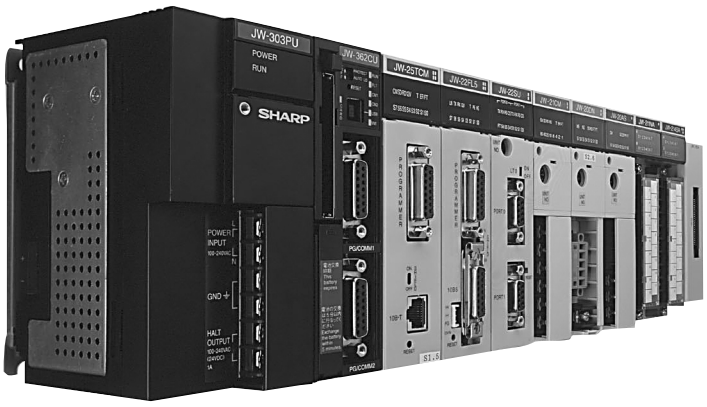
SHARP

Version 1.0
Produced in Nov. 2003

Sharp Programmable Controller

New Satellite *JW300*

User's Manual - Hardware version



We thank you for your purchase of the SHARP programmable controller JW300.
This booklet (user's manual, hardware version) explains mainly the JW300's hardware; the system configuration, specifications, installation method etc.
Carefully read this user's manual, hardware version and the instruction manual attached to each module so that you are able to operate JW300 properly, having thoroughly familiarized yourself with the functions of the system module and their operation method.
As for the description concerning software factors such as instruction words of the JW300, please refer to the JW300 programming manual ladder instruction version.

Precautions

- When you plan to use SHARP programmable controllers (hereafter referred to as "PLCs"), you are requested to design each system so that even if a fault or malfunction occurs within the PLC, it will not lead to a serious accident in your system. You should incorporate back-up measures and fail-safe features in your system that will thoroughly protect your system from malfunctions if a fault or error occurs in the PLC.
- SHARP PLCs are designed and manufactured with the idea that they will be used in general applications in ordinary industries. Therefore, they must not be used in specific applications that can affect the health or safety of the public, such as nuclear power plants and other power generating plants. Such applications require a special warranty of quality that SHARP explicitly does NOT offer for these PLCs. However, if a user will certify that he/she does not requires a special quality warranty on the PLC, and will limit the use of the PLC to non critical areas of these applications, SHARP will agree to such use.
  If you are planning to use SHARP PLCs for applications that may affect the lives of human beings and property, and you need particularly high reliability performance, such as in the fields of aviation, medicine, transportation, combustion and fuel processing equipment, passenger cars, amusement park rides, and safety equipment, please contact our sales division so that we can confirm the required specifications.

Notes

- Though this manual is produced with the almost care, if you have any questions and inquiries, please feel free to contact our dealers.
- The whole or partial photocopy of this booklet is prohibited.
- Contents of this booklet may be revised for improvement without notice.

Safety precautions

Read this manual and attached documents carefully before installation, operation, maintenance and checking in order to use the machine correctly. Understand all of the machine knowledge, safety information, and cautions before starting to use. In this instruction 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 or light injury.

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 don'ts. 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 instruction 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 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 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 supplied or you may have on electric shock.
- Assemble the emergency stop circuit and interlock circuit outside of the programmable controller. Otherwise breakdown or accident damage of the machine may be caused by the trouble of the programmable controller.

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

- Never connect battery in wrong polarity, or charge, disassemble, heat, throw into fire, or short-circuit. Or it may be broken or ignited.
- Do not subject the battery to impact of any kind. Do not pull on the lead wires of the battery, or liquid leakage accident may occur.

Prohibit

- Don’t disassemble or modify the modules.
  Or fire, breakdown or malfunction may be caused.

Caution

- Turn OFF the power source before detaching or attaching the module.
  Or electric shock, malfunction or breakdown may be caused.
- Replace with the fuses in specified ratings only.
  Or electric shock, malfunction may be caused.

Table of contents

Chapter 1. Outline

The New Satellite JW300 series are high-speed, high-performance programmable controllers for medium and large-scale control systems. These are high-level models of the JW30H series.

■ Features

(1) High-speed processing and large memory capacity

- High processing speeds of 33 ns for basic instructions, and 132 ns for application instructions (The overall processing speed will be approximately 20% faster than our conventional JW30H model.)
- Large, 25 K-word maximum capacity for program memory and 8 M-bytes maximum for file registers (both approximately 4 times larger than that of the JW30H).

(2) Compatible with memory cards

- Programs and parameters can be backed up on CF cards.
- Extensions to file memory, logging data, etc. can be stored on SRAM cards.

(3) Equipped with a USB port

The JW300 can exchange commands and data with PCs, at high speeds, through its USB port.

(4) Equipped with three ports for communication

There are two ports on the control module (one port on the JW-311CU/312CU) and one port on the I/O bus expansion adapter (JW-32EA), which can be used for communication. These make it easy to connect to a control terminal or image sensor camera.

(5) Structured programs / block operation

- You can separate the programs that run on the JW300 into a few blocks so that the PLC can operate various machines independently, for trial operations and other purposes.
- Each program block can be further separated into sub programs to save programming effort. This will make it possible to design some programs in parallel. These sub programs can be handled as standardized modules and can be reused.

(6) Built in faulty equipment diagnosis function

Just program relay numbers and monitor times and the PLC can monitor facilities. This feature makes for significant savings in writing ladder programs and for detecting errors.

(7) A variety of models

- Ten control module models are available. You can choose the one that best matches your system's control scale and budget.
- All of the I/O modules and special I/O modules available for the JW20H/30H series can be used with the JW300. Optional modules for the JW20H/30H also can be used if they are labeled as "compatible with the JW300."
- A Windows version of our ladder logic programming software, the JW-300SP, is available to support editing of structured programs.
  The JW-15PG hand-held programmer is available to modify and monitor programs on site.

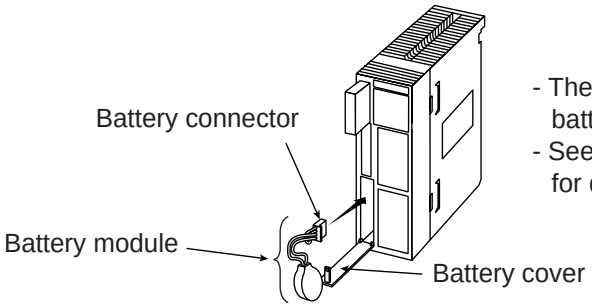
(8) Compatible with various open networks

The JW300 series is Ethernet compatible for communication, FL-net compatible for control, and DeviceNet compatible for the field. It is also AS-I compatible for sensor applications. These devices can exchange data with various layers, without any barriers.

Chapter 2. Precautions for use

(1) Battery

When delivered, the memory backup batteries in the JW300 control modules (JW-311CU through 362CU) are disconnected. Before using a control module, make sure to connect the battery module to the control module, clear the memory and set the time for the clock.



- The battery module is stored under the battery cover when delivered.
- See section 8-3. "Battery" in this manual, for details about battery life.

(2) Option modules

- If you will be using any of the option modules below, make sure to confirm that they are compatible with the JW300 series.
  JW-21CM, JW-22CM, JW-21MN, JW-255CM, JW-25TCM, JW-20FL5, JW-20FLT, JW-22FL5, JW-22FLT, JW-22SU and JW-25CM.
- The JW300 will not work with option modules that are not specified as compatible with the JW300 series.
- JW300 compatible modules are stuck with 300 mark at their front side.

(3) Installation

Avoid keeping the JW300 in the following conditions:

- Direct sunlight.
- Relative humidity which exceeds 35 to 90 %. No condensation due to rapid temperature variation.
- Corrosive and flammable gases.

(4) Operation

- Prepare an emergency stop circuit at the external relay circuit, and connect the halt output from the JW300. (The halt output is installed in the power supply module.)
- Don't handle switches and connectors excessively by force.

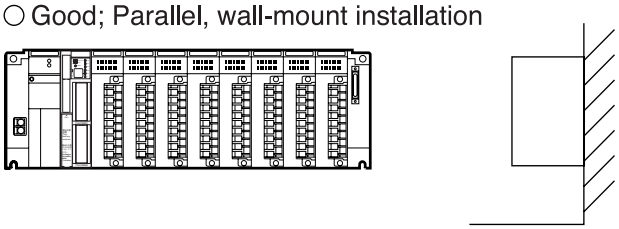
(5) Grounding

Prepare a class-D grounding of the JW300 separately. Never co-ground with high power equipment grounding lines.

(6) Installation

- Securely fasten the retaining screws in each module, and confirm again that it is fastened prior to supply power. Looseness of screws may cause malfunction.
- Firmly connect cable (I/O expansion cable), connecting to the basic/expansion rack panel. Confirm connectors are fastened prior to supplying power. Looseness may cause malfunction.
- Each module has a ventilation hole to allow for cooling. Do not block the holes.
- Install the JW300 horizontally against a control panel (parallel, wall-mount installation), otherwise (vertical, wall-mount installation) temperature increase may occur.

○ Good; Parallel, wall-mount installation



(7) Wiring

- Be aware not to confuse the connection polarity of 5 VDC on the expansion rack panel. Otherwise, rack panel and I/O module etc. may be damaged.
- Keep the input/output lines away from high voltage or strong current lines such as power lines.

(8) Cautions for static electricity

Significant volume of static electricity may build up on the human body in extremely dry conditions. Prior to touching the JW300, discharge the static electricity by touching grounded metals.

(9) Cleaning

Use the soft cloths for cleaning. Volatile solvents (alcohol, paint thinner, freon etc.) and wet rags may cause deformation or change of color.

(10) Storage

Keep the JW300 in cool and dry conditions as it equipped with a battery for memory backup. High ambient temperature may shorten its battery life.

Do not put other objects on the JW300.

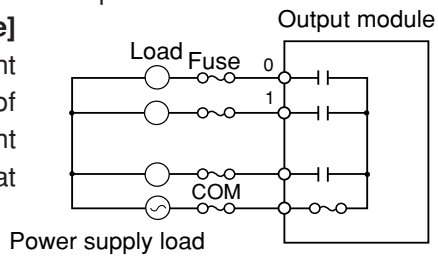
(11) Short circuit protection

If the load connected to the output terminal shorts circuits, the output device or the printed circuit board may burn. Insert a protective fuse in the output lines.

We recommend that you install protective fuses in each line, even if the external devices have fuses for each common unit. These common line fuses are to protect the device against burnout caused by overload, and do not protect against overcurrent of output element and load.

[Precautions when using a rated voltage power source]

When you use a power supply for loads that have a current limiting circuit, provide fuses that match the load rating of each output module. If the load is shorted, and the current limiting circuit functions, the short-circuit current will flow at current level lower than needed to blow the fuse.



(12) Insulation transformer

Choose isolation transformer with a capacity 20% or higher than the rated load. When a transformer of the same capacity as that of the rated load is used, the primary input voltage might exceed the rated transformer capacity.

Power supply module	Power consumption*	Transformer capacity
JW-301PU	60 VA or less	72 VA or more
JW-22PU		
JW-31PU		
JW-303PU	70 VA or less	85 VA or more

* Maximum load capacity when one power supply module is used.

(13) Max. No. of I/O points

Each control module has a maximum number of input and output points, but the number of relay points affecting the maximum number of input and output points varies with the type of the module. It must be noted that it is different from the number of relay assignments. => See page 7-10

(14) Special I/O modules

If a preset scanning time is too short (less than 2 ms), the special I/O module such as JW-21SU and JW-22DA may not function normally.

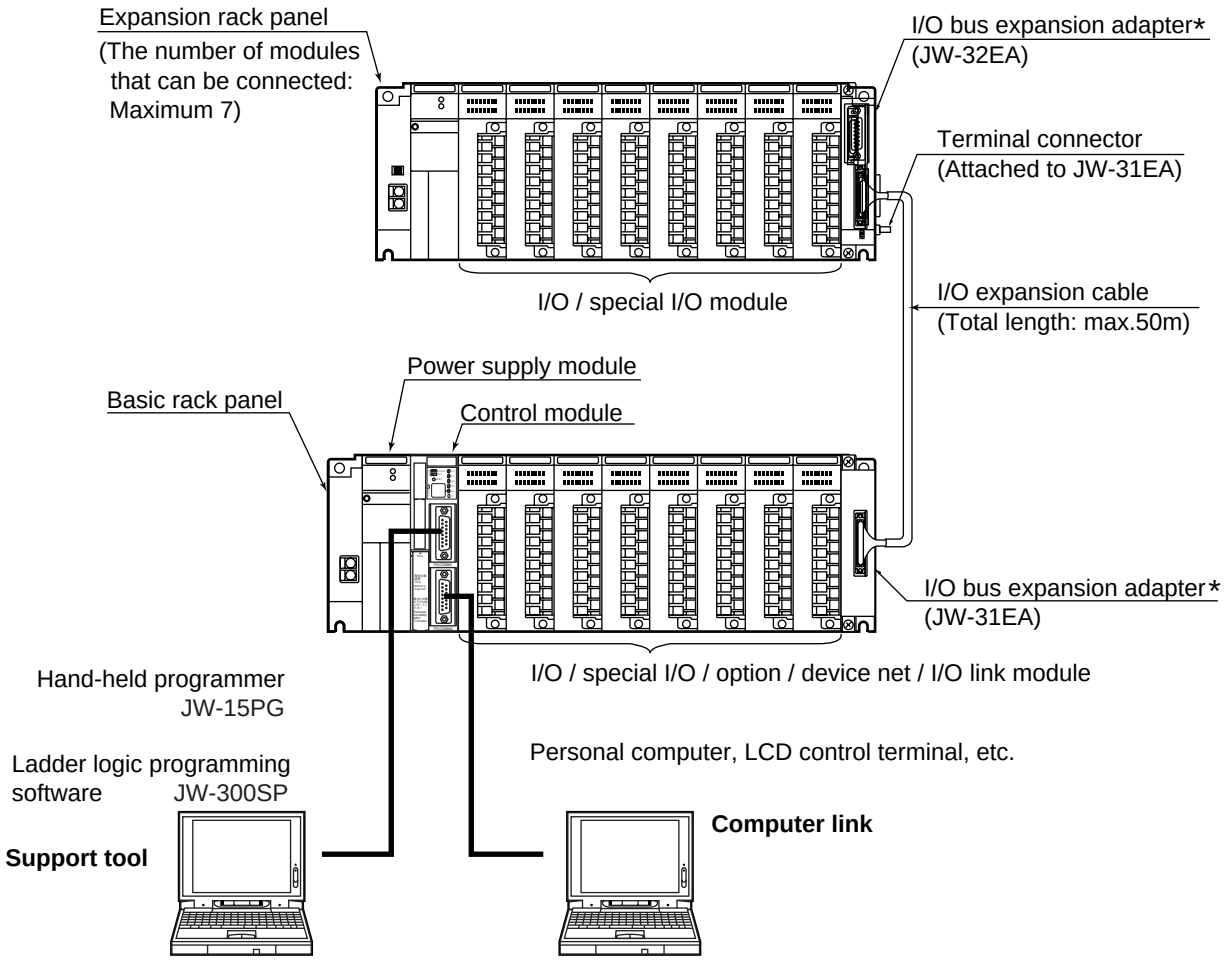
To avoid this malfunction, set a longer scanning time using a constant scanning (set 3 ms or more on the system memory #0226) or other functions.

(15) Insulation resistance and dielectrical strength tests of the power supply module

When testing insulation resistance or dielectrical strength of the JW-301PU/31PU power supply modules, be sure to remove the short bar connected between the SHORT terminal and the GND terminal. If a test is carried out without removing the short bar, internal elements of the module may be damaged.

Chapter 3. System configuration

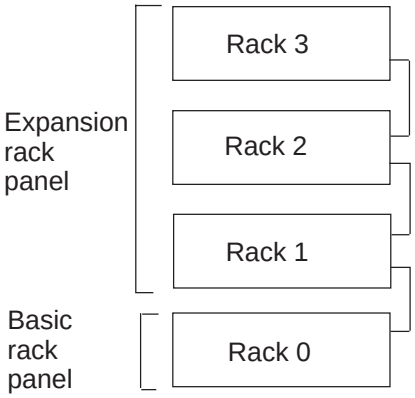
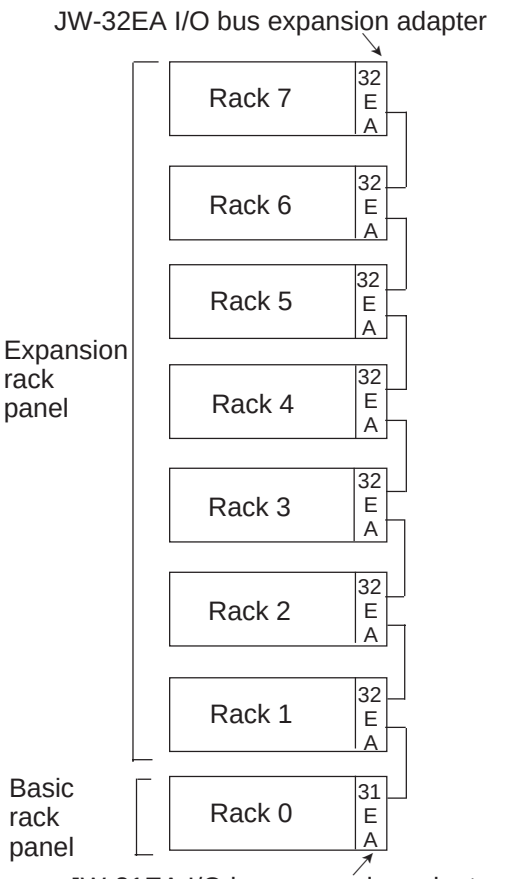
3-1 Basic system configuration



* Note: System can be configured without using an I/O bus expansion adapter. => See the next page.

Number of connectable rack panels	Max. 8 sets in total of 1 basic rack panel and 7 expansion rack panel. (In case of using the I/O bus expansion adapter JW-31EA/32EA.)
Number of I/O module, special I/O module, option module, Device net module, and I/O link module to mount	Total of 64 sets can be mounted. - Max. of 64 I/O modules can be mounted including both the basic and the expansion rack panels (racks 0 to 7). - Max. of 64 special I/O modules can be mounted including both the basic and the expansion rack panels (racks 0 to 7). - Max. of 8 option modules can be mounted on the basic rack panel. - A maximum of 4 modules can be installed on a basic rack panel along with the device net master module (JW-20DN) and an I/O link master module (JW-23LMH).

■ The difference between using and not using I/O bus expansion adapter JW-31EA/32EA

	When not using I/O bus expansion adapter	When using I/O bus expansion adapter
System configuration		
Basic rack panel	JW-314KB/316KB/318KB	JW-314KB/316KB/318KB
Expansion rack panel	JW-34ZB/36ZB/38ZB	JW-34ZB/36ZB/38ZB
I/O bus expansion adapter	-	JW-31EA (Install in basic rack panel) JW-32EA (Install in all expansion rack panel)
I/O expansion cable	JW-203EC/207EC/22EC/25EC/210EC	JW-05EC/1EC/3EC/10EC/20EC/30EC/50EC
No. of racks	4 racks max.	8 racks max.
Cable total length distance	14 m max. (Max. 10 m between rack panels)	50 m max. (Max. 50 m between rack panels)
No. of I/O modules	Max. 32 sets on basic/expansion rack panel (racks 0 to 3)	Max. 64 sets on basic/expansion rack panel (racks 0 to 7)
No. of special I/O modules	Max. 32 sets on basic/expansion rack panel (racks 0 to 3)	Max. 32 sets on basic/expansion rack panel (racks 0 to 3)
No. of option modules	Max. 8 sets for basic rack panel (rack 0)	Max. 8 sets for basic rack panel (rack 0)
No. of device net modules	Max. 4 sets for basic rack panel (rack 0) *	Max. 4 sets for basic rack panel (rack 0) *
No. of I/O link modules	Max. 4 sets for basic rack panel (rack 0)	Max. 4 sets for basic rack panel (rack 0)
Connection support tool with expansion rack panel	Unavailable	Available for connected I/O bus expansion adapter JW-32EA

* Maximum 4 sets including the JW-20DN and JW-23LMH.

(1) Control module

Model mame	Program capacity	File register capacity	Memory card I/F	No.of in/out (maximum)	Communication port	Compatible with multi CPU * 1
JW-311CU	8K words	-	None	512 points	2 ports	Unavailable
JW-312CU	8K words	-	Yes			
JW-321CU	16K words	32K bytes	None	1024 points	3 ports	Available
JW-322CU	16K words	32K bytes	Yes			
JW-331CU	32K words	128K bytes	None	4096 points		
JW-332CU	32K words	128K bytes	Yes			
JW-341CU	64K words	512K bytes	None			
JW-342CU	64K words	512K bytes	Yes			
JW-352CU	128K words	2048K bytes	Yes			
JW-362CU	256K words	8192K bytes	Yes			

* 1: Will be available soon.

(2) Power supply module

Model name	Specification	Approved UL/CSA	Approved CE
JW-303PU *2	85 to 264 VAC. Power capacity: 5 VDC 4.5 A	-	-
JW-301PU *3	85 to 264 VAC. Power capacity: 5 VDC 3.5 A	-	-
JW-31PU	85 to 132 VAC. Power capacity: 5 VDC 3.5 A	O	O
JW-22PU	20.4 to 32 VDC. Power capacity: 5 VDC 3.5 A	-	-

*2: The JW-33PU power supply module for the JW20H/30H can also be used with the JW300.
*3: The JW-21PU power supply module for the JW20H/30H can also be used with the JW300.

(3) Basic rack panel

Model name	No. of slots		
	For power supply module	For control madule	For I/O module *4
JW314KB	1	1	4
JW316KB	1	1	6
JW318KB	1	1	8

*4: Mount I/O, special I/O, option, device net, and I/O link module on the I/O module slot.

(4) Expansion rack panel

Model name	No. of slots	
	For power supply module	For I/O module *5
JW-34ZB	1	4
JW-36ZB	1	6
JW-38ZB	1	8

*5: Mount I/O and special I/O module on the I/O module slot.

(5) I/O bus expansion adapter

Model name	Specifications
JW-31EA	Mounting to basic rack panel
JW-32EA	Mounting to expansion rack panel, with PG port

Use an I/O bus expansion adapter when more than 5 racks (max. 8 racks) on the rack panel are used, or when total length of I/O expansion cables is longer than 15 meters (max. 50 meters).

(6) I/O / special I/O / option / device net / I/O link module

	Model name	Specifications	
I/O	JW-203N	8 points input, 200/240 VAC	
	JW-211NA	16 points input, 100/120 VAC	
	JW-212NA	16 points input, 12/24 VDC	
	JW-214NA	16 points input, 12/24 VDC (high speed type)	
	JW-234N	32 points input, 12/24 VDC (high speed type, connector connection)	
	JW-204SA	8 points output, 250 VAC/30 VDC, 2 A relay output (separated common)	
	JW-212SA	16 points output, 5/12/24 VDC, 0.5 A, transistor output (sink output)	
	JW-213SA	16 points output, 100/200 VAC, 1 A triac output	
	JW-214SA	16 points output, 250 VAC/30 VDC, 2 A, relay output	
	JW-232S	32 points output, 5/12/24 VDC, 0.1 A, transistor output (sink output, connector connection)	
	JW-232M	16 points input, 12/24 VDC 16 points output, 5/12/24 VDC, 0.1 A, transistor output (sink output, connector connection)	
Special I/O	JW-264N	64 points input, 24 VDC (high speed type, connector connection)	
	JW-262S	64 points output, 5/12/24 VDC, 0.1 A, transistor output (sink output, connector connection)	
	JW-21HC	High speed counter: 100 kHz 1 ch	
	JW-22HC	High speed counter: 100 kHz/200 kHz 2 ch	
	JW-24AD	Analog input: 4 points 13 bits	
	JW-22DA	Analog output: 2 points 16 bits	
	JW-22DU	ID control: Microwave	
	JW-21SU	Serial interface 1 port (RS-232C/422A)	
	JW-21PS	Pulse output, number of control axis: 1. Max speed: 250 kpps.	
Option	JW-21CM	Select from computer link / data link / remote I/O functions by switching.	*
	JW-22CM	Network module	
	JW-21MN	ME-NET module	
	JW-255CM	Ethernet module 10BASE-T	
	JW-25TCM	Ethernet module 10BASE-T	
	JW-20FL5	FL-net module (Compatible with ver.1) 10BASE5	
	JW-20FLT	FL-net module (Compatible with ver.1) 10BASE-T	
	JW-22FL5	FL-net module (Compatible with ver.2) 10BASE5	
	JW-22FLT	FL-net module (Compatible with ver.2) 10BASE-T	
	JW-22SU	Serial interface 2 ports (RS-232C/RS-422, RS-232C)	
	JW-25CM	JW10 link module	
Device net	JW-20DN	Device Net master module	
I/O link	JW-23LMH	I/O link master station, up to 32 slave stations, max. 504 points, 345.6 kbits/s / 172.8 kbits/s	
JW-21RS		Remote I/O slave module	

* Make sure to use the JW300 series compatible products for the JW-21CM, JW-22CM, JW-21MN, JW-255CM, JW-25TCM, JW-20FL5, JW-20FLT, JW-22FL5, JW-22FLT, JW-22SU, and JW-25CM. If your modules are not compatible with the JW300 series, the JW300 series modules will not operate normally.

(7) I/O expansion cable

Model name	Specifications		Accessories
JW-203EC	Connection cables between a basic rack panel and an expansion rack panel, or between expansion rack panels.	30 cm	5 V DC cable (30cm) x 1
JW-207EC		70 cm	5 V DC cable (70cm) x 1
JW-22EC		2 m	5 V DC cable (2m) x 1 Short connector x 1
JW-25EC		5 m	Short connector x 1
JW-210EC		10 m	Short connector x 1
JW-05EC	Connection cables between a JW-31EA and a JW-32EA, or between a JW-32EA and a JW-32EA.	50 cm	5 V DC cable (50 cm) x 1
JW-1EC		1 m	5 V DC cable (1 m) x 1
JW-3EC		3 m	None
JW-10EC		10 m	None
JW-20EC		20 m	None
JW-30EC		30 m	None
JW-50EC		50 m	None

(8) Support tools

Model name	Name	Specifications
Hand-held programmer	JW-15PG	4 digit 16 characters LCD, 45 keys, program, monitor, change, terminal, and initial function.
Ladder logic programming software	JW-300SP	Ladder logic programming software for Windows XP, 2000

3-2 System configuration using communication

For details of the communication modules (option / device net / I/O link modules), refer to the each module user's manual.

When using the optional modules listed below, make sure that the ones you select are compatible with the JW300 series.

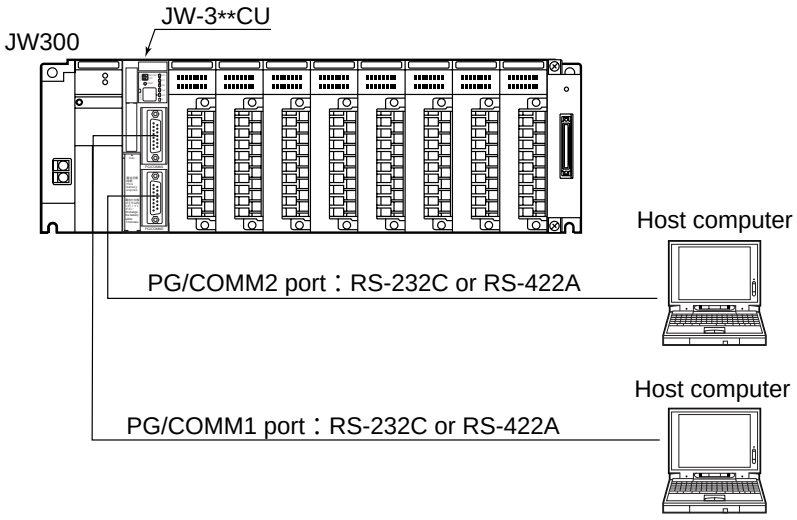
JW-21CM, JW-22CM, JW-21MN, JW-255CM, JW-25TCM, JW-20FL5, JW-20FLT, JW-22FL5, JW-22FLT, JW-22SU, JW-25CM.

- The JW300 will not work with option modules that are not specified as compatible with the JW300 series.
- JW300 compatible modules are stuck with 300 mark at their front side.

[1] Communication system using communication port

By using a communication port of the JW300, the JW300 can communicate with a host computer such as a personal computer and a LCD control terminal. [Computer Link]

The control module (JW-3**CU) has PG/COMM1 port, PG/COMM2 port as communication port. I/O bus expansion adapter has an EA-PG port.



Item	Specifications	
	RS-232C connection	RS-422A connection
No. of connected sets of JW300	1 sets (1:1 connection)	Nax. 31sets (1:N connection)
Communication line	Shielded cable Max.15m	Shieled rwisted pair cable Cabletotal length; max. 1km 4-wire system (Party line connection)
Transfer rate	230400/115200/76800/38400/19200/9600 bits/s	
Data style	Start bit : 1 bits Data length : 7/8 bits Party bit : 1 bits (odd/even/none) stop bit : 1/2 bits	
Character used	ASCII alphanumeric characters	

- JW-311CU/312CU do not have PG/COMM 2 port.
- Please note that the EA-PG port (JW-32EA) cannot be used for "RS-232C" communication and does not offer a data transfer speed of 230,400 bps. => See page 7-30.
- For operational method of communication port, see page 7-29, "Computer link using communication port."

[2] Communication system using link module (JW-21CM)

- The JW-21CM can use any of the following 4 functions by setting its internal switch.

Functions	Total number of mountable modules (Basic rack panel)	
Computer link	Up to 7	=> (1)
Data link DL1 (N:M method)	Up to 6 (total of master and slave stations)	=> (2)
Data link DL9 (1:N method)	Up to 6 (total of master and slave stations)	=> (3)
Remote I/O master station	Up to 1	=> (4)

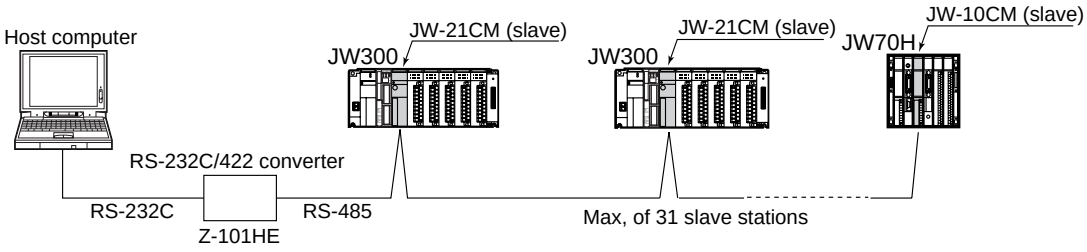
- The JW-21CM is an option module, and up to 7 modules of JW-21CM (including other option modules) can be mounted only on a basic rack panel. Total number of mountable modules varies according to the functions to be used, as shown above.

[Mounting example]

Computer link	: 2
Data link DL1 (N:M method)	: 2
Data link DL9 (1:N method)	: 2
Remote I/O master station	: 1
Total	7

(1) Computer link

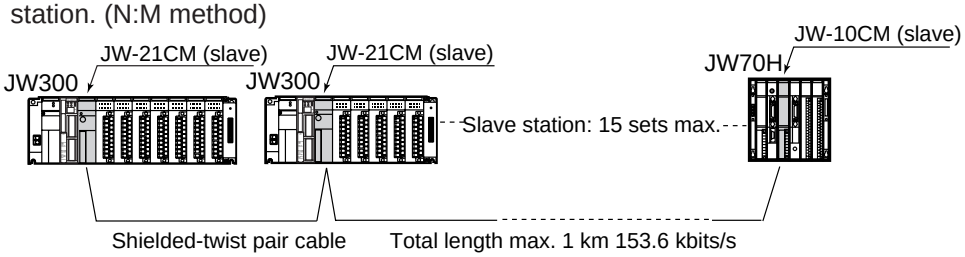
- This link offers communication between a host computer as a master station and a JW-21CM as a slave station.



Items	Specifications
Names of slave stations (PLC)	JW-21CM (JW300, JW30H, JW20H) JW-10CM (JW50H/70H/100H, W70H/100H) ZW-1K0CL2 (W100), ZW-501CL2(W51), ZW-160CL2(W16) ZW-10CL2 (W10), and Z-331J/332J (J-board)
Numbers of slave stations connected	Up to 31 modules (1:N connection)
Communication line cables	A shielded-twist pair cable. Max. length: 1 km. 2-wire / 4-wire systems.
Transfer speed (baud rate)	19200/9600/4800/2400/1200/600/300 bits/s
Data formats	Start bit: 1 bit Data length: 7 bits Parity bits: 1 bit (odd/even) Stop bit: 2 bits
Used character	ASCII alphanumerical characters

(2) Data-link DL1

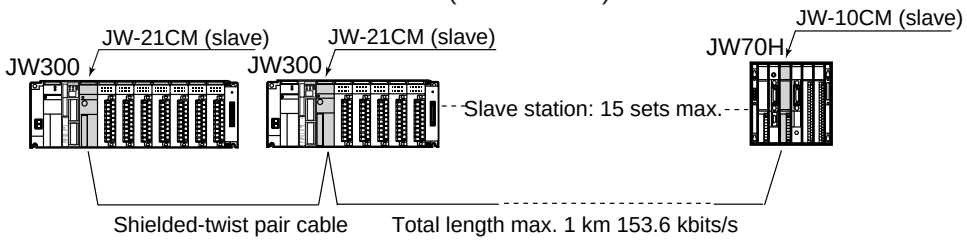
- This communication system can change data between a master and a slave station, or between 2 slave stations, with a PLC configuration that uses the JW-21CM as a master station or a slave station. (N:M method)



Items	Specifications
Model name of master/slave station (PLC)	JW-21CM (JW300, JW30H, JW20H) JW-10CM (JW50H/70H/100H, W70H/100H) ZW-501DL1(W51), ZW-160DL1 (W16), Z-331J/332J (J-board)
No. of connected stations	Max. 16 stations (Including master station)
No. of link bytes	Total 64 bytes (512 points)
No. of link bytes per station	- Divided equally according to the number of slave stations when a JW-21CM or a Z-331J/332J is used as master station. (1 station: 32 bytes, 2 or 3 stations: 16 bytes each, 4 to 7 stations: 8 bytes each, and 8 to 15 stations: 4 bytes each.) - When master station is other than JW-21CM, or Z-331J/332J, up to 64 bytes will be allocated.

(3) Data-link DL9

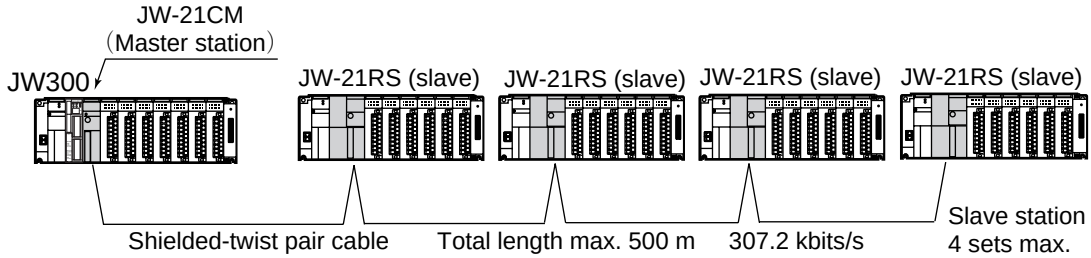
- This communication system can exchange data between a master and slave stations, with a PLC configuration that uses the JW-21CM as a master station or a slave station. It cannot communicate between slave stations.(1: N method)



Item	Specifications
Model name of master/slave station (PLC)	JW-21CM (JW300, JW30H, JW20H) JW-10CM (JW50H/70H/100H, W70H/100H) ZW-1K0DL9 (W100), ZW-501DL9(W51), ZW-160DL9 (W16) Z-331J/332J (J-board)
No. of slave stations connected	Max. 15 sets
No. of link bytes	- Select from 512/256/128/64 bytes when a master station is a JW-21CM, or Z-331J/332J. - When a master station is other than a JW-21CM, or Z-331J/332J, up to 512 bytes will be allocated.
No. of link bytes per station	- Divided equally according to the number of slave stations when a JW-21CM or a Z-331J/332J is used as master station. (1or 2 stations: 128 bytes each, 3 or 4 stations: 64 bytes each, 5 to 8 stations: 32 bytes each, and 9 to 16 stations: 16 bytes each. - When master station is other than JW-21CM, or Z-331J/332J, total of max. 127 bytes will be allocated.

(4) Remote I/O master station

- The system can communicate between a JW-21CM as remote I/O master station and remote I/O slave station.

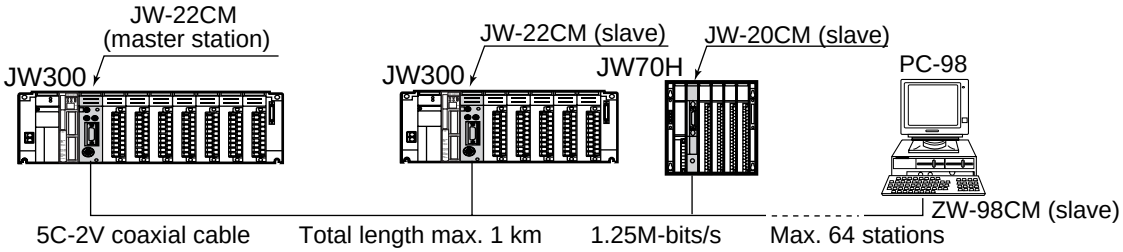


Item	Specifications
Model name of slave station(PLC)	JW-21RS (JW300, JW30H, JW20H) ZW-501RS1 (W51), ZW-160RS1 (W16), ZW-10RS1 (W10)
Number of slave stations connected	Max. 4 sets
Number of remote I/O points	Total point max. 512 (64 bytes)
Number of I/O points per station	128 points (16 bytes)
Number of special I/O modules mounted on a JW-21RS	Max. 8 (Total of 4 slave stations)

[3] Communication system using the satellite module (JW-22CM)

The system can communicate between PLCs or between personal computers by mounting a JW-22CM on a JW300.

- It can realize data linking (N:M method) and computer linking on the same communication line.
- The JW-22CM is an option module, and up to 7 modules (including other option modules) can be mounted only to a basic rack panel.

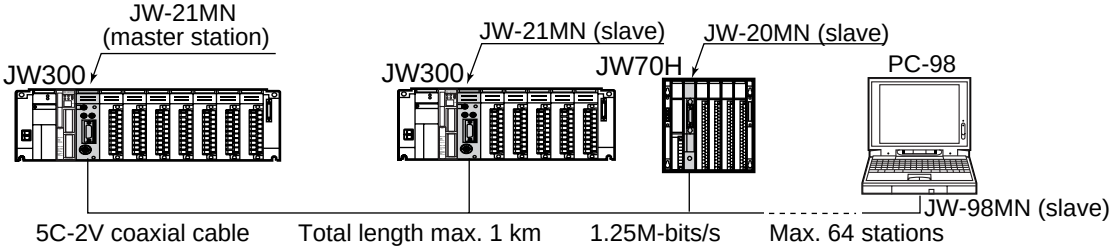


Items	Specifications
Name of connected models (PLC, personal computer)	JW-22CM (JW300, JW30H, JW20H) JW-20CM (JW50H/70H/100H, W70H/100H), Z-335J (J-board) ZW-98CM (PC98), ZW-20AX (IBM/PC, DOS/V)
No. of connected stations	Max. 64 stations
Number of link bytes	Relay link: Max. 2048 points (64 bytes) Register link: Max. 2048 bytes
Number of linked bytes per station	Relay link: Max. 2048 points (64 bytes) Register link: Max. 2048 bytes

[4] Communication system using the ME-NET (JW-21MN)

Mount the JW-21MN on the JW300, you can exchange data with equipment that conform to the ME-NET specifications (PLCs, personal computers, robot controllers, etc.).

- It can realize data link (N:M method) and computer link on the same communication line.
- The JW-21MN is an option module, and up to 7 modules (including other option modules) can be mounted only to a basic rack panel.



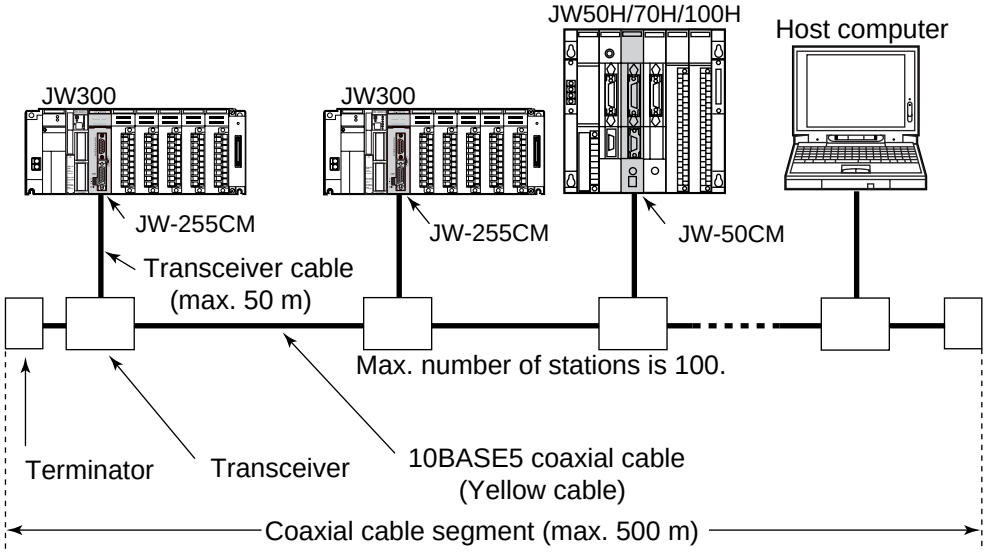
Items	Specifications
Name of connected models (PLC, personal computer)	JW-21MN (JW300, JW30H, JW20H) JW-20MN (JW50H/70H/100H, W70H/100H), Z-334J (J-board) JW-98MN (PC98), JW-90MN (IBM/PC, DOS/V), etc.
No. of connected stations	Max. 64 stations
Number of linked bytes per station	Relay link: Max. 2048 points (64 bytes) Register link: Max. 2048 bytes
Number of transmission bytes per station	Max. 1024 bytes total of relay link and register link

[5] Communication system using the Ethernet (JW-255CM/25TCM)

Install the JW-255CM/25TM on the JW30H, and connect it to a transceiver using a transceiver cable, you can exchange data with a host computer or any LAN system in the network, on the Ethernet *1.

- Both TCP/IP and UDP/IP protocols are available.
- Data communication is possible between host computers in an Ethernet network and PCs in a satellite network or on an FL-net spanning two layers of hierarchy.
- Communication is possible by up to 8 nodes with one JW-255CM/25TCM.
- Data can be exchanged between SHARP PLCs using SHARP's unique SEND/RECEIVE function.
- Using the subnet mask routing function, the JW-255CM can communicate with a large network system through a router.

*1 Ethernet is a trademark of the Xerox Corporation.



Item		Specifications	
		JW-255CM	JW-25TCM
Connection with network		10BASE5	10BASE-T
Transfer speed		10M bits/s	
Physical topology		Bus	Star
Transmission device		50 ohms coaxial cable	10 BASE-T twisted pair cable
Transmission method		Base band	
Max. No. of transfer length		500 m/segments 2.5 km/network *2	100 m/segments 500 m/network *3
Station interval		Length multiplied by 2.5 m (10BASE5)	
Max. No. of stations		100 sets/segments (10BASE5)	
Protocol structure	Application	Sharp computer link/original command	
	Transport	TCP/UDP	
	Network	IP (ARP)	
	Data link	Ethernet V2	
No. of connections		8	
Application		Computer link function, send/receive functions, routing function	

*2: The max. number of transfer length between stations connecting multiple segments using the repeater.

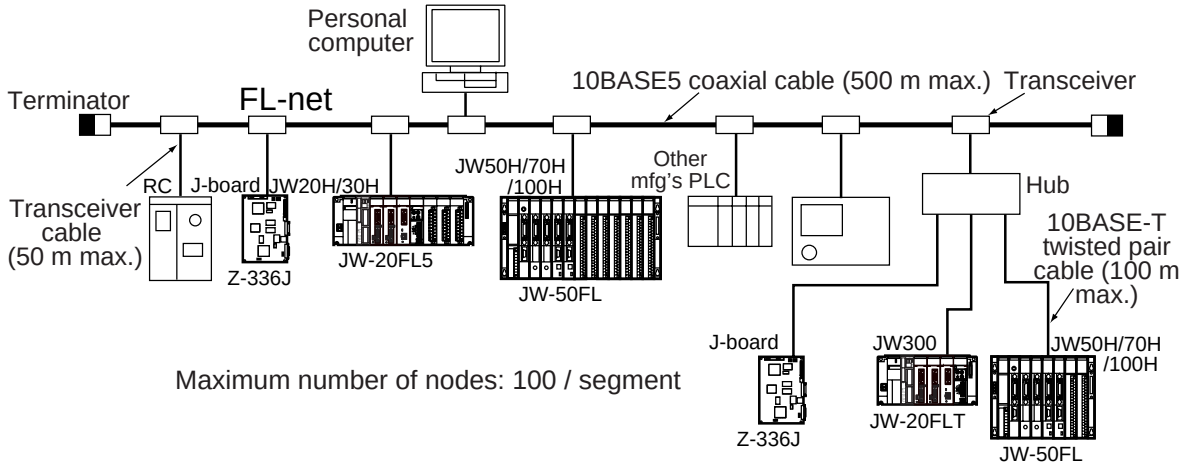
*3: Maximum data transfer distance between stations when multiple 10BASE-T segments are connected using hubs.

[6] Communication system using FL-net (JW-20FL5/T, JW-22FL5/T)

The JW-20FL5/22FL5 (for 10BASE5) and JW-20FLT/22FLT (for 10BASE-T) are modules for the "FL-net" *1 next generation control system network. They facilitate connection with different devices such as NC and industrial robot as well as other manufacturers' PLCs.

- Join to a network is simple by a node automatic entrance and removal function.
- Perform interlock between devices, transfer production instruction, and collection of production result on a single circuit.
- Easy maintenance thanks to data exchange using SHARP's unique SEND/RECEIVE instruction and remote programming and monitor functions.

*1: "FL-net (FA LINK Protocol Network)" is an open FA network system that was suggested by the Japan FA Open Promotion committee (JOP) in the Production Science Center (governmental foundation) as a shared standard in the field.



■ **Specifications of the communication section**

Item	Specifications	
	JW-20FL5, JW-22FL5	**JW-20FLT, JW-22FLT**
Connection to network	10BASE5	10BASE-T
Physical topology	Bus	Star
Data transfer media	50 ohm yellow cable	10BASE-T twisted pair cable
Maximum data transfer distance between stations	500 m / segment 2.5 km / network *2	10 m / segment 500 m / network *3
Data transfer speed	10 Mbps	
Data transfer system	Base band	
Protocol configuration Application Transport Network Data link	 FA link protocol UDP IP Ethernet V2	

*2: The maximum data transfer distance between stations when more than one segment are connected using a repeater.

*3: The maximum data transfer distance between stations when multiple 10BASE-T segment are connected using a hug.

■ **FL-net specifications**

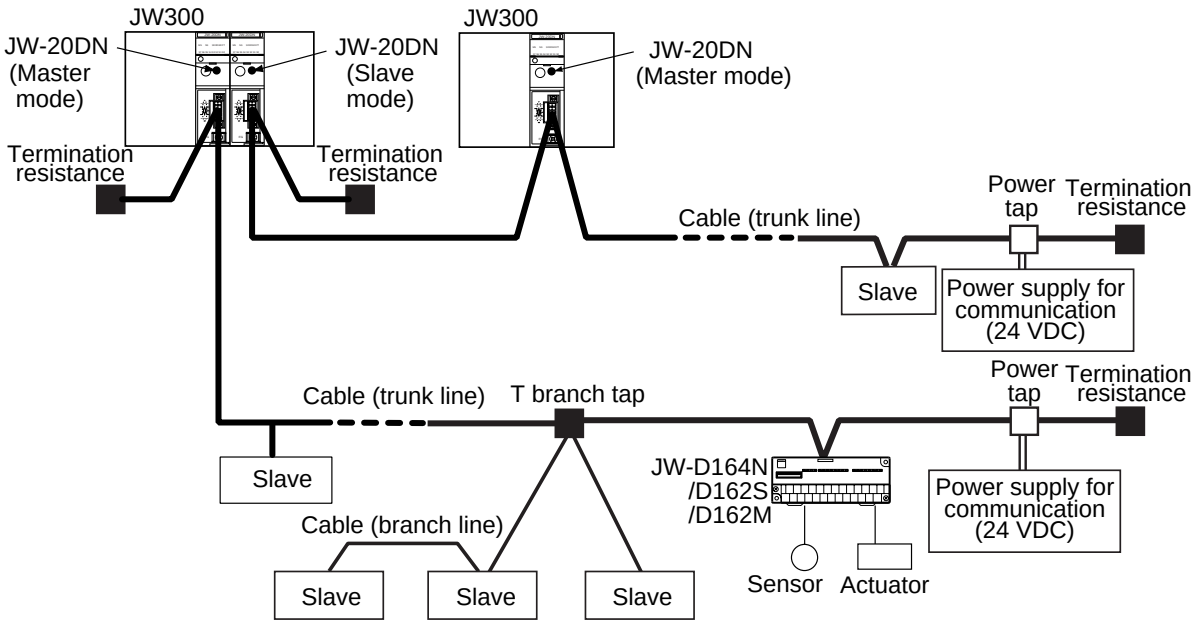
Item	Specifications	
	JW-20FL5, JW-20FLT	JW-22FL5, JW-22FLT
Applicable version	Ver. 1	Ver. 2
Communication control method	Masterless, token system	
Number of connecting stations	Maximum 254	
Communication function	Cyclic data transfer (n: n, 8 k-bits + 8 K-words) Message transfer (1:1, 1: n) Maximum data length of one frame: 1 K-bytes	

[7] Communication system using the JW-20DN DeviceNet

The JW-20DN conforms to the DeviceNet * and can connect various slave stations. It can share other facilities inside/outside Japan.

- It employs multi-drop system that can connect between nodes using a single special cable. Therefore, it offers much wire saving. Branching using a T-branch tap is also available.
- A maximum of four JW-20DN modules (total number of modules including the JW-23LMH) can be mounted on a single basic rack panel. Shortening communication time or separation of systems by dividing systems is possible.
- The editing function of scan list facilitates easy allocation of slave station I/O addresses. There is no need configurator.

*DeviceNet is a trademark of ODVA (Open Device Vendor Association).

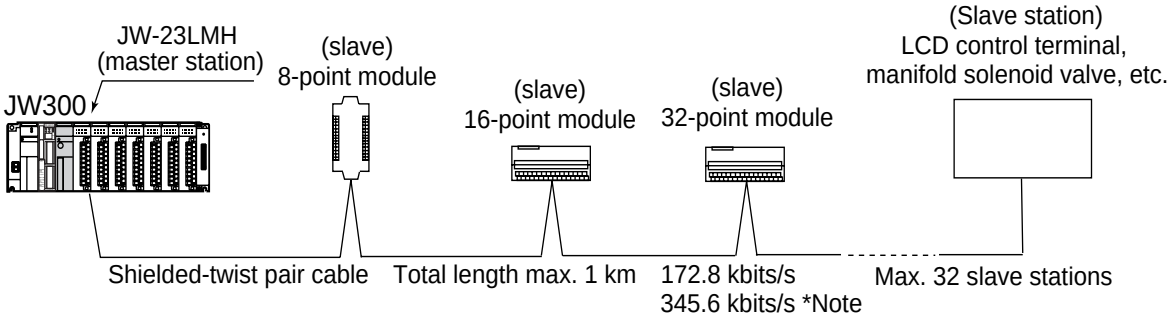


Items	Specifications			
Communication protocol	Device net or equivalent			
Basic operation mode	Master mode, slave mode			
No. of connectable nodes	A maximum of 63 slave nodes can be connected to one master node.			
Number of I/O points	Max. 4096 points (Max. 512 bytes : Total of input and output points for I/O message)			
Communication speed	125 k bits/s, 250 k bits/s, 500 k bits/s			
Communication distance (maximum)	**Communication speed**	**125 kbps**	**250 kbps**	**500 kbps**
	Trunk length using a thick cable	500 m	250 m	100 m
	Trunk length using a thin cable	100 m	100 m	100 m
	Maximum branch line length	6 m	6 m	6 m
	Total length of branch lines	156 m	78 m	39 m
Communication function	I/O message function (polling I/O function, bit strobe function), explicit message function			
Communication cable type	Special cable (Five conductors: 2 signal wires, 2 power source wires, 1 shield) - Thick cable: For trunks - Thin cable: For trunks or branch lines			
Data table assignment at master mode	In the scan list editing mode you can select "allocation in address order," "even number allocation," or "allocation in the order in which vacant nodes are occupied" as the method for I/O data mapping			
Setting the No. of I/O bytes at slave mode	No. of input bytes: 0 to 127 bytes No. of output bytes: 0 to 127 bytes			

[8] Communication system using the satellite I/O link (JW-23LMH)

The system can communicate between a JW-23LMH as an I/O link master station and an I/O link slave module.

Up to 4 JW-23LMH modules can be mounted only on a basic rack panel.



* The communication speed of 345.6 kbits/s can be achieved only when in communication with following high-speed type slave module.

Item	Specifications
Model name of slave station	8-point module: ZW-82N (input), ZW-82S (output) 16-point module: ZW-161N/162N (input), ZW-161S/162S/164S (output), ZW-162M(I/O) 16-point module (high speed type): ZW-164NH (input), ZW-162SH (output), ZW-162MH (I/O) 32-point module (high speed type): ZW-324NH (input), ZW-322SH (output), ZW-322MH (I/O) 8-point module (sensor connector type): ZW-84NC (input) 16-point module (sensor connector type): ZW-162MC (I/O)
Number of slave stations connected	Max. 32 stations
Number of I/O link points	Max. 504 points

[9] Communication system using a JW10 link module (JW-25CM)

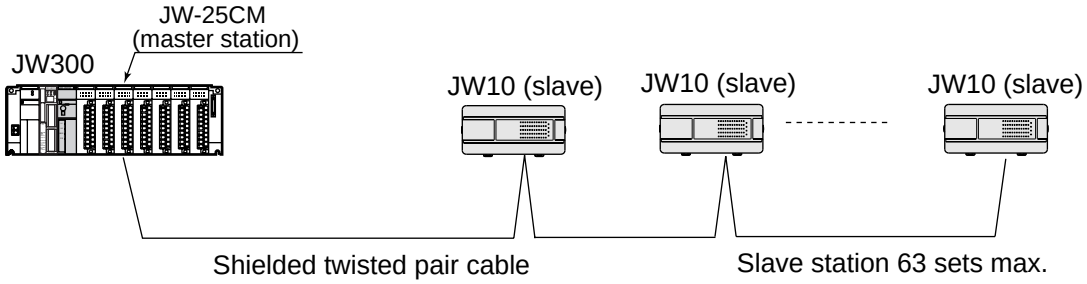
The JW-25CM can communicate with the JW10, by selecting data link master station function or remote I/O master station function.

The JW-25CM is an option module, and up to 7 modules of JW-25CM (including other option modules) can be mounted only to a basic rack panel.

(1) Data link master station

The system can communicate between a JW-25CM, a master station, and a JW10, slave station.

- This communication system can only communicate between a master and a slave station. It cannot communicate between 2 slave stations.



- Total expansion length and max. number of slave stations connected (JW10) are subject to the settings of communication speed.

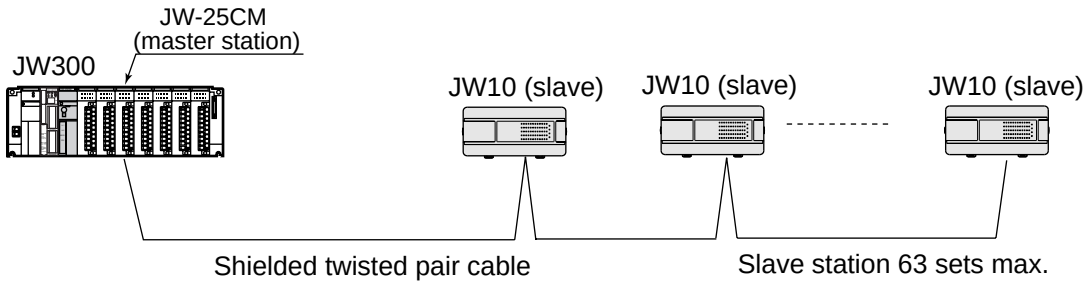
Communication speed	Total expansion length	Number of slave stations connected
76800 bits/s	Max. 500m	Max. 31
38400 bits/s	Max. 1km	Max. 63

Items	Speceifications
Model name of slave station	JW-1324K/1424K/1624K (JW10 basic modules)
Number of transmission bytes per station	8 bytes each for receiving and sending.

(2) Remote I/O master station

The system can communicate between a JW-25CM as a remote I/O master station and a JW10 basic module as a remote I/O slave station.

- Whether or not to synchronize a data exchange between a master and a slave station with operation can be selected.



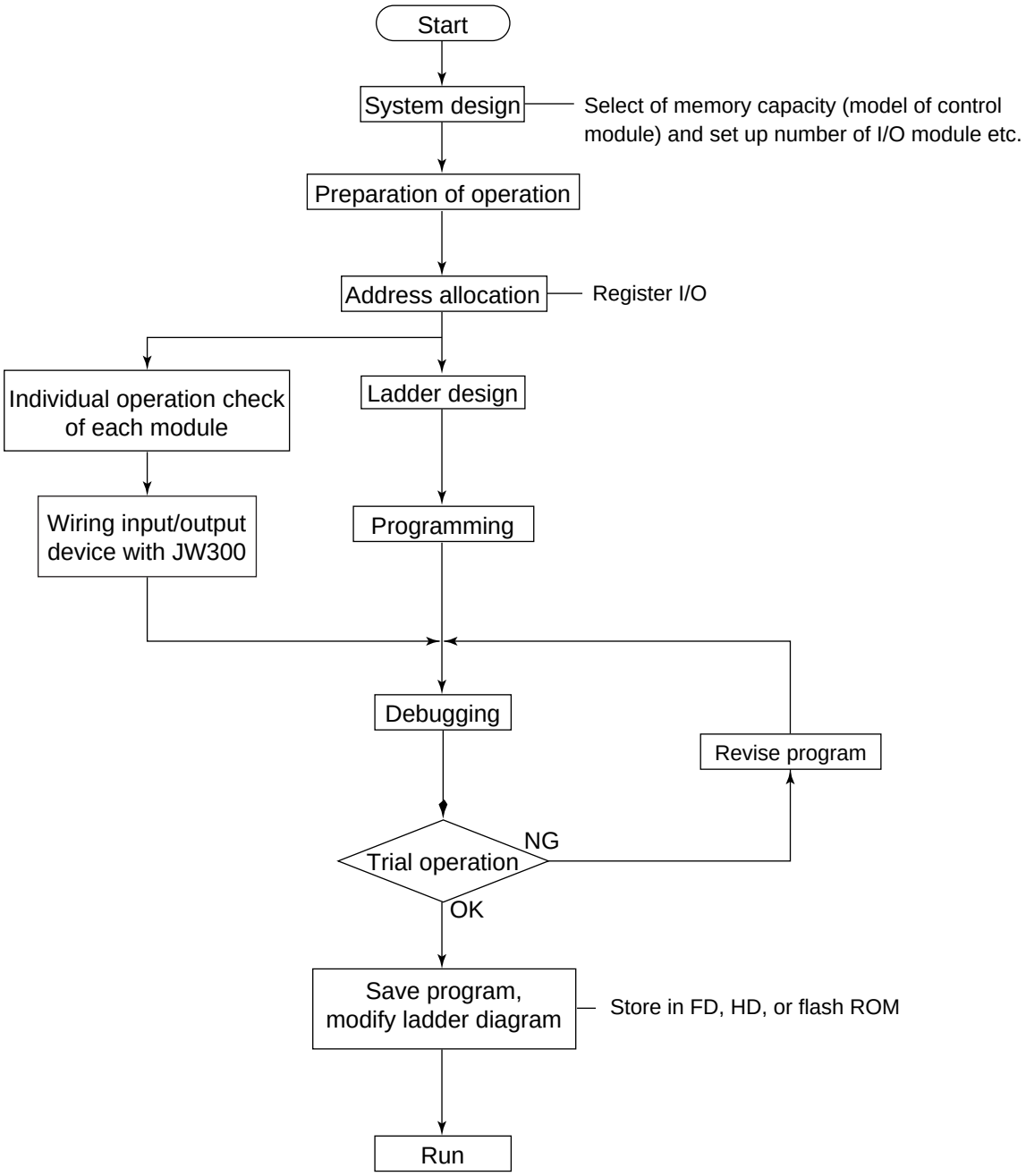
- Total expansion length and max. number of slave stations connected (JW10) are subject to the settings of communication speed.

Communication speed	Data exchange timing	Total expansion length	No.of slave stations connected
76800 bits/s	Synchronous /asynchronous	Max. 500m	Max. 31
38400 bits/s	Synchronous	Max. 1km	Max. 16
	Asynchronous	Max. 1km	Max. 63

Items	Speceifications
Model name of slave station	JW-1324K/1424K/1624K (JW10 basic modules)
Number of I/O points per station	Max. 60 points (36 for inputs, 24 for outputs)

3-3 System design procedures

The following is an example of the system design procedure of the JW300.



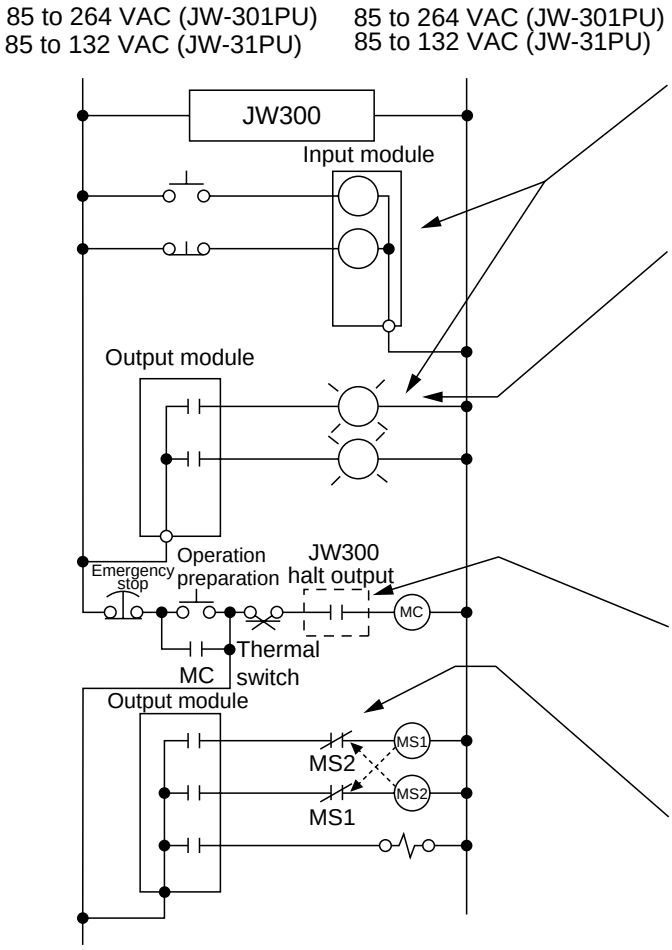
3-4 Precautions for system design

If an error occurs in the PLC, the whole system will report a fault.
In order to create a fail-safe system, we recommend preparing independent external protective circuits for following functions, which may cause a breakdown of machine or injury to workers:

- Emergency stop circuit,
- Protection circuit,
- Operating circuit of high voltage device.

Also, be aware of the operation response time, as a PLC operates using cyclic processing.
To prevent mis-operation due to output signal of the output module soon after switching on power to the JW300, connect in series the halt output for the JW300 in the following operation stand-by circuit.

(1) In case of using AC power supply



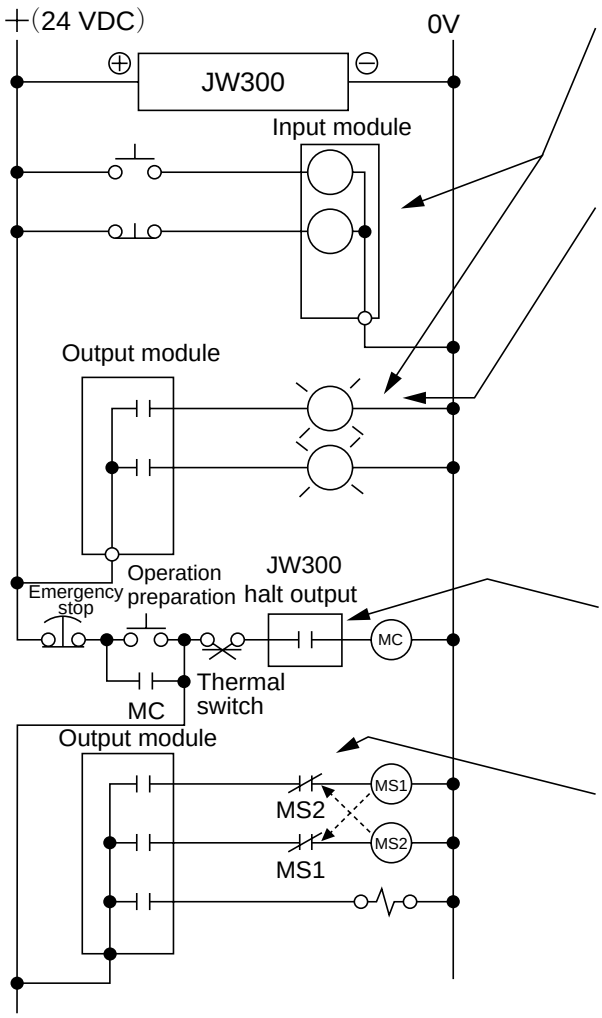
- Connecting the input module and output module for lighting lamps in front of emergency stop circuit makes it possible to grasp the stop condition of devices.

- When the JW300 stops its operation, all the output module indicate ON/OFF condition just before stopping.
  Note: When setting an output holding address in the system memory, all the output after the setting address is retained and you can reset the previously set address. (only available when power is supplied to the JW300.)

- Halt output
  JW-301PU Relay output: 100/200 VAC, 30 VDC, 1A
  JW-31PU Relay output: 100 VAC, 30 VDC, 1A

- Interlock circuit
  Prepare external interlock circuit to prevent reverse operation, damage of machines and injury of workers.
  Note: When DC output module is used as a output module, use AC relay and install its contact in the emergency stop circuit.

(2) In case of using DC power supply

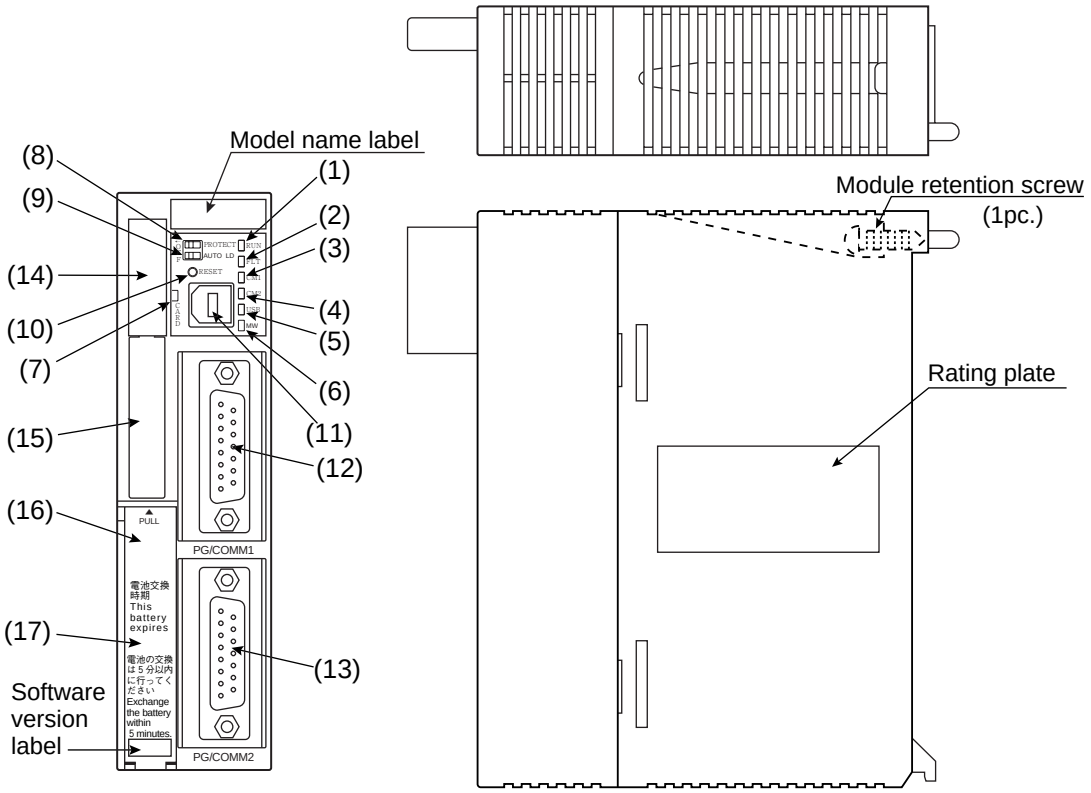


- Connecting an input module and output module for lighting lamps in front of emergency stop circuit makes it possible to grasp the stop condition of devices.
- When the JW300 stops its operation, all the output module indicate ON/OFF condition just before stopping.

  Note: When setting an output holding address in the system memory, all the output after the setting address is retained and you can reset the previously set address.
  (only available when power is supplied to the JW300.)
- Halt output (relay output 100/200 VAC, 30 VDC, 1A)
- Interlock circuit
  Prepare external interlock circuit to prevent reverse operation, damage to machines and injury of workers.

