity exceeds the range of 10% to 90% or condensation occurs due to rapid temperature changes
 - Where there is corrosive or inflammable gas
 - Where subjected to direct vibration or shock
- ◆ Tighten terminal screws securely to avoid malfunctions, etc.
- ◆ When storing the product, avoid high temperature and humidity. (Ambient storage temperature: -20°C to + 75°C)
- ◆ Incorporate the emergency stop circuit or interlock circuit for safety in an external circuit other than the AnyWire system.

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1 Overview

AG22-C1 is an AnyWireBus gateway unit for CC-Link connection. The AnyWire system can be connected to CC-Link by using this gateway.

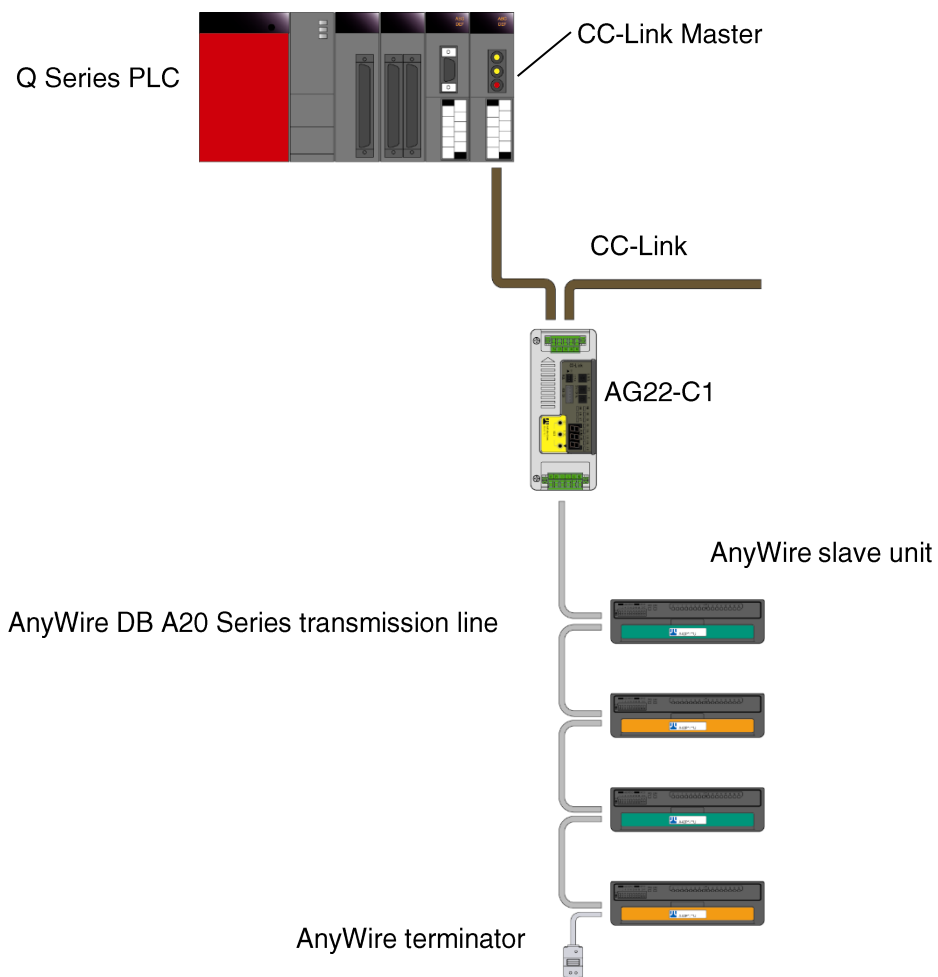
The AnyWire system is a high speed, highly reliable wiring saving system with its own transmission method.

AG22-C1 is a full-duplex transmission CC-Link gateway.

The maximum transmission distance is 3 km (total extension length). AG22-C1 provides 256 input points and 256 output points per unit.

Disconnection can be detected even if branch wiring is carried out.

System diagram



2 Specifications

2.1. General specifications

Operating ambient temperature	0 – + 55°C
Operating ambient humidity Storage ambient humidity	10–90%RH (No condensation)
Storage ambient temperature	-20°C – + 75°C
Atmosphere	No corrosive or inflammable gas
Vibration resistance	Based on JIS C 0040

2.2. Performance specifications

[System specification on AnyWireBus side]

Transmission clock	125 kHz	31.3 kHz	7.8 kHz	2 kHz
Maximum transmission distance (Total extension length)	50 m	200 m	1 km	3 km
Number of connected units	Max. 128 units	Max. 128 units	Max. 128 units	Max. 32 units *1
Transmission method	Full-duplex cyclic method			
Connection mode	Bus type (Multi drop method, T-branch method, Tree branch method)			
Transmission protocol	AnyWire DB A20 protocol			
Error control	Double collation system			
Number of connecting IO points	Max. 512 points (Input 256 points/Output 256 points)			
RAS function	Transmission line disconnection position detecting function, transmission line short-circuit detecting function, transmission power supply drop detecting function			
Connection cable	Multi-purpose 2 line cable/4 line cable (VCTF 0.75–1.25 mm ²) Dedicated flat cable (0.75 mm ²) Multi-purpose electric wire (0.75–1.25 mm ²) (If transmission distance exceeds 1 km, VCTF 1.25 mm ² or more)			
Power supply	Voltage 24 V DC +15%~-10% (21.6 V DC~27.6 V DC) Ripple 0.5 Vp-p or less Current 0.4[A] (When 128 terminal units are connected, load current is not included.)			

*1: 64 units up to 2km

■ Cycle time (ms)

	Transmission clock	125 kHz 50 m	31.3 kHz 200 m	7.8 kHz 1 km	2 kHz 3 km
Maximum number of transmission point settings					
	512 points (256 points × 2)	2.3	9.0	35.8	138.4

Caution: [1] Transmission cycle time is a value between one cycle time and two cycle times.
[2] In order to ensure that input signal responds, issue input signal longer than two cycle times.

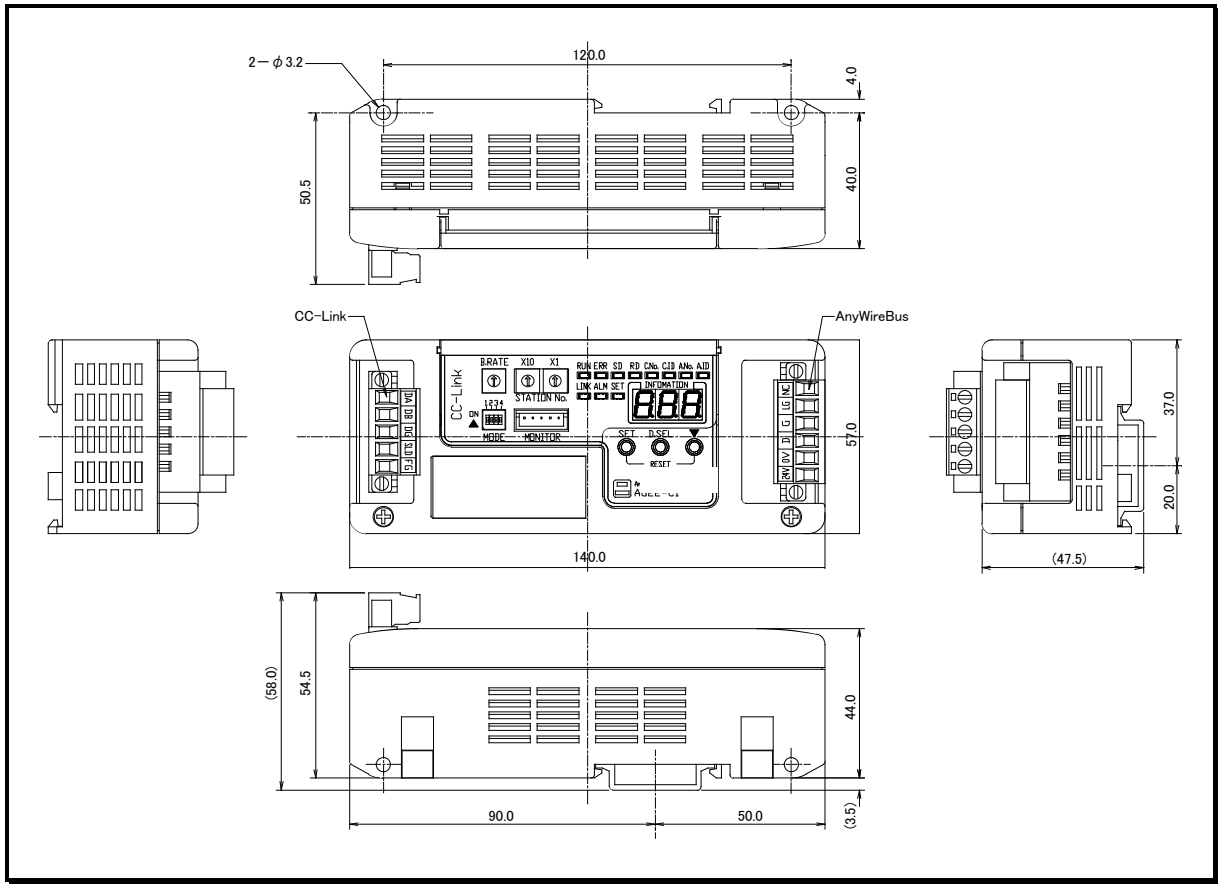
[System specifications on CC-Link side]

Version	CC-Link Ver. 1.10
Communication speed	10 M / 5 M / 2.5 M / 625 K / 156 Kbps (change by switch)
Communication method	Broadcast polling method
Synchronous system	Frame synchronous system
Coding system	NRZI
Transmission line type	Bus type (according to EIA RS485)
Transmission format	According to HDLC
Number of connected units	$(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d) \leq 64$ stations a: Number of units that occupy one station b: Number of units that occupy two stations c: Number of units that occupy three stations d: Number of units that occupy four stations $16 \times A + 54 \times B + 88 \times C \leq 2304$ A: Number of remote I/O station units --- Max. 64 units B: Number of remote device station units --- Max. 42 units C: Number of local station units --- Max. 26 units
Remote station No.	Station number setting range: 1–61 (4 stations are occupied starting the setting station number.)
Error control	CRC ($X^{16} + X^{12} + X^5 + 1$)
RAS function	Automatic return function Slave station separation function Confirmation of data link state Offline test (hardware test, line test, parameter check test)
Connecting cable	CC-Link cable (3-core twist pair cable with shield)
Number of occupied stations	4 remote device stations (RX/Ry: 112 points each (number of occupied points: 128 points)) (RWr/RWw 16/16)

