SHARP

Version 1.0
Produced in Oct. 2005

Sharp Programmable Controller

Board PC J-board

Z-500 series

Model name

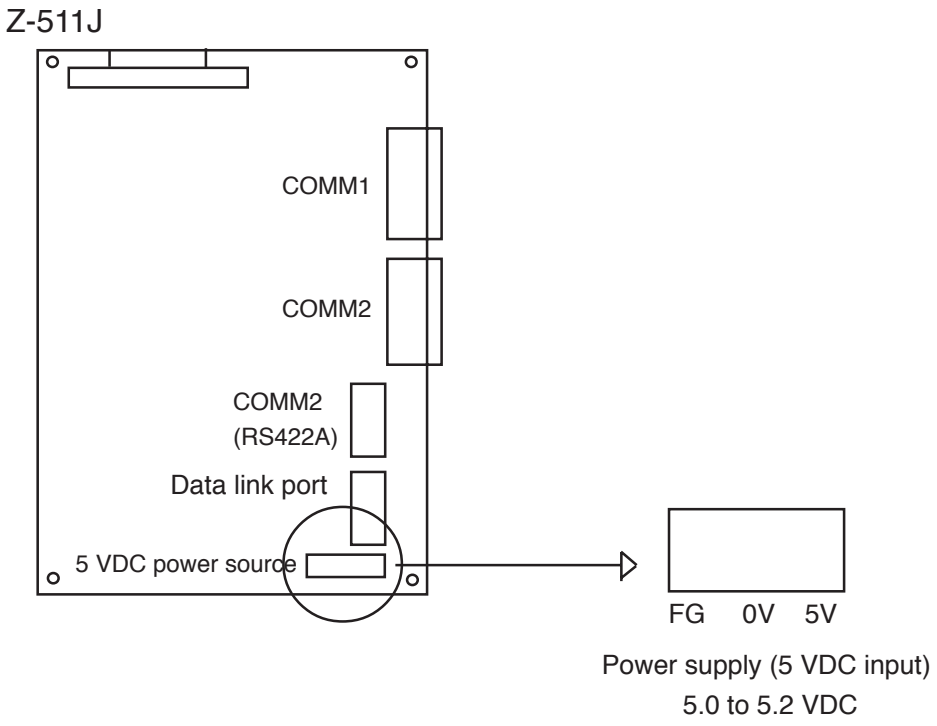
CPU Board 1 : Z-511J

CPU Board with communication function

User's Manual / Hardware version

CAUTION

5 VDC is required to power the Z-511J. Be careful not to apply any other DC or AC voltage such as 24 VDC and 100 VDC. Otherwise, the Z-511J will be destroyed.



Thank you for purchasing a J-board Z500 series programmable controller. This manual (User's Manual: Hardware Version) mostly describes hardware details, including specifications and installation procedures of the J-board.

Before using the J-board, read this manual together with the "JW30H Programming Manual, Ladder Instruction Version," that describes software details such as the available instructions, the "JW-21CM User's Manual" and the "Maintenance Manual for Interface Modules" that describe communication functions.

In addition, learn the handling methods for other I/O and communication boards by reading each "User's Manual."

Safety Precautions

Read this user's manual and attached documents carefully before installation, operation, maintenance and checking in order to use the J-board correctly. Understand all of the J-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

- Connect the rated power source.
  Connection of a wrong power source may cause a fire.
- Wiring should be done by a qualified electrician.
  Wrong wiring may lead to fire, trouble or electric shock.

3) Use

Danger

- Don't touch the terminal while the power is being supply or you may have on electric shock.
- Assemble the emergency stop circuit and interlock circuit outside of the J-board and connect to the halt output of the J-board. Otherwise the machine breakdown or accident may be caused by the trouble of the J-board.

⚠ Caution

- "Run" or "stop" during operation should be done with particular care by confirming safety. Mis-operation may lead to damage or accident of the machine.
- Turn ON the power source in the specified sequence. Turn ON with wrong sequence may lead to machine breakdown or accident.

4) Maintenance

⚠ Danger

- The Z-511J controller contains a lithium battery. Do not expose the Z-511J directly to flames as the battery may explode and seriously injure people nearby.

Prohibit

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

⚠ Caution

- Turn OFF the power before attaching or removing the board, attaching the I/O connector, modifying each type of setting switch.
  Or electric shock, malfunction or trouble may be caused.

Table of Contents

1. Outline

Programable controller "J-board: Z-500 series," hereafter referred to as "the J-board," realized both compactness and low cost by employing a board type structure together with various communication functions which only larger class models have. It is a programmable controller for middle and small scale control systems, suitable for integrating into equipment and providing local control of distributed control systems.

2. Special precautions

■ Precautions for installation

Never install the 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 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 for 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.
(When the board is put directly on conductive objects such as metallic boards, battery terminals of the board may be shorted and the back-up memory may be lost.)
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 before connecting the board, installing the I/O connector, changing a switch setting, or mounting a ROM for ROM operation.

■ 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.

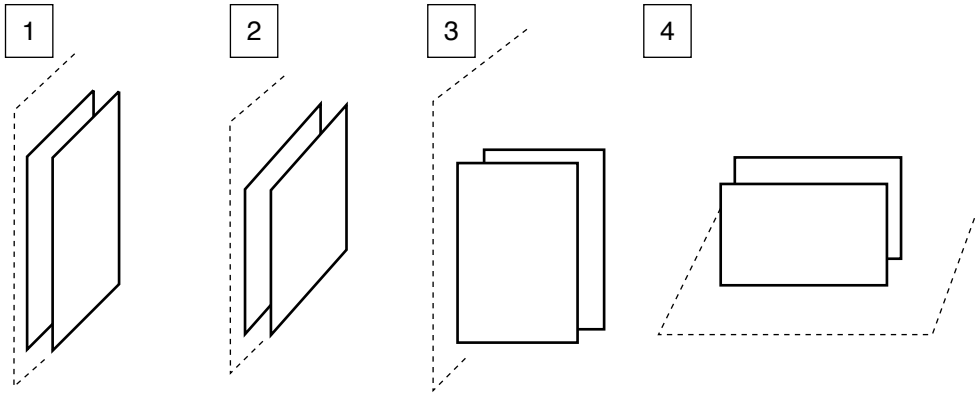
■ Precautions for wiring work

· Required voltage of the Z-511J is 5 VDC. Be careful not to exceed voltage or reverse the polarity. (Overvoltage and reversed polarity may damage the internal circuits.)
· A 5 VDC power supply for the Z-511J should be kept away from sources of electrical noise such as separate from a power supply for loads.
· Do not run I/O lines and communication lines parallel or proximate with power lines and high voltage lines. Do not run noise generating lines such as power lines, high voltage lines, and I/O lines proximate above the printerd circuit board of the J-board.
· Some I/O boards are equipped with a fuse for output circuit protection. If the fuse is blown by a short circuit, change whole of the I/O board after repairing the external cause.
* The integrated fuse in the I/O board is to prevent heating by overcurrent and burn out of internal circuit at shorted loads, and does not protect output elements.

■ Precautions for installation

Basically use the fixing bracket exclusive for installing the J-board and apply any of the recommended installation conditions shown below (1, 2, 3, or 4 of figures below). If you intend to install the J-board without using the fixing bracket, install it with sufficient holding strength. Install J-board in well ventilated conditions.

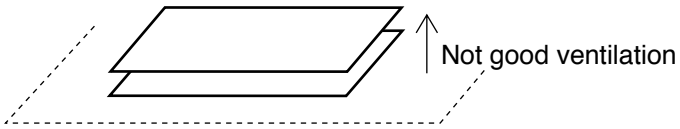
<Recommendation fixing conditions>



When fixing bracket A (Z-341J) is used

When fixing bracket B (Z-342J) is used

In case of plane installation shown below, the J-board is not given sufficient ventilation. Therefore, provide enough space above J-board to prevent temperature rise exceeding 55˚C.



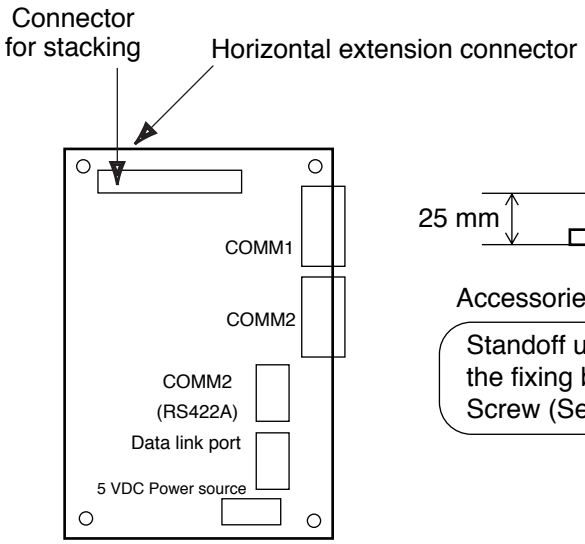
Note: The fixing bracket B (Z-342J) cannot be used with the Z-325J.

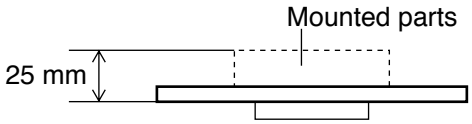
■ Precautions for memory back up

The Z-511J contains a memory backup battery. Do not store the Z-511J in high temperatures or at high humidity. Storing it at high temperatures will greatly reduce the battery life.
Do not put any object directly on the top of the Z-511J.

3. Board configuration

■ Z-511J: CPU board



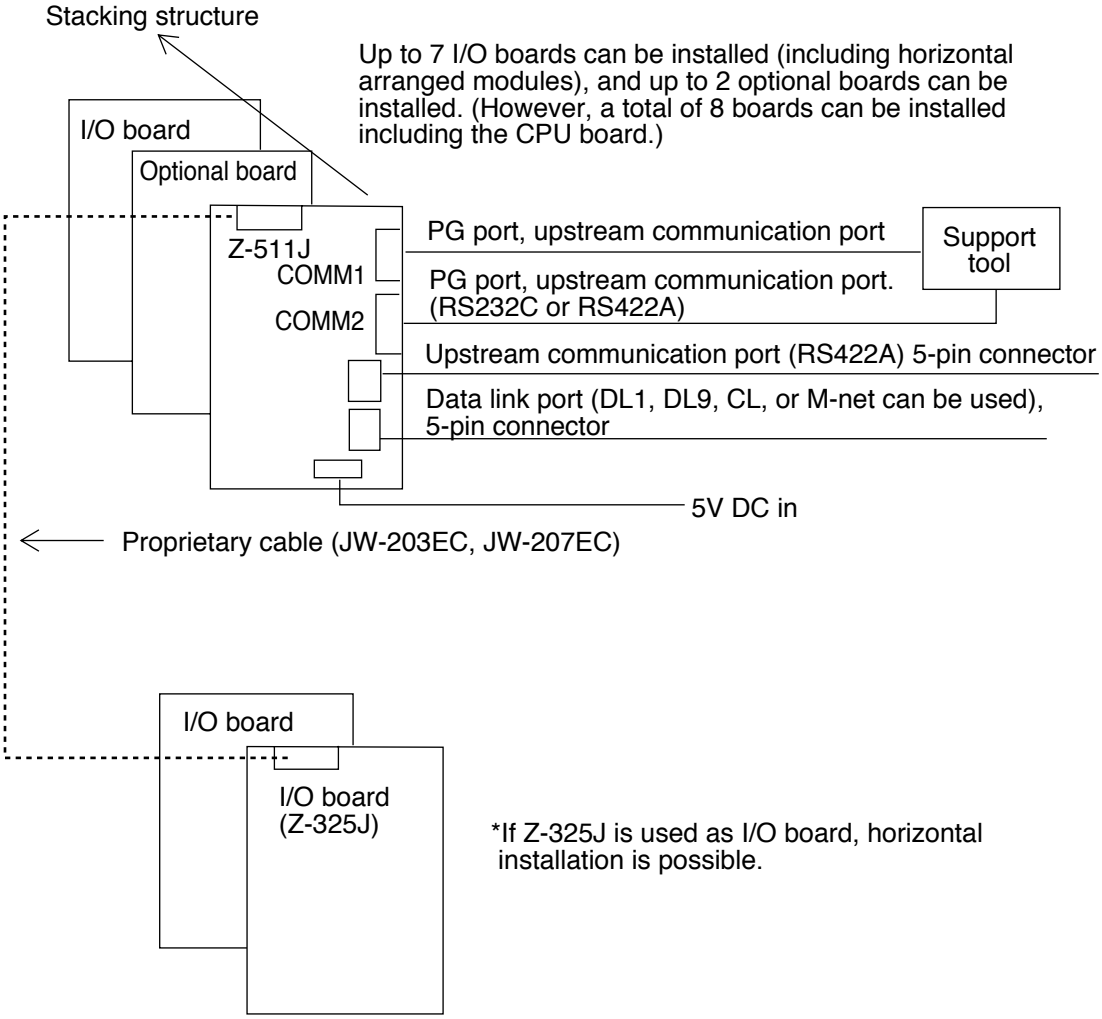


Accessories

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

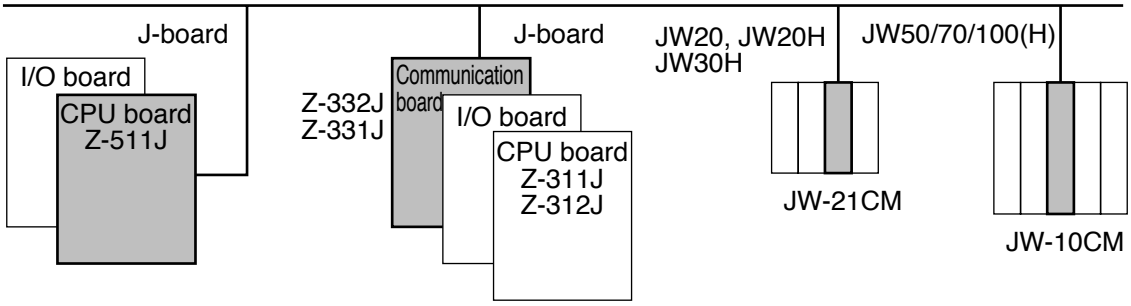
4. System configuration

<Basic system>



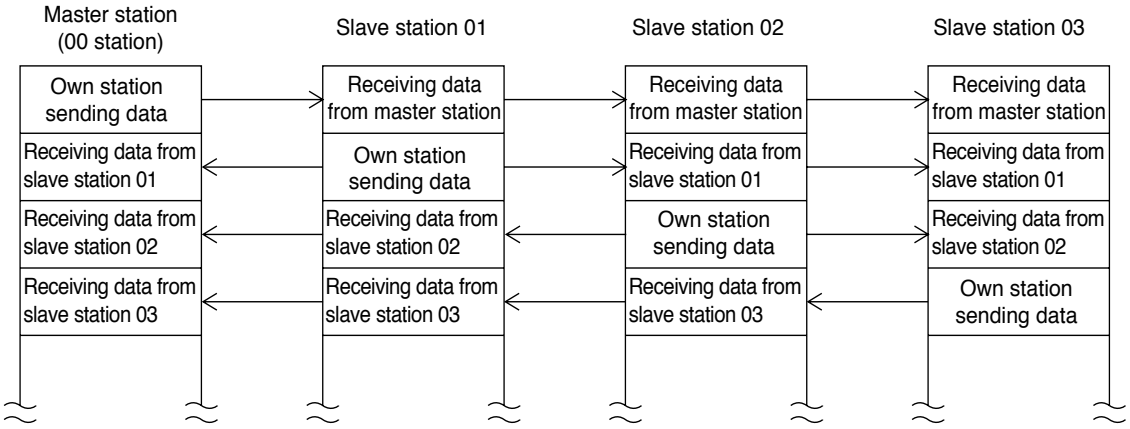
<DL1 data link system>

No. of connected stations: Max. 16 stations
Total extension length: 1 km
Transfer rate: 153.6 kbps
No. of link points: Max. 64 bytes.
* When JW-21CM or J-board are used as the master station, the number of link points per station is restricted by the number of connected stations.



