SHARP

Sharp Programmable Controller

Board PC J-board

Z-300 series

Model name

Communication Board : Z-331J/332J/333J

User's Manual

We thank you for your purchase of SHARP Programmable Controller "J-board: Z-300 Series." This book, Z-331J/332J/333J User's Manual, mainly describes hardware contents such as specifications and system configuration of the communication board.

Before using the communication board, we ask you to carefully read "JW-21CM User's Manual." and "JW-23LM User's manual" together with this manual.

See the "J-board Z-300 series Z-311J/312J, Z-321J User's Manual: Hardware version" covering the installation methods and basic use of this board.

Models covered by this manual

Model name	Details
Z-331J	Communication board 1: Data link function (CM) + I/O link master station function (LM)
Z-332J	Communication board 2: Data link function (CM)
Z-333J	Communication board 3: I/O link master station function (LM)

Note

- Should you have any questions or inquires, please feel free to contact one of our dealers, or our service department.

- Copying this manual in part of in total is prohibited.

- The contents of this manual may be revised without notice.

Safety Precautions

Read this user's manual and attached documents carefully before installation, operation, maintenance and checking in order to use the board correctly. Understand all of the board knowledge, safety information, and cautions before starting to use. In this user's manual, safety precautions are ranked into "Danger" and "Caution" as follows.

◇ Danger : Wrong handling may possibly lead to death or heavy injury.

⚠ Caution : Wrong handling may possibly lead to medium, light injury, or loss on properties.

Even in the case of ⚠ Caution , a serious result may be experienced depending on the circumstances. Anyway, important points are mentioned. Be sure to observe them strictly.

The picture signs of prohibit and compel are explained below.

🚫 :It means a don't. For example, prohibition of disassembly is indicated as (🚫).

❗ :It means a must. For example, obligation of grounding is indicated as (⏚).

1) Installation

⚠ Caution
• Use in the environments specified in the catalog and user's manual. Electric shock, fire or malfunction may be caused when used in the environments of high temperature, high humidity, dusty or corrosive atmosphere, vibration or impact. • Install according to the instruction manual and user's manual. Wrong installation may cause drop, trouble or malfunction. • Never admit wire chips or foreign matter. Or fire, trouble or malfunction may be caused.

2) Wiring

⏚ Compel
• Be sure to ground. Unless grounded, electric shock or malfunction may be caused.

⚠ Caution
• Wiring should be done by a qualified electrician. Wrong wiring may lead to fire, trouble or electric shock.

3) Use

◇ Danger

- Assemble the emergency stop circuit and interlock circuit outside of the J-board and integrate the J-board's halt output. Otherwise the machine breakdown or accident may be caused by the trouble of the programmable controller.
- Turn OFF the power source before detaching or attaching the module.
  Or electric shock, malfunction or trouble may be caused.

⚠ Caution

- Manipulation for program change, forced output, RUN or STOP during operation should be done with particular care by confirming safety. Misoperation may lead to machine trouble or accident.
- Follow the power input order specified. Otherwise, the J-board malfunctions and damages machines or cause an accident.

4) Maintenance

🚫 Prohibit

- Don't disassemble or modify.
  Or fire, trouble or malfunction may be caused.

⚠ Caution

- Make sure to turn OFF the power before removing /installing the board, installing the connectors, or changing the switch settings.

Table of contents

1. Outline

The Z-331J/332J/333J are communication boards for the J-board programmable controller: Z-300 series (hereafter simply referred to as "the J-board").

You can use these modules to construct various communication systems such as a "data link between PLCs," a "computer link between host computers," or an "I/O link." Also, these boards let you use the J-board in a system that combines the Sharp JW series and ZW series PLCs.

2. Precautions for use

■ Precautions for installation

Never install J-board in the following locations.

· Where proximate to any heat generating object, or ambient temperature exceeding 0 to 55˚C range (at storage -20 to 70˚C).
· Where temperature rapidly changes and gives dew condensation.
· Where there is corrosive or flammable gas.
· Where it directly receives vibration or shocks.
· Where exposed to dust, iron powder, or salty atmosphere.
 (In conditions where the printed circuit boards of the J-board may be directly affected by these causes, make sure to provide an appropriate external case to cover the J-board.)
· Where it is proximate to high voltage equipment, driving power tools, large open/close surge generating devices, and their wirings.

■ Precautions at use

· Construct an emergency stop circuit externally to prevent damage to machines and personnel and connect with a halt output of the J-board.
· As the J-board is board structure and it's electronic parts are exposed, be careful when handling.
 ① Before you touch the board directly, be sure to eliminate static electricity in your body.
 ② Do not touch directly with dirty hands such as stacked oil etc.
 ③ Do not put the board alone directly on conductive objects such as metallic boards.
 ④ Be careful not to apply excessive force to each switch, connector, terminal block of the J-board.
· Make sure to turn OFF the power to all of the modules before connecting the board, installing or removing the connectors, or changing the settings on the switches.
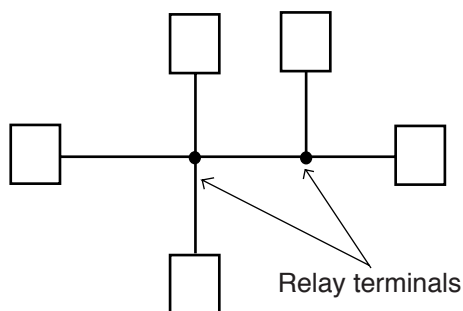
■ Precautions for grounding

Provide class-3 grounding independently for FG terminal of the J-board (on a terminal block of the CPU board). Do not use with a high voltage ground line in common.
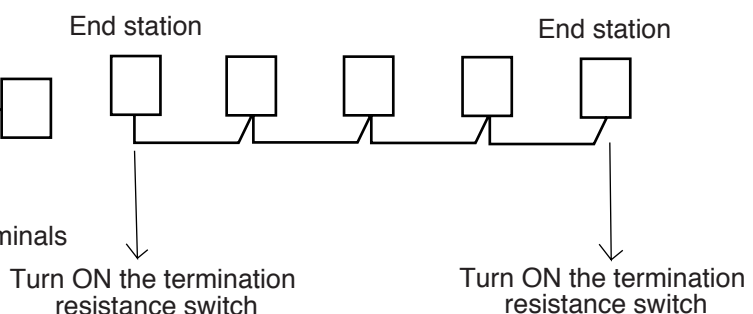
■ Precautions for wiring work

· Be sure to follow our recommendation for communication cables. (Use of cables other than the recommended cables may cause improper communication in certain conditions.)
· Do not run communication cables parallel to or close to power lines, high voltage lines, or I/O cables.
· Never connect multiple communication cables from a single point.
· Make sure to turn ON the termination resistance switch on the last station in a circuit.
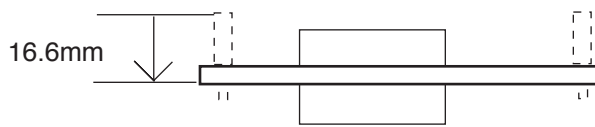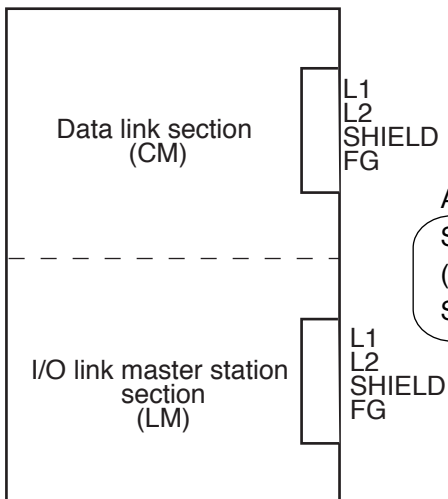
[Example of incorrect wiring]   [Example of good wiring]

End station   End station

Relay terminals

Turn ON the termination resistance switch   Turn ON the termination resistance switch

3. Product design

■ Z-331J: Communication board 1

Data link section
(CM)

L1
L2
SHIELD
FG

I/O link master station
section
(LM)

L1
L2
SHIELD
FG

16.6mm

Accessories

Standoff used to attach the PC board to the fixing bracket
(15 mm + 6 mm protrusion): 4 pieces   Standoff
Screw (Semuth M3 x 6 mm): 4 pieces   Screw

■ Z-332J: Communication board 2

Data link section
(CM)

L1
L2
SHIELD
FG

16.6mm

Accessories

Standoff used to attach the PC board to the fixing bracket
(15 mm + 6 mm protrusion): 4 pieces   Standoff
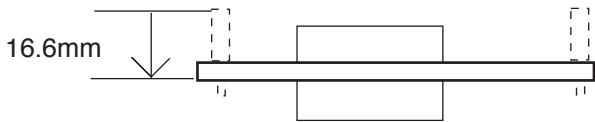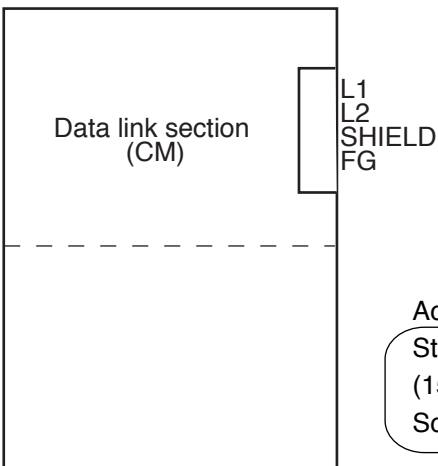Screw (Semuth M3 x 6 mm): 4 pieces   Screw

■ Z-333J: Communication board 3

16.6mm

Accessories

Standoff used to attach the PC board to the fixing bracket
(15 mm + 6 mm protrusion): 4 pieces   Standoff
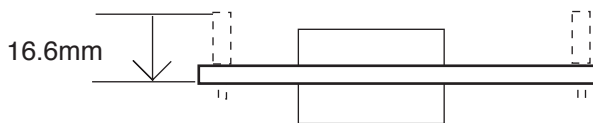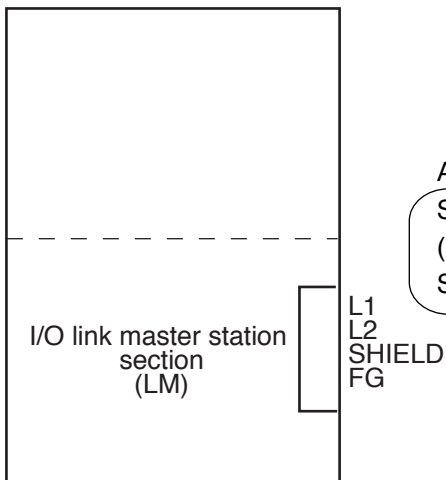Screw (Semuth M3 x 6 mm): 4 pieces   Screw

I/O link master station
section
(LM)

L1
L2
SHIELD
FG

4. System configuration

4-1. Basic configuration / limitation for installation

Stacking structure
(Connectable up to four I/O boards
or communication boards)

Personal computer,
NC liquid crystal
terminal or similar
devices.