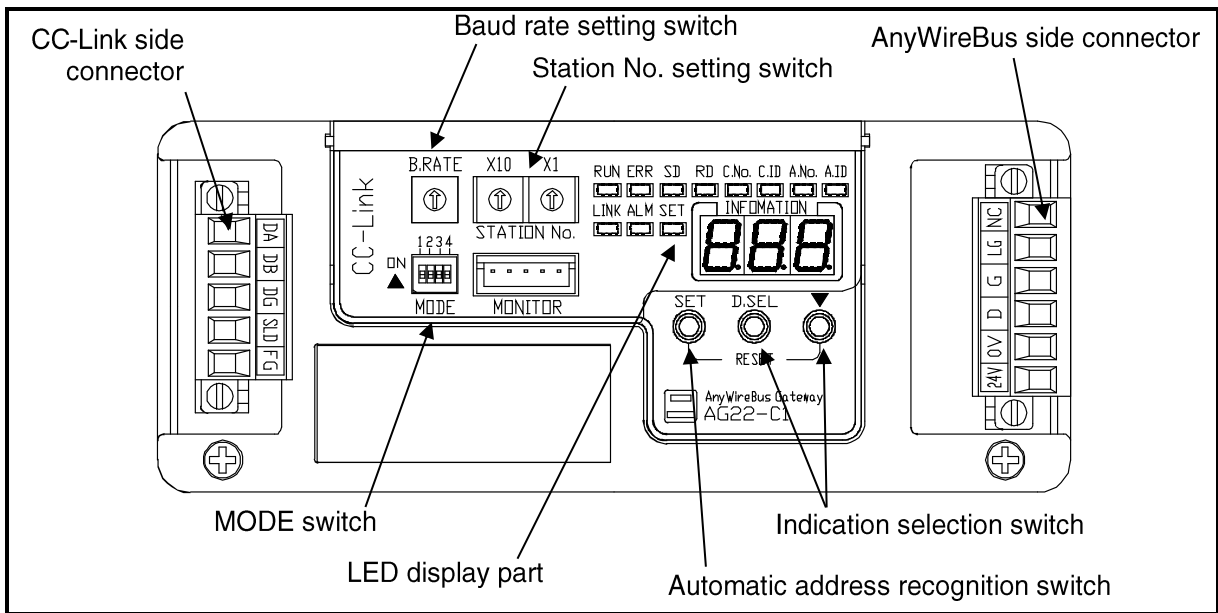
Maximum transmission distance

Communication speed	156 kbps	625 kbps	2.5 Mbps	5 Mbps	10 Mbps
Cable length between stations	0.2 m or more				
Maximum transmission distance	1200 m	900 m	400 m	160 m	100 m
Termination resistance	110Ω (DA-DB)				

2.3. Dimensional outline drawing



2.4. Name of each part



3 Installation of body

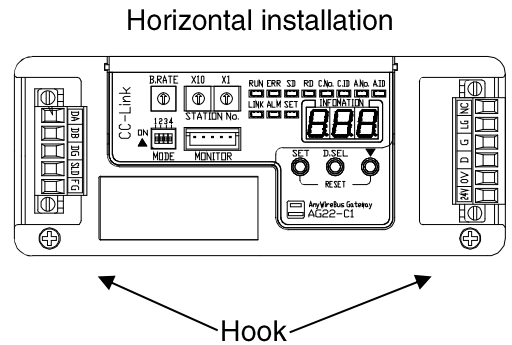
Install this machine to the DIN rail and use it.

Horizontal installation and vertical installation are available.

[For horizontal installation]

1. How to attach to the DIN rail
 - [1] Hook the fixing pin on the upper side of the bottom face onto the DIN rail.
 - [2] Fit the machine so as to press against the DIN rail.
2. How to detach from the DIN rail

Insert a flat-blade screwdriver into the right and left hooks, and simultaneously tilt the screwdrivers to this machine side to detach it.



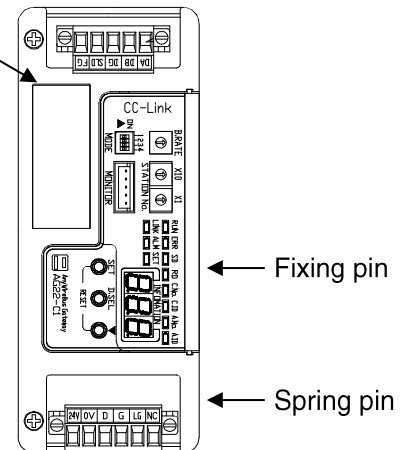
Mount the unit so that the CC-Link connector faces up.

Vertical installation

[For vertical installation]

1. How to attach to the DIN rail
 - [1] Hook the spring pin on the lower side of the bottom face onto the DIN rail.
 - [2] Fit the machine into the DIN rail while pushing this machine upward from underneath.
2. How to detach from the DIN rail

Pull the upper side of this machine toward the front while pushing it upward from underneath to detach from the DIN rail.

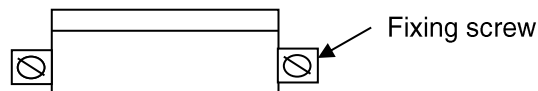


For vertical installation, do not install the body in the opposite direction (with the arrow downward). It may come off the DIN rail due to vibration, etc.

4 Connection of transmission line

When removing a “CC-Link side connector” or “AnyWireBus side connector,” make sure that the fixing screws at both ends are loosened (removed from the sockets) and then pull them out. If the connector is forcibly pulled out with the fixing screws still secured, the equipment may be damaged.

When installing the connector, make sure that there is no short-circuit caused by protruding or loosened wires and then install it and make sure to tighten the screw at both ends. (Tightening torque: 0.5 N·m)



[CC-Link side]

This machine is treated as CC-Link “remote device station.”

As for connection of the CC-Link portion, refer to “CC-Link System Master/Local Unit User’s Manual (detail version)” made by Mitsubishi Electric Corporation, etc.

Provided with easily detachable connector terminals.

Model: MSTB2.5/5-STF-5.08 (manufactured by PHOENIX CONTACT)

Connectable cable: 0.2–2.5 mm² (AWG24–12)

Tightening torque: 0.5–0.6 N·m

Terminal name	Signal type	Line color	
DA	Communication line	Blue	* For the last station, insert the terminal resistance.
DB	Communication line	White	
DG	Communication ground	Yellow	
SLD	Shield of communication cable	-	
FG	Frame ground	-	

*SLD and FG are connected inside the unit.

The transmission cable is a twist cable with a shield dedicated for CC-Link.

As for the shielded wire of the twist cable, ground (Type III ground) the both ends via SLD and FG of each unit.

When AG22-C1 is the terminal station, install the terminal resistance included in the master unit between DA and DB.

This terminal resistance different from that installed between DA and DB of the master unit is required separately.

If these are not installed, it may cause improper communication on the CC-Link side.

[AnyWireBus side]

Provided with easily detachable connector terminals.

Model: MSTB2.5/6-STF-5.08 (manufactured by PHOENIX CONTACT)

Connectable cable: 0.2–2.5 mm² (AWG24–12)

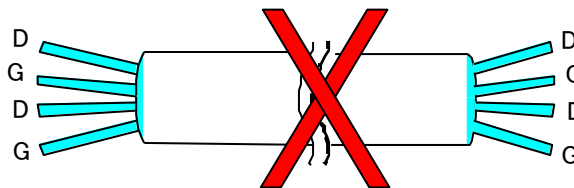
Tightening torque: 0.5–0.6 N·m

24 V	Connect to a stable 24 V DC power supply.
0 V	Capacity of current required for load and slave unit + 2 A or more
D	Transmission cable
G	Transmission cable
LG	Connected to neutral point of noise filter. Ground when there is a malfunction due to 24 V based power noise. In that case, perform single point ground with the FG terminal on CC-Link side.
NC	Spare terminal. Do not connect anything to this terminal.

Connect D and G to D and G of the slave unit respectively. (See the instruction manual of each unit.)



- Do not bind several transmission lines (D and G) of multiple-wire cable together. Crosstalk may cause the equipment to malfunction.



- The thickness of the transmission line shall be 0.75 mm² or more if the transmission distance is up to 200 m and 0.9 mm² or more if the distance exceeds 200 m.
- The lower limit of power voltage shall be 21.6 V or more if the transmission distance is up to 200 m and 24 V if the distance exceeds 200 m.
- Please be careful of voltage drop by a cable. Voltage drop may cause the equipment to malfunction. If the voltage drop is large, supply power on the terminal side. (Local power)
- Do not solder a wire connected to a connector terminal; otherwise it may loosen the wire, causing a contact failure.

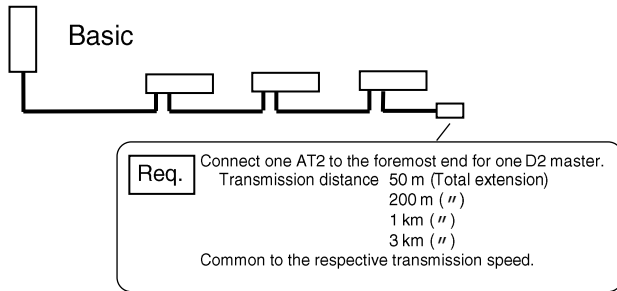
● **MONITOR connector**

Connector for connecting maintenance monitor.

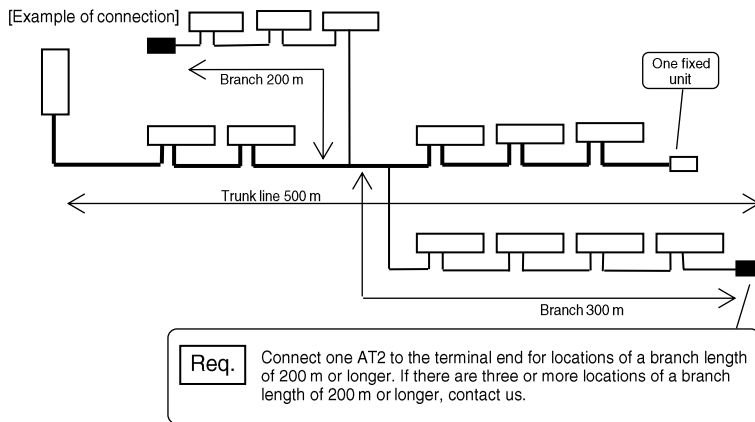
4.1. Terminator

In order to ensure more stable transmission quality, connect a terminator (**AT2**) to the **AnyWire** transmission line end.

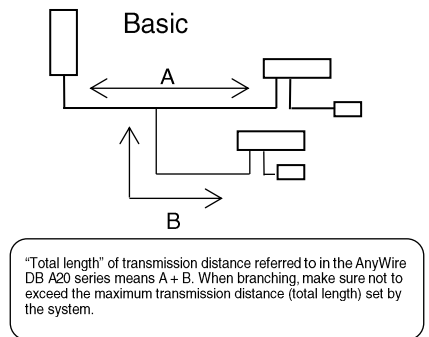
■ Connection of terminator



■ Branch of transmission line (Transmission distance 1 km specification)



■ Total extension



5 Setting of switches

5.1. CC-Link side

5.1.1. Setting of station numbers

Station numbers are set with the station number setting switch "STATION NO".
The setting range of this machine is up to 61 because 4 stations are occupied.

Station number	Station No. setting switch	
	× 10	× 1
1	0	1
2	0	2
3	0	3
4	0	4
.	.	.
60	6	0
61	6	1

*All the switch positions at shipment are "0."

When a station number overlaps with another node, station number overlap occurs to make communication access impossible.

If the station number is set at "0" or a number of "62" or larger, the "ERR" LED lights.

5.1.2. Setting of baud rate

The communication speed is set with the B.RATE switch

B.RATE switch setting value	Communication speed
0	156 kbps
1	625 kbps
2	2.5 Mbps
3	5 Mbps
4	10 Mbps
5-F	Error

*All the switch positions at shipment are "0."

When it is set to "5" or more, the "ERR" LED of this machine lights up.

5.1.3. Reset switch

This machine is reset by holding down the "▼" switch and pressing the "SET" switch.

After resetting it, release both switches simultaneously.

(If the "SET" switch is kept held, the machine shifts to the "automatic address recognition" operation.)