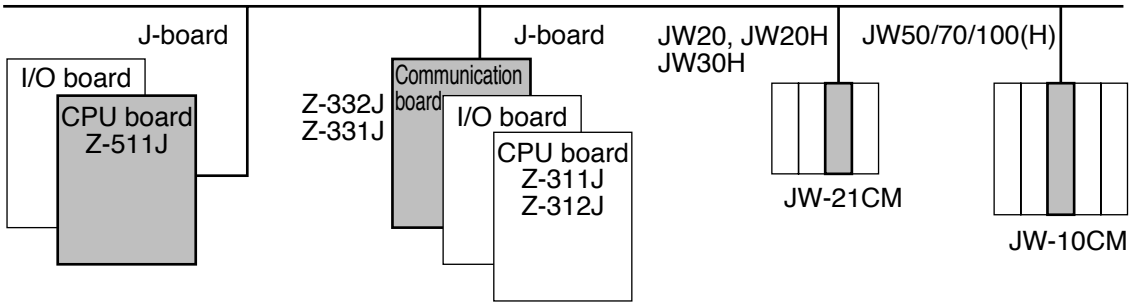
[DL1 data link communication system]

The DL1 data link is a communication system used to send and receive data between the master station and a slave station, and between slave stations, as shown in the figure below.

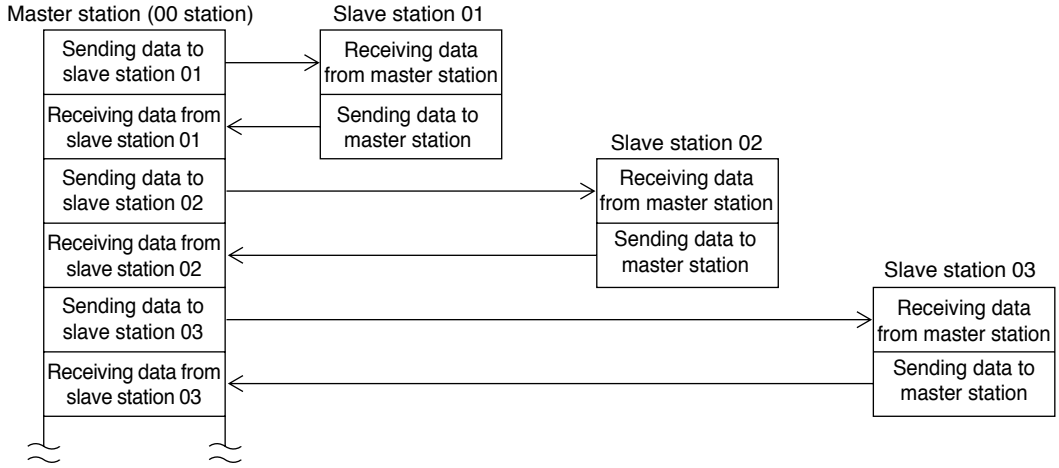


<DL9 data link system>

No. of connected stations: Max. 16 stations
Total extension length: 1 km
Transfer rate: 153.6 kbps
No. of link points: Max. 512 bytes.
* When JW-21CM or J-board are used as the master station, the number of link points per station is restricted by the number of connected stations.

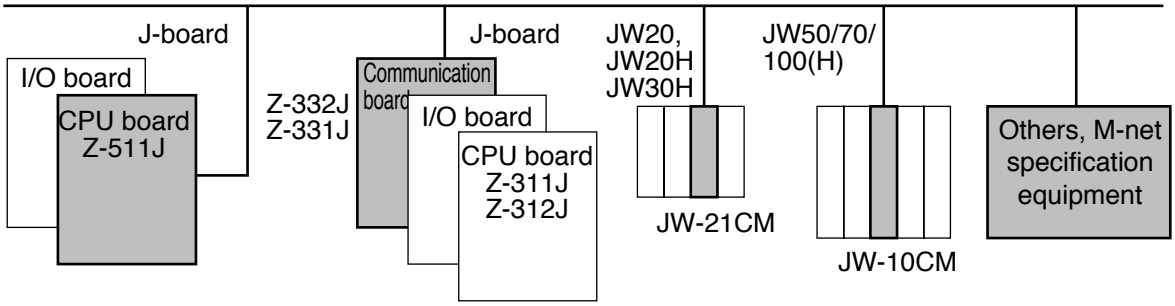


[DL9 data link communication system]
The DL9 data link is a communication system used to send and receive data between the master station and a slave station as shown in the figure below.
* Direct communication between slave stations is not possible.



<M-net system>

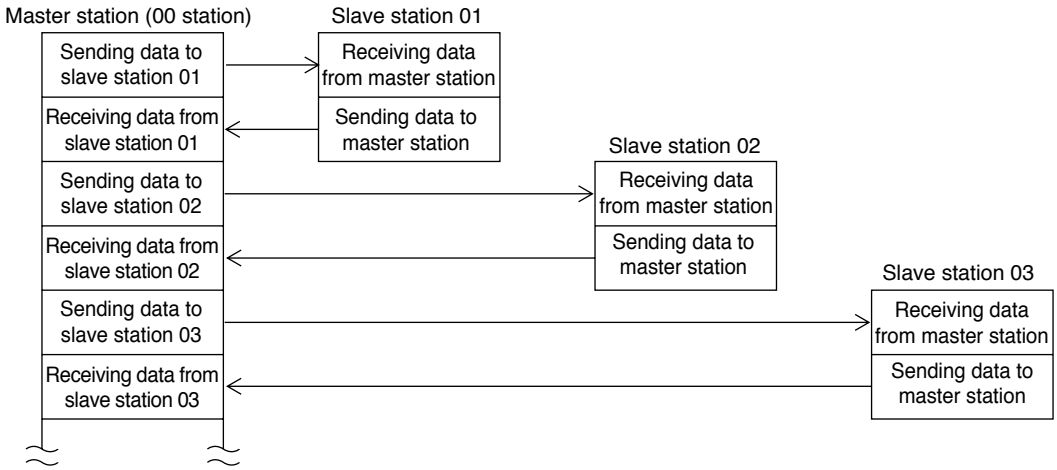
No. of connected stations: Max. 8 stations
Total extension length: 1 km
Transfer rate: 19.2 kbps/38.4 kbps
No. of link points: Max. 64 bytes.



[M-net communication system]

The M-net is a communication system used to send and receive data between the master station and a slave station as shown in the figure below.

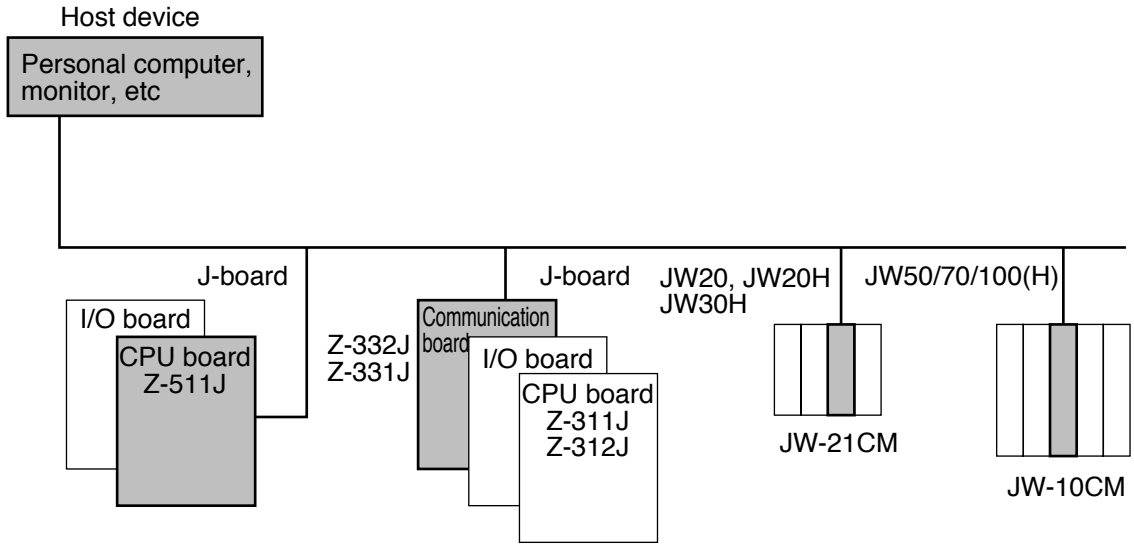
* Direct communication between slave stations is not possible.



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

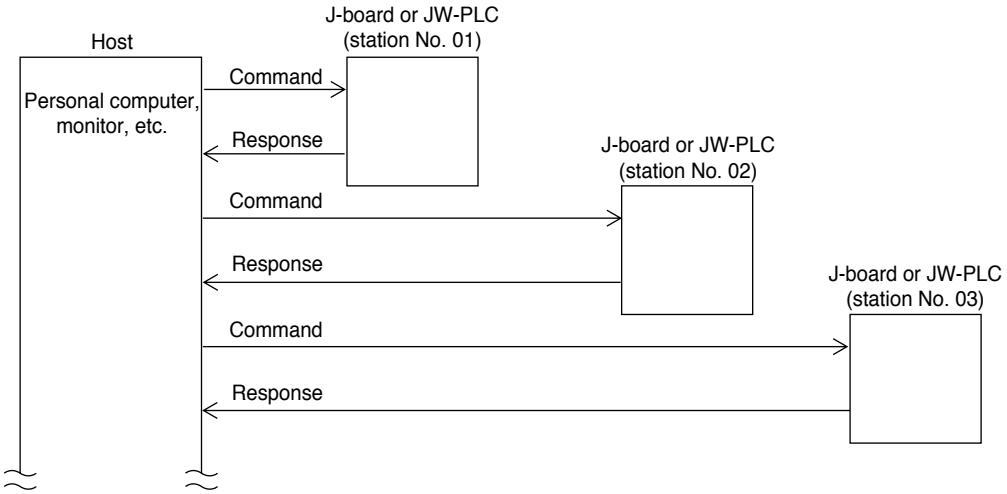
<Computer link (CL) system>

No. of connected stations: Max. 32 stations
Total extension length: 1 km
Transfer rate: 300 to 19200 bps



[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.



5. Specifications of Z-511J

5-1. General specifications

Item	Specifications
Allowable power voltage	5 VDC (5.0 to 5.2V) The 5V power supply must be able to handle the total of the current consumption from all of the boards. MAX. 2.7A
Ambient operation temperature / humidity	0 to 55°C / 35 to 90%RH (without dewing)
Storage temperature / humidity	-20 to 70°C / 35 to 90%RH (without dewing)
Vibration resistance	JIS-C-0911 or equivalent, double amplitude : 0.15 mm (10 to 55Hz),1G (55 to 150Hz), 2 hours each in X, Y, and Z directions
Shock resistance	JIS-C-0912 or equivalent, 10G, 3 times each in X, Y, Z directions
Installation	Any of 3 directions
Grounding	Class-3 grounding
5V current consumption	Approx. 700 mA
Weight	Approx. 400 g
Board size	115 mm x 190 mm

5-2. Performance specifications (CU section)

Item			Specifications
Calculation port/memory section	Calculation method		Cyclic calculation and interrupt dealing system
	Processing speed		Equivalent to JW30HN
		Basic instruction	0.038 μseconds. (STR, AND, OR, and others), 0.076 μseconds (OUT)
		TMR, CNT	Few μsecconds on average
		Application instruction	Few μ. to few tens μsecconds on average
	Numbers of instruction		Basic instruction : 20, application instruction: 113
	Program size		15.5 K words (equivalent to the JW32CHU1)
	ROM operation		ROM operation with an internal flash ROM
	Memory back-up		Back up by an integrated lithium primary side battery
	No. of control I/O points		1024 points (equivalent to the JW32CUH1)
	Timer, counter		1024 points in total
	Data memory		30720 relay and other points. File register: 80 K bytes
	Connectable I/O board		Up to 8 modules, including this module, can be installed.
	Clock feature		Yes
External interface	Host communication port		Use PG/COMM1 port or PG/COMM2 port. Communication standard: RS232C/RS422A (Only PG/COMM2 port can be used for RS232C) With an RS422A connection, 1: N connection is available. D-sub 15-pin or proprietary connector. The port complies with the Sharp computer link protocol (Max. 115.2 K bit/s)
	Data link port		RS485 (proprietary connector) The DL1 data link, DL9 data link, M-net, or computer link can be connected.
	PG port		2 D-sub 15-pin connectors. Shared with the communication port to connect to host computers.
Support tool	Applicable model		Hand-held programmer (JW-13PG) Application program JW92SP (for PC98), JW50SP (for IBM PC)
	Model setting		JW-32CUH1 15.5K
	Connection cable		Exclusive cable: JW-22KC (2 m) or JW-24KC (4 m)

5-3. Performance specifications (CM section: data link port)

