SHARP®

Version 1.1
Produced in April, 2002

Sharp Programmable Controller

NEW Satellite JW50H/70H/100H

Model name

DeviceNet Master Module JW-50DN

User's Manual

Thank you for purchasing this DeviceNet master module, the JW-50DN for use with the JW50H/70H/100H programmable controller.

This manual describes the specifications, usage etc. of the DeviceNet master module JW-50DN.

Please familiarize yourself with the module by reading this user's manual thoroughly.

Keep this manual handy as well as the instruction manuals that come with each JW-50DN and JW50H/70H/100H control module. We are confident that these manuals will be helpful whenever you face a problem.

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

Note

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

Safety Precautions

Read this 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 .

: This means an action is required. For example, a required grounding is shown as 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 to and on the device.
  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

Disassembly prohibited

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

Table of contents

Chapter 1: Outline

The JW-50DN 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-50D'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-50DN 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-50DN's PC board. Therefore, prior to accessing the JW-50DN, touch your hand to a grounded piece of metal to discharge the static current in your body.

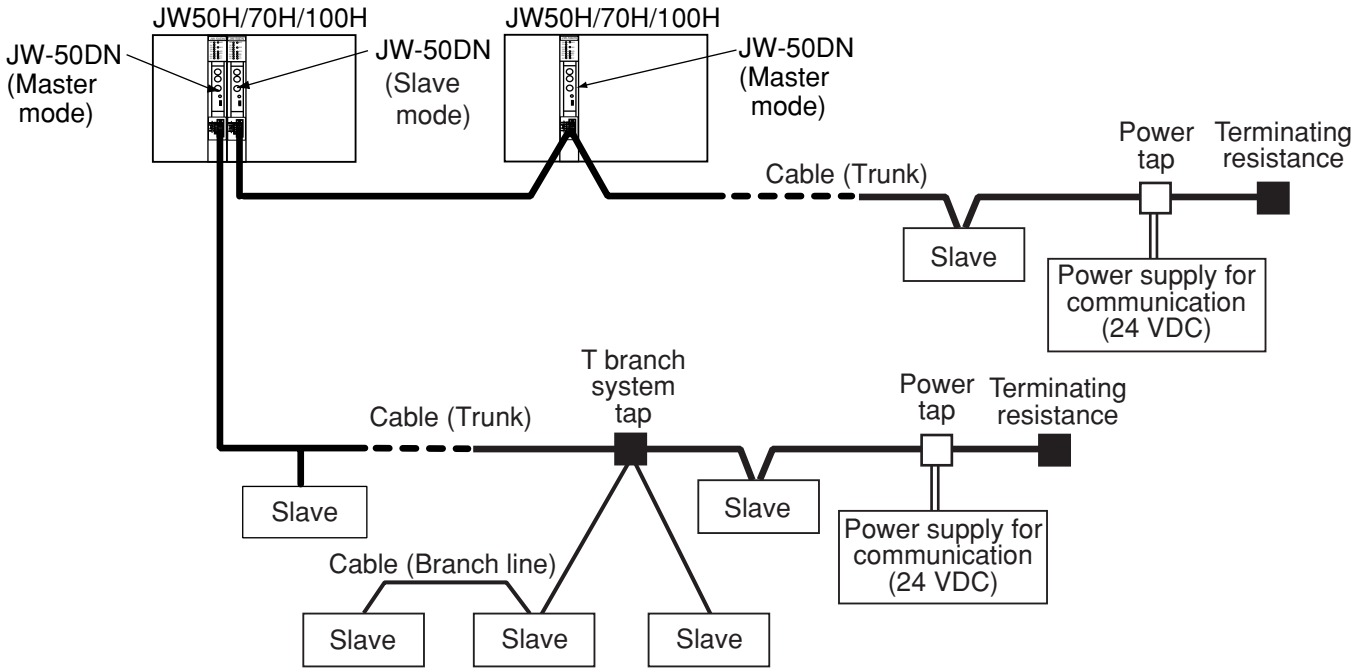
(5) Cleaning

Use a clean, dry cloth when cleaning the JW-50DN. 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-50DN 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-50DN.
- Up to two JW-50DN 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-50DN.

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

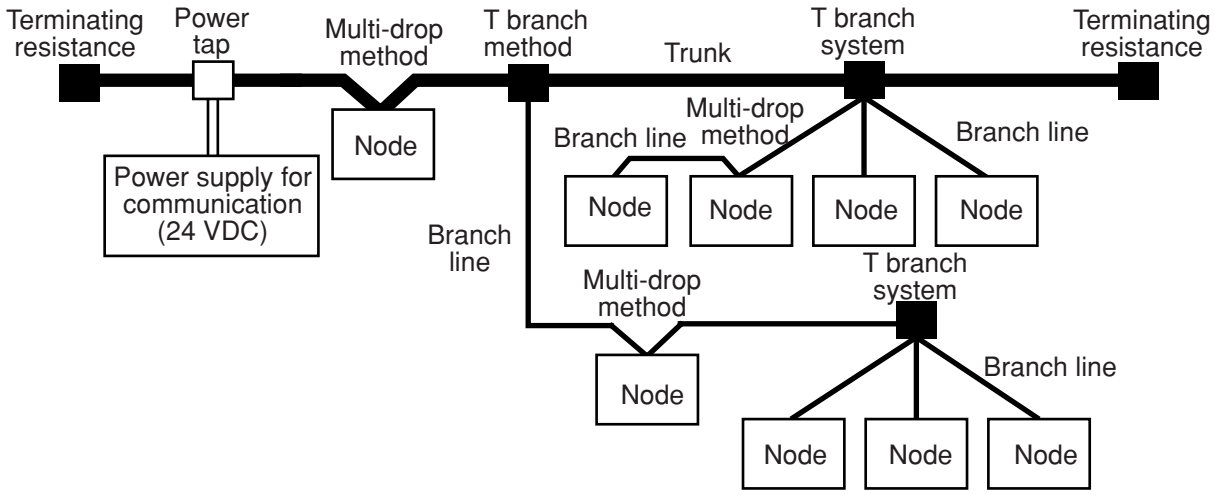
Model name	Master	Slave	PLC to install
JW-50DN	○	○	JW50H, JW70H, JW100H
JW-20DN	○	○ (V 2.1 or more)	JW20H, JW30H
JW-32CUM1	○	—	JW30H
JW-32CUM2	○	○	JW30H
JW-32CV3	○	○	VME built-in controller
Z-337J	○	○ (V 2.1 or more)	J-board
Z-338J	○	○ (V 2.1 or more)	(Z300/Z500 series)

○ : Usable, Inside parenthesses : Software version

[1] Network names and functions

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

● **Network example**



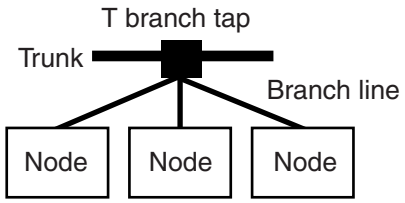
Names	Functions
Node	Master and slave nodes are available on the DeviceNet. [Master: Integrates external I/Os from each slave. [Slave: provides connections for external I/Os. - Since there are no restrictions in allocating a master and slaves, you can arrange nodes at any location shown above.
Trunk	Cable with a terminating resistance 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 to the trunk - 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 a terminating resistance (121ohm) on both ends of the trunk, in order to reduce signal reflection and stabilize the communication. - JW-50DN 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.

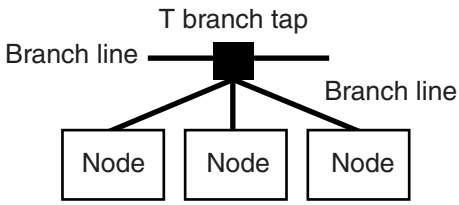
[2] Connection method

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

(1) T branch method

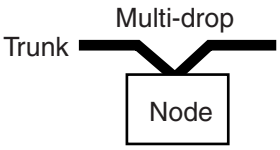
You can make up to three branch lines away from a trunk or a branch line. Use a T branch tap to branch off.

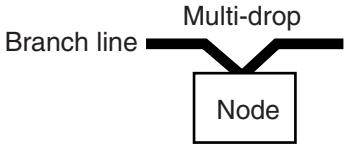




(2) Multi-drop method

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





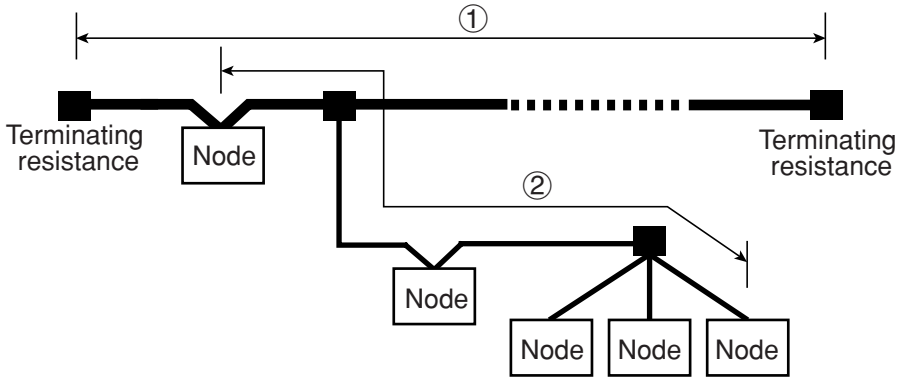
[3] Cable length

(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

[Ex.]



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) is less than 100 m
250 k bits/s	(A + 2.5 x B) is less than 250 m
125 k bits/s	(A + 5 x B) is less than 500 m

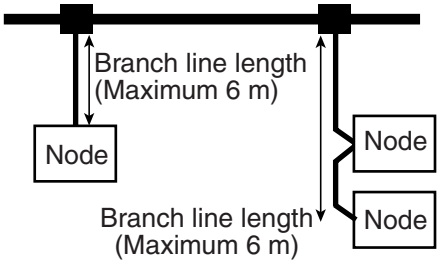
A: Thick cable length
B: Thin cable length

(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.