Chapter 4. Name and function of each part

4-1 Control module (JW-3**CU)



	Name	Function
(1)	RUN lamp (green)	Lights, blinks, and goes OFF, according to JW300 operating condition. - Lights when the JW300 is operating. - Blinks when the JW300 is being programmed by a connected support tool (the JW300 stops calculating.) - Goes OFF when the JW300 detects an error using its self-diagnosis function. (Lights when a battery error occurs.)
(2)	FAULT lamp (red)	Lights when detecting errors by self-diagnosis. JW300 stops its operations. (However, it operates even when battery is error.)
(3)	CM1 lamp (yellow)	Lights when communicating with personal computer or the like, by using PG/COMM1 port. Lights up in monitoring state by connecting a support tool.
(4)	CM2 lamp (yellow)	Lights when communicating with personal computer or the like, by using PG/COMM2 port. Lights up in monitoring state by connecting a support tool.
(5)	USB lamp (yelow)	Lights when the JW300 is communicating through its USB port.
(6)	MW lamp (red)	Blinks when changing the program memory. Goes OFF when special relay 7331 is turned ON.
(7)	CARD lamp	Lights when the JW300 is accessing a PC card.
(8)	PROTECT switch	Set prohibit (ON), enable (OFF) about writing to program memory and system memory.
(9)	AUTO LD switch	Select a mode for the memory card - When it is slid to the ON position, the JW300 automatically loads programs and data from a memory card (compact flash card) immediately after the power is turned ON.

↓
Next page

	Name	Function
(10)	RESET switch	Software reset - If the calculation time for one scan is abnormally long, the JW300 may repeat a run and stop sequence. In this case, press the RESET switch to change the JW300 to the program mode.
(11)	USB port *	A connector used to connect the JW300 to a USB port on a personal computer. (USB1.1 compatible.)
(12)	PG/COMM1 port * (RS-232C / RS-422A)	A connector for connecting with device having Serial I/O port such as support tool, personal computer. JW-311CU/312CU don't have PG/COMM2 port.
(13)	PG/COMM 2 port * (RS-232C / RS-422A)	
(14)	Card cover	Insert a CF or SRAM card into the PC card slot. Close the card cover to prevent the CF or SRAM card from falling out. (Protection). - The JW-311CU/321CU/331CU/341CU do not have a PC card slot or card cover.
(15)	PC card slot *	
(16)	Battery cover	A battery module for memory backup is provided inside; opened and closed when replacing battery. When delivered, the battery is not connected to the JW300. Before using the JW300, make sure to connect the battery assembly connector to the battery connecter on the control module. Then clear (initialize) the memory inside the JW300.
(17)	Validity period label on the battery	Indicates the period within which the battery (for memory back up) for the control module should be functional. Write down the time to replace the battery along with the conditions in which you are using the control module.

* With cover

4-2 Power supply module

The power supply modules that can be used with the JW300 are as follows:

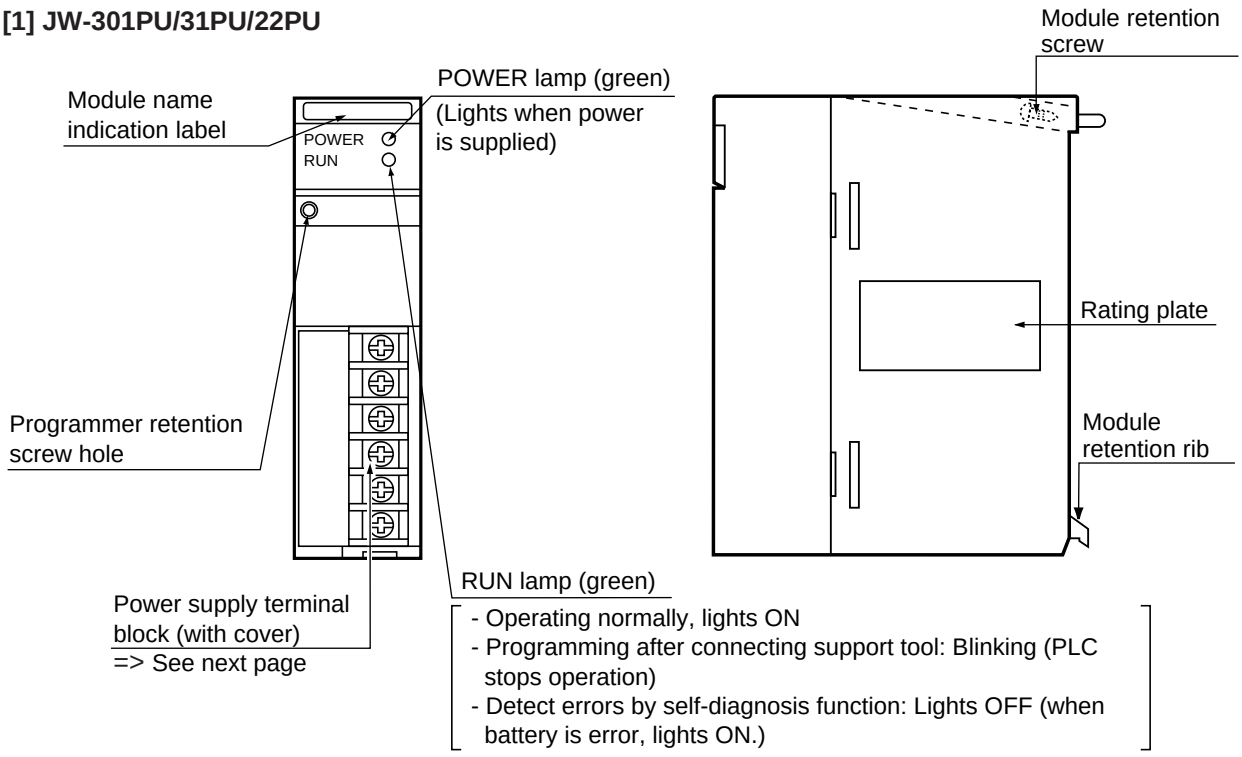
Model name	Specification	Approved UL	Approved CSA
JW-303PU *1	85 to 264 VAC. Power capacity: 5 VDC 4.5 A	——	——
JW-301PU *2	85 to 264 VAC. Power capacity: 5 VDC 3.5 A	——	——
JW-31PU	85 to 132 VAC. Power capacity: 5 VDC 3.5 A	O	O
JW-22PU	20.4 to 32 VDC. Power capacity: 5 VDC 3.5 A	——	——

*1: The JW-33PU power supply module for theJW20H/30H can also be used with the JW300.

*2: The JW-21PU power supply module for theJW20H/30H can also be used with the JW300.

- When a power supply module is installed on an expansion rack panel, and if a power is supplied to the power supply module on the basic rack panel without supplying power to the power supply module on the expansion rack panel, the system detects as "input/output error" (#0160 = Error code 40) or "expansion power supply error" (#0160 = Error code 43). Make sure to supply power also to the power supply module on the expansion rack panel.
- The power terminal block is equipped with a terminal block cover at delivery. Remove this cover when you wire. After connecting, make sure to put the cover to the original position.

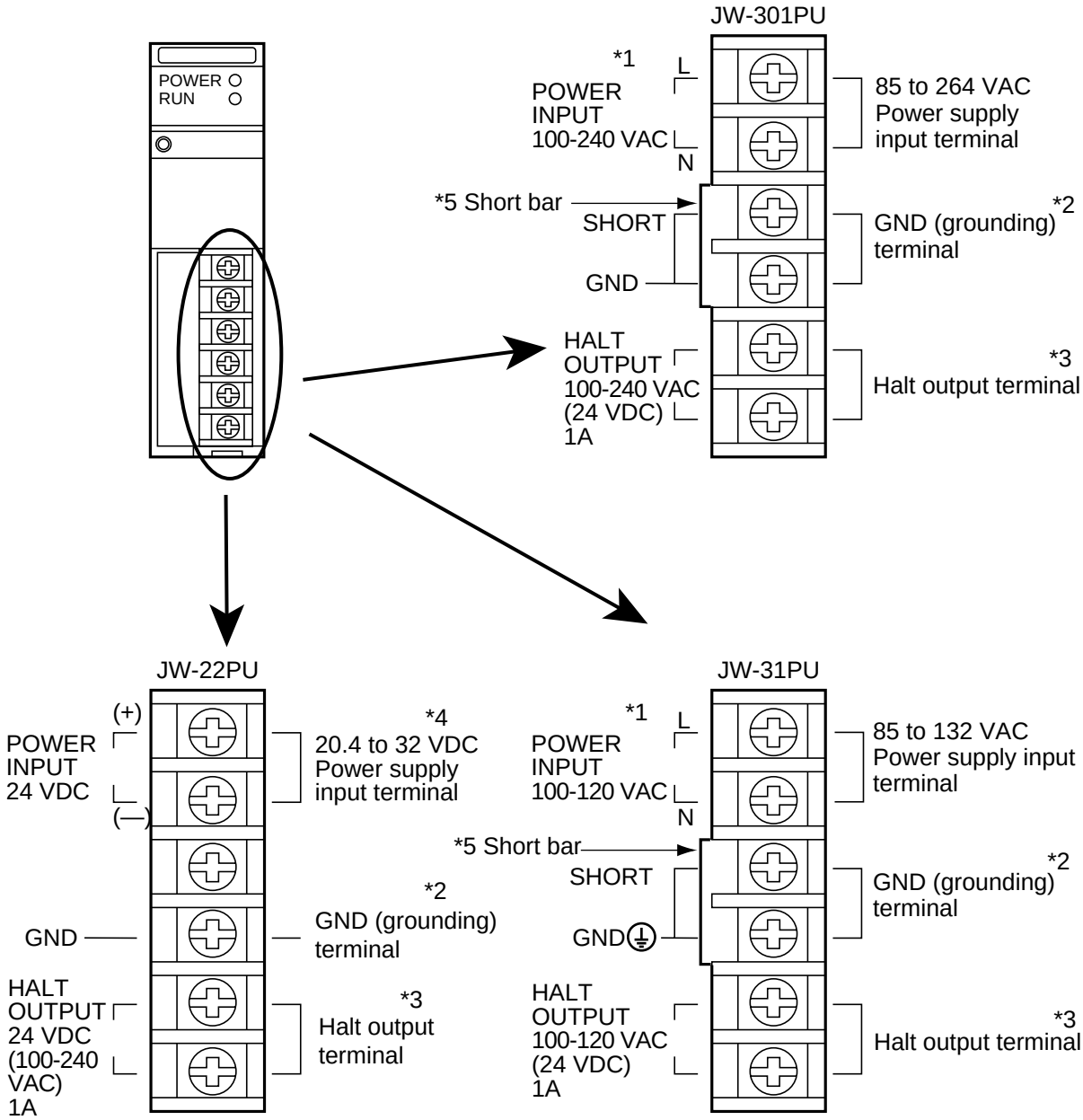
[1] JW-301PU/31PU/22PU



- The JW-301PU, 31PU, and 22PU are identical in shape.

[Power supply terminal block]

This is a terminal block for connecting extended line of power supply, GND, halt output and the like.



*1 Connect the power supply input of JW-301PU/31PU while paying attention to the L terminal (LIVE: non-grounded side) and N terminal (NEUTRAL: grounded side).

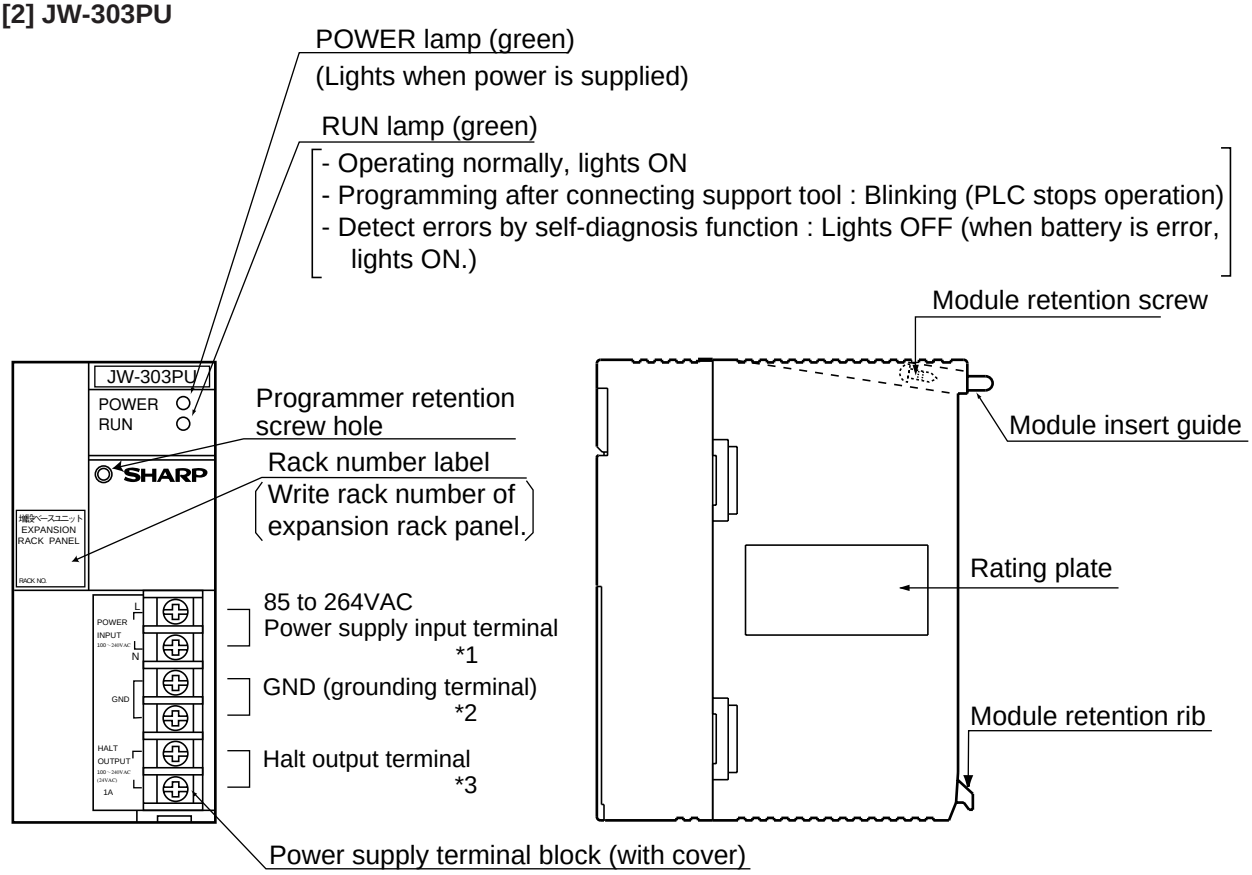
*2 To prevent electric shock and noise error, be sure to separately prepare class-3 grounding.

*3 Be sure to incorporate the line to the external emergency stop circuit.

*4 As for DC input power supply, use power source of 20.4 to 32 VDC (ripple rate 20% or less; however, ripple upper limit: 32 V or less, lower limit: 20.4 V or more).

*5 When testing insulation resistance or dielectric strength of the JW-301PU/31PU power supply modules, be sure to remove the short bar connecting between the SHORT terminal and the GND terminal. The power supply module has a serge absorber connected between the AC input line and the SHORT terminal, as well as a short bar between the SHORT terminal and the GND terminal at the time of shipment. If a test is carried out without removing the short bar, internal elements of the module may be damaged due to overcurrent.

[2] JW-303PU



*1: Connect the power supply input while paying attention to the terminal (LIVE: non-grounded side) and N terminal (NEUTRAL : grounded side).

*2: To prevent electric shock and noise, error, be sure to separately prepare class-3 grounding. Connect with internal between GND terminal.(Short bar having JW-301PU/31PU do not have in JW-303PU).

*3: Be sure to incorporate the line to the external emergency stop circuit.

4-3 Input/output module

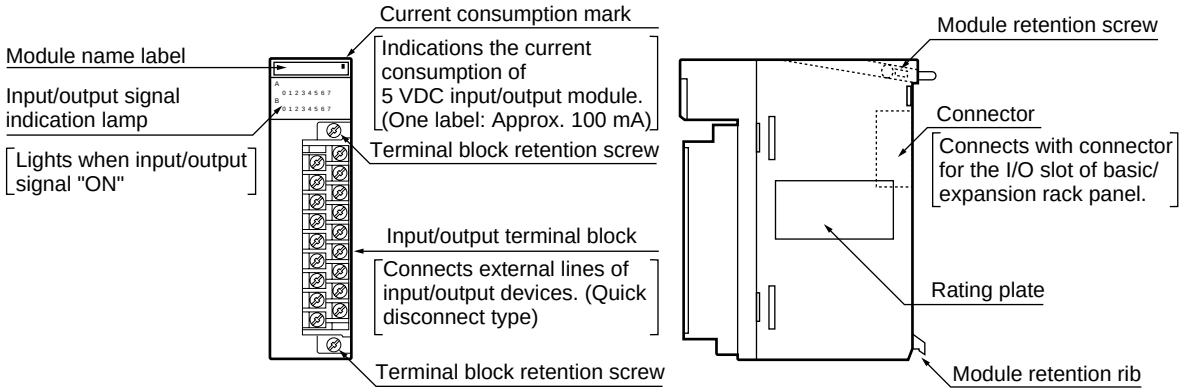
The input/output module can be installed in any order in the I/O module slot of the basic/expansion rack panel.

■ Kinds of input/output module

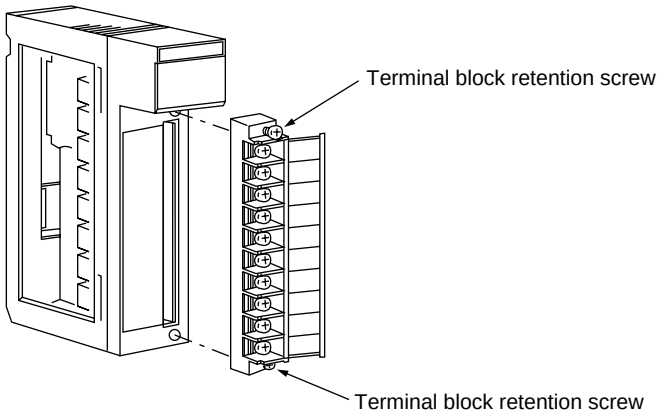
I/O modules having 8, 16, and 32 points are available.
Special I/O modules having 64 points are available.

	Model name	Points	Specifications	Applied CE markings
Input	JW-203N	8	200/240 VAC	-
	JW-211NA	16	100/120 VAC	O
	JW-212NA	16	12/24 VDC	O
	JW-214NA	16	12/24 VDC (high speed type)	O
	JW-234N	32	12/24 VDC (high speed type, connector connection)	O
Output	JW-204SA	8	250 VAC/30 VDC, 2A, relay output (separated common)	-
	JW-212SA	16	5/12/24 VDC, 0.5A, transistor output (sink output)	O
	JW-213SA	16	100/200 VAC, 0.5A, triac output	O
	JW-214SA	16	250 VAC/30 VDC, 2A, relay output	O
	JW-232S	32	5/12/24 VDC, 0.1A, transistor output (sink output, connector connection)	O
I/O	JW-232M	12/24 VDC, input 16 points, transistor 16 points output, 0.1A (sink output, connector connection)		O
Special I/O	JW-264N	64	24 VDC (high speed type, connector connection)	O
	JW-262S	64	5/12/24 VDC, 0.1A transistor output (sink output, connector connection)	O

[1] 8/16 points module

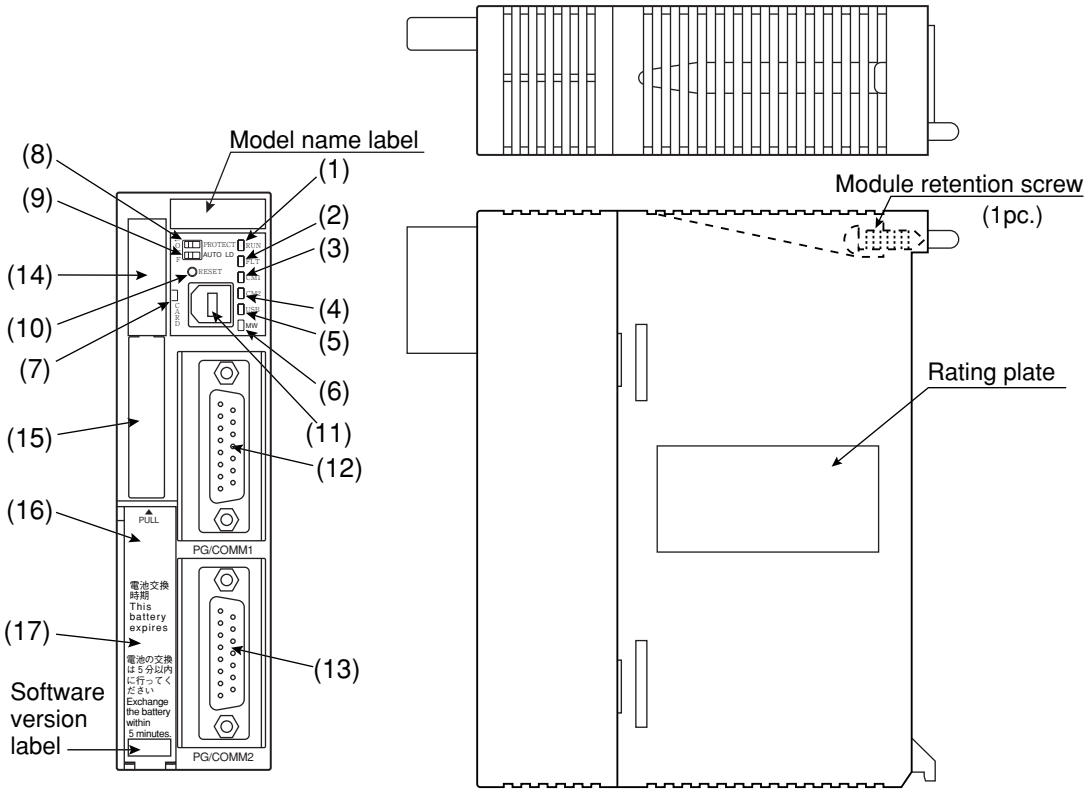


The terminal block connecting external lines in 8/16 points I/O module is quick-disconnect type. Loosen 2 mounting screws provided in upper and lower positions of the terminal block, then the terminal block can be detached. And a malfunctioning I/O module can be replaced without removing the external lines from the terminal block.



Chapter 4. Name and function of each part

4-1 Control module (JW-3**CU)



	Name	Function
(1)	RUN lamp (green)	Lights, blinks, and goes OFF, according to JW300 operating condition. - Lights when the JW300 is operating. - Blinks when the JW300 is being programmed by a connected support tool (the JW300 stops calculating.) - Goes OFF when the JW300 detects an error using its self-diagnosis function. (Lights when a battery error occurs.)
(2)	FAULT lamp (red)	Lights when detecting errors by self-diagnosis. JW300 stops its operations. (However, it operates even when battery is error.)
(3)	CM1 lamp (yellow)	Lights when communicating with personal computer or the like, by using PG/COMM1 port. Lights up in monitoring state by connecting a support tool.
(4)	CM2 lamp (yellow)	Lights when communicating with personal computer or the like, by using PG/COMM2 port. Lights up in monitoring state by connecting a support tool.
(5)	USB lamp (yelow)	Lights when the JW300 is communicating through its USB port.
(6)	MW lamp (red)	Blinks when changing the program memory. Goes OFF when special relay 7331 is turned ON.
(7)	CARD lamp	Lights when the JW300 is accessing a PC card.
(8)	PROTECT switch	Set prohibit (ON), enable (OFF) about writing to program memory and system memory.
(9)	AUTO LD switch	Select a mode for the memory card - When it is slid to the ON position, the JW300 automatically loads programs and data from a memory card (compact flash card) immediately after the power is turned ON.

↓
Next page

	Name	Function
(10)	RESET switch	Software reset - If the calculation time for one scan is abnormally long, the JW300 may repeat a run and stop sequence. In this case, press the RESET switch to change the JW300 to the program mode.
(11)	USB port *	A connector used to connect the JW300 to a USB port on a personal computer. (USB1.1 compatible.)
(12)	PG/COMM1 port * (RS-232C / RS-422A)	A connector for connecting with device having Serial I/O port such as support tool, personal computer. JW-311CU/312CU don't have PG/COMM2 port.
(13)	PG/COMM 2 port * (RS-232C / RS-422A)	
(14)	Card cover	Insert a CF or SRAM card into the PC card slot. Close the card cover to prevent the CF or SRAM card from falling out. (Protection). - The JW-311CU/321CU/331CU/341CU do not have a PC card slot or card cover.
(15)	PC card slot *	
(16)	Battery cover	A battery module for memory backup is provided inside; opened and closed when replacing battery. When delivered, the battery is not connected to the JW300. Before using the JW300, make sure to connect the battery assembly connector to the battery connecter on the control module. Then clear (initialize) the memory inside the JW300.
(17)	Validity period label on the battery	Indicates the period within which the battery (for memory back up) for the control module should be functional. Write down the time to replace the battery along with the conditions in which you are using the control module.

* With cover

4-2 Power supply module

The power supply modules that can be used with the JW300 are as follows:

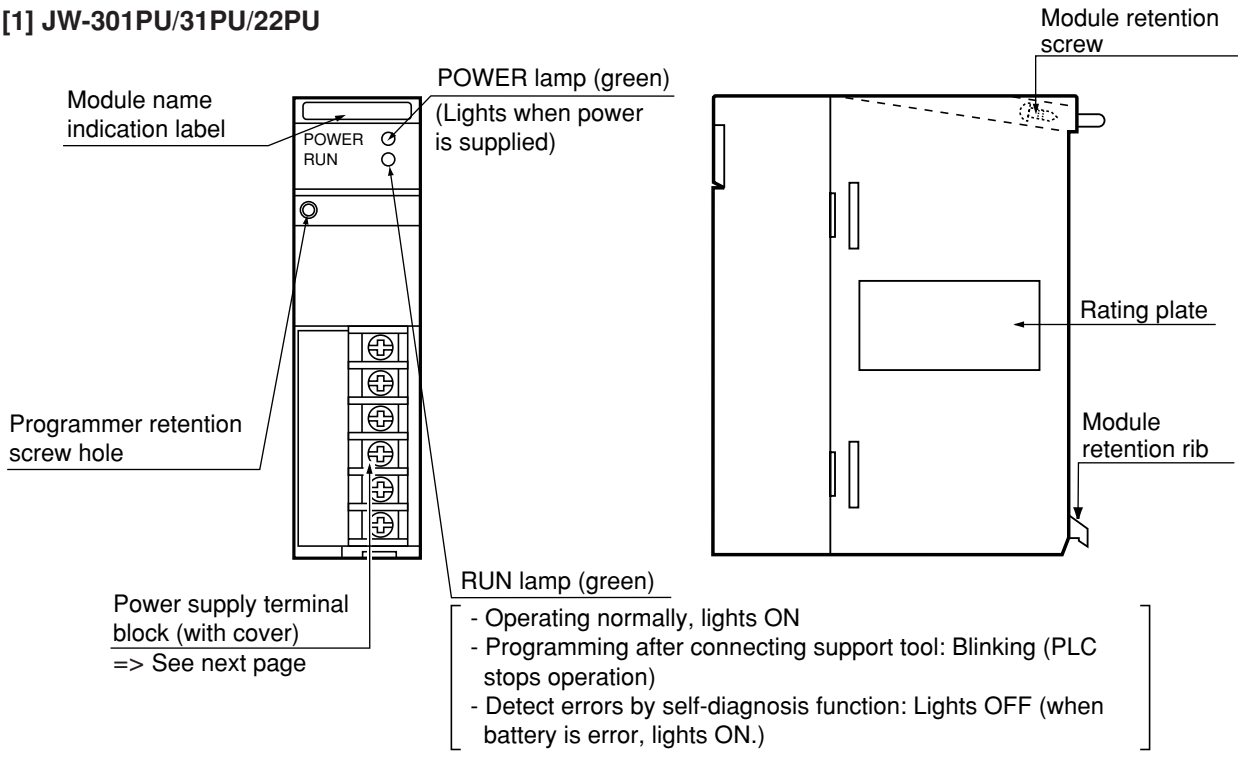
Model name	Specification	Approved UL	Approved CSA
JW-303PU *1	85 to 264 VAC. Power capacity: 5 VDC 4.5 A	——	——
JW-301PU *2	85 to 264 VAC. Power capacity: 5 VDC 3.5 A	——	——
JW-31PU	85 to 132 VAC. Power capacity: 5 VDC 3.5 A	O	O
JW-22PU	20.4 to 32 VDC. Power capacity: 5 VDC 3.5 A	——	——

*1: The JW-33PU power supply module for theJW20H/30H can also be used with the JW300.

*2: The JW-21PU power supply module for theJW20H/30H can also be used with the JW300.

- When a power supply module is installed on an expansion rack panel, and if a power is supplied to the power supply module on the basic rack panel without supplying power to the power supply module on the expansion rack panel, the system detects as "input/output error" (#0160 = Error code 40) or "expansion power supply error" (#0160 = Error code 43). Make sure to supply power also to the power supply module on the expansion rack panel.
- The power terminal block is equipped with a terminal block cover at delivery. Remove this cover when you wire. After connecting, make sure to put the cover to the original position.

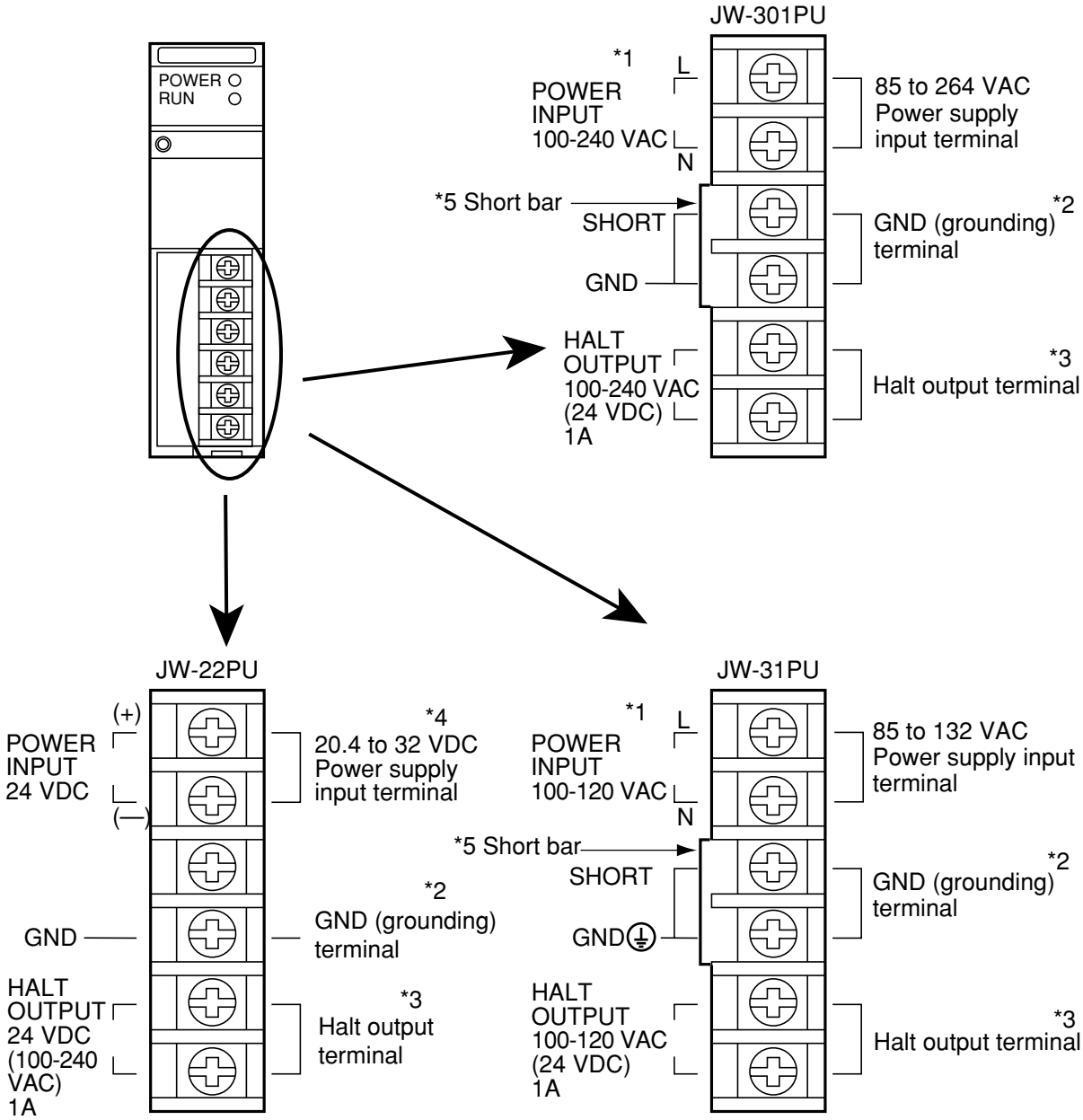
[1] JW-301PU/31PU/22PU



- The JW-301PU, 31PU, and 22PU are identical in shape.

[Power supply terminal block]

This is a terminal block for connecting extended line of power supply, GND, halt output and the like.



*1 Connect the power supply input of JW-301PU/31PU while paying attention to the L terminal (LIVE: non-grounded side) and N terminal (NEUTRAL: grounded side).

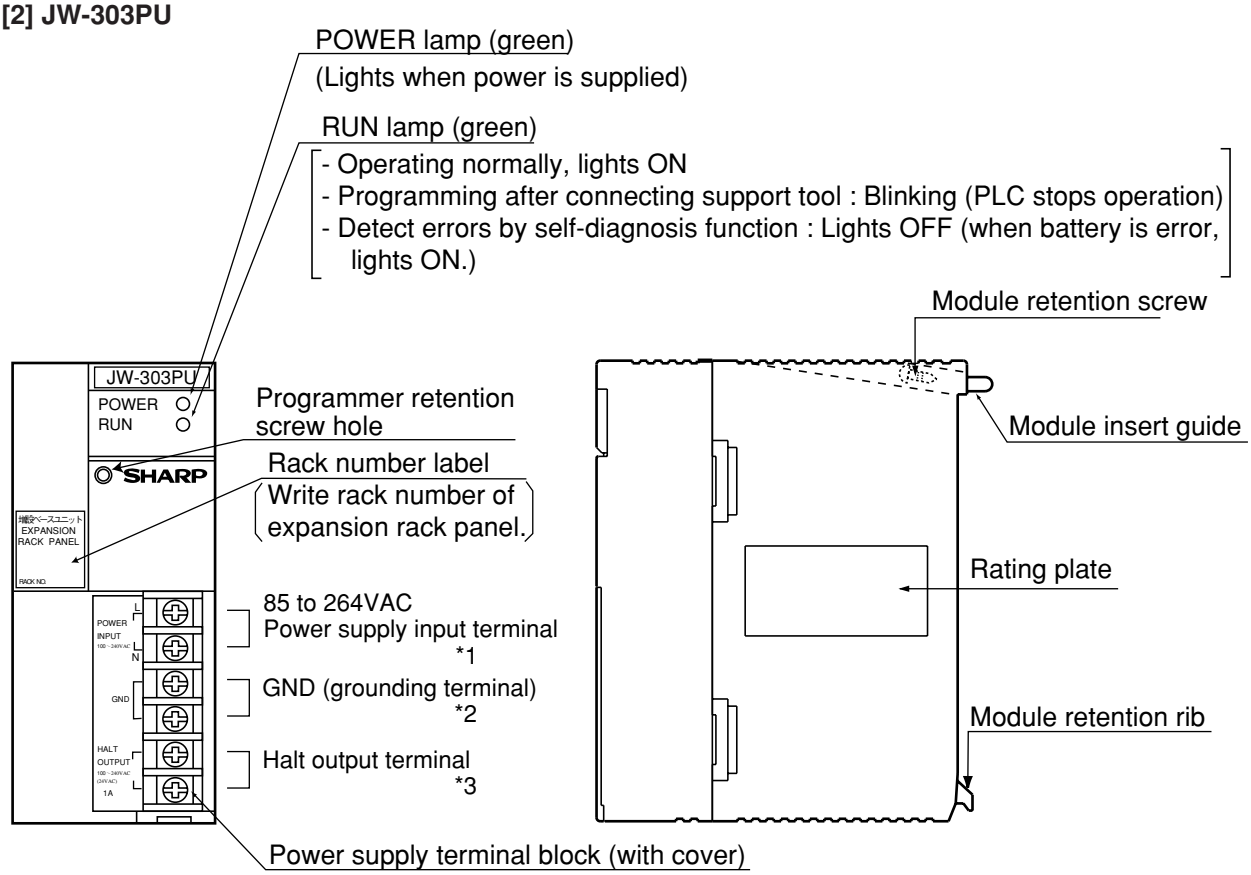
*2 To prevent electric shock and noise error, be sure to separately prepare class-3 grounding.

*3 Be sure to incorporate the line to the external emergency stop circuit.

*4 As for DC input power supply, use power source of 20.4 to 32 VDC (ripple rate 20% or less; however, ripple upper limit: 32 V or less, lower limit: 20.4 V or more).

*5 When testing insulation resistance or dielectric strength of the JW-301PU/31PU power supply modules, be sure to remove the short bar connecting between the SHORT terminal and the GND terminal. The power supply module has a serge absorber connected between the AC input line and the SHORT terminal, as well as a short bar between the SHORT terminal and the GND terminal at the time of shipment. If a test is carried out without removing the short bar, internal elements of the module may be damaged due to overcurrent.

[2] JW-303PU



*1: Connect the power supply input while paying attention to the terminal (LIVE: non-grounded side) and N terminal (NEUTRAL : grounded side).

*2: To prevent electric shock and noise, error, be sure to separately prepare class-3 grounding. Connect with internal between GND terminal.(Short bar having JW-301PU/31PU do not have in JW-303PU).

*3: Be sure to incorporate the line to the external emergency stop circuit.

4-3 Input/output module

The input/output module can be installed in any order in the I/O module slot of the basic/expansion rack panel.

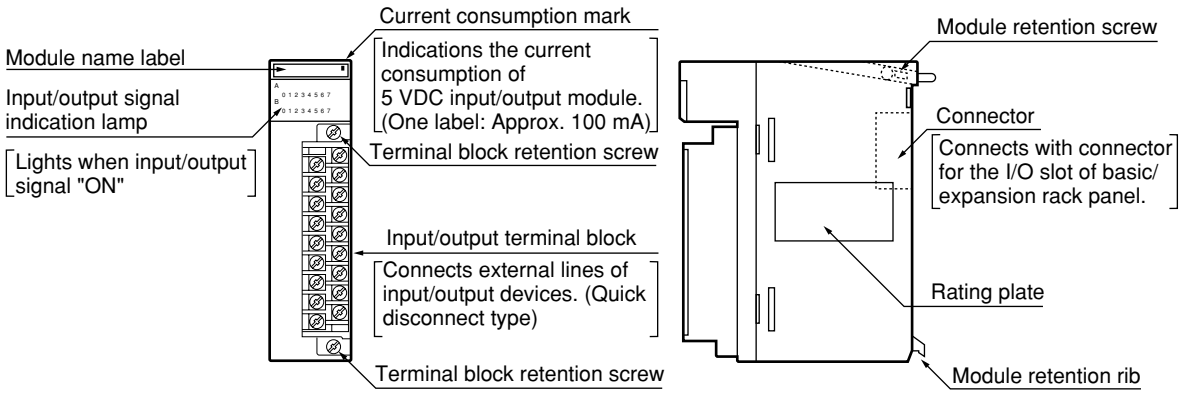
■ Kinds of input/output module

I/O modules having 8, 16, and 32 points are available.

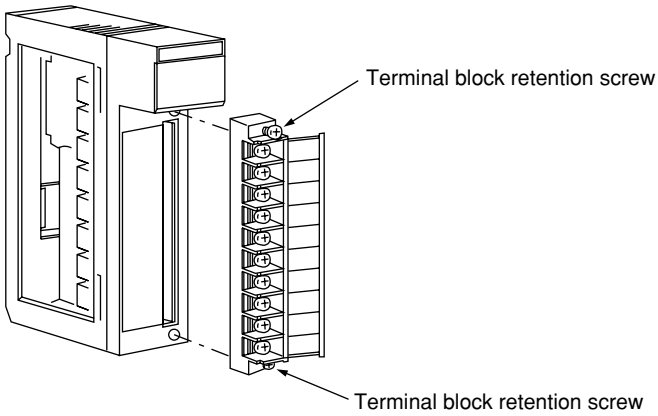
Special I/O modules having 64 points are available.

	Model name	Points	Specifications	Applied CE markings
Input	JW-203N	8	200/240 VAC	-
	JW-211NA	16	100/120 VAC	O
	JW-212NA	16	12/24 VDC	O
	JW-214NA	16	12/24 VDC (high speed type)	O
	JW-234N	32	12/24 VDC (high speed type, connector connection)	O
Output	JW-204SA	8	250 VAC/30 VDC, 2A, relay output (separated common)	-
	JW-212SA	16	5/12/24 VDC, 0.5A, transistor output (sink output)	O
	JW-213SA	16	100/200 VAC, 0.5A, triac output	O
	JW-214SA	16	250 VAC/30 VDC, 2A, relay output	O
	JW-232S	32	5/12/24 VDC, 0.1A, transistor output (sink output, connector connection)	O
I/O	JW-232M	12/24 VDC, input 16 points, transistor 16 points output, 0.1A (sink output, connector connection)		O
Special I/O	JW-264N	64	24 VDC (high speed type, connector connection)	O
	JW-262S	64	5/12/24 VDC, 0.1A transistor output (sink output, connector connection)	O

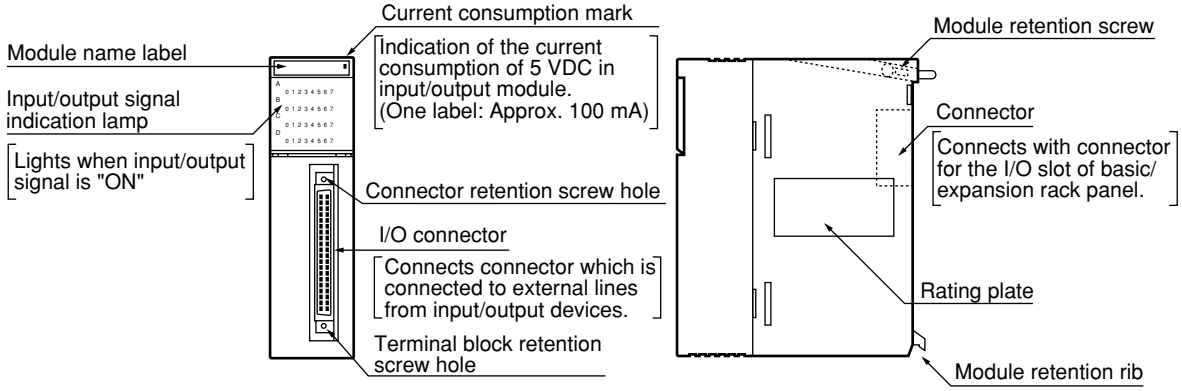
[1] 8/16 points module



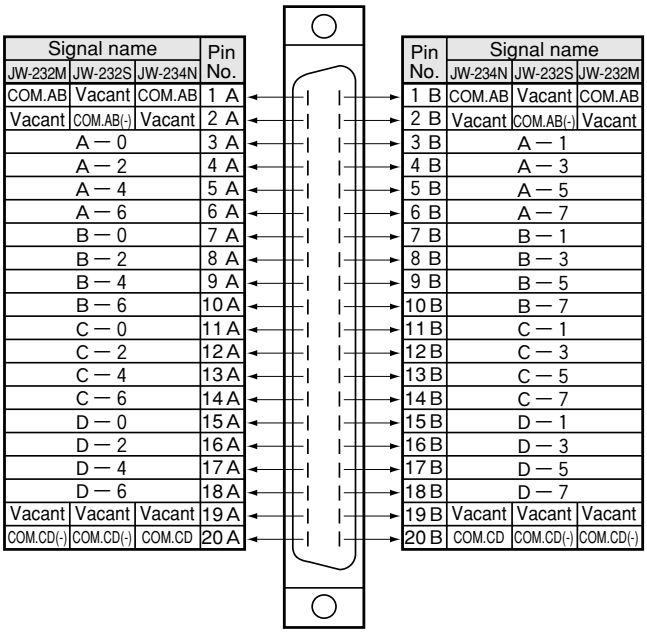
The terminal block connecting external lines in 8/16 points I/O module is quick-disconnect type. Loosen 2 mounting screws provided in upper and lower positions of the terminal block, then the terminal block can be detached. And a malfunctioning I/O module can be replaced without removing the external lines from the terminal block.



[2] 32 points module



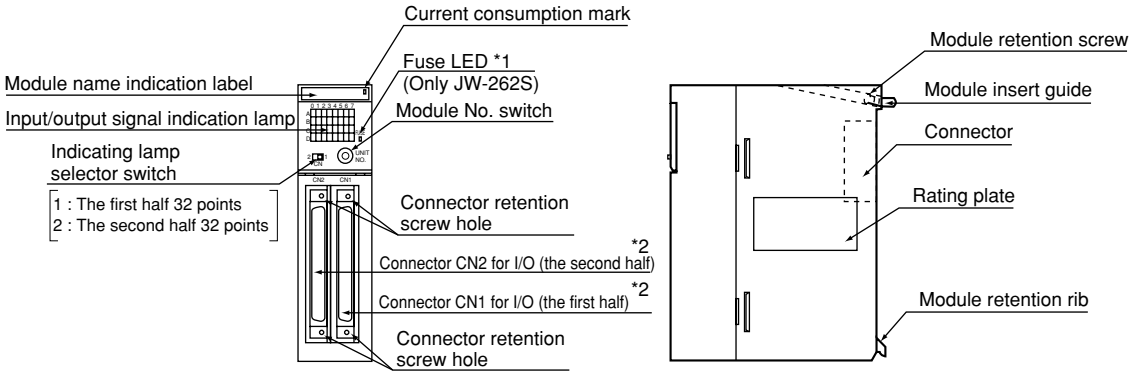
[Pin No. of I/O connector and signal name]



Signal name			Pin No.
JW-232M	JW-232S	JW-234N	
COM.AB	Vacant	COM.AB	1 A
Vacant	COM.AB(-)	Vacant	2 A
A — 0			3 A
A — 2			4 A
A — 4			5 A
A — 6			6 A
B — 0			7 A
B — 2			8 A
B — 4			9 A
B — 6			10 A
C — 0			11 A
C — 2			12 A
C — 4			13 A
C — 6			14 A
D — 0			15 A
D — 2			16 A
D — 4			17 A
D — 6			18 A
Vacant	Vacant	Vacant	19 A
COM.CD(-)	COM.CD(-)	COM.CD	20 A

Pin No.	Signal name		
	JW-234N	JW-232S	JW-232M
1 B	COM.AB	Vacant	COM.AB
2 B	Vacant	COM.AB(-)	Vacant
3 B	A — 1		
4 B	A — 3		
5 B	A — 5		
6 B	A — 7		
7 B	B — 1		
8 B	B — 3		
9 B	B — 5		
10 B	B — 7		
11 B	C — 1		
12 B	C — 3		
13 B	C — 5		
14 B	C — 7		
15 B	D — 1		
16 B	D — 3		
17 B	D — 5		
18 B	D — 7		
19 B	Vacant	Vacant	Vacant
20 B	COM.CD	COM.CD(-)	COM.CD(-)

[3] 64 points module



*1 The fuse LED (JW-262S only) lights up (red) when the blown fuse or when the load power supply is turned OFF. When the connector CN1 or CN2 is not used (not connected), power supply is not applied to line (+) and COM (–), and hence the fuse LED lights (red). (It has, however, no effect on the output operation of the operating connector side.)
In this case, by connecting the furnished connector to an idle connector and applying power supply between line (+) and COM (–), it prevents from lighting of fuse LED due to idle connector.

*2 Pin No. of connector CN1, CN2 and signal name

● **CN1 (The first half 32 points)**

CN1

Signal name		Pin No.
JW-264N	JW-262S	
COM.1	Power supply 1 (+)	1 A
Vacant	COM.1 (-)	2 A
A — 0		3 A
A — 2		4 A
A — 4		5 A
A — 6		6 A
B — 0		7 A
B — 2		8 A
B — 4		9 A
B — 6		10 A
C — 0		11 A
C — 2		12 A
C — 4		13 A
C — 6		14 A
D — 0		15 A
D — 2		16 A
D — 4		17 A
D — 6		18 A
Vacant	COM.1 (-)	19 A
COM.1	Power supply 1 (+)	20 A

- Pin number 1A and 20A, and 1B and 20B of JW-264N are respectively connected inside.

Pin No.	Signal name	
	JW-264N	JW-262S
1 B	COM.1	Power supply 1 (+)
2 B	Vacant	COM.1 (-)
3 B	A — 1	
4 B	A — 3	
5 B	A — 5	
6 B	A — 7	
7 B	B — 1	
8 B	B — 3	
9 B	B — 5	
10 B	B — 7	
11 B	C — 1	
12 B	C — 3	
13 B	C — 5	
14 B	C — 7	
15 B	D — 1	
16 B	D — 3	
17 B	D — 5	
18 B	D — 7	
19 B	Vacant	COM.1 (-)
20 B	COM.1	Power supply 1 (+)

- Pin number 1A and 19A, 2A and 20B, 1B and 19B, and 2B and 20B of JW-262S are respectively connected insides.

● **CN2 (The second half 32 points)**

CN2

Signal name		Pin No.
JW-264N	JW-262S	
COM.2	Power supply 2 (+)	1 A
Vacant	COM.2 (-)	2 A
A — 0		3 A
A — 2		4 A
A — 4		5 A
A — 6		6 A
B — 0		7 A
B — 2		8 A
B — 4		9 A
B — 6		10 A
C — 0		11 A
C — 2		12 A
C — 4		13 A
C — 6		14 A
D — 0		15 A
D — 2		16 A
D — 4		17 A
D — 6		18 A
Vacant	COM.2 (-)	19 A
COM.2	Power supply 2 (+)	20 A

- Pin number 1A and 20A, and 1B and 20B of JW-264N are respectively connected inside.

Pin No.	Signal name	
	JW-264N	JW-262S
1 B	COM.2	Power supply 2 (+)
2 B	Vacant	COM.2 (-)
3 B	A — 1	
4 B	A — 3	
5 B	A — 5	
6 B	A — 7	
7 B	B — 1	
8 B	B — 3	
9 B	B — 5	
10 B	B — 7	
11 B	C — 1	
12 B	C — 3	
13 B	C — 5	
14 B	C — 7	
15 B	D — 1	
16 B	D — 3	
17 B	D — 5	
18 B	D — 7	
19 B	Vacant	COM.2 (-)
20 B	COM.2	Power supply 2 (+)

- Pin number 1A and 19A, 2A and 20A, 1B and 19B, and 2B and 20B of JW-262S are respectively connected insides.

Relation with relay number
=> See A-1

4-4 Basic/expansion rack panel

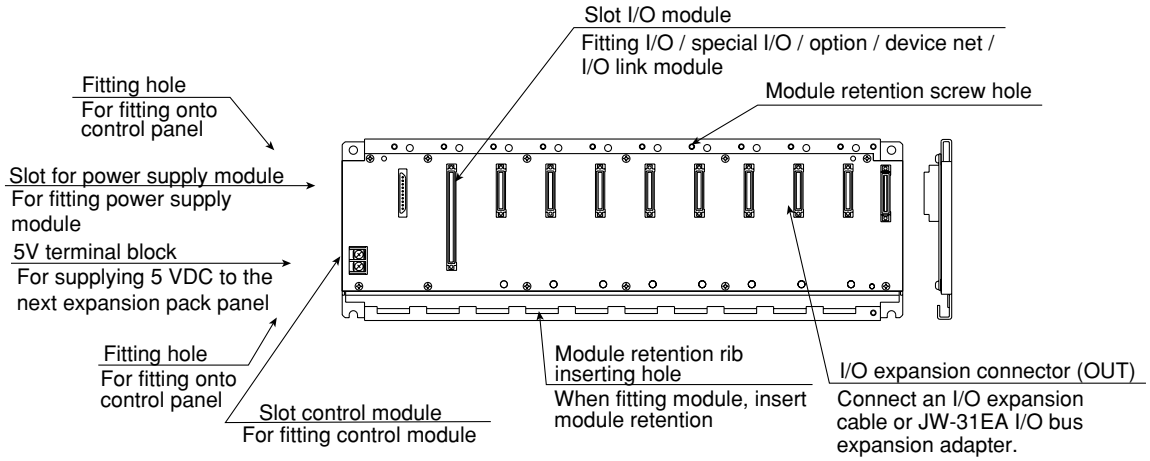
[1] Basic rack panel

Three types of basic rack panels are provided, with variations in the number of slots available for connecting I/O modules.

Model name	Number of slots		
	For power supply module	For control module	For I/O module
JW-314KB	1	1	4
JW-316KB	1	1	6
JW-318KB	1	1	8

In the slot for I/O module, I/O, special I/O, I/O link, and option module, device net, and I/O link can be connected in mixture.

- JW-318KB



- Compared with the JW-318KB, the JW-314KB and JW-316KB differ only in the number of slots for connecting I/O modules.

Note

- Put a connector cover on unused slots to prevent dust from entering.
  Connector covers are put on each slot when delivered.

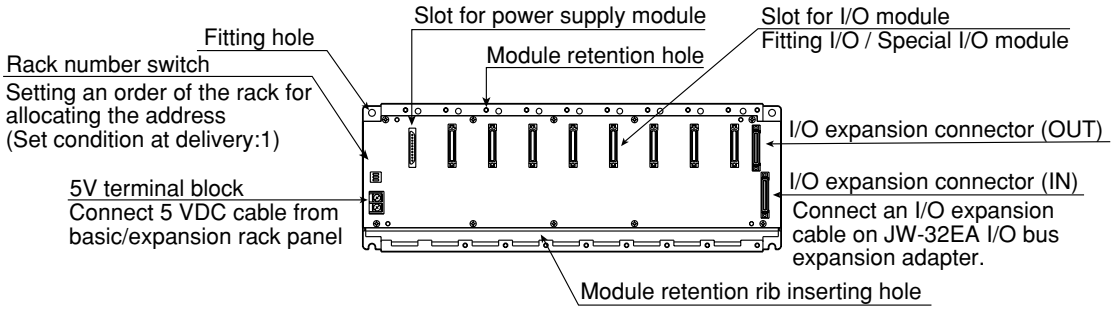
[2] Expansion rack panel

Three types of expansion rack panels are provided, with variations in the number of slots available for connecting I/O modules.

Model name	No. of slot	
	For power supply module	For I/O module
JW-34ZB	1	4
JW-36ZB	1	6
JW-38ZB	1	8

In the slot for I/O module, I/O and special I/O module can be connected in mixture. The option, device net, and I/O link module cannot be installed on it.

- JW-38ZB



- Compared with the JW-38ZB, the JW-34ZB and JW-36ZB differ only in the number of slots for connecting I/O modules.

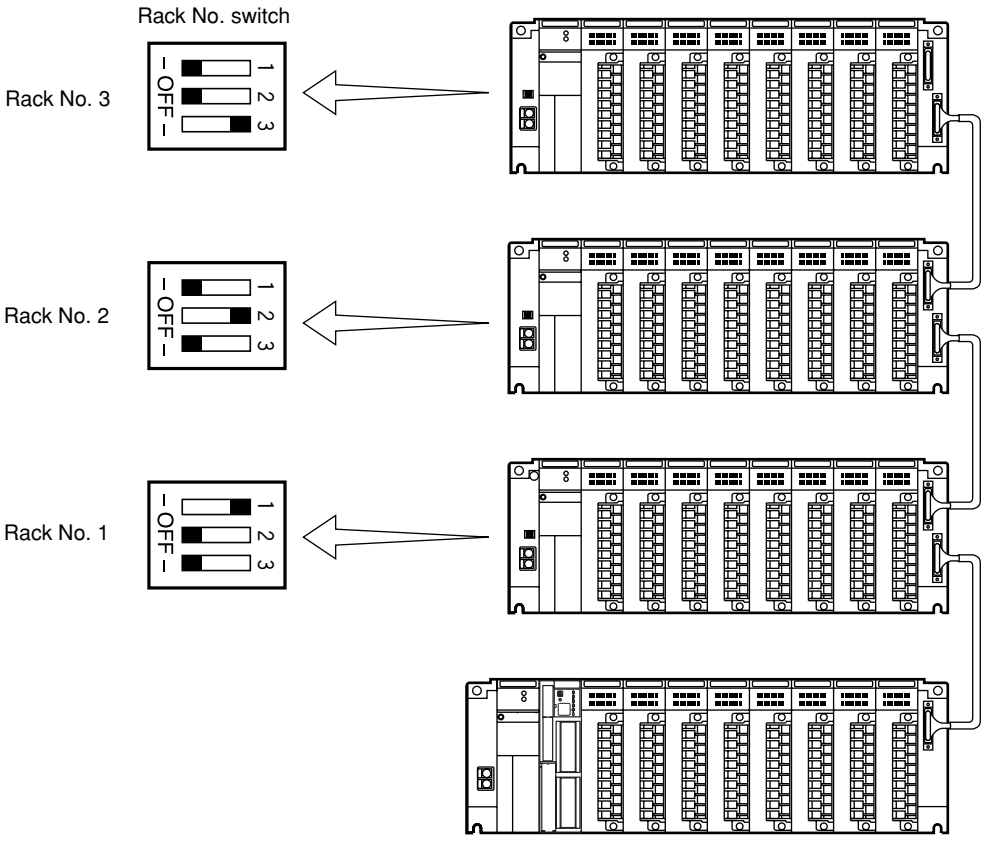
Note

- Put a connector cover on unused slots to prevent dust from entering.
  Connector covers are put on each slot when delivered.

[3] Rack No. (expansion rack panel)

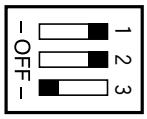
(1) In case of not using I/O bus expansion adapter

System can be configured with up to 4 racks, and each rack ID number will be specified by the settings of the rack number switch on the expansion rack panel(JW-34ZB/36ZB/38ZB).
The basic rack panel is fixed to rack No. 0.



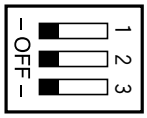
It is a table registration error (70) or table verification error (60) when the rack number switch is set as follows 1 to 3, and the JW300 does not operate.

1. There are plural ON settings.



[Ex.]

2. All setting of the rack no. is OFF.

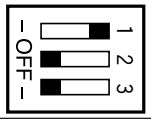
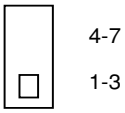
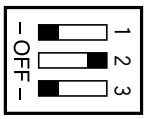
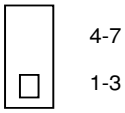
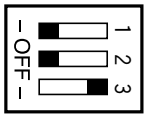
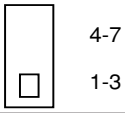
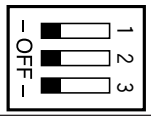
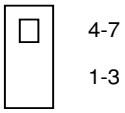
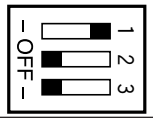
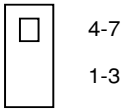
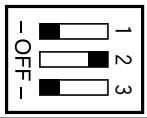
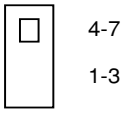
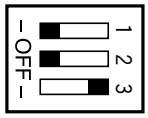
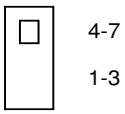


3. Rack numbers are duplicated with other expansion rack panel.
   The error code is stored in the system memory #0160.
   The shipping setting of rack number switch is "1: switch 1 is ON."

(2) In case of using I/O bus expansion adapter

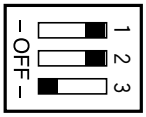
System can be configured with max. 8 racks when an expansion rack panel, JW-34ZB/36ZB/38ZB, is connected with an I/O bus expansion adapter, JW-32EA. Each rack panel ID number will be defined by combination of settings for the rack number switches on the expansion rack panel and the JW-32EA.

The basic rack panel is fixed to rack No. 0.

Rack No.	Rack No. switch of expansion rack panel	Rack No. switch of I/O bus expansion adapter (JW-32EA)
1	ON for only No. 1 	1-3 side 
2	ON for only No. 2 	1-3 side 
3	ON for only No. 3 	1-3 side 
4	OFF for all 	4-7 side 
5	ON for only No. 1 	4-7 side 
6	ON for only No. 2 	4-7 side 
7	ON for only No. 3 	4-7 side 

It is a table registration error (70) or table verification error (60) when the rack number switch is set as follows 1, 2, and the JW300 does not operate.

1. There are plural ON settings.

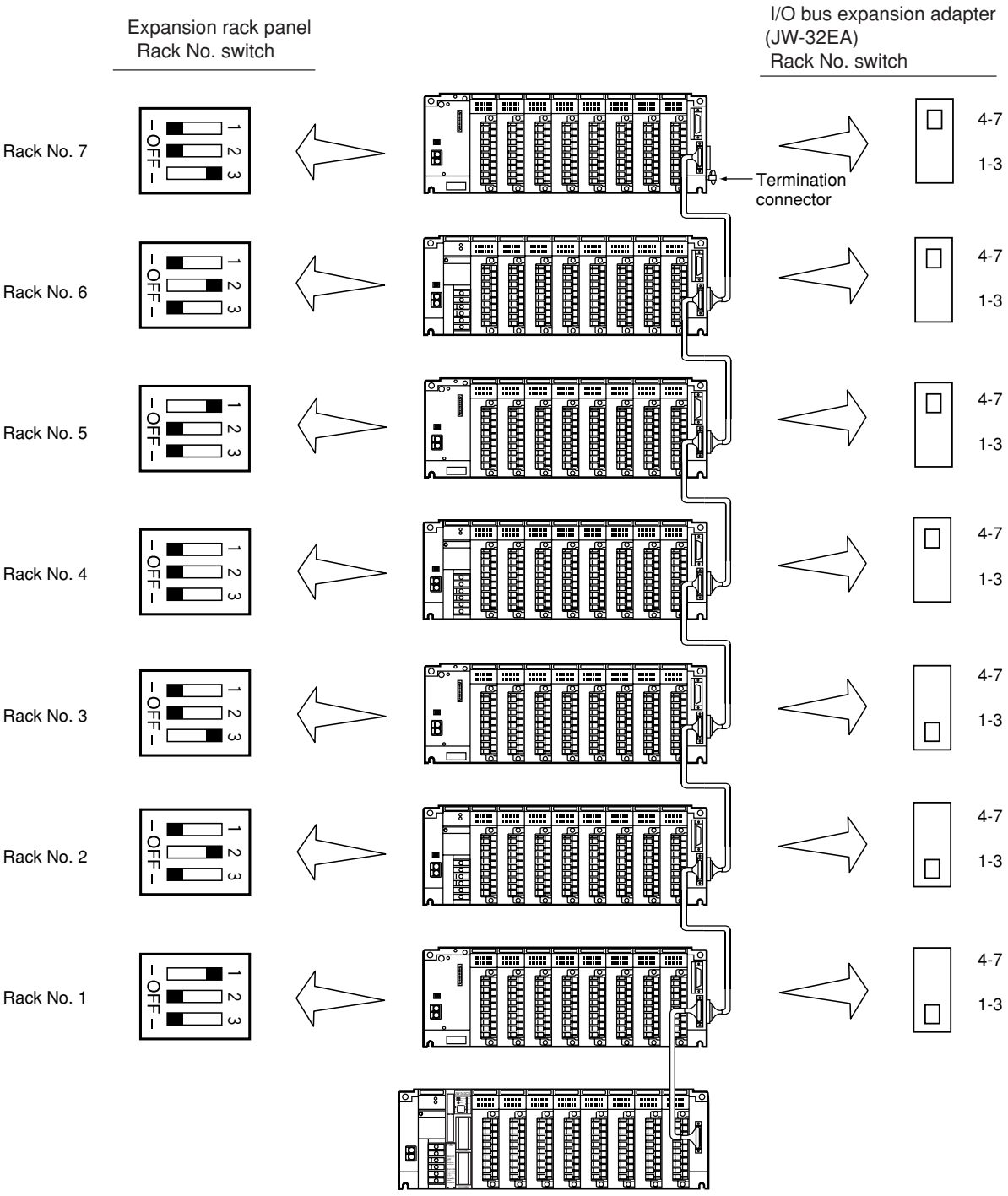
 [Ex.]

2. Rack numbers are duplicated with other expansion rack panel.

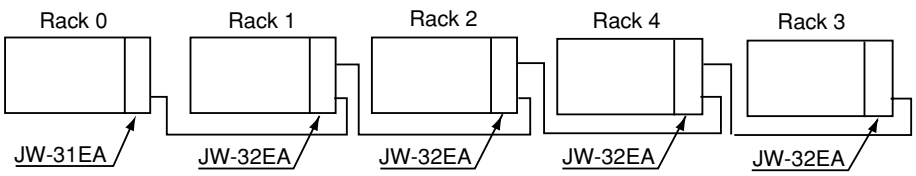
The shipping setting of rack number switch is "1 : switch 1 is ON," and that of I/O bus expansion adapter is "1 to 3" side.

For I/O bus expansion adapter, see page 4-16 to 18.

(3) Setting example for rack No.



Note: Rack numbers are not necessarily set in order of added timings. For example, they can be set as shown below.



[4] Important points when using basic /expansion rack panels

System specifications can be defined by the combination of basic rack panel and expansion rack panel as shown in the table below.

■ **Combinations of basic and expansion rack panels**

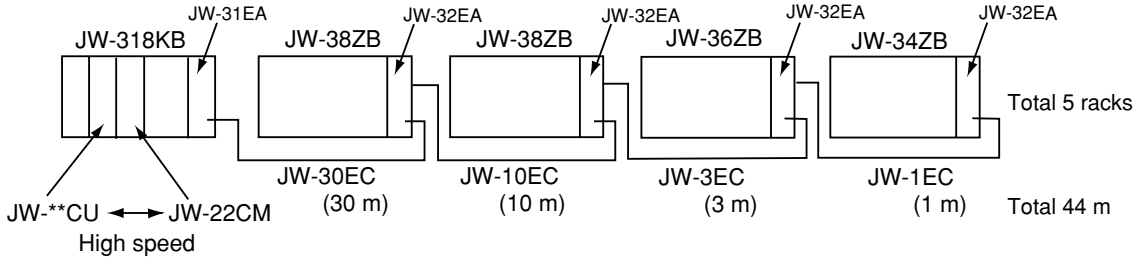
Expansion rack panel \ Basic rack panel	JW-314KB/36KB/318KB (Without JW-31EA)	JW-314KB/316KB/318KB (With JW-31EA)
None	A	Unable to use in combination
JW-34ZB/36ZB/38ZB (Without JW-32EA)	B	Unable to use in combination
JW-34ZB/36ZB/38ZB (With JW-32EA)	Unable to use in combination	C

■ **System specifications**

Specifications	Combinations of basic/expansion rack panels (as above)		
	A	B	C
Max. number of racks	1	4	8
Total expansion length	-	14 m	50 m
Option bus speed (Note)	High speed	Conventional speed	High speed
I/O expansion cable	-	JW-203EC (30 cm) JW-207EC (70 cm) JW-22EC (2 m) JW-25EC (5 m) JW-210EC (10 m)	JW-05EC (50 cm) JW-1EC (1 m) JW-3EC (3 m) JW-10EC (10 m) JW-20EC (20 m) JW-30EC (30 m) JW-50EC (50 m)

Note: Option bus speed is data exchange speed between an option module and a control module, and the “high speed” is twice faster than the “conventional speed.”

- An example of combination C above

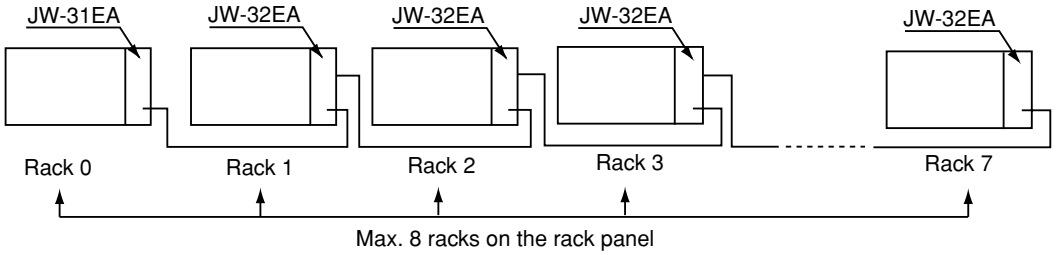


4-5 I/O bus expansion adapter

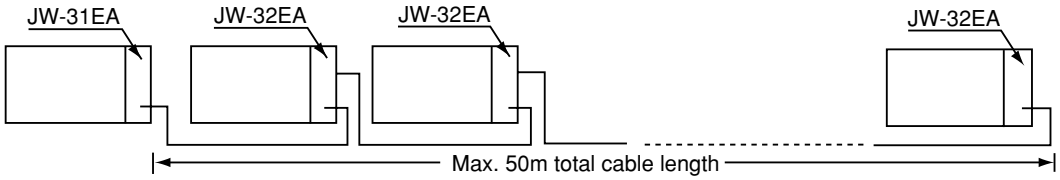
I/O bus expansion adapter for the JW30H has two available models, the JW-31EA and the JW-32EA, that are used to link signals sent from each rack panel. The JW-31EA is installed in the basic rack panel JW-314KB/316KB/318KB, while the JW-32EA is installed in the expansion rack panel JW-34ZB/36ZB/38ZB. The I/O expansion cable, JW-05EC/1EC/3EC/10EC/20EC/30EC/50EC, is used to connect rack panels (install the I/O bus expansion adapter). (See page 6-18 for connection method of I/O expansion cable).

