AIRSTAGE™

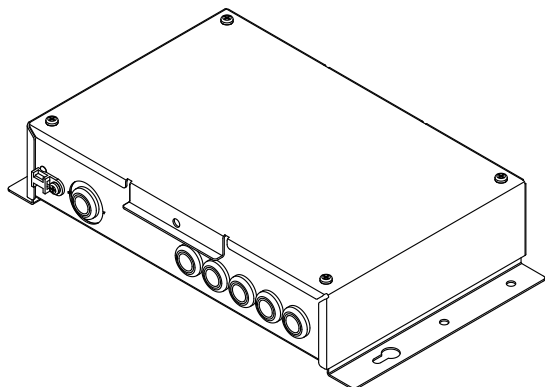# INSTALLATION MANUAL

MODBUS CONVERTOR FOR VRF
For authorized service personnel only.

UTY-VMGX

FUJITSU GENERAL LIMITED

INSTALLATION MANUAL

PART NO. 9374707133-03
MODBUS CONVERTOR for VRF

Contens

1. SAFETY PRECAUTIONS

• The "SAFETY PRECAUTIONS" indicated in this manual contain important information pertaining to your safety. Be sure to observe them.

• Request the user to keep this manual on hand for future use, such as for relocating or repairing the unit.

⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.

Each terminal marked with ⏚ shall be securely connected to grounding, not allowed to be blank.

Perform electrical work by an authorized service personnel in accordance with this manual and the electrical wiring regulations or implementation regulations of the country. Also do not install this unit by yourself. Improper electric work will cause electric shock or a fire.

Perform installation work in accordance with this manual. Request an authorized service personnel to perform installation work. Do not install this unit by yourself. Improper installation will cause injury, electric shock, fire, etc.

In the event of a malfunction (burning smell, etc.), immediately stop operation, turn off the electrical breaker, and consult authorized service personnel.

Install a leakage circuit breaker to power supply cable in accordance with the related laws and regulations and electric company standards.

Use a power source exclusively for this unit. Never share the power source with other electrical equipment. Doing so will cause fire and electric shock.

Do not install the unit in the following areas:
• Do not install the unit near a source of heat, steam, or flammable gas.
• Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen. It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.
• Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali. It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
• Area containing equipment that generates electromagnetic interference. It will cause the control system to malfunction, preventing the unit from operating normally.
• Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline. If gas leaks and settles around the unit, it can cause a fire.

• Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects. It can degrade the quality of the preserved or stored objects.
• Install the unit in a well-ventilated place avoiding rains and direct sunlight.

Do not operate this unit when your hands are wet. Touching the unit with wet hands will cause an electric shock.

If children may approach the unit, take preventive measures so that they cannot reach the unit.

⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user or damage to property.

Pay abundant care when transporting this unit because it is a precision device. Improper transportation will cause trouble.

Do not touch the switches with sharp objects. Doing so will cause injury, trouble, or electric shock.

Do not expose this unit directly to water. Doing so will cause trouble, electric shock, or heating.

Do not set vessels containing a liquid on this unit. Doing so will cause heating, fire, or electric shock.

Dispose of the packing materials safely. Tear and dispose of the plastic packing bags so that children cannot play with them. There is the danger of suffocation if children play with the original plastic bags.
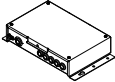
Do not insert articles into the slit parts of this unit. Doing so will cause trouble, heating, or electric shock.

2. MAIN UNIT AND ACCESSORIES

Important: Download the interface specifications from the website before starting installation work.
http://www.fujitsu-general.com/global/support/
The following installation parts are supplied. Use them as required.

Name and Shape	Q'ty	Application
MODBUS convertor	1	Main unit
Installation manual	1	This manual
Cable tie	7	For mounting the power supply cable and transmission cable.
Screw (M4 x 16 mm)	4	For mounting the Network Convertor.
DVD	1	For initial setting.
MODBUS connector	1	For connecting the cable and attaching the board connector.
USB cable	1	For initial setting tool

3. ELECTRICAL REQUIREMENT

Use	Size		Wire type	Remarks
Power supply cable	Maximum	1.25 mm² (16AWG)	Type 60245 IEC 57 or equivalent	1Ø AC208–240 V 50/60Hz, 2 Cable + earth (ground) [Always earth (ground) the unit]
	Minimum	0.5 mm² (20AWG)		
Transmission cable	0.33 mm² (22AWG)		22AWG LEVEL4 (NEMA) nonpolar 2 core, twisted pair solid core Shielded	LONWORKS® compatible cable
MODBUS cable	Maximum	1.25 mm² (16AWG)	AWG16-26 3Wire+ Sheathed PVC cable	
	Minimum	0.128 mm² (26AWG)		
Fuse capacity	2 A			

* LONWORKS® is registered trademark of Echelon Corporation in the United States and other countries.
* MODBUS is registered trademark of Schneider Electric SA.
* : Use shielded cable in accordance with local rules for MODBUS cable.

4. MODBUS COMMUNICATION SPECIFICATIONS

Transfer mode	RTU mode
Communication method	Half-duplex operation, Master/slave method
Communication speed	9600bps / 19200bps
Synchronous system	Asynchronous communication method
Data bit	8 bit
Parity	even/odd/none
Stop bit	2 bit (no parity) / 1 bit
Network	3 wire RS485
Maximum cable length	1000 (m) (3280 (ft))

5. SELECTING AN INSTALLATION LOCATION

5.1. Dimensions

The MODBUS Convertor is comprised of a body and cover.

