SHARP®

Version 1.1
Produced in Oct. 2005

Sharp Programmable Controller

NEW Satellite JW50H/70H/100H

Model name

DeviceNet Master Module JW-50DN2

User's Manual

Thank you for purchasing this DeviceNet master module, the JW-50DN2 for use with the JW50H/70H/100H programmable controller.
This manual describes the specifications, usage etc. of the DeviceNet master module JW-50DN2.
Please familiarize yourself with the module by reading this user's manual thoroughly.
In addition to this manual, the following manuals are available for your further study.

JW50H/70H/100H Control module
- User's manual - hardware version
- Programming manual

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.

Note

- Should you have any questions or inquires, please feel free to contact one of our dealers, or our service department.
- Copying this manual in part or in total is prohibited.
- The contents of this manual may be changed without notice.

Safety Precautions

Read this manual and the attached documents carefully before installation, operation, maintenance and checking, in order to use the machine correctly. Make sure you understand all of the machine operations, safety information, and cautions before starting to use it. In this user's manual, safety precautions are classified as "danger" or "caution," as follows.

Danger : Incorrect handling may lead to death or serious injury.

Caution : Incorrect handling may lead to property damage or injury.

Even when a Caution is given, serious problems may be experienced, depending on the circumstances. In all cases, important points are discussed. Be sure to follow the advice given.
The symbols that prohibit action or show a required action are explained below.

: This means don't. For example, when disassembly is prohibited, you will see a .

1) Installation

Caution

- Use this device only in the environments specified in the leaflet, instruction manual, and user's manual.
  Electric shock, fire or malfunction may occur when used at high temperature, in high humidity, in a dusty or corrosive atmosphere, or when vibration or shock loading are present.
- Install the device according to the instruction manual and the user's manual.
  Incorrect installation may cause the device to fall, breakdown, or malfunction.
- Never allow wire trimmings or foreign matter in the module.
  If they do a fire may break out, breakdown or a malfunction may occur.

2) Wiring

Caution

- All wiring and connections should be done by a qualified electrician.
  Incorrect wiring may lead to a fire, a breakdown of the product or an electric shock for the user.

3) Use

Danger

- Assemble an emergency stop circuit and interlock circuit outside of the programmable controller. Otherwise a machine may malfunction or be damaged by a problem with the programmable controller.

Caution

- Changing a program during operation, or forcing a "Run" or "Stop" command during operation should only be done with particular care and only after confirming the safety of such an operation. Incorrect operation may lead to damage or cause an accident.

4) Maintenance

Prohibited

- Don't disassemble or modify the modules.
  A fire, damage or malfunction may result.

Caution

- Turn OFF the power before removing or installing the module.
  Otherwise, you may receive an electrical shock, cause a malfunction or damage the module.

Table of contents

Chapter 1: Outline

The JW-50DN2 DeviceNet master module is an interface module used to connect a JW50H/70H/100H programmable controller to a DeviceNet in a network.

- This module is equipped with I/O message function (Polling I/O function, Bit Strobe function) and Explicit message functions, among the many functions available with DeviceNet devices.
- In addition to the master function, it has slave function and can be used as a data link system.
- When used in master mode, this module can be connected to up to 63 slave nodes.
  The maximum total number of I/O points is 4096.
- By integrating Sharp's unique scan list editing function, there is no need to configure the JW-50DN2's settings.

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

Chapter 2: Handling Precautions

Make sure to follow the precautions below while using this module.

(1) Storing

Do not store the JW-50DN2 in the following conditions.

1. In direct sunlight, or ambient temperatures exceeding the range of 0 to 55 ˚C.
2. In relative humidity that exceeds the range of 35 to 90%, or in a location subject to sudden temperature changes which may cause condensation.
3. Near corrosive or inflammable gas.
4. In a location subject to vibration or hard jolts.

(2) Installation

Make sure to turn OFF the power to the JW50H/70H/100H before removing or installing a module on the basic rack panel.

(3) Treatment

Make sure to follow the precautions below while using this module.

1. Holes are provided in the cabinet for ventilation to prevent the temperature from increasing. Do not block the ventilation holes. Good ventilation is necessary.
2. When a problem or an abnormal condition such as overheating, fumes, or smoke are observed, stop the operation immediately, and call your dealer or our service department.
3. Make sure to turn OFF the power to the JW50H/70H/100H before changing the switch settings. An imprudent changeover of the switches may cause a malfunction.

(4) Static electricity

In extremely dry circumstances, the human body may have excessive static current. This excessive static current may damage parts in the JW-50DN2's PC board. Therefore, prior to accessing the JW-50DN2, touch your hand to a grounded piece of metal to discharge the static current in your body.

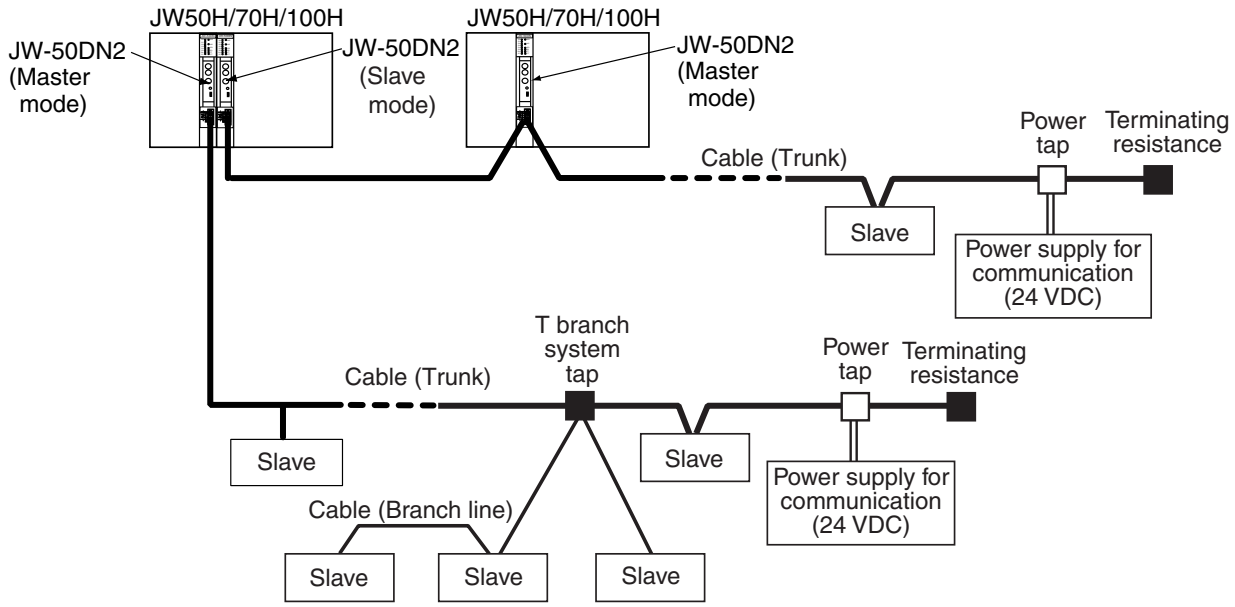
(5) Cleaning

Use a clean, dry cloth when cleaning the JW-50DN2. Do not use volatile chemicals such as thinner or alcohol as it may result in deformation and color fading.

Chapter 3: System Configuration

The JW-50DN2 can be used to communicate as a master or slave module in a DeviceNet.

● **Connection example**



- Select the basic operation mode (master/slave) using the SW6-3 switch on the JW-50DN2.=>See page 6-5.
- Up to two JW-50DN2 modules can be installed in the same rack panel.
  (Two master modules or two slave modules can also be installed)
- Supply master modules, slave modules, cables, T branch taps, power taps, and termination resistors that are compatible with DeviceNet, for use in a system containing a JW-50DN2.

● **SHARP's modules applied for the DeviceNet (master/slave)**

	Model name	Master	Slave	PLC to install
	JW-50DN2	○	○	JW50H, JW70H, JW100H
	JW-50DN	○	○	
	JW-20DN2	○	○	JW20H, JW30H, JW300
	JW-20DN	○	○ (V 2.1 or more)	JW20H, JW30H
	JW-32CUM1	○	—	JW30H
	JW-32CUM2	○	○	
	JW-32CV3	○	○	VME built-in controller
	Z-337J/Z-338J	○	○ (V 2.1 or more)	J-board (Z300/Z500 series)
*	JW-D164NH/D162SH/D162MH /D165SH/D165MH	—	○	—
*	JW-D324NH/D322SH/D322MH /D325SH/D325MH	—	○	
	JW-D164N/D162S/D162M	—	○	

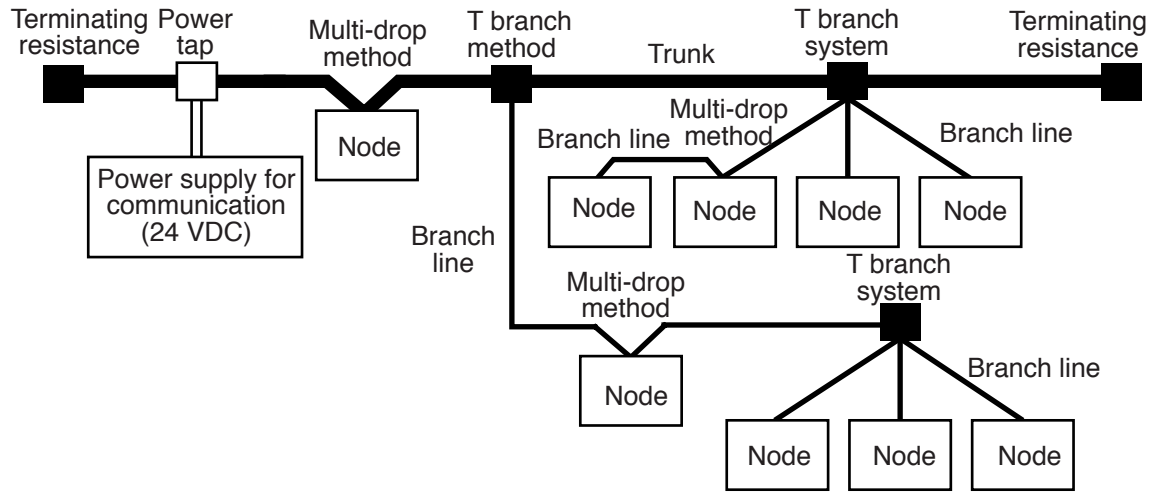
○ : Usable, Inside parentheses ( ): Software version

* For details of JW-D164NH to D165MH, JW-D324NH to D325MH, see the "Appendix" of this manual

[1] Network names and functions

This section lists the device names and describes functions used in DeviceNet networks.

● **Network example**



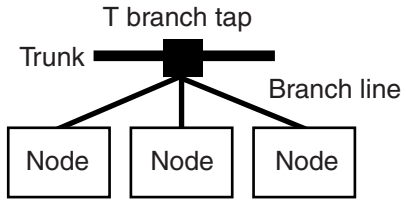
Names	Functions
Node	Master and slave nodes are available on the DeviceNet. [Master: Integrates external I/Os from each slave. [Slave: provides connections for external I/Os. - Since there are no restrictions in allocating a master and slaves, you can arrange nodes at any location shown above.
Trunk	Cable with terminating resistances at both ends. - Normally, the cable connecting the terminals the furthest distance apart will be a trunk cable. - Use a five conductor cable (2 signal wires, 2 power wires, 1 shield). - The trunk length is not always equal to the maximum length of the network.
Branch line	A cable branching off the trunk. - You can add new branch lines from a branch line. - Use a five conductor cable (2 signal wires, 2 power wires, 1 shield).
Connection method	There are two methods for connecting nodes: T branch and Multi-drop. [T branch method: Uses T branch taps for up to three separate branch lines. [Multi-drop method: Connects a node directly to a trunk or to a branch line. - Both the T branch method and the Multi-drop method can be used in the same network.
Terminating resistance	Install terminating resistances (121ohm) on both ends of the trunk, in order to reduce signal reflection and stabilize the communication. - JW-50DN2 has an integrated terminating resistance which can be enabled or disabled.
Power supply for communication	Communication power should be supplied to the communication connector on each node through the five conductor cable. - Use only a power supply dedicated exclusively to communications. Do not share this power supply with other devices.

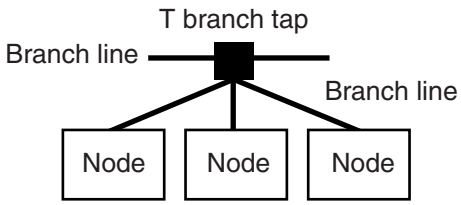
[2] Connection method

There are two methods for connecting nodes: T branch and Multi-drop.

(1) T branch method

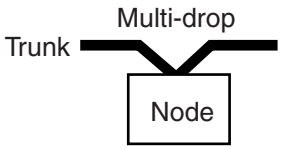
You can make up to three branch lines away from a trunk or a branch line. Use a T branch tap to branch off.

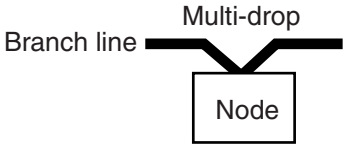




(2) Multi-drop method

Connect a node directly to a trunk or a branch line.





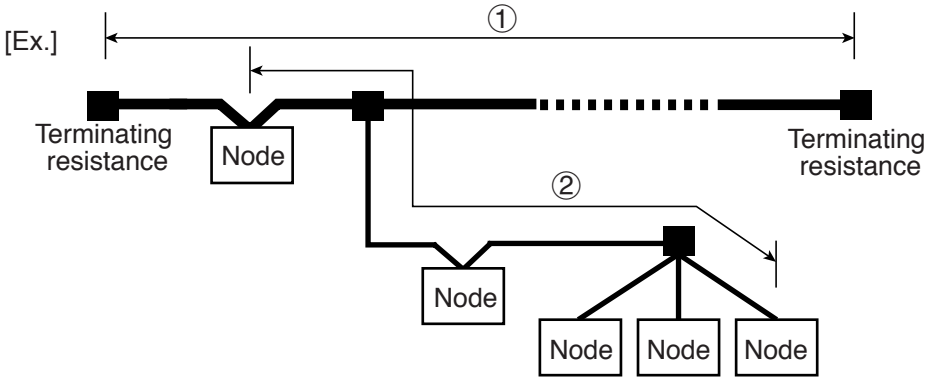
[3] Cable length

(1) Maximum network length

The maximum network length will be the longest of the following:

① The distance between the two terminating resistances

② The distance between the two nodes in the network that are the farthest apart



The maximum network length possible will vary, depending on the type of cable used.

	Cable type	Maximum network length
①	Thick cable: 5 conductors	500 m
	Thin cable: 5 conductors	100 m
②	Thin cable: 5 conductors	100 m

- The maximum network length is also limited by the communication speed. => See section (3) below.
- When thick and thin cables are mixed in the same network, the following conditions must be met.

Communication speed	Maximum network length
500 k bits/s	(A + B) 100 m or shorter
250 k bits/s	(A + 2.5 x B) 250 m or shorter
125 k bits/s	(A + 5 x B) 500 m or shorter

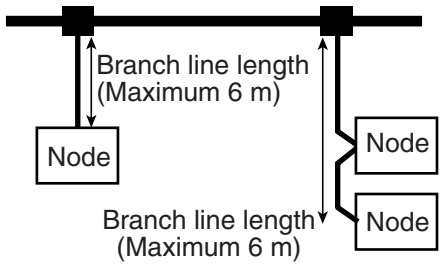
A: Thick cable length
B: Thin cable length

(2) Maximum branch line length

The maximum branch line length is 6 m.

- You can make a new branch line from a branch line.
  However, the maximum distance between the branch point on the trunk and the end of the most distant branch line should not be more than 6 m.

[Ex.]



(3) Communication speed and communication distance

The communication distance will vary, depending on the communication speed.

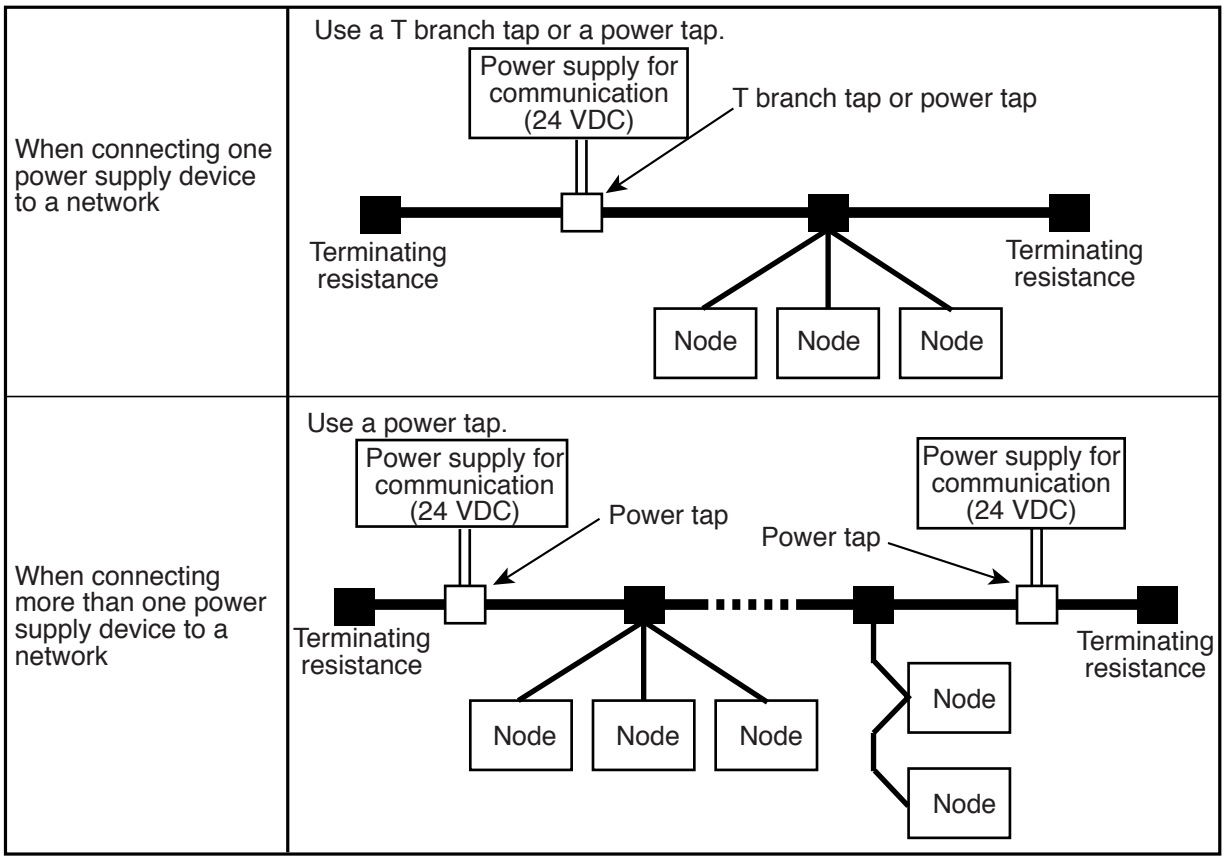
Communi-cation speed	Maximum network length		Branch line length	Total length of branch lines
	Thick cable	Thin cable		
500 k bits/s	100 m or less	100 m or less	6 m or less	39 m or less
250 k bits/s	250 m or less			78 m or less
125 k bits/s	500 m or less			156 m or less

[4] Power supply

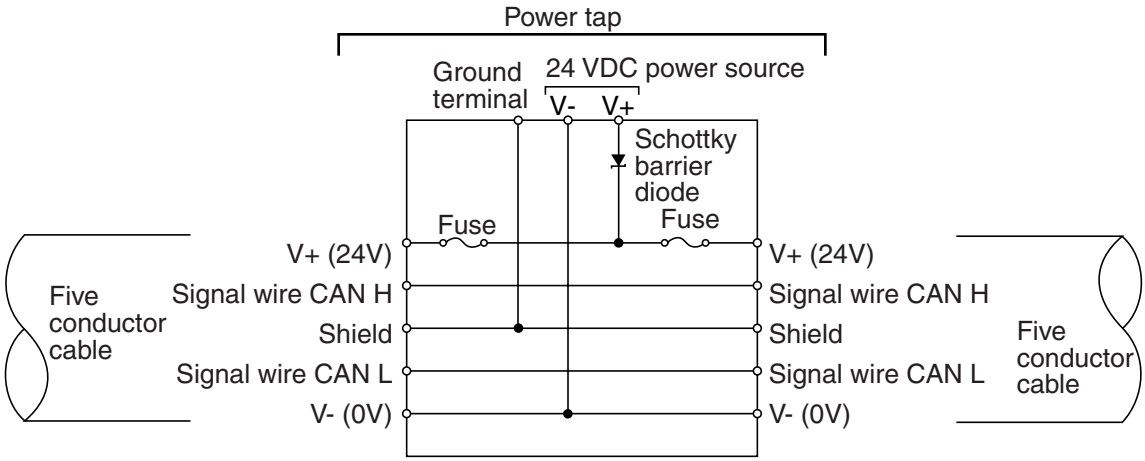
Connect the communication power supply to the trunk.

Two of the five conductors in the cable used for trunk and branch lines are assigned to carry power for communication (24 VDC).

The following methods can be used to connect a communication power source to the trunk.



● **Configuration of a power tap**



Remarks

- Do not share the communication power source with other devices.

[5] Communication related devices

In addition to master and slave nodes, the following devices can be used in this system: cables, T branch taps, power taps, communication connectors, terminating resistances, and communication power supplies. Listed below are the models (manufacturer) of devices currently available.

(1) Cable

Thick or thin five conductor cable is available.

Number of conductors	Manu-facturers	Type	Model	Outside diameter (mm)	Main use
Five Signal lines: 2 Power source lines: 2 Shield: 1	Nihon Electric Wire & Cable Co., Ltd.	Thick	DVN18	12	Trunk line
		Thin	DVN24	7	Branch line or trunk line
		Thick	DVN18SF	12	* For moving section
		Thin	DVN24SF	7	* For moving section
		-	DVN20SF	10	* Bend and twist resistant

* For details, contact the cable manufacturer.

- The thick power line has an internal resistance of approximately 12 ohm / km, and the thin power line has an internal resistance of approximately 58 ohm / km. Calculate the voltage drop and current consumption for a total distance covering both directions (to and from the slave stations), and determine the position and number of communication power supplies needed.

(2) T branch tap

You can connect up to three new branch lines off a single existing branch line.

Manufacturer	Model	Number of connectors	Remarks
Omron	DCN1-1C	Three (this tap is used to connect one new branch line)	- Has three connectors for connecting up to three new lines - Connects to a terminating resistor
	DCN1-3C	Five (this tap is used to connect three new branch lines)	- Has five connectors for connecting up to five new lines - Connects to a terminating resistor

(3) Power tap

This tap is used to supply power to the five conductor cable when connecting more than one communication power supply to a single network.

Manufacturer	Model name	Specifications
Allen-Bradley	1485T-P2T5-T5	Power tap with a reverse current flow prevention function, and ground terminal
Omron	DCN1-1P	

- This tap can be used to connect a single communication power supply to a network. In this case, you can also use a T branch tap (above), in addition to the power tap.

(4) Communication connector

The JW-50DN2 is equipped with one MSTB2.5/5-STF-5.08AUM (with a screw to secure the connector: Made by Phoenix Contact) (when delivered). => See pages 5-2 and 5-3

(5) Terminating resistance

Manu-facturer	Model	Remarks
Omron	DRS1-T	Terminal block type terminating resistance (121 ohms)
	----	Terminating resistance attached to the T branch tap (121 ohms)

(6) Communication power supply

Make sure to use a power supply device for communication that conform to the specifications below.

Item	Specifications
Output voltage	24VDC ± 1 %
Output current	16A or less
Input variation	0.3% max.
Load variation	0.3% max.
Influence of ambient temperature	0.03%/℃ max.
Input voltage	100 to 1200 V
Input frequency	47 to 450 Hz
Output ripple	250 mVp-p
Output side capacity	7000 μF max.
Ambient temperature	Operation: 0 to 60℃, Storage: −40 to 85℃
Instantaneous maximum output current	65A or less (peak)
Overvoltage protection	Provided
Overcurrent protection	Provided (Max. current: 125%)
Start up time	250 ms until 5% value of final output current
Overshoot while starting up	0.2% max.
Insulation	Between output - AC, and output - frame ground
Conformity	Essential: UL Recommend: FCC Class B, CSA, TUV, VDE
Ambient humidity	30 to 90% (without dewing)
Surge current capacity	Up to 10 %

Chapter 4: Installation Method

[1] Installation of cable for option module

Install the optional cable on the basic rack panel on which the JW-50DN2 is installed.
Optional cables and a basic rack panel are available in various combinations, as shown below.

● **Cable type for option module**

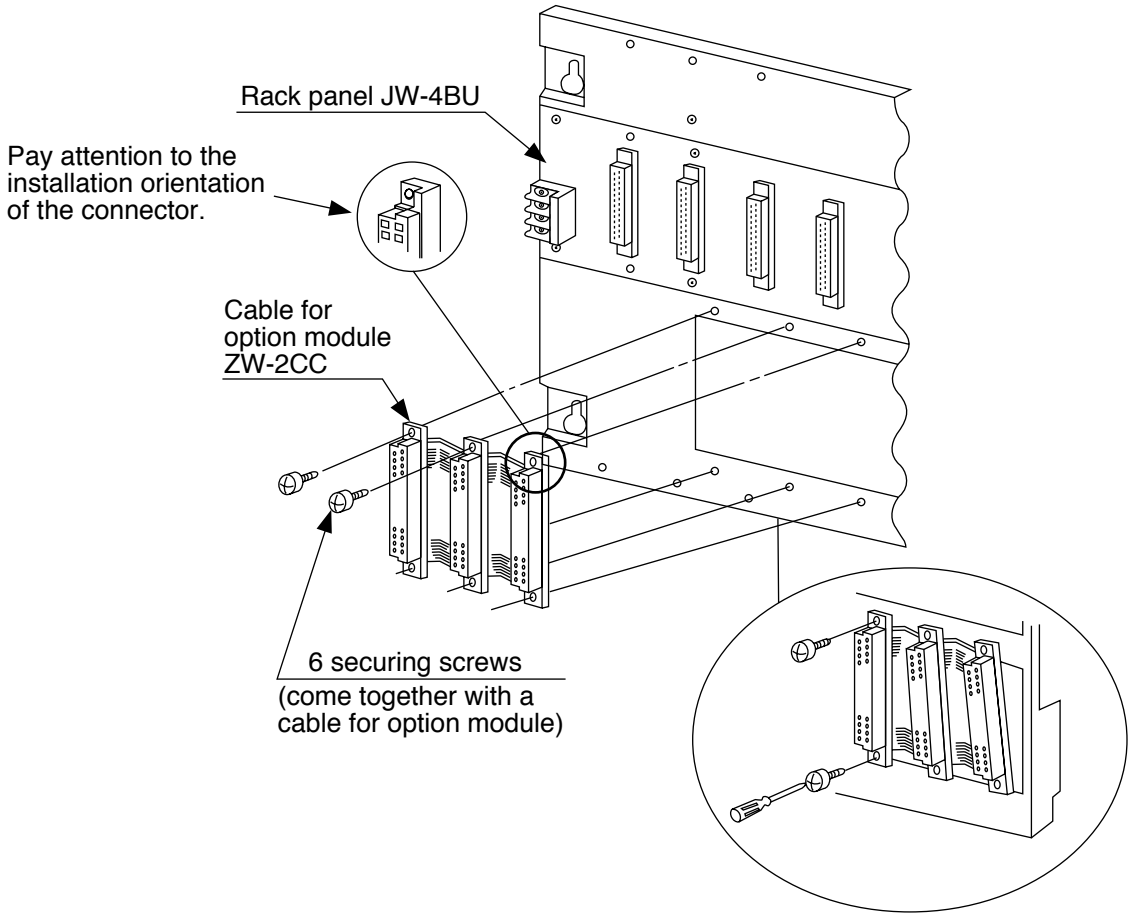
Cable for option module	Maximum number of JW-50DN2 that can be installed
ZW-2CC	Max. 2 sets
ZW-4CC	
ZW-6CC	

● **Rack panel type**

Model name of the rack panel on which optional cable is installed	Cable for option module		
	ZW-2CC	ZW-4CC	ZW-6CC
JW-4BU	○	×	×
JW-6BU	○	○	×
JW-8BU	○	○	○
JW-13BU	○	○	○

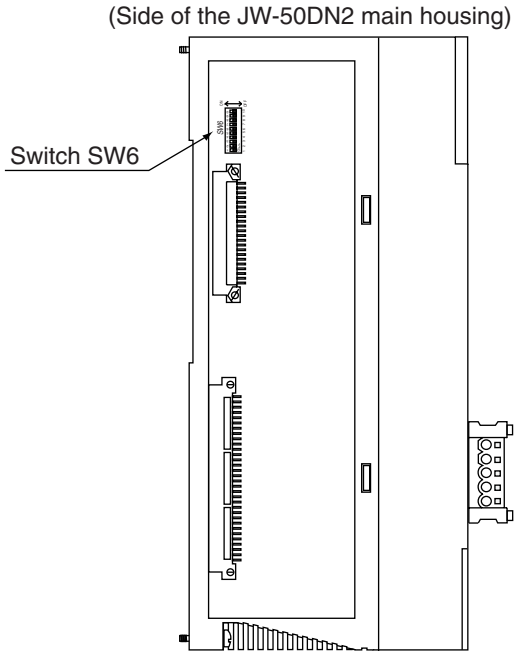
○ : Can be installed
× : Cannot be installed

[Example] In case to install ZW-2CC on a rack panel JW-4BU to ZW-2CC



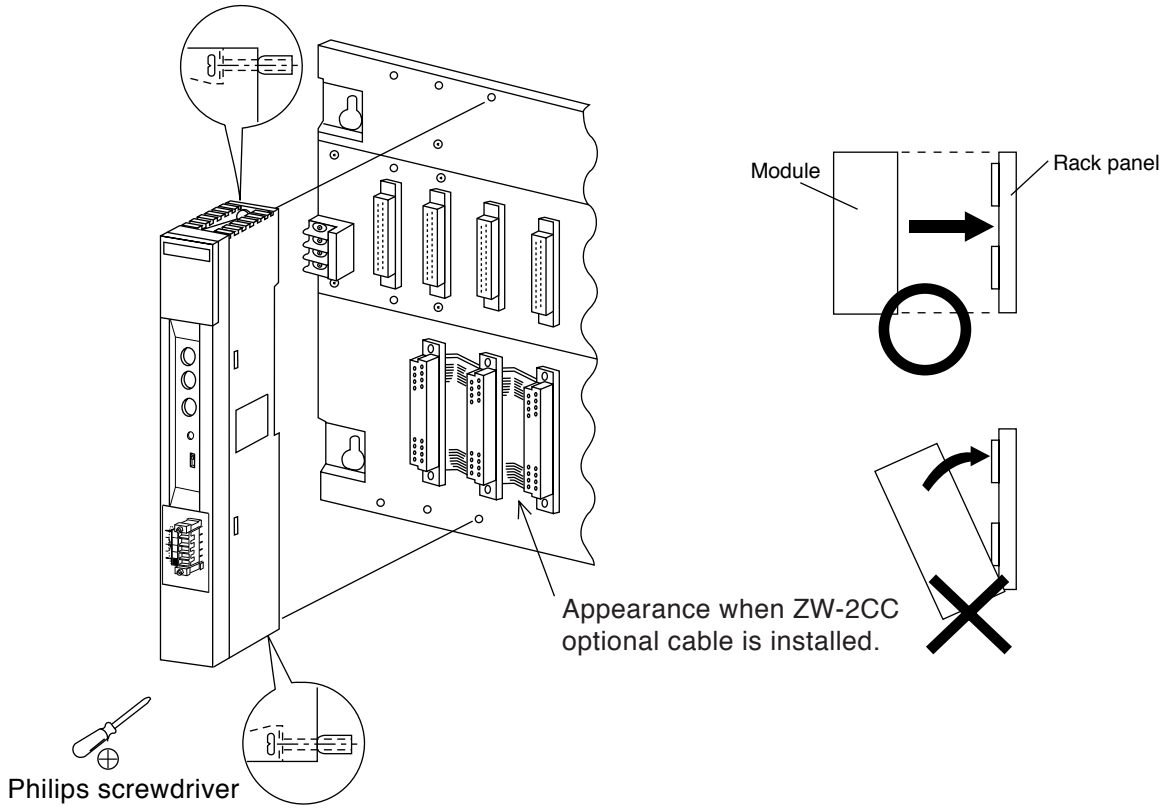
[2] Installation of JW-50DN2

(1) Set switch SW6 on the side of the JW-50DN2 main housing. (Setting details => See page 6-5.)



(2) Install the JW-50DN2 into a rack panel using the two attachment screws.
Before installation and removal, make sure to shut OFF the power supply to the PLC.