Item		Specifications
DL1 data link SW5 = 2	Communication standard	EIA RS-485 or equivalent
	Transmission rate	153.6 k bps
	Transmission format	JIS X-5104. Conforms to the frame organization of the High level Data Link Control (HDLC) protocol. Data check: CRC
	Communication line	Shielded twisted pair cable. Cable total length: Max. 1 km (party line connection)
	No. of connected stations	Max. 16 stations (1 master station + 15 slave stations)
	No. of link bytes	Max. 64 bytes *When the master station is a Z-551J, Z-313J, Z-331J, Z-332J or JW-21CM, the following limitations apply. In case of 1 slave station: 32 bytes per station In case of 2 to 3 stations: 16 bytes per station In case of 4 to 7 stations: 8 bytes per station In case of 8 to 15 stations: 4 bytes per station
	Link area	Set using SW8 (module No. SW)
DL9 data link SW5 = 3	Communication standard	EIA RS-485 or equivalent
	Transmission rate	153.6 k bps
	Transmission format	JIS X-5104. Conforms to the frame organization of the High level Data Link Control (HDLC) protocol. Data check: CRC
	Communication line	Shielded twisted pair cable. Cable total length: Max. 1 km (party line connection)
	No. of connected stations	Max. 16 stations (1 master station + 15 slave stations)
	No. of link bytes	Max. 512 bytes When the master station is a Z-313J, Z-331J, Z-332J or JW-21CM, the following limitations apply. In case of 1 to 2 stations: Max. 128 bytes per station In case of 3 to 4 stations: Max. 64 bytes per station In case of 5 to 8 stations: Max. 32 bytes per station In case of 9 to 15 stations: Max. 16 bytes per station
	Link area	Assign using SW3 (module No. switch)
M-net SW5 = 7	Communication standard	EIA RS-485 or equivalent
	Transmission rate	19.2 k bps/38.4 k bps
	Transmission format	M-net (interface between modules) specifications or equivalent Start (1) + data (7) + even parity (1) + stop (1)
	Communication line	Shielded twisted pair cable. Cable total length: Max. 1 km (party line connection)
	No. of connected stations	Max. 8 stations (1 master station + 7 slave stations)
	No. of link bytes	Max. 64 bytes
	Link area	Set by the parameter (parameter address is determined by SW8)
Computer link SW5 = 4	Communication standard	EIA RS-485 or equivalent
	Transmission rate	300, 600, 1200, 2400, 4800, 9600, 19200 k bps
	Transmission format	Start-stop synchronization Start (1) + data (7) + parity (1) + stop (2). Used character: ASCII alphanumeric character
	Communication line	Shielded twisted pair cable. Cable total length: Max. 1km (party line connection) The wiring system is 2-wire system. (4-wire system is no available.)
	No. of connected stations	Maximum of 32 stations (one host station + 31 slave stations)

[Allocation of Z-511J address]

Address(8)	Allocation	No. of bytes occupied
⊐. 0000	CM section (dummy)	8 bytes
⊐. 0001		
⊐. 0002	Vacant	
⊐. 0003		
⊐. 0004	Vacant	
⊐. 0005		
⊐. 0006	Vacant	
⊐. 0007		

5-4. Name and description of each part (Z-511J)

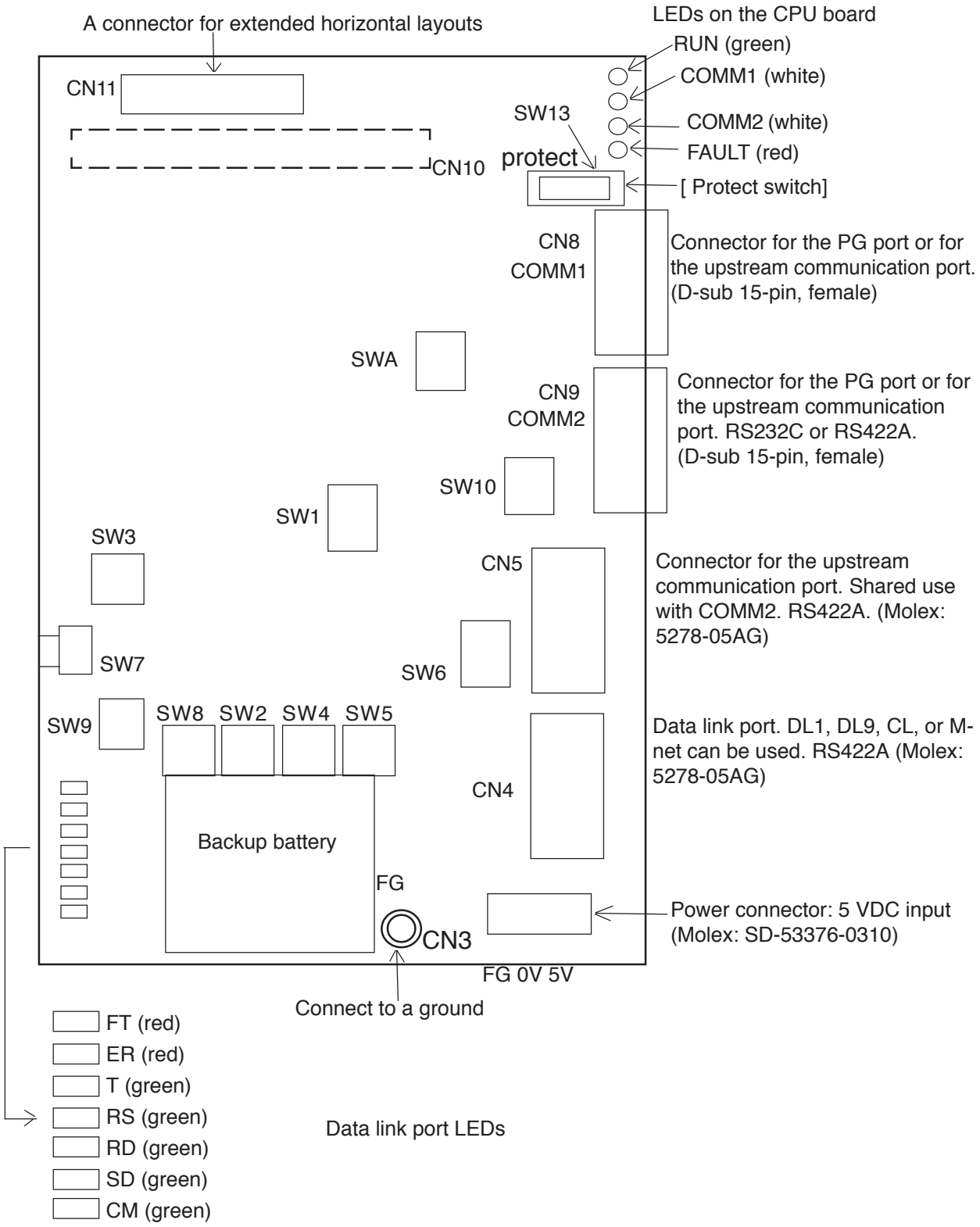
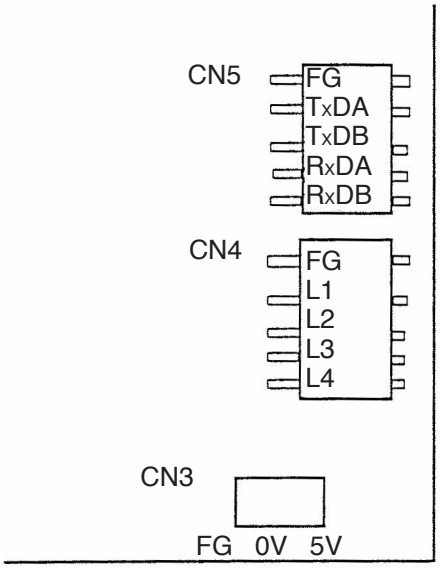


Table of applicable connectors

Connector number	Connector name	Data transfer standard	Applicable connector
CN5	Upstream communication port	RS422A	Molex: 5265-N, 2578G
CN4	Data link port	RS422A	Molex: 5265-N, 2578G
CN3	5 VDC power	-	Molex: 51102-0500, 50351-8100

LEDs on the CPU board

J-board status	RUN	FAULT
Operation mode	Goes ON	Goes OFF
Stop mode	Blinks	Goes OFF
Error	Goes OFF	Goes ON



CN5: CPU section upstream communication port (5-pin)

Signal name	Description	
FG	Frame ground (connect to the shield)	
TxDA	Sending data (+)	RS422A upstream communication port
TxDB	Sending data (-)	
RxDA	Receiving data (+)	
RxDB	Receiving data (-)	

CN4: Data link port (5-pin)

Signal name	Description	
FG	Frame ground (connect to the shield)	
L1	Sending data, receiving data (+)	RS422A upstream communication port
L2	Sending data, receiving data (-)	
L3	Receiving data (+)	
L4	Receiving data (-)	

CN3: Power connector

Signal name	Description
FG	Frame ground
0V	Power input (0V)
5V	Power input (5V)

Description of the indicator lamps (Z-511J)

CU section

LED name	Display condition		
	Operation mode	Stop mode	When an error occurs
RUN (green)	Goes ON	Blinks	Goes OFF
FAULT (red)	Goes OFF	Goes OFF	Goes ON

LED name	Display condition
COMM1 (orange)	Monitor data transmission and reception of a peripheral device or host computer connected to COMM1.
COMM2 (orange)	Monitor data transmission and reception of a peripheral device or host computer connected to COMM2.

CM section

1) On a DL1 data link, DL9 data link, or computer link

LED name	Display condition	Recovery
CM (green)	Goes ON during link operation (communication)	-
SD (green)	Goes ON while sending data	-
RD (green)	Goes ON while receiving data	-
RS (green)	Goes ON during link operation (request to send data)	-
T (green)	Goes ON during a test (Used for inspection by the manufacturer)	-
ER (red)	Goes ON when a SW setting error occurs	Check switch settings. Replace the board.
FT (red)	Goes ON when the WDT time out	Replace the board.

2) On an M net

LED name	Display condition	Recovery
CM (green)	Goes ON during link operation (communication)	-
SD (green)	Goes ON while sending data	-
RD (green)	Goes ON while receiving data	-
RS (green)	Goes ON during link operation (request to send data)	-
T (green)	Goes ON during a test (Used for inspection by the manufacturer)	-
ER (red)	Goes ON when a communication error occurs.	Check switch settings, parameter settings, disconnected communication cable, replace the board.
FT (red)	Goes ON by when the WDT times out	Replace the board.

Note

The CM section does not have LEDs for displaying error codes. Monitor the system memory (#170 and up) and check the error details.

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

Description of each switch

Switches in the CU section

Switch no.	Default setting	Switch details
SWA-1	ON	Slot assignment switch. Specifies whether it is the first or last half in the same rack number.
SWA-2	ON	
SW7	-	Recovery switch. Turn ON the power while pressing this switch to recover from an error condition. such as a memory error. The details are maintained in memory. To clear the memory, take other steps.
SW1-1	OFF	Rack number switch. Assign a rack address.
SW1-2	OFF	
SW1-3	OFF	
SW13	OFF	Prohibit (ON) or allow (OFF) writing the program and system memories.

Switches in the CM section

Switch No.	Default setting	Switch details			
		DL1 data link	DL9 data link	M-net	Computer link
SW9-1	OFF	OFF	OFF	OFF	OFF
SW9-2	OFF	OFF	Specify the total number of link bytes (set only when used as a master station)	OFF	OFF: 2-wire system ON: 4-wire system
SW10-1	OFF	OFF		Communication mode when an error occurs.	OFF
SW10-2	OFF	OFF		OFF	Parity OFF: Odd ON: Even
SW6-1	OFF	Not used	Not used	Not used	Termination resistance (4-wire system)
SW6-2	OFF	Termination resistance	Termination resistance	Termination resistance	Termination resistance (2-wire system)
SW8	0	Upper digit of station number	Upper digit of station number	Upper digit of station number	Upper digit of station number
SW2	0	Lower digit of station number	Lower digit of station number	Lower digit of station number	Lower digit of station number
SW3	0	Module No. switch	Module No. switch	Module No. switch	Module No. switch
SW4	0	Number of slave stations (only when used as a master station)	Number of slave stations (only when used as a master station)	Data transfer speed	Data transfer speed
SW5	0	2	3	7	4

5-5. Data memory (Z-511J)

See pages 2-1 to 2-3 in the "JW30H Programming Manual, Ladder Instruction Version." (The details are identical to the JW32CUH1)

5-6. System memory (Z-511J)

See pages 3-1 to 3-2 and 5-1 to 5-17 in the "JW30H Programming Manual, Ladder Instruction Version." (The details are identical to the JW32CUH1)

6. Current consumption of each board

The current requirement of the Z-511J is the total current consumption of all the boards and support tools connected to it.

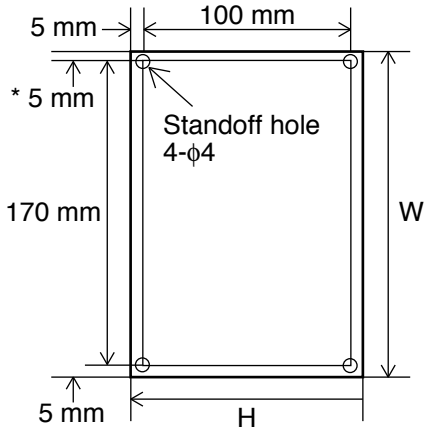
Current consumption of each board

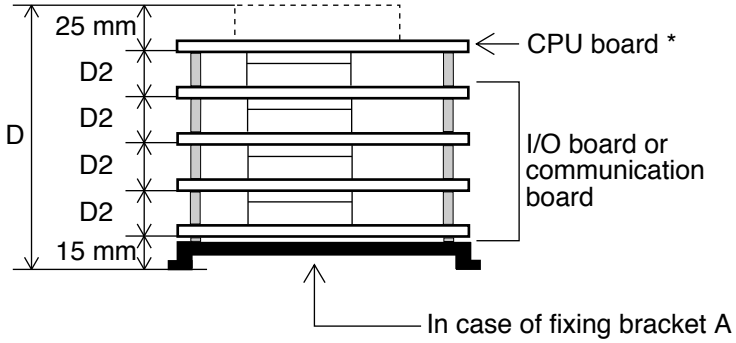
Model name	Current consumption
Z-511J: CPU board	700 mA
Z-321J: 32 point I/O board	111 mA (when all of the output points are ON). When "N" number of points are ON = 10 + 6.3 N1 (N1: Number of points whose output is ON)
Z-322J: 64 point I/O board	212 mA (when all of the output points are ON). When "N" number of points are ON = 10 + 6.3 N1 (N1: Number of points whose output is ON)
Z-323J: 30 point I/O board	126 mA (when all of the output points are ON). When "N" number of points are ON = 15 + 2.5N1 + 12N2 (N1: Number of points whose TR output is currently turned ON. N2 = Number of points whose triac output is currently turned ON)
Z-324J: 28 point I/O board	38 mA (when all of the output points are ON). When "N" number of points are ON = 10 + 2.3N1 (N1: Number of points whose output is ON)
Z-325J: 64 point I/O board 2	267 mA (when all of the output points are ON). When "N" number of points are ON = 15 + 6.3N1 (N1: Number of points whose output is ON)
Z-331J: Communication board 1 (LM+CM)	170 mA
Z-332J: Communication board 2(CM)	100 mA
Z-333J: Communication board 3 (LM)	80 mA
Z-334J: ME-NET board	330 mA
Z-335J: Satellite net board	280 mA
Z-351J: Analog input board	60 mA
Z-352J: Analog output board	100 mA
Z-353J: Pulse output board	120 mA

Support tool (JW-2PG, JW-13PG)	150 mA

7. Board size

Printed circuit board size





* CPU board should be installed on the top.