Unit : mm (in.)
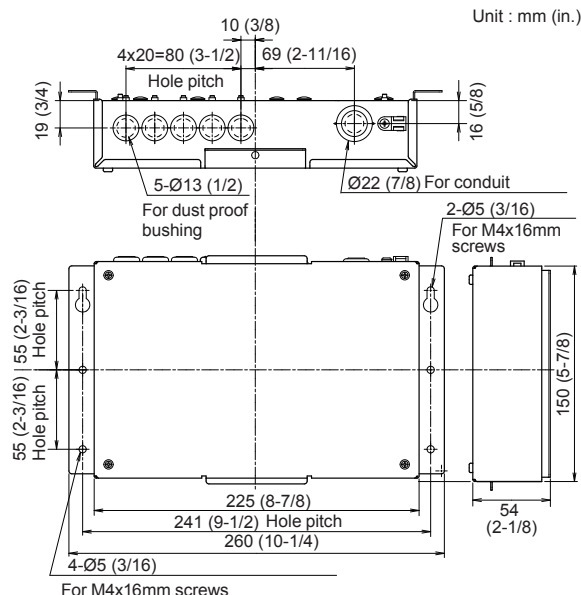
10 (3/8)
4x20=80 (3-1/2) Hole pitch
69 (2-11/16)
19 (3/4)
16 (5/8)
5-Ø13 (1/2) For dust proof bushing
Ø22 (7/8) For conduit
2-Ø5 (3/16) For M4x16mm screws
55 (2-3/16) Hole pitch
55 (2-3/16) Hole pitch
150 (5-7/8)
225 (8-7/8)
241 (9-1/2) Hole pitch
260 (10-1/4)
54 (2-1/8)
4-Ø5 (3/16) For M4x16mm screws

Power supply	1Ø AC208–240V 50/60 Hz
Power consumption (W)	2.0
Temperature °C(°F)	Operating	0–46 (32–114)
	Packaged	-10–60 (14–140)
Humidity (%)	Packaged	0–95 (RH); No condensation
Dimensions H x W x D mm(in.)	54 × 260 × 150 (2-1/8 × 10-1/4 × 5-7/8)
Weight g (oz.)	1100 (39)

6. WIRING

⚠ WARNING

Before starting installation work, turn off the power of this unit and the connection destination. Do not turn on the power again until installation is completed. Otherwise, it will cause electric shock or fire.

Use specified cables or accessory cables to connect to this unit. Do not modify the cables to connect this unit other than those specified, do not use extension cables, and do not use independent branch wiring. It may cause electric shock or fire.

Install the transmission cables securely to the terminal block. Confirm that external force is not applied to the cable. Use transmission cables made of the specified cable. If intermediate connection or insertion fixing are imperfect, it will cause electric shock, fire, etc.

When connecting the cables to this unit, route the cables so that the cover of this unit is securely fixed. If the cover is imperfectly fixed, it may cause fire or overheating of the terminals.

Perform earth (ground) work positively. Do not connect the earth (ground) cable to a telephone cable, water pipe, or conductor rod.

Always fasten the outside covering of the cables with the cable clamp. (If the insulator is chafed, electric leakage may occur.)

Perform all wiring works so that the user does not touch the wiring. Otherwise, injury or electric shock could result.

If any cable is damaged, do not repair or modify it yourself. Improper work will cause electric shock or fire.

⚠ CAUTION

Do not bind the remote controller cable and the transmission cable together with or parallel to the power supply cable of the indoor and outdoor units. It may cause erroneous operation.

When performing wiring work, be careful not to damage the cable or injure yourself. Also, connect the connectors securely. Loose connectors will cause trouble, heating, fire, or electric shock.

Install the indoor and outdoor units, power supply cable, transmission cable and remote control cable 1 m (40 in.) away from television and radio to avoid distorted images and noise. Otherwise, a malfunction could result.

Perform wiring so that water does not enter this unit along the external wiring. Always install a trap to the wiring or take other countermeasures. Otherwise it will cause trouble or electric shock or fire.

Confirm the name of each unit and name of each terminal block of the unit and connect the wiring in accordance with the directions given in the manual so that there is no incorrect wiring. Incorrect wiring will damage the electric parts and cause smoke and fire.

When installing the connection cables near a source of electromagnetic waves, use shielded cable. Otherwise, a breakdown or malfunction could result.

The terminal screws and earth (ground) screws have different shapes. Be sure to install the screws in the correct locations. If the screws are installed in the wrong locations, the circuit board could be damaged.

PROPER SYSTEM DIAGRAM

| VRF Outdoor unit | Indoor unit | Transmission cable (non-polar 2-conductor) |
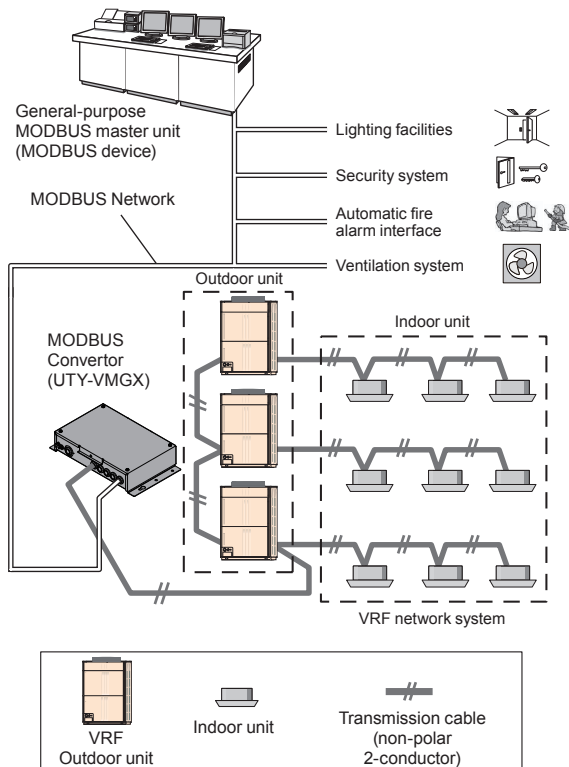
Maximum controllable indoor unit number per 1 MODBUS Convertor	128
Maximum controllable outdoor unit number per 1 MODBUS Convertor	100
Maximum connectable MODBUS Convertor number per 1 VRF System	9

