



CIDRW SYSTEM

V640 SERIES

AMPLIFIER UNITS SERIAL TYPE

USER'S MANUAL

AMPLIFIER UNITS

V640-HAM13

CIDRW HEADS

V640-HS63



Z523-E1-01

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Introduction

Thank you for purchasing the V640-series CIDRW System. This manual describes the functions, performance, and application methods needed for optimum use of the V640-series CIDRW System.

Allow the V640-series CIDRW System to be installed and operated only by qualified specialists with a sufficient knowledge of electrical systems.

Please read and understand the contents of this manual before using the system.

After reading this manual, store it in a convenient location for easy reference whenever necessary.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing CIDRW systems.
- Personnel in charge of designing CIDRW systems.
- Personnel in charge of installing and maintaining CIDRW systems.
- Personnel in charge of managing CIDRW systems and facilities.

Applicable Products

This manual covers the following products.

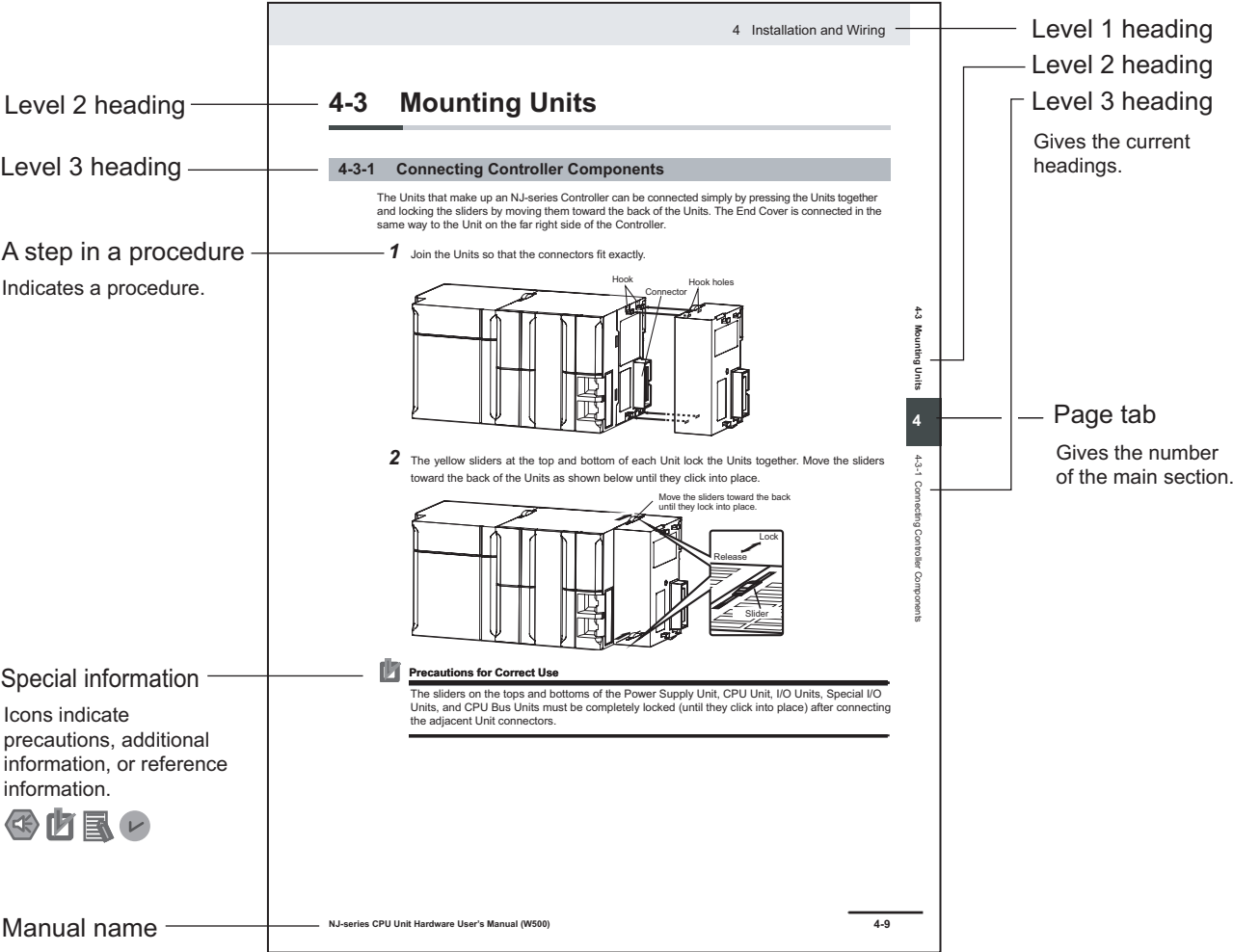
CIDRW System

V640-HAM13	Amplifier Unit
V640-HS63	CIDRW Head

Manual Structure

Page Structure

The following page structure is used in this manual.



Note : This page is a sample for the purpose of describing the page structure. It differs in its actual content.

Icons

The icons used in this manual have the following meanings.



Precautions for Safe Use

Precautions on what to do and what to avoid doing to ensure the safe use of the product.



Precautions for Correct Use

Precautions on what to do and what to avoid doing to ensure proper operation and performance.



Additional Information

Additional information to read as required.
This information is provided to increase understanding or make operation easier.



Version Information

Information on differences in specifications and functionality between versions is given.

Indicator Status

The following symbols are used to show the status of the indicators on the Amplifier Units.



OFF



Flashing



ON

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Precautions for Safe Use

Please observe the following precautions for safe use of the products.

- Never use the product in an environment where combustible or explosive gas is present.
- Please separate from a high-pressure equipment and the power equipment to secure the safety of the operation and maintenance.
- Please do not insert foreign bodies such as water and the wires from the space of the case.
- Please do not dismantle, repair or modify this product.
- Please process as industrial waste when you abandon this product.
- When you work on wiring and put on and take off cables, CIDRW head, please perform it after switching off this product.
- Provide enough space around this product for ventilation.
- Please avoid installing this product near the machinery (a heater, a transformer, large-capacity resistance) that has high the calorific value.
- Talk to our office by any chance after you cancel use immediately when you felt abnormality to this product, and having switched it off.
- Never use this product with AC power supply. This may damage the product.
- Use an appropriate ground. An insufficient ground can affect this product operation or result in damage to this product.
- When you put on and take off a CIDRW head, please do not add excessive power to a connector.
- When using the V640-HAM13, always use it in combination with the V640-HS63.
- Depending on the material and environment around the antenna, the communication distance and time may vary. Please evaluate in advance before use.

Confirm the effects of radio waves on medical devices. The following guideline is from JAISA (Japan Automatic Identification Systems Association).

This product is a reader-writer that uses radio waves for RFID equipment. The application and location of this product may affect medical devices. The following precaution must be observed in the application of the product to minimize the effects on medical devices.

Any person with an implanted medical device must keep the area where the device is implanted at least 22 cm away from the antenna of a stationary or modular RFID device.

Precautions for Correct Use

Please observe the following precautions to prevent failure to operate, malfunctions, or undesirable effects on product performance.

About installation Site

Do not install this product in the locations subject to the following conditions.

- Place where direct sunshine strikes.
- Place with corroded gas, dust, metallic powder, and salinity.
- Place with condensation due to rapid temperature fluctuations.
- Place with condensation due to high humidity.
- Place where vibration and impact more than being provided by specification are transmitted directly to main body.
- Place with spray of water, oil, and chemical medicine.
- The working temperature is within the range stipulated in the specifications.

About depositoty Site

- Please follow the save ambient temperature / humidity, and keep this product.

About wiring

- Use the power supply voltage specified in this cocument.
- Ensure correct polarity when connecting to the +/- power supply terminals.
- Do not run high-voltage lines and power lines though the same conduit.
- To avoid static-induced failure, wear a wrist band or equivalent means to release a static charge before touching a terminal or a signal line within a connector.
- Please connect the correct CIDRW head to the amplifier unit.
- If an incorrect CIDRW head is connected, the desired communication performance may not be achieved.
- Turn off the power to the amplifier unit before attaching or detaching the antenna.

Mounting

- Do not drop the Controller. Doing so may result in injury.

About cleaning

- Wipe off any dirt from the Digital Controller with a soft dry cloth. Never use thinners, benzine, alcohol, or any cleaners that contain these or other organic solvents. Deformation or discoloration may occur.

Maintenance

- Perform inspections both daily and periodically.

About the communication range and time

- Do the communication test with Transponder in the installation environment because the metal, noise and ambient temperature around CIDRW head damage to the communication range and time.
- Install CIDRW head and ID tag in the appropriate distance because the communication range can change by the difference of ID tag specifications.

About mounting

- This product communicates with ID Tags using the 134 KHZ frequency band. Some transceivers, motors, monitoring equipment, and power supplies (power supply ICs) generate electrical waves (noise) that interfere with communications with ID Tags. If you are using the product in the vicinity of any of these devices, check the effect on communications in advance.
- In order to minimize the effects of noise, ground nearby metal bodies with a grounding resistance not exceeding 100 ohms.
- When multiple CIDRW Heads are mounted next to each other, communications performance could be impaired by mutual interference. Read and follow *A-3-2 Mutual Interference Distances (Reference Only)* on page A-12 on mutual interference when installing multiple heads.
- Please avoid installing this product near the machinery (a heater, a transformer, large-capacity resistance) that has high the calorific value.
- In the installation, please tighten the screw surely. (Recommended 1.2N·m)
- Use a small flat-blade screwdriver to operate the DIP switches.
- Turn off the power before operating the DIP switches.

Screw Locking Adhesive

- Screw locking adhesive (screw lock) may cause deterioration and cracking of resin parts; do not use it for screws in resin parts or anywhere where resin washers are used.

Host Communications

- Always confirm that the Controller has been started before attempting to communicate with it from the host.
When the Controller is being started, unstable signals may be output from the host interface. When starting operation, clear the reception buffers in the host or take other suitable countermeasures.

Startup Precaution

- Never turn OFF the power supply while the CIDRW Controller is starting, including when power is turned ON, when the mode is changed, or when the CIDRW Controller is being reset. Doing so may damage the CIDRW Controller.

About Transponder made by Texas Instruments Co.

1. We can't warrant the specifications of the communication with Transponder(RI-TRP-DR2B(-40)).
2. We can't responsible for any malfunctions of Transponder.

Revision History

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.

Cat. No. Z523-E1-01

Revision code

Revision code	Date	Revised content
01	July 2026	Original production

Product Outline

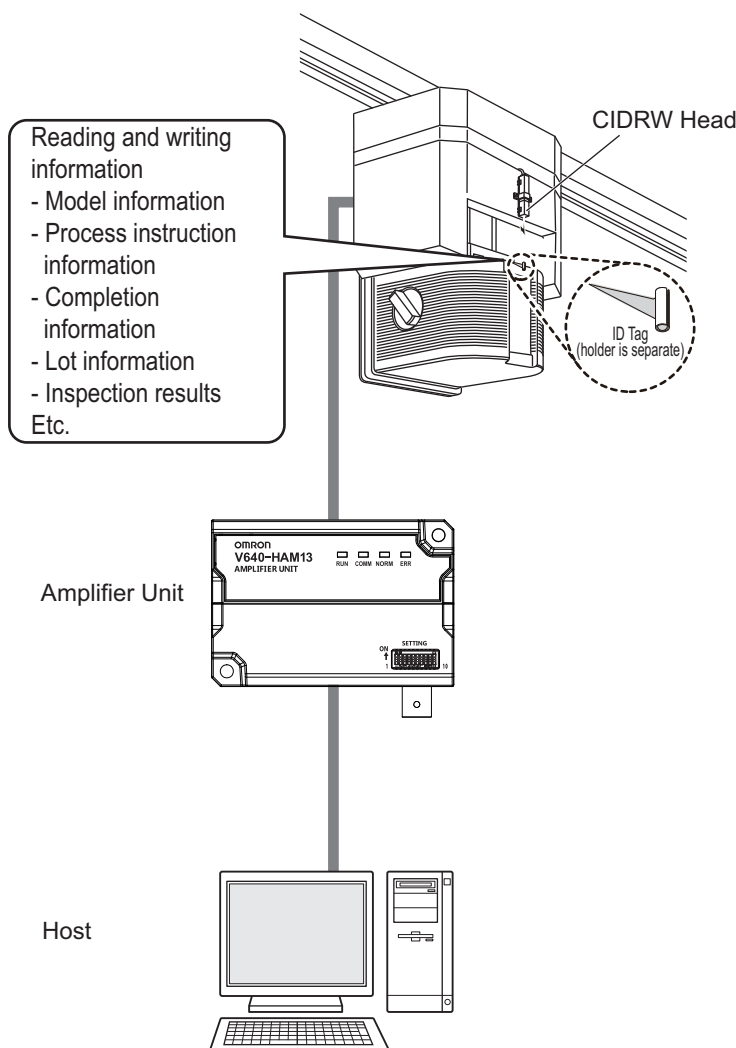
This section provides an overview of the V640-series CIDRW System, including its features, system configuration, component names and functions, and a flowchart for getting started.

1-1	What Is a CIDRW System.....	1-2
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1-1 What Is a CIDRW System

The CIDRW system writes data to, and reads data from, the carrier IDs (ID Tags) mounted on the carriers (FOUP) in semiconductor manufacturing processes without contacting these ID Tags. CIDRW is the abbreviation of Carrier ID Reader/Writer and this abbreviation is used throughout this manual. Reading and writing information such as models, process instructions, lots, and inspection results to and from ID Tags makes it possible to manage work instruction information from a host device.

Example: Management of information in semiconductor and wafer manufacturing processes



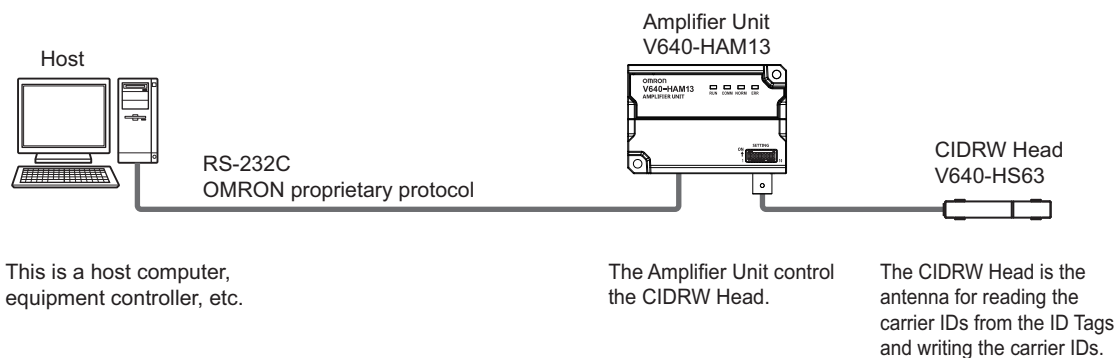
1-2 Features

A V640-series CIDRW Head can be connected to a V640-HAM13 to read and write ID Tags manufactured by Texas Instruments (TI). This is a compact RFID Amplifier Unit that performs reading and writing according to commands from the host device.

You can build CIDRW system suitable for Over Head Transport systems in semiconductor production lines where space saving is required.

1-3 System Configuration

The Amplifier Unit is connected directly to the host device. Communications with the host device follow the OMRON proprietary protocol.

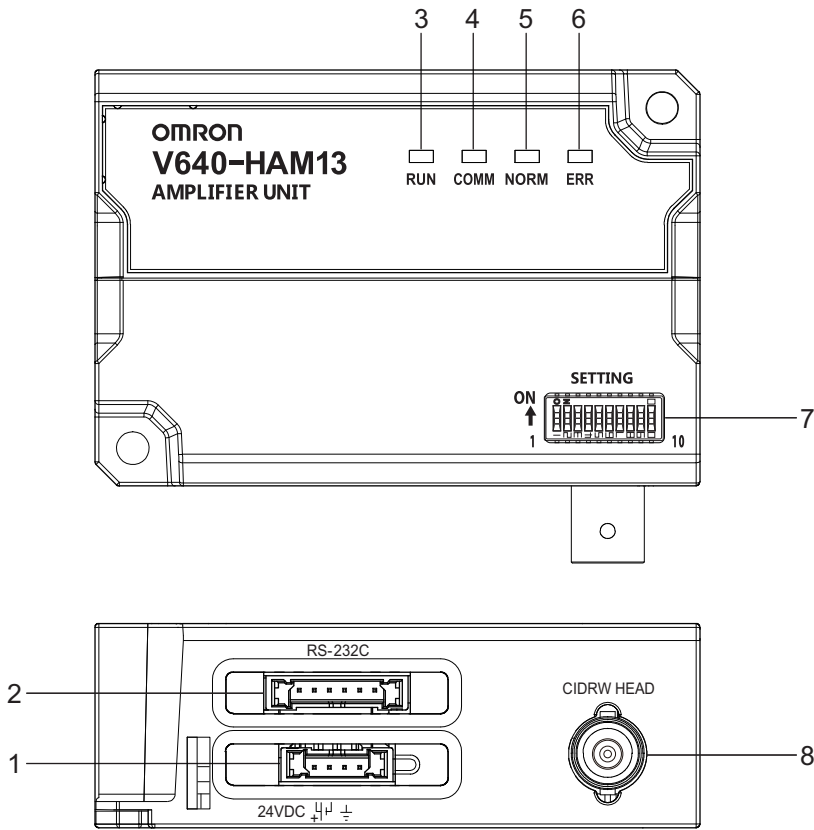


The V640-HS63 CIDRW Head can be connected to V640-HAM13 Amplifier Unit to communicate with ID Tags.