Press the switch when this machine operates improperly for any cause.

However, **as it is in the transmission signal halt condition during reset, the output terminal also temporarily acts as if a transmission error occurs.**

(In the case of default specification, all the settings are turned OFF.)

Therefore, make sure to check that there is no systematic problem when resetting the machine.



CAUTION

- Make sure to turn off the power supply to set the DIP switch.
- Make sure to set the DIP switch according to the transmission specification to be used.
- Unless the DIP switch coincides with the transmission specification of the slave unit connected to this unit, transmission cannot be correctly made, or a malfunction may result.

5.2. AnyWireBus side

Connect AnyWire DB A20 series slave units.

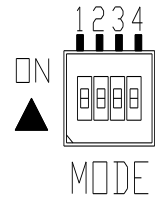
5.2.1. Specification selection (MODE switch)

Select transmission distance, etc., with the “MODE” switch (quad dip switch).

SW-1, 2 Sets transmission distance by combination of ON/OFF with 1 and 2.

SW-3 Selects the operation mode: Bit mode or Word mode.

SW-4 Not used (Set this switch at OFF.)



MODE Switch		Specification	
1	2		
OFF	OFF	2 kHz	3 km
OFF	ON	7.8 kHz	1 km
ON	OFF	31.3 kHz	200 m
ON	ON	125 kHz	50 m

* All the switch positions at shipment are OFF side.

MODE Switch	Operation mode	Specification
3		
OFF	Bit mode	Performs double collation of data per bit (1 point).
ON	Switch the internal operation mode. Do not normally turn it ON.	

6 Memory Map

This gateway unit occupies **four stations**, starting from the station No. specified in the CC-Link system.

Station No.	Remote input	Remote output	Remote register RWr (Remote → Master)	Remote register RWw (Master → Remote)	Remark
0	–	–	–	–	Master station designation
1	E0H–E1H	160H–161H	2E0H–2E3H	1E0H–1E3H	
2	E2H–E3H	162H–163H	2E4H–2E7H	1E4H–1E7H	
3	E4H–E5H	164H–165H	2E8H–2EBH	1E8H–1EBH	
4	E6H–E7H	166H–167H	2ECH–2EFH	1ECH–1EFH	
5	E8H–E9H	168H–169H	2F0H–2F3H	1F0H–1F3H	
6	EAH–EBH	16AH–16BH	2F4H–2F7H	1F4H–1F7H	
7	ECH–EDH	16CH–16DH	2F8H–2FBH	1F8H–1FBH	
8	EEH–EFH	16EH–16FH	2FCH–2FFH	1FCH–1FFH	
9	F0H–F1H	170H–171H	300H–303H	200H–203H	
10	F2H–F3H	172H–173H	304H–307H	204H–207H	
11	F4H–F5H	174H–175H	308H–30BH	208H–20BH	
12	F6H–F7H	176H–177H	30CH–30FH	20CH–20FH	
13	F8H–F9H	178H–179H	310H–313H	210H–213H	
14	FAH–FBH	17AH–17BH	314H–317H	214H–217H	
15	FCH–FDH	17CH–17DH	318H–31BH	218H–21BH	
16	FEH–FFH	17EH–17FH	31CH–31FH	21CH–21FH	
17	100H–101H	180H–181H	320H–323H	220H–223H	
18	102H–103H	182H–183H	324H–327H	224H–227H	
19	104H–105H	184H–185H	328H–32BH	228H–22BH	
20	106H–107H	186H–187H	32CH–32FH	22CH–22FH	
21	108H–109H	188H–189H	330H–333H	230H–233H	
22	10AH–10BH	18AH–18BH	334H–337H	234H–237H	
23	10CH–10DH	18CH–18DH	338H–33BH	238H–23BH	
24	10EH–10FH	18EH–18FH	33CH–33FH	23CH–23FH	
25	110H–111H	190H–191H	340H–343H	240H–243H	
26	112H–113H	192H–193H	344H–347H	244H–247H	
27	114H–115H	194H–195H	348H–34BH	248H–24BH	
28	116H–117H	196H–197H	34CH–34FH	24CH–24FH	
29	118H–119H	198H–199H	350H–353H	250H–253H	

Memory Map

30	11AH-11BH	19AH-19BH	354H-357H	254H-257H	
31	11CH-11DH	19CH-19DH	358H-35BH	258H-25BH	
32	11EH-11FH	19EH-19FH	35CH-35FH	25CH-25FH	
33	120H-121H	1A0H-1A1H	360H-363H	260H-263H	
34	122H-123H	1A2H-1A3H	364H-367H	264H-267H	
35	124H-125H	1A4H-1A5H	368H-36BH	268H-26BH	
36	126H-127H	1A6H-1A7H	36CH-36FH	26CH-26FH	
37	128H-129H	1A8H-1A9H	370H-373H	270H-273H	
38	12AH-12BH	1AAH-1ABH	374H-377H	274H-277H	
39	12CH-12DH	1ACH-1ADH	378H-37BH	278H-27BH	
40	12EH-12FH	1AEH-1AFH	37CH-37FH	27CH-27FH	
41	130H-131H	1B0H-1B1H	380H-383H	280H-283H	
42	132H-133H	1B2H-1B3H	384H-387H	284H-287H	
43	134H-135H	1B4H-1B5H	388H-38BH	288H-28BH	
44	136H-137H	1B6H-1B7H	38CH-38FH	28CH-28FH	
45	138H-139H	1B8H-1B9H	390H-393H	290H-293H	
46	13AH-13BH	1BAH-1BBH	394H-397H	294H-297H	
47	13CH-13DH	1BCH-1BDH	398H-39BH	298H-29BH	
48	13EH-13FH	1BEH-1BFH	39CH-39FH	29CH-29FH	
49	140H-141H	1C0H-1C1H	3A0H-3A3H	2A0H-2A3H	
50	142H-143H	1C2H-1C3H	3A4H-3A7H	2A4H-2A7H	
51	144H-145H	1C4H-1C5H	3A8H-3ABH	2A8H-2ABH	
52	146H-147H	1C6H-1C7H	3ACH-3AFH	2ACH-2AFH	
53	148H-149H	1C8H-1C9H	3B0H-3B3H	2B0H-2B3H	
54	14AH-14BH	1CAH-1CBH	3B4H-3B7H	2B4H-2B7H	
55	14CH-14DH	1CCH-1CDH	3B8H-3BBH	2B8H-2BBH	
56	14EH-14FH	1CEH-1CFH	3BCH-3BFH	2BCH-2BFH	
57	150H-151H	1D0H-1D1H	3C0H-3C3H	2C0H-2C3H	
58	152H-153H	1D2H-1D3H	3C4H-3C7H	2C4H-2C7H	
59	154H-155H	1D4H-1D5H	3C8H-3CBH	2C8H-2CBH	
60	156H-157H	1D6H-1D7H	3CCH-3CFH	2CCH-2CFH	
61	158H-159H	1D8H-1D9H	3D0H-3D3H	2D0H-2D3H	
62	15AH-15BH	1DAH-1DBH	3D4H-3D7H	2D4H-2D7H	
63	15CH-15DH	1DCH-1DDH	3D8H-3DBH	2D8H-2DBH	
64	15EH-15FH	1DEH-1DFH	3DCH-3DFH	2DCH-2DFH	

This unit uses remote inputs for error status flag and remote station ready flag only.

Remote output is used for error reset request flag only.

Other remote inputs and outputs are not used.

Remote input	Input	Remote output	Output
RX0000	Not used	RY0000	Not used
RX0001		RY0001	
RX0002		RY0002	
:		:	
RX006D		RY006D	
RX006E		RY006E	
RX006F		RY006F	
RX0070	System area	RY0070	System area
RX0071		RY0071	
RX0072		RY0072	
RX0073		RY0073	
RX0074		RY0074	
RX0075		RY0075	
RX0076		RY0076	
RX0077		RY0077	
RX0078	Initial data processing request flag	RY0078	Initial data processing completion flag
RX0079	Initial data setting completion flag	RY0079	Initial data setting request flag
RX007A	Error state flag	RY007A	Error reset request flag
RX007B	Remote station Ready	RY007B	Reserve
RX007C	Reserve (reserved)	RY007C	Reserve (reserved)
RX007D	Reserve (reserved)	RY007D	Reserve (reserved)
RX007E	OS definition	RY007E	OS definition
RX007F		RY007F	

Memory Map

Input and output are performed by the remote register.

16 words can be used for input and output respectively.

For an address of the slave unit, both input units and output units are set in the range of 0–255.

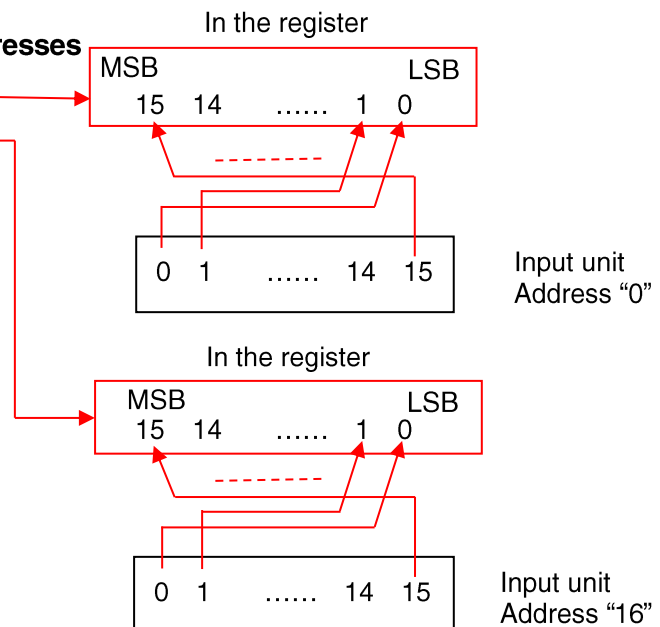
The correspondence table of the remote register and input/output numbers are as follows:

Input Remote register	Bit. No															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWr0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWr1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	⋮															
RWr14	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
RWr15	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

Output Remote register	Bit. No															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWw0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RWw1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	⋮															
RWw14	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
RWw15	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

Example of corresponding input addresses

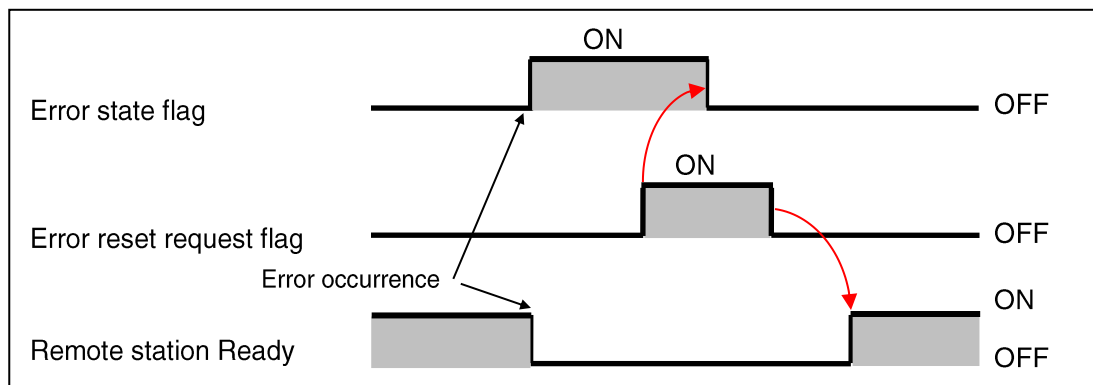
Remote register input	AnyWire input
RWr0	0
RWr1	16
RWr2	32
⋮	⋮
RWrD	208
RwrE	224
RWrF	240



Also output unit can be set from address "0" as with input unit.