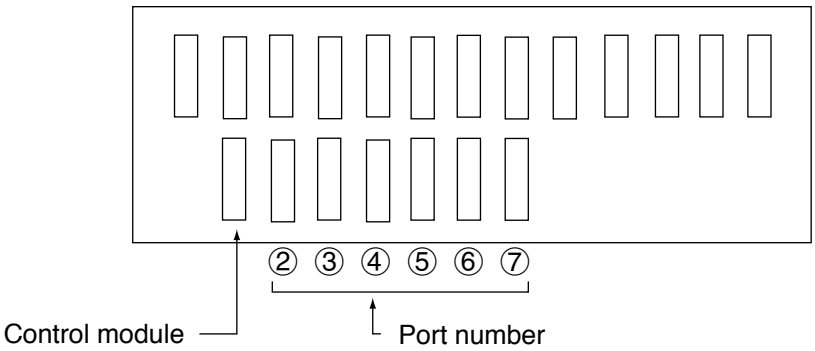
[Example] Install on rack panel JW-4BU



This module can be installed in any one of the optional slots.
Be careful not to bend the connector pins on the module by applying too much force to them.

Optional slots have each port numbers. When an error occurs, the JW50H/70H/100H (control module) stores the port number corresponding to the error occurred module into system memory #050 in the PLC.

(In case of JW-13BU)



Chapter 5: Connection (Wiring) Method

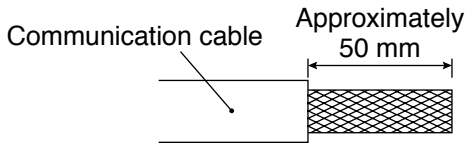
This chapter describes how to connect the JW-50DN2 to a DeviceNet.

[1] Preparing a communication cable

Prepare the communication cable following the steps below to attach the connector.

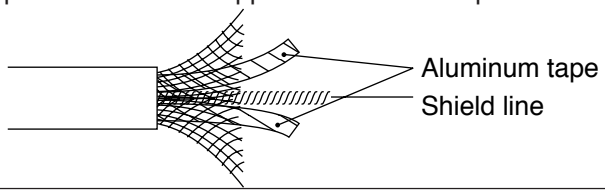
① Remove approximately 50 mm of insulation from the communication cable

- Remove the insulation without damaging the coaxial shield around the cable. Do not remove more insulation than necessary, as it may cause a short-circuit.



② Unwrap the wires in the coaxial shield carefully

- Inside the coaxial shield there is one signal line, one power line, and one ground line. The signal line and power lines are wrapped in aluminum tape.

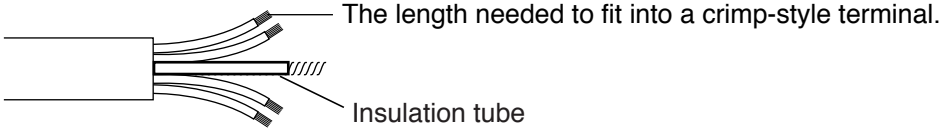


③ Cut off the excess coaxial shield and peel off the aluminum tape on the signal line and power line.

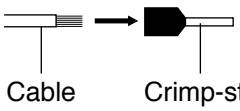
- Put an insulation tube through the shield line.

④ Remove the insulation from the signal and power lines until enough bare wire is exposed to fit into a crimp-style terminal.

- Twist the strands of wire in the signal and power lines tightly, in order to slide them into a terminal.



⑤ Crimp a terminal on each of the individual lines and then insulate it using vinyl tape or shrink tubing.



- Shown below are the recommended crimp-style terminals

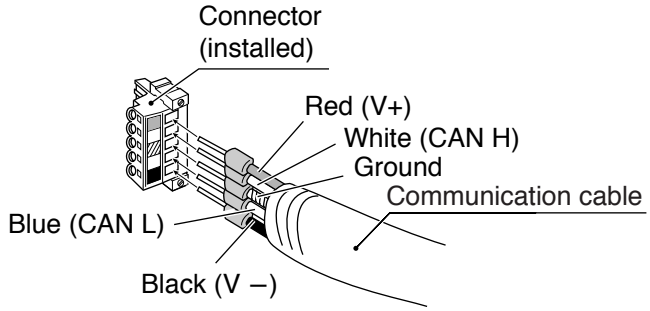
Recommended crimp-style terminals	Special tool
AI series made by Phoenix Contact	ZA3 made by Phoenix Contact
Nichifu - For thin wire: BT 1.25-18 - For thick wire: BT 2-18 (power line) BT1.25-18 (communication line)	NH-1
JST Mfg. Co., Ltd. - For thin wire: 1.25-AF 2.3A - For thick wire: 2-AF 2.3A (power line) 1.25-AF 2.3A (communication line)	YHT-2210

To the next page

From the previous page

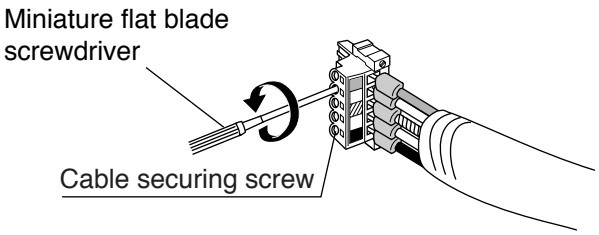
⑥ Insert the signal line, power line, and the ground line into the appropriate connector holes.

- Insert the wires from the top down, in the following order: red, white, ground, blue, and black. Pay strict attention to the connector orientation.
- Before inserting the wires, loosen the screws on the connector enough to insert the wires easily.
- The JW-50DN2 is supplied with one set of MSTB2.5/5-STF-5.08AUM (with connector securing screw: Made by Phoenix Contact).

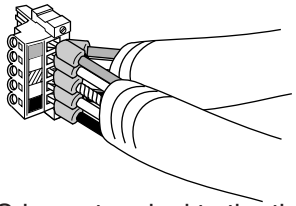


⑦ Secure each wire tightly using the wire retention screws of the connector.

Use a miniature flat blade screwdriver which has the same diameter from the neck all the way to the end. Tighten the screws using 0.5 N-m of force.



- **When connecting two thin cables in a multi-drop system**
  Insert the wires from each cable with the same color insulation into the same hole.



Crimp a terminal to the tip of the two wires.

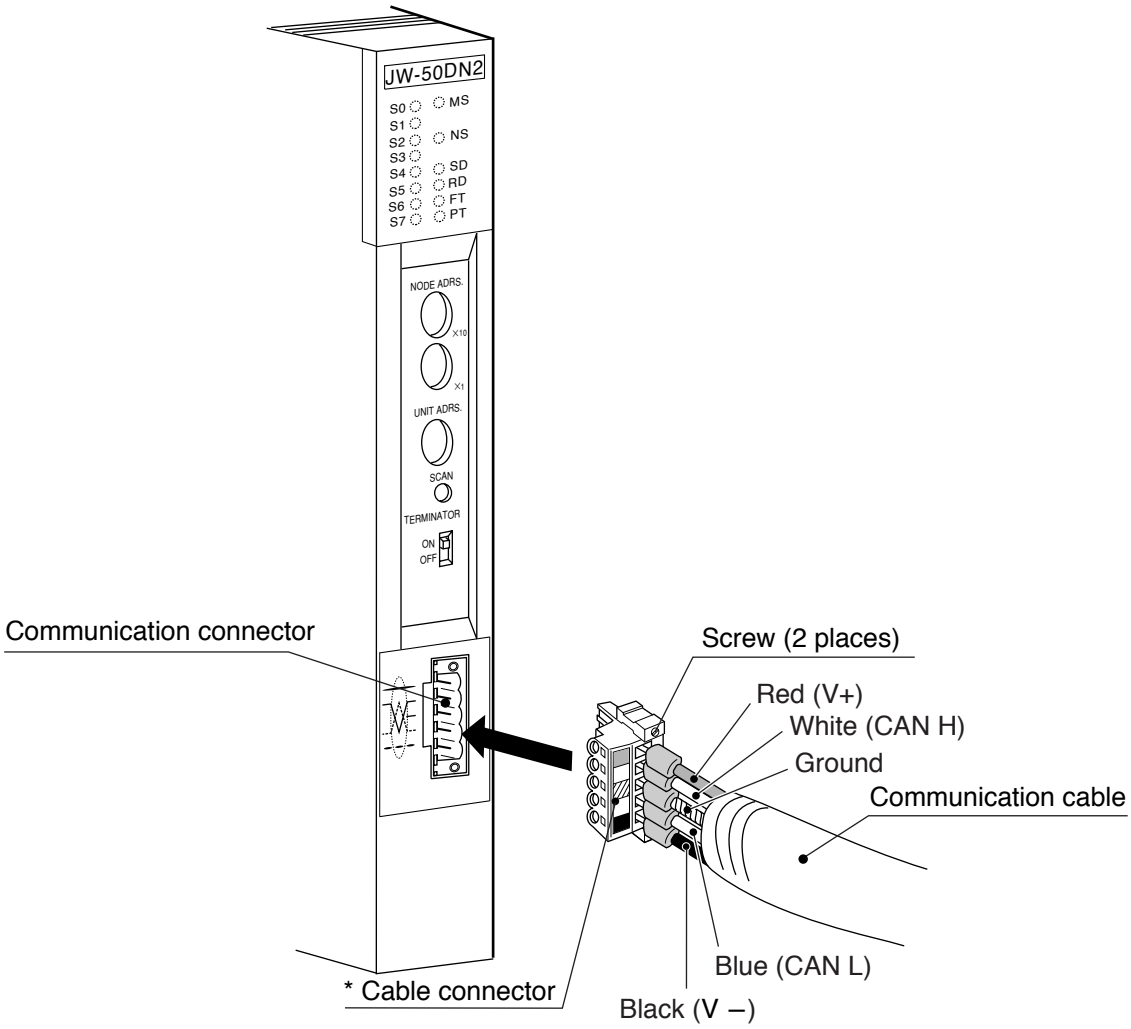
Remarks

- Before connecting the communication cable, make sure to turn OFF the power to the JW50H/70H/100H, all slave stations, and the communication power supply.
- Do not pull hard on the communication cable since the connector can be pulled off or disconnected easily.

[2] Connecting a communication cable

This section describes how to plug a connector that has been installed on the communication cable into the JW-50DN2.

Match the orientation of the connector on the cable with the female connector on the JW-50DN2 and insert the male cable connector as far as it will go. After inserting it all the way, tighten the screws on the male connector. (The appropriate tightening torque is 0.3 N-m of force.)

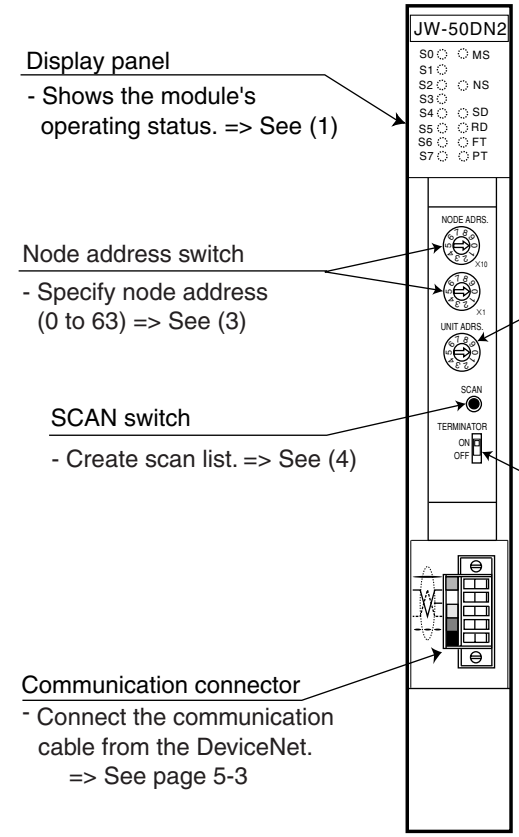


* One male connector is supplied with the JW-50DN2.
  Model name: MSTB2.5/5-STF-5.08AUM (made by Phoenix Contact)

Chapter 6: Description of Switch and Lamp, Setting System Memory

6-1 Name and function of switch and lamp

■ Front side



Display panel
- Shows the module's operating status. => See (1)

Node address switch
- Specify node address (0 to 63) => See (3)

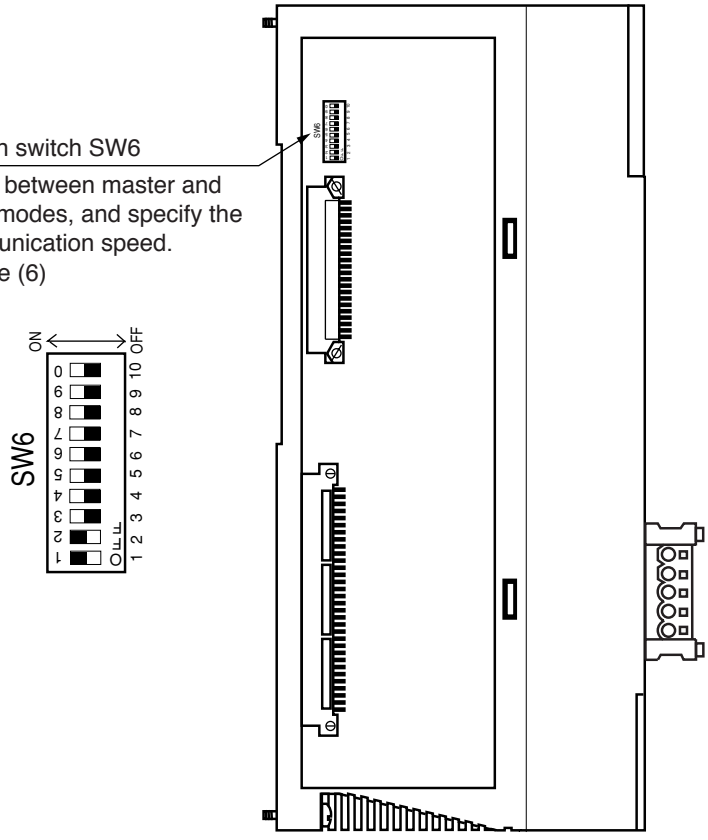
SCAN switch
- Create scan list. => See (4)

Communication connector
- Connect the communication cable from the DeviceNet. => See page 5-3

Module address switch
- Select a system memory area in which to specify the operating conditions. => See (2)

Termination resistance switch
- Enable/disable the termination resistance. => See (5)

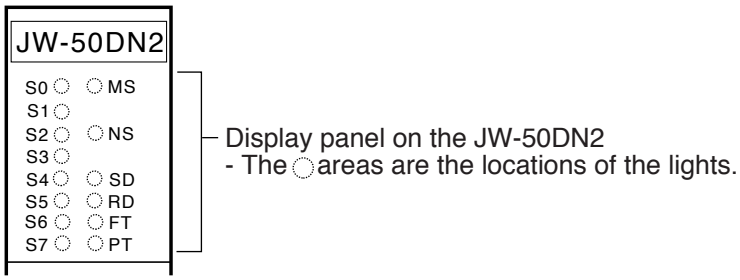
■ Rear side



Function switch SW6
- Select between master and slave modes, and specify the communication speed. => See (6)

(1) Display panel

Shows the module's operating status by turning ON and OFF, and blinking.



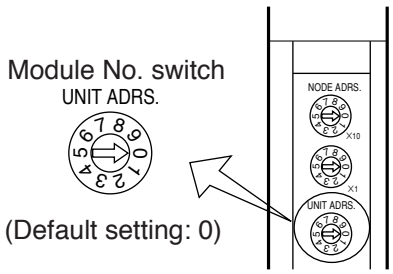
Lamp name	Color	Operation details	
MS	Green/Red	Indicates the module's status.	For details, see the table below.
NS	Green/Red	Indicates the network status.	
SD	Red	Lights when sending data.	
RD	Red	Lights when receiving data.	
FT	Red	Lights when this module is faulty.	
PT	Red	Lights when this module is in the protected mode.	
S7 to S0	Red	Displays error codes and the node address when an error occurs.	

● **Details of the MS/NS**

Lamp name	Color	Status		Details
MS (Module Status)	Green	ON	Normal	The JW-50DN2 is functioning normally.
		Blinks	Not yet set	Currently reading the switch settings.
	Red	ON	Hardware error	The JW-50DN2 has a hardware error.
		Blinks	Abnormal setting	Mis-set switches.
	---	OFF	No power supplied	- Hardware error in the JW-50DN2. - No power is supplied to the JW-50DN2. - Currently resetting. - Waiting for initialization.
NS (Network Status)	Green	ON	On-line/connected	The network is functioning normally (communication has been established)
		Blinks	On-line/not yet connected	Though the network is functioning normally, communication has not yet been established.
	Red	ON	Communication error 1	- Communication error (the module detected an error indicating that communication on the network is not possible). - A node address is allocated twice. - Detected Bus Off.
		Blinks	Communication error 2	A slave station or some other stations are causing a communication error.
	---	OFF	Off-line/power OFF status	There are no nodes other than the JW-50DN2.

(2) Module address switch: UNIT ADRS

Allocate system memory in the PLC control module (JW50H/70H/100H) for each DeviceNet that is used with the JW-50DN2. => See page 6-6.

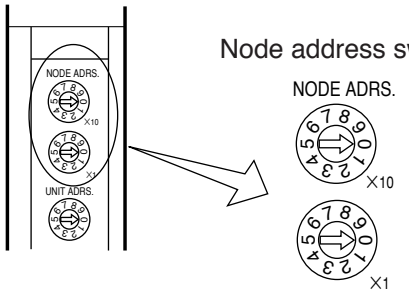


(Default setting: 0)

- Set the module address switch to "0" or "1." If this switch is set to positions "2" to "9", it will cause an error.

(3) Node address switch: NODE ADRS

Assign a node address from 0 to 63 (decimal)



- Upper switch is for the 10's digit and the lower switch is for the 1's digit.

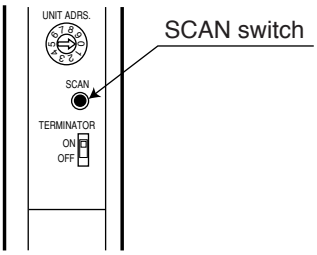
(Default setting: Both set to 0)

- As long as the node address assigned to the JW-50DN2 does not duplicate the address of another node, the node address on the JW-50DN2 can be set anywhere from 0 to 63. If the same node address is assigned to two devices, a duplicate node address error will occur and the JW-50DN2 will not be able to communicate.

(4) SCAN switch

When the switch 6-7 (page 6-5) is set to "Protection OFF" or a "Busoff" error occurs, keep press the SCAN switch for three seconds, the JW-50DN2 executes the following procedures.

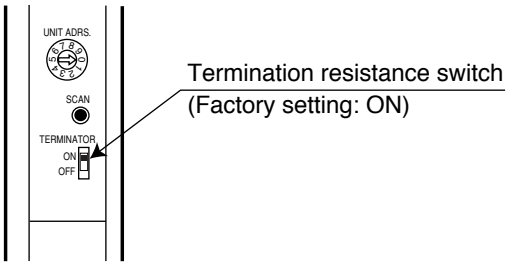
When used in the master mode	When used in the slave mode
Re-reading settings of the switches and system memory ↓ (If there is no error) Edit the scan list	Re-reading settings of the switches and system memory



- See page 7-8 for details about editing the scan list.

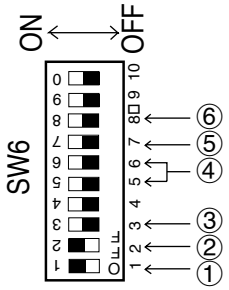
(5) Termination resistance: TERMINATOR

If the JW-50DN2 is the final module in the DeviceNet communication trunk line, turn this switch ON.



(6) Function switch SW6

Select basic operation mode (master/slave), communication speed etc.



Basic operation mode		Switch No.		Set details
Master	Slave		SW6	
○	-	①	1	**Operation when a slave communication error occurs** - Select whether or not to continue operation of JW50H/70H/100H control module (on which the JW-50DN2 is mounted) when a communication error occurs while communicating with a slave station. OFF: When an communication error occurs, JW50H/70H/100H continues operation. ON: When an communication error occurs, JW50H/70H/100H stops operation and enters the program mode. (Default setting) - When the slave mode is selected, this parameter is fixed to "continue calculation" regardless of this setting.
		②	2	**Synchronous/asynchronous operation** - Select whether or not to synchronize the communication with the operation cycle. OFF: Not synchronized. ON: Synchronized with the operation (default setting) - When the JW-50DN2 is used in the slave mode, this item is always "Not synchronized," regardless of the setting. Note: The synchronization operation is only possible with one other control module, such as the JW-10CM and JW-20CM communication modules. Therefore, if more than one module is used in synchronization mode, the synchronized operation is not supported.
○	○	③	3	**Basic operation mode** - Select the basic operation mode (master/slave) of JW-50DN2. OFF: Master (default setting) ON: Slave
○	○	④	5, 6	**Communication speed** - Select a baud rate: 125 kbps, 250 kbps, or 500 kbps. **SW6-6**: OFF / OFF / ON / ON **SW6-5**: OFF / ON / OFF / ON Band rate: 125 kbps (default setting) / 250 kbps / 500 kbps / Prohibited setting
	-	⑤	7	**Protection function (ON/OFF)** - Select whether to use the protection function. OFF (No protection: default setting): Press the SCAN switch for 3 seconds, the JW-50DN2 will enter the scan list editing mode. - A scan list can be created by collecting slave information from the slave modules. ON (protected): While the JW50H/70H/100H on which the JW-50DN2 is installed is stopped, press the SCAN switch for 3 seconds. The JW-50DN2 will enter the scan list editing mode. (Note that this will not work in the RUN mode.) => See page 6-4, 7-8.
	-	⑥	8	**Communication monitor time** Communication monitor time (ISD, EPR) is timeout time of communication. Select either of "normal mode" and "long mode." However, only if the following system memory is set to 00 (HEX) (see page 6-8), this function can be set. OFF: Normal mode (Factory setting) ON: Long mode - #1624 to #1627 (When module address is "0") - #1724 to #1727 (When module address is "1")
-	-	-	4, 9, 10	Do not use (set to OFF at the factory)

(O: Enable, -: Disable)

6-2 Setting system memory

The table of JW-50DN2 system memory settings is shown below.

Basic operation mode		Setting item	Setting value of module address switch			
Master	Slave		0	1		
O	-	Top address of I/O table	#1600 to #1603	#1700 to #1703	⇨ (1)	See page 6-7.
O	O	Top address of diagnostic table	#1604 to #1607	#1704 to #1707	⇨ (2)	
O	-	Top address of Explicit message table	#1610 to #1613	#1710 to #1713	⇨ (3)	
O	-	Top address of scan list table	#1614 to #1617	#1714 to #1717	⇨ (4)	
O	-	I/O data allocation system when editing scan list	#1620	#1720	⇨ (5)	
O	-	Number of bytes to allocate nodes when editing scan list	#1621	#1721	⇨ (6)	See page 6-8.
O	-	Request explicit message	#1622	#1722	⇨ (7)	
O	-	ISD (communication monitor time)	#1624 #1625	#1724 #1725	⇨ (8)	
O	-	4* EPR (communication monitor time)	#1626 #1627	#1726 #1727		
O	-	Slave module output status when the JW50H/70H/100H is not operating.	#1630	#1730	⇨ (9)	See page 6-9.
-	O	Top address of I/O table (when used as slave module)	#1660 to #1663	#1760 to #1763	⇨ (10)	
-	O	Number of I/O bytes (when used as slave module)	#1664 to #1667	#1764 to #1767	⇨ (11)	
-	O	Hold/clean slave area when a communication error occurs (when used as slave module)	#1670	#1770	⇨ (12)	See page 6-10.
-	O	Response time to the master module (when used as slave module)	#1671 #1672	#1771 #1772	⇨ (13)	

(○: Enable, －: Disable)

Remarks

- Within the system memory range #1600 to #1777, make sure to set the memory to $00_{(HEX)}$ all the addresses except the above.
- If you will not be using the "top address of the diagnosis table," "top address of the Explicit message table," and "top address of the scan list table," make sure to disable them by setting them to $01_{(HEX)}$. If you enable them $00_{(HEX)}$ while leaving the top address set to $00_{(HEX)}$, the data will overlap from the top address (⊐0000)], and cause a malfunction. Be especially careful the "top address of the diagnosis table" can be enabled when the JW-50DN2 is used in the slave mode.

(1) Top address of the I/O table (When in the master mode)

When the JW-50DN2 is used in the master mode, this system memory location is used to store the top address of the I/O table (max. 512 bytes) that will be used for I/O message functions. (I/O data table => See page 7-1.)

Module address switch setting value		Setting item	Setting range
0	1		
#1600 to #1601	#1700 to #1701	File address	000000 to 177777(OCT)
#1602	#1702	File number	00 to 07(HEX)
#1603	#1703	---	00(HEX) fixed

(2) Top address of the diagnosis table

This system memory location is used to store the top address and to enable/disable the diagnosis table (256 bytes in the master mode, 128 bytes in the slave mode) which is used to check the communication status of the nodes (master, slave). The diagnosis table can be used in both the master and slave modes. (Diagnostic data table => See page 10-5.)

Module address switch setting value		Setting item	Setting range
0	1		
#1604 to #1605	#1704 to #1705	File address	000000 to 177777(OCT)
#1606	#1706	File number	00 to 07(HEX)
#1607	#1707	Enable/disable	00(HEX): Enable, 01(HEX): Disable

(3) Top address of the Explicit message table (When in the master mode)

When the JW-50DN2 is used in the master mode, this system memory location is used to store the top address and to enable/disable the Explicit message table (256 bytes) which is used for the Explicit message function. (Explicit message data table => See page 8-1.)

Module address switch setting value		Setting item	Setting range
0	1		
#1610 to #1611	#1710 to #1711	File address	000000 to 177777(OCT)
#1612	#1712	File number	00 to 07(HEX)
#1613	#1713	Enable/disable	00(HEX): Enable, 01(HEX): Disable

(4) Top address of the scan list table (When in the master mode)

When the JW-50DN2 is used in the master mode, this system memory location is used to store the top address and to enable/disable the scan list table (512 bytes) which is used when editing the scan list. (Scan list data table => See page 7-9.)

Module address switch setting value		Setting item	Setting range
0	1		
#1614 to #1615	#1714 to #1715	File address	000000 to 177777(OCT)
#1616	#1716	File number	00 to 07(HEX)
#1617	#1717	Enable/disable	00(HEX): Enable, 01(HEX): Disable

(5) I/O data allocation system when editing the scan list (When in the master mode)

This system memory is allocated by editing a scan list, if the JW-50DN2 is used in the master mode.

(Details in each allocation system => See page 7-1.)

Module address switch setting value		Setting item	Setting range
0	1		
#1620	#1720	Allocation system of I/O data	$00_{(HEX)}$: Allocate in time order $01_{(HEX)}$: Allocate evenly $02_{(HEX)}$: Allocate in order of securing empty node area

(6) Number of node allocation bytes while editing the scan list (When in the master mode)

This system memory is allocated by editing a scan list (with allocation of even distance / allocation in the order of securing empty node area), if the JW-50DN2 is used in the master mode.

(Description => See page 7-1.)

Module address switch setting value		Setting item	Setting range
0	1		
#1621	#1721	Data length when editing scan list	1 to 64 bytes (001 to $100_{(OCT)}$)

(7) Explicit message list (When in the master mode)

This is a system memory area used for the Explicit message function, when the JW-50DN2 is used in the master mode. (Explicit message data function => See page 8-1.)

Module address switch setting value		Setting item	Setting range
0	1		
#1622	#1722	Request Explicit message	$00_{(HEX)}$: Do not use Explicit message function $01_{(HEX)}$: Use Explicit message function

(8) Communication monitor time (ISD, EPR) (When in the master mode)

This system memory contains the "ISD" and "EPR" settings used for determining a communication timeout, when the JW-50DN2 is used in the master mode.

- **ISD (InterScan Delay)**
  The ISD is the communication monitor time allowed after the master module sends a request to a slave module until it receives a response from the last slave module.
  When the time allowed for the ISD has elapsed without a response from the last slave, the JW-50DN2 advances to the next communication cycle.
- **EPR (Expected Packet Rate)**
  The EPR is the communication monitor time allowed after a master module sends a request to a slave module until it receives a response from all of the slave modules.
  If there is no response from a slave module after the EPR time has elapsed, the JW-50DN2 will retry the request once each communication cycle. If there is no response after 4*EPR times have elapsed, the JW-50DN2 turns OFF the communication flag for the corresponding slave module, and turns ON the error node table.
  For example, if 4*EPR equals 1000 (ms), the JW-50DN2 will turn OFF the slave module communication flag one second after receiving no response from the slave module. Then it will turns ON the error node table.

Module address switch setting value		Setting item	Setting range
0	1		
#1624 to #1625	#1724 to #1725	ISD (communication monitor time)	2 to 65534 ms (2 to 65534(DCM)) - Specify in units of 2 ms. - A setting of "0" enables the reading of the setting on SW6-8. => See below
#1626 to #1627	#1726 to #1727	4*EPR (communication monitor time)	4 to 65532 ms (4 to 65532(DCM)) - Specify in units of 4 ms. - A setting of "0" enables the reading of the setting on SW6-8. => See below

● **Communication monitor time when "0" is entered in the module address switch setting**

Number of slave modules	Communication monitor time (ms)			
	Normal mode (when SW6-8 is OFF)		Long mode (when SW6-8 is ON)	
	ISD	4*EPR	ISD	4*EPR
1 to 15	40	1000	80	1500
16 to 31	60		120	
32 to 47	80		160	
48 to 63	100		200	

- The communication time can be measured using a commercial DeviceNet analyzer.
- For details about switch 6-8, see page 6-5.

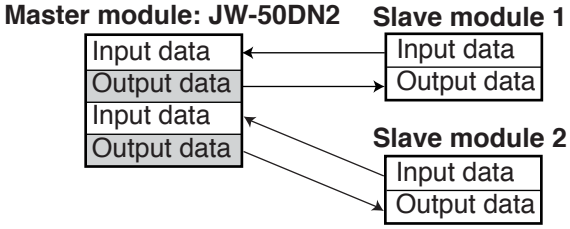
(9) Output status of the slave module when JW50H/70H/100H stops operation (When used in the master mode)

When the JW-50DN2 is used in the master mode, this system memory location is used to select the data sent to the slave modules if a JW50H/70H/100H (in which the JW-50DN2 is mounted) control module stops operation (enters the program mode). => See page 10-13.

Module address switch setting value		Setting item	Setting range
0	1		
#1630	#1730	Output status to a slave module when JW50H/70H/100H stops operation	00(HEX): Send idle data. * 01(HEX): Clear

* For details about slave station operation when a slave station receives idle data, see the instruction manual for each slave station.

The areas shown in gray in the figure below can be set to "send/clear idle data" when JW50H/70H/100H stops operation.



(10) Top address of the I/O table (when used in the slave mode)

This system memory location is used to store the top address of the I/O table when the JW-50DN2 is in the slave mode.

Module address switch setting value		Setting item	Setting range
0	1		
#1660 to #1661	#1760 to #1761	File address	000000 to 177777(OCT)
#1662	#1762	File number	00 to 07(HEX)
#1663	#1763	----	00(HEX): Fixed

(11) Number of I/O bytes (when used in the slave mode)

This system memory location is used to store the number of input bytes (0 to 127 bytes) and output bytes (0 to 127) when the JW-50DN2 is in the slave mode.

Module address switch setting value		Setting item	Setting range
0	1		
#1664	#1764	Number of input (sending) bytes	0 to 127 bytes (0 to $177_{(OCT)}$)
#1665	#1765	----	$00_{(HEX)}$: Fixed
#1666	#1766	Number of output (sending) bytes	0 to 127 bytes (0 to $177_{(OCT)}$)
#1667	#1767	----	$00_{(HEX)}$: Fixed

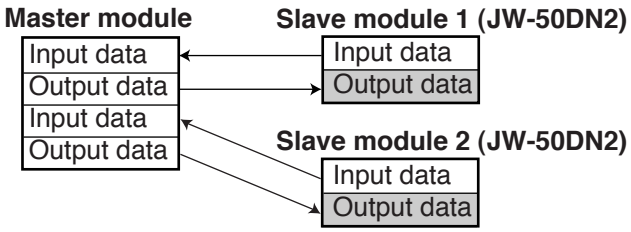
- The specified number of bytes are allocated from the top address in the I/O table (when used in the slave mode) with input bytes being allocated first, followed by the area for the output bytes.

(12) Restore/clear the slave area when a communication error occurs (when used in the slave mode)

When the JW-50DN2 is used in the slave mode, this system memory location is used to determine whether a slave area is restored or cleared when a communication error occurs. => See page 10-13.

Module address switch setting value		Setting item	Setting range
0	1		
#1670	#1770	Preserve or clear the slave area when a communication error occurs.	$00_{(HEX)}$: Latch $01_{(HEX)}$: Clear

Slave areas, which select "latch or clear" when communication error occurs, are shown in gray below.



