TOSHIBA

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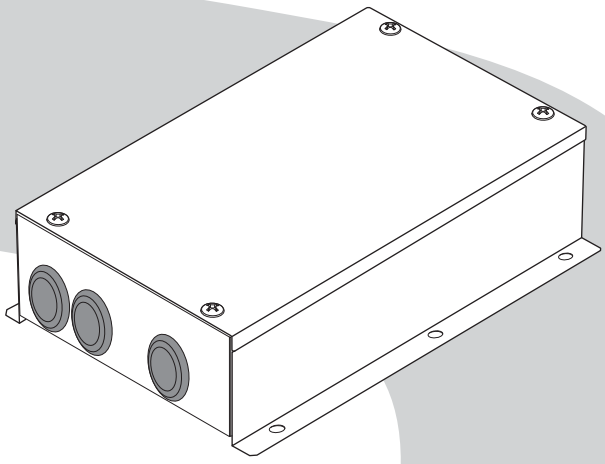
Modbus interface

SERVICE MANUAL

Model name:

BMS-IFMB1280U-E
BMS-IFMB1280U-TR



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Contents

Safety precautions

Important safety-related information is described on the product and in this Service Guide.
Read the following description on labels and symbols carefully and follow their directions.

[Explanation of labels]

Label	Explanation
⚠ DANGER	Indicates that the repair engineer and other third-party individuals in the vicinity may be exposed to immediate risk of death or serious injury if operation is not performed correctly.
⚠ WARNING	Indicates that the repair engineer and other third-party individuals in the vicinity may be exposed to a risk of death or serious injury if operation is not performed correctly.
⚠ CAUTION	Indicates that the repair engineer and other third-party individuals in the vicinity may be exposed to a risk of injury or that property damage (*) may result if operation is not performed correctly or from failure of product after operation.

(*): Property damage means expanded damages to assets, furniture, livestock and/or pets.

[Explanation of symbols]

Symbol	Explanation
	Indicates prohibited activity Specific prohibited actions are described in statements near the symbol.
	Indicates enforced action Specific enforced actions are described in statements near the symbol.
	Indicates caution (includes danger alert and warning) Specific content of caution is indicated in a picture or statement near the symbol.

⚠ DANGER	
 Turn off breaker	**Turn off breaker before performing work.** Otherwise, one may receive electric shock from the high-voltage electricity, resulting in death or injury.
 Prohibition	**Do not turn on the breaker when the cover of the unit is removed.** Otherwise, one may receive electric shock from the high-voltage electricity, resulting in death or injury.

⚠ WARNING	
 Check for ground wire	**Before fault diagnosis or beginning repair work, make sure that the ground wire is connected to the ground terminal of the unit.** If not, ground leakage may result in electric shock hazard.
 No alteration	**Do not alter the product.** Components of the unit should also not be taken apart or altered. Otherwise, it may result in fire, electric shock or injury.
 Use designated parts	**Use designated parts for replacement.** Using parts other than those designated may cause fire or electric shock.

⚠ WARNING

 Restricted area	**Do not allow unauthorized personnel other than repair engineers to enter areas where fault diagnosis and repair work is conducted.** Unauthorized persons may suffer injury from tools and disassembled parts.
 Insulation	**Connect lead wires with crimping terminals and turn the closed end upwards to avoid exposure to water.** Failure to perform this post-connection treatment may cause disasters, such as electricity leakage and fire, on the client's premises.
 Assembly wiring caution	**After repair, ensure that the assembly of disassembled parts and the connection and wiring of removed wires are completed so as to restore them to their former state. Be careful not to have the internal wires caught in the cover or other closures.** A defect in assembly or wire connection may cause disasters in the client premise, such as electricity leakage and fire.
 Insulation check	**After repair, check for insulation between the charged part and non-charged metal part (ground terminal) using an insulation resistance tester (500 V) and ensure at least 2 MΩ resistance.** If the insulation resistance value is low, it indicates the risk of disasters, such as electricity leakage and electric shock, on the client's premises.
 Electric shock caution	**In case of performing circuit inspection while the circuit is connected to a power source (if such condition is necessary), use rubber gloves and other measures to prevent contact with the charged part.** Otherwise, one will risk electric shock from contacting the charged part.
 Check after repair	**Upon completion of repair, ensure that there are no abnormalities.** Risks of fire, electric shock or injury may be prevented by inspection. Turn off the breaker before performing inspection.
	Test run the system after repair and make sure that there are no abnormalities including smoke. Risks of fire and electric shock may be prevented by inspection.
 Repair and Reinstall	**Repair and reinstallation must be performed by qualified professional.**

1 Product overview

The Modbus interface is used to connect air conditioners “with TU2C-LINK Uh Line (hereinafter, referred to as Uh Line) installed” and TCB-IFCG1TLE to Modbus* system.
This Modus Interface enables building management systems to calculate EER (Energy Efficiency Ratio) in real time.

- Receiving cooling capacity data from outdoor units.
- Letting Modbus register hold the cooling capacity data.

* “Modbus” is a registered trademark of Schneider Electric SA.

Products that can be connected to the Modbus Interface are listed below.

(1) Applicable air conditioner indoor unit

- VRF System
  - SMMS-i (Super Modular Multi System-i)
  - SHRM-i (Super Heat Recovery Multi System-i)
  - SMMS-e (Super Modular Multi System-e)
  - SHRM-e (Super Heat Recovery Multi System-e)
  - SMMS 7 (Super Modular Multi System 7)
  - SMMS-u (Super Modular Multi System-u)
  - SMMS ∞ (Super Modular Multi System ∞)
  - Mini-SMMS Series
  - Side Blow VRF
  - VRF Dx-coil controller (TCB-IFDMX01UP-E, TCB-IFDMR01UP-E)

- Light Commercial model
  - Super Digital Inverter Series (*1)
  - Digital Inverter Series (*1)
    (*1) TCB-PCNT30TLE2 is necessary except High wall Series.

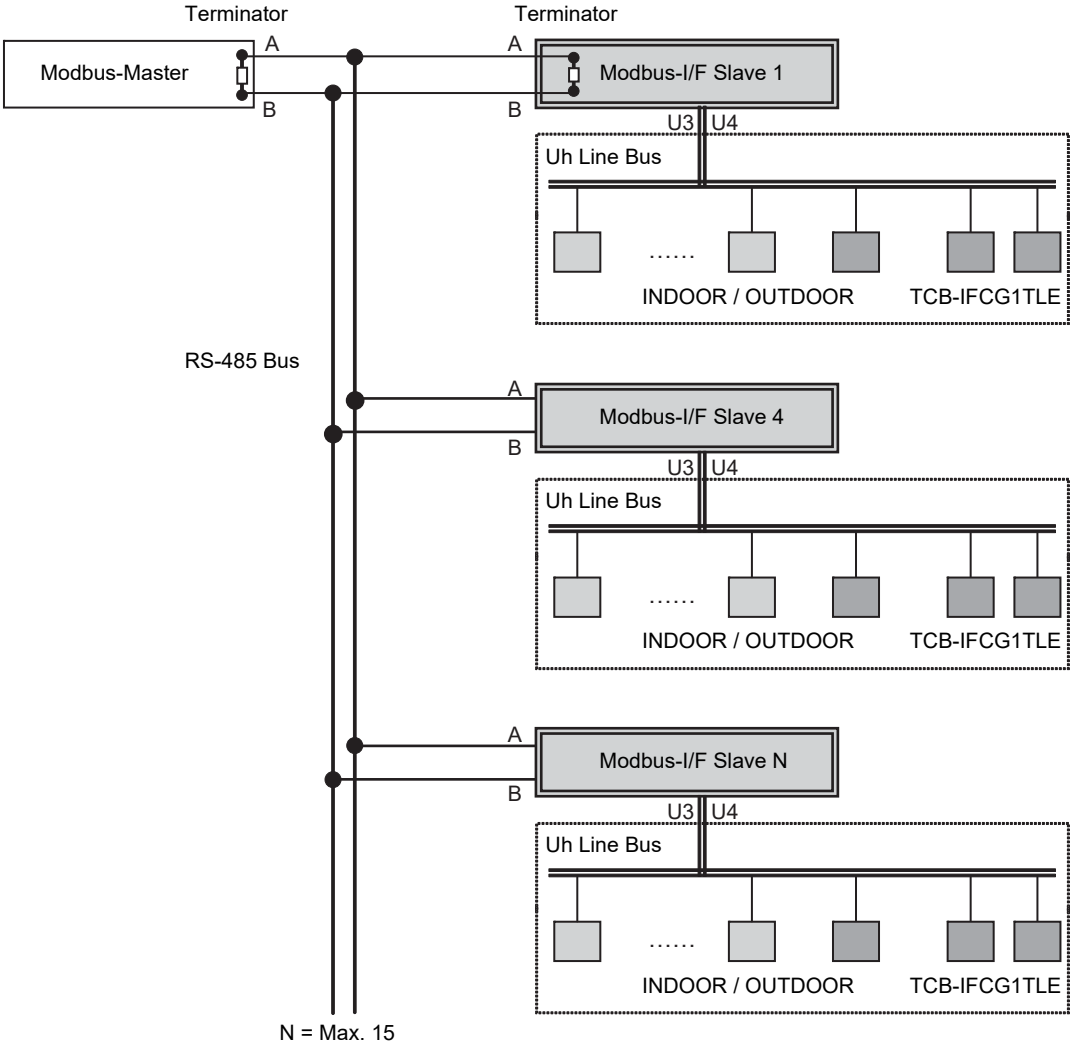
- Ventilation
  - Air to Air Heat exchanger

(2) Applicable air to water heat pump (ATW)
  - TU2C-LINK model

(3) Applicable TCC-LINK interface and TU2C-LINK interface
  - TCB-IFCG1TLE
  - TCB-SSRL011UUP-E (Room Air Conditioner TU2C-LINK Interface)

2 System configuration

An example of connection of the Modbus master device, the Modbus interface, and air conditioners is shown in the diagram below.



System devices configuration

Modbus interface is connected to the Uh Line communication bus. Modbus interface uses central control address assigned to indoor units to read the operating status of indoor units and change settings. The setting range for central control address of indoor units is based on the ranges indicated in the table below.

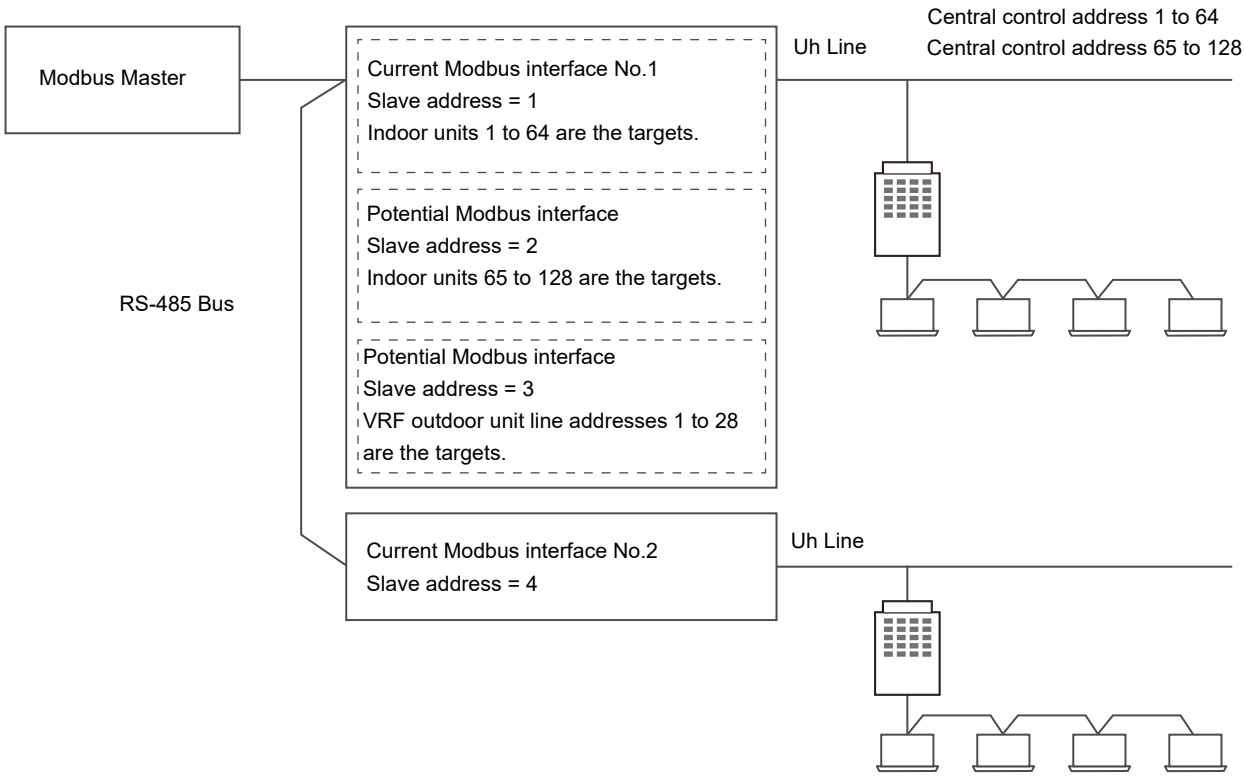
Indoor unit	Central control address setting range
Indoor unit compatible with Uh Line	1-128
Indoor unit not compatible with Uh Line	1-64

Device Name	Model	Number of Units Connected	Remarks
Outdoor unit	SMMS-7, MiNi-SMMS7, SMMS∞	16 systems (The line address is 1–28)	The model names for the outdoor units are covered in "9-9. Questions about functions".

Central control device	Central control address setting range
When used together with a central control device compatible with Uh Line	1-128
When used together with a central control device not compatible with Uh Line	1-64

A single Modbus interface uses three Modbus slave addresses. (One address for the current interface and two addresses for potential interfaces.)
As shown in the table below, the reply target of the Modbus interface varies according to the slave address for Modbus communication.

Slave address	Target air conditioner
Address set in Modbus interface	Operating status can be read and settings can be changed for indoor units with central control address 1 to 64.
Address set in Modbus interface +1	Operating status can be read and settings can be changed for indoor units with central control address 65 to 128.
Address set in Modbus interface +2	It is possible to read out capacity data of VRF outdoor unit line addresses 1 to 28. For an indoor unit not compatible with Uh Line, data of up to 16 lines can be read out.



When two or more Modbus interfaces are connected to a single line RS-485 bus, set the slave addresses of the Modbus interface as indicated in the table below.

Modbus interface	Slave address
No.1	1
No.2	4
No.3	7
No.4	10
No.5	13

2-1. Communication and power cable specification

2-1-1. Communication and power cable specification (use the following materials)

Uh Line	Topology	Bus
	Signal wire type	2-core shield wire
	Wire size, length	Refer to "Design of Control Wiring" (P.22 to P.25).
	Transmission rate	9.6 kbps
	Polarity	Not exist

RS-485	Topology	Bus
	Signal wire type	2-core shield wire
	Wire size, length	For 1.25 mm^2 (AWG16), up to 500 m (Total length)
	Number of nodes	Up to 32 (include master and slave device)
	Transmission rate	9.6 k / 1.92 k / 3.84 kbps (Setting by SW3 bit3,4) 3 OFF, 4 OFF 9600 bps, 3 ON, 4 OFF 19200 bps, 3 OFF, 4 ON 38400 bps, 3 ON, 4 ON 19200 bps.
	Polarity	Exist

For Power	Type	H05RN-F or 245IEC57
	Wire size, length	For 0.75 mm^2 , up to 50 m

2-1-2. RS-485 communication parameters

Modbus uses the Modbus RTU mode with the frame format shown below.

START	SLAVE ADDRESS	FUNCTION	DATA	CRC	END
>=3.5 characters	8 bits	8 bits	N*8 bits (N = 252 max.)	16 bits	>= 3.5 characters

RS 485 communication parameters are shown below.

- Character length = 11 bits, Data = 8 bits, Parity Check = even, Start bit =1 bit low, Stop bit = 1 bit high
- Communication: 9600/19200/38400 bps selected manually.
- Bit transmission order: LSB first (b0, b1….). Bit data is transmitted sequentially from the LSB.
- Byte transmission order: Big Endian. 0x1234 -> 0x12 then 0x34. Byte data is transmitted in the big endian order.
- Half duplex, 2 wires. 120 Ω termination. A: Non-inverted input, B: Inverted input
- After receiving a packet, a response is permitted after at least 3.5 characters.
- Connecter: 2 terminals

For further details, refer to the Specifications Manual of Modbus Interface.

3 Modbus functions

For further details, refer to the Specifications Manual of Modbus Interface.

3-1. Applied function codes

The following function codes are implemented. Broadcast message cannot be used.

Function code	Sub function code	Function name
0x01	None	Read coils
0x02	None	Read Discrete input
0x03	None	Read holding register
0x04	None	Read Input register
0x05	None	Write single coil
0x06	None	Write single holding register
0x08	0x00, 01, 02, 04, 0A, 0B, 0C, 0D, 0E, 0F, 11, 12, 14	Diagnostics
0x0B	None	Get Comm Event Counter
0x0C	None	Get Comm Event Log
0x0F	None	Write multiple coils
0x10	None	Write multiple holding registers
		Exception

The relationship between the start address specified in a request from the master device and the value shown by “Modbus-address for registers” in the address assignment table is as follows:

- For Coil
  Start address = (Value of Modbus-address for registers) - 1
- For Discrete input
  Start address = (Value of Modbus-address for registers) - 10001
- For Input register
  Start address = (Value of Modbus-address for registers) - 30001
- For Holding register
  Start address = (Value of Modbus-address for registers) - 40001

3-2. Exception response

Slave units must return an exception response when they receive a request which has been sent correctly but contains an error that applies to any of the following exception codes.

Exception code	Name
0x01	Illegal function A request of illegal function that is not supported by this specification is received
0x02	Illegal data address An illegal address that does not exist in section 7 of this manual. Address Assignment table or a data request size larger than 249 octets is specified. <For indoor unit registers> An address is specified for two or more devices.
0x03	Illegal data value Illegal data other than that defined in section 7 of this manual Address Assignment table is specified.
0x04	Slave device failure Slave device internal processing is not correct (When any error occurs during booting or reading the RAM).
0x05	ACK A slave device returns response ACK when it received a request while it is acquiring response data during the slave device initial data acquisition process.
0x06	Slave device busy When a slave device is busy and cannot return response data, this code is returned.
0x07	When a master's request is about an indoor unit which does not respond to the request. (However, the master's request is sent to the indoor unit.)

3-3. Counters and registers

TCB-IFMB641TLE is equipped with the following counters and registers that are cleared by a power-on reset, restart process, or a counter reset command.

Register / Counter	Description
Coils (R/W)	For air-conditioner database
Discrete input (R)	For air-conditioner database
Input register (R)	For air-conditioner database
Holding register (R/W)	For air-conditioner database
Event counter	Counted when a slave device has processed a received message correctly. This counter is not incremented when the exception command or 0B command is received.
Message counter	Retains the number of messages sent by the slave device.
Diagnostics register	A 16-bit register that retains the content of diagnosis. 0x0000: Normal 0x0001: CRC error 0x0002: EEPROM checksum error Other: Reserved
Bus Communication Error Count	Total number of CRC errors detected by slave devices
Exception Error Count	Total number of exception errors detected by slave devices
Slave Message Count	Total number of messages received by the corresponding slave device
No Response Count	Total number of messages received by the corresponding slave device, which are not accompanied by response
Busy Count	Total of Busy Count (exception error) detected by the corresponding slave device
Bus Character Overrun Count	Number of character overrun errors (failure in receiving part of the data) detected in messages to the corresponding slave device

3-4. List of functions for air conditioner

For further details, refer to the Specifications Manual of Modbus Interface.
<For indoor units>

Function	Monitoring	Controlling
ON / OFF	○	○
Setting temperature	○	○
Auto cool temperature setting	○	○
Auto heat temperature setting	○	○
Operation mode	○	○
Fan speed	○	○
Louver	○	○
Remote controller permit / Prohibit	○	○
Filter sign	○	○ (filter sign reset)
Ventilation On/Off	○	○
Ventilation Mode	○	○
Ventilation Fan speed	○	○
Save operation rate	○	○
Accumulated operation time	○	—
Alarm	○	—
Room temperature	○	—
Check code	○	—
Thermo status	○	—
Facility request	○	—
Model name *	○	—
Serial number *	○	—
Indoor unit capacity	○	—
Indoor unit type	○	—
Operation mode / Fan range	○	—
Cooling temperature range	○	—
Heating temperature range	○	—
Dry temperature range	○	—
Auto temperature range	○	—
Ventilation mode/fan speed, valid/invalid	○	—
Save operation rate valid/invalid	○	—

* Different from product when service board is used.

NOTE

- The functions listed above may vary according to the product.
- The DDC setting type of the Dx-coil controller (TCB-IFDMX01UP-E, TCB-IFDMR01UP-E) cannot be controlled from the Modbus Interface.
  If the Dx-coil controller TA/TF/DDC setting type is changed, restart the Modbus Interface.
- In the case of Auto cool temperature setting ≥ Auto heat temperature setting, both setting values will be transmitted to the indoor unit.
  In the case of Auto cool temperature setting < Auto heat temperature setting, the setting values will not be transmitted.

<For outdoor units>
The EER function will be available with the Modbus interface for product lots manufactured in January 2022 or after.
The model name of the outdoor unit that supports the EER function is mentioned in "9-9. Questions about functions".

Function	Monitoring	Controlling
EER function start/stop (Acquire cooling capacity data from the outdoor units)	○	○
Line address bitmap (The line address is 1–32)	○	—
EER function use bitmap (The line address is 1–32)	○	—
Outdoor communication error bitmap (The line address is 1–32)	○	—
Cooling capacity data (The line address is 1–32)	○	—

3-5. List of functions for TCB-IFCG1TLE

For further details, refer to the Specifications Manual of Modbus Interface.

Function	Monitoring	Controlling
ON / OFF input for TCB-IFCG1TLE	○	—
Alarm input for TCB-IFCG1TLE	○	—
Din1 input for TCB-IFCG1TLE	○	—
Din2 input for TCB-IFCG1TLE	○	—
Din3 input for TCB-IFCG1TLE	○	—
Din4 input for TCB-IFCG1TLE	○	—
Analog input for TCB-IFCG1TLE	○	—
Relay 1ch output for TCB-IFCG1TLE	—	○
Relay 2ch output for TCB-IFCG1TLE	—	○
Relay 3ch output for TCB-IFCG1TLE	—	○
Relay 4ch output for TCB-IFCG1TLE	—	○
Analog output for TCB-IFCG1TLE	—	○
Local operation prohibit for TCB-IFCG1TLE	—	○

3-6. List of functions for air to water heat pump (ATW)

The ATW function is available with the Modbus interface for product lots manufactured in October 2021 or after.
For further details, refer to the Specifications Manual of Modbus Interface.

Function	Special functions for ATW	Monitoring	Controlling
ON / OFF *2		○	○
Zone1 / 2 ON / OFF	○	○	○
HOT WATER ON / OFF	○	○	○
Operation mode *3		○	○
Remote controller permit / Prohibit		○	○
Zone1 Setting temperature	○	○	○
Zone2 Setting temperature	○	○	○
HOT WATER Setting temperature	○	○	○
AUTO TEMP operation ON / OFF	○	○	○
Night setback operation ON / OFF	○	○	○
Frost protection operation ON / OFF	○	○	○
Anti Bacteria operation ON / OFF	○	○	○
Alarm		○	—
Check code		○	—
Floor Dry operation ON / OFF	○	○	—
Zone1 Control Temperature	○	○	—
Zone2 Control Temperature	○	○	—
HOT WATER Control Temperature	○	○	—
Thermo status		○	—
Facility request		○	—
Model name *1		○	—
Serial number *1		○	—
Indoor unit capacity		○	—

Function	Special functions for ATW	Monitoring	Controlling
Indoor unit type		○	—
Operation mode / Fan range		○	—
Water temperature control mode / Room temperature control mode status	○	○	—
HOT WATER Device Connection status	○	○	—
Zone1 Device Connection status	○	○	—
Zone2 Device Connection status	○	○	—
Zone1 / Zone2 Cooling Mode, water temperature range	○	○	—
Zone1 Heating Mode, water temperature range	○	○	—
Zone2 Heating Mode, water temperature range	○	○	—
HOT WATER temperature range	○	○	—
Room temperature control mode, Cooling temperature range	○	○	—
Room temperature control mode, Heating temperature range	○	○	—
Function status	○	○	—

*1 Different from product when service board is used.

*2 Turn on and off both Zone1 / 2 and HOT WATER.

*3 Operation modes are only heating and cooling.

NOTE

Notes on controlling air to water heat pump (ATW) from Modbus Interface

- Operation modes are heating and cooling.
  With cooling mode, status may be no use depending on the settings of ATW.
- When Floor Dry operation ON/OFF status is ON, control of ATW is entirely disabled.
- AUTO TEMP operation ON/OFF setting cannot be used in the following cases.
  - In the case of room temperature control mode status
  - When External Thermo Control status is use
- "HOT WATER Temperature Setting" register cannot be used in the following cases.
  - When HOT WATER Device Connection status is no use
  - When Hot Water Tank Thermo Control status is use
  - When Frost protection operation is being performed
- "Zone1 Temperature Setting" register cannot be used in the following cases.
  - When Zone1 Device Connection status is no use
  - When External Thermo Control status is use
  - When Frost protection operation is being performed
  - When AUTO TEMP operation is being performed
- "Zone2 Temperature Setting" register cannot be used in the following cases.
  - When Zone2 Device Connection status is no use
  - When External Thermo Control status is use
  - When Frost protection operation is being performed
  - When AUTO TEMP operation is being performed
- Use of "Zone2 Temperature Setting" register is limited to the case of Zone1 Temperature ≥ Zone2 Temperature.
  - If Zone2 Temperature setting is higher than Zone1 temp, Modbus interface change Zone2 temp same as Zone1 automatically and send it.
  - If Zone1 Temperature setting is lower than Zone2 temp, Modbus interface send Zone1 and Zone2 temp send. Zone2 temp is same as Zone1.
- The upper/lower limits of "Zone1 Temperature Setting" register and "Zone2 Temperature setting" register are different between water temperature control mode and room temperature control mode status of ATW.

3-7. List of functions for Room Air Conditioner TU2C-LINK Interface (RAC)

For further details, refer to the Specifications Manual of Modbus Interface.

NOTE

The RAC Interface model name is RAC TU2C-LINK Interface (TCB-SSRL011UUP-E).

(1) RAC Interface is in the “Residential AC type” setting

Function	Special functions for Residential AC type	Monitoring	Controlling
ON / OFF		○	○
Setting temperature		○	○
Operation mode		○	○
Fan speed		○*4	○*4
Louver		swing / stop	swing / stop
Save operation rate *2		○ (Power select)	○ (Power select)
Pure Filter ON/OFF	○	○	
Hi-Power ON/OFF	○	○	○
ECO ON/OFF *3	○	○	○
Quiet FCU ON/OFF	○	○	○
Silence CDU ON/OFF *3	○	○	○
Alarm		○	
Room temperature		○	
Check code		○	
Model name *1		○	
Operation mode / Fan range		○	
Cooling temperature range		○	
Heating temperature range		○	
Dry temperature range		○	
Auto temperature range		○	
Save operation rate valid/invalid		○	
Function status	○	○	

*1 Model name is Room Air Conditioner's model name.

*2 Save operation rate “0x0003 = 100% Save (Forcibly Thermo OFF)” cannot be used.

*3 Functions currently being performed on the RAC side may be cancelled depending on controls implemented later.

*4 When operation mode is set to “Dry”, fan speed can only be on auto.

The ON/OFF control of the functions of the RAC interface is subject to the limitations shown in the following table.

✓: ON/OFF setting is allowed. ×: ON/OFF setting is prohibited.

			Operation mode					
		Operation stopped	Heat	Cool	Dry	Fan	Auto heat	Auto cool
Controlling	Hi-Power ON/OFF	✓	✓	✓	×	×	✓	✓
	ECO ON/OFF	✓	✓	✓	×	×	✓	✓
	Quiet FCU ON/OFF	✓	✓	✓	×	✓	✓	✓
	Silence CDU ON/OFF	✓	✓	✓	×	×	✓	✓

(2) RAC Interface is in the “Light commercial AC type” setting

Function	Special functions for Residential AC type	Monitoring	Controlling
ON / OFF		○	○
Setting temperature		○	○
Operation mode		○	○
Fan speed		○	○
Louver		swing / stop	swing / stop
Save operation rate			
Pure Filter ON/OFF	○		
Hi-Power ON/OFF	○		
ECO ON/OFF	○		
Quiet FCU ON/OFF	○		
Silence CDU ON/OFF	○		
Alarm		○	
Room temperature		○	
Check code		○	
Model name		○	
Operation mode / Fan range		○	
Cooling temperature range		○	
Heating temperature range		○	
Dry temperature range		○	
Auto temperature range		○	
Save operation rate valid / invalid			
Function status	○		

NOTE

(Please refer the Installation manual of Modbus interface for details)

- When connecting with RAC interface, need to set the "Central controller ID setting" of the Modbus interface to "old controller".
- When connecting with RAC interface and also connecting with air conditioning central controller (BMS-CT2560U-E,TCB-SC640U-E), need to set the "Central controller ID setting" of air conditioning central controller to "old controller".
- ATW and RAC interfaces cannot be connected at the same time.
- The maximum number of indoor units that can be connected is 64 IDUs.

3-8. List of functions for VRF Dx-coil controller

For further details, refer to the Specifications Manual of Modbus Interface.

NOTE

- The VRF Dx-coil controller model name is TCB-IFDMX01UP-E, TCB-IFDMR01UP-E.
- The functions listed may vary according to the product.
- The DDC setting type of the Dx-coil controller cannot be controlled from the Modbus Interface.
- If the Dx-coil controller TA/TF/DDC setting type is changed, restart the Modbus Interface.

