FUJITSU

OPTIONAL PART

DX kit for single split outdoor unit

DESIGN & TECHNICAL MANUAL

DX kit for single split outdoor unit

UTY-XDZX

FUJITSU GENERAL LIMITED

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Notices:

- Product specifications and design are subject to change without notice for future improvement.
- For further details, please check with our authorized dealer.

CONTENTS

DX KIT FOR SINGLE SPLIT OUTDOOR UNIT

MODEL NAME:

UTY-XDZX

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1. Precautions

- This manual shows guidelines regarding the Air Handling Unit (AHU) design and notices for the use of DX kit for single split outdoor unit.
- This product enables AHUs made by other manufacturers to be incorporated into a Fujitsu General split-type outdoor unit. Check the guidelines written in this manual when implementing this product into the system that the other manufacturer's AHU is used.
- Check the installation manuals of this product and outdoor unit to be connected for correct use and installation.

⚠ CAUTION

- Conformity of regulations and laws must be confirmed on the whole system (including outdoor unit) by your side.
- R32 is a mildly flammable refrigerant. Make sure to read the original IEC 60335 and IEC 60335 2-40 (Edition 6.0). The fire safety warranty for the whole system (including outdoor unit) must be done by your side when using R32 refrigerant.
- Also for safety, make sure to read the installation manual for the outdoor unit, especially when using R32 refrigerant.
- Fujitsu General Limited does NOT take any responsibility on the system design at field or the failure caused by the system design at the field including our outdoor unit.

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2. Model lineup

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2-1. Applicable outdoor units

Model code		Model name	
kBtu/h	kW	R410A	R32
09	2.5	—	AOYG09KBTB
12	3.5	AOYG12LBLA	AOYG12KBTB
14	4.3	AOYG14LBLA	AOYG14KBTB
18	5.2	AOYG18LBCA	AOYG18KBTB
22	6.0	—	AOYG22KBTB
24	6.8	AOYG24LBCA	AOYG24KBTB
30	8.5	AOYG30LBTA	AOYG30KBTB
36	9.4	AOYG36LBTA	AOYG36KBTB
		AOYG36LATT (3 Ø)	
45	12.1	AOYG45LBTA	AOYG45KBTB
		AOYG45LATT (3 Ø)	
54	13.3	AOYG54LBTA	AOYG54KBTB
		AOYG54LATT (3 Ø)	
60	15.0	AOYG60LATT (3 Ø)	—
72	19.0	AOYG72LRLA (3 Ø)	—
90	22.0	AOYG90LRLA (3 Ø)	—

RELATED LINKS

1. Precautions on page 2

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■ Applicable outdoor units number

⚠ CAUTION

If it makes mistake to choose the outdoor unit and refrigerant, it causes the damage and trouble for outdoor unit. Make sure to check the connecting outdoor unit model and choose the proper outdoor unit type.

Outdoor unit number	Model name	
	R410A	R32
0	—	—
1	—	—
2	—	—
3	—	AOYG24KBTB
4	AOYG60LATT (3 Ø)	—
5	—	AOYG09KBTB
		AOYG12KBTB
		AOYG14KBTB
6	AOYG36LATT (3 Ø)	—
	AOYG45LATT (3 Ø)	
	AOYG54LATT (3 Ø)	
7	—	—
8	—	—
9	—	—
10	—	—
11	—	—
12	—	—
13	—	—
14	—	—
15	—	—
16	—	AOYG18KBTB
		AOYG22KBTB
17	AOYG30LBTA	AOYG30KBTB
	AOYG36LBTA	AOYG36KBTB
18	AOYG12LBLA	—
	AOYG14LBLA	
19	AOYG18LBCA	—
	AOYG24LBCA	
20	AOYG45LBTA	AOYG45KBTB
	AOYG54LBTA	AOYG54KBTB
21	AOYG72LRLA (3 Ø)	—
	AOYG90LRLA (3 Ø)	
22	—	—
23	—	—
24	—	—
25	—	—
26	—	—
27	—	—
28	—	—
29	—	—
30	—	—
31	—	—