(13) Response time to the master module (when used in the slave mode)

This system memory location is used to specify a response time (0 to 65528 ms) to the master module when the JW-50DN2 is in slave mode.

Module address switch value		Setting item	Setting range and details
0	1		
#1671 to #1672	#1771 to 1772	Response time to the master module	Specify a time between 0 and 65528 ms (0 to 65528 (DCM)) in units of 8 ms. - If you specify 1 to 7 ms, the setting will be 8 ms. If you enter a value not evenly divisible by 8, the modulus will be dropped. (Ex.: When 15 ms is entered, the setting will be 8 ms.)

- Normally, this item is set to 0 ms

6-3 Table of switches and system memory settings

[1] When the JW-50DN2 is used in the master mode

● Switch settings

Switch name		Setting details		Set value
UNIT ADRS		Module address	0, 1	
NODE ADRS (X10)		Upper digit of node address	00 to 63	
NODE ADRS (X1)		Lower digit of node address		
TERMINATOR		Termination resistance	Set termination node to ON	
SW6	1	Select CU operation status when an communication error occurs.	OFF: Continue operation ON: Stop operation	
	2	Select synchronize/asynchronize between the communication cycle and CU operation	OFF: Asynchronous calculation ON: Synchronous calculation	
	3	Select master/slave mode	OFF (master mode)	OFF
	4	Not used	Set to OFF	OFF
	5	Select baud rate	5 (OFF), 6(OFF) = 125 kbps 5 (ON), 6(OFF) = 250 kbps 5 (OFF), 6(ON) = 500 kbps	
	6			
	7	Select protect mode	OFF: Not protection ON: Protection	
	8	Select a communication monitor time - This will be used when ISD and 4*EPR in system memory are set to 0.	OFF: Normal ON: Long	
	9	Not used	Set to OFF	OFF
	10	Not used	Set to OFF	OFF

● System memory settings

Set value of module address		Set details				Set value
0	1	Item			Set range	
#1600 #1601	#1700 #1701	Top address of I/O table (occupy max. 512 bytes)	File address		000000 to 177777(OCT) (Set with octal and word)	
#1602	#1702		File number		00 to 07(HEX)	
#1603	#1703		---		Set to 00(HEX)	00 (HEX)
#1604 #1605	#1704 #1705	Top address of diagnosis table (occupy 256 bytes)	File address		000000 to 177777(OCT) (Set with octal and word)	
#1606	#1706		File number		00 to 07(HEX)	
#1607	#1707		00(HEX): Enable, 01(HEX): Disable		00, 01(HEX)	
#1610 #1611	#1710 #1711	Top address of Explicit message table (occupy 256 bytes)	File address		000000 to 177777(OCT) (Set with octal and word)	
#1612	#1712		File number		00 to 07(HEX)	
#1613	#1713		00(HEX): Enable, 01(HEX): Disable		00, 01(HEX)	
#1614 #1615	#1714 #1715	Top address of scan list table (occupy 512 bytes)	File address		000000 to 177777(OCT) (Set with octal and word)	
#1616	#1716		File number		00 to 07(HEX)	
#1617	#1717		00(HEX): Enable, 01(HEX): Disable		00, 01(HEX)	
#1620	#1720	I/O data allocation system when editing scan list	00(HEX): In order of allocation time, 01(HEX): Even allocation, 02(HEX): Allocate in order of empty node secured area		00 to 02(HEX)	
#1621	#1721	Number of bytes for allocating mode when editing scan list	1 to 64 bytes (when the in order allocation is selected)		001 to 100(HEX) (set with octal)	
#1622	#1722	Request Explicit message	00(HEX): Use 01(HEX): Does not use		00, 01(HEX)	
#1623	#1723	Not used	---		Set to 00(HEX)	00 (HEX)
#1624 #1625	#1724 #1725	ISD (communication monitor time)	2 to 65534 ms (in units of 2 ms)	- A setting of "0" enables the reading of the setting on SW6-8.	00002 to 65534(DCM) (Set with decimal and word)	
#1626 #1627	#1726 #1727	4*EPR (communication monitor time)	4 to 65532 ms (in units of 4 ms)		00004 to 65532(DCM) (Set with decimal and word)	
#1630	#1730	Output status to a slave module when JW50H/70H/100H is stopped operation	00(HEX): Send idling data 01(HEX): Clear		00, 01(HEX)	
#1631 to #1677	#1731 to #1777	Not used	---		Set to 00(HEX)	00 (HEX)

- See page 6-6 for the precautions.

[2] When the JW-50DN2 is used in the slave mode

- **Switch settings**

Switch name		Setting details		Set value
UNIT ADRS		Module address	0, 1	
NODE ADRS (X10)		Upper digit of node address	00 to 63	
NODE ADRS (X1)		Lower digit of node address		
TERMINATOR		Termination resistance	Set termination node to ON	
SW6	1	Select CU operation status when an communication error occurs. *1	Set to OFF	OFF
	2	Select synchronize/asynchronize between the communication cycle and CU operation *2	Set to OFF	OFF
	3	Select master/slave mode	Set ON (slave mode)	ON
	4	Not used	Set to OFF	OFF
	5	Select baud rate	5 (OFF), 6 (OFF) = 125 kbps 5 (ON), 6 (OFF) = 250 kbps 5 (OFF), 6 (ON) = 500 kbps	
	6			
	7	Select protect mode	OFF: Not protection ON: Protection	
	8	Communication monitor time*3	Set to OFF	OFF
	9	Not used	Set to OFF	OFF
	10	Not used	Set to OFF	OFF

*1: The control module continues operation when a communication error occurs, regardless of the settings.

*2: Calculations between the communication cycle and the control module will be "asynchronous," regardless of the settings.

*3: Settings for the communication monitor time are invalid.

- **System memory settings**

Set value of module address		Set details			Set value
0	1	Item		Set range	
#1600 to #1603	#1700 to #1703	Not used	---	Set to $00_{(HEX)}$	$00_{(HEX)}$
#1604 #1605	#1704 #1705	Top address of diagnostic table (occupy max. 128 bytes)	File address	000000 to $177777_{(OCT)}$ (Set with octal and word)	
#1606	#1706		File number	00 to $07_{(HEX)}$	
#1607	#1707		$00_{(HEX)}$: Enable, $01_{(HEX)}$: Disable	00, $01_{(HEX)}$	
#1610 to #1657	#1710 to #1757	Not used	---	Set to $00_{(HEX)}$	$00_{(HEX)}$
#1660 #1661	#1760 #1761	Top address of I/O table (occupy 254 bytes)	File address	000000 to $177777_{(OCT)}$ (Set with octal and word)	
#1662	#1762		File number	00 to $07_{(HEX)}$	
#1663	#1763		---	Set to $00_{(HEX)}$	$00_{(HEX)}$
#1664	#1764	Number of input bytes	0 to 127 bytes	000 to $177_{(OCT)}$ (Set with octal)	
#1665	#1765	Not used	---	Set to $00_{(HEX)}$	$00_{(HEX)}$
#1666	#1766	Number of output bytes	0 to 127 bytes	000 to $177_{(OCT)}$ (Set with octal)	
#1667	#1767	Not used	---	Set to $00_{(HEX)}$	$00_{(HEX)}$
#1670	#1770	Preserve or clear the slave area when a communication error occurs.	$00_{(HEX)}$: Preserve $01_{(HEX)}$: Clear	00, $01_{(HEX)}$	
#1671 to #1677	#1771 to #1777	Not used	---	Set to $00_{(HEX)}$	$00_{(HEX)}$

*4: If you will not be using the "top address in the diagnostic table," make this invalid = $01_{(HEX)}$. If this is "valid, $00_{(HEX)}$," and the top address is $00_{(HEX)}$, various data will fill the top address (⊐0000), and cause malfunctions.

Note: Make sure to set all unused areas to $00_{(HEX)}$.

Chapter 7: I/O Message Function

Among I/O messages of the DeviceNet, the JW-50DN2 supports Polling I/O function and Bit Strobe function. The JW-50DN2 can communicate messages with slave modules having either of these two functions.

- The Polling I/O is a method that a master module sends a command (point to point) to each slave module and receive messages, if any.
- Bit Strobe is a message that multiple slave modules receive one command and respond using broadcasting function. This is convenient for collecting small data such as multiple slaves devices are arranged like sensors. Use the JW-50DN2 with master mode, when creating a scan list, it establishes connection with the Bit Strobe for slave modules having Bit Strobe function.

When the JW-50DN2 is used in the master mode, the JW-50DN2 enters top address of the I/O table (max. 512 bytes) used with the I/O message function. (=> See page 6-7.)

■ **Input/output data table addresses**

Basic operation mode		No. of bytes	Module No. switch setting	
Master	Slave		0	1
○	—	512	#1600 to #1603 (Set the top address.)	#1700 to #1703 (Set the top address.)

(O: Enable, -: Disable)

7-1 Input/output data table allocation

The JW-50DN2 (when used in the master mode) can select from several allocation methods for the slave station input/output data table. For selection, set system memory of the JW50H/70H/100H (On which the JW-50DN2 is mounted). The choices are "allocation in address order," "even number allocation," and "allocation in the order in which vacant nodes are occupied." => See page 6-7.

Allocation method	Input/output data table allocation details	Details
Address order allocation	1. Assign a number of bytes in node address order of slave stations. 2. Enter the data length required by each slave station. 3. A slave station that does not have an I/O message function is not assigned a number of bytes. 4. Any slave station number (node address), that does not have hardware connected is not assigned a number of bytes.	Page 7-2
Even number allocation	1. Assign a number of bytes in node address order of slave stations. 2. Assign the default number of bytes required every for each slave station. For any slave station that needs more data than the default number of bytes, increase the size in multiples of the set number of bytes. 3. A slave station that does not have an I/O message function is assigned a default number of bytes. 4. Any slave station number (node address), that does not have hardware connected is assigned a default data length.	Page 7-4
Allocation in the order in which vacant nodes are occupied	1. Assign a number of bytes in node address order of slave stations. 2. Enter the number of bytes required by each slave station with a I/O message function. 3. A slave station that does not have an I/O message function is not assigned a number of bytes. 4. Any slave station number (node address), that does not have hardware connected, is assigned the default number of bytes.	Page 7-6

- No matter which allocation method is selected, you have to start the master module JW-50DN2 in the scan list edit mode, collect the data from slave stations, and create a scan list. The scan list classifies slave station inputs and outputs, number of bytes, and addresses. Therefore, a separate configuration program is not needed for the input/output data table allocation. => See page 7-8 and 7-9.
- Set the default number of bytes used in the "Even number allocation" and "Allocation in the order in which vacant nodes are occupied" modes to 1 to 64 bytes. For selecting data, use the system memory in the JW50H/70H/100H (on which the JW-50DN2 is mounted.) => See page 6-8.

Remark

- Number of I/O points with the JW-50DN2 is maximum 4096 (512 bytes).
  When editing the scan list while the total number of I/O points of slave modules connected exceeds 4096, node addresses exceeding 4096 will be ignored.

Three allocation examples are shown below.

- Node address 0 : The JW-50DN2 (master)
- Node address 1 : Slave station — Polling I/O input data = 1 byte; Polling I/O output data = 1 byte
- Node address 2 : Not connected
- Node address 3 : Slave station — Polling I/O input data = 3 bytes; Polling I/O output data = 3 bytes
- Node address 4 : Slave station — (No Polling I/O function)
- Node address 5 : Slave station — Bit Strobe input data = 3 bytes; Bit Strobe output data = 0 byte

[1] Address order allocation

Assign the number of bytes of data in the input/output data table in the same order as the node addresses were assigned to each slave station.

1. Assign the number of bytes required by each slave station.
2. A slave station that does not have I/O message function is not assigned a number of bytes.
3. Any slave station number (node address), that does not have hardware connected, is not assigned a number of bytes.

■ Allocation example

The allocation results using the "address order allocation" are as follows:

Address *	Input/output data table	
1st byte (000000)	Node address 1 (slave station)	Input
2nd byte (000001)		Output
3rd byte (000002)	Node address 3 (slave station)	Input
4th byte (000003)		
5th byte (000004)		
6th byte (000005)		Output
7th byte (000006)		
8th byte (000007)		
9th byte (000010)	Node address 5 (slave station)	Input
10th byte (000011)		
11th byte (000012)		
12th byte (000013) to 512th byte (000777)	Not used	

* The addresses shown in parentheses ( ) are correct when the top address of the I/O table is set to file address 000000(OCT) in file number 1.

System memory		Setting value
#1600 to #1601	#1700 to #1701	000000 (OCT)
#1602	#1702	01(HEX)
#1603	#1703	00(HEX)

0 1 ← Module address

Node address	Required number of bytes	I/O message function	Assigned data length (bytes)
1	2 (1 input, 1 output)	Yes	2 (1 input, 1 output)
2	Not connected	-	0
3	6 (3 input, 3 output)	Yes	6 (3 input, 3 output)
4	0	No	0
5	3 (3 input, 0 output)	Yes	3 (3 input)

- The required number of bytes are assigned to the slaves at nodes 1, 3, and 5.
- Slave 2 (not connected) and slave 4 (doesn't have a I/O message function) are not assigned any number of bytes.

The scan list data table (page 7-9) for this example will be as follows:

Address *	Value (HEX): Details	
1st byte (000000)	FF: This JW-50DN2 station (master)	Node address 0
2nd byte (000001)	All 00	
3rd byte (000002)		
4th byte (000003)		
5th byte (000004)		
6th byte (000005)		
7th byte (000006)		
8th byte (000007)		
9th byte (000010)	02: A slave station connected with a Polling I/O function	Node address 1
10th byte (000011)	00: Not used	
11th byte (000012)	01: 1 byte (input)	
12th byte (000013)	01: 1 byte (output)	
13th byte (000014)	00: 1st byte	
14th byte (000015)	00: (input data offset)	
15th byte (000016)	01: 2nd byte	
16th byte (000017)	00: (output data offset)	
17th byte (000020)	00: Not connected	Node address 2
18th byte (000021)	00: Not used	
19th byte (000022)	00: 0 byte (input)	
20th byte (000023)	00: 0 byte (output)	
21st byte (000024)	02: 3rd byte	
22nd byte (000025)	00: (input data offset)	
23rd byte (000026)	02: 3rd byte	
24th byte (000027)	00: (output data offset)	
25th byte (000030)	02: A slave station with a Polling I/O function	Node address 3
26th byte (000031)	00: Not used	
27th byte (000032)	03: 3 bytes (input)	
28th byte (000033)	03: 3 bytes (output)	
29th byte (000034)	02: 3rd byte	
30th byte (000035)	00: (input data offset)	
31st byte (000036)	05: 6th byte	
32nd byte (000037)	00: (output data offset)	
33rd byte (000040)	01: A slave station without an I/O message function	Node address 4
34th byte (000041)	00: Not used	
35th byte (000042)	00: 0 byte (input)	
36th byte (000043)	00: 0 byte (output)	
37th byte (000044)	08: 9th byte	
38th byte (000045)	00: (input data offset)	
39th byte (000046)	08: 9th byte	
40th byte (000047)	00: (output data offset)	
41st byte (000050)	04: A slave station with a Bit Strobe function	Node address 5
42nd byte (000051)	00: Not used	
43rd byte (000052)	03: 3 bytes (input)	
44th byte (000053)	00: 0 byte (output)	
45th byte (000054)	08: 9th byte	
46th byte (000055)	00: (input data offset)	
47th byte (000056)	0B: 12th byte	
48th byte (000057)	00 (output data offset)	

Address *	Value(HEX): Details	
49th byte (000060)	All 00	Node address 6
50th byte (000061)		
51st byte (000062)		
52nd byte (000063)		
53rd byte (000064)		
54th byte (000065)		
55th byte (000066)		
56th byte (000067)		
to	to	to
505th byte (000770)	All 00	Node address 63
506th byte (000771)		
507th byte (000772)		
508th byte (000773)		
509th byte (000774)		
510th byte (000775)		
511th byte (000776)		
512th byte (000777)		

* The addresses shown in parentheses ( ) are correct when the top address of the scan list table is set to file address 000000(OCT) in file number 2.

System memory		Setting value
#1614 to #1615	#1714 to #1715	000000 (OCT)
#1616	#1716	02(HEX)
#1617	#1717	00(HEX)

Module address → 0 1

[2] Even number allocation

Assign the number of bytes of data in the input/output data table in the order that the node addresses were assigned to each slave station.

1. Allocate the specified number of bytes to each slave station evenly.
   If an individual slave station needs more than the specified number of bytes, the JW-50DN2 allocates multiples of the specified number of bytes.
2. The JW-50DN2 assigns the specified number of bytes to slave stations that do not have an I/O message function.
3. The JW-50DN2 also assigns the specified number of bytes to slave station numbers (node addresses) that do not have any hardware connected to them.

Enter the specified number of bytes (1 to 64 bytes) between 1 and 3 on the system memory of the JW50H/70H/100H (in which the JW-50DN2 is mounted). => See page 6-8.

■ Allocation example

The allocation results of the case described on page 7-2 top are as shown as follows.
The below is true when the specified data length is 2 bytes.

Address *		Input/output data table	
1st byte	(000000)	Node address 1 (slave station)	Input
2nd byte	(000001)		Output
3rd byte	(000002)	Node address 2 (not connected)	Not used
4th byte	(000003)	Node address 3 (slave station)	Input
5th byte	(000004)		
6th byte	(000005)		
7th byte	(000006)		
8th byte	(000007)		Output
9th byte	(000010)		
10th byte	(000011)		
11th byte	(000012)	Node address 4 (slave station)	Not used
12th byte	(000013)	Node address 5 (slave station)	Input
13th byte	(000014)		
14th byte	(000015)		
15th byte	(000016)		
16thbyte	(000017)		Not used

* The addresses shown in parentheses ( ) are correct when the top address of the I/O table is set to file address $000000_{(OCT)}$ in file number 1. => See page 7-2.

17th byte	(000020)	Node address 6 (not connected)	Not used
18th byte	(000021)		
to	to	to	
131st byte	(000202)	Node address 63 (not connected)	Not used
132nd byte	(000203)		
133rd byte	(000204)	Not used	
to	to		
512thbyte	(000777)		

(When the data length is set to 2 bytes)

Node address	Required number of bytes	I/O message function	Assigned number of bytes
1	2 (1 input, 1 output)	Yes	2 (1 input, 1 output)
2	Not connected	-	2
3	6 (3 input, 3 output)	Yes	6 (3 input, 3 output)
4	0	No	2
5	3 (3 input, 0 output)	Yes	4 (3 input, 1 not used)

- The needed number of bytes (2 bytes) is assigned to slave station 1.
- Slave station 2 (not connected) and slave station 4 (does not have a I/O message function) are assigned the specified number of bytes (2 bytes).
- Slave stations 3 and 5 need a larger number of bytes than the specified number of bytes. (2 bytes). Therefore, in these cases, a different number of bytes is assigned which is a multiple of the specified data length (2 bytes).
  => Slave station 3 needs 6 bytes and is assigned 6 bytes (2 x 3).
  => Slave station 5 needs 3 bytes and is assigned 4 bytes (2 x 2).

The scan list data table (page 7-9) for this example will be as follows:

Address * 1	Value (HEX): Details	
1st byte (000000)	FF: This JW-50DN2 station (master)	Node address 0
2nd byte (000001)	All 00	
3rd byte (000002)		
4th byte (000003)		
5th byte (000004)		
6th byte (000005)		
7th byte (000006)		
8th byte (000007)		
9th byte (000010)	02: A slave station with a Polling I/O function	Node address 1
10th byte (000011)	00: Not used	
11th byte (000012)	01: 1 byte (input)	
12th byte (000013)	01: 1 byte (output)	
13th byte (000014)	00: 1st byte	
14th byte (000015)	00: (input data offset)	
15th byte (000016)	01: 2nd byte	
16th byte (000017)	00: (output data offset)	
17th byte (000020)	00: Not connected	Node address 2
18th byte (000021)	00: Not used	
19th byte (000022)	00: 0 byte (input)	
20th byte (000023)	00: 0 byte (output)	
21st byte (000024)	02: 3rd byte	
22nd byte (000025)	00: (input data offset)	
23rd byte (000026)	02: 3rd byte	
24th byte (000027)	00: (output data offset)	
25th byte (000030)	02: A slave station with a Polling I/O function	Node address 3
26th byte (000031)	00: Not used	
27th byte (000032)	03: 3 bytes (input)	
28th byte (000033)	03: 3 bytes (output)	
29th byte (000034)	04: 5th byte	
30th byte (000035)	00: (input data offset)	
31st byte (000036)	07: 8th byte	
32nd byte (000037)	00: (output data offset)	
33rd byte (000040)	01: A slave station without an I/O message function	Node address 4
34th byte (000041)	00: Not used	
35th byte (000042)	00: 0 byte (input)	
36th byte (000043)	00: 0 byte (output)	
37th byte (000044)	0A: 11th byte	
38th byte (000045)	00: (input data offset)	
39th byte (000046)	0A: 11th byte	
40th byte (000047)	00: (output data offset)	
41st byte (000050)	04: A slave station with a Bit Strobe function	Node address 5
42nd byte (000051)	00: Not used	
43rd byte (000052)	03: 3 bytes (input)	
44th byte (000053)	00: 0 byte (output)	
45th byte (000054)	0C: 13th byte	
46th byte (000055)	00: (input data offset)	
47th byte (000056)	0F: 16th byte	
48th byte (000057)	00: (output data offset)	

Address * 1	Value(HEX): Details	
49th byte (000060)	00	Node address 6
50th byte (000061)	00	
51st byte (000062)	00	
52nd byte (000063)	00	
53rd byte (000064)	11 * 2	
54th byte (000065)	00	
55th byte (000066)	11 * 2	
56th byte (000067)	00	
to	to	to
505th byte (000770)	00	Node address 63
506th byte (000771)	00	
507th byte (000772)	00	
508th byte (000773)	00	
509th byte (000774)	83 * 2	
510th byte (000775)	00	
511th byte (000776)	83 * 2	
512th byte (000777)	00	

* 1: The addresses shown in parentheses ( ) are correct when the top address of the scan list table is set to file address 000000(OCT) in file number 2. => See page 7-3.

* 2: The offset values are calculated by adding 2 bytes (specified number of bytes) to each address.

[3] Allocation in the order in which vacant nodes are occupied

Assign the number of bytes of data in the input/output data table in the order that the node addresses were assigned to each slave station.

1. Assign the required number of bytes to slave stations using the I/O message function.
2. The JW-50DN2 does not allocate any number of bytes for slave stations that do not have an I/O message function.
3. The JW-50DN2 will allocate the specified number of bytes to any slave station number (node address) that does not actually have hardware connected.
   Enter the number of bytes (1 to 64 bytes) on the system memory of the JW50H/70H/100H (in which the JW-50DN2 is mounted).
   => See page 6-8.

■ Allocation example

The results of "allocation in the order in which vacant nodes are occupied," for the example shown on page 7-2, are as follows.
The specified number of bytes was set to 2 bytes.

Address *		Input/output data table	
1st byte	(000000)	Node address 1 (slave)	Input
2nd byte	(000001)		Output
3rd byte	(000002)	Node address 2 (not connected)	Not used
4th byte	(000003)	Node address 3 (slave)	Input
5th byte	(000004)		
6th byte	(000005)		
7th byte	(000006)		
8th byte	(000007)		Output
9th byte	(000010)		
10th byte	(000011)		
11th byte	(000012)	Node address 5 (slave)	Input
12th byte	(000013)		
13th byte	(000014)		
14th byte	(000015)	Node address 6 (not connected)	Not used
15th byte	(000016)		
	to	to	
128th byte	(000177)	Node address 63 (not connected)	Not used
129th byte	(000200)	Not used	
130th byte	(000201)		
	to		
512th byte	(000777)		

* The addresses shown in parentheses ( ) are correct when the top address of the I/O table is set to file address $000000_{(OCT)}$ in file number 1.
=> See page 7-2.

(When the default data length is set to 2 bytes)

Node address	Required number of bytes	I/O message function	Assigned number of bytes
1	2 (1 input, 1 output)	Yes	2 (1 input, 1 output)
2	Not connected	-	2
3	6 (3 input, 3 output)	Yes	6 (3 input, 3 output)
4	0	No	0
5	3 (3 input, 0 output)	Yes	3 (3 input)

- The required number of bytes is assigned to slave stations 1, 3, and 5.
- Slave station 2 (no hardware connected) is assigned the specified number of bytes (2 bytes).
- Slave station 4 (without a I/O message function) is not allocated any number of bytes.

The scan list data table (page 7-9) for this example will be as follows:

Address * 1	Value (HEX): Details	
1st byte (000000)	FF: This JW-50DN2 station (master)	Node address 0
2nd byte (000001)	All 00	
3rd byte (000002)		
4th byte (000003)		
5th byte (000004)		
6th byte (000005)		
7th byte (000006)		
8th byte (000007)		
9th byte (000010)	02: A slave station with a Polling I/O function	Node address 1
10th byte (000011)	00: Not used	
11th byte (000012)	00: 1 byte (input)	
12th byte (000013)	01: 1 byte (output)	
13th byte (000014)	00: 1st byte	
14th byte (000015)	00: (input data offset)	
15th byte (000016)	01: 2nd byte	
16th byte (000017)	00: (output data offset)	
17th byte (000020)	00: Not connected	Node address 2
18th byte (000021)	00: Not used	
19th byte (000022)	00: 0 byte (input)	
20th byte (000023)	00: 0 byte (output)	
21st byte (000024)	02: 3rd byte	
22nd byte (000025)	00: (input data offset)	
23rd byte (000026)	02: 3rd byte	
24th byte (000027)	00: (output data offset)	
25th byte (000030)	02: A slave station with a Polling I/O function	Node address 3
26th byte (000031)	00: Not used	
27th byte (000032)	03: 3 bytes (input)	
28th byte (000033)	03: 3 bytes (output)	
29th byte (000034)	04: 5th byte	
30th byte (000035)	00: (input data offset)	
31st byte (000036)	07: 8th byte	
32nd byte (000037)	00: (output data offset)	
33rd byte (000040)	01: A slave station without an I/O message function	Node address 4
34th byte (000041)	00: Not used	
35th byte (000042)	00: 0 byte (input)	
36th byte (000043)	01: 0 byte (output)	
37th byte (000044)	0A: 11th byte	
38th byte (000045)	00: (input data offset)	
39th byte (000046)	0A: 11th byte	
40th byte (000047)	00: (output data offset)	
41st byte (000050)	04: A slave station with a Bit Strobe function	Node address 5
42nd byte (000051)	00: Not used	
43rd byte (000052)	03: 3 bytes (input)	
44th byte (000053)	00: 0 byte (output)	
45th byte (000054)	0A: 11th byte	
46th byte (000055)	00: (input data offset)	
47th byte (000056)	0D: 14th byte	
48th byte (000057)	00: (output data offset)	

Address * 1	Value(HEX): Details	
49th byte (000060)	00	Node address 6
50th byte (000061)	00	
51st byte (000062)	00	
52nd byte (000063)	00	
53rd byte (000064)	0F * 2	
54th byte (000065)	00	
55th byte (000066)	0F * 2	
56th byte (000067)	00	
to	to	to
505th byte (000770)	00	Node address 63
506th byte (000771)	00	
507th byte (000772)	00	
508th byte (000773)	00	
509th byte (000774)	81 * 2	
510th byte (000775)	00	
511th byte (000776)	81 * 2	
512th byte (000777)	00	

* 1: The addresses shown in parentheses ( ) are correct when the top address of the scan list table is set to file address $000000_{(OCT)}$ in file number 2. => See page 7-3.

* 2: The offset values are calculated by adding 2 bytes (specified number of bytes) to each address.

7-2 Editing the scan list

Before using the JW-50DN2 as a master mode for the first time, you will have to edit the scan list (to allocate I/O data).

[1] Editing procedure

Shown below are the procedures used to edit the scan list.

■ **Procedures**

① Switch the JW50H/70H/100H control module to the program mode.

↓

② Turn OFF the power to the JW50H/70H/100H and remove the JW-50DN2.

↓

③ Change switch SW6-7 on the JW-50DN2 to "Protection ON." => See page 6-5.

↓

④ Install the JW-50DN2 in the JW50H/70H/100H. => See chapter 4.

↓

⑤ Connect any slave stations.

↓ - Make sure to start all of the slave modules. Creating a scan list while some of the slave modules are turned off may cause problems with the I/O assignments. => See *1 below.

⑥Turn on the power to the JW50H/70H/100H.

↓

⑦ Press and hold the SCAN switch on the JW-50DN2 for at least 3 seconds.

↓ - The JW-50DN2 will edit the scan list. => See * 2 below.

⑧ Put the JW50H/70H/100H control module in the operation mode.

* 1: Connecting the slave stations mentioned in step ⑤ above

When "even number allocation" or "allocation in the order in which vacant nodes are occupied" is selected for the I/O data allocation method, and some node addresses are not occupied by slave stations, those node address will be assigned the specified number of bytes. This will make operation possible with only the connected slave stations.

When a slave station is connected at a vacant address, and if this station needs more than the specified number of bytes for I/O, the I/O addresses thereafter can be incremented by editing the next time a scan list will be created.

* 2: Scan list editing procedure mentioned in step ⑦

When the JW-50DN2 is in the normal operation mode and you change the JW50H/70H/100H (control module) to the operation mode, the JW-50DN2 will start I/O communication. However, when you press the SCAN switch immediately after communication is started, the JW-50DN2 will start editing the scan list. This may cause a malfunction.

[2] Scan list data table

Assign top address of the scan list data table (512 bytes) to the following system memory.

(=> See page 6-7.)

■ Addresses in the scan list data table

Basic operation mode		No. of bytes	Module No. switch setting	
Master	Slave		0	1
○	—	512	#1614 to #1617 (Specify top address and enable/disable)	#1714 to #1717 (Specify top address and enable/disable)

(○: Enable, —: Disable)

■ Details of the scan list data table

Address * 1	Details			
1st byte (000000)	Slave information flag * 2			Node address 0 information
2nd byte (000001)	Not used			
3rd byte (000002)	Input number of bytes	- Data length for the data which slave stations will send and receive in Polling I/O messages.	* 3	
4th byte (000003)	Output number of bytes			
5th byte (000004)	Input data offset	- These indicate the byte mappings in the I/O data table (page 7-1) that data will be sent from or received into using I/O messages. * 4.		
6th byte (000005)				
7th byte (000006)	Output data offset			
8th byte (000007)				
9th byte (0000010) to 16th byte (0000017)	Node address 1 information (same as node address 0)			
17th byte (000020) to 24th byte (000027)	Node address 2 information (same as node address 0)			
⋮	⋮			
505th byte (000770) to 512th byte (000777)	Node address 63 information (same as node address 0)			

* 1: The addresses shown in parentheses ( ) are correct when the top address of the scan list table is set to file address 000000(OCT) in file number 2.

System memory		Setting value
#1614 to #1615	#1714 to #1715	000000 (OCT)
#1616	#1716	02(HEX)
#1617	#1717	00(HEX)

0 1 ← Module address

* 2: Slave information flag

Value(HEX)	Details
00	Node not connected
01	Node connected does not have a I/O message function
02	Node connected with a Polling I/O function
04	Node connected with a Bit Strobe.
FF	JW-50DN2's node address

* 3: The data following the input data length becomes meaningful when the 1st byte of the slave data flag is 02 or 04.

* 4: The position of an address from the top byte is expressed by a byte + 1.
(Ex.: When the value is 0, it is the 1st byte. When the value is 2, it is the 3rd byte.)

Chapter 8: Explicit Message Function

This function is not needed when you use the I/O message function.

The JW-50DN2 can send a request for service to any device made by another manufacturer that uses the Explicit message function defined in the DeviceNet specifications.

(#1622, #1722 = $01_{(HEX)}$ => See page 6-8.)

This function uses the Explicit message data table (128 bytes for both request and response) in the JW50H/70H/100H (control module).

- An Explicit message data table request issues an Explicit message defined by the DeviceNet, and asks any corresponding device to provide service.
- The Explicit message data table response stores the service data details from the slave station.

Enter the leading address for the next system memory area in the explicit message table.

=> See page 6-7.

■ Addresses of the Explicit message data table areas (requests and responses)

Basic operation mode		Table	No. of bytes	Module No. switch setting	
Master	Slave			0	1
○	–	Requests	128	#1610 to #1613 (Specify top address and enable/disable)	#1710 to #1713 (Specify top address and enable/disable)
		Responses	128		

(O: Enable, -: Disable)

[1] Details of the Explicit message data table (requests)

JW-50DN2 side reading flag, control module writing flag, and other parameters are described.