(1) VRF Dx-coil controller is in the “TA mode” or the "TF mode" setting

Function	Monitoring	Controlling
ON / OFF	○	○
Setting temperature	○	○
Auto cool temperature setting	○	○
Auto heat temperature setting	○	○
Operation mode	○	○
Fan speed	○ HH,H,L,AUTO	○ HH,H,L,AUTO
Louver		
Remote controller permit / Prohibit	○	○
Filter sign		
Ventilation On/Off		
Ventilation Mode		
Ventilation Fan speed		
Save operation rate	○	○
Accumulated operation time	○	
Alarm	○	
Room temperature / TF sensor	○	
Check code	○	
Thermo status	○	
Facility request	○	
Model name *	○	
Serial number *		
Indoor unit capacity	○	
Indoor unit type	○	
Operation mode / Fan range	○	
Cooling temperature range	○	
Heating temperature range	○	
Dry temperature range	○	
Auto temperature range	○	
Ventilation mode / fan speed, valid / invalid		
Save operation rate valid / invalid	○	

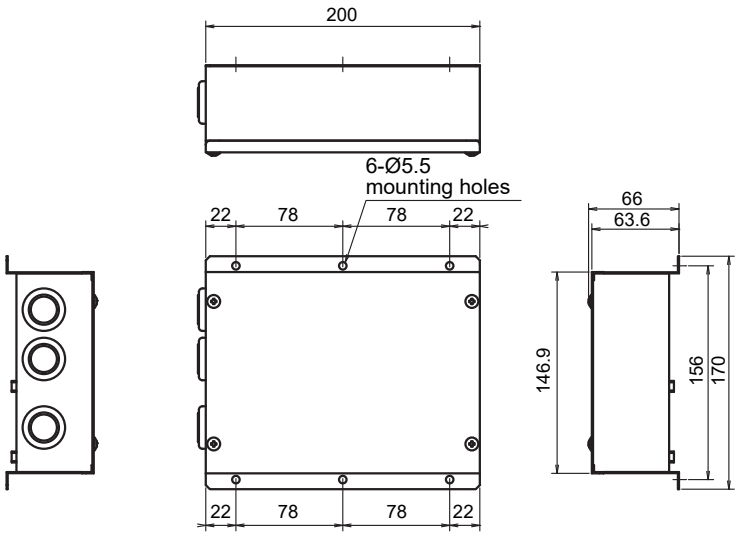
(2) VRF Dx-coil controller is in the “DDC mode" setting

Function	Monitoring	Controlling
ON / OFF	○	
Setting temperature		
Auto cool temperature setting		
Auto heat temperature setting		
Operation mode	○	
Fan speed	○ HH,H,L,AUTO	
Louver		
Remote controller permit / Prohibit	○	
Filter sign		
Ventilation On/Off		
Ventilation Mode		
Ventilation Fan speed		
Save operation rate		
Accumulated operation time	○	
Alarm	○	
Room temperature		
Check code	○	
Thermo status	○	
Facility request	○	
Model name *	○	
Serial number *		
Indoor unit capacity	○	
Indoor unit type	○	
Operation mode / Fan range	○	
Cooling temperature range		
Heating temperature range		
Dry temperature range		
Auto temperature range		
Ventilation mode / fan speed, valid / invalid		
Save operation rate valid / invalid		

* Different from product when service board is used.

4 Product specification

■ Modbus Interface

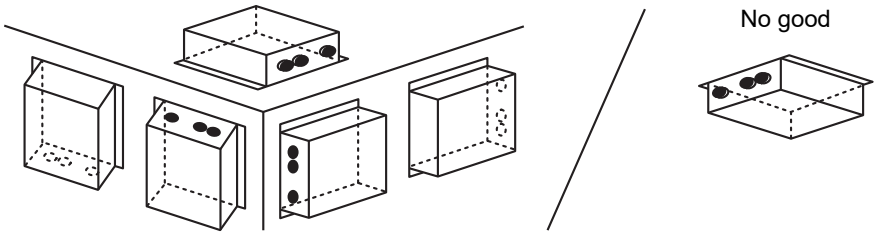


Power supply	220 - 240 VAC, 50/60 Hz
Power consumption	3 W
Operating temperature / humidity	0 to 40 °C, 10 to 90 % RH
Storage temperature	-20 to +60 °C
Dimensions	66 (H) x 170 (W) x 200 (D) mm
Mass	1.1 kg

5 Installation of the Modbus Interface

■ Modbus Interface installation method and orientation

There are five installation methods for this Modbus Interface as shown below: surface mount and wall mounts. Use the attached screws.



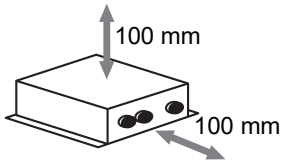
REQUIREMENT

Do not install the unit in any of the following places.

- Humid or wet place
- Dusty place
- Place exposed to direct sunlight
- Place where there is a TV set or radio within one meter
- Place exposed to rain (outdoors, under eaves, etc.)

■ Installation space and maintenance space

A side space for connecting through cable inlets and an upper space for maintenance must be reserved before installation.
The other sides can be adjacent to surrounding objects.



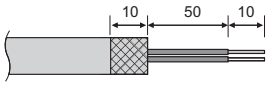
6 Connection of power cables / earth wires / communication cables

⚠ CAUTION

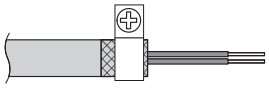
- The RS-485 communication cables have polarity. Connect A(+) to A(+), and B(-) to B(-). If connected with incorrect polarity, the unit will not work.
- The Uh Line communication cable have no polarity.

Connect power cables, earth wires, and communications cables to the specified terminals on the terminal block.

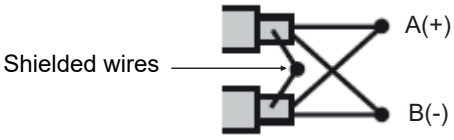
Length of stripped RS-485 communication cable (not shielded wire ends)



Clamping RS-485 communication cable (address 1)

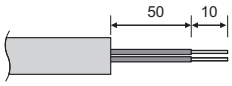


The RS-485 communication cable must be earthed on address 1 (Modbus Interface address SW=1) Modbus Interface. Fix the shielded wire of RS-485 communication cable with metal cable clamp and screw it to the chassis to earth it.

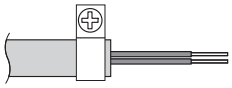


The shielded wires must be crimped with closed end connectors on interfaces with address of other than 1 and not shielded wire ends.

Length of stripped RS-485 (Shielded wire ends) and Uh Line communication cable

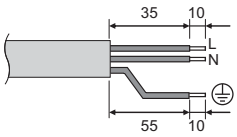


Clamping communication cable



Do not connect the shield wire to the earth. It should be open and insulated.

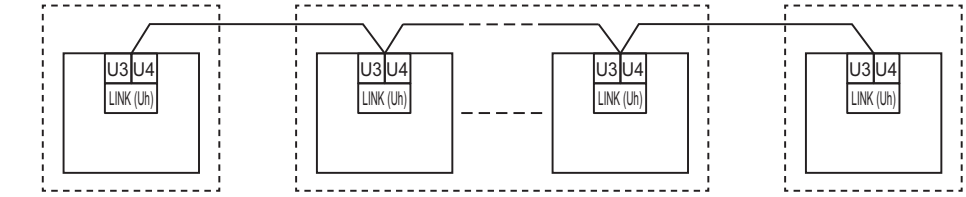
Length of stripped power cable



Termination resistance setting

- TU2C-LINK / TCC-LINK termination resistance setting ..<For TCC-LINK>
  Leave just 1 line of the termination resistance in the interface board of the outdoor unit (centre unit) ON, and turn all the others OFF. (Refer to the wiring diagram attached to the outdoor unit for the position of SW.)
  <For TU2C-LINK>
  For the central control wiring (Uh line), set the termination resistance that is farthest away on the wiring between this central controller and the other unit (VRF, light commercial, air to air heat exchanger, general purpose control interface, air to water heat pump) to ON.

Refer to the manual of each model for the termination resistance setting method.



Termination resistance ON **Termination resistance OFF** **Termination resistance ON**

Shield grounding process

- Central control wiring shielded wire ..... When using the central remote controller with one unit, open the shielded wire of the central control wiring and perform insulation processing.
  When using the central remote controller with multiple units, connect the shield of the central control wiring to the closed end and open the shield at the final end of the central remote controller to perform insulation processing.
  Perform the central control wiring shield grounding on the air conditioner side.

REQUIREMENT

- Be sure to install a circuit breaker or all-pole isolating switch (with a contact breaking distance of at least 3 mm) on the primary side of the power supply.
- Fasten the screws to the terminal block with torque of 0.5 N•m.

■ Design of Control Wiring

Communication method and model name

The TU2C-LINK model (U series) can be used together with previous models (other than U series).
For details of the model and communication method, see the following table.

Communication method	TU2C-LINK (U series)	TCC-LINK (other than U series)
Outdoor unit	MMY-M**U**P*** U series model	Other than on the left (MMY-MAP***, MCY-MAP***, etc.)
Indoor unit	MM*-**U**P*** U series model	Other than on the left (MM*-AP***, etc.)
Wired remote controller	RBC-AMS**U**** U series model	Other than on the left
Wireless remote controller receiver	RBC-AXR**U**** U series model TCB-AXR**U**** U series model	Other than on the left
Central control device	***-*****U**** U series model	Other than on the left

When the connected outdoor unit is Super Multi u series (U series)

Follow the wiring specifications in the table below even when there is a mix of U series and non-U series in the connected indoor units or remote controllers.

Wiring specifications

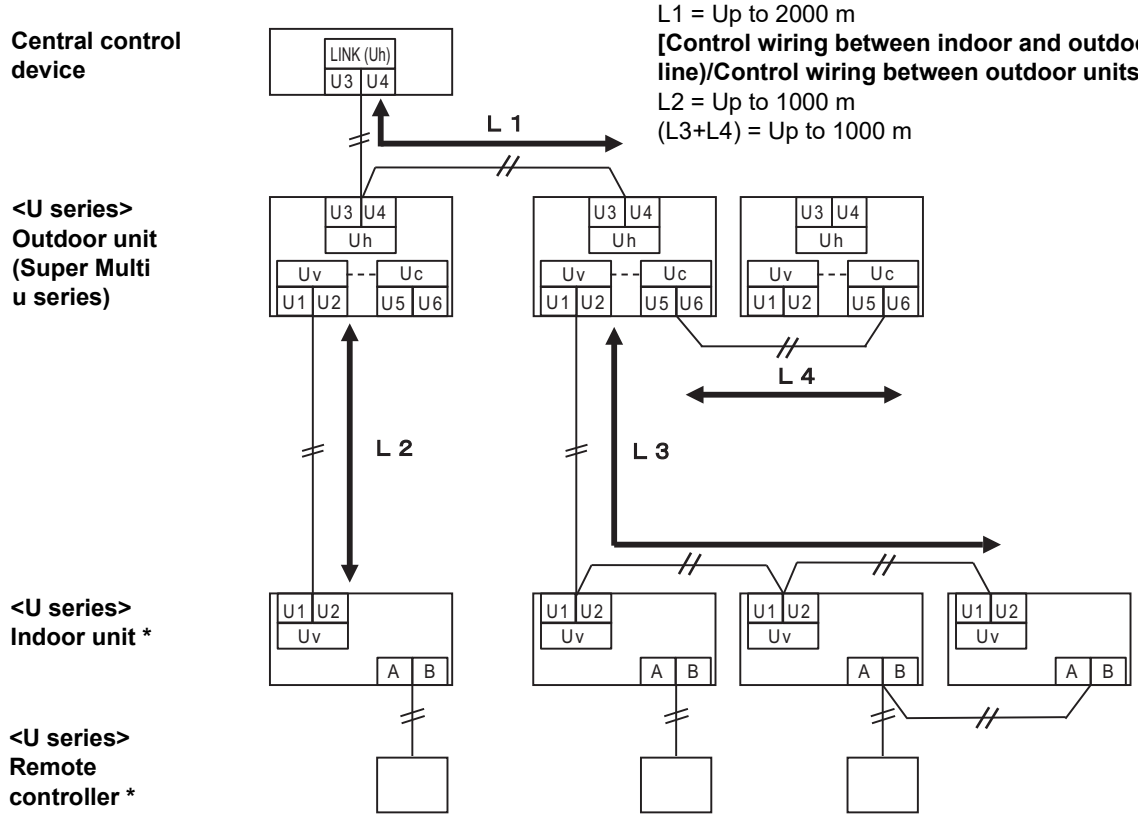
Item	Communication line
	Central control wiring (Uh line)
Wire diameter	1.0 to 1.5 mm^2 (up to 1000 m)
	2.0 mm^2 (up to 2000 m)
Wire type	2-core, non-polar
Wire types that can be used	Shielded wire

REQUIREMENT

When wiring the control wiring between indoor and outdoor units (Uv line)/control wiring between outdoor units (Uc line) and the central control wiring (Uh line), use the same wire type and diameter for each line.
Using a mixture of different wire types and diameters may cause a communication error.

System diagram

[Central control wiring (Uh line)]
L1 = Up to 2000 m
[Control wiring between indoor and outdoor units (Uv line)/Control wiring between outdoor units (Uc line)]
L2 = Up to 1000 m
(L3+L4) = Up to 1000 m



* The wiring specifications in the system diagram above are the same even when the indoor unit or remote controller are other than the U series.

When the connected outdoor units are other than Super Multi u series (U series)

Wiring specifications

Item	Communication line
	Control wiring between indoor and outdoor units and central control wiring
Wire diameter	1.25 mm^2 (up to 1000 m)
	2.0 mm^2 (up to 2000 m)
Wire type	2-core, non-polar
Wire types that can be used	Shielded wire

REQUIREMENT

When wiring the control wiring between indoor and outdoor units/central control wiring and the control wiring between outdoor units, use the same wire type and diameter for each line.
Using a mixture of different wire types and diameters may cause a communication error.

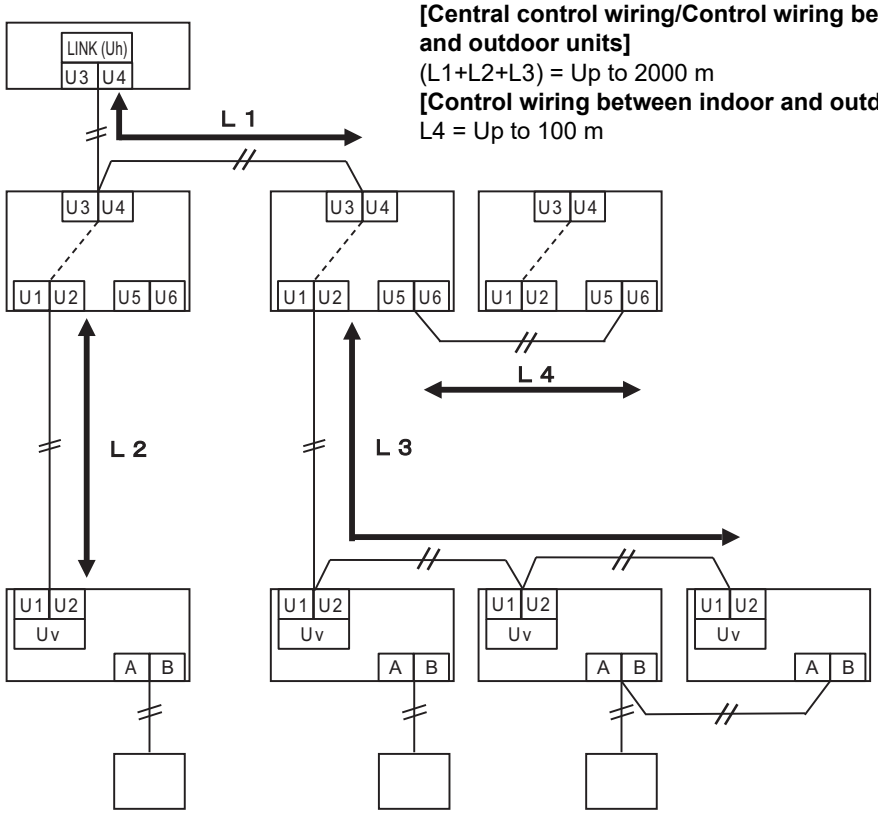
System diagram

Central control device

<Other than U series> Outdoor unit (Super Module Multi i series • Super Multi mini)

<U series> Indoor unit *

<U series> Remote controller *



[Central control wiring/Control wiring between indoor and outdoor units]
(L1+L2+L3) = Up to 2000 m
[Control wiring between indoor and outdoor units]
L4 = Up to 100 m

* The wiring specifications in the system diagram above are the same even when the indoor unit or remote controller are other than the U series.

When connecting to a previous model light commercial, air to air heat exchanger, air to water heat pump, or general purpose equipment control interface

Follow the wiring specifications in the table below even when there is a mix of U series and non-U series in the connected indoor units or remote controllers.

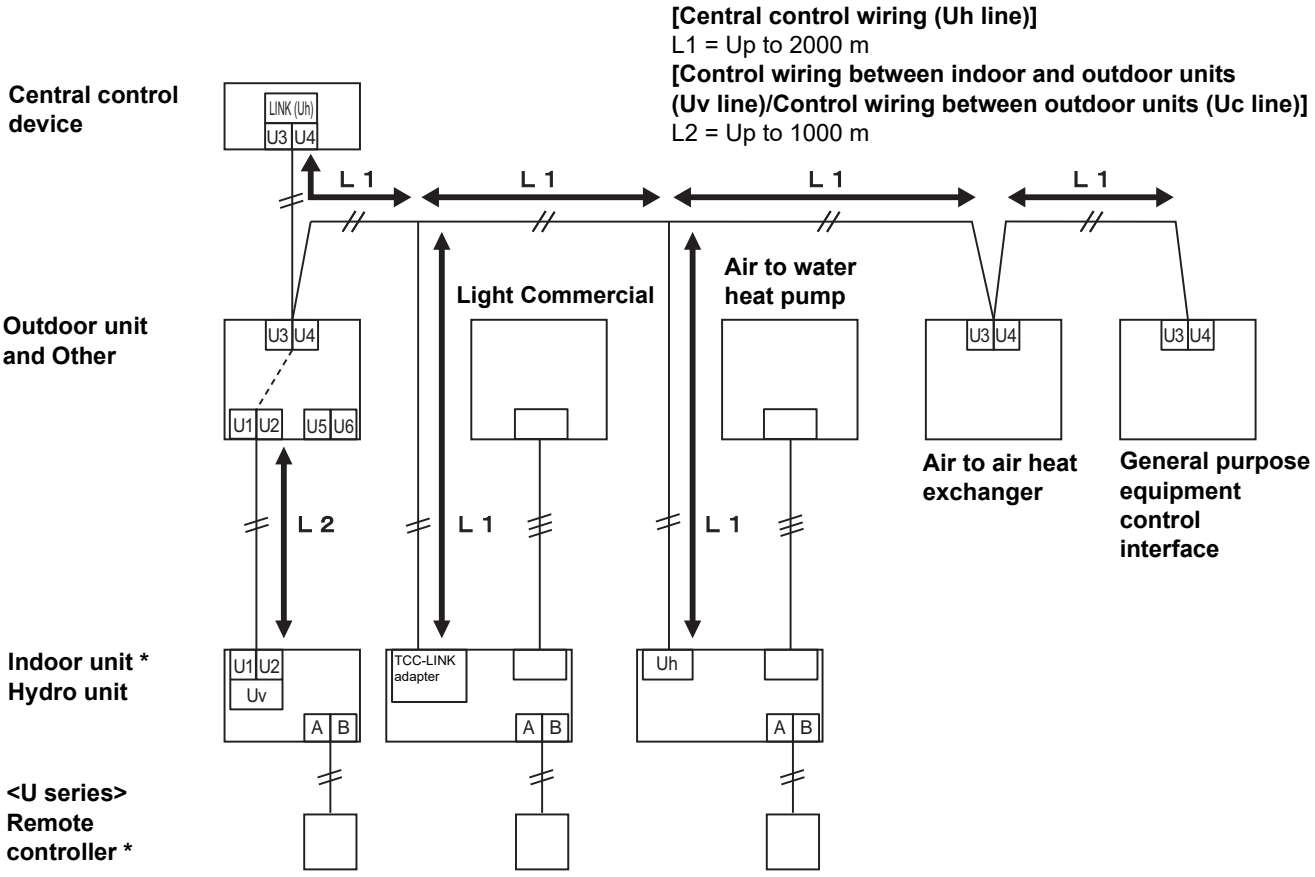
Wiring specifications

Item	Communication line
	Central control wiring (Uh line)
Wire diameter	1.25 mm^2 (up to 1000 m)
	2.0 mm^2 (up to 2000 m)
Wire type	2-core, non-polar
Wire types that can be used	Shielded wire

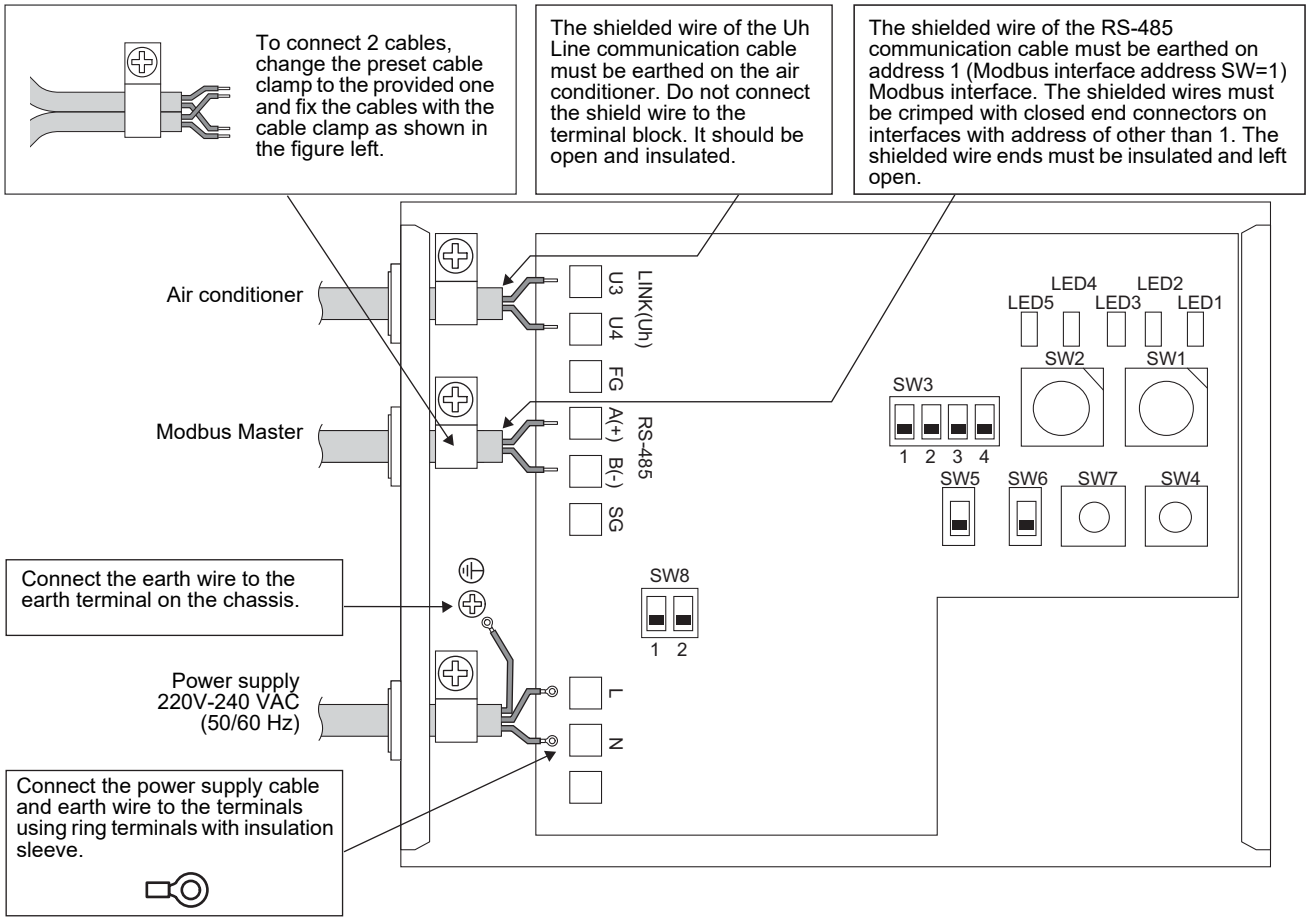
REQUIREMENT

When wiring the control wiring between indoor and outdoor units (Uv line)/control wiring between outdoor units (Uc line) and the central control wiring (Uh line), use the same wire type and diameter for each line.
Using a mixture of different wire types and diameters may cause a communication error.

System diagram



* The wiring specifications in the system diagram above are the same even when the indoor unit or remote controller are other than the U series.



REQUIREMENT

Disconnect the appliance from the main power supply.

This appliance must be connected to the main power supply by a circuit breaker or switch with a contact separation of at least 3 mm.

Fasten the screws to the terminal with torque of 0.5 Nm.

■ Wiring connection

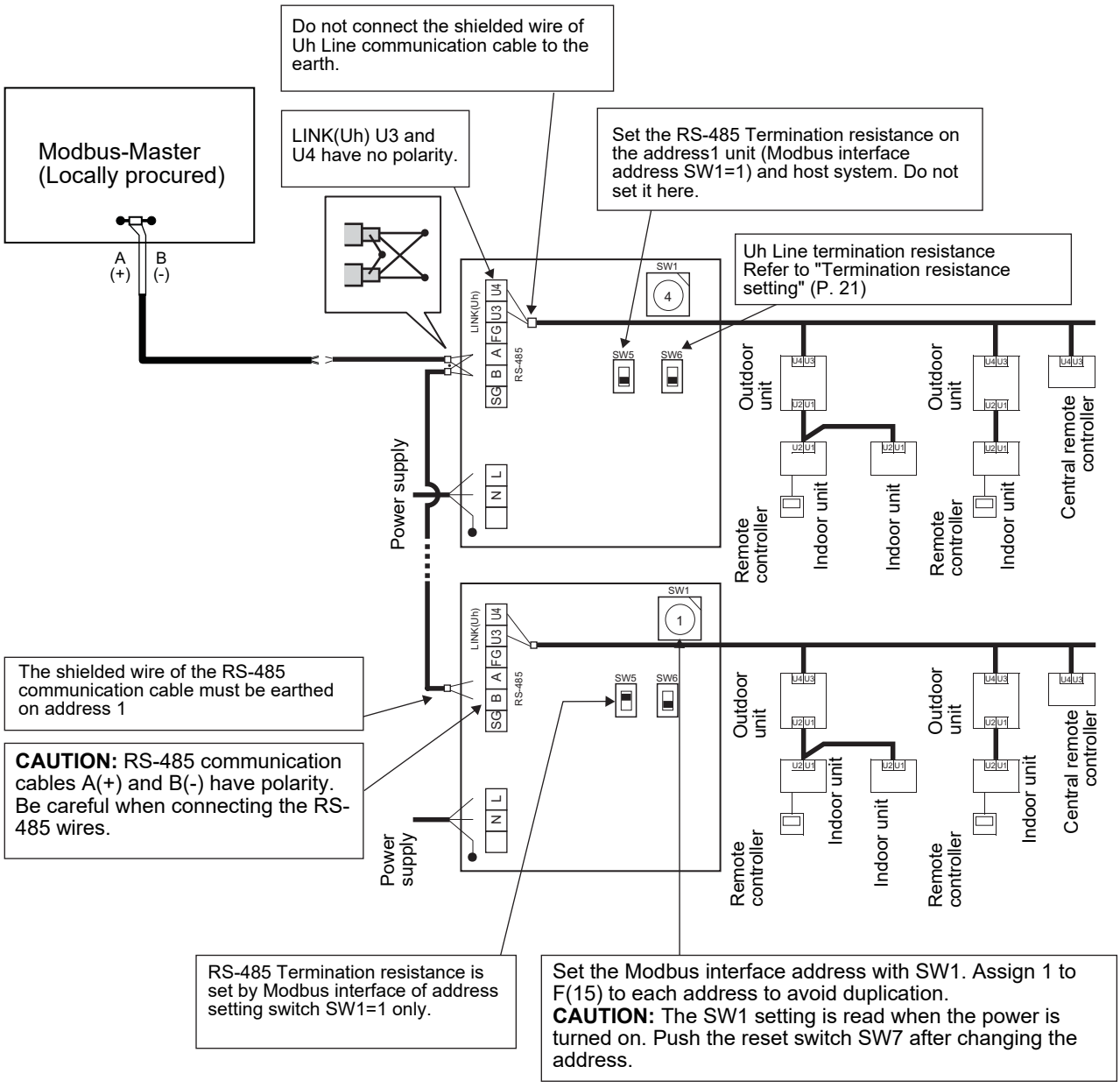
The following describes a connection example when two or more Modbus Interface units are used.

Termination resistance setting (See “7 Switches for setting” for the setting method.)

- Set the RS-485 Termination resistance to “120 ohm” for address1 (Modbus Interface address SW1=1) Modbus Interface unit, and set to “open” for other units.
- Set the Uh Line Termination resistance.
  Refer to "Termination resistance setting" (P. 21)

Shield earthing

- The shielded wire of the RS-485 communication cable must be earthed on address 1 (Modbus Interface address SW=1) Modbus Interface. Fix the shielded wire of RS-485 communication cable with metal cable clamp and screw it to the chassis to earth it. The shielded wires must be crimped with closed end connectors on interfaces with address of other than 1. The shielded wire ends must be insulated and left open.
- Do not connect the shield wire to the terminal block. It should be open and insulated. The shielded wire of the Uh Line communication cable must be earthed on the air conditioner.



7 Switches for setting

The following settings are necessary to use Modbus interface.

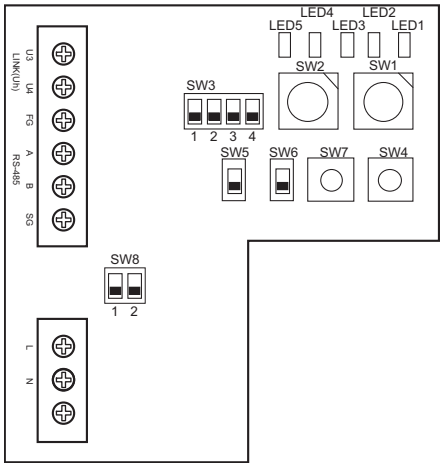
- SW1 Sets the Modbus slave addresses of the Modbus interface.
  A single Modbus interface uses three Modbus slave addresses.
  (One address for the current interface and two addresses for potential interfaces.)
  When two or more Modbus interfaces are used for a single line RS-485 bus, set the addresses as indicated in the table below.
  Assign address numbers in ascending order, from smallest to largest.

Modbus interface	Address
No.1	1
No.2	4
No.3	7
No.4	10
No.5	13

⚠ CAUTION

- **For the Modbus Interface whose address SW1=1, perform Termination resistance setting.**
- **When the SW1 setting has been changed, press the reset switch SW7. The new address setting is read.**
- **To clear all accumulated operating values to 0, set SW2 to 3 and press the reset switch SW7, and then set SW2 to 0 and press the reset switch SW7 again.**

- SW2 Test switch Not used during operation. Set these switches to zero (0) or “all OFF”.
- SW3 Test switch Bit1: Central controller ID setting mode switch
- Bit2: Switches the LED5 display for test runs.
- Bit3, 4: RS-485 baud rate setting (9600/19200/38400) bps.
- SW4 Test switch Not used during operation.
- SW5 RS-485 Termination resistance select switch
  Set “120 ohm” only when the Modbus interface address SW=1, and set “open” for other Modbus interfaces.
- SW6 Uh Line Termination resistance select switch
  Refer to "Termination resistance setting" (P. 21)
- SW7 Reset switch
  When performing an address setting with SW1, push this reset switch after the address setting to read the set value.
- SW8 Test switch (Not used during operation. All OFF usually)



SW1	Modbus interface address set switch		
	1-F	Modbus interface address	
	0	Not used	
SW2	Test switch (0 usually)		
SW3	Bit1: Uh Line communication setting mode switch. OFF: Normal circumstance; ON: Central controller ID setting mode Bit2: Switches the LED5 display for test runs. OFF RS-485 communication status indicator. ON Uh Line communication status indicator. Bit3, 4: RS-485 baud rate setting (9600/19200/38400) bps. 3 OFF, 4 OFF 9600 bps, 3 ON, 4 OFF 19200 bps, 3 OFF, 4 ON 38400 bps, 3 ON, 4 ON 19200 bps.		
SW4	Test switch		
SW5	RS-485 Termination resistance select switch	ON 120 ohm	ON Open
SW6	Uh Line Termination resistance select switch	ON 100 ohm	ON Open
SW7	Reset switch		
SW8	Test switch (all OFF usually)		
LED1	Power indicator		
LED2	RS-485 communication status indicator		
LED3	Uh Line communication status indicator		
LED4	Uh Line communication error indicator		
LED5	Test indicator		

REQUIREMENT

- **RS-485 Termination resistance select switch SW5.**
  Set “120 ohm” only when the Modbus interface address SW=1, and set “open” for other Modbus interfaces.
- **The Uh Line Termination resistance is set on the air conditioner side. Set SW6 to “open”.**

■ Central controller ID setting mode

The central controller ID setting mode changes the central controller ID of the Modbus interface. (central controller ID at the time of factory shipping is central controller ID 20.)
The central controller ID number indicates the Uh Line address and communication priority for the Uh Line compatible central control device.