—: Setting prohibited

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2-2. Applicable air handling units

NOTES:

- Specifications are based on the following conditions:
  - Cooling: Indoor temperature of 27 °CDB/19 °CWB and outdoor temperature of 35 °CDB/ 24 °CWB
  - Heating: Indoor temperature of 20 °CDB/15 °CWB and outdoor temperature of 7 °CDB/ 6 °CWB
  - Pipe length: 5.0 m
  - Voltage: 230 V
- Be sure to satisfy the requirements of heat exchange capacity and airflow for the system design using other manufacturer's AHU. However, the capacities are not guaranteed.
- For other requirements of heat exchanger, refer to “Important notices” on page 1.
- For detailed specifications of outdoor unit, refer to the “DESIGN & TECHNICAL MANUAL” of the outdoor unit.

- **Refrigerant type: R410A**

Connected outdoor unit model name					AOYG12LBLA	AOYG14LBLA	AOYG18LBCA
Specification	Capacity (Nominal)	Rated	Cooling	kW	3.5	4.3	5.2
			Heating		4.1	5.0	6.0
	Connection pipe	Size	Liquid	mm (in)	Ø6.35 (1/4)		
			Gas		Ø9.52 (3/8)	Ø12.70 (1/2)	
		Pre-charge length		m	15		
		Max. length			25		30
		Max. height difference			15		20
		Additional charge amount		g/m	20		
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	746	746	1,370
			Max.		746	746	1,480
	Airflow volume		Min.	m^3/h	510	570	780
			Max.		850	950	1,050

Connected outdoor unit model name					AOYG24LBCA	AOYG30LBTA	AOYG36LBTA
Specification	Capacity (Nominal)	Rated	Cooling	kW	6.8	8.5	9.4
			Heating		7.8	10.0	10.8
	Connection pipe	Size	Liquid	mm (in)	Ø6.35 (1/4)		
			Gas		Ø15.88 (5/8)		
		Pre-charge length		m	15	20	
		Max. length			30	50	
		Max. height difference			20	30	
		Additional charge amount		g/m	20	40	
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	1,370	1,490	1,640
			Max.		1,480	1,630	2,260
	Airflow volume		Min.	m^3/h	870	1,070	1,180
			Max.		1,150	1,600	1,560

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Connected outdoor unit model name					AOYG36LATT	AOYG45LBTA	AOYG45LATT
Specification	Capacity (Nominal)	Rated	Cooling	kW	9.4	12.1	
			Heating		10.8	13.3	
	Connection pipe	Size	Liquid	mm (in)	Ø9.52 (3/8)		
			Gas		Ø15.88 (5/8)		
		Pre-charge length		m	30	20	30
		Max. length			75	50	75
		Max. height difference			30		
		Additional charge amount		g/m	50	40	50
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	1,370	2,270	1,590
			Max.		1,870	2,730	2,730
	Airflow volume		Min.	m^3/h	970	1,430	1,100
			Max.		1,360	1,960	1,860

Connected outdoor unit model name					AOYG54LBTA	AOYG54LATT	AOYG60LATT
Specification	Capacity (Nominal)	Rated	Cooling	kW	13.3		15.0
			Heating		15.8		18.0
	Connection pipe	Size	Liquid	mm (in)	Ø9.52 (3/8)		
			Gas		Ø15.88 (5/8)		
		Pre-charge length		m	20	30	
		Max. length			50	75	
		Max. height difference			30		
		Additional charge amount		g/m	40	50	
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	2,270	1,940	2,556
			Max.		2,810	2,810	2,556
	Airflow volume		Min.	m^3/h	1,430	1,300	2,450
			Max.		1,960	1,860	3,550