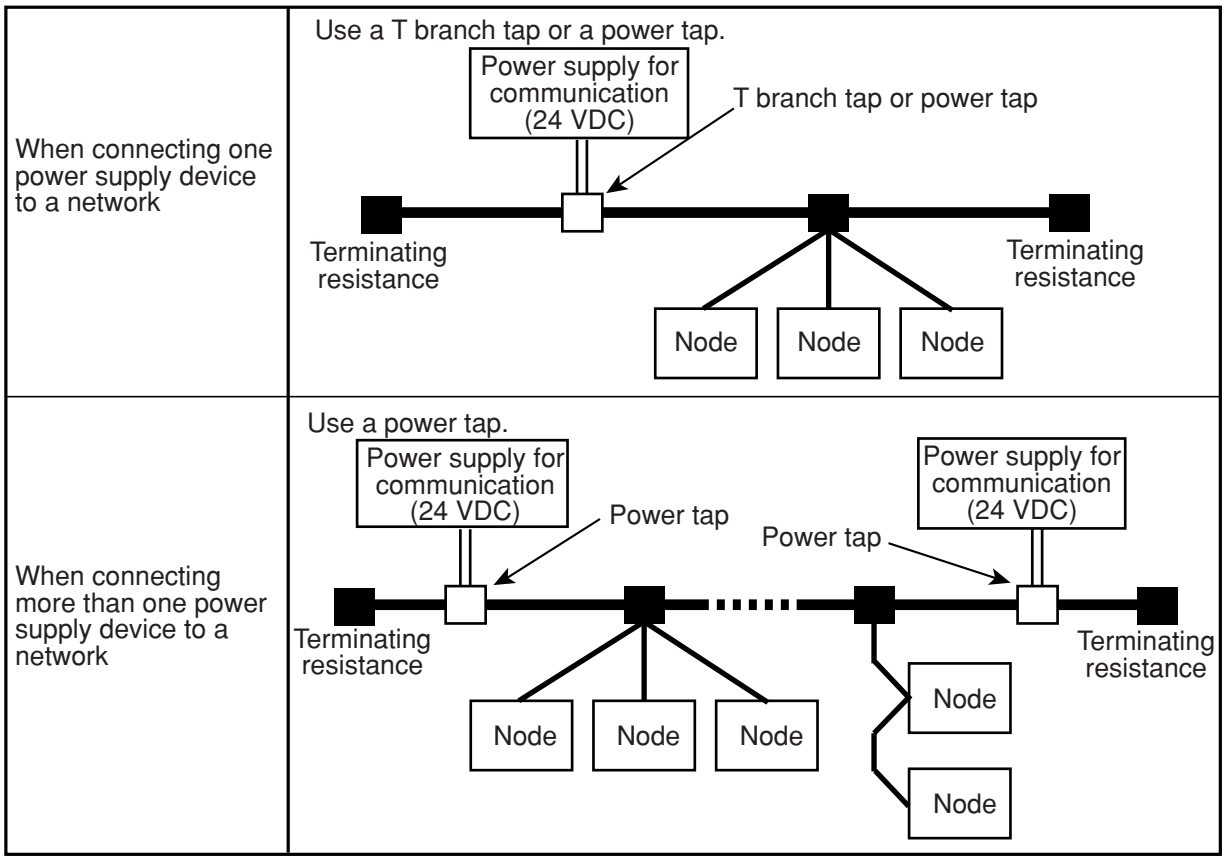
Communic-ation speed	Maximum network length		Branch line length	Total length of branch lines
	Thick cable	Thin cable		
500 k bits/s	100 m or less	100 m or less	6 m or less	39 m or less
250 k bits/s	250 m or less			78 m or less
125 k bits/s	500 m or less			156 m or less

[4] Power supply

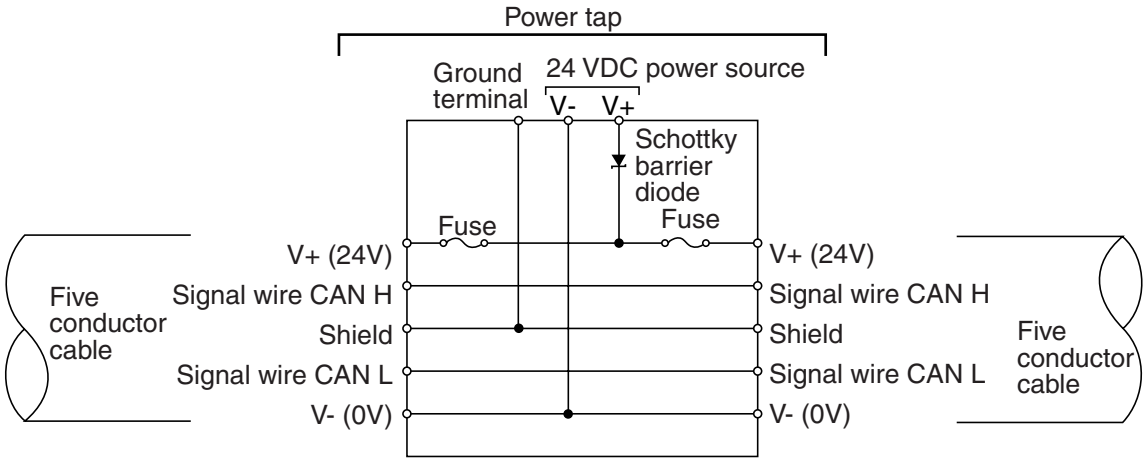
Connect the communication power supply to the trunk.

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 of devices currently available (by manufacturer).

(1) Cable

Thick or thin five conductor cable is available.

Number of conductors	Manufacturers	Type	Model	Length (m)	Outside diameter (mm)	Main use
Five Signal lines: 2 Power source lines: 2 Shield: 1	Allen-Bradley	Thick	1485C-P1-A50	50	11.6 to 12.1	Trunk
		Thin	1485C-P1-C150	150	6.9	Branch line or trunk *
	Omron	Thick	DCA2-5C10	100	11.6 to 12.1	Trunk
		Thin	DCA1-5C10	100	6.9	Branch line or trunk *

* When using a thin cable for a trunk, make sure that the trunk is not more than 100 m long.

(2) T branch tap

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

Model	Number of connectors	Remarks	Manufacturer
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	Omron
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 .

Model	Specifications	Manufacturer
1485T-P2T5-T5	Power tap With a reverse current prevention function and ground terminal	Allen-Bradley

- 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.
- When connecting a power supply device to a single network, use this multi-outlet power strip to prevent reverse current flow to the power supply, due to a difference in potential.

(4) Communication connector

This module contains one BLZ5.08/5F AU-DN (with a screw for securing the connector made by Nihon Weidmuller).

⇨ See page 5-2 to 5-3.

(5) Terminating resistance

Model	Remarks	Manufacturer
DRS1-T	Terminal block type terminating resistance (121 ohms)	Omron
----	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 that installed JW-50DN.
Optional cables and a basic rack panel are available in various combinations, as shown below.

● **Cable type for option module**

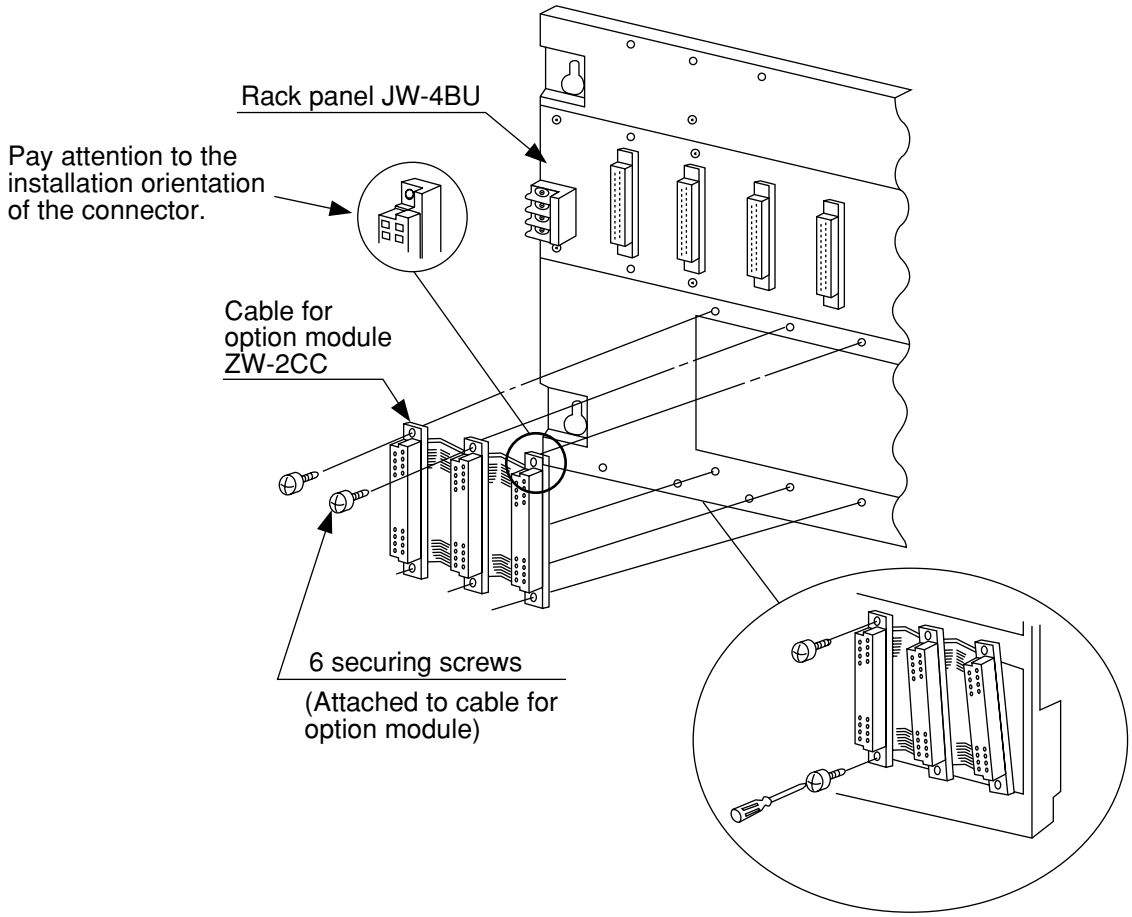
Cable for option module	Maximum number of JW-50DN that can be installed
ZW-2CC	Max. 2 sets
ZW-4CC	
ZW-6CC	

● **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	○	○	○

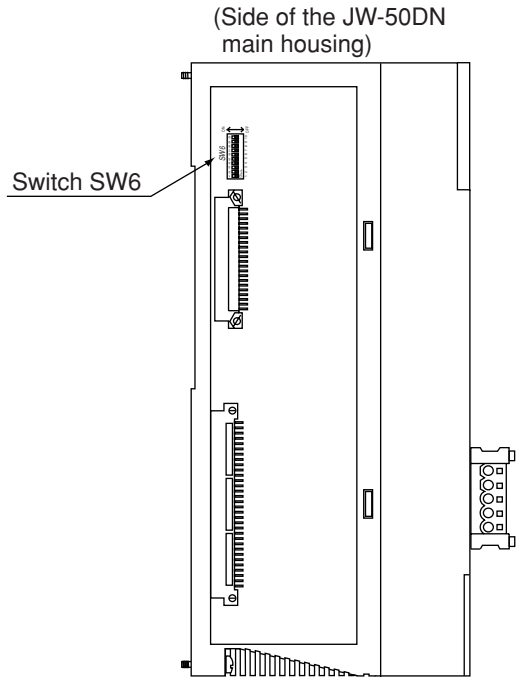
○ : Can be installed
× : Cannot be installed

