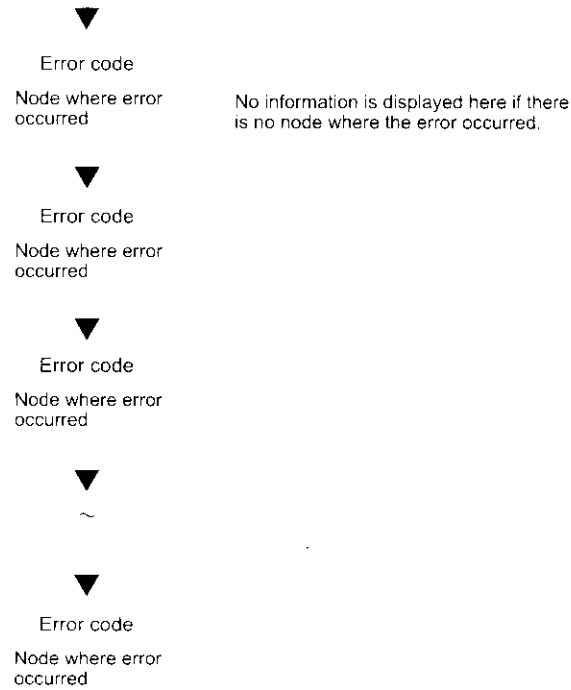


● LED display

Normally, this display is off. When an error occurs, error codes are shown in the order of "error code + node where error occurred" and in the order that they occurred. In addition, the level of reception is shown in the display during tests.



NOTE

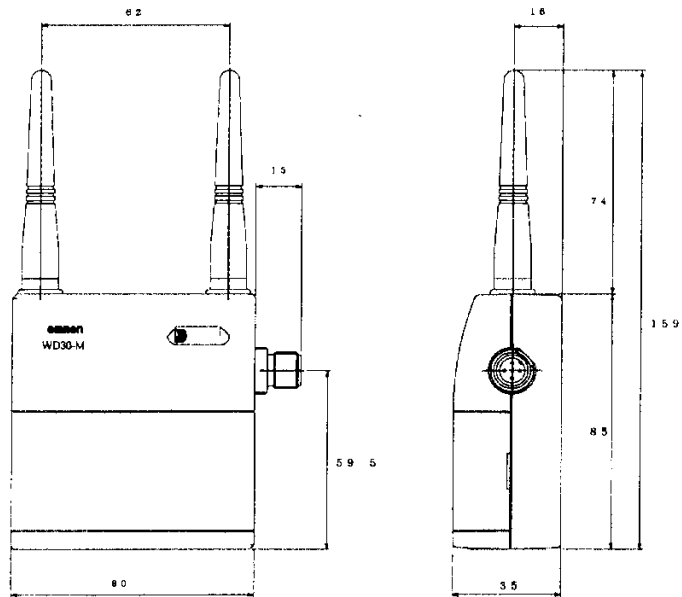
The MS LED, NS LED, WS LED, and LED display together show data concerning errors. Refer to "10-2 Troubleshooting" for details concerning the specific meanings of these displays.

■ External terminals/connectors

- Antenna connector
RP-SMA connector. Included with the 2 antennas.
- Communication connector
DeviceNet transmission connector (plug) and DeviceNet micro-connector accessory.

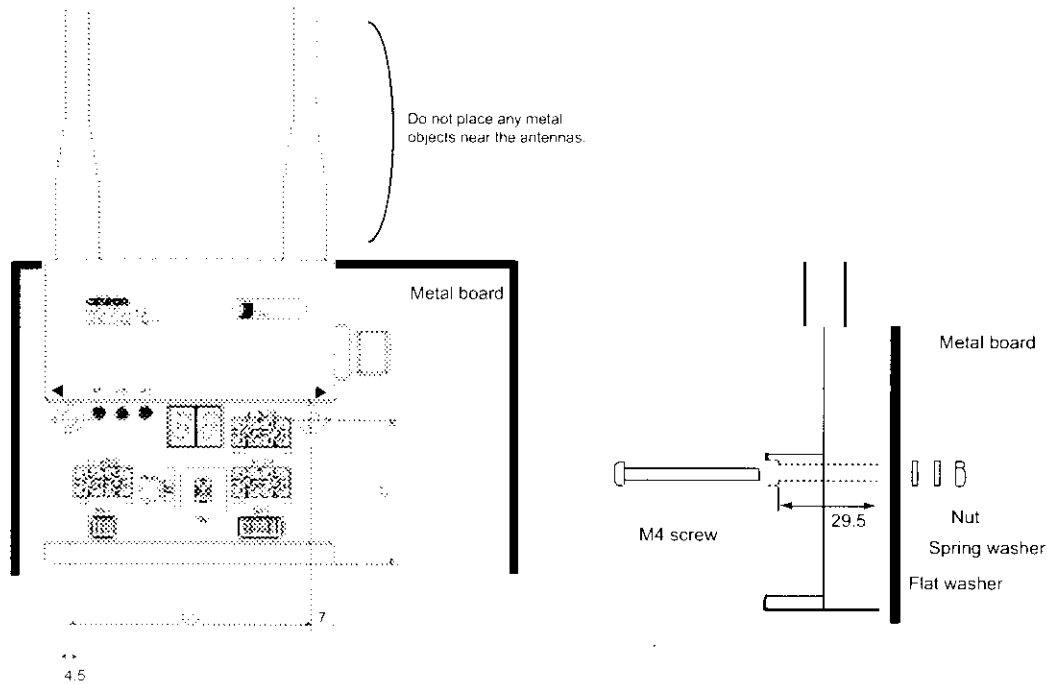
■ Installation

- Installation location
 - Do not install this device in locations such as the following:
 - Areas exposed to direct sunlight
 - Areas with extremely high humidity
 - Near devices that use electric waves, such as televisions and radios
 - Near devices that emit sparks, such as motors and drills
 - Near strong magnets
 - Near fluorescent lights
- Installation conditions
When tightening screws, be careful not to apply a torque of greater than 0.3N/m.
- External dimensions



● Installation method

Use the screws provided to fix the device in the 2 locations shown in the figure below.



■ Wiring

● DeviceNet communication cable

Use a special DeviceNet cable (with socket on one end). Refer to the appendix for models.