* 15 mm for Z-511J and Z-325J

Board size (Fixing bracket size is excluded.)

Type	H	W	D	Weight *
Z-511J: CPU board	115 mm	190 mm	25.0 mm (D1)	Approx. 230 g
Z-321J: 32 point I/O board	110 mm	180 mm	16.6 mm (D2)	Approx. 125 g
Z-322J: 64 point I/O board	110 mm	180 mm	16.6 mm (D2)	Approx. 135 g
Z-323J: 30 point I/O board	117.5 mm	180 mm	21.6 mm (D2)	Approx. 180 g
Z-324J: 28 point I/O board	115 mm	180 mm	21.6 mm (D2)	Approx. 210 g
Z-325J: 64 point I/O board 2	115 mm	190 mm	16.6 mm (D2)	Approx. 170 g
Z-331J: Communication board 1 (LM+CM)	117.5 mm	180 mm	16.6 mm (D2)	Approx. 180 g
Z-332J: Communication board 2 (CM)	117.5 mm	180 mm	16.6 mm (D2)	Approx. 180 g
Z-333J: Communication board 3 (LM)	117.5 mm	180 mm	16.6 mm (D2)	Approx. 180 g
Z-334J: ME-NET board	117.5 mm	180 mm	21.6 mm (D2)	Approx. 250 g
Z-335J: Satellite net board	117.5 mm	180 mm	21.6 mm (D2)	Approx. 250 g
Z-351J: Analog input board	117.5 mm	180 mm	21.6 mm (D2)	Approx. 220 g
Z-352J: Analog output board	117.5 mm	180 mm	21.6 mm (D2)	Approx. 210 g
Z-353J: Pulse output board	117.5 mm	180 mm	16.6 mm (D2)	Approx. 200 g
Z-341J: Fixing bracket A	See "8-3. Specialized fixing bracket"			Approx. 220 g
Z-342J: Fixing bracket B				Approx. 290 g

* Including standoffs and screws

Example for measurement D

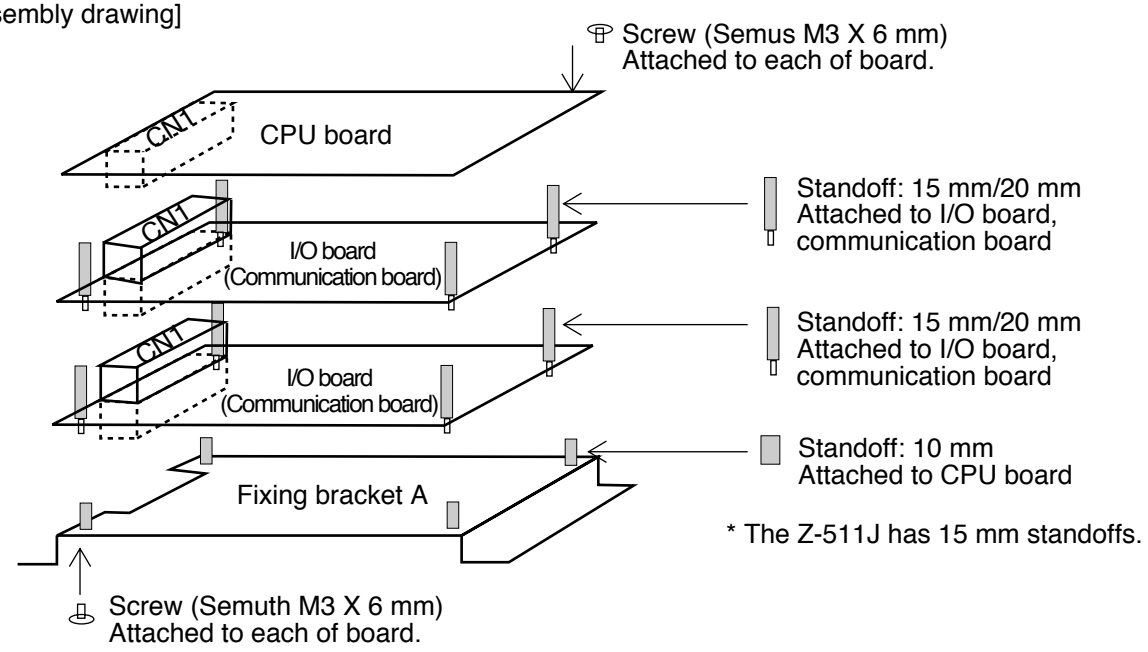
Board composition	Measurement D	
	When the board (D2=16.6 mm) is/are used.	When the board (D2=21.6 mm) is/are used.
CPU board + one I/O board + fixing bracket A	56.6 mm	61.6 mm
CPU board + two I/O boards + fixing bracket A	73.2 mm	83.2 mm
CPU board + three I/O boards + fixing bracket A	89.8 mm	104.8 mm
CPU board + four I/O boards + fixing bracket A	105.2 mm	126.4 mm

8. Assemble/fixing

8-1. Assemble

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

[Assembly drawing]



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 an incorrect direction.

[Required tools for building up]

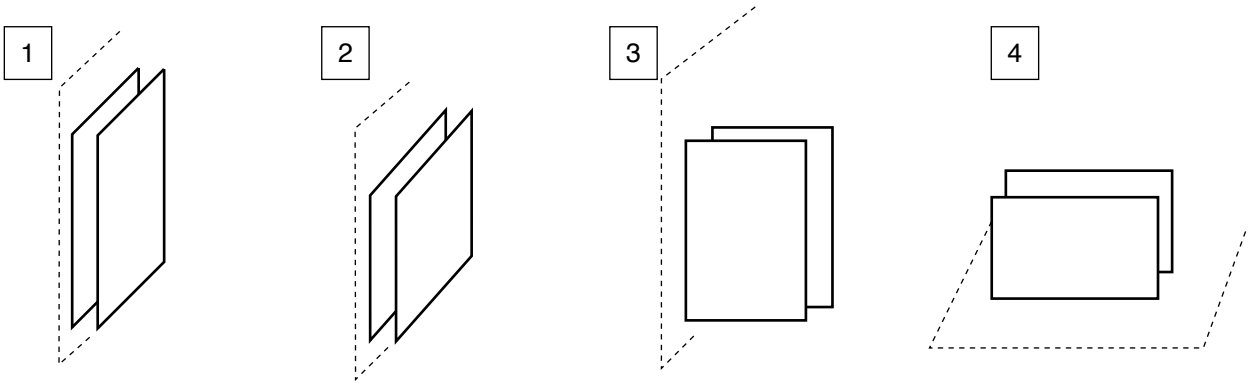
- Phillips screw driver
- Box (hex.) driver: for 5.5 mm

Standoff shape

8-2. Fixing

Basically use the fixing bracket exclusive for installing the J-board and apply all of the recommended installation conditions shown below (1, 2, 3 or 4 of figures below). If you intend to install J-board without using the fixing bracket, install it with sufficient holding strength. Install the J-board in well ventilated condition.

<Our recommendation fixing conditions>



When fixing bracket A (Z-341J) is used

When fixing bracket B (Z-342J) is used

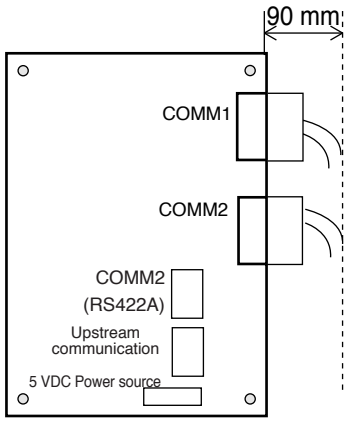
Note: The fixing bracket B (Z-342J) cannot be used with the Z-325J.

<Spare space for installation>

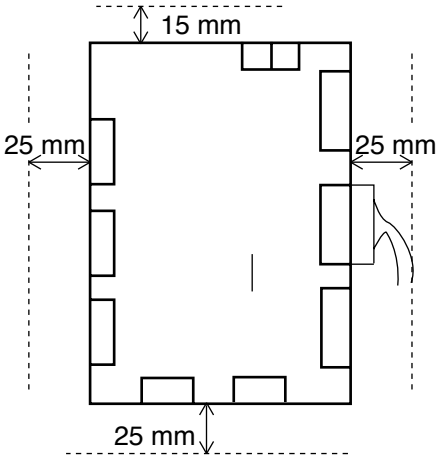
For spare space for connector wiring work of each board, see the figures below.

(Spare space dimensions nominated below are not considered for attachment and detachment of wires after installation. Required spare space may vary with wiring method and used cable size so confirm final required space at actual wiring work.)

Z-511J: CPU board



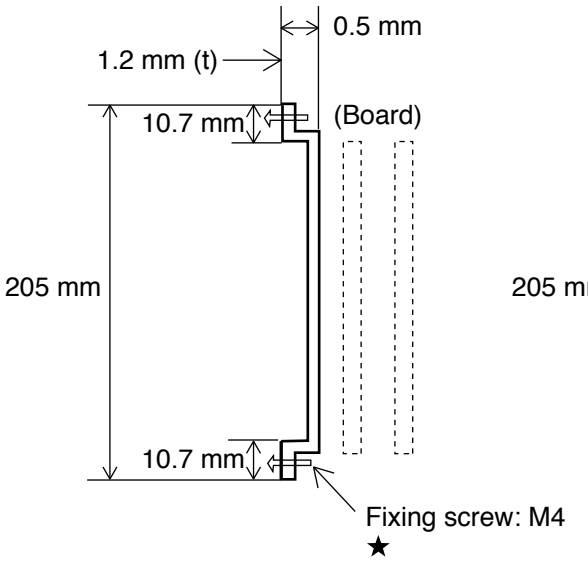
Z-325J: 64-point I/O board 2



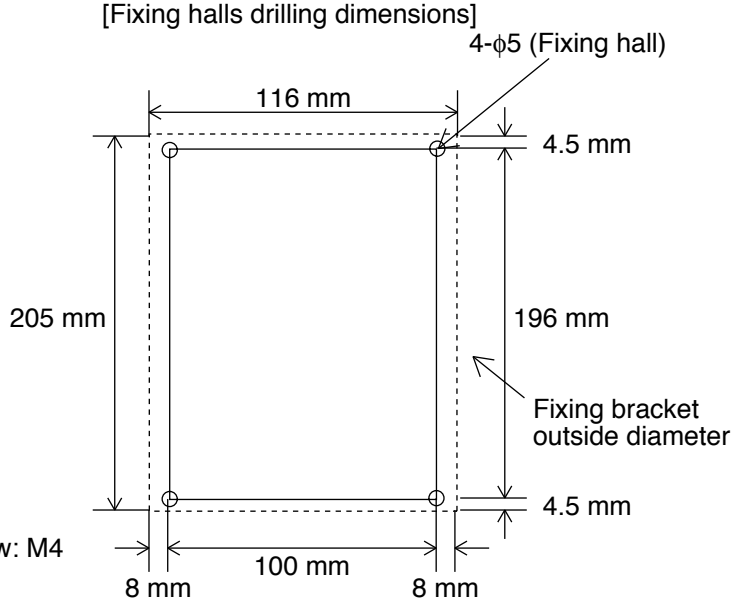
8-3. Specialized fixing bracket

■ Fixing bracket A: Z-341J (Plane fixing type)

[Bracket size]

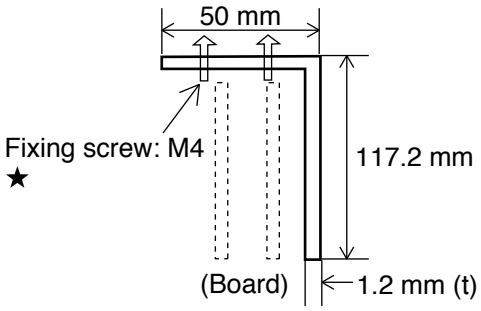


[Fixing halls drilling dimensions]

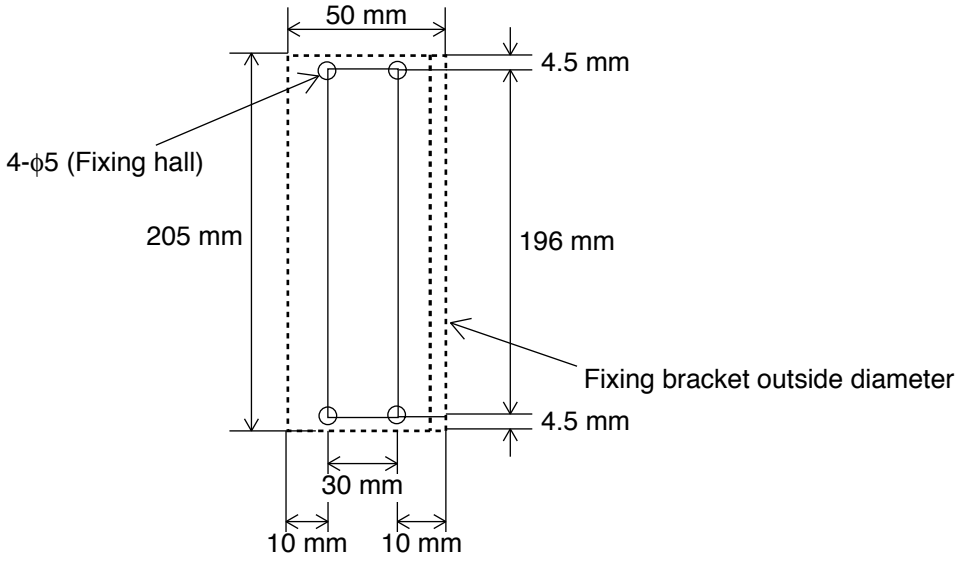


■ Fixing bracket B: Z-342J (Vertical fixing type)

[Bracket size]



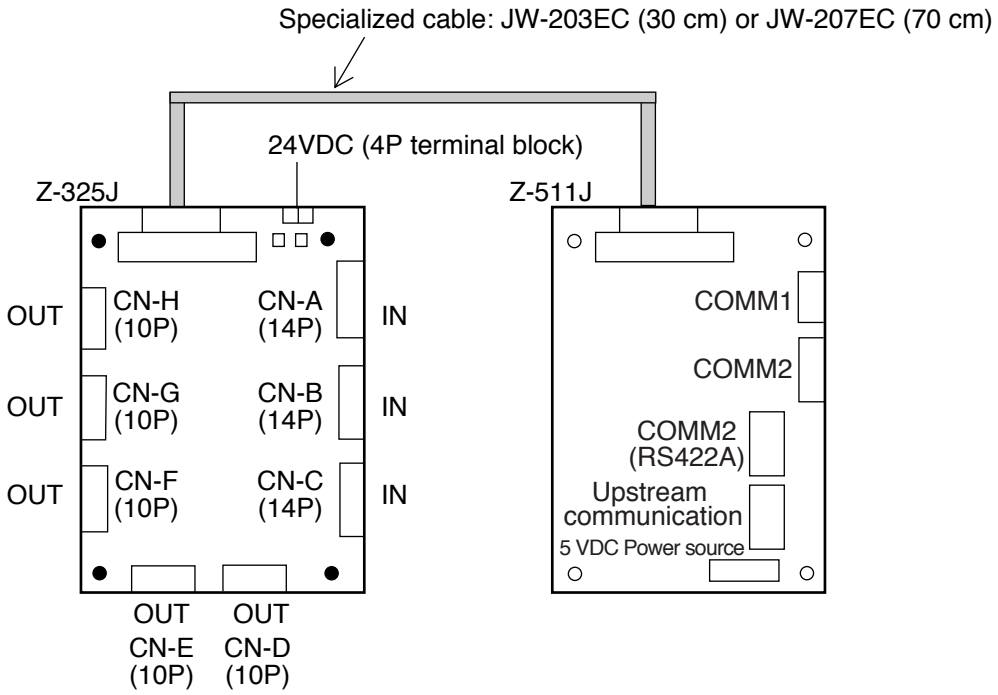
[Fixing halls drilling dimensions]



★ Fixing screw should be prepared by user.