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



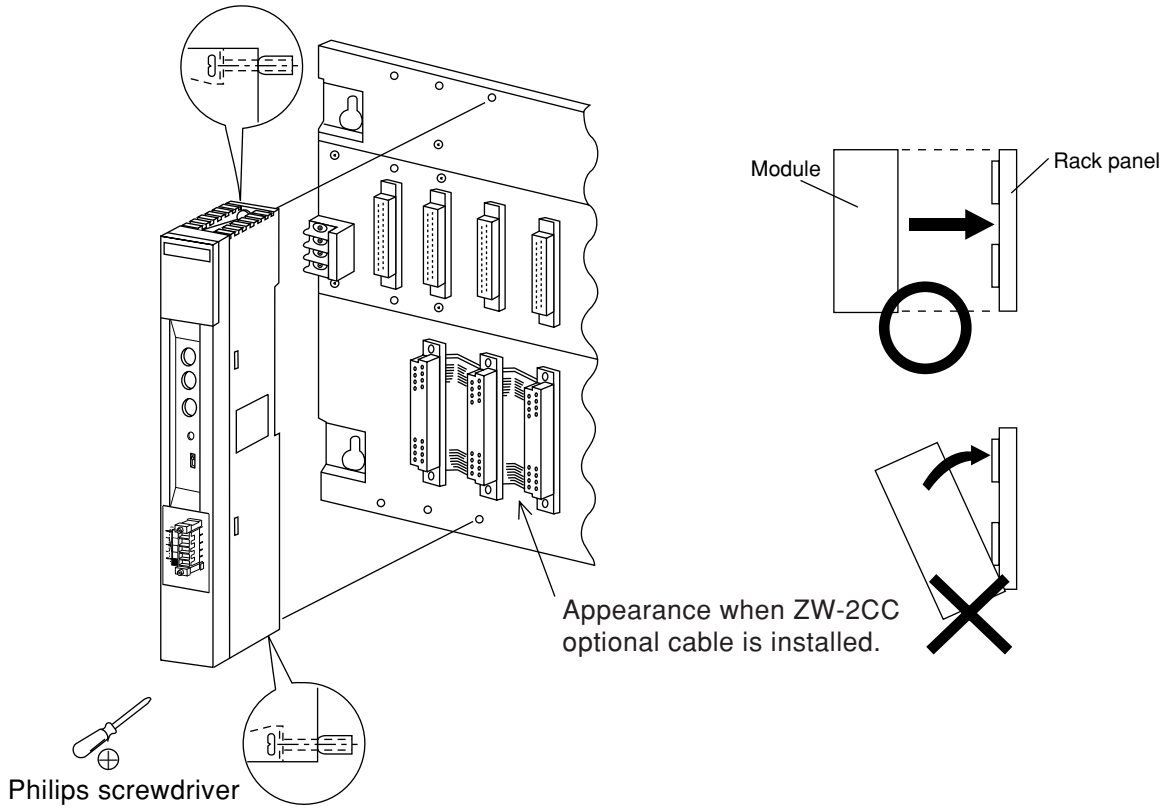
[2] Installation of JW-50DN

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



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

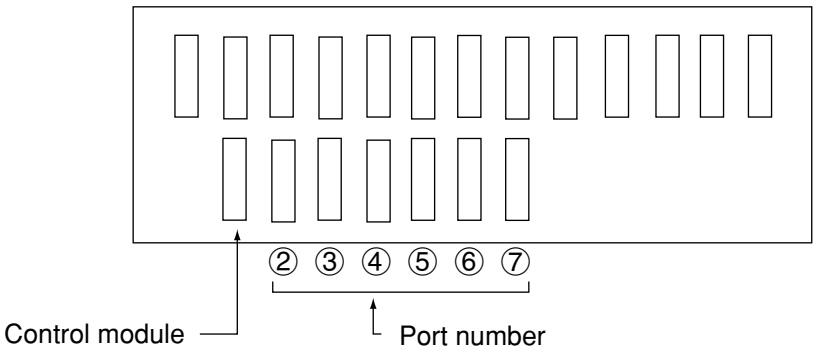
[Example] Install on rack panel JW-4BU



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 PC. This is applied only error code 53: Optional error.

(JW-13BU)



Chapter 5: Connection (Wiring) Method

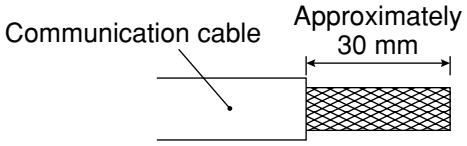
This chapter describes how to connect the JW-50DN to a DeviceNet.

[1] Preparing a communication cable

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

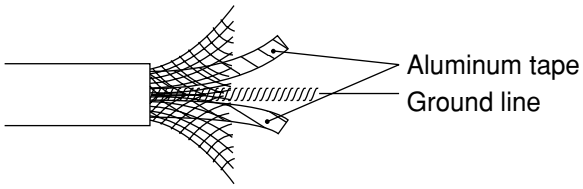
① Remove approximately 30 mm of insulation from the communication cable

- 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

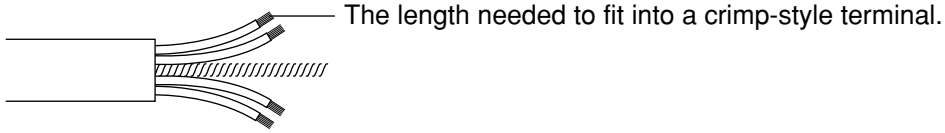
- Under the coaxial shield there is one signal line, one power line, and one ground line. The signal line and power lines are wrapped in aluminum tape.



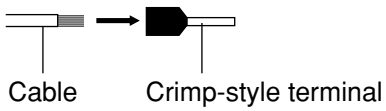
③ Cut off the excess coaxial shield and peel back the aluminum tape on the signal line and power line.

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.



⑤Crimp 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

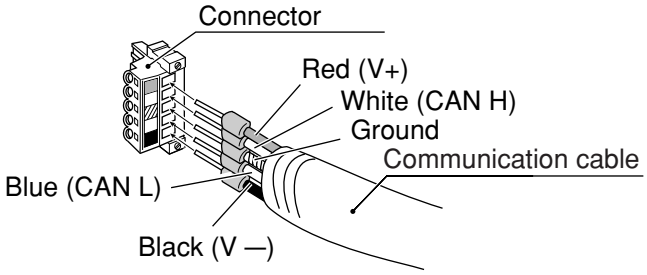
Recommended crimp-style terminals	Special tool
AI series made by Phoenix Contact	ZA3 made by Phoenix Contact
TC series made by Nichifu - For thin wire : TME TC-0.5 - For thick wire : TME TC-2-11 (power line) TME TC-1.25-11 (communication line)	NH-32

To the next page

From the previous page

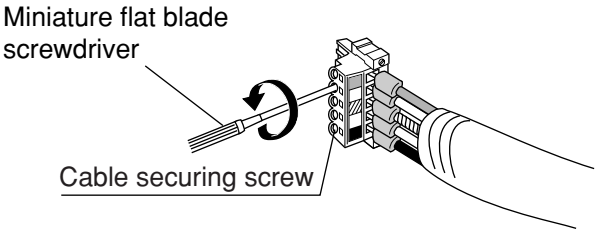
⑥ Insert the signal line, power line, and the ground line into the appropriate connector holes.

- 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-50DN is supplied with one set of BLZ5.08/5F AU-DN (with connector securing screw: Nihon Weidmuller).

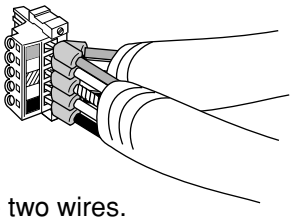


⑦ Secure each wire tightly using the wire retention screws of the connector.

- 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.

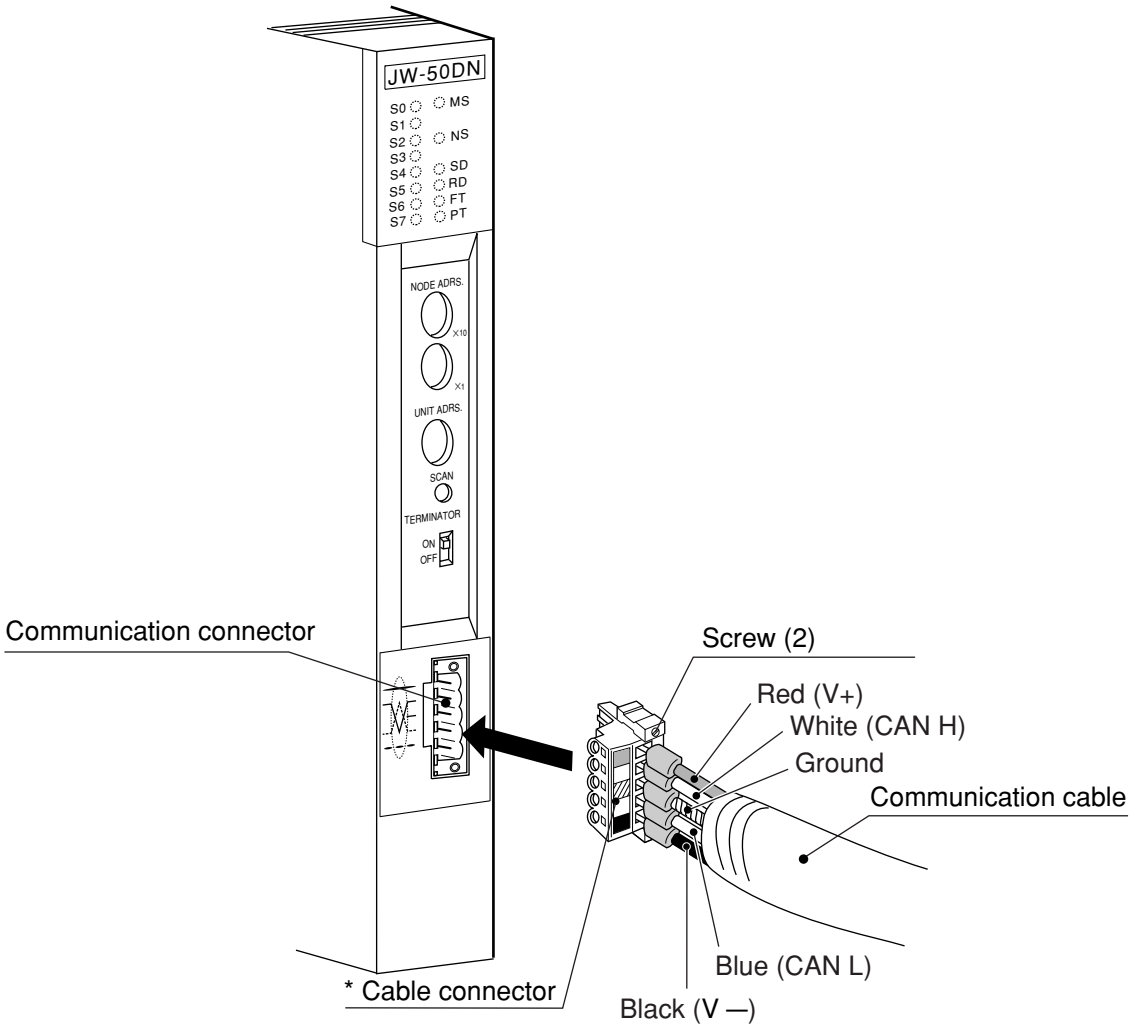
Remarks

- 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-50DN.

Match the orientation of the connector on the cable with the female connector on the JW-50DN 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.