Communication board

Communication board

I/O board

I/O board

CPU board

Support
tool

PG port ← Proprietary cable
(JW-22KC/24KC)

CN (15P)

Upper stream communication
port (RS-232C) 1 : 1

CN(9P)

Upper stream communication port
(RS-422A) N : 1

Terminal block
(7P)

Up to two communication
boards can be installed.

24 VDC in

FG

* Either RS-232C or 422A
standards can be used
for communication with
a host controller.
(Simultaneous use of
both standards is not
possible.)

Limitations when installing a communication board

1. Up to two sets of communication board can be installed. (When I/O boards are included, up to 4 sets
   can be installed.)
2. Only one communication board with an LM section (I/O link master station function) can be installed.

<Acceptable combinations when using two communication boards>
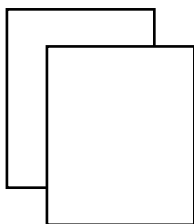
Z-331J: Communication board 1 (LM + CM)
+
Z-332J: Communication board 2 (CM)

Z-332J: Communication board 2 (CM)
+
Z-332J: Communication board 2 (CM)

Z-332J: Communication board 2 (CM)
+
Z-333J: Communication board 3 (LM)

* For I/O assignment details, see section 9, "I/O relay allocation," in this manual.

4-2. DL1 data link system

* The Z-331J and Z-332J can be used for this system.

Number of stations that can be connected: Maximum of 16 modules.

Total extension distance: 1 km.

Data transfer speed: 153.6 kbps.

Number of link points: Maximum 64 bytes

* If JW21CM or J-board is used as master module, the number of link points per station is limited by the number of stations connected.

[Communication method for DL1 data link]

The DL1 data link uses a communication method to send data between the master module and a slave module, and between slave modules, as shown below.

4-3. DL9 data link system

Number of stations that can be connected: Maximum of 16 modules.

Total extension distance: 1 km.

Data transfer speed: 153.6 kbps.

Number of link points: Maximum 512 bytes

* If JW21CM or J-board is used as master module, the number of link points per station is limited by the number of stations connected.

[Communication method for a DL9 data link]

The DL9 data link uses a communication method for sending and receiving data between a master and a slave station.

* This method cannot be used for direct communication between slave stations.

4-4. M-net system
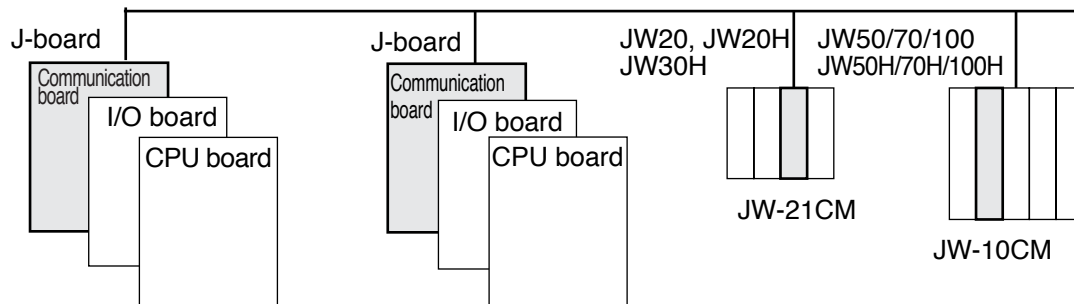
* The Z-331J and Z-332J can be used for this system.

Number of stations that can be connected: Maximum of 8 modules.

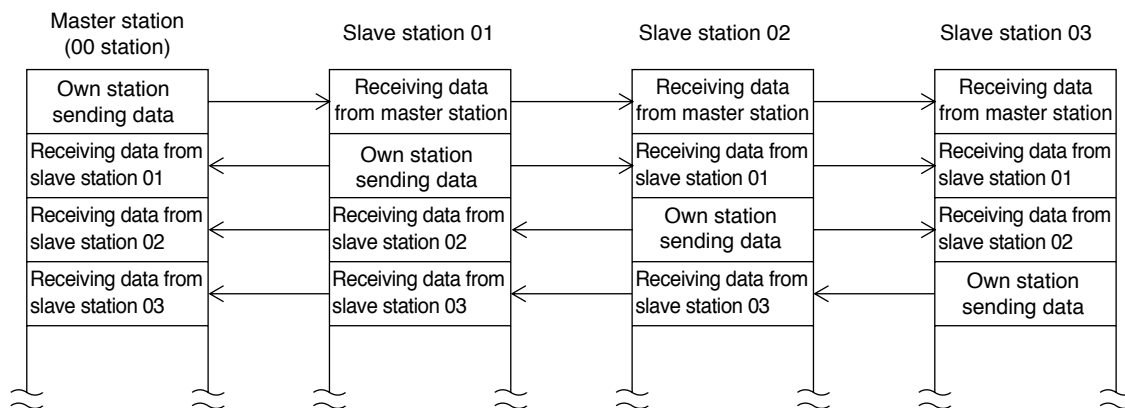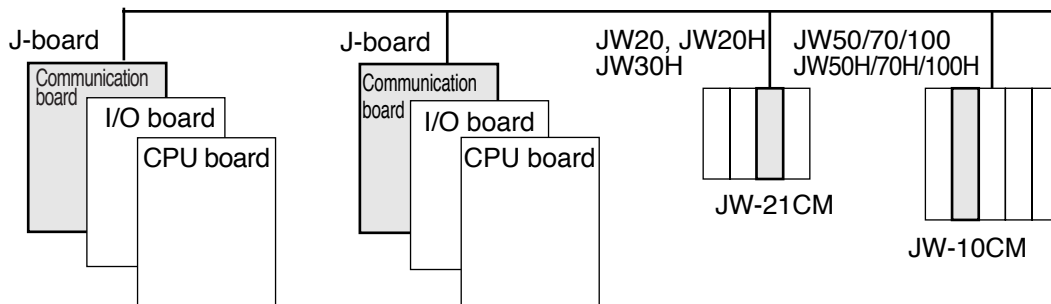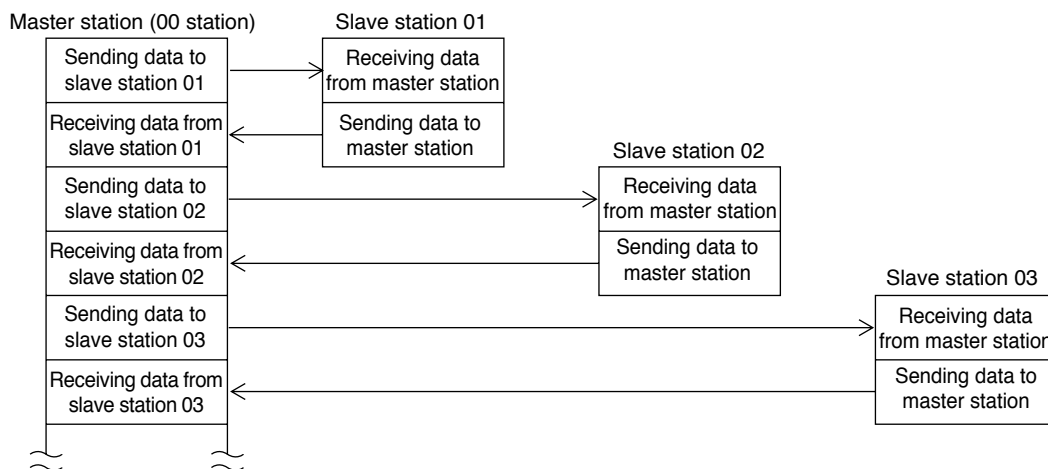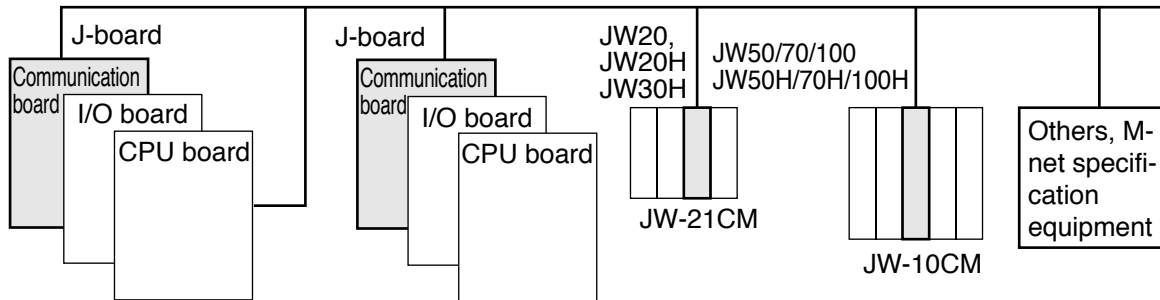Total extension distance: 1 km.
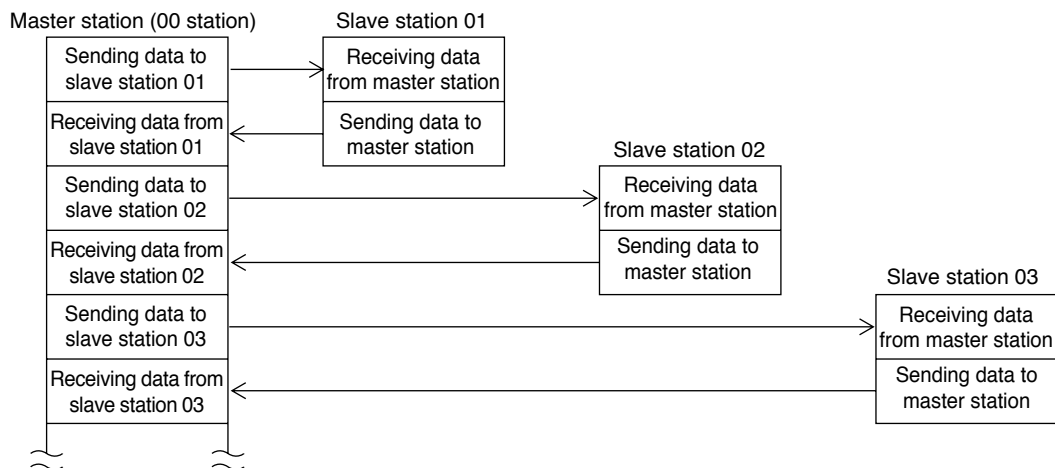
Data transfer speed: 19.2 kbps/ 38.4kbps.

Number of link points: Maximum 64 bytes

J-board		J-board		JW20, JW20H JW30H	JW50/70/100 JW50H/70H/100H		Others, M-net specification equipment
Communication board	I/O board CPU board	Communication board	I/O board CPU board	JW-21CM	JW-10CM		

[Communication method for M-net]

The M-net uses a communication method for sending and receiving data between a master and a slave station.