9. The horizontal extension connector

The Z-511J and Z-325J are equipped with a connector for horizontal boards (CN11) in addition to stacking connector (CN10.)
The horizontal arrangement shown below is available.



<Installation limit>

① Several J-boards can be installed under the Z-511J as the stacked installation.

② To connect boards horizontally, an I/O board with a horizontal extension connector should be at the top.

* Only the Z-325J has the horizontal extension connector.

③ The horizontal I/O board cannot be connected the communication board.

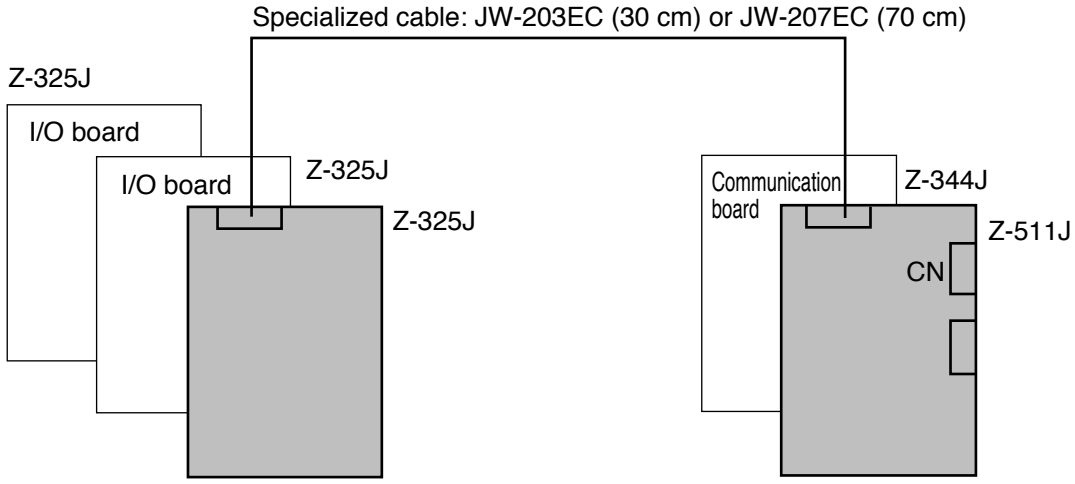
④ Do not set SW1 (RACK NO.) to "0" on the horizontal I/O board.
(Make sure to set 1 to 3.)

⑤ Four input/output boards and three communication board can be connected to the Z-511J, including when arranged horizontally.

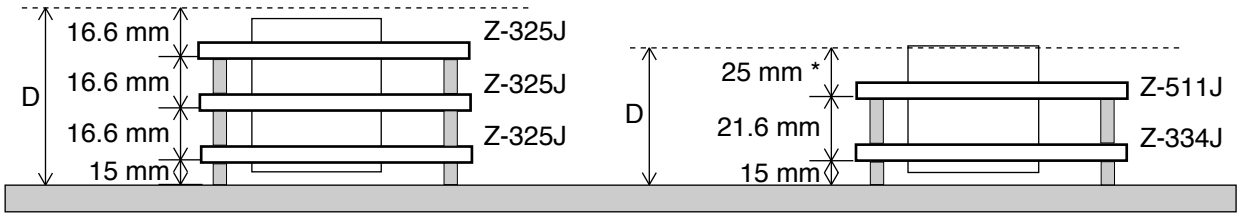
⑥ Be sure to use the specialized cables listed below for the horizontal extension cable.

Model name	Cable length
JW-203EC	30 cm
JW-207EC	70 cm

<Example of a horizontal arrangement>



Dimension D



* Including table connector depth, when horizontal arrangement connector is connected.

Board composition	Measurement D
Z-325J	31.6 mm
Z-325J + Z-325J	48.2 mm
Z-325J + Z-325J + Z-325J	64.8 mm

Board composition	Measurement D
Z-511J	35 mm
Z-511J + Z-334J	56.6 mm

10. Allocation of I/O relay

10-1. Basic description

The I/O relay addresses are assigned using SW1 and SW2 (SWA) on each board, as shown in the table below.

■ SW1 (RACK NO.) settings

The rack numbers are assigned as shown in the table below.

SW1 (RACK NO.) settings			Rack number
	1	OFF	Rack. NO = 0
	2	OFF	
	3	OFF	
	1	ON	Rack. NO = 1
	2	OFF	
	3	OFF	
	1	OFF	Rack. NO = 2
	2	ON	
	3	OFF	
	1	OFF	Rack. NO = 3
	2	OFF	
	3	ON	

■ SW2 (SWA) settings

1: Assigns the first half or last half of a rack. (ON = first half, and OFF = last half.)

★ If you use two communication boards, set the second communication board to "OFF."

2: Set the number of bytes used. (ON = 8 bytes, and OFF = 4 bytes.)

★ Normally, this switch is set to "ON."

SW2 settings			Details
	1	ON	First half 8 bytes occupation *
	2	ON	
	1	ON	First half 4 bytes occupation **
	2	OFF	
	1	OFF	Last half 8 bytes occupation *
	2	ON	
	1	OFF	Last half 4 bytes occupation **
	2	OFF	

* 10 bytes occupation in the case of Z-325J

** 6 bytes occupation in the case of Z-325J

Note 1. Be careful not to set the same number for more than one board with SW1 (RACK No.) and SW2. When multiple boards are allocated on the same I/O, J-board malfunctions.

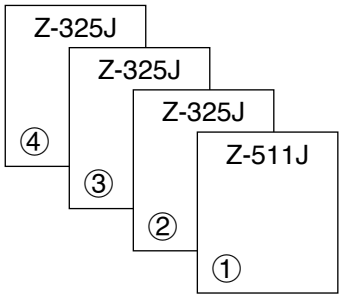
Note 2. When more than one point is turned ON with SW1 (RACK No.), "I/O verify error: Error code 60" occurs.

10-2. I/O relay allocation of Z-511J

Type		Address (OTC)
CM	Dummy	ㅋ.N
CM	Dummy	ㅋ.N+1
Vacant	Dummy	ㅋ.N+2
Vacant	Dummy	ㅋ.N+3
Vacant	Dummy	ㅋ.N+4
Vacant	Dummy	ㅋ.N+5
Vacant	Dummy	ㅋ.N+6
Vacant	Dummy	ㅋ.N+7

10-3. Example for I/O relay allocation

① Vertical arrangement: Z-511J + Z-325J x n (n = max. 3)

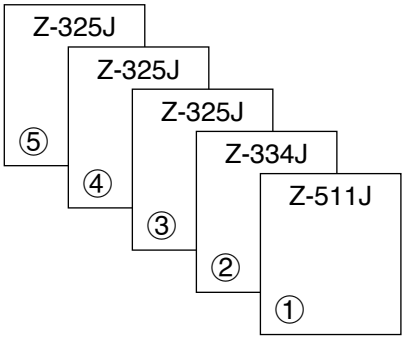


SW setting and I/O relay allocation

Installation	SW1 (RACK NO)	SW2 (SWA)	I/O relay address	Installed address
①	1 2 3	SWA 1 2	ㅋ. 000,001	R = 0, S = 0
			ㅋ. 002,003	R = 0, S = 1
			ㅋ. 004,005	R = 0, S = 2
			ㅋ. 006,007	R = 0, S = 3
②	1 2 3	SW2 1 2	ㅋ. 010,011	R = 1, S = 0
			ㅋ. 012,013	R = 1, S = 0
			ㅋ. 014,015	R = 1, S = 1
			ㅋ. 016,017	R = 1, S = 2
			ㅋ. 020,021	R = 1, S = 3
③	1 2 3	SW2 1 2	ㅋ. 022,023	R = 2, S = 0
			ㅋ. 024,025	R = 2, S = 0
			ㅋ. 026,027	R = 2, S = 1
			ㅋ. 030,031	R = 2, S = 2
			ㅋ. 032,033	R = 2, S = 3
④	1 2 3	SW2 1 2	ㅋ. 034,035	R = 3, S = 0
			ㅋ. 036,037	R = 3, S = 0
			ㅋ. 040,041	R = 3, S = 1
			ㅋ. 042,043	R = 3, S = 2
			ㅋ. 044,045	R = 3, S = 3

■ ON
□ OFF

② Vertical arrangement: Z-511J + Z-334J + Z-325J x n (n = max. 3)

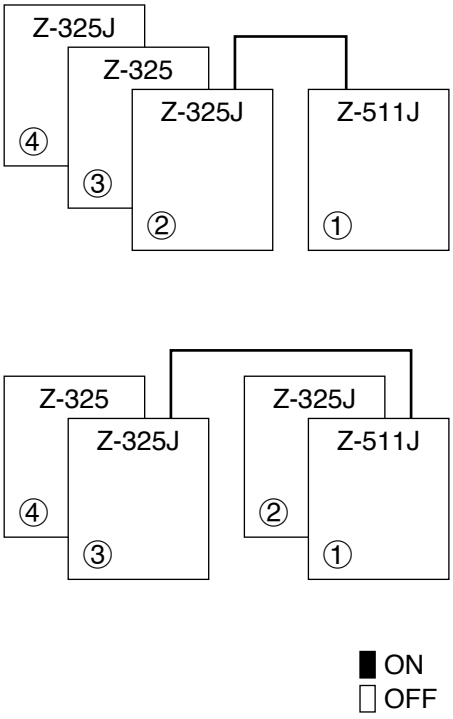


SW setting and I/O relay allocation

Installation	SW1 (RACK NO)	SW2 (SWA)	I/O relay address	Installed address
①	1 2 3	SWA 1 2	ㅋ. 000.001	R = 0, S = 0
			ㅋ. 002,003	R = 0, S = 1
			ㅋ. 004,005	R = 0, S = 2
			ㅋ. 006,007	R = 0, S = 3
②	None	SWA 1 2	ㅋ. 010,011	R = 0, S = 4
			ㅋ. 012,013	R = 0, S = 5
			ㅋ. 014,015	R = 0, S = 6
			ㅋ. 016,017	R = 0, S = 7
③	1 2 3	SW2 1 2	ㅋ. 020,021	R = 1, S = 0
			ㅋ. 022,023	R = 1, S = 0
			ㅋ. 024,025	R = 1, S = 1
			ㅋ. 026,027	R = 1, S = 2
			ㅋ. 030,031	R = 1, S = 3
④	1 2 3	SW2 1 2	ㅋ. 032,033	R = 2, S = 0
			ㅋ. 034,035	R = 2, S = 0
			ㅋ. 036,037	R = 2, S = 1
			ㅋ. 040,041	R = 2, S = 2
			ㅋ. 042,043	R = 2, S = 3
⑤	1 2 3	SW2 1 2	ㅋ. 044,045	R = 3, S = 0
			ㅋ. 046,047	R = 3, S = 0
			ㅋ. 050,051	R = 3, S = 1
			ㅋ. 052,053	R = 3, S = 2
			ㅋ. 054,055	R = 3, S = 3

■ ON
□ OFF

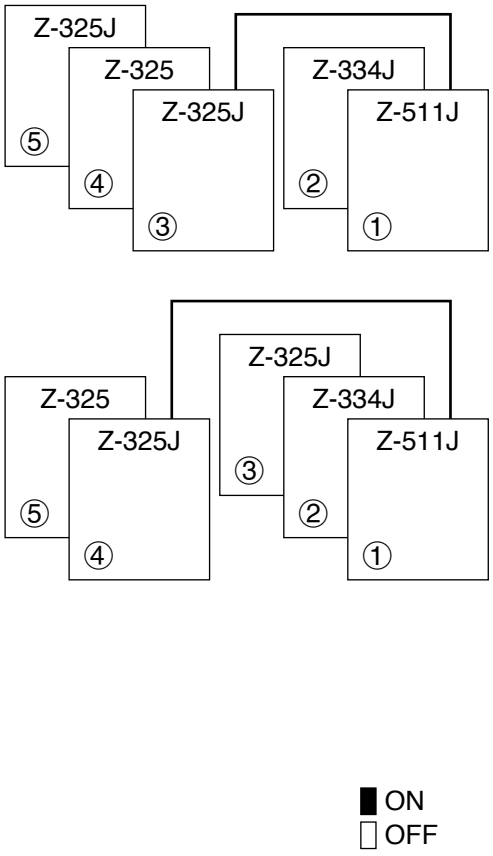
③ Horizontal arrangement: Z-511J + Z-325J x n (n = max. 3)