Change the central controller ID in the following cases.

- If using Modbus interface with a central control device not compatible with Uh Line, set the central controller ID as “old controller.”

(1) Transition to central controller ID setting mode

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.
- Turn on bit1 of SW3.

(2) Verification of central controller ID

- If SW1 is set to 0, central controller ID is displayed by LED2 to LED5.

○=ON, ●=OFF

Central controller ID	LED5	LED4	LED3	LED2
Central controller ID7	●	●	●	○
Central controller ID8	●	●	○	●
Central controller ID9	●	●	○	○
Central controller ID10	●	○	●	●
Central controller ID11	●	○	●	○
Central controller ID12	●	○	○	●
Central controller ID13	●	○	○	○
Central controller ID14	○	●	●	●
Central controller ID15	○	●	●	○
Central controller ID16	○	●	○	●
Central controller ID17	○	●	○	○
Central controller ID18	○	○	●	●
Central controller ID19	○	○	●	○
Central controller ID20 (initial value)	○	○	○	●
Old controller	○	○	○	○

(3) Change of central controller ID

- Change SW1 to 1-F and press SW4.
- If using Modbus interface with a central control device not compatible with Uh Line, set as “old controller.”

Central controller ID	SW1
Central controller ID7	1
Central controller ID8	2
Central controller ID9	3
Central controller ID10	4
Central controller ID11	5
Central controller ID12	6
Central controller ID13	7
Central controller ID14	8
Central controller ID15	9
Central controller ID16	A
Central controller ID17	B
Central controller ID18	C
Central controller ID19	D
Central controller ID20 (initial value)	E
Old controller	F

NOTE

Because the Uh Line compatible central control device uses high-order central controller ID, setting of central controller ID1 to ID6 cannot be done with Modbus interface.

(4) Conclusion of central controller ID setting mode

- Turn off bit1 of SW3.
- Return the SW1 value to that of the Modbus slave address.

IMPORTANT

Immediately after the power is turned on for the Modbus interface, the SW1 value is the Modbus slave address. When the power is turned on, if the SW1 value is that of the central controller ID or is 0, the Modbus interface will not operate properly.
When concluding the central controller ID setting mode, be sure to return the SW1 value to that of the Modbus slave address.

8 Test run

Start the system to perform operation check by following the procedure below.
The air conditioner and TCB-IFCG1TLE connected by the Uh Line are hereinafter called the Uh Line device.

8-1. Preparation

No.	Item	Details		Procedure
1	Preparation	Discuss with a customer to determine details of the following. • Select devices, and create a system diagram. • Determine the addresses of Uh Line devices and create an address management table. • Check the slave address for the Modbus IF on the system.		
2	Device installation	Install Modbus Interface.		Refer to "Installation of the Modbus Interface" in this manual. For further details, refer to the Installation manual of each device.
3	Wiring	Connection of power cables / earth wires / communication cables to Modbus Interface.		Refer to "Connection of power cables / earth wires / communication cables" in this manual. For further details, refer to the Installation manual of each device.
4	Device setting	Set the air conditioner and the interfaces.		For further details, refer to the Installation manual of each device.
		1) Uh Line device	Central control address setting.	
		2) Modbus Interface	Address setting, RS-485 termination resistance setting, RS-485 baud rate.	Set the address of the devices according to the address management table. Refer to "Switches for setting" in this manual.

8-2. Check items before test run

No.	Check item
1	Has the electrical work (power supply and communication wiring work) been completed? **Key point** 1.Check that the polarity (A(+) / B(-)) of the wiring is correct. 2.Check that the terminal resistance has been set. 3.When a Digital Inverter / Super Digital Inverter is connected, check that the Uh Line adaptor has been connected.
2	Has the central control address of the Indoor units (DN=03) / General Purpose Interface(TCB-IFCG1TLE) (SW1 and SW2 setting) been set?
3	Are Modbus interface turned on?

8-3. Uh Line communication check

Complete the test run of air conditioners before Uh Line communication check.

■ Before starting Uh Line communication check

- Set the indoor unit central control address so that it does not match any other indoor unit addresses.
- Be sure to press the reset switch SW7 on the Modbus Interface when the setting of the indoor unit's central control address, line address, or unit address has been changed or added.

■ Uh Line communication check (Indoor unit)

Check the communication status between Modbus interface and indoor unit or TCB-IFCG1TLE with LED5.
Check that the communication between Modbus interface and each indoor unit or TCB-IFCG1TLE connected is normally performed by selecting an indoor unit or TCB-IFCG1TLE using SW1 to SW3.
Confirming procedure:

- Set bit2 of SW3 to "ON" during normal operation.
- Set the central control address of the target indoor unit with SW1 and SW2. Set SW1 and SW2 according to the "Indoor unit central control address and SW1/SW2 setting" table below.
- Communication status is displayed by LED5.

Communication status with indoor unit	LED5	Remarks
Normal	Lighting	
Error	Blinking	Communication with the indoor unit was established previously, but is disabled currently.
Invalid indoor unit	Light off	Communication with the indoor unit has never been established.

- The protocol for communication with an indoor unit is displayed by LED4.

Protocol for communication with indoor unit	LED4	Note
In communication via Uh Line	On	When Modbus interface is performing communication with the relevant indoor unit via Uh Line.
In communication based on old communication protocol	Blinking	When Modbus interface is performing communication with the relevant indoor unit based on old communication protocol.

(Example) Check the communication status of indoor unit with a central control address of 41.
Set bit2 of SW3 to "ON", SW2 to "2" and SW1 to "8".

Indoor unit or TCB-IFCG1TLE central control address and SW1/SW2 setting

Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1
1	0	0	17	1	0	33	2	0	49	3	0
2	00	1	18	1	1	34	2	1	50	3	1
3	0	2	19	1	2	35	2	2	51	3	2
4	0	3	20	1	3	36	2	3	52	3	3
5	0	4	21	1	4	37	2	4	53	3	4
6	0	5	22	1	5	38	2	5	54	3	5
7	0	6	23	1	6	39	2	6	55	3	6
8	0	7	24	1	7	40	2	7	56	3	7
9	0	8	25	1	8	41	2	8	57	3	8
10	0	9	26	1	9	42	2	9	58	3	9
11	0	A	27	1	A	43	2	A	59	3	A
12	0	B	28	1	B	44	2	B	60	3	B

Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1
13	0	C	29	1	C	45	2	C	61	3	C
14	0	D	30	1	D	46	2	D	62	3	D
15	0	E	31	1	E	47	2	E	63	3	E
16	0	F	32	1	F	48	2	F	64	3	F
65	4	0	81	5	0	97	6	0	113	7	0
66	4	1	82	5	1	98	6	1	114	7	1
67	4	2	83	5	2	99	6	2	115	7	2
68	4	3	84	5	3	100	6	3	116	7	3
69	4	4	85	5	4	101	6	4	117	7	4
70	4	5	86	5	5	102	6	5	118	7	5
71	4	6	87	5	6	103	6	6	119	7	6
72	4	7	88	5	7	104	6	7	120	7	7
73	4	8	89	5	8	105	6	8	121	7	8
74	4	9	90	5	9	106	6	9	122	7	9
75	4	A	91	5	A	107	6	A	123	7	A
76	4	B	92	5	B	108	6	B	124	7	B
77	4	C	93	5	C	109	6	C	125	7	C
78	4	D	94	5	D	110	6	D	126	7	D
79	4	E	95	5	E	111	6	E	127	7	E
80	4	F	96	5	F	112	6	F	128	7	F

■ Uh Line communication check (Header outdoor unit)

Check the communication status between Modbus Interface and outdoor unit with LED5.
Check that the communication between Modbus Interface and each outdoor unit connected is normally performed by selecting an outdoor unit using SW1 to SW3.

Confirming procedure:

- Set bit2 of SW3 to “ON” during normal operation.
- Set the line address of the target outdoor unit with SW1 and SW2.
  Set SW1 and SW2 according to the table below, titled “Line address of outdoor unit and SW1/SW2 setting”.
- Communication status is displayed by LED5.

Communication status with outdoor unit	LED5	Remarks
Normal	Lighting	Modbus interface is in communication with the outdoor unit.
Error	Blinking	Communication with the outdoor unit was established previously, but is disabled currently.
Invalid outdoor unit	Light off	The outdoor unit dose not supports the output of cooling capacity data. Communication with the outdoor unit has never been established.

- The protocol for communication with an outdoor unit is displayed by LED4.

Protocol for communication with outdoor unit	LED4	Note
In communication via Uh Line	On	When Modbus interface is performing communication with the relevant outdoor unit via Uh Line.
In communication based on old communication protocol	Blinking	When Modbus interface is performing communication with the relevant outdoor unit based on old communication protocol.

(Example) Check the communication status of outdoor unit with line address of 10.
Set bit1 of SW3 to “ON”, SW2 to “8” and SW1 to “9”.

Line address of outdoor unit and SW1/SW2 setting

Line address of outdoor unit	SW2	SW1	Line address of outdoor unit	SW2	SW1
1	8	0	17	9	0
2	8	1	18	9	1
3	8	2	19	9	2
4	8	3	20	9	3
5	8	4	21	9	4
6	8	5	22	9	5
7	8	6	23	9	6
8	8	7	24	9	7
9	8	8	25	9	8
10	8	9	26	9	9
11	8	A	27	9	A
12	8	B	28	9	B
13	8	C	29	9	C
14	8	D	30	9	D
15	8	E	31	9	E
16	8	F	32	9	F

NOTE

For air conditioner (multi type), the line addresses of outdoor unit 29 to 32 are not used.

8-4. RS-485 communication check

The Modbus Master is needed for RS-485 communications. Check the Modbus Master for details on transmissions. Check the LEDs on the Modbus Interface.

Perform the communication status checking between Modbus Interface and Modbus Master.
Check that the communication with Modbus Master is normally performed.
When bit2 of SW3 is set to “OFF”, the communication status with the Modbus Master is displayed by LED5.

Communication status with Modbus Master	LED5	Remarks
Normal reception	Lighting	Lights for one second
Error	Light off	A communication error occurred or no data has been received.

8-5. LED display verification

		When normal	When error
LED1	Power indicator	On	Off
LED2	RS-485 communication status indicator	Blinking	Off
LED3	Uh Line communication status indicator	Blinking	Off
LED4	Uh Line communication error indicator	Off	On

- LED1 Power indicator
  On: The LED lights up when the power is on.
  Off: No power.
- LED2 RS-485 communication status indicator
  Blinking: Blinks when communication with the host system is normal.
  Off: Unable to communicate with the host system.
- LED3 Uh Line communication status indicator
  Blinking: Blinks when communication with any of the air conditioners is normal.
  Off: Unable to communicate with any air conditioner.
- LED4 Uh Line communication error indicator
  On: Lights up when communication from the interface to air conditioners produces no normal response from air conditioners.
  Off: Goes out when there is normal response from air conditioners.
  Blinking: Blinks when the central control addresses of indoor units are duplicated.
  Push reset switch SW7 of the Modbus Interface after changing the central control address of an indoor unit.
- LED5 Test indicator
  When Bit2 of SW3 is OFF, the status of communication with the Modbus master is indicated by LED5.
  Indicates operation in test mode.

9 Troubleshooting

9-1. Uh Line communication trouble

No.	Cause	Check and action
1	Central control address of indoor unit is not set.	Check the “8-3. Uh Line communication check”. Check that the central control address of indoor unit is set.
2	Central control address of indoor unit has been changed.	Check the “9-6. Changing the central control address, line address, or unit address of indoor units”.
3	Uh Line communication wiring is not connected, disconnected, or incorrect.	Check the conduction of Uh Line communication wiring.
4	The Uh Line terminal resistance is not connected.	Check the value of the Uh Line terminal resistance with a Digital Multi Meter.
5	The wiring length is too long.	Change it to the specified wiring length.
6	The communication circuit of the Modbus Interface failed.	Replace with the normal Modbus Interface and check that the communication is available.
7	The communication cable in use is not the specified one.	Change it to the specified communication cable.
8	Remote controller of indoor unit is in “Setting” mode.	Wait until remote controller is in the normal operating mode.
9	Central control addresses of indoor units are duplicated.	If the Modbus Interface detects duplication of an indoor unit central control address, LED4 (ERROR) of the Modbus Interface will blink. The indoor unit central control address duplication check is performed when the Modbus Interface commences communication with indoor units The blinking of LED4 will not stop until the Modbus Interface is reset. Push reset switch SW7 of the Modbus Interface after changing the central control address of an indoor unit.
10	The central controller ID of the Uh Line compatible central control device and the central controller ID of the Modbus Interface are duplicated.	If the Modbus Interface detects duplication of the central controller ID, LED4 (ERROR) of the Modbus Interface will blink. Set the Modbus Interface central controller ID as a low-order ID below the central control device ID. Example) Central control device: ID1; Modbus Interface: ID20 Refer to the explanation of central controller ID setting mode in Section 7 Switches for setting.
11	The outdoor units do not support the function to output cooling capacity data.	Models that are not listed in "9-9. Questions about functions" cannot acquire cooling capacity data.
12	The communication cable between an outdoor unit and Modbus Interface is disconnected. The power supply to the outdoor units was power outage.	Check the "8-3. Uh Line communication check".
13	When the Modbus interface and air conditioning management controller are being used together, the values in the Modbus register will be slow to update.	When the Modbus interface and air conditioning management controller are being used together, the update cycle may be 4 minutes.

9-2. RS-485 can not communicated

No.	Cause	Check and action
1	RS-485 communication wiring is not connected, disconnected, or incorrect.	Check the conduction of RS-485 communication wiring.
2	The RS-485 communication wiring is connected with wrong polarity.	Check the terminal block (A(+) and B(-)) connected.
3	The RS-485 terminal resistance is not connected.	Check the RS-485 terminal resistor to “120 Ohm” for address 1(Modbus Interface address SW1 = 1) Modbus Interface unit.
4	The wiring length is too long.	Change it to the specified wiring length.
5	The communication circuit of the Modbus Interface failed.	Replace with the normal Modbus Interface and check that the communication is available.
6	The communication cable in use is not the specified one.	Change it to the specified communication cable.
7	The address switch setting of the Modbus Interface does not match.	Check the address switch setting of the Modbus Interface and the data which are transmit by Modbus Master.

No.	Cause	Check and action
8	The RS-485 baud rate switch setting of the Modbus Interface does not match.	Check the RS-485 baud rate switch setting of the Modbus Interface and baud rate setting of the Modbus Master.
9	The switches variable specification setting of the Modbus Interface does not match.	The settings for using BMS-IFMB1280U as TCB-IFMB640TLE or TCB-IFMB641TLE are described in Section "11 TCB-IFMB640TLE, TCB-IFMB641TLE, TCB-IFMB641TLE-SG product replacement".
10	The communication circuit of the Modbus Interface failed.	Replace with the normal Modbus Interface and check that the communication is available.

9-3. Cannot operation Indoor Unit from Modbus Master

No.	Cause	Solution
1	The command from the Modbus Master does not match the specifications of the Modbus Interface.	Check the “Specifications Manual” of Modbus Interface.

9-4. Air conditioner settings are different from settings from Modbus Master (temperature or operation mode)

No.	Cause	Solution
1	The operation setting falls outside the range of the temperature or operation mode set in the air conditioner.	If the setting falls outside the set temperature range, the temperature will be set to the upper or lower limit value of the set temperature range.
		If the setting falls outside the range of the set operation mode, the air conditioner does not operate in the mode set. It operates in the mode before the change.

9-5. The operation is unavailable with the remote controller

No.	Cause	Solution
1	Operation by remote controller is prohibited by Modbus Master.	Cancel it from Modbus Master.

9-6. Changing the central control address, line address, or unit address of indoor units

The following trouble occurs when the central control address, line address, or unit address of an indoor unit is changed. Do the procedure noted under Solution.

No.	Cause	Solution
1	Communication with indoor unit is no longer possible.	Push the reset switch SW7 of Modbus Interface.
2	Cannot acquire settings from indoor unit.	
3	The value for the accumulated operation time is strange.	To clear all accumulated operating values to 0, set SW2 to 3 and press the reset switch SW7, and then set SW2 to 0 and press the reset switch SW7 again.

9-7. After changing the Modbus Interface central controller ID to the old controller

No.	Cause	Solution
1	Modbus Interface cannot communicate with TU2C-LINK compatible indoor units.	When the communication protocol of the Uh line is judged as TU2C-LINK, then TU2C-LINK compatible indoor units cannot communicate with the Modbus Interface. Re-start the TU2C-LINK compatible indoor unit.

9-8. Controlling and monitoring of air to water heat pump (ATW)

No.	Cause	Solution
1	Mode cannot be changed to cooling through operation mode setting.	Operation modes are only heating and cooling. With cooling mode, status may be "no use" depending on the settings of ATW.
2	Control of ATW does not work at all.	When Floor Dry operation ON / OFF status is ON, control of ATW is entirely disabled.
3	AUTO TEMP cannot be turned on through AUTO TEMP setting.	AUTO TEMP operation ON / OFF setting cannot be used in the following cases. • In the case of Room temperature control mode status • When with Function Status, External Thermo Control status is "use"
4	Hot water set temperature cannot be changed through HOT WATER Temperature Setting.	• The HOT WATER Temperature Setting function cannot be used in the following cases. • When HOT WATER Device Connection status is "no use" • When Hot Water Tank Thermo Control status is "use" • When Frost protection operation is being performed
5	Zone1 set temperature cannot be changed through Zone1 Temperature Setting.	The Zone1 Temperature Setting function cannot be used in the following cases. • When Zone1 Device Connection status is "no use" • When External Thermo Control status is "use" • When Frost protection operation is being performed • When AUTO TEMP operation is being performed
6	Zone2 set temperature cannot be changed through Zone2 Temperature Setting.	The Zone2 Temperature Setting function cannot be used in the following cases. • When Zone2 Device Connection status is "no use" • When External Thermo Control status is "use" • When Frost protection operation is being performed • When AUTO TEMP operation is being performed
7	There is a discrepancy between the temperature specified through HOT WATER Temperature Setting and the hot water set temperature.	Hot water set temperature must be within the range from the lower limit up to the upper limit. The factory set temperature for ATW is in the range from 40°C to 75°C.
8	There is a discrepancy between the temperature specified through Zone1 Temperature Setting and the Zone1 set temperature.	Zone1 set temperature must be within the range from the lower limit up to the upper limit. (1) Water temperature control mode • The heating mode temperature range is from 20°C to 55°C. • The cooling mode temperature range is from 7°C to 25°C. (2) Room temperature control mode • The heating mode temperature range is from 18°C to 29°C. • The cooling mode temperature range is from 18°C to 29°C.
9	There is a discrepancy between the temperature specified through Zone2 Temperature Setting and the Zone2 set temperature.	Zone2 set temperature must be within the range from the lower limit up to the upper limit. With heating mode, the condition of Zone1 set temperature >=Zone2 set temperature must be met. (1) Water temperature control mode • The heating mode temperature range is from 20°C to 55°C. • The cooling mode temperature range is from 7°C to 25°C. (2) Room temperature control mode • The heating mode temperature range is from 18°C to 29°C. • The cooling mode temperature range is from 18°C to 29°C.
10	ATW is not provided with a terminal block to use for Uh communication cabling.	It is necessary to provide Option parts (TCB-KBCN32VEE) mentioned in "Central Remote Controller (option)" in the ATW Installation Manuel.
11	Modbus Interface cannot detect ATW. (TU2C-LINK communication cannot be achieved.)	• Uh Line is broken. • Termination resistance is not configured on Uh Line. • Central control address is not configured on ATW. (DN 03) • The Modbus Interface central controller ID has been changed to Old controller. The current central controller ID is for old communication protocol, so communication with ATW is impossible.

9-9. Questions about functions

No.	Cause	Answer
1	How many air conditioners can be connected?	The number of indoor units is described in Section "2 System configuration".
2	How many Modbus Interface can be connected?	Up to 5 Modbus Interface can be connected Modbus Master.
3	Is it possible to connect external device?	This is possible by connecting to the TCB-IFCG1TLE. Refer to TCB-IFCG1TLE's Manual.
4	Can the BACnet system be used together?	Not possible.
5	Can the LONwork system be used together?	Not possible.
6	Can a device in the AI-NETwork series be connected?	Not possible.
7	Can it be used together with a central control device?	Possible. Example) TU2C-LINK compatible product: BMS-CT2560U-E Example) TU2C-LINK non-compatible product: BMS-CT1280E **NOTE** If using it together with a TU2C-LINK non-compatible product, set the central controller ID setting mode (as described in Section "7 Switches for setting") to "Old controller"
8	Can it be used together with a central remote controller?	Possible. Example) TU2C-LINK compatible product: TCB-SC640U-E Example) TU2C-LINK non-compatible product: TCB-SC643TLE **NOTE** If using it together with a TU2C-LINK non-compatible product, set the central controller ID setting mode (as described in Section "7 Switches for setting") to "Old controller"
9	Does turning off the Modbus Interface require any specific operation?	No specific operation is necessary.
10	Does turning off the Modbus Interface stop the air conditioner?	The air conditioner does not stop when the Modbus Interface is turned off.
11	Can all the indoor units be made operation at a time?	Not possible.
12	Is monitoring the operation state of the outdoor unit possible?	Not possible.
13	Does setting operation for an air conditioner have any priority?	Last setting priority.
14	Is it possible to connect an indoor unit without its remote controller?	Possible.
15	Can BMS-IFMB1280U-E be used as TCB-IFMB640TLE or TCB-IFMB641TLE?	Possible. The setting method is described in Section "11 TCB-IFMB640TLE, TCB-IFMB641TLE, TCB-IFMB641TLE-SG product replacement".
16	Can a heat exchange ventilators be connected?	Possible.
17	Please tell me the Modbus register addresses for indoor units (central control addresses 65 to 128).	The Modbus register addresses for indoor units (central control addresses 65 to 128) are the same as for central control addresses 1 to 64. Example) The ON/OFF setting for central control address 65 is Coils-1. When reading out the Modbus register address for an indoor unit (central control addresses 65 to 128), set the Modbus slave address as the SW1 address +1. Details are described in Section "2 System configuration". Example) If SW1=1, the Modbus slave address is 2.
18	What are the differences between the TCB-IFMB640TLE and TCB-IFMB641TLE variable specifications and the BMS-IFMB1280U-E variable specification?	• Accommodates 128 indoor units (central control addresses 1 to 128) • Compatible with heat exchange ventilator • Room temperature of outdoor unit is the TF sensor value • Check Code is 2 bytes • There is no check code for indoor cordless handsets 1 to 7. The indoor unit cordless handset check code is 0x00FE (P30 Group terminal unit error).
19	If the Uh Line indoor units comprise a mix of TU2C-LINK compatible and non-compatible indoor units, BMS-IFMB1280U-E cannot be used.	Possible.

<table>
<tr><th>No.</th><th>Cause</th><th>Answer</th></tr>
<tr><td>20</td><td>Which model of outdoor unit can read cooling capacity data?</td><td>This Modbus Interface can be connected with SMMS-7, MiNi-SMMS7, and SMMS∞.

Products with the following model numbers or later

<table>
<tr><td rowspan="10">SMMS-7</td><td rowspan="9">Standard</td><td>MMY-MAP0807T8P*/T7P</td></tr>
<tr><td>MMY-MAP1007T8P*/T7P</td></tr>
<tr><td>MMY-MAP1207T8P*/T7P</td></tr>
<tr><td>MMY-MAP1407T8P*/T7P</td></tr>
<tr><td>MMY-MAP1607T8P*/T7P</td></tr>
<tr><td>MMY-MAP1807T8P*/T7P</td></tr>
<tr><td>MMY-MAP2007T8P*/T7P</td></tr>
<tr><td>MMY-MAP2207T8P*/T7P</td></tr>
<tr><td>MMY-MAP2407T8P*/T7P</td></tr>
<tr><td>High efficiency</td><td>MMY-MAP14A7T8P*/T7P</td></tr>
<tr><td rowspan="3">MiNi-SMMS7</td><td rowspan="3">Standard</td><td>MCY-MAP0401TP*</td></tr>
<tr><td>MCY-MAP0501TP*</td></tr>
<tr><td>MCY-MAP0601TP*</td></tr>
</table>
*: -SG, -T, -ID

<table>
<tr><td rowspan="12">SMMS∞</td><td>MMY-MUP0801T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP1001T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP1201T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP1401T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP14A1T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP1601T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP1801T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP2001T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP2201T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP2401T8P*1/T8JP*2/T7P/T7JP</td></tr>
<tr><td>MMY-MUP2601T8P*1/T8JP*2/T7P/T7JP</td></tr>
</table>
*1: -T,-SG
*2: -T</td></tr>
<tr><td>21</td><td>Modbus interface version that enables use of Modbus register for ATW</td><td>Product lots manufactured in October 2021 or after.
The value of Modbus register “Software version” is Ver.4.00.</td></tr>
<tr><td>22</td><td>Modbus interface version that enables use of Modbus register for outdoor unit EER</td><td>Product lots manufactured in February 2022 or after.
The value of Modbus register “Software version” is Ver.4.01.</td></tr>
<tr><td>23</td><td>Modbus interface version that enables use of Modbus register for VRF Dx-coil controller.</td><td>Product lots manufactured in August 2022 or after.
The value of Modbus register “Software version” is Ver.4.02.</td></tr>
<tr><td>24</td><td>Modbus interface version that enables use of Modbus register for Room Air Conditioner TU2C-LINK Interface.</td><td>Product lots manufactured in August 2022 or after.
The value of Modbus register “Software version” is Ver.4.02.</td></tr>
</table>

9-10. Controlling and monitoring of VRF Dx-coil controller

No.	Cause	Solution
1	Dx-coil controller cannot be controlled from the Modbus interface with DDC setting type.	Controlling the DDC setting type of the VRF Dx-coil controller (TCB-IFDMX01UP-E, TCB-IFDMR01UP-E) from the Modbus interface is prohibited. Check the value for “Central controller permit/prohibit” on the Modbus register.
2	Modbus register has Dx-coil controller as TA setting type (Monitoring, Controlling).	Although it is possible to use the same register as the VRF indoor unit, it depends on the product.
3	Modbus register has Dx-coil controller as TF setting type (Monitoring, Controlling).	Although it is possible to use the same register as the VRF indoor unit, it depends on the product. Room temperature is the TF sensor value.

9-11. Controlling and monitoring of Room Air Conditioner TU2C-LINK Interface (RAC)

No.	Cause	Solution
1	Cannot control and monitor RAC from the Modbus interface.	• If the RAC interface is in HA mode, the Modbus interface is only capable of ON/OFF control and monitoring and Alarm monitoring. • If the RAC interface is in Light commercial AC type, the Modbus register’s Special functions for RAC (Section 3-5.) cannot be used. • If the RAC interface is in Residential AC type, the Modbus register’s Special functions for RAC (Section 3-5.) can be used. • If you have changed the RAC interface settings, restart the Modbus interface.
2	The Modbus interface is not communicating with the RAC interface. The result for "8-3. Uh Line communication check" is an invalid indoor unit.	• If the RAC interface is in HA mode, set the central control addresses to 1-64. • If the RAC interface is in Light commercial AC type, set the central control addresses to 1-64. • If the RAC interface is in Residential AC type, set the central control addresses to 1-128. • If you have changed the RAC interface settings, restart the Modbus interface.
3	When the Modbus interface and air conditioning management controller are being used together, the Residential AC type functions of the RAC interface cannot be used.	If the air conditioning management controller does not support an RAC interface, the Residential AC type functions of the RAC interface cannot be used. Set the RAC interface to Light commercial AC type.

10 Product replacement procedure in the case of failure

■ Service parts

There are no service parts for this product. Please procure the product.

■ Product replacement

Perform the same settings for the replacement Modbus Interface as the settings for the various switches of the failed Modbus Interface.
(For the setting method, refer to Section "7 Switches for setting".)

11 TCB-IFMB640TLE, TCB-IFMB641TLE, TCB-IFMB641TLE-SG product replacement

This section explains how to use BMS-IFMB1280U as TCB-IFMB640TLE or TCB-IFMB641TLE.

(1) Set the central controller ID setting mode (as described in Section "7 Switches for setting") to "Old controller".
Specifications when set to “Old controller”

Central control address setting range	1-64
Uh Line communication protocol	Old protocol
Modbus slave addresses	1 - 15 (SW1=1 - F)
Number of RS-485 Line Modbus Interfaces	15 max.

(2) Change the variable specification settings according to Sections 11-1 and 11-2.

11-1. TCB-IFMB640TLE product replacement

This product can be used as TCB-IFMB640TLE variable specification mode.

■ BMS-IFMB1280U-E installation

Turn off the power and remove TCB-IFMB640TLE and then install BMS-IFMB1280U-E.
Install the BMS-IFMB1280U-E according to "5 Installation of the Modbus Interface" and "6 Connection of power cables / earth wires / communication cables" in this manual.

■ BMS-IFMB1280U-E setting

Set the RS-485 baud rate and the address switches of BMS-IFMB1280U-E according to Section "7 Switches for setting", the same as the installed TCB-IFMB640TLE. (For address 1, set the terminator of the RS-485.)

■ Switching variable specification

Switching from BMS-IFMB1280U-E variable specification to TCB-IFMB640TLE variable specification is done by the following procedures.

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.
(2) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.

○=ON, ●=OFF

variable specification	LED5	LED4	LED3	LED2
BMS-IFMB640TLE	●	●	●	○
BMS-IFMB641TLE	●	●	○	●
BMS-IFMB1280U	●	●	○	○

(3) When SW4 is pressed, LED2 to LED5 will go out.
(4) Set SW1 to 1 and press SW4.
(5) The variable specification setting is displayed by LED2 to LED5.
If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.
- When the power is turned on in this configuration, operation will be the same as for TCB-IFMB640TLE.

11-2. TCB-IFMB641TLE product replacement

This product can be used as TCB-IFMB641TLE variable specification mode.

■ BMS-IFMB1280U-E installation

Turn off the power and remove TCB-IFMB641TLE and then install BMS-IFMB1280U-E.
Install BMS-IFMB1280U-E according to Section "5 Installation of the Modbus Interface" and Section "6 Connection of power cables / earth wires / communication cables" in this manual.