Connected outdoor unit model name					AOYG72LRLA	AOYG90LRLA
Specification	Capacity (Nominal)	Rated	Cooling	kW	19.0	22.0
			Heating		22.4	27.0
	Connection pipe	Size	Liquid	mm (in)	Ø12.70 (1/2)	
			Gas		Ø25.40 (1)	
		Pre-charge length		m	30	
		Max. length			100	
		Max. height difference			30	
		Additional charge amount		g/m	110	
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	3,170	3,170
			Max.		4,100	5,470
	Airflow volume		Min.	m^3/h	2,000	2,200
			Max.		2,720	3,720

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- **Refrigerant type: R32**

Connected outdoor unit model name					AOYG09KBTB	AOYG12KBTB	AOYG14KBTB
Specification	Capacity (Nominal)	Rated	Cooling	kW	2.5	3.5	4.3
			Heating		3.2	4.1	5.0
	Connection pipe	Size	Liquid	mm (in)	Ø6.35 (1/4)		
			Gas		Ø9.52 (3/8)		
		Pre-charge length		m	15		
		Max. length			20	25	
		Max. height difference			15	20	
		Additional charge amount		g/m	20		
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	670	670	690
			Max.		680	740	830
	Airflow volume		Min.	m^3/h	390	410	480
			Max.		540	600	680

Connected outdoor unit model name					AOYG18KBTB	AOYG22KBTB	AOYG24KBTB
Specification	Capacity (Nominal)	Rated	Cooling	kW	5.2	6.0	6.8
			Heating		6.0	7.0	7.5
	Connection pipe	Size	Liquid	mm (in)	Ø6.35 (1/4)		
			Gas		Ø12.70 (1/2)		
		Pre-charge length		m	20		15
		Max. length			30		
		Max. height difference			20	25	
		Additional charge amount		g/m	20		
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	960	1,270	1,270
			Max.		1,480	1,480	1,480
	Airflow volume		Min.	m^3/h	750	530	530
			Max.		830	830	930

Connected outdoor unit model name					AOYG30KBTB	AOYG36KBTB
Specification	Capacity (Nominal)	Rated	Cooling	kW	8.5	9.4
			Heating		10.0	10.8
	Connection pipe	Size	Liquid	mm (in)	Ø9.52 (3/8)	
			Gas		Ø15.88 (5/8)	
		Pre-charge length		m	30	
		Max. length			50	
		Max. height difference			30	
		Additional charge amount		g/m	40	
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	1,370	1,370
			Max.		1,630	2,260
	Airflow volume		Min.	m^3/h	980	980
			Max.		1,600	1,870

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Connected outdoor unit model name					AOYG45KBTB	AOYG54KBTB
Specification	Capacity (Nominal)	Rated	Cooling	kW	12.1	13.3
			Heating		13.3	15.8
	Connection pipe	Size	Liquid	mm (in)	Ø9.52 (3/8)	
			Gas		Ø15.88 (5/8)	
		Pre-charge length		m	30	
		Max. length			50	
		Max. height difference			30	
		Additional charge amount		g/m	40	
Applicable AHU requirement	Heat exchanger capacity		Min.	cm^3	1,830	2,270
			Max.		2,420	2,420
	Airflow volume		Min.	m^3/h	1,070	1,430
			Max.		1,850	2,100

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2-3. Important notices

There are some requirements for incorporating this product into the system. Read the conditions described in this section carefully and design appropriately to avoid AHU failure.

■ Requirements for using R32 refrigerant

- When the compressor operation stop is necessary as a measure to the fire safety (e.g. refrigerant leakage), refer to "External input and output" on page 16 for the method to disable the compressor operation.
- Requirements for charge limits and ventilation (IEC 60335 2-40 Annex GG) shall be satisfied.
- Requirements for marking (e.g. flame symbol) and information in the regulation shall be satisfied.
- Requirements for constructions (e.g. location of the refrigerant detection sensor) shall be satisfied.