* This method cannot be used for direct communication between slave stations.

```
Master station (00 station)        Slave station 01
┌──────────────────┐          ┌──────────────────┐
│ Sending data to  │─────────▶│ Receiving data   │
│ slave station 01 │          │ from master station │
├──────────────────┤          ├──────────────────┤
│ Receiving data from │◀───────│ Sending data to  │
│ slave station 01 │          │ master station   │
├──────────────────┤          └──────────────────┘
│ Sending data to  │──────────────────▶ Slave station 02
│ slave station 02 │              ┌──────────────────┐
├──────────────────┤              │ Receiving data   │
│ Receiving data from │◀────────────│ from master station │
│ slave station 02 │              ├──────────────────┤
├──────────────────┤              │ Sending data to  │
│ Sending data to  │              │ master station   │
│ slave station 03 │              └──────────────────┘
├──────────────────┤                      Slave station 03
│ Receiving data from │              ┌──────────────────┐
│ slave station 03 │              │ Receiving data   │
└──────────────────┘              │ from master station │
                                  ├──────────────────┤
                                  │ Sending data to  │
                                  │ master station   │
                                  └──────────────────┘
```

* M-net is a communication system used to create a data link between a programmable controller and other equipment. It is a communication conform to the "Standard for the interface between modules."
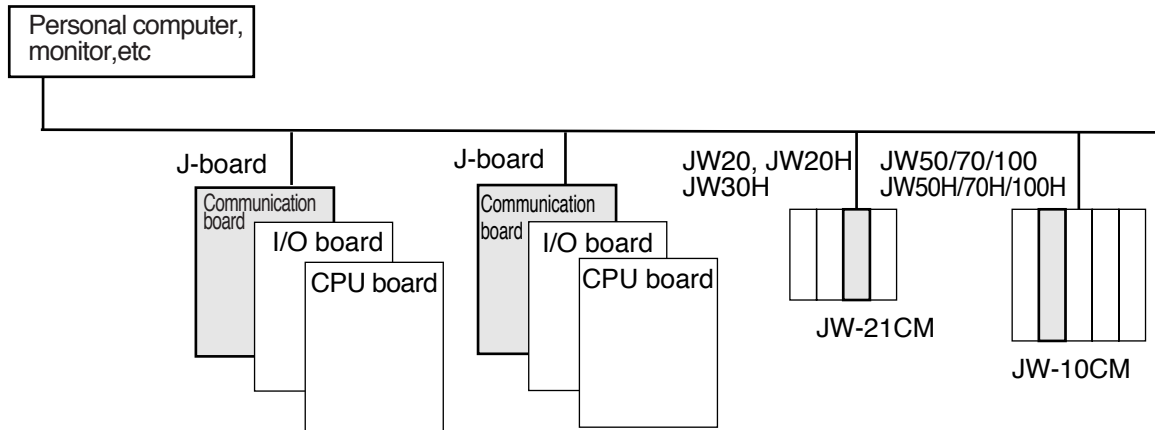
4-5. Computer link system

No. of connected stations: Max. 32 stations

Total extension length: 1 km

Transfer rate: 300 to 19200 bps

Host device

```
┌─────────────────────┐
│ Personal computer,  │
│ monitor,etc         │
└─────────────────────┘
```

J-board   J-board   JW20, JW20H   JW50/70/100
                                  JW30H   JW50H/70H/100H

Communication   Communication
board   board
   I/O board   I/O board
      CPU board   CPU board

JW-21CM

JW-10CM

[Computer link communication system]

The computer link is a communication method in which the J-board responds to commands from a host personal computer and display unit, as shown in the figure below.

```
Host                J-board or JW-PLC (station No. 01)

Personal computer,  ──Command──>
monitor, etc.
                    <──Response──

                    ──Command────────────>  J-board or JW-PLC (station No. 02)

                    <──Response────────────

                    ──Command──────────────────────────>  J-board or JW-PLC (station No. 03)

                    <──Response──────────────────────────
```
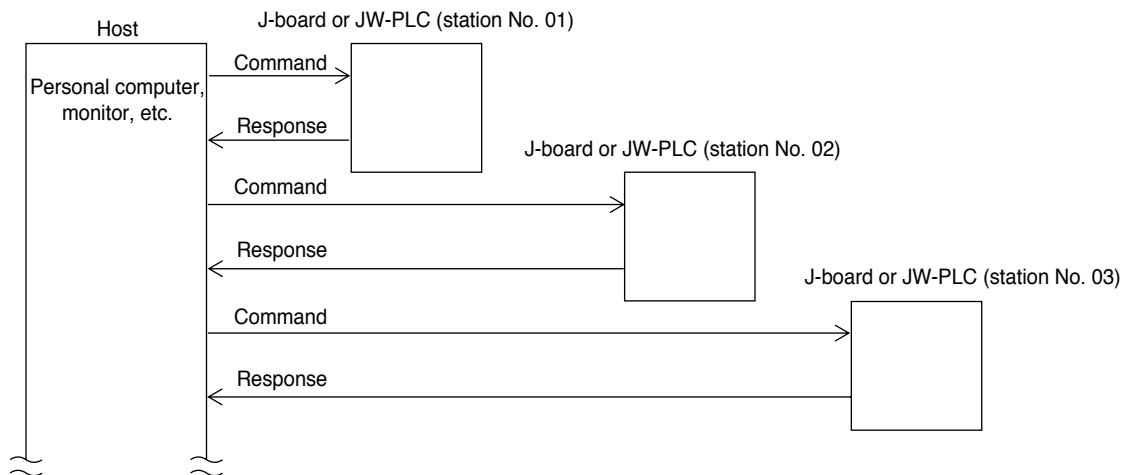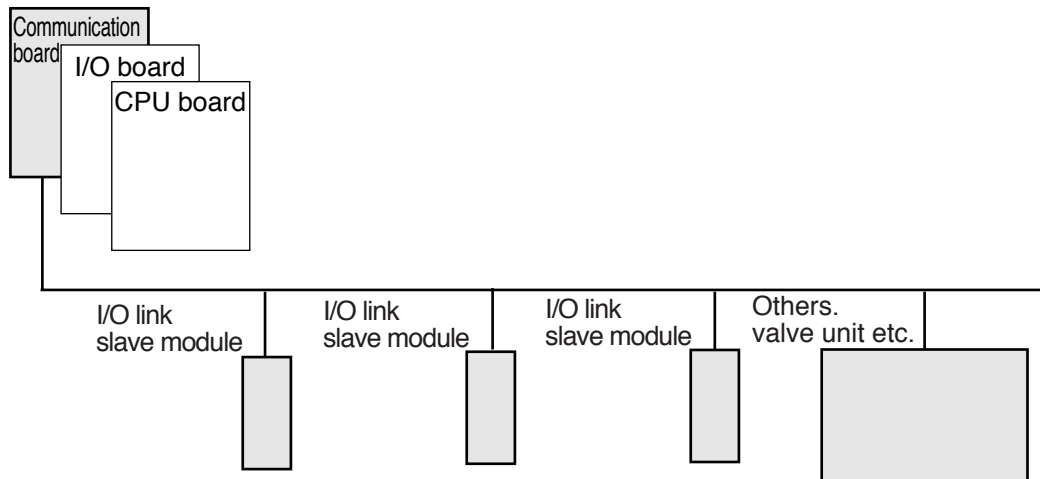
4-6. I/O link system

* The Z-331J and Z-333J can be used for this system.

Number of stations that can be connected: Maximum of 32 modules.
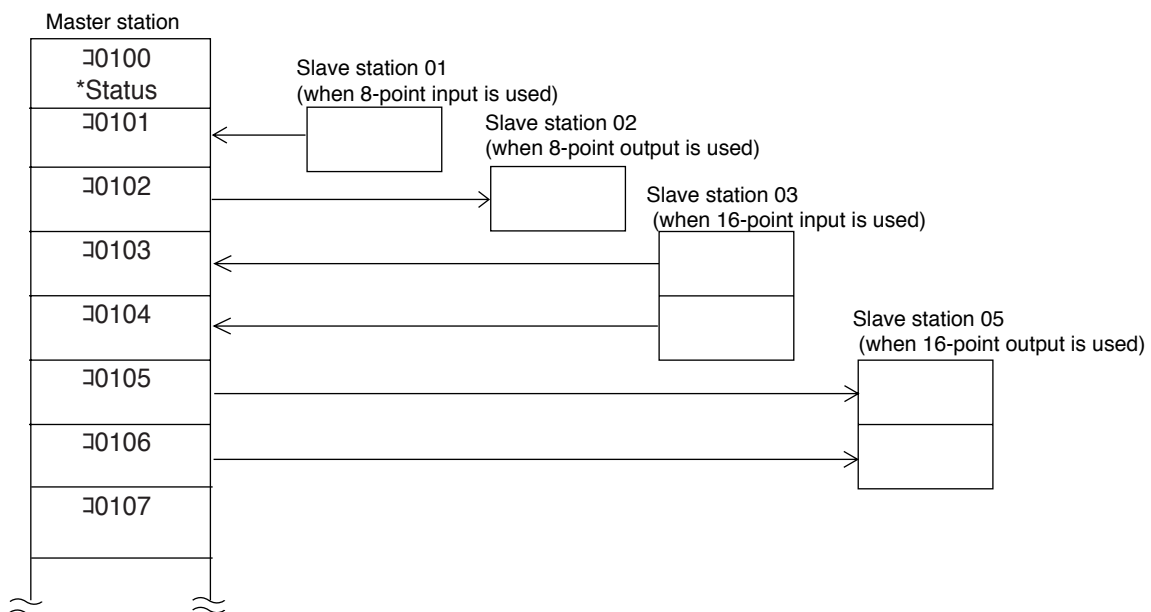
Total extension distance: 1 km.

Data transfer speed: 172.8kbps.

Number of I /O link points: Maximum 504 points

[I/O link communication system]

The I/O link is a communication method in which the master station communicates with slave stations as remote I/Os.

*"Status" is an area to store communication information such as error codes.