As this machine does not require initial processing, initial data processing request flag, initial data processing completion flag, and initial data setting completion flag are disabled.

- Remote station Ready is turned ON when the power is turned ON or after reset by the reset switch.
- Error state flag is set (turned ON) in the event of an error, and if the reason for the error is resolved, the error state flag can be turned OFF by turning ON the error reset request flag.
- Remote station Ready is reset (turned OFF) in the event of an error, and is kept OFF until the error reset request flag is changed from ON to OFF.

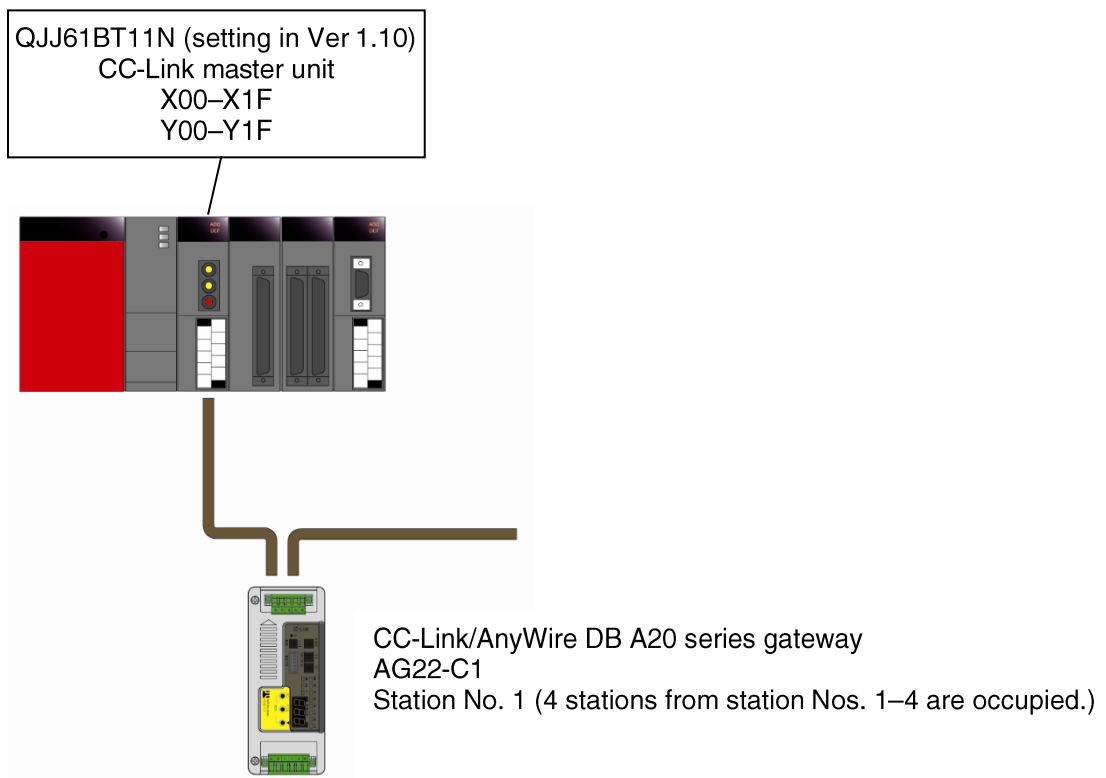


7 Programming method

Also refer to “CC-Link System, Master/Local Unit User’s Manual (detail version) made by Mitsubishi Electric Corporation, etc.

7.1. Example of parameter setting in Q Series CPU

When first input and output numbers for the CC-Link master unit are “0”, and the station No. for AG22-C1 is “1”



Parameter setting is required for communication between the master station and remote I/O station, remote device station and local station in CC-Link. CC-Link parameters can be set on the parameter setting screen of a programming software in Q CPU, QnA, Q4AR, QnAS and QnASH CPU. (Parameter setting is also enabled with the ladder program. Refer to Section 7.2.)



CAUTION

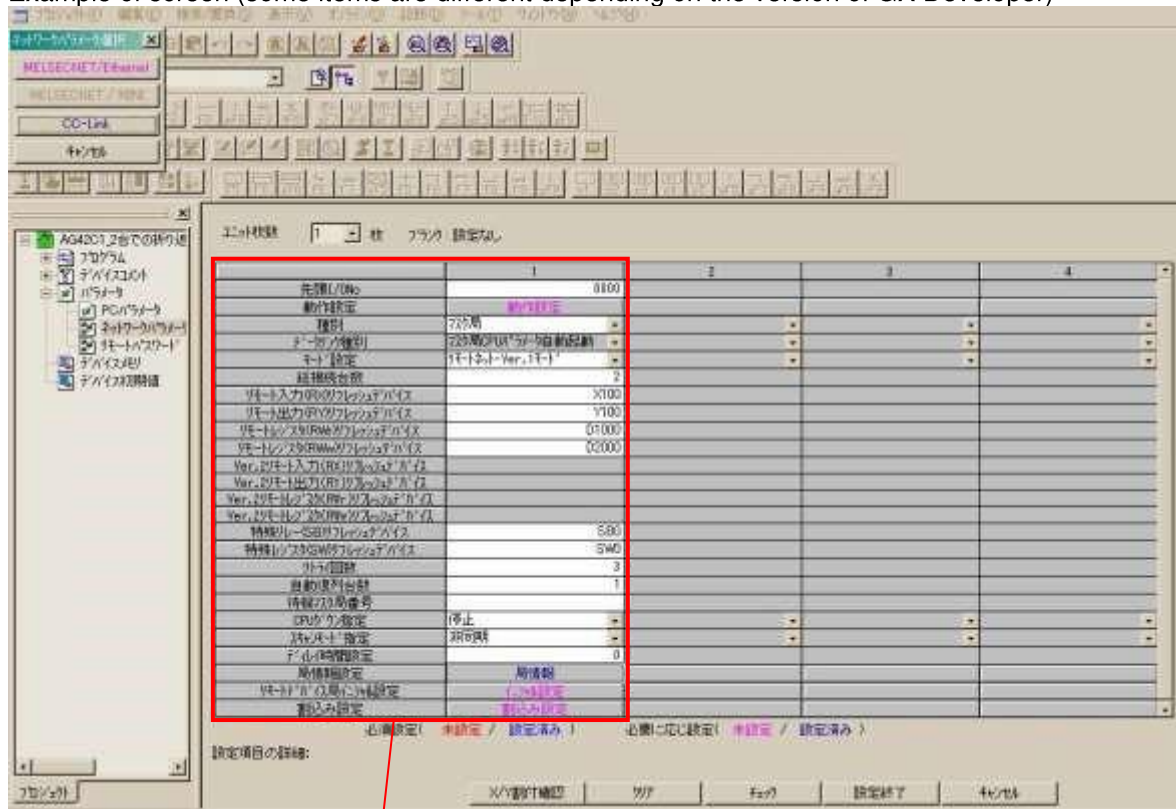
To set parameters with the Q-series CPU, use the parameter setting screen of the programming software or a ladder program.

Multiple settings by different methods will duplicate accesses to CC-Link buffer memory, resulting in the unstable state of output.

[Example of setting]

Check the box of [Project Data List] on the display menu. When [Parameter] → [Network Parameter] → [CC-LINK] are clicked in the project window displayed, the following screen appears.

Example of screen (some items are different depending on the version of GX Developer)



The enlarged screen in the frame is shown in the next section.

Enlarged screen

	1
先頭I/ONo	0000
動作設定	動作設定
種別	マスタ局
ターミナル種別	マスタ局CPUのラマータ自動起動
モード設定	リモートネット-Ver.1モード
総接続台数	2
リモート入力(RX)リフレッシュデバイス	X100
リモート出力(RY)リフレッシュデバイス	Y100
リモートレジスタ(RWr)リフレッシュデバイス	D1000
リモートレジスタ(RWw)リフレッシュデバイス	D2000
Ver.2リモート入力(RX)リフレッシュデバイス	
Ver.2リモート出力(RY)リフレッシュデバイス	
Ver.2リモートレジスタ(RWr)リフレッシュデバイス	
Ver.2リモートレジスタ(RWw)リフレッシュデバイス	
特殊リレー(SB)リフレッシュデバイス	SB0
特殊レジスタ(SW)リフレッシュデバイス	SW0
リトライ回数	3
自動復列台数	1
待機マスタ局番号	
CPUの指定	停止
スタンバイ指定	非同期
タイムアウト時間設定	0
局情報設定	局情報
リモートデバイス局仁別設定	仁別設定
割込み設定	割込み設定
必須設定(未設定 / 設定済み)	

Set each item according to the system specifications you use.

Setting item	Content
First I/O No.	Input the first I/O No. on which CC-Link is installed by 16-point unit.
Mode setting	Select a mode suitable for the system being unit: Remote Net Ver. 1 mode, Remote Net Ver. 2 mode, or Remote Net additional mode.
Total number of connected units	Set the total number of connected units including reserved station and disabled station within the range of 1–64.
Remote input (RX) refresh device	Input the device names and numbers of X, M, L, B, D, W, R, and ZR.
Remote output (RY) refresh device	Input the device names and numbers of Y, M, L, B, T, C, ST, D, W, R, and ZR.
Remote register (RWr) refresh device	Input the device names and numbers of M, L, B, D, W, R, and ZR.
Remote register (RWw) refresh device	Input the device names and numbers of M, L, B, T, C, ST, D, W, R, and ZR.
Special relay (SB) refresh device	Input the device names and numbers of M, L, B, D, W, R, SB, and ZR.
Special register (SW) refresh device	Input the device names and numbers of M, L, B, D, W, R, SW, and ZR.

Station information setting

Double-click “Station Information” to open the “Station Information Setting” window below.

Select “Remote device station” for [Station type], and select “4 stations occupied” for [Number of Occupied Station].

台数/局番	局種別	拡張サイクル設定	占有局数	リモート局点数	予約/無効局指定	インタフェース用バッファ指定(ワード)		
						送信	受信	自動
1/1	リモートデバイス局	1倍設定	4局占有	128点	設定なし			
2/5	リモートデバイス局	1倍設定	4局占有	128点	設定なし			

**CAUTION**

Incorrect parameter settings cause unexpected operation, such as CC-Link communication failure and unstable communication.

Set the parameters correctly, and write the parameters into the CPU securely.

In this case, each signal and device correspondence are as follows:

Type of signal	Station No. 1 - compliant device	Station No. 5 - compliant device
Bit-Bus input (128 points)	X100–X17F	X180–X1FF
Bit-Bus output (128 points)	Y100–Y17F	Y180–Y1FF
Word-Bus input (16 words)	D1000–D1015	D1016–D1031
Word-Bus output (16 words)	D2000–D2015	D2016–D2031

The parameters that have been set with the programming software will become active through the following procedure:

1. Write the parameters into the PLC CPU.
2. Turn OFF the power supply once and then turn it ON again, or reset the PLC CPU.