■ Temperature sensor of AHU heat exchanger (locally purchased) installation requirements

- Temperature sensor of AHU heat exchanger (locally purchased) is necessary to control the outdoor unit operation.
  NTC Temperature sensor type:
  – R25: 10 kΩ (±1%)
    Rated zero-power resistance at 25°C: 10 kΩ (Resistance tolerance ±1%)
  – B25/85: 3950 K (3900 K—4000 K)
    B-constant at 25°C and 85°C: Temperature characteristics 3950 K (3900 K—4000 K)
- The full length of the sensor must be covered with suitable insulation material so that the temperature reading is not influenced by surrounding air temperature.
- Recommended length of the sensor cable is 2 m. If cable length of 2 m or more is necessary, select the proper wire type, such as noise shield wire.
  Longer cables may be used if proper precautions are taken to avoid electrical noise from influencing the measurement.
  – Cable of 15 m is normally possible as long as shielded cable is used.
  – Ground loops in shield should be avoided.
- Placement of the temperature sensor
  – Optimal sensor placement depends on intended use of the system.
  – The temperature sensor should be installed in a way that the temperature of condensation and evaporation can be detected securely.
  – For DX coils with cooling and heating system, the optimal sensor location is approximately in the middle of the inlet and outlet pipe. (Recommendations)
  – For sensors used in cooling-only system, the optimal sensor location is on the coldest part of the evaporator or in the middle of the inlet and outlet pipe. (Recommendations)
- Installing the temperature sensor
  – The temperature sensor must be installed so that it has good thermal contact with the surface of the sensed pipe.
  – The temperature sensor should properly be fastened to the pipe.
    Zip tie, aluminum tape, or equivalent may be used to fix the sensor to the pipe.
  – Protect the sensor with heat insulating materials not to be affected by ambient temperature, etc.
  – When routing the wire of sensor, don’t apply the stress to the wire of sensor and don’t submerge it.
  – Install in a position where it will not be exposed to condensed water or where it will not be submerged.
  – Ensure sufficient contact area between the sensor and piping so that the detection performance of the sensor is not decrease.
  – Install in a position where it will not to take the direct sunlight.

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■ AHU heat exchanger requirements in field system design

The AHU heat exchanger should have pipes that satisfies following conditions.

- Clean pipe with no adhesion of oil, moisture, cutting chips etc. its inside
  - Free from remaining chlorine
  - Remaining water: 20 mg or less
  - Remaining oil: 1 mg/m or less
  - Remaining foreign substance: 15 mg or less
- Soldering needs to be performed under a protective gas atmosphere.
- No dent or deformation on the pipe
- Contraction part of the pipes should be processed smoothly without any significant corrugation and burrs
- No discolored or deformed copper tube used

When designing the system using other manufacturer's AHU, following withstanding pressure of the heat exchangers should be satisfied.

- Design pressure of outdoor unit: 4.15 MPa
- Burst pressure of AHU: 12.45 MPa

Observe the following in maintenance of the AHU heat exchanger.

- Keep clean inside the heat exchanger by cleaning. Rinse sufficiently not to leave flux.
- Do not use chlorinated detergent when cleaning.

■ Cooling operation requirements

- Supply air (inlet) temperature range in cooling mode is between 18°C and 32°C. Outside this range, the supply air temperature cannot be guaranteed.
- When temperature around AHU heat exchanger air inlet gets below 18 °C, risk of icing adheres to the heat exchanger and icing up the heat exchanger may occur.
- When the evaporation temperature of the AHU heat exchanger gets below 4 °C, stop the compressor operation by AHU controller. Do not operate the AHU with an evaporation temperature of heat exchanger below 4 °C as it may cause failure.
- When the temperature of the heat exchanger pipes does not fall less than the temperature around AHU heat exchanger air inlet in continuous operation for 20 minutes or more, stop compressor operation by AHU controller because outdoor unit 4-way valve might be failure.

■ Heating operation requirements

- Supply air (inlet) temperature range in heating mode is between 10°C and 30°C. Outside this range, the supply air temperature cannot be guaranteed.
- Stop operation when the temperature of the heat exchanger pipes does not rise higher than the temperature around the air inlet even if the system is continuously operating for 20 minutes or more. There might be a failure on the outdoor unit.
- Operation at a lower temperature than specified may cause compressor malfunction. When the temperature around the AHU heat exchanger air inlet is lower than the specified, defrosting operation may be performed frequently.