5. Specifications

5-1. General specifications (common specifications)

Item		Specifications
Ambient operating temperature / humidity		0 to 55°C / 35 to 90%RH (non condensing)
Ambient storage temperature / humidity		-20 to 70°C / 35 to 90%RH (non condensing)
Vibration		Equivalent to JISC-0911, Vibration width 0.15 mm (10 to 58 Hz) , 1G (55 to 150 Hz) , 2 hours each on the X,Y and Z axes.
Shock		Equivalent to JISC-0912, 10G , 3 times each on the X, Y and Z axes
Noise immunity		1000 Vp-p , 1 μs (using a noise simulator: Charge placed on the power line)
Installation		Any orientation
Grounding		Class 3 ground
5V current consumption (weight)	Z-331J	170 mA (approximately 180 g)
	Z-332J	100 mA (approximately 180 g)
	Z-333J	80 mA (approximately 180 g)

5-2. Data link function (CM section)

* For the Z-331J and Z-332J

Item		Specifications
DL1 data link SW0=2	Communication standard	EIA RS-485 or equivalent
	Data transfer speed	153.6 kbps
	Data transfer format	Equivalent to JIX X-5104 High Level Data Link Control procedure (HDLC) frame structure. Error detection method: CRC
	Communication circuit	Shielded twisted pair cables. Total cable extension length: Maximum 1 km (party line connection)
	Number of stations supported	Maximum of 16 (1 master and 15 slave stations)
	Number of link bytes	Maximum of 64 bytes *If the master station is a JW-21CM, Z-331J, or Z-332J, the following limitations apply: If the Number of slave stations is 1: 32 bytes per station Number of slave stations is 2 to 3: 16 bytes per station Number of slave station is 4 to 7: 8 bytes per station Number of slave station is 8 to 15 : 4 bytes per station
	Link area	Specified on SW8 (module number switch.)
DL9 SW0=3	Communication standard	EIA RS-485 or equivalent
	Data transfer speed	153.6 kBPS
	Data transfer format	Equivalent to JIX X-5104 High Level Data Link Control procedure (HDLC) frame structure. Error detection method: CRC
	Communication circuit	Shielded twisted pair cables. Total cable extension length: Maximum 1 km (party line connection)
	Number of stations supported	Maximum of 16 (1 master and 15 slave stations)
	Number of link bytes	Maximum of 512 bytes *If master station is JW-21CM, Z-331J, or Z-332J, the following limitations apply : If the Number of slave stations is 1 to 2: 128 bytes per station Number of slave stations is 3 to 4: 64 bytes per station Number of slave station is 5 to 8: 32 bytes per station Number of slave station is 9 to 15 : 16 bytes per station
	Link area	Specified with SW8 (module number switch)

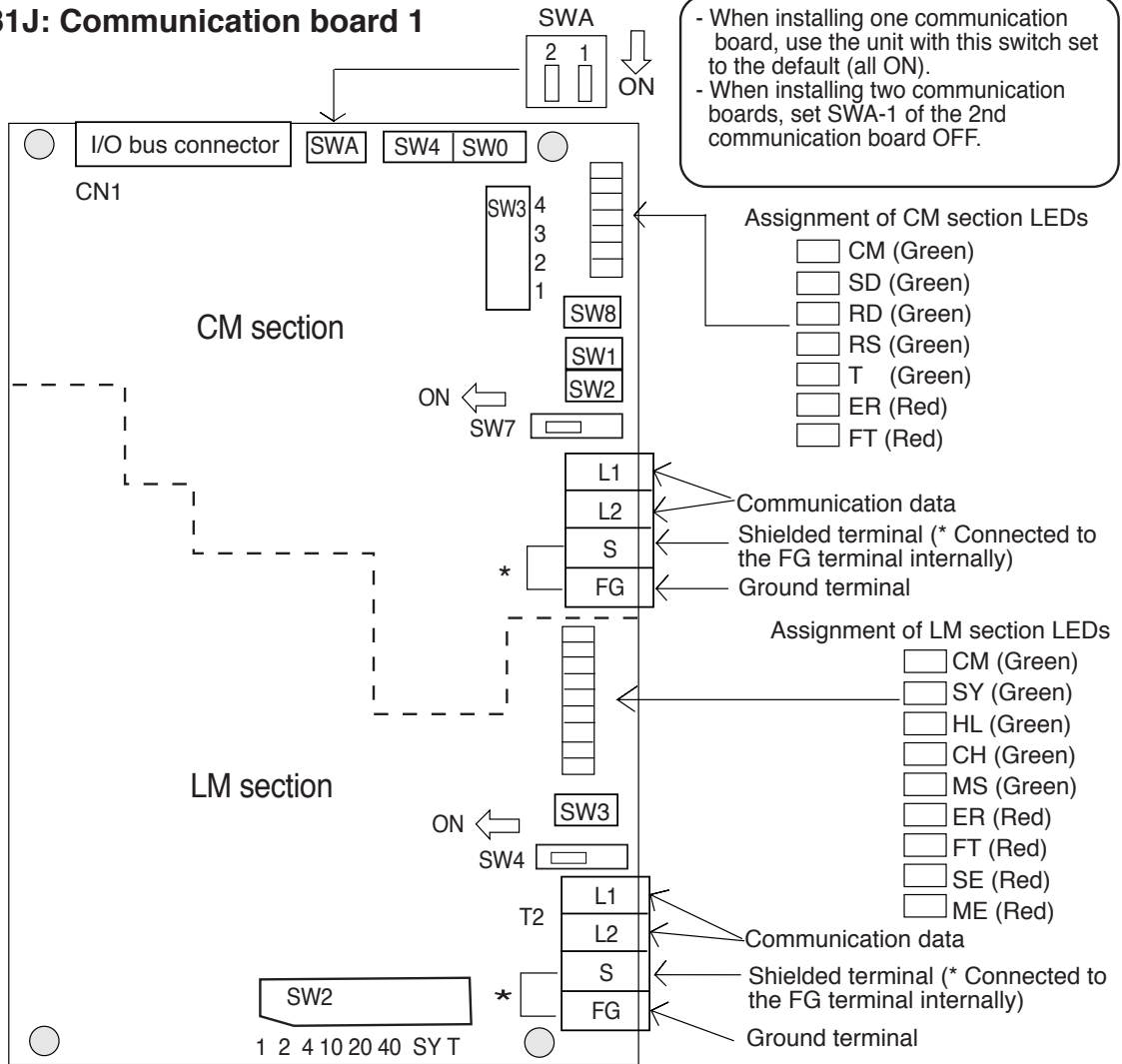| M-net	Communication standard	EIA RS-485 or equivalent
SW0=7	Data transfer speed	19.2 kBPS/38.4 kBPS
	Data transfer format	Same as M net (interface between modules). Start (1) + data (7) + Even parity (1) +Stop (1)
	Communication circuit	Shielded twisted pair cables. Total cable extension length: Maximum 1 km (party line connection)
	Number of stations supported	Maximum of 8 (1 master and 7 slave stations)
	Number of link bytes	Maximum of 64 bytes
	Link area	Specified as a parameter (specify the parameter address using SW8)
Com-puter link	Communication standard	EIA RS-485 or equivalent
	Data transfer speed	300, 600, 1200, 2400, 4800, 9600, 19200 BPS
SW0=4	Data transfer format	Start-stop synchronization. Start (1) + data (7) + parity (1) + stop (2). Characters used: ASCII letters and numbers
	Communication circuit	Shielded twisted pair cables. Total cable extension length: Maximum 1 km (party line connection) *Wiring method : 2-line system (4-line system is not available)
	Number of stations supported	Maximum of 32 (1 master and 31 slave stations)

5-3. I/O link master station function (LM section)

* For the Z-331J and Z-333J

Item		Specifications
I/O link master station	Communication standard	EIA RS-485 or equivalent
	Data transfer speed	172.8 kbps
	Transfer format	Start-stop synchronization. Error detection method: Parity and transfer verification
	Communication circuit	Shielded twisted pair cables. Total cable extension length: Maximum 1 km (party line connection)
	Number of stations supported	Maximum of 32
	Number of link points	Maximum of 504
	I/O ink area	⅃ 0100 to 0177 (Flag area:⅃1570 to 1571)

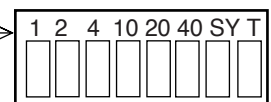# 6. Name and description of each part

6-1. Z-331J: Communication board 1

- When installing one communication board, use the unit with this switch set to the default (all ON).
- When installing two communication boards, set SWA-1 of the 2nd communication board OFF.

Assignment of CM section LEDs
- CM (Green)
- SD (Green)
- RD (Green)
- RS (Green)
- T (Green)
- ER (Red)
- FT (Red)

L1 / L2 — Communication data
S — Shielded terminal (* Connected to the FG terminal internally)
FG — Ground terminal

Assignment of LM section LEDs
- CM (Green)
- SY (Green)
- HL (Green)
- CH (Green)
- MS (Green)
- ER (Red)
- FT (Red)
- SE (Red)
- ME (Red)

L1 / L2 — Communication data
S — Shielded terminal (* Connected to the FG terminal internally)
FG — Ground terminal

Switches on the CM section

SW No.		Default	DL1 data link	DL9 data link	M net	computer link
SW0		0	2	3	7	4
SW1		0	Station No. (lower digit)	Station No. (lower digit)	Station No. (lower digit)	Station No. (lower digit)
SW2		0	Station No. (upper digit)	Station No. (upper digit)	Station No. (upper digit)	Station No. (upper digit)
SW3	1	OFF	OFF (not used)	OFF (not used)	OFF (not used)	OFF (not used)
	2	OFF	OFF	Total number of link bytes (when only used as master station)	OFF	OFF (only 2-wire system is usable)
	3	OFF	OFF		Communication mode when an error occurs	OFF
	4	OFF	OFF		OFF	Parity (Even: OFF, Odd: ON)
SW4		0	Number of slave stations (when only used as master station)	Number of slave stations (when only used as master station)	Data transfer speed	Data transfer speed
SW7		OFF	Termination resistance	Termination resistance	Termination resistance	Termination resistance
SW8		0	Module No. SW	Module No. SW	Module No. SW	Module No. SW