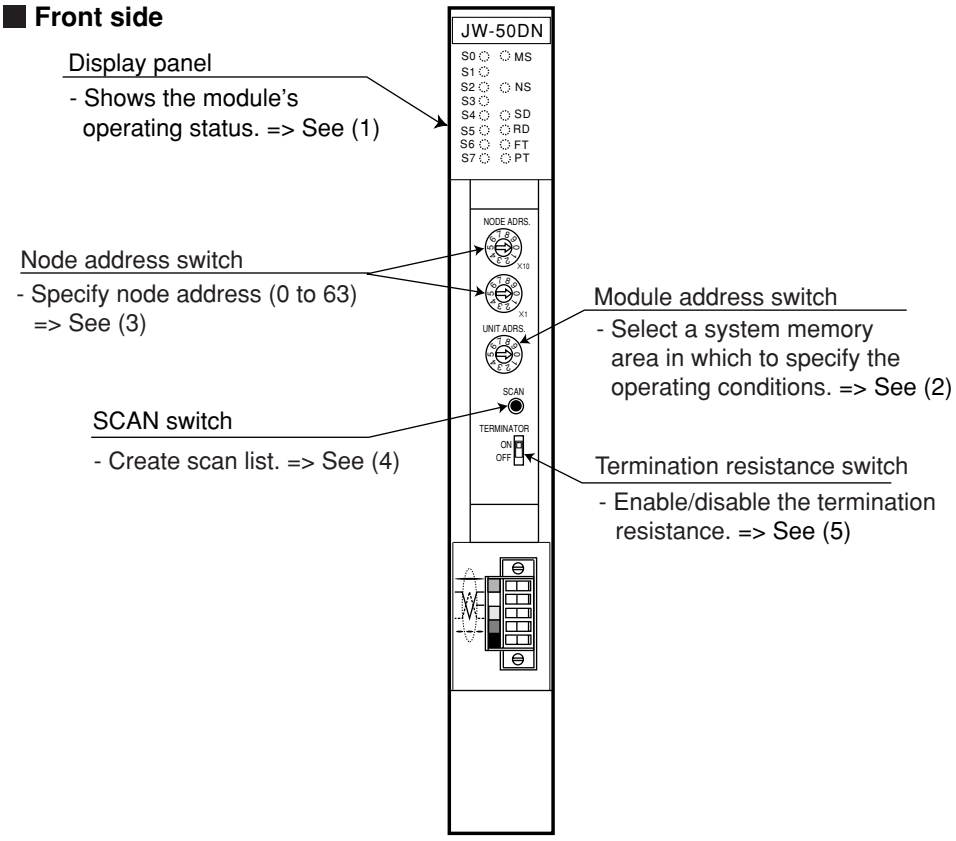


* One male connector is supplied with the JW-50DN.
  - Model name: BLZ5.08/5F AU-DN (made by Nihon Weidmuller)

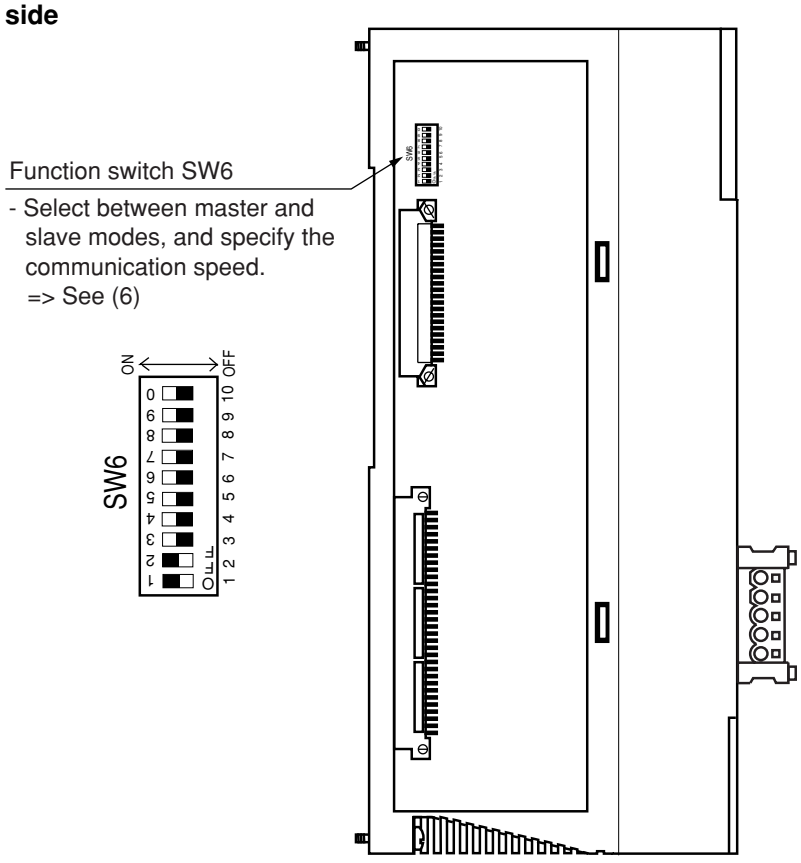
Chapter 6: Description of switch and lamp, setting system memory

6-1 Name and function of switch and lamp

■ Front side

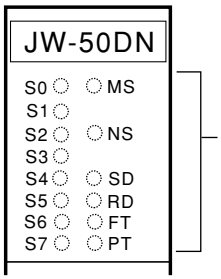


■ Rear side



(1) Display panel

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



Display panel on the JW-50DN
- The ○ areas are the locations of the lights.

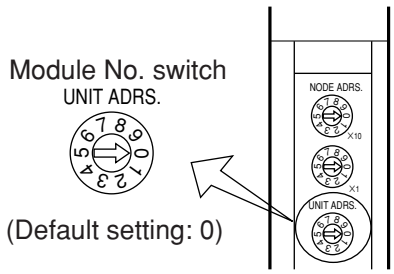
Lamp name	Color	Operation details	
MS	Green/Red	Indicates the module's status.	For details, see the table below.
NS	Green/Red	Indicates the network status.	
SD	Red	Lights when sending data.	
RD	Red	Lights when receiving data.	
FT	Red	Lights when the module is faulty.	
PT	Red	Lights when the module is 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-50DN is functioning normally.
		Blinks	Not yet set	Currently reading the switch settings.
	Red	ON	Hardware error	The JW-50DN has a hardware error.
		Blinks	Abnormal setting	Mis-set switches.
	---	OFF	No power supplied	- Hardware error in the JW-50DN. - No power is supplied to the JW-50DN. - 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 has been used 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-50DN.

(2) Module address switch: UNIT ADRS

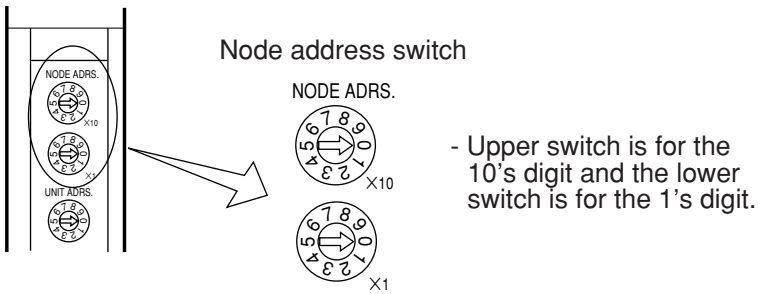
Allocate system memory in the PLC control module (JW50H/70H/100H) for each DeviceNet that is used with the JW-50DN. ⇨See page 6-6.



- 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)



(Default setting: Both set to 0)

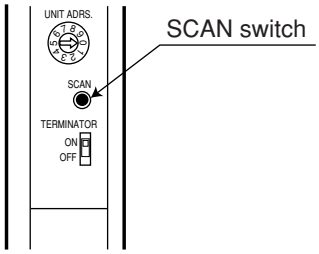
- As long as the node address assigned to the JW-50DN does not duplicate the address of another node, the node address on the JW-50DN can be set anywhere from 0 to 63. If the same node address is assigned to two devices, a duplicate node address error will occur and the JW-50DN will not be able to communicate.

(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-50DN executes the following procedures.

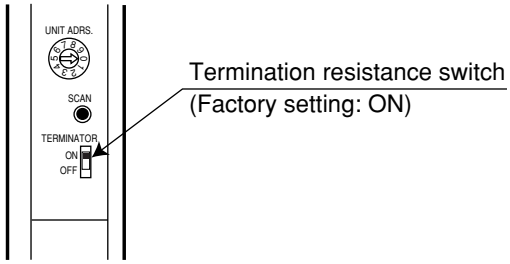
When used in the master mode	When used in the slave mode
Re-reading settings of the switches and system memory ↓ (If there is no error) Edit the scan list	Re-reading settings of the switches and system memory

- When the "Busoff" error occurs, there is a fault on the communication. In this case, turn OFF/ON the PLC power or keep pressing the SCAN switch for longer than three seconds regardless of the settings of the protect, the JW-50DN is shut off connection, and is issued connection again. If there is no problem on the communication, the JW-50DN can communicate normally.



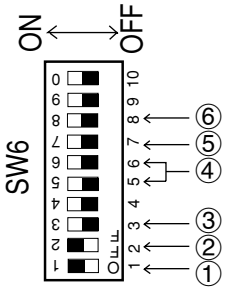
(5) Termination resistance: TERMINATOR

If the JW-50DN 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 when a communcation error occurs while communicating with a slave station. OFF: The control module continues operation. ON: The control module stops operation and enters the program mode. (Default 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) 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-50DN. 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: Protection ON (Factory setting) ON: Protection OFF ⇨ 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 6-9), 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)

(○: Enable, －: Disable)

6-2 Setting system memory

The table of JW-50DN 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)	See page 6-8.
O	-	Data length when editing scan list	#1621	#1721	⇨ (6)	
O	-	Request explicit message	#1622	#1722	⇨ (7)	
O	-	ISD (communication monitor time)	#1624 #1625	#1724 #1725	⇨ (8)	See page 6-9.
O	-	EPR (communication monitor time)	#1626 #1627	#1726 #1727		
O	-	Slave module output status when the control module is not operating.	#1630	#1730	⇨ (9)	
-	O	Top address of I/O table (when used as slave module)	#1660 to #1663	#1760 to #1763	⇨ (10)	See page 6-10.
-	O	Number of I/O bytes (when used as slave module)	#1664 to #1667	#1764 to #1767	⇨ (11)	
-	O	Latch/clear slave area when communication error occurs (when used as slave module)	#1670	#1770	⇨ (12)	

(○: 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 (Ɔ0000)], and cause a malfunction. Be especially careful the "top address of the diagnosis table" can be enabled when the JW-50DN is used in the slave mode.

(1) Top address of the I/O table

When the JW-50DN 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)
#1605	#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 the JW-50DN is used in the master mode, this system memory location is used to store the top address of 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)
#1612	#1713	Enable/disable	00(HEX): Enable, 01(HEX): Disable

(4) Top address of the scan list table

When the JW-50DN is used in the master mode, this system memory location is used to store the top address of 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	#1704 to #1705	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

This system memory is allocated by editing a scan list, if the JW-50DN 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) I/O data allocation system when editing the scan list

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-50DN 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

This is a system memory area used for the Explicit message function, when the JW-50DN 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)

This system memory contains the "ISD" and "EPR" settings used for determining a communication timeout, when the JW-50DN 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-50DN 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 one or more of the slave modules fails to return a response within the time allowed, a commu nication error occurs.

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	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	EPR	ISD	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.

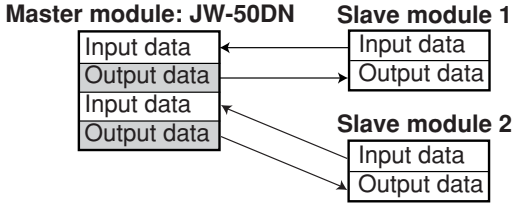
(9) Output status of the slave module when the control module stops operation

When the JW-50DN 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 control module stops operation (enters the program mode).

Module address switch setting value		Setting item	Setting range
0	1		
#1630	#1730	Output status of slave module when control module 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 reach slave station.

The areas shown in gray in the figure below can be set to "send/clear idle data" when the control module stops operation.