■ BMS-IFMB1280U-E setting

Set the RS-485 baud rate and the address switches of BMS-IFMB1280U-E according to Section "7 Switches for setting", the same as the installed TCB-IFMB641TLE. (For address 1, set the terminator of the RS-485.)

■ Switching variable specification

Switching from BMS-IFMB1280U-E variable specification to TCB-IFMB641TLE variable specification is done by the following procedures.

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.

(2) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.

○=ON, ●=OFF

variable specification	LED5	LED4	LED3	LED2
BMS-IFMB640TLE	●	●	●	○
BMS-IFMB641TLE	●	●	○	●
BMS-IFMB1280U	●	●	○	○

(3) When SW4 is pressed, LED2 to LED5 will go out.

(4) Set SW1 to 2 and press SW4.

(5) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.
If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.
- When the power is turned on in this configuration, operation will be the same as TCB-IFMB641TLE.

11-3. TCB-IFMB641TLE-SG product replacement

This product can be used as TCB-IFMB641TLE-SG variable specification mode.

■ BMS-IFMB1280U-E installation

Turn off the power and remove TCB-IFMB641TLE-SG and then install BMS-IFMB1280U-E.
Install BMS-IFMB1280U-E according to Section "5 Installation of the Modbus Interface" and Section "6 Connection of power cables / earth wires / communication cables" in this manual.

■ BMS-IFMB1280U-E setting

Set the RS-485 baud rate and the address switches of BMS-IFMB1280U-E according to Section "7 Switches for setting", the same as the installed TCB-IFMB641TLE-SG. (For address 1, set the terminator of the RS-485.)

■ Switching variable specification

Switching from BMS-IFMB1280U-E variable specification to TCB-IFMB641TLE-SG variable specification is done by the following procedures.

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.

(2) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.

○=ON, ●=OFF

variable specification	LED5	LED4	LED3	LED2
BMS-IFMB640TLE	●	●	●	○
BMS-IFMB641TLE	●	●	○	●
BMS-IFMB1280U	●	●	○	○
BMS-IFMB641TLE-SG	●	○	●	●

(3) When SW4 is pressed, LED2 to LED5 will go out.

(4) Set SW1 to 4 and press SW4.

(5) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.
If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.
- When the power is turned on in this configuration, operation will be the same as TCB-IFMB641TLE-SG.

11-4. When returning to BMS-IFMB1280U

This product can be used as BMS-IFMB1280U variable specification mode.

IMPORTANT

Step 1: Switch Modbus register map to BMS-IFMB1280U-E. (Refer to the following procedure in this section)
Step 2: Follow the procedure for "Central controller ID setting mode" (P. 30) to change the central controller ID to “Central controller ID20 (initial value)”

■ Switching variable specification

Switching to BMS-IFMB1280U variable specification is done by the following procedures.

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.
(2) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.

○=ON, ●=OFF

variable specification	Setting value	LED5	LED4	LED3	LED2
BMS-IFMB640TLE	1	●	●	●	○
BMS-IFMB641TLE	2	●	●	○	●
BMS-IFMB1280U	3	●	●	○	○
BMS-IFMB641TLE-SG	4	●	○	●	●

(3) When SW4 is pressed, LED2 to LED5 will go out.
(4) Set SW1 to 3 and press SW4.
(5) When SW1 is set to 1, the variable specification setting is displayed by LED2 to LED5.
If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.
- When the power is turned on in this configuration, operation will be the same as for BMS-IFMB1280U.

IMPORTANT

Immediately after the power is turned on for the Modbus interface, the SW1 value is the Modbus slave address. When the power is turned on, if the SW1 value is that of the central controller ID or is 0, the Modbus interface will not operate properly.
When concluding the central controller ID setting mode, be sure to return the SW1 value to that of the Modbus slave address.

12 Other settings

12-1. When changing Modbus communication response to 250ms

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.

(2) When SW1 is set to 2, the Modbus response mode setting is displayed by LED2 to LED5.

○=ON, ●=OFF

variable specification	LED5	LED4	LED3	LED2
Normal response	●	●	●	○
250ms response	●	●	○	●

(3) When SW4 is pressed, LED2 to LED5 will go out.

(4) Set SW1 to 2 and press SW4.

If returning it to normal response, set SW1 to 1, not 2, and press SW4.

(5) When SW1 is set to 1, the setting is displayed by LED2 to LED5.

If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.
- When the power is turned on in this configuration, operation will be the same as for TCB-IFMB640TLE.

12-2. Switching between the old and new communication settings for TU2C-LINK

The factory default of the TU2C-LINK communication setting is “Automatic judgment of old / new communication mode (value 1)”.

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.

(2) When SW1 is set to 4, the Modbus response mode setting is displayed by LED2 to LED5.

○=ON, ●=OFF

		Setting value indications by LEDs			
variable specification	Setting value	LED5	LED4	LED3	LED2
Automatic judgment of old / new communication mode	1	●	●	●	○
Old communication mode	2	●	●	○	●
New communication mode	3	●	●	○	○

(3) When SW4 is pressed, LED2 to LED5 will go out.

(4) Set SW1 to 1-3 and press SW4.

If returning it to normal response, set SW1 to 1, not 2, and press SW4.

(5) When SW1 is set to 1, the setting is displayed by LED2 to LED5.
If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.

12-3. Switching between the enable and disable settings for the VRF outdoor unit EER data acquisition function

The factory default of the VRF outdoor unit EER data acquisition function is “Enable (value 2)”.

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.

(2) When SW1 is set to 5, the Modbus response mode setting is displayed by LED2 to LED5.

○=ON, ●=OFF

		Setting value indications by LEDs			
variable specification	Setting value	LED5	LED4	LED3	LED2
Disable the VRF outdoor unit EER data acquisition function	1	●	●	●	○
Enable the VRF outdoor unit EER data acquisition function	2	●	●	○	●

(3) When SW4 is pressed, LED2 to LED5 will go out.

(4) Set SW1 to 1 or 2 and press SW4.
If returning it to normal response, set SW1 to 1, not 2, and press SW4.

(5) When SW1 is set to 1, the setting is displayed by LED2 to LED5.
If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.

12-4. Modbus interface operation settings for central control prohibition requests obtained from indoor units

The factory default for this setting is “Enable (value 1).”

1 Before performing setting

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.

2 Setting

(1) Set SW2 to 8.

(2) When SW1 is set to 6, the Modbus response mode setting is displayed by LED2 to LED5.

○=ON, ●=OFF

		Setting value indications by LEDs			
variable specification	Setting value	LED5	LED4	LED3	LED2
Enable central control prohibition requests. Do not send configuration directives from the Modbus interface to indoor units.	1	●	●	●	○
Disable central control prohibition requests. Send configuration directives from the Modbus interface to indoor units.	2	●	●	○	●
Partially disable central control prohibition requests. Do not send configuration directives from the Modbus interface to indoor units, but do send operation ON/OFF setting directives.	3	●	●	○	○

(3) When SW4 is pressed, LED2 to LED5 will go out.

(4) Set SW1 to 1 or 3 and press SW4.

If returning it to normal response, set SW1 to 1, not 2, and press SW4.

(5) When SW1 is set to 1, the setting is displayed by LED2 to LED5.

If you make a mistake in the setting, perform the setting in the order of (3) and (4).

3 After performing setting

- Set SW2 to 0.
- Return the SW1 value to the Modbus slave address value.

Specifications Manual

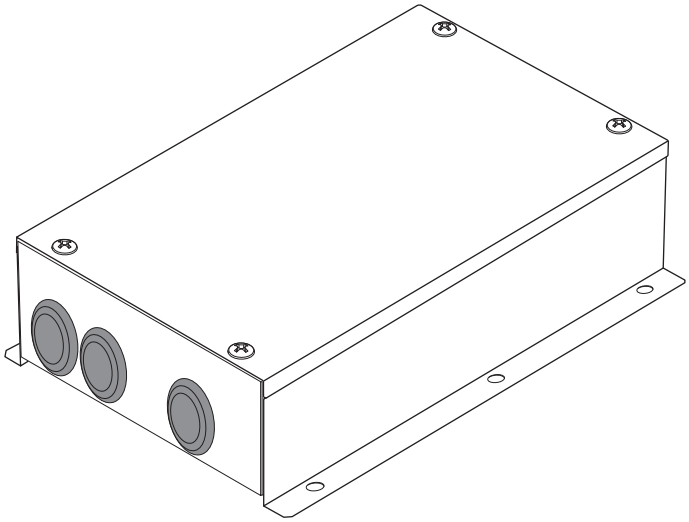
TOSHIBA

Specifications Manual
Central Control Device

Modbus interface

Model name:

BMS-IFMB1280U-E
BMS-IFMB1280U-TR



Contents

1 System overview

This manual describes Modbus* protocol implementation specifications of Modbus interface is equipped with the Modbus Slave function. Specifications that are not detailed in this manual conform to the following Modbus specifications.

- Modbus APPLICATION PROTOCOL SPECIFICATION V1.1b
- Modbus over Serial Line Specification and Implementation Guide V1.01
  http://www.modbus.org/

This implementation specification specifies the operation of Modbus that works on the RS485 serial line, where a slave device sends a response to a request from the master device. Multiple slave devices are connected to the RS485 bus. Modbus uses the Modbus RTU mode with the frame format shown below.

START	SLAVE ADDRESS	FUNCTION	DATA	CRC	END
>=3.5 characters	8 bits	8 bits	N*8 bits (N = 252 max.)	16 bits	>= 3.5 characters

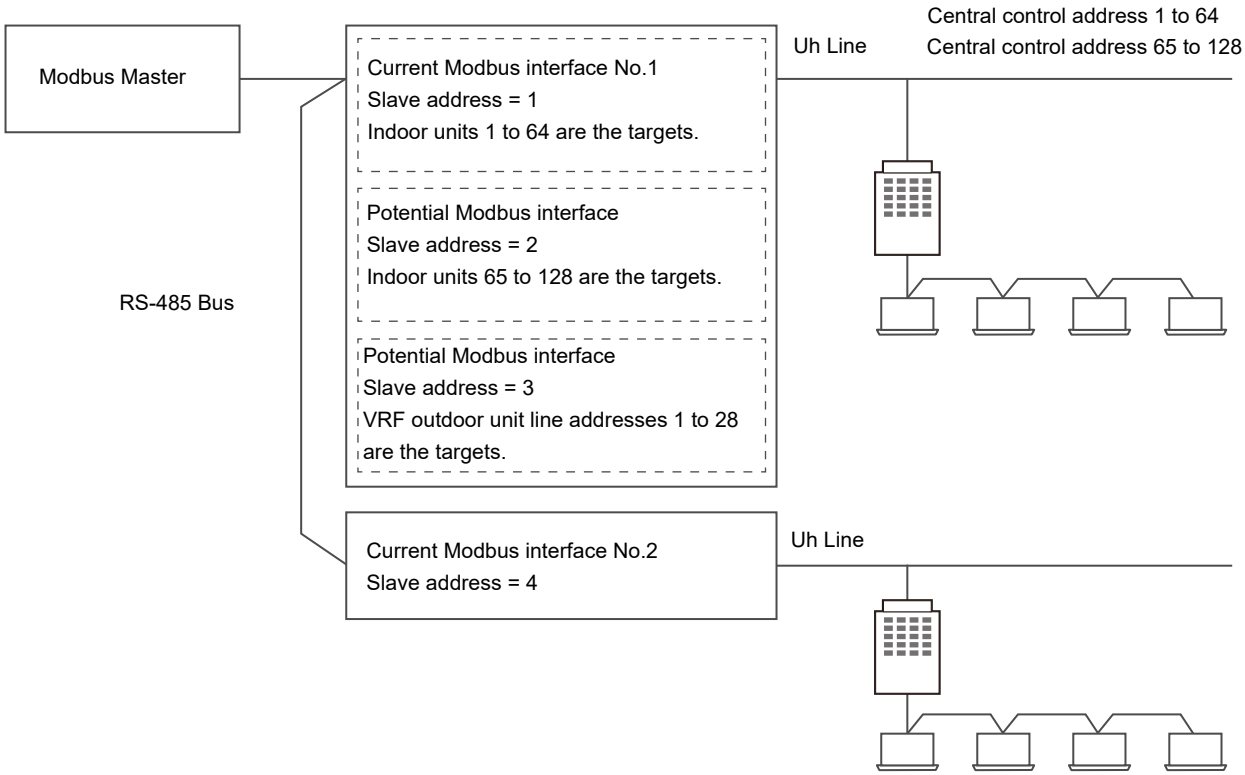
Modbus interface is connected to the TU2C-LINK Uh Line (hereinafter, referred to as Uh Line) communication bus. Modbus interface uses central control address assigned to indoor units to read the operating status of indoor units and change settings. The setting range for central control address of indoor units is based on the ranges indicated in the table below.

Indoor unit	Central control address setting range
Indoor unit compatible with Uh Line	1-128
Indoor unit not compatible with Uh Line	1-64

Central control device	Central control address setting range
When used together with a central control device compatible with Uh Line	1-128
When used together with a central control device not compatible with Uh Line	1-64

A single Modbus interface uses three Modbus slave addresses. (One address for the current interface and two addresses for potential interfaces.)
As shown in the table below, the reply target of the Modbus interface varies according to the slave address for Modbus communication.

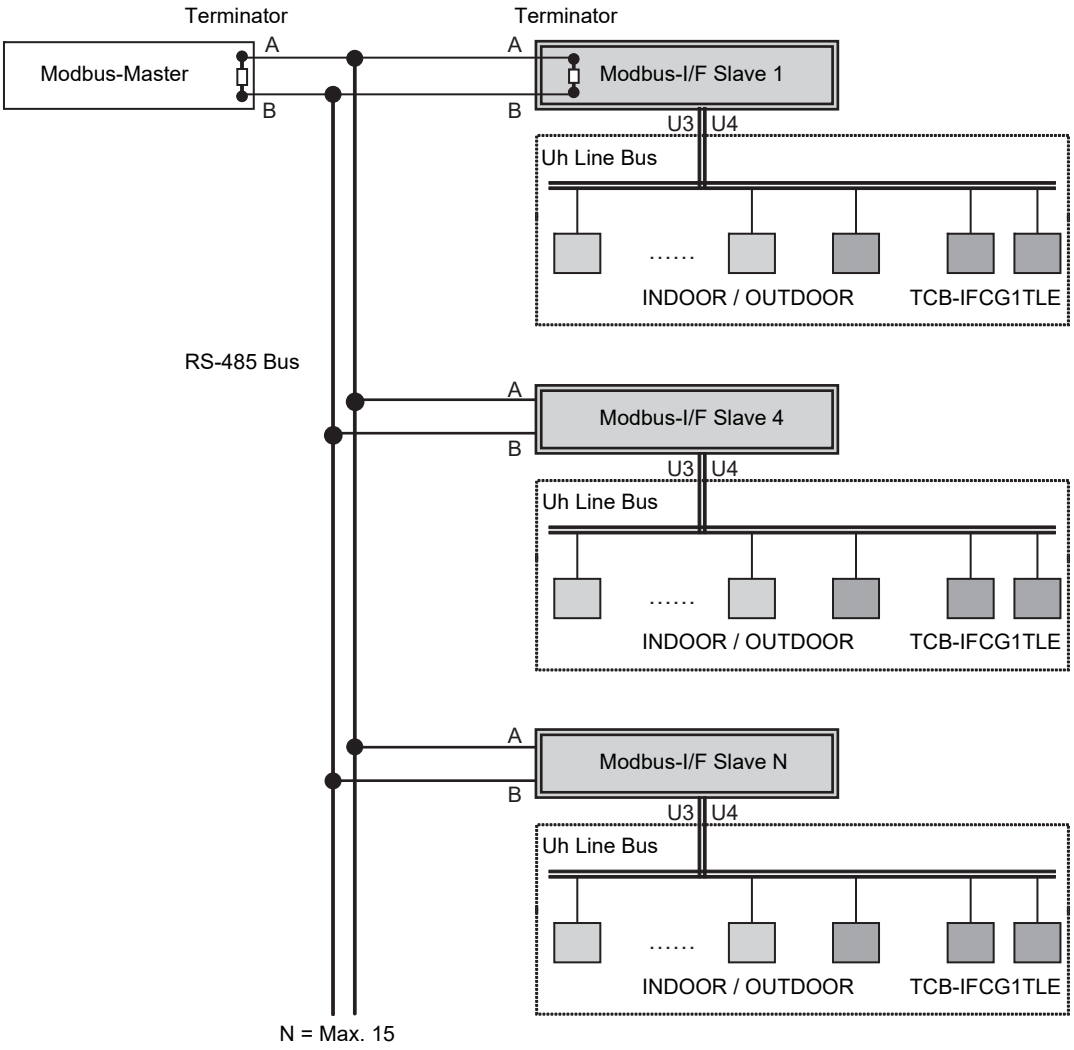
Slave address	Target air conditioner
Address set in Modbus interface	Operating status can be read and settings can be changed for indoor units with central control address 1 to 64.
Address set in Modbus interface +1	Operating status can be read and settings can be changed for indoor units with central control address 65 to 128.
Address set in Modbus interface +2	It is possible to read out capacity data of VRF outdoor unit line addresses 1 to 28. For an indoor unit not compatible with Uh Line, data of up to 16 lines can be read out.



When two or more Modbus interfaces are connected to a single line RS-485 bus, set the slave addresses of the Modbus interface as indicated in the table below.

Modbus interface	Slave address
No.1	1
No.2	4
No.3	7
No.4	10
No.5	13

An example of connection of the Modbus master device, the Modbus interface, and air conditioners is shown in the diagram below.



* “Modbus” is a registered trademark of Schneider Electric SA.

2 RS 485 communication parameters

RS 485 communication parameters are shown below.

- Character length = 11 bits, Data = 8 bits, Parity Check = even, Start bit =1 bit low, Stop bit = 1bit high
- Communication: 9600/19200/38400 bps selected manually.
- Bit transmission order: LSB first (b0, b1….). Bit data is transmitted sequentially from the LSB.
- Byte transmission order: Big Endian. 0x1234 -> 0x12 then 0x34. Byte data is transmitted in the big endian order.
- Half duplex, 2 wires. 120 Ω termination. A: Non-inverted input, B: Inverted input
- After receiving a packet, a response is permitted after at least 3.5 characters.
- Connecter: 2 terminals

3 Applied function codes

The following function codes are implemented. Broadcast message cannot be used.

Function code	Sub function code	Function name
0x01	None	Read coils
0x02	None	Read Discrete input
0x03	None	Read holding register
0x04	None	Read Input register
0x05	None	Write single coil
0x06	None	Write single holding register
0x08	0x00, 01, 02, 04, 0A, 0B, 0C, 0D, 0E, 0F, 11, 12, 14	Diagnostics
0x0B	None	Get Comm Event Counter
0x0C	None	Get Comm Event Log
0x0F	None	Write multiple coils
0x10	None	Write multiple holding registers
		Exception

The relationship between the start address specified in a request from the master device and the value shown by “Modbus-address for registers” in the address assignment table is as follows:

- For Coil
  Start address = (Value of Modbus-address for registers) - 1
- For Discrete input
  Start address = (Value of Modbus-address for registers) - 10001
- For Input register
  Start address = (Value of Modbus-address for registers) - 30001
- For Holding register
  Start address = (Value of Modbus-address for registers) - 40001

4 Exception response

Slave units must return an exception response when they receive a request which has been sent correctly but contains an error that applies to any of the following exception codes.

Exception code	Name
0x01	Illegal function A request of illegal function that is not supported by this specification is received
0x02	Illegal data address An illegal address that does not exist in section 7 of this manual. Address Assignment table or a data request size larger than 249 octets is specified. An address is specified for two or more devices.
0x03	Illegal data value Illegal data other than that defined in section 7 of this manual Address Assignment table is specified. If the set temperature range of the indoor unit is not acquired, this code is returned.
0x04	Slave device failure Slave device internal processing is not correct (When any error occurs during booting or reading the RAM).
0x05	ACK A slave device returns response ACK when it received a request while it is acquiring response data during the slave device initial data acquisition process.
0x06	Slave device busy When a slave device is busy and cannot return response data, this code is returned.
0x07	When a master's request is about an indoor unit which does not respond to the request. (However, the master's request is sent to the indoor unit.)

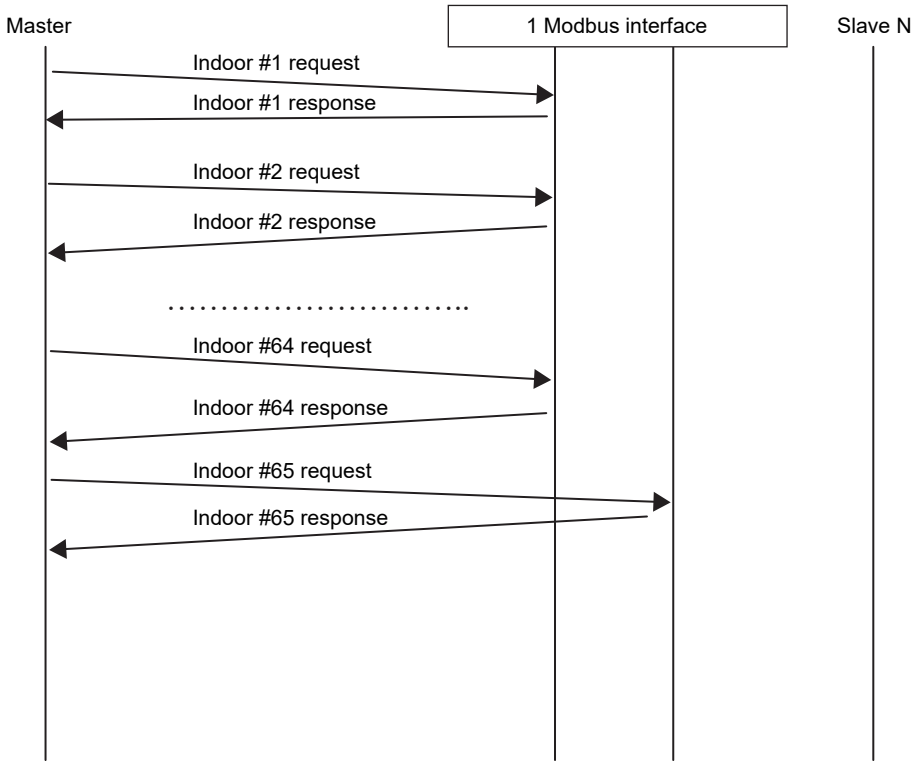
5 Counters and registers

TCB-IFMB641TLE is equipped with the following counters and registers that are cleared by a power-on reset, restart process, or a counter reset command.

Register / Counter	Description
Coils (R/W)	For air-conditioner database
Discrete input (R)	For air-conditioner database
Input register (R)	For air-conditioner database
Holding register (R/W)	For air-conditioner database
Event counter	Counted when a slave device has processed a received message correctly. This counter is not incremented when the exception command or 0B command is received.
Message counter	Retains the number of messages sent by the slave device.
Diagnostics register	A 16-bit register that retains the content of diagnosis. 0x0000: Normal 0x0001: CRC error 0x0002: EEPROM checksum error Other: Reserved
Bus Communication Error Count	Total number of CRC errors detected by slave devices
Exception Error Count	Total number of exception errors detected by slave devices
Slave Message Count	Total number of messages received by the corresponding slave device
No Response Count	Total number of messages received by the corresponding slave device, which are not accompanied by response
Busy Count	Total of Busy Count (exception error) detected by the corresponding slave device
Bus Character Overrun Count	Number of character overrun errors (failure in receiving part of the data) detected in messages to the corresponding slave device

6 Sequence

The master device sends a request sequentially to each slave device, and gets response data from each slave device. A slave device returns a response to a request from the master device within one second (see the diagram below). When a slave device receives a data read request, the slave device returns the data stored in the register.
It is recommended that the master device collects specific information such as air conditioner models, addresses, unique numbers, and operation setting range when the master device accesses the air conditioning system for the first time.
When writing to air conditioners, the master device must read the operation range for, operation mode, fan speed and setting temperature from each air conditioner and write values within the operation range. Pay attention to the sequence of simultaneous setting for writing to air conditioners because it requires time for processing on the slave device side. It is recommended to confirm whether a master's request is reflected by reading the read register after appropriate time once a communication is completed, because indoor units may not be able to receive a normal request from the mater due to Uh Line communication condition.
In addition, it is also recommended that data be requested at appropriate intervals so that the alarm data that is output from air conditioners is properly reflected in the discrete input register.



7 List of function

Products that can be connected to the Modbus Interface are listed below.

(1) Applicable air conditioner indoor unit

- VRF System
  - SMMS-i (Super Modular Multi System-i)
  - SHRM-i (Super Heat Recovery Multi System-i)
  - SMMS-e (Super Modular Multi System-e)
  - SHRM-e (Super Heat Recovery Multi System-e)
  - SMMS 7 (Super Modular Multi System 7)
  - SMMS-u (Super Modular Multi System-u)
  - SMMS ∞ (Super Modular Multi System ∞)
  - Mini-SMMS Series
  - Side Blow VRF
  - VRF Dx-coil controller (TCB-IFDMX01UP-E, TCB-IFDMR01UP-E)

- Light Commercial model
  - Super Digital Inverter Series (*1)
  - Digital Inverter Series (*1)
    (*1) TCB-PCNT30TLE2 is necessary except High wall Series.

- Ventilation
  - Air to Air Heat exchanger

(2) Applicable air to water heat pump (ATW)
  - TU2C-LINK model

(3) Applicable TCC-LINK interface and TU2C-LINK interface
  - TCB-IFCG1TLE
  - TCB-SSRL011UUP-E (Room Air Conditioner TU2C-LINK Interface)

NOTE

- The functions listed may vary according to the product.
- When the Modbus interface and central control device are being used together, the update cycle may be 4 minutes. Also, if the central control device is not compatible with these functions, it may not be possible to use these functions.

7-1. List of functions for air conditioner

For further details, refer to the Specifications Manual of Modbus Interface.

Function	Monitoring	Controlling
ON / OFF	○	○
Setting temperature	○	○
Auto cool temperature setting	○	○
Auto heat temperature setting	○	○
Operation mode	○	○
Fan speed	○	○
Louver	○	○
Remote controller permit / Prohibit	○	○
Filter sign	○	○ (filter sign reset)
Ventilation On/Off	○	○
Ventilation Mode	○	○
Ventilation Fan speed	○	○
Save operation rate	○	○
Accumulated operation time	○	—
Alarm	○	—
Room temperature	○	—
Check code	○	—
Thermo status	○	—
Facility request	○	—
Model name *	○	—
Serial number *	○	—
Indoor unit capacity	○	—
Indoor unit type	○	—
Operation mode / Fan range	○	—
Cooling temperature range	○	—
Heating temperature range	○	—
Dry temperature range	○	—
Auto temperature range	○	—
Ventilation mode/fan speed, valid/invalid	○	—
Save operation rate valid/invalid	○	—

* Different from product when service board is used.

NOTE

- The functions listed above may vary according to the product.
- The DDC setting type of the Dx-coil controller (TCB-IFDMX01UP-E, TCB-IFDMR01UP-E) cannot be controlled from the Modbus Interface.
  If the Dx-coil controller TA/TF/DDC setting type is changed, restart the Modbus Interface.

7-2. List of functions for TCB-IFCG1TLE

For further details, refer to the Specifications Manual of Modbus Interface.

Function	Monitoring	Controlling
ON / OFF input for TCB-IFCG1TLE	○	—
Alarm input for TCB-IFCG1TLE	○	—
Din1 input for TCB-IFCG1TLE	○	—
Din2 input for TCB-IFCG1TLE	○	—
Din3 input for TCB-IFCG1TLE	○	—
Din4 input for TCB-IFCG1TLE	○	—
Analog input for TCB-IFCG1TLE	○	—
Relay 1ch output for TCB-IFCG1TLE	—	○
Relay 2ch output for TCB-IFCG1TLE	—	○
Relay 3ch output for TCB-IFCG1TLE	—	○
Relay 4ch output for TCB-IFCG1TLE	—	○
Analog output for TCB-IFCG1TLE	—	○
Local operation prohibit for TCB-IFCG1TLE	—	○

7-3. List of functions for air to water heat pump (ATW)

For further details, refer to the Specifications Manual of Modbus Interface.

Function	Monitoring	Controlling	Special functions for ATW
ON / OFF *2	○	○	
Zone1 / 2 ON / OFF	○	○	○
HOT WATER ON / OFF	○	○	○
Operation mode *3	○	○	
Remote controller permit / Prohibit	○	○	
Zone1 Setting temperature	○	○	○
Zone2 Setting temperature	○	○	○
HOT WATER Setting temperature	○	○	○
AUTO TEMP operation ON / OFF	○	○	○
Night setback operation ON / OFF	○	○	○
Frost protection operation ON / OFF	○	○	○
Anti Bacteria operation ON / OFF	○	○	○
Alarm	○	—	
Check code	○	—	
Floor Dry operation ON / OFF	○	—	○
Zone1 Control Temperature	○	—	○
Zone2 Control Temperature	○	—	○
HOT WATER Control Temperature	○	—	○
Thermo status	○	—	
Facility request	○	—	
Model name *1	○	—	
Serial number *1	○	—	
Indoor unit capacity	○	—	
Indoor unit type	○	—	

Function	Monitoring	Controlling	Special functions for ATW
Operation mode / Fan range	○	—	
Water temperature control mode / Room temperature control mode status	○	—	○
HOT WATER Device Connection status	○	—	○
Zone1 Device Connection status	○	—	○
Zone2 Device Connection status	○	—	○
Zone1 / Zone2 Cooling Mode, water temperature range	○	—	○
Zone1 Heating Mode, water temperature range	○	—	○
Zone2 Heating Mode, water temperature range	○	—	○
HOT WATER temperature range	○	—	○
Room temperature control mode, Cooling temperature range	○	—	○
Room temperature control mode, Heating temperature range	○	—	○
Function status	○	—	○

*1 Different from product when service board is used.

*2 Turn on and off both Zone1 / 2 and HOT WATER.

*3 Operation modes are only heating and cooling.

NOTE

Notes on controlling air to water heat pump (ATW) from Modbus Interface

- Operation modes are heating and cooling.
  With cooling mode, status may be no use depending on the settings of ATW.
- When Floor Dry operation ON/OFF status is ON, control of ATW is entirely disabled.
- AUTO TEMP operation ON/OFF setting cannot be used in the following cases.
  - In the case of room temperature control mode status
  - When External Thermo Control status is use
- "HOT WATER Temperature Setting" register cannot be used in the following cases.
  - When HOT WATER Device Connection status is no use
  - When Hot Water Tank Thermo Control status is use
  - When Frost protection operation is being performed
- "Zone1 Temperature Setting" register cannot be used in the following cases.
  - When Zone1 Device Connection status is no use
  - When External Thermo Control status is use
  - When Frost protection operation is being performed
  - When AUTO TEMP operation is being performed
- "Zone2 Temperature Setting" register cannot be used in the following cases.
  - When Zone2 Device Connection status is no use
  - When External Thermo Control status is use
  - When Frost protection operation is being performed
  - When AUTO TEMP operation is being performed
- Use of "Zone2 Temperature Setting" register is limited to the case of Zone1 Temperature ≥ Zone2 Temperature.
  - If Zone2 Temperature setting is higher than Zone1 temp, Modbus interface change Zone2 temp same as Zone1 automatically and send it.
  - If Zone1 Temperature setting is lower than Zone2 temp, Modbus interface send Zone1 and Zone2 temp send. Zone2 temp is same as Zone1.
- The upper/lower limits of "Zone1 Temperature Setting" register and "Zone2 Temperature setting" register are different between water temperature control mode and room temperature control mode status of ATW.