The V640-HAM13 will automatically detect the model and read/write data for RI-TRP-DR2B ID Tags manufacturer by Texas Instruments.

1-4 Component Names and Functions

1-4-1 V640-HAM13 Amplifier Units



No.	Name	Function
1	Dedicated power supply connector	Connect to the 24 VDC power supply.
2	RS-232C port	Connected to a host device. Uses the OMRON proprietary communications protocol.
3	RUN indicator (green)	Turns ON when the Amplifier Unit is in normal operation.
4	COMM indicator (yellow)	Turns ON during communications with the host device or during communications with an ID Tag.
5	NORM indicator (green)	Turns ON when the communications finish with no error.
6	ERR indicator (red)	Turns ON when an error occurs during communications with the host device, or during communications with an ID Tag.
7	Setting DIP Switch	Used to set the communications conditions and the Test Mode.
8	CIDRW Head connection port	A CIDRW Head is connected here.

Functions

• SN MEASUREMENT

Noise and signal information during communication with ID Tags in the vicinity of the CIDRW Head are measured, and the noise and signal values are compared. This allows you to easily investigate whether communication is successful in the vicinity of the antenna without using any measuring equipment.

For more information, see 4-1-12 *SN MEASUREMENT* on page 4-17.

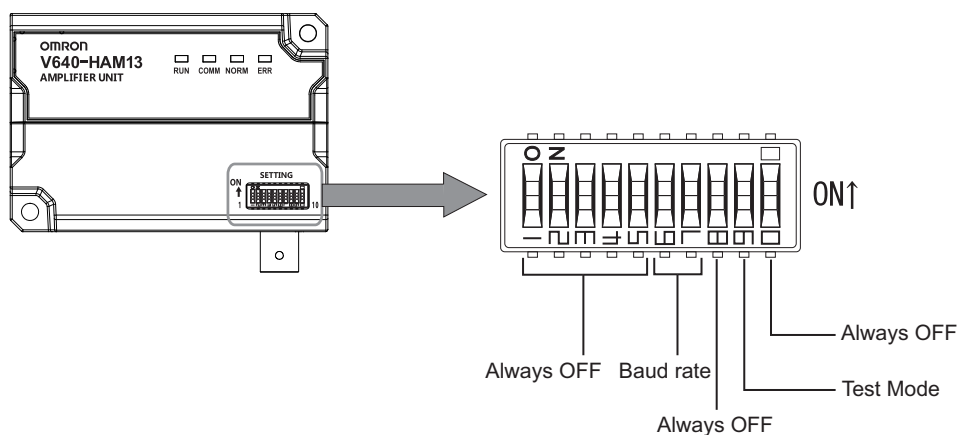
• Test Mode

Test Mode can be used to check communications between the ID Tags and Amplifier Units without connecting a host device.

Communications with ID Tags are automatically performed every second and the communications results are displayed on the OPERATING indicator.

Set the Test Mode using the DIP Switch on the side face of the Amplifier Unit.

After changing the DIP Switch settings, restart the system. The new settings will not become effective until the system is restarted.



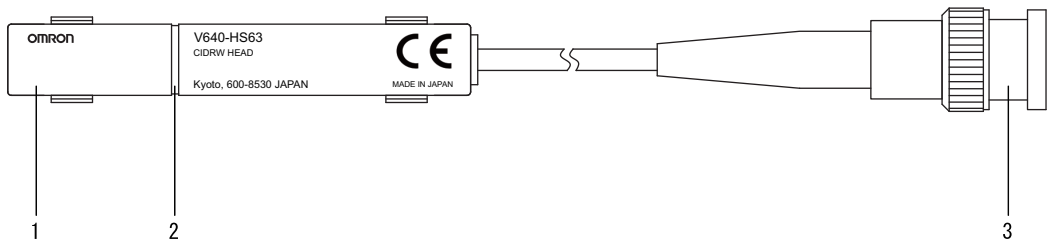
Test Mode	DIP Switch	Description
	9	
Enabled	ON	Set the Test Mode and then restart the Amplifier Unit to make the setting effective.
Disabled	OFF	



Additional Information

- For information on the OPERATING indicator for communications result, refer to 1-4-1 *V640-HAM13 Amplifier Units* on page 1-5.
- Always connect the CIDRW Head before operating the Amplifier Unit in Test Mode. If Test Mode is used without connecting a CIDRW Head, the ERROR indicator will light and Amplifier Unit operation will stop.
- Commands from the host device are not accepted during operation in Test Mode. To end Test Mode, turn OFF the Test Mode pin on the DIP switch and restart the Amplifier Unit.

1-4-2 V640-HS63 CIDRW Head



No.	Name	Function
1	Antenna	Used to communicate with ID Tags.
2	Antenna center	This is the center of the communications area.
3	Connector	Connect to an Amplifier Unit.

1-5 Flowchart for Getting Started

Installation and Connections	
Installation	2-1 <i>Installation</i> on page 2-2
Connection and Wiring	2-2 <i>Connections and Wiring</i> on page 2-5



Preparation for Trial Operation Communications	
Setting the Communications Conditions for Amplifier Units	3-1 <i>Setting the Communications Conditions for Amplifier Units</i> on page 3-2



Trial Operation	
Test for Communications with the Host Device	3-2-1 <i>Communications Test with the Host Device</i> on page 3-3
ID Tag <-> CIDRW System Communications Test	3-2-2 <i>Communications Test between ID Tags and CIDRW System</i> on page 3-4
Check the Surrounding Environment	2-1-2 <i>CIDRW Head</i> on page 2-3



Communications	
Communications Test with Actual Commands	4-1 <i>Command/Response Format</i> on page 4-2



Additional Information

For Troubleshooting, please refer to the following.

- List of Error Messages: 5-1-2 *List of Error Messages* on page 5-3
- Amplifier Unit Indicators: *Amplifier Unit Indicators* on page 5-2
- Operation Check Flowchart: 5-1-3 *Operation Check Flowchart* on page 5-4

2

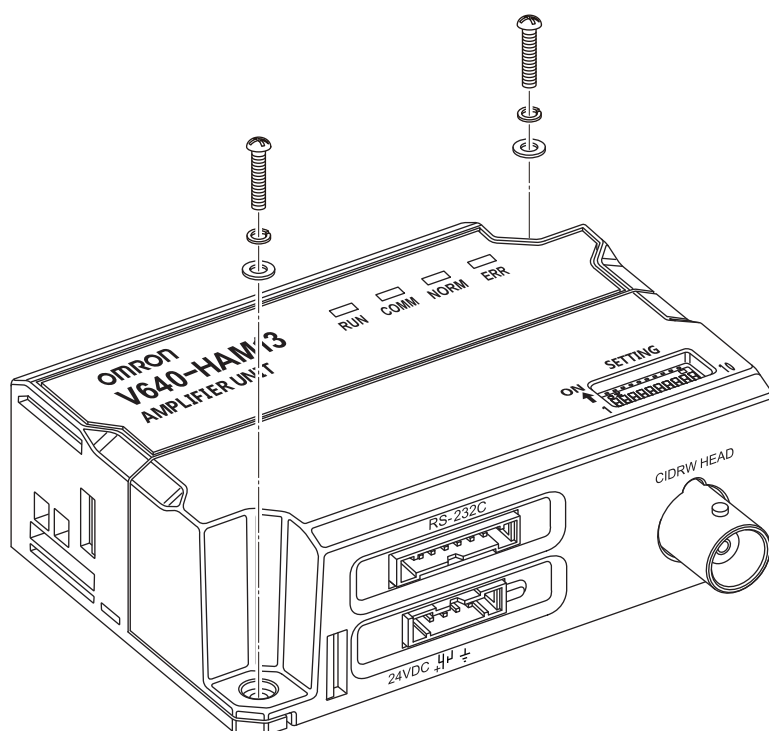
Installation and Connections/ Wiring

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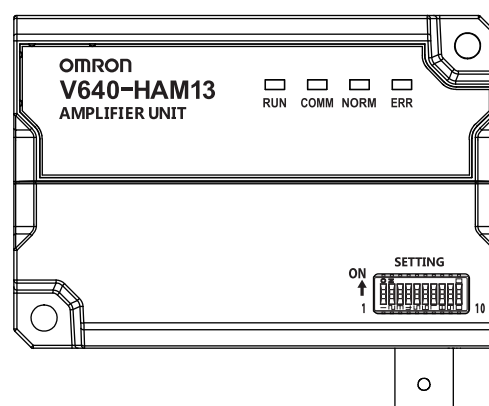
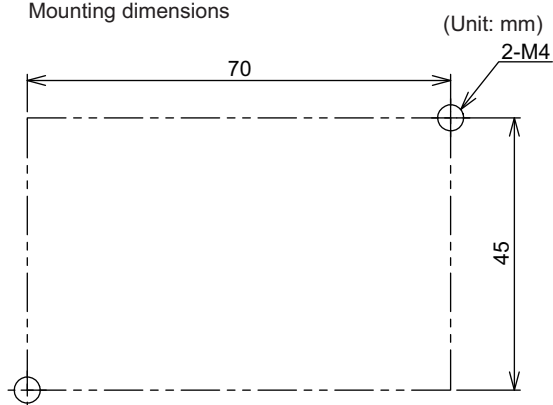
2-1 Installation

2-1-1 Amplifier Unit

Use spring washers and flat washers (small) with the two M4 screws when mounting the Amplifier Unit.



Mounting dimensions



Precautions for Safe Use

Tighten the M4 screws with a torque not exceeding 1.2 N·m.

2-1-2 CIDRW Head

The area for communications with ID Tags varies substantially according to the installation orientations and the background conditions (metals, noise, etc.). Check the communications area before deciding the installation position.

For details on actual communications distances, see *A-3 Characteristic Data According to Conditions of Use* on page A-6 in Appendix.

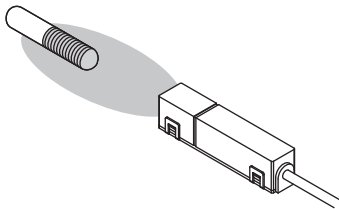
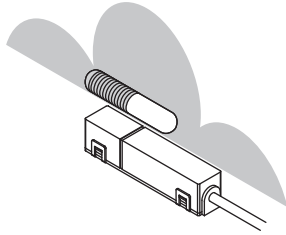
Precautions for Installing the CIDRW Head

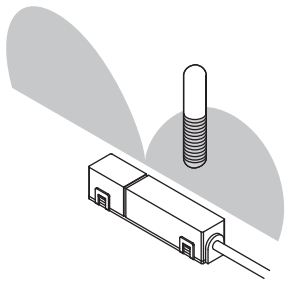
This section explains precautions for installing the CIDRW head.

- Do not attach the antenna directly to metal objects or near ferromagnetic objects, as metal may reduce the communication distance.
For details, see *A-3-3 Influence of Background Metals (Reference Only)* on page A-13.
- When encasing the antenna or using a mounting bracket, use non-metallic parts and screws, such as plastic.
Also, be careful not to cause looseness due to insufficient tightening, or deformation or damage due to excessive torque.
- Do not apply excessive tension to the cable or bend it too tightly.
Also, secure the cable so that it does not come into contact with sharp edges or moving parts.
- After installing the antenna, make sure it is securely fastened and there is no looseness.
Also, make sure that the cable is not under excessive stress.
- Communication distance may vary depending on the antenna installation conditions and the surrounding environment.
Thoroughly evaluate your own system and adjust the installation position and method as necessary.

Positional Relationship between the CIDRW Head and the ID Tag

The communications area differs according to the positional relationship during communications.

Mounting orientation	Communications area (purely illustrative)	Explanation
Coaxial		The maximum communications area is obtained when the center lines of the CIDRW Head and the ID Tag coincide.
Parallel		The maximum communications area is obtained when the center point of the antenna on the CIDRW Controller is aligned with the center line of the ID Tag.

Mounting orientation	Communications area (purely illustrative)	Explanation
Vertical		When the center point of the antenna on the CIDRW Head is aligned with the center line of the ID Tag, the communications area is substantially reduced.

Data Reading and Writing

The communications distances for reading and writing are not the same; the distance is shorter for writing. Therefore, when data is to be both read and written, take the distance for writing as the reference distance when installing the CIDRW Head and the ID Tag.

Influence of Background Metal on ID Tag

Metals in the vicinity of the communications area will affect the range, making it smaller. For more information, see *A-3-3 Influence of Background Metals (Reference Only)* on page A-13.

Influence of Noise

This CIDRW system uses a frequency of 134 kHz for communications with ID Tags. Equipment such as switching power supplies, inverters, servomotors, or monitors in the surrounding area will adversely affect communications, restricting the communications area.



Precautions for Correct Use

- The noise levels in the vicinity of the CIDRW Head can be determined with the environmental SN MEASUREMENT command. For more information, see *4-1-12 SN MEASUREMENT* on page 4-17.
- For details on the relationship between noise and communications distance, see Appendix. Refer to *A-3-5 Communications Distance Characteristics vs. Ambient Noise* on page A-17.

Mounting

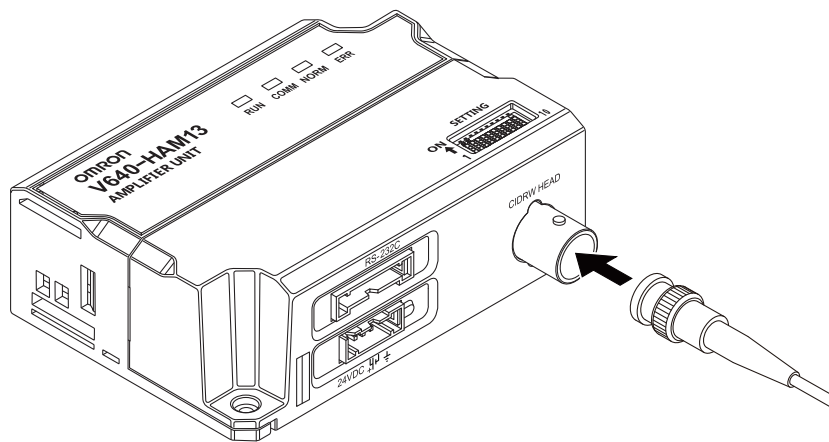
Securely fasten the antenna using a mounting bracket. You will need to provide the mounting brackets and fastening components.

2-2 Connections and Wiring

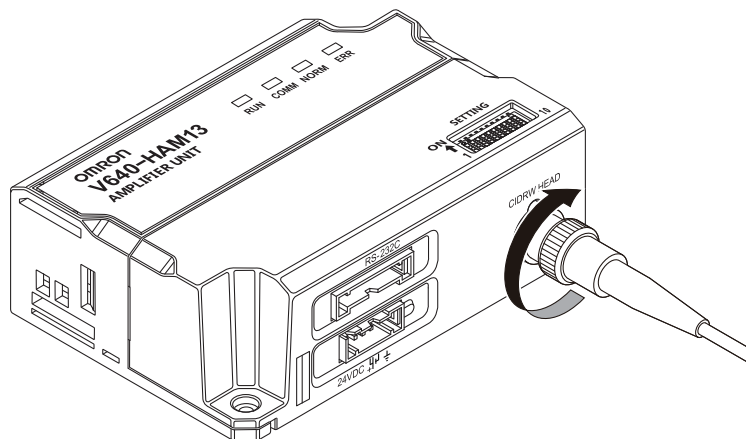
2-2-1 Amplifier Unit

Connector for Connecting a CIDRW Head

- 1** Align the pin on the connector with the channel in the cable connector and insert the cable connector.
Hold the fixed part of the connector while making this insertion.



- 2** After inserting the connector fully home, turn the fixed part clockwise to lock it.



Precautions for Correct Use

Disconnecting the CIDRW head.

