# **Installation Manual**

# Air Handling Unit Interface: AHU-KIT-SP2



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	$\wedge$
	Please perform grounding work.
	Please do not connect the ground wire to gas pipe
	Incomplete grounding work may cause electric sh
	• Be sure to install a leakage breaker outside the
•	If a leakage breaker is not installed, electric shoc
	<ul> <li>Clearances, creepage distances and solid inst</li> </ul>
	The primary and secondary wires must be reinfore
	Keep the wires at least 5mm apart or add a protect
$\mathbf{\nabla}$	• Do not install this interface in the following place
<b>V</b>	1. This interface may consequently be damaged,
	<ul> <li>Where it is exposed to direct sunlight</li> </ul>
	<ul> <li>Where the ambient temperature drops below</li> </ul>
	<ul> <li>Where the surface is not flat</li> </ul>
	<ul> <li>Where the soundness of the installation are</li> </ul>
	<ul> <li>Where dust tends to accumulate, such as or</li> </ul>
	2. Abnormality in the control system or abnormal
	Where machinery generates radio waves.

# 2. Accessories

Interface main unit, installation manual, caution label (1 sheet), ferrite core (1 piece), sensor (heat exchanger x 3, return air x 1, supply air x 1, length of each wire 8 m), spring leaf for heat exchangers (3 pieces)

# 3. Installation Work

#### 3.1 Installation location

It must be installed in an enclosure that is free from dust and water. The caution label should be affixed to the front of the enclosure in an easily visible position.

#### 3.2 Parts procured on site

Before installing this interface, prepare the following parts. - DIN rail (DIN rail TS 35 mm x 7.5 mm (as per DIN EN 60715))

- Wiring (refer to 4.Wiring)
- Lockable and protective earth enclosure

#### 3.3 Installation procedure

Install this interface in the direction shown in the figure below so that letters can be read correctly. Any other direction may cause a cooling failure affecting internal parts, which may result in a malfunction or breakdown.



View A

1. Slide the fixed part down (2 places)

2. Hang the box on the DIN rail

3. Push the fixed part (2 places) up and fix onto the DIN rail Make sure it is securely fastened

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- This installation manual describes installation procedures and precautions for the Air Handling Unit Controller interface.
- Please also refer to the outdoor unit manual and other supplied manuals.
- For proper installation, please read this manual carefully before starting installation work.
- This interface must be installed in accordance with national wiring regulations.
- This interface is precision equipment, so please handle it with enough care to prevent damage from falling and being stepped on.
- For other languages, download from HP.

https://www.mhi-mth.co.jp/en/products/detail/air-conditioner users manual.html

# **1. Safety Precautions**

 Before starting the installation work, please read these Safety Precautions and follow them properly. All of the following are important and must be strictly observed.

# $\square$ warning:

Failure to follow these instructions properly may have serious consequences such as death and severe injury.

Failure to follow these instructions properly may cause injury or property damage. There could be serious consequences depending on the circumstances.

• The following pictograms are used in the text.

Never do.

Always follow the instructions given.

- After installation, please perform a test run and confirm no abnormalities occur during the test run.
- Please explain the operation method to customers as per the user's manual and product specifications.
- Keep this manual in a safe place where users can consult it whenever needed. Show this manual to installers when moving or repairing this interface. When ownership of this interface is transferred, this manual should be given to the new owner.

	<ul> <li>Consult your dealer or a professional contractor to install this interface.</li> </ul>
	Improper installation done on your own may cause electric shock, fire or breakdown.
	<ul> <li>Installation work should be performed properly as per this installation manual.</li> </ul>
	Improper installation work may result in electric shock, fire or breakdown.
	• Be sure to use accessories and specified parts for installation work.
	Use of unspecified parts may result in falls, fire or electric shock.
	Choose an installation location inside a locked enclosure.
	Otherwise electric shock of incorrect operation may result.
	• The electrical work should be performed by a qualified electrical engineer, as per electrical estates and wiring energifications.
	Incomplete installation work may cause electric shock or fire
	• Turn OFF the power supply before starting electrical work or repairing/inspecting this interface
	Otherwise electric shock injury breakdown or malfunction may result
$\overline{\overline{\mathbf{a}}}$	• This interface is not intended for use by persons (including children) with reduced physical, sensory or
$\mathbf{\nabla}$	mental capabilities, or lack of experience and knowledge, unless they have been supervised or instructed
·	concerning use of the appliance by a person responsible for their safety. Children should be supervised to
	ensure that they do not play with the appliance.
$\bigcirc$	<ul> <li>Do not modify anything, including accessories.</li> </ul>
	Otherwise electric shock, fire or breakdown may result.
$\mathbf{n}$	<ul> <li>Do not install this interface in a special environment or where inflammable gas could originate, enter,</li> </ul>
V	accumulate or leak.
	If this interface is used in places where air contains dense oil, mist, steam, organic solvent vapour, corrosive
	gas ammonia, sulpriuric compounds, acid, etc. or where acidic or alkaline solutions, special sprays, etc. are
	used, electric shock, breakdown, smoke of me may result due to conosion of significant detenoration in
	• Do not install this interface where excessive water vanour is generated or condensation occurs
$\mathbf{\nabla}$	Otherwise electric shock, fire or breakdown may result.
$\overline{\frown}$	• Do not use this interface in a place where it can get wet, such as a laundry room.
S.	Otherwise electric shock, fire or breakdown may result.
	Do not operate this interface with wet hands.
<u>v</u>	Otherwise electric shock may result.
$\mathbf{n}$	<ul> <li>Do not wash this interface with water.</li> </ul>
V	Otherwise electric shock, fire or breakdown may result.