Address *	Parameter name	Details
1st byte (000000)	JW-50DN2 side reading flag	When the JW-50DN2 has finished reading the contents being sent from the control module, the data in memory is automatically inverted. (Inverting data changes $00_{(H)}$ + $01_{(H)}$, and vise-versa.)
2nd byte (000001)	Control module writing flag	When this address data is inverted (the value of the read flag in the JW-50DN2 is different from the write flag in the control module) the JW-50DN2 reads the requested details from the control module and sends the requested message to the slave modules.
3rd byte (000002)	Status	The device status and response information are stored.
4th byte (000003)	TXID (transaction ID)	Assign an ID when creating a request.
5th byte (000004)	Size	Specify the request data length.
6th byte (000005)	Reserved area	Use prohibited.
7th byte (000006)	MAC ID	Specify a node address that will be transaction objective.
8th byte (000007)	Service code	Service code for the DeviceNet request.
9th byte (000010) 10th byte (000011)	Class ID	Assign a class ID to the Explicit message sending target.
11th byte (000012) 12th byte (000013)	Instance ID	Assign an instance ID to the Explicit message sending target.
13th byte (000014) to 118th byte (000165)	Service data (106 bytes)	Assign data that is defined by the service code. (In most cases, enter the attribute for the 1st byte.)

* The addresses shown in parentheses ( ) are correct when the top address of the Explicit message table is set to file address $000000_{(OCT)}$ in file number 1. (For the addresses of the other settings => See page 8-3.)

[2] Details of the Explicit message data table (responses)

Control module reading flag, JW-50DN2 writing flag etc. are provided for parameters.

Address *	Parameter name	Details
1st byte (000200)	Control module reading flag	When reading the received data, the same data is written to the JW-50DN2.
2nd byte (000201)	JW-50DN2 side writing flag	When the JW-50DN2 receives a response from a slave station, the JW-50DN2 inverts the data. (Inverting data changes $00_{(H)}$ to $01_{(H)}$, and vise-versa.)
3rd byte (000202)	Status	The device status and response information are stored.
4th byte (000203)	TXID (transaction ID)	Transaction ID of the response data.
5th byte (000204)	Size	Response data length.
6th byte (000205)	Reserved area	Use prohibited.
7th byte (000206)	MAC ID	Node address that will be the target for the transaction.
8th byte (000207)	Service code	Service code for the Device Net request.
9th byte (000210) to 118th byte (000365)	Response data (110 bytes)	A received data message, as defined by the service code, is returned.

* The addresses shown in parentheses ( ) are correct when the top address of the Explicit message table is set to file address $000000_{(OCT)}$. (For the addresses of the other settings => See page 8-3.)

- For details about the Explicit message parameters, see the "DeviceNet specifications."
  To obtain a copy of "DeviceNet specifications," contact an ODVA branch office in your country.

[3] Parameter addresses for the Explicit message data table (requests, responses)

Shown below are the parameter addresses that are selected by setting the module address switches.

Address (*5)	Module address switch set value		Parameter name	
	0	1		
1st byte (000000)	*1	*2	JW-50DN2 reading flag	Request
2nd byte (000001)			Control module writing flag	
3rd byte (000002)			Status	
4th byte (000003)			TXID (transaction ID)	
5th byte (000004)			Size	
6th byte (000005)			Reserved area	
7th byte (000006)			MAC ID	
8th byte (000007)			Service code	
9th byte (000010) 10th byte (000011)			Class ID	
11th byte (000012) 12th byte (000013)			Instance ID	
13th byte (000014) to 118th byte (000165)	↓	↓	Service data (106 bytes)	
129th byte (000200)	*3	*4	Control module read out flag	Response
130th byte (000201)			JW-50DN2 write flag	
131st byte (000202)			Status	
132nd byte (000203)			TXID (transaction ID)	
133rd byte (000204)			Size	
134th byte (000205)			Reserved area	
135th byte (000206)			MAC ID	
136th byte (000207)			Service code	
137th byte (000210) to 246th byte (000365)	↓	↓	Response data (110 bytes)	

*1: Enter top address to system memory #1610 to #1613.

System memory	Item	Setting range etc.
#1610 to #1611	File address	000000 to 177777 (OCT)
#1612	File number	00 to 07 (HEX)
#1613	Enable/disable	00 (HEX): Enable, 01 (HEX) : Disable

*2: Enter top address to system memory #1710 to #1713.

System memory	Item	Setting range etc.
#1710 to #1711	File address	000000 to 177777 (OCT)
#1712	Fine number	00 to 07 (HEX)
#1713	Enable/disable	00 (HEX): Enable, 01 (HEX): Disable

*3: "*1＋128th byte" address.
*4: "*2＋128th byte" address.
*5: Addresses in parenthesis are true when top address of the Explicit message table is set to "file address 000000 (OCT)."

[4] Example

Shown below is an example of reading the vendor ID of the identified object in a slave station (node address 1.)

(Top address of Explicit message table: File address 000000(OCT))

Explicit message data table **(requests)**

Address (OCT)	Parameter name	Value(HEX)	
000000	JW-50DN2 side reading flag	00(01)	③④
000001	Control module writing flag	00(01)	②
000002	Status	00	①
000003	TXID	00	
000004	Size	05	
000005	Reserved area	00	
000006	MAC ID	01	
000007	Service code	0E	
000010	Class ID	01	
000011		00	
000012	Instant ID	01	
000013		00	
000014	Service data	01	
000015		00	

Explicit message data table **(responses)**

Address (OCT)	Parameter name	Value(HEX)	
000200	Control module reading flag	00(01)	⑦
000201	JW-50DN2 side writing flag	00(01)	⑥
000202	Status	01	⑤
000203	TXID	00	
000204	Size	02	
000205	Reserved area	00	
000206	MAC ID	01	
000207	Service code	8E	
000210	Response data	68	
000211		00	

When Sharp's vendor ID is returned: 104 (DCM) = 68 (HEX)

- **Request table**
  - ① Enter the values above in the request table (000002 to 000015(OCT)).
  - ② Reverse the write flag (000001(OCT)) . (00 -> 01:*)
  - ③ When the write flag (00001(OCT)) and read flag (000000(OCT)) are not the same, the JW-50DN2 starts reading the details of the transaction.
  - ④ When the read process is complete, the JW-50DN2 automatically reverses the read flag (000000(OCT)) (00 -> 01:*), so that the read flag will be same value as the write flag.
    => The JW-50DN2 sends a request message to a slave module.
- **Response table**
  - ⑤ When the JW-50DN2 receives a response corresponding to the request above from a slave module, or if a time out occurs, the JW-50DN2 writes data to the transaction block in the response table.
    - The JW-50DN2 stores the response data from a slave module in the transaction block, starting at address 000202(OCT). In practice, the slave module vender ID104(DCM) for MAC ID01 is stored with the service data.
  - ⑥ The values of the write flag (000201(OCT)) in the response is reversed.
  - ⑦ Until the write flag (000200(OCT)) (00 -> 01:*) is reversed, the details of the transaction block are not allowed to change. To issue messages consecutively, the read flag should be reversed.

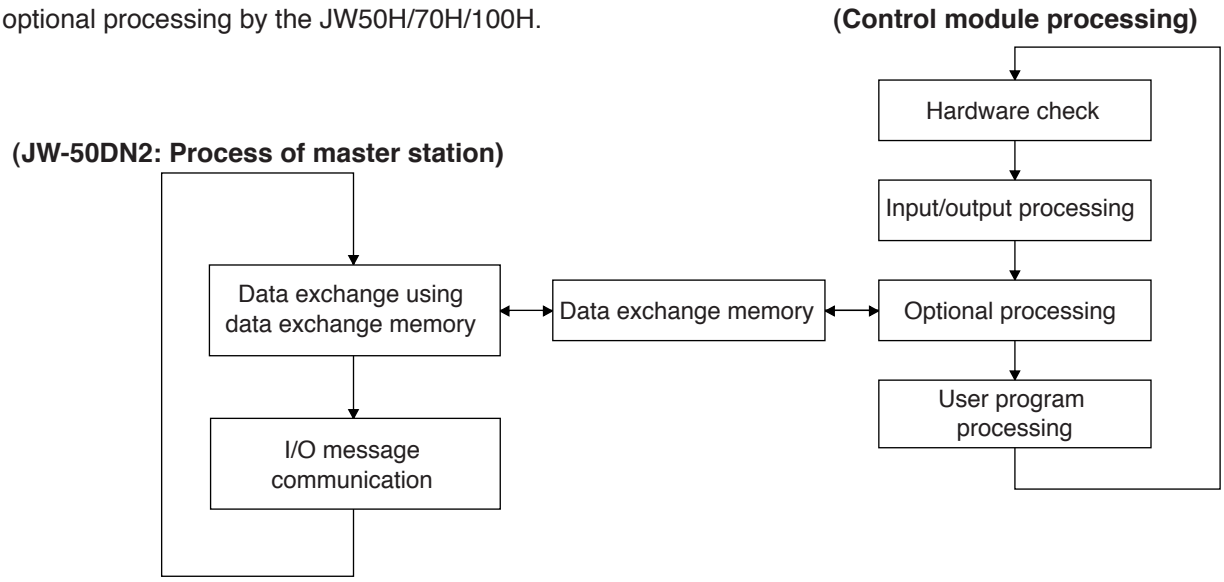
* Reverse

The initial status of each flag is 00. When receiving a response after sending a request, the flag changes to 01. Then the flag changes back to 00 again, and so on.

Chapter 9: Communication Timing

This chapter describes the communication between the JW50H/70H/100H (control module), the JW-50DN2 (master), and the slave stations.

To exchange data between the JW-50DN2 and the JW50H/70H/100H control module, the JW-50DN2 uses optional processing by the JW50H/70H/100H.



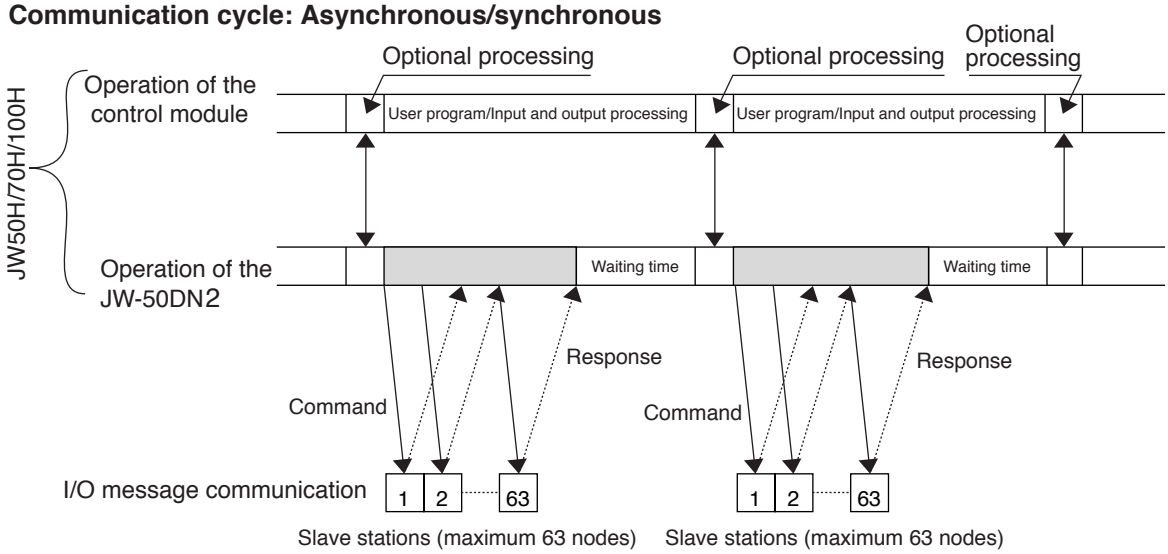
The JW-50DN2 receives responses from all slave stations. If not, after a communication time out, it will complete one I/O message communication cycle, and exchange data with the JW50H/70H/100H control module.

- The time-out time is the normal time required after the JW-50DN2 completes sending commands to all of the slave stations, until it receives responses from all of the slave stations. The actual communication time-out period is determined by the setting of Switch SW6-8 (selecting communication monitor time) on the JW-50DN2 and the number of slave stations connected. => See page 6-8.

The communication timing between the I/O message communication time and the operation time of the JW50H/70H/100H is as follows.

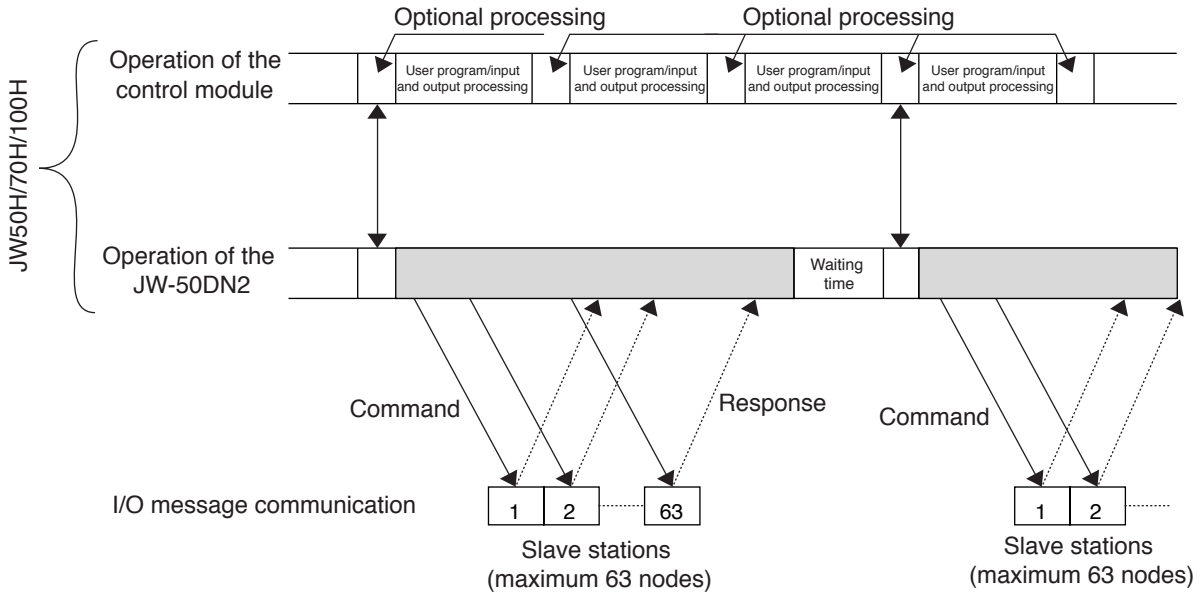
[1] When the I/O message communication time is shorter than the JW50H/70H/100H cycle operation time

■ **Communication cycle: Asynchronous/synchronous**

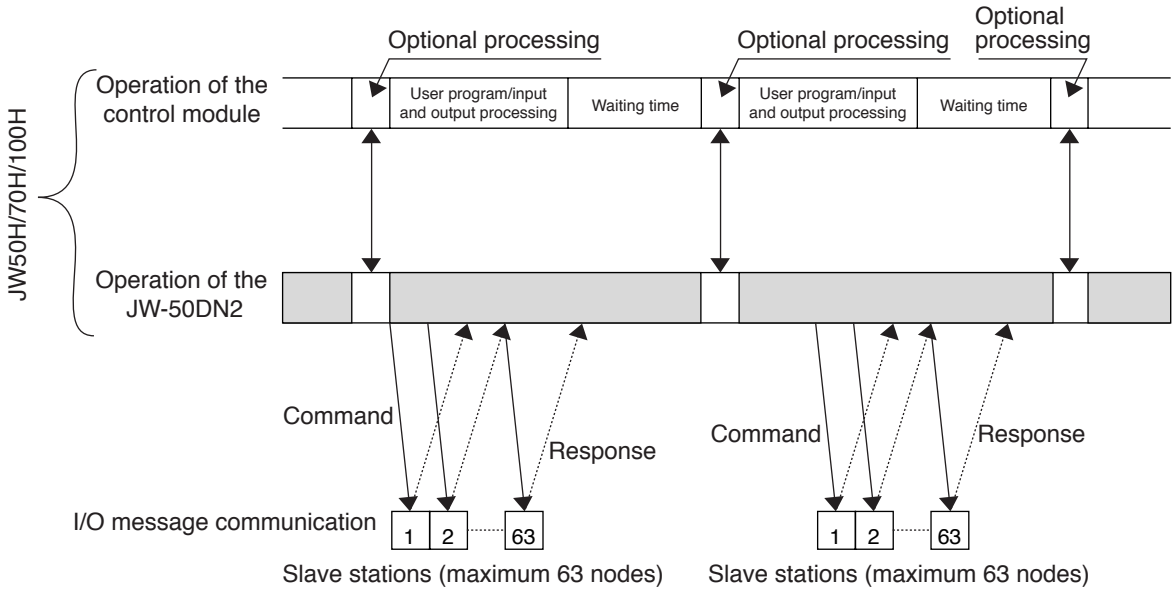


[2] When the I/O message communication time is longer than the JW50H/70H/100H cycle operation time

(1) Communication cycle: Asynchronous



(2) Communication cycle: Synchronous



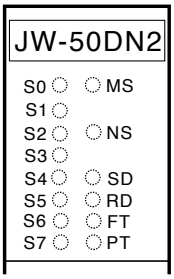
Note: The synchronous calculation operation is only possible with one module, including other communication modules (JW-10CM, JW-20CM). Therefore, be careful because using multiple modules in the synchronous mode may not be supported proper synchronous operation.

Chapter 10: Error Handling

When an error occurs during communication with the JW-50DN2, check the error details by referring to the indicator lamps and the diagnostic data table. Then take the appropriate action.

10-1 Indicator lamp

When an error occurs on a node (master and slave station), the error code and the node address will be displayed on the JW-50DN2 display panel (S0 to S7).



[1] Error code

(1) Error code display

The JW-50DN2 displays error codes using lights S0 to S7 on the display panel.

S0 to S7 lamp status (● : Lit, ○ : Off)								Error code (HEX)
S7	S6	S5	S4	S3	S2	S1	S0	
●	●	○	●	○	○	●	○	D2
●	●	○	●	○	●	○	●	D5
●	●	○	●	○	●	●	○	D6
●	●	○	●	●	○	○	●	D9
●	●	●	○	○	○	○	○	E0
●	●	●	●	○	○	○	○	F0
●	●	●	●	○	○	○	●	F1
●	●	●	●	○	○	●	○	F2
●	●	●	●	○	○	●	●	F3
●	●	●	●	○	●	○	○	F4
●	●	●	●	○	●	○	●	F5
●	●	●	●	○	●	●	○	F6
●	●	●	●	○	●	●	●	F7
●	●	●	●	●	○	○	○	F8
●	●	●	●	●	○	○	●	F9
●	●	●	●	●	○	●	○	FA
●	●	●	●	●	○	●	●	FB
●	●	●	●	●	●	○	○	FC

- When an indicator alternately turns ON and OFF.

If the S7 indicator is lit, an error code is displayed. If the S7 indicator is off, a node address is displayed.

(2) Error details

The error code details and actions are as follows.

Indicator lamp		Error details		Communication operation	Master status *1	Treatment
MS/NS/FT	S0 to S7 (error code)					
MS: Keeps the current status NS: Red lamp blinks	D2	Configuration error	The I/O area of one slave station exceeds input 127 bytes, output 127 bytes	- Does not retry connection for error slave station. - Does not communicate with all the slave station.	D4 turns ON * 2	Reset the slave node addresses.
	D5	Verification error	- There is no slave data table at all. - The slave does not exist.		D16 and D3 turn ON * 2	- Check whether the slaves are properly connected. - Recreate the scan list after checking the slave connections and node assignments.
	D6		The slave's I/O data size does not match the scan list register details.	- Retry connection for error slave station. - Communicate with normal slave station.		After checking the number of I/O bytes used by the slaves, recreate the scan list.
	D9	Communication error	- No response is returned from a slave module after 4*EPR time. - Unable to make a connection with a slave module registered in the scan list		D16 and D2 turn ON * 2	Check the following: - Make sure the communication speed of the master station and slave stations are the same. - Make sure there are no disconnected or loose cables. - Make sure there is not too much electrical noise. - Make sure the cable lengths (trunk and branches) are appropriate. - Make sure the terminating resistances are connected to both ends and only to the ends.
MS: Green lamp blinks NS: Goes OFF	E0	Network power source error	Communication power is not supplied normally.	Waiting power supply from network power supply.	D16 and D5 turn ON	Check wiring of network power supply and network cable.
MS: Keeps the current status NS: Red lamp lights	F0	A node address has been used twice	The master station node address has been assigned to another node.	Operation stopped	D16 and D1 turn ON.	Check the other node addresses. Eliminate the duplicated node address and restart the master module.
	F1	Detected a Busoff	The JW-50DN Busoff status is active (communication was stopped due to frequent data errors).			Check the following: - Make sure the communication speed of the master station and slave stations are the same. - Make sure there are no disconnected or loose cables. - Make sure there is not too much electrical noise. - Make sure the cable lengths (trunk and branches) are appropriate. - Make sure the terminating resistances are connected both ends and only to the ends.
MS: Red lamp blinks NS: Goes OFF	F2	Node address error	Some of the switches on the JW-50DN2 are set incorrectly.		D16 and D0 turn ON.	Check the node address switch.
	F3	Communication speed error				Check the SW6-5, 6 switch settings.
	F4	Module No. error				Check the Module No. switch settings.
	F5	Other switch setting error	Other than "F2, F3, and F4"			
	F6	System memory setting error	A value in the JW-50DN2 system memory is out of range.			Check the set values of the system memory.

To the next page

* 1: Master status => See page 10-9, 10-11.

* 2: D17 will turn ON when the JW-50DN2 is connected to more than 1 slave station. (If the master station detects a problem or is unable to establish connection with all slave stations, D17 will turn OFF.)

Indicator lamp		Error details		Operation of JW-50DN2	Master status *	Treatment
MS/NS/FT	S7 to S0 (error node)					
MS: Red lamp lights NS: Goes OFF	F7	Scan list data error	Check sum error in the EEPROM that stores the EEPROM scan list and serial number.	Operation stopped	D16 and D0 turn ON	Recreate the scan list and recreate the data table in the master module (JW-50DN2). Or, replace the JW-50DN2.
	F8	Serial No. error				
	F9	RAM error	An error occurred during a RAM check of the master module.		—	
	FA	ROMSUM error	An error occurred during a ROM check of the master module.			
	FB	DPRAM error	An error occurred during a common RAM check of the master module.			
	FC	Mismatch scan list	The scan list in the control module and the scan list stored in the EEPROM in the JW-50DN2 are not identical.		—	
MS: Keeps the current status NS: Keeps the current status	—	Watchdog timer error	A watchdog timer error occurred on the master station.	Operation stopped	—	Replace the JW-50DN2.
FT: Lights	—	Watchdog timer error on the JW-50DN2 (Hardware error on the JW-50DN2).		Operation stopped	—	

* Master status => See page 10-9 and 10-11.

[2] Display of node addresses

The JW-50DN2 displays node addresses using the S0 to S7 lamps on the display panel.

S0 to S7 lamp status (●: Lit, ○: Off)								Node address (DCM)
S7	S6	S5	S4	S3	S2	S1	S0	
○	○	○	○	○	○	○	○	0
○	○	○	○	○	○	○	●	1
○	○	○	○	○	○	●	○	2
○	○	○	○	○	○	●	●	3
○	○	○	○	○	●	○	○	4
○	○	○	○	○	●	○	●	5
○	○	○	○	○	●	●	○	6
○	○	○	○	○	●	●	●	7
○	○	○	○	●	○	○	○	8
○	○	○	○	●	○	○	●	9
○	○	○	●	○	○	○	○	10
○	○	○	●	○	○	○	●	11
○	○	○	●	○	○	●	○	12
○	○	○	●	○	○	●	●	13
○	○	○	●	○	●	○	○	14
○	○	○	●	○	●	○	●	15
○	○	○	●	○	●	●	○	16
○	○	○	●	○	●	●	●	17
○	○	○	●	●	○	○	○	18
○	○	○	●	●	○	○	●	19
○	○	●	○	○	○	○	○	20
○	○	●	○	○	○	○	●	21
○	○	●	○	○	○	●	○	22
○	○	●	○	○	○	●	●	23
○	○	●	○	○	●	○	○	24
○	○	●	○	○	●	○	●	25
○	○	●	○	○	●	●	○	26
○	○	●	○	○	●	●	●	27
○	○	●	○	●	○	○	○	28
○	○	●	○	●	○	○	●	29
○	○	●	●	○	○	○	○	30
○	○	●	●	○	○	○	●	31
○	○	●	●	○	○	●	○	32
○	○	●	●	○	○	●	●	33
○	○	●	●	○	●	○	○	34
○	○	●	●	○	●	○	●	35
○	○	●	●	○	●	●	○	36
○	○	●	●	○	●	●	●	37
○	○	●	●	●	○	○	○	38
○	○	●	●	●	○	○	●	39
○	●	○	○	○	○	○	○	40
○	●	○	○	○	○	○	●	41
○	●	○	○	○	○	●	○	42
○	●	○	○	○	○	●	●	43
○	●	○	○	○	●	○	○	44
○	●	○	○	○	●	○	●	45

S0 to S7 lamp status (●: Lit, ○: Off)								Node address (DCM)
S7	S6	S5	S4	S3	S2	S1	S0	
○	●	○	○	○	●	●	○	46
○	●	○	○	○	●	●	●	47
○	●	○	○	●	○	○	○	48
○	●	○	○	●	○	○	●	49
○	●	○	●	○	○	○	○	50
○	●	○	●	○	○	○	●	51
○	●	○	●	○	○	●	○	52
○	●	○	●	○	○	●	●	53
○	●	○	●	○	●	○	○	54
○	●	○	●	○	●	○	●	55
○	●	○	●	○	●	●	○	56
○	●	○	●	○	●	●	●	57
○	●	○	●	●	○	○	○	58
○	●	○	●	●	○	○	●	59
○	●	●	○	○	○	○	○	60
○	●	●	○	○	○	○	●	61
○	●	●	○	○	○	●	○	62
○	●	●	○	○	○	●	●	63

10-2 Diagnostic data table

Using the diagnostic data table created on the JW50H/70H/100H (control module), you can check the communication status of the nodes (master and slave stations). To assign the diagnostic table (master mode: 256 bytes, slave mode: 128 bytes), enter the leading address for the next system memory area. => See page 6-7.

■ **Diagnostic data table addresses**

Basic operation mode		No. of bytes	Module No. switch setting value	
Master	Slave		0	1
○	○	Master: 256 Slave: 128	#1604 to #1607 (Specify top address and enable/disable)	#1704 to #1707 (Specify top address and enable/disable)

(○: Enable)

[1] When JW-50DN2 is master mode

The diagnostic data table contains a communication monitor table, an operating status monitor table, a device status table, master status details, and vender information.

■ **Diagnostic data table**

Address * 1	D7	D6	D5	D4	D3	D2	D1	D0
1st byte (000000)	7	6	5	4	3	2	1	0
2nd byte (000001)	15	14	13	12	11	10	9	8
3rd byte (000002)	23	22	21	20	19	18	17	16
4th byte (000003)	31	30	29	28	27	26	25	24
5th byte (000004)	39	38	37	36	35	34	33	32
6th byte (000005)	47	46	45	44	43	42	41	40
7th byte (000006)	55	54	53	52	51	50	49	48
8th byte (000007)	63	62	61	60	59	58	57	56
9th byte (000010)	Reserved area * 2							
32nd byte (000037)	D7	D6	D5	D4	D3	D2	D1	D0
33rd byte (000040)	7	6	5	4	3	2	1	0
34th byte (000041)	15	14	13	12	11	10	9	8
35th byte (000042)	23	22	21	20	19	18	17	16
36th byte (000043)	31	30	29	28	27	26	25	24
37th byte (000044)	39	38	37	36	35	34	33	32
38th byte (000045)	47	46	45	44	43	42	41	40
39th byte (000046)	55	54	53	52	51	50	49	48
40th byte (000047)	63	62	61	60	59	58	57	56
41st byte (000050)	Reserved area * 2							
64th byte (000077)								
65th byte (000100)	Node 0							
66th byte (000101)	Node 1							
127th byte (000176)	Node 62							
128th byte (000177)	Node 63							
129th byte (000200)	D7	D6	D5	D4	D3	D2	D1	D0
130th byte (000201)	D17	D16	D15	D14	D13	D12	D11	D10
131st byte (000202)	Reserved area * 2							
210th byte (000321)								
211th byte (000322)	**Vender information** (46 bytes) => Page 10-10.							
256th byte (000377)								

← Bit number

Communication monitor table (8 bytes)
- The node addresses are numbered 0 to 63. The communication status of each node is indicated by turning the bits in these 8 bytes ON and OFF.
  - ON: Normal
  - OFF: Abnormal

=> See the next page.
- A bit representing the JW-50DN2 (master module) status will turn OFF when any of the slave stations is abnormal.

Operating status monitor table (8 bytes)
- The node addresses are numbered 0 to 63. The operating status of each node is indicated by turning the bits in these 8 bytes ON and OFF.
  - ON: The slave station is operating
  - OFF: The slave station is idle.

=> See the next page.
- For details about the operating status of slave stations, see the specifications for each slave station.

Device status table (64 bytes)
- The status of the slave station devices can be monitored by keeping track of the device status codes assigned to each node address. 00(HEX) is normal.

=> See page 10-7.

Master status (2 bytes)
- The error information and operating status of the master station is indicated by turning bits ON and OFF.

=> See page 10-9.

* 1: The addresses shown in parentheses ( ) are correct when the top address of the diagnosis table is set to file address 000000(OCT). (For the addresses of the other settings => See page 6-7.)

* 2: Do not change any values in the reserved area. If you do, the JW-50DN2 will malfunction.

Shown below are the addresses of the diagnostic data table (communication monitor table, etc.) by each Module No. switch setting.

(1) Address of the communication monitor table (when in the master mode)

Address (*1)	Module address switch set value		Node address (Bit)							
	0	1	D7	D6	D5	D4	D3	D2	D1	D0
1st byte (000000)	*2	*3	7	6	5	4	3	2	1	0
2nd byte (000001)			15	14	13	12	11	10	9	8
3rd byte (000002)			23	22	21	20	19	18	17	16
4th byte (000003)			31	30	29	28	27	26	25	24
5th byte (000004)			39	38	37	36	35	34	33	32
6th byte (000005)			47	46	45	44	43	42	41	40
7th byte (000006)			55	54	53	52	51	50	49	48
8th byte (000007)	↓	↓	63	62	61	60	59	58	57	56

*2: Enter top address to system memory #1604 to #1607.

System memory	Item	Setting range etc.
#1604 to #1605	File address	000000 to 177777(OCT)
#1606	File number	00 to 07(HEX)
#1607	Enable/disable	00(HEX): Enable, 01(HEX) : Disable

*3: Enter top address to system memory #1704 to #1707.

System memory	Item	Setting range etc.
#1704 to #1705	File address	000000 to 177777(OCT)
#1706	Fine number	00 to 07(HEX)
#1707	Enable/disable	00(HEX): Enable, 01(HEX): Disable

- The bits (ON/OFF) at node addresses 0 to 63 indicate the communication status of each node.
  (ON: Normal, OFF: Abnormal)
- The master node turns ON when it can communicate normally with all the slave modules on the scan list table.
- Even the "even allocation" and " allocation in order of securing empty notes" are selected, bits corresponding to node addresses of "not connected slave module" and "slaves without I/O message" are always OFF.

(2) Operating status monitor table addresses (when in the master mode)

Address (*1)	Module address switch set value		Node address (Bit)							
	0	1	D7	D6	D5	D4	D3	D2	D1	D0
33rd byte (000040)	*4	*5	7	6	5	4	3	2	1	0
34th byte (000041)			15	14	13	12	11	10	9	8
35th byte (000042)			23	22	21	20	19	18	17	16
36th byte (000043)			31	30	29	28	27	26	25	24
37th byte (000044)			39	38	37	36	35	34	33	32
38th byte (000045)			47	46	45	44	43	42	41	40
39th byte (000046)			55	54	53	52	51	50	49	48
40th byte (000047)	↓	↓	63	62	61	60	59	58	57	56

*4: "*2＋32nd byte" address.
*5: "*3＋32nd byte" address.

- The bits at node addresses 0 to 63 indicate the operating status of each node.
  (ON: Slave station is operating, OFF: Slave station is idle)
- The master node turns ON when it can communicate normally with all the slave modules on the scan list table.
- Even the "even allocation" and " allocation in order of securing empty notes" are selected, bits corresponding to node addresses of "not connected slave module" and "slaves without I/O message" are always OFF.

* 1: The addresses shown in parentheses ( ) are correct when the top address of the diagnosis table is set to file address 000000(OCT).

(3) Device status table addresses (when in the master mode)

When an error occurs on a slave station device, a device status code (next page) will be stored at the following addresses. (When the communication is nomal, $00_{(HEX)}$ will be stored.)