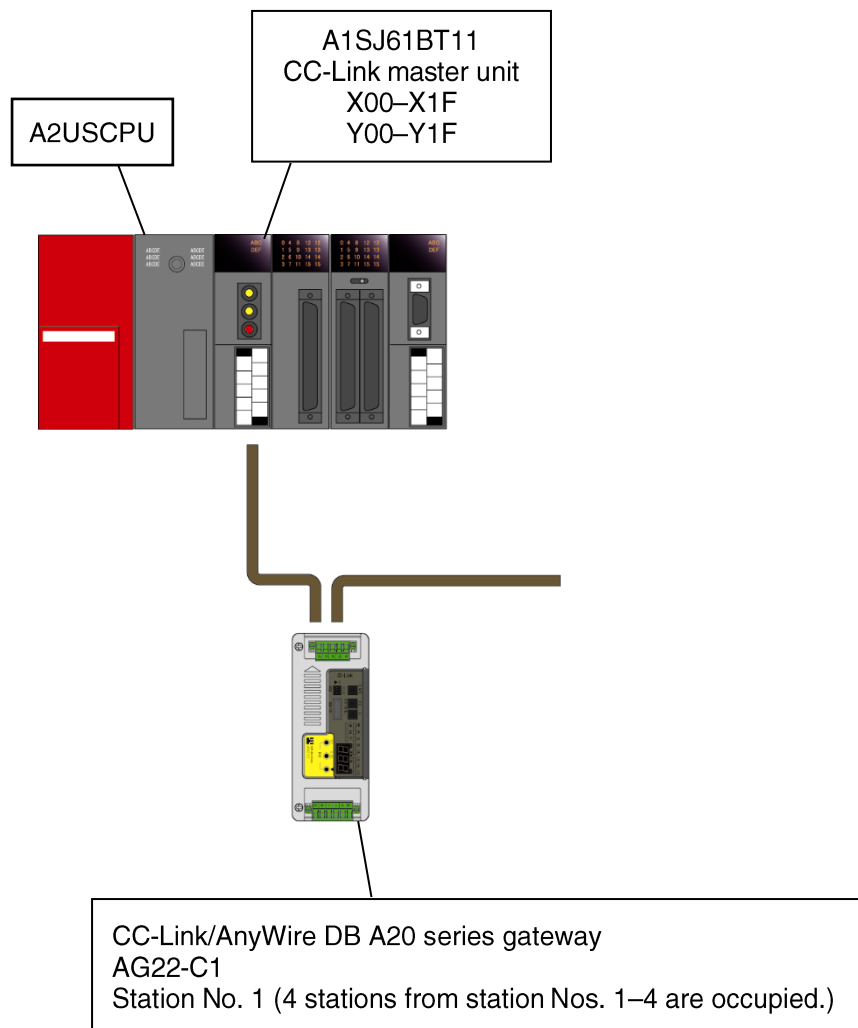
7.2. Parameter setting program for A-series CPU

To set parameters with the A-series CPU (AnN, AnA, AnU, AnS, AnSH, AnUS and AnUSH), use a ladder program.

For your reference, examples of ladder programs for this system configuration are shown below.

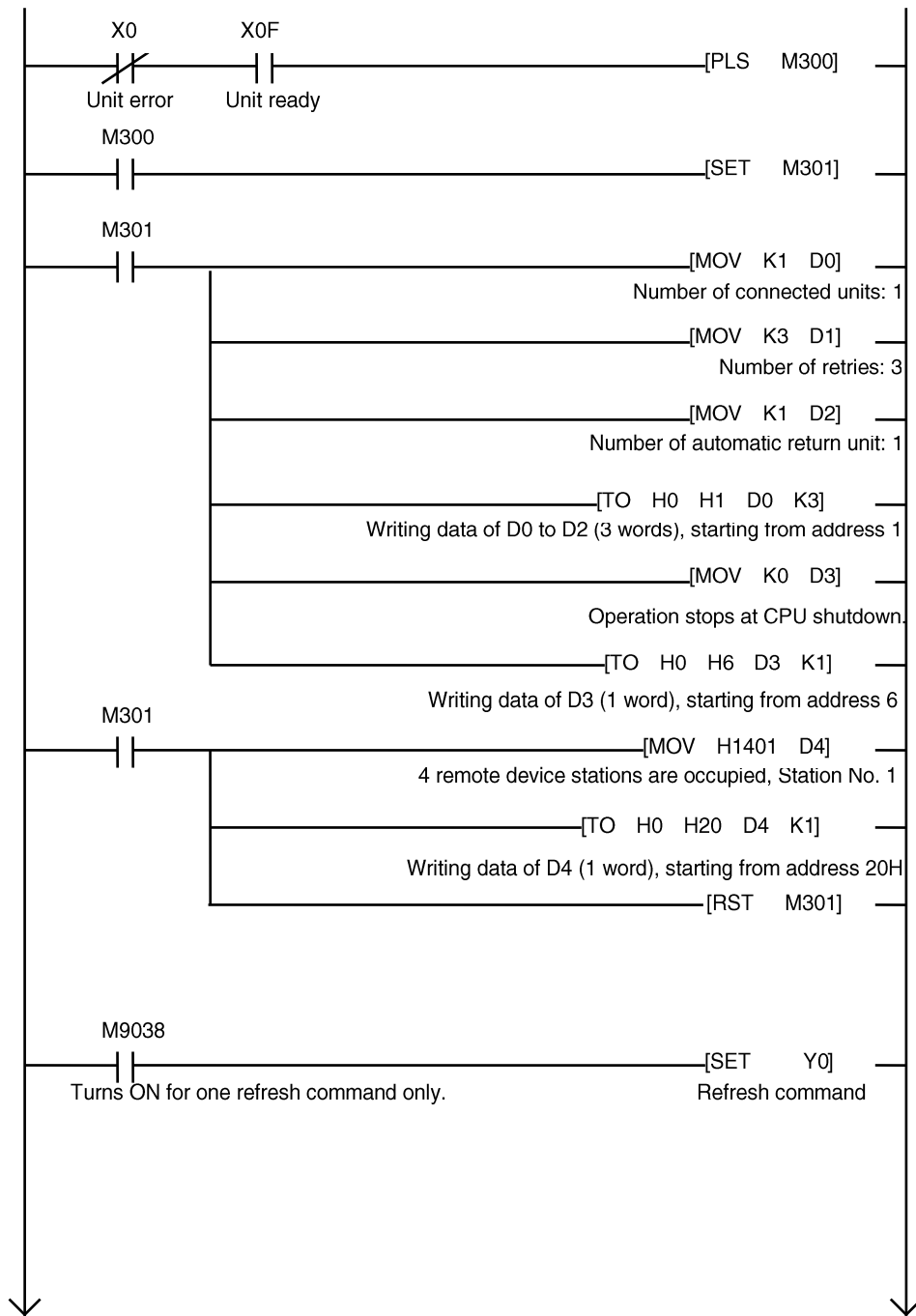
CC-Link master unit: first I/O number 0

AG22-C1: station No. 1 (1-unit connection)

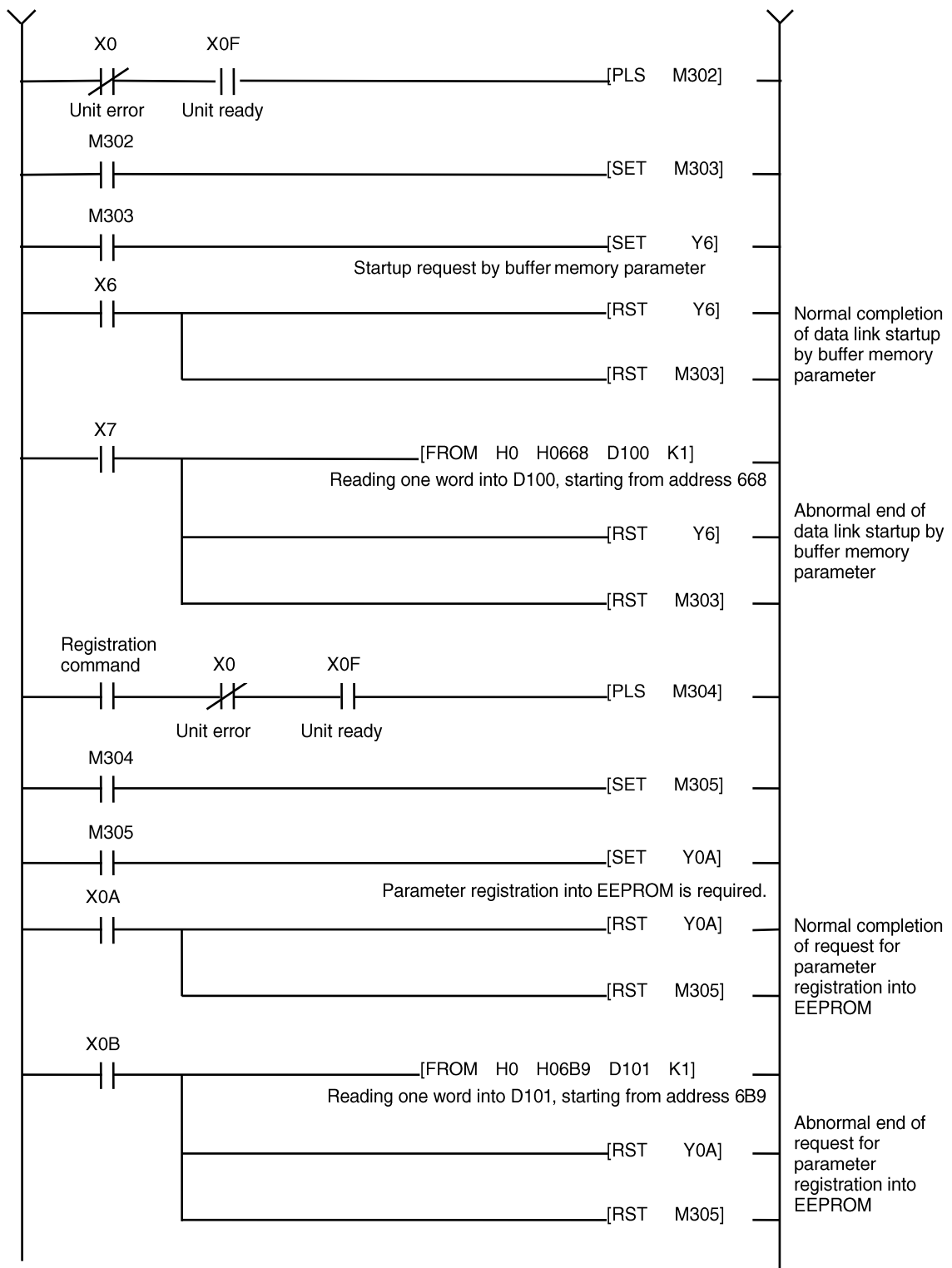


7.3. Parameter setting program

[1] Program for debugging (Example)