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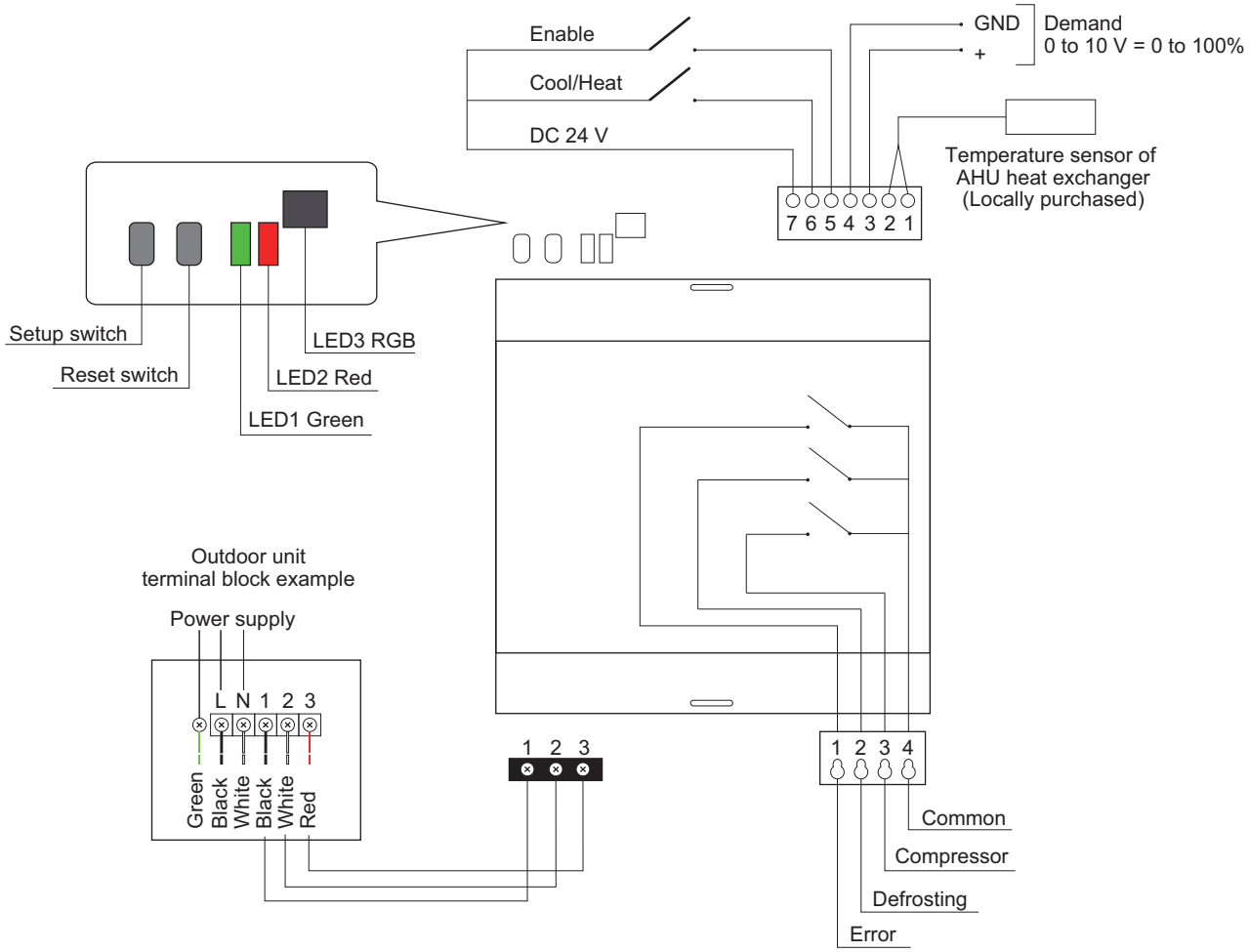
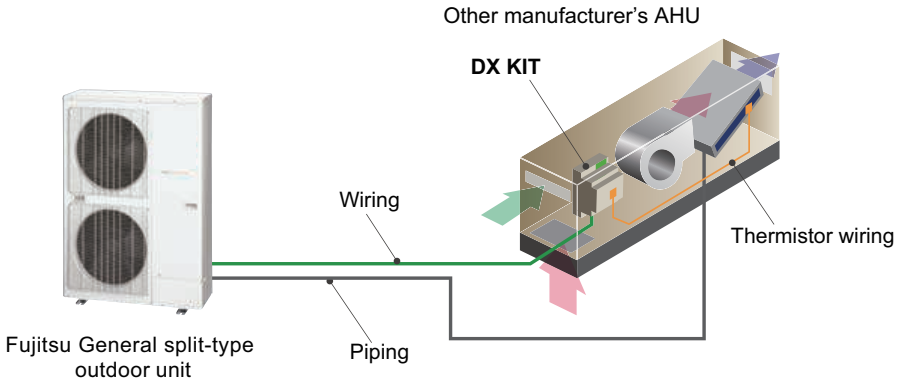
3. Overview