Address (*1)	Module address switch set value		Node address
	0	1	
65th byte (000100)	*6	*7	0
66th byte (000101)	↓	↓	1
67th byte (000102)			2
68th byte (000103)			3
69th byte (000104)			4
70th byte (000105)			5
71st byte (000106)			6
72nd byte (000107)			7
73rd byte (000110)			8
74th byte (000111)			9
75th byte (000112)			10
76th byte (000113)			11
77th byte (000114)			12
78th byte (000111)			13
79th byte (000116)			14
80th byte (000117)			15
81st byte (000120)			16
82nd byte (000121)			17
83rd byte (000122)			18
84th byte (000123)			19
85th byte (000124)			20
86th byte (000125)			21
87th byte (000126)			22
88th byte (000127)			23
89th byte (000130)			24
90th byte (000131)			25
91st byte (000132)			26
92nd byte (000133)			27
93rd byte (000134)			28
94th byte (000135)			29
95th byte (000136)			30
96th byte (000137)			31
97th byte (000140)			32
98th byte (000141)			33
99th byte (000142)			34
100th byte (000143)			35
101st byte (000144)			36
102nd byte (000145)			37
103rd byte (000146)			38
104th byte (000147)			39
105th byte (000150)			40
106th byte (000151)			41
107th byte (000152)			42
108th byte (000153)			43
109th byte (000154)			44
110th byte (000155)			45
111th byte (000156)			46
112th byte (000157)			47
113th byte (000160)			48
114th byte (000161)			49
115th byte (000162)			50
116th byte (000163)			51
117th byte (000164)	↓	↓	52

* 1: The addresses shown in parentheses ( ) are correct when the top address of the diagnostic table is set to file address $000000_{(OCT)}$."
* 6: "*2 + 64th byte" address.(*2, *3: See the previous page)
* 7: "*3 + 64th byte" address.

Address (*1)	Module address switch set value		Node address
	0	1	
118th byte (000165)	*8	*9	53
119th byte (000166)	↓	↓	54
120th byte (000167)	↓	↓	55
121st byte (000170)	↓	↓	56
122nd byte (000171)	↓	↓	57
123rd byte (000172)	↓	↓	58
124th byte (000173)	↓	↓	59
125th byte (000174)	↓	↓	60
126th byte (000175)	↓	↓	61
127th byte (000176)	↓	↓	62
128th byte (000177)	↓	↓	63

* 1: The addresses shown in parentheses ( ) are correct when the top address of the diagnosis table is set to file address 000000(OCT)."
* 8: "*6 + 53rd byte" address. (*6, *7: See the previous page)
* 9: "*7 + 53rd byte" address.

● **Device status code**

Device status code		Details
Decimal	Hexadecimal	
0	0	The node is normal, or does not exist on the scan list.
70	46	Duplicate MAC ID error.
72	48	No I/O response was returned.
77	4D	The I/O size of the slave module does not match the scan list.
78	4E	Open connection error (there is no slave).
79	4F	No other device exists on the network.
80	50	The IDLE mode was entered.
83	53	Open I/O connection error.
84	54	Response timed out while opening a connection.
86	56	The device entered the idle status.
90	5A	Judgment bus off.
91	5B	Entered the bus off status.
92	5C	Network power error.

(4) Master status address (when used in the master mode)

Displays error information and operating status by turning bits ON and OFF.

Address (*1)	Module address switch set value		Diagnostic details
	0	1	
129th byte (000200)	*10	*11	Error information (D0 to D7)
130th byte (000201)	↓	↓	Operation status (D10 to D17)

*12

* 1: The addresses shown in parentheses ( ) are true when the top address of the diagnosis table is set to "file address 000000(OCT)."

*10: "*2 + 128th byte" address.

*11: "*3 + 128th byte" address. (*2, *3: See page 10-6)

*12: Details of the D0 to D7, and D10 to D17 bits.

Error information	D0	Incorrect switch settings, EEPROM error
	D1	Duplicated assignment of a node address. Busoff is detected.
	D2	Communication error
	D3	Verification error
	D4	Configuration error
	D5	Sending error
	D6	Reserved area
	D7	
Operation status	D10	Currently creating scan list
	D11	Currently writing serial numbers
	D12	Send the scan list the other way (Host to JW-50DN2)
	D13	Reserved area
	D14	Disabled scan list (protected mode)
	D15	Message communication enable flag
	D16	Error is currently occurring
	D17	Currently performing I/O message communication. - Tunes ON when communicating with "any of slaves" on the scan list table.

(5) Vender data address (when used in the master mode)

The vender data is used when SHARP provides services to JW-50DN2 users. Do not use the vender data in your applications.

Address (*1)	Vender data	Storage value (data details)	
211th byte (000322) 212th byte (000323)	Vender ID (2 byte)	104(DCM)	Vender ID code (Sharp = 104)
		000(DCM)	
213th byte (000324) 214th byte (000345)	Device Type (2 byte)	012(DCM)	Device type (communication adapter=012)
		000(DCM)	
215th byte (000326) 216th byte (000327)	Product Code (2 byte)	002(DCM)	Product code (JW-50DN2 = 002)
		000(DCM)	
217th byte (000330) 218th byte (000331)	Revision (2 byte)	04(HEX)	Software version (The values left is when S4.1).
		01(HEX)	
219th byte (000332) 220th byte (000333) 221st byte (000334) 222nd byte (000335)	Serial Number (4 byte)	Serial No. □□△△22○○○○(DCM)*2 (Written when manufacturing the JW-50DN2)	
223rd byte (000336)	Product Name (32 byte)	4A(HEX) : J	"JW-50DN2" of ASCII code.
224th byte (000337)		57(HEX) : W	
225th byte (000340)		35(HEX) : 5	
226th byte (000341)		30(HEX) : 0	
227th byte (000342)		44(HEX) : D	
228th byte (000343)		4E(HEX) : N	
229th byte (000344)		32(HEX) : 2	
230th byte (000345)		00(HEX)	All 00(HEX)
: :		:	
: :		:	
254th byte (000375)		00(HEX)	
255th byte (000376)	Scan list establishing flag	When scan list is established, 01(HEX) (if not 00(HEX)).	
256th byte (000377)	Serial No. establishing flag	When serial No. is established, 01(HEX) (if not 00(HEX)).	

*1: The addresses shown in parentheses ( ) are true when the top address of the diagnosis table is set to file address 000000(OCT).

*2: Serial number. □□△△22○○○○(DCM)

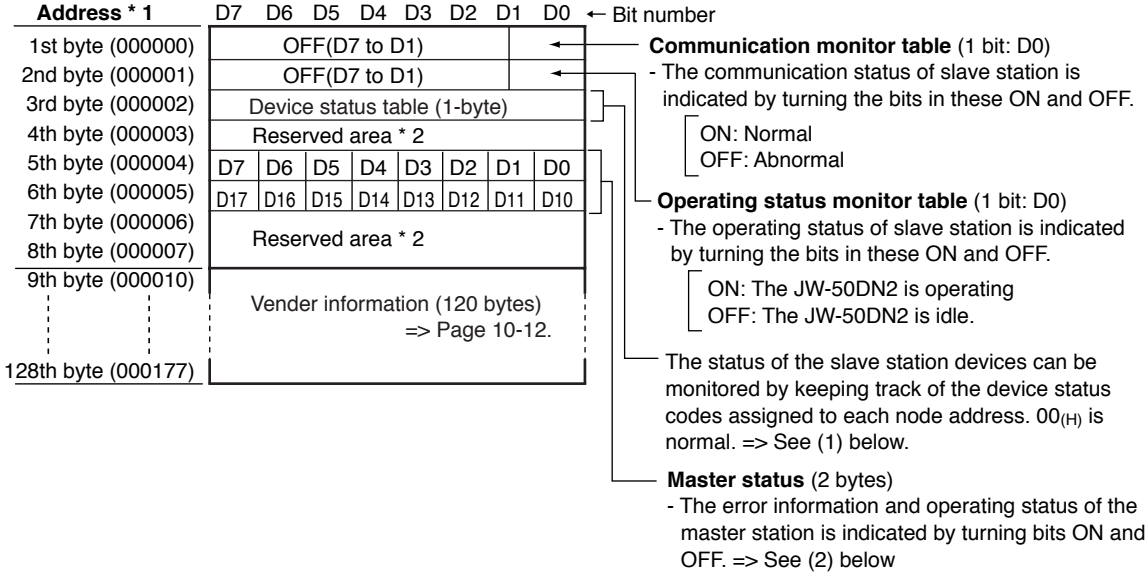
- □□: Year manufactured (lower two digits of Western year: "04" for 2004
- △△: Month manufactured ("01" for January, --- "12" for December)
- 22: Model code (JW-50DN2 is "22")
- ○○○○: Serial number (reset each month)

Ex.: A unit first manufactured in January 2004: 0401220001(DCM)

[2] When the JW-50DN2 is used in the slave mode

The diagnosis tables contain a communications monitor table, an operating status monitor table, a device status table, a master status table, and vender data.

■ **Diagnostic table** (128 byte)



*1 : The addresses shown in parentheses ( ) are true when the top address of the I/O table is set to file address 000000(OCT). (The details of the settings. => Page 6-7.)

*2: Do not modify the numbers in the reserved areas. That may cause the machine to malfunction.

(1) Device status code (when used in the slave mode)

Device status code		Details
Decimal	Hexadecimal	
0	0	The node is normal.
70	46	Duplicate MAC ID error.
72	48	No I/O response was returned.
79	4F	There is no other device on the network.
80	50	The device entered the idle status.
90	5A	Judging bus off.
91	5B	Entered the bus off status.
92	5C	Network power error.

(2) Master status address (when in the slave mode)

Error information	D0	Incorrect switch settings, EEPROM error
	D1	Duplicated assignment of a node address. Busoff is detected.
	D2	Communication error
	D3	Reserved area
	D4	Configuration error
	D5	Sending error
	D6	Reserved area
	D7	
Operation status	D10	Reserved area
	D11	
	D12	
	D13	
	D14	
	D15	
	D16	An error is occurred, and the I/O message stops communication.
	D17	Currently performing I/O message communication.

(3) Vender data address (when used in the slave mode)

The vender data is used when SHARP provides services to JW-50DN2 users. Do not use the vender data in your applications.

Address (*1)	Vender information	Storage value (data details)	
9th byte (000010) 10th byte (000011)	Vender ID (2 byte)	$104_{(DCM)}$ $000_{(DCM)}$	Vender ID code (Sharp = 104)
11th byte (000012) 12th byte (000013)	Device Type (2 byte)	$012_{(DCM)}$ $000_{(DCM)}$	Device type (communication adapter = 12)
13th byte (000014) 14th byte (000015)	Product Code (2 byte)	$002_{(DCM)}$ $000_{(DCM)}$	Product code (JW-50DN2 = 002)
15th byte (000016) 16th byte (000017)	Revision (2 byte)	$04_{(HEX)}$ $01_{(HEX)}$	Software version (The values left is when S4.1).
17th byte (000020) 18th byte (000021) 19th byte (000022) 20th byte (000023)	Serial Number (4 byte)	Serial No. □□△△22○○○○$_{(DCM)}$ *2 (Written when manufacturing the JW-50DN2)	
21st byte (000024)	Product Name (32 byte)	$4A_{(HEX)}$: J	"JW-50DN2" of ASCII code.
22nd byte (000025)		$57_{(HEX)}$: W	
23rd byte (000026)		$35_{(HEX)}$: 5	
24th byte (000027)		$30_{(HEX)}$: 0	
25th byte (000030)		$44_{(HEX)}$: D	
26th byte (000031)		$4E_{(HEX)}$: N	
27th byte (000032)		$32_{(HEX)}$: 2	
28th byte (000033)		$00_{(HEX)}$	All $00_{(HEX)}$
: :		:	
52nd byte (000063)		$00_{(HEX)}$	
53rd byte (000064) : : 126th byte (000175)	Reserved area	- Do not change the numeric values. Otherwise, malfunction will occur.	
127th byte (000176)	Scan list establishing flag	When scan list is established, $01_{(HEX)}$ (if not $00_{(HEX)}$).	
128th byte (000177)	Serial No. establishing flag	When serial No. is established, $01_{(HEX)}$ (if not $00_{(HEX)}$).	

*1: The addresses shown in parentheses ( ) are true when the top address of the diagnosis table is set to file address $000000_{(OCT)}$.

*2: Serial number. □□△△22○○○○$_{(DCM)}$

- □□: Year manufactured (lower two digits of Western year: "04" for 2004
- △△: Month manufactured ("01" for January, --- "12" for December)
- 22: Model code (JW-50DN2 is "22")
- ○○○○: Serial number (reset each month)

Ex.: A unit first manufactured in January 2004: $0401220001_{(DCM)}$

10-3 JW-50DN2 status when the control module has stopped operation or error has occurred

When the JW50H/70H/100H (control module) stops operation or has an error, the JW-50DN2 becomes any of the following communication status. (The display lamps and master status are the same as normal communication.)

	Communication operation	
When used in the master mode	Input data	Transfer data received from an input slave to the control module.
	Output data	The data sent to an output slave module depends on the system memory settings. *
When used in the slave mode	Input data	Always sends idle data to the master module.
	Output data	Transfer data received from the maser module to the control module.

* Output to slave modules (when the control module is stopped) is determined by the value (00, $01_{(HEX)}$) in system memory addresses #1630 (module address = 0) and #1730 (module address = 1).
$00_{(HEX)}$: Master module sends idle data
$01_{(HEX)}$: Master module sends $00_{(HEX)}$ data

- **When receiving idle data**

  When the JW-50DN2 receives idle data, the data sent to the control module is always the same.

Chapter 11: Specifications

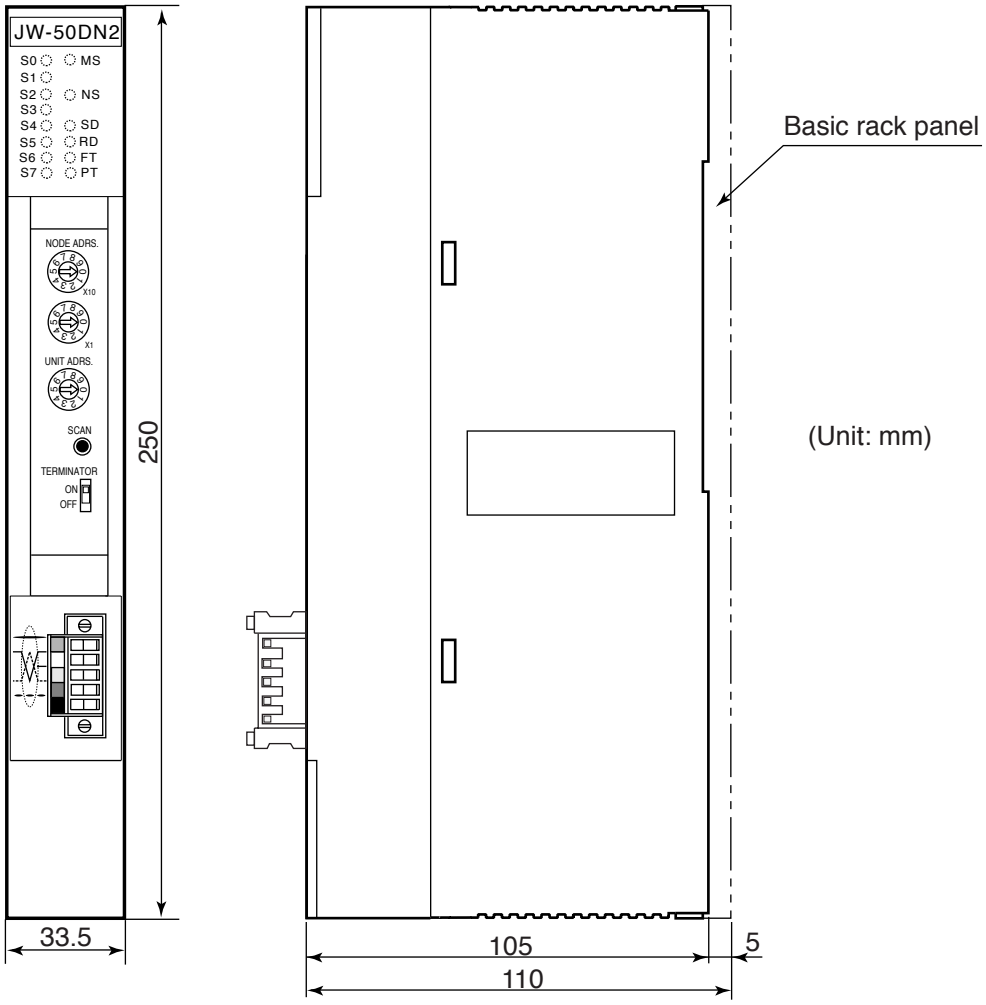
(1) General specifications

Item	Specification	
Applicable PLC	Control module	JW-50CUH, JW-70CUH, JW-100CUH
	Number of modules that can be installed	Maximum two
	Interface with a control module	Optional interface (no occupation of I/O points) - An optional cable is needed to connect to a rack panel.
Insulation resistance	10 M-ohms or more with 500 VDC Meger	
Withstand voltage	1500 VAC, 50/60 Hz, for one minute	
Storage temperature	-20 to +70° C	
Ambient operating temperature	0 to +55° C	
Ambient humidity	35 to 90%RH (non condensing)	
Vibration resistance	Equivalent to JIS B 3502. Oscillation distance: 0.15 mm (10 to 58 Hz), 9.8 m/s^2 (58 to 150 Hz) (2 hours each for X, Y, and Z directions.)	
Shock resistance	Equivalent to JIS B 3502. 147 m/s^2 (3 times each in the X, Y, and Z directions)	
Communication power voltage	11 to 25 VDC (50 mA max./JW-50DN2)	
Internal power consumption	250 mA max. (5 VDC)	
Atmosphere	No corrosive gas	
Weight	Approximately 300 g	
Accessories	One instruction manual	

(2) Communication specifications

Item	Specification			
Communication protocol	Conforms to the DeviceNet protocol			
Basic operation mode	Master mode, slave mode.			
Number of nodes connectable	Maximum of 63 nodes for one master station.			
Number of I/O points	4,096 points at max. (512 bytes: Total number of I/O points of I/O message)			
Communication speed	Selectable: 125 kbps, 250 kbps, or 500 kbps.			
Communication distance (max.)	**Communication speeds**	**125 k bit/s**	**250 k bit/s**	**500 k bit/s**
	Trunk length using a thick cable	500m	250m	100m
	Trunk length using a thin cable	100m	100m	100m
	Maximum branch length	6m	6m	6m
	Total branch length	156m	78m	39m
Communication services	I/O message function (Polling I/O function, Bit Strobe function), Explicit message function			
Communication carrier	Specialized cable (5 lines: 2 signal lines, 2 power lines, 1 shield line) - Thick cable: For trunk lines - Thin cable: For trunk or branch lines			
Data table allocation method	Select the method used for I/O data mapping in the scan list edit mode from "allocation in address order," "even number allocation," or "allocation in the order in which vacant nodes are occupied."			

(3) External dimension drawings



(Unit: mm)

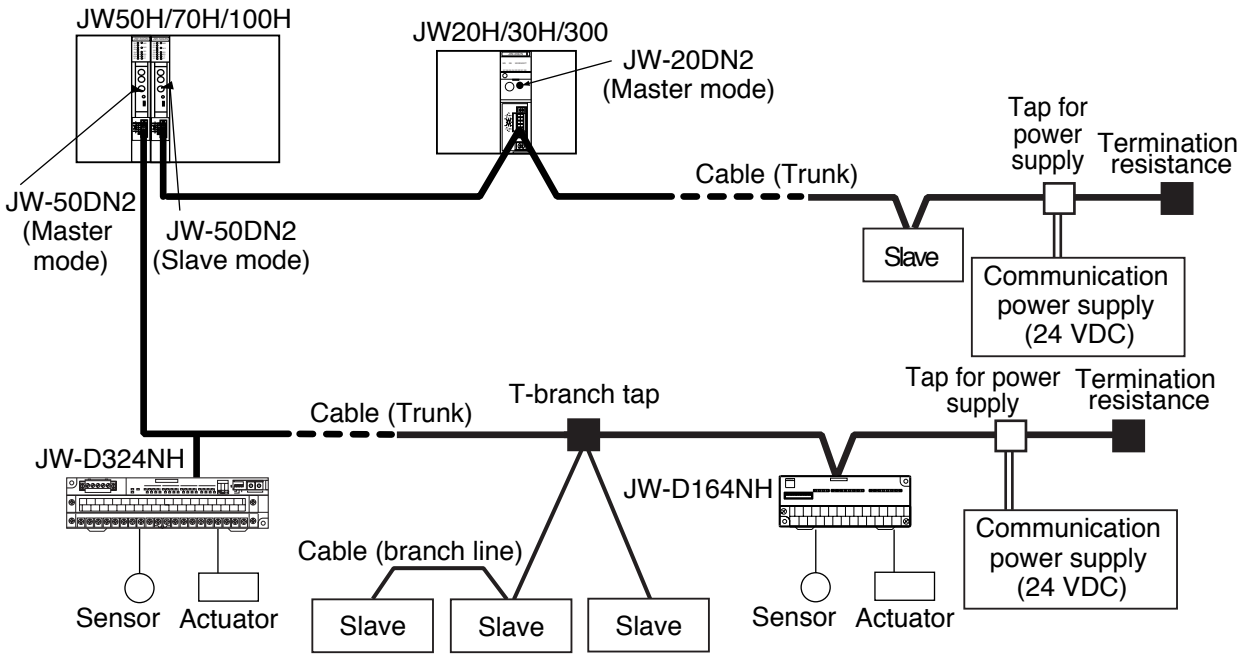
Appendix: Device Net Slave Module

This chapter describes Sharp's DeviceNet slave modules (10 models).

The JW-D164NH DeviceNet slave module and others (10 models In all) are "slave modules" that support the "Polling I/O function" and the "Bit Strobe function" used in DeviceNet communications. The slave module can transfer signals from sensors and actuators to a DeviceNet master module at high speed, and reduce the wiring required.

Model name	Input/output	Reference item
JW-D164NH	16 input points: 24 VDC, 6 mA (24 VDC)	Appendix 1 (App-2 to App-19)
JW-D162SH	16 output points: 24 VDC, 0.3 A, transistor output (current sink)	
JW-D165SH	16 output points: 24 VDC, 0.3 A, transistor output (current source)	
JW-D162MH	8 input points: 24 VDC, 6 mA (24 VDC) 8 output points: 24 VDC, 0.3 A, transistor output (current sink)	
JW-D165MH	8 input points: 24 VDC, 6 mA (24 VDC) 8 output points: 24 VDC, 0.3 A, transistor output (current source)	
JW-D324NH	32 input points: 24 VDC, 6 mA (24 VDC)	Appendix 2 (App-20 to App-38)
JW-D322SH	32 output points: 24 VDC, 0.3 A, transistor output (current sink)	
JW-D325SH	32 output points: 24 VDC, 0.3 A, transistor output (current source)	
JW-D322MH	16 input points: 24 VDC, 6 mA (24 VDC) 16 output points: 24 VDC, 0.3 A, transistor output (current sink)	
JW-D325MH	16 input points: 24 VDC, 6 mA (24 VDC) 16 output points: 24 VDC, 0.3 A, transistor output (current source)	

■ **System configuration (example)**



● **DeviceNet circuit**

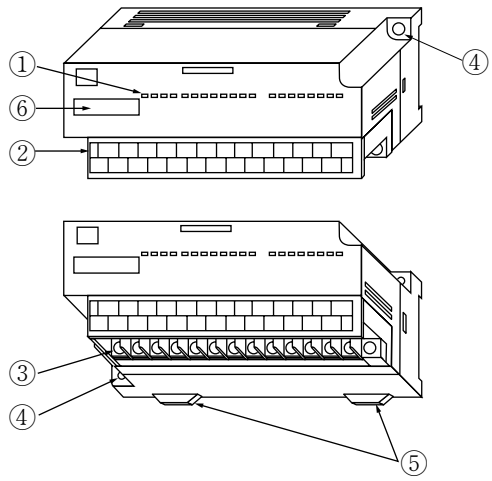
- Communication distance (data transfer speed): 100 m (500 kpbs)/ 250m (250 kbps)/ 500m(125kbps)
- Number of nodes: Maximum 63 slave module nodes per master node
- Number of I/O points: Maximum of 4096 points (max. 512 bytes) when using our DeviceNet (master)

Master stations, slave stations, cables, T-branch taps, power source taps, and termination resistors used in the system must conform to DeviceNet standards. (Sharp's DeviceNet products that are available => Page 3-1)

Appendix 1: JW-D164NH/D162SH/D165SH/D162MH/D165MH

This section gives the names and functions of each part of the JW-D164NH/D162SH/D165SH/D162MH/D165MH (hereafter referred to as "this slave").

Appendix 1-1: Names and functions of each part



① **Indicator lamp**
Shows communication, input, and output status for the DeviceNet. => App-4 and App-5.

② **Terminal block cover**
Protects the terminal block.

③ **Terminal block** (26-pin, detachable type, M3.5 x 7 screws)
Connect the DeviceNet communication, power supply, input and output cables.

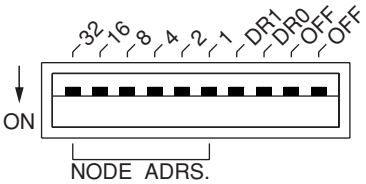
④ **Module installation holes** (ø4: 2 positions)
Holes for installing a module using M3 screws.

⑤ **DIN rail lever**
Used to install and remove the module on a DIN rail.

⑥ **Switch** (with cover)
Assigns a node address for the DeviceNet.
=> See below.

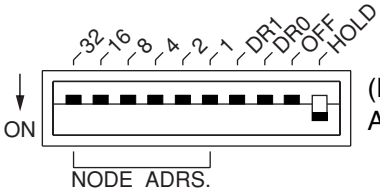
(1) Switch

・JW-D164NH



(Default: All OFF)

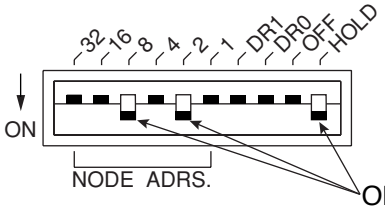
・JW-D162SH/D165SH/D162MH/D165MH



(Default:
All OFF except the HOLD)

Switch	Setting details
HOLD	Set the output status to use when this slave has a communication error. OFF: Clear ON: Hold
OFF	Make sure to set to OFF. (JW-D164NH has two switches)
DR0 DR1	Specify the data communication speed. DR1 OFF, DR0 OFF: 125kbps DR1 OFF, DR0 ON: 250kbps DR1 ON, DR0 OFF: 500kbps DR1 ON, DR0 ON: Unavailable
NODE ADRS. (32, 16, 8, 4, 2, 1)	Specify the node address (0 to 63 in decimal). - Specify a node address that does not duplicate another node address in the same network.

[Setting example]
Using the JW-D162SH, set the output status to use when an error occurs to "HOLD," set the communication speed to 125 kbps, and assign node address 10.



Remarks

- This slave reads the switch settings when the power is first turned ON. Therefore, set these switches while the power is OFF. If a switch setting is changed while the power is ON, the change will not be applied until the next time the power is turned OFF and then back ON.

● **Operation when the control module is in the program mode**

When a JW50H/70H/100H (with a JW-50DN2 master module installed in it) is in the program mode (operation is stopped), the operation seen by the JW-50DN2 slave modules depends on the settings in system memory (#1630, #1730) in the control module.

Module no. → (JW-50DN2)

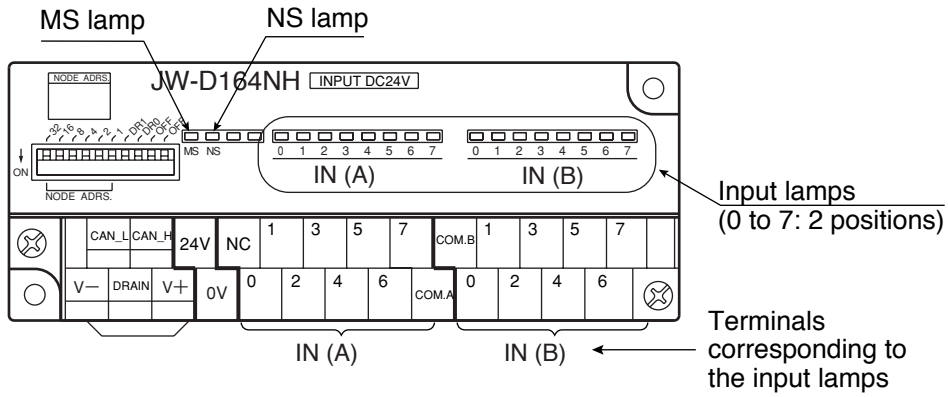
System memory		Setting details
0	1	
#1630	#1730	$00_{(HEX)}$: Send idle data (packets with no I/O data) to the slaves output module. $01_{(HEX)}$: Send OFF data to the slaves output module.

To combine the use of Sharp slave modules, set the switches as follows.

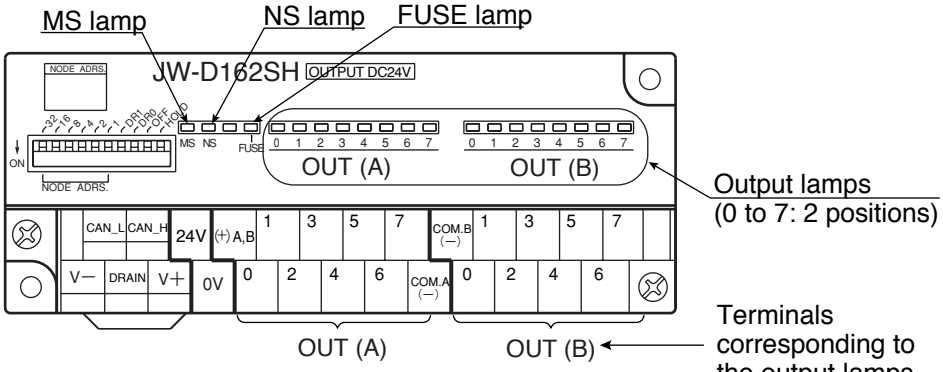
JW-50DN2 Master Module setting	Sharp slave module HOLD switch	
	OFF	ON
#1630, #1730 = 0 (Send idle data)	Output OFF	Hold
#1630, #1730 = 1 (Send OFF data)	Output OFF	Output OFF

(2) Indicator lamp

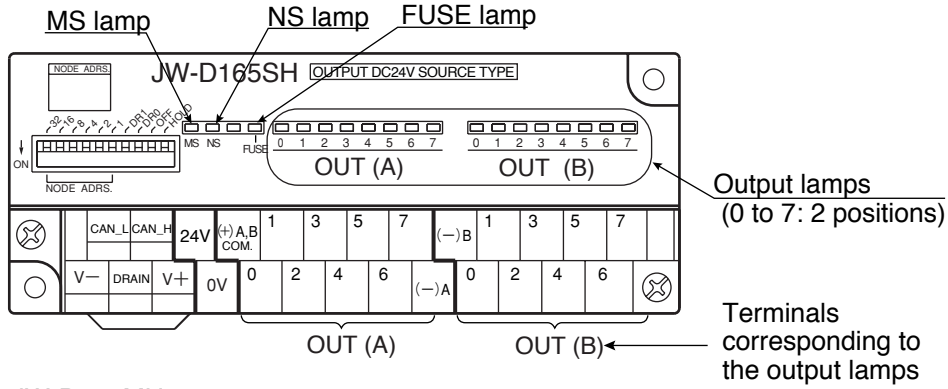
- JW-D164NH



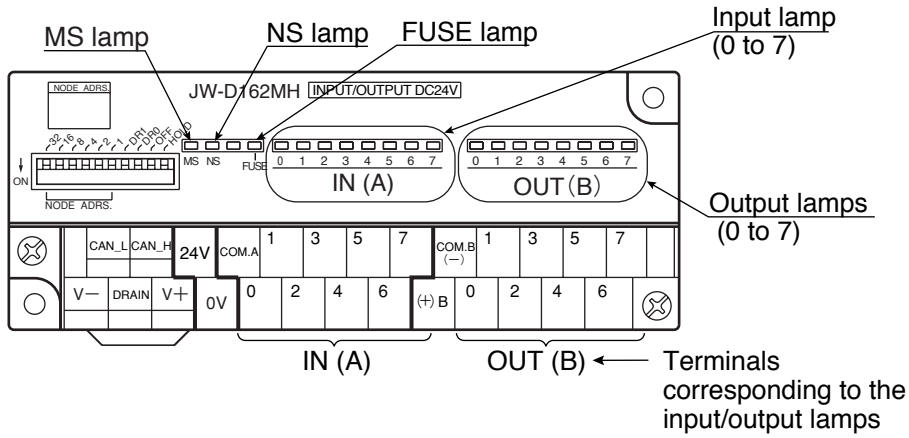
- JW-D162SH



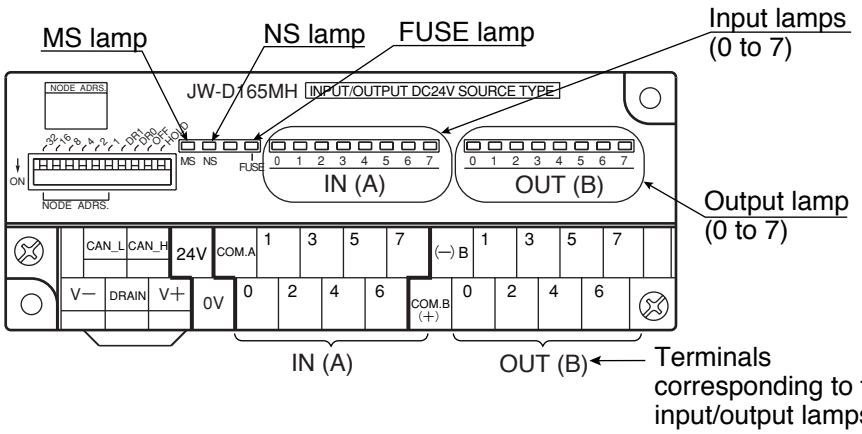
- JW-D165SH



- JW-D162MH



- JW-D165MH



Lamp			Description
Name	**Color**	**Status**	
MS (module status)	Green	ON	Show this slave status by color (green/red) and status (ON/blink/OFF) of MS and NS lamps. => See App-12
		Blinking	
	Red	ON	
		Blinking	
	-	OFF	
NS (network status)	Green	ON	
		Blinking	
	Red	ON	
		Blinking	
	-	OFF	
FUSE *	Red	ON	Internal output fuse blown or no power available.
	Red	OFF	Normal
0 to 7: IN (A/B)	Red	ON/ OFF	When an input signal is ON, the respective lamp goes ON.
0 to 7: OUT (A/B)	Red	ON/ OFF	When an output signal is ON, the respective lamp goes ON.