I/O bus expansion adapter is used for the following cases:

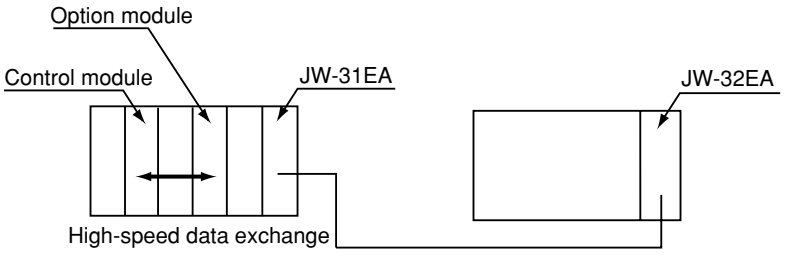
1) In the case of using min. 5 racks (max. 8) on the rack panel



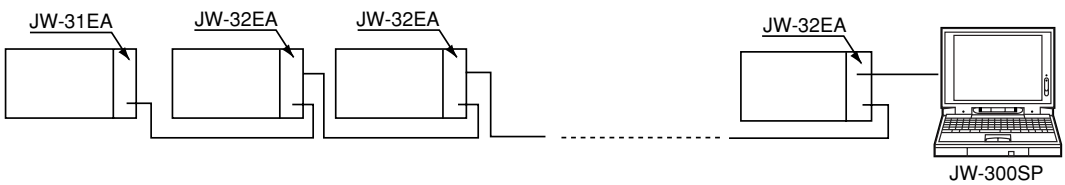
2) In the case of keeping a min. distance of 11 m (max. 50 m) between rack panels, or keeping a min. distance of 15 m (max. 50 m) between the basic rack panel and the last expansion rack panel:



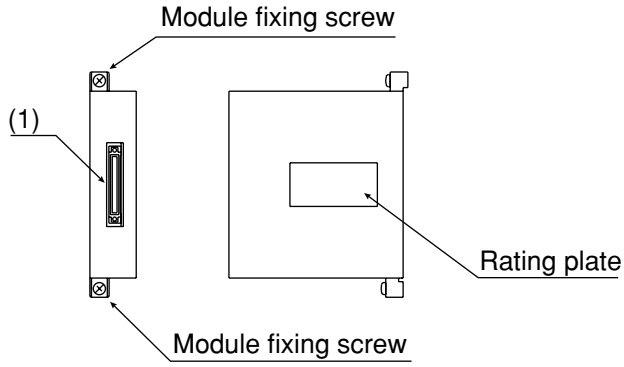
3) In the case of operating a high-speed data exchange (twice faster than without using I/O bus expansion adapter) between an option module, such as JW-21CM and JW-22CM, and a control module on a system that needs an expansion rack panel:



4) In the case of creating, changing, or monitoring a program on the expansion rack panel side using a support tool (JW-300SP, JW-15PG).



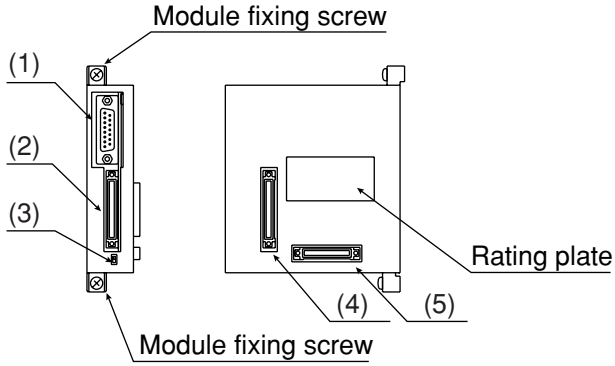
[1] JW-31EA



(1) I/O expansion connector

Connect between the I/O expansion connectors (IN) of JW-32EA using I/O expansion cables.

[2] JW-32EA



(1) Connector for support tool connection (EA-PG port)

Connecting a support tool (JW-300SP, JW-15PG), such as a hand-held programmer, enables creating/changing/monitoring program on the expansion rack panel that is max. 50 meters away.

This connector can be used for communication with equipment that has serial I/O ports, such as a personal computer. This connector is seen as Communication Port 3 in the JW300 system.

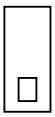
(2) I/O expansion connector (IN)

Connect this connector and an I/O expansion connector (OUT) on the JW-31EAs or the JW-32EAs (a front rack) using an I/O expansion cable.

(3) Rack No. switch

Set rack numbers on the mounted rack panel.

Rack No.



4-7: Racks 4 to 7

1-3: Racks 1 to 3 (setting at delivery)

Rack ID numbers are determined by combined setting of this rack number switches and ones on the expansion rack panel, JW-34ZB/36ZB/38ZB. See page 4-13 for details.

(4) I/O expansion connector (OUT)

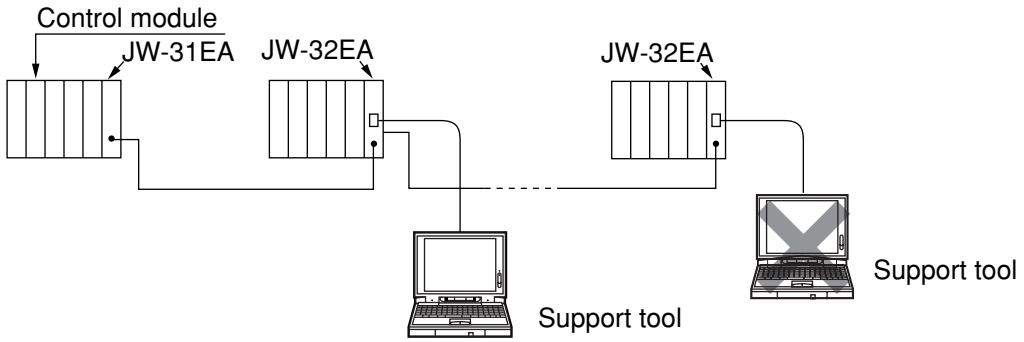
Connect this connector and an I/O expansion connector (IN) on the JW-32EA (the next rack) using an I/O expansion cable.

(5) Termination connector insert

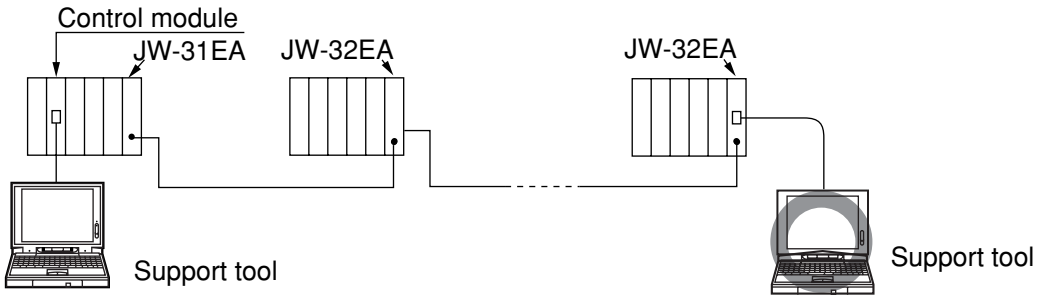
Insert a termination connector when a mounted expansion rack panel is at the end of the system. One each termination connector is supplied with each JW-31EA.

Notes

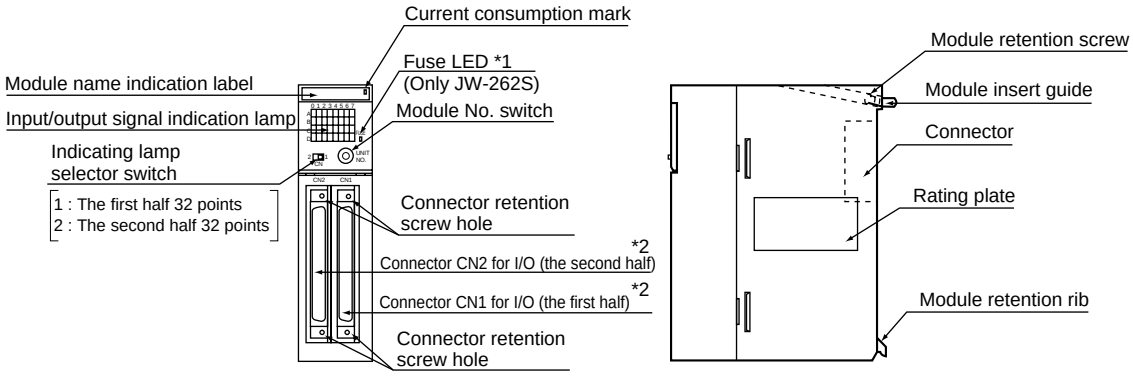
- Only one support tool (JW-300SP, JW-15PG) can be connected to the JW-32EA.
  [Ex.]



- With the JW300 system, while a support tool (JW-300SP, JW-15PG) is connected to the control module, another support tool can be connected to the JW-32EA. (The JW30H cannot connect to a support tool under this condition.)
  [Ex.]



[3] 64 points module



*1 The fuse LED (JW-262S only) lights up (red) when the blown fuse or when the load power supply is turned OFF. When the connector CN1 or CN2 is not used (not connected), power supply is not applied to line (+) and COM (–), and hence the fuse LED lights (red). (It has, however, no effect on the output operation of the operating connector side.)
In this case, by connecting the furnished connector to an idle connector and applying power supply between line (+) and COM (–), it prevents from lighting of fuse LED due to idle connector.

*2 Pin No. of connector CN1, CN2 and signal name

● **CN1 (The first half 32 points)**

CN1

Signal name		Pin No.
JW-264N	JW-262S	
COM.1	Power supply 1 (+)	1 A
Vacant	COM.1 (-)	2 A
A — 0		3 A
A — 2		4 A
A — 4		5 A
A — 6		6 A
B — 0		7 A
B — 2		8 A
B — 4		9 A
B — 6		10 A
C — 0		11 A
C — 2		12 A
C — 4		13 A
C — 6		14 A
D — 0		15 A
D — 2		16 A
D — 4		17 A
D — 6		18 A
Vacant	COM.1 (-)	19 A
COM.1	Power supply 1 (+)	20 A

Pin No.	Signal name	
	JW-264N	JW-262S
1 B	COM.1	Power supply 1 (+)
2 B	Vacant	COM.1 (-)
3 B	A — 1	
4 B	A — 3	
5 B	A — 5	
6 B	A — 7	
7 B	B — 1	
8 B	B — 3	
9 B	B — 5	
10 B	B — 7	
11 B	C — 1	
12 B	C — 3	
13 B	C — 5	
14 B	C — 7	
15 B	D — 1	
16 B	D — 3	
17 B	D — 5	
18 B	D — 7	
19 B	Vacant	COM.1 (-)
20 B	COM.1	Power supply 1 (+)

- Pin number 1A and 20A, and 1B and 20B of JW-264N are respectively connected inside.

- Pin number 1A and 19A, 2A and 20B, 1B and 19B, and 2B and 20B of JW-262S are respectively connected insides.

● **CN2 (The second half 32 points)**

CN2

Signal name		Pin No.
JW-264N	JW-262S	
COM.2	Power supply 2 (+)	1 A
Vacant	COM.2 (-)	2 A
A — 0		3 A
A — 2		4 A
A — 4		5 A
A — 6		6 A
B — 0		7 A
B — 2		8 A
B — 4		9 A
B — 6		10 A
C — 0		11 A
C — 2		12 A
C — 4		13 A
C — 6		14 A
D — 0		15 A
D — 2		16 A
D — 4		17 A
D — 6		18 A
Vacant	COM.2 (-)	19 A
COM.2	Power supply 2 (+)	20 A

Pin No.	Signal name	
	JW-264N	JW-262S
1 B	COM.2	Power supply 2 (+)
2 B	Vacant	COM.2 (-)
3 B	A — 1	
4 B	A — 3	
5 B	A — 5	
6 B	A — 7	
7 B	B — 1	
8 B	B — 3	
9 B	B — 5	
10 B	B — 7	
11 B	C — 1	
12 B	C — 3	
13 B	C — 5	
14 B	C — 7	
15 B	D — 1	
16 B	D — 3	
17 B	D — 5	
18 B	D — 7	
19 B	Vacant	COM.2 (-)
20 B	COM.2	Power supply 2 (+)

- Pin number 1A and 20A, and 1B and 20B of JW-264N are respectively connected inside.

- Pin number 1A and 19A, 2A and 20A, 1B and 19B, and 2B and 20B of JW-262S are respectively connected insides.

Relation with relay number
=> See A-1

4-4 Basic/expansion rack panel

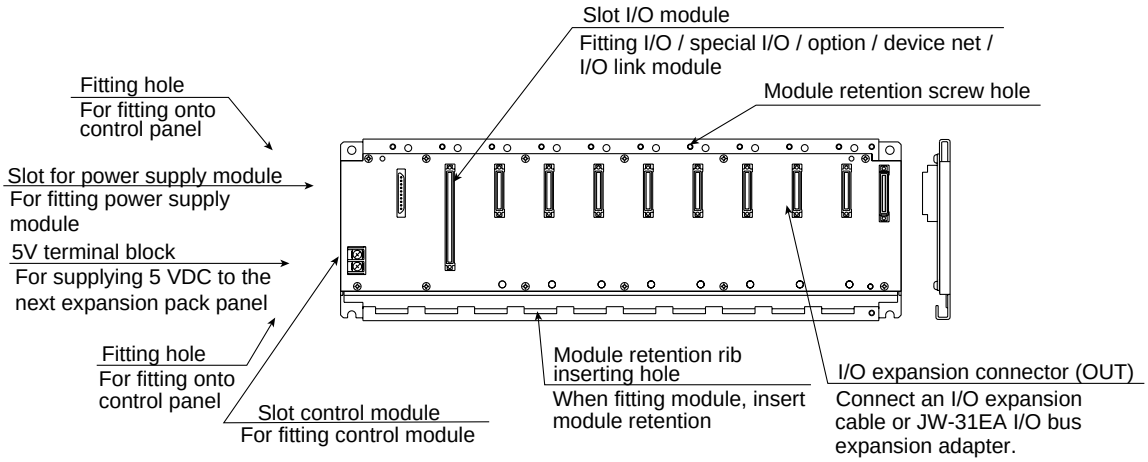
[1] Basic rack panel

Three types of basic rack panels are provided, with variations in the number of slots available for connecting I/O modules.

Model name	Number of slots		
	For power supply module	For control module	For I/O module
JW-314KB	1	1	4
JW-316KB	1	1	6
JW-318KB	1	1	8

In the slot for I/O module, I/O, special I/O, I/O link, and option module, device net, and I/O link can be connected in mixture.

- JW-318KB



- Compared with the JW-318KB, the JW-314KB and JW-316KB differ only in the number of slots for connecting I/O modules.

Note

- Put a connector cover on unused slots to prevent dust from entering.
  Connector covers are put on each slot when delivered.

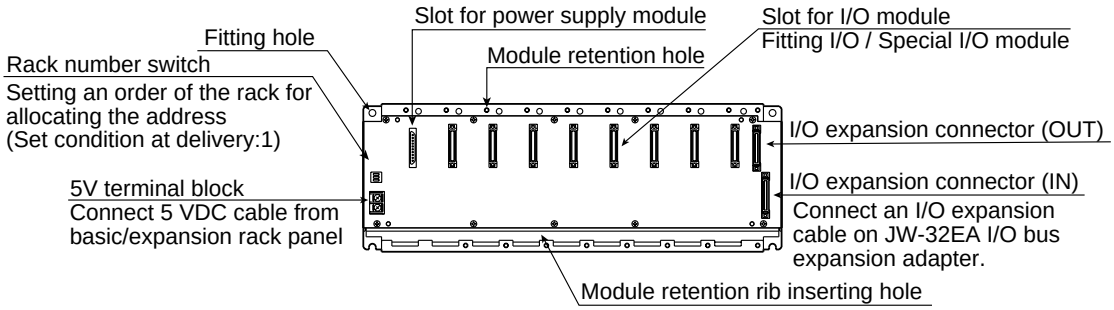
[2] Expansion rack panel

Three types of expansion rack panels are provided, with variations in the number of slots available for connecting I/O modules.

Model name	No. of slot	
	For power supply module	For I/O module
JW-34ZB	1	4
JW-36ZB	1	6
JW-38ZB	1	8

In the slot for I/O module, I/O and special I/O module can be connected in mixture. The option, device net, and I/O link module cannot be installed on it.

- JW-38ZB



- Compared with the JW-38ZB, the JW-34ZB and JW-36ZB differ only in the number of slots for connecting I/O modules.

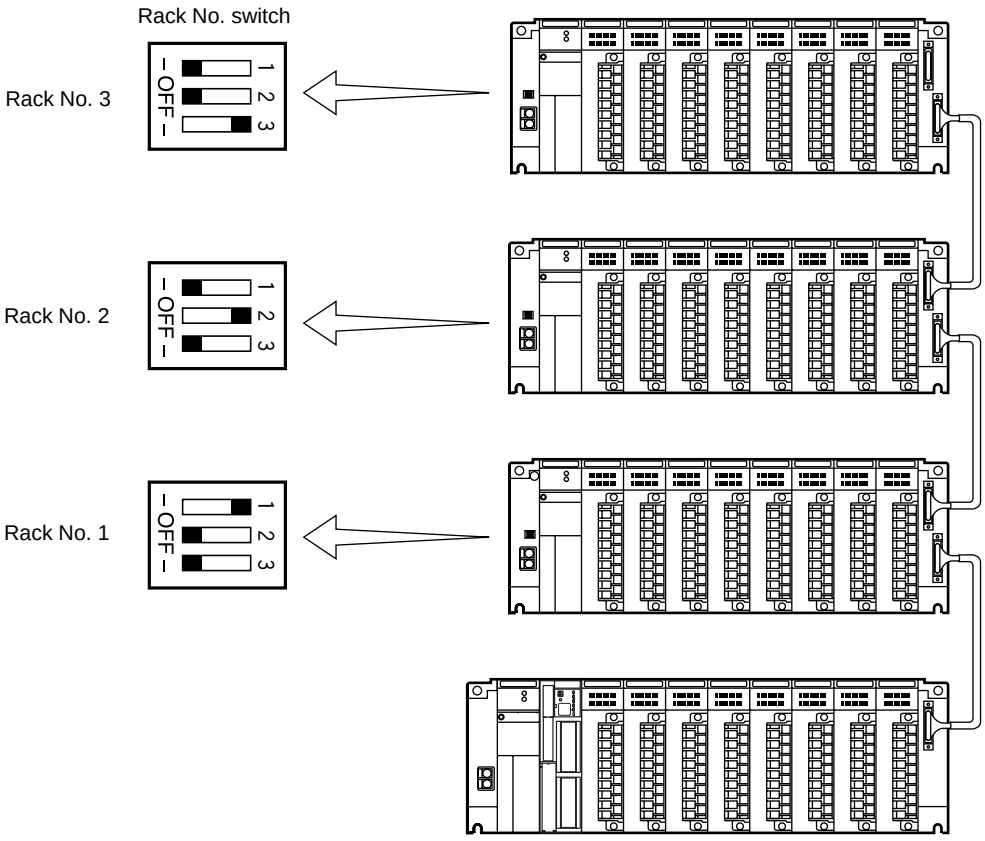
Note

- Put a connector cover on unused slots to prevent dust from entering.
  Connector covers are put on each slot when delivered.

[3] Rack No. (expansion rack panel)

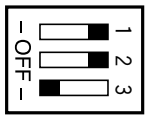
(1) In case of not using I/O bus expansion adapter

System can be configured with up to 4 racks, and each rack ID number will be specified by the settings of the rack number switch on the expansion rack panel(JW-34ZB/36ZB/38ZB).
The basic rack panel is fixed to rack No. 0.



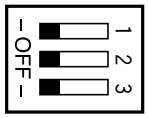
It is a table registration error (70) or table verification error (60) when the rack number switch is set as follows 1 to 3, and the JW300 does not operate.

1. There are plural ON settings.



[Ex.]

2. All setting of the rack no. is OFF.

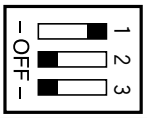
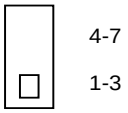
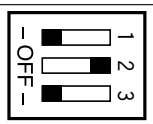
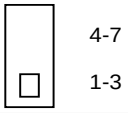
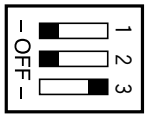
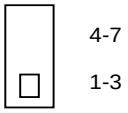
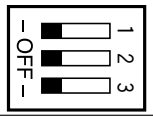
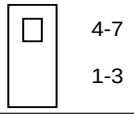
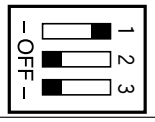
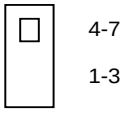
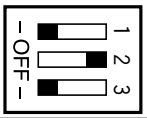
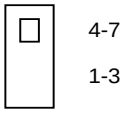
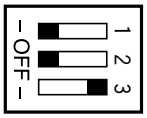
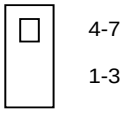


3. Rack numbers are duplicated with other expansion rack panel.
   The error code is stored in the system memory #0160.
   The shipping setting of rack number switch is "1: switch 1 is ON."

(2) In case of using I/O bus expansion adapter

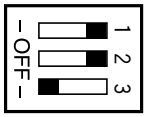
System can be configured with max. 8 racks when an expansion rack panel, JW-34ZB/36ZB/38ZB, is connected with an I/O bus expansion adapter, JW-32EA. Each rack panel ID number will be defined by combination of settings for the rack number switches on the expansion rack panel and the JW-32EA.

The basic rack panel is fixed to rack No. 0.

Rack No.	Rack No. switch of expansion rack panel	Rack No. switch of I/O bus expansion adapter (JW-32EA)
1	ON for only No. 1 	1-3 side 
2	ON for only No. 2 	1-3 side 
3	ON for only No. 3 	1-3 side 
4	OFF for all 	4-7 side 
5	ON for only No. 1 	4-7 side 
6	ON for only No. 2 	4-7 side 
7	ON for only No. 3 	4-7 side 

It is a table registration error (70) or table verification error (60) when the rack number switch is set as follows 1, 2, and the JW300 does not operate.

1. There are plural ON settings.

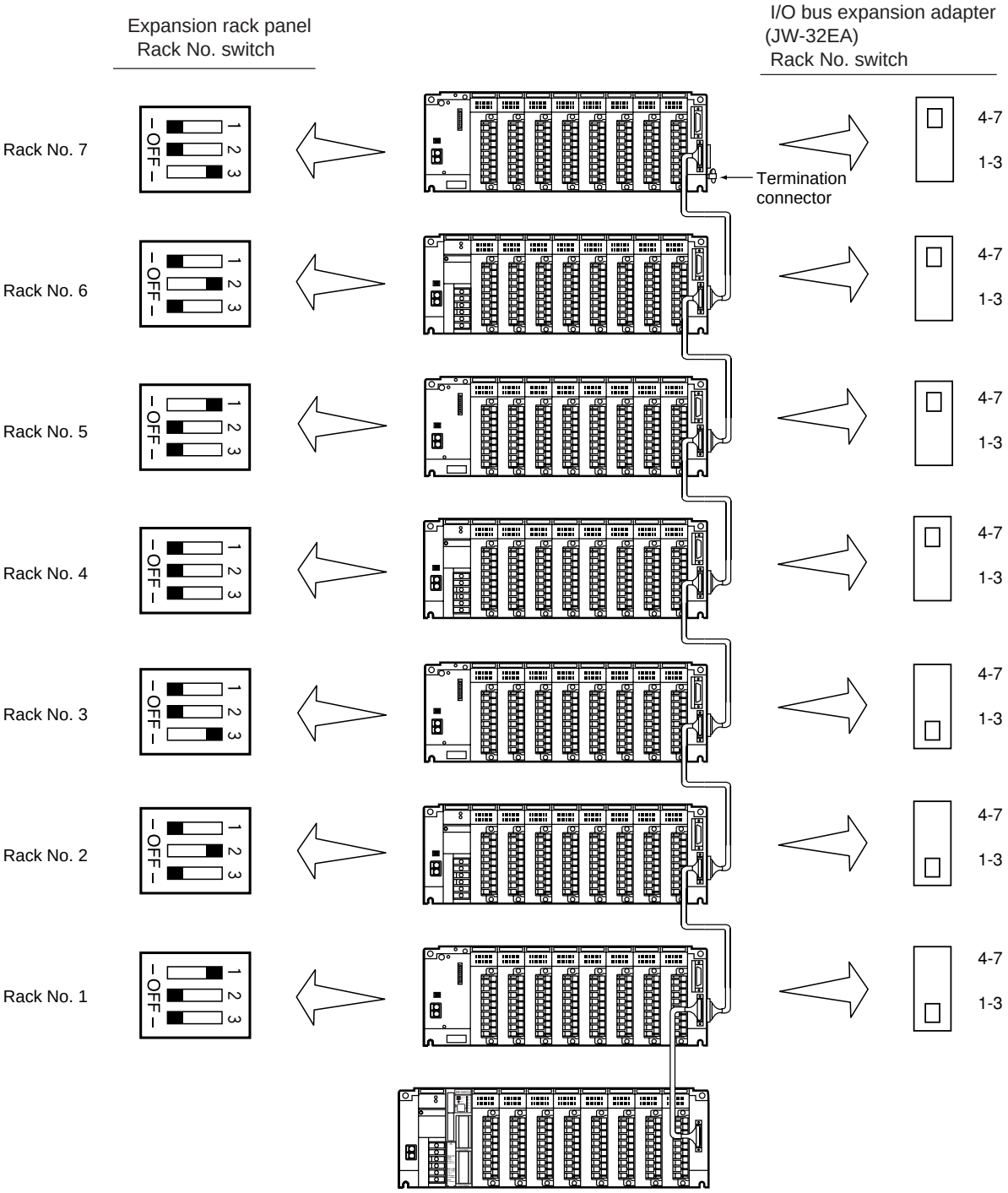
 [Ex.]

2. Rack numbers are duplicated with other expansion rack panel.

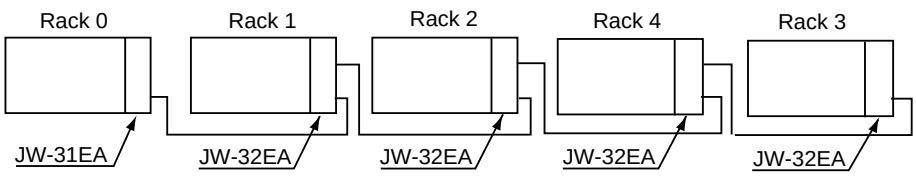
The shipping setting of rack number switch is "1 : switch 1 is ON," and that of I/O bus expansion adapter is "1 to 3" side.

For I/O bus expansion adapter, see page 4-16 to 18.

(3) Setting example for rack No.



Note: Rack numbers are not necessarily set in order of added timings. For example, they can be set as shown below.



[4] Important points when using basic /expansion rack panels

System specifications can be defined by the combination of basic rack panel and expansion rack panel as shown in the table below.

■ **Combinations of basic and expansion rack panels**

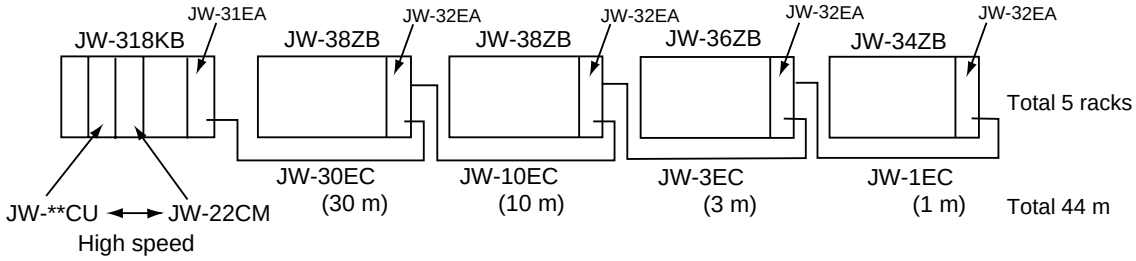
Basic rack panel / Expansion rack panel	JW-314KB/36KB/318KB (Without JW-31EA)	JW-314KB/316KB/318KB (With JW-31EA)
None	A	Unable to use in combination
JW-34ZB/36ZB/38ZB (Without JW-32EA)	B	Unable to use in combination
JW-34ZB/36ZB/38ZB (With JW-32EA)	Unable to use in combination	C

■ **System specifications**

Specifications	Combinations of basic/expansion rack panels (as above)		
	A	B	C
Max. number of racks	1	4	8
Total expansion length	-	14 m	50 m
Option bus speed (Note)	High speed	Conventional speed	High speed
I/O expansion cable	-	JW-203EC (30 cm) JW-207EC (70 cm) JW-22EC (2 m) JW-25EC (5 m) JW-210EC (10 m)	JW-05EC (50 cm) JW-1EC (1 m) JW-3EC (3 m) JW-10EC (10 m) JW-20EC (20 m) JW-30EC (30 m) JW-50EC (50 m)

Note: Option bus speed is data exchange speed between an option module and a control module, and the “high speed” is twice faster than the “conventional speed.”

- An example of combination C above

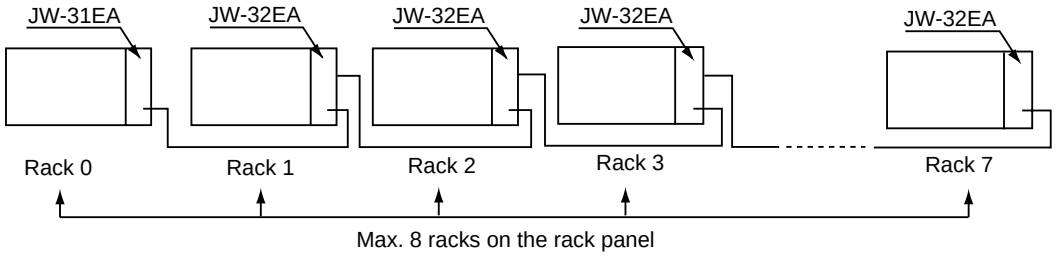


4-5 I/O bus expansion adapter

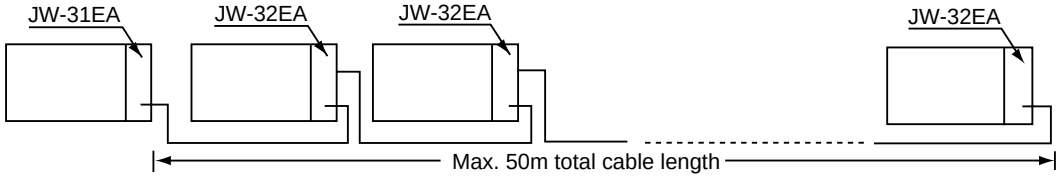
I/O bus expansion adapter for the JW30H has two available models, the JW-31EA and the JW-32EA, that are used to link signals sent from each rack panel. The JW-31EA is installed in the basic rack panel JW-314KB/316KB/318KB, while the JW-32EA is installed in the expansion rack panel JW-34ZB/36ZB/38ZB. The I/O expansion cable, JW-05EC/1EC/3EC/10EC/20EC/30EC/50EC, is used to connect rack panels (install the I/O bus expansion adapter). (See page 6-18 for connection method of I/O expansion cable).

I/O bus expansion adapter is used for the following cases:

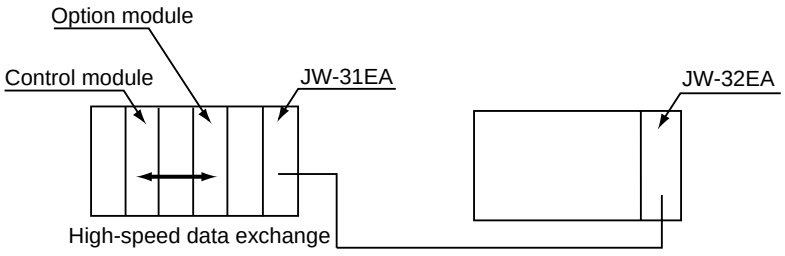
1) In the case of using min. 5 racks (max. 8) on the rack panel



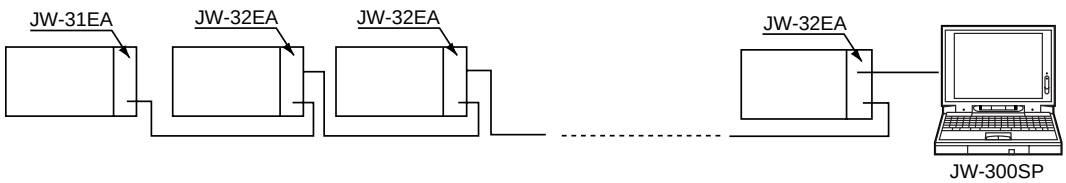
2) In the case of keeping a min. distance of 11 m (max. 50 m) between rack panels, or keeping a min. distance of 15 m (max. 50 m) between the basic rack panel and the last expansion rack panel:



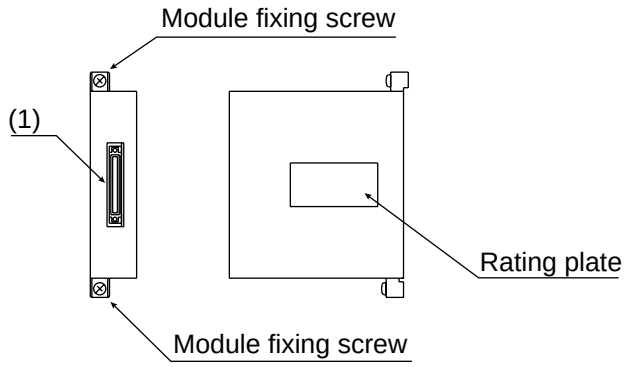
3) In the case of operating a high-speed data exchange (twice faster than without using I/O bus expansion adapter) between an option module, such as JW-21CM and JW-22CM, and a control module on a system that needs an expansion rack panel:



4) In the case of creating, changing, or monitoring a program on the expansion rack panel side using a support tool (JW-300SP, JW-15PG).



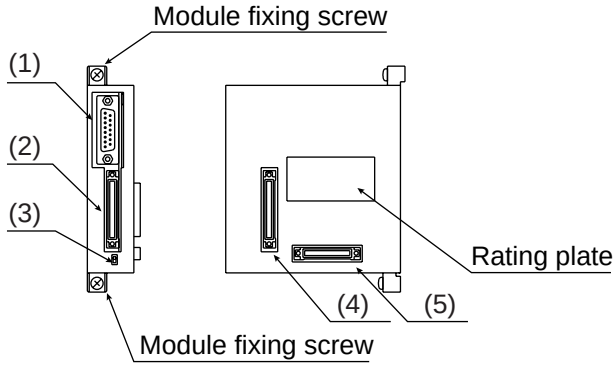
[1] JW-31EA



(1) I/O expansion connector

Connect between the I/O expansion connectors (IN) of JW-32EA using I/O expansion cables.

[2] JW-32EA



(1) Connector for support tool connection (EA-PG port)

Connecting a support tool (JW-300SP, JW-15PG), such as a hand-held programmer, enables creating/changing/monitoring program on the expansion rack panel that is max. 50 meters away.

This connector can be used for communication with equipment that has serial I/O ports, such as a personal computer. This connector is seen as Communication Port 3 in the JW300 system.

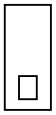
(2) I/O expansion connector (IN)

Connect this connector and an I/O expansion connector (OUT) on the JW-31EAs or the JW-32EAs (a front rack) using an I/O expansion cable.

(3) Rack No. switch

Set rack numbers on the mounted rack panel.

Rack No.



4-7: Racks 4 to 7

1-3: Racks 1 to 3 (setting at delivery)

Rack ID numbers are determined by combined setting of this rack number switches and ones on the expansion rack panel, JW-34ZB/36ZB/38ZB. See page 4-13 for details.

(4) I/O expansion connector (OUT)

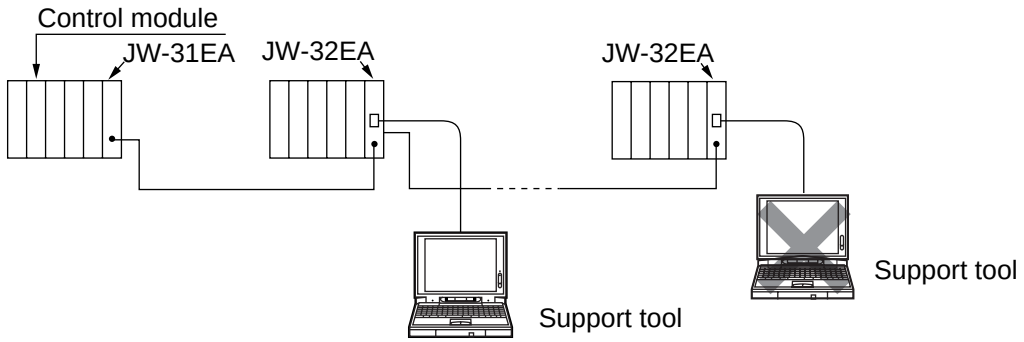
Connect this connector and an I/O expansion connector (IN) on the JW-32EA (the next rack) using an I/O expansion cable.

(5) Termination connector insert

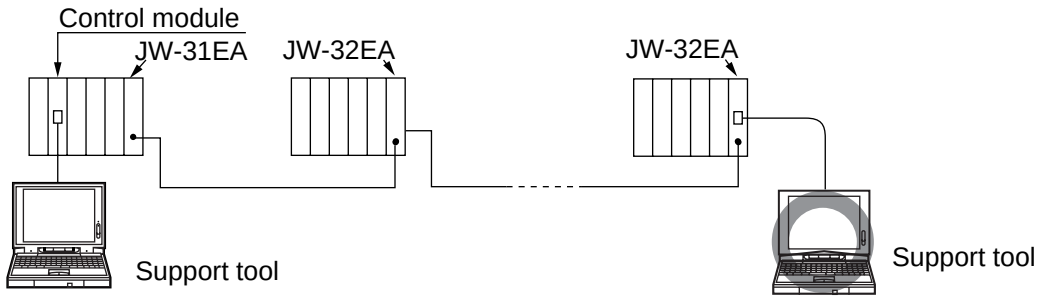
Insert a termination connector when a mounted expansion rack panel is at the end of the system. One each termination connector is supplied with each JW-31EA.

Notes

- Only one support tool (JW-300SP, JW-15PG) can be connected to the JW-32EA.
  [Ex.]



- With the JW300 system, while a support tool (JW-300SP, JW-15PG) is connected to the control module, another support tool can be connected to the JW-32EA. (The JW30H cannot connect to a support tool under this condition.)
  [Ex.]



Chapter 5. Installation

5-1 Precautions for installation

The JW300 is not designed for dust and waterproof construction. Therefore, install JW300 in an enclosed panel.

Avoid keeping the JW300 in the following conditions:

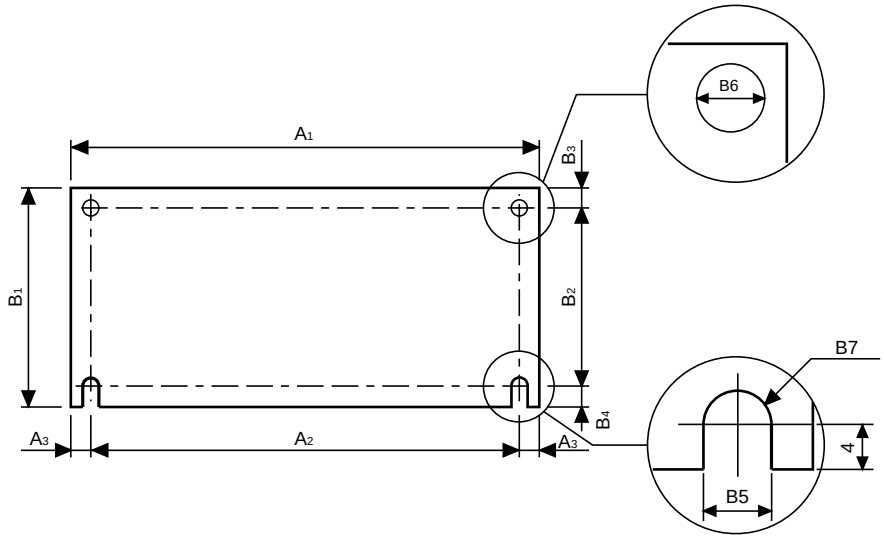
1. Ambient temperature extremes outside the range of 0 to 55 °C
2. The relative humidity exceeding the range of 35 to 90%
3. Sudden temperature changes, which may cause condensation.
4. Corrosive and flammable gases.
5. Water, oil and organic solvents dripping positions.
6. Dusts, iron and salty conditions.
7. A box in which high voltage device is installed.
8. Strong vibration and shock may usually occur.

Install on a good conductivity metal plated panel instead of painted one for easy grounding and better noise tolerance. Use zinc plated retention screws of M5 for installing JW300.

5-2 Installation of basic/expansion rack panel

This section explains the installation method of the basic/expansion rack panel in a control panel.
Fix the basic/expansion rack panel on a partition plate of a control box. Select the appropriate fixing place taking into consideration the size of a wiring duct, wiring to the JW300, a cable length of the I/O expansion cable, ventilation, maintenance, easy access for exchanging modules etc.
We recommend that you install the basic rack panel at the bottom and the expansion rack panel above the basic rack panel.
Note: Use a high conductive partition plate of plating finish for fitting the basic/expansion rack panel so as to increase noise tolerance.

[1] Installation dimensions of basic/expansion rack panel



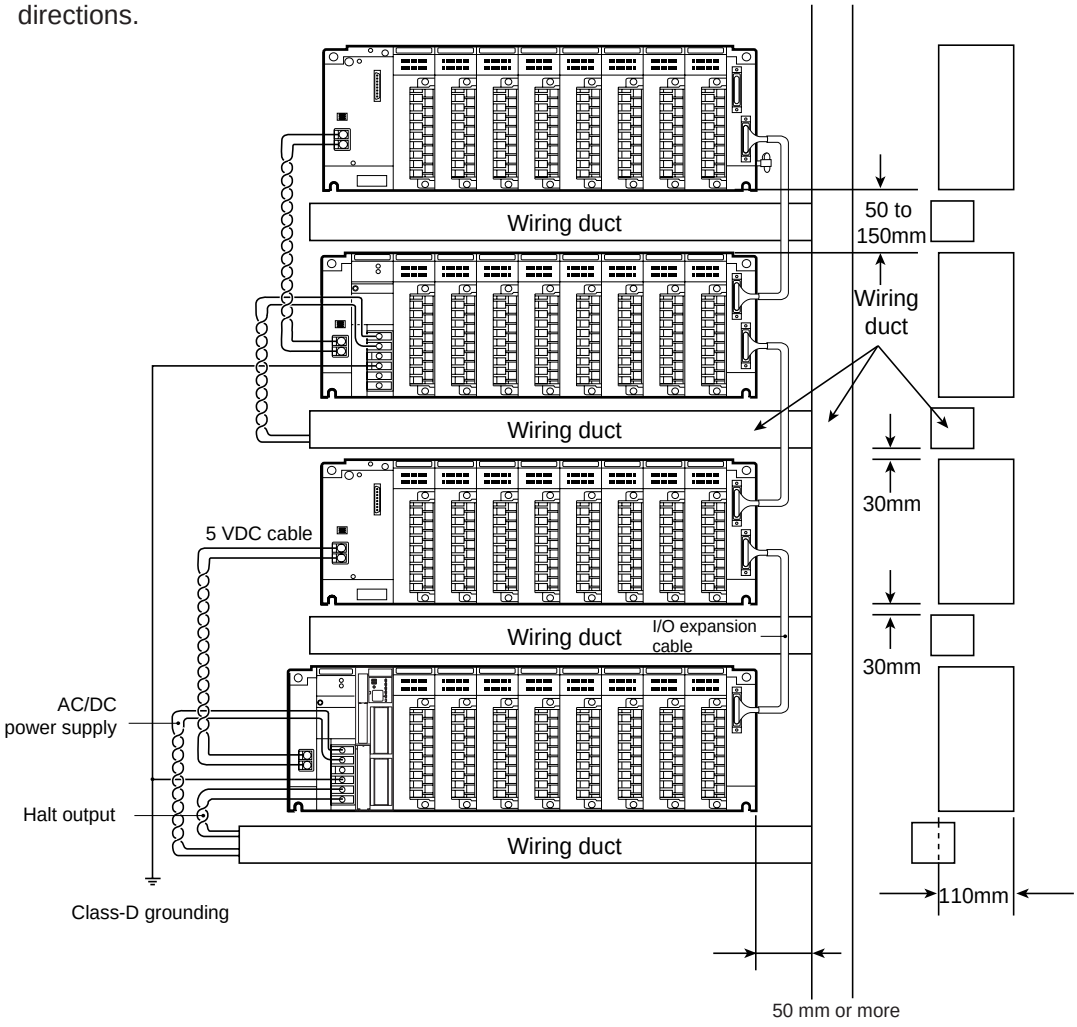
Basic rack panel	Installation dimensions (mm)										Thickness of portion to be inserted *mm)
	A1	A2	A3	B1	B2	B3	B4	B5	B6	B7	
JW-314KB	261.5	245.5	8	130	118	8	4	6	f 6	R3	1.6
JW-316KB	332.5	316.5									
JW-318KB	403.5	387.5									

Expansion rack panel	Installation dimensions (mm)										Thickness of portion to be inserted *mm)
	A1	A2	A3	B1	B2	B3	B4	B5	B6	B7	
JW-34ZB	226	210	8	130	118	8	4	6	f 6	R3	1.6
JW-36ZB	297	281									
JW-38ZB	368	352									

[2] Installation of basic/expansion rack panel in control panel

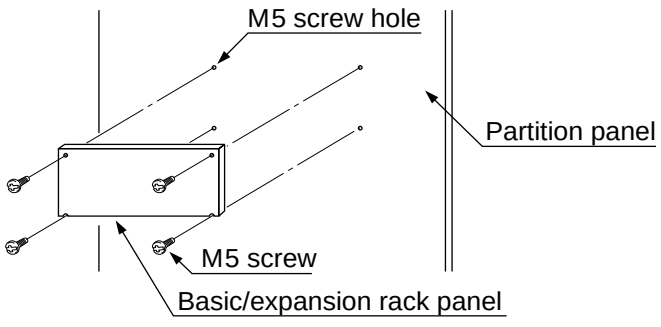
1) Drill fitting holes of basic/expansion rack panel and wiring duct on the control panel and partition plate.

- Refer to previous page for fitting dimension of the basic/expansion rack panel.
- Keep each rack panel at 50 to 150 mm distance and more, from right and left sides of each rack panel to the end of the panel and the wiring duct for 50 mm and more.
- Keep wiring duct 30 mm distance or more from the basic/expansion rack panel for vertical directions.



2) Fix basic/expansion rack panel on partition plate using M5 screws.

- Prepare M5 retention screws locally. (Recommended installation screw: M5 x 12 mm)



To the next page

From the previous page

3) Fit wiring duct

- Prepare the retention screws locally.
- Use a wiring duct to enable easy external wiring for the I/O / special I/O / option / device net / I/O link module of the JW300. By installing a mounting base and increasing the wiring duct height to the same level as the JW300, it will be easier to install the cables and make the necessary connections.

4) Set the rack no. switch of expansion rack panel.

- See page 4-11 to 13 for setting a rack no. switch.

5) Install JW300 system configurating modules to basic/expansion rack panel.

- See page 5-5 to 9 for installation of each module (power supply module, control module, etc.)

6) Connect I/O expansion cable to basic/expansion rack panel or I/O bus expansion adapter.

- I/O expansion cable is to receive signals of each rack panels. Be sure that the total length of the cable does not exceed 14 m (50 m when using an I/O bus expansion adapter).
  See page 6-14 to 15 for connecting the I/O expansion cable.

7) Fit partition plate when installing basic/expansion rack panel to control panel.

- Prepare the retention screws locally.

8) Ground the partition plate securely after installation.

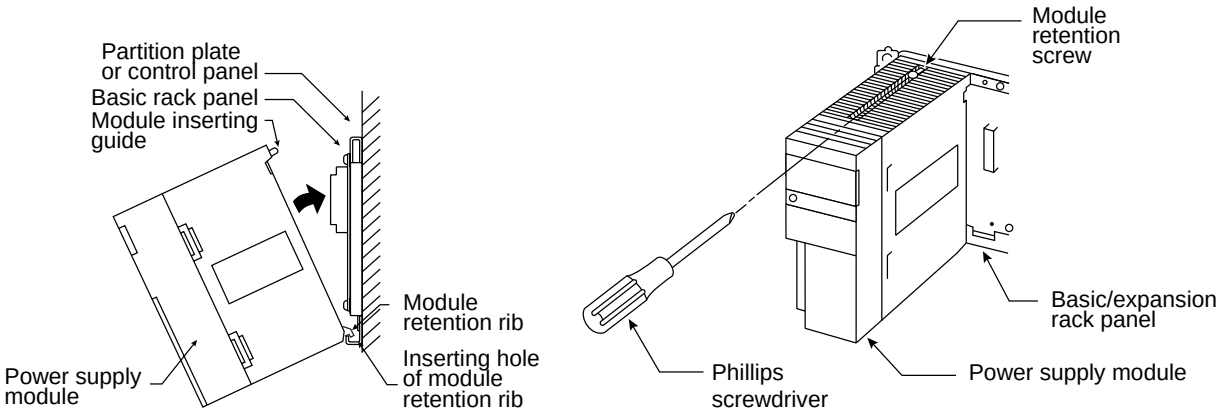
5-3 Installation of power supply module

Power supply module JW-303PU/301PU/31PU/33PU are installed by basic/expansion rack panel.
Be sure to install the power supply module on the basic rack panel. Total consumption current of the power supply module is 3.5 A or less when JW-301PU/31PU/22PU is used, and 4.5 A or less when JW-303PU is used. (See page 7-1 to 3)
Install a power supply module in any of the cases below:

1. When the total consumption current of the power supply module exceeds 3.5 A when JW-301PU/31PU/22PU is used, or 4.5 A when JW-303PU is used.
2. When using JW-25EC/210EC, JW-3EC/10EC/20EC/30EC/50EC, in the I/O expansion cable. Furnish each expansion rack panel with power supply module.
3. When the total length of I/O expansion cable between expansion rack panel covered by the current capacity of one power supply module exceeds 2.1 m.

[Installation procedure]

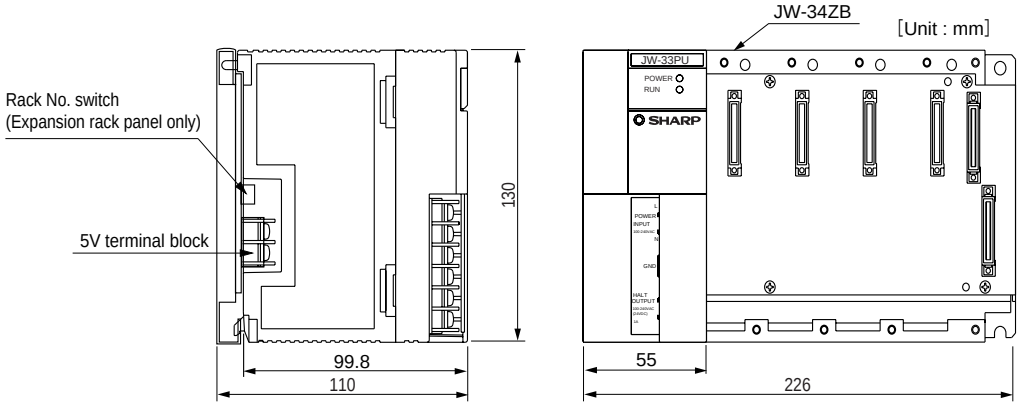
1) Keep at the back of the module retention rib hanging on the inserting hole and push the whole body of the power supply module to the panel.
2) Tighten module retention screw in upper part of the power supply module using a Phillips screwdriver. Fasten the screw with a torque of less than 1.47 N-m.



Note

- After connecting wires to the 5 V terminal block on the basic/expansion rack panel, and after selecting the rack number for the expansion rack panel, install the JW-303PU on the rack panel.

■ **Installing in expansion rack panel (JW-34ZB)**

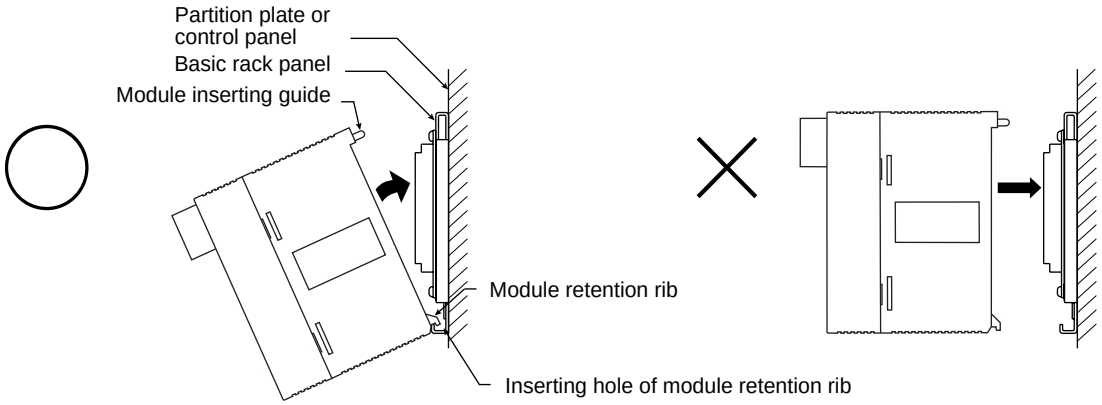


5-4 Installation of control module

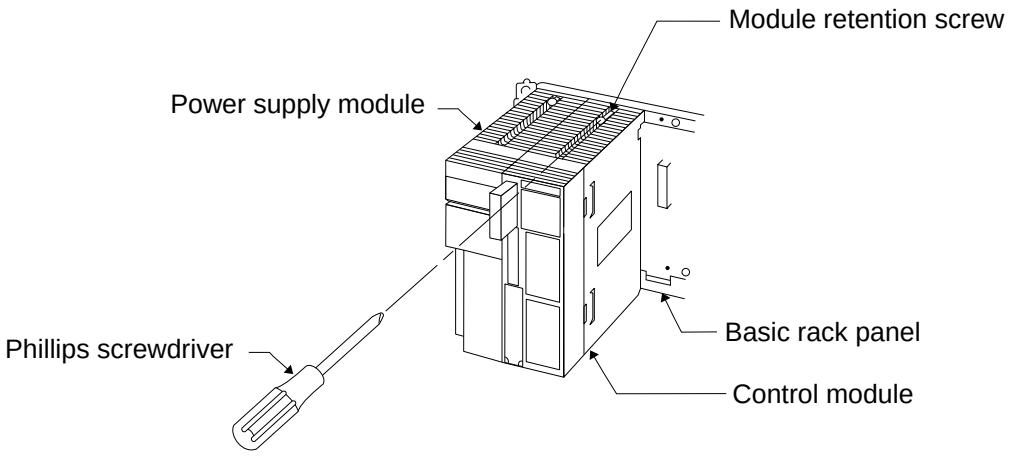
Install the control module (JW-3**CU) at the basic rack panel (the power supply module on the right.)

[Installation procedure]

1) First, catch the module securing rib in a securing rib hole on the basic rack panel. Then, push the module in toward the basic rack panel.



2) Tighten one module retention screw of the control module using a Phillips screwdriver. Fasten the screw with a torque of less than 1.47 N-m.



5-5 Installation of I/O / special I/O / option module

I/O modules and special I/O modules can be installed in a basic rack panel or expansion rack panel. The option, device net, and I/O link modules can only be installed in a basic rack panel. Mixed installation of these modules in the same rack panel is possible.

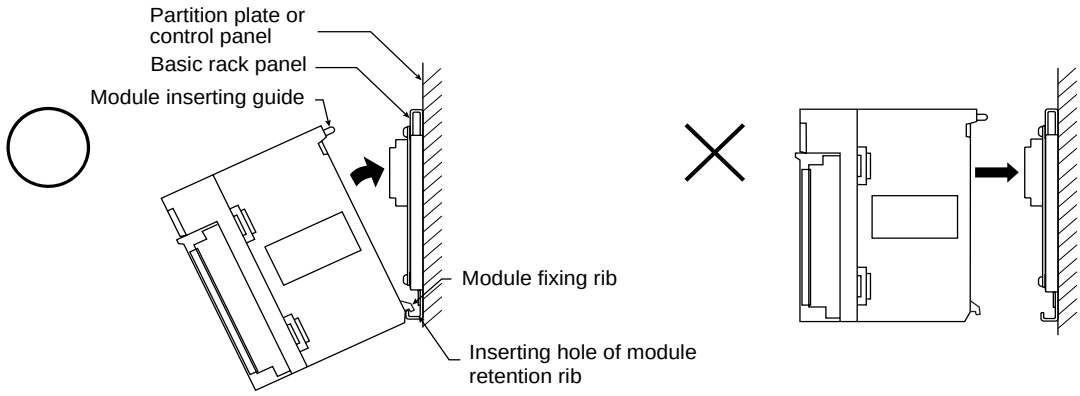
- When setting up the system, arrange so that the total of the current consumptions of each module may be within the output current of the 5 VDC power source supplied from the power supply module.
  If each module is used beyond the output current of the 5 VDC power source of the power supply module, the current limiting function of the power supply module is actuated to stop the operation of the JW300.

[1] Installation to a basic/expansion rack panel

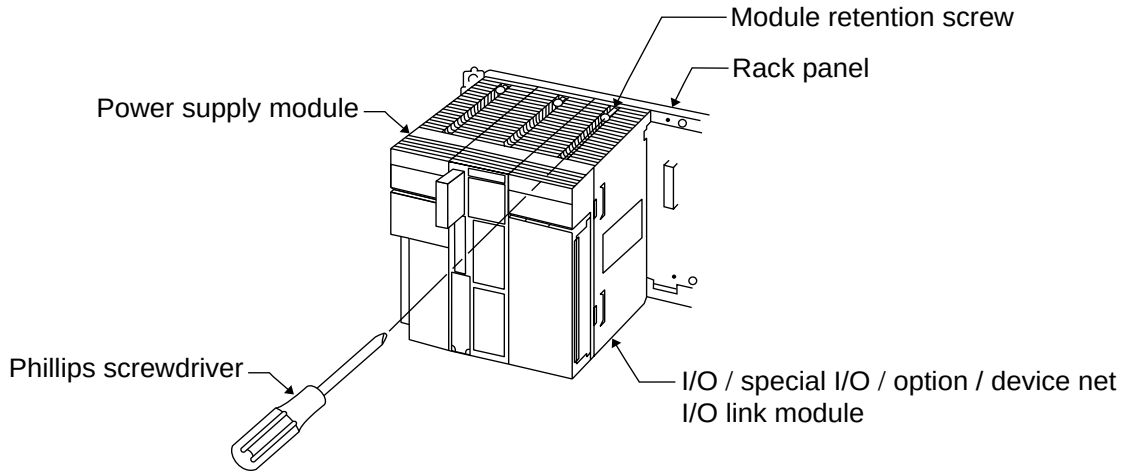
Prior to installation/removal of the I/O module,etc. switch OFF the power supply to the JW300.
The option, device net, and I/O link modules cannot be installed in an expansion rack panel.

[Installation procedure]

1) Keep the I/O module and the like hanging on the module retention rib in the inserting hole and push the entire body of the power supply module to the panel.



2) Tighten module retention screw in upper part of the I/O module and the like using Phillips screwdriver. Fasten the screw with a torque of less than 1.47 N-m.



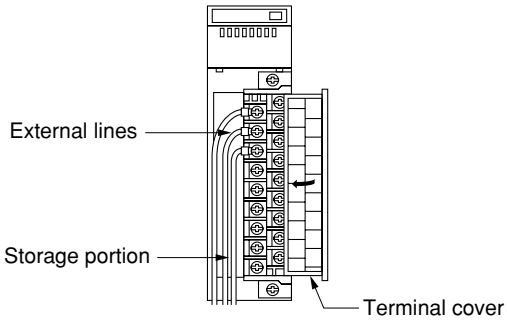
[2] Installation of module cover

Module cover JW-20CV is a cover fitted on a terminal block of the I/O / special I/O / option / I/O link module to which external cables are connected.

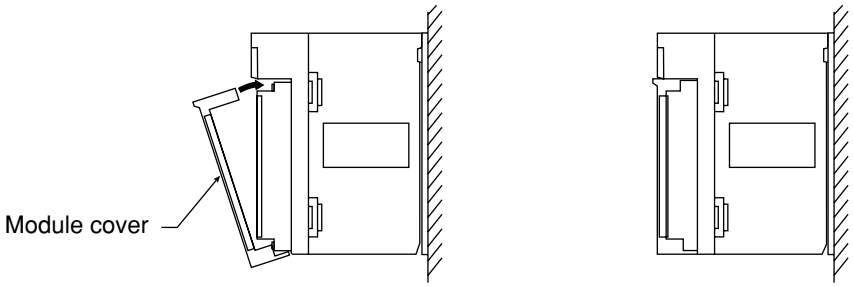
Module covers are ordered separately (8 sets in one pack.)

[Installation procedure]

1) Put the external lines connected to the I/O / special I/O / option / I/O link module into the portion reserved for storage portion.
   - When the external lines can not be stored in the storage portion, repeat connecting the external lines to the terminal block.
   - Put the terminal cover on after installing the external lines in the storage portion.



2) Hang the screw at the lower part of the module cover on terminal block, and insert the upper part of the module cover between the LED display panel and the terminal block of the module.



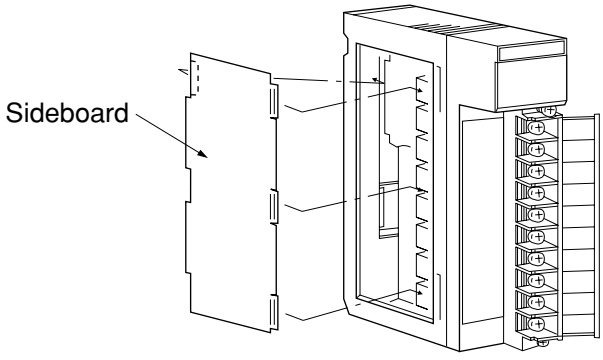
[3] Installation of input/output module sideboard

When power supply module is not installed in the expansion rack panel, attach the sideboard for I/O module supplied with the expansion rack panel (called sideboard hereinafter) to the left end module. The side plate prevents dust from entering into the module.

When the power supply module is installed on the expansion rack panel, do not install the side board. Otherwise, module cannot be installed properly.

[Installation procedure]

Hang sideboard craw on the side of module in order to fix sideboard, and push sideboard toward module.



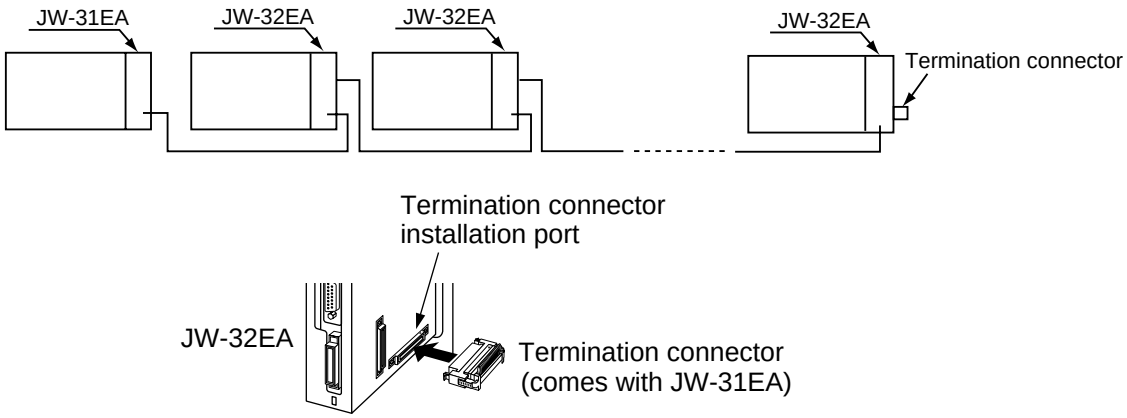
5-6 Installation of I/O bus expansion adapter (JW-31EA/32EA)

Install JW-31EA on an I/O expansion connector on the right edge of the basic rack panel, JW-314KB, etc.

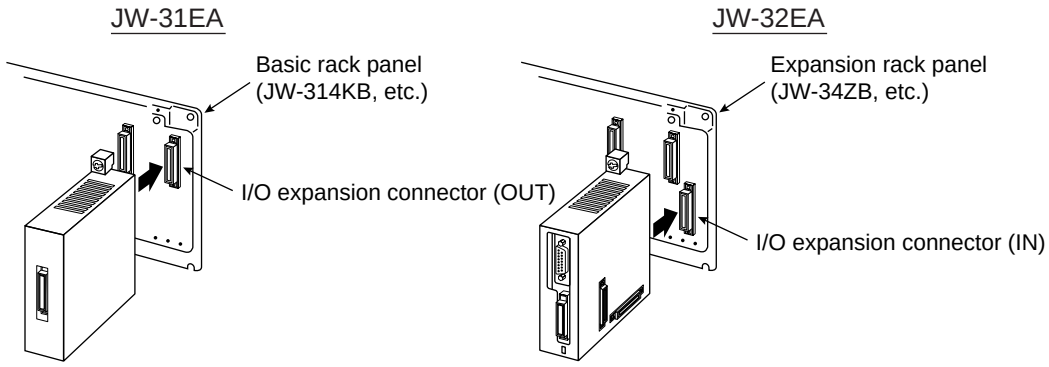
Install JW-32EA on an I/O expansion connector on the right edge of the expansion rack panel, JW-34ZB, etc.

[Installation procedure]

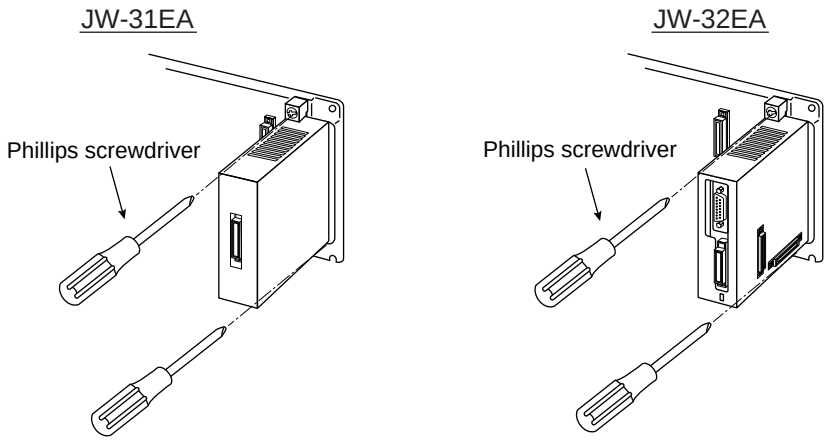
1) Insert a termination connector, which is an accessory of the JW-31EA, into the JW-32EA only on the last expansion rack panel.



2) Install a JW-31EA in an I/O expansion connector on the basic rack panel, in the same way as a JW-32EA in an I/O expansion connector on the expansion rack panel.



3) Tighten module-fixing screws on the upper and lower sides of the JW-31EA/32EA.
Fasten the screw with a torque of less than 1.47 N-cm.



Chapter 6. Wiring

6-1 Precaution for wiring

Follow the below instructions for wiring:

1. Separate power line and I/O lines of the JW300 from high voltage lines and power lines as far as possible. Do not run power lines and I/O lines in parallel with high voltage or power lines.
2. For the I/O expansion cable and wiring the 5 VDC lines, use supplied accessories for the I/O expansion cable.
3. Don't run the I/O expansion cable and the 5 VDC cable inside a duct.
4. Provide easy-to-detach wiring thoroughly considering operability at maintenance and repair.
5. Use twisted cables of over KIV 1.25 square for connection to the primary power input terminal of the power supply module.
6. Use cables of over KIV 0.5 square (0.18 square/32 points connector type) for wiring from the relay terminal block of the control panel to the input module. For wiring to the output module, use cables of over KIV 0.75 square for large capacity such as solenoid valves; and cables of over KIV 0.5 square (0.18 square/32 points connector type), for other usage.
7. Use wires of over KIV 1.25 square for wiring from the relay terminal block to input/output equipment.
8. When the whole factory site is grounded for high electricity and not suitable for the grounding of the JW300, connect the GND terminal of the JW300 with just the board ground.
9. Use the crimp-style terminals of our recommendation for wiring to the terminal blocks of the JW300, whenever possible.

■ Wiring with noise countermeasures

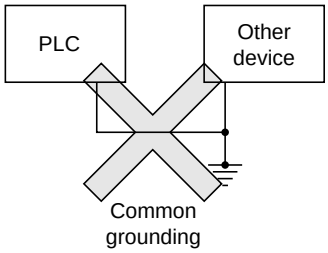
For your safe usage of the JW300, observe the "Precaution for Wiring" of the previous page carefully. Wiring to prevent the JW300 from malfunction caused by noise is shown below. Besides, some malfunctions by noise come from complex causes or a cause, which cannot be analyzed in quantity. Use the following noise countermeasures as your reference, when you take measures for each actual situation.

(1) Grounding (how to connect the ground lines)

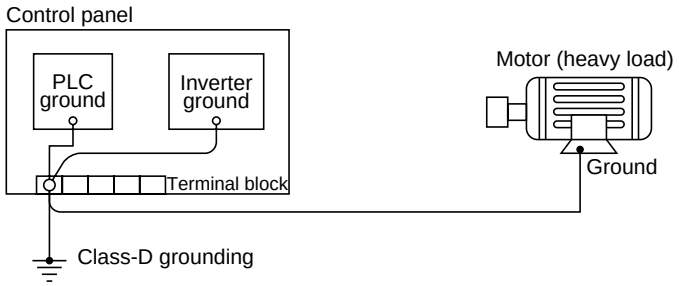
Grounding has two purposes; to protect operators from electric shock and to prevent malfunction by noise. The grounding for noise prevention is shown here.

Don't use a common ground for the JW300 and other device.

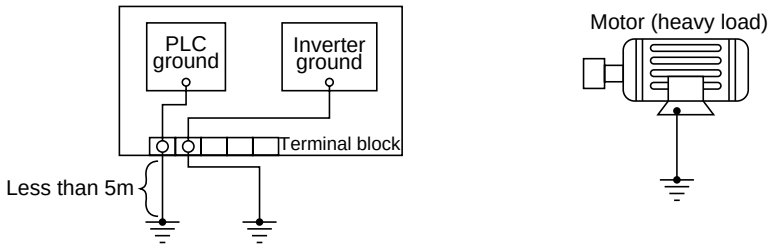
When the GND cable of the JW300 is also used for grounding for other device, noise might come into the JW30H from other device.



Bad example: Don't use the GND line of the JW300 for grounding of a motor or an inverter.