# WARNING

#### CAUTION

es, water pipes, a lightning rod or a telephone ground wire. ock or fire if electric leakage or breakdown occurs. enclosure. k may result. sulation. ced and insulated. ctive tube to the wires. ces. break down or malfunction. w -20 °C or rises above 60 °C a is insufficient n the floor operation may result.

- Leakage breaker (cut-off device with a contact gap of 3 mm or more as per overvoltage category III)



View B

#### 3.4 Installation clearances

For cooling and service work, provide the following clearances above and below and to the right and left.

Bottom clearance	Min. 100 mm (recommended length of 200 mm or more) · · Space for wiring and service
Top clearance	Min. 50 mm • • • • • • • • • • • • • • • • • •
Left clearance	Min. 30 mm • • • • • • • • • • • • • • • • • •
Right clearance	Min. 30 mm • • • • • • • • • • • • • • • • • •
Front clearance	Min. 50 mm • • • • • • • • • • • • • • • • • •



Grounding position (1) for power supply (refer to 4.Wirng) Functional ground terminal: X0 connector pin

#### 3.5 Remove the cover

1. Remove the fixed screw.

2. Push the tab (2 places) and remove the cover from base.



#### 3.6 Each SW setting

	KSD42 3 4	ON KSD42 1 2 3 4		0 2 2 3 9			0 			BCOR
SV	N8	SW7	S	SW6	SW5	SI	N4	SW3	SW2	S
		1			2			3		4
SW7	Ana Sv	alog Inp witching	ut I	Mo	odbus bps	6	Mo P	odbus Parity	Cor C	npr Con
SW8 Out		Digital tput (X4d)		Ca ste	apacity tep up control		Reserve		R	ese
【SW7–3: ON: Non OFF: Eve	Moo pari en pa	dbus Pa ty + 2 St arity + 1	arity top Sto	/】 bits op bi	t C	SW DN: DFF:	7–4 Terr ※ Dir	: Comp peratu Remo ect Co	oresso re Col te con ntrol (	or C ntro tro 0-
SW6		SW5			SW4			SW3	SV	N2
Modbus Address (Tens)		Modbus Address (Ones)		Reserve		R	eserve	Res	erv	
(SW5,SV Ex) Modi SW6	N6:   ous a 6: 3	Modbus address SW5: 3	ac : 38	ldres 8	s (01	-99	)]	【SW 0: Ma	1: Ado aster	dres 1-

# 4. Wiring

- This interface incorporates an earth connection for functional purposes only.
- Be sure to connect the functional ground wire to the sheet metal of the enclosure when connecting wires to the power supply terminal block.
- Be sure to ground the sheet-metal part of the enclosure.
- When removing wires from the enclosure, secure or cover the wires with conduit to prevent tension from being applied to the terminals.
- Do not turn ON the power supply (power switch) until all the work is completed.
- Except for the accessories, obtain other components locally. • Perform grounding work. Wire the ground for the power supply to a functional grounding point (1), shown in the diagram
- for "3.4 Installation clearances". • If the supply cord is damaged, it must be replaced by the manufacturer, the service agent or similarly qualified persons to avoid any hazards.
- Use only copper wires.
- Do not use any supply cord lighter than the one specified in parentheses for each type below - ordinary tough rubber sheathed cord (code designation 60245 IEC 53). Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of appliances parts for outdoor use.

#### Cascade connection (X7) signal line

Wire diameter: 0.75mm<sup>2</sup> – 1.25mm<sup>2</sup>

The line length between Master and Slave must be less than 2 m. Note1: When using a cable longer than 2 m, use a shielded cable for the cascade signal line. Wire the grounding of the body to the sheet metal of the enclosure. Total wiring length of cascade connection can be up to 10 m.

#### Wiring to each connector (X1-X6)

Wire diameter: 0.3mm<sup>2</sup> or more

It is possible to enter into the superlink system by connecting the remote control communication line of SC-ADNA-E to X1.