SW setting and I/O relay allocation

Installation	SW1 (RACK NO)	SW2 (SWA)	I/O relay address	Installed address
①	1 2 3	SWA 1 2	ㅋ. 000,001	R = 0, S = 0
			ㅋ. 002,003	R = 0, S = 1
			ㅋ. 004,005	R = 0, S = 2
			ㅋ. 006,007	R = 0, S = 3
②	1 2 3	SW2 1 2	ㅋ. 010,011	R = 1, S = 0
			ㅋ. 012,013	R = 1, S = 0
			ㅋ. 014,015	R = 1, S = 1
			ㅋ. 016,017	R = 1, S = 2
			ㅋ. 020,021	R = 1, S = 3
③	1 2 3	SW2 1 2	ㅋ. 022,023	R = 2, S = 0
			ㅋ. 024,025	R = 2, S = 0
			ㅋ. 026,027	R = 2, S = 1
			ㅋ. 030,031	R = 2, S = 2
			ㅋ. 032,033	R = 2, S = 3
④	1 2 3	SW2 1 2	ㅋ. 034,035	R = 3, S = 0
			ㅋ. 036,037	R = 3, S = 0
			ㅋ. 040,041	R = 3, S = 1
			ㅋ. 042,043	R = 3, S = 2
			ㅋ. 044,045	R = 3, S = 3

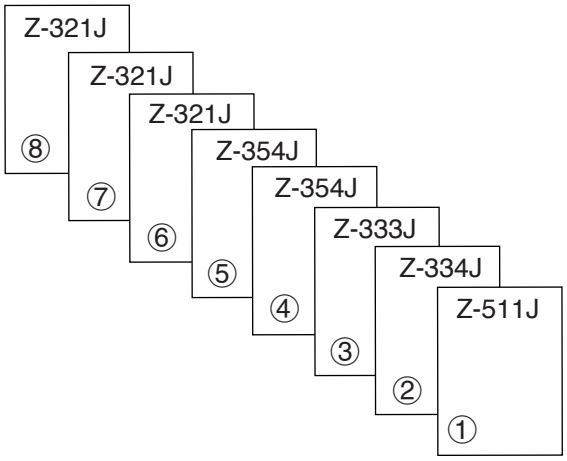
④ Horizontal arrangement: Z-511J + Z-334J + Z-325J x n (n = max. 3)



SW setting and I/O relay allocation

Installation	SW1 (RACK NO)	SW2 (SWA)	I/O relay address	Installed address
①	1 2 3	SWA 1 2	ㅋ. 000.001	R = 0, S = 0
			ㅋ. 002,003	R = 0, S = 1
			ㅋ. 004,005	R = 0, S = 2
			ㅋ. 006,007	R = 0, S = 3
②	None	SWA 1 2	ㅋ. 010,011	R = 0, S = 4
			ㅋ. 012,013	R = 0, S = 5
			ㅋ. 014,015	R = 0, S = 6
			ㅋ. 016,017	R = 0, S = 7
③	1 2 3	SW2 1 2	ㅋ. 020,021	R = 1, S = 0
			ㅋ. 022,023	R = 1, S = 0
			ㅋ. 024,025	R = 1, S = 1
			ㅋ. 026,027	R = 1, S = 2
			ㅋ. 030,031	R = 1, S = 3
④	1 2 3	SW2 1 2	ㅋ. 032,033	R = 2, S = 0
			ㅋ. 034,035	R = 2, S = 0
			ㅋ. 036,037	R = 2, S = 1
			ㅋ. 040,041	R = 2, S = 2
			ㅋ. 042,043	R = 2, S = 3
⑤	1 2 3	SW2 1 2	ㅋ. 044,045	R = 3, S = 0
			ㅋ. 046,047	R = 3, S = 0
			ㅋ. 050,051	R = 3, S = 1
			ㅋ. 052,053	R = 3, S = 2
			ㅋ. 054,055	R = 3, S = 3

⑤ Portrait arrangement: Z-511J +Z-334J +Z-333J +Z-354J +Z-354J +Z-321J +Z-321J +Z-321J



Switch setting and I/O relay allocation

Mounting	SW1 (RACK NO)	SW2 (SWA)	I/O relay address	Installed address
①	1 2 3 ■ □ □	1 2 ■ ■	⊐0000, 0001	R = 1, S = 0
			⊐0002, 0003	R = 1, S = 1
			⊐0004, 0005	R = 1, S = 2
			⊐0006, 0007	R = 1, S = 3
②	None	1 2 ■ ■	⊐0010, 0011	R = 0, S = 0
			⊐0012, 0013	R = 0, S = 1
			⊐0014, 0015	R = 0, S = 2
			⊐0016, 0017	R = 0, S = 3
③	None	1 2 □ ■	⊐0020, 0021	R = 0, S = 4
			⊐0022, 0023	R = 0, S = 5
			⊐0024, 0025	R = 0, S = 6
			⊐0026, 0027	R = 0, S = 7
④	1 2 3 ■ □ □	1 2 □ ■	⊐0030, 0031	R = 1, S = 4
			⊐0032, 0033	R = 1, S = 5
			⊐0034, 0035	R = 1, S = 6
			⊐0036, 0037	R = 1, S = 7
⑤	1 2 3 □ ■ □	1 2 ■ ■	⊐0040, 0041	R = 2, S = 0
			⊐0042, 0043	R = 2, S = 1
			⊐0044, 0045	R = 2, S = 2
			⊐0046, 0047	R = 2, S = 3
⑥	1 2 3 □ ■ □	1 2 □ ■	⊐0050, 0051	R = 2, S = 4
			⊐0052, 0053	R = 2, S = 5
			⊐0054, 0055	R = 2, S = 6
			⊐0056, 0057	R = 2, S = 7
⑦	1 2 3 □ □ ■	1 2 ■ ■	⊐0060, 0061	R = 3, S = 0
			⊐0062, 0063	R = 3, S = 1
			⊐0064, 0065	R = 3, S = 2
			⊐0066, 0067	R = 3, S = 3
⑧	1 2 3 □ □ ■	1 2 □ ■	⊐0070, 0071	R = 3, S = 4
			⊐0072, 0073	R = 3, S = 5
			⊐0074, 0075	R = 3, S = 6
			⊐0076, 0077	R = 3, S = 7

■ ON

□ OFF

11. ROM operation

The ROM operation is a method of operating the Z-511J by the content of the ROM, by storing the system memory or user program in the flash ROM, and transferring from the ROM to the RAM.
Saving of a program and more in the ROM is available, as the contents of the ROM do not disappear after turning OFF the power.
ROM operation is convenient for the following systems:

- Operation frequency is low.
- No alternation of program and system memory.
- Requires registering or loading programs quickly.

With Z-511J series, flash ROMs are installed in the control module and so all the control module are possible ROM operation.

(1) ROM operation method

The ROM operation is available in four types as shown in the table below, depending on the setting value in the system memory #255. Set #255 depending on the use. (initial value is 000 OCT)

Setting value		Transfer ROM to RAM (when power is ON)	Data memory after data transfer when power is ON.	Mode after data transfer when power is ON.	Transfer ROM to RAM using a tool.
OCT	HEX				
000	00	No	—	—	Available
021	11	Yes	Hold	Mode when the power is OFF.	Available
042	22	Yes	Clear*	Stop	Available
104	44	Yes	Clear*	Run	Available

* The stored data in the ROM is maintained.

Note 1: A battery is necessary even in ROM operation.

Note 2: Before transfer data from the ROM to the RAM (when the power is ON, or using a tool), make sure turn OFF the protect switch.

(2) Registerable contents to ROM

Areas that can be registered ROM is decided by setting value of system memory #256. (Initial value is 200OCT.)

Setting value		Registerable contents to ROM				
OCT	HEX	System memory	Program	Register	File 1	File 2
200	80	#200 to 2177	Yes	No	No	No
201	81	#200 to 2177	Yes	8K bytes *1	No	No
202	82	#200 to 2177	Yes	No	16K bytes	64K bytes *2
203	83	#200 to 2177	No	8K bytes *1	No	No
204	84	#200 to 2177	No	No	16K bytes	64K bytes *2
205	85	#200 to 2177	Yes	8K bytes *1	16K bytes	No
206	86	#200 to 2177	No	8K bytes *1	16K bytes	64K bytes *2

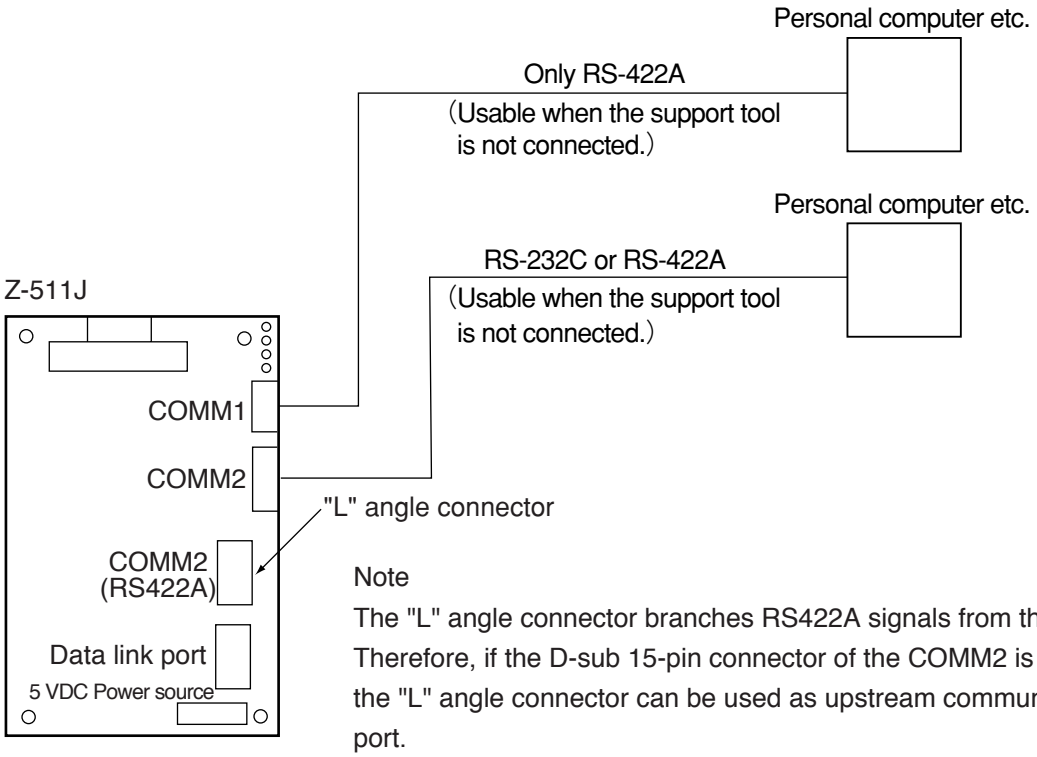
*1: 8 K bytes from 09000 to 99777 and E0000 to #57777. Area E6000 to E7777 cannot be stored in the ROM.

(3) Writing in a flash ROM

By the writing operation by the hand-held programmer JW-13PG or the ladder software JW-92SP / JW-52SP, the program can be written into flash ROMs of control modules.
See instruction manual of respective support tool for operation.

12. Upstream communication port

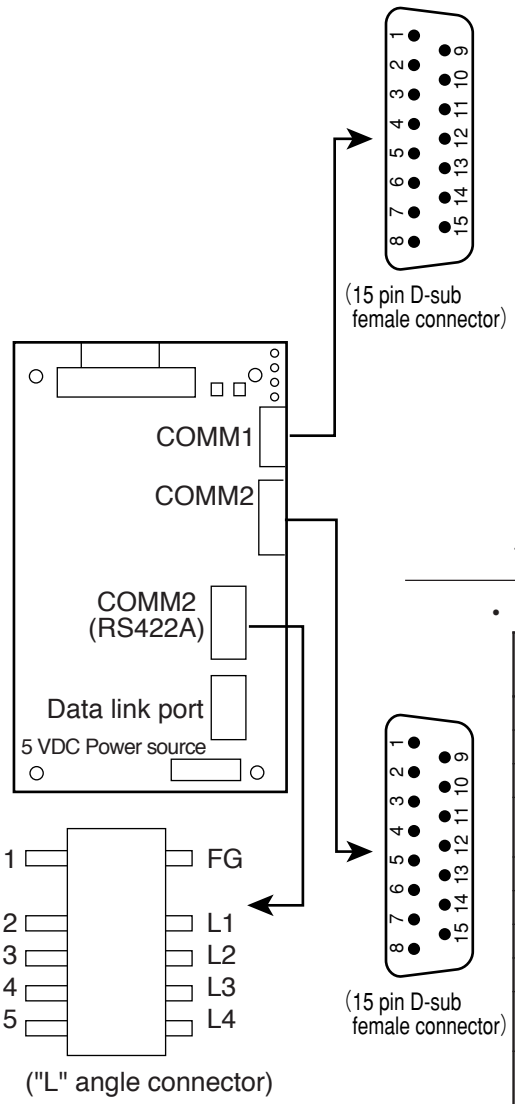
J-board Z-511J has upstream communication ports (communication port) (PG/ COMM1,PG/ COMM2). The communication port can communicate with connected device having the I/O port of RS-232C/422A of host computer, such as personal computer.
It can communicate the same as SHARP's computer link. When the support tool is not used, one set of control module can have two channels of communication port, and two systems such as personal computer and liquid crystal control terminal can be connected.



Note
The "L" angle connector branches RS422A signals from the COMM2. Therefore, if the D-sub 15-pin connector of the COMM2 is not used, the "L" angle connector can be used as upstream communication port.

Name	Function
COMM1 lamp (orange)	• Flickers during communication by connecting PG/COMM1 port and personal computer, etc.
COMM2 lamp (orange)	• Flickers during communication by connecting PG/COMM2 port and personal computer, etc.
PG/COMM1 port (Only the RS-422A)	• Connect with support tool. Usable as communication port (RS-422A only) when the support tool is not used.
PG/COMM2 port (RS-232C/422A)	• Connect with support tool. Usable as communication port (RS-232C/422A) when the support tool is not used.

[1] Pin arrangement of PG/COMM1 port, PG/COMM2 port



• PG/COMM1 port

Pin No.	Signal name	Contents	Signal
1	FG	Outside body grounding	---
2	---	*	
3	TxDA	Sending data (PLC to personal computer)	RS-422A
4	---	*	---
5	RTS(-)		RS-422A
6	SG	Signal grounding	---
7	SG	Signal grounding	
8	---	*	
9	RxDA	Receiving data (Personal computer to PLC)	RS-422A
10	RxDB	Receiving data (Personal computer to PLC)	
11	TxDB	Sending data (PLC to personal computer)	
12	---	*	---
13	RTS(+)		RS-422A
14	+5V		---
15	+5V		

*: Not connected with pin No. 2, 4, 8, and 12.