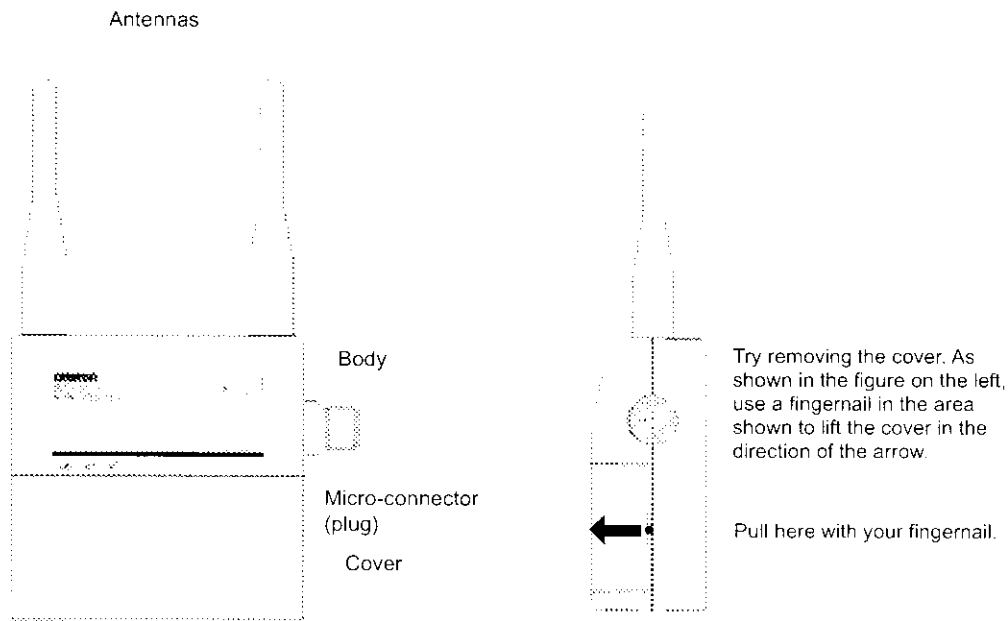
● Antennas

Use the 2 antennas included. Both should be installed. If both are not installed, diversity effects will not be attained.

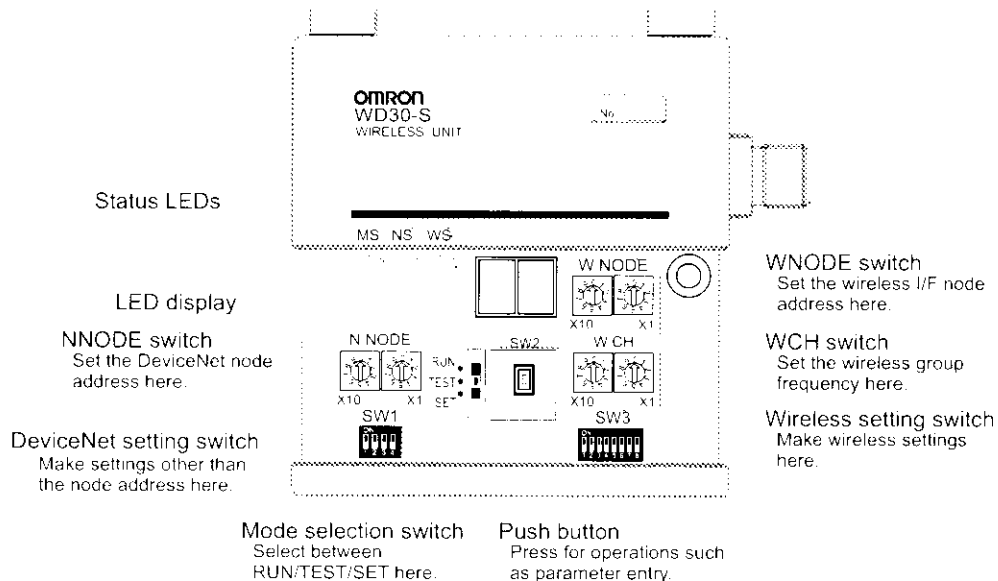
4-2 DeviceNet Wireless Slave Station Specifications

■ Part identification and functions

● External



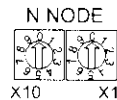
● Internal (with cover removed)



■ Settings

● NNODE switch (DeviceNet node address setting switch)

Set the DeviceNet interface node address here. Set the switches before turning on the power supply. Only the setting values detected immediately after the power supply has been turned on are enabled. Changes to switch settings after the power supply has been turned on are ignored.



● DeviceNet setting switch (SW1)

Set the DeviceNet interface communication speed, relay station, and measures for when communication errors occur.

"Maintain/Clear output when communication errors occur" is for setting whether to maintain or clear the ON output when a wireless network error occurs and while communication continues in the DeviceNet network that the wireless slave station is connected to. (Although communication continues in the wireless network when an error occurs in the DeviceNet network, the ON input to the wireless master station at that time becomes "Maintain".)

Set the switches before turning on the power supply. Only the setting values detected immediately after the power supply has been turned on are enabled. Changes to switch settings after the power supply has been turned on are ignored.



No.	Contents
1	Communication speed selection
2	MODE1 MODE2
3	Relay station/No relay station selection
4	Maintain/Clear output when communication errors occur



Maintaining/
Clearing output
when there is a
DeviceNet slave
communication
error

Applications that require the maintaining of output when a DeviceNet slave communication error occurs (if ON must be maintained when an error is occurred) cannot be used.

4-2 DeviceNet Wireless Slave Station Specifications

- DeviceNet communication rate settings

Baud rate	DIP-SW status		Remarks
	1	2	
	MODE1	MODE2	
125k	OFF	OFF	Length of main line: 500m
250k	ON	OFF	Length of main line: 250m
500k	OFF	ON	Length of main line: 100m
-	ON	ON	Settings prohibited, no communication

No.	Contents	ON	OFF
3	Relay station/No relay station selection	Relay station	No relay station
4	Maintain/Clear output when transmission errors occur	Clear	Maintain

● Wireless setting switch (SW3)

Perform the various settings for TEST and SET modes. Set the switches before turning on the power supply. Only the setting values detected immediately after the power supply has been turned on are enabled. Changes to switch settings after the power supply has been turned on are ignored.

SW3



No.	Contents	ON	OFF
1	(Usually OFF)	-	-
2	(Usually OFF)	-	-
3	Wireless channel monitor	Performed	Not performed
4	Installation test	Performed	Not performed
5	(Usually OFF)	-	-
6	DeviceNet slave entry	Entries	Does not entry
7	(Usually OFF)	-	-
8	Default configuration	Default settings used	Default settings not used

● WCH switch

Set the frequencies for the wireless interface group addresses. The settings should be made in decimals in a range from "01" to "34". "00" will result in a switch setting error. Settings are the same as for wireless master stations.



● WNODE switch

Set the wireless interface node address. The setting range is from "01" to "32".



● Mode select switch

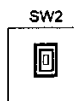
Set the wireless slave station operation mode. (3 positions)



Operation mode	SW status
Normal mode	RUN
Test mode	TEST
Setting mode	SET

● Push button "SW2"

Used as a trigger for making various settings while in setting mode. Settings are the same as for wireless master stations.



Preventing interference with wireless indoor motion detectors

To prevent wave interference on floors where wireless indoor motion detectors are used, set the frequency to a channel other than 12 to 30.



Tips for using the mode select switch

The software is reset (switch settings are reread) when the mode select switch is changed. It should be used when you want to enable the switch changes on the main unit.