Switches on the LM section

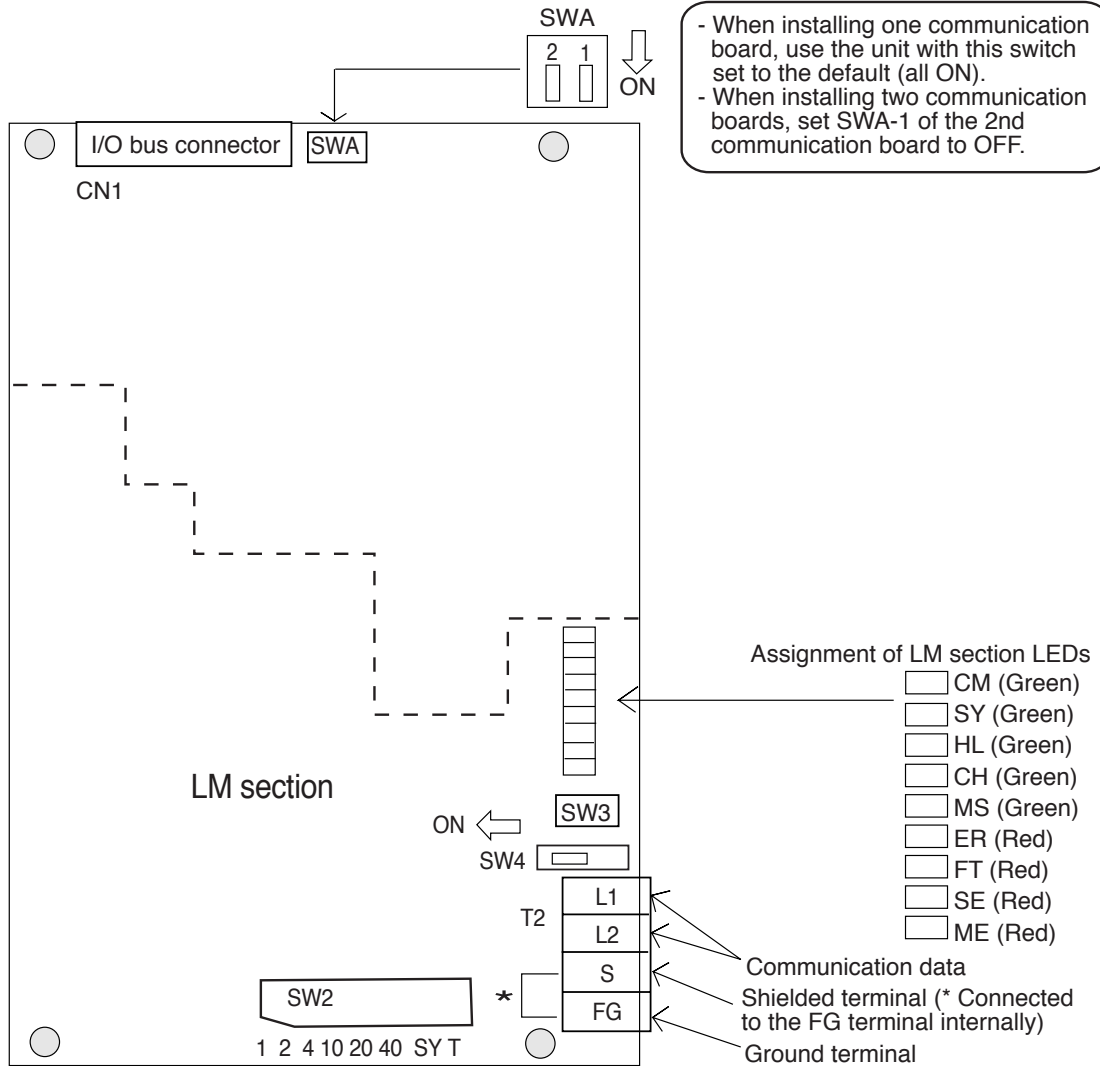| Switch No.	Default setting	Switch details
SW2	All OFF	Number of bytes in the I/O link
SW3	1	Mode change switch (select the communication mode)
SW4	OFF	Termination resistance

SW2
1 2 4 10 20 40 SY T
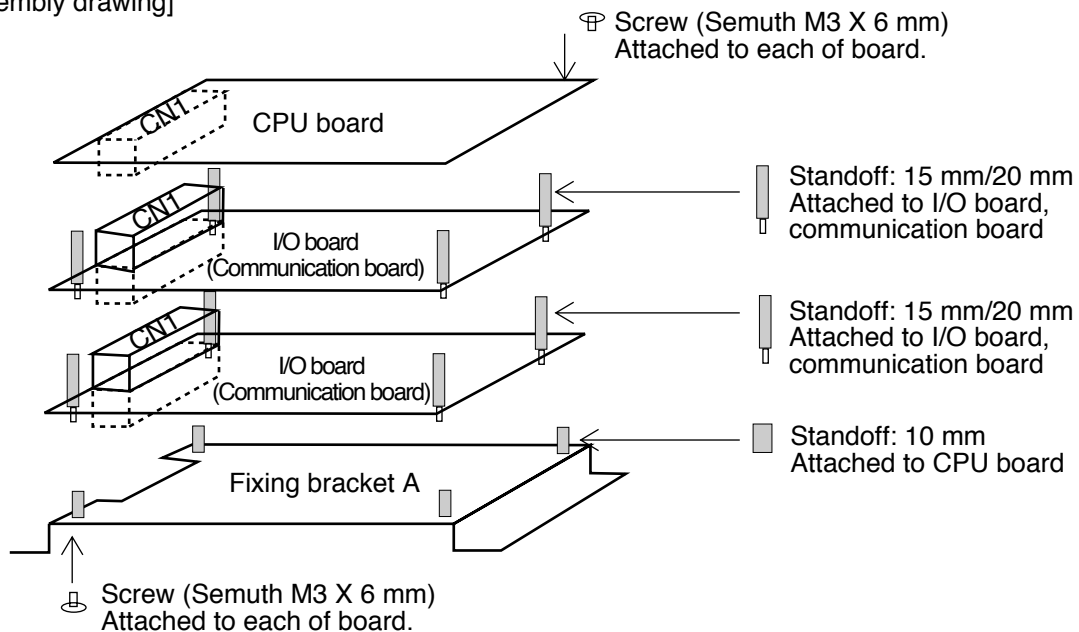
6-2. Z-332J: Communication board 2

- When installing one communication board, use the unit with this switch set to the default (all ON).
- When installing two communication boards, set SWA-1 of the 2nd communication board to OFF.

Assignment of CM section LEDs

- CM (Green)
- SD (Green)
- RD (Green)
- RS (Green)
- T (Green)
- ER (Red)
- FT (Red)

L1, L2 — Communication data
S — Shielded terminal (* Connected to the FG terminal internally)
FG — Ground terminal
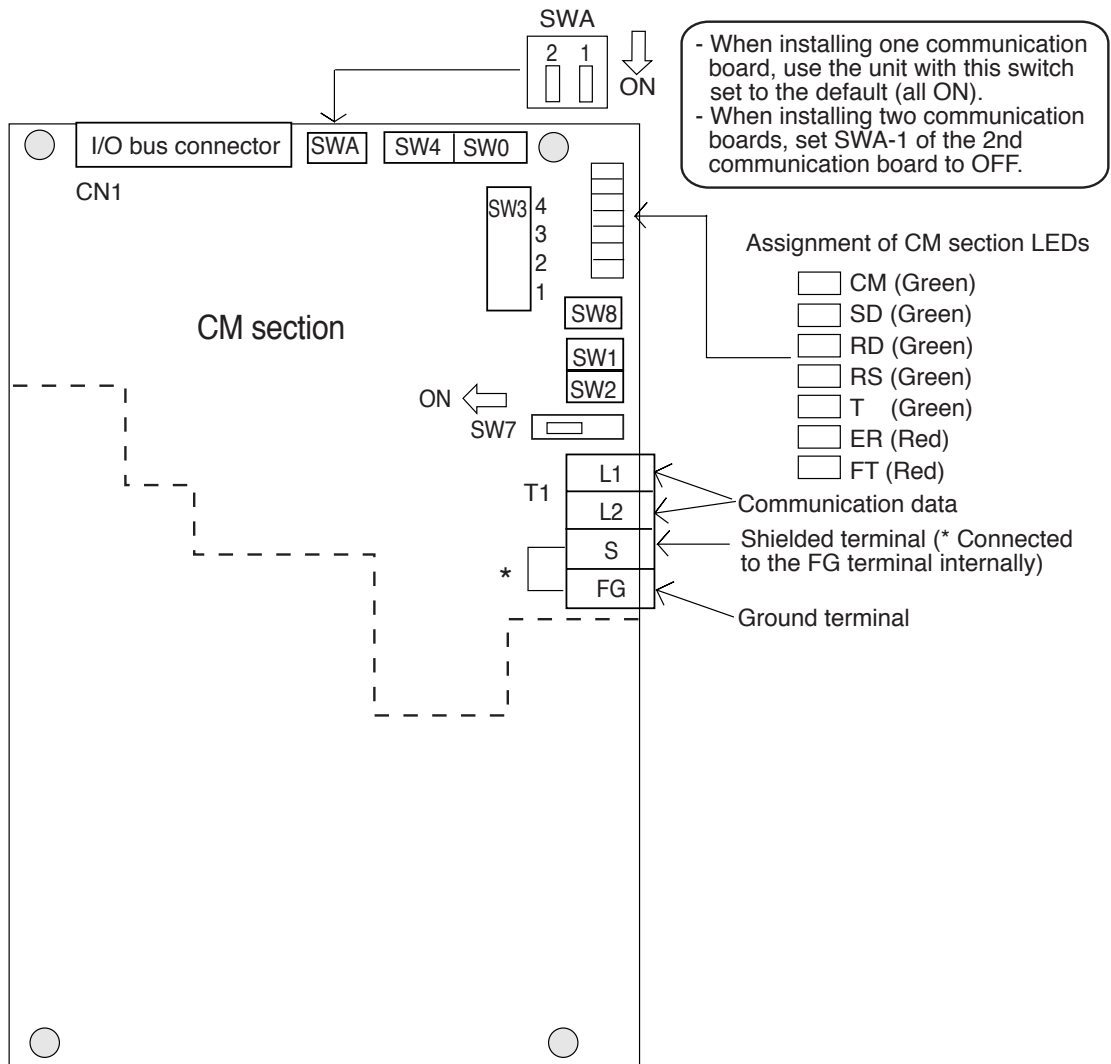
Switches on the CM

SW No.		SW details			
	Default	DL1 data link	DL9 data link	M net	computer link
SW0	0	2	3	7	4
SW1	0	Station No. (lower digit)	Station No. (lower digit)	Station No. (lower digit)	Station No. (lower digit)
SW2	0	Station No. (upper digit)	Station No. (upper digit)	Station No. (upper digit)	Station No. (upper digit)
SW3 1	OFF	OFF (not used)	OFF (not used)	OFF (not used)	OFF (not used)
SW3 2	OFF	OFF	Total number of link bytes (when only used as master station)	OFF	OFF (only 2-wire system is usable)
SW3 3	OFF	OFF		Communication mode when an error occurs	OFF
SW3 4	OFF	OFF		OFF	Parity (Even: OFF, Odd: ON)
SW4	0	Number of slave stations (when only used as master station)	Number of slave stations (when only used as master station)	Data transfer speed	Data transfer speed
SW7	OFF	Termination resistance	Termination resistance	Termination resistance	Termination resistance
SW8	0	Module No. SW	Module No. SW	Module No. SW	Module No. SW

6-3. Z-333J: Communication board 3

SWA

2 1

ON

- When installing one communication board, use the unit with this switch set to the default (all ON).
- When installing two communication boards, set SWA-1 of the 2nd communication board to OFF.