Maximum number of connected MODBUS Convertor units to one MODBUS master unit	Without repeater	31
	With repeater	247*

* Due to the limit in the number of slave addresses

ELECTRICAL WIRING
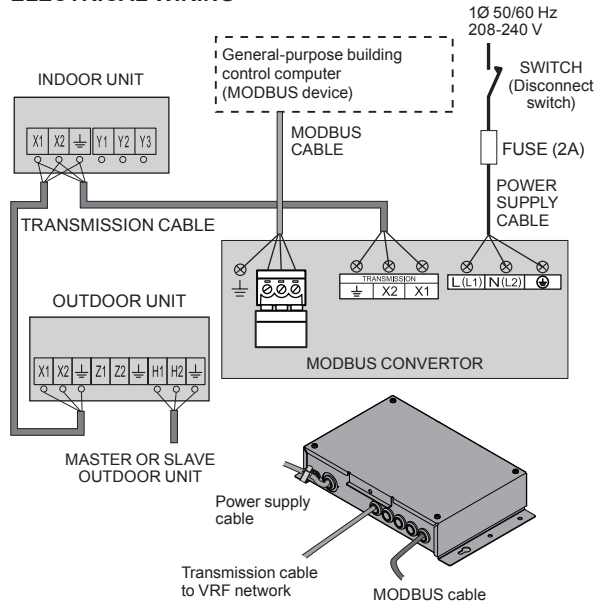
Note :
- Do not bind the power supply cable and transmission cable to avoid an erroneous operation.
- Use shield cable for transmission cable.
  The shield metal should be earthed (grounded).
- Do not forget to earth (ground) the MODBUS Convertor.
- Install the disconnect switch to the easily accessible location.
- Install the fuse (2A) to the L (L1) line of power supply cable.
- Before connecting cables, turn off the power of the VRF units connected to the convertor.

6.2. Unit wiring

6.2.1. Power supply cable
Keep the ground cable longer than the other cables.

Power supply cable
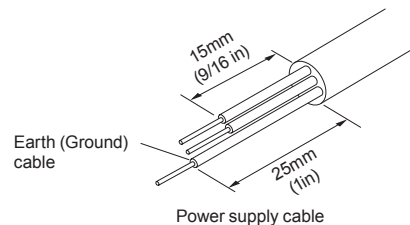
(1) Use ring terminals with insulating sleeves as shown in the figure below to connect to the terminal block.
(2) Securely clamp the ring terminals to the cables using an appropriate tool so that the cables do not come loose.
(3) Use the specified cables, connect them securely, and fasten them so that there is no stress placed on the terminals.
(4) Use an appropriate screwdriver to tighten the terminal screws.
  Do not use a screwdriver that is too small, otherwise, the screw heads may be damaged and prevent the screws from being properly tightened.
(5) Do not tighten the terminal screws too much, otherwise, the screws may break.
(6) See the table for the terminal screw tightening torques.
(7) Do not fix 2 or more power supply cables with 1 screw.

6.2.3. MODBUS cable

MODBUS connector
(Accessories)

Shielded cable
(no sheath)

Tightening torque for installing cables to MODBUS connector
0.22 to 0.25 N • m (1.9 to 2.2 lbf • in) (2.2 to 2.5 kgf • cm)
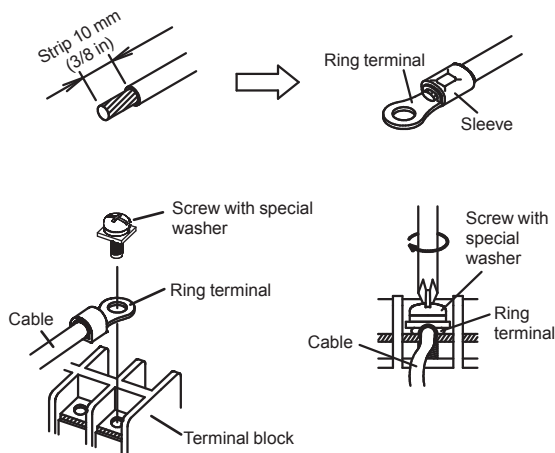
WARNING

Use ring terminals and tighten the terminal screws to the specified torques, otherwise, abnormal overheating may be occurred and possibly cause heavy damage inside the unit.

Tightening torque	
M4 screw (Power supply / L (L1), N (L2), GND)	1.2 to 1.8 N • m (11 to 16 lbf • in) (12 to 18 kgf • cm)

6.2.2. Transmission cable to VRF Network

Shielded cable
(no sheath)
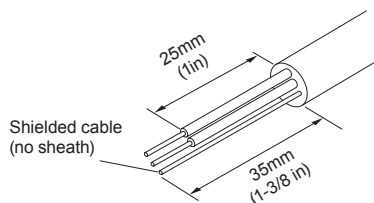
WARNING

Tighten the terminal screws to the specified torques, otherwise, abnormal overheating may be occurred and possibly cause heavy damage inside the unit.

Tightening torque	
M3 screw (Transmission / X1, X2)	0.5 to 0.6 N • m (4.4 to 5.3 lbf • in) (5 to 6 kgf • cm)

CAUTION

To peel the sheath from the lead cable, use a dedicated tool that will not damage the conductor cable.

When installing a screw on the terminal block, do not cut the cable by overtightening the screw. On the other hand, an under tightened screw can cause faulty contact, which will lead to a communication failure.