■ Display

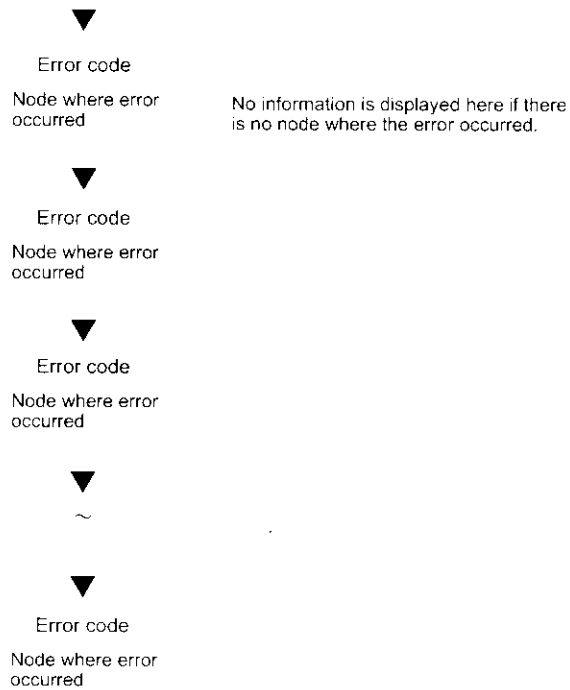
● Status I.ED

LED	Color	Status		Meaning (primary error)
MS (Module Status)	Green	On	Normal conditions	Communication is normal.
		Flashing	Test/Setting mode	Test mode or Setting mode has been activated.
	Red	On	Critical malfunction	A critical error has occurred that can not be recovered. The unit must be replaced.
		Flashing	Minor malfunction	An error has occurred that can be recovered by resetting the system.
	-	Off	No power supply	Power is not being supplied, or the system is resetting.
NS (Network Status)	Green	On	Online/communication connection complete	Remote I/O communications are established while online. Or, message communications are established.
		Flashing	Online/communication connection not complete	Although the system is online, remote I/O communications and message communications are not established.
	Red	On	Critical communication error	Communication is not possible.
		Flashing	Minor communication error	Communication timeout
	-	Off	Offline, power supply turned off	The system is not online.
WS (Wireless Status)	Green	On	Wireless network addition	Wireless network addition approved
		Flashing	A wireless network is being added to the system.	Approval has been received from the wireless master station to add a wireless network.
	Red	On	Critical wireless communication error	A critical error has occurred that can not be recovered.
		Flashing	Minor wireless communication error	An error has occurred that can be recovered.
	-	Off	Current not sent	No current has been sent.

Refer to "10-2 Troubleshooting" for troubleshooting details.

● LED display

Normally, this displays a node address (NNODE). When an error occurs, error codes are shown in the order of "error code + node where error occurred" and in the order that they occurred. In addition, the receiving wave level is shown in the display during tests.



NOTE

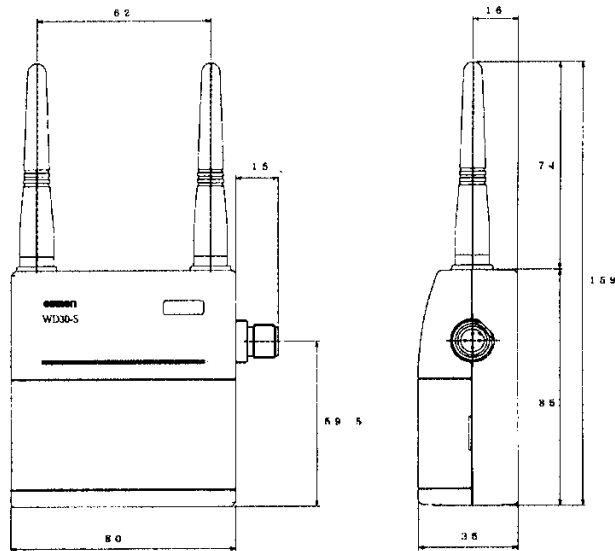
The MS LED, NS LED, WS LED, and LED display together show information concerning errors. Refer to "10-2 Troubleshooting" for details concerning the specific meanings of these displays.

■ External terminals/connectors

- Antenna connector
RP-SMA connector. Included with the 2 antennas.
- Communication connector
DeviceNet communication connector (plug) and DeviceNet micro-connector accessory.

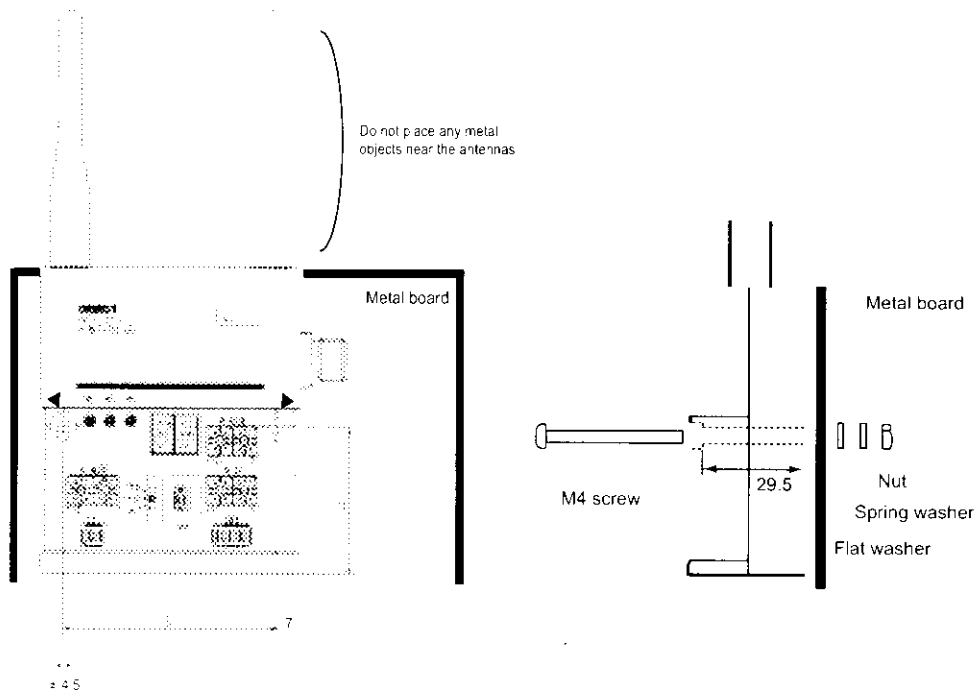
■ Installation

- Installation location
Do not install this device in locations such as the following:
 - Areas exposed to direct sunlight
 - Areas with extremely high humidity
 - Near devices that use electric waves, such as televisions and radios
 - Near devices that emit sparks, such as motors and drills
 - Near strong magnets
 - Near fluorescent lights
- Installation conditions
When tightening screws, be careful not to apply a torque of greater than 0.3N/m.
- External dimensions



● Installation method

Use the screws provided to fix the device in the 2 locations shown in the figure below.