• PG/COMM2 port

Pin No.	Signal name	Contents	Signal
1	FG	Outside body grounding	-
2	SD	Sending data (PLC to personal computer)	RS-232C
3	TxDA	Sending data (PLC to personal computer)	RS-422A
4	RD	Receiving data (Personal computer to PLC)	RS-232C
5	RTS(-)		RS-422A
6	SG	Signal grounding	–
7	SG	Signal grounding	
8	RTS	ON while PLC is supplied power source	RS-232C
9	RxDA	Receiving data (Personal computer to PLC)	RS-422A
10	RxDB	Receiving data (Personal computer to PLC)	
11	TxDB	Sending data (PLC to personal computer)	
12	CTS	ON: Available sending, OFF: Ban sending	RS-232C
13	RTS(+)		RS-422A
14	+5V		-
15	+5V		

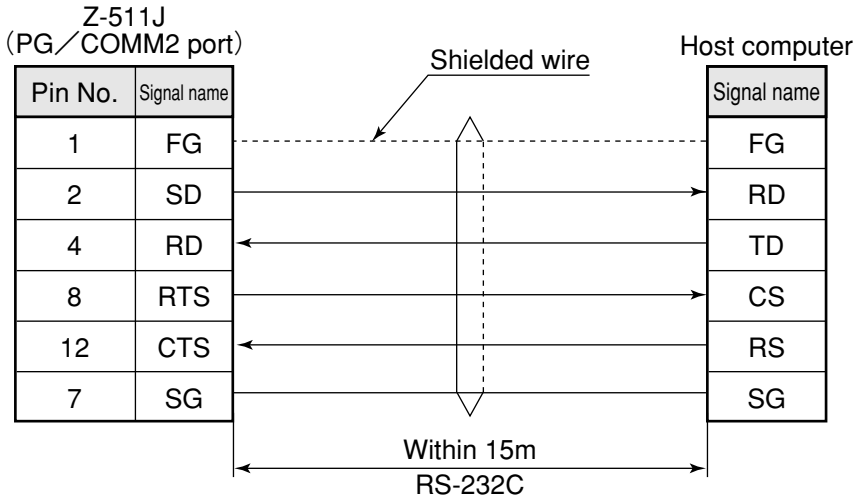
• COMM2 port

Pin number	Signal name	Description	Signal
1	FG	Connect to the shield	-
2	TxDA	Sending data (PLC to personal computer)	RS422A
3	TxDB	Sending data (PLC to personal computer)	RS422A
4	RxDA	Receiving data (Personal computer to PLC)	RS422A
5	RxDB	Receiving data (Personal computer to PLC)	RS422A

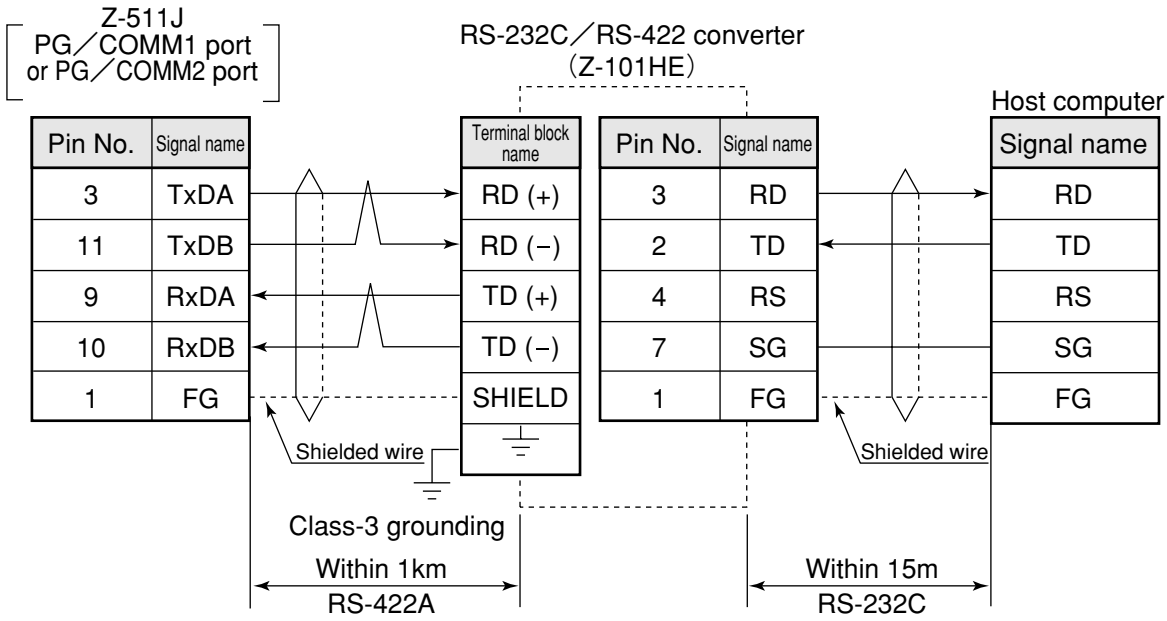
[2] Wiring diagrams

(1) When using RS-232C for communication method of host computer side.

Be within 15m for the total length of a communication cable.

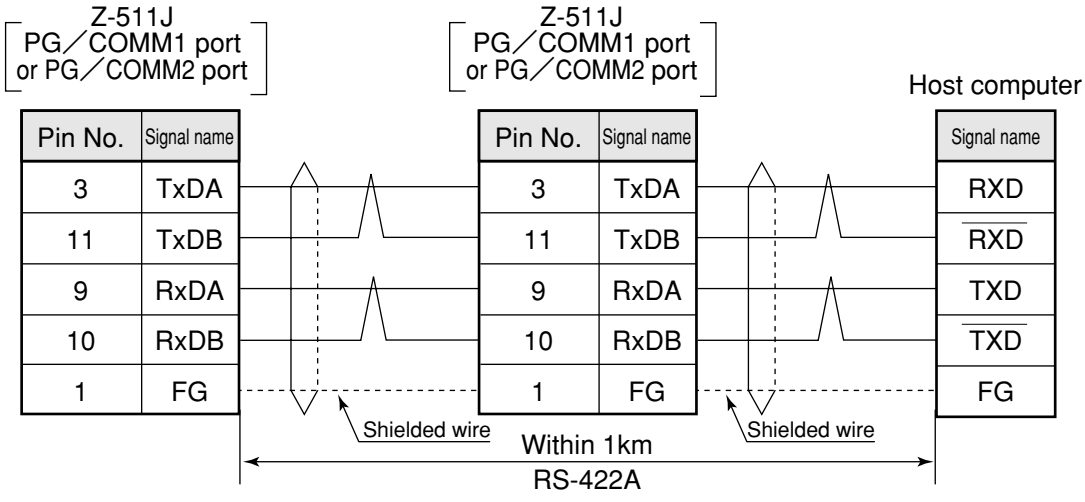


Use the RS-232C/RS-422 converter, such as Z-101HE, when the total length of the communication cable is over 15m.



(2) When using RS-422A for communication method

Be within 1km for the total length of a communication cable.



[3] Setting of Z-511J system memory

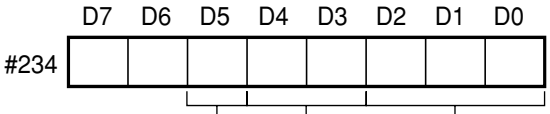
Set system memory #234/#235 (communication port 1) and #236/#237 (communication port 2) for communication conditions when communicating with a personal computer.

System memory number	Description	
#234	Transfer rate, parity, stop bit	Set communication port 1 (PG/COMM1 port)
#235	Station No. 001 to 037_{OCT}	
#236	Transfer rate, parity, stop bit	Set communication port 2 (PG/COMM2 port)
#237	Station No. 001 to 037_{OCT}	

(1) Setting of communication port 1 (PG/COMM1 port)

① Setting of system memory #234

Specify transfer rate, parity, and stop bit as ON (1) / OFF(0) of D0 to D5.



Stop bit

D5	Stop bit
0	1 bit
1	2 bits

Parity

D4	D3	Parity
0	0	None
0	1	Add
1	0	Even
1	1	——

Transfer rate

D2	D1	D0	Transfer rate (bits/s)
0	0	0	19200
0	0	1	9600
0	1	0	4800
0	1	1	2400
1	0	0	1200
1	0	1	115200
1	1	0	57600
1	1	1	38400

Data is fixed to 7 bits.

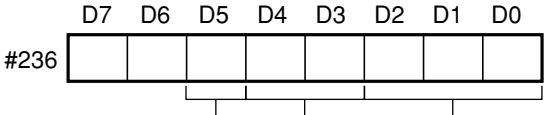
② Setting of system memory #235

Set station No., 001 to 037_{OCT} to communicate.

(2) Setting of communication port 2 (PG/COMM2 port)

① Setting of system memory #236

Specify transfer rate, parity, and stop bit as ON (1) / OFF(0) of D0 to D5.



Stop bit

D5	Stop bit
0	1 bit
1	2 bits

Parity

D4	D3	Parity
0	0	None
0	1	Add
1	0	Even
1	1	——

Transfer rate

D2	D1	D0	Transfer rate (bits/s)
0	0	0	19200
0	0	1	9600
0	1	0	4800
0	1	1	2400
1	0	0	1200
1	0	1	115200
1	1	0	57600
1	1	1	38400

Data is fixed to 7 bits.

② Setting of system memory #237

Set station No., 001 to 037_{OCT} to communicate.

[4] Communicate with a personal computer

The following instructions are available for communicating between the Z-511J and a personal computer. There are three type of command; read out command, write command and control command.

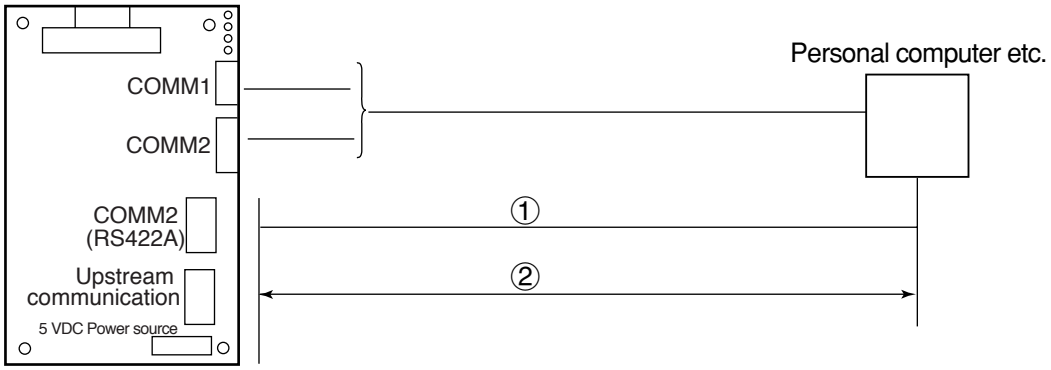
Command	Contents
Read out command	Messages that a personal computer transmits to the Z-511J when it reads out data from the Z-511J.
Write command	Messages that a personal computer transmits to the Z-511J when it reads out data from the Z-511J.
Control command	Messages that a personal computer transmits to the Z-511J when it reads out data from the Z-511J.

As for the detail of each command, see "List of commands," and "Computer link" section of user's manual of link module JW-21CM.

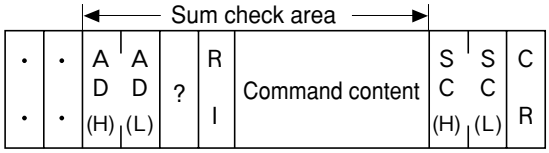
(1) Communication format

When a command from a personal computer is received, the communication port of Z-511J operates according to the received command, and sends a response. When an error occurs while processing, it returns an error response.

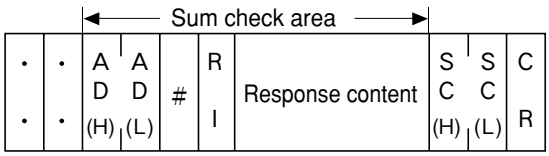
Z-511J



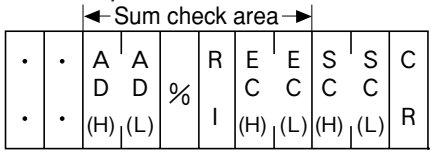
① Communication format of command (personal computer to Z-511J)



② Communication format of response (Z-511J to personal computer)



Error response where an error occurs



[Details of communication format]

	Data	Code used (ASCII character)	Description
*	AD (H) AD (L)	00 to 37_{OCT}	Station No. - In command, the station no. to be received command. - In response, the station no. to send response.
	RI	0 to F_{HEX}	Response time (Set the time from receiving a command to responding. See page 35.)
*	SC (H) SC (L)	00 to FF_{HEX}	Sum check code (Search the mistake of transfer data. Refer to next page.)
*	EC (H) EC (L)	01 to $1B_{HEX}$	Error code (Indicate error content. Refer to the follows)

Identification symbol	ASCII code	Description
: (colon)	$3A_{HEX}$	Header (Indicates beginning of command and response).
? (question)	$3F_{HEX}$	Indicates commands.
# (number mark)	23_{HEX}	Indicates response (at normal).
% (percent)	25_{HEX}	Indicates response (at error).
CR (carriage return)	$0D_{HEX}$	Termination mark (Indicates termination of a command and response).

* (H) indicates upper digit, (L) indicates lower digit.

• Details of error code

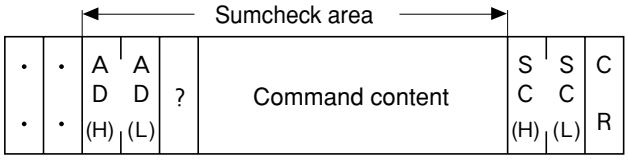
Error code ($EC_{(H)}$, $EC_{(L)}$)	Description
01	Format error
02	Designated address is not TMR/CNT setting value
05	Number of transfer bytes is not correct
06	PLC does not stop by HLT (stop PLC processing)
07	Writing to PLC memory is not executed correctly
08	Memory capacity, file capacity is full
0A	Parity error
0B	Framing error
0C	Overrun error
0D	Sum check error
0E	Prohibit program memory write (memory protection switch "ON")
0F	Other CPU is accessing memory
10	Not match write mode
11	Not program area
12	Tried to write in ROM
1B	System memory error
30	A password is not yet registered.
31	The secret mode is not released.
32	Password register error. (Tried to register other than alphabetical and numerical figures.)
33	The secret mode is not released.

- **Sum check code SC (H), SC (L)**

  The communication port detects error using sum check as well as party check in order to increase the reliability.