* Fuse lamps are installed in the JW-D162SH/D165SH/D162MH/D165MH. However, they are not installed on the JW-D164NH.

Appendix 1-2: Installation method

In order to make full use of the functions of these slave modules, install them after carefully considering the information below.

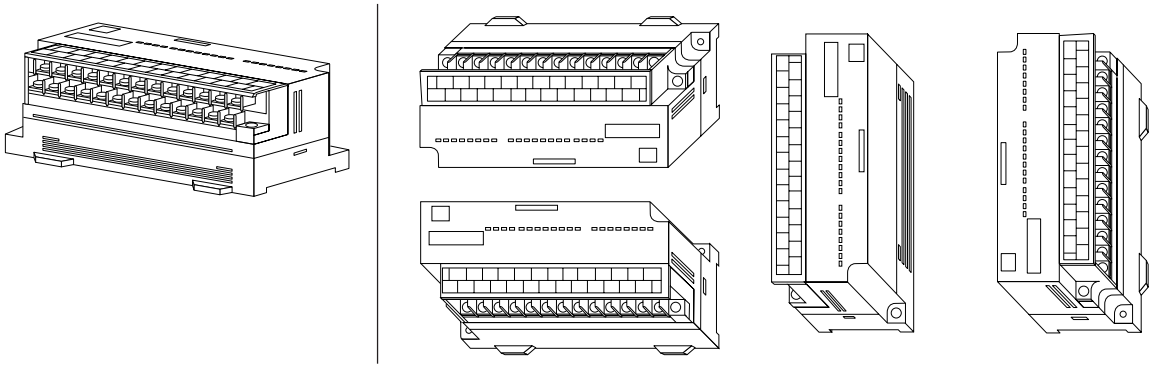
[1] Installation conditions

1. These slave modules are equipped with ventilation holes in order to prevent the temperature inside from becoming too high. Do not block these ventilation holes or prevent air passing through them.
2. These slave modules are not dust-proof or water-proof. Install them in sealed control boxes.
3. Do not install them directly over apparatus that generates heat such as heaters, transformers, or large resistors. Do not install other equipment too close to these slave modules.
4. Do not install them inside enclosures that also contain high voltages.
5. Keep these modules as far away as possible from high voltage lines and driving lines.
6. Install them in a metal chassis to provide a good ground and reduce the effect of electrical noise.

[2] Installation orientation

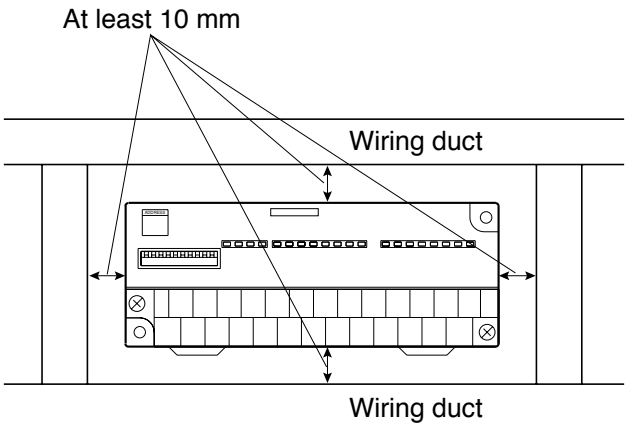
Install them in any of the following 5 orientations which allow good heat radiation

- **Installed on a flat surface** **- Installed on a vertical surface**

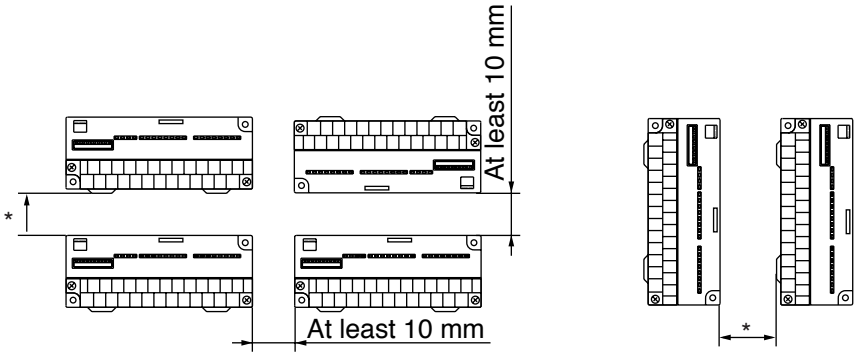


[3] Installation space

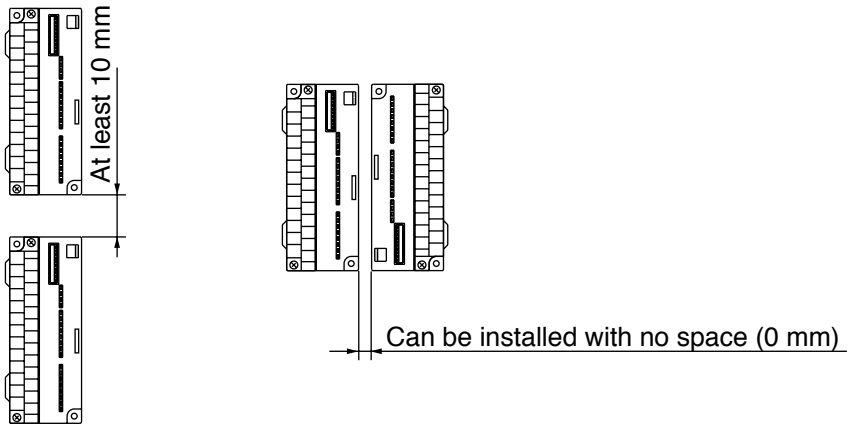
If these modules will be installed near wiring ducts, make sure to allow the following distance between wiring ducts and these modules for heat radiation purposes.



If more than one slave module is installed, allow the following distance between them.



* Secure the space that is needed to run cables

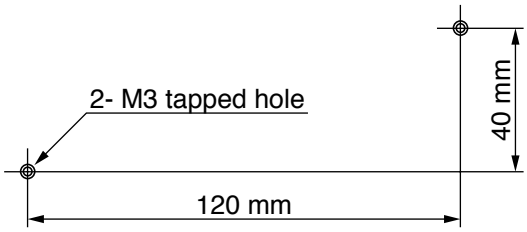


[4] Installation of the modules

Use screws or DIN rails to install these slave modules.

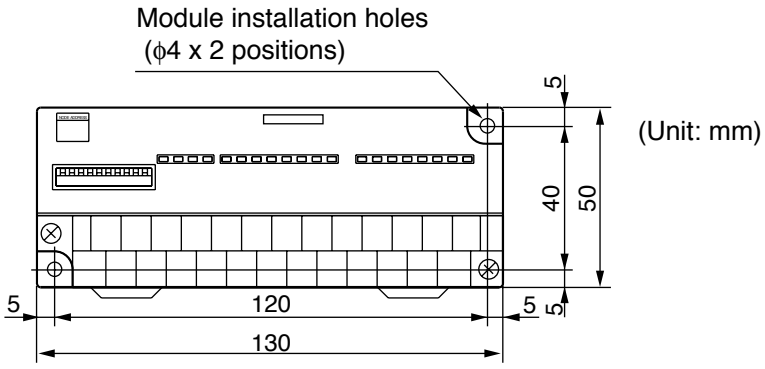
(1) Installing with screws

① Drill M3 tapped holes in a control box with the dimensions below.



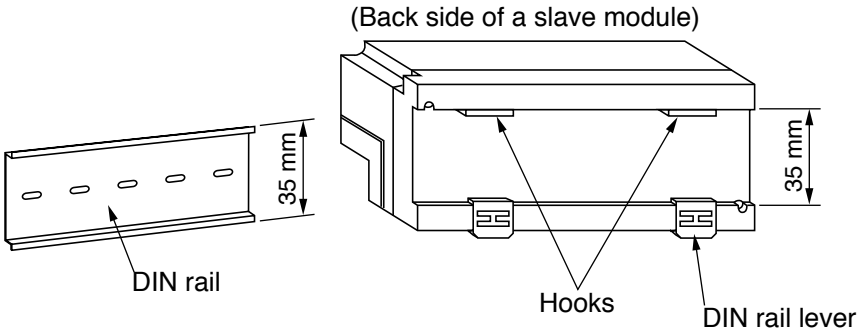
② Tighten two screws using a Phillips screwdriver to secure the slave modules.

- Use two M3-10 galvanized screws
- Tighten to 0.49 N-m or less torque.

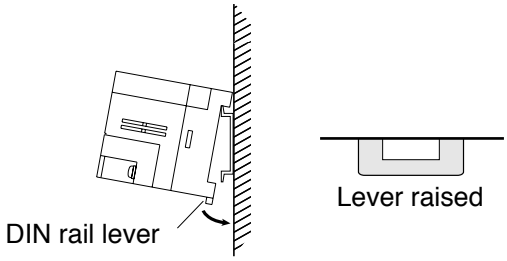


(2) Installing on DIN rails

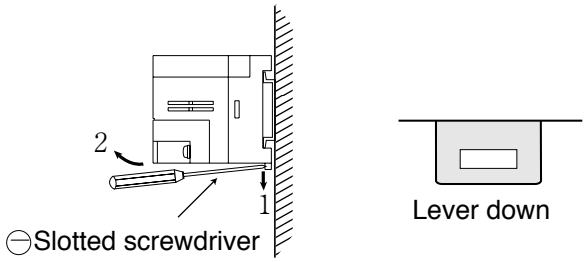
These slave modules can be attached to and removed from DIN rails with a distance of 35 mm between the rails.



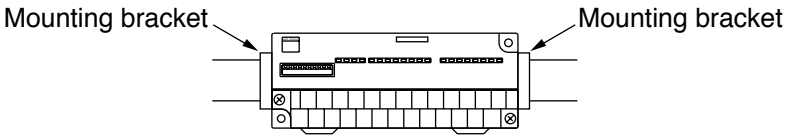
① Put the hooks on the back of the slave module on the DIN rail and press in the direction shown by the arrow.



② To remove the slave module from the DIN rails, press down the groove in the DIN rail lever using a slotted screwdriver and lift the slave module up to remove it.

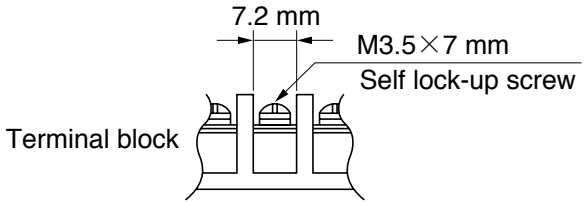


③ Install mounting brackets on a DIN rail



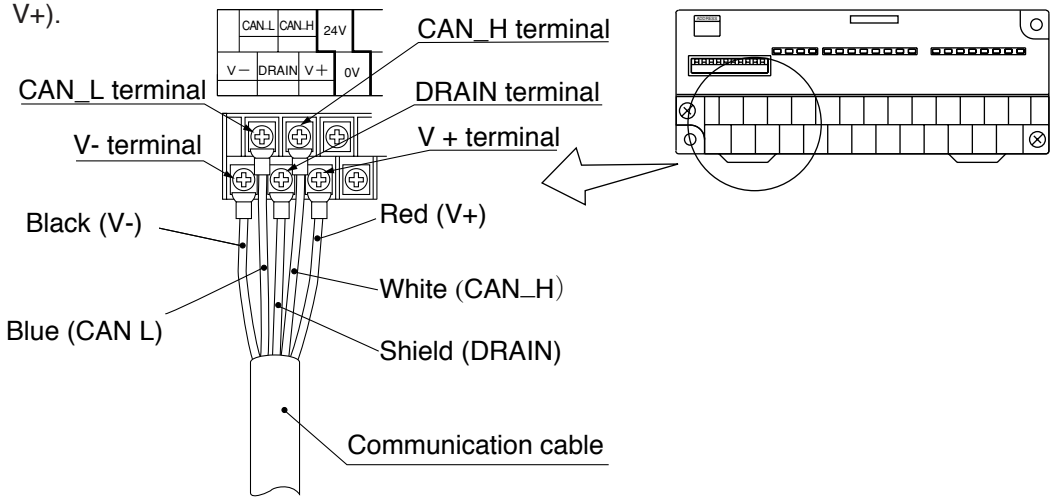
Appendix 1-3: Wiring method

Use crimp terminals to make wire connections to the terminal blocks on these slave modules (DeviceNet communication lines, power lines, inputs/outputs). See the terminal block dimensions below for the correct crimp terminal size.



(1) Wiring the communication cables

Connect the communication cables to the DeviceNet terminals (V-, CAN_L, DRAIN, CAN_H, V+).



One set of communication cable consists of 5 lines. Thick and thin cables are available.

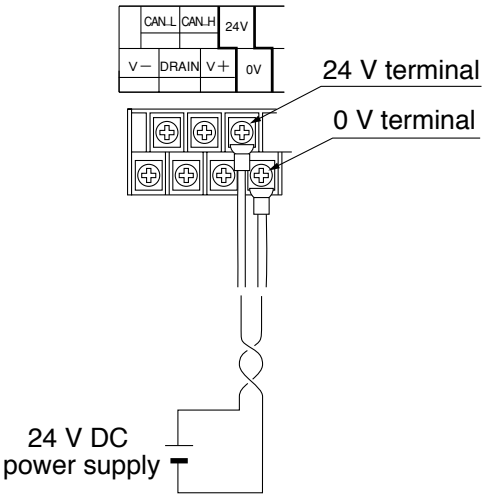
Number of lines	Mfg.	Type	Model name	Outside diameter	Major applications
5 lines (2 signal lines 2 power lines 1 shield)	Nihon Electric Wire & Cable	Thick	DVN18	12	Trunk line
		Thin	DVN24	7	Branch or trunk line
		Thick	DVN18SF	12	For actuating component *
		Thin	DVN24SF	7	For actuating component *
		-	DVN20SF	10	Bending-proof, twist-proof *

* Contact the cable manufacturer for more details.

- The thick cable has a resistance of approximately 12 ohm/km and the thin cable resistance is approximately 58 ohm/km. Calculate the voltage drop of the complete loop (going and coming back) based on the current consumption of the slave modules. Then determine the positions and number of communication power supplies you need to install.

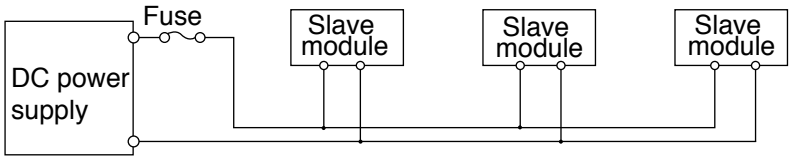
(2) Power line wiring

Connect the power supply line to the power terminals (24 V and 0 V).



Reference

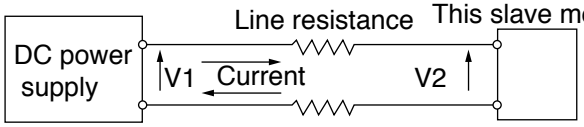
When you need to supply power to slave modules that are far away from the power supply, install a fuse in the DC power supply in order to prevent the wiring from overheating or burning. Carefully calculate the voltage drop when running wires a long distance.



Reference: Voltage drop

Voltage drop ($V_1 - V_2$) =

Current x Line resistance x 2 x Line length (km)



Line resistance

Nominal cross-section area

0.75 mm^2 ····· 24.8 ohm/km

1.25 mm^2 ····· 14.7 ohm/km

2 mm^2 ····· 9.53 ohm/km

- If the DC power supply is set to 26.4 V, arrange the wiring so that the voltage drop will be less than 6 V. 26.4 V - 20.4 V = 6 V (20.4 V: Minimum operating voltage for the slave module)

(3) Input/output cable wiring

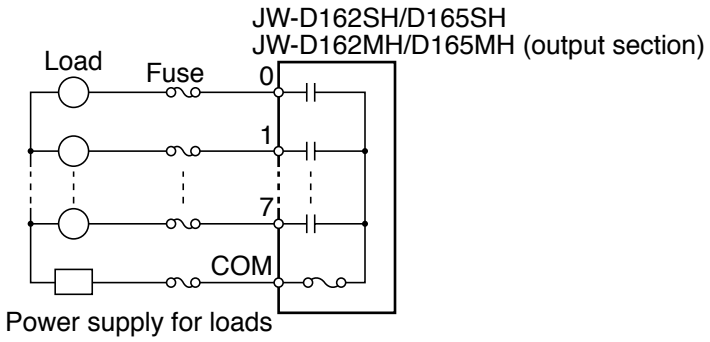
Connect the input/output cables to the input/output terminals (0 to 7).

See App-4 and App-5 for details about the input/output terminal positions. See App-15 to App-19 for the specifications of the circuit configuration.

Remarks Excessive current flow protection (fuse)

If a load connected to the output terminals on the JW-D162SH/D165SH/D162MH/D165MH is shorted, the external wiring or the module itself may be burned. Connect fuses (1.5 A or less) to the output lines (for each common).

The fuses prevent abnormal heat generation in the JW-D162SH to D165MH. They are not intended to protect the output elements or loads from excessive current flow conditions. For safety reasons, use the proper size fuse for each output point, based on the load handled by that point.



If a fuse blows, find the cause (short circuit in the external wiring, load exceeds the rated output, etc.), correct the situation and then replace the fuse.

Note: The slave module JW-D162SH to D165MH has a 2A internal fuse on the output circuit (common line). However, this is only to prevent a buildup of heat in the module due to excessive current flow. It is not intended to protect the output elements and loads from excessive current flow.

Appendix 1-4: Errors and responses

When an error occurs in a slave module, check the error detail by looking at the indicator lamps (MS/NS/FUSE) on the slave module. Then take the recommended countermeasure.

Indicator lamp		Error details		Countermeasures
MS	NS			
Lit green	Lit green	Communicating normally (connection is established)		---
Goes OFF	Goes OFF	Power to the slave module is off.		1. Check the 24 VDC power supply voltage. Look for disconnected cables or loose connections. 2. Hardware error in the slave module. => Replace the slave module.
Lit green	Goes OFF	Error in the network power supply. Cannot detect other devices on the network.		1. Check the voltage. Look for disconnections or loose cable connections related to the network power supply. 2. Check the switch settings on the slave module (duplicate use of the same node address, incorrect communication speed setting, etc.) 3. Hardware error in the slave module. => Replace the slave module.
Lit green /blinking green	Blinking green	Connection not established	Waiting to establish a connection with the master module.	1. Look for disconnections or loose communication cables. 2. Error in the master module. 3. Hardware error in the slave module. => Replace the slave module.
Lit green	Blinking red	I/O time out	I/O connection has time out	
Lit green	Lit red	Network error	Duplicate assignment of the same node address	1. Check the node address switches on the slave modules (look for a duplicate address). 2. Hardware error in the slave module. => Replace the slave module.
			Buss down status (Multiple data errors occurred.)	Check the following - Communication speed is the same for the master and all slave modules? - Are the cable length (trunk and branches) appropriate? - Are there any disconnected or loose cables? - Are terminating resistances present at both ends? - Is there a lot of electrical noise?
Lit red	Goes OFF	Slave module error 1	- Communication speed, node address switch settings are out of range. - Hardware error : RAM check error, ROM check error, EEPROM checksum error, or model name setting error.	1. Check the switch settings on the slave module. (Are they within range?) 2. Hardware error in the slave module. => Replace the slave module. * This error can occur when power is input.
Blinking red	No change	Slave module error 2	Abnormality in the vender information (Checksum error in the EEPROM)	1. Hardware error in the slave module. => Replace the slave module. * This error can occur when power is input.

Indicator	Error details	Countermeasure
FUSE *		
Lit red	Blown output circuit fuse, or power is not being supplied. * The FUSE lamp will go ON regardless of the communication status	1. Check the voltage level of the power supply output. Look for disconnected or loose cables. 2. Hardware error in the slave module. => Replace the slave module. Note: When the internal fuse is blown by a short circuit in the output load or by an overload, this lamp also goes ON. The internal fuse cannot be replaced by the user.

* When a JW-D162SH/D165SH/D162MH/D165MH is used as a slave module

Appendix 1-5: Specifications

[1] Common specification

(1) General specif2ications

Item	Specifications
Main housing voltage	24 VDC (20.4 to 26.4 V)
Main housing current	70 mA max.
Communication power voltage	11 to 25 VDC
Communication power current	40 mA max.
Storage temperature	-20 to 70°C
Ambient operating temperature	0 to 55°C
Ambient operating humidity	35 to 90%RH (non condensing)
Operating atmosphere	No corrosive gases
Vibration resistance	Conforms to JIS B 3502
Shock resistance	Conforms to JIS B3502: 147 m/s^2 (3 times each along the X, Y, and Z axes)
Insulation method	Photo-coupler
Insulation resistance	10 M-ohm or more at 500 VDC megger (between external terminal and internal circuit)
Insulation withstand voltage	500 VAC, for 1 minute (between external and internal terminals)
External line connection method	26-point detachable terminal block (M35. x 7 screws)
Installation	M3 screws, or 35 mm width DIN rails
Size	130 mm (W) x 50 mm (H) x 55 mm (D)
Weight	Approx. 200 g
Accessory	One user's manual

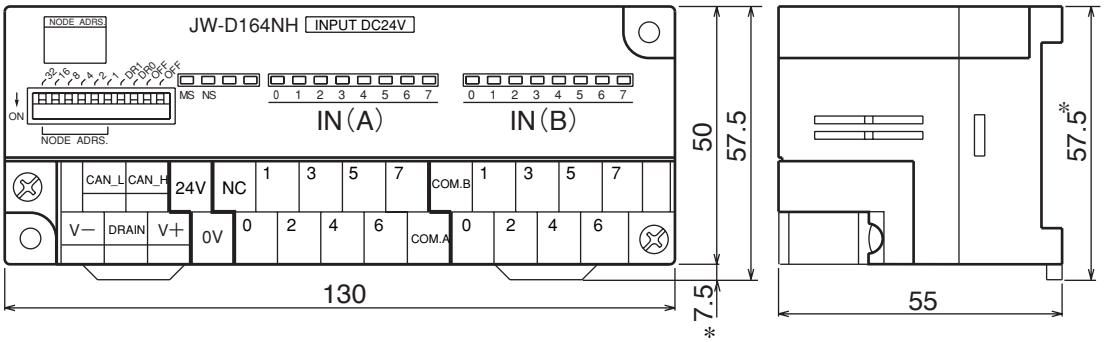
(2) Communication specifications

Item	Specifications			
Communication service	Polling I/O function, Bit Strobe function			
Communication speed	125 kbps, 250 kbps, 500 kbps			
Communication distance (max.)	**Communication speed**	**125 kbps**	**250 kbps**	**500 kbps**
	Trunk length using thick cable	500 m	250 m	100 m
	Trunk length using thin cable	100 m	100m	100 m
	Branch line length	6 m	6 m	6 m
	Total branch line length	156 m	78 m	39 m
Communication wiring	Proprietary cable (5 lines: 2 signal lines, 2 power lines, and 1 shield) - Thick cable: For trunks - Thin cable: For trunks and branches			

(3) External dimension drawings

External dimensions are the same for all five models.

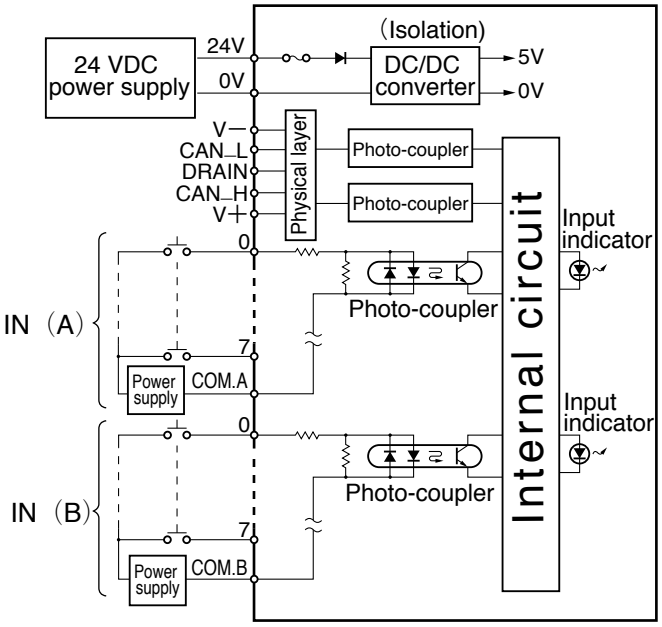
(Unit: mm)



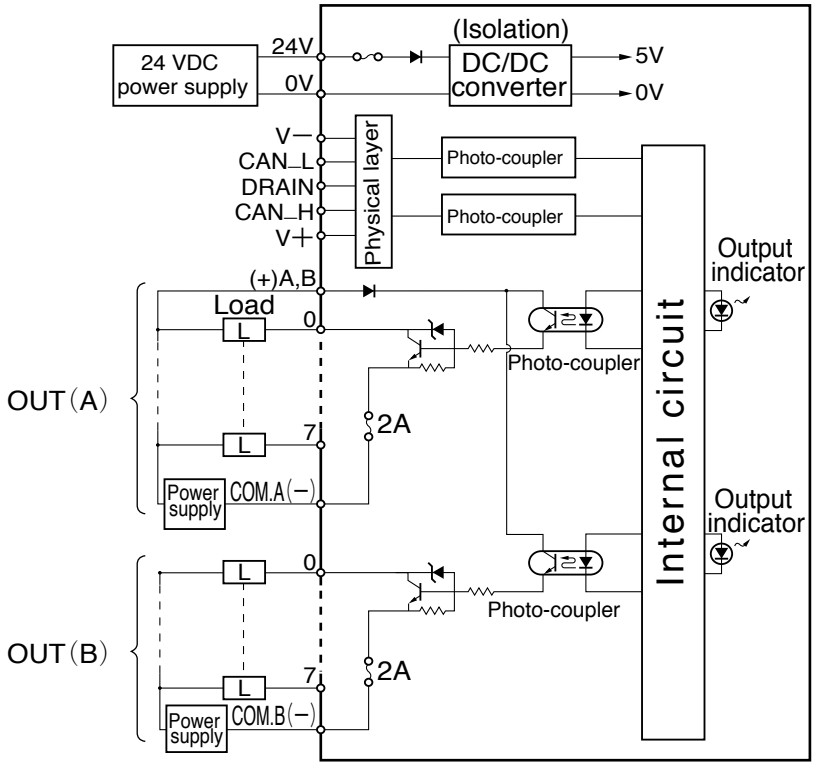
* Dimensions when the DIN rail lever is slid in.

[2] Specifications for each slave module

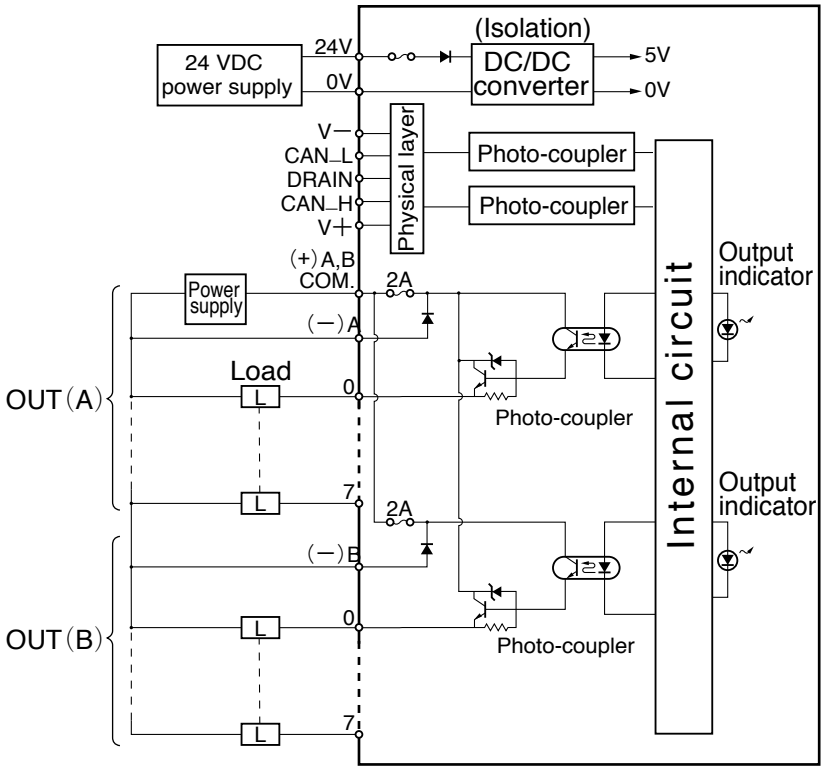
(1) JW-D164NH (24 VDC / 16 points DC input)

Item	Specifications
Number of inputs	16 points (occupies 2 bytes)
Rated input voltage	24 VDC (21.6 to 26.4 V)
Rated input current	Approx. 6 mA (at 24 V), input impedance: Approx. 4 k-ohm
Input ON/OFF levels	ON: 18 V (3 mA or less) OFF: 8V (1.5 mA or less)
Input response time (module alone	OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC)
Common system	One common for 8 points, no common polarity
Circuit configuration	 - The IN (A) side above is for the lower addresses (front half) in the DeviceNet (master) communication area.

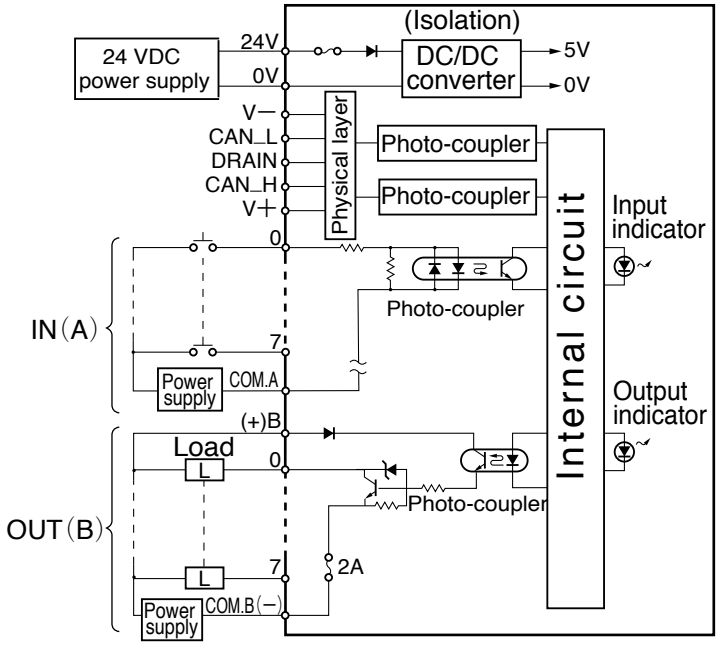
(2) JW-D162SH (24 VDC / 16 points, sink output)

Item		Specifications
Number of outputs		16 points (occupies 2 bytes)
Output method		Transistor output (sink output)
Rated output voltage		24 VDC (21.6 to 26.4 V)
Output current		Max. 300 mA/point, 1.5 A/8 points common Allowable surge current: 1 A (100 ms)
Voltage drop when ON		0.5 V or less (when the output current is 300 mA)
Leak current when OFF		0.1 mA or less
Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
Protection circuit	Surge killer	Zener diode
	Fuse	A 2A fuse is built into each common (this fuse cannot be replaced by the user). Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
Common system		One common for 8 points, negative polarity
Circuit configuration		 - The OUT (A) side above is for the lower addresses (front half) in the DeviceNet (master) communication area. - For safety, only use fuses mathing with the load capacity one for each output point.