7. INSTALLING THE MODBUS CONVERTOR

WARNING

Always use the accessories and specified installation work parts. Check the state of the installation parts. Not using the specified parts will cause units to fall off, electric shock, fire, etc.

Install at a place that can withstand the weight of the unit and install positively so that the unit will not topple or fall.

When installing this unit, make sure that there are no children nearby. Otherwise, injury or electric shock could result.

Install a circuit breaker.
Otherwise, electric shock or fire could result.

CAUTION

Do not set the DIP switch or rotary switch of this unit except as specified in this installation manual or the instruction manual supplied with the air conditioner. Setting the switches other than specified will cause an accident or trouble.

Use an insulated screwdriver to set the DIP switches.

Before opening the cover of this unit, completely discharge static electricity charged on your body. Otherwise, failure or malfunction could result.

Do not touch the circuit board and circuit board parts directly with your hands.
Otherwise, injury or electric shock could result.

Tightening the mounting screws too tight will damage the body of this unit.

Be careful so that the cover does not fall after the cover screws are removed.
Otherwise, injury could result.

Remove 4 screws and remove the cover of main unit.
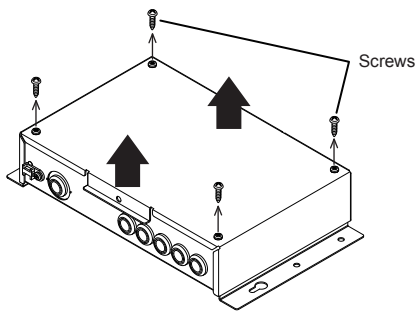
Screws

7.1. Connecting the power supply cable

for U.S.A. and Canada

(1) Remove the 4 screws (M4 × 6 mm), and then remove the cover.
(2) Remove the dust proof bushing and open the knockout hole.
(3) Install the conduit.
(4) Fix the conduit with lock nut.
(5) Pass the power supply cable through the conduit.
(6) Connect the power supply cable to their respective terminal block.
(7) Then confirm that the cable will not come out.

Conduit
(Power supply cable)
[Trade size: 1/2 in.]

Knockout hole

Lock nut

Power supply cable

L (L1) N (L2) ⏚
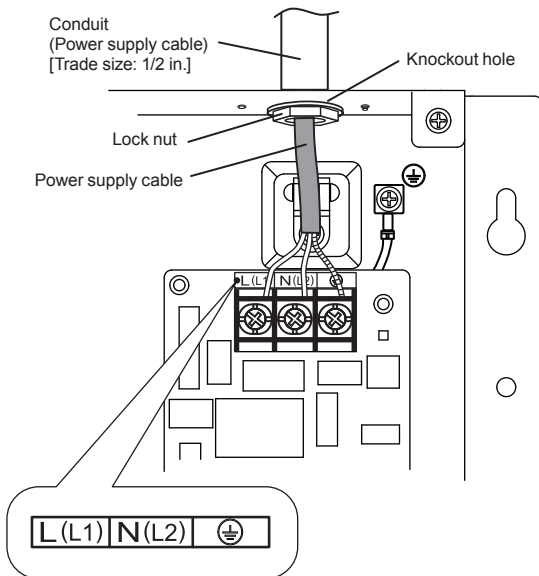
for Others

(1) Remove the 4 screws (M4 × 6 mm), and then remove the cover.
(2) Make a hole in the center of the dust proof bushing with the Phillips head screwdriver.
(3) Pass the power supply cable through the hole of dust proof bushing and pull it into the MODBUS convertor.
(4) Connect the power supply cable to their respective terminal block.
(5) Securely tighten the cable tie and then confirm that the cable will not come out.

Cable tie *
(Accessories)

Dust proof bushing

The screw hole

Power supply cable

Cable tie
(Accessories)

L (L1) N (L2) ⏚
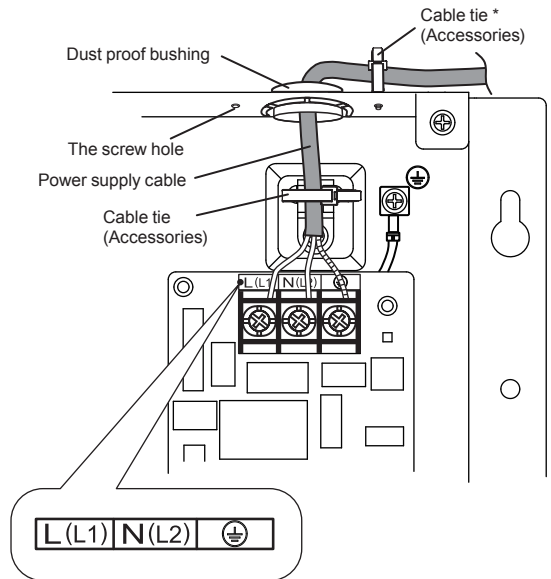
* When wiring the cable to the opposite side, fix the cable as shown below:

(1) Remove the cable tie holder attached to the sheet metal.
(2) Attach the cable tie holder to the screw hole in the direction where the cable is wired.
(3) Fix the cable with the cable tie.

7.2. Connecting the transmission cables

(1) Turn the power off.
(2) Make a hole in the center of the dust proof bushing using a driver.
(3) Pass the transmission cables through the hole of dust proof bushing and pull it into the MODBUS convertor.
(4) Connect the transmission cable to terminal block to connect to VRF network.
(5) Connect the transmission cable to accessory MODBUS Connector to connect to MODBUS network.
(6) Connect the MODBUS cables to RS485_A+ (D+), RS485_B- (D-), and Common (COM) according to the polarity of the master unit.
(7) Attach the MODBUS connector to the board terminal.
(8) When using MODBUS cable with shield, earth (ground) at one end of cable. If this unit is earthed (grounded), connect to the Earth (Ground) terminal. Do not connect the shield to the Common (COM).
(9) Securely tighten the cable ties and then confirm that the cable will not come out.
(10) Once the wiring of the cables has been completed, mount the cover to the MODBUS convertor. Use the screws (M4 × 6 mm) to mount the cover.
(11) Use the 4 screws (M4 × 16 mm) provided to mount the MODBUS convertor to the behind ceiling, wall, floor or other suitable location.