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

This system memory location is used to store the top address of the I/O table when the JW-50DN 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 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-50DN 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

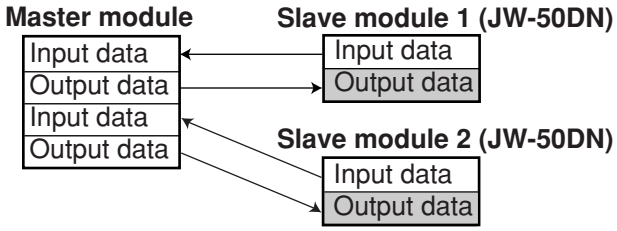
- The specified number of bytes are allocated from the top address in the I/O table (when used in the slave mode) with input bytes being allocated first, followed by the area for the output bytes.

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

When the JW-50DN 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.

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.



6-3 Table of switches and system memory settings

[1] When the JW-50DN 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: Synchornous 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 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	Data length when editing scan list	1 to 64 bytes (when in order of allocation time 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	EPR (communication monitor time)	4 to 65532 ms (in units of 4 ms)		00004 to 65532$_{(DCM)}$ (Set with decimal and word)	
#1630	#1730	Slave output status when the control module 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-50DN 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)	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	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	#1760 to #1761	Not used	---	Set to $00_{(HEX)}$	$00_{(HEX)}$
#1660 #1661	#1760 #1761	Top address of I/O table (occupy 256 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	#1765	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	---	00, $01_{(HEX)}$	$00_{(HEX)}$

*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-50DN supports Polling I/O function and Bit Strobe function. The JW-50DN 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-50DN 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-50DN is used in the master mode, the JW-50DN 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**

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

(○: Enable, —: Disable)

7-1 Input/output data table allocation

The JW-50DN can select from several allocation methods for the slave station input/output data table. For selection, set system memory of the JW-50DN. The choices are "allocation in address order," "even number allocation," and "allocation in the order in which vacant nodes are occupied."

⇨ See page 6-8.

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

- No matter which allocation method is selected, you have to start the master module JW-50DN 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, data lengths, and addresses. Therefore, a separate configuration program is not needed for the input/output data table allocation. ⇨ See page 7-8 to 7-9.
- Set the default data length 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 JW-50DN. ⇨ See page 6-8.

Remark

- Number of I/O points with the JW-50DN 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-50DN (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	Polling I/O input data = 3 bytes Polling I/O output data = 0 byte

[1] Address order allocation

Assign the number of bytes of data in the input/output data table (data length) in the same order as the node addresses are assigned to the slave stations.

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 data length.
3. Any slave station number (node address), that does not have hardware connected, is not assigned a data length.

■ Allocation example

The allocation results from assigning data lengths "in the order in which vacant nodes are occupied" are as follows:

Address *

1st byte (000000)
2nd byte (000001)
3rd byte (000002)
4th byte (000003)
5th byte (000004)
6th byte (000005)
7th byte (000006)
8th byte (000007)
9th byte (000010)
10th byte (000011)
11th byte (000012)
12th byte (000013)
to
512th byte (000777)

Input/output data table

Node address 1 (slave station)	Input
	Output
Node address 3 (slave station)	Input
	Output
Node address 5 (slave station)	Input
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 data length (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 (nothing connected) and slave 4 (doesn't have a I/O message function) are not assigned any data length.

The scan list data table for this example will be as follows:

Address *	Value (hexadecimal): Details (=> See page 7-9)	
1st byte (000000)	FF: This JW-50DN station (master)	Node address 0
2nd byte (000001)	All zeroes	
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 data length)	
12th byte (000013)	01: 1 byte (output data length)	
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)	All zeroes	
19th byte (000022)		
20th byte (000023)		
21st byte (000024)		
22nd byte (000025)		
23rd byte (000026)		
24th byte (000027)		
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 data length)	
28th byte (000033)	03: 3 bytes (output data length)	
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 a Polling I/O function	Node address 4
34th byte (000041)	All zeroes	
35th byte (000042)		
36th byte (000043)		
37th byte (000044)		
38th byte (000045)		
39th byte (000046)		
40th byte (000047)		
41st byte (000050)	02: A slave station with a Polling I/O function	Node address 5
42nd byte (000051)	00: Not used	
43rd byte (000052)	03: 3 bytes (input data length)	
44th byte (000053)	00: 0 byte (output data length)	
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 *	$Value_H$: Details	
49th byte (000060)	All zeroes	Node address 6
50th byte (000061)		
51st byte (000062)		
52nd byte (000063)		
53rd byte (000064)		
54th byte (000065)		
55th byte (000066)		
56th byte (000067)		
≀	≀	≀
505th byte (000770)	All zeroes	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 (data length) in the order that the node addresses were assigned to each slave station.

1. Set the predetermined data length for slave stations to an even number of bytes.
   If an individual slave station needs more than the default amount of data, the JW-50DN can be used to assign a different data length in terms of multiples of the default data length.
2. The JW-50DN assigns the default data length to slave stations that do not have a I/O message function.
3. The JW-50DN also assigns the default data length to slave station numbers (node addresses) that do not have any hardware connected to them.

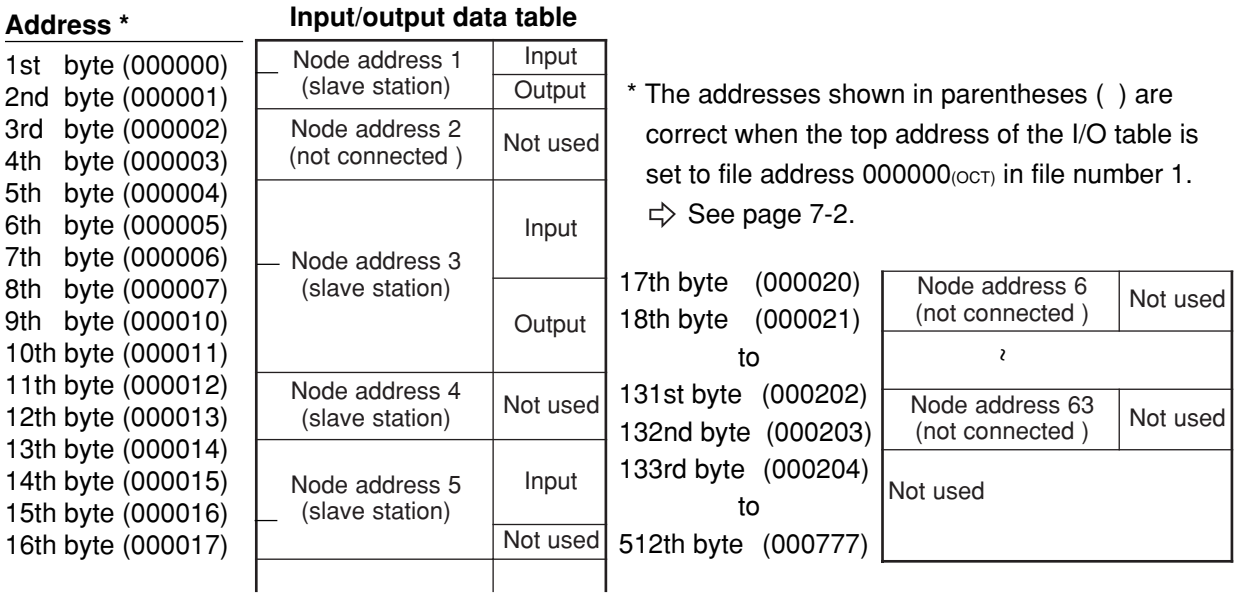
- Enter the data length (1 to 64 bytes) between 1 and 3 on the system memory of the JW-50DN.

⇨ See page 6-8.

■ Allocation example

The allocation results from assigning data lengths by "even number allocation" are as shown on page 7-2, as follows.

- The default data length is 2 bytes.



* 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 data length (bytes)	I/O message function	Assigned data length (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 data length (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 default data length (2 bytes).
- Slave stations 3 and 5 need a larger number of bytes than the default data length. (2 bytes).

  Therefore, in these cases, a different data length is assigned which is a multiple of the default 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 for this example will be as follows:

Address * 1	Value (hexadecimal): Details (=> See page 7-9)	
1st byte (000000)	FF: This JW-50DN station (master)	Node address 0
2nd byte (000001)	All zeroes	
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 data length)	
12th byte (000013)	01: 1 byte (output data length)	
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 data length)	
20th byte (000023)	00: 0 byte (output data length)	
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 data length)	
28th byte (000033)	03: 3 bytes (output data length)	
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 a I/O message function	Node address 4
34th byte (000041)	00: Not used	
35th byte (000042)	00: 0 byte (input data length)	
36th byte (000043)	00: 0 byte (output data length)	
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)	02: A slave station with a Polling I/O function	Node address 5
42nd byte (000051)	00: Not used	
43rd byte (000052)	03: 3 bytes (input data length)	
44th byte (000053)	00: 0 byte (output data length)	
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	$Value_H$: 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	
≀	≀	≀
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 (default data length) 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 (data length) in the order that the node addresses were assigned to each slave station.

1. Assign the required data length to slave stations using the I/O message function.
2. The JW-50DN does not allocate any data length for slave stations that do not have a I/O message function.
3. The JW-50DN will allocate the default data length to any slave station number (node address) that does not actually have hardware connected.
   Enter the data length (1 to 64 bytes) between 1 and 3 on the system memory of the JW-50DN.
   ⇨ 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 default data length 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)		Output
8th byte (000007)		
9th byte (000010)		
10th byte (000011)		
11th byte (000012)	Node address 5 (slave)	Input
12th byte (000013)		
13th byte (000014)		

* 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.

14th byte (000015)	Node address 6 (not connected)	Not used
15th byte (000016)		
to	≀	
128th byte (000177)	Node address 63 (not connected)	Not used
129thbyte (000200)		
130thbyte (000201)	Not used	
to		
512th byte (000777)		

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

Node address	Required data length (bytes)	I/O message function	Assigned data length (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 default data length is assigned to slave stations 1, 3, and 5.
- Slave station 2 (no hardware connected) is assigned the default data length (2 bytes).
- Slave station 4 (without a I/O message function) is not allocated any data length.

The scan list data table for this example will be as follows:

Address * 1	Value (hexadecimal): Details (=> See page 7-9)	
1st byte (000000)	FF: This JW-50DN station (master)	Node address 0
2nd byte (000001)	All zeroes	
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 data length)	
12th byte (000013)	01: 1 byte (output data length)	
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 data length)	
20th byte (000023)	00: 0 byte (output data length)	
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 data length)	
28th byte (000033)	03: 3 bytes (output data length)	
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 a I/O message function	Node address 4
34th byte (000041)	All zeroes	
35th byte (000042)		
36th byte (000043)		
37th byte (000044)		
38th byte (000045)		
39th byte (000046)		
40th byte (000047)		
41st byte (000050)	02: A slave station with a Polling I/O function	Node address 5
42nd byte (000051)	00: Not used	
43rd byte (000052)	03: 3 bytes (input data length)	
44th byte (000053)	00: 0 byte (output data length)	
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	$Value_H$: 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	
≀	≀	≀
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 (default data length) to each address.

7-2 Editing the scan list

Before using the JW-50DN 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.

Note: The scan list can be edited when the "Not protected: Switch 6-7 is OFF", even if the JW-50DN is in operation mode. For safety, only edit the scan list in the program mode.

② Turn OFF the power to the JW50H/70H/100H.