■ Wiring

● DeviceNet communication cable

Use a special DeviceNet cable (with socket on one end). Refer to the appendix for models.

● Antennas

Use the 2 antennas included. Both should be installed. If both are not installed, diversity effects will not be attained.

4-3 Common Specifications to All DeviceNet Wireless Units

Table 1 General specifications

Item	Specifications
DeviceNet transmission voltage	DC11 - 25V (Supplied from the DeviceNet network power supply)
Current consumption	Wireless master station: no more than 220mA Wireless slave station: no more than 220mA
Ambient temperature	-10 to +50°C
Ambient humidity	25 to 85%RH
Storage temperature	-20 to +65°C
Weight	Approximately 200g

Table 2 Wireless interface specifications

Item	Specifications
Wave type	Spectrum dispersion (direct dispersion; DS-SS)
Communication method	Simplex (half duplex)
Frequency band	2.4GHz (2400MHz-2483.5MHz)
Number of channels	34 channels (based on frequency division)
Output power	10mW
Data transfer speed between wireless stations	100kbps
Protocol between wireless stations	1:N polling • selecting method
Transmission format	Conform to HDLC
Transmission distance (varies according to installation environment)	Indoors: 60m maximum (in line of sight) An increase in transmission distance is possible using relays. (3 stages maximum)
Max. number of wireless slave station	32

Table 3 DeviceNet interface specifications (general discription)

Item	Specifications	
Communication functions	Master/Slave connections	Remote I/O functions
Self-diagnosis function	Unit	WDT errors, hardware errors (memory, CAN), setting errors
	DeviceNet communication	Duplicate node address errors, BUSoff detection, connection timeout
Device profile	Communication control unit	IDs (vender, device type = communication adapter, product code, product revision, product name, serial number, status, and I/O unit IDs) can be found in the appendix.

All other specifications are the same as conventional DeviceNet slave unit and DeviceNet communication specifications.

SECTION 5

Test

5-1 Test

- The test consists of the Installation test and confirmation test, which are executable on the unit; wireless channel monitor, which is executable on both unit and configurator; and the running test, which is executable on the configurator.
- The positioning test must be implemented on the system that uses this unit before operation.
- Temporarily fix the unit till the test is finished, and then use screws to firmly fix the unit. While the unit is fixed only temporarily, pay attention so that the unit will not fall and be damaged.
- The purpose of each test is as follows.

Test	Content/Purpose	Test timing	Method	
			Main Unit	Configurator
Installation test	Adjusts the installation position (confirmation of receiving wave, etc.) and the setup conditions (selection of available frequencies). Both master and slave stations require the switch operation.	At installation At advance on-site test		×
Confirmation test	Checks the wireless communication status with each slave station in a system in operation. This is a switch operation from the master station.	At confirmation after installation At maintenance and inspection		×
Wireless channel monitor	Obtains the receiving wave level of the frequency band (all channels) to allow for the selection of the available channels (frequency band). Also, using a configurator (wireless setup tool) enables logging on the receiving wave levels (all channels and temporal modulation of a specific 1 channel).	At installation At advance on-site test		
Running test	Uses the configurator (wireless setup tool) to carry out the communication test and log the results on to a file.	At maintenance and inspection	×	

5-2 Installation Test

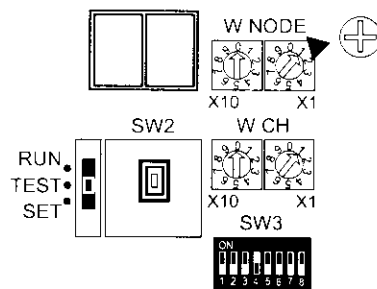
This test is for adjusting the installation position (confirmation of receiving wave, etc.) and the setup conditions (selection of unused frequencies, selection of transmission output, etc.) at installation. Both master and slave stations require the switch operation.

■ Preparation

- The DeviceNet master and DeviceNet slave do not need to be connected for the installation test.
- Set the WNODE switch of the wireless master station to "00" and the WNODE switch of a wireless slave station to "01" to "32", avoiding duplication.
- Since both the wireless master stations and wireless slave stations require the transmission power supply, connect them to the power supply via the DeviceNet cable prepared for a micro-connector.

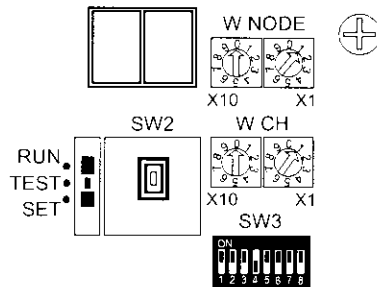
■ Test procedure

Master station



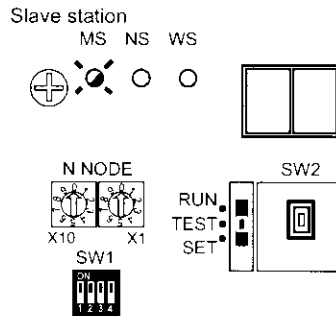
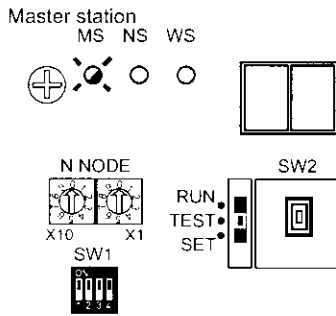
- (1) Set the mode select switch of the wireless master station to "TEST", and the WNODE switch to the WNODE number of the wireless slave station to be tested. "01" is used for this example.
Set SW3 to "bit 4=ON".

Slave station

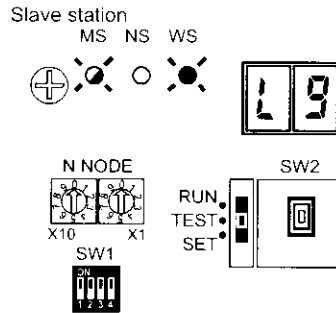
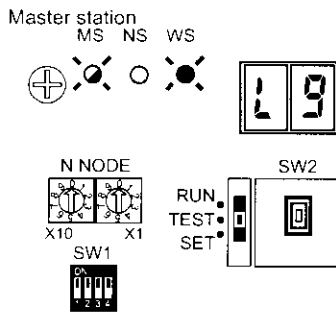


- (2) Set the mode select switch of the wireless slave station to "TEST".

Test

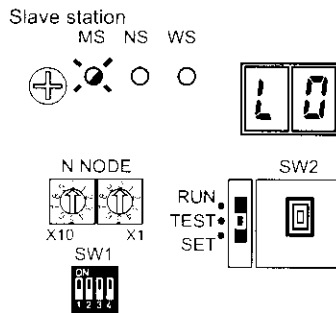
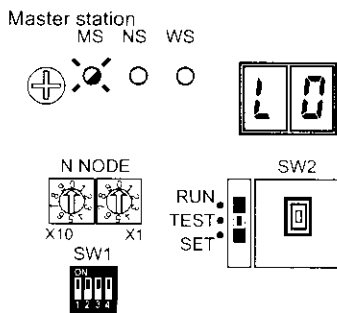


- (3) Turn on the communication power supplies of the wireless master station and all wireless slave stations. The system is in test operation status.