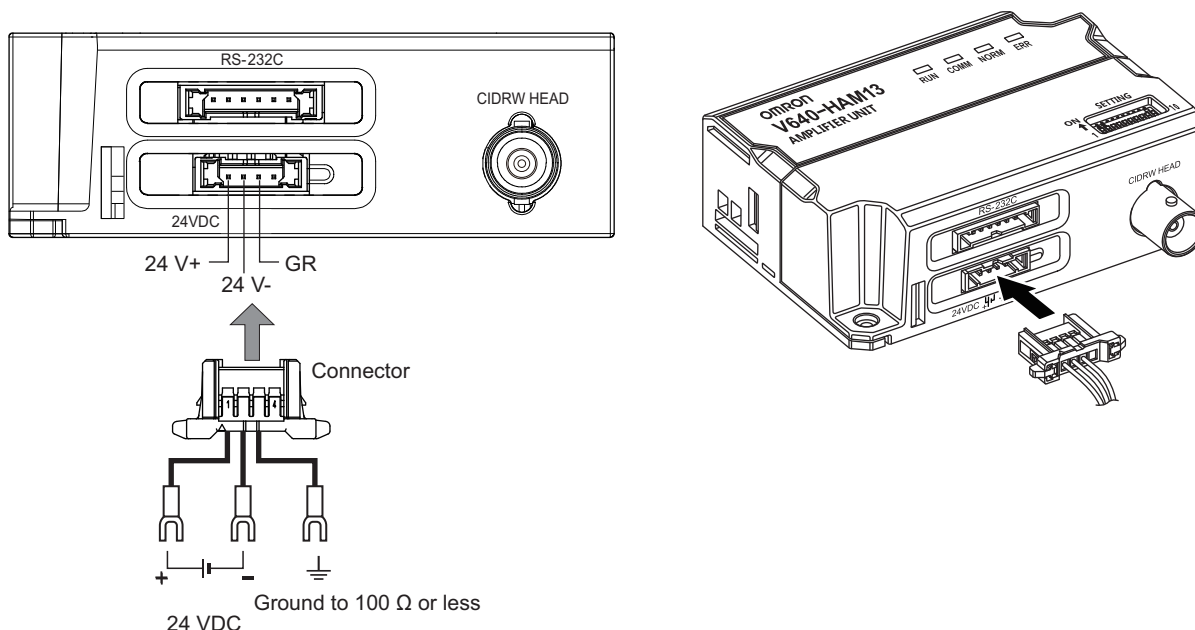
Please pull it straight out after turn a connector counterclockwise and removing a lock.

If it is difficult to pull the connector out, press down on the Amplifier Unit while pulling on the connector.

Please do not pull a cable forcibly.

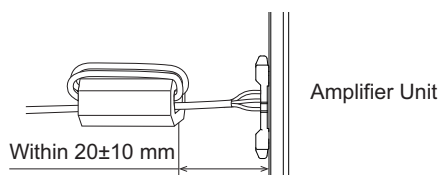
Power Supply and Grounding Wires

Connect the power supply and grounding wires to the dedicated power supply connector.



Precautions for Safe Use

- The grounding wire should be connected to a ground exclusive to the Amplifier Unit. If the grounding wire is shared with another unit, or connected to a beam in a building, there may be adverse effects.
- Make the grounding point as close as possible and the length of the grounding wire used as short as possible.
- When using the Amplifier Unit in Europe, the connecting cable between the Amplifier Unit and the DC power supply must be 3 m or less.
- Attach the ferrite core that is provided with the amplifier unit to the power cable.
- Attach the ferrite core approximately 20 ± 10 mm from the amplifier unit.
- Wrap the power cable around the ferrite core three times (pass it through the inner diameter three times).



● Dedicated Power Supply Connector

Prepare the V640-A93 (can be purchased as an accessory).

Use the power supply connector (DF51-4S-2C) and three connector pins (DF11-2428SCA) from the V640-A93 accessory.

Contents of the V640-A93 set (accessory)

Name	Quantity	When procured individually	
		Manufacture	Model
Power supply connector	One	Hirose Electric	DF51-4S-2C
RS-232C port connector	One		DF51-6S-2C
Connector pin	Eight		DF11-2428SCA

● Dedicated Power Supply Cable

Use an AWG24 to AWG26 cable.

Use a dedicated tool for crimping the cable to the connector pins.

Recommended Crimping Tool

Manufacturer	Model
Hirose Electric	HT801/DF11-2428S(A)

● Power Supply

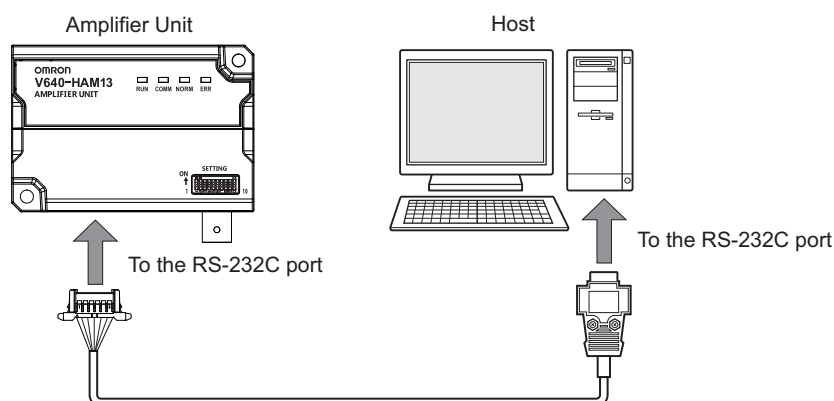
Use a power supply that satisfies the following conditions.

Manufacturer	Model	Output current	Input voltage
OMRON	S8VS-01524	24 VDC, 650 mA	100 to 240 VAC

* The maximum power consumption of the Amplifier Unit is 400 mA at 24 VDC (V640-HAM13). The inrush current, however, must be considered when selecting the power supply capacity. A power supply with an output of 650 mA min. at 24 VDC is recommended.

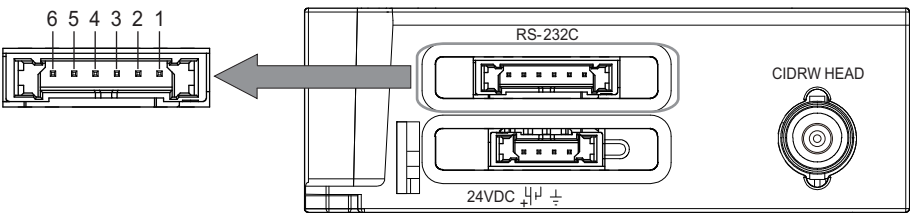
RS-232C Port

The method for connecting a host device via the RS-232C port is explained here.



● RS-232C Port

The RS-232C port on the Amplifier Unit is a 6-pin connector. The pin arrangement is shown below.



Pin No.	Signal name	Symbol	Signal direction	Remarks
1	Send enable	CS	Input	
2	Request send	RS	Output	Always ON during normal operation
3	Signal ground	SG	—	
4	Send data	SD	Output	
5	Receive data	RD	Input	
6	—	NC	—	

Prepare the V640-A93 (can be purchased as an accessory).
Use the RS-232C port connector (DF51-6S-2C) and five connector pins (DF11-2428SCA) from the V640-A93 accessory.

Contents of the V640-A93 set (accessory)

Name	Quantity	When procured individually	
		Manufacture	Model
Power supply connector	One	Hirose Electric	DF51-4S-2C
RS-232C port connector	One		DF51-6S-2C
Connector pin	Eight		DF11-2428SCA

Use a dedicated tool for crimping the cable to the connector pins.

Recommended Crimping Tool

Manufacturer	Model
Hirose Electric	HT801/DF11-2428S(A)

Refer to the recommended models below, for cable and host side connector.

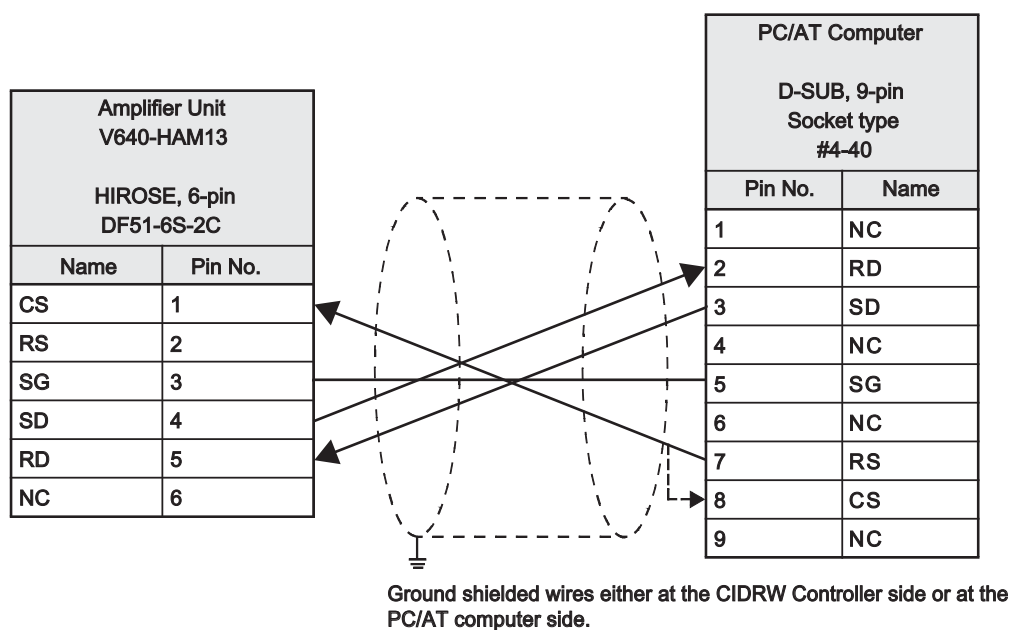
Recommended Models

		Manufacture	Model
Cable		Proterial, Ltd.	CO-VV-SB(MA)5PX28AWG(7/0.127)LF
Host side connector	Socket	OMRON	XM3D-0921
	Hood		XM2S-0913

● Wiring for Connection to a PC/AT Computer (9-pin Connector)

The cable length should be no greater than 15 m.

If the CS function is to be used at the PC/AT computer side, a return wire is required.



3

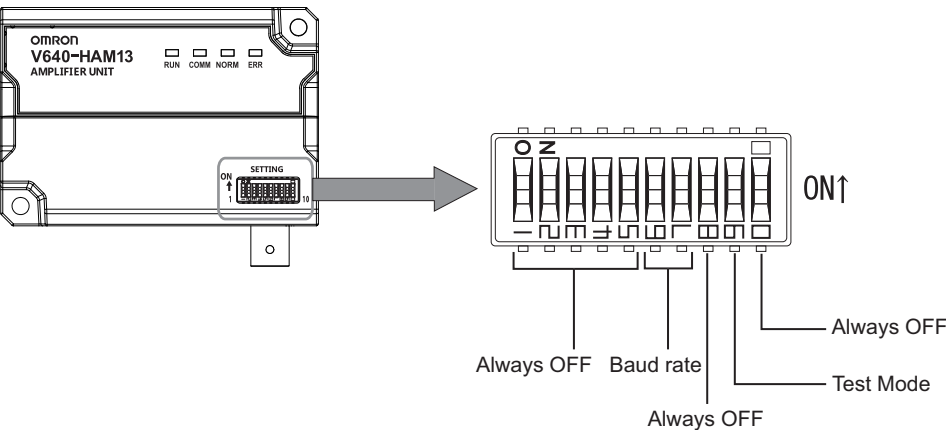
Preparing for Communications

3

3-1	Setting the Communications Conditions for Amplifier Units	3-2
3-2	Communications Test.....	3-3
3-2-1	Communications Test with the Host Device	3-3
3-2-2	Communications Test between ID Tags and CIDRW System	3-4

3-1 Setting the Communications Conditions for Amplifier Units

Set the communications conditions using the DIP Switches on the front face of the Amplifier Unit. After changing the DIP Switch settings, restart the system. The new settings will not become effective until the system is restarted.



Baud Rate

Option	DIP Switch	
	6	7
38400 bps	ON	ON
19200 bps	OFF	ON
9600 bps (default setting)	OFF	OFF
4800 bps	ON	OFF

Test Mode

Test Mode	DIP Switch	Description
	9	
Enabled	ON	Set the Test Mode and then restart the Amplifier Unit to make the setting effective.
Disabled	OFF	

For Test Mode, refer to page 1-6.

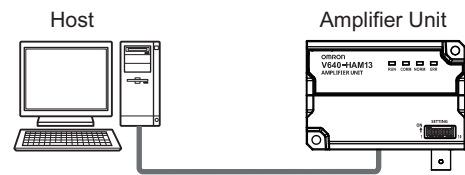
Communications Conditions

Item	Specifications				
Standard conformed to	RS-232C				
Communications control protocol	1:1 protocol exclusive to OMRON				
Synchronization method	Start-stop synchronization				
Baud rate	Set using a DIP Switch				
Frame composition	Start bit	Data bits	Parity bit	Stop bit	Total
	1	8	Even	1	11
Error detection	Vertical parity				

3-2 Communications Test

3-2-1 Communications Test with the Host Device

A communications test is performed to confirm that the host device and Amplifier Unit are connected correctly.



A test is preformed for the Amplifier Unit using the data 12345678.

Command

Command code		Test data								CR
		Data 1		Data 2		Data 3		Data 4		
1	0	1	2	3	4	5	6	7	8	0Dh

Response

If the response test data matches the command, the host device and Amplifier Unit are connected correctly.

Response code		Test data								CR
		Data 1		Data 2		Data 3		Data 4		
0	0	1	2	3	4	5	6	7	8	0Dh

3-2-2 Communications Test between ID Tags and CIDRW System

Send a command from the host device and check that normal communications with the ID Tag is possible.
Place an ID Tag in the communications area of the CIDRW Head connected to the Amplifier Unit for which communications is to be tested.

• READ

The data is read from pages 1 and 3 of the Amplifier Unit.

ID Tag contents

Page 1	12h	34h	56h	78h	90h	12h	34h	56h
Page 2								
Page 3	11h	22h	33h	44h	55h	66h	77h	88h
Page 4								

Command

Command code				Page designation*1								CR
0	1	0	0	0	0	0	0	0	0	1	4	0Dh

*1. Binary notation of *Page designation*

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Response

Response code		Page 1										Page 3										CR
0	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	0Dh

• WRITE

The data is written to pages 8 and 10 of the Amplifier Unit.

Command

Com- mand code				Page designation*1								Data of page 8																Data of page 10																CR
0	2	0	0	0	0	0	0	0	A	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	0Dh

*1. Binary notation of *Page designation*

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Response

Response code	CR
0	0Dh

If the command ends normally, the contents of the ID Tag will be as follows:

Page 7								
Page 8	11h	22h	33h	44h	55h	66h	77h	88h
Page 9								
Page 10	01h	23h	45h	67h	89h	ABh	CDh	EFh
Page 11								

4

Reading from/Writing to ID Tags

4-1	Command/Response Format	4-2
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4-1 Command/Response Format

Command

Command code				Parameter						CR
				1		...		n		
										0Dh

Response

Response code				Parameter						CR
				1		...		n		
										0Dh

4-1-1 Command / Response

Command Code List

Name	Value	Function	See
READ	0100	When this command is received, the system communicates with the ID Tag, and reads the specified page(s) of data. Any pages up to a maximum of 16 can be selected.	page 4-3
WRITE	0200	When this command is received, the system communicates with the ID Tag, and writes the specified page(s) of data. Any pages up to a maximum of 16 can be selected.	page 4-5
SAME WRITE	0300	When this command is received, the system communicates with the ID Tag, and writes the same data in page units to the specified pages. Up to 17 pages, which is the maximum number of pages for an ID Tag, can be specified.	page 4-7
BYTE WRITE	0400	When this command is received the system communicates with the ID Tag, and writes data to the area specified by a first address and number of bytes. A maximum of 128 bytes can be specified.	page 4-8
TEST	10	Sends received data to the host device.	page 4-9
NAK	12	Sends the response made immediately before again.	page 4-10
GET PARAMETER	14	Gets the model number, MAC address, or another parameter.	page 4-11
GET LAST COMMAND	15	Gets the command code of the last command that was executed.	page 4-14
GET COMMUNICATIONS HISTORY	16	Gets the history of communications from when the power was turned ON (total number of communications, total successful communications, and total number of failed communications).	page 4-15
CLEAR COMMUNICATIONS HISTORY	17	Clears the communications history.	page 4-16
SN MEASUREMENT	41	Measures the success/failure of the communication results, the actual signal of the ID Tags, and noise in the vicinity of the CIDRW Head.	page 4-17
RESET	7F	Resets the Amplifier Unit.	page 4-20

Response Code List

Type	Response code	Name	Description
Normal end	00	Normal end	Command execution is completed normally.
Host communications error	14	Format error	There is a mistake in the command format. (For example, the command code is undefined, or the page or address specification is inappropriate.)
Communications error	70	Communications error	Noise or another hindrance occurs during communications with an ID Tag, and communications cannot be completed normally.
	71	Verification error	Correct data cannot be written to an ID Tag.
	72	No Tag error	Either there is no ID Tag in front of the CIDRW Head, or the CIDRW Head is unable to detect the ID Tag due to environmental factors (e.g., noise).
	7B	Outside write area error	A write operation was not completed normally because the ID Tag was in an area in which the ID Tag could be read but not written.
	7E	ID system error (1)	The ID Tag is in a status where it cannot execute command processing.
	7F	ID system error (2)	An inapplicable ID Tag has been used.
CPU hardware error	9A	Hardware error in CPU	An error occurred when writing to EEPROM.



Precautions for Correct Use

Communications with the Host Device

Communicate with the host device only after confirming that the CIDRW Controller has started. Also, unstable signals may occur at the host interface when the CIDRW Controller is started. When initializing operation, clear the reception buffer at the host device or take other suitable methods to clear unwanted signals.