  1) Sum check area (See page 32)

  [Example] Command



  2) Check method

  1. Add data from station No. to the last data of the command contents or response contents (just before sum check code) that are summed up in ASCII code.
  2. Convert the sum check code (2 digits hexadecimal) to 8 bits data and add 1) to the result. When the grand total is "0" (disregarded figure up), the message is regarded as correct. When the grand total is not "0," the message is regarded as an error.

  3) Produce method

  1. Add data from station No. to the last data of the command contents or response contents (just before sum check code) that are summed up in ASCII code.
  2. Operate complement number of 2 of the result of 1.

     Complement number of 2: Turn over all the bits indicated by the binary system (0 to 1, 1 to 0) and add 1.

     [Example] The complement number of 2 of $4E_{HEX}$ is $B2_{HEX}$

     4E → 01001110

     ↓ invert each bit

     10110001

     ↓ add 1

     10110010 → $B2_{HEX}$

  3. Divide upper 4 bits and lower 4 bits and convert them to ASCII code.

     When sum check is not necessary, setting @ in the command line.

- **Response time RI**

When a personal computer is interpreter system, it executes programs one by one while interpreting. This personal computer may not have finished its process before receiving the response from the Z-511J. As a countermeasure, set response time RI of command (max. 600ms).

$RI_{(HEX)}$	Response time (ms)	$RI_{(HEX)}$	Response time (ms)
0	0	8	80
1	10	9	90
2	20	A	100
3	30	B	200
4	40	C	300
5	50	D	400
6	60	E	500
7	70	F	600

As the Z-511J accesses memories after one operation cycle, the actual response time is the total of setting value of RI in command and the waiting time of one operation cycle.

[Reference] Setting response time RI

It is difficult to recommend the optimum response time, as the optimum response time is varied depending on the model of personal computer, the programming language and the system program. First, set a fairly long time, then, shorten gradually.

Note

There are some limitations for the number of bytes to handle by commands and for the communication buffer of personal computers. Be careful for the number of bytes to handle and communication buffers.

(2) Write mode

Write mode of PLCs are "mode 0" (write prohibited for all memories) at power ON. Prior to writing program from the personal computer, change write mode to "mode 1" or "mode 2" using EWR command (setting of write mode). SWE command can be used to read out current status of writing mode.

Set write mode to "mode 0" as much as possible, except when writing date into PLC. Each mode has restrictions as follow:

Mode 0	Write prohibited for all memories
Mode 1	Write enable only for data memory
Mode 2	Write enable for all memories

Note

Turn OFF control module protect switch (write allowed) before executing write commands and change to write mode 2 using EWR command.

Each command can be executed in the write mode or when the PLC is in the following state.

○ : Executable × : Non-executable

Function		Command name	Write mode			PLC status	
			0	1	2	Stopped by HLT command	Run
Read-out command	Relay monitor	MRL	○	○	○	○	○
	Current value monitor of timer/counter/MD	MTC	○	○	○	○	○
	Register current value monitor	MRG	○	○	○	○	○
	Read out register of file 1	RFL	○	○	○	○	○
	Read out register of file 0 to 3	RFLF	○	○	○	○	○
	Read out register of file 00 to 03, 10 to 2C	(Note)RFLE	○	○	○	○	○
	Read out parameter of special I/O module	RPSR	○	○	○	○	○
		RPS	○	○	○	○	○
	Read out parameter of option module	RPO	○	○	○	○	○
	Read out system memory	RSM	○	○	○	○	○
	Read out program memory	RPM	○	○	○	○	○
	Read out date	MDY	○	○	○	○	○
	Read out time	MTM	○	○	○	○	○
Write command	Set/reset relay	SRR	×	○	○	○	○
	Set/reset timer/counter	SRT	×	○	○	×	○
	Write in register	WRG	×	○	○	○	○
	Write the same data in register	FRG	×	○	○	○	○
	Write in register of file 1	WFL	×	○	○	○	○
	Write in register of file 0 to 3	WFLF	×	○	○	○	○
	Write in register of file 00 to 03, 10 to 2C	(Note)WFLE	×	○	○	○	○
	Write in parameter of special I/O module	WPSR	×	×	○	○	×
		WPS	×	×	○	○	×
	Write in parameter of option module	WPO	×	×	○	○	×
	Write in system memory	WSM	×	×	○	○	×
	Write in program memory	WPM	×	×	○	○	×
	Change setting value of timer/counter	CTC	×	×	○	○	○
	Set date	SDY	×	○	○	○	○
	Set time	STM	×	○	○	○	○
	Set time revision	ACL	×	○	○	○	○
Control command	Stop operation	HLT	○	○	○	○	○
	Restart operation	RUN	○	○	○	○	○
	Monitor operation conditions	MPC	○	○	○	○	○
	Read memory capacity	VLM	○	○	○	○	○
	Read out write mode status	SWE	○	○	○	○	○
	Set write mode	EWR	○	○	○	○	○
	Turn back the message	TST	○	○	○	○	○
	Release secret/password registration	PAS	*1	*1	○	○	*1
	Set secret function	SES	*2	*2	○	○	*2
	Check secret function	SEI	○	○	○	○	○

*1: When data of command is 0, then, ○. When data command is 1 or 2, then ×.

*2: When data of command is 0, then, ○. When data command is F, then ×.

(3) Address expression system

In each command, the setting value in the following table is set in the address module of communication format.

		Address (octal)	Setting value (octal)	Using command
Relay number		00000 to 15777 20000 to 75777	00000 to 15777 20000 to 75777	MRL, SRR
Timer/counter point of contact number		T0000 to T1777 C0000 to C1777	T0000 to T1777	MRL
Timer/counter number		0000 to 1777	0000 to 1777	MTC, SRT
MD number		000 to 777	0000 to 1777	MTC
Register address		ㅋ0000 to ㅋ1577 ㅋ2000 to ㅋ7577 b0000 to b1777 b2000 to b3777 09000 to 09777 19000 to 19777 29000 to 29777 39000 to 39777 49000 to 49777 59000 to 59777 69000 to 69777 79000 to 79777 89000 to 89777 99000 to 99777 E0000 to E7777	A0000 to A1577 B2000 to A7577 B0000 to B1777 B2000 to B3777 09000 to 09777 19000 to 19777 29000 to 29777 39000 to 39777 49000 to 49777 59000 to 5977 69000 to 69777 79000 to 79777 89000 to 89777 99000 to 99777 E0000 to E7777	MRG, WRG, FRG
File register address	File 0	000000 to 035777	000000 to 035777	RFL, RFLF, RFLE WFL, WFLF, WFLE
	File 1	000000 to 037777	000000 to 037777	
	File 2, 3	000000 to 177777	000000 to 177777	
	File 10 to 2C	000000 to 177777	000000 to 177777	
Special I/O module parameter address		000 to 177	0000 to 0177	RPSR, RPS WPSR, WPS
Option module parameter address		00 to 77	0000 to 0077	RPO, WPO
System memory address		#0000 to #2177	0000 to 2177	RSM, WSM
Program address	Z-511J(15.5K words)	00000 to 36777	000000 to 036777	RPM, WPM, CTC

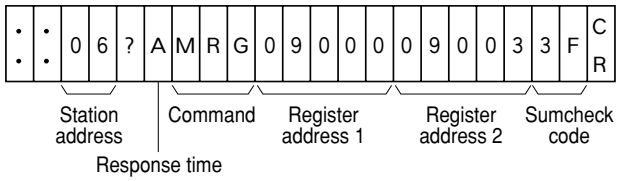
(4) Data expression system

Data are expressed by hexadecimal. Program contents are also expressed by hexadecimal based on machine language. Contents of bit configuration of program memory is not available.

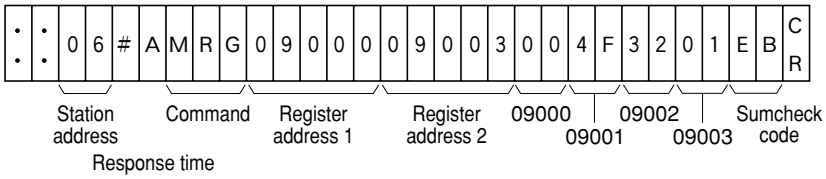
(5) Example of communication (monitor current value of register)

Monitor from 09000 to 09003 of PLC06. (Response time : 100 ms)

■ Command



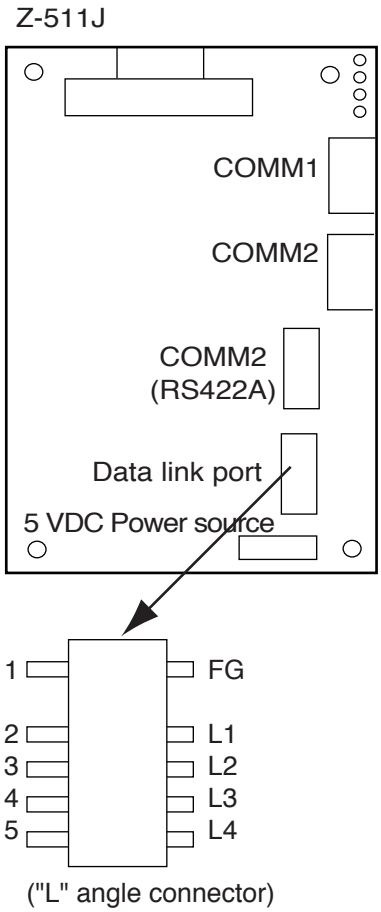
■ Response



13. Data link port

The Z511J consists of a CPU section and a data link section. This data link section is identical to the communication board Z-332J. However, it is compatible with the 4-wire system.

(1) Arrangement of data link ports



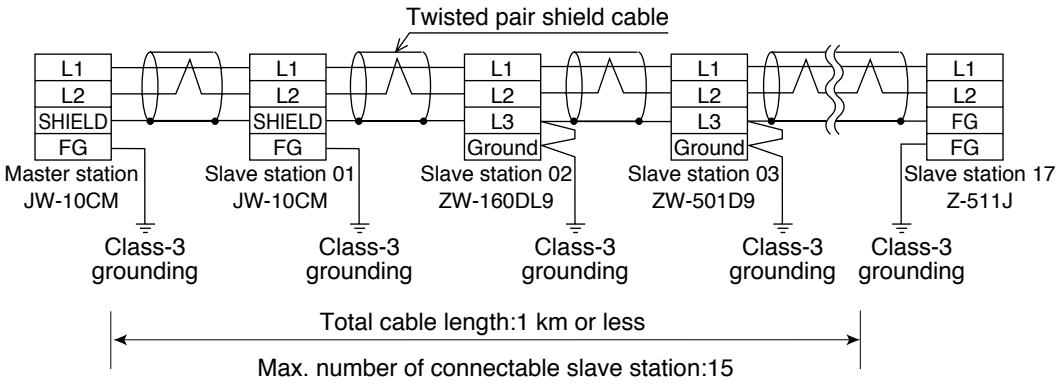
("L" angle connector)

- Data link port (compatible with the 4-wire system)

Pin number	Signal name	Description	Signal
1	FG	Connect to the shield	-
2	L1	Sending data (PLC to personal computer)	RS422A
3	L2	Sending data (PLC to personal computer)	RS422A
4	L3	Receiving data (Personal computer to PLC) (4-wire system only)	RS422A
5	L4	Receiving data (Personal computer to PLC) (4-wire system only)	RS422A

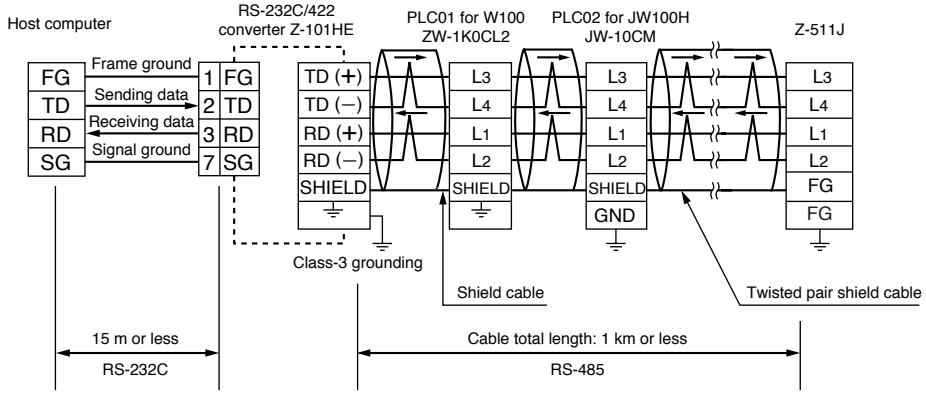
(2) Connection examples

a. When the Z-511J is used as a data link slave station

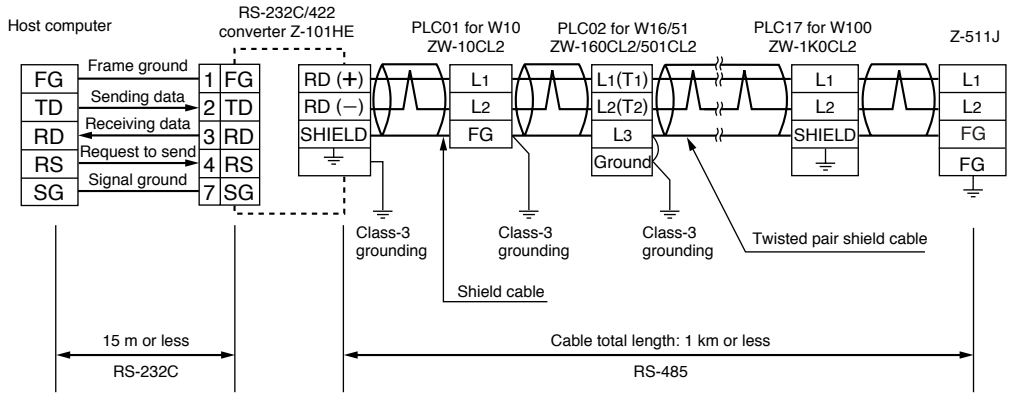


b. When the Z-511J is used as in computer link mode

- 4-wire system



- 2-wire system



(3) How to use the data link port

For specific details about using the data link port, see the "JW21CM User's Manual" and the "Commu nication board: Z-331J/332J/333J User's Manual."

14. Items the user must supply

Please supply the following parts yourself.

Connectors for the upstream communication port and power line.

Connector number	Connector name	Mfg.	Applicable connector
CN5	Upstream communication port	Molex	CN: 5265-N, Terminal: 2578G
CN4	Data link port	Molex	CN: 5265-N, Terminal: 2578G
CN3	5V DC power	Molex	CN: 51102-0500, Terminal: 50351-8100

SHARP MANUFACTURING SYSTEMS CORPORATION

♦ Information about Sharp image sensor camera and programmable controller is available at our internet homepage

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