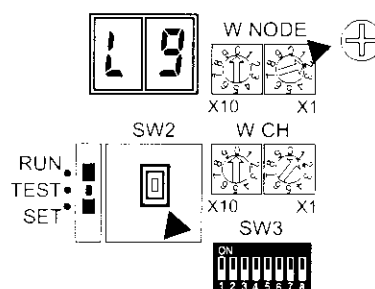
- (4) The LED display shows the receiving wave level "L1 to L9". If the wireless master station and the wireless slave station to be tested have been installed within the distance where both stations can receive the electric wave from each other.

If the WS LED lights green, this means that the wireless communication link has been established. Position the devices so that the WS LED lights green. If the electric wave is weak, adjust the position of the wireless slave station so that receiving wave level is stabilized in L5 or higher.



The LED display shows the receiving wave level "L0" if the devices have been installed outside the distance where they cannot receive the electric wave from each other.

Master station



- (5) Set the WNODE switch of the wireless master station to the WNODE number ("00" for this example) of the wireless slave station to be tested next, and then press SW2. Repeat this procedure till the communication with all wireless slave stations is established and stabilized.

5-3 Confirmation Test

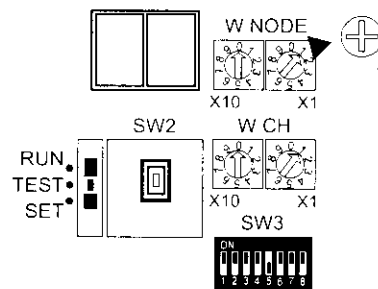
This test is for checking the wireless communication status with each slave station in the system in operation after installation. The test can be implemented by the switching operation from the master station.

■ Preparation

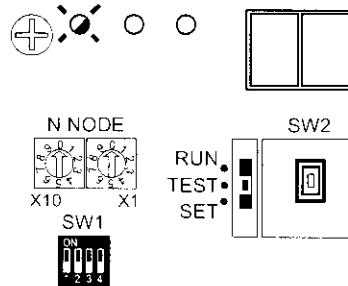
- The DeviceNet master does not need to be connected for the confirmation test. (The DeviceNet slave needs to be connected.)
- The confirmation test is employed for the inspection work after installation. Thus, the system registration is assumed to be completed beforehand.
- Leave the mode select switches of the wireless slave stations in the "Run" position.

■ Test procedure

Master station

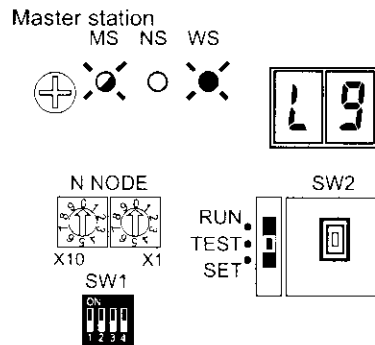


- (1) Set the mode select switch of the wireless master station to "TEST", and the WNODE switch to the WNODE number of the wireless slave station to be tested. "01" is used for this example. Set SW3 to "bit 5=ON".

Master station
MS NS WS

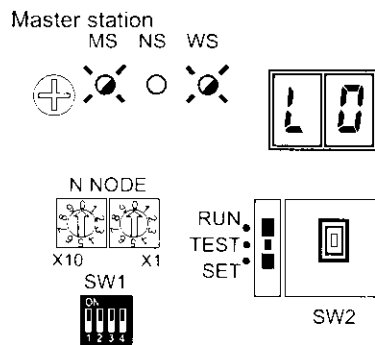
- (2) Turn on the communication power supply to the wireless master station. The system is in test operation status. The NS LED goes off and the MS LED flashes green.

Test

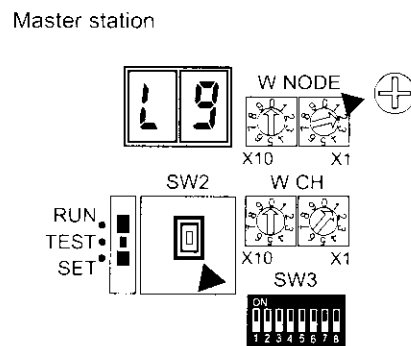


- (3) The LED display shows the receiving wave level "L1 to L9" if the wireless master station and the wireless slave station to be tested have been installed within the distance where both stations can receive the electric wave from each other.

If the WS LED lights green, the wireless communication link has been established. Position the devices so that the WS LED lights green. If the electric wave is weak, adjust the position of the wireless slave station so that the receiving wave level is stabilized at L5 or higher.



The LED display shows the receiving wave level "L0", if the devices have been installed outside the distance where they cannot receive the electric wave from each other.



- (4) Set the WNODE switch of the wireless master station to the WNODE number ("02" for this example) of the wireless slave station to be tested next, and then push SW2.

Repeat this procedure till communication with all wireless slave stations is established and stabilized.

5-4 Wireless Channel Monitor

Obtains the receiving wave level of the frequency band (all channels) to allow for the selection of the available channels (frequency band).

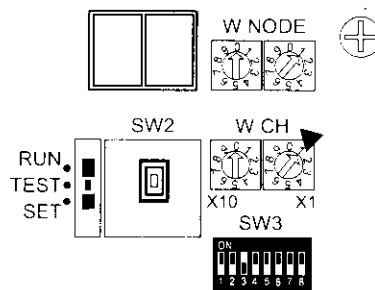
Also, using a configurator (wireless setup tool) enables logging on the receiving wave levels (all channels and temporal modulation of a specific 1 channel).

■ Method without configurator

● Preparation

- The DeviceNet master and DeviceNet slave do not need to be connected for the positioning test.
- Prepare either the wireless master station or an slave station. (Either one is acceptable.)
- The wireless unit requires a communication power supply. Connect the unit to the power via the DeviceNet cable prepared for a micro-connector.

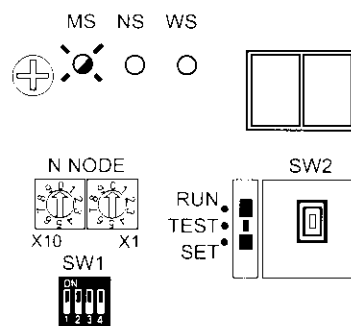
● Test procedure



- (1) Set the mode select switch to "TEST".

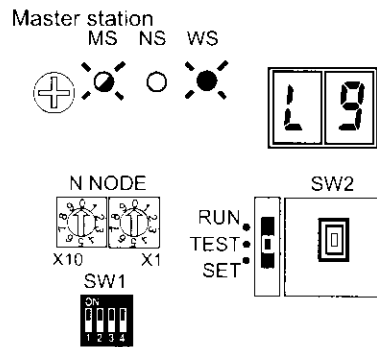
Set SW3 to "bit 3=ON".