MODBUS cable

Transmission cable to VRF Network

Earth (Ground) terminal

Cable tie

MODBUS connector
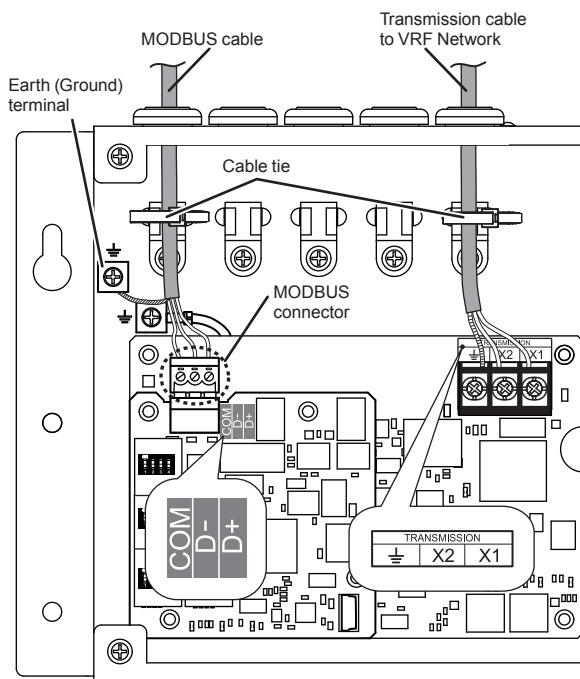
7.3. Installation method

Do not install the main unit with the cables downward.
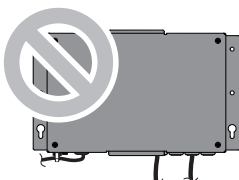
8. CIRCUIT BOARD SETTING

Set MODBUS convertor rotary switch SET1 and DIP switch SET2, SET4, SET5, SET6, SET7.
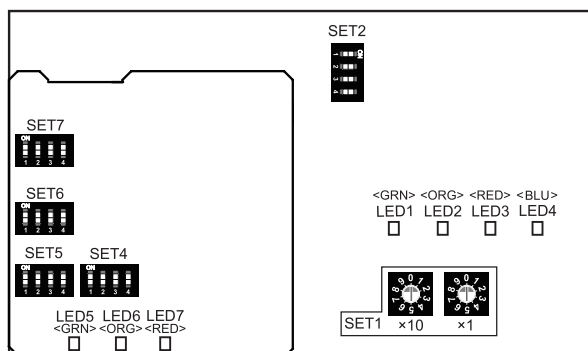
(1) [Rotary switch-SET1] set the address of MODBUS Convertor.

Set the values of SET 1 (x10) and SET 1 (x1) to set the MODBUS convertor Remote Controller Address.
Example:When SET 1 (x10) is set to "1" and SET 1 (x1) is set to "5", MODBUS convertor Remote Controller Address is set to "15".

MODBUS convertor Remote Controller address	Rotary Switch Setting		MODBUS convertor Remote Controller address	Rotary Switch Setting	
	SET1(×10)	SET1(×1)		SET1(×10)	SET1(×1)
0	★0	★0	8	0	8
1	0	1	9	0	9
2	0	2	10	1	0
3	0	3	11	1	1
4	0	4	12	1	2
5	0	5	13	1	3
6	0	6	14	1	4
7	0	7	15	1	5

(★: Factory setting)

• When setting address, please be sure that the address of MODBUS Convertor is not overlap the address of other controller like, Touch Panel Controller & Network Convertor for Group Remote Controller.

• When the rotary switch is set to 16 or more, MODBUS convertor Remote Controller Address setting is 15.

(2) Terminal resistance setting SW (SET2-1)

When there is no other terminal resistance in the VRF network to which the convertor is connected, set to "ON".
ON: Terminal resistance valid
OFF: Terminal resistance invalid (Default)

(3) SCAN setting SW (SET2-4)

SCAN start and reset can be set.
ON: SCAN starts
OFF: SCAN resets (Default)

(4) Test run setting SW (SET 2-3)

Test run start and reset can be set.
ON: Test run starts
OFF: Test run resets (Default)

(5) MODBUS communication setting: MODBUS slave address setting (SET4/5)

Address can be set. (1 to 247)

MODBUS convertor address	DIP Switch Setting ON:● / OFF:○							
	SET5-1	SET5-2	SET5-3	SET5-4	SET4-1	SET4-2	SET4-3	SET4-4
1	★○	★○	★○	★○	★○	★○	★○	★●
2	○	○	○	○	○	○	●	○
3	○	○	○	○	○	○	●	●
4	○	○	○	○	○	●	○	○
5	○	○	○	○	○	●	○	●
6	○	○	○	○	○	●	●	○
7	○	○	○	○	○	●	●	●
8	○	○	○	○	●	○	○	○
9	○	○	○	○	●	○	○	●
10	○	○	○	○	●	○	●	○
11	○	○	○	○	●	○	●	●
12	○	○	○	○	●	●	○	○
13	○	○	○	○	●	●	○	●
14	○	○	○	○	●	●	●	○
15	○	○	○	○	●	●	●	●
16	○	○	○	●	○	○	○	○
17	○	○	○	●	○	○	○	●
18	○	○	○	●	○	○	●	○
19	○	○	○	●	○	○	●	●
20	○	○	○	●	○	●	○	○
21	○	○	○	●	○	●	○	●
22	○	○	○	●	○	●	●	○
23	○	○	○	●	○	●	●	●
24	○	○	○	●	●	○	○	○
25	○	○	○	●	●	○	○	●
26	○	○	○	●	●	○	●	○
27	○	○	○	●	●	○	●	●
28	○	○	○	●	●	●	○	○