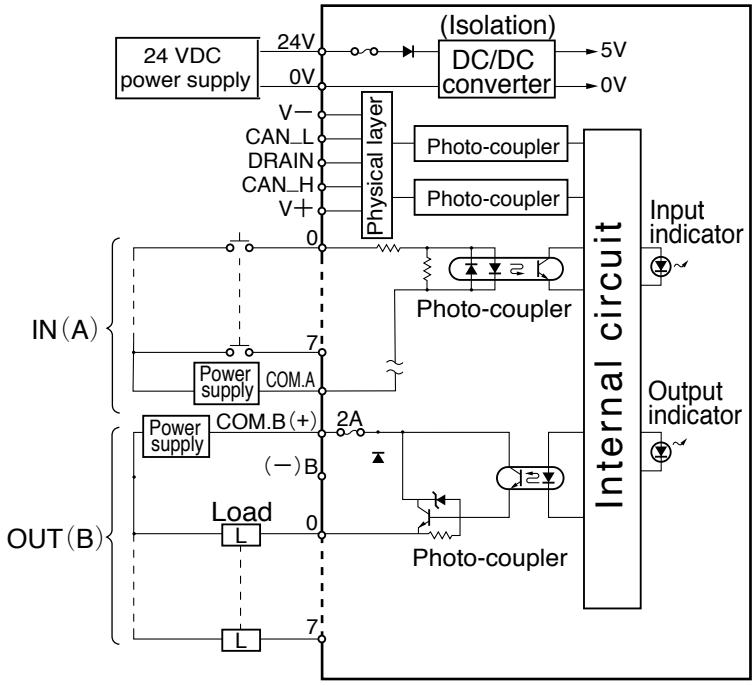
(3) JW-D165SH (24 VDC / 16 points source output)

Item		Specifications
Number of outputs		16 points (occupies 2 bytes)
Output method		Transistor output (source output)
Rated output voltage		24 VDC (21.6 to 26.4 V)
Output current		Max. 300 mA/point, 1.5 A/8 points common Allowable surge current: 1 A (100 ms)
Voltage drop when ON		1.2 V or less (when the output current is 300 mA)
Leak current when OFF		0.1 mA or less
Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
Protection circuit	Surge killer	Zener diode
	Fuse	A 2A fuse is built into each common (this fuse cannot be replaced by the user). Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
Common system		One common for 8 points, Positive polarity
Circuit configuration		 - The OUT (A) side above is for the lower addresses (front half) in the DeviceNet (master) communication area. - For safety, only use fuses mathing with the load capacity one for each output point.

(4) JW-D162MH (24 VDC / 8 point input, 8 points sink output)

Item			Specifications
Number of inputs/outputs			16 points (occupies 2 bytes)
Input	Rated input voltage		24 VDC (21.6 to 26.4 V)
	Rated input current		Approx. 6mA (at 24 V), input impedance: Approx. 4k-ohm
	Input ON/OFF levels		ON :18 V (3 mA or less) OFF: 8 V (1.5 mA or less)
	Input response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC)
	Common system		One common for 8 points, no common polarity
Output	Output method		Transistor output (sink output)
	Rated output voltage		24 VDC (21.6 to 26.4 V)
	Output current		Max. 300 mA/point, 1.5 A/8 points common Allowable surge current: 1 A (100 ms)
	Voltage drop when ON		0.5 V or less (when the output current is 300 mA)
	Leak current when OFF		0.1 mA or less
	Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
	Protecti-on circuit	Surge killer	Zener diode
		Fuse	A 2A fuse is built into each common (this fuse cannot be replaced by the user). Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
	Common system		One common for 8 points, negative polarity
Circuit configuration			 - For safety, only use fuses mathing with the load capacity one for each output point.

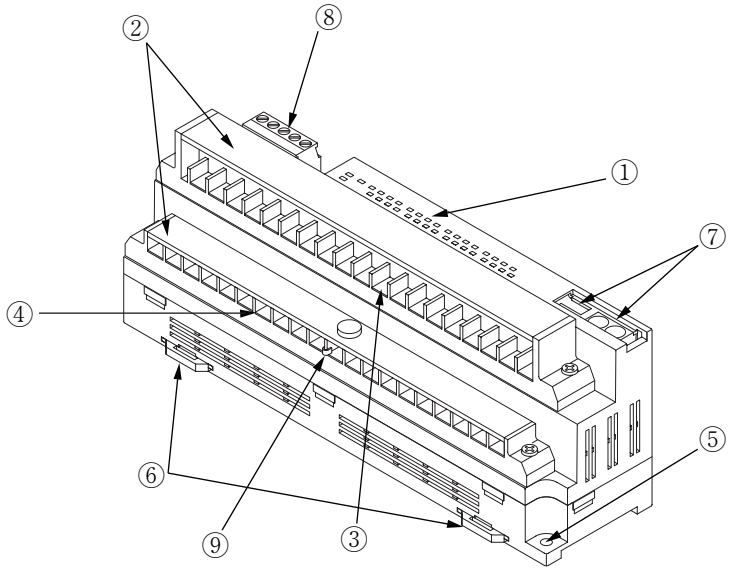
(5) JW-D165MH (24 VDC / 8 point input, 8 points source output)

Item			Specifications
Number of inputs/outputs			16 points (occupies 2 bytes)
Input	Rated input voltage		24 VDC (21.6 to 26.4 V)
	Rated input current		Approx. 6mA (at 24 V), input impedance: Approx. 4k-ohm
	Input ON/OFF levels		ON :18 V (3 mA or less) OFF: 8V (1.5 mA or less)
	Input response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC)
	Common system		One common for 8 points, no common polarity
Output	Output method		Transistor output (source output)
	Rated output voltage		24 VDC (21.6 to 26.4 V)
	Output current		Max. 300 mA/point, 1.5 A/8 points common Allowable surge current: 1 A (100 ms)
	Voltage drop when ON		1.2 V or less (when the output current is 300 mA)
	Leak current when OFF		0.1 mA or less
	Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
	Protecti-on circuit	Surge killer	Zener diode
		Fuse	A 2A fuse is built into each common (this fuse cannot be replaced by the user). Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
	Common system		One common for 8 points, positive polarity
Circuit configuration			 - For safety, only use fuses mathing with the load capacity one for each output point.

Appendix 2: JW-D324NH/D322SH/D325SH/D322MH/D325MH

This section gives the names and functions of each part of the JW-D324NH/D322SH/D325SH/D322MH/D325MH (hereafter referred to as "this slave").

Appendix 2-1: Names and functions of each part



① **Indicator lamp**
Shows communication, input, and output status for the DeviceNet. => App-22 and App-23.

② **Terminal block cover**
Protects the terminal block.

③ **Terminal block** (38-pin, detachable type, M3.5 x 7 screws)
Connect the power supply, input and output cables.

④ **Common terminal** (20-pin)

⑤ **Module installation holes** (ø4: 2 positions)
Holes for installing a module using M3 screws.

⑥ **DIN rail lever**
Used to install and remove the module on a DIN rail.

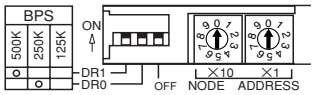
⑦ **Switch** (with cover)
Assigns a node address for the DeviceNet.
=> App-21.

⑧ D**eviceNet communication connector**
Connect a DeviceNet communication cable
One communication cable connector is supplied with each slave module.

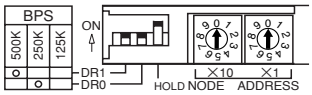
⑨ **Jumper**
Installed on the JW-D324NH/D322SH/D325SH.

(1) Switch

・JW-D324NH



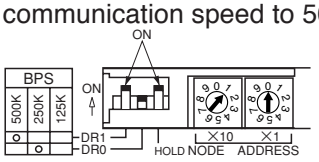
・JW-D322SH/D325SH/322MH/D325MH



<table>
<tr><th>Switch</th><th>Setting details</th></tr>
<tr><td>HOLD</td><td>Set the output status to use when this slave has a communication error.
<table>
<tr><td>OFF</td><td>Clear</td></tr>
<tr><td>ON</td><td>Hold (Default setting)</td></tr>
</table></td></tr>
<tr><td>OFF</td><td>Make sure to set to OFF. (JW-D324NH only)</td></tr>
<tr><td>DR0
DR1</td><td>Specify the data communication speed.
<table>
<tr><th>DR1</th><th>DR0</th><th>Communication speed</th></tr>
<tr><td>OFF</td><td>OFF</td><td>125 kbps (Default setting)</td></tr>
<tr><td>OFF</td><td>ON</td><td>250 kbps</td></tr>
<tr><td>ON</td><td>OFF</td><td>500 kbps</td></tr>
<tr><td>ON</td><td>ON</td><td>Unavailable</td></tr>
</table></td></tr>
<tr><td>NODE ADRS.
(x10, x1)</td><td>Specify the node address (0 to 63 in decimal).
- Specify a node address that does not duplicate another node address in the same network. (Default setting: each switch is set to 0)</td></tr>
</table>

[Setting example]

Using the JW-D322SH, set the output status to use when an error occurs to "HOLD," set the communication speed to 500 kbps and assign node address 10.



● **Operation when the control module is in the program mode**

When a JW50H/70H/100H (with a JW-50D2 master module installed in it) is in the program mode (operation is stopped), the operation seen by the JW-50DN2 slave modules depends on the settings in system memory (#1630, #1730) in the control module.

Module no. (JW-50DN2) →

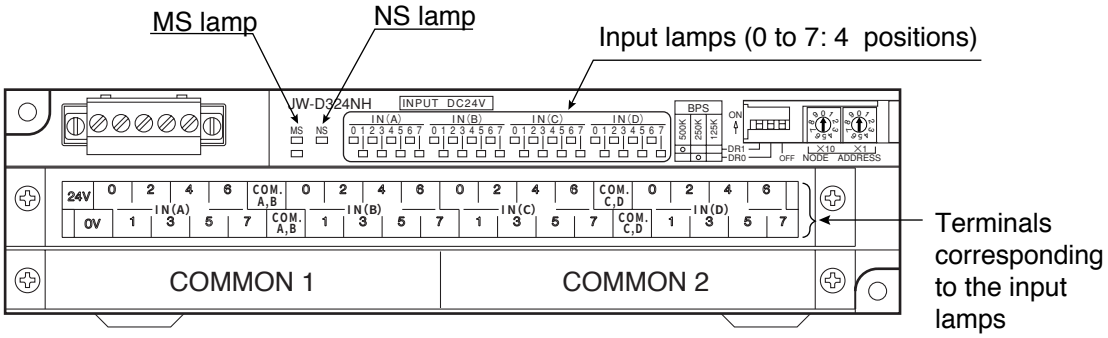
System memory		Setting details
0	1	
#1630	#1730	$00_{(HEX)}$: Send idle data (packets with no I/O data) to the slaves output module. $01_{(HEX)}$: Send OFF data to the slaves output module.

To combine the use of Sharp slave modules, set the switches as follows.

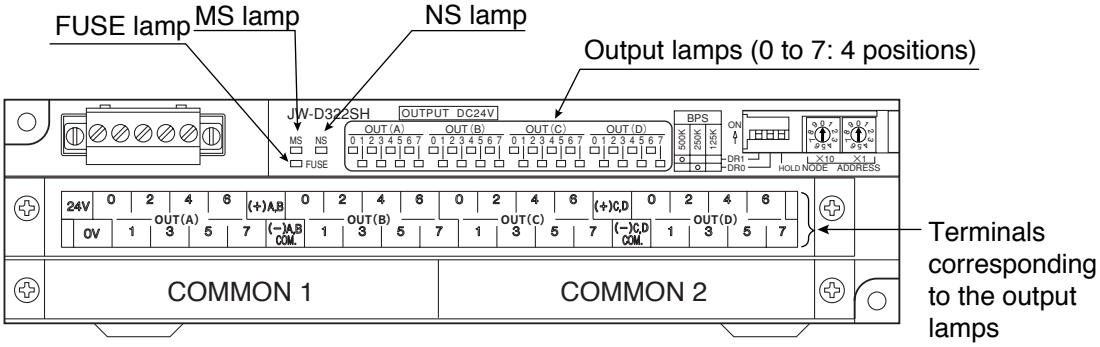
JW-50DN2 Master Module setting	Sharp slave module HOLD switch	
	OFF	ON
#1630, #1730 = 0 (Send idle data)	Output OFF	Hold
#1630, #1730 = 1 (Send OFF data)	Output OFF	Output OFF

(2) Indicator lamp

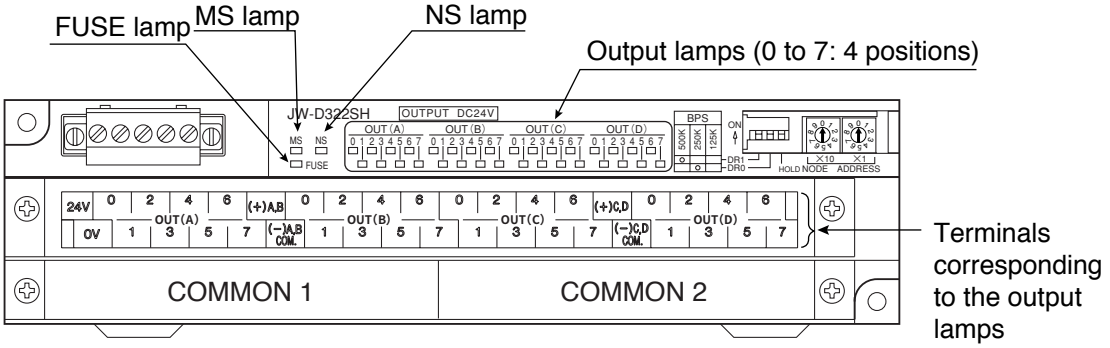
- JW-D324NH



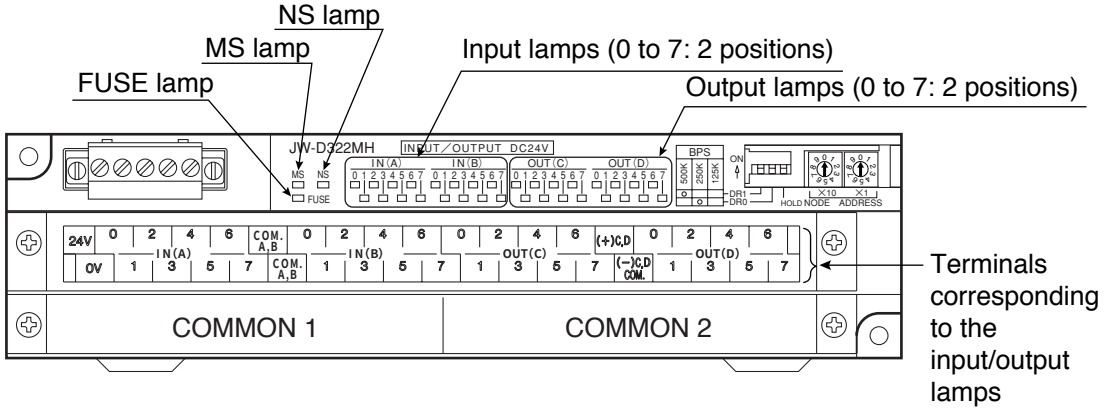
- JW-D322SH



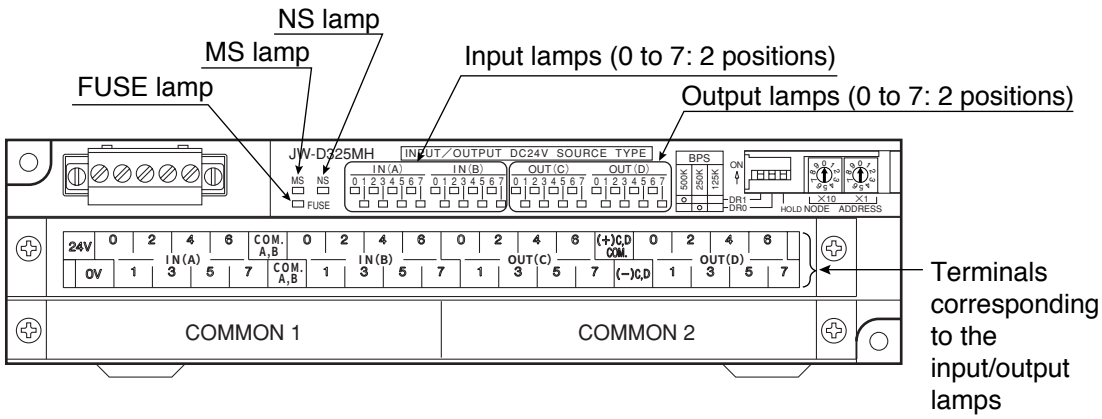
- JW-D325SH



- JW-D322MH



- JW-D325MH



Lamp			Description
Name	**Color**	**Status**	
MS (module status)	Green	ON	Show this slave status by color (green/red) and status (ON/blink/OFF) of MS and NS lamps. => See App-31
		Blinking	
	Red	ON	
		Blinking	
	-	OFF	
NS (network status)	Green	ON	
		Blinking	
	Red	ON	
		Blinking	
	-	OFF	
FUSE *	Red	ON	Internal output fuse blown or no power available.
	Red	OFF	Normal
0 to 7: IN (A/B)	Red	ON/ OFF	When an input signal is ON, the respective lamp goes ON.
0 to 7: OUT (A/B)	Red	ON/ OFF	When an output signal is ON, the respective lamp goes ON.

* Fuse lamps are installed in the JW-D322SH/D325SH/D322MH/D325MH. However, they are not installed on the JW-D324NH.

Appendix 2-2: Installation method

In order to make full use of the functions of these slave modules, install them after carefully considering the information below.

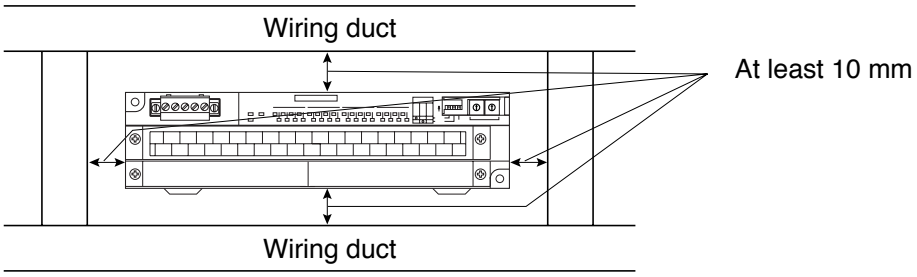
[1] Installation conditions

1. These slave modules are equipped with ventilation holes in order to prevent the temperature inside from becoming too high. Do not block these ventilation holes or prevent air passing through them.
2. These slave modules are not dust-proof or water-proof. Install them in sealed control boxes.
3. Do not install them directly over apparatus that generates heat such as heaters, transformers, or large resistors. Do not install other equipment too close to these slave modules.
4. Do not install them inside enclosures that also contain high voltages.
5. Keep these modules as far away as possible from high voltage lines and driving lines.
6. Install them in a metal chassis to provide a good ground and reduce the effect of electrical noise.

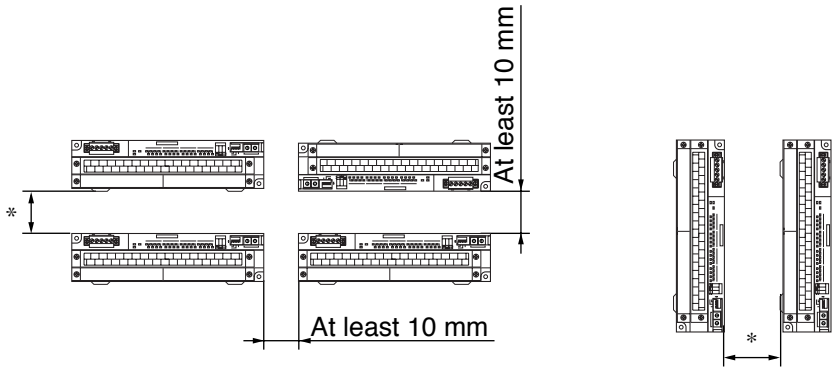
[2] Installation orientation

Install this slave module on a horizontal or vertical surface (so as to get the best ventilation).

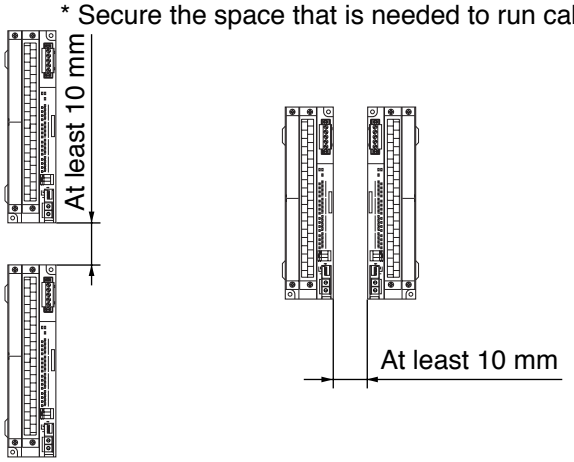
If these modules will be installed near wiring ducts, make sure to allow the following distance between wiring ducts and these modules for heat radiation purposes.



If more than one slave module is installed, allow the following distance between them.



* Secure the space that is needed to run cables

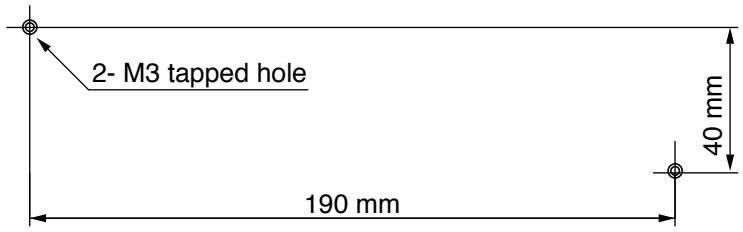


[3] Installation of the modules

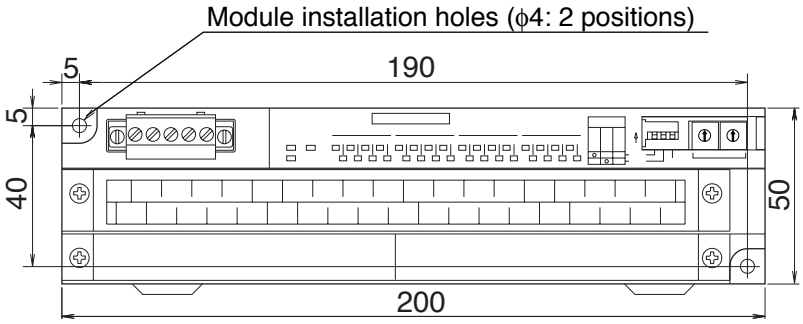
Use screws or DIN rails to install these slave modules.

(1) Installing with screws

1. Drill M3 tapped holes in a control box with the dimensions below.

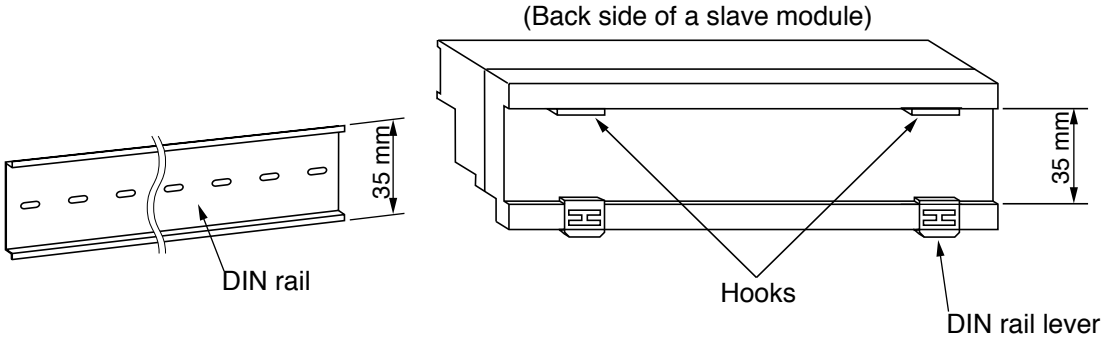


2. Tighten two screws using a Phillips screwdriver to secure the slave modules.
   - Use two M3-10 galvanized screws
   - Tighten to 0.49 N-m or less torque.

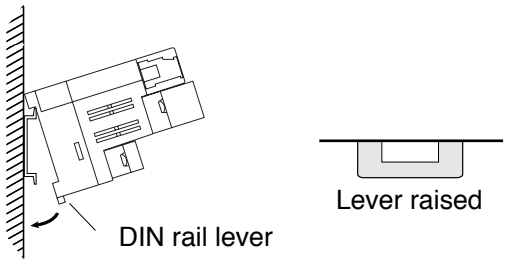


(2) Installing on DIN rails

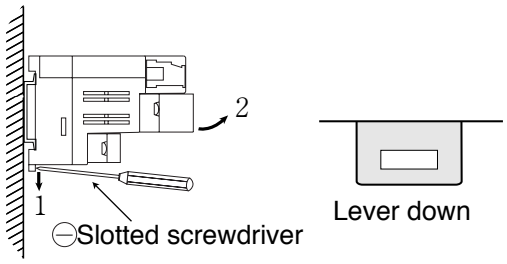
These slave modules can be attached to and removed from DIN rails with a distance of 35 mm between the rails.



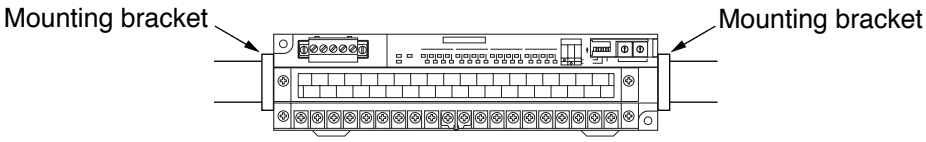
① Put the hooks on the back of the slave module on the DIN rail and press in the direction shown by the arrow.



② To remove the slave module from the DIN rails, press down the groove in the DIN rail lever using a slotted screwdriver and lift the slave module up to remove it.



③ Install mounting brackets on a DIN rail

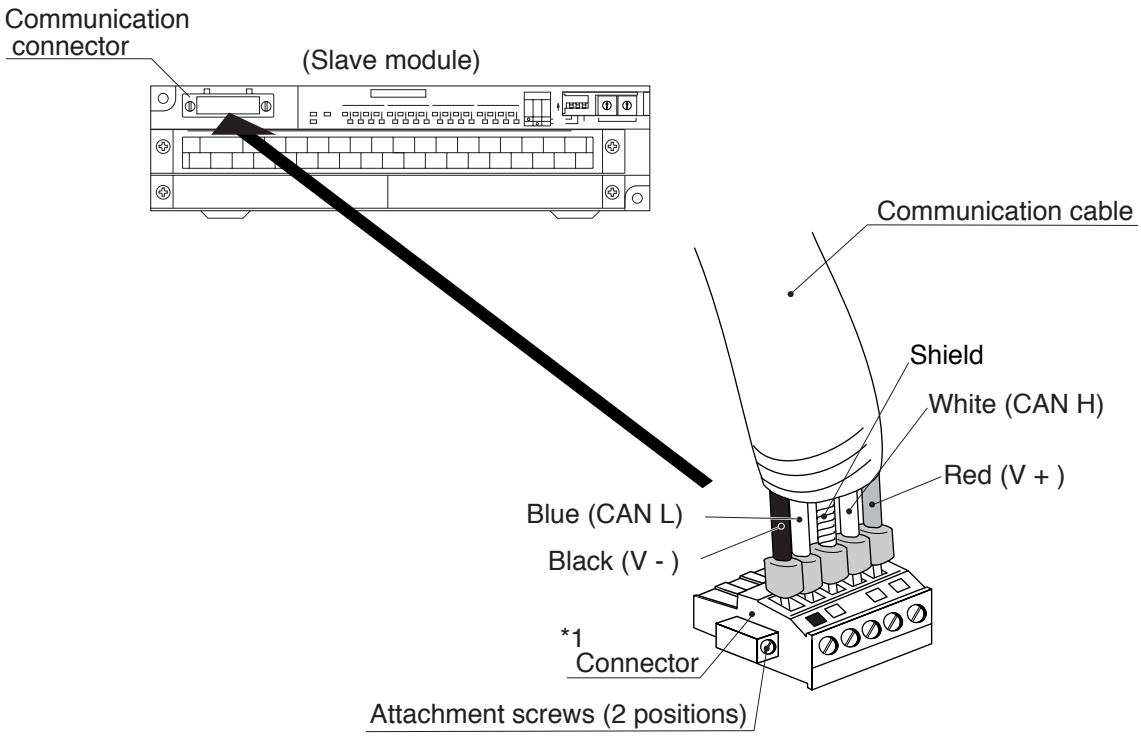


Appendix 2-3: Wiring method

For wiring this slave, connect a communication cable including inputs/outputs and power lines to the DeviceNet communication connector's terminal block.

[1] Wiring the communication cables

Attach the communication cable to the connector and then plug it into the DeviceNet communication connector on this slave module.



*1: One communication cable connector is supplied with each slave module.
Connector model: MVSTBR2.5/5-STF-5.08 AUM (made by Phoenix contact)

One set of communication cable consists of 5 lines. Thick and thin cables are available.

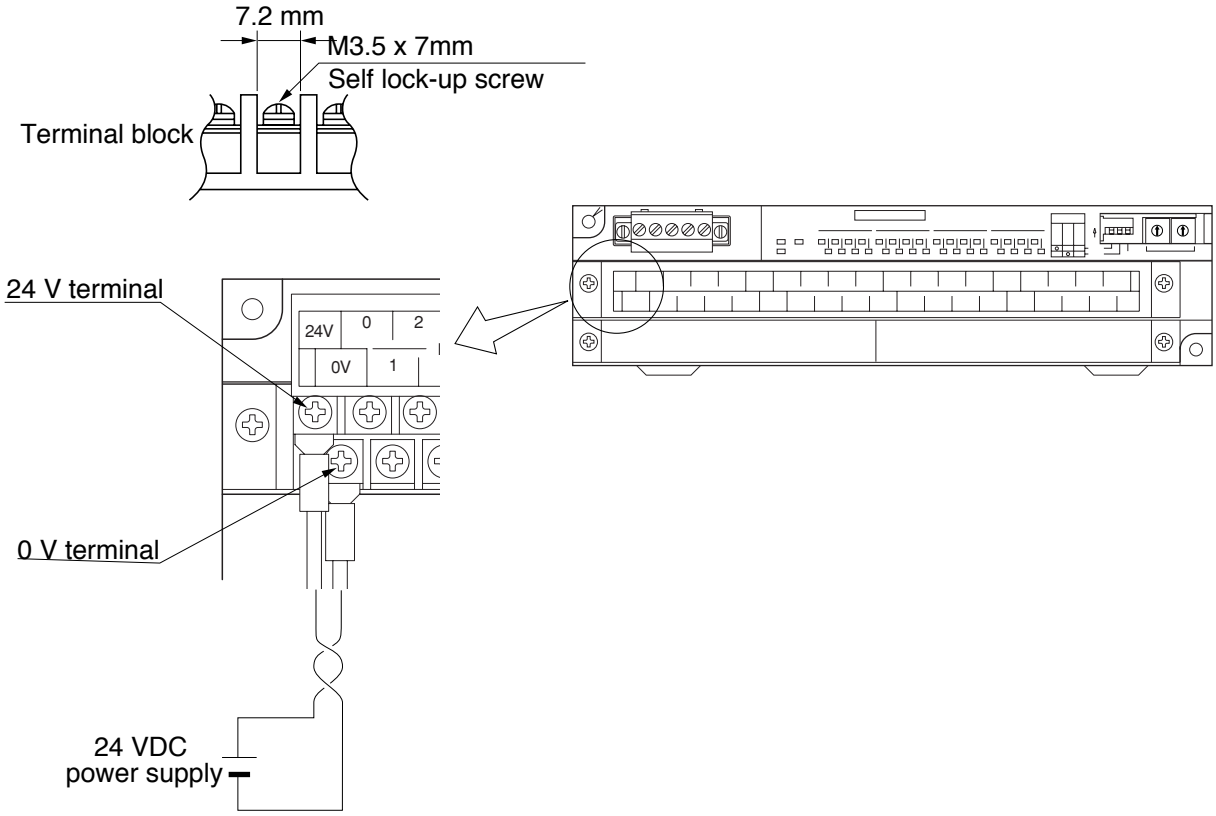
Number of lines	Mfg.	Type	Model name	Outside diameter	Major applications
5 lines (2 signal lines 2 power lines 1 shield)	Nihon Electric Wire & Cable	Thick	DVN18	12	Trunk line
		Thin	DVN24	7	Branch or trunk line
		Thick	DVN18SF	12	For actuating component *2
		Thin	DVN24SF	7	For actuating component *2
		---	DVN20SF	10	Bending-proof, twist-proof *2

*2 Contact the cable manufacturer for more details.