Set the WCH switch to the wireless channel to be monitored. "01" is used for this example.

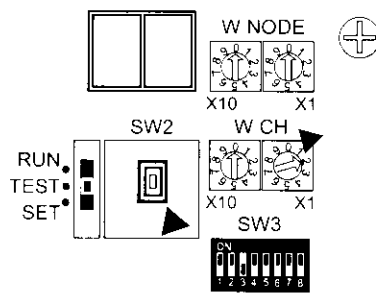


- (2) Turn on the communication power supply. The system is in test operation status. The NS LED goes off and the MS LED flashes green.

Test



- (3) The WS LED lights green and the LED display shows the receiving wave level "L1 to L9".



- (4) Set the WCH switch of the wireless master station to the wireless channel to be monitored next, and then push SW2.

Repeat this procedure to search the available channel whose receiving wave level is "L1" or lower. Select the wireless channel to be used among the unused channels.

SECTION 6

Relay Function

6-1 Relay Function

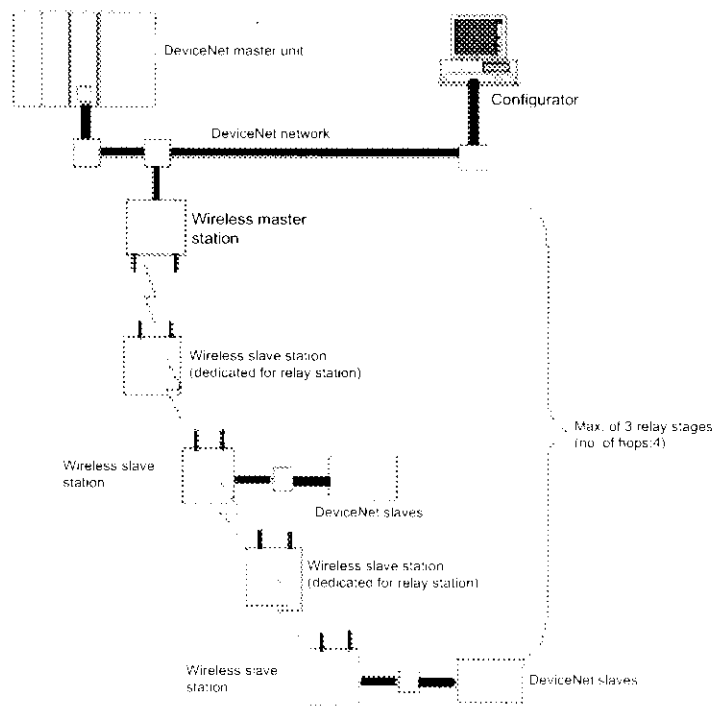
A wireless slave station can be used as a relay station when expansion of the communication area is intended but the direct communication is blocked by obstacles.

The relay station can select either (1) the mode that does not connect the DeviceNet slave (dedicated relay station mode) or (2) the mode functions as both the DeviceNet master and the relay station by connecting the DeviceNet slave (non-dedicated mode) using DIP switches.

For details, refer to "4-2 DeviceNet Wireless Slave Station Specifications".

The maximum number of relay stages is 3 (no. of hops : 4).

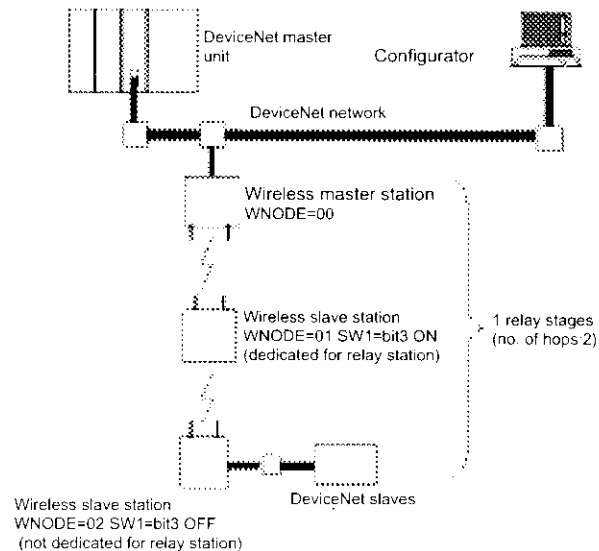
A configurator is used for the relay station system setting. When the wireless slave station is used in the dedicated relay station mode, the DeviceNet slave is not connected. However, since the communication power supply is required, the communication cable needs to be connected. Also, in the relay station system, the WCH switches of all wireless units must be set to an identical frequency.



The I/O connected with wireless slave stations are loaded first by ascending order of DeviceNet node addresses in the wireless slave station, and then by ascending order of wireless node addresses for the slave station (WNODE) in the wireless master station.

6-2 Actual Example

■ System configuration example



Although omitted in the above illustration, it is assumed that the communication power is supplied to all wireless units via the communication cables and that terminators are installed.

■ System setting

● Preparation

Connect the wireless master station and configurator with the DeviceNet network. The wireless slave stations do not need to be prepared at this stage.

● Setting from the configurator

After starting up the configurator, set the system configuration of the relay station and entry it in the wireless master station on the screen of the parameter setting function of the wireless unit.

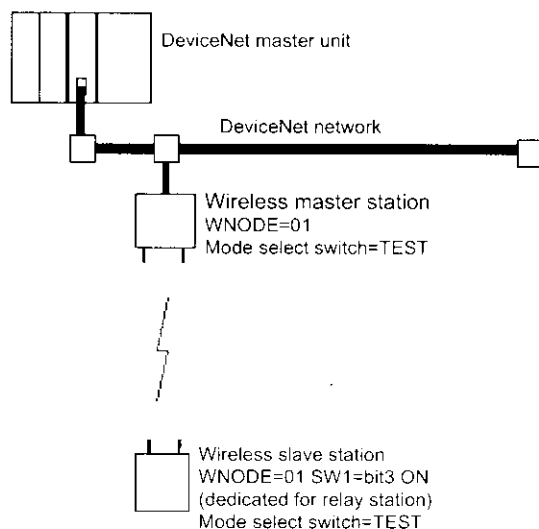
■ Installation test

● Temporary installation

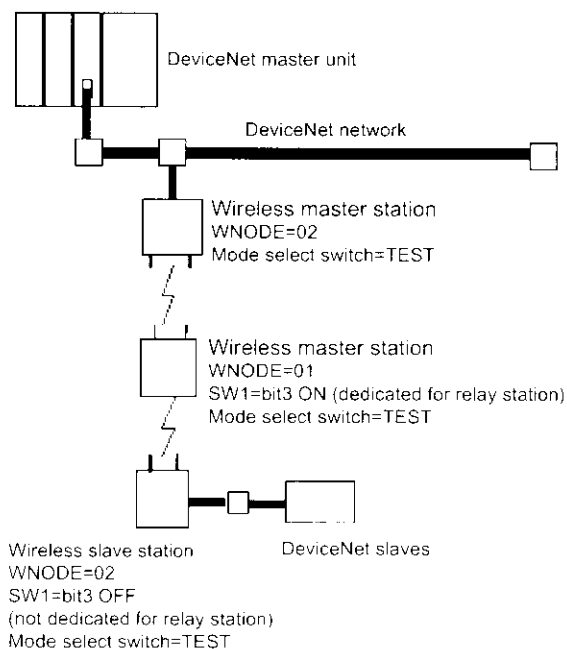
- Temporarily install the wireless master station, relay station, and slave stations to the respective determined positions.
- Set the switches as described in the illustration of the system configuration example.