I/O bus connector   SWA

CN1

LM section

SW3

ON ⟸

SW4

T2

L1
L2
S
FG

SW2

1 2 4 10 20 40 SY T

Assignment of LM section LEDs

CM (Green)
SY (Green)
HL (Green)
CH (Green)
MS (Green)
ER (Red)
FT (Red)
SE (Red)
ME (Red)

Communication data

Shielded terminal (* Connected to the FG terminal internally)

Ground terminal

Switches of the LM section

Switch No.	Default setting	Switch details
SW2	All OFF	Number of bytes in the I/O link
SW3	1	Mode change switch (select the communication mode)
SW4	OFF	Termination resistance

SW2

1 2 4 10 20 40 SY T

7. Board size

5 mm
100 mm
* 5 mm
Standoff hole
4-φ4
170 mm
W
Board size
5 mm
H

25 mm ← CPU board *
D2
D2
D
D2
D2
D2
15 mm
I/O board or communication board

In case of fixing bracket A

* CPU board should be installed on the top.
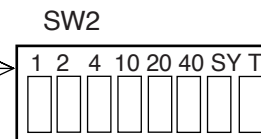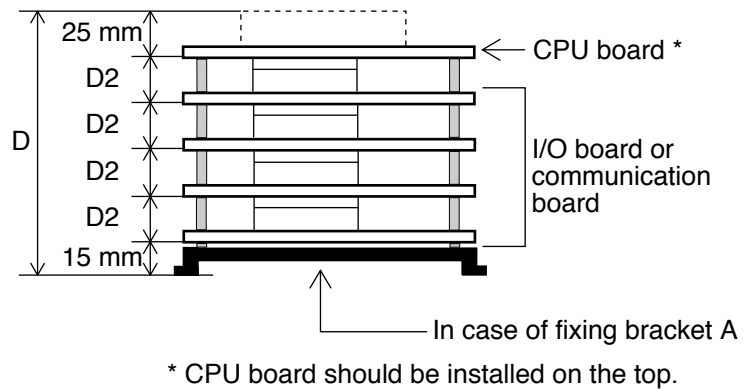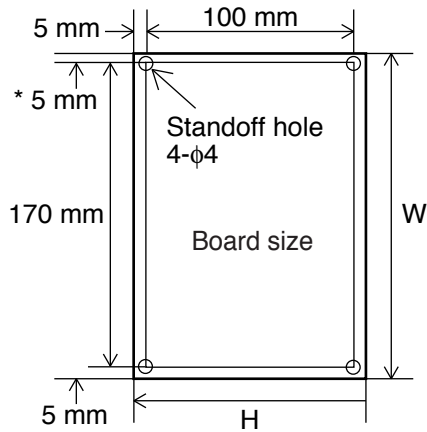
Board size (bracket sizes are not included)

Board type	H	W	D	Weight
Z-331J: Communication board 1	117.5 mm	180 mm	16.6 mm (D2)	Approx.180 g
Z-332J: Communication board 2	117.5 mm	180 mm	16.6 mm (D2)	Approx.180 g
Z-333J: Communication board 3	117.5 mm	180 mm	16.6 mm (D2)	Approx.180 g

* The weight includes the standoff and screws.

For building up of J-board, assemble the boards using the attached standoffs and screws as shown below.

[Assembly drawing]

Screw (Semuth M3 X 6 mm)
Attached to each of board.

CN1
CPU board

CN1
I/O board
(Communication board)

Standoff: 15 mm/20 mm
Attached to I/O board, communication board

CN1
I/O board
(Communication board)

Standoff: 15 mm/20 mm
Attached to I/O board, communication board

Fixing bracket A

Standoff: 10 mm
Attached to CPU board

Screw (Semuth M3 X 6 mm)
Attached to each of board.

Notes For connecting between the boards, match position of each connection connector (CN1) and secure their inserts. For removal, be careful not to forcibly pull them in incorrect direction.

[Required tools for building up]

- Phillips screw driver
- Box (hex.) driver: for 5.5 mm

Standoff shape

5.5 mm
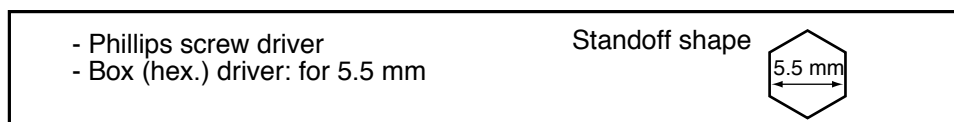
8. Wiring communication lines

When wiring the communication cables, use crimped terminals that meet the following conditions.

Communication board

6 mm

Applicable crimping terminal size

a   b

a   b

a = 6 mm or less
b = 3 mm or less

M3 self-up screw
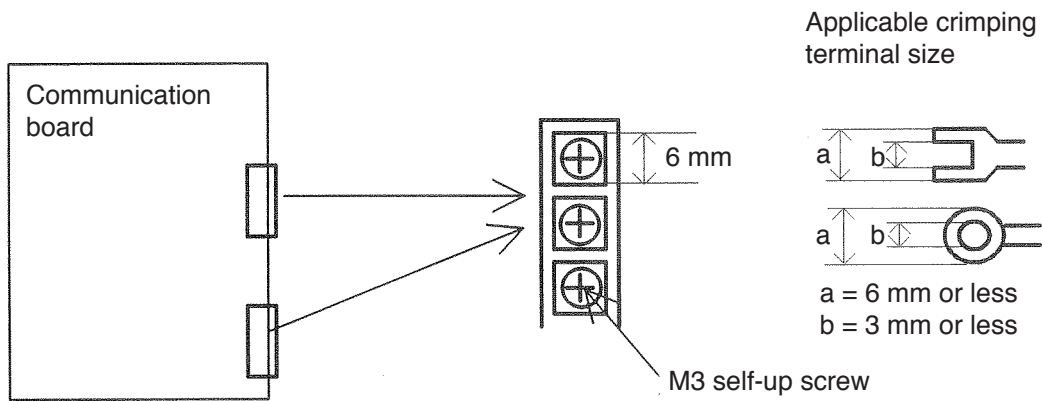
Only use shielded twisted pair cables recommended by us for communication cables.

L1

L2

SHIELD

FG

L1

L2

SHIELD

FG

L1

L2

SHIELD

FG

Communication cable
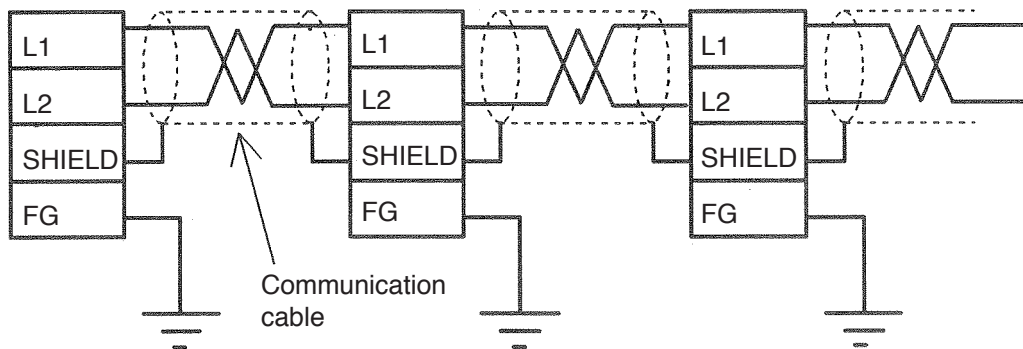
Recommended cables

Hitachi Cable, Ltd.: S-IREV-SW2*0.5
Fujikura Ltd.: RG-22B/U

9. I/O relay allocation

8 bytes are occupied by the units for assignment as I/O relays for the communication boards.

I/O relays are assigned as dummies on the communication boards and are not functional. However, please note that these assignments can affect the I/O relay addresses on other I/O boards.

[I/O address assignment for each communication board]

* An example using the 1st communication board (SWA-1 = ON, SWA-2 = ON)

■ Z-331J:
Communication board 1

Assignment	I/O relay address	Installed address
LM section	⊐0000	R = 0, S = 0
	⊐0001	
CM section	⊐0002	R = 0, S = 1
	⊐0003	
Dummy (vacant)	⊐0004	R = 0, S = 2
	⊐0005	
Dummy (vacant)	⊐0006	R = 0, S = 3
	⊐0007	

■ Z-332J:
Communication board 2

Assignment	I/O relay address	Installed address
Dummy (vacant)	⊐0000	R = 0, S = 0
	⊐0001	
CM section	⊐0002	R = 0, S = 1
	⊐0003	
Dummy (vacant)	⊐0004	R = 0, S = 2
	⊐0005	
Dummy (vacant)	⊐0006	R = 0, S = 3
	⊐0007	
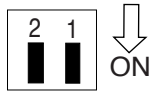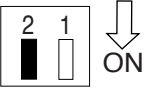
■ Z-333J:
Communication board 3

Assignment	I/O relay address	Installed address
LM section	⊐0000	R = 0, S = 0
	⊐0001	
Dummy (vacant)	⊐0002	R = 0, S = 1
	⊐0003	
Dummy (vacant)	⊐0004	R = 0, S = 2
	⊐0005	
Dummy (vacant)	⊐0006	R = 0, S = 3
	⊐0007	

[I/O relay assignment when using two communication boards]

Possible combinations when using two communication boards

1st communication board	I/O relay address	Installed address
SWA-1 = ON SWA-2 = ON	⊐0000	R = 0, S = 0
	⊐0001	
	⊐0002	R = 0, S = 1
	⊐0003	
	⊐0004	R = 0, S = 2
	⊐0005	
	⊐0006	R = 0, S = 3
	⊐0007	

	Z-331J	Z-332J	Z-332J
	LM section	Dummy (vacant)	Dummy (vacant)
	CM section	CM section	CM section
	Dummy (vacant)	Dummy (vacant)	Dummy (vacant)
	Dummy (vacant)	Dummy (vacant)	Dummy (vacant)

2nd communication board	I/O relay address	Installed address
SWA-1 = OFF SWA-2 = ON	⊐0010	R = 0, S = 4
	⊐0011	
	⊐0012	R = 0, S = 5
	⊐0013	
	⊐0014	R = 0, S = 6
	⊐0015	
	⊐0016	R = 0, S = 7
	⊐0017	

	Z-332J	Z-332J	Z-333J
	Dummy (vacant)	Dummy (vacant)	LM section
	CM section	CM section	Dummy (vacant)
	Dummy (vacant)	Dummy (vacant)	Dummy (vacant)
	Dummy (vacant)	Dummy (vacant)	Dummy (vacant)

Notes

1. When using a communication board, set SW1 (module No.) on the I/O board starting at "1."
   If the SW1 (module No.) on an I/O board is set to "0," an "I/O verification error: Error code 60" will occur.

2. Up to two communication boards can be connected. Be careful that depending on the type of communication board, there are some limitations to the working combinations.

3. When one communication board is used, use the setting for the 1st board (set all of the SWA switches ON). If this board is set up as the 2nd board, an "I/O verify error: Error code 60" will occur.