MODBUS convertor address	DIP Switch Setting ON:● / OFF:○							
	SET5-1	SET5-2	SET5-3	SET5-4	SET4-1	SET4-2	SET4-3	SET4-4
29	○	○	○	●	●	●	○	●
30	○	○	○	●	●	●	●	○
31	○	○	○	●	●	●	●	●
32	○	○	●	○	○	○	○	○
33	○	○	●	○	○	○	○	●
34	○	○	●	○	○	○	●	○
35	○	○	●	○	○	○	●	●
36	○	○	●	○	○	●	○	○
37	○	○	●	○	○	●	○	●
38	○	○	●	○	○	●	●	○
39	○	○	●	○	○	●	●	●
40	○	○	●	○	●	○	○	○
41	○	○	●	○	●	○	○	●
42	○	○	●	○	●	○	●	○
43	○	○	●	○	●	○	●	●
44	○	○	●	○	●	●	○	○
45	○	○	●	○	●	●	○	●
46	○	○	●	○	●	●	●	○
47	○	○	●	○	●	●	●	●
48	○	○	●	●	○	○	○	○
49	○	○	●	●	○	○	○	●
50	○	○	●	●	○	○	●	○
51	○	○	●	●	○	○	●	●
52	○	○	●	●	○	●	○	○
53	○	○	●	●	○	●	○	●
54	○	○	●	●	○	●	●	○
55	○	○	●	●	○	●	●	●
56	○	○	●	●	●	○	○	○
57	○	○	●	●	●	○	○	●
58	○	○	●	●	●	○	●	○
59	○	○	●	●	●	○	●	●
60	○	○	●	●	●	●	○	○
61	○	○	●	●	●	●	○	●
62	○	○	●	●	●	●	●	○
63	○	○	●	●	●	●	●	●
64	○	●	○	○	○	○	○	○
65	○	●	○	○	○	○	○	●
66	○	●	○	○	○	○	●	○
67	○	●	○	○	○	○	●	●
68	○	●	○	○	○	●	○	○
69	○	●	○	○	○	●	○	●
70	○	●	○	○	○	●	●	○
71	○	●	○	○	○	●	●	●
72	○	●	○	○	●	○	○	○
73	○	●	○	○	●	○	○	●
74	○	●	○	○	●	○	●	○
75	○	●	○	○	●	○	●	●
76	○	●	○	○	●	●	○	○
77	○	●	○	○	●	●	○	●
78	○	●	○	○	●	●	●	○
79	○	●	○	○	●	●	●	●
80	○	●	○	●	○	○	○	○
81	○	●	○	●	○	○	○	●
82	○	●	○	●	○	○	●	○
83	○	●	○	●	○	○	●	●
84	○	●	○	●	○	●	○	○
85	○	●	○	●	○	●	○	●
86	○	●	○	●	○	●	●	○
87	○	●	○	●	○	●	●	●
88	○	●	○	●	●	○	○	○
89	○	●	○	●	●	○	○	●
90	○	●	○	●	●	○	●	○
91	○	●	○	●	●	○	●	●
92	○	●	○	●	●	●	○	○
93	○	●	○	●	●	●	○	●
94	○	●	○	●	●	●	●	○
95	○	●	○	●	●	●	●	●
96	○	●	●	○	○	○	○	○
97	○	●	●	○	○	○	○	●
98	○	●	●	○	○	○	●	○
99	○	●	●	○	○	○	●	●
100	○	●	●	○	○	●	○	○
101	○	●	●	○	○	●	○	●
102	○	●	●	○	○	●	●	○
103	○	●	●	○	○	●	●	●
104	○	●	●	○	●	○	○	○
105	○	●	●	○	●	○	○	●
106	○	●	●	○	●	○	●	○
107	○	●	●	○	●	○	●	●
108	○	●	●	○	●	●	○	○
109	○	●	●	○	●	●	○	●
110	○	●	●	○	●	●	●	○
111	○	●	●	○	●	●	●	●
112	○	●	●	●	○	○	○	○
113	○	●	●	●	○	○	○	●
114	○	●	●	●	○	○	●	○
115	○	●	●	●	○	○	●	●
116	○	●	●	●	○	●	○	○
117	○	●	●	●	○	●	○	●
118	○	●	●	●	○	●	●	○
119	○	●	●	●	○	●	●	●
120	○	●	●	●	●	○	○	○
121	○	●	●	●	●	○	○	●
122	○	●	●	●	●	○	●	○
123	○	●	●	●	●	○	●	●
124	○	●	●	●	●	●	○	○
125	○	●	●	●	●	●	○	●
126	○	●	●	●	●	●	●	○
127	○	●	●	●	●	●	●	●
128	●	○	○	○	○	○	○	○
129	●	○	○	○	○	○	○	●
130	●	○	○	○	○	○	●	○
131	●	○	○	○	○	○	●	●
132	●	○	○	○	○	●	○	○
133	●	○	○	○	○	●	○	●
134	●	○	○	○	○	●	●	○
135	●	○	○	○	○	●	●	●
136	●	○	○	○	●	○	○	○
137	●	○	○	○	●	○	○	●
138	●	○	○	○	●	○	●	○
139	●	○	○	○	●	○	●	●
140	●	○	○	○	●	●	○	○
141	●	○	○	○	●	●	○	●
142	●	○	○	○	●	●	●	○
143	●	○	○	○	●	●	●	●
144	●	○	○	●	○	○	○	○
145	●	○	○	●	○	○	○	●
146	●	○	○	●	○	○	●	○
147	●	○	○	●	○	○	●	●
148	●	○	○	●	○	●	○	○
149	●	○	○	●	○	●	○	●
150	●	○	○	●	○	●	●	○
151	●	○	○	●	○	●	●	●
152	●	○	○	●	●	○	○	○
153	●	○	○	●	●	○	○	●
154	●	○	○	●	●	○	●	○
155	●	○	○	●	●	○	●	●
156	●	○	○	●	●	●	○	○
157	●	○	○	●	●	●	○	●
158	●	○	○	●	●	●	●	○
159	●	○	○	●	●	●	●	●
160	●	○	●	○	○	○	○	○
161	●	○	●	○	○	○	○	●
162	●	○	●	○	○	○	●	○
163	●	○	●	○	○	○	●	●
164	●	○	●	○	○	●	○	○
165	●	○	●	○	○	●	○	●
166	●	○	●	○	○	●	●	○
167	●	○	●	○	○	●	●	●
168	●	○	●	○	●	○	○	○
169	●	○	●	○	●	○	○	●
170	●	○	●	○	●	○	●	○
171	●	○	●	○	●	○	●	●
172	●	○	●	○	●	●	○	○
173	●	○	●	○	●	●	○	●
174	●	○	●	○	●	●	●	○
175	●	○	●	○	●	●	●	●
176	●	○	●	●	○	○	○	○