● Test execution

- (1) Perform the installation test between the wireless master station and the relay stations. For the method of installation test, refer to "5-2 Installation Test".



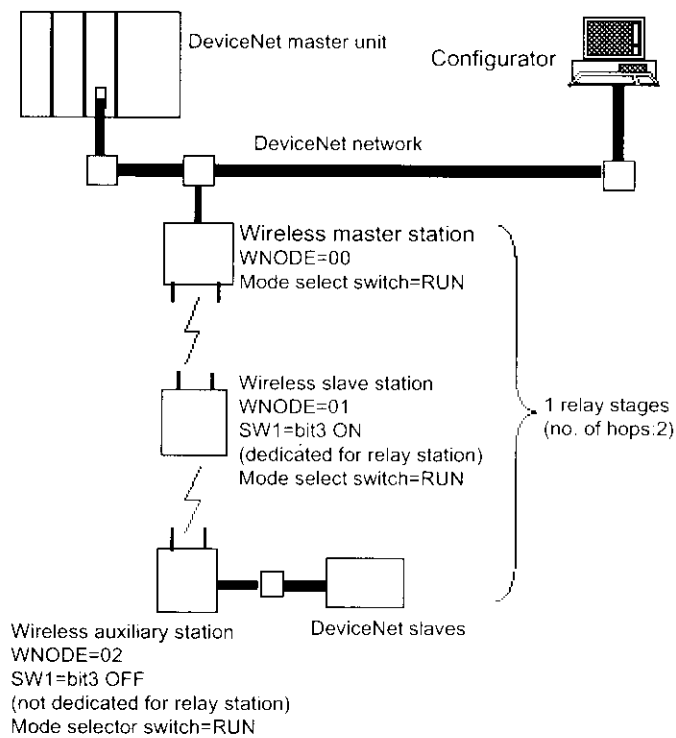
- (2) Perform the installation test between the wireless master station and the relay stations, and between the relay stations and the slave stations. (Select WNODE = 2 in the wireless master station.)



■ Preparation

● Setting and installation

Set the wireless units as shown in the illustration below and fix the wireless unit that has already been temporarily installed. Connect the required cables. For details, refer to "4-1 DeviceNet Wireless Master Station Specifications" or "4-2 DeviceNet Wireless Slave Station Specifications".



Relay Function

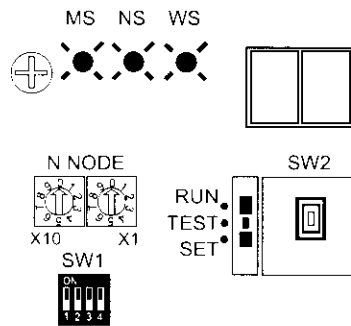
● Starting the system

Turn on the power supplies to the entire system.

■ Communications

● Confirming unit LEDs

If the WS LED of a wireless unit lights green, this indicates that the wireless remote I/O communication is properly made.



■ Response

For the system response of the relay station, refer to "9-1 Remote I/O Communications Characteristics".

SECTION 7

Message Communication
Function

7-1 Explicit Messages Addressed to DeviceNet Wireless Master Station

Use of the following functions is allowed by issuing the Explicit messages from the PLC or a PC on the DeviceNet network to which the wireless master station is connected.

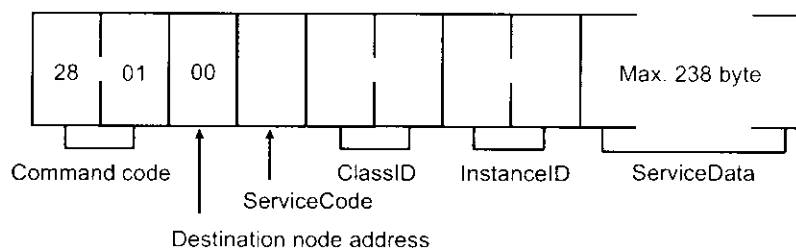
- Parameter setting/reference of wireless master station
- Command send to wireless master station

By the way, the message communication function to a wireless slave station or to a DeviceNet slave unit connected to a wireless slave station is not supported. In addition, this section covers the parts relating to wireless units only. For other parts, refer to the "DeviceNet User's Manual" (SCCC-308□).

■ Basic format

The following explains common parts in each command response. The number of the specified byte of ClassID, InstanceID, and AttributeID may be different depending on a master unit. In the case of the OMRON CompoBus/D master unit, 1 byte (2 digits) for ClassID and InstanceID, and 1 byte (2 digits) for AttributeID.

● Command format



"Destination node address"

This is the wireless unit node address controlled by an Explicit message. Since the wireless master station is the destination node here, "00" is specified to the address.

"ServiceCode", "ClassID", "InstanceID"

These are parameters to specify command types, processing objects, and the details of the process.

"ServiceData"

This data is set as necessary. The maximum specifiable byte is 238.



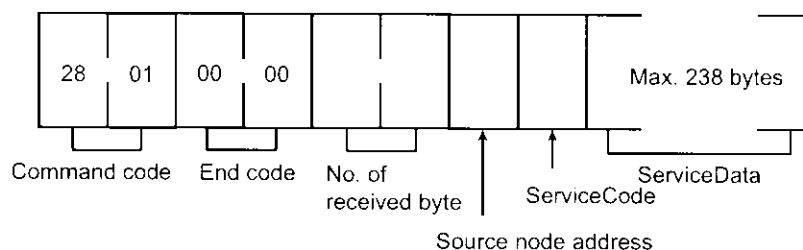
Parameter setting timing to become valid

The set data of the parent wireless station parameter settings take effect when the power supply is reset or a soft reset is executed in the Explicit message.

7-1 Explicit Messages Addressed to DeviceNet Master Wireless Station

● Response format

(1) The issued Explicit message is normally responded to:



"No. of received byte"

The number of bytes of the received data from the source node address and after are responded to in hexadecimal.