- The thick cable has a resistance of approximately 12 ohm/km and the thin cable resistance is approximately 58 ohm/km. Calculate the voltage drop of the complete loop (going and coming back) based on the current consumption of the slave modules. Then determine the positions and number of communication power supplies you need to install.

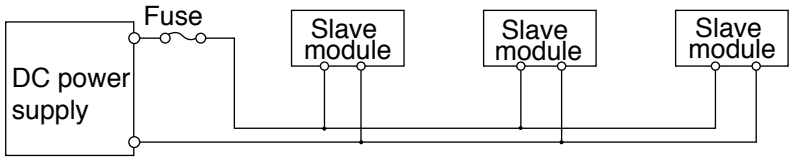
[2] Power line wiring

Connect the power cables to the power supply terminals (24 V and 0 V) on the terminal block using crimped terminals. See the terminal block dimensions below for the crimped terminal sizes.



Reference

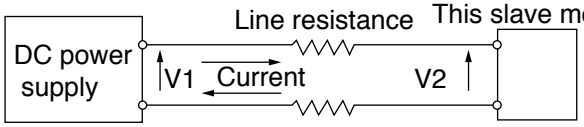
When you need to supply power to slave modules that are far away from the power supply, install a fuse in the DC power supply in order to prevent the wiring from overheating or burning. Carefully calculate the voltage drop when running wires a long distance.



Reference: Voltage drop

Voltage drop (V_1 -V_2) =

Current x Line resistance x 2 x Line length (km)



Line resistance

Nominal cross-section area

0.75mm^2 ····· 24.8 ohm/km

1.25mm^2 ····· 14.7 ohm/km

2mm^2 ····· 9.53 ohm/km

- If the DC power supply is set to 26.4 V, arrange the wiring so that the voltage drop will be less than 6 V. 26.4 V - 20.4 V = 6 V (20.4 V: Minimum operating voltage for the slave module)

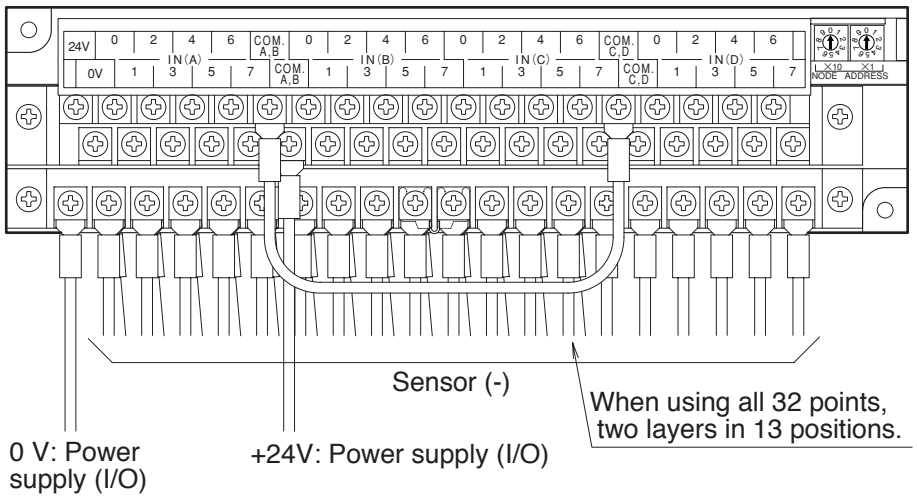
[3] Input/output cable wiring

Connect the input/output cables to the input/output terminals (0 to 7).The dimensions of the input/output terminal block are the same as for the power terminal block. => See App-28.

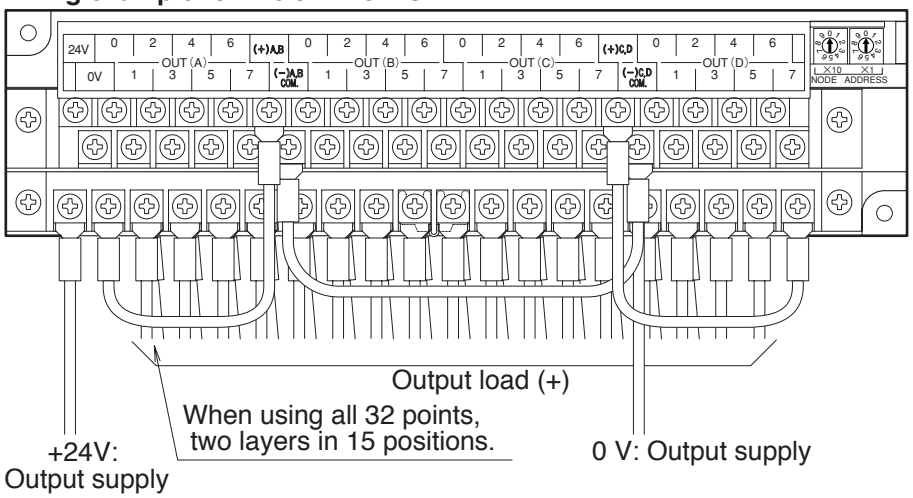
See App-22 and App-23 for details about the input/output terminal positions. See App-34 to App-38 for the specifications of the circuit configuration.

Shown below are wiring examples for each model

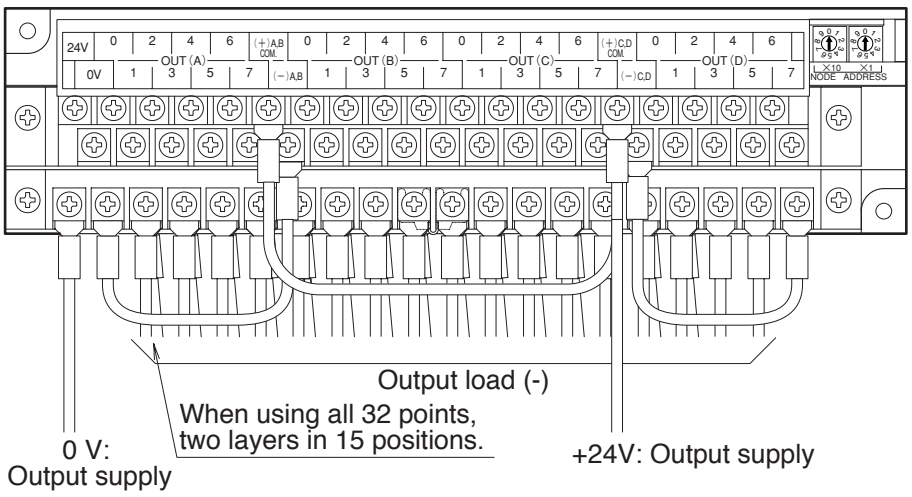
- **Wiring examplesJW-D324NH**



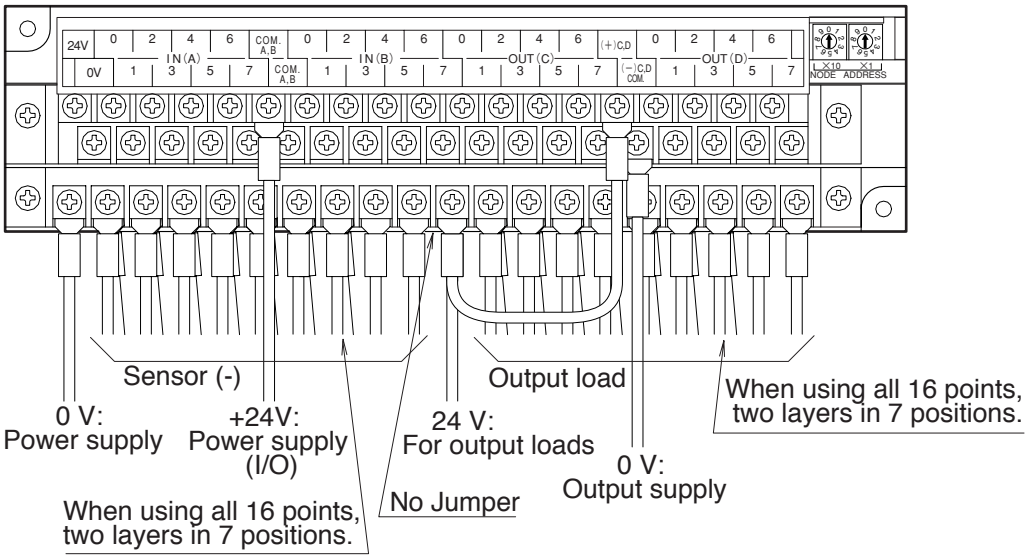
- **Wiring example for the JW-D322SH**



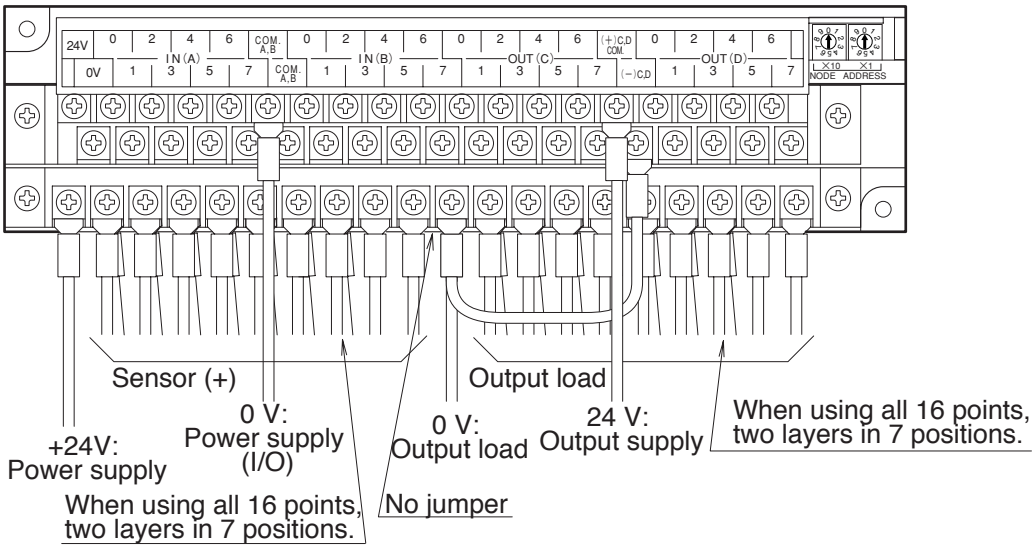
- **Wiring example for the JW-D325SH**



● Wiring example for the JW-D322MH



● Wiring example for the JW-D325MH



Appendix 2-4: Errors and responses

When an error occurs in a slave module, check the error detail by looking at the indicator lamps (MS/NS/FUSE) on the slave module. Then take the recommended countermeasure.

Indicator lamp		Error details		Countermeasures
MS	NS			
Lit green	Lit green	Communicating normally (connection is established)		---
Goes OFF	Goes OFF	Power to the slave module is off.		1. Check the 24 VDC power supply voltage. Look for disconnected cables or loose connections. 2. Hardware error in the slave module. => Replace the slave module.
Lit green	Goes OFF	Error in the network power supply. Cannot detect other devices on the network.		1. Check the voltage. Look for disconnections or loose cable connections related to the network power supply. 2. Check the switch settings on the slave module (duplicate use of the same node address, incorrect communication speed setting, etc.) 3. Hardware error in the slave module. => Replace the slave module.
Lit green /blinking green	Blinking green	Connection not established	Waiting to establish a connection with the master module.	1. Look for disconnections or loose communication cables. 2. Error in the master module. 3. Hardware error in the slave module. => Replace the slave module.
Lit green	Blinking red	I/O time out	I/O connection has time out	
Lit green	Lit red	Network error	Duplicate assignment of the same node address	1. Check the node address switches on the slave modules (look for a duplicate address). 2. Hardware error in the slave module. => Replace the slave module.
			Buss down status (Multiple data errors occurred.)	Check the following - Communication speed is the same for the master and all slave modules? - Are the cable length (trunk and branches) appropriate? - Are there any disconnected or loose cables? - Are terminating resistances present at both ends? - Is there a lot of electrical noise?
Lit red	Goes OFF	Slave module error 1	- Communication speed, node address switch settings are out of range. - Hardware error : RAM check error, ROM check error, EEPROM checksum error, rmodel name setting error.	1. Check the switch settings on the slave module. (Are they within range?) 2. Hardware error in the slave module. => Replace the slave module. * This error can occur when power is input.
Blinking red	No change	Slave module error 2	Abnormality in the vender information (Checksum error in the EEPROM)	1. Hardware error in the slave module. => Replace the slave module. * This error can occur when power is input.

Indicator	Error details	Countermeasure
FUSE *		
Lit red	Blown output circuit fuse, or power is not being supplied. * The FUSE lamp will go ON regardless of the communication status	1. Check the voltage level of the power supply output. Look for disconnected or loose cables. 2. Hardware error in the slave module. => Replace the slave module. Note: When the internal fuse is blown by a short circuit in the output load or by an overload, this lamp also goes ON. The internal use cannot be replaced by the user.

* When a JW-D322SH/D325SH/D322MH/D325MH is used as a slave module

Appendix 2-5: Specifications

[1] Common specification

(1) General specifications

Item	Specifications
Main housing voltage	24 VDC (20.4 to 26.4 V)
Main housing current	70 mA max.
Communication power voltage	11 to 25 VDC
Communication power current	40 mA max.
Storage temperature	-20 to 70 °C
Ambient operating temperature	0 to 55 °C
Ambient operating humidity	35 to 90%RH (non condensing)
Operating atmosphere	No corrosive gases
Vibration resistance	Conforms to JIS B 3502
Shock resistance	Conforms to JIS B3502: 147 m/s^2 (3 times each along the X, Y, and Z axes)
Insulation method	Photo-coupler
Insulation resistance	10 M-ohm or more at 500 VDC megger (between external terminal and internal circuit)
Insulation withstand voltage	500 VAC, for 1 minute (between external and internal terminals)
External line connection method	26-point detachable terminal block (M35. x 7 screws)
Installation	M3 screws, or 35 mm width DIN rails
Size	200 mm (W) x 75.7 mm (H) x 50 mm (D)
Weight	Approx. 400 g
Accessory	One user's manual

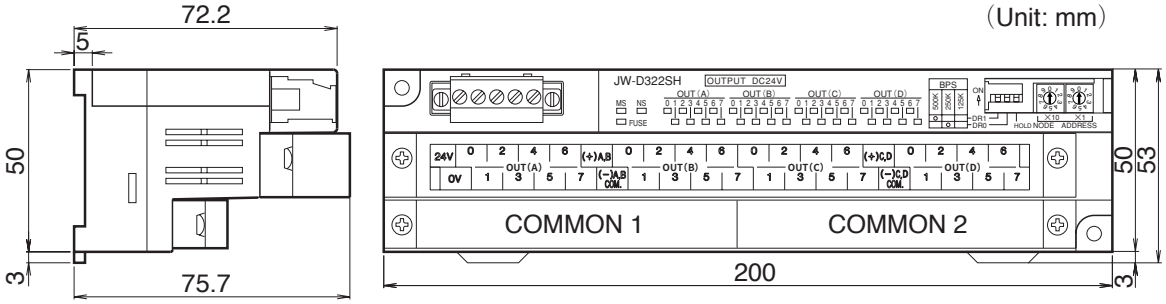
(2) Communication specifications

Item	Specifications			
Communication service	Polling I/O function, Bit Strobe function			
Communication distance (max.)	**Communication speed**	**125 kbps**	**250 kbps**	**500 kbps**
	Trunk length using thick cable	500 m	250 m	100 m
	Trunk length using thin cable	100 m	100 m	100 m
	Branch line length	6 m	6 m	6 m
	Total branch line length	156 m	78 m	39 m
Communication wiring	Proprietary cable (5 lines: 2 signal lines, 2 power lines, and 1 shield) - Thick cable: For trunks - Thin cable: For trunks and branches			

(3) External dimension drawings

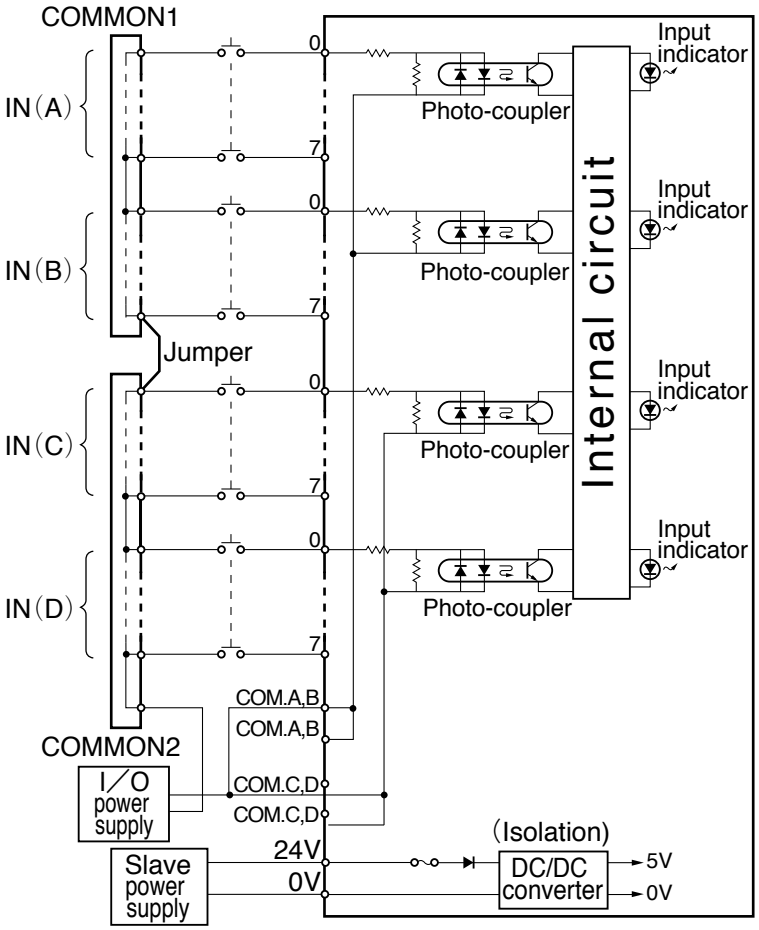
External dimensions are the same for all five models.

（Unit: mm）

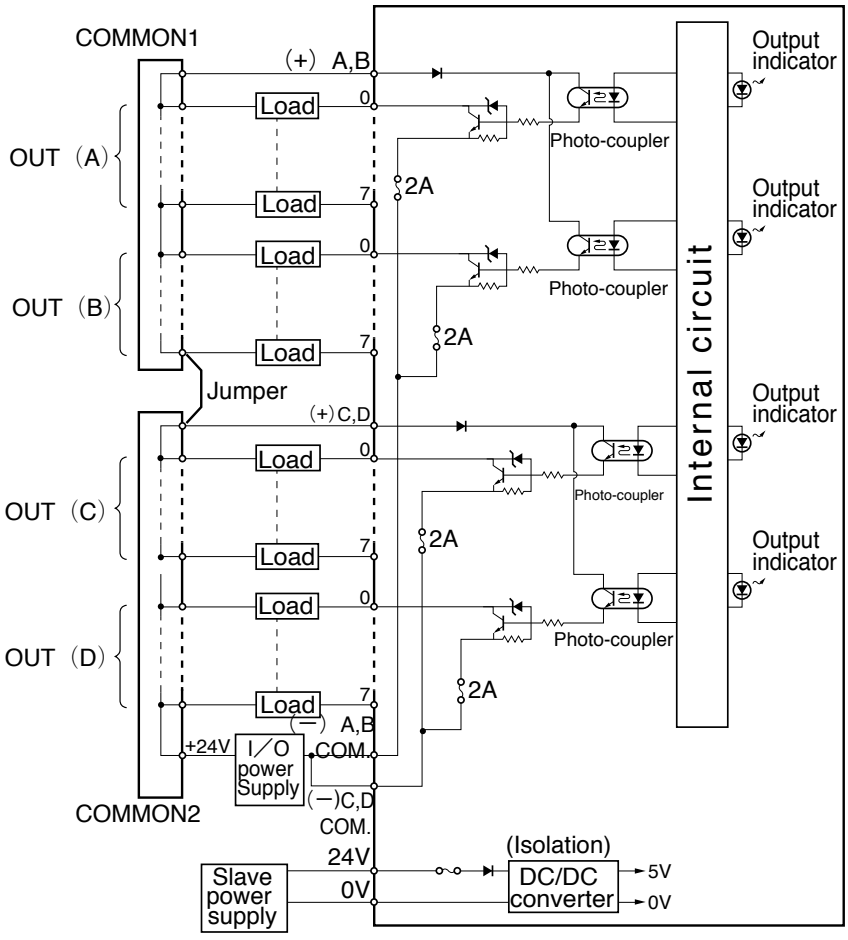


[2] Specifications for each slave module

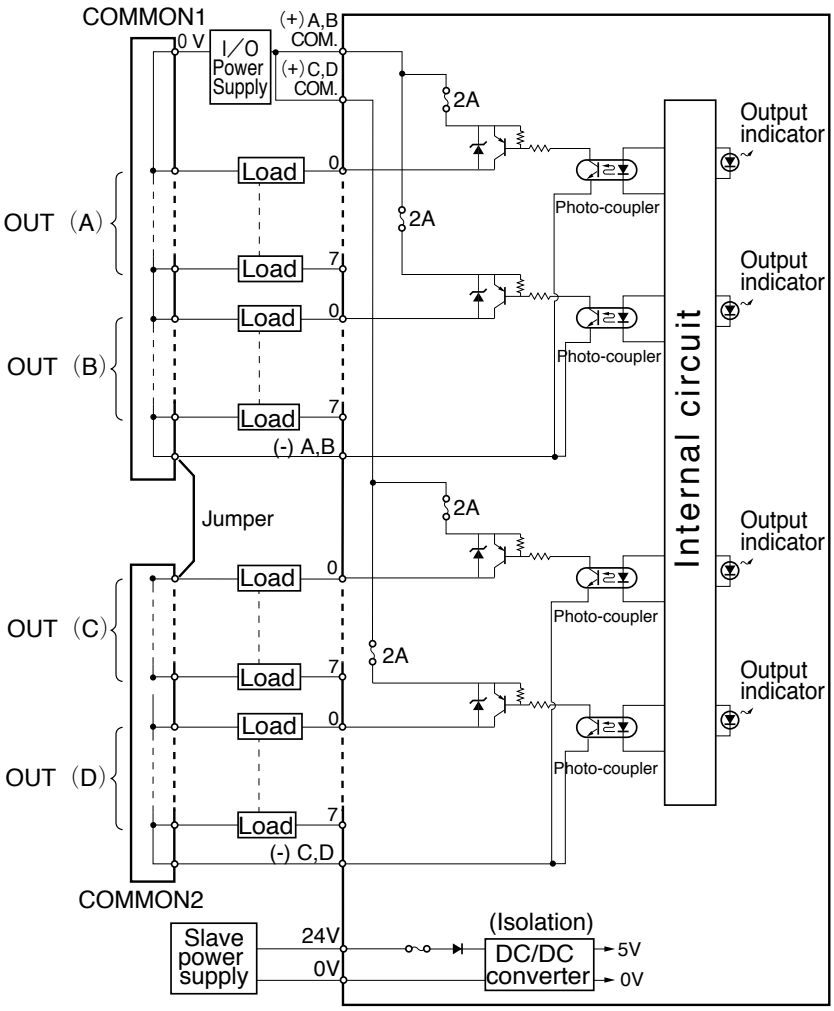
(1) JW-D324NH (24 VDC / 32 points DC input)

Item	Specifications
Number of inputs	32 points (occupies 4 bytes)
Rated input voltage	24 VDC (21.6 to 26.4 V)
Rated input current	Approx. 6 mA (at 24 V), input impedance: Approx. 4 k-ohm
Input ON/OFF levels	ON :18 V (3 mA or less) OFF: 8V (1.5 mA or less)
Input response time (module alone)	OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC)
Common system	One common for 16 points, no common polarity Common terminal: 10 points / common (all the points are shorted to each other)
Common terminal	20 points (all the points are shorted to each other)
Circuit configuration	 - Addresses of DeviceNet (master) communication areas are allocated in the order of IN (A), IN (B), IN (C), and IN (D). - You may remove the jumper to connect independent power supplies: one for IN (A), and IN (B), one for IN (C) and IN (D).

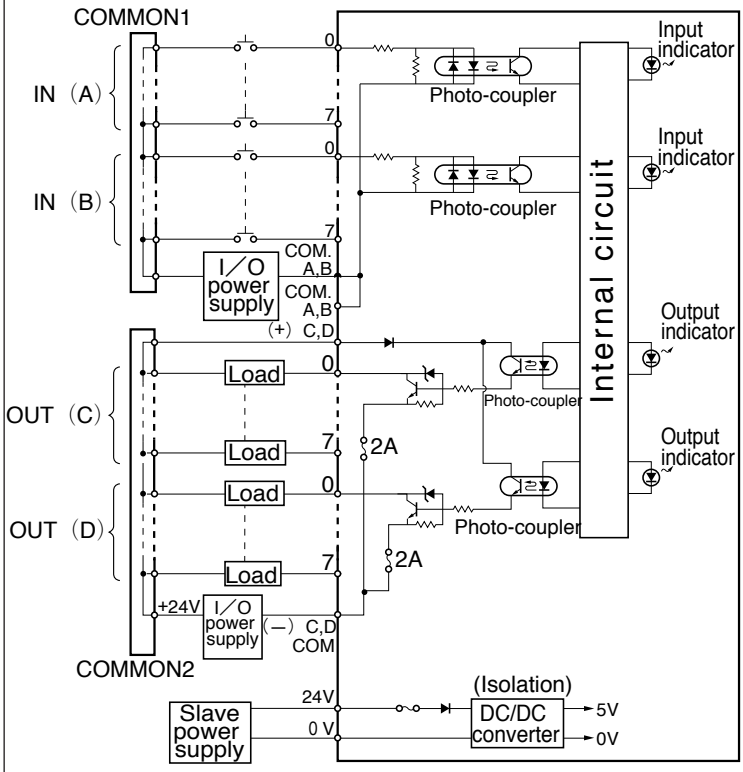
(2) JW-D322SH (24 VDC / 32 points, sink output)

Item		Specifications
Number of outputs		32 points (occupies 4 bytes)
Output method		Transistor output (sink output)
Rated output voltage		24 VDC (21.6 to 26.4 V)
Output current		Max. 300 mA/point, 1.5 A/8 points common Allowable surge current: 1 A (100 ms)
Voltage drop when ON		0.5 V or less (when the output current is 300 mA)
Leak current when OFF		0.1 mA or les
Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
Protection circuit	Surge killer	Zener diode
	Fuse	2A internal fuses are present for each 8 points (cannot be replaced by the user) Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
Common system		One common for 16 points, negative polarity
Common terminal		20 points (all the points are shorted to each other)
Circuit configuration		 - Addresses of DeviceNet (master) communication areas are allocated in the order of OUT (A), OUT (B), OUT (C), and OUT (D). - You may remove the jumper to connect independent power supplies: one for OUT (A) and OUT (B), one for OUT (C) and OUT (D). - For safety, only use fuses mathing with the load capacity one for each output point.

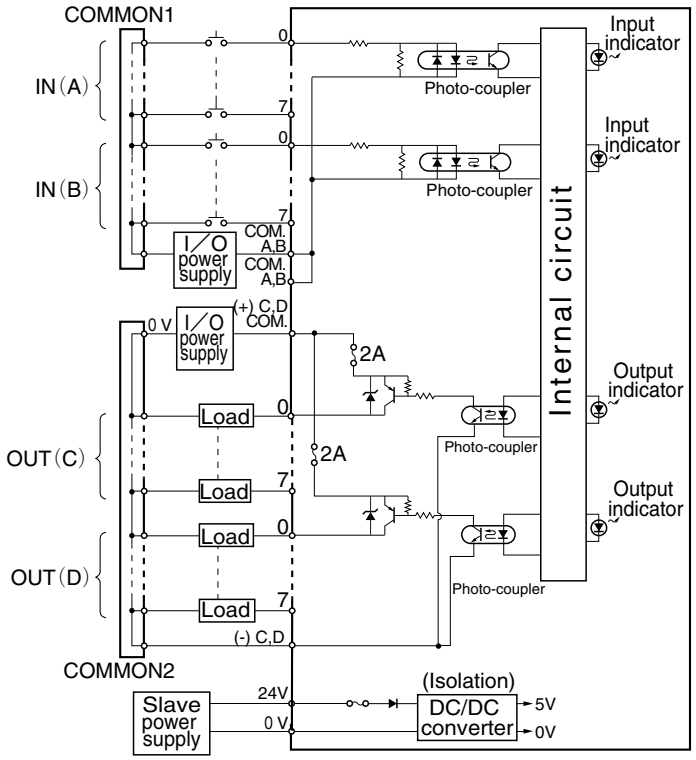
(3) JW-D325SH (24 VDC / 32 points source output)

Item		Specifications
Number of outputs		32 points (occupies 4 bytes)
Output method		Transistor output (source output)
Rated output voltage		24 VDC (21.6 to 26.4 V)
Output current		Max. 300 mA/point, 1.5 A/8 points common Allowable surge current: 1 A (100 ms)
Voltage drop when ON		1.2 V or less (when the output current is 300 mA)
Leak current when OFF		0.1 mA or less
Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
Protection circuit	Surge killer	Zener diode
	Fuse	2A internal fuses are present for each 8 points (cannot be replaced by the user) Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
Common system		One common for 16 points, positive polarity
Common terminal		20 points (all the points are shorted to each other)
Circuit configuration		 - Addresses of DeviceNet (master) communication areas are allocated in the order of OUT (A), OUT (B), OUT (C), and OUT (D). - You may remove the jumper to connect independent power supplies: one for OUT (A) and OUT (B), one for OUT (C) and OUT (D). - For safety, only use fuses mathing with the load capacity one for each output point.

(4) JW-D322MH (24 VDC /16 point input, 16 points sink output)

Item			Specifications
Number of inputs/outputs			32 points (occupies 4 bytes) * The 32 points are allocated as 16 input points in the first half and 16 output points in last half.
Input	Rated input voltage		24 VDC (21.6 to 26.4 V)
	Rated input current		Approx. 6mA (at 24 V), input impedance: Approx. 4k-ohm
	Input ON/OFF levels		ON: 18 V (3 mA or less) OFF: 8V (1.5 mA or less)
	Input response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC)
	Common system		One common for 16 points, no common polarity
Output	Output method		Transistor output (sink output)
	Rated output voltage		24 VDC (21.6 to 26.4 V)
	Output current		Max. 300 mA/point, 3 A/16 points common Allowable surge current: 1 A (100 ms)
	Voltage drop when ON		0.5 V or less (when the output current is 300 mA)
	Leak current when OFF		0.1 mA or les
	Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
	Protection circuit	Surge killer	Zener diode
		Fuse	2A internal fuses are present for each 8 points (cannot be replaced by the user) Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
	Common system		One common for 16 points, negative polarity Common terminal: 10 points/common (all the points are shorted to each other)
Common terminal			10 points / common (all the points are shorted to each other) x 2
Circuit configuration			 - The communication area addresses of the DeviceNet (master) are allocated in the order of IN (A), IN (B), OUT (C), and OUT (D) (IN as input side and OUT as output side). - For safety, only use fuses mathing with the load capacity one for each output point.

(5) JW-D325MH (24 VDC / 16 point input, 16 points source output)

Item			Specifications
Number of inputs/outputs			32 points (occupies 4 bytes) * The 32 points are allocated as 16 input points in the first half and 16 output points in last half.
Input	Rated input voltage		24 VDC (21.6 to 26.4 V)
	Rated input current		Approx. 6mA (at 24 V), input impedance: Approx. 4k-ohm
	Input ON/OFF levels		ON: 18 V (3 mA or less) OFF: 8V (1.5 mA or less)
	Input response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC)
	Common system		One common for 16 points, no common polarity
Output	Output method		Transistor output (source output)
	Rated output voltage		24 VDC (21.6 to 26.4 V)
	Output current		Max. 300 mA/point, 3 A/16 points common Allowable surge current: 1 A (100 ms)
	Voltage drop when ON		1.2 V or less (when the output current is 300 mA)
	Leak current when OFF		0.1 mA or less
	Output response time (module alone)		OFF to ON: 1 ms or less (24 VDC) ON to OFF: 1 ms or less (24 VDC) * When a resistance load is used.
	Protection circuit	Surge killer	Zener diode
		Fuse	2A internal fuses are present for each 8 points (cannot be replaced by the user) Blown fuse indicator (the FUSE lamp lights when the fuse is blown, or when the output power is OFF)
	Common system		One common for 16 points, positive polarity Common terminal: 10 points / common (all the points are shorted to each other)
Common terminal			10 points / common (all the points are shorted to each other) x 2
Circuit configuration			 - The communication area addresses of the DeviceNet (master) are allocated in the order of IN (A), IN (B), OUT (C), and OUT (D) (IN as input side and OUT as output side). - For safety, only use fuses mathing with the load capacity one for each output point.

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