MODBUS convertor address	DIP Switch Setting ON:● / OFF:○							
	SET5-1	SET5-2	SET5-3	SET5-4	SET4-1	SET4-2	SET4-3	SET4-4
177	●	○	●	●	○	○	○	●
178	●	○	●	●	○	○	●	○
179	●	○	●	●	○	○	●	●
180	●	○	●	●	○	●	○	○
181	●	○	●	●	○	●	○	●
182	●	○	●	●	○	●	●	○
183	●	○	●	●	○	●	●	●
184	●	○	●	●	●	○	○	○
185	●	○	●	●	●	○	○	●
186	●	○	●	●	●	○	●	○
187	●	○	●	●	●	○	●	●
188	●	○	●	●	●	●	○	○
189	●	○	●	●	●	●	○	●
190	●	○	●	●	●	●	●	○
191	●	○	●	●	●	●	●	●
192	●	●	○	○	○	○	○	○
193	●	●	○	○	○	○	○	●
194	●	●	○	○	○	○	●	○
195	●	●	○	○	○	○	●	●
196	●	●	○	○	○	●	○	○
197	●	●	○	○	○	●	○	●
198	●	●	○	○	○	●	●	○
199	●	●	○	○	○	●	●	●
200	●	●	○	○	●	○	○	○
201	●	●	○	○	●	○	○	●
202	●	●	○	○	●	○	●	○
203	●	●	○	○	●	○	●	●
204	●	●	○	○	●	●	○	○
205	●	●	○	○	●	●	○	●
206	●	●	○	○	●	●	●	○
207	●	●	○	○	●	●	●	●
208	●	●	○	●	○	○	○	○
209	●	●	○	●	○	○	○	●
210	●	●	○	●	○	○	●	○
211	●	●	○	●	○	○	●	●
212	●	●	○	●	○	●	○	○
213	●	●	○	●	○	●	○	●
214	●	●	○	●	○	●	●	○
215	●	●	○	●	○	●	●	●
216	●	●	○	●	●	○	○	○
217	●	●	○	●	●	○	○	●
218	●	●	○	●	●	○	●	○
219	●	●	○	●	●	○	●	●
220	●	●	○	●	●	●	○	○
221	●	●	○	●	●	●	○	●
222	●	●	○	●	●	●	●	○
223	●	●	○	●	●	●	●	●
224	●	●	●	○	○	○	○	○
225	●	●	●	○	○	○	○	●
226	●	●	●	○	○	○	●	○
227	●	●	●	○	○	○	●	●
228	●	●	●	○	○	●	○	○
229	●	●	●	○	○	●	○	●
230	●	●	●	○	○	●	●	○
231	●	●	●	○	○	●	●	●
232	●	●	●	○	●	○	○	○
233	●	●	●	○	●	○	○	●
234	●	●	●	○	●	○	●	○
235	●	●	●	○	●	○	●	●
236	●	●	●	○	●	●	○	○
237	●	●	●	○	●	●	○	●
238	●	●	●	○	●	●	●	○
239	●	●	●	○	●	●	●	●
240	●	●	●	●	○	○	○	○
241	●	●	●	●	○	○	○	●
242	●	●	●	●	○	○	●	○
243	●	●	●	●	○	○	●	●
244	●	●	●	●	○	●	○	○
245	●	●	●	●	○	●	○	●
246	●	●	●	●	○	●	●	○
247	●	●	●	●	○	●	●	●

(★: Factory setting)

(6) MODBUS communication setting: Baud rate setting (SET6-4)

ON: 19200bps
OFF: 9600bps (Default)

(7) MODBUS communication setting: Parity setting (SET6-3)

ON: odd
OFF: even (Default)
* When the STOP bit setting is "2bit," parity is set to "None" regardless of the setting of this switch.

(8) MODBUS communication setting: Stop bit setting (SET6-2)

Stop bit can be set (1 bit or 2 bit).
ON: 2bit
OFF: 1bit (Default)

(9) MODBUS communication setting: MODBUS communication terminal resistance (SET7-4)

MODBUS communication terminal resistance can be set (Valid or invalid).
Terminal resistance: 120Ω
Set the terminal resistances as necessary.
For MODBUS system, terminal resistances are necessary at the both ends of communication line. (Total 2 terminal resistances)
Set the terminal resistances at the both ends to be valid and set the terminal resistances other than at the both ends to be invalid.
ON: Terminal resistance valid
OFF: Terminal resistance invalid (Default)

* The switches from (5) to (8) are read at the time of power-on. Even if these switches are changed after power-on, the setting is not reflected.