③ Change switch SW6-7 on the JW-50DN to "Protection OFF." ⇨ See page 6-5.

- If switch SW6-7 is set to the protected mode, the procedures below will not work.

④ Install the JW-50DN in the JW50H/70H/100H. ⇨ See chapter 4.

⑤ Connect any slave stations.

- Basically, all slave stations must be started. ⇨ See * 1 below.

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

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

- The JW-50DN will edit the scan list. ⇨ See * 2 below.

⑧ After the editing process is complete, turn OFF the power to the JW50H/70H/100H.

⑨ Remove the JW-50DN from the JW50H/70H/100H.

⑩ Set switch SW6-7 on the JW-50DN to the protected mode.

⑪ Reinstall the JW-50DN in the JW50H/70H/100H.

⑫ Turn ON the power to the JW50H/70H/100H.

⑬ 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 default 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 default number of bytes for I/O, the I/O addresses thereafter can be incremented by editing the next time a scan list is created.

* 2: Scan list editing procedure mentioned in step ⑦

- When the JW-50DN is in the normal operation mode and you change the JW50H/70H/100H to the operation mode, the JW-50DN will start I/O communication. However, when you press the SCAN switch immediately after communication is started, the JW-50DN will start editing the scan list. This may cause a malfunction. Therefore, we recommend that you change to the protected mode as described in step ⑧ above.

[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**

Master	Slave	No. of bytes	Module No. switch setting	
			0	1
○	—	512	#1614 to #1617 (408 bytes)	#1714 to #1717 (320 bytes)

(○: 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 data length	- Data length for the data which slave stations will send and receive in Polling I/O messages.	* 3	
4th byte (000003)	Output data length			
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-50DN'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-50DN 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 PC (JW50H/70H/100H).

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

Set the top address of the Explicit message table to the following point in system memory.

⇨ See page 6-7.

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

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

(○: Enable, —: Disable)

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

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

Address *	Parameter name	Details
1st byte (000000)	JW-50DN side reading flag	When the JW-50DN has finished reading the contents being sent, 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 the data has been inverted, the JW-50DN will send a request message to the slave station.
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	Set the request data length.
6th byte (000005)	Reserved area	Use prohibited.
7th byte (000006)	MAC ID	Set a node address for the transaction object.
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) ≀ 118th byte (000165)	Service data (106 bytes)	Assign data that is defined by a service code.

* 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.)

- 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.

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

Control module reading flag, JW-50DN 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-50DN.
2nd byte (000201)	JW-50DN side writing flag	When the JW-50DN receives a response from a slave station, the JW-50DN 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) ~ 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 0	Module address switch set value 1	Parameter name	
1st byte (000000)	*1	*2	JW-50DN 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) ≀ ≀ 118th byte (000165)	↓	↓	Service data (106 bytes)	
129th byte (000200)	*3	*4	Control module read out flag	Response
130th byte (000201)	↓	↓	JW-50DN 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) ≀ ≀ 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 ones 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-50DN side reading flag	00(01)	③④
000001	Control module writing flag	00(01)	②
000002	Status	00	①
000003	TXID	00	
000004	Size	06	
000005	Reserved area	00	
000006	MAC ID	00	
000007	Service code	00	
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-50DN 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 (decimal) = 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-50DN starts reading the details of the transaction.

④ When the read process is complete, the JW-50DN automatically reverses the read flag (000000(OCT)) (00 -> 01:*), so that the read flag will be same value as the write flag.

⇨ The JW-50DN sends a request message to a slave module.

- **Response table**

⑤ When the JW-50DN receives a response corresponding to the request above from a slave module, or if a time out occurs, the JW-50DN writes data to the transaction block in the response table.

- The JW-50DN 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/write/reverse] flag should be reversed.

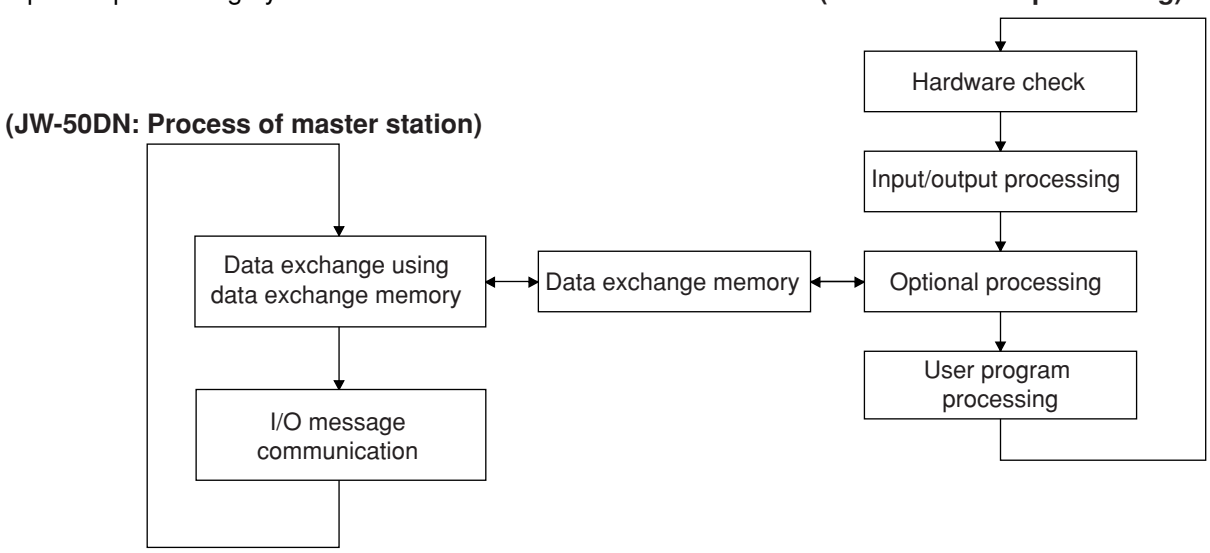
* Reverse

The initial status of each flag is 000. 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 control module (JW50H/70H/100H), the JW-50DN (master), and the slave stations.

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



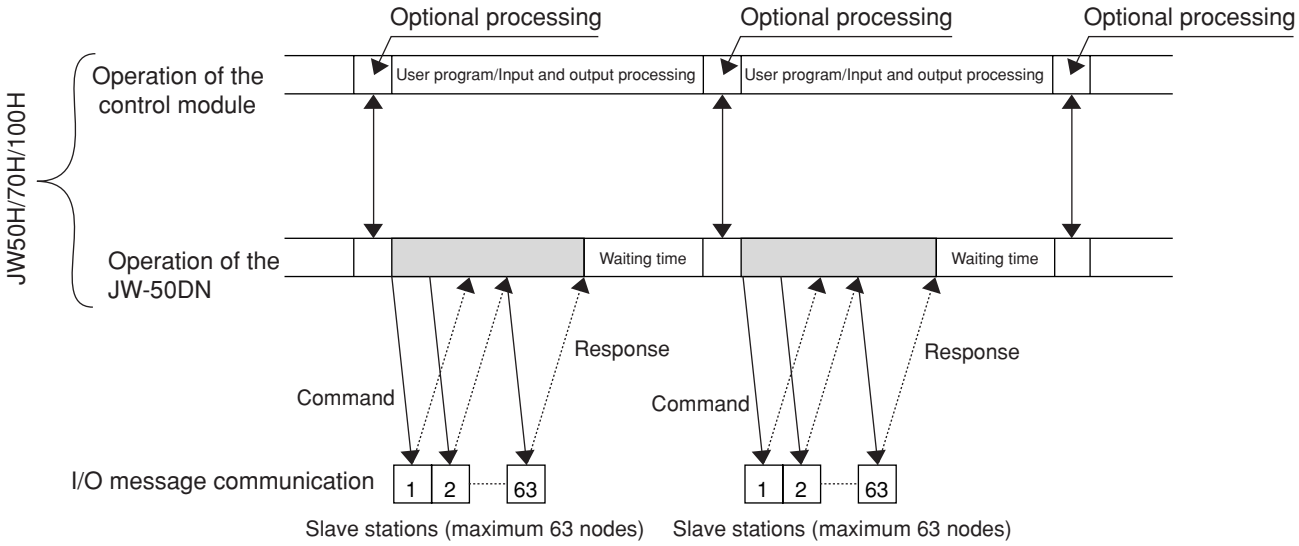
The JW-50DN receives responses from all slave stations. If not, after a communication time out, it will complete one I/O message communication cycle, and exchange data with the JW50H/70H/100H control module.

- The time-out time is the normal time required after the JW-50DN 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 on the JW-50DN and the number of slave stations connected. ⇨ See page 6-9.

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

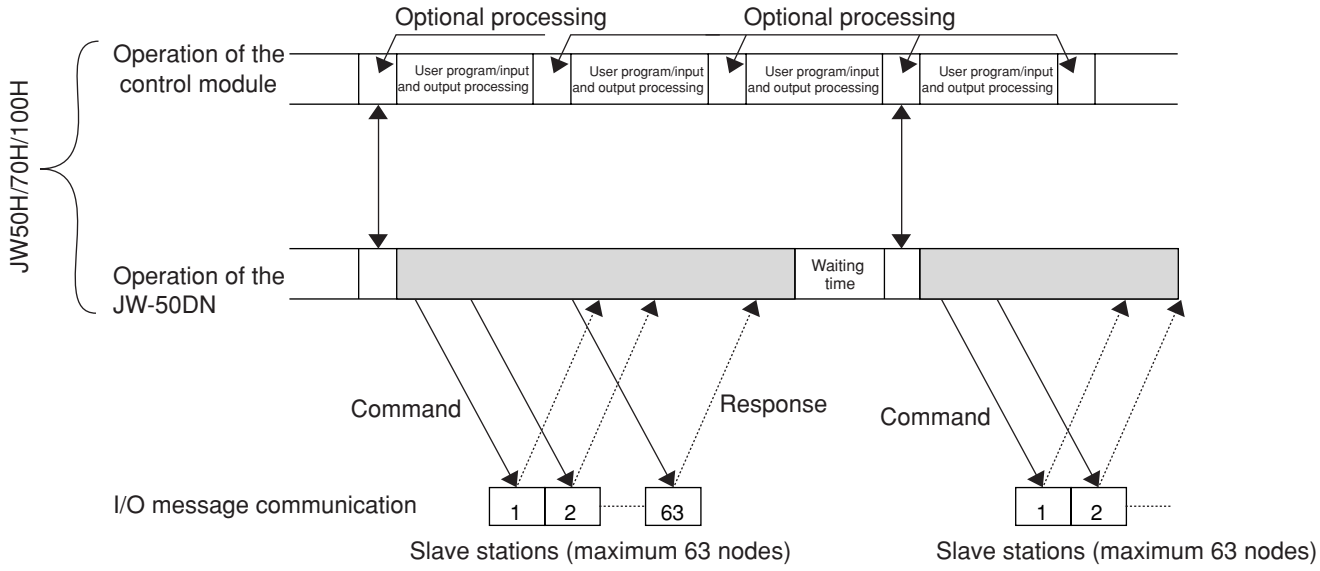
[1] When the I/O message communication time is shorter than the JW50H/70H/100H cycle operation time