7-4. List of functions for Room Air Conditioner TU2C-LINK Interface (RAC)

For further details, refer to the Specifications Manual of Modbus Interface.

NOTE

The RAC Interface model name is RAC TU2C-LINK Interface (TCB-SSRL011UUP-E).

(1) RAC Interface is in the “Residential AC type” setting

Function	Monitoring	Controlling	Special functions for Residential AC type
ON / OFF	○	○	
Setting temperature	○	○	
Operation mode	○	○	
Fan speed	○*4	○*4	
Louver	swing / stop	swing / stop	
Save operation rate *2	○ (Power select)	○ (Power select)	
Pure Filter ON/OFF	○		○
Hi-Power ON/OFF *3	○	○	○
ECO ON/OFF *3	○	○	○
Quiet FCU ON/OFF *3	○	○	○
Silence CDU ON/OFF *3	○	○	○
Alarm	○		
Room temperature	○		
Check code	○		
Model name *1	○		
Operation mode / Fan range	○		
Cooling temperature range	○		
Heating temperature range	○		
Dry temperature range	○		
Auto temperature range	○		
Save operation rate valid/invalid	○		
Function status	○		○

*1 Model name is Room Air Conditioner's model name.
*2 Save operation rate “0x0003 = 100% Save (Forcibly Thermo OFF)” cannot be used.
*3 Functions currently being performed on the RAC side may be cancelled depending on controls implemented later.
*4 When operation mode is set to “Dry”, fan speed can only be on auto.

The ON/OFF control of the functions of the RAC interface is subject to the limitations shown in the following table.
✓: ON/OFF setting is allowed. ×: ON/OFF setting is prohibited.

			Operation mode					
		Operation stopped	Heat	Cool	Dry	Fan	Auto heat	Auto cool
Controlling	Hi-Power ON/OFF	✓	✓	✓	×	×	✓	✓
	ECO ON/OFF	✓	✓	✓	×	×	✓	✓
	Quiet FCU ON/OFF	✓	✓	✓	×	✓	✓	✓
	Silence CDU ON/OFF	✓	✓	✓	×	×	✓	✓

(2) RAC Interface is in the “Manual Light commercial AC type” setting

Function	Monitoring	Controlling	Special functions for Residential AC type
ON / OFF	○	○	
Setting temperature	○	○	
Operation mode	○	○	
Fan speed	○	○	
Louver	swing / stop	swing / stop	
Save operation rate			
Pure Filter ON/OFF			○
Hi-Power ON/OFF			○
ECO ON/OFF			○
Quiet FCU ON/OFF			○
Silence CDU ON/OFF			○
Alarm	○		
Room temperature	○		
Check code	○		
Model name	○		
Operation mode / Fan range	○		
Cooling temperature range	○		
Heating temperature range	○		
Dry temperature range	○		
Auto temperature range	○		
Save operation rate valid / invalid			
Function status			○

NOTE

(Please refer the Installation manual of Modbus interface for details)

- When connecting with RAC interface, need to set the "Central controller ID setting" of the Modbus interface to "old controller".
- When connecting with RAC interface and also connecting with air conditioning central controller (BMS-CT2560U-E,TCB-SC640U-E), need to set the "Central controller ID setting" of air conditioning central controller to "old controller".
- ATW and RAC interfaces cannot be connected at the same time.
- The maximum number of indoor units that can be connected is 64 IDUs.

7-5. List of functions for VRF Dx-coil controller

For further details, refer to the Specifications Manual of Modbus Interface.

NOTE

- The VRF Dx-coil controller model name is TCB-IFDMX01UP-E, TCB-IFDMR01UP-E.
- The functions listed may vary according to the product.
- The DDC setting type of the Dx-coil controller cannot be controlled from the Modbus Interface.
- If the Dx-coil controller TA/TF/DDC setting type is changed, restart the Modbus Interface.

(1) VRF Dx-coil controller is in the “TA mode” or the "TF mode" setting

Function	Monitoring	Controlling
ON / OFF	○	○
Setting temperature	○	○
Auto cool temperature setting	○	○
Auto heat temperature setting	○	○
Operation mode	○	○
Fan speed	○ HH,H,L,AUTO	○ HH,H,L,AUTO
Louver		
Remote controller permit / Prohibit	○	○
Filter sign		
Ventilation On/Off		
Ventilation Mode		
Ventilation Fan speed		
Save operation rate	○	○
Accumulated operation time	○	
Alarm	○	
Room temperature / TF sensor	○	
Check code	○	
Thermo status	○	
Facility request	○	
Model name *	○	
Serial number *		
Indoor unit capacity	○	
Indoor unit type	○	
Operation mode / Fan range	○	
Cooling temperature range	○	
Heating temperature range	○	
Dry temperature range	○	
Auto temperature range	○	
Ventilation mode / fan speed, valid / invalid		
Save operation rate valid / invalid	○	

(2) VRF Dx-coil controller is in the “DDC mode" setting

Function	Monitoring	Controlling
ON / OFF	○	
Setting temperature		
Auto cool temperature setting		
Auto heat temperature setting		
Operation mode	○	
Fan speed	○ HH,H,L,AUTO	
Louver		
Remote controller permit / Prohibit	○	
Filter sign		
Ventilation On/Off		
Ventilation Mode		
Ventilation Fan speed		
Save operation rate		
Accumulated operation time	○	
Alarm	○	
Room temperature		
Check code	○	
Thermo status	○	
Facility request	○	
Model name *	○	
Serial number *		
Indoor unit capacity	○	
Indoor unit type	○	
Operation mode / Fan range	○	
Cooling temperature range		
Heating temperature range		
Dry temperature range		
Auto temperature range		
Ventilation mode / fan speed, valid / invalid		
Save operation rate valid / invalid		

* Different from product when service board is used.

8 Address assignment table

8-1. Indoor unit

“Indoor number” in the table below corresponds with the central control address of the indoor unit.
When the Modbus interface slave address has been specified for the slave address of the request frame, the target indoor units are units 1 to 64.
When the slave address +1 has been specified, the target indoor units are units 65 to 128. Indoor numbers 1 to 64 in the table below correspond with the central control addresses of indoor units 65 to 128.

* ATW is an abbreviation for AIR TO WATER HEAT PUMP.

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Coils (R/W)	1	1	ON/OFF setting	1bit	1=On, 0=Off
		2	Filter sign reset setting	1bit	1=reset, others=no action
		3	Ventilation On/Off	1bit	1=On, 0=Off
		4 - 40	Reserved	-	
		41	Relay 1ch output for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit output see manual of TCB-IFCG1TLE
		42	Relay 2ch output for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit output see manual of TCB-IFCG1TLE
		43	Relay 3ch output for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit output see manual of TCB-IFCG1TLE
		44	Relay 4ch output for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit output see manual of TCB-IFCG1TLE
		45	Local operation prohibit for TCB-IFCG1TLE	1bit	1=prohibit, 0=permit
		46 - 48	Reserved	-	
		49	[ATW]Zone1/2 ON/OFF Setting	1bit	1=On, 0=Off
		50	[ATW]HOT WATER ON/OFF setting	1bit	1=On, 0=Off
		51	[ATW]AUTO TEMP operation ON/OFF setting	1bit	1=On, 0=Off
		52	[ATW]Night setback operation ON/OFF setting	1bit	1=On, 0=Off
		53	Reserved	-	
		54	[ATW]Frost protection operation ON/OFF setting	1bit	1=On, 0=Off
		55	[ATW]Anti Bacteria operation ON/OFF setting	1bit	1=On, 0=Off
		56	Reserved	-	
		57	Reserved	-	
		58	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		59	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		60	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		61	[RAC]Silence CDU ON/OFF	1bit	1=On, 0=Off
		62 - 152	Reserved	-	
	2	153	ON/OFF setting	1bit	
		154	Filter sign reset setting	1bit	
		155	Ventilation On/Off	1bit	1=On, 0=Off
		156 - 192	Reserved	-	
		193	Relay 1ch output for TCB-IFCG1TLE	1bit	
		194	Relay 2ch output for TCB-IFCG1TLE	1bit	
		195	Relay 3ch output for TCB-IFCG1TLE	1bit	
		196	Relay 4ch output for TCB-IFCG1TLE	1bit	
		197	Local operation prohibit for TCB-IFCG1TLE	1bit	
		198 - 200	Reserved	-	
		201	[ATW]Zone1/2 ON/OFF Setting	1bit	
		202	[ATW]HOT WATER ON/OFF setting	1bit	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Coils (R/W)	2	203	[ATW]AUTO TEMP operation ON/OFF setting	1bit	
		204	[ATW]Night setback operation ON/OFF setting	1bit	
		205	Reserved	-	
		206	[ATW]Frost protection operation ON/OFF setting	1bit	
		207	[ATW]Anti Bacteria operation ON/OFF setting	1bit	
		208	Reserved	-	
		209	Reserved	-	
		210	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		211	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		212	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		213	[RAC]Silence CDU ON/OFF	1bit	1=On, 0=Off
		214 - 304	Reserved	-	
	n	152*n - 151	ON/OFF setting	1bit	
		152*n - 150	Filter sign reset setting	1bit	
		152*n - 149	Ventilation On/Off	1bit	1=On, 0=Off
		(152*n - 148) - (152*n - 11)	Reserved	-	
		152*n - 111	Relay 1ch output for TCB-IFCG1TLE	1bit	
		152*n - 110	Relay 2ch output for TCB-IFCG1TLE	1bit	
		152*n - 109	Relay 3ch output for TCB-IFCG1TLE	1bit	
		152*n - 108	Relay 4ch output for TCB-IFCG1TLE	1bit	
		(152*n - 107)	Local operation prohibit for TCB-IFCG1TLE	1bit	
		(152*n - 106) - (152*n - 104)	Reserved	-	
		152*n - 103	[ATW]Zone1/2 ON/OFF Setting	1bit	
		152*n - 102	[ATW]HOT WATER ON/OFF setting	1bit	
		152*n - 101	[ATW]AUTO TEMP operation ON/OFF setting	1bit	
		152*n - 100	[ATW]Night setback operation ON/OFF setting	1bit	
		152*n - 99	Reserved	-	
		152*n - 98	[ATW]Frost protection operation ON/OFF setting	1bit	
		152*n - 97	[ATW]Anti Bacteria operation ON/OFF setting	1bit	
		152*n - 96	Reserved	-	
		152*n - 95	Reserved	-	
		152*n - 94	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		152*n - 93	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		152*n - 92	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		152*n - 91	[RAC]Silence CDU ON/OFF	1bit	1=On, 0=Off
		(152*n - 90) - (152*n)	Reserved	-	
	64	9577	ON/OFF setting	1bit	
		9578	Filter sign reset setting	1bit	
		9579	Ventilation On/Off	1bit	1=On, 0=Off
		9580 - 9616	Reserved	-	
		9617	Relay 1ch output for TCB-IFCG1TLE	1bit	
		9618	Relay 2ch output for TCB-IFCG1TLE	1bit	
		9619	Relay 3ch output for TCB-IFCG1TLE	1bit	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Coils (R/W)	64	9620	Relay 4ch output for TCB-IFCG1TLE	1bit	
		9621	Local operation prohibit for TCB-IFCG1TLE	1bit	
		9622 - 9624	Reserved	-	
		9625	[ATW]Zone1/2 ON/OFF Setting	1bit	
		9626	[ATW]HOT WATER ON/OFF setting	1bit	
		9627	[ATW]AUTO TEMP operation ON/OFF setting	1bit	
		9628	[ATW]Night setback operation ON/OFF setting	1bit	
		9629	Reserved	-	
		9630	[ATW]Frost protection operation ON/OFF setting	1bit	
		9631	[ATW]Anti Bacteria operation ON/OFF setting	1bit	
		9632	Reserved	-	
		9633	Reserved	-	
		9634	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		9635	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		9636	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		9637	[RAC]Silence CDU ON/OFF	1bit	1=On, 0=Off
		9638 - 9728	Reserved	-	
	-	9729 - 10000	Reserved	-	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Discrete input (R)	1	10001	ON/OFF setting status	1bit	1=On, 0=Off
		10002	Filter sign status	1bit	1=abnormal, 0=normal
		10003	Alarm status	1bit	1=abnormal, 0=normal
		10004	Thermo status	1bit	1=On, 0=Off
		10005	Ventilation On/Off	1bit	1=On, 0=Off
		10006 - 10056	Reserved	-	
		10057	ON/OFF input for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit input see manual of TCB-IFCG1TLE
		10058	Alarm input for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit input see manual of TCB-IFCG1TLE
		10059	Din2 input for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit input see manual of TCB-IFCG1TLE
		10060	Din3 input for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit input see manual of TCB-IFCG1TLE
		10061	Din4 input for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit input see manual of TCB-IFCG1TLE
		10062	Din1 input for TCB-IFCG1TLE	1bit	TCB-IFCG1TLE bit input see manual of TCB-IFCG1TLE
		10063 - 10064	Reserved	2bit	
		10065	[ATW]Zone1/2 ON/OFF status	1bit	1=On, 0=Off
		10066	[ATW]HOT WATER ON/OFF status	1bit	1=On, 0=Off
		10067	[ATW]AUTO TEMP operation ON/OFF status	1bit	1=On, 0=Off
		10068	[ATW]Night setback operation ON/OFF status	1bit	1=On, 0=Off
		10069	Reserved	1bit	
		10070	[ATW]Frost protection? operation ON/OFF status	1bit	1=On, 0=Off
		10071	[ATW]Anti Bacteria? operation ON/OFF status	1bit	1=On, 0=Off
		10072	[ATW]Floor Dry operation ON/OFF status	1bit	1=On, 0=Off
		10073	[ATW]Water temperature control mode / Room temperature control mode status	1bit	1=Room temperature control mode, 0=Water temperature control mod
		10074	[ATW]HOT WATER Device Connection status	1bit	1= operation ON/OFF status, 0= operation ON/OFF status
		10075	[ATW]Zone1 Device Connection status	1bit	1= operation ON/OFF status, 0= operation ON/OFF status
		10076	[ATW]Zone2 Device Connection status	1bit	1= operation ON/OFF status, 0= operation ON/OFF status
		10077 - 10080	Reserved	4bit	
		10081	[RAC]Pure Filter ON/OFF	1bit	1=On, 0=Off
		10082	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		10083	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		10084	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		10085	[RAC]Silence CDU ON/OFF	1bit	1=On, 0=Off
		10086 - 10152	Reserved	-	
	2	10153	ON/OFF setting status	1bit	
		10154	Filter sign status	1bit	
		10155	Alarm status	1bit	
		10156	Thermo status	1bit	1=On, 0=Off
		10157	Ventilation On/Off	1bit	1=On, 0=Off
		10158 - 10208	Reserved	-	
		10209	ON/OFF input for TCB-IFCG1TLE	1bit	
		10210	Alarm input for TCB-IFCG1TLE	1bit	
		10211	Din2 input for TCB-IFCG1TLE	1bit	
		10212	Din3 input for TCB-IFCG1TLE	1bit	
		10213	Din4 input for TCB-IFCG1TLE	1bit	
		10214	Din1 input for TCB-IFCG1TLE	1bit	
		10215 - 10216	Reserved	2bit	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Discrete input (R)	2	10217	[ATW]Zone1/2 ON/OFF status	1bit	
		10218	[ATW]HOT WATER ON/OFF status	1bit	
		10219	[ATW]AUTO TEMP operation ON/OFF status	1bit	
		10220	[ATW]Night setback operation ON/OFF status	1bit	
		10221	Reserved	1bit	
		10222	[ATW]Frost protection operation ON/OFF status	1bit	
		10223	[ATW]Anti Bacteria operation ON/OFF status	1bit	
		10224	[ATW]Floor Dry operation ON/OFF status	1bit	
		10225	[ATW]Water temperature control mode / Room temperature control mode status	1bit	
		10226	[ATW]HOT WATER Device Connection status	1bit	
		10227	[ATW]Zone1 Device Connection status	1bit	
		10228	[ATW]Zone2 Device Connection status	1bit	
		10229 - 10232	Reserved	4bit	
		10233	[RAC]Pure Filter ON/OFF	1bit	1=On, 0=Off
		10234	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		10235	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		10236	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		10237	[RAC]Silence CDU ON/OFF	1bit	1=On, 0=Off
		10238 - 10304	Reserved	-	
	n	10001+152*(n-1)	ON/OFF setting status	1bit	
		10002+152*(n-1)	Filter sign status	1bit	
		10003+152*(n-1)	Alarm status	1bit	
		10004+152*(n-1)	Thermo status	1bit	1=On, 0=Off
		10005+152*(n-1)	Ventilation On/Off	1bit	1=On, 0=Off
		(10006+152*(n-1)) - (10056+152*(n-1))	Reserved	-	
		10057+152*(n-1)	ON/OFF input for TCB-IFCG1TLE	1bit	
		10058+152*(n-1)	Alarm input for TCB-IFCG1TLE	1bit	
		10059+152*(n-1)	Din2 input for TCB-IFCG1TLE	1bit	
		10060+152*(n-1)	Din3 input for TCB-IFCG1TLE	1bit	
		10061+152*(n-1)	Din4 input for TCB-IFCG1TLE	1bit	
		10062+152*(n-1)	Din1 input for TCB-IFCG1TLE	1bit	
		(10063+152*(n-1)) - (10064+152*(n-1))	Reserved	2bit	
		10065+152*(n-1)	[ATW]Zone1/2 ON/OFF status	1bit	
		10066+152*(n-1)	[ATW]HOT WATER ON/OFF status	1bit	
		10067+152*(n-1)	[ATW]AUTO TEMP operation ON/OFF status	1bit	
		10068+152*(n-1)	[ATW]Night setback operation ON/OFF status	1bit	
		10069+152*(n-1)	Reserved	1bit	
		10070+152*(n-1)	[ATW]Frost protection operation ON/OFF status	1bit	
		10071+152*(n-1)	[ATW]Anti Bacteria operation ON/OFF status	1bit	
		10072+152*(n-1)	[ATW]Floor Dry operation ON/OFF status	1bit	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Discrete input (R)	n	10073+152*(n-1)	[ATW]Water temperature control mode / Room temperature control mode status	1bit	
		10074+152*(n-1)	[ATW]HOT WATER Device Connection status	1bit	
		10075+152*(n-1)	[ATW]Zone1 Device Connection status	1bit	
		10076+152*(n-1)	[ATW]Zone2 Device Connection status	1bit	
		(10077+152*(n-1)) - (10080+152*(n-1))	Reserved	4bit	
		10081+152*(n-1)	[RAC]Pure Filter ON/OFF	1bit	1=On, 0=Off
		10082+152*(n-1)	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		10083+152*(n-1)	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		10084+152*(n-1)	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		10085+152*(n-1)	[RAC]Silence CDU ON/ OFF	1bit	1=On, 0=Off
		(10086+152*(n-1)) - (10152+152*(n-1))	Reserved	-	
	64	19577	ON/OFF setting status	1bit	
		19578	Filter sign status	1bit	
		19579	Alarm status	1bit	
		19580	Thermo status	1bit	1=On, 0=Off
		19581	Ventilation On/Off	1bit	1=On, 0=Off
		19582 - 19632	Reserved	-	
		19633	ON/OFF input for TCB-IFCG1TLE	1bit	
		19634	Alarm input for TCB-IFCG1TLE	1bit	
		19635	Din2 input for TCB-IFCG1TLE	1bit	
		19636	Din3 input for TCB-IFCG1TLE	1bit	
		19637	Din4 input for TCB-IFCG1TLE	1bit	
		19638	Din1 input for TCB-IFCG1TLE	1bit	
		19639 - 19640	Reserved	2bit	
		19641	[ATW]Zone1/2 ON/OFF status	1bit	
		19642	[ATW]HOT WATER ON/ OFF status	1bit	
		19643	[ATW]AUTO TEMP operation ON/OFF status	1bit	
		19644	[ATW]Night setback operation ON/OFF status	1bit	
		19645	Reserved	1bit	
		19646	[ATW]Frost protection operation ON/OFF status	1bit	
		19647	[ATW]Anti Bacteria operation ON/OFF status	1bit	
		19648	[ATW]Floor Dry operation ON/OFF status	1bit	
		19649	[ATW]Water temperature control mode / Room temperature control mode status	1bit	
		19650	[ATW]HOT WATER Device Connection status	1bit	
		19651	[ATW]Zone1 Device Connection status	1bit	
		19652	[ATW]Zone2 Device Connection status	1bit	
		19653 - 19656	Reserved	4bit	
		19657	[RAC]Pure Filter ON/OFF	1bit	1=On, 0=Off
		19658	[RAC]Hi-Power ON/OFF	1bit	1=On, 0=Off
		19659	[RAC]ECO ON/OFF	1bit	1=On, 0=Off
		19660	[RAC]Quiet FCU ON/OFF	1bit	1=On, 0=Off
		19661	[RAC]Silence CDU ON/ OFF	1bit	1=On, 0=Off

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Discrete input (R)	64	19662 - 19728	Reserved	-	
	-	19729 - 20000	Reserved	-	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	1	30001	Room temperature	2	unit: °C Data type:signed integer Ten times level of temperature Example:20 °C→0x00C8 -5 °C→0xFFCE **NOTE** In the case of Fresh air intake indoor unit, it is the TF sensor value.
		30002	Setting temperature status	2	unit: °C Data type:signed integer Ten times level of temperature Example:20 °C→0x00C8 -5 °C→0xFFCE
		30003	Check Code	2	0x0000=Check Code not generated 0x0001~0xFFFF=Check Code
		30004 - 30006	Reserved	6	
		30007 - 30014	Model name	16	16 characters by 16 ASCII codes
		30015 - 30022	Serial number	16	16 characters by 16 ASCII codes
		30023	Indoor unit capacity	2	Ten times level of unit capacity (kW)
		30024	Indoor unit type	2	Octet expression 0x00**
		30025 - 30028	Analog input for TCB-IFCG1TLE	8	4-channel analog input for TCB-IFCG1TLE address=30025 CH1, address=30026 CH2 • • •
		30029 - 30030	Reserved	-	
		30031	Operation mode / Fan speed	2	RS FM Operation mode and fan speed can be set
		30032	Cooling temperature range	2	CT CB Temperature setting upper and lower limits in cool mode
		30033	Heating temperature range	2	HT HB Temperature setting upper and lower limits in heat mode
		30034	Dry temperature range	2	DT DB Temperature setting upper and lower limits in dry mode
		30035	Auto temperature range	2	FT FB Temperature setting upper and lower limits in auto mode
		30036	Operation mode	2	0x0000=invalid, 0x0001=heat, 0x0002=cool, 0x0003=dry, 0x0004=fan, 0x0005=auto heat, 0x0006=auto cool, 0x0007=unfix
		30037	Fan speed	2	0x0000=invalid, 0x0001=Fan stop, 0x0002=Auto, 0x0003=High, 0x0004=Medium, 0x0005=Low, 0x0007=High+, 0x0008=Low+
		30038	Louver	2	0x0000=invalid, 0x0001=swing, 0x0002=f1, 0x0003=f2, 0x0004=f3, 0x0005=f4, 0x0006=f5, 0x0007=stop
		30039	Remote controller permit / Prohibit	2	Remote controller on/off prohibit setting (bit0) Remote controller mode prohibit setting (bit1) Remote controller setpoint prohibit setting (bit2) Remote controller louver prohibit setting (bit3) Remote controller fan speed prohibit setting (bit4) Remote controller ventilation on/off/mode/Fan speed prohibit setting (bit5) 1=prohibit 0=permit
		30040	Facility request	2	0~15
		30041	Save operation rate	2	0x0000=No Save (100% operation), 0x0001=XX% Save (100-50%), 0x0002=50% Save (50%) 0x0003=100% Save (Forcibly Thermo OFF)
		30042	Save operation rate valid/ invalid	2	0x0000=Invalid, 0x0001=Valid
		30043	Ventilation Mode	2	0x0001=Bypass 0x0002=Heat Exchange 0x0003=Automatic

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	1	30044	Ventilation Fan speed	2	0x0002=H, 0x0003=M, 0x0004=Unbalanced (Only models with Unbalanced enabled)
		30045	Ventilation mode/fan speed, valid/invalid	2	Described in "Note 6"
		30046	[ATW]Zone1 Control Temperature	2	unit: °C Data type:signed integer Ten times level of temperature
		30047	[ATW]Zone2 Control Temperature	2	unit: °C Data type:signed integer Ten times level of temperature
		30048	[ATW]HOT WATER Control Temperature	2	unit: °C Data type:signed integer Ten times level of temperature
		30049	[ATW]Zone1 Setting temperature status	2	unit: °C Data type:signed integer Ten times level of temperature
		30050	[ATW]Zone2 Setting temperature status	2	unit: °C Data type:signed integer Ten times level of temperature
		30051	[ATW]HOT WATER Setting temperature status	2	unit: °C Data type:signed integer Ten times level of temperature
		30052	[ATW]Zone1/Zone2 Cooling Mode, water temperature range	2	see Note 9
		30053	[ATW]Zone1 Heating Mode, water temperature range	2	see Note 9
		30054	[ATW]Zone2 Heating Mode, water temperature range	2	see Note 9
		30055	[ATW]HOT WATER temperature range	2	see Note 9
		30056	[ATW]Room temperature control mode, Cooling temperature range	2	see Note 9
		30057	[ATW]Room temperature control mode, Heating temperature range	2	see Note 9
		30058	[ATW]Function status	2	see Note 8
		30059	[RAC]Function status	2	see Note 11
		30060	Central controller permit/ prohibit	2	Central controller on/off prohibit setting (bit0) Central controller mode prohibit setting (bit1) Central controller setpoint prohibit setting (bit2) Central controller louver prohibit setting (bit3) Central controller fan speed prohibit setting (bit4) Central controller ventilation on/off/mode/Fan speed prohibit setting (bit5) 1=prohibit 0=permit
		30061	Optional control enabled/ disabled	2	Dual Set Point enabled/disabled (bit4) Reserved (bit7-5, bit3-0) 1=enabled 0=disabled
		30062	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		30063	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		30064	Notice Code 1	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30065	Notice Code 2	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30066	Notice Code 3	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	1	30067	Notice Code 4	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30068	Notice Code 5	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30069 - 30156	Reserved	-	
	2	30157	Room temperature	2	
		30158	Setting temperature status	2	
		30159	Check code	2	
		30160 - 30162	Reserved	6	
		30163 - 30170	Model name	16	
		30171 - 30178	Serial number	16	
		30179	Indoor unit capacity	2	
		30180	Indoor unit type	2	
		30181 - 30184	Analog input for TCB-IFCG1TLE	8	
		30185 - 30186	Reserved	-	
		30187	Operation mode / Fan speed	2	
		30188	Cooling temperature range	2	
		30189	Heating temperature range	2	
		30190	Dry temperature range	2	
		30191	Auto temperature range	2	
		30192	Operation mode	2	
		30193	Fan speed	2	
		30194	Louver	2	
		30195	Remote controller permit / Prohibit	2	
		30196	Facility request	2	
		30197	Save operation rate	2	
		30198	Save operation rate valid/ invalid	2	
		30199	Ventilation Mode	2	
		30200	Ventilation Fan speed	2	
		30201	Ventilation mode/fan speed, valid/invalid	2	
		30202	[ATW]Zone1 Control Temperature	2	
		30203	[ATW]Zone2 Control Temperature	2	
		30204	[ATW]HOT WATER Control Temperature	2	
		30205	[ATW]Zone1 Setting temperature status	2	
		30206	[ATW]Zone2 Setting temperature status	2	
		30207	[ATW]HOT WATER Setting temperature status	2	
		30208	[ATW]Zone1/Zone2 Cooling Mode, water temperature range	2	
		30209	[ATW]Zone1 Heating Mode, water temperature range	2	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	2	30210	[ATW]Zone2 Heating Mode, water temperature range	2	
		30211	[ATW]HOT WATER temperature range	2	
		30212	[ATW]Room temperature control mode, Cooling temperature range	2	
		30213	[ATW]Room temperature control mode, Heating temperature range	2	
		30214	[ATW]Function status	2	
		30215	[RAC]Function status	2	see Note 11
		30216	Central controller permit/ prohibit	2	Central controller on/off prohibit setting (bit0) Central controller mode prohibit setting (bit1) Central controller setpoint prohibit setting (bit2) Central controller louver prohibit setting (bit3) Central controller fan speed prohibit setting (bit4) Central controller ventilation on/off/mode/Fan speed prohibit setting (bit5) 1=prohibit 0=permit
		30217	Optional control enabled/ disabled	2	Dual Set Point enabled/disabled (bit4) Reserved (bit7-5, bit3-0) 1=enabled 0=disabled
		30218	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		30219	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		30220	Notice Code 1	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30221	Notice Code 2	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30222	Notice Code 3	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30223	Notice Code 4	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30224	Notice Code 5	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30225 - 30312	Reserved	-	
	n	30001+156(n-1)	Room temperature	2	
		30002+156(n-1)	Setting temperature status	2	
		30003+156(n-1)	Check code	2	
		(30004+156(n-1)) - (30006+156(n-1))	Reserved	6	
		(30007+156(n-1)) - (30014+156(n-1))	Model name	16	
		(30015+156(n-1)) - (30022+156(n-1))	Serial number	16	
		30023+156(n-1)	Indoor unit capacity	2	
		30024+156(n-1)	Indoor unit type	2	
		(30025+156(n-1)) - (30028+156(n-1))	Analog input for TCB-IFCG1TLE	8	
		(30029+156(n-1)) - (30030+156(n-1))	Reserved	-	
		30031+156(n-1)	Operation mode / Fan speed	2	
		30032+156(n-1)	Cooling temperature range	2	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	n	30033+156(n-1)	Heating temperature range	2	
		30034+156(n-1)	Dry temperature range	2	
		30035+156(n-1)	Auto temperature range	2	
		30036+156(n-1)	Operation mode	2	
		30037+156(n-1)	Fan speed	2	
		30038+156(n-1)	Louver	2	
		30039+156(n-1)	Remote controller permit / Prohibit	2	
		30040+156(n-1)	Facility request	2	
		30041+156(n-1)	Save operation rate	2	
		30042+156(n-1)	Save operation rate valid/ invalid	2	
		30043+156(n-1)	Ventilation Mode	2	
		30044+156(n-1)	Ventilation Fan speed	2	
		30045+156(n-1)	Ventilation mode/fan speed, valid/invalid	2	
		30046+156(n-1)	[ATW]Zone1 Control Temperature	2	
		30047+156(n-1)	[ATW]Zone2 Control Temperature	2	
		30048+156(n-1)	[ATW]HOT WATER Control Temperature	2	
		30049+156(n-1)	[ATW]Zone1 Setting temperature status	2	
		30050+156(n-1)	[ATW]Zone2 Setting temperature status	2	
		30051+156(n-1)	[ATW]HOT WATER Setting temperature status	2	
		30052+156(n-1)	[ATW]Zone1/Zone2 Cooling Mode, water temperature range	2	
		30053+156(n-1)	[ATW]Zone1 Heating Mode, water temperature range	2	
		30054+156(n-1)	[ATW]Zone2 Heating Mode, water temperature range	2	
		30055+156(n-1)	[ATW]HOT WATER temperature range	2	
		30056+156(n-1)	[ATW]Room temperature control mode, Cooling temperature range	2	
		30057+156(n-1)	[ATW]Room temperature control mode, Heating temperature range	2	
		30058+156(n-1)	[ATW]Function status	2	
		30059+156(n-1)	[RAC]Function status	2	see Note 11
		30060+156(n-1)	Central controller permit/ prohibit	2	Central controller on/off prohibit setting (bit0) Central controller mode prohibit setting (bit1) Central controller setpoint prohibit setting (bit2) Central controller louver prohibit setting (bit3) Central controller fan speed prohibit setting (bit4) Central controller ventilation on/off/mode/Fan speed prohibit setting (bit5) 1=prohibit 0=permit