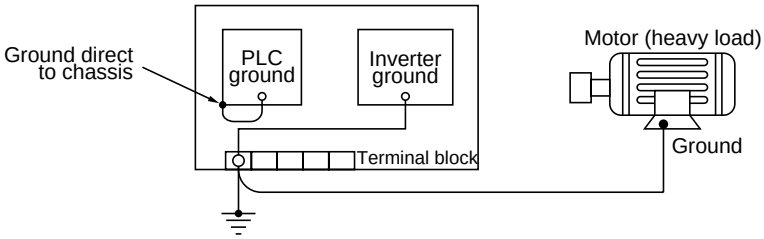
Countermeasure 1: Separate grounding for each of the JW300, the motor and the inverter.



Use a twisted wire of over 2 mm^2 sectional area and less than 5 m long in grounding the JW300 for the noise prevention purpose.

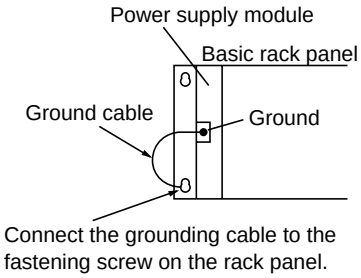
Countermeasure 2: When separate grounding is not available.

If a separate grounding for the JW300 cannot be made, ground directly from the GND terminal of the JW300 to the chassis on which the JW300 is mounted.

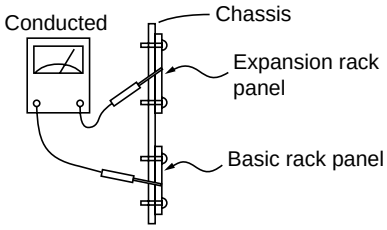


Note: Observe the following points for direct grounding of the GND cable of the JW300 to the chassis:

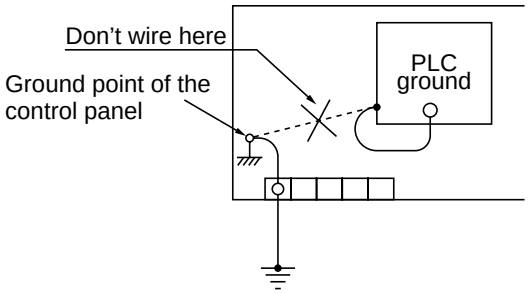
- Connect the grounding cable from the GND terminal of the power supply module of JW300 to the chassis in the minimum distance. The same wiring manner should be used for the expansion rack panel.



- Install firmly the basic rack panel and the expansion rack panel on the chassis of the control panel and make sure of the electric conductivity.



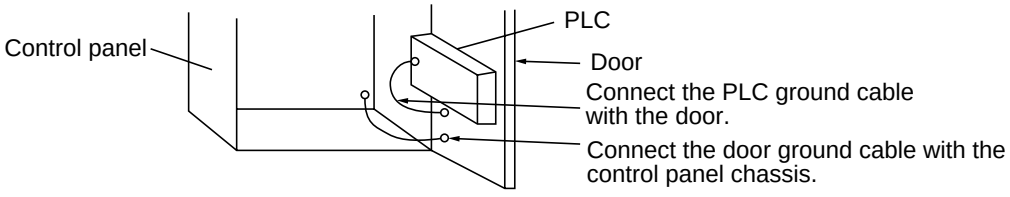
- Where the control panel itself is grounded, do not wire between the grounding point and the GND terminal of the JW300.



Reference: Note for fitting the JW300 on the control panel door.

Ground from the GND terminal of the JW300 to the door.

Use a twisted wire of over 2 mm^2 sectional area for grounding cable of the control panel from its door (less than 50 cm.)

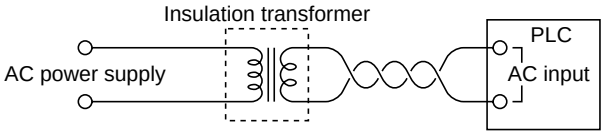


(2) Countermeasure of noise from power supply line

The AC power supply input noise resistance capacity of the JW300 is 1000 Vp-p. When any noise over this limit is possible to come through the power supply line, install an insulation transformer.

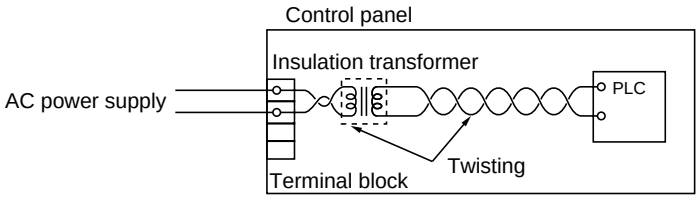
Countermeasure: Install an insulation transformer

Noise has a high frequency of 100 KHz to 2 MHz, which should be blocked by a transformer.



Note: When using an insulation transformer, note the following points:

- An insulation transformer with static electricity shield can also prevent noise by static coupling.
- Install and insulation transformer near the power supply input of the control panel in order to block noise at the entrance of the control panel.

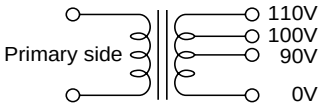


- Use two twisted wires in the primary and secondary sides of the transformer.
- Choose the insulation transformer of the capacity of more than 20% higher than that of the rated load. When a transformer of the same capacity as that of the rated load is used, a primary input voltage might exceed the transformer rated capacity and become dangerous state such as emitting smoke.

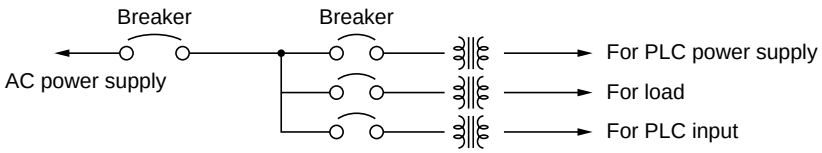
Power supply module	Power consumption*	Using the capacity of transformer
JW-301PU	60 VA or less	72 VA or more
JW-22PU		
JW-31PU		
JW-303PU	70 VA or less	85 VA or more

* Maximum load capacity when one power supply module is used.

- When a large-capacity transformer with higher voltage in the secondary side is chosen, we recommend to install a intermediate voltage tap.

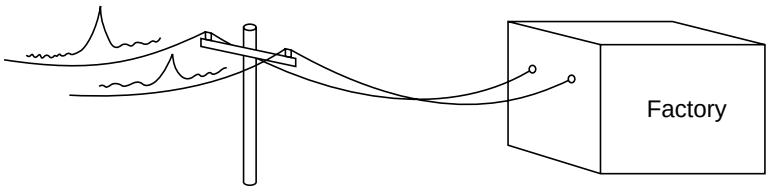


- With particularly large noise, several transformers can be installed, not only to the power supply input of the JW300 but also to the load and AC input.



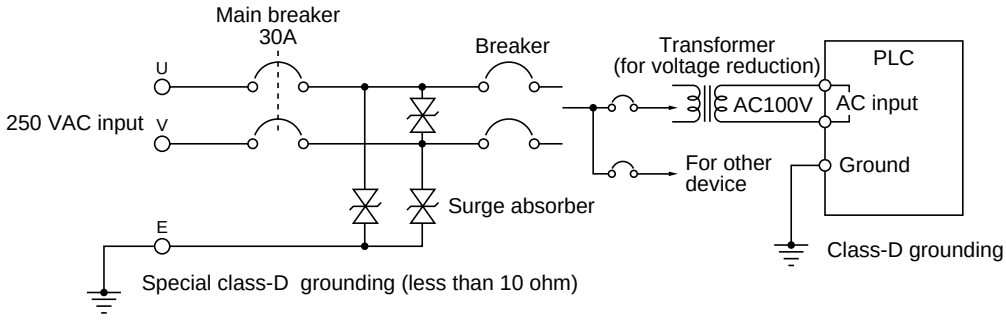
(3) Safeguard from lightning

Below are countermeasures in case when the factory facilities are located far from residential areas and that effects from induced lightning (induced voltage by lightning strikes) are expected. Note, however, that they are not the measures for direct strikes of lightning. In some cases, the voltage of the induced lightning may go beyond 4000 KV. Therefore, the purpose of these countermeasure is just to minimize the damage on the device.



Countermeasure 1: Install a surge absorber on the receiver panel of commercial electric power as protection from induced lightning.

Different models should be chosen according to the facilities load and power supply voltage. For your reference, below is a wiring diagram of the outdoor type cubicle for 1.7 KVA.



Note: Note the following when wiring.

- The ground of the surge absorber is the special class-D ground (less than 10-ohm ground resistance) and should be separated from the ground of the JW300 (Class-D grounding.)
- Install the main breaker before the surge absorber.
- The followings are known surge absorbers in the market. Different types for different power supply voltages.

Commercial power voltage	Model name	Specifications	Manufacturer
100 VAC	ERZ-A20PK251	Varister voltage: 250V –10% Surge resistant volume: 5,000A (8/20 μs) Energy resistant volume: 90 Joule	Matsushita Electric Co.,Ltd.
200 VAC	ERZ-A20PK501	Varister voltage: 500V –10% Surge resistant volume: 5,000A (8/20 μs) Energy resistant volume: 150 Joule	

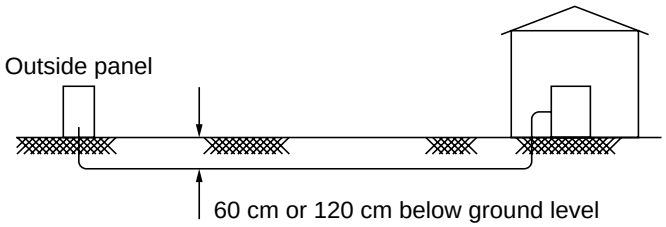
- Use the ground wire of over 3.5mm^2 sectional area for the surge absorber.

Countermeasure 2: Underground wiring as a countermeasure of lightning.

When communication cables and input cables of the JW300 go out of a building, place them underground. Provide junction for input/output signals using relays.

1. Underground cabling

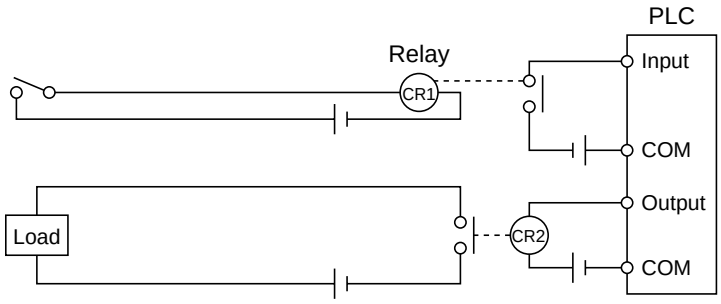
In a lightning weather condition, the atmosphere is electrically charged and a wiring in the air induces a voltage of over 24 VDC. Therefore, place the wiring under the ground.



As for the depth of cable installation, refer to local regulations.

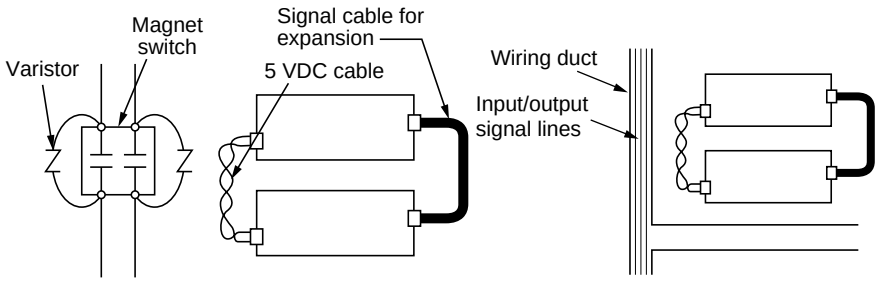
2. Relay connection for the input/output signals using relays

The relay isolates the effects of lightning and minimizes the damage.



(4) Wire of signal cable for expansion

When turning ON/OFF of the magnet switch installed near the JW300 and the signal cable for expansion, high noise and high voltage may occur to give bad effects on the operation of the JW300. Therefore, for prevention of the noise occurrence, insert a noise killer, such as a varistor, at the contact point of the magnet switch. Do not place the signal cable for expansion and the 5 VDC cable inside the duct, through which input/output signal lines and power lines are running.



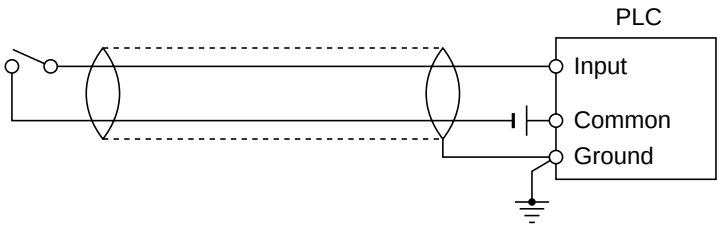
(5) Note for external wiring to I/O module

1. Relay output module: JW-204SA, JW-214SA

Since the relay output module does not have a built-in surge absorbing circuit, do not forget to install a surge killer, such as a varistor, in the output side. Operation without a surge killer might give bad effects on other modules by spark noises from the relay. As for the surge killer, see page 7-16 "Precautions for operating I/O module."

2. DC input module: JW-234N, JW-212NA/214NA

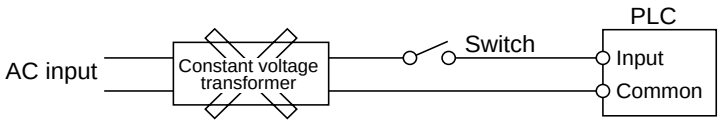
When extending the external line of the DC input module for more than 100 m, use shielding wire. Even in case of less than 100 m extension, shielding wires should be used under certain conditions. Do not forget to connect the shield of the shielding wire with the ground of the JW300.



3. AC input module: JW-203N, JW-211NA

Do not use the outputs from a constant voltage transformer and an AC regulator, for the AC power supply to the AC input module. When the constant voltage transformer and the AC regulator are used, the module signal could be turned ON even with an input voltage less than the rate voltage due to a high distortion rate (10 to 50%) of alternative current waves.

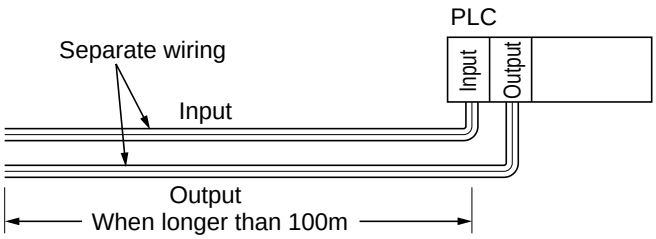
The power supply to the AC input module should have a distortion rate of less than 5%.



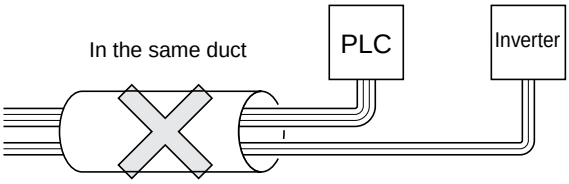
4. Wiring with power line

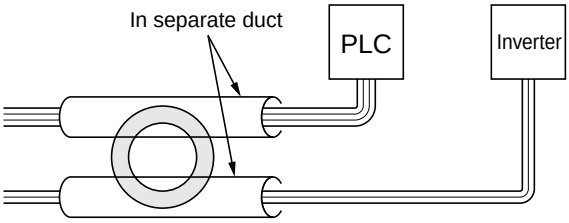
Do not run the input signal, output signal and communication cables of the JW300 near and in parallel with the power line.

- When input and output signal cables are extended over 100 m, make separate wiring for the input signal and the output signal of JW300.



- Make separate wiring for the input signal and the output signal of the JW300 from the power line. Particularly with the power line for the inverter and the servo driver, do not place signal wires inside the same duct or pipe with the power line, even if they are less than 100 m.





6-2 Wiring communication ports

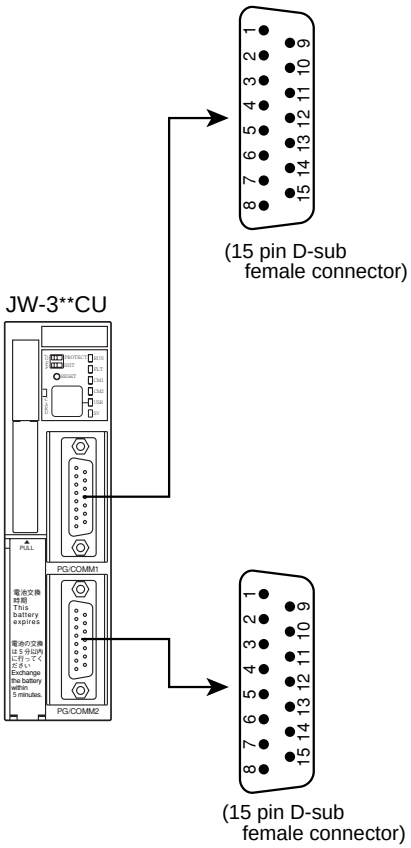
The relationship between the control module, communication ports, and communication standard are as follows:

Control module	Comunication port (communication standard)		
	PG/COMM1 port (RS-422A/RS-232C)	PG/COMM2 port (RS-422A/RS-232C)	EA-PG port *1 (RS-422A)
JW-311CU/312CU	Yes	No	Usable
JW-321CU/322CU	Yes	Yes	
JW-331CU/332CU			
JW-341CU/342CU			
JW-352CU/362CU			

*1: The EA-PG port is a port on the JW-32EA I/O bus expansion adapter.

[1] Pin arrangement of communication port

- PG/COMM1 port



Pin No.	Signal name	Contents	Signal
1	FG	Outside body grounding	---
2	SD	Sending data (PLC to personal computer)	RS-232C
3	SD(+)	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		*2	
9	RD(+)	Receiving data (Personal computer to PLC)	RS-422A
10	RD(—)	Receiving data (Personal computer to PLC)	
11	SD(—)	Sending data (PLC to personal computer)	
12		*2	---
13	RTS(+)		RS-422A
14	+5 V		---
15	+5 V		

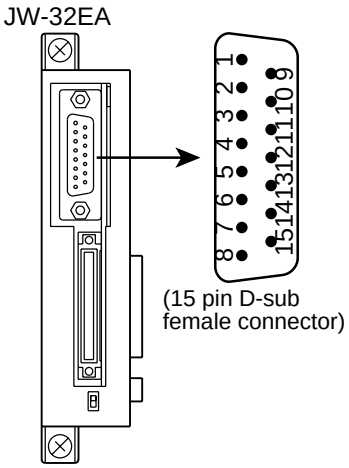
*2: Do not connect to pin No. 8 and 12.

- 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	SD(+)	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 *3	RS-232C
9	RD(+)	Receiving data (Personal computer to PLC)	RS-422A
10	RD(—)	Receiving data (Personal computer to PLC)	
11	SD(—)	Sending data (PLC to personal computer)	
12	CTS	ON: Available sending, OFF: Ban sending	RS-232C
13	RTS(+)		RS-422A
14	+5 V		---
15	+5 V		

*3: When system memory #0222 in the control module is 00_{HEX} (default value), RTS signal will be turned ON while the PLC is turned ON power. When it is set to 02_{HEX}, the RTS will be OFF while sending data, and OFF while other than sending data.

- The JW-311CU/312CU only have a PG/COMM1 port. They do not have a PG/COMM2 port.
- Connector type that can be connected to the communication port (PG/COMM1 port, PG/COMM2 port) is 17JE-23150-02 (D8A) made by DDK.



- EA-PG port

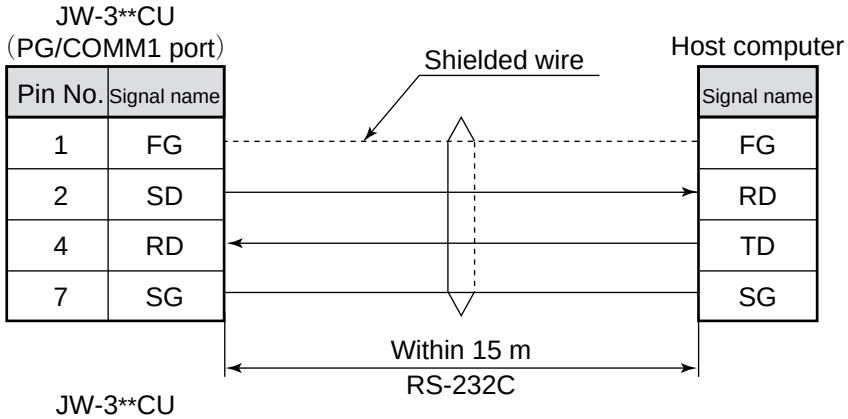
Pin No.	Signal name	Contents	Signal
1	FG	Outside body grounding	---
2	---	*	
3	SD(+)	Sending data (PLC to personal computer)	RS-422A
4	---	*	---
5	RTS(—)		RS-422A
6	SG	Signal grounding	---
7	SG	Signal grounding	
8	---	*	
9	RD(+)	Receiving data (Personal computer to PLC)	RS-422A
10	RD(—)	Receiving data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

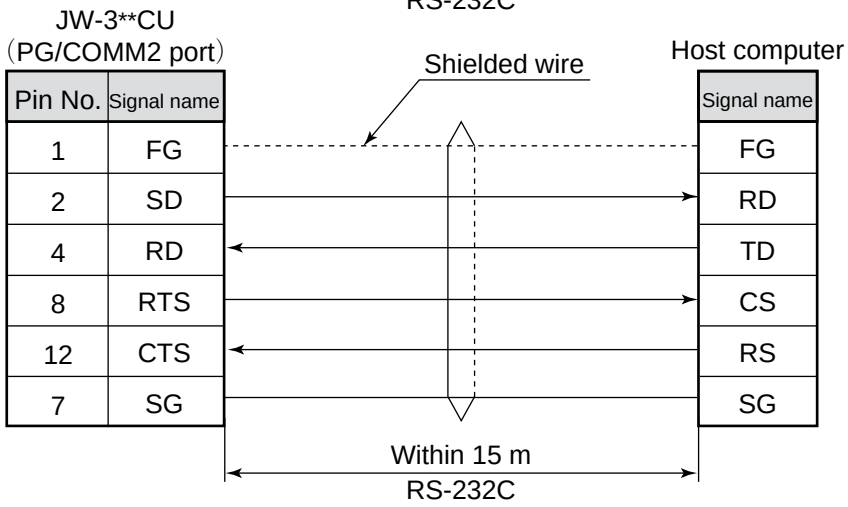
* Do not connect to pin No. 2, 4, 8 and 12.

[2] Wiring figure

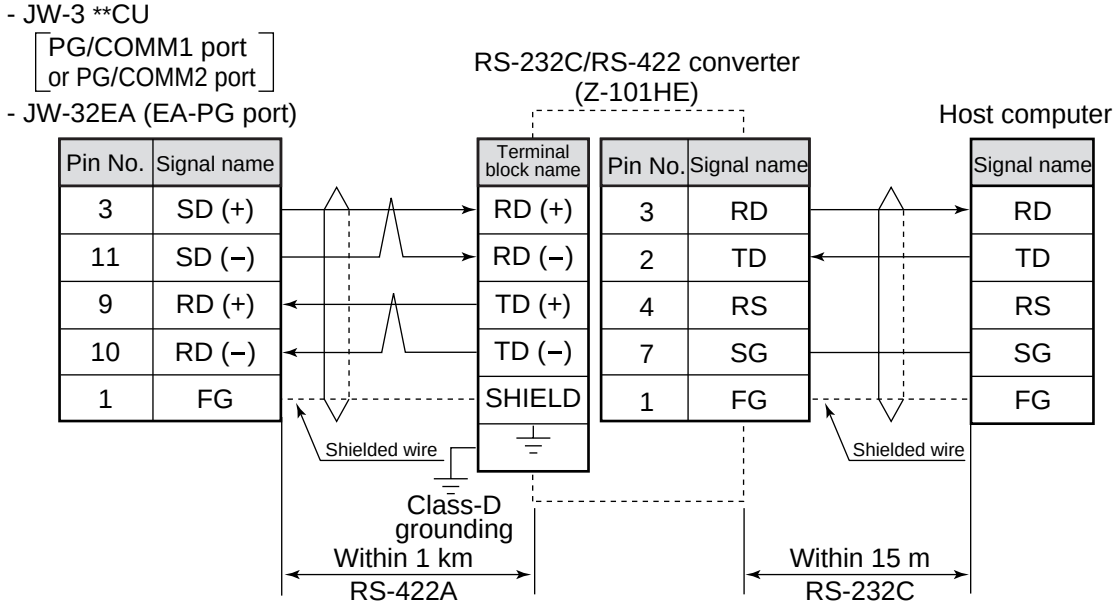
(1) When using RS-232C for communication method of host computer side

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



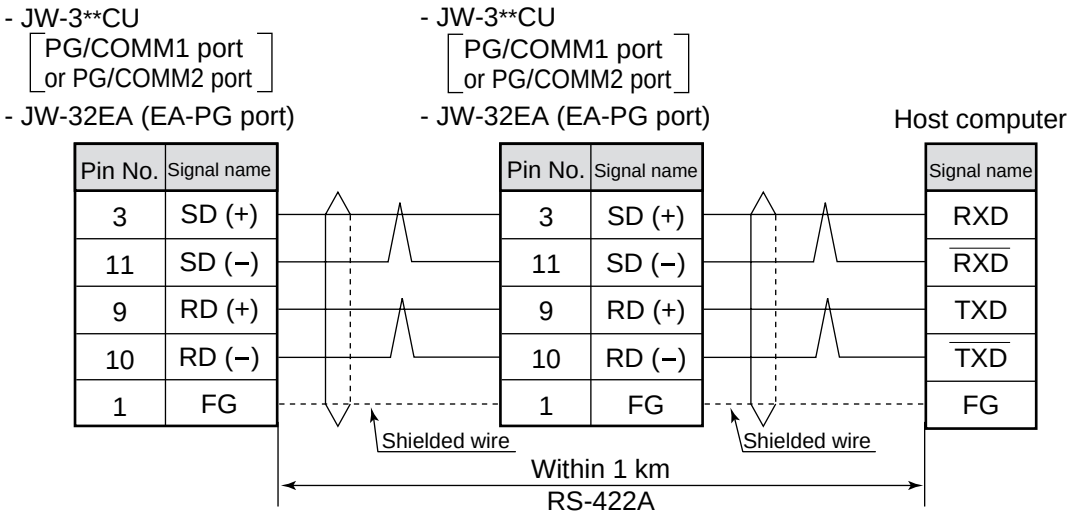


Use the RS-232C/RS-422 converter, such as Z-101HE, when the total length of the communication cable is over 15 m.



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

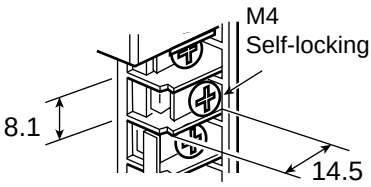
Be within 1km for the total length of a communication cable.



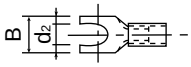
6-3 Wiring for power supply module

In order to prevent wire wastes from dropping into the module through a ventilation hole of the power supply module (JW-303PU, etc.) during the wiring work, keep the caution label stuck onto the upper side of the module. Peel the caution label off of the module when all wiring work is finished.
A cover was installed on the terminal block of the power supply module at delivery. Take off a cover on the power terminal block when wiring, and put the cover back on the terminal block when wiring work is finished.
For wiring, use a twisted wire of over KIV1.25 square and crimp-style terminals.

- Power supply terminal block dimension (mm)



- Crimp-style terminal dimensions



(Our recommendation: Made by JAPAN SOLDERLESS TERMINAL MFG. CO., LTD)

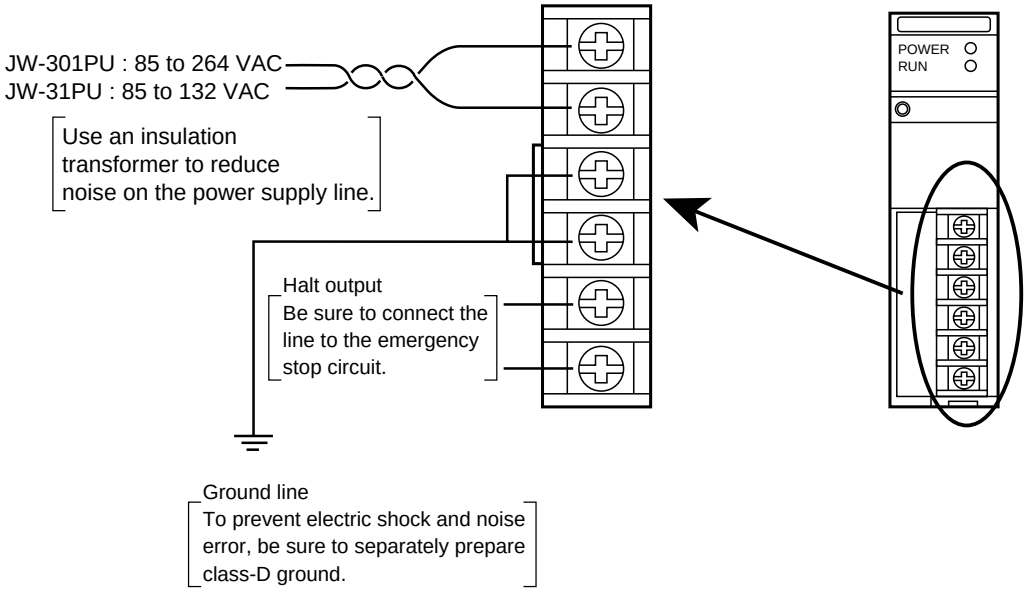
Dimensions (mm)	Models
B<8 d_2>4	1.25-YS4A 2-YS4A V1.25-YS4A V2-YS4A

Fasten the screw on the terminal block with a torque of less than 1.18 N-m.

Notes

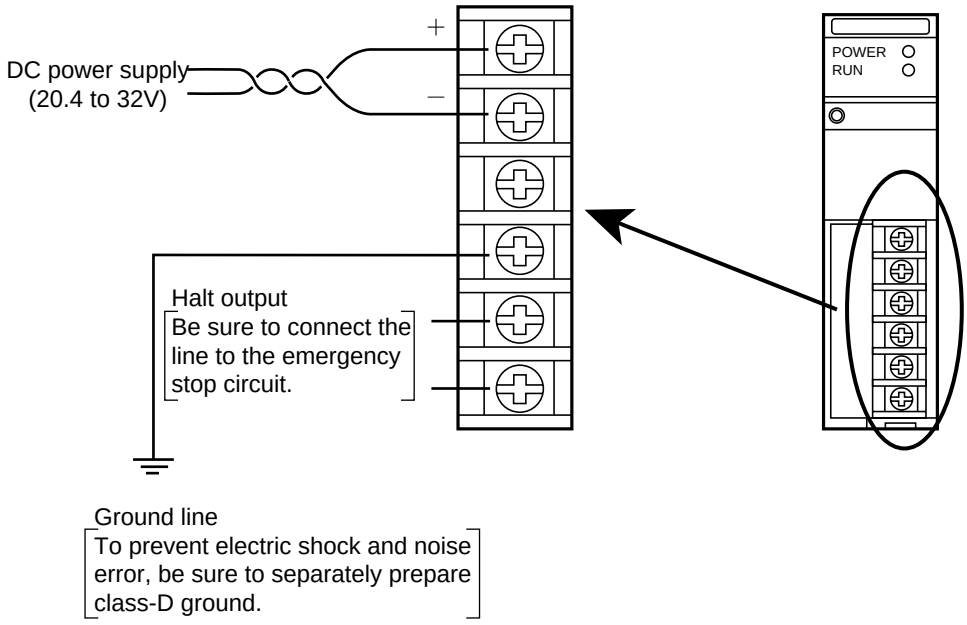
- Wiring of halt output on the power supply module that is mounted on the expansion rack panel is not necessary. Only the halt output on the power supply module that is mounted on the basic rack panel should be connected to an external operation ready circuit.
- In the case where the power supply module is installed on the expansion rack panel for operating the JW300, use one power supply system for both power supply module on the basic rack panel and the expansion rack panel. If each power supply is wired from a different system, the JW300 does not run when either one is switched OFF.

(1) JW-301PU/31PU (AC power supply module)



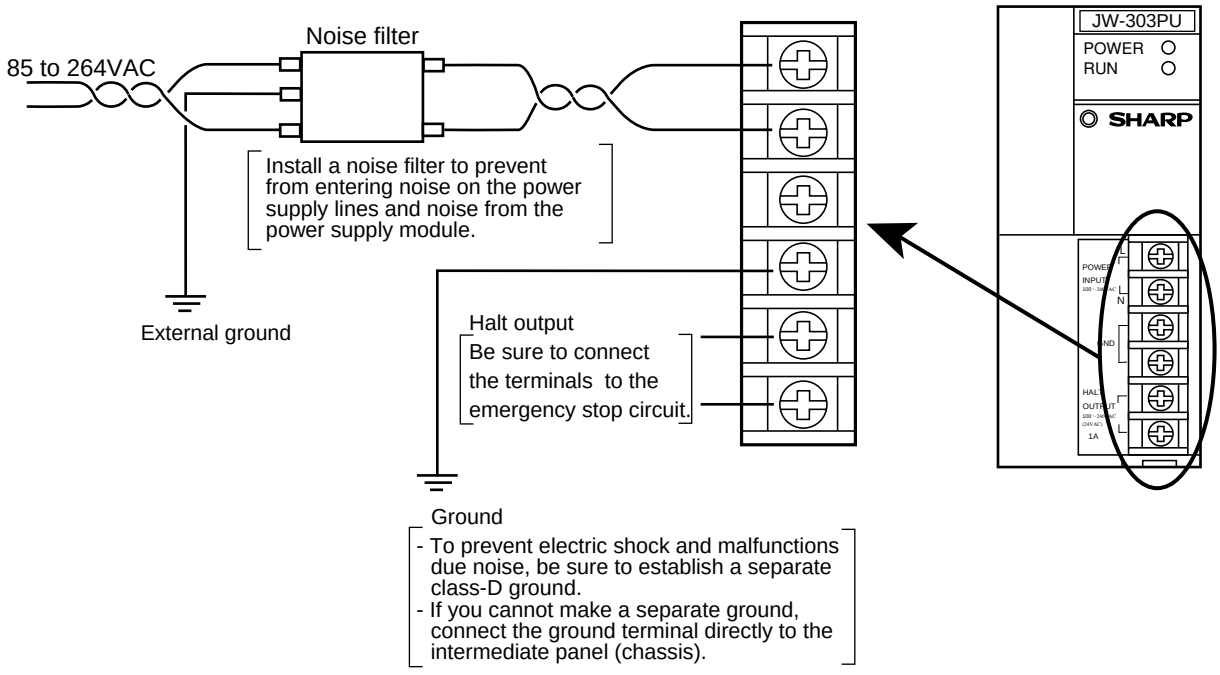
- Connect the power supply input to the L terminal (LIVE: ungrounded side) and N terminal (NEUTRAL: grounded side) while paying attention.

(2) JW-22PU (DC power supply module)



- Ensure correct connection for polarity of the input power supply. Mis-connection of the polarity will destroy the module when power is supplied.
- As for DC input power supply, use power supply of 20.4 to 32 VDC (ripple rate 20% or less; however, ripple upper limit: 32 V or less, lower limit: 20.4 V or more).

(3) JW-303PU (AC power supply module)



- Connect the power supply input to the L terminal (LIVE: ungrounded side) and N terminal (NEUTRAL: grounded side) while paying attention.

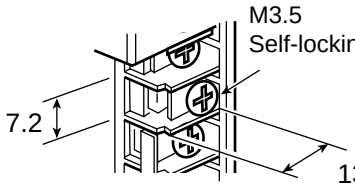
6-4 Wiring to I/O module

Before wiring to the I/O module confirm the specifications of the module. If the module is used beyond its rated specifications, the module might be damaged, destroyed or cause fire.

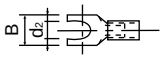
Wiring to the I/O module, use a twisted wire of over KIV 0.5 square (over KIV 0.75 square in case of wiring to the output module of large capacity, such as solenoid valves) and crimp-style terminals. For the common line, use bigger wires than the above.

In order to prevent wire wastes from dropping into the module through a ventilation hole of the module during the wiring work, keep the caution label stuck onto the upper side of the module. Peel the caution label off of the module.

- Terminal block dimension (mm)



- Crimp-style terminal dimensions



(Our recommendation: Made by JAPAN SOLDERLESS TERMINAL MFG. CO., LTD)

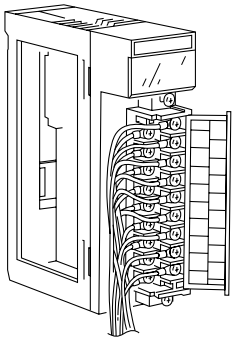
Dimensions (mm)	Models
B<7.2 d_2>4	1.25-YS4A 2-YS4A V1.25-YS4A V2-YS4A

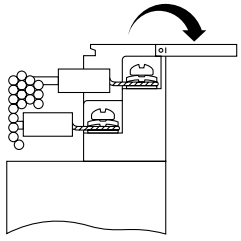
* When a double-row terminal block is used: 9.5

Do not include the I/O lines in the same pipe or duct as high-voltage lines and power lines. It might cause malfunction or damage to the module. Avoid wiring over the operation indicator (LED indication port) of the module.

[1] Terminal block type of 8/16 points

Open the terminal cover of the module when wiring.





Ensure correct connection for polarity of the input power supply. Mis-connection of the polarity will destroy the module when power is supplied. Fasten the screws on the terminal block with a torque of less than 1.18 N-m. After the wiring work, close the terminal cover and install a module cover: JW-20CV (optional), wherever possible. => See page 5-8

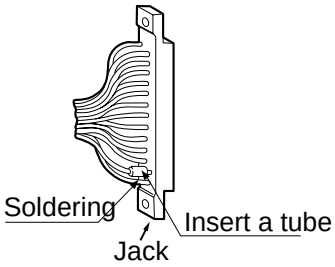
[2] Connector type of 32/64 points

(1) Assembly of the connector

Assemble the connector following the procedures below.

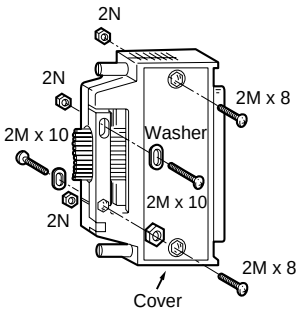
Note that the terminal numbers of the connector are not identical with address numbers.

1) Insert insulation tube into signal line.



2) Solder signal line to connector terminal.
Confirm the connector terminal and its address number, before soldering.

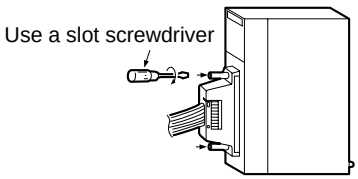
3) Assemble connector.
Assembly parts (screws, washers and nuts) are attached to the connector.



Use the following recommended cable for the signal line.

Recommended cable: Multiple vinyl insulation vinyl sheath cable
18P x 0.18 57VV-SB (made by FUJIKURA LTD.)

(2) Connection with the module



Ensure correct connection for polarity of the input power supply. Mis-connection of the polarity will destroy the module when the power is supplied.

Attached connector of 32/64 points I/O module is soldering type, and available for connector of pressure welding/crimp-style.

Wiring	Model name	Manufacturer	Recommended wiring size	Remarks
Pressure welding	FCN-367J040-AU/F (Connector)	FUJITSU CO., LTD	Flat cable 1.27 mm pitch AWG28 (twisted wire) AWG30 (single wire)	Need a pressure welding tool. Recommended our crimp-style of tool made by FUJITSU CO., LTD.*1
Crimp-style	FCN-360C040-B (Connector cover) FCN-363J040 (Housing) FCN-363J-AU (Contact)		AWG24 to AWG28 Strip outer of cable is Ø1.2 or less	Need a crinping tool. Recommended our crimp-style tool made by FUJITSU CO., LTD.*2
Soldering	FCN-360C040-B (Connector cover) FCN-361J040-AU (Connector)		AWG23 to 26 (0.26 to 0.12 mm^2)	Accessories

*1 Hand press: FCN-707T-T101/H, cable cutter: FCN-707T-T001/H and locator plate: FCN-367T-T012/H are needed.

*2 Manual crimp tool: FCN-363T-T005/H

6-5 Wiring to basic/expansion rack panel

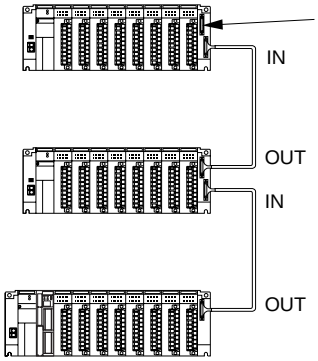
[1] Installation of I/O expansion cable

(1) Install basic/expansion rack panel in direct

Connects between the basic rack panel and the expansion rack panel, or between the expansion rack panel and another expansion rack panel using following cables. (Max. 4 racks can be connected)

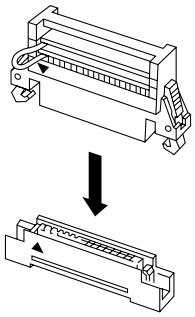
Model name	Cable length	Remarks
JW-203EC	30 cm	With 5 VDC cable (30 cm)
JW-207EC	70 cm	With 5 VDC cable (70 cm)
JW-22EC	2 m	With 5 VDC cable (2 m) and a short connector
JW-25EC	5 m	With short connector. 5 VDC cable is not supplied
JW-210EC	10 m	

When connecting the I/O expansion cable, take care with the IN and OUT parts of each rack panel as follows. Mis-connection indicates "I/O table verify error $60_{(H)}$" or "I/O table registration error $70_{(H)}$" and the JW300 cannot start operation.



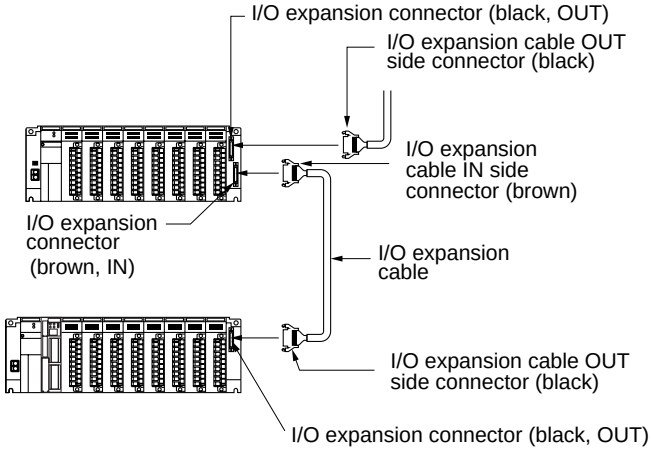
When using the JW-22EC/25EC/210EC with the I/O expansion cable, be sure to install a short connector (for termination resistance) in OUT side of the final expansion rack panel. Otherwise, an error may occur.
When using only JW-203EC/207EC, installation of short connector is unnecessary.
- Separate sale of only the short-circuit connector (QCNCW5252NCZZ) is also available.

- Short connector

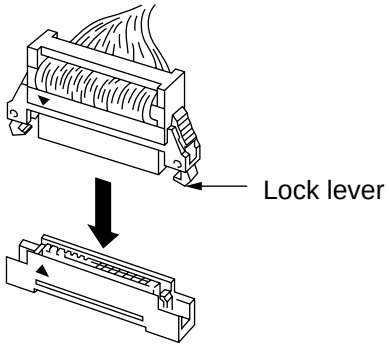


- Allowable total length of the I/O expansion cable is 14 m max.
- When connecting the I/O expansion cable with each rack panel, be careful of its installation position and direction, and fix firmly using lock lever.

- Installation position of I/O expansion cable



- Fitting direction of I/O expansion cable



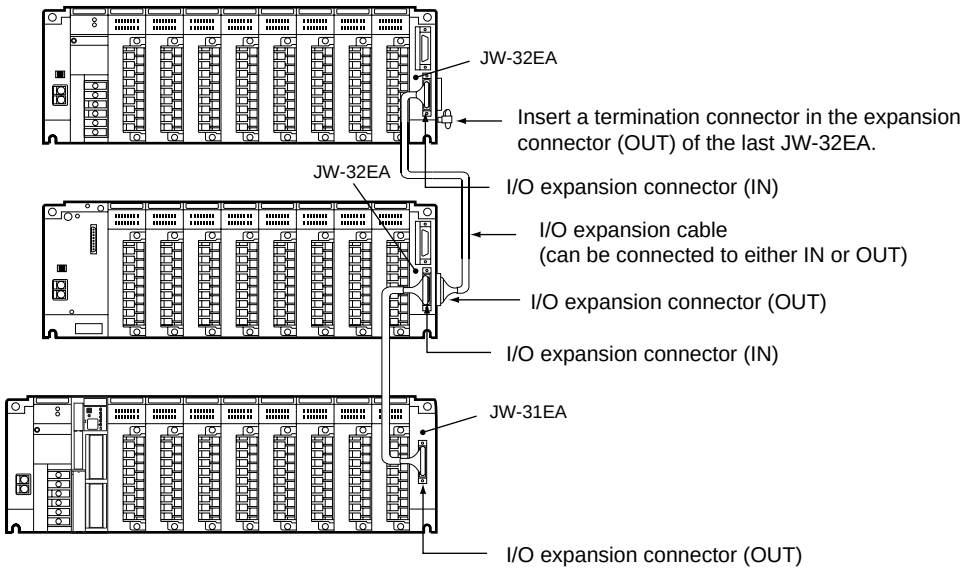
Note 1: When using the JW-25EC/210EC as an I/O expansion cable, fix the shield line of the I/O expansion cable at fixing rack panel.

(2) When installing in an I/O bus expansion adapter

Connect an I/O bus expansion adapter, JW-31EA (mounted on a basic rack panel), to a JW-32EA (installed in an expansion rack panel), or between two JW-32EAs using one of the following cable assemblies. (Max. 8 racks can be connected).

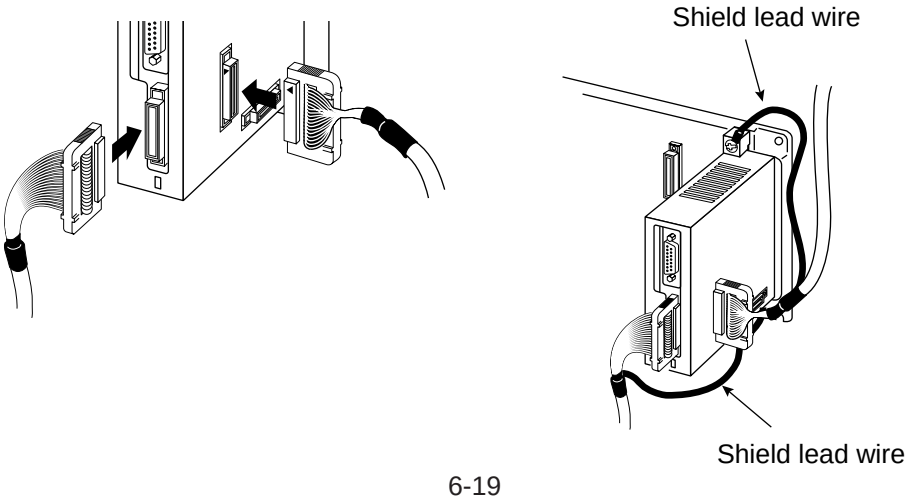
Model name	Cable length	Remarks
JW-05EC	50 cm	With 5 VDC cable (50 cm)
JW-1EC	1 m	With 5 VDC cable (1 m)
JW-3EC	3 m	No accessories
JW-10EC	10 m	
JW-20EC	20 m	
JW-30EC	30 m	
JW-50EC	50 m	

When an I/O expansion cable is connected, do it correctly as shown in the figure below while being careful of the IN and OUT connection of the I/O bus expansion adapter. If IN and OUT are inversely connected, the JW300 will not start operation and become either "I/O table verify error $60_{(H)}$" or "I/O table registration error $70_{(H)}$" status.



- The total length of cables must be no more than 50 meters.
- Put the each end of the shield lead wire of the I/O expansion cable in between the module fixing screw and the I/O bus expansion adapter, and then tighten the screws.

I/O expansion cable insertion direction

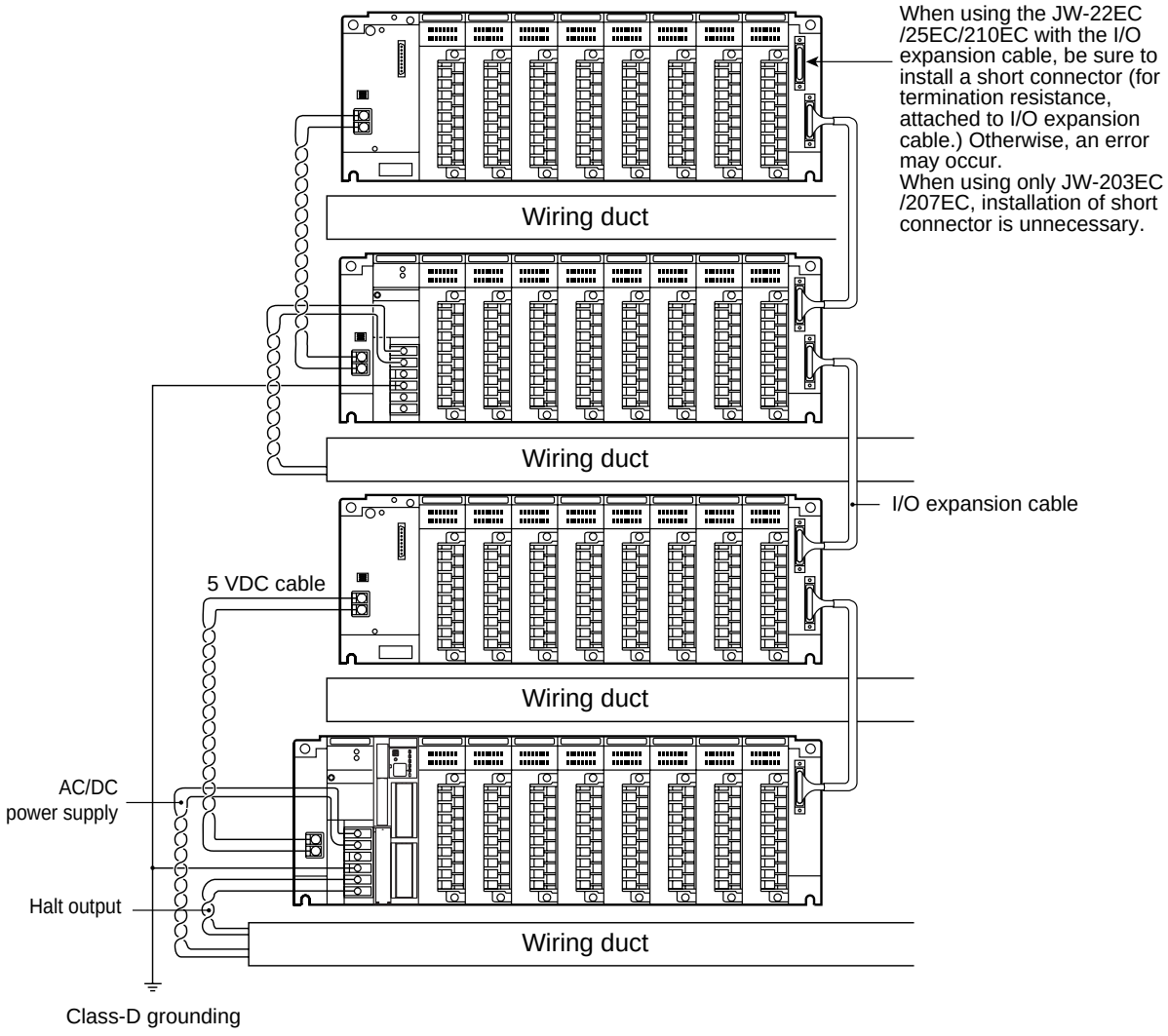


[2] Wiring for 5 VDC cable, process of panel wiring

Be sure to supply 5 VDC to the expansion rack panel without power supply module, through the 5 VDC terminal block of the basic/expansion rack panel with power supply module. Without a supply of 5 VDC power supply, the I/O module cannot run.

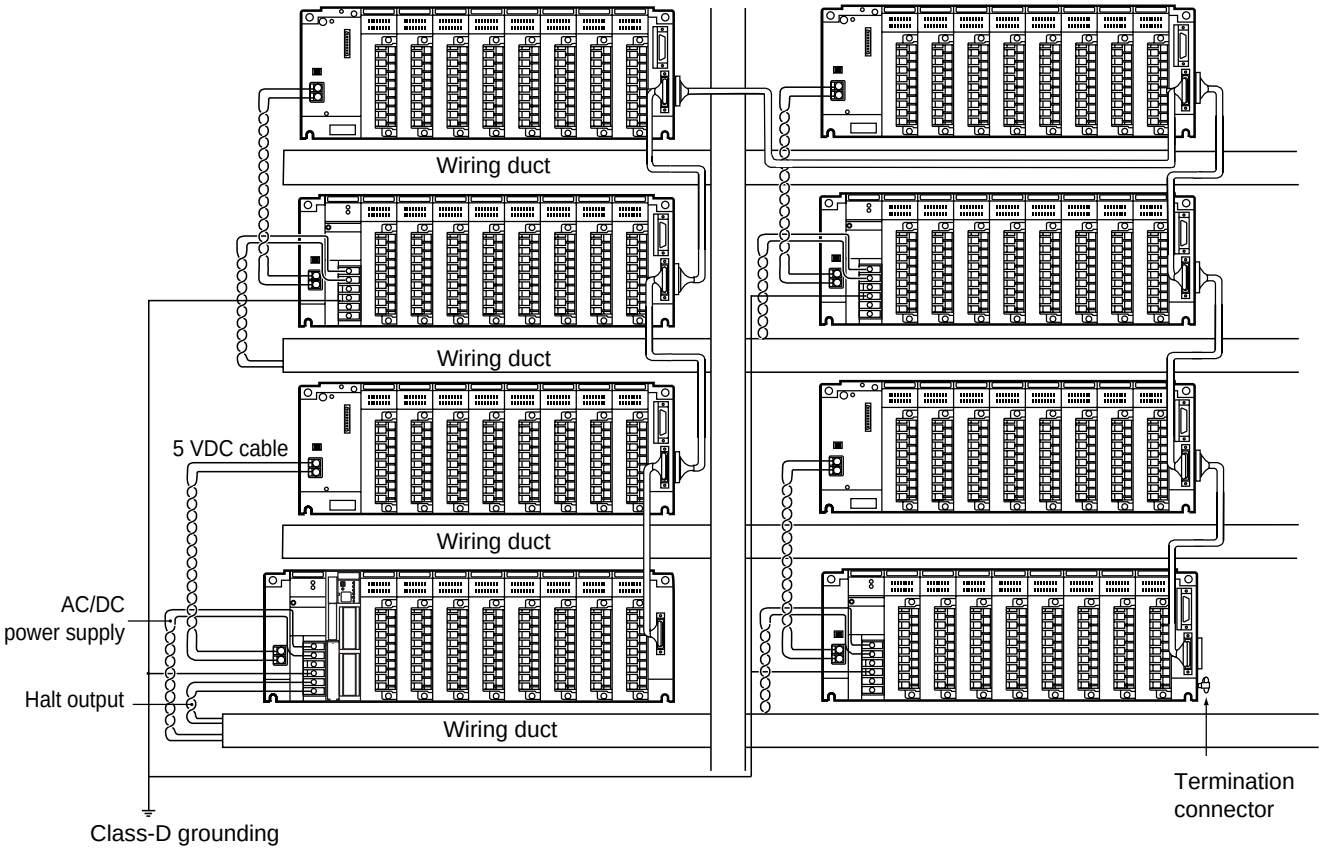
- Be careful not to mistake polarity in connection of basic/expansion rack panel into the 5 VDC terminal block. Mis-connections might damage the module or cause fire.
- Do not use a 5 VDC cable for connection between rack panels that are used to install power supply modules. Connect these may cause malfunction.
- For wiring to the 5 VDC terminal block, use crimp-style terminals.
- In order to prevent wire wastes from dropping into the module through a ventilation hole of the module during the wiring work, keep the caution label stuck onto the upper side of the module. Peel the caution label off of the module.
- Fasten the screw on the terminal block with a torque of less than 1.18 N-m.

(1) Wiring processing example of four rack systems



- Connect AC/DC power supply to the power supply module from the same power.
- Do not place the I/O expansion cable and the 5 VDC cable in the same duct or pipe as the I/O lines and the power lines of the JW300.

(2) Wiring processing example of eight rack systems



Chapter 7. Directions for use

7-1 Current consumption of module

Each module in the JW300 operates by 5 VDC output current supplied by the power supply module: JW-301PU, etc. The make up the system configuration plan is such that the total current consumption of each module does not exceed the current capacity of the power supply module. When the total current consumption of each module exceeds the supply capacity, the JW300 stops operation by the current limit function of the power supply module.

The current consumption in each module can be found using the following two methods:

1. Total numbers of a current consumption indication marks, which are shown on stickers next to model indication label in each module.
2. Calculate the total current consumption.

- Output current of 5 VDC power supply

Model name	Output voltage	Output current
JW-301PU	5 VDC	3.5 A
JW-22PU		
JW-31PU		
JW-303PU		4.5 A

(1) Current consumption of each module

1) Control module

Model name	Current consumption: mA	No. of current consumption mark
JW-311CU, JW-312CU	500	------
JW-321CU, JW-322CU	500	
JW-331CU, JW-332CU	500	
JW-341CU, JW-342CU	500	
JW-352CU	500	
JW-362CU	500	

2) Support tools

Model name	Current consumption: mA	No. of current consumption mark
JW-15PG (Hand-held programmer)	200	------

3) I/O bus expansion adapter

Model name	Current consumption: mA	No. of current consumption mark
JW-31EA (I/O bus expansion adapter)	600	------
JW-32EA (I/O bus expansion adapter)	450	

4) Input/output / special I/O / option / device net / I/O link module

	Model name	Current consumption : mA (when all points ON)	No. of current consumption mark
I/O	JW-203N (200/240 VAC input)	40	1
	JW-211NA (100/120 VAC input)	60	1
	JW-212NA (12/24 VDC input)	60	1
	JW-214NA (12/24 VDC input)	60	1
	JW-234N (12/24 VDC input)	80	1
	JW-204SA (Relay output)	380	4
	JW-212SA (5/12/24 VDC output)	60	1
	JW-213SA (100/240 VAC output)	260	3
	JW-214SA (Relay output)	550	5
	JW-232S (5/12/24 VDC output)	320	3
	JW-232M (12/24 VDC input, 5/12/24 VDC output)	200	2
Special I/O	JW-264N (24 VDC input)	60	1
	JW-262S (5/12/24 VDC output)	300	3
	JW-21HC (High speed counter)	120	2
	JW-22HC (High speed counter)	100	1
	JW-24AD (Analog input)	90	1
	JW-22DA (Analog output)	75	1
	JW-22DU (ID control module)	400	4
	JW-21SU (Serial interface module)	170	2
	JW-21PS (Pulse output module)	150	2
Option	JW-21CM (Link module)	125	2
	JW-22CM (Network module)	360	4
	JW-21MN (ME-NET module)	360	4
	JW-25CM (JW10 link module)	130	2
	JW-255CM (Ethernet module)	370	4
	JW-25TCM (Ethernet module)	350	4
	JW-22FL5, JW-20FL5 (FL-net module)	350	4
	JW-22FLT, JW-20FLT (FL-net module)	350	4
	JW-22SU (Serial interface module)	190	2
Device net	JW-20DN (DeviceNet master module)	200	2
I/O link	JW-23LMH (I/O link master module)	120	2
JW-21RS (remote I/O slave station)		140	2

(2) Calculation of current consumption (by current consumption mark)

Add up the total numbers of the current consumption mark on stickers next to the model name label.

One mark of current consumption means approx.100 mA.

Constitute a system in order to follow the below conditions:

Conditions: The total current consumption units, as shown by stickers on the modules receiving power, must not exceed 35 when the JW-301PU, JW-22PU or JW-31PU are used as the power supply module. The current consumption units must not exceed 45 when the JW-303PU power supply module is used. Please note: These current consumption units are NOT amps, milliamps, etc.

The example below is calculated on the conditions that 5 sets of JW-3**CU control modules, 2 sets of JW-15PG support tools, 6 sets of JW-31EA I/O bus expansion adapters, and 5 sets of JW-32EA are used.

[Example] Calculation of the total current consumption in the system configiration below:

Power supply module:	JW-301PU	
Control module:	JW-3**CU	
Hand-held programmer:	JW-15PG	
Input module:	JW-203N	8 sets
	JW-211NA	8 sets
Output module:	JW-212SA	8 sets
I/O module:	JW-232M	6 sets

	No. of marks
JW-32**CU, JW-15PG	7
JW-203N	8
JW-211NA	8
JW-212SA	8
JW-232M	12
Total	43

As shown above, a total of 43 current consumption is being drawn by the connected modules. This figure exceeds the limit of 35 units when using the JW-301PU power supply module. Therefore, another power supply module must be installed on the expansion rack panel.

(3) Calculation of current consumption (by calculating current consumption)

As the calculation example, calculate current consumption taking the system configuration in the example of (2).

JW-3**CU	0.5A
JW-15PG	0.2A
JW-203N	0.04 x 8 = 0.32A
JW-211NA	0.06 x 8 = 0.48A
JW-212SA	0.06 x 8 = 0.48A
JW-232M	0.20 x 6 = 1.20A
Total	3.18A

Shown here, the total current consumption is 3.18 amps. This figure is below the maximum output current of 3.5 amps provided by the JW-301PU. And another power supply module is not required in the expansion rack panel.

As indicated above, the total current consumption calculation method requires no more power supply module, but the current consumption mark method requires another power supply module. Therefore, get total current consumption using calculation method for determine system configuration. The mark counting method gives only a rough estimate.

7-2 How to calculate the heat value (average power consumption) of the JW300 when designing panels.

Obtain the average power consumption of the entire JW300 system following the calculations below, and calculate temperature inside a panel.

1) Power supply module.
   $Wpw = \frac{3}{7} \times (I_{5V} \times 5)$ (W)
   I_{5V}: Current consumption of 5 VDC circuit of respective module.
2) Tatal comsumption electric power of respective module. (5 VDC)
   $W_{5V} = I_{5V} \times 5$ (W)
3) Average consumption electric power of total 24 VDC power supply of output module. (Power consumption for simultaneous ON points)
   $W_{24V} = I_{24V} \times 24$ (W)
4) Average power consumption by output module drop voltage of output module. (Power consumption for simultaneous ON points)
   Wour = Iour x Vdrop x No. of output points x Simultaneous ON rate (W)
   Iour: Output current (current of use) (A)
   Vdrop: Drop voltage of respective output module. (V)
5) Input module average power consumption of input module. (Power consumption for simultaneous ON points)
   - In case of DC input
     $W_{IN} = I_{IN} \times E \times$ No. of input points x Simultaneous ON rate (W)
   - In case of AC input
     $W_{IN} = 0.1 \times I_{IN} \times E \times$ No. of input points x Simultaneous ON rate (W)
     I_{IN} = Input current (Rms value in the case of AC) (A)
     E = Input voltage (Voltage of use) (V)
6) Consumption electric power of special function module.
   $W_S = I_{5V} \times 5 + I_{24V} \times 24$ (W)

The total of the power consumptions calculated in each module is the power consumption of the entire machine. From this entire power consumption (W), calculate the heat generation and temperature rise in the panel.

7-3 Allocation of relay numbers

Relay numbers for the input, output, special, and option modules are stored in the control module of the JW300 system for each rack and each slot, depending on the type of modules installed.
There are two method to register relay numbers: 1) Automatic I/O registration by turning ON the power to the modules (does not need any support tool), 2) Manually enter I/O addresses using a support tool.

- Auto I/O Registration when the power is ON
  When the PROTECT switch on the control module is OFF, and system memory #0247 = $00_{(H)}$, the relay numbers will be registered automatically if the power is turned ON. After the Auto I/O Registration, turn OFF the PROTECT switch, or make #0247 = $03_{(H)}$, to prohibit further Auto I/O Registration.
- I/O Address Setting using a support tool
  I/O addresses can be registered from a menu by using the JW-300SP or JW-15PG. For details about their operation, see the respective user's manual.
  Using the JW-15PG, you can only perform an Auto I/O Registration. You cannot perform Free I/O Address Setting.
- The JW300 verifies the registered relay numbers whenever its mode changes (from stop to run). After verifying them, if the numbers do not match the modules actually installed, the FLT lamp on the control module will light. The JW300 stops operation, and stores the error code $60_{(H)}$ (table verification error) in system memory #0160.

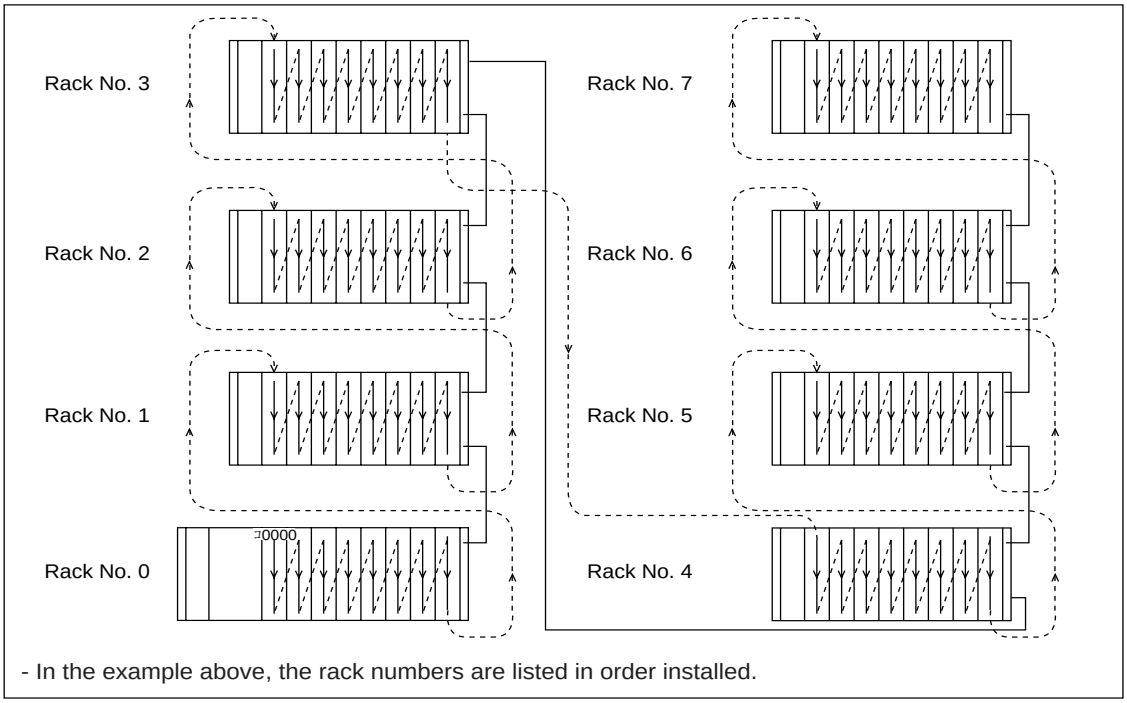
[1] Setting I/O addresses

The JW300's I/O addresses can be set using Auto I/O Registration, Free I/O Registration (continuous allocation), and Free I/O Registration (individual allocation).

I/O address setting		Description	
Auto I/O Registration		- The control modules automatically register I/O addresses from "⊐00000" in series with the same order as the rack numbers (0 to 7).	=> (1)
Free I/O Registration	Continuous allocation	- Allocate the top address for each rack (0 to 7) within the range of⊐00000 to⊐01577. On each rack, the I/O addressees are automatically and continuously registered, working down from the top address.	=> (2)
	Individual allocation	- Allocate the top address for each rack (0 to 7) within the range of⊐00000 to⊐01577.	=> (3)

(1) Auto registration

The control modules automatically register I/O addresses, using sequential addresses starting from "ㅋ00000," in the same order as the rack numbers (0 to 7).



- In the example above, the rack numbers are listed in order installed.

- Number of I/O points and I/O relay area.

Shown below are examples using basic rack panel (JW-318KB) and 7 expansion rack panels (JW-38ZB.)

Control module	No. of I/O points	No. of allocation points of I/O relays	I/O relay area
JW-311CU/312CU	Max. 512 points	Max. 1280 points	ㅋ00000 to ㅋ00237
JW-321CU/322CU	Max.1024 points	Max. 1536 points	ㅋ00000 to ㅋ00277
JW-331CU/332CU	Max. 4096 points	Max. 2048 points	ㅋ00000 to ㅋ00377
JW-341CU/342CU			
JW-352CU			
JW-362CU			

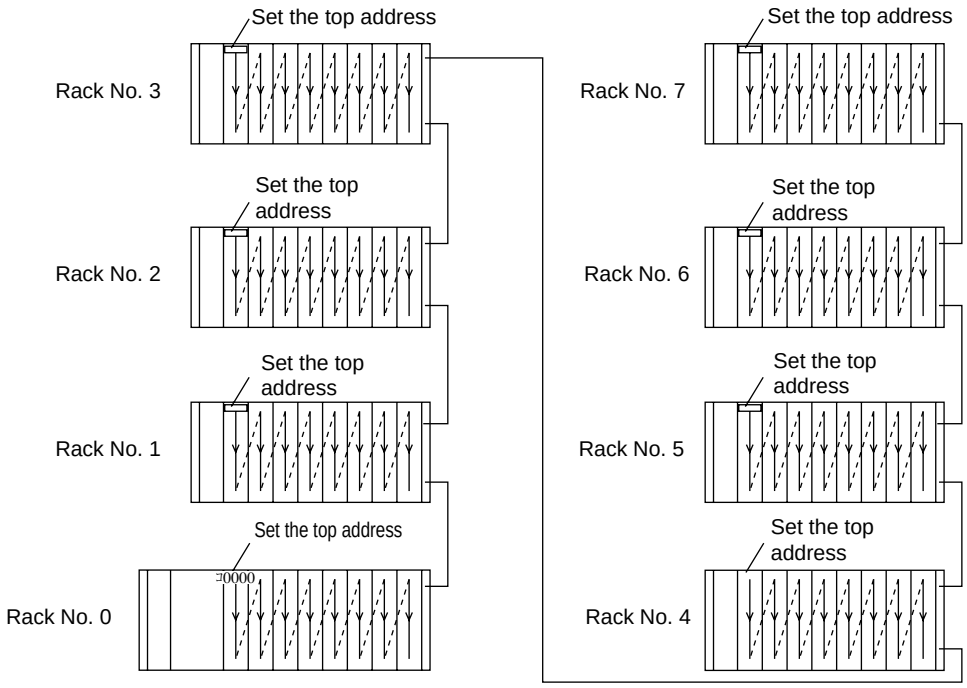
- No. of I/O points, No. of all allocation points of I/O relays => See page 7-10.