4-1-2 READ

Reads any pages of data from the ID Tag. The maximum number of pages that can be read at one time is 16.

Command

Command code				Page designation (8 characters)*1								CR
0	1	0	0									0Dh

*1. Details of *Page designation (8 characters)*

Bit	7	-	0	7	-	3	2	1	0	7	6	-	1	0	7	6	-	2	1	0
Page	Sys	-	Sys	Sys	-	Sys	17	16	15	14	13	-	8	7	6	5	-	1	Sys	Sys
Designation	0*	0*		0*	0*	0*	0/1	0/1	0/1	0/1	0/1	...	0/1	0/1	0/1	0/1	...	0/1	0*	0*
Value	00		00 to 07						00 to FF						00 to FC					

* Always specify 0. If you specify 1 an error (Response code: 14) will occur.

Parameter Description

Parameter	Description
Page designation	Pages are specified by setting the bits corresponding to pages that are to be read to 1 and setting the other bits to 0, then converting the result to a hexadecimal character string.



Additional Information

Refer to *A-4 ID Tag Memory Maps* on page A-18.

The response code (when normal: 00) and the data in the specified pages are returned in ascending order of page numbers.

Response

Response code		Read data												CR	
		Page n						...	Page m (n<m)						
		Data 1	...	Data 8					Data 1	...	Data 8				
0	0														0Dh

Example: Reading Data from Pages 1 and 3 of the Amplifier Unit.

Data Content of the ID Tag

Page 1	12h	34h	56h	78h	90h	12h	34h	56h
Page 2								
Page 3	11h	22h	33h	44h	55h	66h	77h	88h
Page 4								

Command

Command code				Page designation *1								CR
0	1	0	0	0	0	0	0	0	0	1	4	0Dh

*1. Binary notation of *Page designation*

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Response

Response code		Page 1														Page 3														CR				
0	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	0Dh



Precautions for Correct Use

If you send a “Read” command that specified 1 to 2 page to a 1-page only ID Tag, the Amplifier Unit will response 2nd page data as all zero.

4-1-3 WRITE

Data is written in page units to the ID Tag. Any page(s) can be specified. It is possible to write to a maximum of 16 pages at one time.

Command

Command code				Page designation (8 characters)*1								Write data								CR
												Pagen			...	Pagem(n<m)				
												Data1	...	Data8		Data1	...	Data8		
0	2	0	0															0Dh		

*1. Details of *Page designation (8 characters)*

Bit	7	-	0	7	-	3	2	1	0	7	6	-	1	0	7	6	-	2	1	0
Page	Sys	-	Sys	Sys	-	Sys	17	16	15	14	13	-	8	7	6	5	-	1	Sys	Sys
Designation	0*	0*		0*	0*	0*	0/1	0/1	0/1	0/1	0/1	...	0/1	0/1	0/1	0/1	...	0/1	0*	0*
Value	00		00 to 07						00 to FF						00 to FC					

* Always specify 0. If you specify 1 an error (Response code: 14) will occur.

Parameter Description

Parameter	Description
Page designation	Pages are specified by setting the bits corresponding to pages that are to be read to 1 and setting the other bits to 0, then converting the result to a hexadecimal character string.
Write data	The data to be written to the specified pages is specified in ascending order of page numbers.



Additional Information

Refer to *A-4 ID Tag Memory Maps* on page A-18.

Response

The response code (when normal: 00) is returned.

Response code	CR
0	0Dh

Example: Writing Data to Pages 8 and 10 of the Amplifier Unit

Command

Com- mand code	Page designation*1				Data of Page 8																Data of page 10																CR
0 2 0 0	0 0 0 0	0 A 0 0	1 1 2 2	3 3 4 4	5 5 6 6	7 7 8 8	0 1 2 3	4 5 6 7	8 9 A B	C D E F	0 Dh																										

*1. Binary notation of *Page designation*

[illegible]

Response

Response code		CR 9
0	0	0Dh

The ID Tag status on normal completion is as shown below.

Page 7								
Page 8	11h	22h	33h	44h	55h	66h	77h	88h
Page 9								
Page 10	01h	23h	45h	67h	89h	ABh	CDh	EFh
Page 11								

4-1-4 SAME WRITE

This command writes the same data to multiple pages of an ID Tag.
Any page(s) can be specified.

Command

Command code				Page designation (8 characters)*1								Write data				CR
												Data 1		...	Data 8	
0	3	0	0													0Dh

*1. Details of *Page designation* (8 characters)

Bit	7	-	0	7	-	3	2	1	0	7	6	-	1	0	7	6	-	2	1	0
Page	Sys	-	Sys	Sys	-	Sys	17	16	15	14	13	-	8	7	6	5	-	1	Sys	Sys
Designation	0*	0*		0*	0*	0*	0/1	0/1	0/1	0/1	0/1	...	0/1	0/1	0/1	0/1	...	0/1	0*	0*
Value	00		00 to 07								00 to FF				00 to FC					

* Always specify 0. If you specify 1 an error (Response code: 14) will occur.

Parameter Description

Parameter	Description
Page designation	Pages are specified by setting the bits corresponding to pages that are to be read to 1 and setting the other bits to 0, then converting the result to a hexadecimal character string.
Write data	Specify the write data.



Precautions for Correct Use

Refer to *A-4 ID Tag Memory Maps* on page A-18.

Response

The response code (when normal: 00) is returned.

Response code	CR
0	0 0Dh

Example: Clearing All Data on Pages 1 and 17 of the Amplifier Unit to 0

Command

Command code	Page designation*1												Write data																CR
0	3	0	0	0	0	0	7	F	F	F	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0Dh

*1. Binary notation of *Page designation*

0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Response

Response code	CR
0	0 0Dh

4-1-5 BYTE WRITE

This command writes data to any specified number of bytes starting from the address specified in the ID Tag.

The maximum number of bytes that can be written at one time is 128.

Command

Command code				First address		Write data						CR
						Data 1		...	Data n			
0	4	0	0									0Dh

* Data number n = number of bytes written to (2-character units)

Parameter Description

Parameter	Description
First address	Addresses can be specified in the range 00h to 87h.
Write data	Up to 128 bytes of write data, starting from the specified address, can be specified.



Additional Information

Refer to *A-4 ID Tag Memory Maps* on page A-18.

Response

The response code (when normal: 00) is returned.

Response code	CR
0	0Dh

Example: Writing Two Bytes of Data to Address 05h of the Amplifier Unit

Command

Command code				First address		Write data				CR
						Data 1		Data 2		
0	4	0	0	0	5	1	2	3	4	0Dh

Response

Response code	CR
0	0Dh

The ID Tag status on normal completion is as shown below.

Page 1						12h	34h	
Page 2								
Page 3								

4-1-6 TEST

Performs a communications test on communications between the host device and Amplifier Unit.
When an Amplifier Unit receives a test command, it sends the response code and command test data to the host device as the response.

Command

Command code		Test data						CR
		Data 1	...	Data n				
1	0							0Dh

* Number of data n < 136 (2-character units)

Parameter Description

Parameter	Description
Test data	The data to be sent in the test is specified with a hexadecimal value. (270 characters max.) However, note that odd numbers of characters cannot be used.

Response

The response code (when normal: 00) and the received test data are returned.

Response code		Test data						CR
		Data 1	...	Data n				
0	0							0Dh

Example: Performing a Test for the Amplifier Unit Using the Data 12345678

Command

Command code		Test data								CR
		Data 1	Data 2	Data 3	Data 4					
1	0	1	2	3	4	5	6	7	8	0Dh

Response

Response code		Test data								CR
		Data 1	Data 2	Data 3	Data 4					
0	0	1	2	3	4	5	6	7	8	0Dh

4-1-7 NAK

Sends the response made immediately before again.

Command

Command code		CR
1	2	0Dh

Response

Sends the response made immediately before again.

4-1-8 GET PARAMETER

This command gets the model number, firmware version, or another parameter.

Command

Command code		Parameter type		CR
1	4			0Dh

Parameter Description

Parameter	Value	Description
Parameter type	01	Model number
	02	Firmware version
	04	Firmware version details
	20	Memory status
	F0	Hardware error

Response

The response code (00: normal) and received parameter value are returned.

Response code		Parameter value				CR
0	0					0Dh

* The contents and length of the **parameter value** depend on the parameter type that is specified for the command.

Example 1: Getting the Model Number of Amplifier Unit

Command

Command code		Parameter type		CR
1	4	0	1	0Dh

Response

The product model number is returned as an ASCII text string.

Response code		Model number										CR
0	0	V	6	4	0	-	H	A	M	1	3	0Dh

Example 2: Getting the Firmware Version of Amplifier Unit

Command

Command code		Parameter type		CR
1	4	0	2	0Dh

Response

The response code (00: normal) and firmware version are returned as a 4-digit decimal number.

Response code		Firmware version				CR
0	0	0	1	0	0	0Dh
		Major version		Minor version		

* The above response is for a firmware version of 1.00.

Example 3: Getting the Firmware Version Details of Amplifier Unit

Command

Command code		Parameter type		CR
1	4	0	4	0Dh

Response

The response code (00: normal) and firmware version details are returned as a 6-digit decimal number.

Response code		Firmware version						CR
0	0	0	1	0	2	0	3	0Dh
		Major version		Minor version		Revision		

* The above response is for a firmware version of 1.02.03.

Example 4: Getting the Memory Status of Amplifier Unit

Command

Command code		Parameter type		CR
1	4	2	0	0Dh

Response

The response code (00: normal) and memory check results for internal EEPROM are returned.

Response code		Memory status		CR
0	0	0	1	0Dh

* "Memory status" will be if the memory is normal:"01", and is error:"00".

Example 5: Getting some Hardware error as System error

Command

Command code	Parameter type	CR
1	4	F 0 0Dh

Response

The response code (00: normal) and System error code are returned as a 2-digit hexadecimal number.

Response code	System error code	CR
0	0	0 0 0Dh

* "System error code" will be if the hardware is normal:"00".

* If the value is anything other than "00", contact your OMRON representative.

4-1-9 GET LAST COMMAND

Gets the command code of the last command that was executed.

Command

Command code		CR
1	5	0Dh

Response

This command returns the command code of the last command that was executed.

When There Is a Previously Executed Command

Response code		Command code				CR
0	0					0Dh

* The *command code* is given as two or four characters.

When There Is No Previously Executed Command

Response code		Command code				CR
0	0	0	0			0Dh

4-1-10 GET COMMUNICATIONS HISTORY

This command gets the history of communications from when the power was turned ON (total number of communications, total successful communications, and total number of failed communications).

Command

Command code		CR
1	6	0Dh

Response

This command returns the history of communications from when the power was turned ON. Four hexadecimal digits each are returned for the total number of communications, total number of successful communications, and total number of failed communications.

If the total number of communications exceeds 65,535, all data in the communications history will be reset to 0.

Response code		Total number of communications				Total number of successful communications				Total number of failed communications				CR
0	0													0Dh

Example 1: Getting the Communications History of Amplifier Unit

Command

Command code		CR
1	6	0Dh

Response

The following response is returned if there are 32,000 total communications, 30,000 successful communications, and 2,000 failed communications.

Response code		Total number of communications				Total number of successful communications				Total number of failed communications				CR
0	0	7	D	0	0	7	5	3	0	0	7	D	0	0Dh

4-1-11 CLEAR COMMUNICATIONS HISTORY

This command clears the communications history.

Command

Command code		CR
1	7	0Dh

Response

Response code		CR
0	0	0Dh

4-1-12 SN MEASUREMENT

This command returns the success/failure of the communication result, and the average value of the actual amplitude values measured from the actual signal of the ID Tag and the noise in the vicinity of the CIDRW Head as a decimal value.

Command

Command code	Option type	CR
4	1	0Dh

Option Description

Option	Value	Description
Option type	00	Displays the actual ID Tag signal value and noise value.
	01	Displays the simple ratio of the SN ratio between the ID Tag signal value and the noise value.

Response

The response code (00: normal), the communication result, signal value, noise value, and SN ratio are returned.

Response code	Communication result	Signal value	Noise value	SN ratio (Integer part)	SN ratio (Decimal part)	CR
0	0					0Dh

- "Communication result" will be if success:"01", and is failure:"00".
- Signal and noise values are returned as values between "00" and "99".
- If the antenna and ID tag are close together, the signal value is returned as value "99".
- The SN ratio is returned as a ratio calculated from the signal and noise values between "00" and "99".

The SN ratio is calculated as (Signal value) / (Noise value).

The value is returned as a two-digit integer and four-digit decimal. Numbers after the fifth decimal point will be truncated.

If the Noise value is "00" and the Signal value is "01" or greater, the SN ratio will be returned as "999999".

If the Signal value is "00", the SN ratio will be returned as "000000".

Refer to *A-3-5 Communications Distance Characteristics vs. Ambient Noise* on page A-17.

Example 1: Measurement result without SN ratio

Command

Command code	Option type	CR
4	1	0Dh

Response

Response code		Communication result		Signal value		Noise value		CR
0	0	0	1	8	5	0	5	0Dh

Example 2: Measurement result with SN ratio

Command

Command code		Option type		CR
4	1	0	1	0Dh

Response

Response code		Communication result		Signal value		Noise value		SN ratio (Integer part)		SN ratio (Decimal part)				CR
0	0	0	1	9	5	0	7	1	3	5	7	1	4	0Dh

Example 3: Measurement result with SN ratio (communication failed)

Command

Command code		Option type		CR
4	1	0	1	0Dh

Response

Response code		Communication result		Signal value		Noise value		SN ratio (Integer part)		SN ratio (Decimal part)				CR
0	0	0	0	1	5	6	8	0	0	2	2	0	5	0Dh

Example 4: Measurement result with SN ratio (no noise)

Command

Command code		Option type		CR
4	1	0	1	0Dh

Response

Response code		Communication result		Signal value		Noise value		SN ratio (Integer part)		SN ratio (Decimal part)				CR
0	0	0	1	7	0	0	0	9	9	9	9	9	9	0Dh

Example 5: Measurement result with SN ratio (no signal)

Command

Command code	Option type			CR
4	1	0	1	0Dh

Response

Response code		Communication re- sult		Signal value		Noise value		SN ratio (Integer part)		SN ratio (Decimal part)				CR
0	0	0	0	0	0	8	2	0	0	0	0	0	0	0Dh

4-1-13 RESET

All Amplifier Unit processing is stopped, and the initial status is re-established.

Command

Command code		CR
7	F	0Dh

Response

There is no response to this command.

Troubleshooting

This section explains how to troubleshoot the V640-series.

5-1	Troubleshooting	5-2
5-1-1	Status Check with OPERATING Indicator (LED)	5-2
5-1-2	List of Error Messages	5-3
5-1-3	Operation Check Flowchart.....	5-4
5-1-4	Other Troubleshooting.....	5-10

5-1 Troubleshooting

Errors are indicated by the presence or absence of a response to an Amplifier Unit command, and by the indicators.

5-1-1 Status Check with OPERATING Indicator (LED)

The operating status of the Amplifier Unit can be checked with the OPERATING indicator (LED).

Amplifier Unit operating status		OPERATING indicator (LED)				ID tag communications	Communications with host
		RUN (green)	COMM (yellow)	NORM (green)	ERROR (red)		
Startup		●	●	●	●	Not possible	Not possible
Normal operation		☉	●	●	●	Possible	Possible
Fatal error in Amplifier Unit	WDT error	●	●	●	☉	Not possible	Not possible
	Hardware error(9□)	☉	●	●	☉	Not possible	Not possible (Partially possible)
Non-fatal error in Amplifier Unit	Host communications error(1□)	☉	●	●	☉ (Lights once)	Possible	Possible
	ID tag communications error(7□)	☉	☉	●	☉ (Lights once)	Possible	Possible

Amplifier Unit Indicators

Name	Indications
RUN (green)	Turns ON when the Amplifier Unit is in normal operation.
COMM (yellow)	Turns ON during communications with the host device or during communications with an ID Tag.
NORM (green)	Turns ON when the communications finish with no error.
ERR (red)	Turns ON when an error occurs during communications with the host device, or during communications with an ID Tag.