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	n	30061+156(n-1)	Optional control enabled/ disabled	2	Dual Set Point enabled/disabled (bit4) Reserved (bit7-5, bit3-0) 1=enabled 0=disabled
		30062+156(n-1)	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		30063+156(n-1)	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		30064+156(n-1)	Notice Code 1	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30065+156(n-1)	Notice Code 2	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30066+156(n-1)	Notice Code 3	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30067+156(n-1)	Notice Code 4	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		30068+156(n-1)	Notice Code 5	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		(30069+156(n-1)) - (30156+156(n-1))	Reserved	-	
	64	39829	Room temperature	2	
		39830	Setting temperature status	2	
		39831	Check code	2	
		39832 - 39834	Reserved	6	
		39835 - 39842	Model name	16	
		39843 - 39850	Serial number	16	
		39851	Indoor unit capacity	2	
		39852	Indoor unit type	2	
		39853 - 39856	Analog input for TCB-IFCG1TLE	8	
		39857 - 39858	Reserved	-	
		39859	Operation mode / Fan speed	2	
		39860	Cooling temperature range	2	
		39861	Heating temperature range	2	
		39862	Dry temperature range	2	
		39863	Auto temperature range	2	
		39864	Operation mode	2	
		39865	Fan speed	2	
		39866	Louver	2	
		39867	Remote controller permit / Prohibit	2	
		39868	Facility request	2	
		39869	Save operation rate	2	
		39870	Save operation rate valid/ invalid	2	
		39871	Ventilation Mode	2	
		39872	Ventilation Fan speed	2	
		39873	Ventilation mode/fan speed, valid/invalid	2	
		39874	[ATW]Zone1 Control Temperature	2	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	64	39875	[ATW]Zone2 Control Temperature	2	
		39876	[ATW]HOT WATER Control Temperature	2	
		39877	[ATW]Zone1 Setting temperature status	2	
		39878	[ATW]Zone2 Setting temperature status	2	
		39879	[ATW]HOT WATER Setting temperature status	2	
		39880	[ATW]Zone1/Zone2 Cooling Mode, water temperature range	2	
		39881	[ATW]Zone1 Heating Mode, water temperature range	2	
		39882	[ATW]Zone2 Heating Mode, water temperature range	2	
		39883	[ATW]HOT WATER temperature range	2	
		39884	[ATW]Room temperature control mode, Cooling temperature range	2	
		39885	[ATW]Room temperature control mode, Heating temperature range	2	
		39886	[ATW]Function status	2	
		39887	[RAC]Function status	2	see Note 11
		39888	Central controller permit/ prohibit	2	Central controller on/off prohibit setting (bit0) Central controller mode prohibit setting (bit1) Central controller setpoint prohibit setting (bit2) Central controller louver prohibit setting (bit3) Central controller fan speed prohibit setting (bit4) Central controller ventilation on/off/mode/Fan speed prohibit setting (bit5) 1=prohibit 0=permit
		39889	Optional control enabled/ disabled	2	Dual Set Point enabled/disabled (bit4) Reserved (bit7-5, bit3-0) 1=enabled 0=disabled
		39890	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		39891	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		39892	Notice Code 1	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		39893	Notice Code 2	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		39894	Notice Code 3	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		39895	Notice Code 4	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		39896	Notice Code 5	2	0x0000=Notice Code not generated 0x0001~0x00FF=Notice Code
		39897 - 39984	Reserved	-	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Input register (R)	-	39985 - 39992	Software version	16	BMS-IFMB1280U is expressed in ASCII codes followed by the version number. Hexadecimal number 100 times the version number x.yy
		39993	Interface status	2	Indicates Modbus Interface internal status. 0x0000=Status undetermined 0x0001=Initializing 0x0002=In operation 0x0003=In operation (controller also in use) 0x0004=Reserved 0x0005=System suspended 0x0006=Controller address duplicated
		39994 - 40000	Reserved	-	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Holding register (R/W)	1	40001	Setting temperature	2	unit: °C Data type:signed integer Ten times level of temperature Example:20 °C→0x00C8 -5 °C→0xFFCE
		40002	Accumulated operation time	2	unit: hour Monitor on/off of the discrete input register to check the on/off state of all air conditioners every 15 minutes. When the register state is on, add 15 minutes. The register data is retained even during power-off.
		40003 - 40006	Analog output for TCB-IFCG1TLE	8	4-channel analog output for TCB-IFCG1TLE (See manual of TCB-IFCG1TLE) see Note2
		40007	Operation mode	2	0x0000=unfix, 0x0001=heat, 0x0002=cool, 0x0003=dry, 0x0004=fan, 0x0005=auto
		40008	Fan speed	2	0x0000=Invalid, 0x0001 Fan stop, 0x0002=Auto, 0x0003=High, 0x0004=Medium, 0x0005=Low, 0x0007=High+, 0x0008=Low+
		40009	Louver	2	0x0000=invalid, 0x0001=swing, 0x0002=f1, 0x0003=f2, 0x0004=f3, 0x0005=f4, 0x0006=f5, 0x0007=stop
		40010	Remote controller permit / Prohibit	2	Remote controller on/off prohibit setting (bit0) Remote controller mode prohibit setting (bit1) Remote controller setpoint prohibit setting (bit2) Remote controller louver prohibit setting (bit3) Remote controller fan speed prohibit setting (bit4) Remote controller ventilation on/off/mode/fan speed prohibit setting (bit5) 1=prohibit 0=permit
		40011	Save operation rate	2	0x0000=No Save (100% operation), 0x0001=XX% Save (100-50%), 0x0002=50% Save (50%) 0x0003=100% Save (Forcibly Thermo OFF)
		40012	Ventilation Mode	2	0x0001=Bypass 0x0002=Heat Exchange 0x0003=Automatic
		40013	Ventilation Fan speed	2	0x0002=H, 0x0003=M, 0x0004=Unbalanced (Only models with Unbalanced enabled)
		40014	[ATW]Zone1 Temperature Setting	2	unit: °C Data type:signed integer Ten times level of temperature
		40015	[ATW]Zone2 Temperature Setting	2	unit: °C Data type:signed integer Ten times level of temperature
		40016	[ATW]HOT WATER Temperature Setting	2	unit: °C Data type:signed integer Ten times level of temperature
		40017	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		40018	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		40019 - 40156	Reserved	-	
	2	40157	Setting temperature	2	
		40158	Accumulated operation time	2	
		40159 - 40162	Analog output for TCB-IFCG1TLE	8	
		40163	Operation mode	2	
		40164	Fan speed	2	
		40165	Louver	2	
		40166	Remote controller permit / Prohibit	2	
		40167	Save operation rate	2	
		40168	Ventilation Mode	2	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Holding register (R/W)	2	40169	Ventilation Fan speed	2	
		40170	[ATW]Zone1 Temperature Setting	2	
		40171	[ATW]Zone2 Temperature Setting	2	
		40172	[ATW]HOT WATER Temperature Setting	2	
		40173	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		40174	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		40175 - 40312	Reserved	-	
	n	40001+156*(n-1)	Setting temperature	2	
		40002+156*(n-1)	Accumulated operation time	2	
		(40003+156*(n-1)) - (40006+156*(n-1))	Analog output for TCB-IFCG1TLE	8	
		40007+156*(n-1)	Operation mode	2	
		40008+156*(n-1)	Fan speed	2	
		40009+156*(n-1)	Louver	2	
		40010+156*(n-1)	Remote controller permit / Prohibit	2	
		40011+156*(n-1)	Save operation rate	2	
		40012+156*(n-1)	Ventilation Mode	2	
		40013+156*(n-1)	Ventilation Fan speed	2	
		40014+156*(n-1)	[ATW]Zone1 Temperature Setting	2	
		40015+156*(n-1)	[ATW]Zone2 Temperature Setting	2	
		40016+156*(n-1)	[ATW]HOT WATER Temperature Setting	2	
		40017+156*(n-1)	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		40018+156*(n-1)	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		(40019+156*(n-1)) - (40156+156*(n-1))	Reserved	-	
	64	49829	Setting temperature	2	
		49830	Accumulated operation time	2	
		49831 - 49834	Analog output for TCB-IFCG1TLE	8	
		49835	Operation mode	2	
		49836	Fan speed	2	
		49837	Louver	2	
		49838	Remote controller permit / Prohibit	2	
		49839	Save operation rate	2	
		49840	Ventilation Mode	2	
		49841	Ventilation Fan speed	2	
		49842	[ATW]Zone1 Temperature Setting	2	
		49843	[ATW]Zone2 Temperature Setting	2	
		49844	[ATW]HOT WATER Temperature Setting	2	

Modbus description	Indoor number	Modbus register	Data name	Length	Explanation
Holding register (R/W)	64	49845	Auto cool temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		49846	Auto heat temperature setting	2	unit: °C Data type:signed integer Ten times level of tempera see Note 12
		49847 - 49984	Reserved	-	
	-	49985 - 50000	Reserved	-	

Note 1

- Analog In (2 channels, thermistor) reading
  Received Uh Line value is retained in this register with two bytes.
  The received 2-byte data is a two's complement and is converted to as an absolute measurement temperature by dividing it by 100.
  Example) Received value 0xFE97 -> x0169 (converted to two's complement) -> 361 -> converted to 3.61 (K) (divided by 100) The Celsius temperature is obtained by subtracting 273.15 from 3.61.
- Analog In (2CH 0-10VDC)
  Received Uh Line value is retained in this register with two bytes. The true value is a two's complement, and the value obtained by dividing the true value by 1000 becomes the board input value.
  Example) Received value 0xD8F1 -> converted to 0x270F (two's complement) -> 9999 -> converted to 9.999V (divided by 1000)

Note 2

- TCB-IFCG1TLE Analog Out 2-channel writing
  The master device writes a 2-byte two's complement that is 1000 times of the transmit value.
  The TCB-IFCG1TLE board value is obtained by dividing a two's complement of 2-byte received value by 3000.
  A level in accordance with the value is output from the MPU treating 3.333 as 256 levels. The MPU output value is multiplied by 3 in the external circuit, and the TCB-IFCG1TLE board output value equals the transmit value.

Example 1) A value 9.999V calculated by the master device is sent -> -> 9999 (1000 times) -> 0x270F---> 0x D8F1 (two's complement) This value is written.

Calculation at the receiver (TCB-IFCG1TLE board) 0xD8F1- -> 0x270F (two's complement) -> 9999 -> 3.333V (divided by 3000)- -> 256 levels = 0xFF (3.333V) is DA output. A value 3.333*3 = 9.999V is output from "Analog Out" on the TCB-IFCG1TLE board.

Example 2) A value 3.000V calculated by the master device is sent -> 3000 (1000 times) -> 0x0BB8-- -> 0xF448 (two's complement) This value is written to the register.

Calculation at the receiver (TCB-IFCG1TLE board) 0xF448 -> 0x0BB8 (two's complement) -> 3000 -> 1V (divided by 3000) - -> 77 levels = 0x4D (1.00V) is DA output. A value 1.00*3 = 3.00V is output from "Analog Out" on the TCB-IFCG1TLE board.

Note 3

- Unused bits can be read and written. No data can be written to reserved areas. If a reserved area is read, 00 is always returned.

Note 4

- The meaning of RS/FM (operation mode, fan speed), CT/CB (temperature setting upper and lower limits in cool mode), HT/HB (temperature setting upper and lower limits in heat mode), DT/DB (temperature setting upper and lower limits in dry mode), and FT/FB (temperature setting upper and lower limits in auto mode) in the Input register (R) is shown below. The master device must read the following values from each air conditioner in advance, and must set values within this range when specifying operation data.

Bits of RS	Meaning
b7, b6	Reserved
b5	1: Auto mode enabled, 0: Auto mode disabled
b4	1: Ventilation enabled, 0: Ventilation disabled
b3	1: Heating mode enabled, 0: Heating mode disabled
b2	1: Drying mode enabled, 0: Drying mode disabled
b1	1: Cooling mode enabled, 0: Cooling mode disabled
LSB	1: Fan mode enabled, 0: Fan mode disabled

Bits of FM	Meaning (fan speed)
b7	Reserved
b6	1:High+ fan speed enabled, 0:disabled
b5	1:Low+ fan speed enabled, 0:disabled
b4	1:auto fan speed enabled, 0:disabled
b3	1: High fan speed enabled, 0: disabled
b2	1: Medium fan speed enabled, 0: disabled
b1	1: Low fan speed enabled, 0: disabled
b0	Reserved

Upper-limit / lower-limit temperature	Meaning
CT CB	Temperature setting upper-limit value in cool mode Temperature setting lower-limit value in cool mode
HT HB	Temperature setting upper-limit value in heat mode Temperature setting lower-limit value in heat mode

Upper-limit / lower-limit temperature	Meaning
DT DB	Temperature setting upper-limit value in dry mode Temperature setting lower-limit value in dry mode
FT FB	Temperature setting upper-limit value in auto mode Temperature setting lower-limit value in auto mode

The upper-limit and lower-limit values in the table above are converted to Celsius temperatures using the following formula.
Celsius temperature (°C) = -35 + (decimal read value / 2)

Note 5

- When air conditioners are added, deleted, or DN is changed, it is necessary to restart the Modbus Interface.

Note 6

- "Ventilation mode/fan speed valid/invalid" register value is described in the table below.

bit	Meaning
b7 to b3	Reserved
b2	1:Ventilation fan speed enabled, 0:disabled
b1	1:Ventilation mode enabled, 0:disabled
b0	1:Ventilation On/Off enabled, 0:disabled

Note 7

- Check Code format is described in the table below.

<table>
<tr><th>bit</th><th>Item</th><th>Value</th></tr>
<tr><td>15</td><td>Automatic backup</td><td>VRF function (automatic backup) status
0: OFF or not functional
1: Undergoing automatic backup</td></tr>
<tr><td>14</td><td rowspan="3">Model group ID</td><td rowspan="3">000: VRF; Light Commercial model
011: air to water heat pump (ATW)
100: Room Air Conditioner (RAC)
Other: Reserved</td></tr>
<tr><td>13</td></tr>
<tr><td>12</td></tr>
<tr><td>11</td><td>Reserved</td><td>0</td></tr>
<tr><td>10</td><td>Reserved</td><td>0</td></tr>
<tr><td>9</td><td rowspan="2">Code extension</td><td rowspan="2">0 to 3</td></tr>
<tr><td>8</td></tr>
<tr><td>7</td><td rowspan="3">Code classification</td><td rowspan="10">Described in “9 Appendix”.</td></tr>
<tr><td>6</td></tr>
<tr><td>5</td></tr>
<tr><td>4</td><td rowspan="5">Code</td></tr>
<tr><td>3</td></tr>
<tr><td>2</td></tr>
<tr><td>1</td></tr>
<tr><td>0</td></tr>
</table>

Note 8

- "[ATW]Function status" register value is described in the table below.

bit	Item	Value
b15 to b8	Reserved	
b7	External Thermo Control Status	1=use,0=unused
b6	How Water Tank Thermo Control status	1=use,0=unused
b5	Anti Bacteria Function Setting staus	1=use,0=unused
b4	Reserved	
b3	Night Set Back Function Setting staus	1=use,0=unused
b2	Reserved	
b1	Frost Protection Function Setting staus	1=use,0=unused
b0	AUTO TEMP Function Setting staus	1=use,0=unused

Note 9

- Register value is described in the table below.
  [ATW]Zone1/Zone2 Cooling Mode, water temperature range,
  [ATW]Zone1 Heating Mode, water temperature range,
  [ATW]Zone2 Heating Mode, water temperature range,
  [ATW]HOT WATER temperature range,
  [ATW]Room temperature control mode, Cooling temperature range,
  [ATW]Room temperature control mode, Heating temperature range

Octet	Meaning
UT LT	Temperature setting upper-limit value Temperature setting lower-limit value

The upper-limit and lower-limit values in the table above are converted to Celsius temperatures using the following formula.
Celsius temperature (°C) = (decimal read value -32) / 2

Note 10

Notes on controlling AIR TO WATER HEAT PUMP (ATW) from Modbus Interface

- Operation modes are heating and cooling.
  With cooling mode, status may be no use depending on the settings of ATW.
- When Floor Dry operation ON/OFF status is ON, control of ATW is entirely disabled.
- AUTO TEMP operation ON/OFF setting cannot be used in the following cases.
  - In the case of room temperature control mode status
  - When External Thermo Control status is use
- "HOT WATER Temperature Setting" register cannot be used in the following cases.
  - When HOT WATER Device Connection status is no use
  - When Hot Water Tank Thermo Control status is use
  - When Frost protection operation is being performed
- "Zone1 Temperature Setting" register cannot be used in the following cases.
  - When Zone1 Device Connection status is no use
  - When External Thermo Control status is use
  - When Frost protection operation is being performed
  - When AUTO TEMP operation is being performed
- "Zone2 Temperature Setting" register cannot be used in the following cases.
  - When Zone2 Device Connection status is no use
  - When External Thermo Control status is use
  - When Frost protection operation is being performed
  - When AUTO TEMP operation is being performed
- Use of "Zone2 Temperature Setting" register is limited to the case of Zone1 Temperature ≥ Zone2 Temperature.
  - If Zone2 Temperature setting is higher than Zone1 temp, Modbus interface change Zone2 temp same as Zone1 automatically and send it.
  - If Zone1 Temperature setting is lower than Zone2 temp, Modbus interface send Zone1 and Zone2 temp send. Zone2 temp is same as Zone1.
- The upper/lower limits of "Zone1 Temperature Setting" register and "Zone2 Temperature setting" register are different between water temperature control mode and room temperature control mode status of ATW.

Note 11

- "[RAC] Function status" register value is described in the table below.

bit	Item	Value
b15 to b5	Reserved	
b4	Silence CDU ON/OFF status	1=use, 0=unused
b3	Quiet FCU ON/OFF status	1=use, 0=unused
b2	ECO ON/OFF status	1=use, 0=unused
b1	Hi-Power ON/OFF status	1=use, 0=unused
b0	Pure Filter ON/OFF status	1=use, 0=unused

Note 12

- In the case of Auto cool temperature setting ≥ Auto heat temperature setting, both setting values will be transmitted to the indoor unit.
  In the case of Auto cool temperature setting < Auto heat temperature setting, the setting values will not be transmitted.

8-2. Outdoor unit

Modbus descriptio	Outdoor line address	Modbus register	Date name	Length	Explanation
Coils(R/W)	-	9801	EER start / stop	1bit	1= Start(default),0 =Stop
	-	9802	EER data mode	1bit	0 =EER mode(default) VRF Capacity data 1= Reserved

Modbus descriptio	Outdoor line address	Modbus register	Date name	Length	Explanation
Discrete input (R)	-	19801	EER start / stop status	1	1= Start(default),0 =Stop
	-	19802	EER data mode status	1	0 =EER mode(default) VRF Capacity data 1= Reserved

Modbus descriptio	Outdoor line address	Modbus register	Date name	Length	Explanation
Inpit register (R)	-	35001	EER start / stop status	2	1= Start(default),0 =Stop
	-	35002	Line address bitmap(upper)	2	The address of outdoor unit is shown. Line address 32 to 17 1=exist, 0=no exist bit15:Line address 32 bit14:Line address 31 … bit1: Line address 18 bit0: Line address 17
	-	35003	Line address bitmap(lower)	2	The address of outdoor unit is shown.Line address 16 to 1 1=exist, 0=no exist bit15:Line address 16 bit14:Line address 15 … bit1: Line address 2 bit0: Line address 1
	-	35004	EER function use bitmap(upper)	2	An outdoor unit has an EER data output function. Line address 32 to 17 1=use, 0=no use bit15:Line address 32 bit14:Line address 31 … bit1: Line address 18 bit0: Line address 17
	-	35005	EER function use bitmap(lower)	2	An outdoor unit has an EER data output function. Line address 16 to 1 1=use, 0=no use bit15:Line address 16 bit14:Line address 15 … bit1: Line address 2 bit0: Line address 1

Modbus descriptio	Outdoor line address	Modbus register	Date name	Length	Explanation
	-	35006	outdoor communication error bitmap(upper)	2	Communication status between Modbus interface and outdoor unit Line address 32 to 17 1=communication error, 0=no error bit15:Line address 32 bit14:Line address 31 … bit1: Line address 18 bit0: Line address 17
	-	35007	outdoor communication error bitmap(lower)	2	Communication status between Modbus interface and outdoor unit Line address 16 to 1 1=communication error, 0=no error bit15:Line address 16 bit14:Line address 15 … bit1: Line address 2 bit0: Line address 1
	-	35008-35016	Reserved	-	
	1	35017	no.1 capacity data Qc (upper)	2	Capacity data for line address 1 [Notes1]
		35018	no.1 capacity data Qc (lower)	2	
	2	35019	no.2 capacity data Qc (upper)	2	Capacity data for line address 2 [Notes1]
		35020	no.2 capacity data Qc (lower)	2	
	3	35021	no.3 capacity data Qc (upper)	2	Capacity data for line address 3 [Notes1]
		35022	no.3 capacity data Qc (lower)	2	
	4	35023	no.4 capacity data Qc (upper)	2	Capacity data for line address 4 [Notes1]
		35024	no.4 capacity data Qc (lower)	2	
	5	35025	no.5 capacity data Qc (upper)	2	Capacity data for line address 5 [Notes1]
		35026	no.5 capacity data Qc (lower)	2	
	6	35027	no.6 capacity data Qc (upper)	2	Capacity data for line address 6 [Notes1]
		35028	no.6 capacity data Qc (lower)	2	
	7	35029	no.7 capacity data Qc (upper)	2	Capacity data for line address 7 [Notes1]
		35030	no.7 capacity data Qc (lower)	2	
	8	35031	no.8 capacity data Qc (upper)	2	Capacity data for line address 8 [Notes1]
		35032	no.8 capacity data Qc (lower)	2	
	9	35033	no.9 capacity data Qc (upper)	2	Capacity data for line address 9 [Notes1]
		35034	no.9 capacity data Qc (lower)	2	
	10	35035	no.10 capacity data Qc (upper)	2	Capacity data for line address 10 [Notes1]
		35036	no.10 capacity data Qc (lower)	2	
	11	35037	no.11 capacity data Qc (upper)	2	Capacity data for line address 11 [Notes1]
		35038	no.11 capacity data Qc (lower)	2	
	12	35039	no.12 capacity data Qc (upper)	2	Capacity data for line address 12 [Notes1]
		35040	no.12 capacity data Qc (lower)	2	
	13	35041	no.13 capacity data Qc (upper)	2	Capacity data for line address 13 [Notes1]
		35042	no.13 capacity data Qc (lower)	2	
	14	35043	no.14 capacity data Qc (upper)	2	Capacity data for line address 14 [Notes1]
		35044	no.14 capacity data Qc (lower)	2	
	15	35045	no.15 capacity data Qc (upper)	2	Capacity data for line address 15 [Notes1]
		35046	no.15 capacity data Qc (lower)	2	
	16	35047	no.16 capacity data Qc (upper)	2	Capacity data for line address 16 [Notes1]
		35048	no.16 capacity data Qc (lower)	2	
	17	35049	no.17 capacity data Qc (upper)	2	Capacity data for line address 17 [Notes1]
		35050	no.17 capacity data Qc (lower)	2	
	18	35051	no.18 capacity data Qc (upper)	2	Capacity data for line address 18 [Notes1]
		35052	no.18 capacity data Qc (lower)	2	

Modbus descriptio	Outdoor line address	Modbus register	Date name	Length	Explanation
	19	35053	no.19 capacity data Qc (upper)	2	Capacity data for line address 19 [Notes1]
		35054	no.19 capacity data Qc (lower)	2	
	20	35055	no.20 capacity data Qc (upper)	2	Capacity data for line address 20 [Notes1]
		35056	no.20 capacity data Qc (lower)	2	
	21	35057	no.21 capacity data Qc (upper)	2	Capacity data for line address 21 [Notes1]
		35058	no.21 capacity data Qc (lower)	2	
	22	35059	no.22 capacity data Qc (upper)	2	Capacity data for line address 22 [Notes1]
		35060	no.22 capacity data Qc (lower)	2	
	23	35061	no.23 capacity data Qc (upper)	2	Capacity data for line address 23 [Notes1]
		35062	no.23 capacity data Qc (lower)	2	
	24	35063	no.24 capacity data Qc (upper)	2	Capacity data for line address 24 [Notes1]
		35064	no.24 capacity data Qc (lower)	2	
	25	35065	no.25 capacity data Qc (upper)	2	Capacity data for line address 25 [Notes1]
		35066	no.25 capacity data Qc (lower)	2	
	26	35067	no.26 capacity data Qc (upper)	2	Capacity data for line address 26 [Notes1]
		35068	no.26 capacity data Qc (lower)	2	
	27	35069	no.27 capacity data Qc (upper)	2	Capacity data for line address 27 [Notes1]
		35070	no.27 capacity data Qc (lower)	2	
	28	35071	no.28 capacity data Qc (upper)	2	Capacity data for line address 28 [Notes1]
		35072	no.28 capacity data Qc (lower)	2	
	29	35073	no.29 capacity data Qc (upper)	2	Reserved
		35074	no.29 capacity data Qc (lower)	2	Reserved
	30	35075	no.30 capacity data Qc (upper)	2	Reserved
		35076	no.30 capacity data Qc (lower)	2	Reserved
	31	35077	no.31 capacity data Qc (upper)	2	Reserved
		35078	no.31 capacity data Qc (lower)	2	Reserved
	32	35079	no.32 capacity data Qc (upper)	2	Reserved
		35080	no.32 capacity data Qc (lower)	2	Reserved
	-	35081-40000	Reserved	-	

Note 1

- <Example>
  35017 0x0001, 35018 0x1001 → [Hex]0x0001 0x1001 → [Dec] 69633
- In the case of outdoor unit stop, a value is set to 0x0000.
- In the case of outdoor unit communication error, a value is set to 0x8000.
  upper 0x8000, lower 0x8000
- Outdoor unit line addresses are 1 to 28. The maximum number of lines is 16 (Indoor unit not compatible with Uh Line).
- This Modbus Interface can be connected with SMMS-7, MiNi-SMMS7 and SMMS∞.
  Capacity data for cooling mode is set.
  The products concerned are the ones with the following model numbers or later.