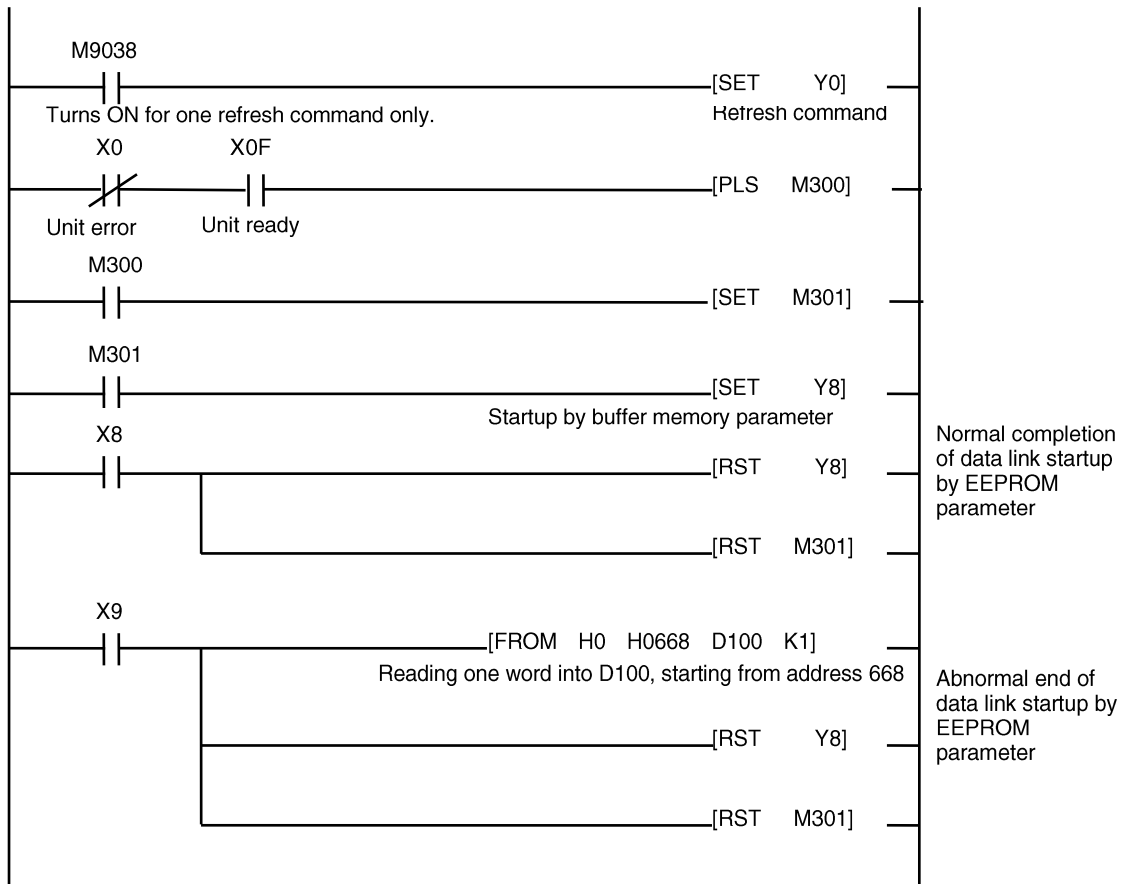
Programming method



Turn ON the “registration command” input at appropriate timing (for example, at completion of debugging), to register the parameter into EEPROM.

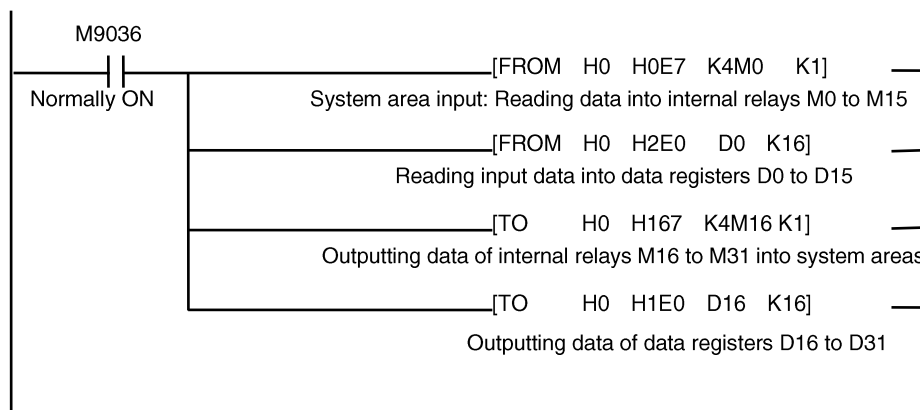
[2] Operation program (Example)

This program reads a parameter from the EEPROM to start the data link.



7.4. Communication program (Example)

With the FROM commands, input data are reflected in the internal relays. With the TO commands, data of the internal relays are output.



Programming method

The communication program uses the following types of signals. The devices corresponding to each signal are as follows:

Signal type	Corresponding device
System area input (16 points)	M0–M15
System area output (16 points)	M16–M31
Input (256 points)	D0–D15
Output (256 points)	D16–D31

■ Details of corresponding devices

Internal relays and corresponding system inputs and outputs are as shown in the table below.

Internal relay No.	Input	Internal relay No.	Output
M0	System area	M16	System area
M1		M17	
M2		M18	
M3		M19	
M4		M20	
M5		M21	
M6		M22	
M7		M23	
M8	Initial data processing request flag	M24	Initial data processing completion flag
M9	Initial data setting completion flag	M25	Initial data setting request flag
M10	Error state flag	M26	Error reset request flag
M11	Remote station Ready	M27	Reserve
M12	Reserve (reserved)	M28	Reserve (reserved)
M13	Reserve (reserved)	M29	Reserve (reserved)
M14	OS definition	M30	OS definition
M15		M31	

- Remote registers and corresponding I/O input numbers and output numbers are as shown in the table below.

Input Remote register	bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
D0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
D1	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	⋮															
D14	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
D15	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

Output Remote register	bit No.															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
D16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
D17	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	⋮															
D30	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224
D31	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240

[Reference]

FROM command

Function: Reads data of “n3” words from the address specified by “n2” in the buffer memory of the CC-Link master unit specified by “n1”, and stores the data in the devices, starting from the device number specified by “D”.

Format: [FROM n1 n2 D n3]

n1: First input/output No. of the CC-Link master unit (Designation of two high-order digits of 3-digit hexadecimal number, when first input/output number is expressed as three digits of hexadecimal number.)

n2: First address of the data to read

D: First device number to store the read data

n3: Quantity of the data to read

TO command

Function: Used to write data of “n3” points from the device specified by “S”, starting from the address number specified by “n2” in the buffer memory of the CC-Link master unit specified by “n1”.

Format: [TO n1 n2 S n3]

n1: First input/output No. of the CC-Link master unit (Designation of two high-order digits of 3-digit hexadecimal number, when first input/output number is expressed as three digits of hexadecimal number.)

n2: First address to write data

S: Device No. storing the data to write

n3: Quantity of the data to write

8 Energization and display of each part

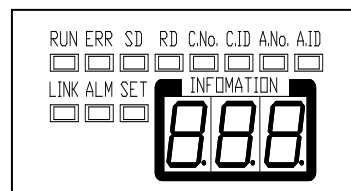
After checking the connection of each part, turn on the power.

When each setting and connection are correct, the displays of the basic equipment are as follows:

AG22-C1

CC-Link side	Display	State	AnyWireBus side	Display	State
	RUN	Lit		LINK	Flashing
ERR	Unlit	ALM	Unlit		
SD	Lit	SET	Unlit		
RD	Unlit				

LED display



Slave unit side

RDY: Lit, LINK: Flashing

After checking this status, execute the “automatic address recognition” procedure to register the slave unit being connected. (Refer to the subsection 9.)

“A-4” is displayed in the “INFORMATION” display part in the early phase of energization. It is because the connected terminal is not registered by “automatic address recognition” operation. The transmission line disconnection monitoring function can be activated by registering the slave unit through the “automatic address recognition” procedure.

And data is transmitted regardless of “automatic address recognition” operation.

After execution of the “automatic address recognition” procedure, the number of registered slave units is indicated in the “INFORMATION” display.

If it does not coincide with the number of connections, there are possible reasons such as duplicate settings of an address, improper wiring and influence by noise. Therefore, check the setting of the slave unit address switch, terminal wiring, transmission line installation environment and terminator.

In a display state other than those above, check whether there is any content and reason matched to those below or not and remove the fault.

8.1. Detailed display of CC-Link side

LED name	Lit	Unlit	Flashing
RUN (Green)	In normal communication	<ul style="list-style-type: none"> • Transmission cable is disconnected. • Transmission cable is improperly wired. • Transmission speed setting is incorrect. • Hardware is being reset. 	-
ERR (Red)	<ul style="list-style-type: none"> • CRC error • Setting error of station number setting SW (The station number to 0 or 62 or more set.) • Baud rate SW setting error (The baud rate to 5 or more set.) 	<ul style="list-style-type: none"> • Normal communication • Hardware is being reset. 	When the baud rate or station number setting switch is changed from the setting at the time of reset release (Flashing for 0.4 seconds) If the setting is returned to the original, the lamp is unlit.
SD (Yellow)	Sending	<ul style="list-style-type: none"> • Transmission cable is disconnected. • Transmission cable is improperly wired. • Transmission speed setting is incorrect. • Hardware is being reset. 	-
RD (Yellow)	Receiving	<ul style="list-style-type: none"> • Transmission cable is disconnected. • Transmission cable is improperly wired. • Hardware is being reset. 	-

8.2. Detailed display of AnyWire Bus side

Display indicating the state of AnyWire Bus

Indication	Name	Color	Meaning	
LINK	Transmission indication	Green	Flashing	This unit is operating.
			Unlit	This unit has an error.
ALM	Alarm indication	Red	Lit	Disconnection of AnyWireBus transmission line D, G
			Slow flashing ^{*1}	Short-circuit between D and G, or short-circuit between D and 24V
			Quick flashing ^{*2}	Voltage of 24V power supply supplied to this unit is low (approximately 21V or less).
			Unlit	In normal transmission
SET	Automatic address recognition indication	Yellow	Lit	In automatic address recognition operation
			Unlit	In normal transmission

*1: "Slow flashing" is flashing of an approximately 1 second cycle.

*2: "Quick flashing" is flashing of an approximately 0.2 second cycle.

If a condition that lights or flashes the "ALM" LED occurs, the "error status flag" of the CC-LINK master unit turns ON.

Energization and display of each part

The number of connected slave units and error address are displayed by the three digits “INFORMATION” LED and four LEDs of “C.No.,” “C.ID,” “A.No.” and “A.ID”.

LED name	Content of “INFORMATION LED”
C.No.	Indicating number of connected units
C.ID	Indicating connected address
A.No.	Indicating number of error units
A.ID	Indicating error address

The indication by the “INFORMATION” LED shows the number of connected units at normal time (ALM LED unlit), and displays alarm code depending on error cause at abnormal time (ALM LED lit).

“INFORMATION LED” display	Error cause
A-1	Short-circuit between D and G
A-2	Short-circuit between D and 24V (when the supply power of this machine and slave unit are the same)
A-3	Voltage of 24V power supply supplied to this machine is low (approximately 21V or less).
A-4	Disconnected. Or slave unit is in failure, or power is not supplied.

When the error state is released, the indications of A-1, A-2 and A-3 are returned and not retained. A-4 is retained until the power is turned off or error reset is performed.

Unless the “D.SEL” or “▼” switch is operated for approximately 5 seconds, the display returns to the indication of number of connected units at normal time, and to the alarm code indication at abnormal time.

If any of the above A-1 to A-4 errors occurs, the “error status flag” of the CC-LINK master unit turns ON.

● Selection of indication items by the “D.SEL” switch

Information on the “INFORMATION” LED changes every time the “D.SEL” switch is pressed as follows:

“INFORMATION LED” display	Error content
At normal time	
At abnormal time (in case of A-4)	
At abnormal time (in the other cases)	

● The following addresses can be displayed by pressing the “▼” switch when the “C.ID” or “A.ID” LED is lit.