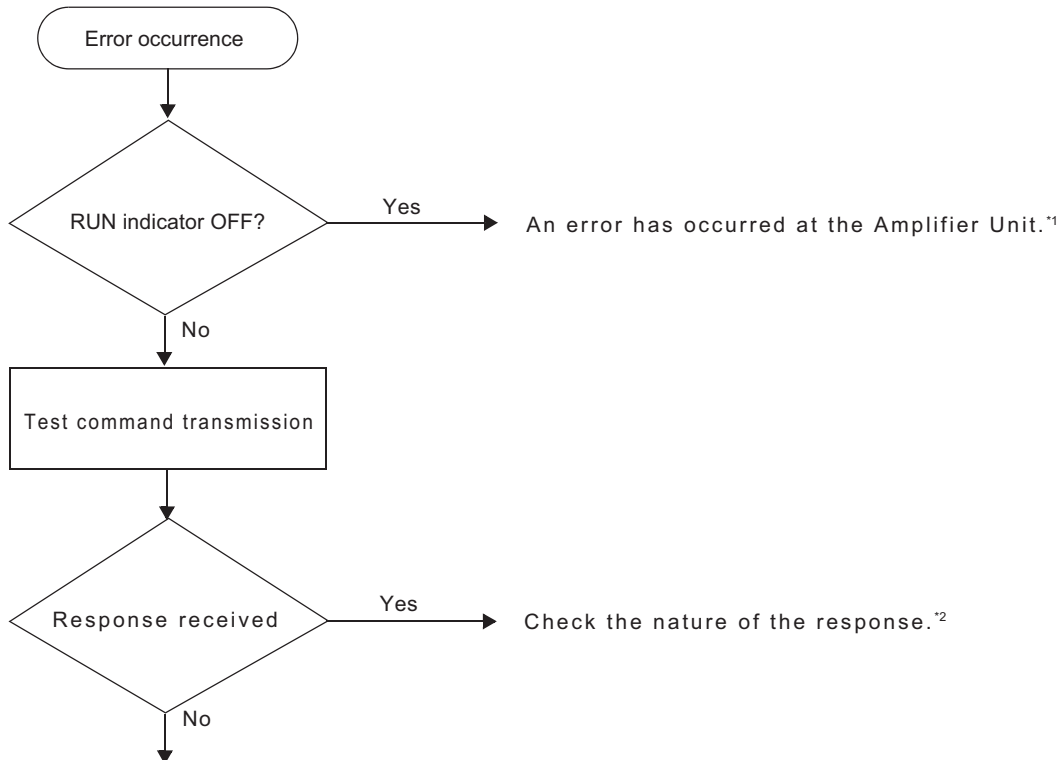
5-1-2 List of Error Messages

Type	Re- sponse code	Name	Description
Host communica- tions error	14	Format error	There is an error in the command format. (For example, command code, page designation, address designation, or processed data volume is inappropriate.) The command received by the Amplifier Unit could not be executed.
ID tag communica- tions error	70	Communica- tions error	Noise or another hindrance has occurred during communica- tions with an ID Tag, and communications cannot be com- pleted normally.
	71	Verification er- ror	Correct data cannot be written to an ID Tag.
	72	No Tag error	Either there is no ID Tag in front of the CIDRW Head, or the CIDRW Head is unable to detect the ID Tag due to environ- mental factors (e.g., noise).
	7B	Outside write area error	The ID Tag is at a position where reading is possible but writing is not, so writing does not complete normally.
	7E	ID system er- ror (1)	The ID Tag is in a status where it cannot execute the com- mand processing.
	7F	ID system er- ror (2)	An inapplicable ID Tag has been used.
Hardware error	9A	Memory error	There is an error in the memory inside the Amplifier Unit. (If restarting the Amplifier Unit does not resolve the issue, please contact your OMRON representative.)

5-1-3 Operation Check Flowchart

From Installation to Trial Operation

Errors are indicated by whether or not a response to the test command is received and by the status of the Amplifier Unit indicators.



Check if the Amplifier Unit settings are correct.*3

*1. Refer to *Amplifier Unit Error* on page 5-5.

*2. Refer to *If There Is a Response to the Command:* on page 5-5.

*3. Refer to *If There Is No Response to the Command:* on page 5-6.

● If the Test Command Was Received Normally:

Indicators

RUN	COMM	NORM	ERROR
(Lights once)			

Response Code for the Response

Type	Response code	Function
Normal	00	The command was received normally.

● Amplifier Unit Error

Check the status of the indicators after transmission of the test command.

After taking appropriate corrective action, restart the Amplifier Unit, send the test command again and check again.

RUN	COMM	NORM	ERROR	Main check points
●	— (If RUN is OFF, the status of the other indicators can be ignored.)			- Influence of background noise (change installation position) - Amplifier Unit power supply If the error cannot be resolved after checking, the Amplifier Unit may be damaged.
●	●	●	⊗	WDT error*1 Please check for conductive objects or noise Restart the Amplifier Unit and see if that resets the error. If the error is not caused by conductive objects or noise, there is a possibility of an Amplifier Unit failure. Replace the Amplifier Unit.

*1. This error can occur for an Amplifier Unit. This error occurs when the watchdog timer times out because of a hardware failure or when temporary data corruption causes the Amplifier Unit to hang.

● If There Is a Response to the Command:

Check the status of the indicators after transmission of the test command.

After taking appropriate corrective action, restart the Amplifier Unit, send the test command again and check again.

RUN	COMM	NORM	ERROR	Main check points
⊗	●	●	⊗ (Lights once)	There is a mistake in the command format (number of characters, character code, etc.) .

● If There Is No Response to the Command:

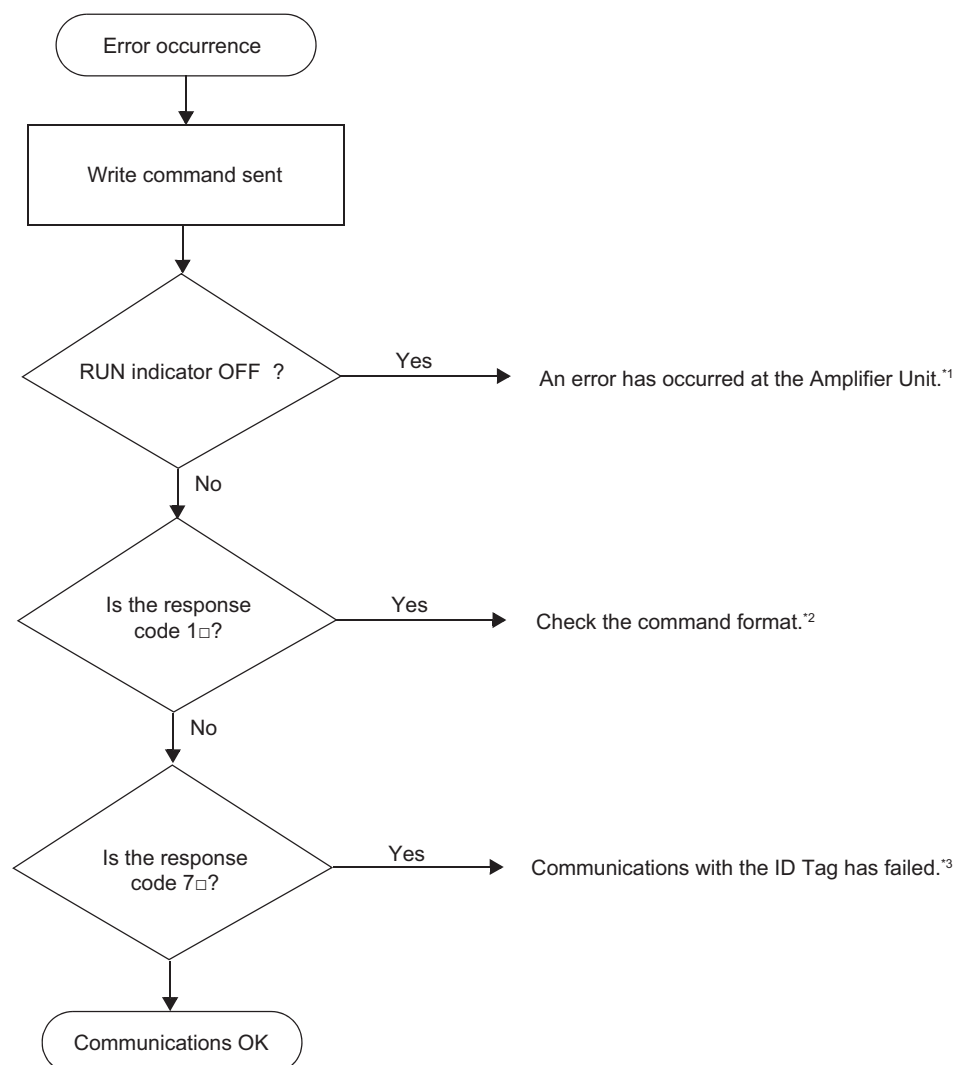
Check the status of the indicators after transmission of the test command.

After taking appropriate corrective action, restart the Amplifier Unit, send the test command again and check again.

RUN	COMM	NORM	ERROR	Main check points
				• Amplifier Unit baud rate settings • Connection and wiring of the cable between the host device and Amplifier Unit • OFF timing of the RS signals between the host device and Amplifier Unit • Routing of each cable (influence of background noise) If the error cannot be resolved after checking, the Amplifier Unit may be damaged.
			 (Lights once)	• Amplifier Unit baud rate settings • Connection and wiring of the cable between the host device and Amplifier Unit • Routing of the cables (influence of background noise) • OFF timing of the RS signals between the host device and Amplifier Unit

From Trial Operation to Communications

Errors are indicated by the status of the indicators after transmission of the write command, and by the response code of the response.



*1. Refer to *Amplifier Unit Error* on page 5-8.

*2. Refer to *If the Response Code is 1□*: on page 5-8.

*3. Refer to *If the Response Code is 7□*: on page 5-9.

● If the ID Tag Was Processed Normally:

Indicators

RUN	COMM	NORM	ERROR
	 (Lights once)	 (Lights once)	

Response Code for the Response

Type	Response code	Function
Normal	00	The ID Tag was processed normally.



Additional Information

If there is no response to the write command, refer to the Operation Check Flowchart of *From Installation to Trial Operation* on page 5-4.

● Amplifier Unit Error

Check the status of the indicators after transmission of the command.

After taking appropriate corrective action, send the write command again and check again.

RUN	COMM	NORM	ERROR	Main check points
	— (If RUN is OFF, the status of the other indicators can be ignored.)	—	—	• Influence of background noise (Change installation position) • Amplifier Unit power supply If the error cannot be resolved by checking the two points above, the Amplifier Unit may be damaged.

● If the Response Code is 1□:

There is a host device communications error.

Check the status of the indicators and the response code of the response after transmission of the command.

After taking appropriate corrective action, send the write command again and check again.

RUN	COMM	NORM	ERROR
			 (Lights once)

Response code	Main check points
14	• There is an error in the command format. Please check the command format (command code, page designation, address designation, processed data volume, etc.) and resend the command. • The command received by the Amplifier Unit could not be executed. Please check the operating status and Permission Settings of the Amplifier Unit and resend the command.

● If the Response Code is 7□:

There is a communications error in communications between the CIDRW Head and ID Tag.

Check the status of the indicators and the response code of the response after transmission of the command.

After taking appropriate corrective action, send the write command again and check again.

RUN	COMM	NORM	ERROR
	 (Lights once)		 (Lights once)

Response code	Main check points
70	- Background noise levels of the CIDRW Head (Check the surroundings with the environmental noise level measurement function) - Distance to another CIDRW Head - Influence of background noise (Change installation position) - Please check the Antenna Connection Status. If the error cannot be resolved after checking, the Amplifier Unit may be damaged.
71	- ID Tag overwrite life (Replace the ID Tag) - Environment of use of the ID Tags (ID Tag breakage due to use in unanticipated ways)
72	- Connection to the CIDRW Head - Distance between the ID Tag and CIDRW Head - CIDRW Head background noise levels (Check the surroundings with the environmental noise level measurement function) - Distance to another CIDRW Head. Please check the Antenna Connection Status.
7B	- Distance between the ID Tag and CIDRW Head - Background noise levels of the CIDRW Head (Check the surroundings with the environmental noise level measurement function) - Distance to another CIDRW Head - Influence of background noise (Change installation position)
7E	- Type/specifications of the ID Tags used - Settings of the ID Tags used (The ID Tag lock function is used. The ID Tag has a lock function, but the Amplifier Unit has no function for locking an ID Tag.) - Environment of use of the ID Tags (ID Tag breakage due to use in unanticipated ways)
7F	

5-1-4 Other Troubleshooting

Operating in Test Mode

Always connect the CIDRW Head before operating the Amplifier Unit in Test Mode. If Test Mode is used with abnormal CIDRW Head cable or without connecting a CIDRW Head, the ERROR indicator will light and Amplifier Unit operation will stop.

RUN	COMM	NORM	ERROR	Main check points
				• Please check that the CIDRW Head is connected correctly. If the error cannot be resolved after checking, the Amplifier Unit or the CIDRW Head may be damaged.



Appendices

This section explains the specifications, dimensions, connection examples, characteristic data according to conditions of use, ID Tag memory map, and more.

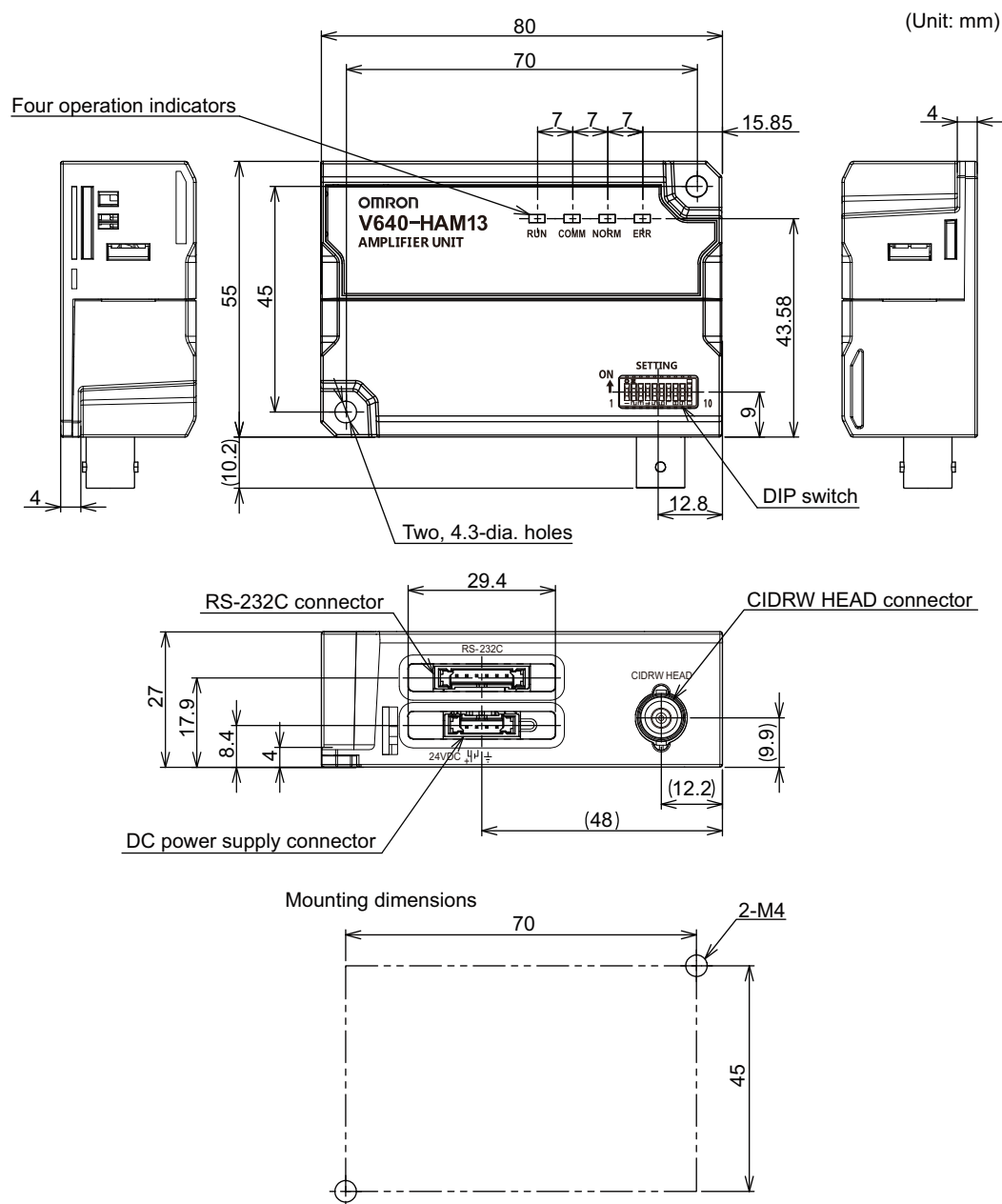
A-1	Specifications and Dimensions	A-2
A-1-1	Amplifier Units	A-2
A-1-2	CIDRW Heads	A-4
A-2	Connection Examples.....	A-5
A-3	Characteristic Data According to Conditions of Use.....	A-6
A-3-1	Maps of Communications Areas (Reference Only)	A-6
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A-1 Specifications and Dimensions