■ **Communication cycle: Asynchronous/synchronous**

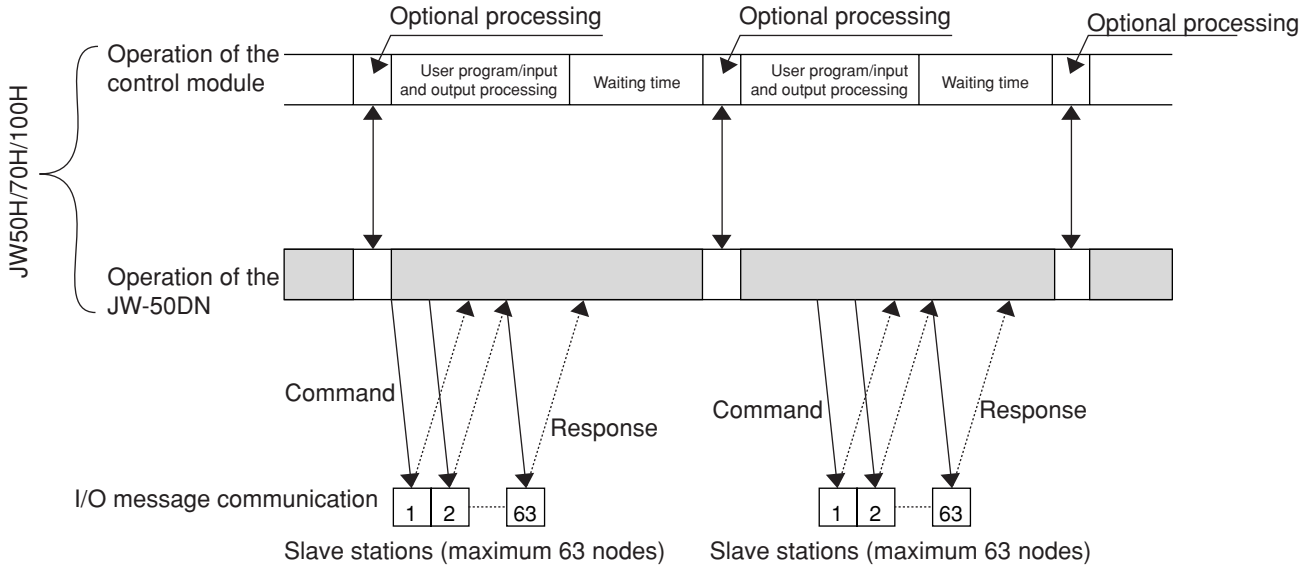


[2] When the I/O message communication time is longer than the JW50H/70H/100H cycle operation time

(1) Communication cycle: Asynchronous



(2) Communication cycle: Synchronous



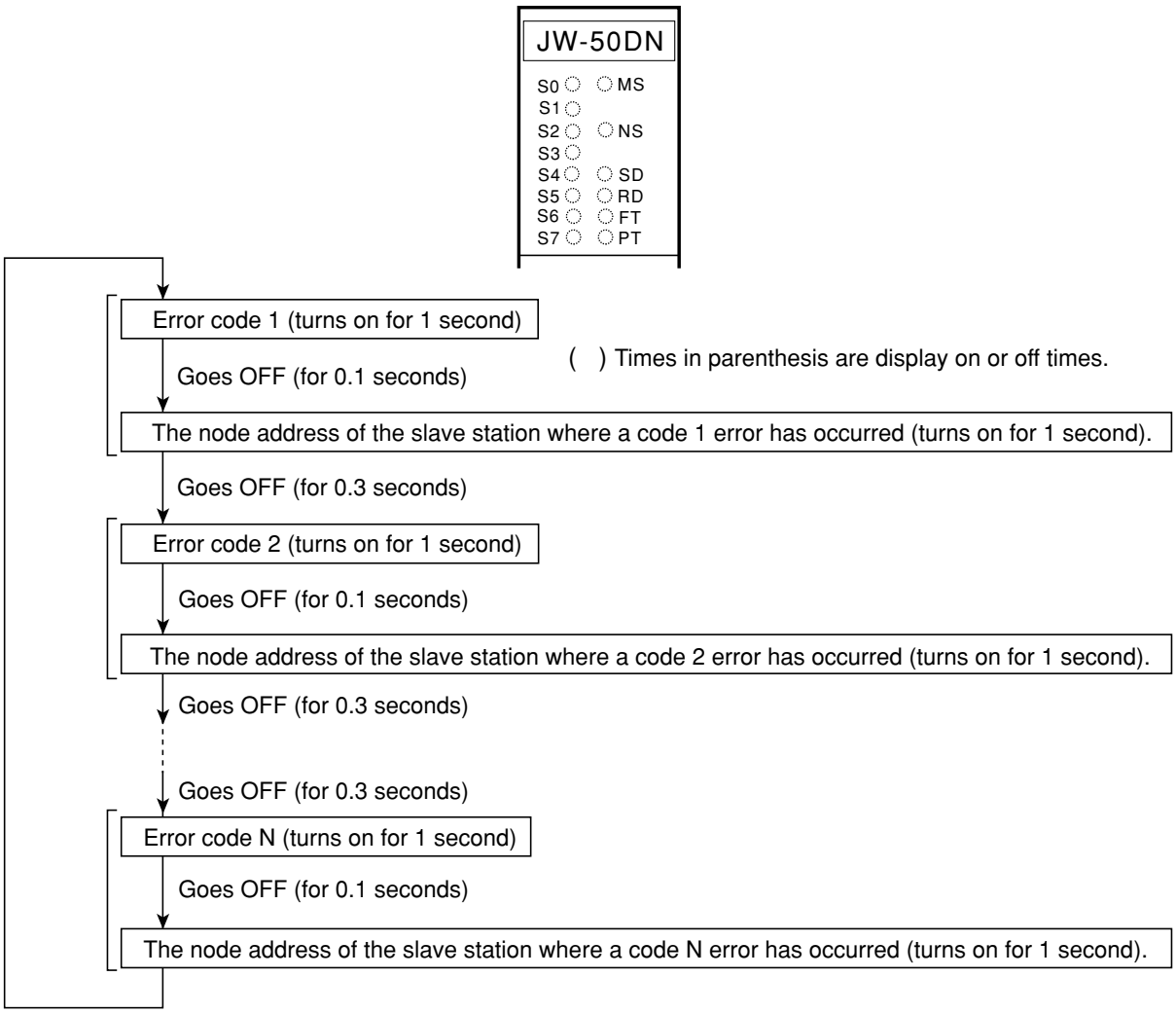
Note: The synchronous calculation operation is only possible with one module, including other communication modules (JW-10CM, JW-20CM). Therefore, be careful because using multiple modules in the synchronous mode may not permit synchronous operation.

Chapter 10: Error Handling

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

10-1 Display 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-50DN display panel (S0 to S7).



- There is no priority in the display of errors. The JW-50DN displays the errors in the order in which they occur.
- If the same error occurs on multiple nodes, such as a communication error, only the lowest node address will be displayed.
- For information about the error code display and details, as well as the node addresses, see the following pages.

[1] Error code

(1) Error code display

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

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

(2) Error details

The error code details and actions are as follows.

Indication 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	- Dose not retry connection for error slave station. - Dose 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	- A slave time out has occurred 6 times in a row while waiting for a response. - A fragmentation protocol error has occurred 3 times.		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 (Sending error)	Communication power dose not supply normally.	Waiting power supply from network power supply.	D16 and D5 turn ON	Check wiring of network power supply and network cable.

To the next page

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

* 2 : D17 will turn ON when the JW-50DN 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.)

Display lamp		Error details		Operation of JW-50DN	Master status *	Treatment
MS/NS/FT	S7 to S0 (error node)					
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 (JW-50DN).
	F1	Detected a Bus OFF	The JW-50DN Bus OFF 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-50DN 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	System memory setting error	Some settings in the JW-50DN system memory are out of the specified range.			Check the set values of the system memory.
MS: Red lamp lights NS: Goes OFF	F7	Scan list data error	The EEPROM has a memory error. - Unable to read or write the scan list parameters since no data table exists on the master module.			Recreate the scan list and recreate the data table in the master module (JW-50DN). Or, replace the JW-50DN.
	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.			
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-50DN.
FT: Lights	—	Watchdog timer error on the JW-50DN (Hardware error on the JW-50DN).		Operation stopped	—	

* Master status ⇨ See page 10-9, 10-11.

[2] Display of node addresses

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

S0 to S7 lamp status (●: Lit, ○: Off)								Node address (decimal)
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 (decimal)
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 PC (JW50H/70H/100H), you can check the communication status of the nodes (master and slave stations). Assign the address of the diagnostic table (256 bytes) using the module No. switch on the JW-50DN. ⇨ See page 6-7.

■ **Diagnostic data table addresses**

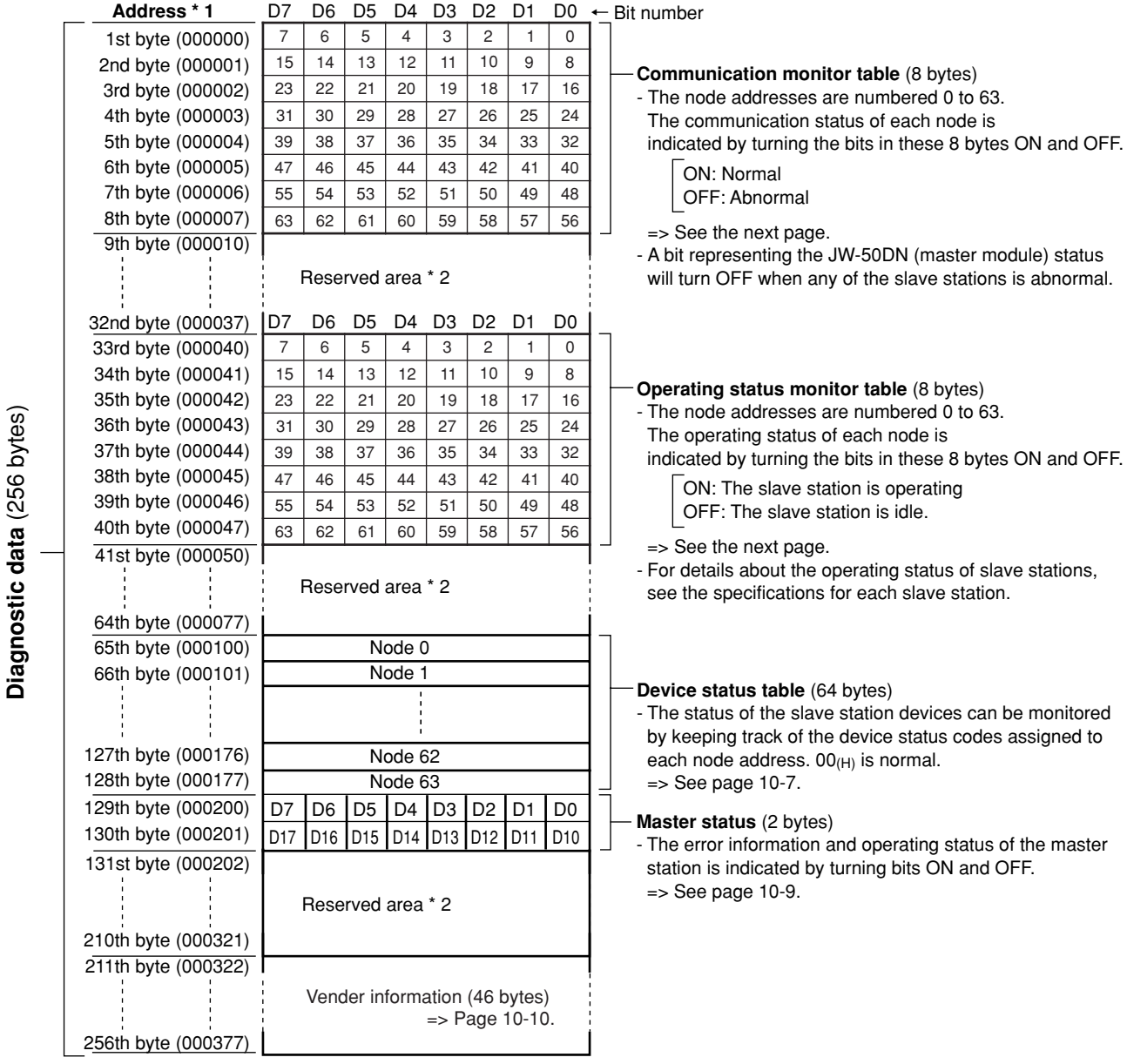
Master	Slave	No. of bytes	Module No. switch setting value	
			0	1
○	○	Master: 256 Slave: 128	#1604 to #1607 (Specify top address and enable/disable)	#1704 to #1707 (Specify top address and enable/disable)

(○: Enable)

10-2-1 When JW-50DN is master mode

[1] Diagnostic data table details

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



* 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-50DN will malfunction.