[Setting example]
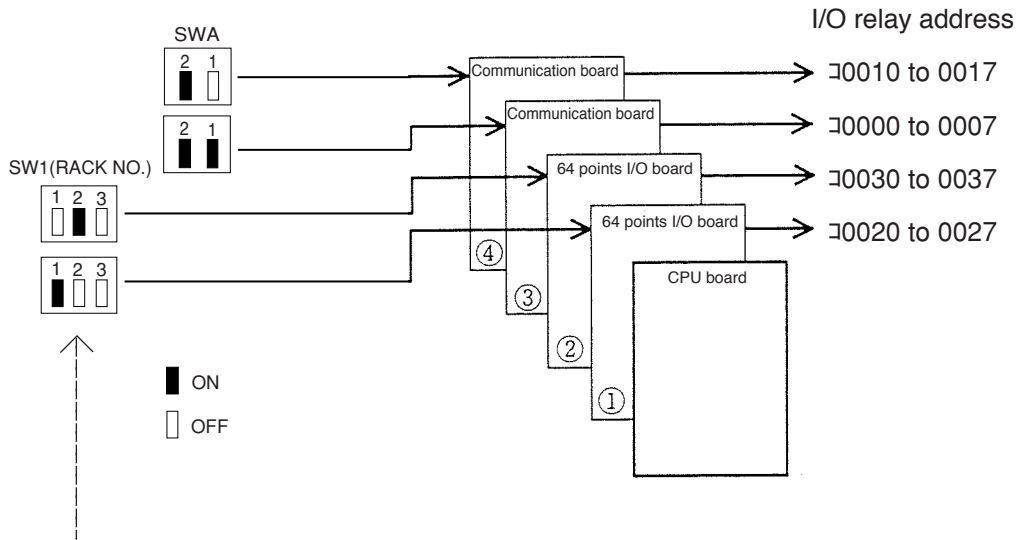
SWA

SW1(RACK NO.)

■ ON

☐ OFF

I/O relay address

Communication board → ⅃0010 to 0017

Communication board → ⅃0000 to 0007

64 points I/O board → ⅃0030 to 0037

64 points I/O board → ⅃0020 to 0027

④ ③ ② ①

CPU board

When using a communication board, set SW1 (module No.) on the I/O board starting at "1."
If the SW1 (module No.) on an I/O board is set to "0," an "I/O verification error: Error code 60" will occur.

When set up as described above, the relationship between the I/O relay addresses and the installed addresses are as follows.

	SW1(Module no.)	SWA/SW2	I/O relay address	Installed address
I/O board ①	1 2 3	SW2 2 1	⅃ 0020, 21	R = 1, S = 0
			⅃ 0022, 23	R = 1, S = 1
			⅃ 0024, 25	R = 1, S = 2
			⅃ 0026, 27	R = 1, S = 3
I/O board ②	1 2 3	SW2 2 1	⅃ 0030, 31	R = 2, S = 0
			⅃ 0032, 33	R = 2, S = 1
			⅃ 0034, 35	R = 2, S = 2
			⅃ 0036, 37	R = 2, S = 3
Communication board ③		SWA 2 1	⅃ 0000, 01	R = 0, S = 0
			⅃ 0002, 03	R = 0, S = 1
			⅃ 0004, 05	R = 0, S = 2
			⅃ 0006, 07	R = 0, S = 3
Communication board ④		SWA 2 1	⅃ 0010, 11	R = 0, S = 4
			⅃ 0012, 13	R = 0, S = 5
			⅃ 0014, 15	R = 0, S = 6
			⅃ 0016, 17	R = 0, S = 7

10. Switch and parameter settings

10-1. Working with a DL1 data link

* Z-331J and Z-332J should be used.

SW NO.	Setting details		Setting
SWA-1	When using more than one board. Set SWA-1 on the 2nd communication board OFF (SWA-2 is always ON)		
SW0	Set the function to "2."		
SW1	Set the station number (lower digit)	Specify the station number (00 to 17) in octal. Ex.: Master station -> 00 Slave station 6 -> 06	
SW2	Set the station number (upper digit)		
SW3	Set all to OFF.		
	1	OFF (Not used)	
	2	OFF	
	3	OFF	
	4	OFF	

SW4 — Only set when the board is a master station:

Specify the number of slave stations connected (the number of link bytes will be determined, accordingly)

Setting	Number of slave stations connected	Number of link bytes per station	Setting	Number of slave stations connected	Number of link bytes per station
0	-	-	8	8	
1	1	32 bytes	9	9	
2	2	16 bytes	A	10	
3	3		B	11	4 bytes
4	4		C	12	
5	5	8 bytes	D	13	
6	6		E	14	
7	7		F	15	

* If a JW-10CM is used for the master station, the number of link bytes per station can be freely assigned, up to 128 bytes.
* When "0" is specified, a setting error will occur. (For details, see the JW-10CM user's manual)

SW8 (Module No. switch):

Specify a data link area and a flag area

Setting	Data link area	Communication flag area
0	⊐1000 to 1077	15000 to 15017
1	⊐1100 to 1177	15100 to 15117
2	⊐1200 to 1277	15200 to 15217
3	⊐1300 to 1377	15300 to 15317
4	⊐1400 to 1477	15400 to 15417
5	89000 to 89077	15500 to 15517

*Setting switch 6 to 9 will cause a setting error.

SW7:

Enabling the termination resistance
Set this switch on last station to ON (provides termination resistance). Set this switch on stations in between to OFF (no termination resistance).

Assignment of communication flags (numbers in the table are the station numbers of the PLCs)

	7	6	5	4	3	2	1	0	← Bit address
⊐15*0	07	06	05	04	03	02	01	00	
	17	16	15	14	13	12	11	10	

"*" will be determined by setting SW8.

* For details about the DL1 data link, see the "JW-21CM User's Manual."

10-2. Working with a DL9 data link
*Z-331J and Z-332J should be used.

Sw No.	Setting details	Setting
SWA-1	When using more than one board. Set SWA-1 on the 2nd communication board OFF (SWA-2 is always ON)	
SW0	Set the function to "3."	
SW1	Set the station number (lower digit)	Specify the station number (00 to 17) in octal.	
SW2	Set the station number (upper digit)	Ex.: Master station -> 00 Slave station 6 -> 06	

SW3 — *Only set when the board is a master station*

Specify the total number of link bytes

Setting					No. of bytes	Number of slave stations					Link area on the master station
1	2	3	4			1	2	3 to 4	5 to 8	9 to 15	
						Number of link bytes per station					
Not used	OFF	OFF	OFF	->	64	32	16	8	4	2	⅃1000-,⅃1100-,⅃1200-, ⅃1300-,⅃1400-, 89000-
	OFF	OFF	ON	->	128	64	32	16	8	4	⅃1000-,⅃1100-,⅃1200-, ⅃1300-, 89000-
	OFF	ON	OFF	->	256	128	64	32	16	8	⅃1000-,⅃1100-, 89000-
	OFF	ON	ON	->	512	128	128	64	32	16	Limited to 89000-

* The number of link bytes per station is each number of bytes for sending (master to slave) and receiving (slave to master) data.
* If a JW-10CM is used for the master station, the number of link bytes per station can be freely assigned, zup to 128 bytes. (For details, see the JW-10CM user's manual)

SW4 — *Only set when the board is a master station*

Specify the number of slave stations connected (the number of link bytes will be determined, accordingly)

Setting	No. of boards connected	Setting	No. of boards connected	Setting	No. of boards connected
0	-	6	6	C	12
1	1	7	7	D	13
2	2	8	8	E	14
3	3	9	9	F	15
4	4	A	10		
5	5	B	11		

SW8 — (Module No. switch)

Specify a data link area and a flag area

Setting	Data link area	Communication monitor flag (slave station)	Initial sequence complete flag (master station)	Link operation flag (master station)	Monitor flag (master station)
0	⅃1000 to	15000	15001	15003	15020 to 15077
1	⅃1100 to	15100	15101	15103	15120 to 15177
2	⅃1200 to	15200	15201	15203	15220 to 15277
3	⅃1300 to	15300	15301	15303	15320 to 15377
4	⅃1400 to	15400	15401	15403	15420 to 15477
5	89000	15500	15501	15503	15520 to 15577

*Setting switch 6 to 9 will cause a setting error.

SW7	Enabling the termination resistance Set this switch on last station to ON (provides termination resistance). Set this switch on stations in between to OFF (no termination resistance).	

Assignment of communication flags (numbers in the table are the station numbers of the PLCs)

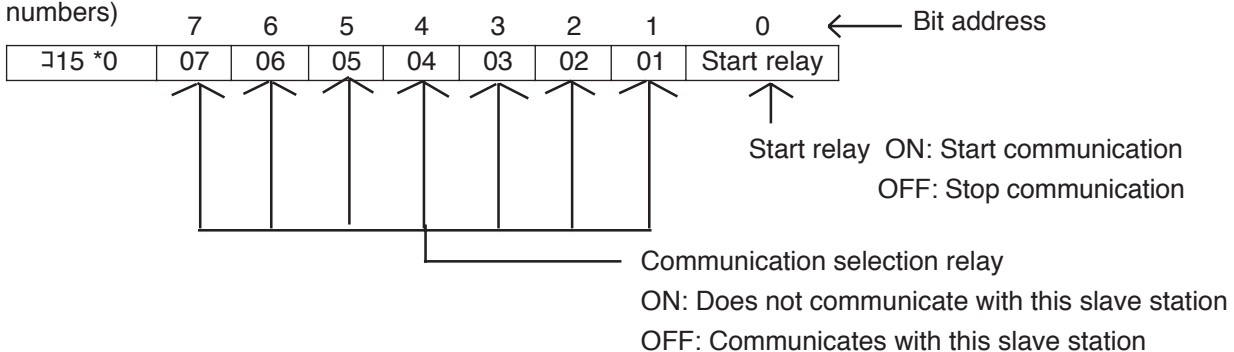|	7	6	5	4	3	2	1	0	<-Bit address
⅃15*2	07	06	05	04	03	02	01	-	Communication monitor flag
⅃15*3	17	16	15	14	13	12	11	10	
⅃15*4	07	06	05	04	03	02	01	-	PLC operation status monitor flag [I]
⅃15*5	17	16	15	14	13	12	11	10	
⅃15*6	07	06	05	04	03	02	01	-	PLC operation status monitor flag [II]
⅃15*7	17	16	15	14	13	12	11	10	

"*" will be determined by setting SW8.

* For details about the DL9 data link, see the "JW-21CM User's Manual."
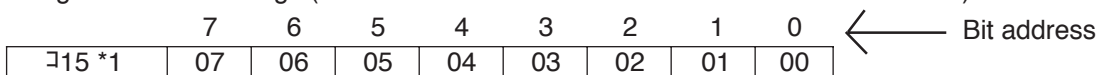
10-3. Working with M-net

* Z-331J and Z-332J should be used.

SW NO.	Setting details		Setting
SWA-1	When using more than one board. Set SWA-1 on the 2nd communication board OFF (SWA-2 is always ON)		
SW0	Set the function to "7."		
SW1	Set the station number (lower digit)	Specify the station number (00 to 17) in octal. Ex.: Master station -> 00 Slave station 6 -> 06	
SW2	Set the station number (upper digit)		
SW3 Only set when the board is a master station	Specify communication mode		
SW4	Setting data transfer speed		
SW8 (Module No. switch)	Specify a data link area, parameter storage area, communication selection register, and a flag area.		
SW7	Enabling the termination resistance Set this switch on last station to ON (provides termination resistance). Set this switch on stations in between to OFF (no termination resistance).		