Note: The I/O mounted on the remote I/O slave station JW-21RS is not registered automatically. When the master station is JW-21CM and the slave station is JW-21RS, the I/O registration of slave station is registered in the parameter of JW-21CM.

(2) Free I/O registration (continuous allocation)

Specify the top address for each rack (0 to 7), within the range of ⊐00000 to ⊐01577.

I/O addresses are registered continuously, starting from the specified top address, on each rack.



- In the example above, the rack numbers are listed in order installed.

- Number of I/O points and I/O relay area.

Shown below are examples using basic rack panel (JW-318KB) and 7 expansion rack panels (JW-38ZB.)

Control module	No. of I/O points	No. of allocation points of I/O relays	I/O relay area
JW-311CU/312CU	Max. 512 points	Max. 1280 points	⊐00000 to ⊐01577
JW-321CU/322CU	Max. 1024 points	Max. 1536 points	
JW-331CU/332CU	Max. 4096 points	Max. 2048 points	
JW-341CU/342CU			
JW-352CU			
JW-362CU			

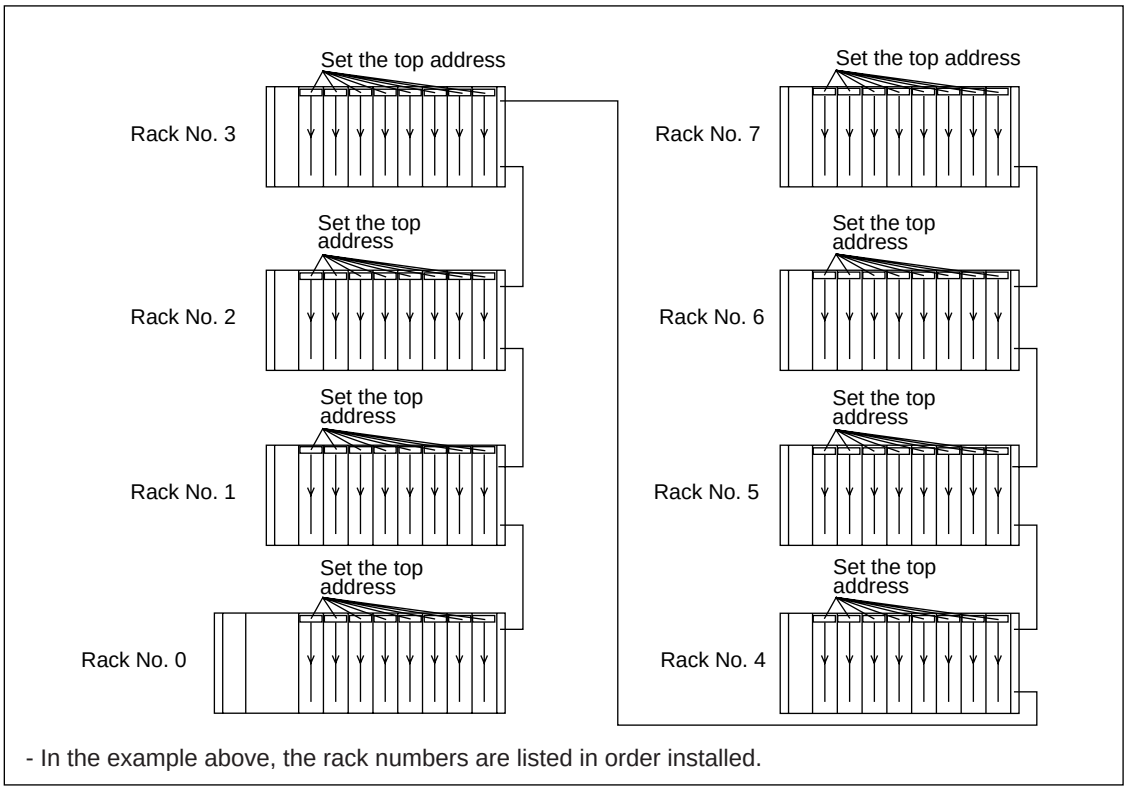
- No. of I/O points, No. of all allocation points of I/O relays => See page 7-10.

Note: Be careful not to reuse the same number in the same system.

(3) Free I/O registration (individual allocation)

Specify the top address for each rack (0 to 7), within the range of ⊐00000 to ⊐01577.

I/O addresses are registered continuously, starting from the specified top address, on each rack.



- In the example above, the rack numbers are listed in order installed.

- Number of I/O points and I/O relay area.

Shown below are examples using basic rack panel (JW-318KB) and 7 expansion rack panels (JW-38ZB).

Control module	No. of I/O points	No. of allocation points of I/O relays	I/O relay area
JW-311CU/312CU	Max. 512 points	Max. 1280 points	⊐00000 to ⊐01577
JW-321CU/322CU	Max. 1024 points	Max. 1536 points	
JW-331CU/332CU	Max. 4096 points	Max. 2048 points	
JW-341CU/342CU			
JW-352CU			
JW-362CU			

- No. of I/O points, No. of all allocation points of I/O relays => See page 7-10.

Note: Be careful not to reuse the same number in the same system.

[2] I/O relays allocated to each module

Relay numbers in each rack panel are automatically allocated in series following each rack top address set by I/O register. Number of points and contents of relays allocated varies with kinds of module.

Kind of module	Allocation No. of points	Contents of allocated relay No.
8 points input module	16	Instead of 8 points, 16 points are assigned. - The first half 8 points is acceptable for input/output and the second half 8 points is unacceptable area for this module.
8 points output module		
16 points input module	16	Acceptable for 16 points as I/O module.
16 points output module		
32 points input module	32	Acceptable for 32 points as input, output, and I/O module.
32 points output module		
32 points input/output module		
64 points input/output module (special I/O module)	16	Although 16 points are assigned, this is a dummy area not used in this module. - In the 64 points I/O module, the relay area for special I/O module can be used as I/O module.
Special I/O module (expect for 64 points input/ output)	16	Although 16 points are assigned, this is a dummy area not used in this module.
Option module		
Device net module		
I/O link master module		
Vacant slot	16	Allocation for 16 points

[3] Number of input/output points and allocation of input/output relays

The number of I/O points (control) and the number of I/O relay allocation points are as follows:
The number of relays will vary, depending on the type of module.

■ **Number of control input/output points and allocation of input/output relays**

Control module	Number of I/O points (control)	Number of I/O relay allocation points	I/O relay area	
			Automatic I/O registration	Manual I/O registration
JW-311CU/312CU	Max. 512 points	Max. 1280 points	□00000 to □00237	□00000 to□01577
JW-321CU/322CU	Max. 1024 points	Max. 1536 points	□00000 to □00277	
JW-331CU/332CU	Max. 4096 points	Max. 2048 points	□00000 to □00377	
JW-341CU/342CU				
JW-352CU				
JW-362CU				

■ **Number of relay points and number of installable modules on each module**

Module type		Number of relay points that affect maximum number of control I/O points	Number of allocation points of I/O relays	Maximum number of installed modules	Racks that can install
8 point input modules		16 points	16 points	64 modules	Rack 0 to 7
8 point output modules		16 points	16 points	64 modules	
16 point input modules		16 points	16 points	64 modules	
16 point output modules		16 points	16 points	64 modules	
32 point input modules		32 points	32 points	64 modules	
32 point output modules		32 points	32 points	64 modules	
32 point input/output/ I/O modules		32 points	32 points	64 modules	
Special I/O module	64 point input/outut	64 points *1	16 points	64 modules	
	Other than 64 point input/output	0	16 points		
Option module		0	16 points	7 modules	Rack 0
Device net module		0	16 points	4 modules	
I/O link master module		0	16 points		
Vacant slot		0	16 points	---	Rack 0 to 7

*1 The 64-point input/output module uses special I/O relay area □03000 to □03777, □04200 to □05177) for its control relay.

- Module installation examples

Below shows an installation example when one set of the JW-318KB basic rack panel (8 slots) and 7 sets of the JW-38ZB expansion rack panels (8 slots) are used.

(Total: 8 slots x 8 racks = 64 modules)

Control module	Maximum number of modules installed				Number of I/O points (control)	Number of I/O relay allocation points
	8-point, 16-point input/output modules	32-point input/output/ I/O modules	64-point input/output module (special I/O module)	Number of modules that can be installed other than the left (including vacant slots) Numbers in [ ] are special I/O modules		
JW-311CU JW-312CU	32 modules	0	0	32 modules [32 modules]	512 points (16 points x 32)	1024 points (16 p x 32 + 16 p x 32)
	0	16 modules	0	48 modules [32 modules]	512 points (32 points x 16)	1280 points (32 p x 16 + 16 p x 48)
	0	0	8 modules	56 modules [24 modules]	512 points (64 points x 8)	1024 points (16 p x 8 + 16 p x 56)
JW-321CU JW-322CU	64 modules	0	0	0	1024 points (16 points x 64)	1024 points (16 p x 64)
	0	32 modules	0	32 modules [0]	1024 points (32 points x 32)	1536 points (32 p x 32 + 16 p x 32)
	0	0	16 modules	48 modules [16 modules]	1024 points (64 points x 16)	1024 points (16 p x 16 + 16 p x 48)
JW-331CU JW-332CU JW-341CU JW-342CU JW-352CU JW-362CU	64 modules	0	0	0	1024 points (16 points x 64)	1024 points (16 p x 64)
	0	64 modules	0	0	2048 points (32 points x 64)	2048 points (32 p x 64)
	0	0	64 modules *2	0	4096 points (64 points x 64)	1024 points (16 p x 64)
	0	0	0	64 modules [64 modules]	0	1024 points (16 p x 64)

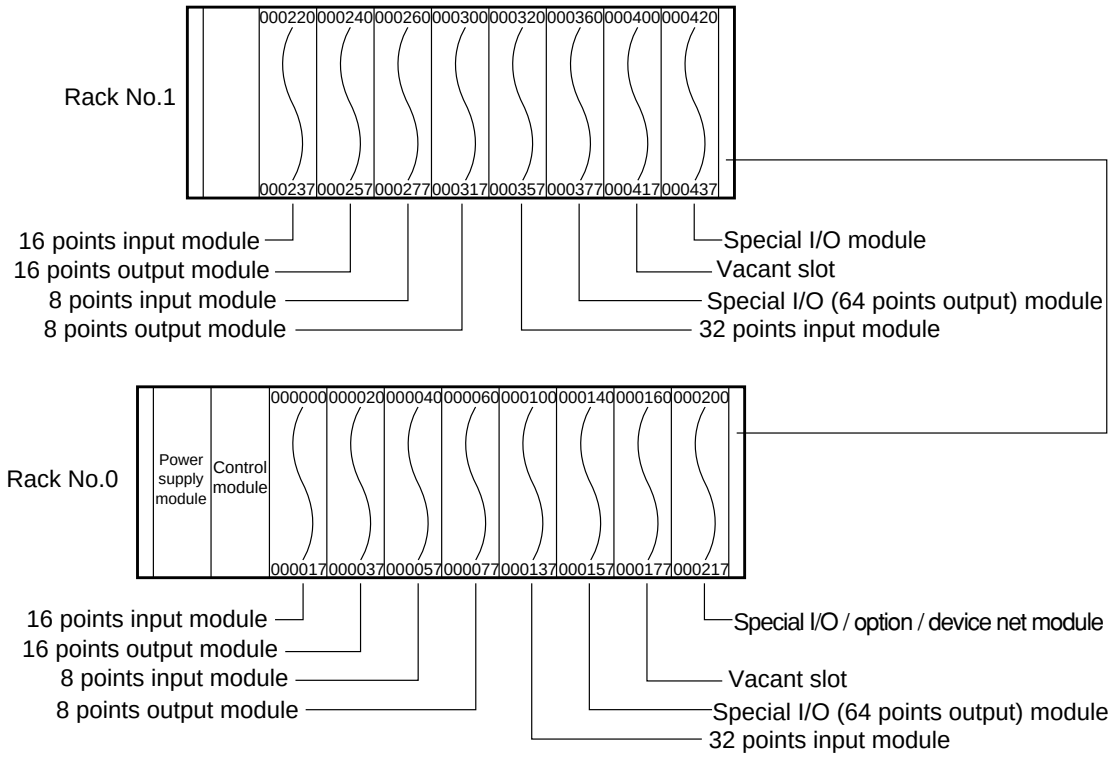
- 64 point I/O modules (special I/O modules) occupy the special I/O module relay area. It uses 16 points per unit.

[Ex.] When 64 sets (*2 on the table above) of 64-point I/O module are installed, the number of I/O points (control) will be 4096 I/O points (64 points x 64 units). However only 1024 relay allocation points will be used (16 points x 64 units.)

[4] Allocation example of relay no.

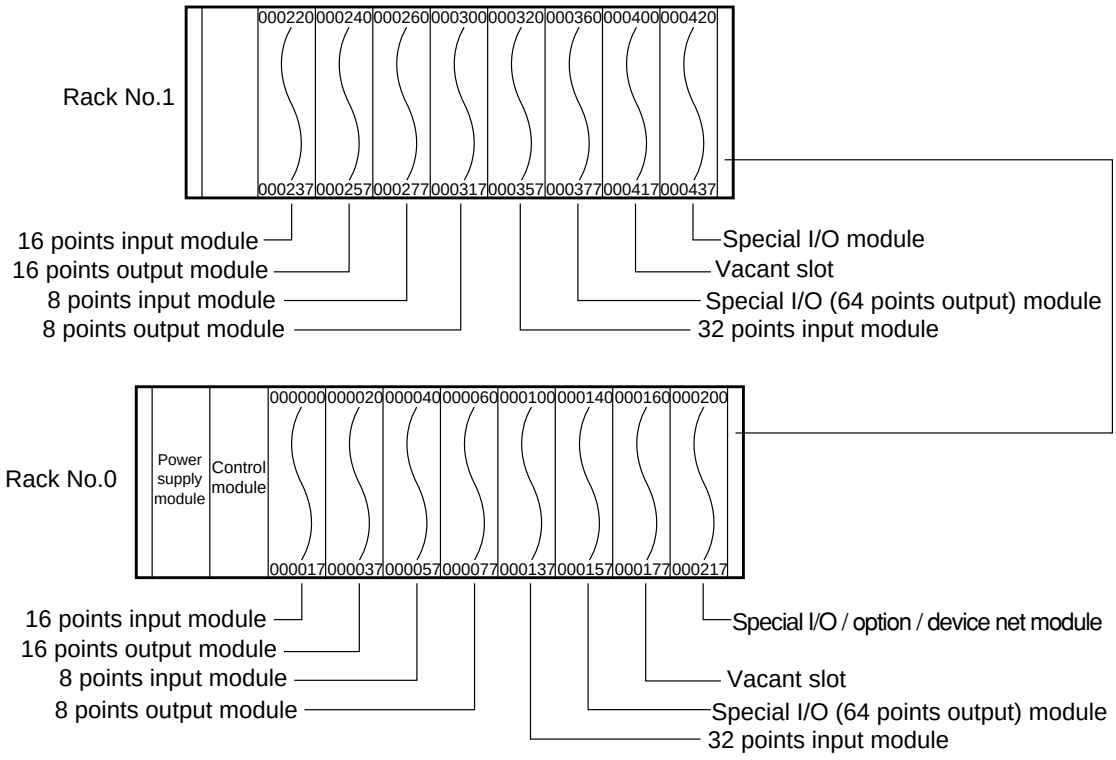
(1) Example of auto I/O registration

This is to show the relay numbers in the following system configuration.



(2) Example of free I/O registration (continuous allocation)

This is to show the relay numbers when the top address of rack number 1 is set at ⊐0200 in the following system configuration.



7-4 Data memory for special I/O, option, device net, I/O link, and option module

Data memory for use special I/O module is set by module No. switch of each modules.

Type	Model name	Module name	No. of installation	
Special I/O module	JW-264N	64 points input	- Max. 64 sets in one system (one control module). Further 8 sets can be extended by using remote I/O slave station.	=> [1]
	JW-262S	64 points output		
	JW-21HC	High speed counter		
	JW-22HC			
	JW-24AD	Analog input		
	JW-22DA	Analog output		
	JW-22DU	ID control		
	JW-21SU	Serial interface		
	JW-21PS	Pulse output		
Option module	JW-21CM	Link	- A maximum of 7 units can be installed on the basic rack panel, including other option modules.	=> [2]
	JW-22CM	Net work		
	JW-21MN	ME-NET		
	JW-25CM	JW10 link	- A maximum of 8 units can be installed on the basic rack panel, including other option modules.	
	JW-255CM	Ethenet		
	JW-25TCM			
	JW-20FL5	FL-net (ver. 1)		
	JW-20FLT			
	JW-22FL5	FL-net (ver. 2)		
	JW-22FLT			
	JW-22SU	Serial interface		
Device net module	JW-20DN	Device net master	- A maximum of 4 units can be installed on the basic rack panel.	
I/O link	JW-23LMH	I/O link master station		

Remark Setting value of the module No. switch

* When setting the module No. switch on a special I/O module, option module, device net module, or I/O link module, note the following carefully:
  1) Do not use the same module switch setting on two or more of the following module types in the same system.
     1. Option modules
     2. Device net modules
     3. I/O link modules
     4. Device net modules and I/O link modules
  2) Do not use the same module switch setting for special I/O modules on the same rack panel.

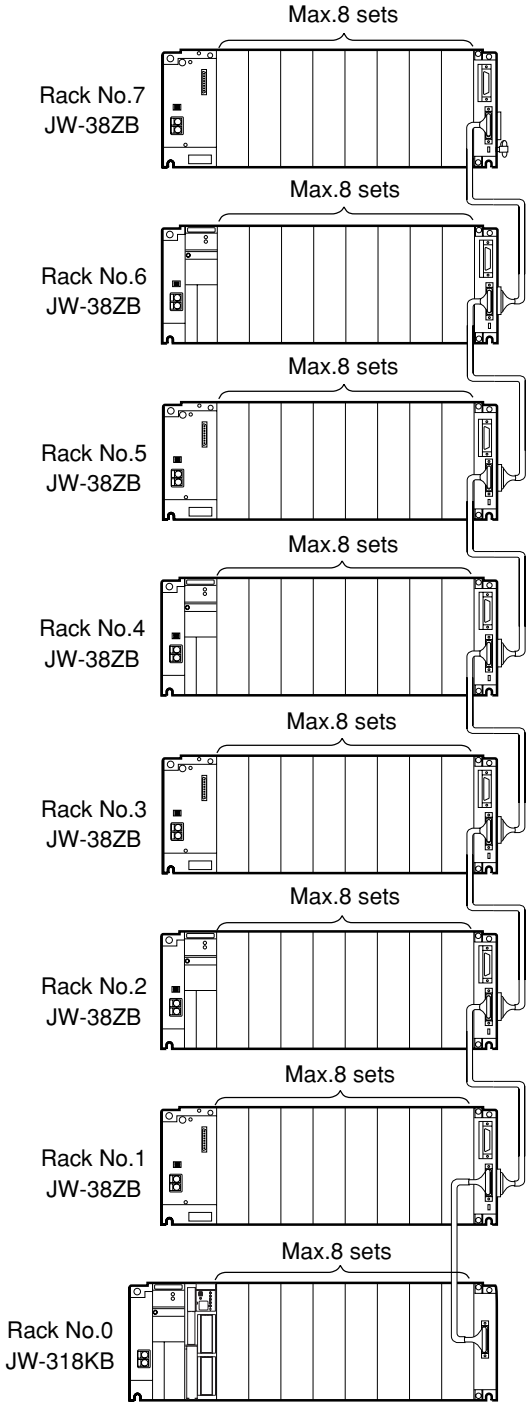
	Option module	Special I/O module	Device net module	I/O link module
Option module	×	○	○	○
Special I/O module	○	△	○	○
Device net module	○	○	×	×
I/O link module	○	○	×	×

O: The same module number can be assigned to more than one module using the module No. switches.
△: The same module number must not be assigned to more than one module in the same basic rack panel. However, it is possible to use the same number for modules on other basic rack panels.
X: Do not use the same setting for any of the module No. switches.

Type	Module model name
Special I/O module	JW-264N, JW-262S, JW-21HC, JW-22HC, JW-24AD, JW-22DA JW-22DU, JW-21SU, JW-21PS
Option module	JW-21CM, JW-22CM, JW-21MN, JW-255CM, JW-20FL5 JW-20FLT, JW-25CM
Device net module	JW-20DN
I/O link module	JW-23LMH

[1] Data memory for special I/O module

The special I/O module will be assigned a place in the special I/O module relay area and the special I/O parameter area by the setting of the Module No. switch (0 to 7) on the special I/O module.



Setting value of module No. switch		Relay area for special I/O module	Parameter area
Rack 7	0	ㅋ05000 to ㅋ05017	T-70 (000 to 377)
	1	ㅋ05020 to ㅋ05037	T-71 (000 to 377)
	2	ㅋ05040 to ㅋ05057	T-72 (000 to 377)
	3	ㅋ05060 to ㅋ05077	T-73 (000 to 377)
	4	ㅋ05100 to ㅋ05117	T-74 (000 to 377)
	5	ㅋ05120 to ㅋ05137	T-75 (000 to 377)
	6	ㅋ05140 to ㅋ05157	T-76 (000 to 377)
	7	ㅋ05160 to ㅋ05177	T-77 (000 to 377)
Rack 6	0	ㅋ04600 to ㅋ04617	T-60 (000 to 377)
	1	ㅋ04620 to ㅋ04637	T-61 (000 to 377)
	2	ㅋ04640 to ㅋ04657	T-62 (000 to 377)
	3	ㅋ04660 to ㅋ04677	T-63 (000 to 377)
	4	ㅋ04700 to ㅋ04717	T-64 (000 to 377)
	5	ㅋ04720 to ㅋ04737	T-65 (000 to 377)
	6	ㅋ04740 to ㅋ04757	T-66 (000 to 377)
	7	ㅋ04760 to ㅋ04777	T-67 (000 to 377)
Rack 5	0	ㅋ04400 to ㅋ04417	T-50 (000 to 377)
	1	ㅋ04420 to ㅋ04437	T-51 (000 to 377)
	2	ㅋ04440 to ㅋ04457	T-52 (000 to 377)
	3	ㅋ04460 to ㅋ04477	T-53 (000 to 377)
	4	ㅋ04500 to ㅋ04517	T-54 (000 to 377)
	5	ㅋ04520 to ㅋ04537	T-55 (000 to 377)
	6	ㅋ04540 to ㅋ04557	T-56 (000 to 377)
	7	ㅋ04560 to ㅋ04577	T-57 (000 to 377)
Rack 4	0	ㅋ04200 to ㅋ04217	T-40 (000 to 377)
	1	ㅋ04220 to ㅋ04237	T-41 (000 to 377)
	2	ㅋ04240 to ㅋ04257	T-42 (000 to 377)
	3	ㅋ04260 to ㅋ04277	T-43 (000 to 377)
	4	ㅋ04300 to ㅋ04317	T-44 (000 to 377)
	5	ㅋ04320 to ㅋ04337	T-45 (000 to 377)
	6	ㅋ04340 to ㅋ04357	T-46 (000 to 377)
	7	ㅋ04360 to ㅋ04377	T-47 (000 to 377)
Rack 3	0	ㅋ03600 to ㅋ03617	T-30 (000 to 377)
	1	ㅋ03620 to ㅋ03637	T-31 (000 to 377)
	2	ㅋ03640 to ㅋ03657	T-32 (000 to 377)
	3	ㅋ03660 to ㅋ03677	T-33 (000 to 377)
	4	ㅋ03700 to ㅋ03717	T-34 (000 to 377)
	5	ㅋ03720 to ㅋ03737	T-35 (000 to 377)
	6	ㅋ03740 to ㅋ03757	T-36 (000 to 377)
	7	ㅋ03760 to ㅋ03777	T-37 (000 to 377)
Rack 2	0	ㅋ03400 to ㅋ03417	T-20 (000 to 377)
	1	ㅋ03420 to ㅋ03437	T-21 (000 to 377)
	2	ㅋ03440 to ㅋ03457	T-22 (000 to 377)
	3	ㅋ03460 to ㅋ03477	T-23 (000 to 377)
	4	ㅋ03500 to ㅋ03517	T-24 (000 to 377)
	5	ㅋ03520 to ㅋ03537	T-25 (000 to 377)
	6	ㅋ03540 to ㅋ03557	T-26 (000 to 377)
	7	ㅋ03560 to ㅋ03577	T-27 (000 to 377)
Rack 1	0	ㅋ03200 to ㅋ03217	T-10 (000 to 377)
	1	ㅋ03220 to ㅋ03237	T-11 (000 to 377)
	2	ㅋ03240 to ㅋ03257	T-12 (000 to 377)
	3	ㅋ03260 to ㅋ03277	T-13 (000 to 377)
	4	ㅋ03300 to ㅋ03317	T-14 (000 to 377)
	5	ㅋ03320 to ㅋ03337	T-15 (000 to 377)
	6	ㅋ03340 to ㅋ03357	T-16 (000 to 377)
	7	ㅋ03360 to ㅋ03377	T-17 (000 to 377)
Rack 0		ㅋ03000 to ㅋ03017	T-00 (000 to 377)
		ㅋ03020 to ㅋ03037	T-01 (000 to 377)
		ㅋ03040 to ㅋ03057	T-02 (000 to 377)
		ㅋ03060 to ㅋ03077	T-03 (000 to 377)
		ㅋ03100 to ㅋ03117	T-04 (000 to 377)
		ㅋ03120 to ㅋ03137	T-05 (000 to 377)
		ㅋ03140 to ㅋ03157	T-06 (000 to 377)
		ㅋ03160 to ㅋ03177	T-07 (000 to 377)

- When the JW-264N/262S (64 I/O points) module is used, the last 8 bytes of the special I/O module relay area are not available for use. This area is used as auxiliary relays.
  [Ex.] If the module No. switch is set to "0" on rack 3, addresses ㅋ03610 to ㅋ03617 cannot be used for the JW-264N/262S.

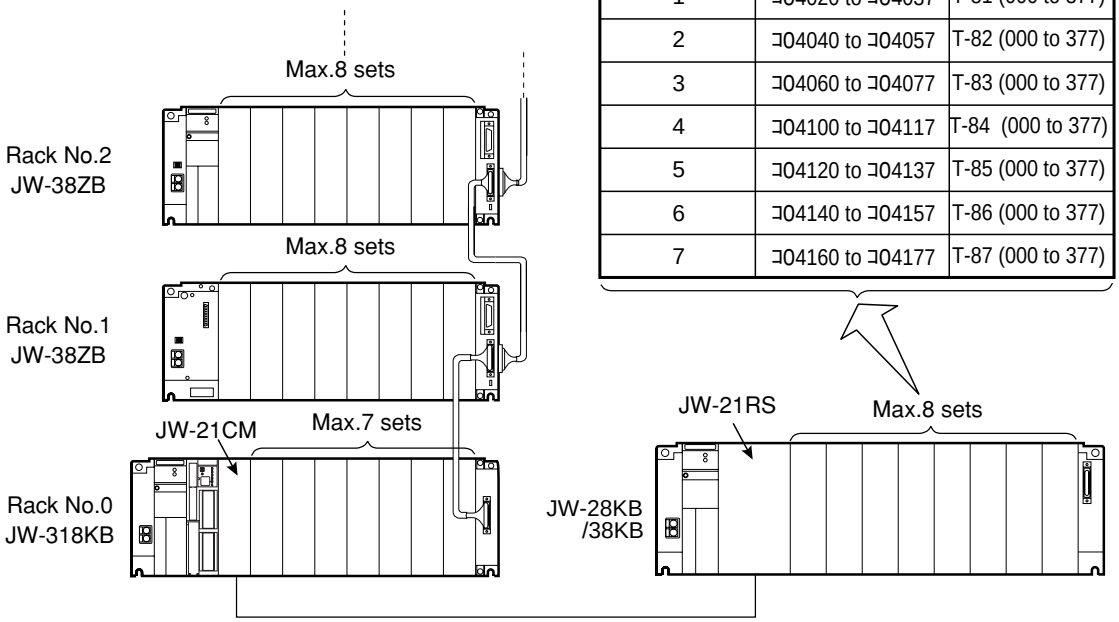
- Do not use special I/O parameter for JW-264N/262S and 22DU.

■ **In case of remote I/O system using JW-21CM link module**

A maximum of 8 special I/O modules can be installed in the JW-21RS remote I/O slave station. The special I/O module will be assigned a place in the special I/O module relay area and the special I/O parameter area by the setting of the Module No. switch (0 to 7) on the special I/O module.

Set value of module No. switch	Relay area for special I/O module	Special I/O parameter area
0	∃04000 to ∃04017	T-80 (000 to 377)
1	∃04020 to ∃04037	T-81 (000 to 377)
2	∃04040 to ∃04057	T-82 (000 to 377)
3	∃04060 to ∃04077	T-83 (000 to 377)
4	∃04100 to ∃04117	T-84 (000 to 377)
5	∃04120 to ∃04137	T-85 (000 to 377)
6	∃04140 to ∃04157	T-86 (000 to 377)
7	∃04160 to ∃04177	T-87 (000 to 377)

● Example of system



- The special I/O module relay area and special I/O parameter area for racks 0 to 7 are the same as described on the previous page.
- When the JW-21CM is master station, up to 4 sets of JW-21RS can be connected, but up to 8 special I/O modules can be installed if they are used as slave stations. If the slave station are different, duplicate module No. switches are not permitted.
- When others than JW-21CM are master station and JW-21RS is a slave station, special I/O module cannot be installed in the slave station.
- The serial interface module JW-21SU cannot be used in the remote I/O slave station.
- If the ID control module JW-22DU or pulse output module JW-21PS is used in the remote I/O slave station, the method of use is limited partly. (The F-85 and F-86 instructions cannot be used.)

[2] Data memory for option, device net, and I/O link

See the user's manual for each modules.

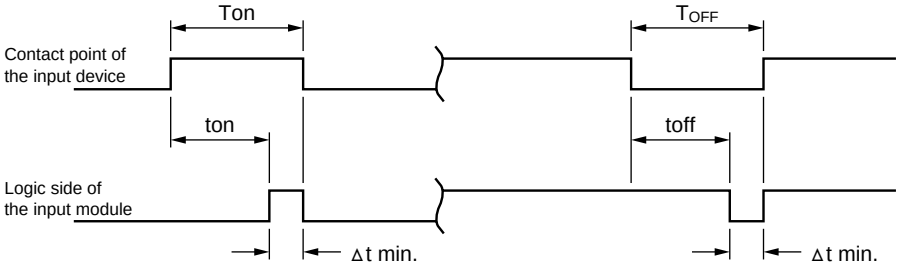
7-5 Precautions for operating I/O module

[1] Precautions for operating input module

(1) ON/OFF time of the input signal

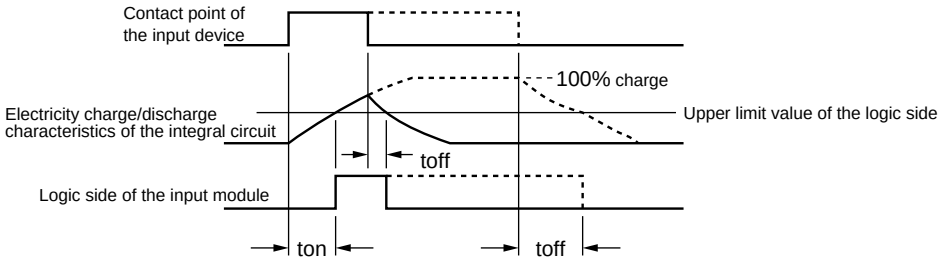
In order to ensure ON/OFF condition of the input device correctly (limit switch etc.) on the operation of the JW300, ON or OFF time should meet the following conditions.

ON time of the input device (T_{ON})	$T_{on} > Dt + t_{on}$
OFF time of the input device (T_{OFF})	$T_{off} > Dt + t_{off}$
	Dt ····· One scanning time of JW300
	t_{on} ····· OFF to ON response time of the input module
	t_{off} ····· ON to OFF response time of the input module



In the input/output process at the beginning of each scanning cycle, ON/OFF state of the logic side of the input module is written in the data memory and used as input data for operation of the user's program within its scanning cycle. Therefore, if ON or OFF time of the logic side of the input module is less than 1 scanning time (Dt), ON/OFF data may not be included in the data memory.

Note: The response time of the input module is made by the electricity charge/discharge characteristics of the integral circuit of the input module, and it varies depending on the time of duration of ON or OFF.



Toff shows the difference, shown in the above, between the case when the ON time of the contact point of the input device is longer as shown by dotted lines and the case when the ON time is shorter as shown by solid line.

- Calculation example in case the JW-214NA is used as an input module

If 1 scanning time is 5ms,

$T_{on} > Dt + t_{on} = 5 + 0.5 = 5.5$ (ms)

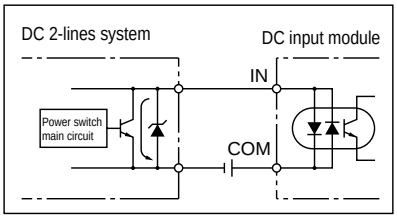
$T_{off} > Dt + t_{off} = 5 + 1.5 = 6.5$ (ms)

(2) Connectable input device

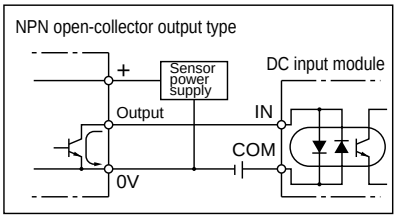
The followings are sensors and switches, which can be connected as input. See below for selection and connection of the input device.

- **DC input device**

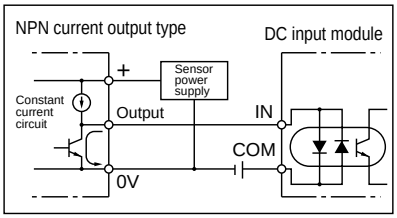
①



②



③



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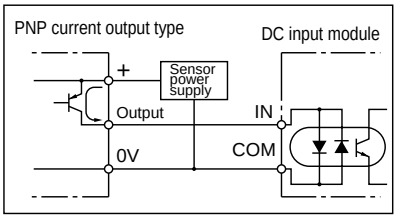
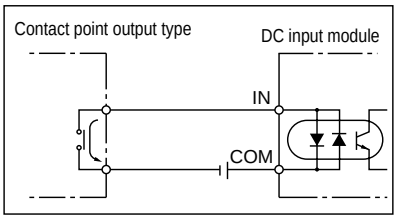
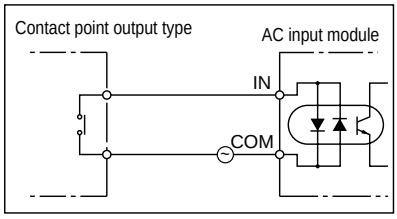


⑤



- **AC input device**

⑥



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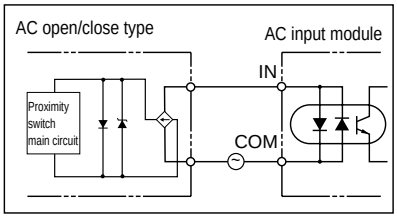
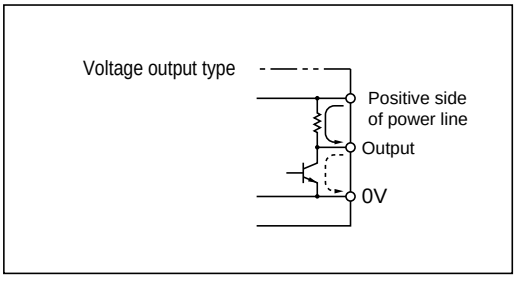


In cases of 1, 2, 3, 4, and 5, use a transistor having current driving capacity lager than that of the constant input current of the DC input module.

In cases of 1 and 7, pay attention to leakage current at OFF. (When leakage current is higher than the OFF input current level of the input module, the proximity switch may not turn OFF.)

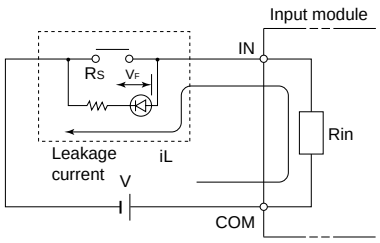
Be careful that voltage output type DC input device shown in the right may not be connected. (Driving capacity of an output transistor should be higher than the ON level of the input module).



(3) Countermeasure leakage current on input device

In the following device, there is also leakage current at OFF. If the leakage current is higher than the OFF level of the input module, the input module may not turn OFF, or noise margin at OFF state may drop.

1) Limit switch with LED



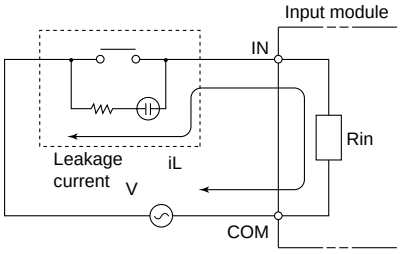
Reference

Calculation of leakage current i_L

$$i_L = \frac{V - V_F}{R_s + R_{in}}$$

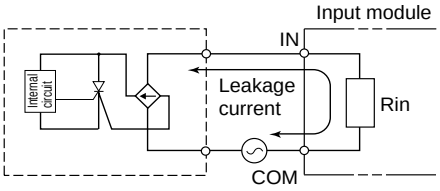
V: Power supply voltage
V_F: Voltage drop in the forward direction of LED
R_S: Current limit resistance
R_{in}: Input impedance of input module

2) Limit switch with neon lamp (the neon lamp is connected in parallel with the contact point.)



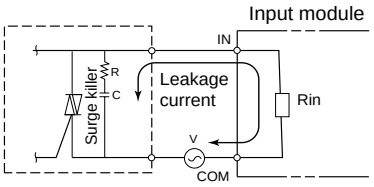
3) Proximity and photo switches of AC two lines system

In the AC two lines system, even at OFF there is leakage current from current consumption of the internal circuit, and this might prevent the input module from falling in the OFF state. This is nominated as “leakage current” in the specifications of photo switches etc. Make sure that this value is less than the OFF level of the input module.



4) Built-in triac, thyristor and contact point output of surge killers

Some device has CR device as a surge killer for the purpose of avoiding the check mistakes of triac and thyristor, and the leakage current of this CR may prevent the input module from falling in the OFF state. In such a case, the best remedy is to remove the CR. If this is not possible, use the C value of the CR of less than 0.033 mF for 100 VAC; and that of less than 0.015 mF, for 200 VAC.



Reference

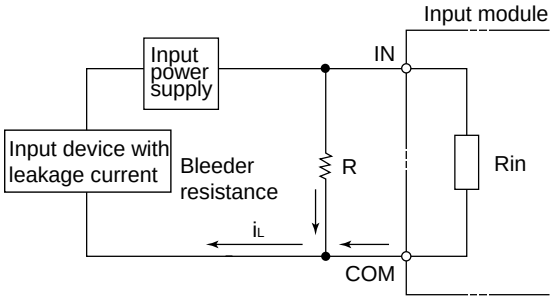
Calculation of leakage current i_L

$$i_L = \frac{V}{2\pi fc}$$

V: Power supply voltage
f: Power frequency (50/60Hz)
C: Capacitor

Countermeasure:Connection of bleeder resistance

As a countermeasure, a bleeder resistance can be inserted in the input side of the input module as shown below.



Choose the bleeder resistance value R to meet the following conditions:

$$i_L = \left(\frac{R_{in} \times R}{R_{in} + R} \right) < V_{in\ OFF}$$

Composite impedance of the bleeder resistance and the input impedance

$$R < \left(\frac{V_{in\ OFF} \times R_{in}}{R_{in} \times i_L - V_{in\ OFF}} \right) \times \underset{\text{Margin}}{0.5}$$

i_L: Current leakage of the input device
$V_{in\ OFF}$: Input of the input module OFF level voltage
R_{in}: Input impedance of the input module
V: Input power supply voltage

In this case, the rating electric power W is,

$$W > \frac{V^2}{R} \times \underset{\text{Margin}}{3}$$

[Example] In case that the JW-212NA is used as an input module at the input power supply voltage of 24 V, and that the leakage current of the input device is 5 mA,

i_L = 5 mA
$V_{in\ OFF}$ = 5 V
R_{in} = 3.3 k ohm
V = 24 V

$$R < \frac{5 \times 3.3}{3.3 \times 5 - 5} \times 0.5 = 0.78 \text{k ohm}$$

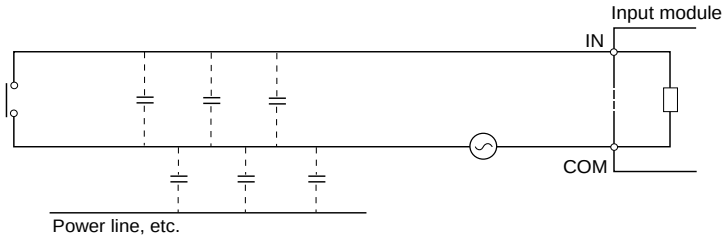
If R is 0.78 k ohm,

$$W > \frac{24^2}{0.78 \times 10^3} \times 3 = 2.22 \text{ W}$$

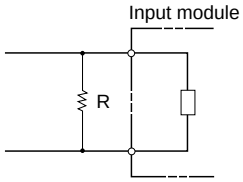
W will be 2.3 W.

(4) Notes for long-distance wiring and by-pass wiring

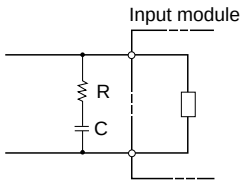
In the AC input module, when the cables to external device are very long or wiring along with power lines is made, the input module might be turned ON in spite of the OFF command in the input device, due to leakage current and inducement by floating capacity among cables.



Countermeasure 1: Connect a bleeder resistance and a CR surge killer in parallel with the input module to reduce the composite impedance of the input module.



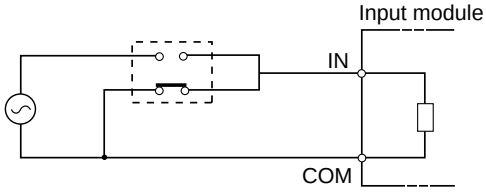
The smaller the R value, the more effective. However, when R becomes small, power consumption ($\frac{V^2}{R}$) increases. Therefore, note the R's watt value.



C: 0.033 to 0.33 μF
(Pressure resistance of over 250 VAC)
R: 47 to 120 ohm

Countermeasure 2: Change the input power supply to DC (Use DC input module)
In general, the direct current signals are little affected by floating capacity and inducement.

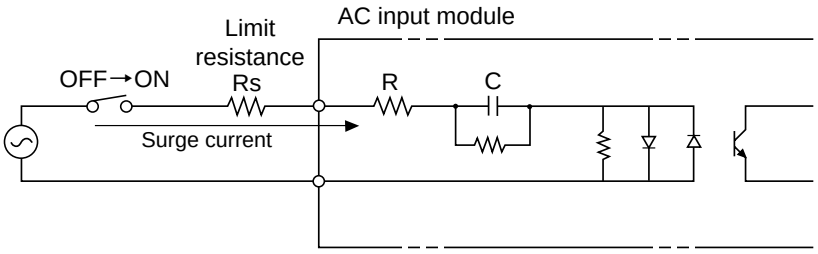
Countermeasure 3: Close circuit by making use of the b contact.
When the b contact is used to make a close circuit at OFF, very little induced voltage is generated.



Note: Do not wire the input signal line near and in parallel with power lines of a motor and an inverter.

(5) Surge current of the AC input module

There is surge current in the AC input module: JW-203N/211NA, when turning ON the input.
The surge current of the AC input module is determined by constants (R, C) of the input circuit inside the module, power supply voltage at ON input, phase, power supply current capacity and wiring impedance. The surge current stated in the AC input module specifications is the worst value for the case of the ON input at the maximum impressed voltage and at the peak phase.
If, in certain input device, contact points are affected (adhered etc.) by the surge current, the surge current should be reduced by connecting a limit resistance Rs outside the module as shown below.



The following limit resistances Rs can be connected outside the module:
For 100 VAC input module, less than 2 k ohm (over 2 W rate electricity)
For 200 VAC input module, less than 4 k ohm (over 2 W rate electricity)

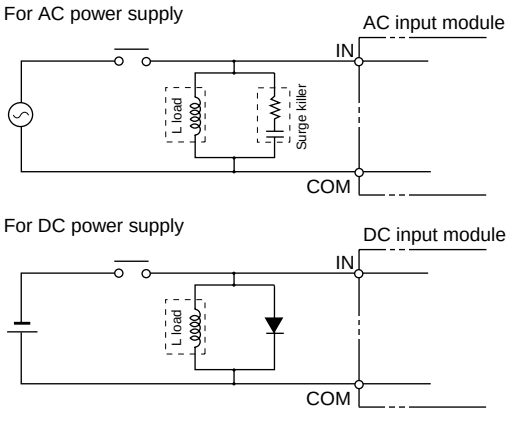
Reference

- When a limit resistance of 2 k ohm (or 4 k ohm) is connected for the 100 VAC (or 200 VAC) input module, the surge current becomes less than 80 mA at the peak ON.

Note: If a resistance bigger than the above value is connected, the input ON/OFF levels and the response times cannot be guaranteed.

(6) Countermeasure in case of connection of induced load to input signal

If the induced load is connected to the input signal, in order to absorb the noise, connect a surge killer near the load for the AC circuit; and a diode, for the DC circuit, as shown below.



Surge killer: R, C
C: 0.033 to 0.33 μF
(Resistance voltage of over 250 VAC)
R: 47 to 120 ohm

Diode:

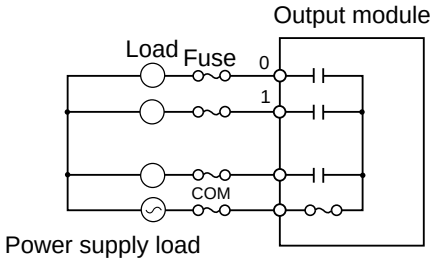
Peak inverse voltage (V_{RM}) should be more than 3 times bigger than the load voltage, and the average rectification current should be bigger than load current.

[2] Precautions for operating the output module

(1) Protection from output short circuit

In case of a short circuit of the load connected to an output terminal, output devices and print board may be burned. Be sure to insert a protection fuse in the output.

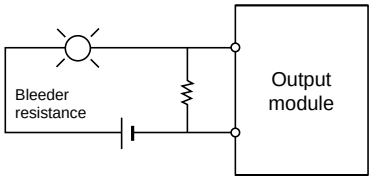
Some modules have a built-in fuse per common line for protection of the module from heating and burning due to excessive current. It is not intended, however, for protection of the output devices and load from excessive current; therefore, insert fuse for each line outside the module. This is also advisable from maintenance point of view.



(2) Countermeasure to surge current of lamp load

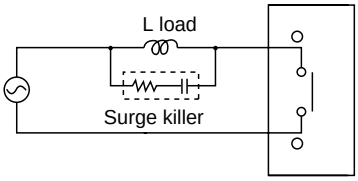
At turning ON an incandescent lamp, there is surge current 10 to 20 times bigger than normal current for several 10ms. For reduction of the surge current, insert either a bleeder resistance or an electric current limit resistance.

1) To insert a bleeder resistance



During the OFF state of the output module, keep supplying dark current so small as to turn on the lamp dimly.

2) To insert an electric current limit resistance

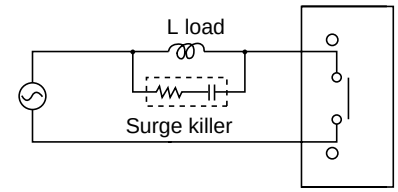


This limits the current within a value determined by the value of the current limit resistance. When the resistance value is high, the voltage on the lamp decreases. Determine the resistance value by the brightness needed when turning ON the lamp.

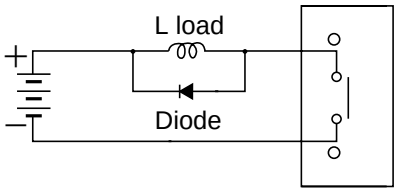
(3) Countermeasure to surge voltage at opening/closing induced load

Some load generates surge voltage of several thousands volt when an induced load is operated or closed its circuit. All output module except the relay output module have a circuit to absorb surge within module. However, when the wiring to the load is long, its effectiveness is reduced and a surge countermeasure is required in the load side as well. In case of the relay output module without surge absorption circuit, surge countermeasure outside the module is indispensable in case the load generates high voltage. (This surge voltage countermeasure can extend the life time of the contact points of the relay.)

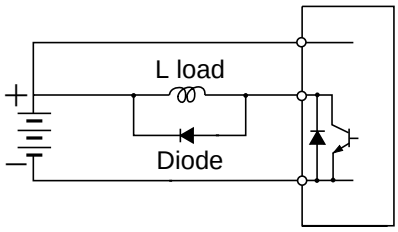
Surge voltage countermeasure



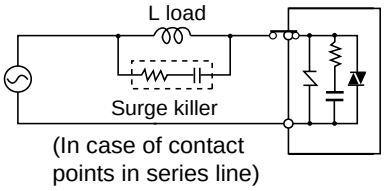
Relay output module



Relay output module



Transistor output module, FET output module



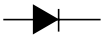
Triac output module

CR surge killer: 

C: 0.033 to 0.33 mF (Pressure resistance of over 250 VAC)
R: 47 to 120 ohm

Example of CR surge killer

For 100 VAC	953M2503 10411(0.1 m+ 120 ohm) (made by Matsuo Electric Co., Ltd.)
For 200 VAC	953M5003 33311(0.033 m+ 120 ohm) (made by Matsuo Electric Co.,Ltd.)

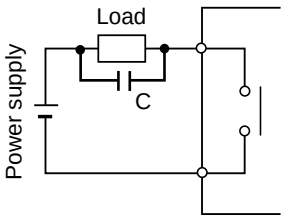
Diode: 

Peak inverse voltage (V_{RM}) is more than three times of the load voltage.
Average rectified current (Io) is more than load current.

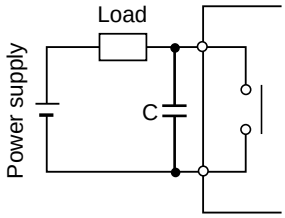
In case of AC load, a varistor can be used in place of the CR surge killer for the same effect. (Installation of both of the CR surge killer and the varistor increases the effect.)

For 85 to 132 VAC	TNR12G221K (made by Marcon Co., Ltd.), NV220D14 (made by NEC)
For 170 to 264 VAC	TNR12G431K (made by Marcon Co., Ltd.), NV430D14 (made by NEC)

Note: Avoid the use of a capacitor only as an arc killer, as shown below:



Though a capacitor is very effective for the arc deletion at shut-off. But charged current to the capacitor may melt the contact point at turning ON a contact point.



Though a capacitor is very effective for the arc deletion at shut-off. But at the opening of the circuit of a contact point, electricity is accumulated at the capacitor. Therefore, the short circuit current of the capacitor may melt the contact point at turning ON the contact.

(4) Load which can be driven by the AC output module

The AC output module with SSR as an output device JW-213SA can drive directly the loads of electro-magnetic switches, solenoid valves and lamps. In such cases note the surge current at turning ON (from OFF to ON) and the maintenance current during the maintenance state (ON state). Concretely, use the module within the following range:

Model	Range of Load Voltage	At turning ON	During maintenance state	
		Repeated allowable surge current	Minimum action current	Maximum rated load current
JW-213SA	15 to 250 VAC	6A (100 ms)	15 mA	1A/point, 2A/common

When the AC output module drives the load, note the surge current at turning ON and the holding current during the maintenance state. Keep the surge current below the repeated allowed surge current at the turning ON; and keep the maintenance current, over the minimum action current and below the maximum rated load current during the maintenance state.

The repeated allowable surge current is a value in case of the pulse width below 100 ms and repeated switching frequency below 20 times/minute. When, in case of the load of a motor, the pulse width of the surge current is large and that the switching frequency is high, keep the ON time of 1 pulse below 50%.

(When the repeated surge current is below the maximum rated load current, there is no limit in the pulse width or in the switching frequency.)

When many loads with big surge current are driven within a same common line circuit, make the number of points, which turn from OFF to ON at the same time minimum. When a strong surge current goes through a built-in fuse in a common unit, the built-in fuse may be damaged or fused.

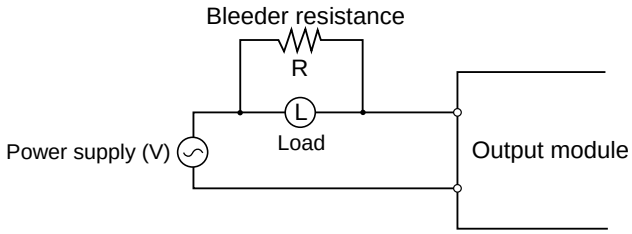
The number of the surge current per common, which can be turned from OFF to ON at the same time is determined by a fusing property of the built-in fuse as follows (as a guidance):

Below 10A (100ms)/JW-213SA, Below 7A (100ms)/JW-213SA

The numbers in ( ) are pulse widths.

For a light load of the holding current which is smaller than the minimum action current, some characteristics of load may prevent turning OFF. In such a case, connect a bleeder resistance in parallel with the load to increase the maintenance current up to the minimum action current or more.

Some electro-magnetic switches of the pulse-driven cannot be turned OFF even if the holding current is over the minimum action current. In such a case, also, connect a bleeder resistance in parallel with the load. (Select a value of the bleeder resistance so that it can allow the minimum action current by itself.)



Calculate the value R of the bleeder resistance in the following formula:

$$R < \frac{V}{I}$$

V: Power supply voltage
I: Minimum action current of the output module

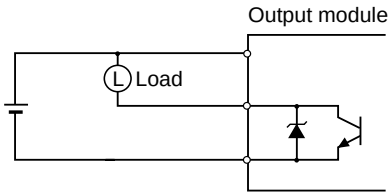
Then, the capacity of R (W) is

$$W > \frac{V^2}{R} \times 3$$

Margin

(5) OFF delay time when the DC output module drives the induced load

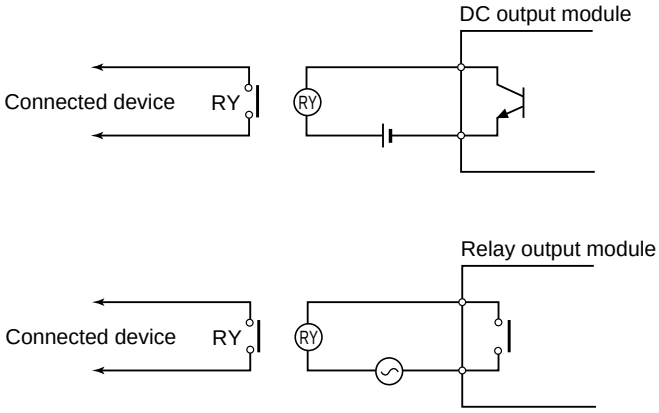
When the DC output module with a built-in cramp diode is used as a surge killer to drive the induced load of direct current such as electro-magnetic valves and solenoid valves, it may be impossible to complete high-speed switching due to the delay of response, since electric current goes to the load through the cramp diode. In such a case, the DC output module with a built-in zener diode, instead of the cramp diode, could speed up the response.



DC output module with a built-in zener diode
JW-212SA

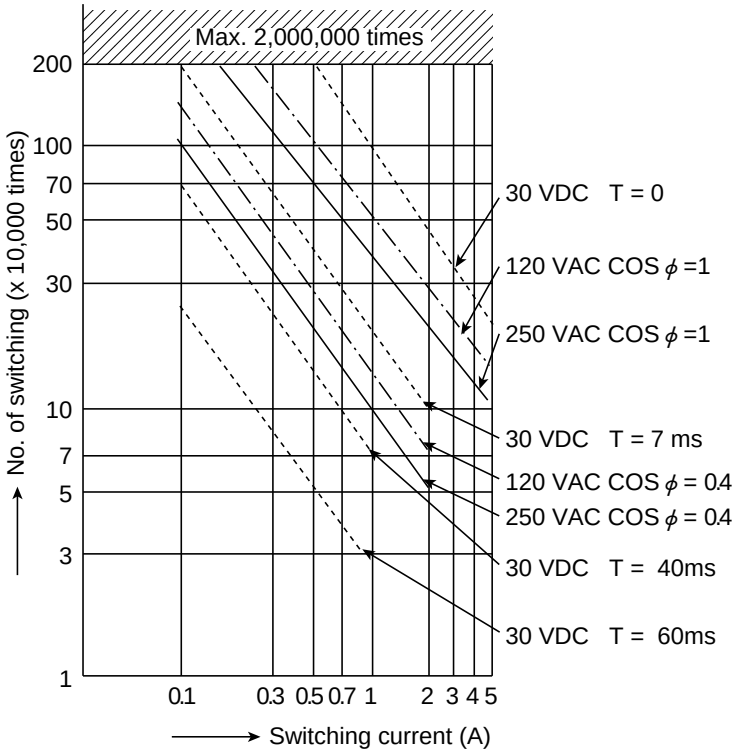
(6) When miniature load is driven by a relay output

The relay used in the relay output module is suitable for power drive, and so with a low voltage and small current such as 24 VDC and 10mA, the contact reliability of the contact point drops. In such a case, we recommend to use a DC output module (transistor output). When connection with a low voltage and small current contact point output cannot be avoided, the following connection should be made: A miniature relay with a reliable contact point under low voltage and small current is driven, and the contact is made at that contact point.



(7) Life of relays of the relay output module

The relay's life of the module (JW-204SA/214SA), which uses a relay in output circuit, varies depending on the kind of loads (difference of the power rate of the signal on the contact point is AC or DC and its current value). The following shows characteristic curves of the relay contact point.



Note 1: The above chart shows standard values.
Depending on the environment of usage (ambient temperature and humidity), different life may result.

Note 2: When the signal to the contact point is DC, the life of relays varies according to the load rise characteristics (time constant: T) of the load. The load rise characteristics of the load after the contact point is turned ON are determined by inductance: L and resistance: R

$$\left(T = \frac{R}{L} \right)$$

For the time constant of the load used, see below:

In case of resistance load: T < 1ms

In case of small size relay: T =7 ms

In case of large current L load and magnet: T = 40ms

In case of the L load with a diode for surge countermeasure, the life of relays may be similar to the case of T < 1ms.

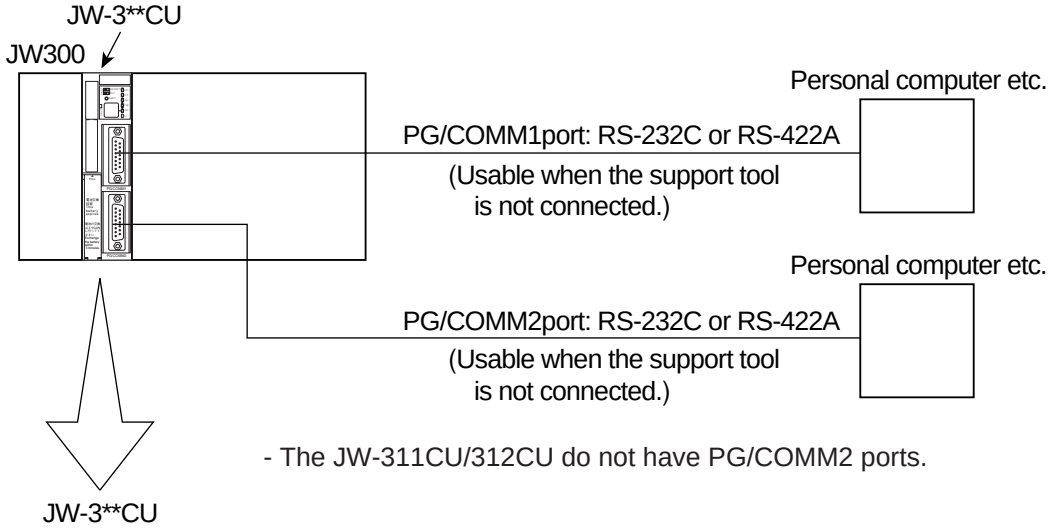
Note 3: Use the relay output module, with the contact switching life of more than 100,000 times and within the current capacity of less than 2A.

7-6 Computer link using communication port

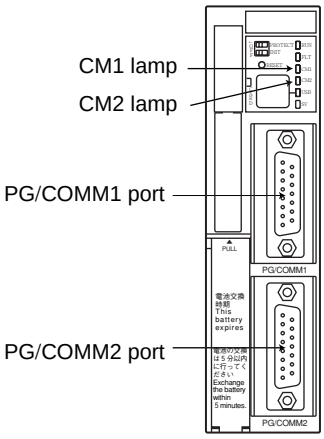
The PG/COMM1 and PG/COMM2 ports are built into the JW-3**CU control module as communication ports for the JW300 series. The EA-PG port is available on the JW-32EA I/O bus expansion adapter. You use communication ports to communicate with host computers (personal computers, LCD control terminals, etc.) through the RS-232C/422A I/O ports.

- They can communicate using the same method as the SHARP computer link.
- For wiring details, see section 6-2, "Wiring the communication ports", in this manual.

■ PG/COMMI, PG/COMM2 port



- The JW-311CU/312CU do not have PG/COMM2 ports.

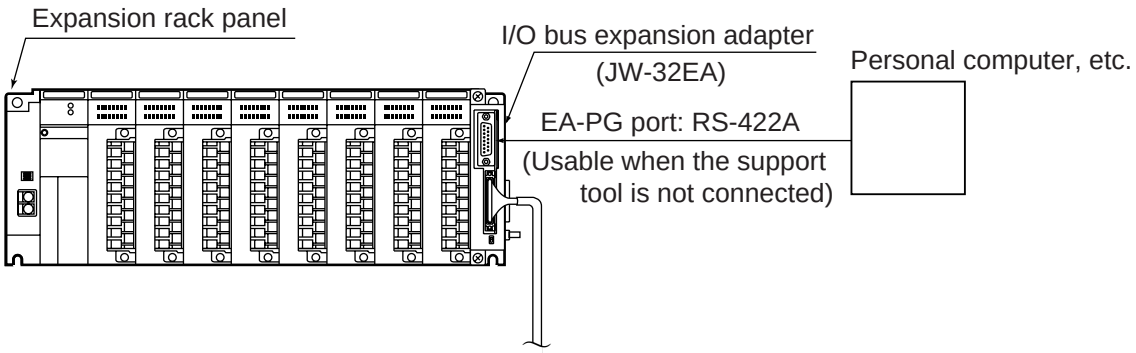


Name	Function
CM1 lamp (yellow)	- Flickers during communication by connecting PG/COMM1 port and personal computer, etc.
CM2 lamp (yellow)	- Flickers during communication by connecting PG/COMM2 port and personal computer, etc.
PG/COMM1 port (RS-232C/RS-422A)	- Connected with support tool and personal computer, etc. - Usable as communication port 1 when the support tool is not used.
PG/COMM2 port (RS-232C/RS-422A)	- Connect support tool and personal computer, etc. - Usable as communication port 2 when the support tool is not used.

● Communication specifications (PG/COMM1, PG/COMM2 port)

Items	Specifications	
	RS-232C connection	RS-422A connection
No. of modules connectable to JW300	1 (1 : 1 connection)	Max. 31 (1 : N connection)
Transfer line	Shielded wire Max. length : 15 m	Shielded twisted pair wire Total length (Maximum) : 1 km, 4 wire type (party line connection)
Transfer rate	230400/115200/76800/38400/19200/9600 bps	
Data system	Start bit : 1 bit Data length : 7/8 bits Parity bit : 1 bit (odd, even, or none) Stop bit : 1/2 bits	
Used characters	ASCII alphameric characters	

■ **EA-PG port**



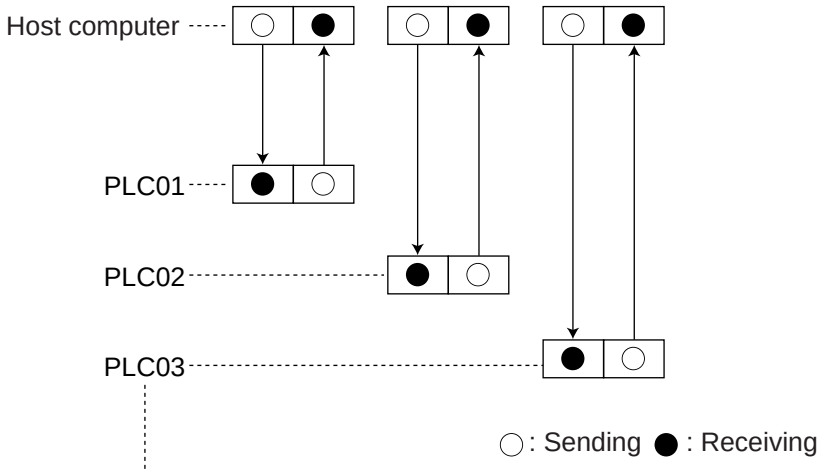
● **Communication specifications (EA-PG port)**

Items	Specifications
	RS-422A connection
No. of modules connectable to JW300	Max. 31 (1 : N connection)
Transfer line	Shielded twisted pair wire Total length (Maximum): 1 km, 4 wire type (party line connection)
Transfer rate	115200/76800/38400/19200/9600 bps
Data system	Start bit : 1 bit Data length : 7/8 bits Parity bit : 1 bit (odd, even, or none) Stop bit : 1/2 bits
Used Characters	ASCII alphanumeric characters

[1] Communication method

This section describes how to communicate between a host computer (personal computer etc.) and a PLC (the communication ports on the JW300).

- The PLC only responds to signals from the host computer. The PLC cannot send communication requests to the host computer.
- A signal from the host computer to the PLC is referred to as a "command." A signal from the PLC to the host computer is referred to as a "response."



[2] Communication conditions

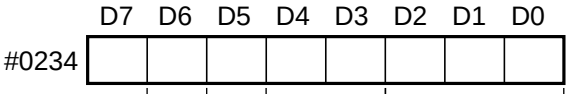
Specify the communication conditions (such as the data transfer speed) between the JW300 (communication port) and the host computer in system memory addresses #0234/#0235 (PG/COMM1 port), #0236/#0237 (PG/COMM2 port), or #0266/#0267 (EA-PG port) in the JW-3xxCU control module.

System memory number	Contents	
#0234	Set PG/COMM1 port	Transfer rate, parity, stop bit, data length
#0235		Station No. 001 to 037(8)
#0236	Set PG/COMM2 port	Transfer rate, parity, stop bit, data length
#0237		Station No. 001 to 037(8)
#0266	Set EA-PG port	Transfer rate, parity, stop bit, data length
#0267		Station No. 001 to 037(8)

(1) Set PG/COMM1 port (communication port 1)

1) Set system memory #0234

For transfer rate, parity, stop bit, and data length set ON (1) / OFF(0) of D0 to D6.



Data length

D6	Data length
0	7 bits
1	8 bits

Parity

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

Stop bit

D5	Stop bit
0	1 bit
1	2 bits

Transfer rate

D2	D1	D0	Transfer rate (bps)
0	0	0	9600
0	0	1	19200
0	1	0	38400
0	1	1	76800
1	0	0	115200
1	0	1	230400

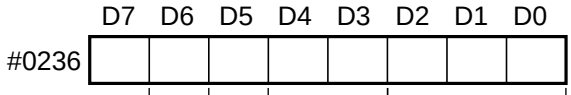
2) Set system memory #0235

Set station No., 001 to 037(8).

(2) Set PG/COMM2 port (communication port 2)

1) Setting system memory #0236

For transfer rate, parity, stop bit, and data length set ON (1) / OFF(0) of D0 to D6.



Data length

D6	Data length
0	7 bits
1	8 bits

Parity

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

Stop bit

D5	Stop bit
0	1 bit
1	2 bits

Transfer rate

D2	D1	D0	Transfer rate (bps)
0	0	0	9600
0	0	1	19200
0	1	0	38400
0	1	1	76800
1	0	0	115200
1	0	1	230400

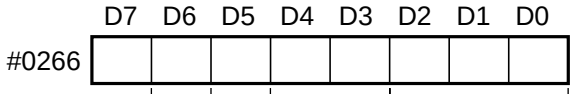
2) Set system memory #0237

Set station No., 001 to 037(8).

(3) Set EA-PG port (communication port 3)

1) Set system memory #0266

For transfer rate, parity, stop bit, and data length, set ON (1) / OFF (0) of D0 to D6.



Data length

D6	Data length
0	7 bits
1	8 bits

Parity

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

Transfer rate

D2	D1	D0	Transfer rate (bps)
0	0	0	9600
0	0	1	19200
0	1	0	38400
0	1	1	76800
1	0	0	115200

Stop bit

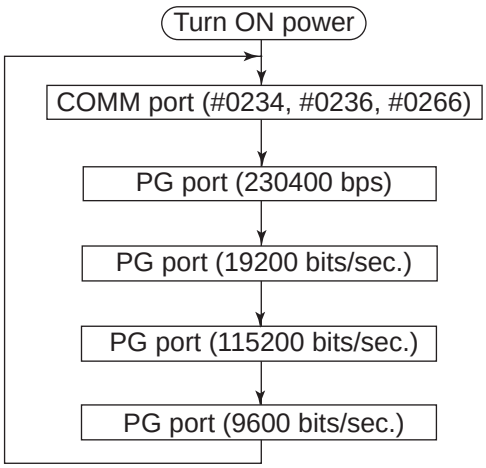
D5	Stop bit
0	1 bit
1	2 bits

2) Set system memory #0267

Set station No., 001 to 037(8).