A-1-1 Amplifier Units

V640-HAM13

● Dimensions



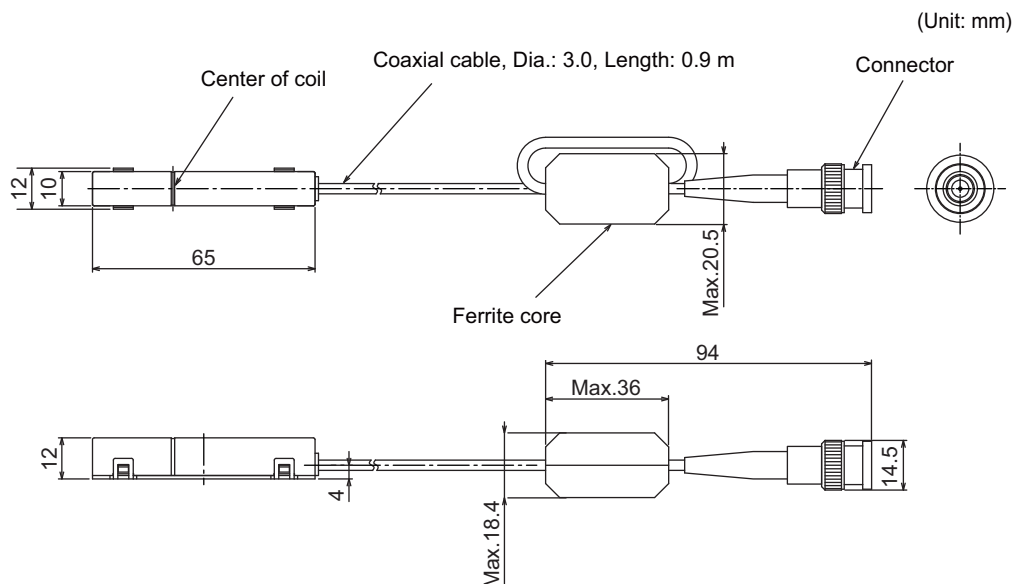
● Specifications

Item	Specifications
Power supply voltage	24 VDC +10% -15%
Current consumption	400 mA max.
Degree of protection	IP20 (IEC60529)
Ambient temperature	Operating: 0 to +40°C Storage: -15 to +65°C (with no icing)
Ambient humidity	Operating/Storage: 35% to 85% (with no condensation)
Insulation resistance	20 MΩ min.(with 100 VDC megohmmeter) between power supply terminals and the frame ground terminal
Dielectric strength	1,000 VAC (50/60 Hz for 1 min.) leak current consumption 5 mA max. between both power supply terminals and the frame ground terminal
Vibration resistance	10 to 150 Hz, double amplitude: 0.20 mm, Max. Acceleration: 15 m/s ² with 10 sweeps for 8 min. each in 3 directions
Shock resistance	150 m/s ² , 3 times each in 6 directions
Ground	Ground to 100 Ω or less.
Case material	PC/ABS resin
Dimensions	80x55x27 mm (WxDxH, excluding protruding parts)
Mass	Approx. 95 g
Frequency	134.2 kHz
Radiated magnetic field strength	maximum 35 dBmA/m at 10 meters (fixed)
Environmental pollution degree	Degree 2
Over voltage category	Category I
Mounting method	Secured with two M4 screws. (tightening torque: 1.2N·M)
Accessory	Ferrite core (1 piece)
CIDRW Head	V640-HS63

A-1-2 CIDRW Heads

V640-HS63

● Dimensions

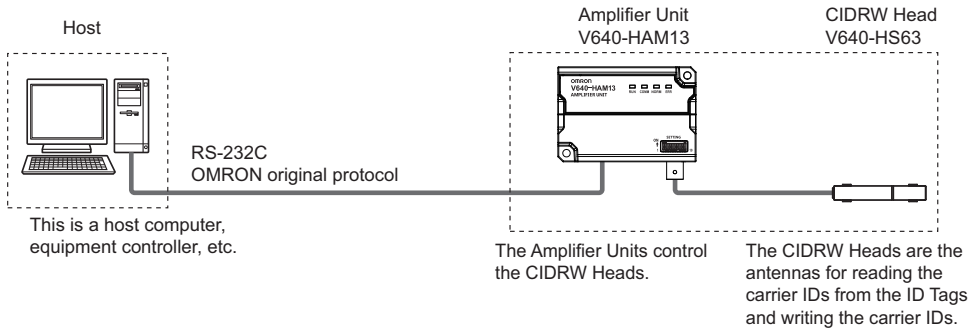


● Specifications

Item	Specifications
Transmission frequency	134 kHz
Ambient temperature	Operating: 0 to +40°C Storage: -15 to +65°C (with no icing)
Ambient humidity	Operating/Storage: 35% to 85% (with no condensation)
Degree of protection	IP20 (IEC60529)
Insulation resistance	20 MΩ min. between all terminals and the case (100 VDC M)
Dielectric strength	Leak current not to exceed 5 mA on application of 1000 VAC (50/60 Hz for 1 minute) between all terminals and the case
Vibration resistance	Frequency: 10 to 150 Hz; double amplitude: 0.20 mm; acceleration: 15 m/s ² for 8 minutes, 10 times each in X, Y, and Z directions
Shock resistance	Shock of 150 m/s ² in X, Y, and Z directions, 3 times each for 18 repetitions
Casing material	ABS Stainless steel
Environmental pollution degree	Degree 2
Over voltage category	Category I
Weight	Approx. 70 g
Cable length	0.9 m
Cable specification	3-mm-dia. coaxial cable

A-2 Connection Examples

Communications with the host device follow the OMRON proprietary protocol.
The Amplifier Unit is connected to the host device.



A-3 Characteristic Data According to Conditions of Use

A-3-1 Maps of Communications Areas (Reference Only)

The figures given below for communications areas (communications distances) are reference values only.

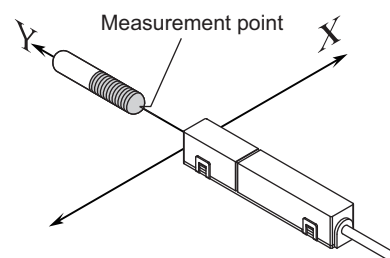
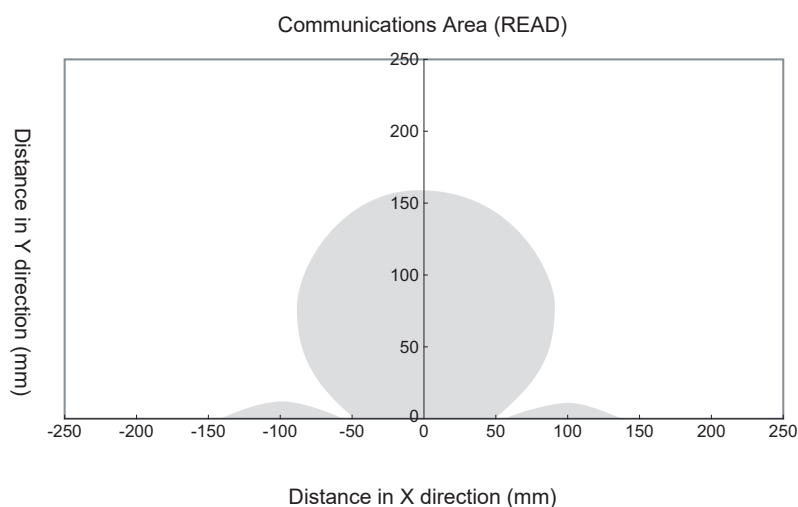
The maps of communications areas will vary according to the ID Tags that you use, the background metals, the ambient noise, the effects of temperature and so on, and should be thoroughly confirmed on installation.

The direction of the ID Tags will affect communications performance. Check the direction of the coils in the ID Tags before using the ID Tags.

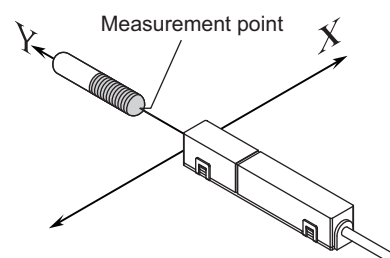
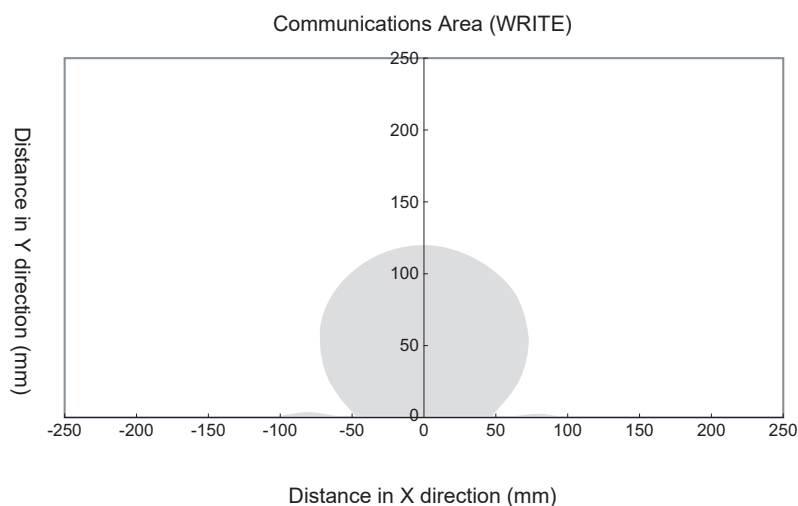
V640-HAM13

● Coaxial Mounting (RI-TRP-DR2B-40)

• READ

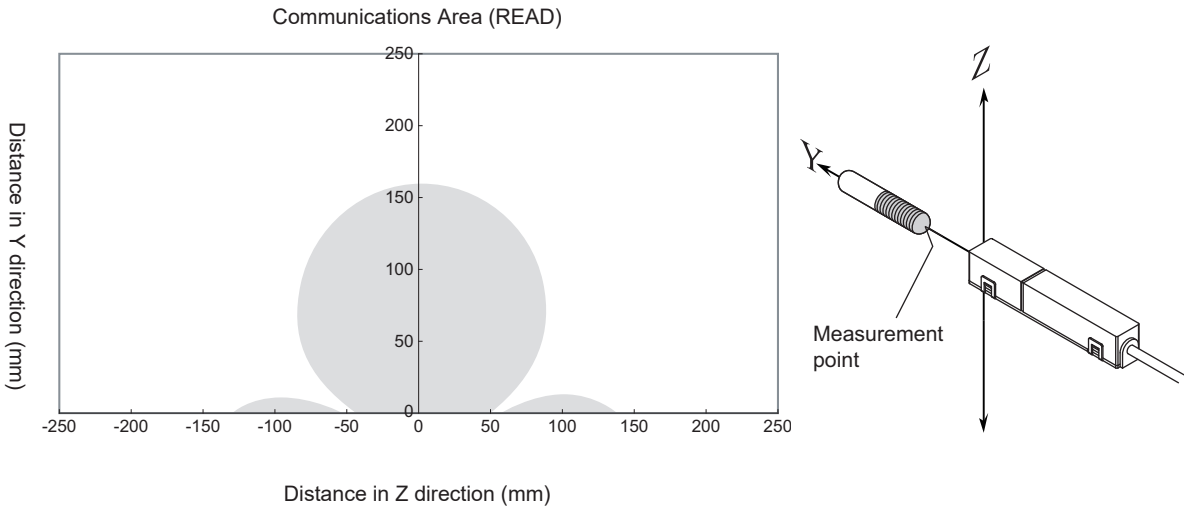


• WRITE

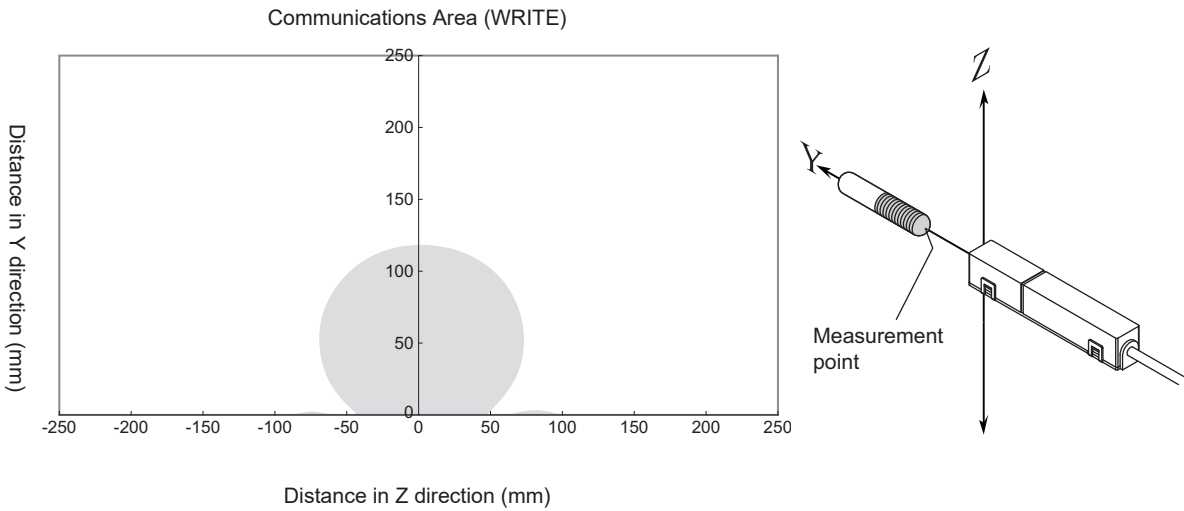


● Coaxial Mounting (RI-TRP-DR2B-40)

• READ

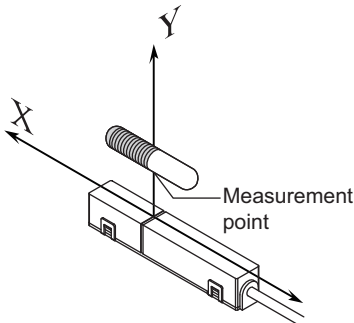
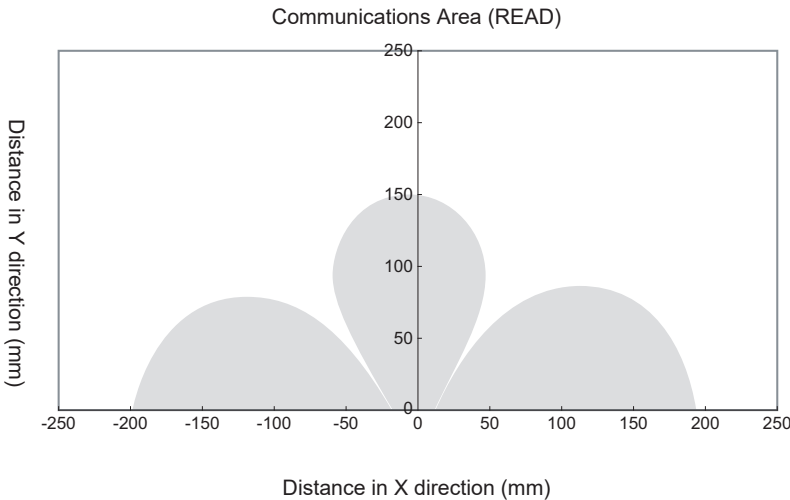


• WRITE

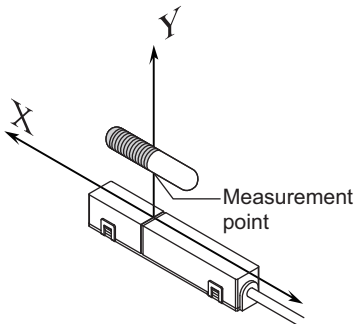
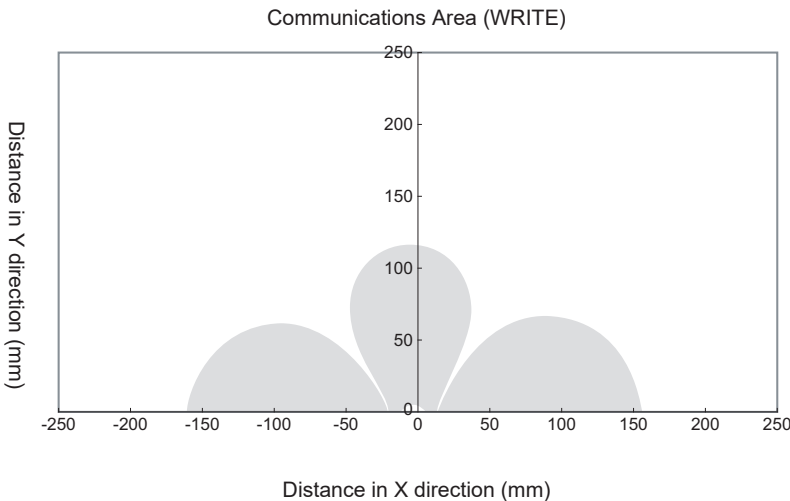