SW3 communication mode:

1	OFF (Not used)
2	OFF
3	Operation mode when a communication error occurs. OFF: Stop operation. ON: Continues communication with other normal stations.
4	OFF

SW4 data transfer speed:

Setting	Data transfer speed
0	19.2 kBPS
7	38.4 kBPS

* Setting this switch to other than "0" or "7" will cause a setting error.
* The data transfer speed must be the same on all of the station

SW8 settings:

Setting	Data link area	Parameter storage area (parameter for CPU option)	Communication selection register *Only when used as a master station	Error flag *Only when used as a master station
0	コ1000-	O-SW0:000 to 017	コ1500	15010
1	コ1100-	O-SW1:000 to 017	コ1510	15110
2	コ1200-	O-SW2:000 to 017	コ1520	15210
3	コ1300-	O-SW3:000 to 017	コ1530	15310
4	コ1400-	O-SW4:000 to 017	コ1540	15410
5	89000-	O-SW5:000 to 017	コ1550	15510

*Setting switch 6 to 9 will cause a setting error.

Assignment of the communication selection register (the numbers in the table are the slave station numbers)

	7	6	5	4	3	2	1	0	← Bit address
コ15 *0	07	06	05	04	03	02	01	Start relay	

Start relay ON: Start communication
OFF: Stop communication

Communication selection relay
ON: Does not communicate with this slave station
OFF: Communicates with this slave station

Assignment of error flags (the numbers in the table are the slave station numbers)

	7	6	5	4	3	2	1	0	← Bit address
コ15 *1	07	06	05	04	03	02	01	00	

"*" is determined by the setting on SW8.

* For details about the M-net, see the "Maintenance Manual for Interface Modules."

M-net parameter settings

Master station parameter settings

Parameter address*	Setting details	Setting value
000	Number of data bytes to transfer from the master station to slave station 01 (decimal)	
001	Number of data bytes to transfer from slave station 01 to the master station (decimal)	
002	Number of data bytes to transfer from the master station to slave station 02 (decimal)	
003	Number of data bytes to transfer from slave station 02 to the master station (decimal)	
004	Number of data bytes to transfer from the master station to slave station 03 (decimal)	
005	Number of data bytes to transfer from slave station 03 to the master station (decimal)	
006	Number of data bytes to transfer from the master station to slave station 04 (decimal)	
007	Number of data bytes to transfer from slave station 04 to the master station (decimal)	
010	Number of data bytes to transfer from the master station to slave station 05 (decimal)	
011	Number of data bytes to transfer from slave station 05 to the master station (decimal)	
012	Number of data bytes to transfer from the master station to slave station 06 (decimal)	
013	Number of data bytes to transfer from slave station 06 to the master station (decimal)	
014	Number of data bytes to transfer from the master station to slave station 07 (decimal)	
015	Number of data bytes to transfer from slave station 07 to the master station (decimal)	
016	Number of slave stations connected (decimal)　Note	
017	Always set to 00	

Slave station parameter settings

Slave station no.	Parameter address*	Setting details	Setting value
Slave station 01	000	Number of data bytes to transfer from the master station to slave station 01 (decimal)	
	001	Number of data bytes to transfer from slave station 01 to the master station (decimal)	
Slave station 02	000	Number of data bytes to transfer from the master station to slave station 02 (decimal)	
	001	Number of data bytes to transfer from slave station 02 to the master station (decimal)	
Slave station 03	000	Number of data bytes to transfer from the master station to slave station 03 (decimal)	
	001	Number of data bytes to transfer from slave station 03 to the master station (decimal)	
Slave station 04	000	Number of data bytes to transfer from the master station to slave station 04 (decimal)	
	001	Number of data bytes to transfer from slave station 04 to the master station (decimal)	
Slave station 05	000	Number of data bytes to transfer from the master station to slave station 05 (decimal)	
	001	Number of data bytes to transfer from slave station 05 to the master station (decimal)	
Slave station 06	000	Number of data bytes to transfer from the master station to slave station 06 (decimal)	
	001	Number of data bytes to transfer from slave station 06 to the master station (decimal)	
Slave station 07	000	Number of data bytes to transfer from the master station to slave station 07 (decimal)	
	001	Number of data bytes to transfer from slave station 07 to the master station (decimal)	

* Specify the parameters in memory on the CPU board using a support tool.
　The offset address (-SW*) for the parameters is determined by the SW8 setting.

Note　Specify the number of slave stations connected, regardless of the settings in the communication relay
　　　selection (ON/OFF).

10-4. Working with a computer link

Z-331J and Z-332J should be used.

SW NO.	Setting details		Setting
SWA-1	When using more than one board. Set SWA-1 on the 2nd communication board OFF (SWA-2 is always ON)		
SW0	Set the function to "4."		
SW1	Set the station number (lower digit)	Specify the station number (01 to 37) in octal. Ex.: Station No. 01 -> 01	
SW2	Set the station number (upper digit)	Station No. 17 -> 17	
SW3	Specify communication mode 1 Always set to OFF. 2 Always set to OFF* Used only with a 2-wire system. 3 Always set to OFF. 4 Select parity check OFF: Odd ON: Even		
SW4	Setting data transfer speed **Setting / Data transfer speed** 0 / 19200 BPS 1 / 9600 BPS 2 / 4800 BPS 3 / 2400 BPS 4 / 1200 BPS 5 / 600 BPS 6 / 300 BPS * Setting this switch to other than "7" to "F" will cause a setting error. * The data transfer speed must be the same on all of the station		
SW8 (Module No. switch)	Specify a flag area **Setting / Global address command complete flag** 0 / 15000 1 / 15001 2 / 15002 3 / 15003 4 / 15004 5 / 15005 6 / 15006 *Setting switch 7 to 9 will cause a setting error.		
SW7	Enabling the termination resistance Set this switch on last station to ON (provides termination resistance). Set this switch on stations in between to OFF (no termination resistance).		

* For details about computer links, see the "JW-21CM User's Manual."

10-5. Working with an I/O link master station (LM)   * Z-331J and Z-333J should be used.

SW No.	Setting details	Setting
SWA-1	When using more than one board. Set SWA-1 on the 2nd communication board OFF (SWA-2 is always ON)	
SW2	Number of I/O link bytes | 1		
2		
4	Specify the total number of bytes occupied by all of the	
10	slave station modules. (Enter as an octal number)	
20		
40		
SY	Select asynchronous or synchronous calculation of the communication cycle and J-board ON: Synchronous	
T	Always set to OFF.	| [An example setting 11 modules with 16 points as slave stations] Total number of bytes = 2 bytes (16 points) x 11 modules = 22 bytes (decimal) -> 26 (octal) 1 2 4 10 20 40 SY T ON ☐ ■ ■ ☐ ■ ☐ ☐ ☐ ■	
SW3	Mode select switch (select a communication mode) | 1	Communication mode 1 In the normal case, the board checks the connection once per 100 cycles. If there is a slave station that does not respond, the board will repeat the connection check.
2	Communication mode 2 In the normal case, the board checks the connection once per 100 cycles. If there is a slave station that does not respond, the board will assume this is a disconnected station and continue with the other, normal slave stations.
3	Communication mode 3 The board checks the connection when power is first applied or the CHECK relay is ON. If there is a slave station that does not respond, the board will assume this is a disconnected station and continue with the other, normal slave stations. | * Setting this switch to other than "1" or "2" or "3" will cause a setting error.	
SW4	Enabling the termination resistance Set this switch on last station to ON (provides termination resistance). Set this switch on stations in between to OFF (no termination resistance).	

I/O link area (ユ100 to 177)

ユ0100	Status (input)
ユ0101	Slave station data (Slave station address 01)
ユ0102	Slave station data (Slave station address 02)
ユ0103	Slave station data (Slave station address 03)
～	
ユ0176	Slave station data (Slave station address 76)
ユ0177	Slave station data (Slave station address 77)

Error flag assignment (the numbers in the table are the slave station numbers)

15707	15706	15705	15704	15703	15702	15701	15700	
Read relay	Operation relay					HALT	CHECK	Output

15717	15716	15715	15714	15713	15712	15711	15710	
Error data								Input

Note There is no module no. switch for the LM section. (It is set to "0" internally.)

* For details about the I/O link, see the "JW-23LM User's Manual."

11. Indicator lamps

CM section

① For DL1 data links, DL9 data links, and computer links

LED name	Display condition	Recovery
CM (green)	Goes ON during link operations (while communicating)	-
SD (green)	Goes ON while sending data	-
RD (green)	Goes ON while receiving data	-
RS (green)	Goes ON during link operations (request to send)	-
T (green)	Goes ON while testing (used for factory inspections by the manufacturer)	-
ER (red)	Goes ON when a switch setting error occurs.	Check the switch setting. Replace the board.
FT (red)	Goes ON when the WDT times out.	Replace the board.

② In case of M net

LED name	Display condition	Recovery
CM (green)	Goes ON during link operations (while communicating)	-
SD (green)	Goes ON while sending data	-
RD (green)	Goes ON while receiving data	-
RS (green)	Goes ON during link operations (request to send)	-
T (green)	Goes ON while testing (used for factory inspections by the manufacturer)	-
ER (red)	Goes ON when a switch setting error occurs.	Check the switch setting. Check the parameter setting. Check for a disconnection in the communication cable. Replace the board.
FT (red)	Goes ON when the WDT times out.	Replace the board.

Note There are no LEDs to display the error code. Check the error status by monitoring system memory (#170 and up).

LM section

LED name	Display condition	Recovery
CM (green)	Goes ON during link operations (while communicating)	-
SY (green)	Goes ON when "synchronous" is selected as communication cycle type.	-
HL (green)	Goes ON when the internal relay (HALT) is ON.	-
CH (green)	Goes ON when the internal relay (CHECK) is on in communication mode 3.	-
MS (green)	Goes ON when a communication error occurs.	See the "JW-23LM User's Manual."
ER (red)	Goes ON when a switch setting error occurs on the master station. Goes ON when a switch setting error occurs.	
FT (red)	Goes ON when an error occurs in the master station.(Goes ON when the WDT times out.)	
ME (red)	Goes ON when a circuit error occurs in the master station. Goes ON when a switch setting error occurs in the master station. Goes ON when a communication error occurs.	
SE (red)	Goes ON when a communication error occurs.	

Note There are no LEDs to display the error code. Check the error status by monitoring the status register (ⱻ1571).

* For details about errors and troubleshooting, see the "JW-21CM User's Manual," "Maintenance Manual for Interface Modules," and the "JW-23LM User's Manual".

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