Remarks

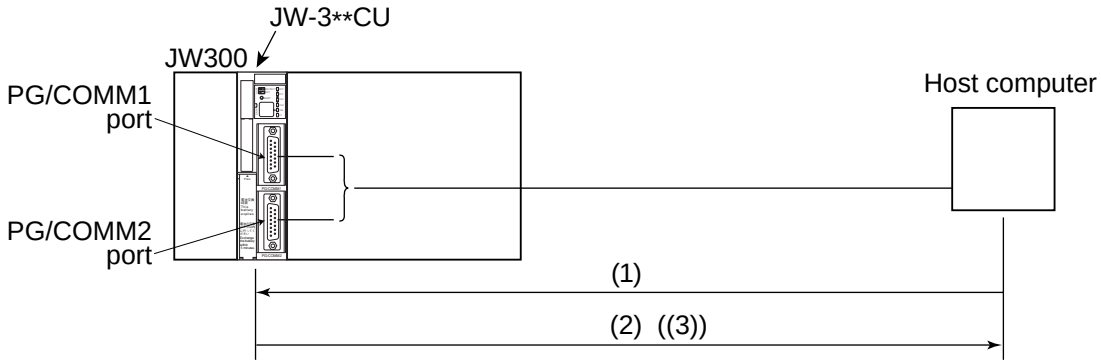
- Change of the communication setting (#0234, #0236, #0266) for the communication ports (PG/COMM1, PG/COMM2, EA-PG) is effective while turned ON the power.
- However, as the JW300 automatically changes the communication setting as shown below, it will take few number of retries until establishment of communication after changed settings.

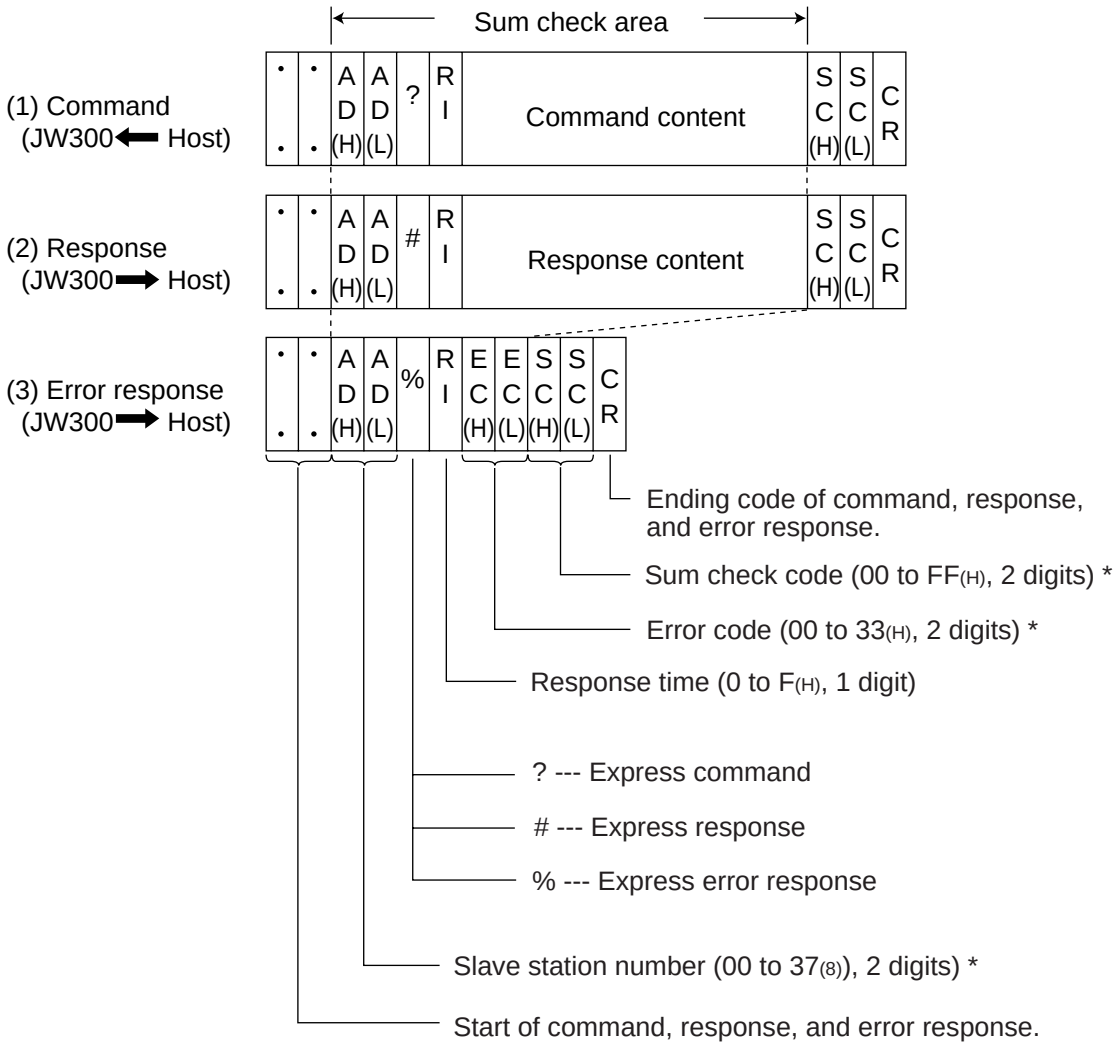


- As shown above, the needs five times of retry to re-establish communication after changed setting, on the condition that the communication port successfully established communication just before changing the settings.

[3] Communication format

When a command from a host computer is received, the communication port (PG/COMM1, PG-COMM2, EA-PG) of JW-300 operates according to the received command, and sends the response. When an error occurs while processing, it returns error response.





* "(H)" means upper digit. "(L)" means lower digit.

- The EA-PG port also has the same communication format above.

(1) Identification symbol

ASCII characters	ASCII code	Contents
: (colon)	3A $_{HEX}$	Header (Indicates beginning of command and response.)
? (question)	3F $_{HEX}$	Indicates command.
# (number mark)	23 $_{HEX}$	Indicates response.
% (percent)	25 $_{HEX}$	Indicates error response.
CR (carriage return)	0D $_{HEX}$	Terminal mark (Indicates termination of a command and response.)

(2) Slave station No. AD (H), AD (L)....ASCII characters 01 to $37_{(8)}$

In the "command," specify a slave station number, 01 to $37_{(8)}$, to be controlled by the host computer.
In the "response," specify a slave station number, 01 to $37_{(8)}$, to send to the host computer.

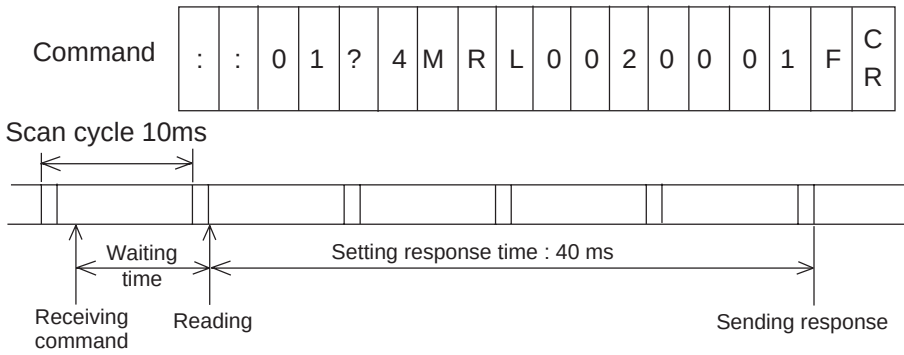
(3) Response time RI....ASCII characters 0 to $F_{(H)}$

The response time RI refers to the interval after the slave station performs the "command" from the host computer until it sends the "response" back.
Set the response time RI between 0 and $F_{(H)}$ (0 to 600 ms), to match the processing capacity of the host computer.

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

As the JW300 accesses memories after one scan cycle, the actual response time is the total of setting value of RI in command and the waiting time of one operation cycle.

[Ex.] Monitor relay 002000 on PLC01 (when the scan cycle is 10 ms and the response time is 40 ms)



[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

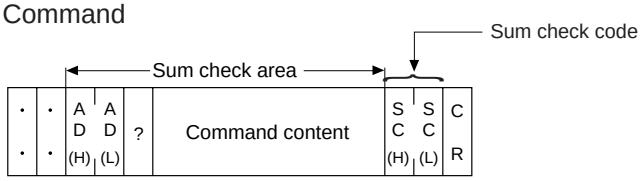
There are some limits for handling bit numbers by commands and for the communication buffer of personal computers. Be careful for handling bit numbers and communication buffers.

(4) 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 (=> Page 7-33)

● Command



2) Check method

1. Add the data in the checksum with ASCII code.
2. Convert the sum check code (2 digits hexadecimal) to 8 bits data and add to the sum of "1" above.
   When the grand total is "$00_{(H)}$" (disregard 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 of the sum check cord

1. Add data in the range of sum check with 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 $B2_{HEX}$
   $4E_{HEX}$ → 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 code is not necessary

Put two @ signs (@ sign: $40_{(H)}$) in the checksum high and low byte positions SC(H) and SC(L) in a command and the JW300 (control module) will not execute a checksum calculation on the command.

Even when the @ signs are used, a checksum will still be added to the response. Please ignore the checksums in the response if you do not need them.

[Ex.] To set relay 007030 on the PLC02 (response time: 50 ms)

A command sent from a host computer (to specify the area for checksum)

0 2 ? 5 S R R 0 0 7 0 3 0 1

- Command detail
- Response time: 50 ms
- Slave station number

Sum all the bytes of data from the slave station number until the end of the command details as ASCII codes. Then take the 2's complement of that number. This is the checksum.

[Complement of 2]

Invert all binary bits (0 -> 1, 1 -> 0), and add 1. This is the 2's complement number. $28_{(H)}$ → 00101000

↓ Bit inversion

11010111

↓ Add 1

11011000 → $D8_{(H)}$

ASCII code		
0	…	$30_{(H)}$
2	…	32
?	…	3F
5	…	35
S	…	53
R	…	52
R	…	52
0	…	30
0	…	30
7	…	37
0	…	30
3	…	33
0	…	30
+ 1	…	31
		$328_{(H)}$
		↓
		$28_{(H)}$
Complement of 2		↓
		$D8_{(H)}$

Then, the command will be as follows:

: : 0 2 ? 5 S R R 0 0 7 0 3 0 1 D 8 C R

- Checksum code

After receiving this command, the PLC02 will return a response as follows:

: : 0 2 # 5 S R R 0 0 7 0 3 0 2 5 C R

- Checksum code

The host computer receives this response and adds all the bytes of data from the slave station number until the end of the response data as ASCII codes. Then, it adds the checksum in this case $25_{(H)}$ to the data. If the lower two digits are $00_{(H)}$ (300(ASCII Hex)), the host computer will determine that the response is appropriate.

ASCII code		
0	…	$30_{(H)}$
2	…	32
#	…	23
5	…	35
S	…	53
R	…	52
R	…	52
0	…	30
0	…	30
7	…	37
0	…	30
3	…	33
+ 0	…	30
		$2DB_{(H)}$
+ Checksum code		$25_{(H)}$
		$300_{(H)}$

(5) Error cord $EC_{(H)}$, $EC_{(L)}$

The JW300 (control module) processes commands received from a host computer and if an error occurs, it will send one of the following error codes (error responses).

Error code ($EC_{(H)}$, $EC_{(L)}$)	Contents
01	Format error
02	Designated address is not TMR/CNT setting value
05	Number of transfer bytes is not correct
06	PLC (JW300) does not stop by HLT (stop PLC processing)
07	Writing to PLC (JW300) 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	Password is not yet registered
31	The secret function is not released
32	Password error (tried to register other than alphabetical and numeric letters)
33	The secret is not yet released.

Note: If any of the following conditions are met, the JW300 (control module) neither processes the command nor sends a response.

1. If the slave station number in the command does not match the JW300 station number.
2. If it fails to find a "*", "?," or "CR" in the command.

To recover from this condition, use the time out function on the host computer.

[4] Command (response)

This section describes the commands (and responses) that can be used for communication (in a computer link) between the JW300 (control module) and a host computer.

(1) Command type

There are 39 commands. Mostly, they are classified as "read commands," "write commands," or "control commands."

	Function	Command name	Write mode	JW30H *
Read-out command	Monitor relay	MRL	7-42	○
	Monitor multiple relays	MRS	43	×
	Current value monitor of TMR/CNT/MD	MTC	44	
	Relay, register, TMR/CNT/MD current value monitor	MRG	46	
	Monitor the current values of any required relays, registers, TMR, CNT, or MD	MGS	47	
	Read out file register	RFL	49	
	Read out file address	RFLF	50	○
	Read out parameter of special I/O module	RPSR	51	
		RPS	52	
	Read out parameter of option module	RPO	53	
	Read out system memory	RSM	54	
	Read out date	MDY	56	
	Read out time	MTM	57	
Write command	Set/reset relay	SRR	7-42	○
	Set/reset multiple relay	SRS	43	×
	Set/reset relay, register TMR/CNT/MD	SRT	44	○
	Write in relay, register, TMR/CNT/MD	WRG	46	
	Write to any required relays, registers, TMR, CNT, or MD	WGS	47	×
	Write the same data in relay, register, TMR/CNT/MD	FRG	48	
	Write in file register	WFL	49	
	Write in file address	WFLF	50	
	Write in parameter of special I/O module	WPSR	51	
		WPS	52	
	Write in parameter of option module	WPO	53	○
	Write in system memory	WSM	54	
	Change setting value of TMR/CNT	CTC	55	
	Set date	SDY	56	
	Set time	STM	57	
	Set time revision	ACL	58	
Control command	Stop operation of PLC	HLT	7-59	
	Restart operation of PLC	RUN	60	
	Monitor operation conditions	MPC	59	
	Read memory capacity	VLM	61	
	Read out write mode status	SWE	41	○
	Set write mode	EWR	41	
	Turn back the message	TST	59	
	Release secret/password registration	PAS	60	
	Set secret function	SES	60	
	Check secret function	SEI	61	

* ○: The JW30H has the same function.
× : The JW30H does not have this function.

Command	Contents
Read out command	Messages that a personal computer transmits to the JW300 when it reads out data from the JW300.
Write command	Messages that a personal computer transmits to the JW300 when it reads out data from the JW300.
Control command	Messages that a personal computer transmits to the JW300 when it reads out data from the JW300.

(2) Write mode

To enable/disable writing data to the JW300 from the host computer, set write mode (0, 1, 2) using the EWR (select write mode) command.

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

Write mode of JW300 are "mode 0" (write prohibited for all memories) at power ON. Prior to writing into the JW300, change write mode to "mode 1" or "mode 2" using EWR command (setting of write mode).

- SWE command read out current status of writing mode.
- Set write mode to "mode 0" as much as possible, except when writing data into JW300. Each mode has restrictions as follow:

Note

- Turn OFF control module (JW-3**CU) protect switch (write allowed) before executing write commands and change to "mode 2" using EWR command.

(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	000000 to 015777	000000 to 015777	MRL, SRR MRS, SRS
	020000 to 075777	020000 to 075777	
TMR/CNT point of contact number	T00000 to T17777	T00000 to T17777	MRL, MRS
	C00000 to C17777		
TMR/CNT number	00000 to 17777	00000 to 17777	MTC, SRT
MD number	00000 to 00777	00000 to 00777	MTC
Byte address of relay, register, TMR/CNT/MD current value	⊐00000 to ⊐01577	A00000 to A01577	MRG, WRG, FRG, MGS, WGS
	⊐02000 to ⊐07577	A02000 to A07577	
	⊐10000 to ⊐54377	A10000 to A54377	
	b00000 to b37777	B00000 to B37777	
	009000 to 009777	009000 to 009777	
	019000 to 019777	019000 to 019777	
	⋮	⋮	
	099000 to 099777	099000 to 099777	
	E0000 to E0777	E00000 to E00777	
	⋮	⋮	
	E7000 to E7777	E07000 to E07777	
	109000 to 109777	109000 to 109777	
	⋮	⋮	
	199000 to 199777	199000 to 199777	
	209000 to 209777	209000 to 209777	
	⋮	⋮	
	299000 to 299777	299000 to 299777	
	309000 to 309777	309000 to 309777	
	⋮	⋮	
	389000 to 389777	389000 to 389777	
	Z000 to Z377	Z00000 to Z00377	
File address (except for file register)	00000000 to 00177777	00000000 to 00177777	RFL, RFLF, RFLE WFL, WFLF, WFLE
File register byte address	00000000 to 40177777	00000000 to 40177777	
Special I/O module parameter address	000 to 377	0000 to 0377	RPSR, RPS WPSR, WPS
Option module parameter address	0000 to 3777	00000 to 03777	RPO, WPO
System memory address	#0000 to #2777	0000 to 2777	RSM, WSM
Program address	000000 to 777777	0000000 to 0777777	CTC

(4) Data expression system

Data are expressed by hexadecimal.

(5) Each command (and response)

Starting here, each of the 39 commands (page 7-37) (and responses) is described, one at a time.

■ SWE (Read out write mode status)

Function		Read out current write mode status.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | S | W | E | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | S | W | E | Data | SC(H) | SC(L) | CR
Data		0: Mode 0 .... Write prohibited for all memories 1: Mode 1 .... Write enable only for data memory 2: Mode 2 .... Write enable for all memories
Execution condition		Write mode: Mode 0, Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use		Read out write mode status of PLC06. (Response time: 10 ms) Command : : 0 6 ? 1 S W E 3 B CR (0 6: Station number; 1: Response time; 3 B: Sum check code) Response : : 0 6 # 1 S W E 0 2 7 CR (0 6: Station number; 1: Response time; 0 2 7: Sum check code; 0: Mode 0)

Note: Be mode 0 (write prohibited), at power ON.

■ EWR (Set write mode)

Function		Read out current write mode status.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | E | W | R | Data | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | E | W | R | SC(H) | SC(L) | CR
Data		0: Mode 0 .... Write prohibited for all memories 1: Mode 1 .... Write enable only for data memory 2: Mode 2 .... Write enable for all memories
Execution condition		Write mode: Mode 0, Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use		Set PLC22 to the mode 2 (enable to write all the memory). (Response time: 40 ms) Command : : 2 2 ? 4 E W R 2 0 9 CR (2 2: Station number; 4: Response time; 2 0 9: Sum check code; 2: Mode 2) Response : : 2 2 # 4 E W R 5 7 CR (2 2: Station number; 4: Response time; 5 7: Sum check code)

Note: In order to prevent inadvertent accident, set the mode to "mode 0" (write prohibited) while not writing data.

■ MRL (Relay monitor)

Function		Monitor ON/OFF state of the designated relay.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | M | R | L | Relay number (6 characters) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | M | R | L | Relay number (6 characters) | Data | SC(H) | SC(L) | CR
Relay number		000000 to 015777, 020000 to 075777, 100000 to 543777 T00000 to T00777, T01000 to T01777, T02000 to T17777 (Octal) - Set the counter using Txxxxx, just like the timer.
Data		1 : ON 0 : OFF
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Monitor auxiliary relay 004033 of PLC01. (Response time: 0ms) Command : : 01 ? 0 M R L 0 0 4 0 3 3 1 B CR (Station number, Response time, Relay number, Sum check code) Response : : 01 # 0 M R L 0 0 4 0 3 3 1 0 7 CR (Station number, Response time, Relay number, ON, Sum check code)

■ SRR (Set/reset relay)

Function		Set/reset the relay.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | S | R | R | Relay number (6 characters) | Data | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | S | R | R | Relay number (6 characters) | SC(H) | SC(L) | CR
Relay number		000000 to 015777, 020000 to 075777, 100000 to 543777 (Octal)
Data		1 : Set 0 : Reset
Execution condition	Write mode	Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Reset auxiliary relay 007001 of PLC03. (Response time: 0 ms) Command : : 01 ? 0 S R R 0 0 7 0 0 1 0 E 1 CR (Station number, Response time, Relay number, Reset, Sum check code) Response : : 01 # 0 S R R 0 0 7 0 0 1 2 D CR (Station number, Response time, Relay number, Sum check code)

Note: Special relays and relays which are used for link system (computer link, data link, remote I/O) cannot be set/reset.

■ MRS (Monitor more than one relay)

Function		Specifies the monitor ON/OFF status of multiple relays. (Maximum 128 points)
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | M | R | S | Number of relays that can be monitored (2 characters) | Relay number 1 (6 characters) | ..... | Relay number N (6 characters) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | M | R | S | Number of relays that can be monitored (2 characters) | Relay number 1 (6 characters) | Data 1 | ..... | Relay number N (6 characters) | Data N | SC(H) | SC(L) | CR
Number of relays that can be monitored		00 to 80 (hexadecimal)
Relay number 1-N		000000 to 015777, 020000 to 075777, 100000 to 543777 T00000 to T00777, T01000 to T01777, T02000 to T17777 (Octal) - Set the counter contact points using Txxxxx, just like the timer.
Data 1-N		1 : ON 0 : OFF
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Monitor relay 015000 to 020000 of PLC01. (Response time : 0 ms)

Command : : 0 1 ? 0 M R S 0 2 0 1 5 0 0 0 0 2 0 0 0 0 9 4 CR
(Station number; Response time; Number of relays that can be monitored; Relay number 1; Relay number 2; Sum check code)

Response : : 0 1 # 0 M R S 0 2 0 1 5 0 0 0 1 0 2 0 0 0 0 0 5 0 CR
(Station number; Response time; Number of relays that can be monitored; Relay number 1; ON; Relay number 2; OFF; Sum check code)

■SRS (set/reset multiple relays)

Function		Set/reset multiple relays. (Maximum 128 points)
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | S | R | S | Number of relays that can be set (2 characters) | Relay number 1 (6 characters) | Data 1 | ..... | Relay number N (6 characters) | Data N | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | S | R | S | Number of relays that can be set (2 characters) | Relay number 1 (6 characters) | ..... | Relay number N (6 characters) | SC(H) | SC(L) | CR
Number of relays that can be set		00 to 80 (hexadecimal)
Relay number 1-N		000000 to 015777, 020000 to 075777, 100000 to 543777 (Octal)
Data 1-N		1 : Set 0 : Reset
Execution condition	Write mode	Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Set relay 015000 and reset 020000 on the PLC03 (Response time : 0ms).

Command : : 0 1 ? 0 S R S 0 2 0 1 5 0 0 0 1 0 2 0 0 0 0 0 2 D CR
(Station number; Response time; Number of relays that can be set; Relay number 1; Set; Relay number 2; Reset; Sum check code)

Response : : 0 3 # 0 S R S 0 2 0 1 5 0 0 0 0 2 0 0 0 0 A A CR
(Station number; Response time; Number of relays that can be set; Relay number 1; Relay number 2; Sum check code)

Note: Relays, which are used for input relay, special relay, special register and link system (data link, remote I/O) cannot be set/reset.

■ MTC (Current value monitor of TMR/CNT/MD)

Function

Read out current value of TMR/CNT/MD number 1 to 2.
Sequential read out current value of timer/counter up to 256.

Communication format

Command

-	-	AD (H)	AD (L)	?	RI	M	T	C	TMR/CNT/MD number 1 (5 characters)	TMR/CNT/MD number 2 (5 characters)	SC (H)	SC (L)	CR

Response

-	-	AD (H)	AD (L)	#	RI	M	T	C	TMR/CNT/MD number 1 (5 characters)	TMR/CNT/MD number 2 (5 characters)	Data 1 (4 characters)	.....

.....	Data n (4 characters)	Attributed data 1 (2 characters)	....	Attributed data n (2 characters)	SC (H)	SC (L)	CR

TMR/CNT/MD number

00000 to 00777 (Shared by TMR, CNT, and MD)
01000 to 17777 (Shared by TMR, CNT)

Data

=> See next page n: Max. 256

Attributed data

00 : JW300 program is not in use
01 : MD
02 : CNT
04 : TMR
08 : BCD DOWN TMR
09 : BIN DOWN TMR
0A : BCD UP TMR
0B : BIN UP TMR
0C : BCD DOWN CNT
0D : BIN DOWN CNT
0E : BCD UP CNT
0F : BIN UP CNT

Execution condition

Write mode | Mode 0, Mode 1, Mode 2

Stop, does not stop the data written by a HLT command

Example for use

Read out TMR/CNT/MD current value 000 to 002 of PLC 01. (Response time: 0 ms)

Command :: 01 ? 0 MTC 00000 00002 6A CR
(01: Station number; 0: Response time; 00000: TMR/CNT/MD number 1; 00002: TMR/CNT/MD number 2; 6A: Sum check code)

Response :: 01 # 0 MTC 00000 00002 6518
(01: Station number; 0: Response time; 00000: TMR/CNT/MD number 1; 00002: TMR/CNT/MD number 2; 6518: TMR000 current value 1865)

3200 1413 04 02 02 FC CR
(3200: CNT 001 current value 0032; 1413: CNT 002 current value 1314; 04: TMR; 02: CNT; 02: CNT; FC: Sum check code)

■ SRT (Set/reset TMR/CNT)

Function

Set timer/counter (time-up, count-up) or reset (return to setting value).

Communication format

Command

-	-	AD (H)	AD (L)	?	RI	S	R	T	TMR/CNT number (5 characters)	Data	SC (H)	SC (L)	CR

Response

-	-	AD (H)	AD (L)	#	RI	S	R	T	TMR/CNT number (5 characters)	SC (H)	SC (L)	CR

TMR/CNT number

00000 to 17777 (Octal)

Data

1: set 0: reset

Execution condition

Write mode | Mode 1, Mode 2

Stop, does not stop the data written by a HLT command

Example for use

Set TMR 0002 of PLC01. (Response time: 0 ms)

Command :: 01 # 0 SRT 00002 1 14 CR
(01: Station number; 0: Response time; 00002: TMR number; 1: Set; 14: Sum check code)

Response :: 01 # 0 SRT 00002 61 CR
(01: Station number; 0: Response time; 00002: TMR number; 61: Sum check code)

■ MTC (described on the previous page) data 1 to n

Current values of the TMR, CNT, and MD, the numbers consist of two bytes.

● TMR

- 100ms timer (TMR00000 to 17777 or DTMR00000 to 17777, UTMR00000 to 17777)

		2nd byte								1st byte							
Data \ Bit		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0.1 to 799.9 sec. (BCD)	* Reset		$x10^2$				$x10^1$				$x10^0$				$x10^{-1}$		
		4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	
0.1 to 3276.7 sec. (BIN)	* Reset	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	

- 10ms timer (TMR00400 to 00777)

		2nd byte								1st byte							
Data \ Bit		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0.01 to 79.99 sec. (BCD)	* Reset		$x10^1$				$x10^0$				$x10^{-1}$				$x10^{-2}$		
		4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	

- 1 ms timer (TMR17770 to 17777)

		2nd byte								1st byte							
Data \ Bit		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0.01 to 79.99 sec. (BCD)	* Reset		$x10^0$				$x10^{-1}$				$x10^{-2}$				$x10^{-3}$		
		4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	

● CNT00000 to 17777

		2nd byte								1st byte							
Data \ Bit		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
1 to 7999 (BCD)	* Reset		$x10^3$				$x10^2$				$x10^1$				$x10^0$		
		4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	
1 to 32767 (BIN)	* Reset	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	

● MD00000 to 00777

		2nd byte								1st byte							
Data \ Bit		7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0 to 999 (BCD)	1		Input information				$x10^2$				$x10^1$				$x10^0$		
		S1	S2	S3	8	4	2	1	8	4	2	1	8	4	2	1	

* Reset

If the JW300 is forcibly reset in the set value change mode, the value will be 0 (OFF). Normally, it is 1 (ON).

■ MRG (Relay, register, TMR/CND/MD current value monitor)

Function		Read out current value of byte address 1 to 2. Sequential read out up to 512 bytes.
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | M | R | G | Byte address 1 (6 characters) | Byte address 2 (6 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | M | R | G | Byte address 1 (6 characters) | Byte address 2 (6 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
Byte address		A00000 to A01577, A02000 to A07577, A10000 to A54377, B00000 to B37777, 009000 to 099777, E00000 to E07777, 109000 to 199777, 209000 to 299777, 309000 to 389777, Z00000 to Z00377, (Octal) - A00000 to A54377 to express ⊐00000 to ⊐54377. B00000 to B37777 to express b00000 to b37777.
Data		2 characters (hexadecimal) n: Max. 512
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Read the data (hexadecimal) 009000 to 009003 of PLC01. (Response time : 0 ms)

Command : : 0 1 ? 0 M R G 0 0 9 0 0 0 0 0 9 0 0 3 F 5 CR
(0 1: Station number; 0: Response time; 009000: Byte address 1; 009003: Byte address 2; F5: Sum check code)

Response : : 0 1 # 0 M R G 0 0 9 0 0 0 0 0 9 0 0 3
(0 1: Station number; 0: Response time; 009000: Byte address 1; 009003: Byte address 2)

0 0 4 F 3 2 0 1 7 1 CR
(0900: 00, 0901: 4F, 0902: 32, 0903: 01; 71: Sum check code)

■ WRG (Write in relay, register, TMR/CNT/MD)

Function		Write required data from the byte address 1 to 2. Available to sequentially write up to 512 bytes.
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | W | R | G | Byte address 1 (6 characters) | Byte address 2 (6 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | W | R | G | Byte address 1 (6 characters) | Byte address 2 (6 characters) | SC (H) | SC (L) | CR
Byte address		A00000 to A01577, A02000 to A07577, A10000 to A54377, B00000 to B37777, 009000 to 099777, E00000 to E07777, 109000 to 199777, 209000 to 299777, 309000 to 389777, Z00000 to Z00377, (Octal) - A00000 to A54377 to express ⊐00000 to ⊐54377. B00000 to B37777 to express b00000 to b37777.
Data		2 characters (hexadecimal) n: Max. 512
Execution condition	Write mode	Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Write 14, 00, 32, 56 (hexadecimal) in ⊐00400 to ⊐00403 of PLC01, respectively. (Response time: 0 ms)

Command : : 0 1 ? 0 W R G A 0 0 4 0 0 A 0 0 4 0 3
(0 1: Station number; 0: Response time; A00400: Byte address 1; A00403: Byte address 2)

1 4 0 0 3 2 5 6 3 E CR
(14: ⊐00400, 00: ⊐00401, 32: ⊐00402, 56: ⊐00403; 3E: Sum check code)

Response : : 0 1 # 0 W R G A 0 0 4 0 0 A 0 0 4 0 3 E F CR
(0 1: Station number; 0: Response time; A00400: Byte address 1; A00403: Byte address 2; EF: Sum check code)

■ MGS (Monitor the current values of any specified relays, registers, MTR, CNT, and MD registers)

Function		Read the data at any specified multiple byte address (maximum 128 bytes).
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | M | G | S | No. of data to read (2 characters) | Byte address 1 (6 characters) | ..... | Byte address N (6 characters) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | M | G | S | No. of data to read (2 characters) | Byte address 1 (6 characters) | Data 1 (2 characters) | ..... | Byte address N (6 characters) | Data N (2 characters) | SC(H) | SC(L) | CR
No. of data to read		00 to 80 (hexadecimal)
Byte address N-1		A00000 to A01577, A02000 to A07577, A10000 to A54377, B00000 to B37777, 009000 to 099777, E00000 to E07777, 109000 to 199777, 209000 to 299777, 309000 to 389777, Z00000 to Z00377, (Octal) - A00000 to A54377 to express ⊐00000 to ⊐54377. B00000 to B37777 to express b00000 to b37777.
Data N-1		2 characters (hexadecimal) n: Max. 128
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
	Stop, does not stop the data written by a HLT command	
Example for use		Read registers 009000 and 209000 in the PLC01. (Response time : 0 ms)

Command : : 0 1 ? 0 M G S 0 2 0 0 9 0 0 0 2 0 9 0 0 0 9 3 CR
(Station number: 01; Response time: 0; No. of data to read: 02; Register address 1: 009000; Register address 2: 209000; Sum check code: 93)

Response : : 0 1 # 0 M G S 0 2 0 0 9 0 0 0 4 F 2 0 9 0 0 0 3 2 D 0 CR
(Station number: 01; Response time: 0; No. of data to read: 02; Register address 1: 009000; 009000 Data: 4F; Register address 2: 209000; 209000 data: 32; Sum check code: D0)

■ WGS (Write to any specified relays, registers, TMR, CNT, and MD registers)

Function		Write the data at any specified multiple byte address (maximum 128 bytes).
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | W | G | S | No. of data to write (2 characters) | Byte address 1 (6 characters) | Data 1 (2 characters) | ..... | Byte address N (6 characters) | Data N (2 characters) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | W | G | S | No. of data to write (2 characters) | Byte address 1 (6 characters) | ..... | Byte address N (6 characters) | SC(H) | SC(L) | CR
No. of data to write		00 to 80 (hexadecimal)
Byte address N-1		A00000 to A01577, A02000 to A07577, A10000 to A54377, B00000 to B37777, 009000 to 099777, E00000 to E07777, 109000 to 199777, 209000 to 299777, 309000 to 389777, Z00000 to Z00377, (Octal) - A00000 to A54377 to express ⊐00000 to ⊐54377. B00000 to B37777 to express b00000 to b37777.
Data N-1		2 characters (hexadecimal) n: Max. 128
Execution condition	Write mode	Mode 1, Mode 2
	Stop, does not stop the data written by a HLT command	
Example for use		Write 14, 32 (hexadecimal) to registers 009000 and 209000 in PLC01. (Response time : 0 ms)

Command : : 0 1 ? 0 W G S 0 2 0 0 9 0 0 0 1 4 2 0 9 0 0 0 3 2 B F CR
(Station number: 01; Response time: 0; No. of data to write: 02; Register address 1: 009000; 009000: 14; Register address 2: 209000; 209000: 32; Sum check code: BF)

Response : : 0 1 # 0 W G S 0 2 0 0 9 0 0 0 2 0 9 0 0 0 A 5 CR
(Station number: 01; Response time: 0; No. of data to write: 02; Register address 1: 009000; Register address 2: 209000; Sum check code: A5)

■ FRG (Write the same data in relay, register, TMR/CNT/MD)

<table>
<tr><td colspan="2">Function</td><td>Write the same data in the byte address 1 to 2. Sequential write up to 512 bytes.</td></tr>
<tr><td rowspan="2">Communication format</td><td>Command</td><td>
<table>
<tr><td>- -</td><td>- -</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>F</td><td>R</td><td>G</td><td>Byte address 1 (6 characters)</td><td>Byte address 2 (6 characters)</td><td>Data 1 (2 characters)</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td>Response</td><td>
<table>
<tr><td>- -</td><td>- -</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>F</td><td>R</td><td>G</td><td>Byte address 1 (6 characters)</td><td>Byte address 2 (6 characters)</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Byte address</td><td>A00000 to A01577, A02000 to A07577, A10000 to A54377, B00000 to B37777, 009000 to 099777, E00000 to E07777, 109000 to 199777, 209000 to 299777, 309000 to 389777, Z00000 to Z00377, (Octal)
- A00000 to A54377 to express ⊐00000 to ⊐54377. B00000 to B37777 to express b00000 to b37777.</td></tr>
<tr><td colspan="2">Data</td><td>2 characters (hexadecimal)</td></tr>
<tr><td colspan="2" rowspan="2">Execution condition</td><td>Write mode | Mode 1, Mode 2</td></tr>
<tr><td>Stop, does not stop the data written by a HLT command</td></tr>
<tr><td colspan="2">Example for use</td><td>Write data 40 (hexadecimal) in register 009000 to 009077 of PLC01.
(Response time: 0 ms)
Command : : 0 1 ? 0 F R G 0 0 9 0 0 0 0 0 9 0 7 7 4 0 8 D CR
(Station number, Response time, Byte address 1, Byte address 2, Data, Sum check code)
Response : : 0 1 # 0 F R G 0 0 9 0 0 0 0 0 9 0 7 7 0 D CR
(Station number, Response time, Byte address 1, Byte address 2, Sum check code)</td></tr>
</table>

■ RFL (Read file register)

Function		Read data from byte address 1 to 2 in the file register. Sequential read out up to 512 bytes.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | R | F | L | Byte address 1 (8 characters) | Byte address 2 (8 characters) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | R | F | L | Byte address 1 (8 characters) | Byte address 2 (8 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC(H) | SC(L) | CR
Byte address		00000000 to 37777777 (hexadecimal)
Data		2 characters (hexadecimal) n: Max. 512
Execution condition		Write mode: Mode 0, Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Read data (hexadecimal) from byte addresses 00030000 to 00030003(8) in the file register in PLC01. (Response time : 0 ms)

Command: `: 0 1 ? 0 R F L 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 4 3 CR`
(01: Station number; 0: Response time; 00030000: File register byte address 1; 00030003: File register byte address 2; 43: Sum check code)

Response: `: 0 1 # 0 R F L 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3`
(01: Station number; 0: Response time; 00030000: File register byte address 1; 00030003: File register byte address 2)

`1 0 4 1 2 F C 0 A E CR`
(1041: 00030000; 2FC0: 00030002; AE: Sum check code; 00030001; 00030003)

■ WFL (Write to file register)

Function		Write data from byte address 1 to 2 in the file register. Sequential read out up to 512 bytes.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | W | F | L | Byte address 1 (8 characters) | Byte address 2 (8 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | W | F | L | Byte address 1 (8 characters) | Byte address 2 (8 characters) | SC(H) | SC(L) | CR
Byte address		00000000 to 37777777 (hexadecimal)
Data		2 characters (hexadecimal) n: Max. 512
Execution condition		Write mode: Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Write 55 (hexadecimal) to byte addresses 00030000 to 00030003(8) in the PLC01's file register (Response time : 0 ms)

Command: `: 0 1 ? 0 W F L 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 5 5`
(01: Station number; 0: Response time; 00030000: File register byte address 1; 00030003: File register byte address 2; 55: 00030000 data)

`5 5 5 5 5 5 9 6 CR`
(55: 00030001; 5555: 00030002; 5596: Sum check code)

Response: `: 0 1 # 0 W F L 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 5 A CR`
(01: Station number; 0: Response time; 00030000: File register byte address 1; 00030003: File register byte address 2; 5A: Sum check code)

■ RFLF (Read file address)

Function	Read data from file addresses 1 to 2. Sequential read out up to 512 bytes. Specify the file registers with byte addresses.
Communication format – Command	- - | A D (H) | A D (L) | # | R I | R | F | L | F | F I L | File address 1 (8 characters) | File address 2 (8 characters) | S C (H) | S C (L) | C R
Communication format – Response	- - | A D (H) | A D (L) | # | R I | R | F | L | F | F I L | File address 1 (8 characters) | File address 2 (8 characters) | Data 1 (2 characters) | .... | Data n (2 characters) | S C (H) | S C (L) | C R
FIL	- When the data consists of relay, TMR, CNT contact points, TMR, CNT, MD current value, or a register, set this to 0 (file number) - When a file register is selected, set this to 1 (file number)
File address	- To read a relay, TMR, CNT contact points, TMR, CNT, MD current value, or a register, set 00000000 to 00177777 - To read a file register, set 00000000 to 37777777 (byte addresses)
Data	2 characters (hexadecimal) n: Max. 512
Execution condition	Write mode: Mode 0, Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use	Read the data (hexadecimal) at file addresses 00030000 to 00030003(8) in PLC01. Command: `: : 0 1 ? 0 R F L F 0 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 C C CR` (01 = Station number, ?0: 0 = Response time, 00030000 = File address 1, 00030003 = File address 2, CC = Sum check code) Response: `: : 0 1 # 0 R F L F 0 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 1 0 4 1 2 F C 0 3 7 CR` (01 = Station number, 0 = Response time, 00030000 = File address 1, 00030003 = File address 2; 10 = 00030000, 41 = 00030001, 2F = 00030002, C0 = 00030003, 37 = Sum check code) (Response time : 0ms)

■ WFLF (Write to file address)

Function	Write data to file addresses 1 to 2. Sequential read out up to 512 bytes. Set the file register with the byte addresses.
Communication format – Command	- - | A D (H) | A D (L) | ? | R I | W | F | L | F | F I L | File address 1 (8 characters) | File address 2 (8 characters) | Data 1 (2 characters) | .... | Data n (2 characters) | S C (H) | S C (L) | C R
Communication format – Response	- - | A D (H) | A D (L) | # | R I | W | F | L | F | F I L | File address 1 (8 characters) | File address 2 (8 characters) | S C (H) | S C (L) | C R
FIL	- When the data consists of relay, TMR, CNT contact points, TMR, CNT, MD current value, or a register, set this to 0 (file number) - When a file register is selected, set this to 1 (file number)
File address	- To read a relay, TMR, CNT contact points, TMR, CNT, MD current value, or a register, set 00000000 to 00177777 - To read a file register, set 00000000 to 37777777 (byte addresses)
Data	2 characters (hexadecimal) n: Max. 512
Execution condition	Write mode: Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use	Write 55 (hexadecimal) to file addresses 00030000 to 00030003(8) in PLC01. (Response time : 0ms) Command: `: : 0 1 ? 0 W F L F 0 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 5 5 5 5 5 5 5 5 1 F CR` (01 = Station number, 0 = Response time, 00030000 = File address 1, 00030003 = File address 2; 55 = 00030000, 55 = 00030001, 55 = 00030002, 55 = 00030003, 1F = Sum check code) Response: `: : 0 1 # 0 W F L F 0 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 3 E 3 CR` (01 = Station number, 0 = Response time, 00030000 = File address 1, 00030003 = File address 2, E3 = Sum check code)

■ RPSR (Read parameter of a special I/O module: Except remote I/O slave stations)

Function

Read the parameter data at addresses 1 to 2 for the specified (rack number, module number) special I/O modules. (Maximum of 128 sequential bytes, except remote I/O slave stations)

Communication format

Command

-	-	AD(H)	AD(L)	?	RI	R	P	S	R	RCK	Module No.	Parameter addresses 1 (4 characters)	Parameter addresses 2 (4 characters)	SC(H)	SC(L)	CR

Response

-	-	AD(H)	AD(L)	#	RI	R	P	S	R	RCK	Module No.	Parameter addresses 1 (4 characters)	Parameter addresses 2 (4 characters)	Data 1 (2 characters)	.....	.....	Data n (2 characters)	SC(H)	SC(L)	CR

RCK: 0 to 7 (Rack No.)

Module number: 0 to 7 (Module No. switch set value)

Parameter addresses: 0000 to 0377 (Octal)

Data: 2 characters (hexadecimal) n: Max. 256

Execution condition: Write mode | Mode 0, Mode 1, Mode 2

Stop, does not stop the data written by a HLT command

Example for use

Read the data (hexadecimal) at parameter addresses 0100 to 0102 for rack number 1, module number 2 (special I/O modules) in PLC03. (Response time : 30 ms)

Command

`: : 0 3 ? 3 R P S R 1 2 0 1 0 0 0 1 0 2 F D CR`

- `0 3`: Station number
- `?`: Response time
- `1`: Rack No.
- `2`: Module No.
- `0 1 0 0`: Parameter addresses 1
- `0 1 0 2`: Parameter addresses 2
- `F D`: Sum check code

Response

`: : 0 3 # 3 R P S R 1 2 0 1 0 0 0 1 0 2 0 0 3 0 2 0 F 4 CR`

- `0 3`: Station number
- `#`: Response time
- `1`: Rack No.
- `2`: Module No.
- `0 1 0 0`: Parameter addresses 1
- `0 1 0 2`: Parameter addresses 2
- `0 0 3 0 2 0`: 0100, 0101, 0102
- `F 4`: Sum check code

■ WPSR (Write parameter of a special I/O module: Except remote I/O slave stations)

Function

Write the parameter data at addresses 1 to 2 for the specified (rack number, module number) special I/O modules. (Maximum of 128 sequential bytes, except remote I/O slave stations)

Communication format

Command

-	-	AD(H)	AD(L)	?	RI	W	P	S	R	RCK	Module No.	Parameter addresses 1 (4 characters)	Parameter addresses 2 (4 characters)	Data 1 (2 characters)	.....	.....	Data n (2 characters)	SC(H)	SC(L)	CR

Response

-	-	AD(H)	AD(L)	#	RI	W	P	S	R	RCK	Module No.	Parameter addresses 1 (4 characters)	Parameter addresses 2 (4 characters)	SC(H)	SC(L)	CR

RCK: 0 to 7 (Rack No.)

Module number: 0 to 7 (Module No. switch setting value)

Parameter addresses: 0000 to 0377 (Octal)

Data: 2 characters (hexadecimal) n: Max. 256

Execution condition: Write mode | Mode 2

Stop by a HLT command

Example for use

Write the data (hexadecimal) at parameter addresses 0100 to 0102 for rack number 3, module number 2 (special I/O modules) in PLC03. (Response time : 30 ms)

Command

`. . 0 3 ? 3 W P S R 3 2 0 1 0 0 0 1 0 2 0 0 3 0 2 0 D 1 CR`

- `0 3`: Station number
- `?`: Response time
- `3`: Rack No.
- `2`: Module No.
- `0 1 0 0`: Parameter addresses 1
- `0 1 0 2`: Parameter addresses 2
- `0 0 3 0 2 0`: 0100, 0101, 0102
- `D 1`: Sum check code

Response

`: : 0 3 # 3 W P S R 3 2 0 1 0 0 0 1 0 2 1 2 CR`

- `0 3`: Station number
- `#`: Response time
- `3`: Rack No.
- `2`: Module No.
- `0 1 0 0`: Parameter addresses 1
- `0 1 0 2`: Parameter addresses 2
- `1 2`: Sum check code

■ RPS (Read parameter of a special I/O module: Remote I/O slave station only)

Function		Read the data from parameter addresses 1 to 2 of the special I/O modules in the remote I/O slave stations. (Maximum of 128 sequential bytes)
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | R | P | S | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | R | P | S | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
Module number		0 to 7 (Module No. switch setting value)
Parameter addresses		0000 to 0377 (Octal)
Data		2 characters (hexadecimal) n: Max. 256
Execution condition		Write mode | Mode 0, Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Read the data (hexadecimal) at parameter addresses 0100 to 0102 for module number 2 (special I/O modules) in PLC03. (Response time : 30 ms)

Command : : 0 3 ? 3 R P S 2 0 1 0 0 0 1 0 2 8 0 CR
(Station number: 03; Response time: 3; Module No.: 2; Parameter addresses 1: 0100; Parameter addresses 2: 0102; Sum check code: 80)

Response : : 0 3 # 3 R P S 2 0 1 0 0 0 1 0 2 0 0 3 0 2 0 7 7 CR
(Station number: 03; Response time: 3; Module No.: 2; Parameter addresses 1: 0100; Parameter addresses 2: 0102; 0100: 0030; 0101: 0207; Sum check code: 77)

■ WPS (Write parameter of a special I/O module: Remote I/O slave station only)

Function		Write the data from parameter addresses 1 to 2 of the special I/O modules in the remote I/O slave stations. (Maximum of 128 sequential bytes)
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | W | P | S | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | W | P | S | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | SC (H) | SC (L) | CR
Module number		0 to 7 (Module No. switch setting value)
Parameter addresses		0000 to 0377 (Octal)
Data		2 characters (hexadecimal) n: Max. 256
Execution condition		Write mode | Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Write the data (hexadecimal) at parameter addresses 0100 to 0102 for rack number 1, module number 2 (special I/O modules) in PLC03. (Response time : 30 ms)

Command : . 0 3 ? 3 W P S 2 0 1 0 0 0 1 0 2 0 0 3 0 2 0 5 6 CR
(Station number: 03; Response time: 3; Module No.: 2; Parameter addresses 1: 0100; Parameter addresses 2: 0102; 0100: 0030; 0101: 0205; Sum check code: 56)

Response : : 0 3 # 3 W P S 2 0 1 0 0 0 1 0 2 9 7 CR
(Station number: 03; Response time: 3; Module No.: 2; Parameter addresses 1: 0100; Parameter addresses 2: 0102; Sum check code: 97)

■ RPO (Read option module parameters)

Function		Read the data from parameter addresses 1 to 2 for the specified option modules (module number). (Maximum of 512 sequential bytes)
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | R | P | O | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | R | P | O | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
Module No.		0 to 7 (Module No. switch setting value)
Parameter addresses		0000 to 0377 (Octal)
Data		2 characters (hexadecimal) n: Max. 512
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Read the data for parameter addresses 0030 to 0032 for module number 3 (option module) in PLC12. (Response time : 40 ms)

Command : : 1 2 ? 4 R P O 3 0 0 3 0 0 0 3 2 7 E CR
(Station number: 12; Response time: 4; Module No.: 3; Parameter addresses 1: 0030; Parameter addresses 2: 0032; Sum check code: 7E)

Response : : 1 2 # 4 R P O 3 0 0 3 0 0 0 3 2 1 5 2 1 0 0 7 1 CR
(Station number: 12; Response time: 4; Module No.: 3; Parameter addresses 1: 0030; Parameter addresses 2: 0032; 0030 data: 15; 0031 data: 21; 0032 data: 00; Sum check code: 71)

■ WPO (Write option module parmeters)

Function		Write the data from parameter addresses 1 to 2 for the specified option modules (module number). (Maximum of 512 sequential bytes)
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | W | P | O | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | W | P | O | Module No. | Parameter addresses 1 (4 characters) | Parameter addresses 2 (4 characters) | SC (H) | SC (L) | CR
Module No.		0 to 7 (Module No. switch setting value)
Parameter addresses		0000 to 0377 (Octal)
Data		2 characters (hexadecimal) n: Max. 512
Execution condition	Write mode	Mode 2
		Stop, does not stop the data written by a HLT command
Example for use		Write the data for parameter addresses 0040 to 0042 for module number 3 (option module) in PLC03. (Response time : 40 ms)

Command . . 0 3 ? 3 W P O 2 0 0 4 0 0 0 4 2 1 4 0 0 3 3 4 E CR
(Station number: 03; Response time: 3; Module No.: 2; Parameter addresses 1: 0040; Parameter addresses 2: 0042; 0040 data: 14; 0041 data: 00; 0042 data: 33; Sum check code: 4E)

Response : : 0 3 # 3 W P O 2 0 0 4 0 0 0 4 2 9 5 CR
(Station number: 03; Response time: 3; Module No.: 2; Parameter addresses 1: 0040; Parameter addresses 2: 0042; Sum check code: 95)

■ RSM (Read system memory)

Function		Read the contents of the system memory from system memory addresses 1 to 2 (Maximum of 256 sequential bytes).
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | R | S | M | System memory addresses 1 (4 characters) | System memory addresses 2 (4 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | R | S | M | System memory addresses 1 (4 characters) | System memory addresses 2 (4 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
System memory address		0000 to 0377, 0400 to 2777 (Octal)
Data		2 characters (hexadecimal) n: Max. 512
Execution condition		Write mode: Mode 0, Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use		Read the data (hexadecimal) in system memory addresses #0201, #0202 in PLC01. (Response time : 0 ms) Command : : 01 ? 0 R S M 0201 0202 B7 CR (Station number, Response time, System memory addresses 1, System memory addresses 2, Sum check code) Response : : 01 # 0 R S M 0201 0202 #0201 #0202 12 CR (Station number, Response time, System memory addresses 1, System memory addresses 2, #0201, #0202, Sum check code)

■ WSM (Write system memory)

Function		Write the contents of the system memory from system memory addresses 1 to 2 (Maximum of 256 sequential bytes).
Communication format	**Command**	- - | - - | AD (H) | AD (L) | ? | RI | W | S | M | System memory addresses 1 (4 characters) | System memory addresses 2 (4 characters) | Data 1 (2 characters) | ..... | ..... | Data n (2 characters) | SC (H) | SC (L) | CR
	Response	- - | - - | AD (H) | AD (L) | # | RI | W | S | M | System memory addresses 1 (4 characters) | System memory addresses 2 (4 characters) | SC (H) | SC (L) | CR
System memory address		0000 to 0377, 0400 to 2777 (Octal)
Data		2 characters (hexadecimal)
Execution condition		Write mode: Mode 2 Stop, does not stop the data written by a HLT command
Example for use		Write 01, 01, (hexadecimal) to system memory addresses #0201, #0202 in PLC01. Command : : 01 ? 0 W S M 0201 0202 0201 0202 01 01 F0 CR (Response time : 0 ms) (Station number, Response time, System memory addresses 1, System memory addresses 2, #0201, #0202, Sum check code) Response : : 01 # 0 W S M 0201 0202 CE CR (Station number, Response time, System memory addresses 1, System memory addresses 2, Sum check code)

Note : Do not write data to addresses that are not available to customers for use as system memory. These addresses belong to the PLC. It may cause a malfunction.

■ CTC (Change setting value of TRM/CNT)

<table>
<tr><td colspan="2">Function</td><td>Change timer/counter setting value in the designated program address.</td></tr>
<tr><td rowspan="2">Communication format</td><td>Command</td><td>
<table>
<tr><td>- -</td><td>- -</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>C</td><td>T</td><td>C</td><td>BLOCK No. (4 characters)</td><td>Program addresses (7 characters)</td><td>Setting value (4 characters)</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td>Response</td><td>
<table>
<tr><td>- -</td><td>- -</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>C</td><td>T</td><td>C</td><td>BLOCK No. (4 characters)</td><td>Program addresses (7 characters)</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td colspan="2">BLOCK No.</td><td>- 0000 to 0016 [JW-311CU/312CU]
- 0000 to 0032 [JW-321CU/322CU]
- 0000 to 0064 [JW-331CU/332CU]
- 0000 to 0128 [JW-341CU/342CU]
- 0000 to 0256 [JW-352CU]
- 0000 to 0512 [JW-362CU] (Decimal)</td></tr>
<tr><td colspan="2">Program address</td><td>- 000000 to 017777 [JW-311CU/312CU]
- 000000 to 037777 [W-321CU/322CU]
- 000000 to 077777 [JW-331CU/332CU]
- 000000 to 177777 [JW-341CU/342CU]
- 000000 to 377777 [JW-352CU]
- 000000 to 777777 [JW-362CU] (Octal)</td></tr>
<tr><td colspan="2">Setting value</td><td>0000 to 7999 (BCD)</td></tr>
<tr><td colspan="2" rowspan="2">Execution condition</td><td>Write mode | Mode 2</td></tr>
<tr><td>Stop, does not stop the data written by a HLT command</td></tr>
<tr><td colspan="2">Example for use</td><td>Change setting value of address 0000024 to 0100 of PLC01. (Response time: 0 ms)
Command : : 01 ? 0 C T C 0000 0000024 0100 7F CR
(01: Station number, 0: Response time, 0000: BLOCK No., 0000024: Program address, 0100: Setting value, 7F: Sum check code, CR)
Response : : 01 # 0 C T C 0000 0000024 5C CR
(01: Station number, 0: Response time, 0000: BLOCK No., 0000024: Program address, 5C: Sum check code, CR)</td></tr>
</table>

Note : The MD's setting cannot be changed.

■ MDY (Read out date)

Function: Read out date (year, month, date, and day) of clock.

Communication format

Command

-	-	AD (H)	AD (L)	?	RI	M	D	Y	SC (H)	SC (L)	CR

Response

-	-	AD (H)	AD (L)	#	RI	M	D	Y	Year (H)	Year (L)	Month (H)	Month (L)	Date (H)	Date (L)	Day (H)	Day (L)	SC (H)	SC (L)	CR

Year/month/date/day

Year (BCD)	Month (BCD)	Day (BCD)	Day of the week (BCD)						
00 to 99 [Lower 2 digits of A.C. Example: 03 as 2003]	01 to 12	01 to 31	SUN	MON	TUE	WED	THU	FRI	SAT
			00	01	02	03	04	05	06

Execution condition

Write mode: Mode 0, Mode 1, Mode 2

Stop, does not stop the data written by a HLT command

Example for use

Read out date of PLC01. (Response time: 0 ms)

Command: : 0 1 ? 0 M D Y 4 6 CR
(Station number: 01; Response time: 0; Sum check code: 46)

Response: : 0 1 # 0 M D Y 0 3 0 7 2 5 0 5 C C CR
(Station number: 01; Response time: 0; Jul 25th, 2003 (Fri.): 03 07 25 05; Sum check code: CC)

■ SDY (Set date)

Function: Set date (year, month, date and day) of clock.

Communication format

Command

-	-	AD (H)	AD (L)	#	RI	S	D	Y	Year (H)	Year (L)	Month (H)	Month (L)	Date (H)	Date (L)	Day (H)	Day (L)	SC (H)	SC (L)	CR

Response

-	-	AD (H)	AD (L)	?	RI	S	D	Y	SC (H)	SC (L)	CR

Year/month/date/day

Year (BCD)	Month (BCD)	Day (BCD)	Day of the week (BCD)						
00 to 99 [Lower 2 digits of A.C. Example: 03 as 2003]	01 to 12	01 to 31	SUN	MON	TUE	WED	THU	FRI	SAT
			00	01	02	03	04	05	06

Execution condition

Write mode: Mode 1, Mode 2

Stop, does not stop the data written by a HLT command

Example for use

Set date of PLC01 as Sat, July 26th, 2003. (Response time: 0 ms)

Command: : 0 1 ? 0 S D Y 0 3 0 7 2 6 0 6 A 8 CR
(Station number: 01; Response time: 0; Jul 25th, 2003 (Fri.): 03 07 26 06; Sum check code: A8)

Response: : 0 1 # 0 S D Y 5 C CR
(Station number: 01; Response time: 0; Sum check code: 5C)

■ MTM (Read out time)

Function		Read out time (hour, minute, second) of clock.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | M | T | M | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | M | T | M | Hour(H) | Hour(L) | Min.(H) | Min.(L) | Sec.(H) | Sec.(L) | SC(H) | SC(L) | CR
Hour/minute/second	Hour (BCD)	Minute (BCD) / Second (BCD)
	00 to 23	00 to 59 / 00 to 59
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
	Stop, does not stop the data written by a HLT command	
Example for use	Read out time of PLC06. (Response time: 10 ms)	

Command: : 0 6 ? 1 M T M 3 C CR
(0 6: Station number; 1: Response time; 3 C: Sum check code)

Response: : 0 6 # 1 M T M 0 8 3 0 3 0 2 A
(0 6: Station number; 1: Response time; 0 8 3 0 3 0: 8:30:30 AM; 2 A: Sum check code)

■ STM (Set time)

Function		Set time (hour, minute, second) of clock.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | # | RI | S | T | M | Hour(H) | Hour(L) | Min.(H) | Min.(L) | Sec.(H) | Sec.(L) | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | ? | RI | S | T | M | SC(H) | SC(L) | CR
Hour/minute/second	Hour (BCD)	Minute (BCD) / Second (BCD)
	00 to 23	00 to 59 / 00 to 59
Execution condition	Write mode	Mode 1, Mode 2
	Stop, does not stop the data written by a HLT command	
Example for use	Set 13:30:00 in the clock of PLC07. (Response time: 20 ms)	

Command: : 0 7 ? 2 S T M 1 3 3 0 0 0 0 D CR
(0 7: Station number; 2: Response time; 1 3 3 0 0 0: 13:30:30 AM; 0 D: Sum check code)

Response: : 0 7 # 2 S T M 5 0 CR
(0 7: Station number; 2: Response time; 5 0: Sum check code)

■ ACL (Correct clock time)

<table>
<tr><td colspan="2">Function</td><td>Correct time, run, and stop of clock.</td></tr>
<tr><td rowspan="2">Communication format</td><td>Command</td><td>
<table>
<tr><td>- -</td><td>- -</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>A</td><td>C</td><td>L</td><td>Setting value (2 characters)</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td>Response</td><td>
<table>
<tr><td>- -</td><td>- -</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>A</td><td>C</td><td>L</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Data</td><td>00: Start clock 01: Stop clock
08:30 sec. correction — 0 to 29 sec.------ Becomes "00" sec. without addition of 1 minute.
30 to 59 sec.---- Becomes "00" sec. with addition of 1 minute.</td></tr>
<tr><td colspan="2" rowspan="2">Execution condition</td><td>Write mode | Mode 1, Mode 2</td></tr>
<tr><td>Stop, does not stop the data written by a HLT command</td></tr>
<tr><td colspan="2">Example for use</td><td>Stop clock of PC07. (Response time: 30 ms)

Command : : 0 7 ? 3 A C L 0 1 F 6 CR
(Station number, Response time, Stop clock, Sum check code)

Response : : 0 7 # 3 A C L 7 3 CR
(Station number, Response time, Sum check code)</td></tr>
</table>

■ MPC (Monitor operational condition)

Function		Monitor PLC is running or stops.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | M | P | C | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | M | P | C | Data | SC(H) | SC(L) | CR
Set value		0: Run 1: Stop by other optional device 2: Stop by HLT command
Execution condition		Write mode: Mode 0, Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use		Monitor operational condition of PLC01. (Response time: 20 ms) Command : : 0 1 ? 2 M P C 4 E CR (Station number; Response time; Sum check code) Response : : 0 1 # 2 M P C 0 3 A CR (Station number; Response time; Sum check code; At operation)

■ HLT (Stop PC operation)

Function		Stop PLC operation.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | H | T | L | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | H | T | L | SC(H) | SC(L) | CR
Execution condition		Write mode: Mode 0, Mode 1, Mode 2 Stop, does not stop the data written by a HLT command
Example for use		Stop operation of PLC03. (Response time: 10 ms) Command : : 0 3 ? 1 H L T 4 5 CR (Station number; Response time; Sum check code) Response : : 0 3 # 1 H L T 6 1 CR (Station number; Response time; Sum check code)

Note: A PLC, which has been stopped by HLT command cannot start operation again by support tool such as JW-300SP.

■ RUN (Restart PLC operation)

<table>
<tr><td colspan="2">Function</td><td colspan="12">Release HLT (stop PLC operation) command, restart PLC operation.</td></tr>
<tr><td rowspan="2">Communication format</td><td>Command</td><td>--</td><td>--</td><td>AD (H)</td><td>AD (L)</td><td>?</td><td>RI</td><td>R</td><td>U</td><td>N</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
<tr><td>Response</td><td>--</td><td>--</td><td>AD (H)</td><td>AD (L)</td><td>#</td><td>RI</td><td>R</td><td>U</td><td>N</td><td>SC (H)</td><td>SC (L)</td><td>CR</td></tr>
<tr><td colspan="2">Execution condition</td><td colspan="12">Write mode | Mode 0, Mode 1, Mode 2
Stop, does not stop the data written by a HLT command</td></tr>
<tr><td colspan="2">Example for use</td><td colspan="12">Restart operation of PLC03. (Response time: 10 ms)

Command : : 0 3 ? 1 R U N 3 8 CR
Station number / Response time / Sum check code

Response : : 0 3 ? 1 R U N 5 4 CR
Station number / Response time / Sum check code</td></tr>
</table>

Note: RUN command restarts a PLC, which has been stopped by HLT command.
When the PLC has stopped by other causes (stop by the program mode, parity error or program, and a command from a remote I/O master station), it cannot restart operation even RUN command is executed.
In these cases, response returns normally.

■ VLM (Read memory capacity)

Function		Reads the program memory capacity of the PLC.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | V | L | M | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | ? | RI | V | L | M | Data | SC(H) | SC(L) | CR
Data		0 : 8 K words (JW-311CU/312CU) 1 : 16 K words (JW-321CU/322CU) 2 : 32 K words (JW-331CU/332CU) 3 : 64 K words (JW-341CU/342CU) 4 : 128 K words (JW-352CU) 5 : 256 K words (JW-362CU)
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
	Stop, does not stop the data written by a HLT command	
Example for use		Read the program memory capacity of PLC06. (Response time: 30 ms) Command : : 0 6 ? 3 V L M 3 9 CR (0 6: Station number, 3: Response time, 3 9: Sum check code) Response : : 0 6 # 3 V L M 3 2 5 CR (0 6: Station number, 3: Response time, 3 2 5: Sum check code, 3: Program memory capacity (32K words))

■ TST (Turn back the message)

Function		Send back the received command as it is.
Communication format	**Command**	- - | - - | AD(H) | AD(L) | ? | RI | T | S | M | M1 | ..... | Mn | SC(H) | SC(L) | CR
	Response	- - | - - | AD(H) | AD(L) | # | RI | T | S | M | M1 | ..... | Mn | SC(H) | SC(L) | CR
Data		Message visible character strings (20H to 7EH of ASCII code, except "colon") Max. 1024 characters
Execution condition	Write mode	Mode 0, Mode 1, Mode 2
	Stop, does not stop the data written by a HLT command	
Example for use		Test sending and returning of a message toward PLC01. (Response time: 50 ms) Command : : 0 1 ? 5 T S T T E S T C O M M A N D F 1 CR (0 1: Station number, 5: Response time, T E S T C O M M A N D: Message, F 1: Sum check code) Response : : 0 1 # 5 T S T T E S T C O M M A N D 0 D CR (0 1: Station number, 5: Response time, T E S T C O M M A N D: Message, 0 D: Sum check code)

■ PAS (Release secret/password registration)

Function	Release secret function, register password.	
Communication format **Command**	- - | - - | AD (H) | AD (L) | ? | RI | P | A | S | Data | Password (4 characters) | SC (H) | SC (L) | CR	
Communication format **Response**	- - | - - | AD (H) | AD (L) | # | RI | P | A | S | SC (H) | SC (L) | CR	
Data	0: Release····Release the secret function. 1: Temporary registration····Set before regular registration 2: Regular registration····Set after temporary registration	
Password	Alphanumeric 4 characters	
Execution condition		Data = 0 / Data = 1, 2
	Write mode	Mode 0, Mode 1, Mode 2 / Mode 2
	Stop, does not stop the data written by a HLT command	Stop by a HLT command
Example for use	Regularly register password 15AE to PLC05. (Response time: 20 ms) Command : : 05 ? 2 PAS 2 15AE 28 CR (Station number, Response time, Password, Regular registration, Sum check code) Response : : 05 # 2 PAS 62 CR (Station number, Response time, Sum check code)	

Note: If secret function is set, the following commands cannot be used:
RSM, RPM, WPM, WSM, CTC, HLT, RUN, SES.
In addition, setting of secret function on the JW300 requires a support tool such as JW-300SP to set its password, which is connected to the JW300.

■ SES (Set secret function)

Function	Set secret function.	
Communication format **Command**	- - | - - | AD (H) | AD (L) | ? | RI | S | E | S | Data | SC (H) | SC (L) | CR	
Communication format **Response**	- - | - - | AD (H) | AD (L) | # | RI | S | E | S | SC (H) | SC (L) | CR	
Data	1: Enable secret function ····Enable secret function by the registered password. F: Delete ····Delete registered password of JW300.	
Execution condition		Data = 0 / Data = 1, 2
	Write mode	Mode 0, Mode 1, Mode 2 / Mode 2
	Stop, does not stop the data written by a HLT command	Stop by a HLT command
Example for use	Enable secret function of PLC07. (Response time: 10 ms) Command : : 07 ? 1 SES 10D CR (Station number, Response time, Sum check code, Enable secret function) Response : : 07 ? 1 SES 5A CR (Station number, Response time, Sum check code)	

Note: If secret function is set, the following commands cannot be used:
RSM, RPM, WPM, WSM, CTC, HLT, RUN, SES.
In addition, setting of secret function on the JW300 requires a support tool such as JW-300SP to set its password, which is connected to the JW300.

■ SEI (Check secret function)

<table>
<tr><td colspan="2">Function</td><td>Check secret function (enable/disable).</td></tr>
<tr><td rowspan="2">Communication format</td><td>Command</td><td>
<table>
<tr><td>--</td><td>--</td><td>AD(H)</td><td>AD(L)</td><td>#</td><td>RI</td><td>S</td><td>E</td><td>I</td><td>SC(H)</td><td>SC(L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td>Response</td><td>
<table>
<tr><td>--</td><td>--</td><td>AD(H)</td><td>AD(L)</td><td>#</td><td>RI</td><td>S</td><td>E</td><td>I</td><td>Data</td><td>SC(H)</td><td>SC(L)</td><td>CR</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Data</td><td>0: Disable secret function
1: Enable secret function</td></tr>
<tr><td colspan="2" rowspan="2">Execution condition</td><td>Write mode | Mode 0, Mode 1, Mode 2</td></tr>
<tr><td>Stop, does not stop the data written by a HLT command</td></tr>
<tr><td colspan="2">Example for use</td><td>Check secret function (enable/disable) of PLC03. (Response time: 30ms)

Command ::03?3SEI4A CR
(Station number, Response time, Sum check code)

Response ::03#3SEI135 CR
(Station number, Response time, Sum check code, Enable secret function)</td></tr>
</table>

Chapter 8. Maintenance and check

8-1 Self-diagnosis function

By the self-diagnostic function, the system is running while checking if its own hardware is normal or not. As a result of self-diagnosis, if abnormality is detected, the stop output is turned OFF (opened), and the fault lamp lights up to stop operation.

Self-diagnosis is executed in every scan, and when recovered to normal state, the stop output is automatically turned ON (closed), and the operation is resumed. (By the infinite loop of user program or the like, when the watchdog timer is actuated, the operation is stopped by the program mode, and the stop output is opened.)

[1] Abnormality not detected by self-diagnostic function

1. Abnormality directly affecting the self-diagnostic function itself of the control module (such as hardware abnormality of control module)
2. Abnormality in the outer side circuit module of input and output module (abnormality not affecting the I/O bus port)

   Examples:
   - When the load cannot be driven due to abnormality of output transistor of output module.
   - When input signal cannot be taken in due to abnormality of photo coupler of input circuit of input module.
3. Communication abnormality in data link

   Communication abnormality can be confirmed by the LED of option module or communication flag.

   For details, see "user's manual" of option module.

[2] Self-diagnosis function (Error code table)

Item			Contents	JW300 operating condition	Halt output	Control module	Indication lamp of power supply module		Special relay *3	Error code (BCD)	
										Special register	System memory
						FAULT	POWER	RUN		⊐00734	#0160 to #0167
Self-diagnosis	Memory error		Check instruction code	Stop	Open	Light ON	Light ON	Light OFF	007370	20	24
			Check system memory setting								23
			Check program ROM								25
			Check program sum								26
			Check I/O module registration table								28
	CPU error		Watch dog timer			Light OFF		Blinking	---	00	31
			RAM check (R/W)			Light ON		Light OFF	007371	30	32
			Hardware check								35
	I/O error	At re-freshing	I/O data bus						007373	40	44
			Output data check								42
			Installed module check								40
			I/O rack panel error								48
			Number of bytes per module Check								
		At table verifying	Table verify error							60	60
			Switch verify error								61
		At table registra-tion	Table registration error							70	70
			No module error								71
			I/O points over								72
			Switch setting error								73
	Special I/O error		Hardware error						007375	40	46
			Parameter error								47
			*1 *2 Fuse blow of JW-262S	Operation	Close	Light OFF	Light ON	Light ON	007363		49
				Stop	Open	Light ON	Light ON	Light OFF			
	Option error		*1 Hardware error	Operation	Close	Light OFF	Light ON	Light ON	007374	50	53
				Stop	Open	Light ON	Light ON	Light OFF			
			Option command error	Operation	Close	Light OFF	Light ON	Light ON			54
			System protection error	Operation	Close	Light OFF	Light ON	Light ON			55
	Power supply error		Power failure/low voltage	Stop	Open	Light OFF	Light OFF	Light OFF	007377	10	13*4
	Expansion power supply error		Power failure/low voltage			Light ON	Light ON		007376	40	43
	Battery error		Battery low voltage/ No installation of battery	Operation	Close			Light ON	007372	20	22
Halt output			Relay output, 100/200 VAC, 30 VDC, 1A, ON while JW300 operation (close)								

*1 The upper or lower state of each item may occur when the fuse is melted down in the system memory #0206 or #0207, or by the setting in the case of option abnormality.