● **Parallel Mounting (RI-TRP-DR2B-40)**

• **READ**

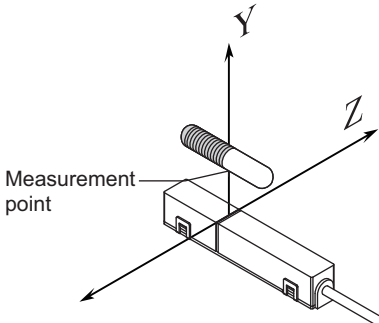
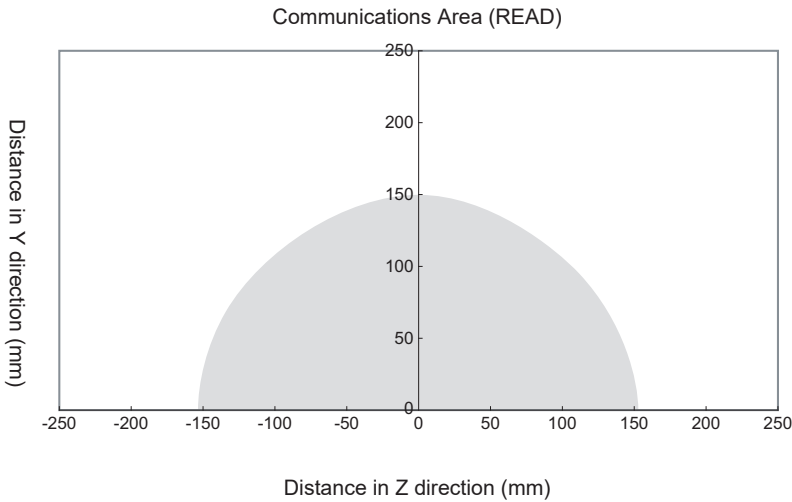


• **WRITE**

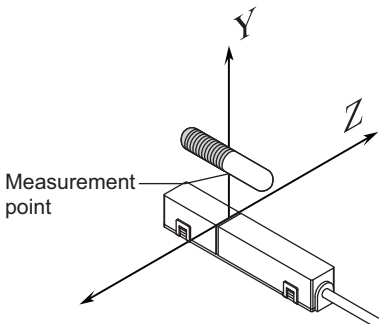
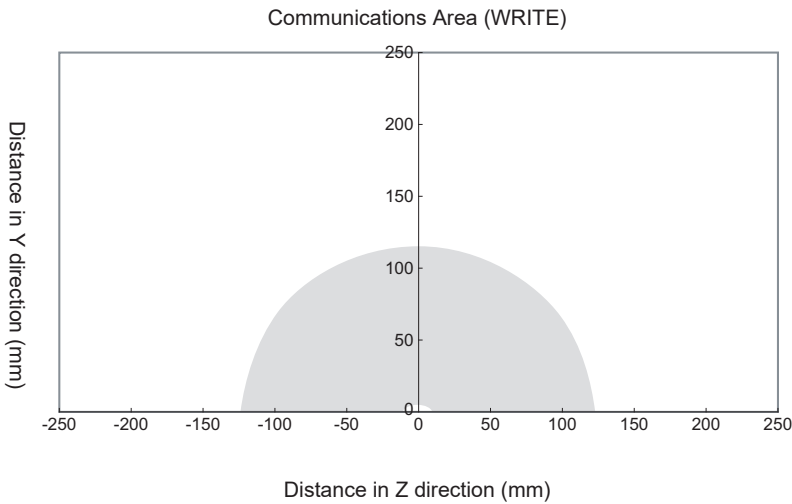


● Parallel Mounting (RI-TRP-DR2B-40)

• READ

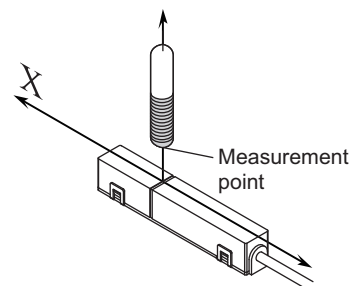
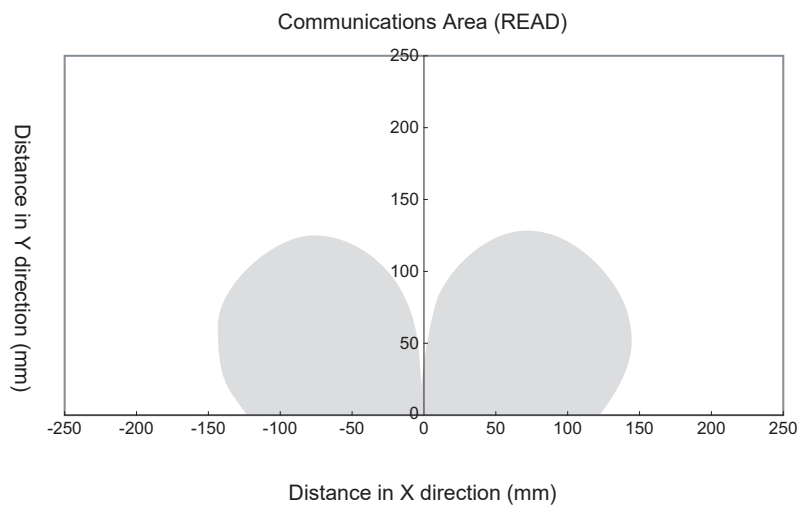


• WRITE

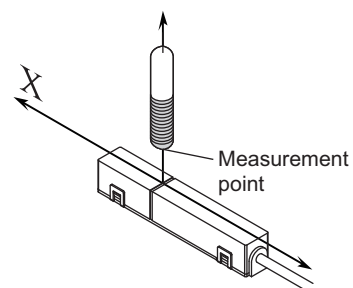
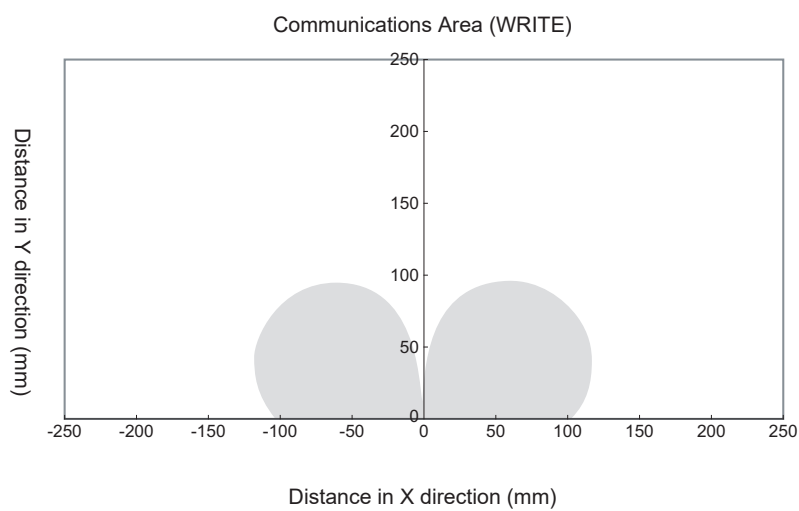


● Vertical Mounting (RI-TRP-DR2B-40)

• READ

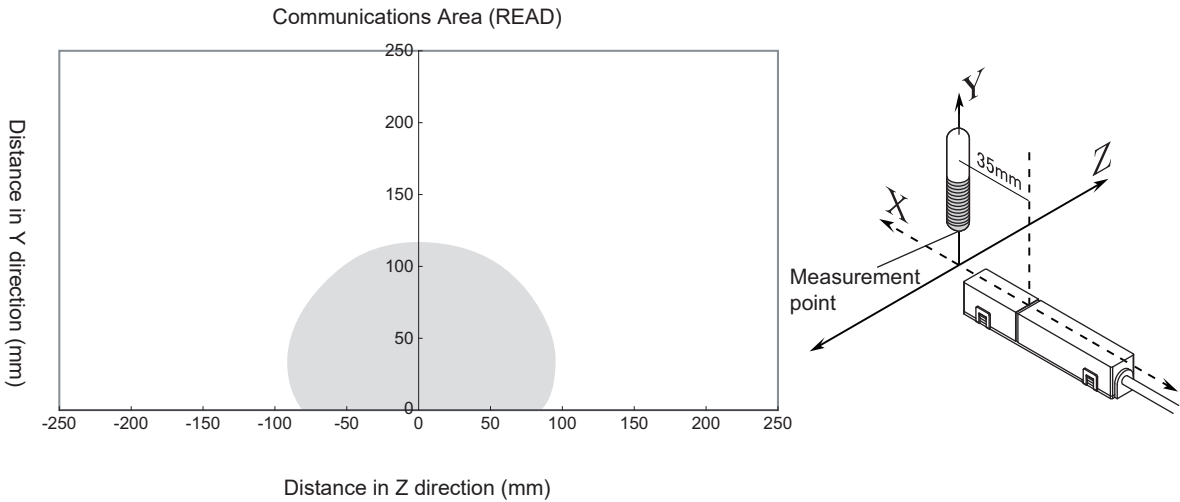


• WRITE

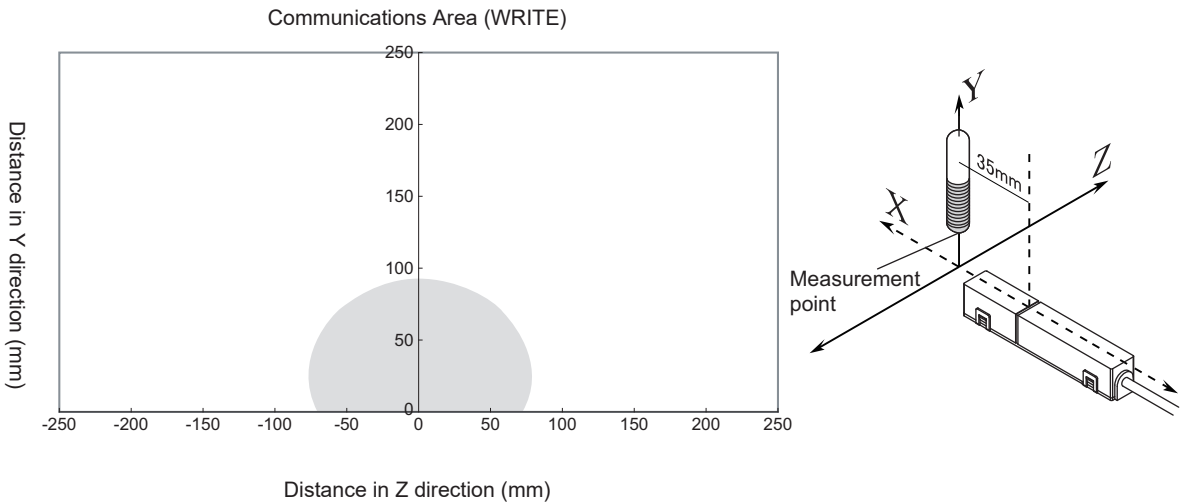


● Vertical Mounting (RI-TRP-DR2B-40)

• READ



• WRITE



A-3-2 Mutual Interference Distances (Reference Only)

● When the CIDRW Systems are installed close to each other

Distance between Antennas and Changes in Communications Distances (Reference Only)

• V640-HS63

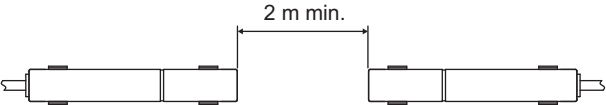
Distance between Antennas	Change in communications distance
2,000 mm	96%
1,600 mm	96%
1,400 mm	96%
1,200 mm	95%
1,000 mm	94%
800 mm	71%
600 mm	55%
400 mm	34%
200 mm	0%

*If there is no interference between CIDRW Heads, the change in communication distance will be 100%.

If CIDRW Heads in separate CIDRW systems process commands simultaneously, mutual interference between the Heads can result in malfunctions. If this is a problem, install the CIDRW Heads separated at least by the distances shown in the following illustrations.

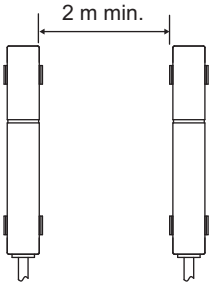
• For Coaxial Installation

V640-HS63



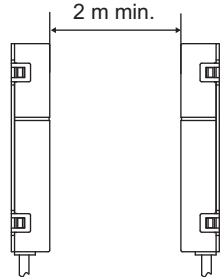
• For Parallel Installation

V640-HS63



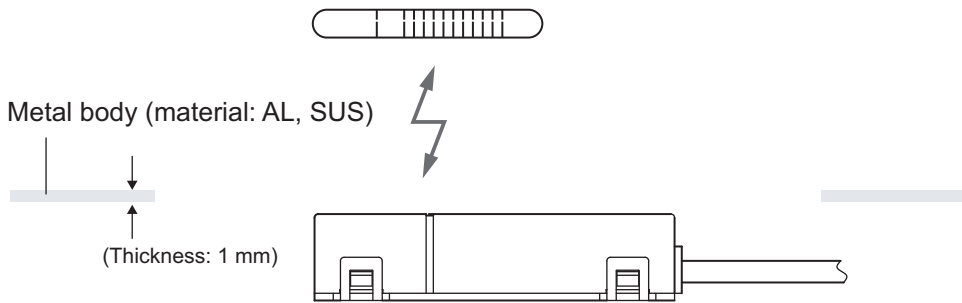
• For Face-to-Face Installation

V640-HS63



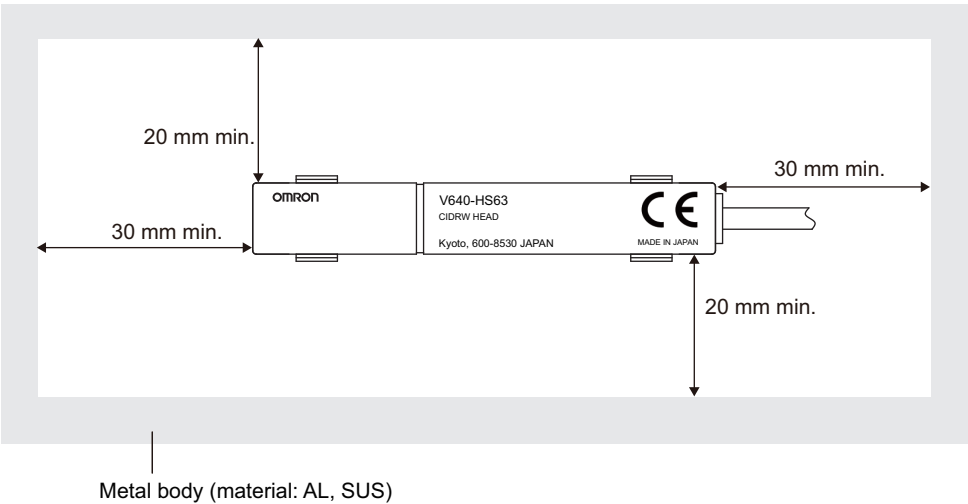
A-3-3 Influence of Background Metals (Reference Only)

The CIDRW Head can also communicate from an opening in a ceiling panel (metal body).



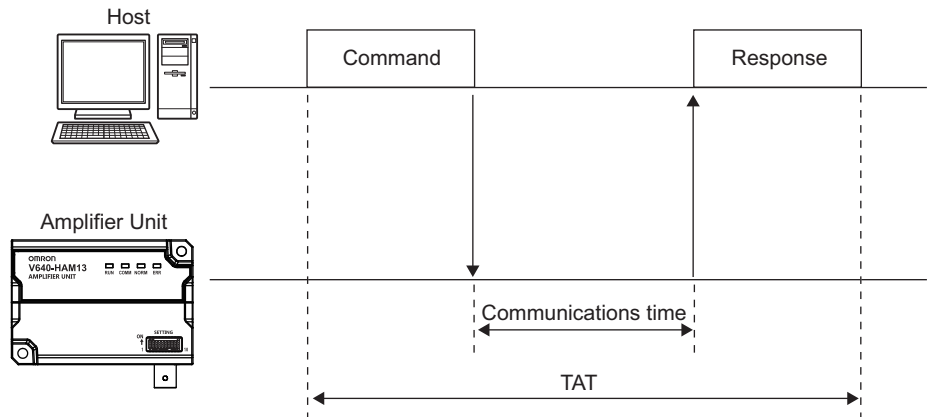
However, ensure the distances indicated below between the CIDRW Head and the metal body. If you do not ensure these distances the communications distance will be substantially shortened.

• V640-HS63



A-3-4 Communications Time

Take the time required for processing between the host device and Amplifier Units into account when designing the system.



Time	Description
Communications time	This is the time required for communications between an ID Tag and the CIDRW Head.
TAT	This is the time required for processing at the Amplifier Unit, seen from the host device.

Communications time calculation formula (unit: ms)

READ: $138.7 \times (\text{number of pages}) + 10.0$

WRITE, SAME WRITE: $379.8 \times (\text{number of pages}) + 145.4$

BYTE WRITE: $383.0 \times (\text{number of pages}/8) + 249.0$

* The result of underlined portion "number of pages/8" is rounded up.

TAT calculation formula (units: ms)

TAT = command and response transmission time + communications time

The command and response transmission time differs depending on the number of characters sent and the communications conditions.

Transmission time (ms) = [Number of bits per character (bits) $\times$ 1000/Baud rate (bps)] $\times$ total number of characters of command and response

This calculation applies to continuous transmission in which the Controller uses no spaces between command characters.