Address is displayed in hexadecimal number.

The lower two digits indicate an address set for the slave unit.

The uppermost digit indicates the type of slave unit.

“INFORMATION LED” display	Content
000–0FF	Address of output slave unit
200–2FF	Address of input slave unit

9 Monitoring function

Overview

The slave units of the AnyWireBus have their own unique addresses, and a slave unit which has an address that was sent from this unit returns responses to the address, then detects for disconnection and checks for existence of a slave unit.

This machine stores an address of the slave unit connected at that time by the “automatic address recognition operation” (described later) into EEPROM. This information is stored even if the power is turned off.

Then registered addresses are sequentially sent out, and if there is no response to them, disconnection is displayed by the “ALM” LED of this machine. In addition, addresses of the slave units having errors can be known by the “INFORMATION” LED.

9.1. Automatic address recognition

Storing addresses of the connected slave units into EEPROM of this machine is called “Automatic address recognition.”

Procedure

- 1 Check that all of the slave units operate normally.
- 2 Press the “SET” switch until the “SET” LED (Yellow) lights up.
- 3 If the “SET” LED lights up for a while and then turns off, storage of an address has been completed.

*Carry out “automatic address recognition” operation in the following cases:

- When all slave units are connected to the master unit and operation is started.
- When a slave unit is added
- When a slave unit is deleted.
- When the address of a slave unit is changed.



CAUTION

- Input/output may not be carried out during the automatic address recognition operation. When carrying out automatic address recognition operation, stop execution of the PLC program or carry out it in a state that there is no problem with the operation of the equipment.
- Automatic address recognition operation cannot be carried out at the time of an error in an AnyWireBus such as a short-circuit, after the power is turned on, or for approximately 5 seconds after resetting.
- When disconnection error occurs during operation, do not conduct “automatic address recognition.” Disconnection information will be lost.

9.2. Monitoring operation

Addresses registered are sequentially sent out, and if there is no response to them, disconnection is displayed by the “ALM” LED.

This error information is retained until the power is turned off or the alarm is reset. (For details, see “8 Energization and display of each part.”)

10 CC-Link input/output response time

10.1. Link scan time (LS)

(1) In remote net mode

$$LS = BT \{27 + (NI \times 4.8) + (NW \times 9.6) + (N \times 30) + (ni \times 4.8) + (nw \times 9.6)\} + ST + EX + F + TR [\mu s]$$

BT: Constant (transmission speed)

Transmission speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
BT	51.2	12.8	3.2	1.6	0.8

NI: Final station number of a, b and c

(Including the number of occupied stations expect for reserved stations. However, in multiples of 8.)

a: The total number of occupied stations of remote I/O stations

b: The total number of occupied stations of remote device stations

c: The total number of occupied stations of local stations, waiting master station and intelligent device station

NW: The final station number of b and c

(Including the number of occupied stations expect for reserved stations. However, in multiples of 8.)

Final station No.	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64
NI, NW	8	16	24	32	40	48	56	64

N: The number of connected units (except for reserved stations)

ni: a + b + c (except for reserved stations)

nw: b + c (except for reserved stations)

ST: Constant

A: The final station number of remote I/O station

B: The final station number of remote device station (including the number of occupied stations)

C: The final station number of local station, waiting master station and intelligent device station (including the number of occupied stations)

(It shall be the larger value of [1], [2] and [3]. However, disregard [2] in the case of B = 0 and [3] in the case of C = 0.)

[1] $800 + (A \times 15)$

[2] $900 + (B \times 50)$

[3] $C \leq 26: 1200 + (C \times 100)$

$C > 26: 3700 + \{(C-26) \times 25\}$

EX: Constant (only when remote net Ver.2 mode or remote net addition mode is used)

50 + the total in the table below

Number of occupied stations	1 station occupied	2 stations occupied	3 stations occupied	4 stations occupied
Extended cyclic setting				
Single setting	0	0	0	0
Double setting	70 × number of units	80 × number of units	90 × number of units	100 × number of units
Quadruple setting	90 × number of units	110 × number of units	130 × number of units	150 × number of units
Octuple setting	110 × number of units	160 × number of units	210 × number of units	260 × number of units

F: Reset processing time {only when communication error stations (including error ineffective station and temporary ineffective station) exist}

Number of communication error stations × 118 × BT × (1 + number of retries)

TR: Transient processing time (only transient request is made)

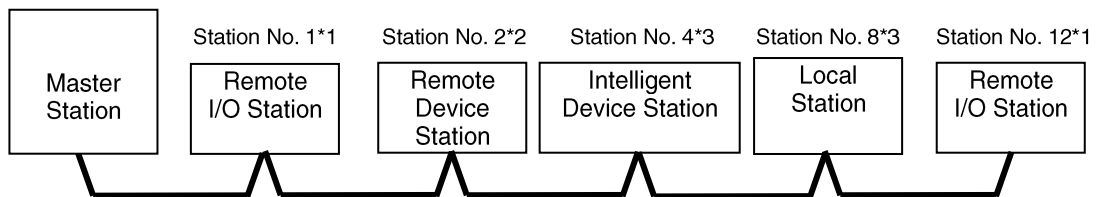
•When transient request is made from the master station

180 × BT

•When transient request is made from the master station

40.8 × BT × number of transient transmitter station

(Ex.) When the transmission speed is 10 Mbps in the system configuration example below (however, communication error station and transient transmission shall not be included.)



*1: 1 station occupied

*2: 2 stations occupied, quadruple setting

*3: 4 stations occupied, single setting

BT = 0.8

ST = 2300

EX = 50 + 110 × 1 = 160

NI = 12 → 16

[1] 800 + (12 × 15) = 980

NW = 11 → 16

[2] 900 + (3 × 50) = 1050

N = 5

[3] 1200 + (11 × 100) = 2300

ni = 12

A = 12, B = 3, C = 11

nw = 10

LS = 0.8 {27 + (16 × 4.8) + (16 × 9.6) + (5 × 30) + (12 × 4.8) + (10 × 9.6)} + 2300 + 160

= 2908.8 [μs]

= 2.91 [ms]

10.2. Transmission delay time

The transmission delay time between the master station and AG22-C1 (remote device station) is as follows:

Set the remote device station processing time to 1 ms in AG22-C1.

Since this unit operates in the CC-Link Ver. 1.10 mode, use “m = 1” in the following calculation formula.

(1) Master station (RX) ← remote device station (RX)

It indicates the time from when a signal is input to the remote device station until the device of the CPU is turned ON (OFF).

[Calculation formula]

[Normal value]

- (a) Non-synchronous mode (perform data link without synchronization with sequence program)

$$SM + LS \times 1 \times m + \text{remote device station processing time [ms]}$$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

- (Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$$\begin{aligned} & SM + LS \times 1 \times m + \text{remote device station processing time [ms]} \\ & = 20 + 3 \times 1 \times 3 + 1 \\ & = 30 \text{ [ms]} \end{aligned}$$

- (b) Synchronous mode (perform data link with scanning in synchronization with sequence program)

$$(SM \times n) \times 1 + \text{remote device station processing time [ms]}$$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m / SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

- (Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$$\begin{aligned} & (SM \times n) \times 1 + \text{remote device station processing time [ms]} \\ & = (20 \times 1) \times 1 + 1 \\ & = 21 \text{ [ms]} \end{aligned}$$

[Maximum value]

(a) Non-synchronous mode

$SM + LS \times 2 \times m +$ remote device station processing time [ms]

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM + LS \times 2 \times m +$ remote device station processing time [ms]

$$= 20 + 3 \times 2 \times 3 + 1$$

$$= 39 \text{ [ms]}$$

(b) Synchronous mode

$(SM \times n) \times 2 +$ remote device station processing time [ms]

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m/SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$(SM \times n) \times 2 +$ remote device station processing time [ms]

$$= (20 \times 1) \times 2 + 1$$

$$= 41 \text{ [ms]}$$

(2) Master station (RY) → remote device (RY)

It indicates the time from when the device of CPU is turned ON (OFF) until output of the remote device station is turned ON (OFF).

[Calculation formula]

[Normal value]

(a) Non-synchronous mode

$SM + LS \times (1 \times m + 1) +$ remote device station processing time [ms]

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM + LS \times (1 \times m + 1) +$ remote device station processing time [ms]

$$= 20 + 3 \times (1 \times 3 + 1) + 1$$

$$= 33 \text{ [ms]}$$

CC-Link input/output response time

(b) Synchronous mode

$SM \times n + LS \times m + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m / SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM \times n + LS \times m + \text{remote device station processing time [ms]}$

$$= 20 \times 1 + 3 \times 3 + 1$$

$$= 30 \text{ [ms]}$$

[Maximum value]

(a) Non-synchronous mode

$SM + LS \times (2 \times m + 1) + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM + LS \times (2 \times m + 1) + \text{remote device station processing time [ms]}$

$$= 20 + 3 \times (2 \times 3 + 1) + 1$$

$$= 42 \text{ [ms]}$$

(b) Synchronous mode

$SM \times n + LS \times m + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m / SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM \times n + LS \times m + \text{remote device station processing time [ms]}$

$$= 20 \times 1 + 3 \times 3 + 1$$

$$= 30 \text{ [ms]}$$

(3) Master station (RWr) ← remote device station (RWr)

It indicates the time from when a signal is input to the remote device station until the device of the CPU is changed.

[Calculation formula]

[Normal value]

(a) Non-synchronous mode

$SM + LS \times 1 \times m + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station
 $SM + LS \times 1 \times m + \text{remote device station processing time [ms]}$
 $= 20 + 3 \times 1 \times 3 + 1$
 $= 30 \text{ [ms]}$

(b) Synchronous mode

$(SM \times n) + 1 + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m / SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station
 $(SM \times n) \times 1 + \text{remote device station processing time [ms]}$
 $= (20 \times 1) \times 1 + 1$
 $= 21 \text{ [ms]}$

[Maximum value]

(a) Non-synchronous mode

$SM + LS \times 2 \times m + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station
 $SM + LS \times 2 \times m + \text{remote device station processing time [ms]}$
 $= 20 + 3 \times 2 \times 3 + 1$
 $= 39 \text{ [ms]}$

CC-Link input/output response time

(b) Synchronous mode

$$(SM \times n) \times 2 + \text{remote device station processing time [ms]}$$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m/SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$$(SM \times n) \times 2 + \text{remote device station processing time [ms]}$$

$$= (20 \times 1) \times 2 + 1$$

$$= 41 \text{ [ms]}$$

(4) Master station (RWw) → remote device station (RWw)

It indicates the time from when the data is set in the device of the CPU until the data of the remote device station is changed.