*2 When eternal power is not supplied to the JW-262S, a fuse failure will also occur.
A special attention must be paid when #0206 is set to operation stoppage.

(Setting)		(State)
Continue operation	→	Upper column
Halt	→	Lower column

*3 The special relay 07370 to 07377 are special relay, which are turned ON when detected in self-diagnosis. In the event of abnormality, the kind of trouble is known by monitoring the special relay through support tool, host communication, or data link. (The special relay is turned ON in the event of abnormality, but I/O processing is not executed in the event of abnormality, and hence it cannot be taken out of the output.)

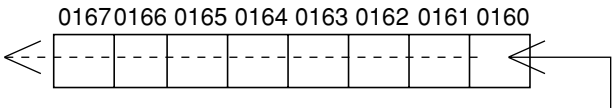
*4 The power source error is stored when the power source is turned ON even in normal state.

Note: If the JW300 detects an error during an operation using its self-diagnosis function, it stores the error code. In addition, the operation status, stop output, indicator (FAULT etc.), and special relay status will be as follows:

- If the error condition is removed before the watchdog timer times out (300 ms), the condition of the JW300 will not be as shown in the table above.
- If the error status lasts longer than the watchdog timer time (300 ms), the condition of the JW300 will be as shown in the table above.

■ Error code storage area #0160 to 0167

The error codes are stored in the system memory "0160 to 0167." This memory area has stack structure, so that the latest error code is always stored in #0160.



The newest error code

(The content in #0160 is transferred to #0161 when next failure occurs.)

8-2 Troubleshooting

In the event of abnormality, check the LED (RUN) of the power supply module and the LED (FLT) of the control module (=>[1]), and remedy according to the check flow (=>[4]) depending on the state.

[1] State of LED

RUN (Power supply module)	FLT (Control module)	Remarks	
OFF ○	ON ●	Detectable error for self-diagnosis	→ Check flow1
OFF ○	OFF ○	Power supply OFF	→ Check flow2
Blink ◎	OFF ○	Halt mode	→ Check flow3
ON ●	OFF ○	Disable detection error by self-diagnosis (input related)	→ Check flow4
		Disable detection error by self-diagnosis (output relatde)	→ Check flow5
ON ●	ON ●	Others	→ Check flow1

[2] Precondition of check flow

This check flow describes the countermeasure method (replacement of defective module and subsequent restoring method) in the event the system running normally so far suddenly breaks down. Therefore, the following cases are excluded.

1. Trouble due to error in initial setting when starting up the system (system memory, parameter, setting switch, etc.).
2. Momentary failure due to transient abnormality due to noise or other effect (irreproducible trouble).
3. Trouble due to effect of ladder program (customer's application).

If you cannot recover the JW300 after your treatment by referring to the check flows, or want to request repair of a faulty module, contact our local dealers.

[3] Prepare for causing trouble

1. **Be sure to keep back-up for program memory, system memory, and parameter memory.**
   When the control module is abnormal, the current program memory and the like may not be saved by the support tool, or the saved data may be incorrect. Therefore, store the latest program memory and back-up of system memory .
   In the case of ROM operation, store the back-up, too.
2. **Prepare for support tool at hand**
   Prepare the support tool that can load/save of hand-held programmer or program.
3. **Prepare for spare parts**
   Prepare always a spare of each module to be ready for abnormality.
4. **Prepare for "setting SW, setting system memory, I/O relay allocation table" of each module**
   For prompt troubleshooting, prepare the "switch setting table and I/O relay allocation table" of each module.
   *Prepare also the "parameter setting table" in the module, which requires setting of parameter aside from switches, such as special I/O module and option module.

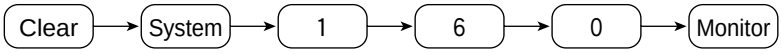
[4] Check flow

(1) Check flow 1

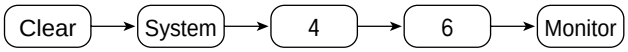
Monitor system memory #0160 using a hand-held programmer.

Contents of #0160 (HEX)	Countermeasure
32, 35	Replace the control module
23, 24, 26	Under RAM operation: Clear the memory, and then re-load the program. If this error still occurs, replace the control module. Under ROM operation: Turn ON the power from OFF. If this error still occurs, replace the control module.
25	Program re-loading. If this error still occurs, re-write the ROM program. If this error still occurs, replace the control module.
44	Replace the control module. If this error still occurs, replace I/O modules one after the other from the first module. If this error still occurs, check and replace the expansion cable and the termination connector. If this error still occurs, replace the I/O bus expansion adapter. If this error still occurs, replace the rack panel.
40, 42, 48	Monitor #0046 and replace the I/O module. If this error still occurs, replace the other I/O modules. If this error still occurs, check and replace the expansion cable and the termination connector. If this error still occurs, replace the I/O bus expansion adapter. If this error still occurs, replace the rack panel.
60, 70	Check the rack No. switches on the expansion rack panel and the I/O bus expansion adapter (JW-32EA). If this error still occurs, monitor #0046 and replace the I/O module. If this error still occurs, replace the other I/O modules. If this error still occurs, check and replace the expansion cable and the termination connector. If this error still occurs, replace the I/O bus expansion adapter. If this error still occurs, replace the rack panel.
61, 73	Check if there are any doubling settings among module No. switches for the special I/O module, option module, I/O link master module, or device net module. If this error still occurs, replace the special I/O module, option module, I/O link master module, and device net module, one after the other.
71	Check that an I/O module is installed. If this error still occurs, replace the control module. If this error still occurs, replace the basic rack panel.
72	Install an I/O module within the max. number of I/O points. If this error still occurs, replace the control module. If this error still occurs, replace the control module. If this error still occurs, replace I/O modules one after the other from the first module. If this error still occurs, check and replace the expansion cable and the termination connector. If this error still occurs, replace the I/O bus expansion adapter. If this error still occurs, replace the rack panel.
46, 47	Monitor #0046 and replace the I/O module. If this error still occurs, replace the other I/O modules. If this error still occurs, check and replace the expansion cable and the termination connector. If this error still occurs, replace the I/O bus expansion adapter. If this error still occurs, replace the rack panel.
53	Replace the I/O link master module, device net master module (can be monitored on #0152), and option module (can be monitored on #0150) that FT lamp lights.
22	Exchange battery. If this error still occurs, replace the control module.
43	Make sure power is supplied to the expansion power supply. If this error still occurs, replace the expansion power supply. If this error still occurs, replace the expansion cable. If this error still occurs, replace the control module. If this error still occurs, replace the rack panel.
Can't monitor in programmer	Replace the control module.

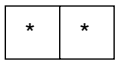
- Monitor operation of system memory #0160



- Monitor operation of system memory #0046

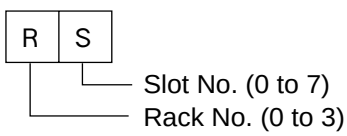


Monitor in HEX

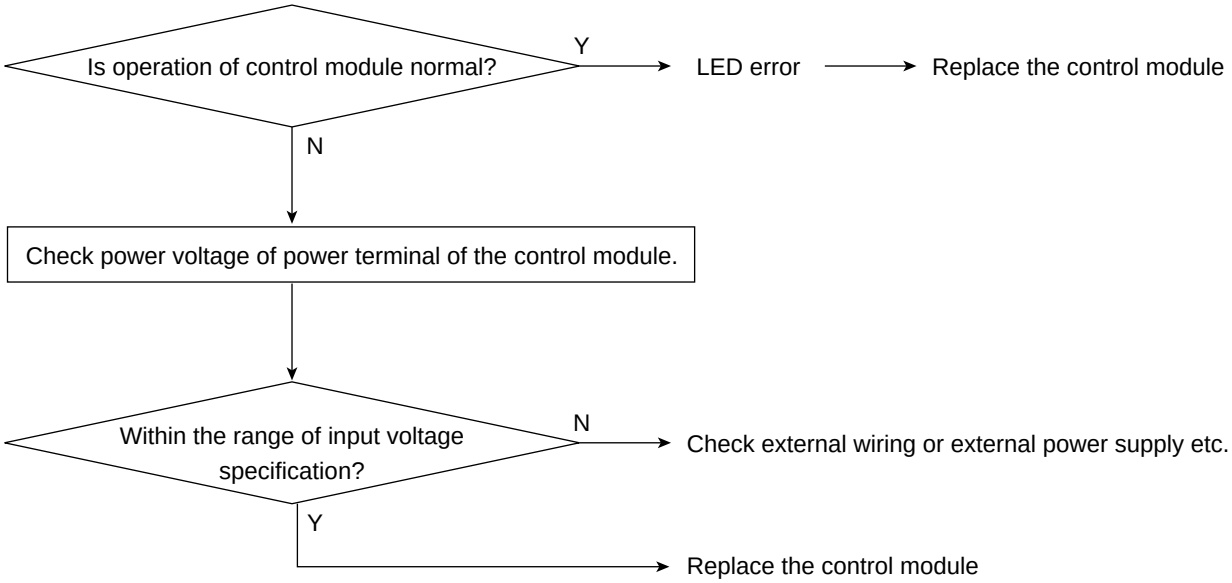


*, * is error code

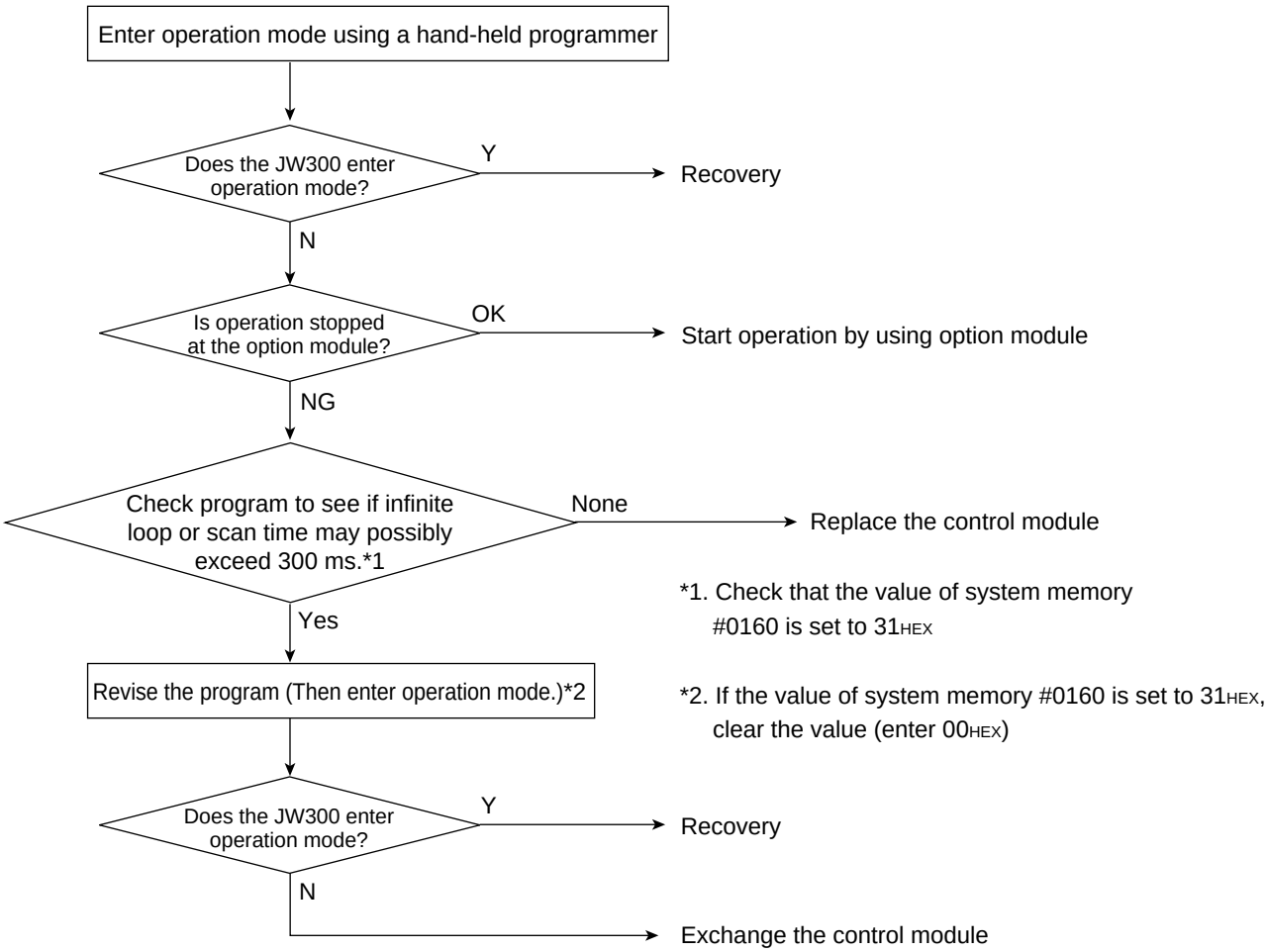
Monitor in HEX



(2) Check flow 2



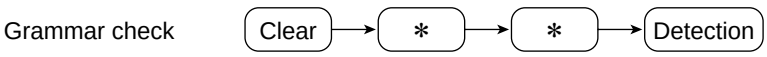
(3) Check flow 3



*1. Check that the value of system memory #0160 is set to 31_{HEX}

*2. If the value of system memory #0160 is set to 31_{HEX}, clear the value (enter 00_{HEX})

- Operation of program check



(4) Check flow 4

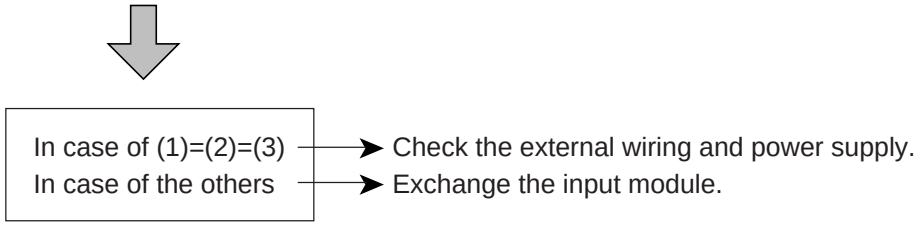
This flow shows the checking procedure in the event of abnormality of input signal not detected by the self-diagnosis of the control module.

Example of the error

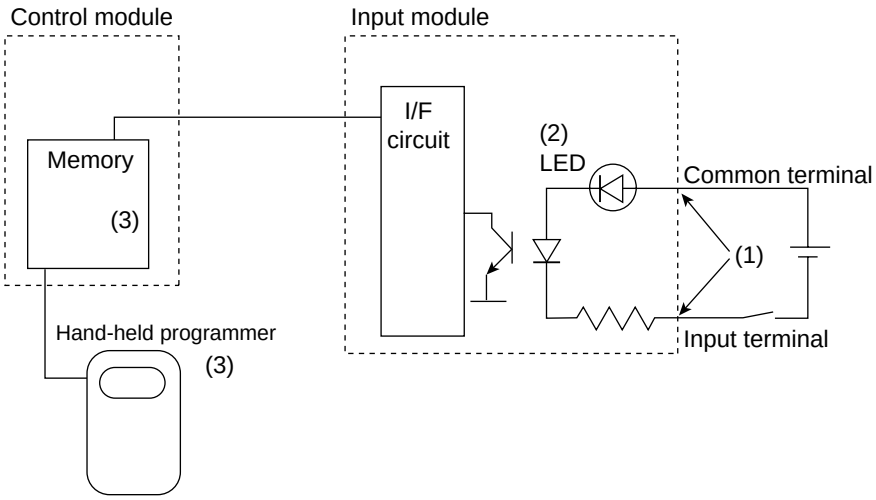
- All inputs of specific input module fail to be turned ON.
- Specific input fails to be turned ON (OFF).
- Among input signals of a same input module, operation of a certain input signal affects other input signal.

Countermeasure: Error input signal

(1) Measure the voltage between the corresponding input terminal of the input module and the common terminal using a tester.
If supply voltage is applied between terminals: ON
If supply voltage is not applied between terminals: OFF
(2) Check the state of LED of input module.
(3) Connect hand-held programmer, and check ON/OFF by monitoring the data memory (input relay) corresponding to the abnormal input.



[The flow of input signal]



(5) Check flow 5

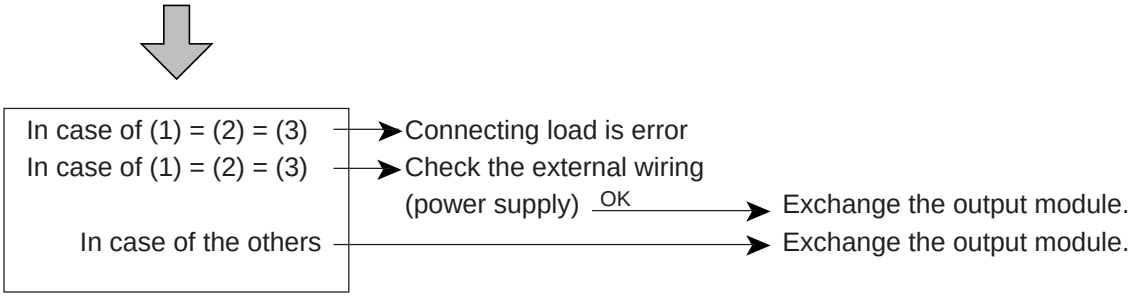
This flow shows the checking procedure in the event of abnormality of output signal not detected by the self-diagnosis of the control module.

Example of the error

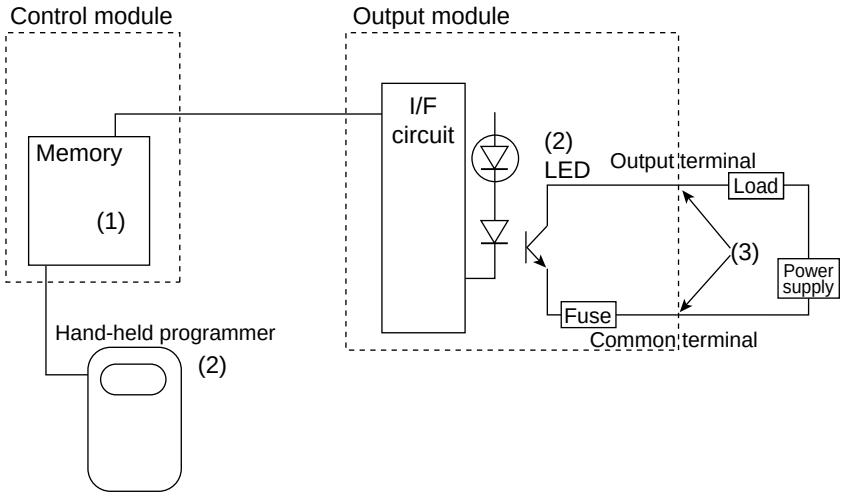
- All inputs of specific output module fail to be turned ON.
  (In this case, it is highly possible that the fuse of load power output is melted down.)
- Specific output fails to be turned ON (OFF).
- Among output signals of a same output module, operation of a certain output signal affects other output signal.

Countermeasure: Error output signal

(1) Connect hand-held programmer, and check ON/OFF by monitoring the data memory (output relay) corresponding to the abnormal output.
(2) Check the state of LED of output module.
(3) Measure the voltage between the corresponding output terminal of the output module and the common terminal using a tester.
When the inter-terminal voltage is output ON voltage (about 1 V or less): ON
When the inter-terminal voltage is load supply voltage: OFF
Note: When the load power source is OFF and wiring to the load is disconnected, it is abnormal if the output is normal.



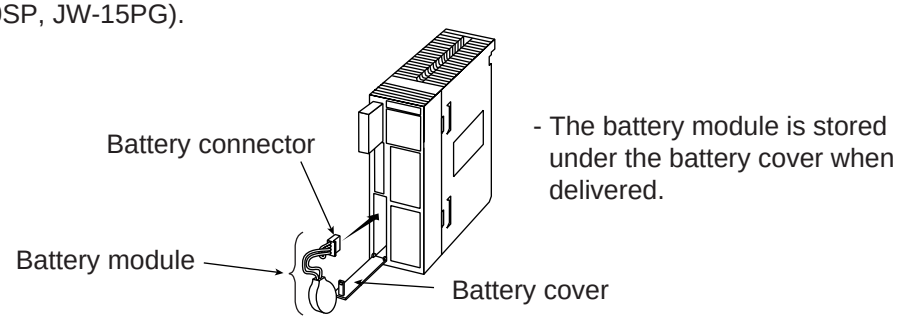
[The flow of output signal]



8-3 Battery

[1] Connecting the memory backup battery

When delivered, the memory backup battery in the JW300 control module (JW-311CU through 362CU) is disconnected. Before using a control module, make sure to connect the battery module to the control module, clear the memory (initialize) and set the time for the clock using a support tool (JW-300SP, JW-15PG).



■ **Operation using the support tool**

(1) Clear the memory (initialize all)

1) When the JW-300SP is used

Online → Transfer data to PLC → Clear memory → Select a project

2) When the JW-15PG is used

[*] → [*] → [PROG MODE] → [SET 8] → [クリア CLR] → [RESET 9] → [シフト SHIFT] → [A 0] → [書込 ENT]

(2) Adjusting the clock

1) When the JW-300SP is used

Online → Transfer data to PLC → Display time → Set

2) When the JW-15PG is used

[クリア CLR] → [システム SYS] → [A 0] to [7] → [モニタ MNTR] → Data setting → [書込 ENT]

Specify system memory address (#0010 to #0017)

Remarks

- Connect the battery just before supplying power to the control module.
  If the control module is left without power and the battery is connected, the battery life will be reduced.

[2] Battery replacement

(1) Battery life and replacement timing

The maximum effective period of the battery is five years.

Please note that the battery life may vary with the ratio of time being charged and discharged.

Charge time ratio = Total charging time / (total charging time + total of non-charging time)

For details about the amount of time that the memory will be backed up, see the table below.

Charge time ratio	Warranty period (stored at 70 ° C)	Actual expected use (stored at 25 ° C)	Warranty period when a battery error occurs
0% (0 hours charging/ day)	0.285 years (104 days)	0.759 years (277 days)	5 days
30% (7.2 hours charging/ day)	0.405 years (148 days)	1.085 years (369 days)	5 days
50% (12 hours charging/ day)	0.570 years (208 days)	1.518 years (554 days)	5 days
70% (16.8 hours charging/ day)	0.950 years (347 days)	2.536 years (925 days)	5 days
100% (24 hours charging/ day)	5 years	5 years	5 days

(2) Low battery voltage detection and replacement

If the battery voltage drops enough to indicate it is at the end of its life span, the control module detects the drop in the battery voltage and lights the red error indicator (FLT). (When the control module is in the operation mode, it will continue the operation. During this time, the stop output relay is held closed.)

In addition, special relay 007372 turns ON and the control module stores error code $22_{(H)}$ in system memory #0160. Output this special relay status externally and use it to detect errors in the control module.

Even if special relay 007372 is turned ON, the battery will still maintain the data for the specified time. However, we recommend replacing the battery as soon as possible.

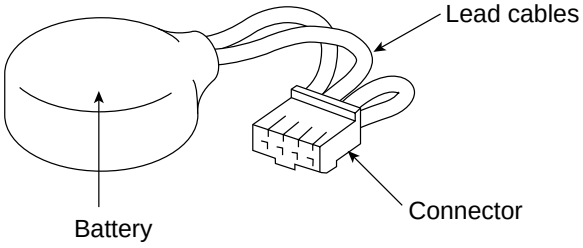
Even if the control module does not detect a low battery voltage, we recommend replacing the memory backup battery periodically, according to the conditions in which you are using the unit.

[3] Exchange method of batteries

Exchange battery for memory back-up in control module (JW-3**CU) within its validity.

● **Model name of battery module**

UBATN5005NCZZ

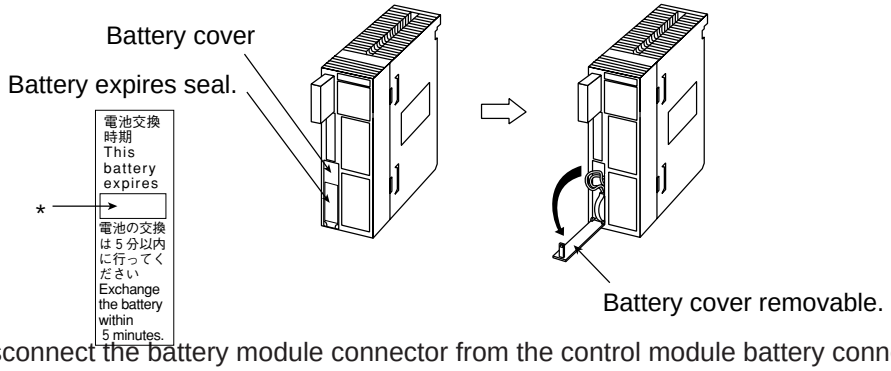


■ **Battery exchange procedure**

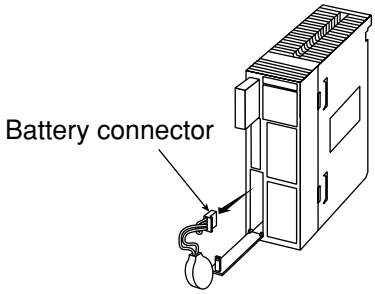
Battery module can be replaced while supplying power to the JW300. If you want to replace the battery when the power to the control module is turned off, supply power to the JW300 control module for at least 10 minute before replacing the battery. This is in order to charge the memory storage capacitor, which will keep the existing memory settings while you replace the battery.

(1) Prepare a new battery module for exchange.

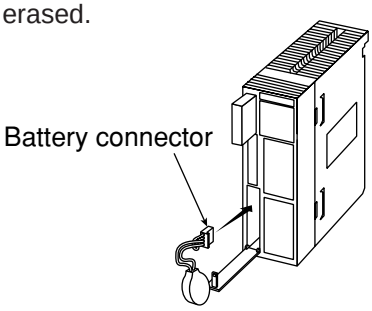
(2) Open the battery cover.



(3) Disconnect the battery module connector from the control module battery connector.



(4) Insert a new battery module connector in the battery connector of the control module. The battery change must complete within 5 minutes. Otherwise, the memory may be erased.



(5) Put battery into control module, and close battery cover.

(6) Calculate the effective period of the battery according to the conditions you are using (charge ratio), and write it on the battery label. => See page 8-10.

Note

- Do not subject the battery to impact of any kind. Do not pull on the lead wires of the battery, or liquid leakage accident may occur.

[4] Internal flash ROM and PC card use

All of the control modules in the JW300 series are equipped with FLASH ROM.

This internal ROM can be used to store part of the programs and system memory data in the ROM in advance, so that the control module will store vital data, even if the back up battery voltage drops.

The models that can also use PC cards (compact flash card, FLASH ATA card) can store data on a card.

The back up function using these memories can select the back up area, save/load timing, and operation mode. Set the conditions for use according to your environment and system.

Chapter 9. Specifications

9-1 JW300 general specifications

Items / Power supply module	Specifications			
	Using JW-303PU *1	Using JW-301PU *2	JW-31PU (UL/CSA approved)	Using JW-22PU
Power voltage	85 to 264 VAC, 47 to 63Hz	85 to 264 VAC, 47 to 63 Hz	85 to 132 VAC, 47 to 63Hz	20.4 to 32.0 VDC *3
Guaranteed voltage interruption time	Available voltage interruption time of 10 ms max.			
Insulation resistance	10 M ohm min. at 500 VDC megger			
	(Between AC external terminal and rack panel)			(Between DC external terminal and rack panel)
Dielectrical strength	1500 VAC, 50/60 Hz for 1 minute (Between AC external terminal and rack panel)			1000 VAC, 50/60Hz for 1 minute (Between DC external terminal and rack panel)
Noise immunity	1500 Vp-p 1 μ width impulse (By noise simulator between the power line and rack panel)			
Storage temperature	- 20 to 70 ° C			
Ambient temperature	0 to 55 ° C			
Ambient humidity	35 to 90% RH (Non-condensing)			
Atmosphere	Free from corrosive gas			
Vibration resistance	JIS B 3502 or equivalent - Multiple vibration width: 0.15 mm (10 to 57 Hz),9.8 m/s^2 (57 to 150 Hz), Number of sweep: (1 octave/minute), each 2 hours for X, Y, and Z directions			
Shock resistance	JIS C 0912 or equivalent, 147 m/s^2 (3 times in each X, Y and Z axis)			
Power consumption	70 VA max *4	60 VA max *4		
Weight	Approx. 3.7 kg [When one power supply module, one control module, one memory module, and eight I/O modules installed in basic rack panel]			
Grounding	Class-D grounding			
Accessory of control module	One instruction manual			

*1 The JW-33PU power supply module for JW20H/30H can be used with the JW300.

*2 The JW-21PU power supply module for JW20H/30H can be used with the JW300.

*3 As for DC input power source, use power source of 20.4 to 32 VDC (ripple rate 20% or less; however, ripple upper limit: 32 V or less, lower limit: 20.4 V or more).

*4 This value is at max load state of single power supply module.

9-2 JW300 system specifications

<table>
<tr><th>Items</th><th>Specifications</th></tr>
<tr><td>Number of rack panel connected</td><td>Max. 8 sets in total of 1 basic rack panel and 7 expansion rack panel. *1</td></tr>
<tr><td>Total length of expansion cable</td><td>Max. 50 m *1</td></tr>
<tr><td>Number of input/output points</td><td>Maximum 4096 points (combining only I/O modules) *2
Maximum 20224 points (combined used of 4 device net modules and an I/O module)</td></tr>
<tr><td>Number of mounting I/O module, special I/O module, I/O link module, and option module</td><td>Total of 64 sets can be mounted *3
- Max. of 64 I/O modules can be mounted including on both the basic and the expansion rack panels (racks 0 to 7).
- Max. 64 special I/O modules can be mounted including on both the basic and the expansion rack panels (racks 0 to 3).
- Max. of 8 option modules can be mounted on the basic rack panel.
- A maximum of 4 including device net modules and I/O modules can be installed on a basic rack panel along with a device net master module (JW-20DN) and an I/O link master module (JW-23LMH).</td></tr>
<tr><td>Number of I/O relay occupied points of I/O module, special I/O module, option module, etc.
(Allocation of relay address)</td><td>
<table>
<tr><th>Module Item</th><th>Number of I/O relay area occupied points</th></tr>
<tr><td>8 points input/output module</td><td>16 points</td></tr>
<tr><td>16 points input/output module</td><td>16 points</td></tr>
<tr><td>32 points input/output module</td><td>32 points</td></tr>
<tr><td>Special I/O module</td><td>16 points</td></tr>
<tr><td>Option module</td><td>16 points</td></tr>
<tr><td>Device net master module
I/O link master module</td><td>16 points</td></tr>
<tr><td>Vacant slot</td><td>16 points</td></tr>
</table>
Special I/O, option, device net, and I/O link modules use also the special relay area, as well as the I/O relay area.
</td></tr>
<tr><td>Program memory</td><td>The JW300 has a standard provision of memory port for storing the user program (fixed capacity).
The program can be stored in the built-in flash ROM.</td></tr>
<tr><td>Remote operation</td><td>A peripheral device can be connected to the JW-31EA/32EA I/O bus expansion adapter (expansion rack panel side). (15 pin D-sub connector)</td></tr>
</table>

*1 In case of using I/O bus expansion adapter, JW-31EA/32EA

*2 Varies with the control module model used.

*3 In case of using basic rack panel JW-318KB and seven expansion rack panel JW-38ZB.

9-3 Control module performance and communication specifications

This section describes the performance and communication specifications of the JW-3xxCU control modules.

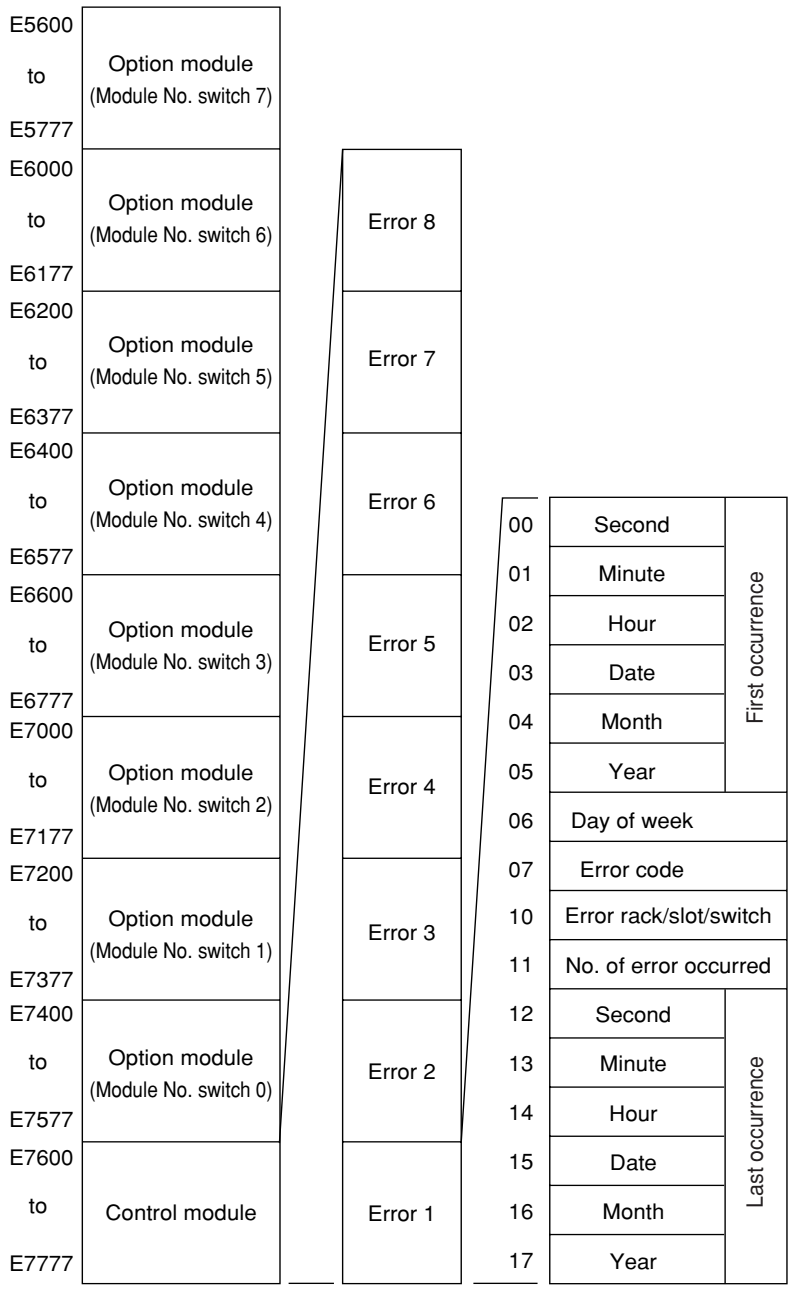
Items	Specifications					
	JW-311CU JW-312CU	JW-321CU JW-322CU	JW-331CU JW-332CU	JW-341CU JW-342CU	JW-352CU	JW-362CU
Program system	Stored program system					
Control system	Compatible cyclic calculation and interrupt dealing system					
I/O control system	Both block refresh system and refresh system by instruction are applied.					
Program language	Ladder, mnemonic					
Type and numbers of instruction	Basic instruction: 34 Application instruction: Approx. 400					
Instruction processing speed	Basic instruction: 33 ns and up / instruction Application instructions: 132 ns and up / instruction					
Program size	8K words	16K words	32K words	64K words	128K words	256K words
Max. No. of blocks	16	32	64	128	256	512
Max. No. of sub-programs	256	512	1024	2048	4096	8192
Memory back-up	By built-in lithium battery. (Available for ROM operation using integrated flash ROM.)					
Numbers of I/O point	512 point	1024 point	4096 point			
Data memory — Relay	30720 point	53248 point	180224 point (000000 to 015777 : ㅋ00000 to ㅋ01577 020000 to 075777 : ㅋ02000 to ㅋ07577) (100000 to 153777 : ㅋ10000 to ㅋ15377) (154000 to 543777 : ㅋ15400 to ㅋ54377)			
Data memory — Relay for option module	2560 point (010000 to 014777 : ㅋ01000 to ㅋ01477)					
Data memory — Flag for option module	448 point (015000 to 015677 : ㅋ01500 to ㅋ01567)					
Data memory — Flag for I/O link	64 point (015700 to 015777 : ㅋ01570 to ㅋ01577)					
Data memory — Relay for I/O link	2048 point (020000 to 023777 : ㅋ02000 to ㅋ02377) *					
Data memory — Relay for special I/O module (basic system 1)	4096 point (030000 to 037777 : ㅋ03000 to ㅋ03777)					
Data memory — Relay for special I/O module (remote I/O)	1024 point (040000 to 041777 : ㅋ04000 to ㅋ04177)					
Data memory — Relay for special I/O module (basic system 2)	4096 point (042000 to 051777 : ㅋ04200 to ㅋ05177)					
Data memory — Special relay	64 point (007300 to 007377) 007300 to 007327 : Reserved area 007330 : MW flag 007331 : MW reset 007332 to 007337 : Reserved area 007340 to 007347 : Error code storage 007354 : Non-carry flag 007355 : Error flag 007356 : Carry flag 007357 : Zero flag 007360 : 0.1 second clock 007362 : Initialize pulse 007363 : Fuse blown 007364 : 1.0 second clock 007365 : Setting value change switch 007366 : Normally OFF contact 007370 : Memory error 007371 : CPU error 007372 : Battery error 007373 : I/O error 007374 : Option error 007375 : Special I/O error 007376 : Expansion power supply error 007377 : Power supply error					

* Each relay is set by module No. switch of option, special I/O, and I/O link modules.

↓ Next page

<table>
<tr><th colspan="2" rowspan="2">Items</th><th colspan="6">Specifications</th></tr>
<tr><th>JW-311CU
JW-312CU</th><th>JW-321CU
JW-322CU</th><th>JW-331CU
JW-332CU</th><th>JW-341CU
JW-342CU</th><th>JW-352CU</th><th>JW-362CU</th></tr>
<tr><td rowspan="3">Data memory</td><td>Timer/counter/MD</td><td>1024 points
00000
to 01777</td><td>2048 points
00000
to 03777</td><td colspan="4">8192 points
00000 to 17777</td></tr>
<tr><td colspan="6">- Timer/counter/MD number
00000 to 00777: Timer/counter/MD common
01000 to 17777: Timer/counter common
- Timer set value
100 ms timer (Max. 8192 points : TMR00000 to 17777)
0.1 sec. to 3276.7 sec.(BIN)
0.1 sec. to 799.9 sec.(BCD)
10 ms timer (Max. 512 points : TMR 00400 to 00777)*
0.01 sec. to 327.67 sec.(BIN)
0.01 sec. to 79.99 sec.(BCD)
1 ms timer (Max. 8 points : TMR 01770 to 01777)*
0.001 sec. to 32.767 sec.(BIN)
0.001 sec. to 7.999 sec.(BCD)
* Select units from 10 ms to 100 ms for TMR00400 to 00777, and from 1 ms to 100 ms for TMR01770 to 01777 using system memory (#0227/#0225). DTMR and UTMR function as 10 ms timers.
- Counter setting value
1 to 32767 (BIN)
1 to 7999 (BCD)
- MD setting value
0 to 999
The current value of the counter and MD are kept ON at power OFF. Timer is selectable between kept or reset after power OFF. Assignable timer/counter setting value into registers. (Refer to application instructions F-260, Fc260, F-261 and Fc261 of JW300 programming manual.)</td></tr>
<tr><td>Data register</td><td colspan="6">24K bytes (kept after power OFF)
[009000 to 009777, 019000 to 019777, ····, 099000 to 099777
E0000 to E0777, E1000 to E1777, ····, E7000 to E7777
109000 to 109777, 119000 to 119777, ····, 199000 to 199777
209000 to 209777, 219000 to 219777, ····, 299000 to 299777
309000 to 309777, 319000 to 319777, ····, 389000 to 389777
Z000 to Z377]</td></tr>
<tr><td>Current timer storage register</td><td colspan="6">099770 : Second
099771 : Minute
099772 : Hour
099773 : Day
099774 : Month
099775 : Year
099776 : The day of the week
099777 : Control code</td></tr>
</table>

↓
Next page

<table>
<tr><th colspan="2" rowspan="2">Items</th><th colspan="6">Specifications</th></tr>
<tr><th>JW-311CU
JW-312CU</th><th>JW-312CU
JW-322CU</th><th>JW-331CU
JW-332CU</th><th>JW-341CU
JW-342CU</th><th>JW-352CU</th><th>JW-362CU</th></tr>
<tr><td rowspan="2">Data memory</td><td>Error history storage register</td><td colspan="6">This register can store the last 8 error codes of the control module and option module including the error occurrence time and the number.
Total : 1152K bytes (E5600 to E7777)
 

The error occurrence time is stored by 24 hour indication.</td></tr>
<tr><td>File register</td><td>———</td><td>32 K-bytes
00000000
to
00077777</td><td>128 K-bytes
00000000
to
00377777</td><td>512 K-bytes
00000000
to
01777777</td><td>2048 K-bytes
00000000
to
07777777</td><td>8192 K-bytes
00000000
to
37777777</td></tr>
</table>

Items			Specifications					
			JW-311CU JW-312CU	JW-321CU JW-322CU	JW-331CU JW-332CU	JW-341CU JW-342CU	JW-352CU	JW-362CU
System memory			1.5K bytes: #0000 to #2777					
Parameter memory			- Parameter for special I/O module : 256 bytes x 64 modules - Parameter for special I/O module (Install in the remote I/O slave station): 256 bytes x 8 modules - Parameter for option module: 2 bytes x 8 modules					
Interrupt program			There are two types of interruption program, one is input interruption and the other is timer interruption. Both types can be set independently of interruption permission/prohibition. If interruption prohibition is set, you can use the interruption label as the conventional label. Input interruption: 32 points Timer interruption: 1, 2, 5, 10, and 20 ms in each					
Facility fault diagnosis function		Number of I/O cycles	128	256	512	1024	2048	4096
		Number of relays constantly monitored	128	256	512	1024	2048	4096
Debugging function	Sampling trace	Number of relay points	Up to 127 points.					
		Number of register points	Up to 48 relays					
		Trace memory	Stored in internal memory and on memory cards					
		Trigger condition	Program trigger conditions with contact point status and comparison of registers					
	Break function	Break function	Set any program address as a break point					
		Step operation	Allows execution of programs one instruction at a time					
		N scan operation	Execute calculations for the specified number of scans					
	Forced ON/OFF		Up to 32 points each for ON and OFF					
	Logging function		Possible to log specified data (also possible to write it to a memory card).					
Communication port			- Using PG/COMM1 port or PG/COMM2 port. (Not available on the JW-311CU/312CU) EA-PG port (Port of the I/O bus expansion adapter JW-32EA) - Communication standard: RS-232C/RS-422A (RS-232C doesn't have in EA-PG port) - Transfer rate: 230400/115200/76800/38400/19200/9600/ bits/s (EA-PG port is not available 230400 bps.) - Data length: 7/8 bits - Parity bit: odd/even/none - Stop bit: 1/2 bit - Connection form: 1:1 (RS-232C) 1: N (RS-422A) - Communication format: Computer link or equipment - Connector: 15 pin D-sub - No of connected stations: 31 sets max.(In case of using the RS-422A) Note: When the RS-422A is used, available only for four wire system					
USB port			USB1.1 compatible (device)					
Memory card I/F (Not available on the JW-311CU/321CU/ 331CU/341CU)			**- Connector shape, power supply voltage** PC card standard: Equipped with a 68-pin connector for Type I, II cards Power supply voltage: 3.3 V/5 V **- Compatible memory cards** Small PC card (needs a conversion adapter) Compact flash (needs a conversion adapter)					

9-4 Specifications of I/O module

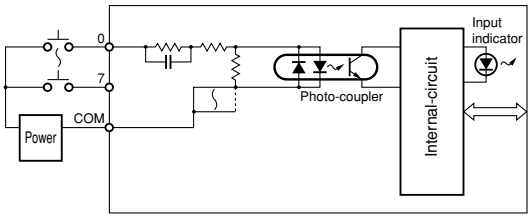
	Model name	Reference page
Input	JW-203N	9-7
	JW-211NA	9-8
	JW-212NA	9-9
	JW-214NA	9-10
	JW-234N	9-11

	Model name	Reference page
Output	JW-204SA	9-12
	JW-212SA	9-13
	JW-213SA	9-14
	JW-214SA	9-15
	JW-232S	9-16

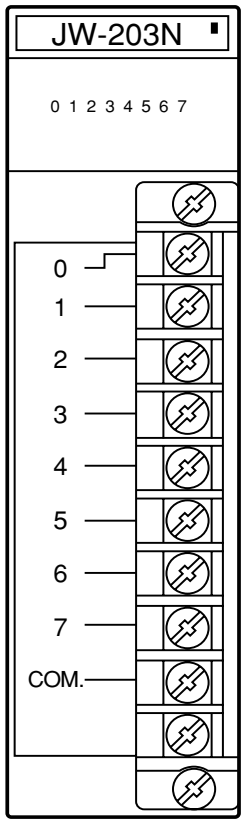
	Model name	Reference page
I/O	JW-232M	9-17
Special I/O	JW-264N	9-18
	JW-262S	9-19

[1] Input module

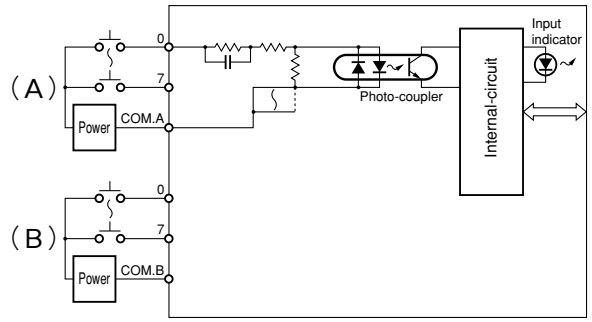
(1) JW-203N

Model name	AC input module : JW-203N
No. of input	8 points
Rated input voltage	200 to 240 VAC (50/60 Hz)
Input voltage range	170 to 250 VAC (50/60 Hz, waveform distortion : 5% or less)
Rated input current	9.1 mA TYP. (200 VAC, 60 Hz) 8 mA TYP. (200 VAC, 50 Hz)
Input impedance	22 k ohm (TYP., 60 Hz), 25k ohm (TYP, 50 Hz)
Surge current	Max. 500 mA, 0.2 ms (at 250 VAC peak ON)
Input ON level	170 V/7 mA or less
Input OFF level	70 V/3 mA or more
Response time (module alone)	OFF to ON : 30 ms or less (200 VAC) ON to OFF : 40 ms or less (200 VAC)
Internal current consumption (5 VDC)	40 mA max.
Operation indication	LED lights at ON condition
External wire connection system	10 P detachable terminal block (M3.5 × 7 screws, blue)
Dielectrical strength	1500 VAC for 1 minute (between input terminal and secondary circuit)
Insulation resistance	500 VDC, 10 M ohm or more (between input terminal and secondary circuit)
Insulation system	By photo-coupler
Common system	1 common line for 8 points
Weight	Approx. 180g
Circuit diagram	

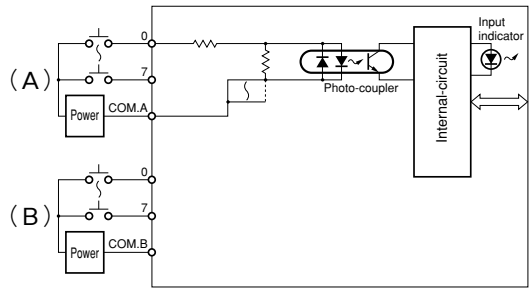
Front view



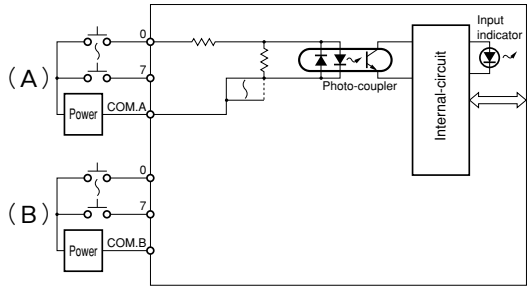
(2) JW-211NA

Model name	AC input module : JW-211NA	Front view
No. of input	16 points	
Rated input voltage	100/120 VAC (50/60 Hz)	
Input voltage range	85 to 132 VAC (50/60 Hz, waveform distortion : 5% or less)	
Rated input current	10 mA TYP. (100 VAC, 60 Hz) 8.4 mA TYP. (100 VAC, 50 Hz)	
Input impedance	10 k ohm (TYP., 60 Hz), 12k ohm (TYP, 50 Hz)	
Surge current	Max. 480 mA, 0.2 ms (at 132 VAC peak ON)	
Input ON level	80 V/7 mA or less	
Input OFF level	30 V/3 mA or more	
Response time (module alone)	OFF to ON : 30 ms or less (100 VAC) ON to OFF : 40 ms or less (100 VAC)	
Internal current consumption (5 VDC)	60 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	10 P detachable terminal block (M3.5 x 7 screws, blue)	
Dielectrical strength	1500 VAC for 1 minute (between input terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between input terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 8 points	
Weight	Approx. 220g	
Circuit diagram		

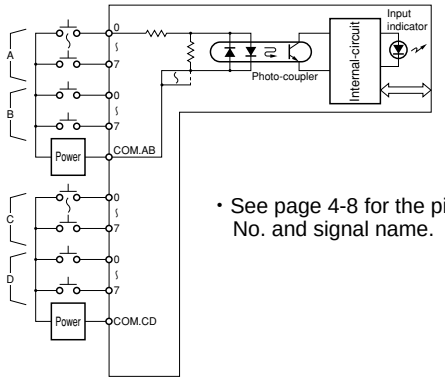
(3) JW-212NA

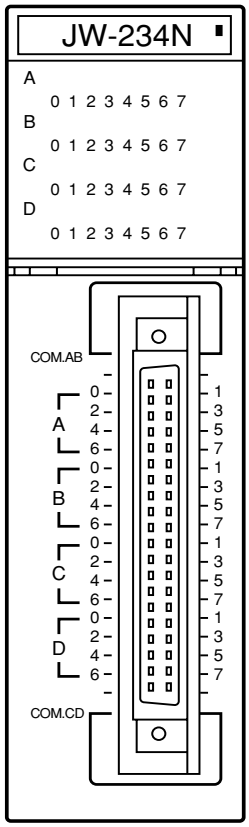
Model name	DC input module : JW-212NA	Front view
No. of input	16 points	
Rated input voltage	12/24 VDC	
Input voltage range	10.5 to 26.4 VDC (ripple rate at 24 VDC : 15% or less) (ripple rate at 12 VDC : 5% or less)	
Rated input current	7.5 mA TYP. (24 VDC) 3.5 mA TYP. (12 VDC)	
Input impedance	3.3 k ohm TYP.	
Surge current	————	
Input ON level	10.5 V/3 mA or less	
Input OFF level	5 V/1.5 mA or more	
Response time (module alone)	OFF to ON : 10 ms or less (12/24 VDC) ON to OFF : 10 ms or less (12/24 VDC)	
Internal current consumption (5 VDC)	60 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	18 P detachable terminal block (M3.5 x 7 screws, blue)	
Dielectrical strength	1000 VAC for 1 minute (between input terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between input terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 8 points (no polarity)	
Weight	Approx. 210g	
Circuit diagram		

(4) JW-214NA

Model name	DC input module(high speed type) : JW-214NA	Front view
No. of input	16 points	
Rated input voltage	12/24 VDC	
Input voltage range	10.5 to 26.4 VDC (ripple rate or at 24 VDC : 15% or less) (ripple rate at 12 VDC : 5% or less)	
Rated input current	7.5 mA TYP. (24 VDC) 3.5 mA TYP. (12 VDC)	
Input impedance	3.3 k ohm TYP.	
Surge current	————	
Input ON level	10.5 V/3 mA or less	
Input OFF level	5 V/1.5 mA or more	
Response time (module alone)	OFF to ON : 0.5 ms or less (12/24 VDC) ON to OFF : 1 ms or less (12/24 VDC)	
Internal current consumption (5 VDC)	60 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	18 P detachable terminal block (M3.5 x 7 screws, blue)	
Dielectrical strength	1000 VAC for 1 minute (between input terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between input terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 8 points (no polarity)	
Weight	Approx. 210g	
Circuit diagram		

(5) JW-234N

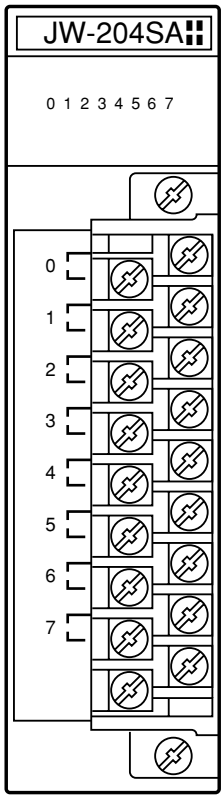
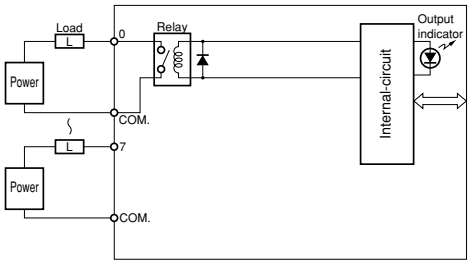
Model name	DC input module : JW-234N	Front view
No. of input	32 points *	
Rated input voltage	12/24 VDC	
Input voltage range	10.5 to 26.4 VDC (ripple rate at 24 VDC : 15% or less) (ripple rate at 12 VDC : 5% or less)	
Rated input current	7 mA TYP. (24 VDC) 3.5 mA TYP. (12 VDC)	
Input impedance	3.5 k ohm TYP.	
Surge current	————	
Input ON level	10.5 V/3 mA or less	
Input OFF level	5 V/1.5 mA or more	
Response time (module alone)	OFF to ON : 0.5 ms or less (12/24 VDC) ON to OFF : 1.5 ms or less (12/24 VDC)	
Internal current consumption (5 VDC)	80 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	40 P connector (soldering) Applicable wire size : AW23 to 26 (0.26 to 0.12 mm^2)	
Dielectrical strength	1000 VAC for 1 minute (between input terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between input terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 16 points (no polarity)	
Weight	Approx. 410g	
Circuit diagram	 ・See page 4-8 for the pin No. and signal name.	
Accessories	40 P connector (soldering) x 1	



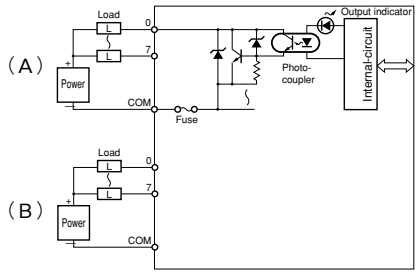
* When using this module at ambient temperature of 45 to 55 °C and is supplied 24 VDC, do not exceed 10 points of simultaneous input per common terminal. However, this limitation is not applied when the module is used with 12 VDC.

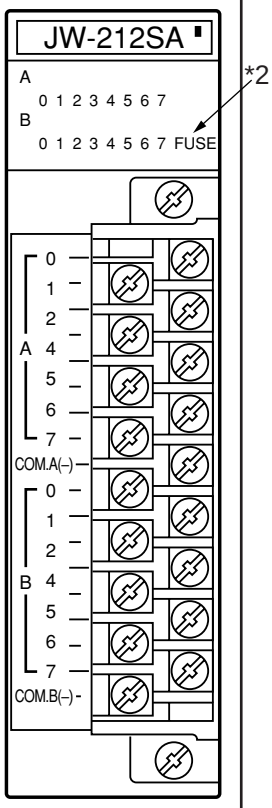
[2] Output module

(1) JW-204SA

Model name		Relay output module (separated common) : JW-204SA	Front view
No. of output		8 points	
Max. open-close voltage and current		250 VAC/30 VDC, 2A/point (resistance load)	
Min. load		5 VDC, 10 mA	
Ope-ration life	Mechanical	20,000,000 times or more	
	Electrical	1. Max. open-close voltage and current resistance load :100,000 times or more 2. Inductive load (250 VAC, 0.5 A (COS ϕ = 0.4)) : 200,000 times or more 3. Inductive load (30 VDC, 0.5 A (T = 7 ms)) : 200,000 times or more	
Response time (module alone)		OFF to ON : 10 ms or less ON to OFF : 10 ms or less	
Surge killer		———	
Rated capacity of fuse element		———	
Internal current consumption (5 VDC)		430 mA max.	
Operation indication		LED lights at ON condition	
External wire connection system		18 P detachable terminal block (M 3.5 x 7 screws, red)	
Dielectrical strength		1500 VAC for 1 minute (between output terminal and secondary circuit)	
Insulation resistance		500 VDC, 10 M ohm or more (between output terminal and secondary circuit)	
Insulation system		By relay	
Common system		1 common line for 1 point (separated common)	
Weight		Approx. 220g	
Circuit diagram			

(2) JW-212SA

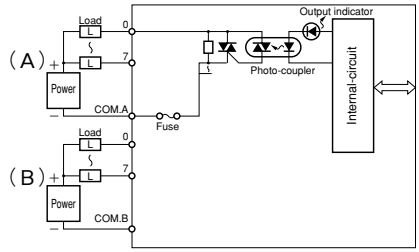
Model name	DC output module (sink output) : JW-212SA	Front view
No. of output	16 points	
Rated load voltage	5/12/24 VDC	
Load voltage range	4.75 to 27 VDC	
Rated max. load current	0.5 A/point, 2 A/common *1	
Allowable surge current	1 A (100 ms)	
Min. load current	————	
OFF leak current	0.2 mA or less	
ON voltage drop	1.2 V or less (0.3 A)	
Response time (module alone)	OFF to ON : 1 ms or less (resistance load) ON to OFF : 1 ms or less (resistance load)	
Surge killer	Zener diode (built-in between C and B of transistor)	
Rated capacity of fuse element	Built-in 3.15 A fuse (unable replacement) /common	
Blown fuse indication	LED display	
Internal current consumption (5 VDC)	60 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	18 P detachable terminal block (M 3.5 x 7 screws, red)	
Dielectrical strength	1000 VAC for 1 minute (between output terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between output terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 8 points	
Weight	Approx. 200g	
Circuit diagram		

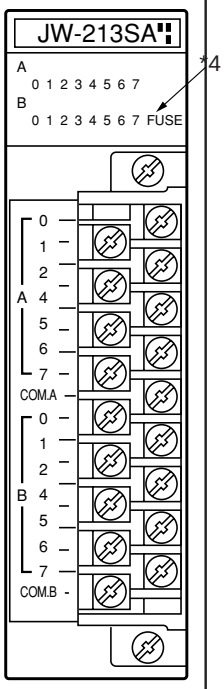


*1 When load current exceeds 0.3 A, install a diode as surge absorber at load side.

*2 The JW-212SA displays fuse blow (FUSE) using an LED. However, this is only indication and the JW300 control module cannot detect this fuse blow. In addition, the users cannot replace the installed fuses. Ask our sales agent for replacement of the fuses.

(3) JW-213SA

Model name	DC output module (sink output) : JW-213SA	Front view
No. of output	16 points	
Rated load voltage	100 to 240 VAC (50/60 Hz)	
Load voltage range	15 to 250 VAC (50/60 Hz, waveform distortion: less tha 5%) *3	
Rated max. load current	1.0 A/point, 2 A/common *1	
Allowable surge current	6 A (100 ms)	
Min. load current	15 mA *2	
OFF leak current	1.5 mA or less (120 VAC, 25° C), 3 mA or less (240 VAC, 25° C)	
ON voltage drop	1.6 V or less (0.3 A)	
Response time (module alone)	OFF to ON : 1 ms or less ON to OFF : 1 ms pulse half power frequency or less	
Surge killer	Capacitive varistor	
Rated capacity of fuse element	Built-in 3.15 A fuse (unable replacement) /common	
Blown fuse indication	LED display	
Internal current consumption (5 VDC)	260 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	18 P detachable terminal block (M 3.5 x 7 screws, red)	
Dielectrical strength	1500 VAC for 1 minute (between output terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between output terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 8 points	
Weight	Approx. 210g	
Circuit diagram		



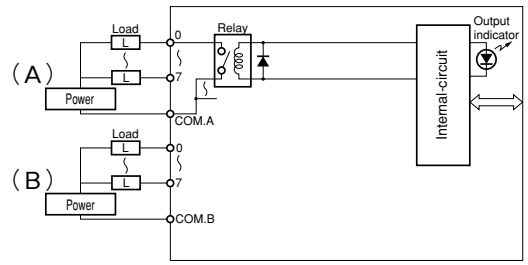
*1 When ambient temperature is more than 45 C, make sure that load current should be less than 0.7 A/point.

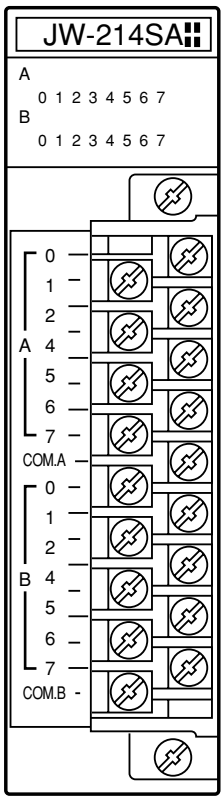
*2 When load current at hold is less than 15 mA, the module may not be able to be switched OFF in certain load situations. In these cases, connect a bleeder parallel to the load line to increase the load current to more than 15 mA level.

*3 When supply power voltage is less than 85 VAC, the module may not detect fuse blow.

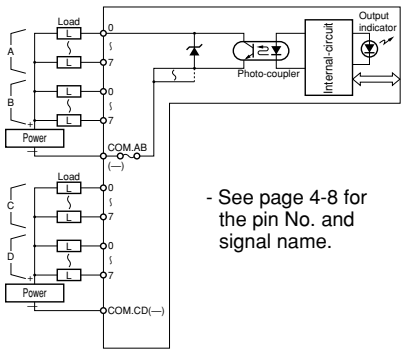
*4 The JW-213SA displays fuse blow (FUSE) using an LED. However, this is only indication and the JW300 control module cannot detect this fuse blow. In addition, the users cannot replace the installed fuses. Ask our sales agent for replacement of the fuses.

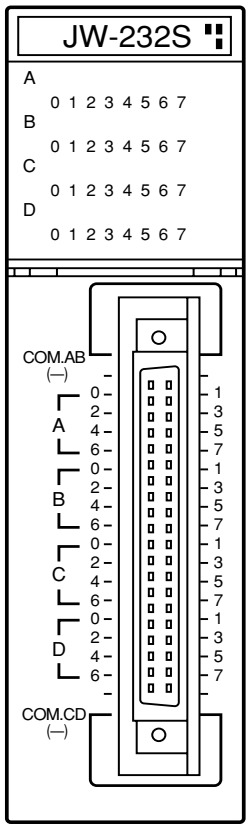
(4) JW-214SA

Model name		Relay output module : JW-214SA	Front view
No. of output		16 points	
Max. open-close voltage and current		250 VAC/30 VDC, 2A/points, 5A/common	
Min. load		5 VDC, 10 mA	
Operation life	Mechanical	20,000,000 times or more	
	Electrical	1. Max. open-close voltage and current resistance load :100,000 times or more 2. Inductive load (250 VAC, 0.5 A (COS ϕ = 0.4)) : 200,000 times or more 3. Inductive load (30 VDC, 0.5 A (T = 7 ms)) : 200,000 times or more	
Response time (module alone)		OFF to ON : 10 ms or less ON to OFF : 10 ms or less	
Surge killer		———	
Rated capacity of fuse element		———	
Blown fuse indication		———	
Internal current consumption (5 VDC)		550 mA max.	
Operation indication		LED lights at ON condition	
External wire connection system		18 P detachable terminal block (M 3.5 x 7 screws, red)	
Dielectrical strength		1500 VAC for 1 minute (between output terminal and secondary circuit)	
Insulation resistance		500 VDC, 10 M ohm or more (between output terminal and secondary circuit)	
Insulation system		By relay	
Common system		1 common line for 8 points	
Weight		Approx. 240g	
Circuit diagram			



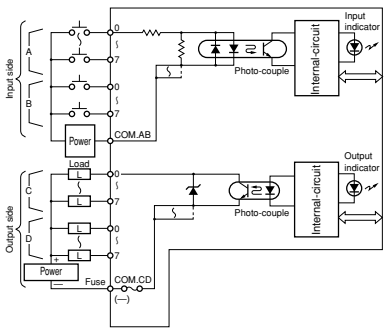
(5) JW-232S

Model name	DC output module (sink output) : JW-232S	Front view
No. of output	32 points	
Rated load voltage	5/12/24 VDC	
Load voltage range	4.75 to 30 VDC	
Rated max. load current	0.1 A/point, 1.6 A/common *	
Allowable surge current	0.15 A (10 ms)	
Min. load current	———	
OFF leak current	0.2 mA or less	
ON voltage drop	1.3 V or less (0.1 A)	
Response time (module alone)	OFF to ON : 1 ms or less ON to OFF : 1 ms or less (with resistance load)	
Surge killer	Zener diode	
Rated capacity of fuse element	Built-in 2 A fuse (unable replacement)/common	
Internal current consumption (5 VDC)	320 mA max.	
Operation indication	LED lights at ON condition	
External wire connection system	40 P connector (soldering) Applicable wire size: AWG23 to 26 (0.26 to 0.12 mm^2)	
Dielectrical strength	1000 VAC for 1 minute (between output terminal and secondary circuit)	
Insulation resistance	500 VDC, 10 M ohm or more (between output terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 16 points	
Weight	Approx. 410g	
Circuit diagram	 - See page 4-8 for the pin No. and signal name.	
Accessories	40P connector (soldering) x 1	

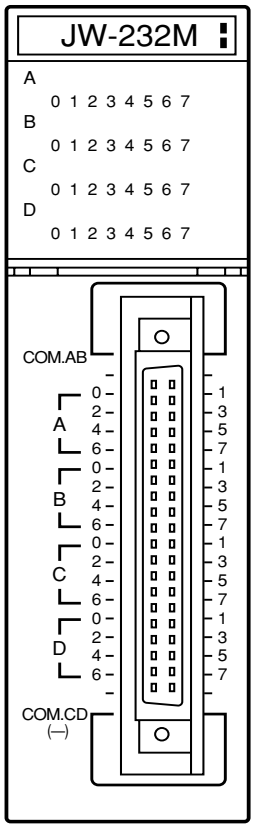


* When using at ambient temperature of 45 to 55 C, use within 1 A per common terminal.

[3] I/O module JW-232M

Input port	**Model name**	DC I/O module (sink output) : JW-232M
	Rated input voltage	16 points *1
	Rated input voltage	12/24 VDC
	Input voltage range	10.5 to 26.4 VDC (ripple rate at 24 VDC : 15% or less / ripple rate at 12 VDC : 5% or less)
	Rated input current	7 mA TYP. (24 VDC), 3.3 mA TYP. (12 VDC)
	Input impedance	3.5k ohm TYP.
	Surge current	———
	Input ON level	10.5 V/3 mA or less
	Input OFF level	5 V/1.5 mA or more
	Response time (module alone)	OFF to ON : 0.5 ms or less ON to OFF : 1.5 ms or less
Output port	**No. of output**	16 points
	Rated load voltage	5/12/24 VDC
	Load voltage range	4.75 to 30 VDC
	Rated max. load current	0.1 A/point, 1.6 A/common *2
	Allowable surge current	0.15 A (10 ms)
	Min. load current	———
	OFF leak current	0.2 mA or less
	ON voltage drop	1.3 V or less (0.1 A)
	Response time (module alone)	OFF to ON : 1 ms or less ON to OFF : 1 ms or less (with resistance load)
	Surge killer	Zener diode
	Rated capacity of fuse element	Built-in 2 A fuse (unable replacement)/common
Internal current consumption (5 VDC)		200 mA max.
Operation indication		LED lights at ON condition
External wire connection system		40 P connector (soldering) Applicable wire size: AWG23 to 26 (0.26 to 0.12 mm^2)
Dielectrical strength		1000 VAC for 1 minute (between I/O terminal and secondary circuit)
Insulation resistance		500 VDC, 10 M ohm or more (between I/O terminal and secondary circuit)
Insulation system		By photo-coupler
Common system		1 common line for 16 points (no polarity for input)
Weight		Approx. 410g
Circuit diagram		 - See page 4-8 for pin No. and signal name.
Accessories		40 P connector (soldering) x 1

Front view

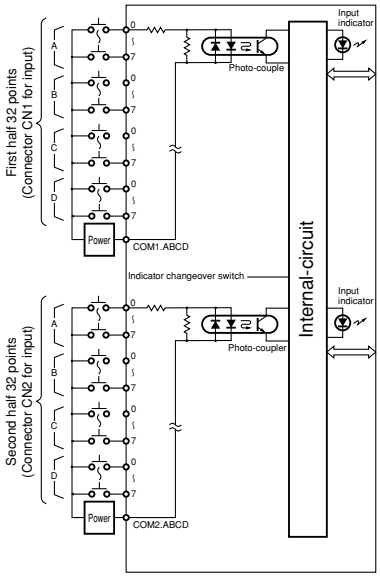


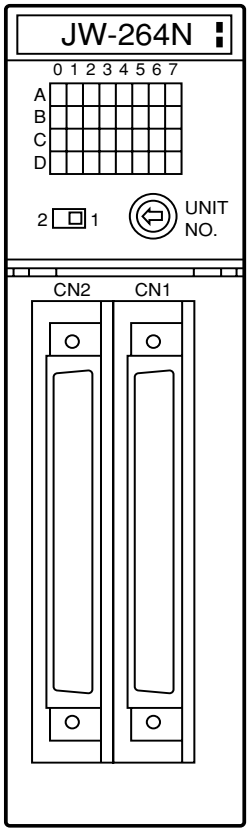
*1 When using at ambient temperature of 45 to 55 C in 24 VDC, use that same time input ON no. of points should be less than 10 points per common.