- **Circuit diagram**



- **System diagram example:**



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3-1. Wireless LAN control

By registering user account on EcoSmart.cloud, several functions can be controlled remotely.
For registering the user account and details of network settings, refer to EcoSmart.cloud.

⚠ CAUTION

To prevent personal injury, property damage, or product malfunction, read the installation manual of the product carefully, and be sure to comply with the safety precautions.

■ System requirement

Before using this function, prepare the following items:

- **Wireless router:**

Wireless LAN standard	IEEE802.11b/g/n
Frequency bands*	2.400 to 2.484 GHz (1ch—14ch)
Network security	Supported to provide the latest security requirement on your network. • Hardware WAPI acceleration engine • AES • TKIP • WPA • WPA2

*: Usable only in the country or region where you purchased the product.

To check whether your wireless router complies with the network security technologies or standards are listed above, refer to the installation manual.

■ Output power

Characteristics		Type	Criteria	Unit
RF average output power, 802.11b CCK mode	1M	16.5	±1.5	dBm
	11M	16.5	±1.5	dBm
RF average output power, 802.11g OFDM mode	6M	15	±1.5	dBm
	54M	13	±1.5	dBm
RF average output power, 802.11n OFDM mode	MCS0	14.5	±1.5	dBm
	MCS7	12	±1.5	dBm

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4. Specifications

Item		Unit	Specification
Power supply			230 V ~ 50 Hz
Maximum input power		W	2
Maximum operating current		A	0.01
Dimensions (H × W × D)	Net	mm	90.2 × 53.3 × 57.5
	Gross		105 × 95 × 65
Weight	Net	g	110
	Gross		150
Dry bulb temperature of installed environmental	Operating	°C	-20 to 46
Degree of protection			IP10

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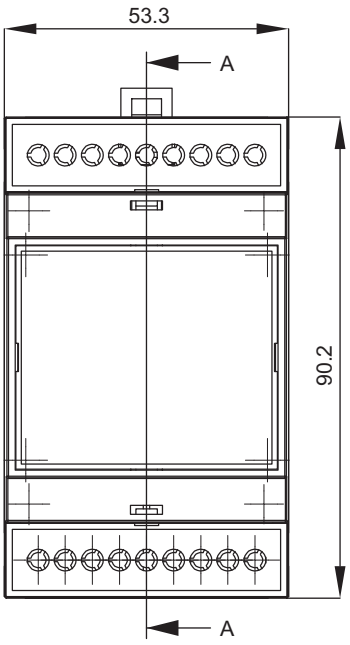
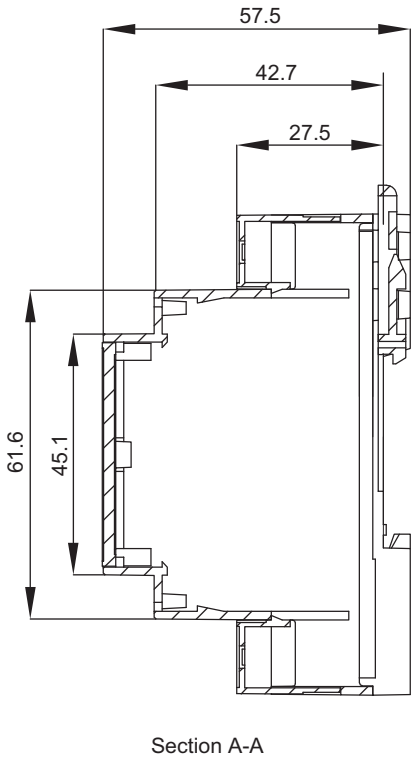
5. Dimensions