SMMS-7	Standard	MMY-MAP0807T8P*/T7P
		MMY-MAP1007T8P*/T7P
		MMY-MAP1207T8P*/T7P
		MMY-MAP1407T8P*/T7P
		MMY-MAP1607T8P*/T7P
		MMY-MAP1807T8P*/T7P
		MMY-MAP2007T8P*/T7P
		MMY-MAP2207T8P*/T7P
		MMY-MAP2407T8P*/T7P
	High efficiency	MMY-MAP14A7T8P*/T7P
MiNi-SMMS7	Standard	MCY-MAP0401TP*
		MCY-MAP0501TP*
		MCY-MAP0601TP*

*: -SG, -T, -ID

SMMS∞	MMY-MUP0801T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP1001T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP1201T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP1401T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP14A1T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP1601T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP1801T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP2001T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP2201T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP2401T8P*[1]/T8JP*[2]/T7P/T7JP
	MMY-MUP2601T8P*[1]/T8JP*[2]/T7P/T7JP

*1:-T,-SG
*2:-T

9 Appendix

9-1. Check Code (VRF system, Light Commercial mode)

Check Code		Description
Hexadecimal number	Main remote controller display	
00		No active error
01		Reserved
02		Reserved
03		Reserved
04		Reserved
05		Reserved
06		Reserved
07		Reserved
08		Reserved
09		Reserved
0A		Reserved
0B		Reserved
0C		Reserved
0D		Reserved
0E		Reserved
0F		Reserved
10		Reserved
11		Reserved
12		Reserved
13		Reserved
14		Reserved
15		Reserved
16		Reserved
17		Reserved
18		Reserved
19		Reserved
1A		Reserved
1B		Reserved
1C		Reserved
1D		Reserved
1E		Reserved
1F		Reserved
20		Reserved
21		Reserved
22		Reserved
23		Reserved
24		Reserved
25	C05	Sending error in Uh Line central control device
26	C06	Receiving error in Uh Line central control device
27		Reserved
28		Reserved

Check Code		Description
Hexadecimal number	Main remote controller display	
29		Reserved
2A		Reserved
2B		Reserved
2C	C12	Batch alarm of general-purpose equipment control interface
2D		Reserved
2E		Reserved
2F		Reserved
30		Reserved
31		Reserved
32		Reserved
33		Reserved
34		Reserved
35		Reserved
36		Reserved
37		Reserved
38		Reserved
39		Reserved
3A		Reserved
3B		Reserved
3C		Reserved
3D		Reserved
3E		Reserved
3F		Reserved
40		Reserved
41	E01	Communication error between indoor and remote controller
42	E02	Sending error of remote controller
43	E03	Communication error between indoor and remote controller
44	E04	Communication circuit error between indoor and outdoor
45		Reserved
46	E06	Decrease of No. of indoor units
47	E07	Communication circuit error between indoor/outdoor
48	E08	Duplicated indoor addresses
49	E09	Duplicated master remote controllers
4A	E10	Communication error between indoor P.C.board
4B	E11	Communication error between indoor-sub-PCB, sub-PCB-option PCB
4C	E12	Automatic address start error
4D	E13	Periodic communication error (DX-kit - 0-10V_I/F) at indoor unit - 0-10V_interface
4E	E14	Periodic communication error between indoor unit and 0 to 10V interface
4F	E15	No indoor automatic address
50	E16	Capacity over / No. of connected indoor units
51	E17	Bad reception from flow selector (FS) unit
52	E18	Communication error between indoor header and follower units
53	E19	Outdoor header units quantity error
54	E20	Other line connected during automatic address

Check Code		Description
Hexadecimal number	Main remote controller display	
55	E21	Header thermal storage units quantity error
56	E22	Decease of No. of thermal storage units
57	E23	Sending error in communication between outdoor units
58		Reserved
59	E25	Duplicated follower outdoor address
5A	E26	Decrease of No. of connected outdoor units
5B		Reserved
5C	E28	Follower outdoor unit error
5D		Reserved
5E		Reserved
5F	E31	IPDU communication error
60		Reserved
61	F01	Indoor TCJ sensor error
62	F02	Indoor TC2 sensor error
63	F03	Indoor TC1 sensor error
64	F04	TD1 sensor error
65	F05	TD2 sensor error
66	F06	TE1/TE2 sensor error
67	F07	TL sensor error
68	F08	TO sensor error
69	F09	TG sensor error
6A	F10	Indoor TA/TSA sensor error
6B	F11	Indoor TF/TFA sensor error
6C	F12	TS1 sensor error
6D	F13	TH sensor error
6E	F14	TR sensor error
6F	F15	Outdoor temp. sensor misconnection (TE1/TL)
70	F16	Outdoor pressure sensor misconnection (Pd/Ps)
71	F17	TOA sensor error
72	F18	TRA sensor error
73	F19	Indoor heat exchanger temperature sensor (TF) error
74	F20	PL (fluid piping pressure) sensor error
75		Reserved
76	F22	TD3 sensor error
77	F23	Ps sensor error
78	F24	Pd sensor error
79	F25	Indoor heat exchanger temperature sensor (TA) error
7A	F26	Indoor heat exchanger temperature sensor (TC2) error
7B		Reserved
7C		Reserved
7D	F29	Indoor other error
7E	F30	Occupancy sensor error or indoor air cleanliness error
7F	F31	Outdoor EEPROM error
80		Reserved

Check Code		Description
Hexadecimal number	Main remote controller display	
81	H01	Compressor break down
82	H02	Magnet switch / Overcurrent operation / Compressor error
83	H03	Current detection circuit error
84	H04	Comp-1 case thermo operation
85	H05	Outdoor temp. sensor misconnection (TD1)
86	H06	Low pressure protective operation
87	H07	Low oil level protection
88	H08	Oil level temp. sensor error
89		Reserved
8A		Reserved
8B		Reserved
8C		Reserved
8D		Reserved
8E	H14	Comp-2 case thermo operation
8F	H15	Outdoor temp. sensor misconnection (TD2)
90	H16	Oil level circuit / Magnet switch / Overcurrent error
91		Reserved
92		Reserved
93		Reserved
94		Reserved
95		Reserved
96		Reserved
97		Reserved
98		Reserved
99	H25	Outdoor temp. sensor misconnection (TD3)
9A		Reserved
9B		Reserved
9C	H28	Compressor winding error
9D		Reserved
9E		Reserved
9F		Reserved
A0		Reserved
A1	J01	Flow selector (FS) unit has bad reception from indoor unit (main unit)
A2	J02	Communication error between flow selector (FS) unit boards and between MCUs
A3	J03	Flow selector (FS) unit is duplicated
A4		Reserved
A5		Reserved
A6		Reserved
A7		Reserved
A8		Reserved
A9		Reserved
AA	J10	Float SW operating at flow selector (FS) unit
AB	J11	TCS sensor error in flow selector (FS) unit
AC	J12	Sensor 2 error in flow selector (FS) unit

Check Code		Description
Hexadecimal number	Main remote controller display	
AD		Reserved
AE		Reserved
AF		Reserved
B0		Reserved
B1		Reserved
B2		Reserved
B3		Reserved
B4		Reserved
B5		Reserved
B6		Reserved
B7		Reserved
B8		Reserved
B9		Reserved
BA		Reserved
BB		Reserved
BC		Reserved
BD	J29	Refrigerant leak sensor error
BE	J30	Refrigerant leak detection
BF	J31	Refrigerant leak sensor life
C0		Reserved
C1		Reserved
C2	L02	Inconsistency error of outdoor units
C3	L03	Duplicated indoor header units
C4	L04	Duplicated outdoor line address
C5	L05	Duplicated indoor units with priority
C6	L06	Duplicated indoor units with priority
C7	L07	Group line in individual indoor unit
C8	L08	Indoor group / Address unset
C9	L09	Indoor capacity unset
CA	L10	Outdoor capacity unset
CB	L11	Absence of flow selector (FS) unit
CC	L12	Flow selector system error
CD	L13	Safety device mismatch
CE	L14	No safety device connected
CF	L15	Inconsistency error of indoor units
D0		Reserved
D1	L17	Inconsistency error of outdoor units
D2	L18	FS unit error
D3		Reserved
D4	L20	Duplicated central control addresses
D5	L21	200 V applied voltage error
D6	L22	There are units in the group that do not support DX-KIT.
D7	L23	Setting abnormality
D8	L24	Flow selector unit is set incorrectly

Check Code		Description
Hexadecimal number	Main remote controller display	
D9		Reserved
DA	L26	Over No. of connected thermal storage units
DB	L27	Thermal storage units quantity error
DC	L28	Maximum number of outdoor units exceeded
DD	L29	No. of IPDU error
DE	L30	Auxiliary interlock in indoor unit
DF	L31	IC error
E0		Reserved
E1	P01	Indoor fan motor error
E2	P02	Boost circuit error
E3	P03	Discharge temp. TD1 error
E4	P04	High-pressure switch detection error
E5	P05	Phase-missing detection / Phase order error
E6		Reserved
E7	P07	Heat sink overheat error
E8	P08	Intake air temperature error
E9	P09	Thermal storage unit drought abnormality
EA	P10	Indoor overflow error
EB	P11	Outdoor heat exchanger freeze trouble
EC	P12	Indoor fan motor error
ED	P13	Outdoor liquid back detection error
EE	P14	Other cycle protection
EF	P15	Gas leak detection
F0	P16	Injection circuit trouble
F1	P17	Discharge temp. TD2 error
F2	P18	Discharge temp. TD3 error
F3	P19	4-way valve inverse error
F4	P20	High-pressure inverse error
F5		Reserved
F6	P22	Outdoor fan IPDU error
F7		Reserved
F8	P24	Abnormal Thermal storage unit
F9	P25	Compressor inverter board error
FA	P26	Compressor energization error
FB	P27	Active filter error
FC	P28	Active filter miswiring
FD	P29	Comp position detection circuit error
FE	P30	Group terminal unit error
FF	P31	Follower indoor unit error (Group error)

In case you detect an error code not listed, contact your nearest Toshiba technical support service.

9-2. Check Code (Air to water heat pump model)

Check Code		Description
Hexadecimal number	Main remote controller display	
00	N/A	No active error
01	A01	Pump or flowing quantity error
02	A02	Temperature increase error (Heating)
03	A03	Temperature increase error (Hot Water Supply)
04	A04	Antifreeze operation (1)
05	A05	Piping antifreeze operation
07	A07	Pressure switch operation
08	A08	Low pressure sensor operation error
09	A09	Overheat protection operation
0A	A10	Antifreeze operation (2)
0B	A11	Operation of the release protection
0C	A12	Heating, hot water heater
0D	A13	Pump error (Mainly low voltage to the system)
0E	A14	Pump error (Mainly except low voltage to the system)
0F	A15	Pump error (for zone2)
41	E01	No communication between hydro unit and remote controller
42	E02	Defect in the signal transmission to the hydro unit
43	E03	Regular communication error between hydro unit and remote controller
44	E04	Regular communication error between hydro unit and outdoor unit
48	E08	Duplicate address of Hydro unit, or Duplicate master Hydro unit during Group control
49	E09	Several remote controller base units
4E	E14	Regular communication error between hydro unit and 0-10 V-IF
52	E18	Regular communication error between master Hydro unit and slave Hydro unit during Group control
63	F03	TC sensor error
64	F04	TD sensor error
66	F06	TE sensor error
67	F07	TL sensor error
68	F08	TO sensor error
6A	F10	TWI sensor error
6B	F11	TWO sensor error
6C	F12	TS sensor error
6D	F13	TH sensor error
6E	F14	TTW sensor error
6F	F15	TE, TS sensors error
71	F17	TFI sensor error
72	F18	THO sensor error
73	F19	Detection of THO disconnection error
74	F20	TFI sensor error

Check Code		Description
Hexadecimal number	Main remote controller display	
77	F23	Low pressure sensor error
78	F24	PD sensor error
7D	F29	EEROM error
7E	F30	Extended IC error
7F	F31	EEPROM error
160	F32	Flow sensor error
161	F33	Flowing quantity error
81	H01	Compressor
82	H02	Compressor lock
83	H03	Defect in the current detection circuit
84	H04	Operation of case thermostat
C2	L02	Combination
C3	L03	Duplicate main Hydro unit during Group control
C7	L07	Communication error
C8	L08	Hydro Unit group / Address unset
C9	L09	Communication error
CA	L10	Unset service PC board jumper
CF	L15	Combination error
D0	L16	Setting error
D6	L22	0-10V Setting error
DD	L29	The communication between the outdoor PC board MCUs error
E3	P03	The outlet temperature error
E4	P04	The high pressure switch error
E5	P05	The power supply voltage error
E7	P07	Overheating of heat-sink error
EF	P15	Detection of gas leak
F3	P19	The 4-way valve inversion error
F4	P20	High pressure protection operation
F6	P22	Outdoor fan system
FA	P26	Short circuit of the compressor driver element error
FD	P29	Compressor rotor position error
FF	P31	Slave Hydro unit error which occurs when error occurs in master Hydro unit

In case you detect an error code not listed, contact your nearest Toshiba technical support service.

9-3. Check Code (Room Air Conditioner TU2C-LINK Interface)

(1) Light commercial AC type

Check Code		Description
Hexadecimal number	Main remote controller display	
00	N/A	No active error
2C	C12	Batch alarm of general-purpose equipment control interface
44	E04	Communication circuit error between indoor and outdoor
61	F01	Indoor TCJ sensor error
63	F03	Indoor TC1 sensor error
64	F04	TD1 sensor error
66	F06	TE1/TE2 sensor error
68	F08	TO sensor error
81	H01	Compressor break down
82	H02	Magnet switch / Over current operation / Compressor error
83	H03	Current detection circuit error
84	H04	Comp-1 case thermo operation
4B	E11	Communication error at optional PCB in indoor unit
5F	E31	IPDU communication error
6A	F10	Indoor TA/TSA sensor error
7D	F29	Indoor other error
BD	J29	Refrigerant leak sensor error
BE	J30	Refrigerant leak detection
BF	J31	Refrigerant leak sensor life
E3	P03	Discharge temp. TD1 error
EC	P12	Indoor fan motor error
F4	P20	High-pressure inverse error
F6	P22	Outdoor fan IPDU error
FA	P26	G-Tr short circuit protection error
FD	P29	Comp position detection circuit error

(2) Residential AC type

Check Code		Description
Hexadecimal number	Main remote controller display	
4004	04	Serial signal error
4007	07	Case thermo error
400C	0C	TA sensor (Room temperature sensor) error
400D	0D	TC sensor (Heat exchanger temperature sensor) error
400E	0E	Refrigerant leak sensor error
400F	0F	TCJ sensor (Heat exchanger temperature sensor) error
4011	11	Indoor fan motor error
4012	12	Indoor P.C. board error
4014	14	G-Tr short circuit protection error
4016	16	Comp position detection circuit error
4017	17	Current sensor error
4018	18	TE senor (Outdoor heat exchanger temperature sensor) or TS (Suction pipe temperature sensor) error
4019	19	TD sensor (Discharge pipe temperature sensor) error
401A	1A	Outdoor fan motor error
401B	1B	TO sensor (Outdoor temperature sensor) error
401C	1C	Compressor system or other error
401D	1D	Compressor does not rotate
401E	1E	TD sensor (Discharge pipe temperature sensor) over limit
401F	1F	Compressor break down
4021	21	High pressure is detect
4025	25	Refrigerant leak detection
4026	26	Gas detector sensor error (only bi-flow)
4041	41	UART communication error between RAC IF to RAC

9-4. Notice Code

Notice Code		Description
Hexadecimal number	Main remote controller display	
2	001	Compressor maintenance timer over
16	022	NFC tag wiring trouble
84	203	Battery life / deterioration / abnormality
85	204	Refrigerant sensor life pre-notification
87	206	General-purpose temperature sensor error
C2	301	Group terminal unit notice

Installation Manual

TOSHIBA

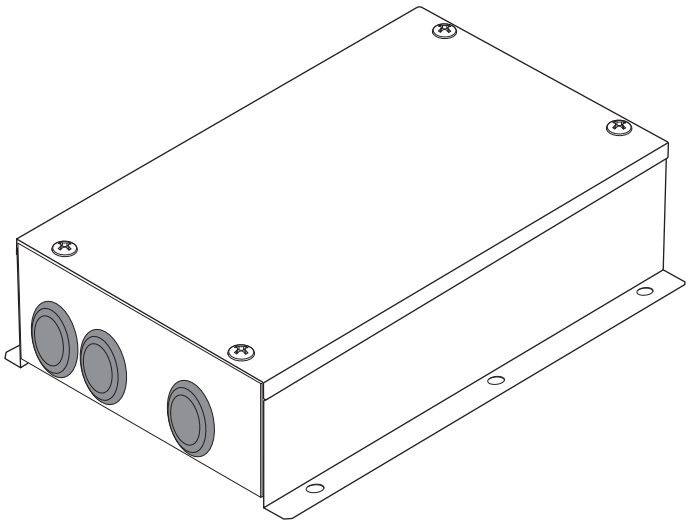
Installation Manual
Central Control Device

For commercial use

Modbus interface

Model name:

BMS-IFMB1280U-E
BMS-IFMB1280U-TR



Multilingual installation manuals

[български] Ръководство за монтаж Изтегляне / [Česky] Stažení montážní příručky / [Dansk] Installationsvejledning, Download / [Deutsch] Installationshandbuch Herunterladen / [Ελληνικά] Λήψη Εγχειριδίου εγκατάστασης / [English] Installation manual Download / [Español] Descarga del Manual de instalación / [Eesti] Paigaldusjuhendi allalaadimine / [Suomi] Asennusohjeiden lataaminen / [Français] Manuel d'installation Téléchargement / [Hrvatski] Priručnik za instalaciju Preuzimanje / [Magyar] Telepítési kézikönyv Letöltés / [Italiano] Manuale di installazione Scaricamento / [Latviešu] Uzstādīšanas rokasgrāmata Lejupielādēt / [Norsk] Installasjonsveiledning Last ned / [Nederlands] Installatiehandleiding downloaden / [Polski] Pobieranie Instrukcji instalacyjnej / [Português] Tranferência do manual de instalação / [Română] Manual de instalare Descărcare / [Русский] Руководство по установке Скачать / [Slovensky] Montážna príručka Stiahnutie / [Slovenščina] Prenos navodil za montažo / [Svenska] Installationshandbok Nedladdning / [Türkçe] Kurulum kılavuzu İndirme / [中文] 安装手册下载

https://www.toshiba-carrier.co.jp/global/manual/bms-ifmb1280u.htm

- Thank you very much for purchasing this TOSHIBA Modbus interface.
- Please read this manual carefully beforehand for proper installation of the Modbus interface.

"AEEE Yönetmeligine Uygundur."

Contents

1 Precautions for safety

- Read these “Precautions for Safety” carefully before installation.
- The precautions described below include important items regarding safety. Observe them without fail. Understand the following details (indications and symbols) before reading the body text, and follow the instructions.
- After the installation work has been completed, perform a test run to check for any problems. Explain how to use and maintain the unit to the customer.
- Ask customer to keep this Manual at accessible place for future reference.

Indication	Meaning of Indication
⚠WARNING	Text set off in this manner indicates that failure to adhere to the directions in the warning could result in serious bodily harm (*1) or loss of life if the product is handled improperly.
⚠CAUTION	Text set off in this manner indicates that failure to adhere to the directions in the caution could result in serious bodily injury (*2) or damage (*3) to property if the product is handled improperly.

*1: Serious bodily harm indicates loss of eyesight, injury, burns, electric shock, bone fracture, poisoning, and other injuries which leave aftereffect and require hospitalization or long-term treatment as an outpatient.
*2: Bodily injury indicates injury, burns, electric shock, and other injuries which do not require hospitalization or long-term treatment as an outpatient.
*3: Damage to property indicates damage extending to buildings, household effects, domestic livestock, and pets.

Symbols	Meaning of Symbols
	“⃠” Indicates prohibited items. The actual contents of the prohibition are indicated by a picture or text placed inside or next to the graphic symbol.
	“❗” Indicates compulsory (mandatory) items. The actual contents of the obligation indicated by a picture or text placed inside or next to the graphic symbol.

⚠WARNING	
	• **Ask an authorized dealer or qualified installation professional to install or reinstall this unit.** Inappropriate installation may result in electric shock or fire. • **Electrical work must be performed by a qualified electrician in accordance with this installation manual.** **The work must satisfy all local, national and international regulations.** Inappropriate work may result in electric shock or fire. • **Be sure to turn off all main power supply switches before starting any electrical work.** Failure to do so may result in electric shock.
	• **Do not modify the unit.** A fire or an electric shock may occur.

⚠CAUTION	
	• **Do not install this unit where flammable gas may leak.** If gas leaks and accumulates around the unit, it may cause a fire.
	• **Perform wiring correctly in accordance with specified the current capacity.** Failure to do so may result in short-circuiting, overheating or fire. • **Use predefined cable and connect them certainly. Keep the connecting terminal free from external force.** It may cause an exothermic or a fire.

2 Introduction

■ Applications / Functions / Specifications

Applications

- The Modbus interface is used to connect air conditioners “with TU2C-LINK Uh Line (hereinafter, referred to as Uh Line) installed” and TCB-IFCG1TLE to Modbus* system.

Functions

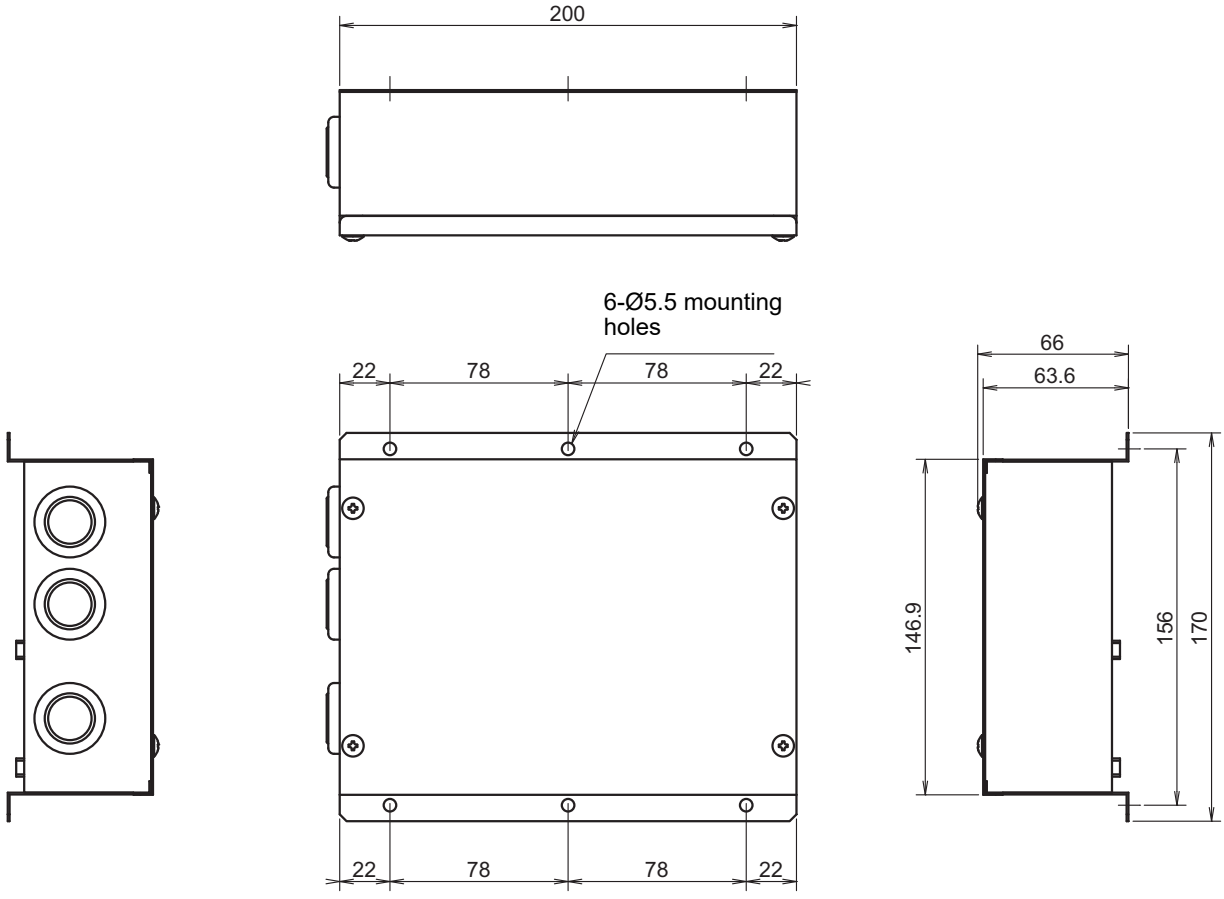
- The Modbus interface converts signals between Uh Line and Modbus Master.

Specifications

Power supply	220 - 240 VAC, 50/60 Hz
Power consumption	3 W
Operating temperature / humidity	0 to 40 °C, 10 to 90 % RH (no condensation)
Storage temperature	-20 to +60 °C
Chassis material	Galvanized sheet metal 0.8 t (no coating)
Dimensions	66 (H) x 170 (W) x 200 (D) mm
Mass	1.1 kg

* Note) “Modbus” is a registered trade mark of Schneider Electric SA.

■ External view



3 Before installation

Check the following package contents.

No.	Item	Quantity	Remarks
1	Modbus interface	1	
2	Installation Manual	1	
3	Screw	4	M4 x 12 mm tapping screws
4	Cable clamp	1	

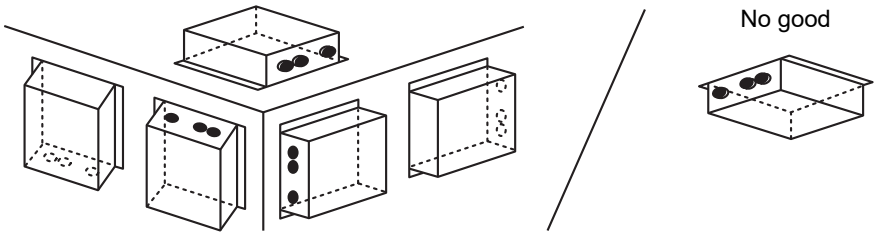
Use the following wiring materials to connect the communication cables and power cables. (locally procured)

No.	Line	Description	
1	For Uh Line	Type	Refer to "Design of Control Wiring"(P.7 to P.11).
		Wire size	
		Length	
2	For RS-485	Type	2-core shielded wires
		Wire size	1.25 mm^2, 500 m max. (total length)
		Length	
3	For power	Type	H07 RN-F or 245IEC66 0.75 mm^2, 50 m max.
		Wire size	

4 Installation

■ Modbus interface installation method and orientation

There are five installation methods for this Modbus interface as shown below: surface mount and wall mounts. Use the attached screws.



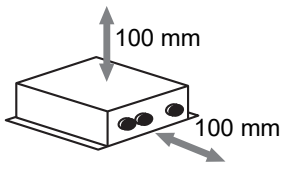
REQUIREMENT

Do not install the unit in any of the following places.

- Humid or wet place
- Dusty place
- Place exposed to direct sunlight
- Place where there is a TV set or radio within one meter
- Place exposed to rain (outdoors, under eaves, etc.)

■ Installation space and maintenance space

A side space for connecting through cable inlets and an upper space for maintenance must be reserved before installation.
The other sides can be adjacent to surrounding objects.



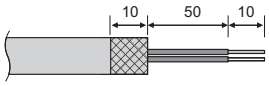
5 Connection of power cables / earth wires / communication cables

⚠ CAUTION

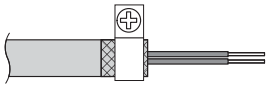
- The RS-485 communication cables have polarity. Connect A(+) to A(+), and B(-) to B(-). If connected with incorrect polarity, the unit will not work.
- The Uh Line communication cable have no polarity.

Connect power cables, earth wires, and communications cables to the specified terminals on the terminal block.

Length of stripped RS-485 communication cable (not shielded wire ends)

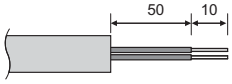


Clamping RS-485 communication cable (address 1)

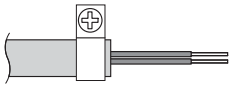


The RS-485 communication cable must be earthed on address 1 (Modbus interface address SW=1) Modbus interface. Fix the shielded wire of RS-485 communication cable with metal cable clamp and screw it to the chassis to earth it.

Length of stripped RS-485 (Shielded wire ends) and Uh Line communication cable

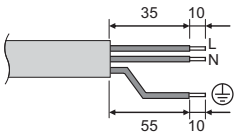


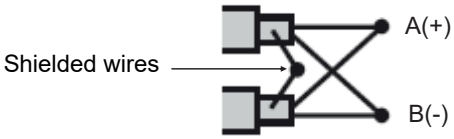
Clamping communication cable



Do not connect the shield wire to the earth. It should be open and insulated.

Length of stripped power cable



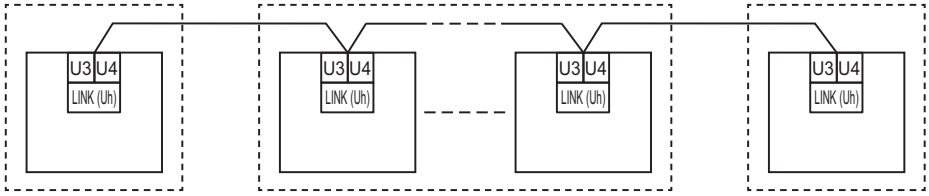


The shielded wires must be crimped with closed end connectors on interfaces with address of other than 1 and not shielded wire ends.

Termination resistance setting

- TU2C-LINK / TCC-LINK termination resistance setting .....<For TCC-LINK>
  Leave just 1 line of the termination resistance in the interface board of the outdoor unit (centre unit) ON, and turn all the others OFF. (Refer to the wiring diagram attached to the outdoor unit for the position of SW.)
  <For TU2C-LINK>
  For the central control wiring (Uh line), set the termination resistance that is farthest away on the wiring between this central controller and the other unit (VRF light commercial, air to air heat exchanger, general purpose control interface, air to water heat pump) to ON.

Refer to the manual of each model for the termination resistance setting method.



Termination resistance ON **Termination resistance OFF** **Termination resistance ON**

Shield grounding process

- Central control wiring shielded wire .....When using the central remote controller with one unit, open the shielded wire of the central control wiring and perform insulation processing.
  When using the central remote controller with multiple units, connect the shield of the central control wiring to the closed end and open the shield at the final end of the central remote controller to perform insulation processing.
  Perform the central control wiring shield grounding on the air conditioner side.

REQUIREMENT

- Be sure to install a circuit breaker or all-pole isolating switch (with a contact breaking distance of at least 3 mm) on the primary side of the power supply.
- Fasten the screws to the terminal block with torque of 0.5 N•m.

■ Design of Control Wiring

Communication method and model name

The TU2C-LINK model (U series) can be used together with previous models (other than U series).
For details of the model and communication method, see the following table.

Communication method	TU2C-LINK (U series)	TCC-LINK (other than U series)
Outdoor unit	MMY-M**U**P*** U series model	Other than on the left (MMY-MAP***, MCY-MAP***, etc.)
Indoor unit	MM*-**U**P*** U series model	Other than on the left (MM*-AP***, etc.)
Wired remote controller	RBC-AMS**U** U series model	Other than on the left
Wireless remote controller receiver	RBC-AXR**U**** U series model TCB-AXR**U**** U series model	Other than on the left
Central control device	***-****U**** U series model	Other than on the left

When the connected outdoor unit is Super Multi u series (U series)

Follow the wiring specifications in the table below even when there is a mix of U series and non-U series in the connected indoor units or remote controllers.

Wiring specifications

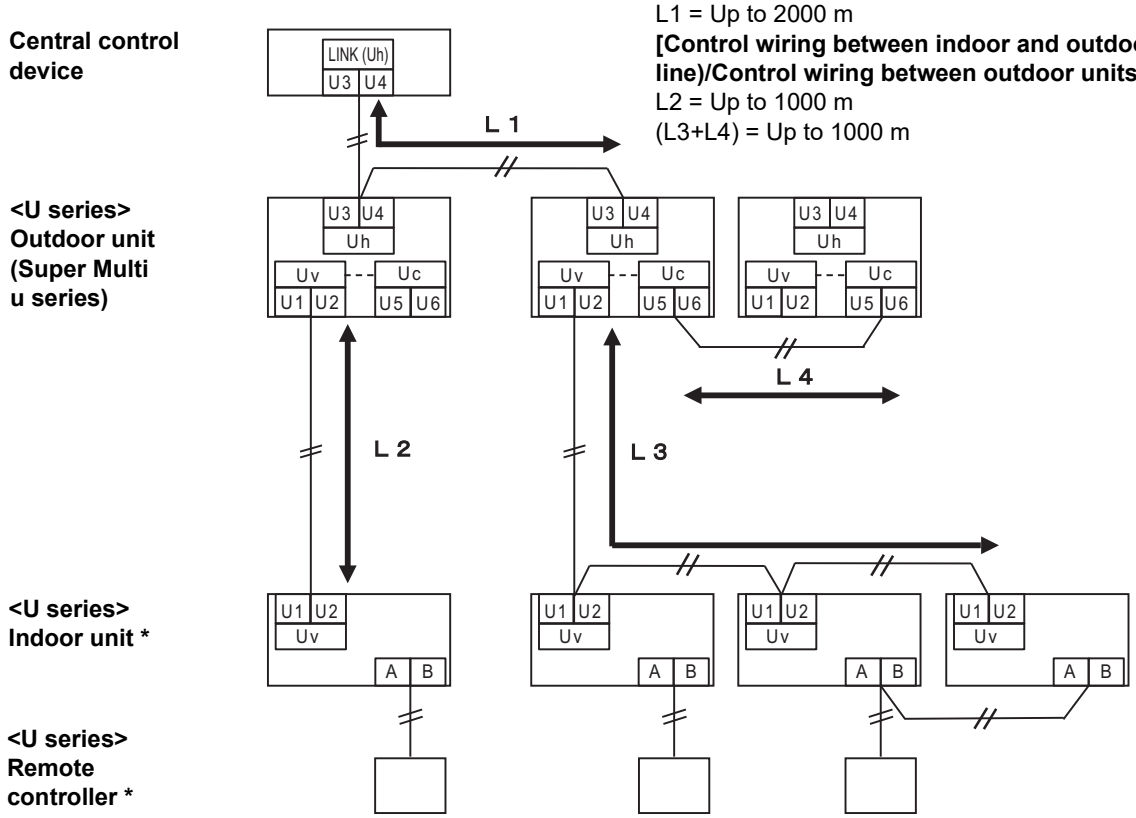
Item	Communication line
	Central control wiring (Uh line)
Wire diameter	1.0 to 1.5 mm² (up to 1000 m)
	2.0 mm² (up to 2000 m)
Wire type	2-core, non-polar
Wire types that can be used	Shielded wire

REQUIREMENT

When wiring the control wiring between indoor and outdoor units (Uv line)/control wiring between outdoor units (Uc line) and the central control wiring (Uh line), use the same wire type and diameter for each line.
Using a mixture of different wire types and diameters may cause a communication error.

System diagram

[Central control wiring (Uh line)]
L1 = Up to 2000 m
[Control wiring between indoor and outdoor units (Uv line)/Control wiring between outdoor units (Uc line)]
L2 = Up to 1000 m
(L3+L4) = Up to 1000 m



* The wiring specifications in the system diagram above are the same even when the indoor unit or remote controller are other than the U series.