*2 When using at ambient temperature of 45 to 55 C, use within 1 A per common terminal.

[4] Special I/O module

(1) JW-264N

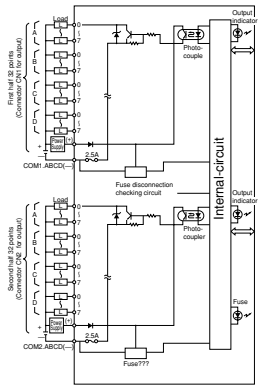
Model name	DC input module : JW-264N	Front view
No. of input	64 points (Allocation of the first half 64 points of the relay for special module.) *	
Number of I/O occupied points	I/O relay : 16 points (dummy) Relay for special module : 128 points	
Rated input voltage	24 VDC	
Input voltage range	20 to 26.4 VDC	
Rated input current	4.1 mA (24 VDC)	
Input impedance	5.9 k ohm	
Surge current	———	
Input ON level	18 V/3 mA or less	
Input OFF level	8 V/1.5 mA or more	
Response time (module alone)	OFF to ON : 0.5 ms or less ON to OFF : 1 ms less	
Internal current consumption (5 VDC)	60 mA max. (At all points ON for input.)	
Operation indication	Indicator lamps at ON condition (The simultaneous indication is 32 points max., first half 32 points and second half 32 points are changed over by the indicator changeover switch.)	
External wire connection system	Applicable wire size using connection connector (accessories) : AWG23 to 26 (0.26 to 0.12 mm^2)	
Dielectrical strength	1000 VAC for 1 minute (between input terminal and secondary circuit)	
Insulation resistance	500 VDC, 10M ohm or more (between input terminal and secondary circuit)	
Insulation system	By photo-coupler	
Common system	1 common line for 32 points (no polarity)	
Weight	Approx. 220g	
Circuit diagram		
Accessories	40 P connector (soldering) x 2	



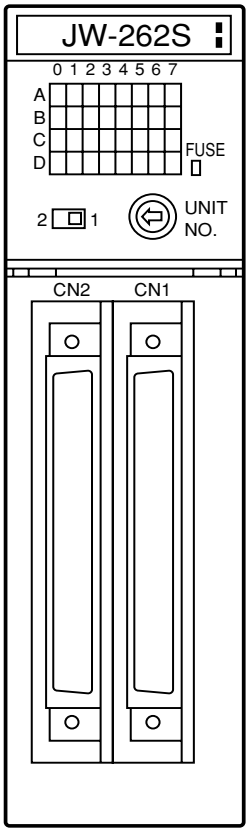
* When using at ambient temperature of 45 to 55 C, use that same time input ON no. of points should be less than 10 points per common.

See page 4-9 for the pin No. of connector and signal name.

(2) JW-262S

Model name	DC output module (sink output) : JW-262S
No. of output	64 points (Allocation of the first half 64 points of the relay for special module.)
Number of I/O occupied points	I/O relay : 16 points (dummy) Relay for special module: 128 points
Rated load voltage	5/12/24 VDC
Load voltage range	4.75 to 26.4 VDC
Rated max. load current	0.1 A/point, 2 A/common *
Allowable surge current	0.15 A (100 ms)
Min. load current	———
OFF leak current	0.2 mA or less
ON voltage drop	1.2 V or less (0.1A)
Response time (module alone)	OFF to ON : 0.5 ms or less ON to OFF : 1 ms or less (with 0.1A resistance load)
Internal current consumption (5 VDC)	300 mA max. (At all points ON for output.)
Surge killer	Zener diode
Rated capacity of fuse element	Built-in 2.5A fuse (unable replacement). Melt-down detection function is provided. (When melted down or external power source is turned OFF, the LED lights.)
Operation indication	Indicator lamps at ON condition (The simultaneous indication is 32 points max., first half 32 points and second half 32 points are changed over by the indication changeover switch.)
External energizer	5/12/24 V (200 mA max.) Use same source with load source
External wire connection system	Applicable wire size using connection connector (accessories) : AWG23 to 26 (0.26 to 0.12 mm^2)
Dielectrical strength	1000 VAC for 1 minute (between input terminal and secondary circuit)
Insulation resistance	500 VDC, 10M ohm or more (between input terminal and secondary circuit)
Insulation system	By photo-coupler
Common system	1 common line for 32 points (slot common)
Weight	Approx. 220g
Circuit diagram	 • See page 4-9 for the pin No. of connector and signal name.
Accessories	40 P connector (soldering) x 2

Front view



* When the load power source is 5/12 VDC, the load current per point decreases.

Rated power	5 VDC	12 VDC	24 VDC
The load current per point	30 mA max.	60mA max.	100 mA max.

9-5 Specifications of power supply module

[1] JW-301PU/22PU/31PU

Items	Specifications			
	JW-301PU	**JW-22PU**	**JW-31PU (UL/CSA approved)**	
Installed position	Slot for the power supply module of basic/expansion rack panel			
Input voltage	85 to 264 VAC (47 to 63Hz)	* 20.4 to 32 VDC	85 to 132 VAC (47 to 63Hz)	
Power consumption	30W (60 VA) or less	30W or less	30W (60 VA) or less (At output current 3.5A)	
Surge current	40A or less (200 VAC)	40A or less (32 VAC)	20A or less	
Leakage current	1mA or less (at 100 VAC) 3.5mA or less (at 200 VAC)	———	1mA or less (at 100 VAC)	
Output voltage	5 VDC			
Output current	3.5A			
Rated output current	0 to 3.5A			
Output hold time	10 ms or more			
Protection circuit	Overcurrent protection	Drooping automatic reset system		
	Overvoltage protection	Shut-off type manual reset system		
Halt output	Function	Relay output becoming OFF when the control module stops.		
	Load voltage	100/200 VAC (50/60Hz) 30 VDC	100 VAC (50/60Hz) 30 VDC	
	Load current	1A max.		
	Leakage current	1mA (200 VAC)	1mA or less (100 VAC)	
Insuration resistance	500 VDC 10M ohm or more			
Dielectrical strength	1500 VAC for 1 minute	1000 VAC for 1 minute	1500 VAC for 1 minute	
Indication	POWER LED (green), RUN LED (green)			
External wire connection system	6P terminal block			
Operation ambient temperature	0 to 55° C			
Storage temperature	- 20 to 70° C			
Operation ambient humidity	35 to 90 %RH (without dew condensation)			
Operation atmosphere	Free from corrosive gas			
Vibration resistance	JIS C 0911 or equivalent - Multiple vibration width: 0.15 mm (10 to 57 Hz), 9.8 m/s^2 (57 to 150 Hz), Number of sweep: (1 octave/minute), three directions (X, Y, and Z)			
Shock resistance	JIS C 0912 or equivalent 147 m/s^2 (3 times in each X, Y and Z directions)			
Noise immunity	1000 Vp-p 1μs (by noise simulator between the power line and rack panel)			
Weight	Approx. 330 g	Approx. 300 g	Approx. 330 g	

* As for DC input power source, use power source of 20.4 to 32 VDC (ripple rate 20% or less; however, ripple upper limit: 32 V or less, lower limit : 20.4 V or more).

[2] JW-303PU

Items		Specifications
Installed position		Slot for the power supply module of basic/expansion rack panel
Input voltage		85 to 264 VAC (47 to 63 Hz)
Power consumption		70 VA or less
Surge current		40 A or less (200 VAC)
Leakage current		1mA or less (at 100 VAC), 3.5mA or less (at 200 VAC)
Output voltage		5 VDC
Output current		4.5 A
Rated output current		0 to 4.5A
Output hold time		10 ms or more
Protection circuit	Overcurrent	Dropping automatic reset system
	Overvoltage	Shut-OFF type manual reset system
Halt output	Function	Relay output becoming OFF when the control module stops.
	Load voltage	100/200 VAC (50/60 Hz),30 VDC
	Load current	1A max.
	Leakage current	1 mA (200 VAC)
Insulation resistance		500 VDC, 10M ohms or more
Dielectical strength		1500 VAC for 1 minute
Display		POWER LED (green), RUN LED (green)
External wire connection		6P terminal block
Operation temperature		0 to 55 degrees
Storage temperature		-20 to 70 degrees
Operation ambient humidity		35 to 90%RH (without condensation)
Operation atmosphere		Free from corrosive gas
Vibration resistance		JIS C 0911 or equivalent - Multiple vibration width: 0.15 mm (10 to 57 Hz), 9.8 m/s^2 (57 to 150 Hz), Number of sweeps: 10 (1 octave/minute), three directions (X, Y, and Z)
Shock resistance		JIS C 0912 or equivalent, 147m/s^2 (3 times in each X, Y and Z directions)
Noise immunity		1000 Vp-p 1μs (by noise simulator between the power line and rack panel)
Weight		Approx. 410g

9-6 Specifications of I/O bus expansion adapter

Items	Specifications	
	JW-31EA	JW-32EA
Rack panel	JW-34KB/36KB/38KB	JW-34ZB/36ZB/38ZB
Cable total length	Total length from JW-31EA is 50m	
Number of rack panel connected	Max. 8 sets in total of 1 basic rack panel and 7 expansion rack panel.	
Weight	Approx. 300 g	Approx. 300 g
Accessories	Termination connector : 1	————

9-7 Specifications of basic rack panel

Items		Specifications		
		JW-314KB	JW-316KB	JW-318KB
No. of slot	Power supply module	1	1	1
	Control module	1	1	1
	I/O module	4	6	8
Installation of JW-31EA		Available	Available	Available
Weight		Approx. 740 g	Approx. 940 g	Approx. 1140 g

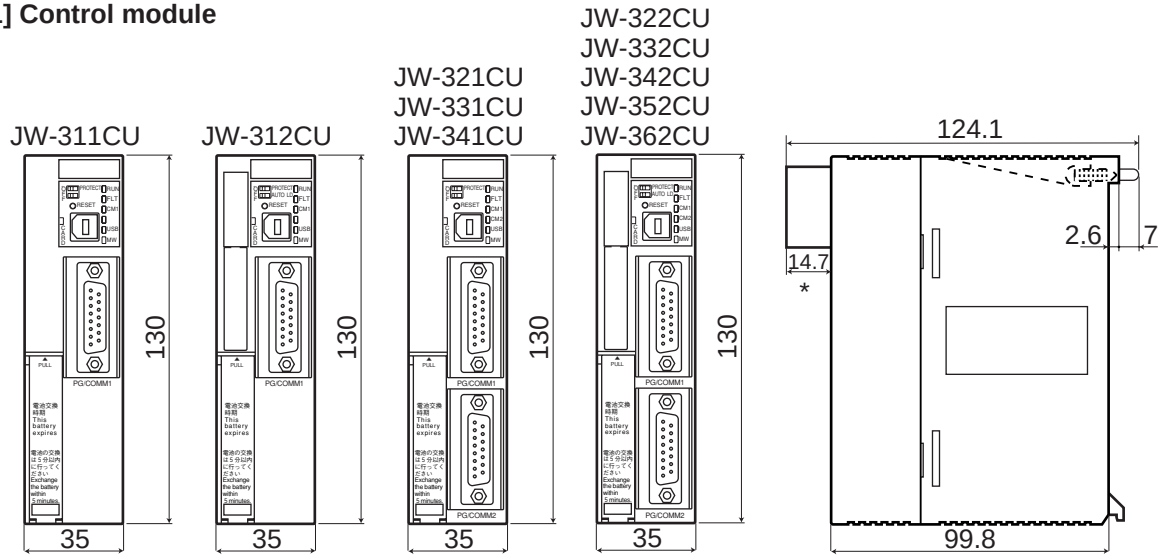
9-8 Specifications of expansion rack panel

Items		Specifications		
		JW-34ZB	JW-36ZB	JW-38ZB
No. of slot	Power supply module	1	1	1
	I/O module	4	6	8
Installation of JW-32EA		Available	Available	Available
Weight		Approx. 630 g	Approx. 830 g	Approx. 1020 g
Accessories		Side board for I/O module : 1		

9-9 Outline dimension drawings (unit: mm)

This section shows the external dimensions of the control modules etc. For the dimensions of the special I/O, option, device net, and I/O link modules, see the user's manual for each module.

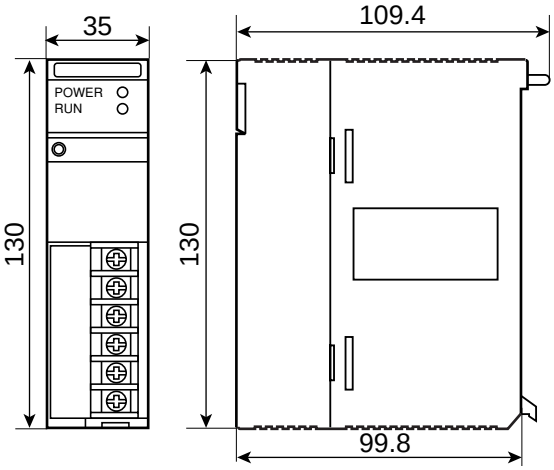
[1] Control module



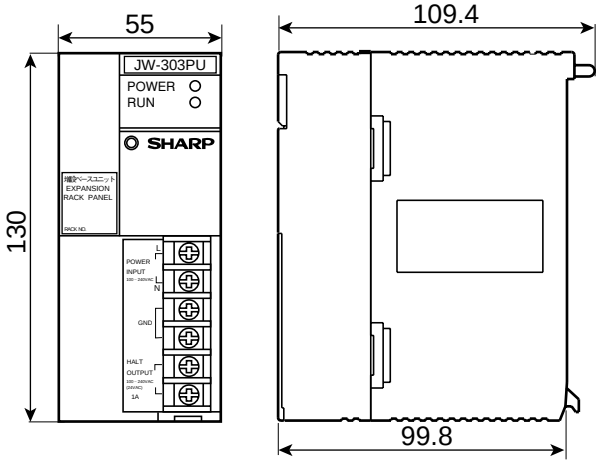
* In case of JW-3*2CU

[2] Power supply module

(1) JW-301PU/22PU/31PU

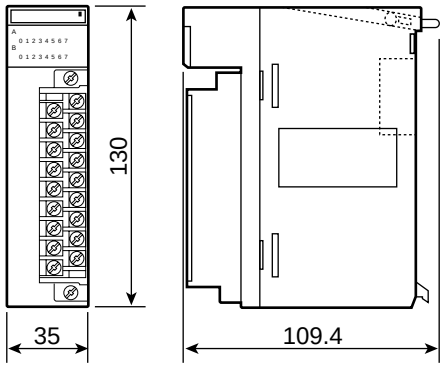


(2) JW-303PU

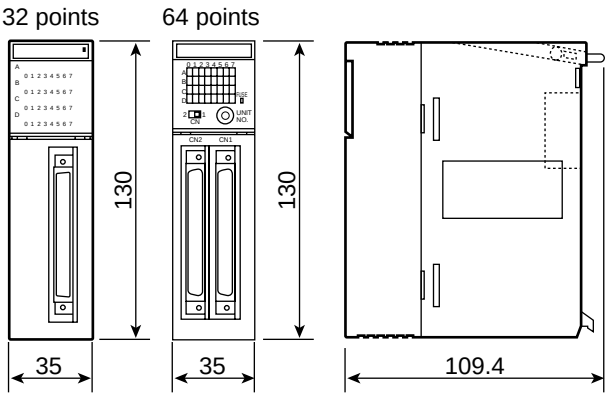


[3] I/O module

(1) 8/16 points module

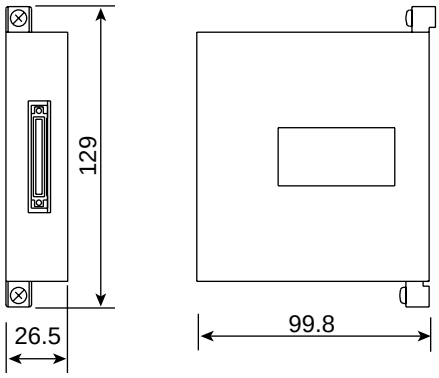


(2) 32/64 points module

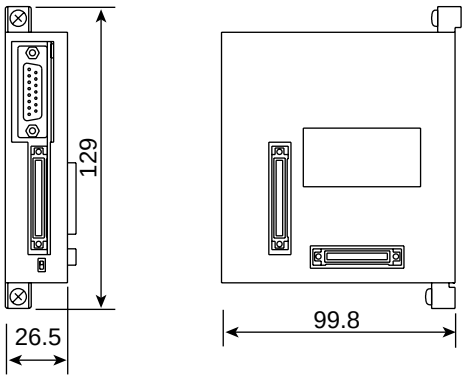


[4] I/O bus expansion adapter

(1) JW-31EA

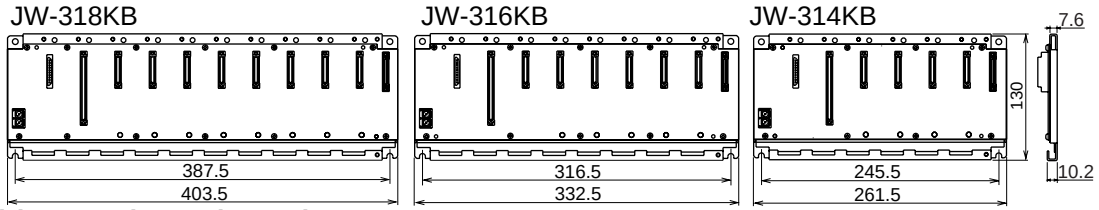


(2) JW-32EA

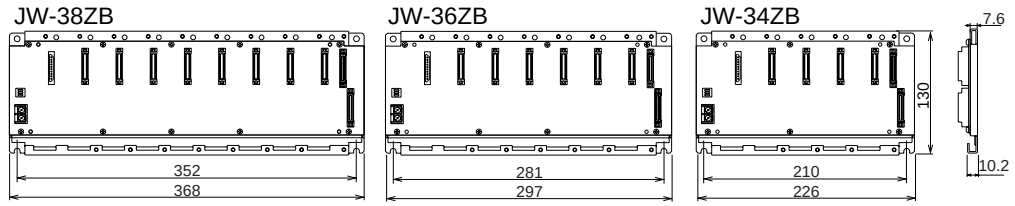


[5] Basic/expansion rack panel

(1) Basic rack panel



(2) Expansion rack panel



Appendix

Appendix-1: Allocation of the relay No. for the JW-264N and JW-262S

The relay numbers for the JW-264N (64 points input module) and JW-262S (64 points output module) are allocated as special I/O modules on the rack in which they are installed (0 to 7) or in the remote I/O slave station. => See page 7-15.

The relationship between the CN1/CN2 connector (pin numbers) on the JW-264N/262S and the relay numbers is shown below.

● Rack 0

	Pin No.	* S/G	Setting value of module No. switch 0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	030000	030200	030400	030600	031000	031200	031400	031600
	3B	A-1	030001	030201	030401	030601	031001	031201	031401	031601
	4A	A-2	030002	030202	030402	030602	031002	031202	031402	031602
	4B	A-3	030003	030203	030403	030603	031003	031203	031403	031603
	5A	A-4	030004	030204	030404	030604	031004	031204	031404	031604
	5B	A-5	030005	030205	030405	030605	031005	031205	031405	031605
	6A	A-6	030006	030206	030406	030606	031006	031206	031406	031606
	6B	A-7	030007	030207	030407	030607	031007	031207	031407	031607
	7A	B-0	030010	030210	030410	030610	031010	031210	031410	031610
	7B	B-1	030011	030211	030411	030611	031011	031211	031411	031611
	8A	B-2	030012	030212	030412	030612	031012	031212	031412	031612
	8B	B-3	030013	030213	030413	030613	031013	031213	031413	031613
	9A	B-4	030014	030214	030414	030614	031014	031214	031414	031614
	9B	B-5	030015	030215	030415	030615	031015	031215	031415	031615
	10A	B-6	030016	030216	030416	030616	031016	031216	031416	031616
	10B	B-7	030017	030217	030417	030617	031017	031217	031417	031617
	11A	C-0	030020	030220	030420	030620	031020	031220	031420	031620
	11B	C-1	030021	030221	030421	030621	031021	031221	031421	031621
	12A	C-2	030022	030222	030422	030622	031022	031222	031422	031622
	12B	C-3	030023	030223	030423	030623	031023	031223	031423	031623
	13A	C-4	030024	030224	030424	030624	031024	031224	031424	031624
	13B	C-5	030025	030225	030425	030625	031025	031225	031425	031625
	14A	C-6	030026	030226	030426	030626	031026	031226	031426	031626
	14B	C-7	030027	030227	030427	030627	031027	031227	031427	031627
	15A	D-0	030030	030230	030430	030630	031030	031230	031430	031630
	15B	D-1	030031	030231	030431	030631	031031	031231	031431	031631
	16A	D-2	030032	030232	030432	030632	031032	031232	031432	031632
	16B	D-3	030033	030233	030433	030633	031033	031233	031433	031633
	17A	D-4	030034	030234	030434	030634	031034	031234	031434	031634
	17B	D-5	030035	030235	030435	030635	031035	031235	031435	031635
	18A	D-6	030036	030236	030436	030636	031036	031236	031436	031636
	18B	D-7	030037	030237	030437	030637	031037	031237	031437	031637
Connector CN2 (The first half 32 points)	3A	A-0	030040	030240	030440	030640	031040	031240	031440	031640
	3B	A-1	030041	030241	030441	030641	031041	031241	031441	031641
	4A	A-2	030042	030242	030442	030642	031042	031242	031442	031642
	4B	A-3	030043	030243	030443	030643	031043	031243	031443	031643
	5A	A-4	030044	030244	030444	030644	031044	031244	031444	031644
	5B	A-5	030045	030245	030445	030645	031045	031245	031445	031645
	6A	A-6	030046	030246	030446	030646	031046	031246	031446	031646
	6B	A-7	030047	030247	030447	030647	031047	031247	031447	031647
	7A	B-0	030050	030250	030450	030650	031050	031250	031450	031650
	7B	B-1	030051	030251	030451	030651	031051	031251	031451	031651
	8A	B-2	030052	030252	030452	030652	031052	031252	031452	031652
	8B	B-3	030053	030253	030453	030653	031053	031253	031453	031653
	9A	B-4	030054	030254	030454	030654	031054	031254	031454	031654
	9B	B-5	030055	030255	030455	030655	031055	031255	031455	031655
	10A	B-6	030056	030256	030456	030656	031056	031256	031456	031656
	10B	B-7	030057	030257	030457	030657	031057	031257	031457	031657
	11A	C-0	030060	030260	030460	030660	031060	031260	031460	031660
	11B	C-1	030061	030261	030461	030661	031061	031261	031461	031661
	12A	C-2	030062	030262	030462	030662	031062	031262	031462	031662
	12B	C-3	030063	030263	030463	030663	031063	031263	031463	031663
	13A	C-4	030064	030264	030464	030664	031064	031264	031464	031664
	13B	C-5	030065	030265	030465	030665	031065	031265	031465	031665
	14A	C-6	030066	030266	030466	030666	031066	031266	031466	031666
	14B	C-7	030067	030267	030467	030667	031067	031267	031467	031667
	15A	D-0	030070	030270	030470	030670	031070	031270	031470	031670
	15B	D-1	030071	030271	030471	030671	031071	031271	031471	031671
	16A	D-2	030072	030272	030472	030672	031072	031272	031472	031672
	16B	D-3	030073	030273	030473	030673	031073	031273	031473	031673
	17A	D-4	030074	030274	030474	030674	031074	031274	031474	031674
	17B	D-5	030075	030275	030475	030675	031075	031275	031475	031675
	18A	D-6	030076	030276	030476	030676	031076	031276	031476	031676
	18B	D-7	030077	030277	030477	030677	031077	031277	031477	031677

● Rack 1

	Pin No.	* S/G	Setting value of module No. switch 0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	032000	032200	032400	032600	033000	033200	033400	033600
	3B	A-1	032001	032201	032401	032601	033001	033201	033401	033601
	4A	A-2	032002	032202	032402	032602	033002	033202	033402	033602
	4B	A-3	032003	032203	032403	032603	033003	033203	033403	033603
	5A	A-4	032004	032204	032404	032604	033004	033204	033404	033604
	5B	A-5	032005	032205	032405	032605	033005	033205	033405	033605
	6A	A-6	032006	032206	032406	032606	033006	033206	033406	033606
	6B	A-7	032007	032207	032407	032607	033007	033207	033407	033607
	7A	B-0	032010	032210	032410	032610	033010	033210	033410	033610
	7B	B-1	032011	032211	032411	032611	033011	033211	033411	033611
	8A	B-2	032012	032212	032412	032612	033012	033212	033412	033612
	8B	B-3	032013	032213	032413	032613	033013	033213	033413	033613
	9A	B-4	032014	032214	032414	032614	033014	033214	033414	033614
	9B	B-5	032015	032215	032415	032615	033015	033215	033415	033615
	10A	B-6	032016	032216	032416	032616	033016	033216	033416	033616
	10B	B-7	032017	032217	032417	032617	033017	033217	033417	033617
	11A	C-0	032020	032220	032420	032620	033020	033220	033420	033620
	11B	C-1	032021	032221	032421	032621	033021	033221	033421	033621
	12A	C-2	032022	032222	032422	032622	033022	033222	033422	033622
	12B	C-3	032023	032223	032423	032623	033023	033223	033423	033623
	13A	C-4	032024	032224	032424	032624	033024	033224	033424	033624
	13B	C-5	032025	032225	032425	032625	033025	033225	033425	033625
	14A	C-6	032026	032226	032426	032626	033026	033226	033426	033626
	14B	C-7	032027	032227	032427	032627	033027	033227	033427	033627
	15A	D-0	032030	032230	032430	032630	033030	033230	033430	033630
	15B	D-1	032031	032231	032431	032631	033031	033231	033431	033631
	16A	D-2	032032	032232	032432	032632	033032	033232	033432	033632
	16B	D-3	032033	032233	032433	032633	033033	033233	033433	033633
	17A	D-4	032034	032234	032434	032634	033034	033234	033434	033634
	17B	D-5	032035	032235	032435	032635	033035	033235	033435	033635
	18A	D-6	032036	032236	032436	032636	033036	033236	033436	033636
	18B	D-7	032037	032237	032437	032637	033037	033237	033437	033637
Connector CN2 (The first half 32 points)	3A	A-0	032040	032240	032440	032640	033040	033240	033440	033640
	3B	A-1	032041	032241	032441	032641	033041	033241	033441	033641
	4A	A-2	032042	032242	032442	032642	033042	033242	033442	033642
	4B	A-3	032043	032243	032443	032643	033043	033243	033443	033643
	5A	A-4	032044	032244	032444	032644	033044	033244	033444	033644
	5B	A-5	032045	032245	032445	032645	033045	033245	033445	033645
	6A	A-6	032046	032246	032446	032646	033046	033246	033446	033646
	6B	A-7	032047	032247	032447	032647	033047	033247	033447	033647
	7A	B-0	032050	032250	032450	032650	033050	033250	033450	033650
	7B	B-1	032051	032251	032451	032651	033051	033251	033451	033651
	8A	B-2	032052	032252	032452	032652	033052	033252	033452	033652
	8B	B-3	032053	032253	032453	032653	033053	033253	033453	033653
	9A	B-4	032054	032254	032454	032654	033054	033254	033454	033654
	9B	B-5	032055	032255	032455	032655	033055	033255	033455	033655
	10A	B-6	032056	032256	032456	032656	033056	033256	033456	033656
	10B	B-7	032057	032257	032457	032657	033057	033257	033457	033657
	11A	C-0	032060	032260	032460	032660	033060	033260	033460	033660
	11B	C-1	032061	032261	032461	032661	033061	033261	033461	033661
	12A	C-2	032062	032262	032462	032662	033062	033262	033462	033662
	12B	C-3	032063	032263	032463	032663	033063	033263	033463	033663
	13A	C-4	032064	032264	032464	032664	033064	033264	033464	033664
	13B	C-5	032065	032265	032465	032665	033065	033265	033465	033665
	14A	C-6	032066	032266	032466	032666	033066	033266	033466	033666
	14B	C-7	032067	032267	032467	032667	033067	033267	033467	033667
	15A	D-0	032070	032270	032470	032670	033070	033270	033470	033670
	15B	D-1	032071	032271	032471	032671	033071	033271	033471	033671
	16A	D-2	032072	032272	032472	032672	033072	033272	033472	033672
	16B	D-3	032073	032273	032473	032673	033073	033273	033473	033673
	17A	D-4	032074	032274	032474	032674	033074	033274	033474	033674
	17B	D-5	032075	032275	032475	032675	033075	033275	033475	033675
	18A	D-6	032076	032276	032476	032676	033076	033276	033476	033676
	18B	D-7	032077	032277	032477	032677	033077	033277	033477	033677

* Signal name

● Rack 2

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	034000	034200	034400	034600	035000	035200	035400	035600
	3B	A-1	034001	034201	034401	034601	035001	035201	035401	035601
	4A	A-2	034002	034202	034402	034602	035002	035202	035402	035602
	4B	A-3	034003	034203	034403	034603	035003	035203	035403	035603
	5A	A-4	034004	034204	034404	034604	035004	035204	035404	035604
	5B	A-5	034005	034205	034405	034605	035005	035205	035405	035605
	6A	A-6	034006	034206	034406	034606	035006	035206	035406	035606
	6B	A-7	034007	034207	034407	034607	035007	035207	035407	035607
	7A	B-0	034010	034210	034410	034610	035010	035210	035410	035610
	7B	B-1	034011	034211	034411	034611	035011	035211	035411	035611
	8A	B-2	034012	034212	034412	034612	035012	035212	035412	035612
	8B	B-3	034013	034213	034413	034613	035013	035213	035413	035613
	9A	B-4	034014	034214	034414	034614	035014	035214	035414	035614
	9B	B-5	034015	034215	034415	034615	035015	035215	035415	035615
	10A	B-6	034016	034216	034416	034616	035016	035216	035416	035616
	10B	B-7	034017	034217	034417	034617	035017	035217	035417	035617
	11A	C-0	034020	034220	034420	034620	035020	035220	035420	035620
	11B	C-1	034021	034221	034421	034621	035021	035221	035421	035621
	12A	C-2	034022	034222	034422	034622	035022	035222	035422	035622
	12B	C-3	034023	034223	034423	034623	035023	035223	035423	035623
	13A	C-4	034024	034224	034424	034624	035024	035224	035424	035624
	13B	C-5	034025	034225	034425	034625	035025	035225	035425	035625
	14A	C-6	034026	034226	034426	034626	035026	035226	035426	035626
	14B	C-7	034027	034227	034427	034627	035027	035227	035427	035627
	15A	D-0	034030	034230	034430	034630	035030	035230	035430	035630
	15B	D-1	034031	034231	034431	034631	035031	035231	035431	035631
	16A	D-2	034032	034232	034432	034632	035032	035232	035432	035632
	16B	D-3	034033	034233	034433	034633	035033	035233	035433	035633
	17A	D-4	034034	034234	034434	034634	035034	035234	035434	035634
	17B	D-5	034035	034235	034435	034635	035035	035235	035435	035635
	18A	D-6	034036	034236	034436	034636	035036	035236	035436	035636
	18B	D-7	034037	034237	034437	034637	035037	035237	035437	035637
Connector CN2 (The first half 32 points)	3A	A-0	034040	034240	034440	034640	035040	035240	035440	035640
	3B	A-1	034041	034241	034441	034641	035041	035241	035441	035641
	4A	A-2	034042	034242	034442	034642	035042	035242	035442	035642
	4B	A-3	034043	034243	034443	034643	035043	035243	035443	035643
	5A	A-4	034044	034244	034444	034644	035044	035244	035444	035644
	5B	A-5	034045	034245	034445	034645	035045	035245	035445	035645
	6A	A-6	034046	034246	034446	034646	035046	035246	035446	035646
	6B	A-7	034047	034247	034447	034647	035047	035247	035447	035647
	7A	B-0	034050	034250	034450	034650	035050	035250	035450	035650
	7B	B-1	034051	034251	034451	034651	035051	035251	035451	035651
	8A	B-2	034052	034252	034452	034652	035052	035252	035452	035652
	8B	B-3	034053	034253	034453	034653	035053	035253	035453	035653
	9A	B-4	034054	034254	034454	034654	035054	035254	035454	035654
	9B	B-5	034055	034255	034455	034655	035055	035255	035455	035655
	10A	B-6	034056	034256	034456	034656	035056	035256	035456	035656
	10B	B-7	034057	034257	034457	034657	035057	035257	035457	035657
	11A	C-0	034060	034260	034460	034660	035060	035260	035460	035660
	11B	C-1	034061	034261	034461	034661	035061	035261	035461	035661
	12A	C-2	034062	034262	034462	034662	035062	035262	035462	035662
	12B	C-3	034063	034263	034463	034663	035063	035263	035463	035663
	13A	C-4	034064	034264	034464	034664	035064	035264	035464	035664
	13B	C-5	034065	034265	034465	034665	035065	035265	035465	035665
	14A	C-6	034066	034266	034466	034666	035066	035266	035466	035666
	14B	C-7	034067	034267	034467	034667	035067	035267	035467	035667
	15A	D-0	034070	034270	034470	034670	035070	035270	035470	035670
	15B	D-1	034071	034271	034471	034671	035071	035271	035471	035671
	16A	D-2	034072	034272	034472	034672	035072	035272	035472	035672
	16B	D-3	034073	034273	034473	034673	035073	035273	035473	035673
	17A	D-4	034074	034274	034474	034674	035074	035274	035474	035674
	17B	D-5	034075	034275	034475	034675	035075	035275	035475	035675
	18A	D-6	034076	034276	034476	034676	035076	035276	035476	035676
	18B	D-7	034077	034277	034477	034677	035077	035277	035477	035677

● Rack 3

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	036000	036200	036400	036600	037000	037200	037400	037600
	3B	A-1	036001	036201	036401	036601	037001	037201	037401	037601
	4A	A-2	036002	036202	036402	036602	037002	037202	037402	037602
	4B	A-3	036003	036203	036403	036603	037003	037203	037403	037603
	5A	A-4	036004	036204	036404	036604	037004	037204	037404	037604
	5B	A-5	036005	036205	036405	036605	037005	037205	037405	037605
	6A	A-6	036006	036206	036406	036606	037006	037206	037406	037606
	6B	A-7	036007	036207	036407	036607	037007	037207	037407	037607
	7A	B-0	036010	036210	036410	036610	037010	037210	037410	037610
	7B	B-1	036011	036211	036411	036611	037011	037211	037411	037611
	8A	B-2	036012	036212	036412	036612	037012	037212	037412	037612
	8B	B-3	036013	036213	036413	036613	037013	037213	037413	037613
	9A	B-4	036014	036214	036414	036614	037014	037214	037414	037614
	9B	B-5	036015	036215	036415	036615	037015	037215	037415	037615
	10A	B-6	036016	036216	036416	036616	037016	037216	037416	037616
	10B	B-7	036017	036217	036417	036617	037017	037217	037417	037617
	11A	C-0	036020	036220	036420	036620	037020	037220	037420	037620
	11B	C-1	036021	036221	036421	036621	037021	037221	037421	037621
	12A	C-2	036022	036222	036422	036622	037022	037222	037422	037622
	12B	C-3	036023	036223	036423	036623	037023	037223	037423	037623
	13A	C-4	036024	036224	036424	036624	037024	037224	037424	037624
	13B	C-5	036025	036225	036425	036625	037025	037225	037425	037625
	14A	C-6	030026	036226	036426	036626	037026	037226	037426	037626
	14B	C-7	036027	036227	036427	036627	037027	037227	037427	037627
	15A	D-0	036030	036230	036430	036630	037030	037230	037430	037630
	15B	D-1	036031	036231	036431	036631	037031	037231	037431	037631
	16A	D-2	036032	036232	036432	036632	037032	037232	037432	037632
	16B	D-3	036033	036233	036433	036633	037033	037233	037433	037633
	17A	D-4	036034	036234	036434	036634	037034	037234	037434	037634
	17B	D-5	036035	036235	036435	036635	037035	037235	037435	037635
	18A	D-6	036036	036236	036436	036636	037036	037236	037436	037636
	18B	D-7	036037	036237	036437	036637	037037	037237	037437	037637
Connector CN2 (The first half 32 points)	3A	A-0	036040	036240	036440	036640	037040	037240	037440	037640
	3B	A-1	036041	036241	036441	036641	037041	037241	037441	037641
	4A	A-2	036042	036242	036442	036642	037042	037242	037442	037642
	4B	A-3	036043	036243	036443	036643	037043	037243	037443	037643
	5A	A-4	036044	036244	036444	036644	037044	037244	037444	037644
	5B	A-5	036045	036245	036445	036645	037045	037245	037445	0037645
	6A	A-6	036046	036246	036446	036646	037046	037246	037446	037646
	6B	A-7	036047	036247	036447	036647	037047	037247	037447	037647
	7A	B-0	036050	036250	036450	036650	037050	037250	037450	037650
	7B	B-1	036051	036251	036451	036651	037051	037251	037451	037651
	8A	B-2	036052	036252	036452	036652	037052	037252	037452	037652
	8B	B-3	036053	036253	036453	036653	037053	037253	037453	037653
	9A	B-4	036054	036254	036454	036654	037054	037254	037454	037654
	9B	B-5	036055	036255	036455	036655	037055	037255	037455	037655
	10A	B-6	036056	036256	036456	036656	037056	037256	037456	037656
	10B	B-7	036057	036257	036457	036657	037057	037257	037457	037657
	11A	C-0	036060	036260	036460	036660	037060	037260	037460	037660
	11B	C-1	036061	036261	036461	036661	037061	037261	037461	037661
	12A	C-2	036062	036262	036462	036662	037062	037262	037462	037662
	12B	C-3	036063	036263	036463	036663	037063	037263	037463	037663
	13A	C-4	036064	036264	036464	036664	037064	037264	037464	037664
	13B	C-5	036065	036265	036465	036665	037065	037265	037465	037665
	14A	C-6	036066	036266	036466	036666	037066	037266	037466	037666
	14B	C-7	036067	036267	036467	036667	037067	037267	037467	037667
	15A	D-0	036070	036270	036470	036670	037070	037270	037470	037670
	15B	D-1	036071	036271	036471	036671	037071	037271	037471	037671
	16A	D-2	036072	036272	036472	036672	037072	037272	037472	037672
	16B	D-3	036073	036273	036473	036673	037073	037273	037473	037673
	17A	D-4	036074	036274	036474	036674	037074	037274	037474	037674
	17B	D-5	036075	036275	036475	036675	037075	037275	037475	037675
	18A	D-6	036076	036276	036476	036676	037076	037276	037476	037676
	18B	D-7	036077	036277	036477	036677	037077	037277	037477	037677

* Signal name

● Rack 4

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	042000	042200	042400	042600	043000	043200	043400	043600
	3B	A-1	042001	042201	042401	042601	043001	043201	043401	043601
	4A	A-2	042002	042202	042402	042602	043002	043202	043402	043602
	4B	A-3	042003	042203	042403	042603	043003	043203	043403	043603
	5A	A-4	042004	042204	042404	042604	043004	043204	043404	043604
	5B	A-5	042005	042205	042405	042605	043005	043205	043405	043605
	6A	A-6	042006	042206	042406	042606	043006	043206	043406	043606
	6B	A-7	042007	042207	042407	042607	043007	043207	043407	043607
	7A	B-0	042010	042210	042410	042610	043010	043210	043410	043610
	7B	B-1	042011	042211	042411	042611	043011	043211	043411	043611
	8A	B-2	042012	042212	042412	042612	043012	043212	043412	043612
	8B	B-3	042013	042213	042413	042613	043013	043213	043413	043613
	9A	B-4	042014	042214	042414	042614	043014	043214	043414	043614
	9B	B-5	042015	042215	042415	042615	043015	043215	043415	043615
	10A	B-6	042016	042216	042416	042616	043016	043216	043416	043616
	10B	B-7	042017	042217	042417	042617	043017	043217	043417	043617
	11A	C-0	042020	042220	042420	042620	043020	043220	043420	043620
	11B	C-1	042021	042221	042421	042621	043021	043221	043421	043621
	12A	C-2	042022	042222	042422	042622	043022	043222	043422	043622
	12B	C-3	042023	042223	042423	042623	043023	043223	043423	043623
	13A	C-4	042024	042224	042424	042624	043024	043224	043424	043624
	13B	C-5	042025	042225	042425	042625	043025	043225	043425	043625
	14A	C-6	042026	042226	042426	042626	043026	043226	043426	043626
	14B	C-7	042027	042227	042427	042627	043027	043227	043427	043627
	15A	D-0	042030	042230	042430	042630	043030	043230	043430	043630
	15B	D-1	042031	042231	042431	042631	043031	043231	043431	043631
	16A	D-2	042032	042232	042432	042632	043032	043232	043432	043632
	16B	D-3	042033	042233	042433	042633	043033	043233	043433	043633
	17A	D-4	042034	042234	042434	042634	043034	043234	043434	043634
	17B	D-5	042035	042235	042435	042635	043035	043235	043435	043635
	18A	D-6	042036	042236	042436	042636	043036	043236	043436	043636
	18B	D-7	042037	042237	042437	042637	043037	043237	043437	043637
Connector CN2 (The first half 32 points)	3A	A-0	042040	042240	042440	042640	043040	043240	043440	043640
	3B	A-1	042041	042241	042441	042641	043041	043241	043441	043641
	4A	A-2	042042	042242	042442	042642	043042	043242	043442	043642
	4B	A-3	042043	042243	042443	042643	043043	043243	043443	043643
	5A	A-4	042044	042244	042444	042644	043044	043244	043444	043644
	5B	A-5	042045	042245	042445	042645	043045	043245	043445	043645
	6A	A-6	042046	042246	042446	042646	043046	043246	043446	043646
	6B	A-7	042047	042247	042447	042647	043047	043247	043447	043647
	7A	B-0	042050	042250	042450	042650	043050	043250	043450	043650
	7B	B-1	042051	042251	042451	042651	043051	043251	043451	043651
	8A	B-2	042052	042252	042452	042652	043052	043252	043452	043652
	8B	B-3	042053	042253	042453	042653	043053	043253	043453	043653
	9A	B-4	042054	042254	042454	042654	043054	043254	043454	043654
	9B	B-5	042055	042255	042455	042655	043055	043255	043455	043655
	10A	B-6	042056	042256	042456	042656	043056	043256	043456	043656
	10B	B-7	042057	042257	042457	042657	043057	043257	043457	043657
	11A	C-0	042060	042260	042460	042660	043060	043260	043460	043660
	11B	C-1	042061	042261	042461	042661	043061	043261	043461	043661
	12A	C-2	042062	042262	042462	042662	043062	043262	043462	043662
	12B	C-3	042063	042263	042463	042663	043063	043263	043463	043663
	13A	C-4	042064	042264	042464	042664	043064	043264	043464	043664
	13B	C-5	042065	042265	042465	042665	043065	043265	043465	043665
	14A	C-6	042066	042266	042466	042666	043066	043266	043466	043666
	14B	C-7	042067	042267	042467	042667	043067	043267	043467	043667
	15A	D-0	042070	042270	042470	042670	043070	043270	043470	043670
	15B	D-1	042071	042271	042471	042671	043071	043271	043471	043671
	16A	D-2	042072	042272	042472	042672	043072	043272	043472	043672
	16B	D-3	042073	042273	042473	042673	043073	043273	043473	043673
	17A	D-4	042074	042274	042474	042674	043074	043274	043474	043674
	17B	D-5	042075	042275	042475	042675	043075	043275	043475	043675
	18A	D-6	042076	042276	042476	042676	043076	043276	043476	043676
	18B	D-7	042077	042277	042477	042677	043077	043277	043477	043677

● Rack 5

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	044000	044200	044400	044600	045000	045200	045400	045600
	3B	A-1	044001	044201	044401	044601	045001	045201	045401	045601
	4A	A-2	044002	044202	044402	044602	045002	045202	045402	045602
	4B	A-3	044003	044203	044403	044603	045003	045203	045403	045603
	5A	A-4	044004	044204	044404	044604	045004	045204	045404	045604
	5B	A-5	044005	044205	044405	044605	045005	045205	045405	045605
	6A	A-6	044006	044206	044406	044606	045006	045206	045406	045606
	6B	A-7	044007	044207	044407	044607	045007	045207	045407	045607
	7A	B-0	044010	044210	044410	044610	045010	045210	045410	045610
	7B	B-1	044011	044211	044411	044611	045011	045211	045411	045611
	8A	B-2	044012	044212	044412	044612	045012	045212	045412	045612
	8B	B-3	044013	044213	044413	044613	045013	045213	045413	045613
	9A	B-4	044014	044214	044414	044614	045014	045214	045414	045614
	9B	B-5	044015	044215	044415	044615	045015	045215	045415	045615
	10A	B-6	044016	044216	044416	044616	045016	045216	045416	045616
	10B	B-7	044017	044217	044417	044617	045017	045217	045417	045617
	11A	C-0	044020	044220	044420	044620	045020	045220	045420	045620
	11B	C-1	044021	044221	044421	044621	045021	045221	045421	045621
	12A	C-2	044022	044222	044422	044622	045022	045222	045422	045622
	12B	C-3	044023	044223	044423	044623	045023	045223	045423	045623
	13A	C-4	044024	044224	044424	044624	045024	045224	045424	045624
	13B	C-5	044025	044225	044425	044625	045025	045225	045425	045625
	14A	C-6	044026	044226	044426	044626	045026	045226	045426	045626
	14B	C-7	044027	044227	044427	044627	045027	045227	045427	045627
	15A	D-0	044030	044230	044430	044630	045030	045230	045430	045630
	15B	D-1	044031	044231	044431	044631	045031	045231	045431	045631
	16A	D-2	044032	044232	044432	044632	045032	045232	045432	045632
	16B	D-3	044033	044233	044433	044633	045033	045233	045433	045633
	17A	D-4	044034	044234	044434	044634	045034	045234	045434	045634
	17B	D-5	044035	044235	044435	044635	045035	045235	045435	045635
	18A	D-6	044036	044236	044436	044636	045036	045236	045436	045636
	18B	D-7	044037	044237	044437	044637	045037	045237	045437	045637
Connector CN2 (The first half 32 points)	3A	A-0	044040	044240	044440	044640	045040	045240	045440	045640
	3B	A-1	044041	044241	044441	044641	045041	045241	045441	045641
	4A	A-2	044042	044242	044442	044642	045042	045242	045442	045642
	4B	A-3	044043	044243	044443	044643	045043	045243	045443	045643
	5A	A-4	044044	044244	044444	044644	045044	045244	045444	045644
	5B	A-5	044045	044245	044445	044645	045045	045245	045445	045645
	6A	A-6	044046	044246	044446	044646	045046	045246	045446	045646
	6B	A-7	044047	044247	044447	044647	045047	045247	045447	045647
	7A	B-0	044050	044250	044450	044650	045050	045250	045450	045650
	7B	B-1	044051	044251	044451	044651	045051	045251	045451	045651
	8A	B-2	044052	044252	044452	044652	045052	045252	045452	045652
	8B	B-3	044053	044253	044453	044653	045053	045253	045453	045653
	9A	B-4	044054	044254	044454	044654	045054	045254	045454	045654
	9B	B-5	044055	044255	044455	044655	045055	045255	045455	045655
	10A	B-6	044056	044256	044456	044656	045056	045256	045456	045656
	10B	B-7	044057	044257	044457	044657	045057	045257	045457	045657
	11A	C-0	044060	044260	044460	044660	045060	045260	045460	045660
	11B	C-1	044061	044261	044461	044661	045061	045261	045461	045661
	12A	C-2	044062	044262	044462	044662	045062	045262	045462	045662
	12B	C-3	044063	044263	044463	044663	045063	045263	045463	045663
	13A	C-4	044064	044264	044464	044664	045064	045264	045464	045664
	13B	C-5	044065	044265	044465	044665	045065	045265	045465	045665
	14A	C-6	044066	044266	044466	044666	045066	045266	045466	045666
	14B	C-7	044067	044267	044467	044667	045067	045267	045467	045667
	15A	D-0	044070	044270	044470	044670	045070	045270	045470	045670
	15B	D-1	044071	044271	044471	044671	045071	045271	045471	045671
	16A	D-2	044072	044272	044472	044672	045072	045272	045472	045672
	16B	D-3	044073	044273	044473	044673	045073	045273	045473	045673
	17A	D-4	044074	044274	044474	044674	045074	045274	045474	045674
	17B	D-5	044075	044275	044475	044675	045075	045275	045475	045675
	18A	D-6	044076	044276	044476	044676	045076	045276	045476	045676
	18B	D-7	044077	044277	044477	044677	045077	045277	045477	045677

* Signal name

● Rack 6

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	046000	046200	046400	046600	047000	047200	047400	047600
	3B	A-1	046001	046201	046401	046601	047001	047201	047401	047601
	4A	A-2	046002	046202	046402	046602	047002	047202	047402	047602
	4B	A-3	046003	046203	046403	046603	047003	047203	047403	047603
	5A	A-4	046004	046204	046404	046604	047004	047204	047404	047604
	5B	A-5	046005	046205	046405	046605	047005	047205	047405	047605
	6A	A-6	046006	046206	046406	046606	047006	047206	047406	047606
	6B	A-7	046007	046207	046407	046607	047007	047207	047407	047607
	7A	B-0	046010	046210	046410	046610	047010	047210	047410	047610
	7B	B-1	046011	046211	046411	046611	047011	047211	047411	047611
	8A	B-2	046012	046212	046412	046612	047012	047212	047412	047612
	8B	B-3	046013	046213	046413	046613	047013	047213	047413	047613
	9A	B-4	046014	046214	046414	046614	047014	047214	047414	047614
	9B	B-5	046015	046215	046415	046615	047015	047215	047415	047615
	10A	B-6	046016	046216	046416	046616	047016	047216	047416	047616
	10B	B-7	046017	046217	046417	046617	047017	047217	047417	047617
	11A	C-0	046020	046220	046420	046620	047020	047220	047420	047620
	11B	C-1	046021	046221	046421	046621	047021	047221	047421	047621
	12A	C-2	046022	046222	046422	046622	047022	047222	047422	047622
	12B	C-3	046023	046223	046423	046623	047023	047223	047423	047623
	13A	C-4	046024	046224	046424	046624	047024	047224	047424	047624
	13B	C-5	046025	046225	046425	046625	047025	047225	047425	047625
	14A	C-6	046026	046226	046426	046626	047026	047226	047426	047626
	14B	C-7	046027	046227	046427	046627	047027	047227	047427	047627
	15A	D-0	046030	046230	046430	046630	047030	047230	047430	047630
	15B	D-1	046031	046231	046431	046631	047031	047231	047431	047631
	16A	D-2	046032	046232	046432	046632	047032	047232	047432	047632
	16B	D-3	046033	046233	046433	046633	047033	047233	047433	047633
	17A	D-4	046034	046234	046434	046634	047034	047234	047434	047634
	17B	D-5	046035	046235	046435	046635	047035	047235	047435	047635
	18A	D-6	046036	046236	046436	046636	047036	047236	047436	047636
	18B	D-7	046037	046237	046437	046637	047037	047237	047437	047637
Connector CN2 (The first half 32 points)	3A	A-0	046040	046240	046440	046640	047040	047240	047440	047640
	3B	A-1	046041	046241	046441	046641	047041	047241	047441	047641
	4A	A-2	046042	046242	046442	046642	047042	047242	047442	047642
	4B	A-3	046043	046243	046443	046643	047043	047243	047443	047643
	5A	A-4	046044	046244	046444	046644	047044	047244	047444	047644
	5B	A-5	046045	046245	046445	046645	047045	047245	047445	047645
	6A	A-6	046046	046246	046446	046646	047046	047246	047446	047646
	6B	A-7	046047	046247	046447	046647	047047	047247	047447	047647
	7A	B-0	046050	046250	046450	046650	047050	047250	047450	047650
	7B	B-1	046051	046251	046451	046651	047051	047251	047451	047651
	8A	B-2	046052	046252	046452	046652	047052	047252	047452	047652
	8B	B-3	046053	046253	046453	046653	047053	047253	047453	047653
	9A	B-4	046054	046254	046454	046654	047054	047254	047454	047654
	9B	B-5	046055	046255	046455	046655	047055	047255	047455	047655
	10A	B-6	046056	046256	046456	046656	047056	047256	047456	047656
	10B	B-7	046057	046257	046457	046657	047057	047257	047457	047657
	11A	C-0	046060	046260	046460	046660	047060	047260	047460	047660
	11B	C-1	046061	046261	046461	046661	047061	047261	047461	047661
	12A	C-2	046062	046262	046462	046662	047062	047262	047462	047662
	12B	C-3	046063	046263	046463	046663	047063	047263	047463	047663
	13A	C-4	046064	046264	046464	046664	047064	047264	047464	047664
	13B	C-5	046065	046265	046465	046665	047065	047265	047465	047665
	14A	C-6	046066	046266	046466	046666	047066	047266	047466	047666
	14B	C-7	046067	046267	046467	046667	047067	047267	047467	047667
	15A	D-0	046070	046270	046470	046670	047070	047270	047470	047670
	15B	D-1	046071	046271	046471	046671	047071	047271	047471	047671
	16A	D-2	046072	046272	046472	046672	047072	047272	047472	047672
	16B	D-3	046073	046273	046473	046673	047073	047273	047473	047673
	17A	D-4	046074	046274	046474	046674	047074	047274	047474	047674
	17B	D-5	046075	046275	046475	046675	047075	047275	047475	047675
	18A	D-6	046076	046276	046476	046676	047076	047276	047476	047676
	18B	D-7	046077	046277	046477	046677	047077	047277	047477	047677

● Rack 7

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	050000	050200	050400	050600	051000	051200	051400	051600
	3B	A-1	050001	050201	050401	050601	051001	051201	051401	051601
	4A	A-2	050002	050202	050402	050602	051002	051202	051402	051602
	4B	A-3	050003	050203	050403	050603	051003	051203	051403	051603
	5A	A-4	050004	050204	050404	050604	051004	051204	051404	051604
	5B	A-5	050005	050205	050405	050605	051005	051205	051405	051605
	6A	A-6	050006	050206	050406	050606	051006	051206	051406	051606
	6B	A-7	050007	050207	050407	050607	051007	051207	051407	051607
	7A	B-0	050010	050210	050410	050610	051010	051210	051410	051610
	7B	B-1	050011	050211	050411	050611	051011	051211	051411	051611
	8A	B-2	050012	050212	050412	050612	051012	051212	051412	051612
	8B	B-3	050013	050213	050413	050613	051013	051213	051413	051613
	9A	B-4	050014	050214	050414	050614	051014	051214	051414	051614
	9B	B-5	050015	050215	050415	050615	051015	051215	051415	051615
	10A	B-6	050016	050216	050416	050616	051016	051216	051416	051616
	10B	B-7	050017	050217	050417	050617	051017	051217	051417	051617
	11A	C-0	050020	050220	050420	050620	051020	051220	051420	051620
	11B	C-1	050021	050221	050421	050621	051021	051221	051421	051621
	12A	C-2	050022	050222	050422	050622	051022	051222	051422	051622
	12B	C-3	050023	050223	050423	050623	051023	051223	051423	051623
	13A	C-4	050024	050224	050424	050624	051024	051224	051424	051624
	13B	C-5	050025	050225	050425	050625	051025	051225	051425	051625
	14A	C-6	050026	050226	050426	050626	051026	051226	051426	051626
	14B	C-7	050027	050227	050427	050627	051027	051227	051427	051627
	15A	D-0	050030	050230	050430	050630	051030	051230	051430	051630
	15B	D-1	050031	050231	050431	050631	051031	051231	051431	051631
	16A	D-2	050032	050232	050432	050632	051032	051232	051432	051632
	16B	D-3	050033	050233	050433	050633	051033	051233	051433	051633
	17A	D-4	050034	050234	050434	050634	051034	051234	051434	051634
	17B	D-5	050035	050235	050435	050635	051035	051235	051435	051635
	18A	D-6	050036	050236	050436	050636	051036	051236	051436	051636
	18B	D-7	050037	050237	050437	050637	051037	051237	051437	051637
Connector CN2 (The first half 32 points)	3A	A-0	050040	050240	050440	050640	051040	051240	051440	051640
	3B	A-1	050041	050241	050441	050641	051041	051241	051441	051641
	4A	A-2	050042	050242	050442	050642	051042	051242	051442	051642
	4B	A-3	050043	050243	050443	050643	051043	051243	051443	051643
	5A	A-4	050044	050244	050444	050644	051044	051244	051444	051644
	5B	A-5	050045	050245	050445	050645	051045	051245	051445	051645
	6A	A-6	050046	050246	050446	050646	051046	051246	051446	051646
	6B	A-7	050047	050247	050447	050647	051047	051247	051447	051647
	7A	B-0	050050	050250	050450	050650	051050	051250	051450	051650
	7B	B-1	050051	050251	050451	050651	051051	051251	051451	051651
	8A	B-2	050052	050252	050452	050652	051052	051252	051452	051652
	8B	B-3	050053	050253	050453	050653	051053	051253	051453	051653
	9A	B-4	050054	050254	050454	050654	051054	051254	051454	051654
	9B	B-5	050055	050255	050455	050655	051055	051255	051455	051655
	10A	B-6	050056	050256	050456	050656	051056	051256	051456	051656
	10B	B-7	050057	050257	050457	050657	051057	051257	051457	051657
	11A	C-0	050060	050260	050460	050660	051060	051260	051460	051660
	11B	C-1	050061	050261	050461	050661	051061	051261	051461	051661
	12A	C-2	050062	050262	050462	050662	051062	051262	051462	051662
	12B	C-3	050063	050263	050463	050663	051063	051263	051463	051663
	13A	C-4	050064	050264	050464	050664	051064	051264	051464	051664
	13B	C-5	050065	050265	050465	050665	051065	051265	051465	051665
	14A	C-6	050066	050266	050466	050666	051066	051266	051466	051666
	14B	C-7	050067	050267	050467	050667	051067	051267	051467	051667
	15A	D-0	050070	050270	050470	050670	051070	051270	051470	051670
	15B	D-1	050071	050271	050471	050671	051071	051271	051471	051671
	16A	D-2	050072	050272	050472	050672	051072	051272	051472	051672
	16B	D-3	050073	050273	050473	050673	051073	051273	051473	051673
	17A	D-4	050074	050274	050474	050674	051074	051274	051474	051674
	17B	D-5	050075	050275	050475	050675	051075	051275	051475	051675
	18A	D-6	050076	050276	050476	050676	051076	051276	051476	051676
	18B	D-7	050077	050277	050477	050677	051077	051277	051477	051677

* Signal name

● Remote I/O slave station

	Pin No.	* S/G	Setting value of module No. switch							
			0	1	2	3	4	5	6	7
Connector CN1 (The first half 32 points)	3A	A-0	040000	040200	040400	040600	041000	041200	041400	041600
	3B	A-1	040001	040201	040401	040601	041001	041201	041401	041601
	4A	A-2	040002	040202	040402	040602	041002	041202	041402	041602
	4B	A-3	040003	040203	040403	040603	041003	041203	041403	041603
	5A	A-4	040004	040204	040404	040604	041004	041204	041404	041604
	5B	A-5	040005	040205	040405	040605	041005	041205	041405	041605
	6A	A-6	040006	040206	040406	040606	041006	041206	041406	041606
	6B	A-7	040007	040207	040407	040607	041007	041207	041407	041607
	7A	B-0	040010	040210	040410	040610	041010	041210	041410	041610
	7B	B-1	040011	040211	040411	040611	041011	041211	041411	041611
	8A	B-2	040012	040212	040412	040612	041012	041212	041412	041612
	8B	B-3	040013	040213	040413	040613	041013	041213	041413	041613
	9A	B-4	040014	040214	040414	040614	041014	041214	041414	041614
	9B	B-5	040015	040215	040415	040615	041015	041215	041415	041615
	10A	B-6	040016	040216	040416	040616	041016	041216	041416	041616
	10B	B-7	040017	040217	040417	040617	041017	041217	041417	041617
	11A	C-0	040020	040220	040420	040620	041020	041220	041420	041620
	11B	C-1	040021	040221	040421	040621	041021	041221	041421	041621
	12A	C-2	040022	040222	040422	040622	041022	041222	041422	041622
	12B	C-3	040023	040223	040423	040623	041023	041223	041423	041623
	13A	C-4	040024	040224	040424	040624	041024	041224	041424	041624
	13B	C-5	040025	040225	040425	040625	041025	041225	041425	041625
	14A	C-6	040026	040226	040426	040626	041026	041226	041426	041626
	14B	C-7	040027	040227	040427	040627	041027	041227	041427	041627
	15A	D-0	040030	040230	040430	040630	041030	041230	041430	041630
	15B	D-1	040031	040231	040431	040631	041031	041231	041431	041631
	16A	D-2	040032	040232	040432	040632	041032	041232	041432	041632
	16B	D-3	040033	040233	040433	040633	041033	041233	041433	041633
	17A	D-4	040034	040234	040434	040634	041034	041234	041434	041634
	17B	D-5	040035	040235	040435	040635	041035	041235	041435	041635
	18A	D-6	040036	040236	040436	040636	041036	041236	041436	041636
	18B	D-7	040037	040237	040437	040637	041037	041237	041437	041637
Connector CN2 (The first half 32 points)	3A	A-0	040040	040240	040440	040640	041040	041240	041440	041640
	3B	A-1	040041	040241	040441	040641	041041	041241	041441	041641
	4A	A-2	040042	040242	040442	040642	041042	041242	041442	041642
	4B	A-3	040043	040243	040443	040643	041043	041243	041443	041643
	5A	A-4	040044	040244	040444	040644	041044	041244	041444	041644
	5B	A-5	040045	040245	040445	040645	041045	041245	041445	041645
	6A	A-6	040046	040246	040446	040646	041046	041246	041446	041646
	6B	A-7	040047	040247	040447	040647	041047	041247	041447	041647
	7A	B-0	040050	040250	040450	040650	041050	041250	041450	041650
	7B	B-1	040051	040251	040451	040651	041051	041251	041451	041651
	8A	B-2	040052	040252	040452	040652	041052	041252	041452	041652
	8B	B-3	040053	040253	040453	040653	041053	041253	041453	041653
	9A	B-4	040054	040254	040454	040654	041054	041254	041454	041654
	9B	B-5	040055	040255	040455	040655	041055	041255	041455	041655
	10A	B-6	040056	040256	040456	040656	041056	041256	041456	041656
	10B	B-7	040057	040257	040457	040657	041057	041257	041457	041657
	11A	C-0	040060	040260	040460	040660	041060	041260	041460	041660
	11B	C-1	040061	040261	040461	040661	041061	041261	041461	041661
	12A	C-2	040062	040262	040462	040662	041062	041262	041462	041662
	12B	C-3	040063	040263	040463	040663	041063	041263	041463	041663
	13A	C-4	040064	040264	040464	040664	041064	041264	041464	041664
	13B	C-5	040065	040265	040465	040665	041065	041265	041465	041665
	14A	C-6	040066	040266	040466	040666	041066	041266	041466	041666
	14B	C-7	040067	040267	040467	040667	041067	041267	041467	041667
	15A	D-0	040070	040270	040470	040670	041070	041270	041470	041670
	15B	D-1	040071	040271	040471	040671	041071	041271	041471	041671
	16A	D-2	040072	040272	040472	040672	041072	041272	041472	041672
	16B	D-3	040073	040273	040473	040673	041073	041273	041473	041673
	17A	D-4	040074	040274	040474	040674	041074	041274	041474	041674
	17B	D-5	040075	040275	040475	040675	041075	041275	041475	041675
	18A	D-6	040076	040276	040476	040676	041076	041276	041476	041676
	18B	D-7	040077	040277	040477	040677	041077	041277	041477	041677

* Signal name

Appendix-2: ASCII code table

(1) For binary/hexadecimal

Lower bit	Upper bit																
	Hexa-decimal	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	Hexa-decimal / Decimal / Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL	DLE	SP	0	@	P	`	p			SP	ー	タ	ミ		
1	0001	SOH	DC1	!	1	A	Q	a	q			。	ア	チ	ム		
2	0010	STX	DC2	〃	2	B	R	b	r			「	イ	ツ	メ		
3	0011	ETX	DC3	#	3	C	S	c	s			」	ウ	テ	モ		
4	0100	EOT	DC4	$	4	D	T	d	t			、	エ	ト	ヤ		
5	0101	ENQ	NAK	%	5	E	U	e	u			・	オ	ナ	ユ		
6	0110	ACK	SYN	&	6	F	V	f	v			ヲ	カ	ニ	ヨ		
7	0111	BLE	ETB	´	7	G	W	g	w			ァ	キ	ヌ	ラ		
8	1000	BS	CAN	(	8	H	X	h	x			ィ	ク	ネ	リ		
9	1001	HT	EM	)	9	I	Y	i	y			ゥ	ケ	ノ	ル		
A	1010	LF	SUB	*	:	J	Z	j	z			ェ	コ	ハ	レ		
B	1011	VT	ESC	+	;	K	[	k	{			ォ	サ	ヒ	ロ		
C	1100	FF	FS	,	<	L	¥	l	|			ャ	シ	フ	ワ		
D	1101	CR	GS	-	=	M	]	m	}			ュ	ス	ヘ	ン		
E	1110	SO	RS	.	>	N	^	n	‾			ョ	セ	ホ	゛		
F	1111	SI	US	/	?	O	_	o	DEL			ッ	ソ	マ	゜		

• This code table is JIS standard table and undefined parts are deleted.

• How to use ASCII code table
Capital "A" is positioned in "4" of upper bit and "1" of lower bit. Therefore, ASCII code of A is "$41_{(H)}$."

Lower bit	Upper bit: 0	1	2	3	4	5
0						
1					A	
2						
3						

(2) For octal

		Upper 2 digits															
Lower 1 digit	Octal	00	01	02	03	04	05	06	07	10	11	12	13	14	15	16	17
	0	NUL	BS	DLE	CAN	SP	(	0	8	@	H	P	X	`	h	p	x
	1	SOH	HT	DC1	EM	!	)	1	9	A	I	Q	Y	a	i	q	y
	2	STX	LF	DC2	SUB	〃	*	2	:	B	J	R	Z	b	j	r	z
	3	ETX	VT	DC3	ESC	#	+	3	;	C	K	S	[	c	k	s	{
	4	EOT	FF	DC4	FS	$	,	4	<	D	L	T	¥	d	l	t	|
	5	ENQ	CR	NAK	GS	%	−	5	=	E	M	U	]	e	m	u	}
	6	ACK	SO	SYN	RS	&	.	6	>	F	N	V	^	f	n	v	―
	7	BLE	SI	ETB	US	´	/	7	?	G	O	W	_	g	o	w	DEL

		Upper 2 digits															
Lower 1 digit	Octal	20	21	22	23	24	25	26	27	30	31	32	33	34	35	36	37
	0					SP	ィ	ー	ク	タ	ネ	ミ	リ				
	1					。	ゥ	ア	ケ	チ	ノ	ム	ル				
	2					「	ェ	イ	コ	ツ	ハ	メ	レ				
	3					」	ォ	ウ	サ	テ	ヒ	モ	ロ				
	4					゛	ャ	エ	シ	ト	フ	ヤ	ワ				
	5					・	ュ	オ	ス	ナ	ヘ	ユ	ン				
	6					ヲ	ョ	カ	セ	ニ	ホ	ヨ	゙				
	7					ァ	ッ	キ	ソ	ヌ	マ	ラ	゜				

• This code table is JIS standard table and undefined parts are deleted.

• How to use ASCII code table
Capital "A" is positioned in "10" of upper 2 digits and "1" of lower 1 digit. Therefore, ASCII code of "A" is "$101_{(8)}$" in octal.

		Upper							
		04	05	06	07	08	10	11	12
Lower	0								
	1						A		
	2								

Appendix-3: Binary/octal/decimal/hexadecimal/BCD code correspondence table

Decimal	Binary	Octal	Hexadecimal	Binary Coded Decimal (4 digits)
0	00000000 00000000	0	0000	0000 0000 0000 0000
1	00000000 00000001	1	0001	0000 0000 0000 0001
2	00000000 00000010	2	0002	0000 0000 0000 0010
3	00000000 00000011	3	0003	0000 0000 0000 0011
4	00000000 00000100	4	0004	0000 0000 0000 0100
5	00000000 00000101	5	0005	0000 0000 0000 0101
6	00000000 00000110	6	0006	0000 0000 0000 0110
7	00000000 00000111	7	0007	0000 0000 0000 0111
8	00000000 00001000	10	0008	0000 0000 0000 1000
9	00000000 00001001	11	0009	0000 0000 0000 1001
10	00000000 00001010	12	000A	0000 0000 0001 0000
11	00000000 00001011	13	000B	0000 0000 0001 0001
12	00000000 00001100	14	000C	0000 0000 0001 0010
13	00000000 00001101	15	000D	0000 0000 0001 0011
14	00000000 00001110	16	000E	0000 0000 0001 0100
15	00000000 00001111	17	000F	0000 0000 0001 0101
16	00000000 00010000	20	0010	0000 0000 0001 0110
17	00000000 00010001	21	0011	0000 0000 0001 0111
18	00000000 00010010	22	0012	0000 0000 0001 1000
19	00000000 00010011	23	0013	0000 0000 0001 1001
20	00000000 00010100	24	0014	0000 0000 0010 0000
21	00000000 00010101	25	0015	0000 0000 0010 0001
22	00000000 00010110	26	0016	0000 0000 0010 0010
23	00000000 00010111	27	0017	0000 0000 0010 0011
24	00000000 00011000	30	0018	0000 0000 0010 0100
25	00000000 00011001	31	0019	0000 0000 0010 0101
26	00000000 00011010	32	001A	0000 0000 0010 0110
27	00000000 00011011	33	001B	0000 0000 0010 0111
28	00000000 00011100	34	001C	0000 0000 0010 1000
29	00000000 00011101	35	001D	0000 0000 0010 1001
30	00000000 00011110	36	001E	0000 0000 0011 0000
31	00000000 00011111	37	001F	0000 0000 0011 0001
63	00000000 00111111	77	003F	0000 0000 0110 0011
255	00000000 11111111	377	00FF	0000 0010 0101 0101
9999	00100111 00001111	23417	270F	1001 1001 1001 1001
65535	11111111 11111111	177777	FFFF	—