Unit: mm



Top view



Section A-A

Side view

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6. Electrical characteristics

Wiring spec. *1	Circuit breaker current		A	Depending on connected outdoor unit
	Connection cable *2	Cross-sectional area	mm^2	2.5 (Maximum)
		Limited wiring length	m	Refer to Max. length of connection pipe in "Applicable air handling units" on page 5
		Type		Use confirmed cable with type 60245 IEC57.

*1: As the regulations of wire size and circuit breaker differ in each country or region, select appropriate devices complied to the regional standard.

*2: Limit voltage drop to less than 2%. Increase conductor size if voltage drop is 2% or more.

NOTE: Connect the ground to the external ground properly.

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7. External input and output

NOTES:

- Use suitable isolated wires of 0.25 to 0.5 mm^2.
- In noisy environments or if the wire length exceeds 2 m, a twisted pair shielded cable (0.25 to 0.5 mm^2) is recommended.
- Especially when using with high impedance inputs, the wire connection should be separate from the power cable.

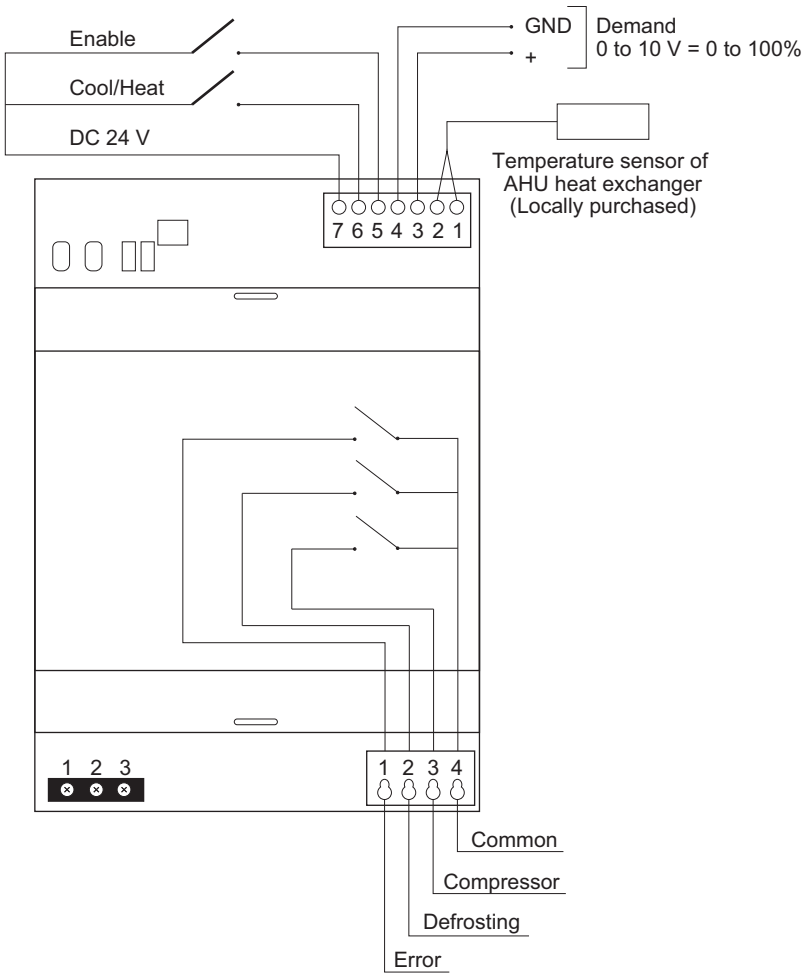
- **External input**

Input name	Terminal No.
Cool/Heat	6—7
Enable	5—7
Demand	3, 4
Temperature sensor	1, 2