"Communication source node address"

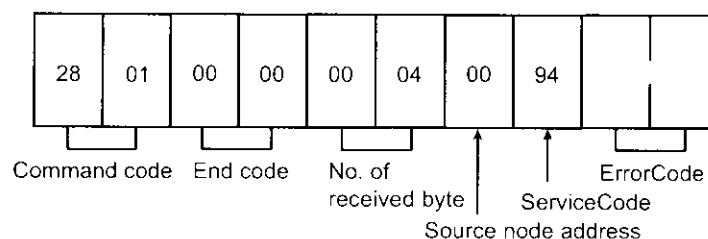
This is the node address of the node that issued a command. Since the wireless master station is the destination node here, "00" is specified to the address.

"ServiceCode"

If the system ends normally, the value resulting when the uppermost bit of the ServiceCode specified by the command becomes ON is stored. Code 0004 Hex always results when an error is responded.

"ServiceData"

When a read command is issued, the read data is stored. 238 byte is the maximum.



(2) The issued Explicit message is responded to with an error:

"ErrorCode"

This is the error code of the Explicit message. For details, refer to the DeviceNet specifications.

To obtain the DeviceNet specifications, contact ODVA Japan branch office (listed on Pages 9 ~ 29 of the CompoBus/D User's Manual).

7-2 List of Explicit Messages Addressed to DeviceNet Wireless Master Station

The following table shows the Explicit messages that can be processed by the wireless master station.

Explicit message	Function	ServiceCode Format in () is response	ClassID	InstanceID	AttributeID	Page
Reading actual time of wireless communication cycle	Reads the latest actual time of wireless communication cycle at a user system.	0E Hex (8E Hex)	A6 Hex	01 Hex	64	7-6
Reading addition information of lower DeviceNet slave	Reads the addition information of the DeviceNet slave connected to a wireless slave station.	0E Hex (8E Hex)	A7 Hex	01 Hex	6A	7-7
Reading addition information of wireless slave station	Reads the addition information of wireless slave station.	0E Hex (8E Hex)	A7 Hex	01 Hex	6B	7-8
Entry a specified wireless slave station	Entries a specified wireless slave station to wireless network.	10 Hex (90 Hex)	A8 Hex	01 to 20 Hex	64	7-9
Deleting a specified wireless slave station	Deletes a specified wireless slave station from the network.	10 Hex (90 Hex)	A8 Hex	01 to 20 Hex	64	7-9
Setting the No. of IN points	Sets the number of IN points of a specified wireless slave station.	10 Hex (90 Hex)	A8 Hex	01 to 20 Hex	6D	7-10
Reading the No. of IN points	Reads the number of IN points of a specified wireless slave station.	0E Hex (8E Hex)	A8 Hex	01 to 20 Hex	6D	7-11
Setting No. of OUT points	Sets the number of OUT points of a specified wireless slave station.	10 Hex (90 Hex)	A8 Hex	01 to 20 Hex	6E	7-12
Reading the number of OUT points	Reads the number of OUT points of a specified wireless slave station.	0E Hex (8E Hex)	A8 Hex	01 to 20 Hex	6E	7-13
Setting upper station node address	Sets the node address of the upper station on the relay route of a specified wireless slave station.	10 Hex (90 Hex)	A8 Hex	01 to 20 Hex	6F	7-14
Reading upper station node address	Reads the node address of the upper station on the relay route of a specified wireless slave station.	0E Hex (8E Hex)	A8 Hex	01 to 20 Hex	6E	7-15
Reading wireless network status	Reads the status information of wireless network between the master station and a specified wireless slave station.	0E Hex (8E Hex)	AA Hex	01 to 20 Hex	64	7-16

7-2 List of Explicit Messages Addressed to DeviceNet Wireless Master Station

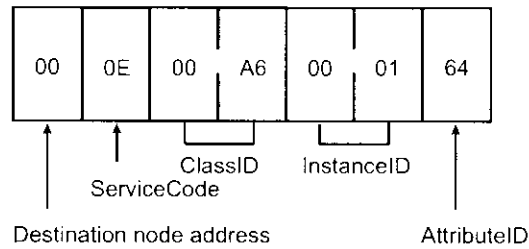
Explicit message	Function	ServiceCode Format in () is response	ClassID	InstanceID	AttributeID	Page
Reading wireless error count	Reads the error counts between the master station and a specified wireless slave station.	0E Hex (8E Hex)	AA Hex	01 to 20 Hex	65	7-17
Reading DeviceNet master status	Reads the DeviceNet master status of a specified wireless slave station.	0E Hex (8E Hex)	AA Hex	01 to 20 Hex	67	7-18
Writing settings/ Soft reset	Writes settings in EEPROM or executes soft reset.	10 Hex (90 Hex)	AC Hex	01 Hex	64	7-19

The following pages explain each command. By the way, in the command (response) format, the command codes and end codes in the header section are omitted.

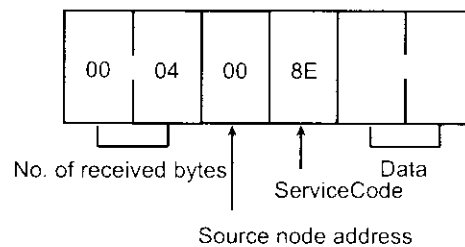
Reading actual time of wireless communication cycle

Reads the latest actual time of wireless communication cycle at a user system.

● Command format



● Response format



● Parameter details

"Data" (response)

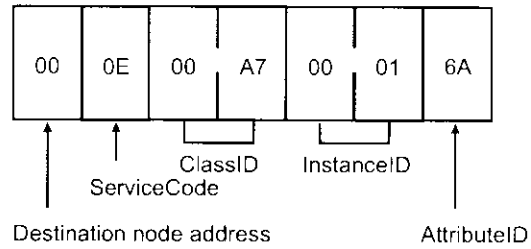
The read actual cycle time of wireless communication is stored. The data consists of 2 byte character codes.

Actual cycle time (lower)
Actual cycle time (upper)

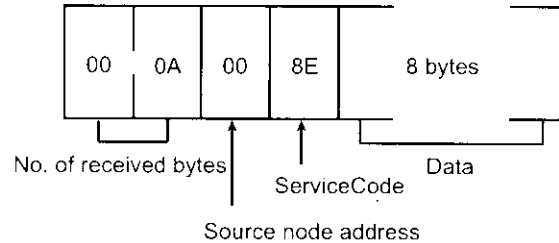
Reading addition information of lower DeviceNet slave

Reads the addition information of the DeviceNet slave connected to a wireless slave station.

● Command format



● Response format



● Parameter details

The read addition information of the lower DeviceNet slave is stored. The data consists of 8 byte character codes.

D7	D6	D5	D4	D3	D2	D1	D0
7	6	5	4	3	2	1	0
15	14	13	12	11	10	9	8
23	22	21	20	19	18	17	16
31	30	29	28	27	26	25	24
39	38	37	36	35	34	33	32
47	46	45	44	43	42	41	40
55	54	53	52	51	50	49	48
63	62	61	60	59	58	57	56

If the DeviceNet slave of the above node address is 1, an slave station is added, and if 0, not added.