When the connected outdoor units are other than Super Multi u series (U series)

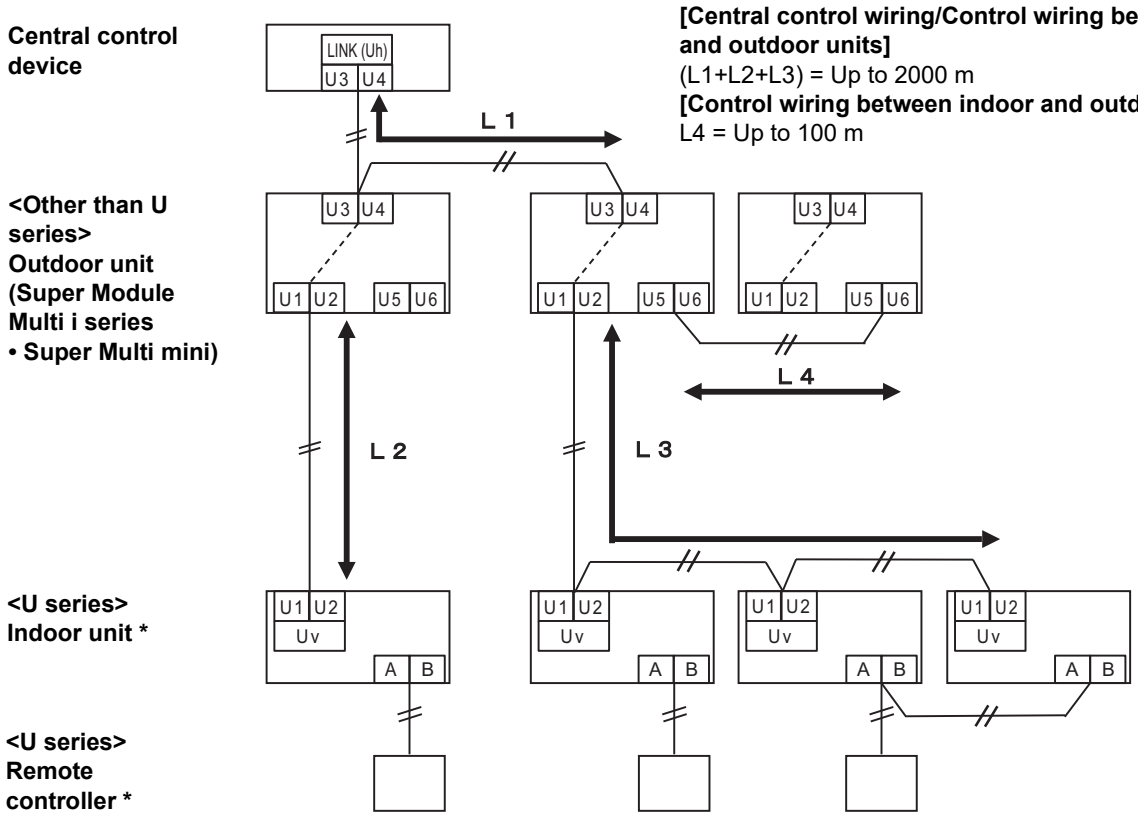
Wiring specifications

Item	Communication line
	Control wiring between indoor and outdoor units and central control wiring
Wire diameter	1.25 mm^2 (up to 1000 m)
	2.0 mm^2 (up to 2000 m)
Wire type	2-core, non-polar
Wire types that can be used	Shielded wire

REQUIREMENT

When wiring the control wiring between indoor and outdoor units/central control wiring and the control wiring between outdoor units, use the same wire type and diameter for each line.
Using a mixture of different wire types and diameters may cause a communication error.

System diagram



* The wiring specifications in the system diagram above are the same even when the indoor unit or remote controller are other than the U series.

When connecting to a previous model light commercial, air to air heat exchanger, air to water heat pump, or general purpose equipment control interface

Follow the wiring specifications in the table below even when there is a mix of U series and non-U series in the connected indoor units or remote controllers.

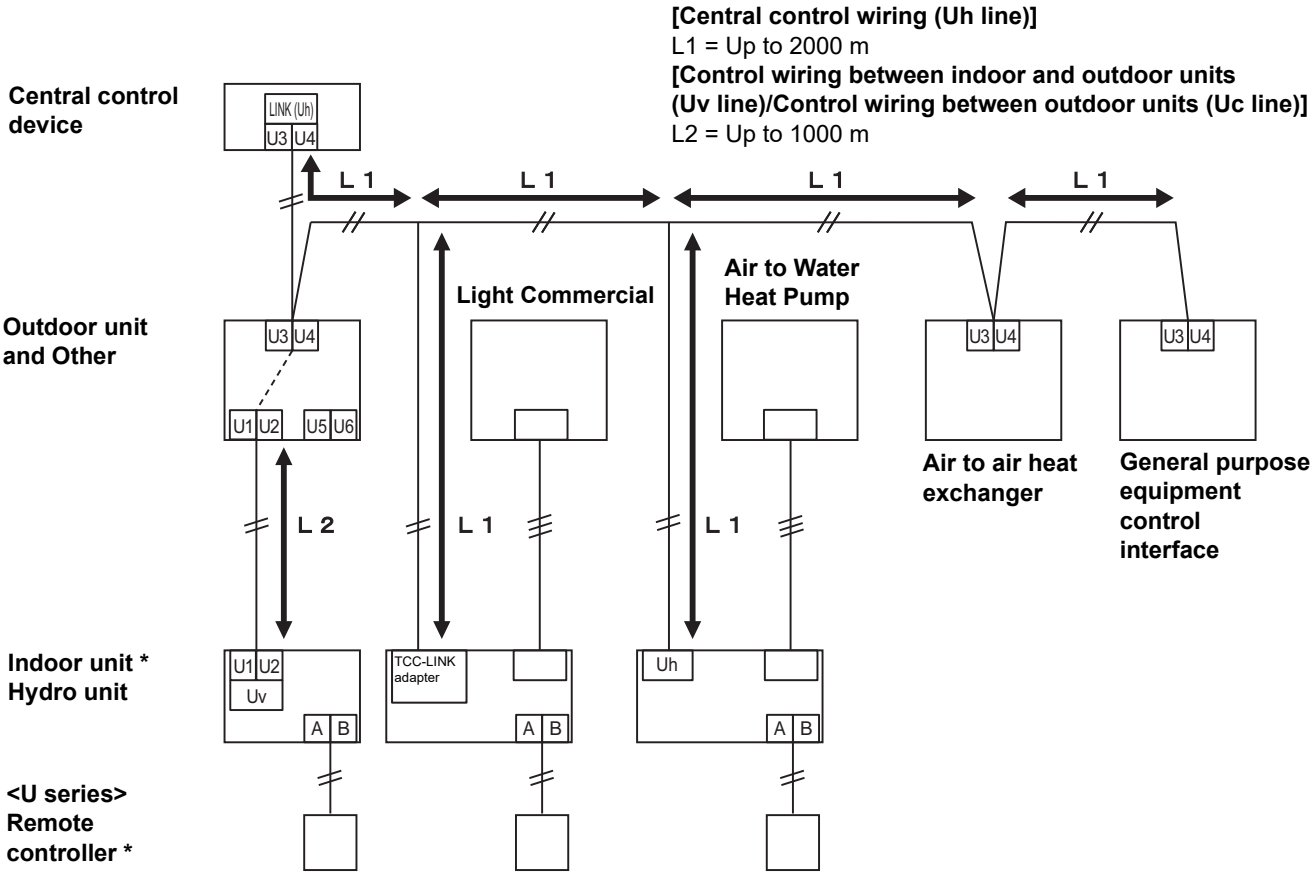
Wiring specifications

Item	Communication line
	Central control wiring (Uh line)
Wire diameter	1.25 mm^2 (up to 1000 m)
	2.0 mm^2 (up to 2000 m)
Wire type	2-core, non-polar
Wire types that can be used	Shielded wire

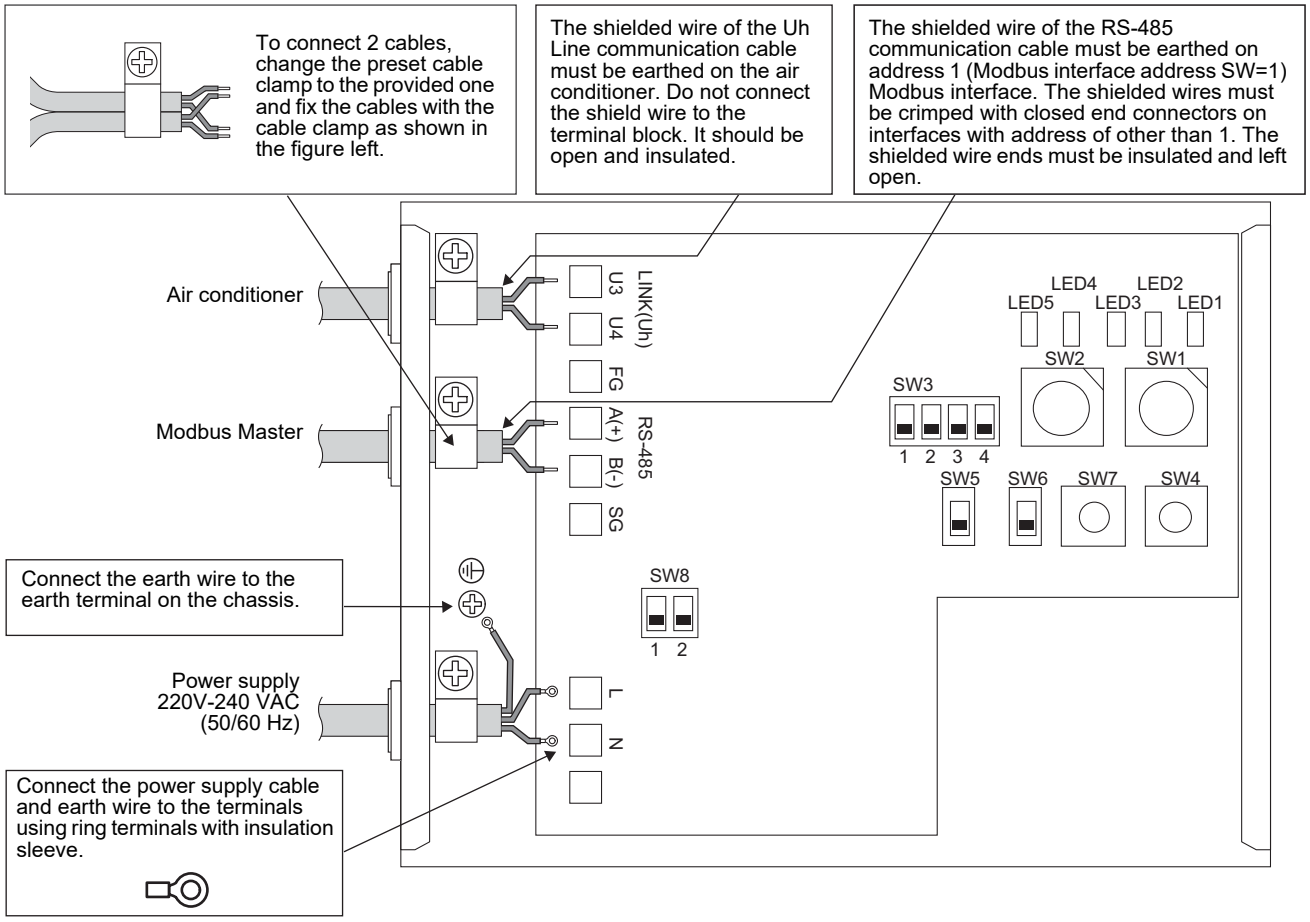
REQUIREMENT

When wiring the control wiring between indoor and outdoor units (Uv line)/control wiring between outdoor units (Uc line) and the central control wiring (Uh line), use the same wire type and diameter for each line.
Using a mixture of different wire types and diameters may cause a communication error.

System diagram



* The wiring specifications in the system diagram above are the same even when the indoor unit or remote controller are other than the U series.



REQUIREMENT

Disconnect the appliance from the main power supply.
This appliance must be connected to the main power supply by a circuit breaker or switch with a contact separation of at least 3 mm.
Fasten the screws to the terminal with torque of 0.5 Nm.

■ Wiring connection

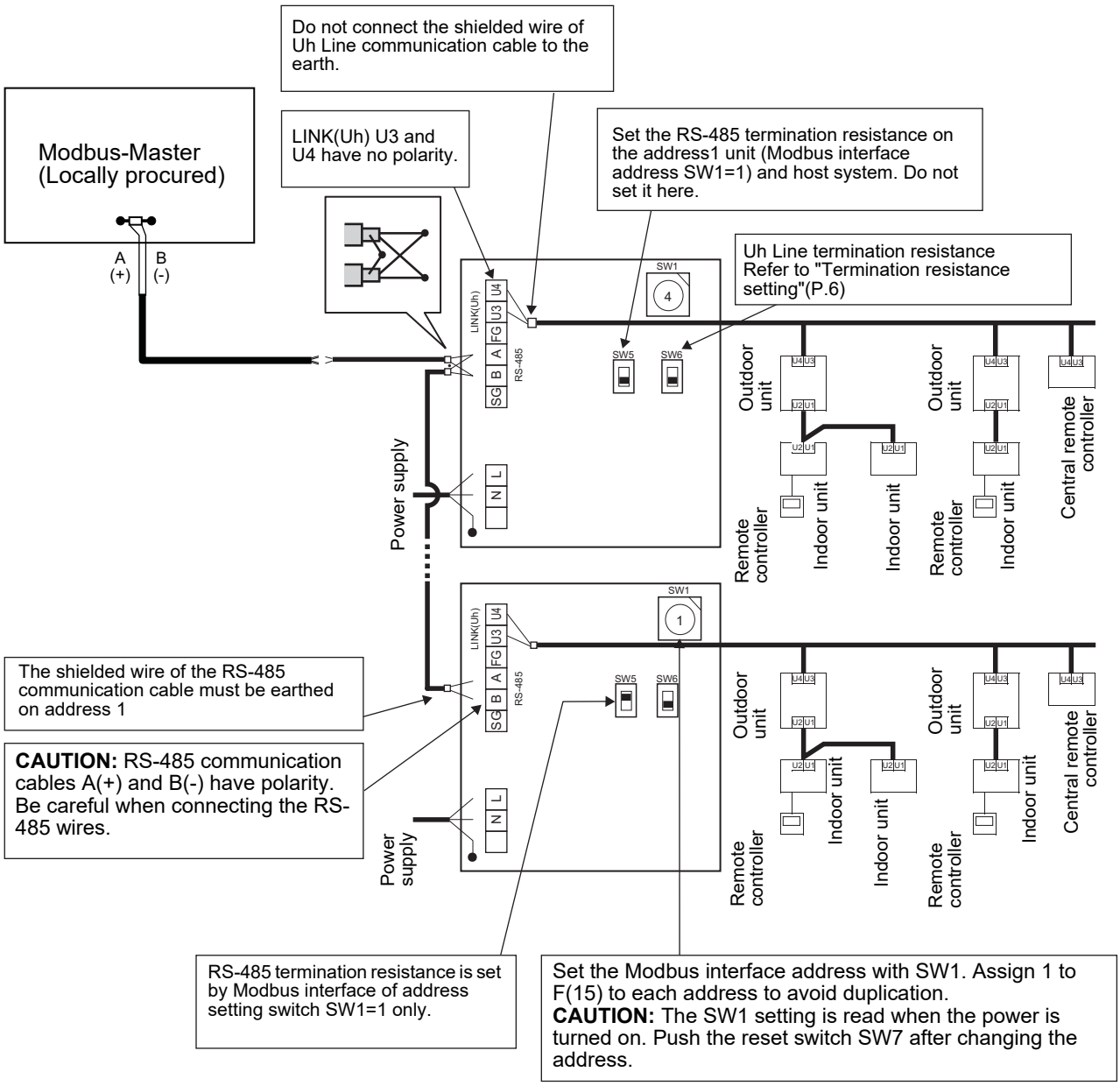
The following describes a connection example when two or more Modbus interface units are used.

Termination resistance setting (See “6 Setting” for the setting method.)

- Set the RS-485 termination resistance to “120 ohm” for address1 (Modbus interface address SW1=1) Modbus interface unit, and set to “open” for other units.
- Set the Uh Line Termination resistance.
  Refer to "Termination resistance setting"(P.6)

Shield earthing

- The shielded wire of the RS-485 communication cable must be earthed on address 1 (Modbus interface address SW=1) Modbus interface. Fix the shielded wire of RS-485 communication cable with metal cable clamp and screw it to the chassis to earth it. The shielded wires must be crimped with closed end connectors on interfaces with address of other than 1. The shielded wire ends must be insulated and left open.
- Do not connect the shield wire to the terminal block. It should be open and insulated. The shielded wire of the Uh Line communication cable must be earthed on the air conditioner.


Do not connect the shielded wire of Uh Line communication cable to the earth.
Modbus-Master (Locally procured)
A (+)
B (-)
LINK(Uh) U3 and U4 have no polarity.
Set the RS-485 termination resistance on the address1 unit (Modbus interface address SW1=1) and host system. Do not set it here.
Uh Line termination resistance Refer to "Termination resistance setting"(P.6)
LINK(Uh)
U4
U3
FG
A
B
SG
RS-485
SW1
SW5
SW6
N
L
Power supply
Outdoor unit
Indoor unit
Remote controller
Central remote controller
The shielded wire of the RS-485 communication cable must be earthed on address 1
CAUTION: RS-485 communication cables A(+) and B(-) have polarity. Be careful when connecting the RS-485 wires.
RS-485 termination resistance is set by Modbus interface of address setting switch SW1=1 only.
Set the Modbus interface address with SW1. Assign 1 to F(15) to each address to avoid duplication.
CAUTION: The SW1 setting is read when the power is turned on. Push the reset switch SW7 after changing the address.

6 Setting

The following settings are necessary to use Modbus interface.

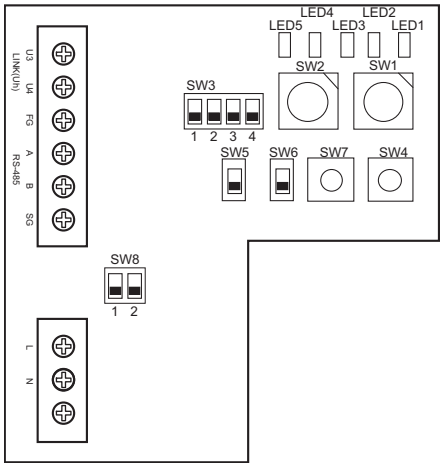
- SW1 Sets the Modbus slave addresses of the Modbus interface.
  A single Modbus interface uses three Modbus slave addresses.
  (One address for the current interface and two addresses for potential interfaces.)
  When two or more Modbus interfaces are used for a single line RS-485 bus, set the addresses as indicated in the table below.
  Assign address numbers in ascending order, from smallest to largest.

Modbus interface	Address
No.1	1
No.2	4
No.3	7
No.4	10
No.5	13

⚠ CAUTION

- **For the Modbus interface whose address SW1=1, perform termination resistance setting.**
- **When the SW1 setting has been changed, press the reset switch SW7. The new address setting is read.**
- **When the setting of bit3 and bit4 of SW3 has been changed, press the reset switch SW7. The new set value is read.**

- SW2 Test switch Not used during operation. Set these switches to zero (0) or “all OFF”.
- SW3 Test switch
  - Bit1: Central controller ID setting mode switch
  - Bit2: Switches the LED5 display for test runs.
  - Bit3, 4: RS-485 baud rate setting (9600/19200/38400) bps.
- SW4 Test switch Not used during operation.
- SW5 RS-485 termination resistance select switch
  Set “120 ohm” only when the Modbus interface address SW=1, and set “open” for other Modbus interfaces.
- SW6 Uh Line termination resistance select switch
  Refer to "Termination resistance setting"(P.6)
- SW7 Reset switch
  When performing an address setting with SW1, push this reset switch after the address setting to read the set value.
- SW8 Test switch (Not used during operation. All OFF usually)



SW1	Modbus interface address set switch		
	1-F	Modbus interface address	
	0	Not used	
SW2	Test switch (0 usually)		
SW3	Bit1: Uh Line communication setting mode switch. OFF: Normal circumstance; ON: Central controller ID setting mode Bit2: Switches the LED5 display for test runs. OFF RS-485 communication status indicator. ON Uh Line communication status indicator. Bit3, 4: RS-485 baud rate setting (9600/19200/38400) bps. 3 OFF, 4 OFF 9600 bps, 3 ON, 4 OFF 19200 bps, 3 OFF, 4 ON 38400 bps, 3 ON, 4 ON 19200 bps.		
SW4	Test switch		
SW5	RS-485 termination resistance select switch	ON 120 ohm	ON Open
SW6	Uh Line termination resistance select switch	ON 100 ohm	ON Open
SW7	Reset switch		
SW8	Test switch (all OFF usually)		
LED1	Power indicator		
LED2	RS-485 communication status indicator		
LED3	Uh Line communication status indicator		
LED4	Uh Line communication error indicator		
LED5	Test indicator		

REQUIREMENT

- **RS-485 termination resistance select switch SW5.**
  Set “120 ohm” only when the Modbus interface address SW=1, and set “open” for other Modbus interfaces.
- **The Uh Line termination resistance is set on the air conditioner side. Set SW6 to “open”.**

■ Central controller ID setting mode

The central controller ID setting mode changes the central controller ID of the Modbus interface. (central controller ID at the time of factory shipping is central controller ID 20.)
The central controller ID number indicates the Uh Line address and communication priority for the Uh Line compatible central control device.

Change the central controller ID in the following cases.

- If using Modbus interface with a central control device not compatible with Uh Line, set the central controller ID as “old controller.”

(1) Transition to central controller ID setting mode

- If setting the Modbus slave address with SW1, make a note of the SW1 value before performing central controller ID setting operations.
- Turn on bit1 of SW3.

(2) Verification of central controller ID

- If SW1 is set to 0, central controller ID is displayed by LED2 to LED5.

○=ON, ●=OFF

Central controller ID	LED5	LED4	LED3	LED2
Central controller ID7	●	●	●	○
Central controller ID8	●	●	○	●
Central controller ID9	●	●	○	○
Central controller ID10	●	○	●	●
Central controller ID11	●	○	●	○
Central controller ID12	●	○	○	●
Central controller ID13	●	○	○	○
Central controller ID14	○	●	●	●
Central controller ID15	○	●	●	○
Central controller ID16	○	●	○	●
Central controller ID17	○	●	○	○
Central controller ID18	○	○	●	●
Central controller ID19	○	○	●	○
Central controller ID20 (initial value)	○	○	○	●
Old controller	○	○	○	○

(3) Change of central controller ID

- Change SW1 to 1-F and press SW4.
- If using Modbus interface with a central control device not compatible with Uh Line, set as “old controller.”

Central controller ID	SW1
Central controller ID7	1
Central controller ID8	2
Central controller ID9	3
Central controller ID10	4
Central controller ID11	5
Central controller ID12	6
Central controller ID13	7
Central controller ID14	8
Central controller ID15	9
Central controller ID16	A
Central controller ID17	B
Central controller ID18	C
Central controller ID19	D
Central controller ID20 (initial value)	E
Old controller	F

NOTE

Because the Uh Line compatible central control device uses high-order central controller ID, setting of central controller ID1 to ID6 cannot be done with Modbus interface.

(4) Conclusion of central controller ID setting mode

- Turn off bit1 of SW3.
- Return the SW1 value to that of the Modbus slave address.

IMPORTANT

Immediately after the power is turned on for the Modbus interface, the SW1 value is the Modbus slave address. When the power is turned on, if the SW1 value is that of the central controller ID or is 0, the Modbus interface will not operate properly.
When concluding the central controller ID setting mode, be sure to return the SW1 value to that of the Modbus slave address.

7 Test run check

■ Before starting test run

- Set the indoor unit central control address so that it does not match any other indoor unit addresses.
- Be sure to press the reset switch SW7 on the Modbus interface when the indoor unit central control address setting has been changed or added.

■ Test run

(1) Check the communication status between Modbus interface and indoor unit or TCB-IFCG1TLE with LED5. Check that the communication between Modbus interface and each indoor unit or TCB-IFCG1TLE connected is normally performed by selecting an indoor unit or TCB-IFCG1TLE using SW1 to SW3.

Confirming procedure:

- Set bit2 of SW3 to “ON” during normal operation.
- Set the central control address of the target indoor unit with SW1 and SW2. Set SW1 and SW2 according to the “Indoor unit central control address and SW1/SW2 setting” table below.
- Communication status is displayed by LED5.

Communication status with indoor unit	LED5	Remarks
Normal	Lighting	
Error	Blinking	Communication with the indoor unit was established previously, but is disabled currently.
Invalid indoor unit	Light off	Communication with the indoor unit has never been established.

- The protocol for communication with an indoor unit is displayed by LED4.

Protocol for communication with indoor unit	LED4	Note
In communication via Uh Line	On	When Modbus interface is performing communication with the relevant indoor unit via Uh Line.
In communication based on old communication protocol	Blinking	When Modbus interface is performing communication with the relevant indoor unit based on old communication protocol.

(Example) Check the communication status of indoor unit with a central control address of 41.
Set bit2 of SW3 to “ON”, SW2 to “2” and SW1 to “8”.

Indoor unit or TCB-IFCG1TLE central control address and SW1/SW2 setting

Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1
1	0	0	17	1	0	33	2	0	49	3	0
2	0	1	18	1	1	34	2	1	50	3	1
3	0	2	19	1	2	35	2	2	51	3	2
4	0	3	20	1	3	36	2	3	52	3	3
5	0	4	21	1	4	37	2	4	53	3	4
6	0	5	22	1	5	38	2	5	54	3	5
7	0	6	23	1	6	39	2	6	55	3	6
8	0	7	24	1	7	40	2	7	56	3	7
9	0	8	25	1	8	41	2	8	57	3	8
10	0	9	26	1	9	42	2	9	58	3	9
11	0	A	27	1	A	43	2	A	59	3	A
12	0	B	28	1	B	44	2	B	60	3	B

Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1	Indoor unit central control address	SW2	SW1
13	0	C	29	1	C	45	2	C	61	3	C
14	0	D	30	1	D	46	2	D	62	3	D
15	0	E	31	1	E	47	2	E	63	3	E
16	0	F	32	1	F	48	2	F	64	3	F
65	4	0	81	5	0	97	6	0	113	7	0
66	4	1	82	5	1	98	6	1	114	7	1
67	4	2	83	5	2	99	6	2	115	7	2
68	4	3	84	5	3	100	6	3	116	7	3
69	4	4	85	5	4	101	6	4	117	7	4
70	4	5	86	5	5	102	6	5	118	7	5
71	4	6	87	5	6	103	6	6	119	7	6
72	4	7	88	5	7	104	6	7	120	7	7
73	4	8	89	5	8	105	6	8	121	7	8
74	4	9	90	5	9	106	6	9	122	7	9
75	4	A	91	5	A	107	6	A	123	7	A
76	4	B	92	5	B	108	6	B	124	7	B
77	4	C	93	5	C	109	6	C	125	7	C
78	4	D	94	5	D	110	6	D	126	7	D
79	4	E	95	5	E	111	6	E	127	7	E
80	4	F	96	5	F	112	6	F	128	7	F

(2) Check the communication status between Modbus Interface and outdoor unit with LED5.
Check that the communication between Modbus Interface and each outdoor unit connected is normally performed by selecting an outdoor unit using SW1 to SW3.

Confirming procedure:
- Set bit2 of SW3 to “ON” during normal operation.
- Set the line address of the target outdoor unit with SW1 and SW2.
  Set SW1 and SW2 according to the table below, titled “Line address of outdoor unit and SW1/SW2 setting”.
- Communication status is displayed by LED5.

Communication status with outdoor unit	LED5	Remarks
Normal	Lighting	Modbus interface is in communication with the outdoor unit.
Error	Blinking	Communication with the outdoor unit was established previously, but is disabled currently.
Invalid outdoor unit	Light off	Communication with the outdoor unit has never been established.

- The protocol for communication with an outdoor unit is displayed by LED4.

Protocol for communication with outdoor unit	LED4	Note
In communication via Uh Line	On	When Modbus interface is performing communication with the relevant outdoor unit via Uh Line.
In communication based on old communication protocol	Blinking	When Modbus interface is performing communication with the relevant outdoor unit based on old communication protocol.

(Example) Check the communication status of outdoor unit with line address of 10.
Set bit1 of SW3 to “ON”, SW2 to “8” and SW1 to “9”.

Line address of outdoor unit and SW1/SW2 setting

Line address of outdoor unit	SW2	SW1	Line address of outdoor unit	SW2	SW1
1	8	0	17	9	0
2	8	1	18	9	1
3	8	2	19	9	2
4	8	3	20	9	3
5	8	4	21	9	4
6	8	5	22	9	5
7	8	6	23	9	6
8	8	7	24	9	7
9	8	8	25	9	8
10	8	9	26	9	9
11	8	A	27	9	A
12	8	B	28	9	B
13	8	C	29	9	C
14	8	D	30	9	D
15	8	E	31	9	E
16	8	F	32	9	F

NOTE

For air conditioner (multi type), the line addresses of outdoor unit 29 to 32 are not used.

(3) Perform the communication status checking between Modbus interface and Modbus Master.
Check that the communication with Modbus Master is normally performed.
When bit2 of SW3 is set to “OFF”, the communication status with the Modbus Master is displayed by LED5.

Communication status with Modbus Master	LED5	Remarks
Normal reception	Lighting	Lights for one second
Error	Light off	A communication error occurred or no data has been received.

■ LED indication during normal operation

LED		Description
LED1	Power indicator	Lights while the power is on.
LED2	RS-485 communication status indicator	Blinks during RS-485 communication.
LED3	Uh Line communication status indicator	Blinks during Uh Line communication.
LED4	Uh Line communication error indicator	Lights temporarily when Uh Line is busy.
LED5	TEST indicator	Used in the test mode.

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Revision record

Number	The contents of modification	Page	Date
First issue	-	-	May, 2021
Revision 1 (●)	Added mention of air to water heat pump. Updated Installation Manual and Specifications Manual.	7,10,12,13, 16,17,18,19,2 0,22,34	Nov., 2021
Revision 2 (II)	Added mention of Energy Efficiency Ratio. Updated Specifications Manual.	5, 6, 9, 10, 11, 12, 29, 30, 32, 36, 40, 41, 42, 43	Feb., 2022
Revision 3	Updated “11-4 When returning to BMS-IFMB1280U”	41	Mar., 2022
Revision 4 (III)	Added mention of VRF Dx-coil controller and Room Air Conditioner TU2C-LINK Interface. Updated Specifications Manual.	5, 11, 15, 16, 17, 18, 37, 41, 42, 50	June, 2022
Revision 5 (IV)	Updated mention of Room Air Conditioner TU2C-LINK Interface. Updated Specifications Manual.	15, 16, 42	Sept., 2022
Revision 6 (V)	Added Dual Set Point. Updated Specifications Manual.	11, 17, 18	Aug., 2023
	Added the symbol (V) to the product serial plate.	-	
Revision 7	Corporation name change	-	May, 2024