Note 2: Use a shielded cable when operating a cable longer than 2 m.

#### Power supply wire & functional ground wire (X0)

Wind the ferrite core supplied with the ground wire for 6 turns (5 loops) and connect it to the sheet metal of the enclosure.

Wire diameter: 0.75mm<sup>2</sup> or more

Line length: 40 cm or more (recommendation)





#### Cascade connection



#### Installing temperature sensors

Correctly securing temperature sensors (example)

When installing the temperature sensors, make sure that they have optimum contact with the surface to be measured. Secure with a wide-band hose clamp.

#### Important

Using cable ties will lead to faulty and squashed temperature sensors. Use wide-band hose clamps for fastening.

No.	Designation	
1	Temperature sensor cable	
2	Temperature sensor	
3	Fastener	



#### Installation locations of the heat exchanger sensor

Mounting position of temperature sensors (example)



Function of each heat exchanger sensor

	Mounting	Detected to	Purpose	
	position	Cooling	Heating	
Thi-R1	U-bend	Evaporating temperature	Condensing temperature	Anti-freezing protection
Thi-R2	Capillary	Evaporating temperature	Outlet temperature	Anti-freezing protection
Thi-R3	Header	Outlet temperature	Inlet gas temperature	EEV-control

Refrigerant temperature in heat exchanger









Each sensor has a unique function. It is important to determine correct location. If fixed to incorrect location, the system will not be controlled correctly; double-check during commissioning. The Thi-R3 sensor diameter is larger than the others to avoid mistakes.

#### Items to be checked

- 1. Thi-R1 : on U-bend section (with **RED** tape)
- a) Given that frost accumulates on the heat exchanger during cooling, mount the sensor on the circuit with the lowest temperature (avoid mounting on the lowest position in the circuit). However, the circuit which the liquid refrigerant is not held in during heating is better.
- b) Mounting the sensor at the middle point of the circuit pass is recommended. If it is mounted near to the header side or the distributor side, it will detect the temperature at the overheat or sub-cool area, so it cannot detect the actual condensing/evaporating temperature correctly.

Be sure to check whether the refrigerant is in 2-phase flow in the circuit by testing the actual unit.



2. Thi-R2 : on capillary tube section of distributor (with YELLOW tape)

- a) It should be mounted on the capillary tube section to detect the evaporating temperature under conditions enabling a good response.
- b) It should be mounted in a position that detects the average outlet temperature and not to hold the liquid refrigerant during heating.



3. Thi-R3 : on header section (without tape)

a) It should be mounted on the header main pipe after collecting refrigerant during cooling.

b) If the header main pipe runs horizontally, be sure to mount the sensor on the side part of the pipe to prevent from evaporating liquid refrigerant.



- 4. Thi-A : return air temperature sensor. (with **BLACK** tape) Fixed location
- a) Position where the air flow does not stagnate.
- b) Position not to be affected by other heat source. (heat exchanger etc.)

List of	abbreviations	
EX	Exhaust air	
OA	Outside air	
DA	Discharge air	
CA	Circulating air	
SA	Supply air	

<sup>\*</sup>Due to the system's complexity, the illustration is schematic and simplified.

5. Be careful to mount the sensors in the correct position and by identifying the attached colour tape of each sensor. 6. Be sure to confirm whether the temperature of each sensor is correct by actual operation testing at commissioning.

DA

**OA** 

#### Other items to be checked

- 1. The indoor heat exchangers should have pockets for installing sensors.
- 2. The indoor heat exchanger sensors should not be affected by other heat sources. • Avoid installing the sensors near any electrical devices that generate heat. • Wrap the sensors with insulation and check for any temperature or air flow changes. ·Confirm that the sensors do not touch incorrect piping.
  - The sensors must be installed where the temperature can be measured accurately. • The sensors must have a good response and vary correctly.
- 3. The sensor should be inserted into the holder from the bottom side and the wiring should have a trap. This is to prevent drain water from intruding into the sensor through the gap between the lead wire and the resin at the connecting part of the sensor.



To avoid water intrusion from molding part

- 4. The drain water does not intrude into the connection part of the control box through the sensor wire (protective tube). The wiring route must have a trap so that the drain water drops down just before the control box.
- 5. The sensor wiring should be loose and not tight.

6. The sensors should not be inserted too far into the holder in order to prevent the sensor wire from being damaged.

7. The sensors should not make contact with other parts.

- 8. The sensor wiring should not be located where a person can touch it. If it can be touched, ensure it is covered by a protective tube with a thickness of 1 mm or more. (for safety reasons)
- 9. The sensors should not be mounted in a position where the drain water accumulates.
- 10. The sensor wiring should be covered by a protective tube or rerouted to prevent it from being cut by metal edges.





To have a trap





AHU

Interface



Wiring may be cut by edge



Wrong temperature will be detected