[Calculation formula]

[Normal value]

(a) Non-synchronous mode

$$SM + LS \times (1 \times m + 1) + \text{remote device station processing time [ms]}$$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$$SM + LS \times (1 \times m + 1) + \text{remote device station processing time [ms]}$$

$$= 20 + 3 \times (1 \times 3 + 1) + 1$$

$$= 33 \text{ [ms]}$$

(b) Synchronous mode

$$SM \times n + LS \times m + \text{remote device station processing time [ms]}$$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m/SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$$SM \times n + LS \times m + \text{remote device station processing time [ms]}$$

$$= 20 \times 1 + 3 \times 3 + 1$$

$$= 30 \text{ [ms]}$$

[Maximum value]

(a) Non-synchronous mode

$SM + LS \times (2 \times m + 1) + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM + LS \times (2 \times m + 1) + \text{remote device station processing time [ms]}$

$$= 20 + 3 \times (2 \times 3 + 1) + 1$$

$$= 42 \text{ [ms]}$$

(b) Synchronous mode

$SM \times n + LS \times m + \text{remote device station processing time [ms]}$

SM: Master station sequence program scan time

LS: Link scan time (refer to the section 10.1)

n: Value of $(LS \times m / SM)$ rounded away from zero

m: Constant (extended cyclic setting)

Extended cyclic setting	Single setting	Double setting	Quadruple setting	Octuple setting
m	1	3	7	15

(Ex.) In the case of sequence scan time 20 ms, link scan time 3 ms, extended cyclic setting “double setting” and remote device station processing time 1 ms of the master station

$SM \times n + LS \times m + \text{remote device station processing time [ms]}$

$$= 20 \times 1 + 3 \times 3 + 1$$

$$= 30 \text{ [ms]}$$

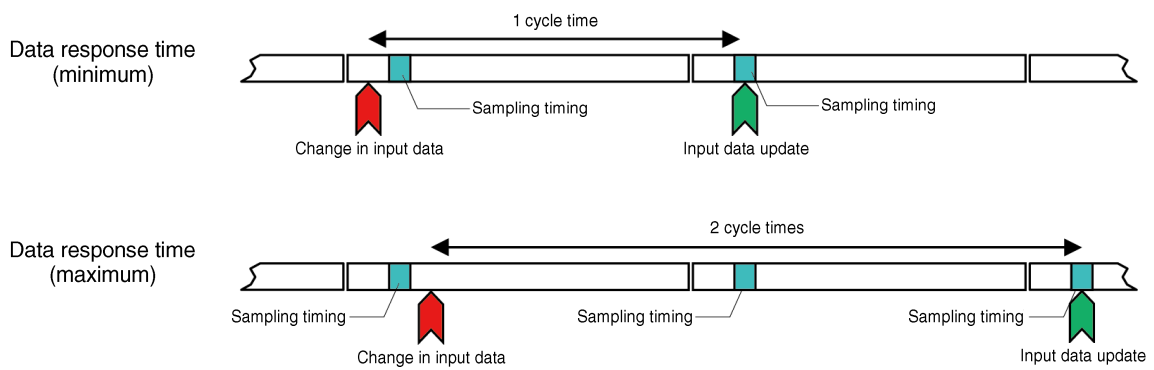
11 Transmission Required Time

11.1. Double collation

This gateway unit does not update data of an input area, unless same data is input consecutively twice (double collation). Therefore, the transmission time required for updating data is 1-cycle time (at the minimum), up to 2-cycle time (at the maximum).

[Response to input signal]

If signal input time is shorter than 2-cycle time, it may not be captured depending on sampling timing. **Therefore, in order to ensure response to input, hold the input signal for 2-cycle time or longer.**



[Response to output signal]

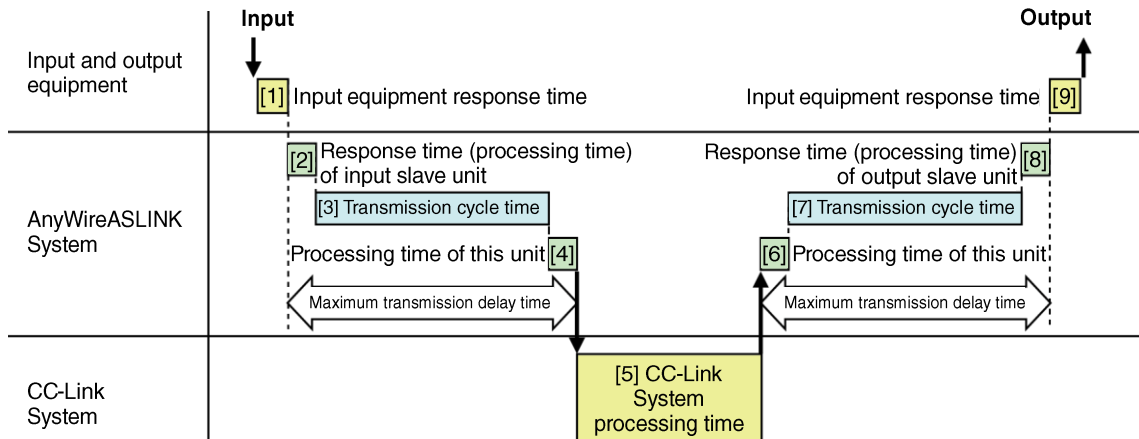
Since each output slave unit executes double collation internally, it takes a transmission delay time of 1-cycle time to 2-cycle time to receive an output signal from the controller until the signal is reflected in the data.

Therefore, the output signal from the controller should be held for 2-cycle time or longer.

11.2. Maximum transmission delay time

Response delay time is expressed as the figure below.

Cycle time	Repeated transmission time of actual data transmitted
Maximum transmission delay time	Processing time on gateway side + Refresh time + Signal delay time on slave side



12 Troubleshooting

12.1. CC-Link side

Trouble	Check item	Checking method
The entire system cannot link data.	No cable is disconnected.	Check the cable state by visual check or line test. Check the line state (SW0090).
	Terminal resistances (110Ω) are connected to the stations at both ends.	Connect the terminal resistances included in the master local unit to the stations at both ends.
	No error occurs in the sequencer CPU of master station.	Check the error code of sequencer CPU to handle the error.
	Parameters are set in the master station.	Check the content of the parameter.
	Data link activate request (Yn6 or Yn8) is turned ON.	Check the sequence program.
	No error occurs in the master station.	Check the following content: <ul style="list-style-type: none"> • Self station parameter state (SW0068) • Switch setting state (SW006A) • Implementation state (SW0069) • “ERR” LED of master station is flashing.
The scan time does not exceed the maximum value in the synchronous mode.	Change to the non-synchronous mode or decrease the transmission speed.	
Data cannot be normally read or written. Data is delayed.	Make sure that the CC-Link parameter settings are correct. Check if “intelligent device station” is not selected for station type.	Check the parameters.
Remote input (RX) of AG22-C1 cannot be retrieved.	Remote device station links data.	Check by the following methods. <ul style="list-style-type: none"> • LED display of unit • Communication state of master station with other stations (SW0080–SW0083)
	Data is read out from the correct address of remote input RX (buffer memory).	Check the sequence program.
	It is not set as a reserved station.	Check the parameters.
	The station numbers are not duplicated.	Check the station numbers.
Remote output (RY) of AG22-C1 cannot be turned ON/OFF.	Remote device station links data.	Check by the following methods. <ul style="list-style-type: none"> • LED display of unit • Communication state of master station with other stations (SW0080–SW0083)
	Refresh command (Yn0) of master station is ON.	Check the sequence program.
	Data is read out from the correct address of remote input RX (buffer memory).	Check the sequence program.
	It is not set as a reserved station.	Check the parameters.
The station numbers are not duplicated.	Check the station numbers.	

Trouble	Check item	Checking method
No data of AG22-C1 remote resistor (RWr) can be retrieved.	The remote device station operates data link.	Check by the following methods. • LED display of unit • Communication state of master station with other stations (SW0080–SW0083)
	Data is read out from the correct address of remote register RWr (buffer memory).	Check the sequence program.
	It is not set as a reserved station.	Check the parameters.
	The station numbers are not duplicated.	Check the station numbers.
No parameter can be registered in EEPROM.	Parameter registration request (YnA) to EEPROM is ON.	Check the sequence program.
	No error occurs.	Check the state of EEPROM registration (SW00B9).
No error station can be detected.	It is not set as an error ineffective station.	Check the parameters.
	The station numbers are not duplicated.	Check the station numbers.

Also check the following:

- [1] Check whether the wiring of the cables is correct or not.
- [2] Check whether the terminal resistances are properly connected to the units at both ends or not.
- [3] Check whether communication can be made by decreasing the transmission speed or not.
- [4] Check whether the settings of the parameter and launching station are correct or not.
- [5] Check whether the station numbers are duplicated or not.
- [6] Replace the unit with a unit which normally operates to check whether it is a problem in the single body of the unit or not.

12.2. AnyWireBus side

First, check the following:

- [1] “RDY” lamps of all equipment light up.
- [2] “LINK” lamps of all equipment flash.
- [3] The power voltage of each equipment is within the range of 21.6V–27.6V.
- [4] All wirings and connections are assured.
- [5] All address settings are correct and addresses are not overlapped.

In addition, see the technical manual prepared by our company.

Checklist by symptom

Symptom	Check Item
No data can be input/output.	AG22-C1 Connection of AnyWireBus transmission cable is correct. The transmission specification (setting of MODE switch) is consistent with that of the slave unit side.
	Slave unit side Power is supplied to slave unit. The addresses of slave units are set correctly.
AKM.LED (red) is lighting	D and G lines are not disconnected. Automatic address recognition was performed correctly. Screws of the terminal block are not loose.
AKM.LED (red) is flashing slowly	D and G lines have no short-circuit. D does not contact with 24 V.
AKM.LED (red) is flashing quickly	The voltage of 24V DC power supplied to AG22-C1 is normal.

13 中国版 RoHS 指令

电子信息产品上所示标记是依据 SJ/T11364-2006 规定，按照电子信息产品污染控制标识要求制定。本产品的环保使用期限为 10 年。如果遵守产品说明书中的操作条件使用电子信息产品，不会发生因产品中的有害物质泄漏或突发异变而引发严重的环境污染，人身事故，或损坏财产等情况。

的产品中有害物质的名称及含量

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

14 Warranty

■ **Warranty Term**

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

■ **Warranty Range**

If any failure occurs in normal use within specifications in accordance with the instruction manual during the above warranty period, we will replace or repair the failed parts of the equipment 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 single delivered product, and any damage caused by a failure of delivered product is out of warranty.

■ **Repair at user's cost**

Investigations and repairs after elapse of the warranty period shall be conducted at user's cost.

Even in the warranty period, we shall accept order of repair of a fault or investigation of a cause of a fault beyond the above scope of warranty at user's cost.

■ **Changes in the product specifications and the descriptions in the manual**

The descriptions in this manual may be subject to change without notice.

15 History of Changes

Version	Date	Change Description
First edition	Nov. 25, 2004	Formal version
1.0	May 26, 2005	Indication of transmission cycle time value on p. 2-1
1.1	Sep. 8, 2008	Contact information changed
1.2	Apr. 19, 2010	Addition of instructions for automatic address recognition on p. 9-1 Addition of description of CC-Link input/output response time on p. 10-1
1.3	Aug. 22, 2013	Contact information changed
1.4	Jul. 30, 2018	Information on new contact section
1.5	Oct. 12, 2018	Correction of “Dimensional outline drawing” and “Name of each part” on p. 2-3 Correction of “CC-Link input/output response time” on p. 10-1 Addition of contents of “China RoHS Directive”, Addition of “Warranty”, Unification of other expressions
1.6	Aug. 21, 2019	7. Programming method 11. Required transmission time 12. Troubleshooting 14. Warranty
1.7	Jun. 15, 2021	Correction of “2-2 Performance specifications” Correction of “4-1 Terminator” Update of customer-support call receiving hours
1.8	Oct. 15, 2021	Correction of “5.2.1 Specification selection (MODE switch)” Correction of “10. CC-Link input/output response time” Correction of “12.2 AnyWireBus side” Unification of other expressions
1.9	Nov. 19, 2021	Correction of “9.2 Monitoring operation”

Anywire

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