[2] Diagnostic data table addresses

Shown below are the addresses of the diagnostic data table (communication monitor table, etc.) for each PC model (JW50H/70H/100H) and each Module No. switch setting.

(1) Address of the communication monitor table

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 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

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 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 normal, $00_{(HEX)}$ 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 diagnosis 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 slave station is normal or it is not in the scan list.
72	48	The slave station device has stopped communication.
73	49	Identification of the slave station device does not match the value in the scan list.
77	4D	The data size is different from the setting.
78	4E	The slave station device does not return a response.
86	56	The slave station device is idle.

(4) Master status address

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 correct 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. Bus OFF 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	Reserved area
	D13	
	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

The vender data is used when SHARP provides services to JW-50DN 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 (JW-50DN = 012 <- communication adapter
		$000_{(DCM)}$	
215th byte (000326) 216th byte (000327)	Product Code (2 byte)	$002_{(DCM)}$	Product code (JW-50DN = 002)
		$000_{(DCM)}$	
217th byte (000330) 218th byte (000331)	Revision (2 byte)	$01_{(HEX)}$	Software version (The values left is when S1.2).
		$02_{(HEX)}$	
219th byte (000332) 220th byte (000333) 221st byte (000334) 222nd byte (000335)	Serial Number (4 byte)	Serial No. □□△△21○○○○$_{(DCM)}$*2 (Written when manufacturing the JW-50DN)	
223rd byte (000336)	Product Name (32 byte)	$4A_{(HEX)}$: J	"JW-50DN" 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)		$00_{(HEX)}$	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 correct when the top address of the diagnosis table is set to file address $000000_{(OCT)}$.

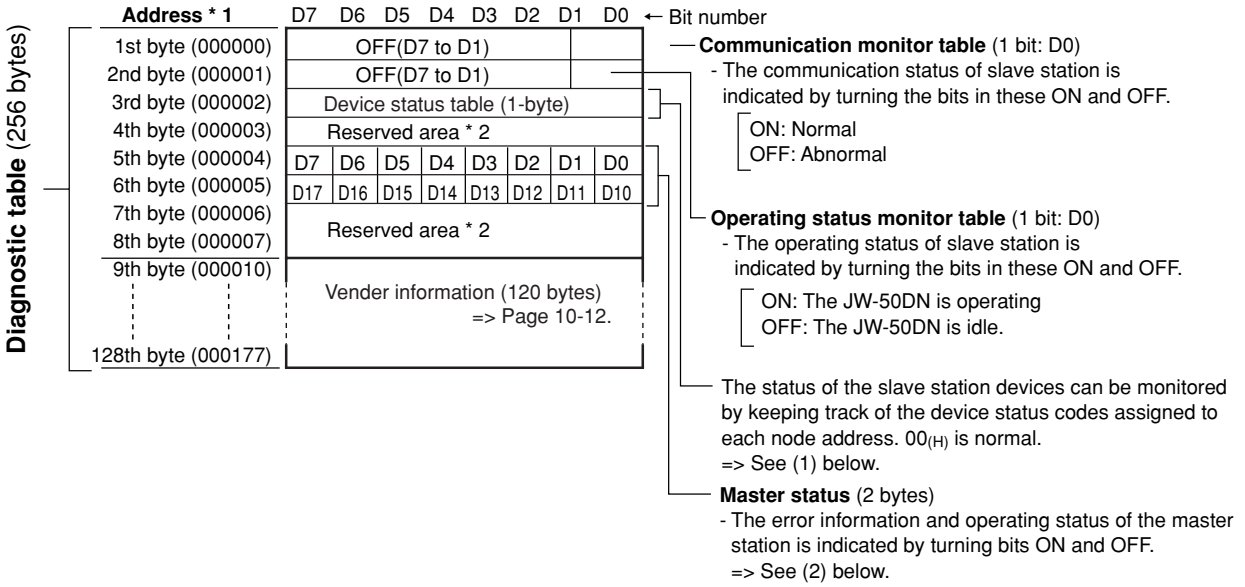
*2: Serial number. □□△△21○○○○$_{(DCM)}$

- □□: Year manufactured (lower two digits of Western year: "01" for 2001
- △△: Month manufactured ("01" for January, --- "12" for December)
- 21: Model code (JW-50DN is "21")
- ○○○○: Serial number (reset each month)

Ex.: A unit first manufactured in July 2001: $0107210001_{(DCM)}$

10-2-2 When the JW-50DN 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.



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

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

(1) Device status code

Device status code		Details
Decimal	Hexadecimal	
0	0	The slave station is normal or it is not in the scan list.
72	48	The slave station device has stopped communication.
73	49	Identification of the slave station device does not match the value in the scan list.
77	4D	The data size is different from the setting.
78	4E	The slave station device does not return a response.
86	56	The slave station device is idle.

(2) Master status address (D0 to D17: 2 bytes)

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

(3) Vender data address

The vender data is used when SHARP provides services to JW-50DN 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)	Vender ID code (Sharp = 104)
		000(DCM)	
11th byte (000012) 12th byte (000013)	Device Type (2 byte)	012(DCM)	Device type (JW-50DN = 012 <- communication adapter
		000(DCM)	
13th byte (000014) 14th byte (000015)	Product Code (2 byte)	002(DCM)	Product code (JW-50DN = 002)
		000(DCM)	
15th byte (000016) 16th byte (000017)	Revision (2 byte)	01(HEX)	Software version (The values left is when S1.2).
		02(HEX)	
17th byte (000020) 18th byte (000021) 19th byte (000022) 20th byte (000023)	Serial Number (4 byte)	Serial No. □□△△21○○○○(DCM) *2 (Written when manufacturing the JW-50DN)	
21st byte (000024)	Product Name (32 byte)	4A(HEX) : J	JW-50DN" 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)		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 correct when the top address of the diagnosis table is set to file address 000000(OCT).

*2: Serial number. □□△△21○○○○(DCM)

- □□: Year manufactured (lower two digits of Western year: "01" for 2001
- △△: Month manufactured ("01" for January, --- "12" for December)
- 21: Model code (JW-50DN is "21")
- ○○○○: Serial number (reset each month)

Ex.: A unit first manufactured in July 2001: 0107210001(DCM)

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

When the JW50H/70H/100H control module is in the program mode (operation has stopped), the JW-50DN sends out status information that the JW-50DN is in idle. (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).
$00_{(HEX)}$: Restore (master module sends idle data)
$01_{(HEX)}$: Clear (master module sends $00_{(HEX)}$ data)

- **When receiving idle data**

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

Chapter 11: Specifications

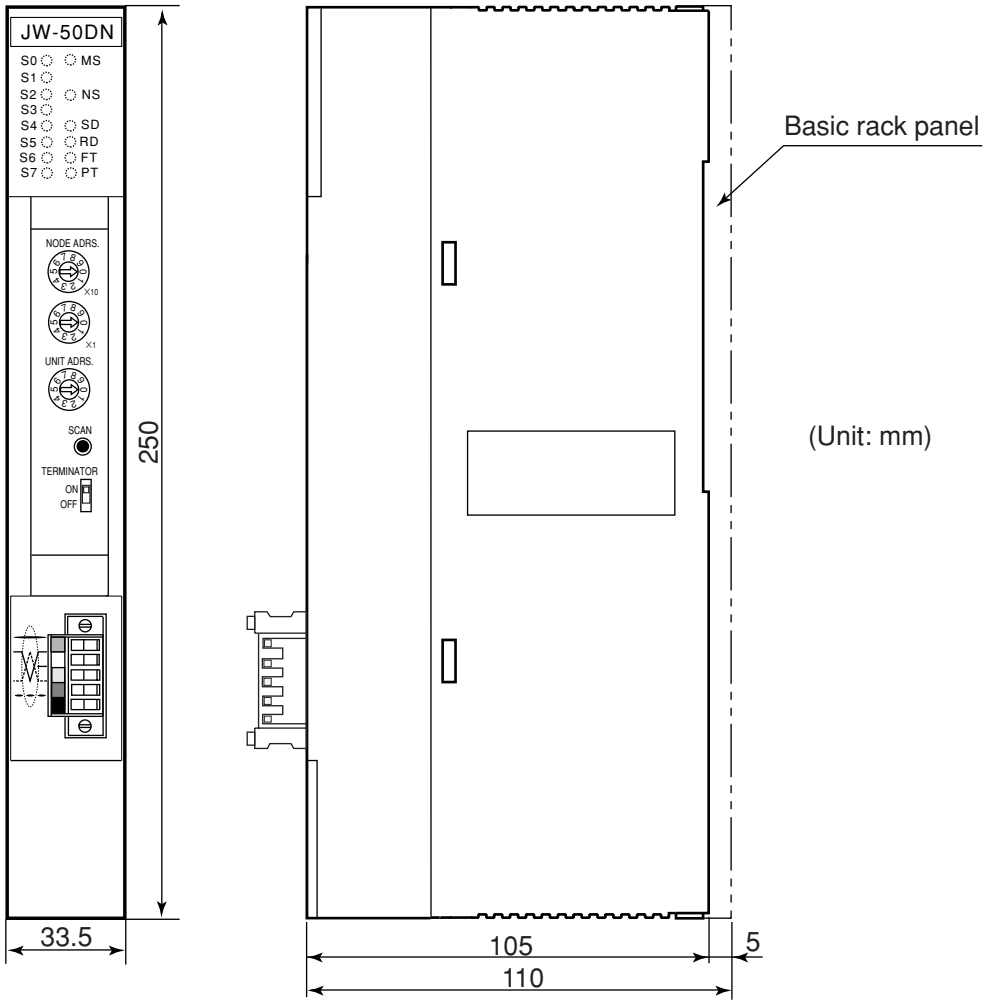
(1) General specifications

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 Megohms 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 C 0911. 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 C0912. 98 m/s^2 (3 times each in the X, Y, and Z directions)	
Communication power voltage	11 to 25 VDC (50 mA max./JW-50DN)	
Internal power consumption	150 mA max. (5 VDC)	
Atmosphere	No corrosive gas	
Weight	Approximately 320 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 (512 bytes) in an input/output data table.			
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)