(10) Unused SW

SET2-2, SET6-1, SET7-1 to 3: Not used
All Default settings: "OFF"

9. TURNING ON THE POWER

⚠ CAUTION

Check that the power supply voltage is within the specified range. If the power supply voltage outside the specification is input, it will cause trouble.

Recheck the wiring. Incorrect wiring will cause trouble.

(1) Check the wiring of MODBUS convertor.

(2) Check the wiring and switches of units connected to convertor before tuning on the power.

(3) Check that the switches of MODBUS convertor are correct.

(4) Turn on the power for the MODBUS Convertor.

• The MODBUS Convertor is initialized for a period of approximately a few seconds after the power is turned on.
LED1 (green), LED2 (orange), LED5 (green), and LED6 (orange) flash.

• After initial setting is completed, operation will be restarted automatically. LED1 (green) and LED5 (green) light.

* MODBUS Convertor does not operate during initialization.
If an error occurs, the LED1, LED2, LED3, or LED5, LED6, LED7 lights or flashes.

10. INITIAL SETTING

Address initial settings are 3 methods as follows.

(1) Default addresses of indoor unit and outdoor unit are used. (Initial setting is not necessary)

Default address value ([RefNo.—NodeNo.])

Indoor unit:　　[00—00] [00—01] ••• [00—63]
　　　　　　　　 [01—00] [01—01] ••• [01—63]
Outdoor unitt:　[00—00] [00—01] ••• [00—03]
　　　　　　　　 [01—00] [01—01] ••• [01—03]

(2) Scan

Scan procedure is as follows.

　• Turn on the switch of scan setting.

　• "Scan display" by LED (address is registering inside the convertor.)

　• "Number of connected indoor unit display" by LED (Scan is complete)

　• Turn off the switch of scan setting

　• "Address update display" by LED

　• Turn on the main power again.

　• "Address rewriting display" by LED (Addresses are synchronized among boards)

　* When scan error is generated, performing the scan again is necessary.

(3) Setting from PC (Refer to the application manual in the DVD of an accessary.)

11. USB CABLE CONNECTION

Connect the accessory USB cable to the terminal below.

USB cable connector
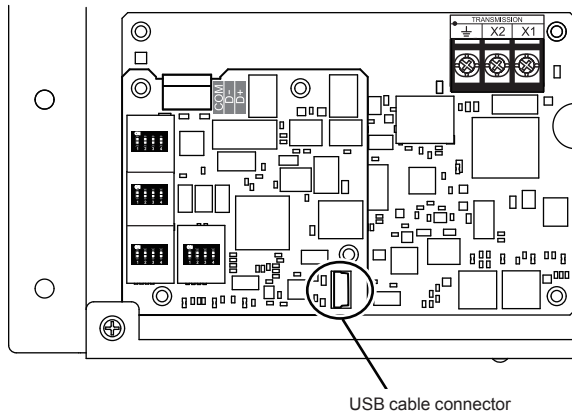
Scan information (indoor unit address and outdoor unit address) can be input from the PC.
Connect the USB cable after turning off the power.

12. TEST RUN

Test run can be performed in the following procedure using the switch SET 2-3.

(1) Turn the test run switch (SET2-3) to ON.

(2) The indoor unit registered to the convertor starts the test run.

(3) Check that the indoor unit registered to the convertor performs the test run.

(4) Turn the test run switch (SET2-3) to OFF.

(5) The indoor unit which performs the test run stops it.

* When 60 minutes passes after the start of test run, test run of indoor unit ends automatically. Always turn the test run switch (SET2-3) to OFF.

13. LED DISPLAY

13.1. Normal code

Normal indications				Normal contents
LED1 (green)	LED2 (orange)	LED3 (red)	LED4 (Blue)	
▲ (Flashes alternately)		□	□	Start sequence or address rewriting
■	□	□	□	Normal starting
■	■	□	□	VRF sending or receiving
▲ (Flashes simultaneously)				SCAN indication
▲ (Flashes simultaneously)		□	□	Test run indication
● (*)			■	Number of connected indoor unit indication
■	□	□	■	Address update display

(*): Blinking example of 108 units connection
• Flashes per 12 seconds cycle

• LED1 indicates hundreds place of number of connected units: Flashes once at 0.5s interval (example of 1)

• LED2 indicates tens place of number of connected units: Lights (example of 0)

• LED3 indicates ones place of number of connected units: Flashes 8 times at 0.5s interval (example of 8)

Normal indications			Normal contents
LED5 (green)	LED6 (orange)	LED7 (red)	
■	□	□	Normal starting
■	■	□	MODBUS sending or receiving
▲ (Flashes alternately)		□	Start sequence or address rewriting
▲ (Flashes simultaneously)			USB mode indication

Display mode　■ : On
　　　　　　　□ : Off
　　　　　　　● : 0.5s ON / 0.5s OFF
　　　　　　　▲ : 1.0s ON / 1.0s OFF

13.2. Error code

For the error indications of devices connected to the convertor, refer to each manual.

Error indications			Error contents
LED1 (green)	LED2 (orange)	LED3 (red)	
● (1)	● (5)	◇	Scan error
● (1)	● (6)	◇	Peripheral unit communication error

Error indications			Error contents
LED5 (green)	LED6 (orange)	LED7 (red)	
● (11)	● (1)	◇	Peripheral unit main PCB error

Display mode ● : 0.5s ON / 0.5s OFF

◇ : 0.1s ON / 0.1s OFF

( ) : Number of flashing