- **External output**

Output name	Terminal No.
Compressor running	3—4
Defrosting	2—4
Error	1—4

7-1. Terminal layout



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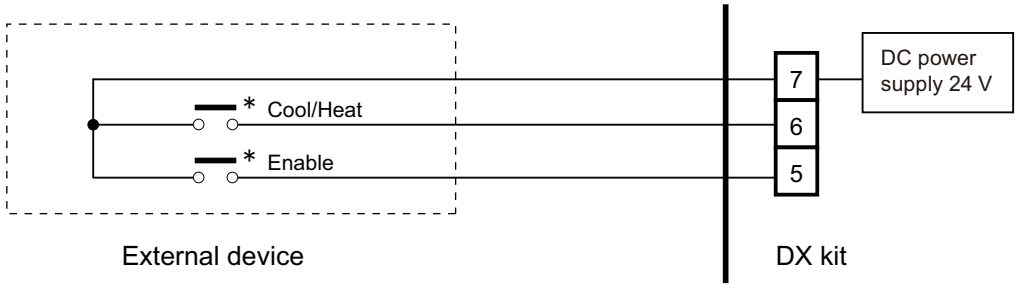
7-2. External input

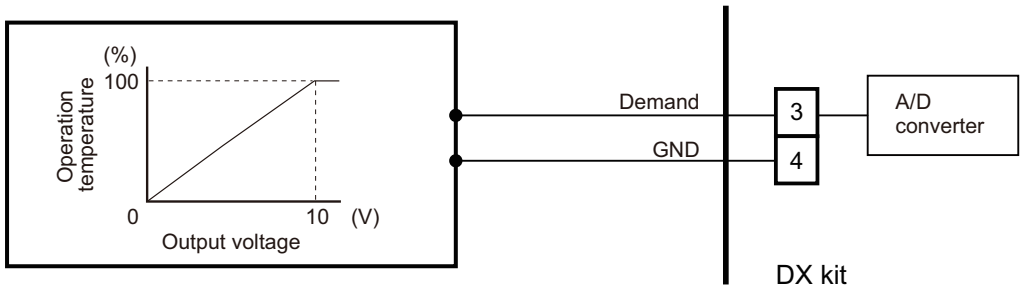
- The unit features a galvanically isolated internal power source.
  The required control signals:
  – Enable
    Short: Demand input is available
    Open: Demand input is not available. Compressor does not work.
  – Cool/Heat
    Short: Heating mode is set.
    Open: Cooling mode is set.
  – Demand
    DC 0—10 V for 0—100% compressor demand.
    0 V: Compressor off (Refer to the following description.)

  All these signals must be either potential free or refer to a common potential.

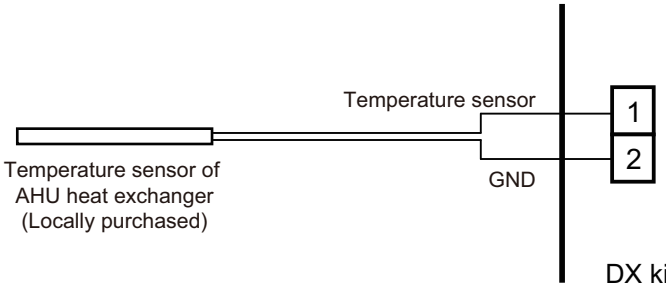
- **Cool/Heat, Enable inputs**



- **Demand input**



- **Temperature sensor of AHU heat exchanger input**
  For temperature sensor installation requirements, refer to “Important notices” on page 1.



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7-3. External output

The external outputs are 3 potential free relays with a common supply. Total rating is 3 A, AC 250 V or DC 30 V resistive load.