Example of TAT calculation:

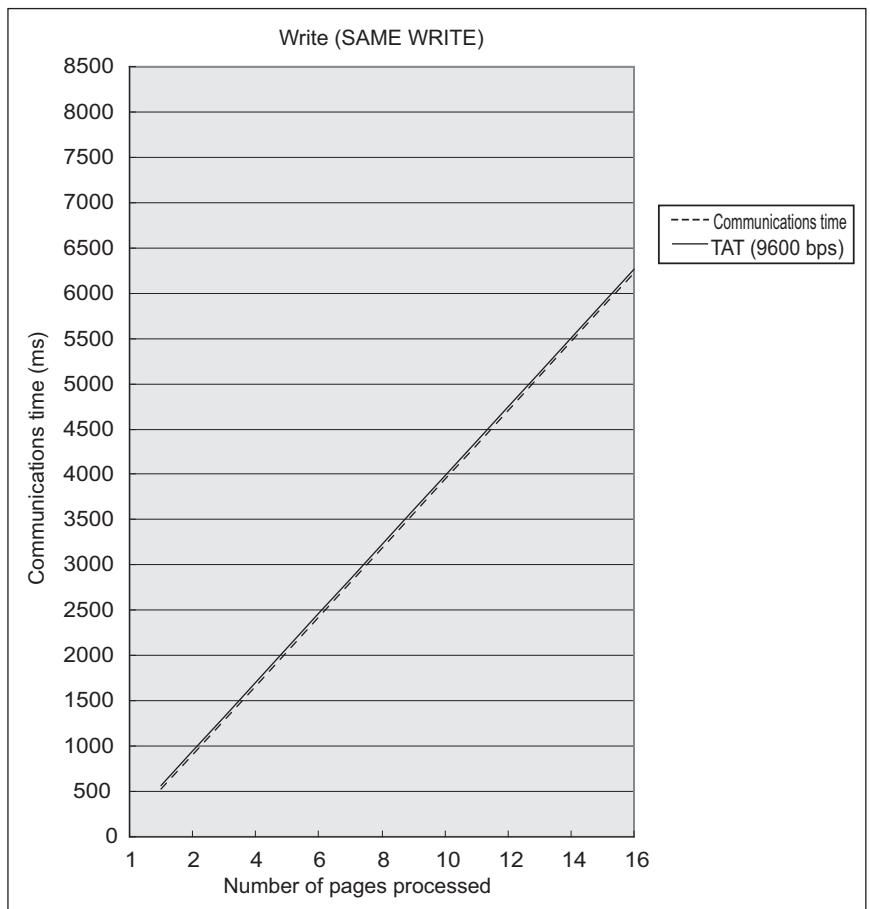
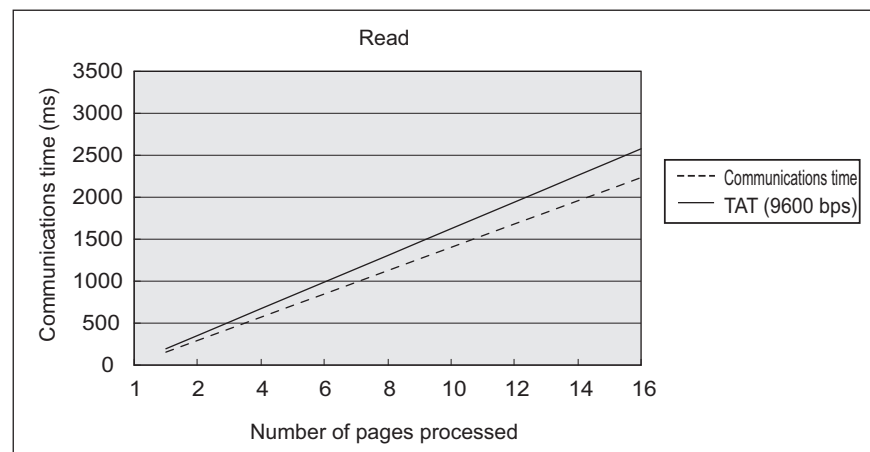
Number of command characters: A; number of response characters: B

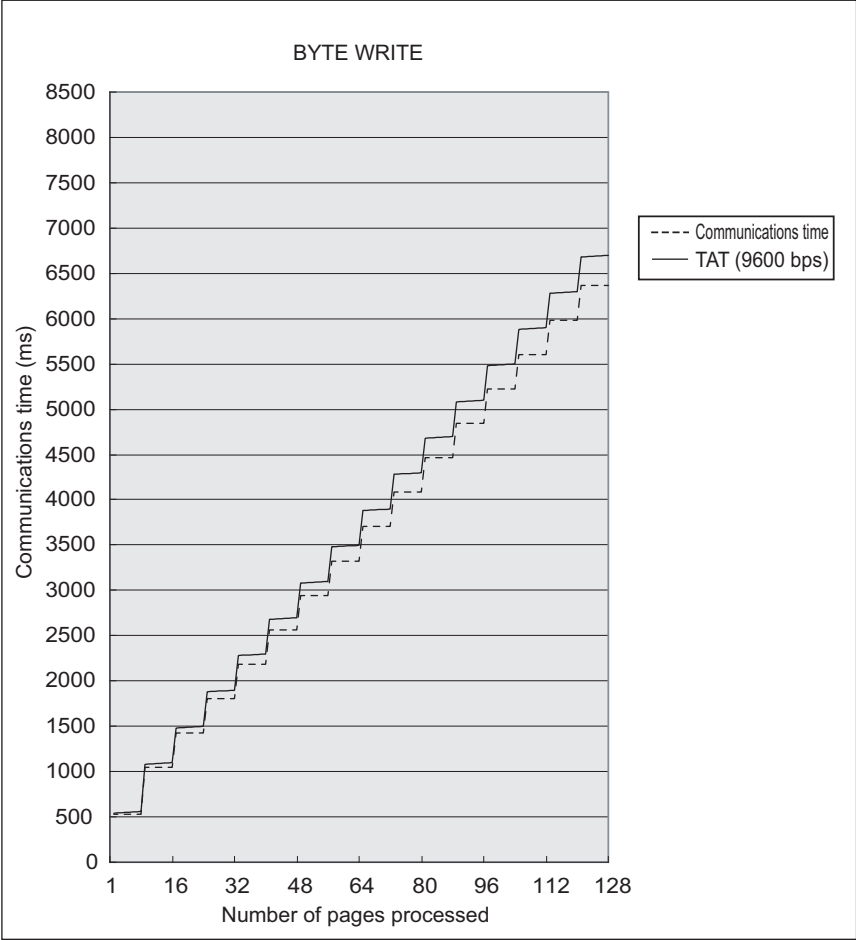
Baud rate: 9600 bps, data length: 8 bits, non parity, 1 stop bit

TAT(ms) = $(10 \times 1000/9600) \times (A + B) + \text{Communications time (ms)}$

The graph for communications time for communications between the ID Tag and CIDRW Head, and TAT (when the baud rate is 9600 bps), is shown below.

The communications time and TAT, however, may increase substantially according to the conditions of use.





A-3-5 Communications Distance Characteristics vs. Ambient Noise

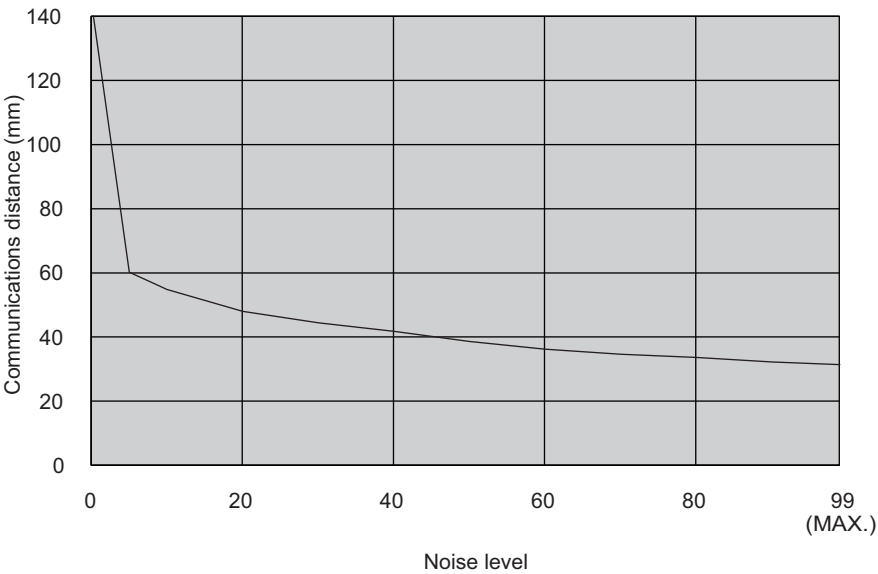
The graph below compares the results of measurement using the noise measurement function with communications distances.

At installation implement measures in regard to metal in the vicinity of the CIDRW Head, power supply noise, and atmospheric noise, to ensure that the noise level does not exceed 10.

SN MEASUREMENT command, refer to 4-1-12 SN MEASUREMENT on page 4-17.

• V640-HAM13

Relationship between noise level and communications distance (reference values)



A-4 ID Tag Memory Maps

The memory maps of the RI-TRP-DR2B(-40) ID Tags are given below.

A-4-1 RI-TRP-DR2B(-40)

ID Tag Memory Map

Page	8 bytes/1 page							
1	00h	01h	02h	03h	04h	05h	06h	07h
2	08h	09h	0Ah	0Bh	0Ch	0Dh	0Eh	0Fh
3	10h	11h	12h	13h	14h	15h	16h	17h
4	18h	19h	1Ah	1Bh	1Ch	1Dh	1Eh	1Fh
5	20h	21h		...	...			27h
6	28h	29h		...	...			2Fh
7	30h	31h		...				37h
8								
9								:
10	:							:
11	:							
12								
13								
14	68h	69h		...	...			6Fh
15	70h	71h		...	...			77h
16	78h	79h		...	...			7Fh
17	80h	81h		...	...			87h

Example of data segment settings

DATASEG	LENGTH
Carrier ID	16
"S01"	8
"S02"	8
"S03"	8
"S04"	8
"S05"	8
"S06"	8
"S07"	8
"S08"	8
"S09"	8
"S10"	8
"S11"	8
"S12"	8
"S13"	8
"S14"	8
"S15"	8



Additional Information

- The carrier ID memory area starts from page 1 (fixed).
- 00h to 87h in the table are addresses.
- The RI-TRP-DR2B(-40) has a memory capacity of 136 bytes.

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A-6 Regular Inspection

In order to maintain optimum performance of the functions of the CIDRW system, daily and periodic inspections are necessary.

Inspection item		Detail	Criteria	Tools re- quired
Supply voltage fluctuation		Check that the supply voltage fluctuation at the power supply terminal block is within the permissible range.	To be within supply voltage rating.	Multimeter
		Check that there are no frequent instantaneous power failures or radical voltage drops.	To be within permissible voltage fluctuation range.	Power supply analyzer
Environment	Ambient temperature	Check that the ambient temperature and humidity are within specified range.	To be within the specified range.	Maximum and minimum thermometer Hygrometer
	Ambient humidity			
	Vibration and shock	Check that no vibration or shock is transmitted from any machines.		
	Dust	Check that the system is free of dust accumulation.	To be none.	
	Corrosive gas	Check that no metal part of the system is discolored or corroded.		
I/O power supply	Voltage fluctuation	Check on the I/O terminal block that the voltage fluctuation and ripple are within the permissible ranges.	To be within the specified range.	Multimeter Oscilloscope
	Ripple			
Mounting condition		Check that each device is securely mounted.	There must be no loose screws.	—
		Check that each connector is securely connected.	Each connector must be locked or securely tightened with screws.	
		Check that no wire is broken or nearly broken.	There must be no wire that is broken or nearly broken.	
		Check if grounding to 100 Ω or less has been done.	To be grounded to 100 Ω or less.	

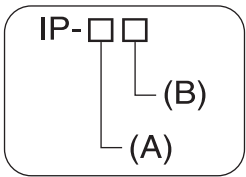
A-7 ASCII Code Table

Leftmost bits Rightmost bits	b8 to b5	0000	1001	0010	0011	0100	0101	0110	0111	1000	1101	1010	1011	1100	1101	1110	1111
	Row b4 to b1 Line	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0000	0	NUL	TC7(DLE)	(SP)	0	@	P	`	p	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined	Undefined
0001	1	TC1(SOH)	DC ₁	!	1	A	Q	a	q								
0010	2	TC2(STX)	DC ₂	"	2	B	R	b	r								
0011	3	TC3(ETX)	DC ₃	#	3	C	S	c	s								
0100	4	TC4(EOT)	DC ₄	\$	4	D	T	d	t								
0101	5	TC5(NEQ)	TC ₈ (NAK)	%	5	E	U	e	u								
0110	6	TC6(ACK)	TC ₉ (SYN)	&	6	F	V	f	v								
0111	7	BEL	TC ₁₀ (ETB)	'	7	G	W	g	w								
1000	8	FE0(BS)	CAN	(	8	H	X	h	x								
1001	9	FE1(HT)	EM	)	9	I	Y	i	y								
1010	10	FE2(LF)	SUB	*	:	J	Z	j	z								
1011	11	FE3(VT)	ESC	+	;	K	[	k	{								
1100	12	FE4(FF)	IS ₄ (FS)	,	<	L	\	l									
1101	13	FE5(CR)	IS ₃ (GS)	-	=	M	]	m	}								
1110	14	S0	IS ₂ (RS)	.	>	N	^	n	ÅP								
1111	15	S1	IS ₁ (US)	/	?	O	_	o	DEL								

A-8 Degree of Protection

Ingress protection degrees (IP-□□) are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.
 IP stands for International Protection.

IEC (International Electrotechnical Commission) IEC 60529

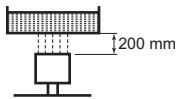
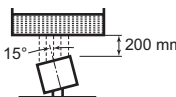
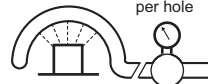
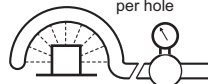
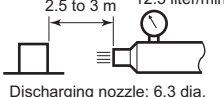
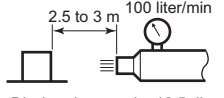
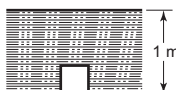


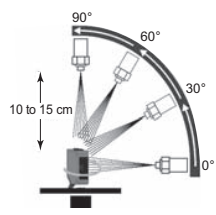
(A) First Digit: Degree of Protection from Solid Materials

Degree		Protection
0		No protection
1		Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter.
2		Protects against penetration of any solid object, that is 12.5 mm or more in diameter. Even if finger or other object 12 mm in diameter penetrates, it will not reach a hazardous part.
3		Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more in diameter.
4		Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter.
5		Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product.
6		Protects against penetration of all dust.

(B) Second Digit: Degree of Protection Against Water

De-gree	Protection		Test method (with pure water)
0	No protection	Not protected against water.	No test

De- gree	Protection	Test method (with pure water)
1	Protection against water drops 	Protects against vertical drops of water towards the product. Water is dropped vertically towards the product from the test machine for 10 min. 
2	Protection against water drop 	Protects against drops of water approaching at a maximum angle of 15° to the left, right, back, and front from vertical towards the product. Water is dropped for 25 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine. 
3	Protection against sprinkled water 	Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product. Water is sprinkled for 10 min at a maximum angle of 60° to the left and right from vertical from the test machine. 
4	Protection against water spray 	Protects against water spray approaching at any angle towards the product. Water is sprayed at any angle towards the product for 10 min from the test machine. 
5	Protection against water jet spray 	Protects against water jet spray approaching at any angle towards the product. Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
6	Protection against high-pressure water jet spray 	Protects against high-pressure water jet spray approaching at any angle towards the product. Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
7	Protection against limited immersion in water 	Resists the penetration of water when the product is placed underwater at specified pressure for a specified time. The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min. 
8 (See note.)	Protection against long-term immersion in water 	Can be used continuously underwater. The test method is determined by the manufacturer and user.

De- gree	Protection	Test method (with pure water)
9	Protection against high-pressure, high-temperature water jet spray 	Protects against high-pressure, high-temperature water jet spray approaching at any angle towards the product. Water is sprayed on 80 °C hot water with the water pressure of 80 to 100BAR from a nozzle to the test piece. Amount of water is 14 to 16 liters/minute. The distance between the test piece and a nozzle is 10 to 15 cm, and the directions of water-drainage are 0 degrees, 30 degrees, 60 degrees, and 90 degrees horizontally. They are evaluated with the test piece is rotating on a horizontal plane by 30 seconds in each direction. 

Note: OMRON Test Method

Usage condition: 10 m or less under water in natural conditions

1. No water ingress after 1 hour under water at 2 atmospheres of pressure.
2. Sensing distance and insulation resistance specifications must be met after 100 repetitions of half hour in 5°C water and half hour in 85°C water.

Oil Resistance (OMRON in-house standard)

Protection	
Oil-resistant	No adverse affect from oil drops or oil spray approaching from any direction.
Oil-proof	Protects against penetration of oil drops or oil spray approaching from any direction.

Note. Oil resistance has been tested using a specific oil as defined in the OMRON test method.
(Equivalent to the old JIS C 0920:2003, Appendix 1)

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