

LG

THERMA V™

Air-to-Water Heat Pump / Monobloc

R290 / 50Hz

20260702

TOTAL HVAC SOLUTION PROVIDER

ENGINEERING PRODUCT DATA BOOK



Therma V General Information

1. Model Line up

2. Nomenclature

1. Model line up

1.1 Indoor Unit

Product	Phase	Chassis	Model Name
Hydro Unit	1,3	K1	FHNW16X0AV1 [HN16XAHC.NK1]
Control unit	-	-	PHCS1 [PHCS1]
Cascade Control Unit	-	-	PHCM0 [PHCM0]
Combi Unit	1,3	K5	FHNW20X0AY1 [HN20XAHY.NK1]
			FHNW20X0AB1 [HN20XAHB.NK1]

◆ External appearance

Hydro Unit	Control unit	Combi Unit
		

1.2 Outdoor Unit

Product	Phase	Chassis	Capacity Index (kW)	Model Name
Monobloc	1	UN36A	5.5	FHBW056B1 [HM051HFD UA41]
			7.0	FHBW076B1 [HM071HFD UA41]
			9.0	FHBW096B1 [HM091HFD UA41]
		UN36B	12.0	FHBW126B1 [HM121HFD UB41]
			14.0	FHBW146B1 [HM141HFD UB41]
			16.0	FHBW166B1 [HM161HFD UB41]
	3	UN36A	7.0	FHBW078B1 [HM073HFD UA41]
			9.0	FHBW098B1 [HM093HFD UA41]
		UN36B	12.0	FHBW128B1 [HM123HFD UB41]
			14.0	FHBW148B1 [HM143HFD UB41]
			16.0	FHBW168B1 [HM163HFD UB41]

Note

* : Actual system capacity would be different accordance with combination of outdoor unit.

◆ External appearance

UN36A	UN36B
	

1. Model line up

1.3 Combination Compatibility

Combination Compatibility	Indoor Unit		
	Hydro Unit	Control Unit	CasCade Controller
Outdoor Unit	FHNW16X0AV1 [HN16XAHK NK1]	PHCS1 [PHCS1 EEWXLEU]	PHCM0 ¹⁾ [PHCM0]
FHBW056B1 [HM071HFD UA41]	O	O	O
FHBW076B1 [HM071HFD UA41]	O	O	O
FHBW096B1 [HM091HFD UA41]	O	O	O
FHBW126B1 [HM121HFD UB41]	O	O	O
FHBW146B1 [HM141HFD UB41]	O	O	O
FHBW166B1 [HM161HFD UB41]	O	O	O
FHBW078B1 [HM073HFD UA41]	O	O	O
FHBW098B1 [HM093HFD UA41]	O	O	O
FHBW128B1 [HM123HFD UB41]	O	O	O
FHBW148B1 [HM143HFD UB41]	O	O	O
FHBW168B1 [HM163HFD UB41]	O	O	O

Combination Compatibility	Indoor Unit	
	Combi Unit	
Outdoor Unit	FHNW20X0AY1 [HN20XAHY NK1]	FHNW20X0AB1 [HN20XAHB NK1]
FHBW056B1 [HM071HFD UA41]	O	O
FHBW076B1 [HM071HFD UA41]	O	O
FHBW096B1 [HM091HFD UA41]	O	O
FHBW126B1 [HM121HFD UB41]	O	O
FHBW146B1 [HM141HFD UB41]	O	O
FHBW166B1 [HM161HFD UB41]	O	O
FHBW078B1 [HM073HFD UA41]	O	O
FHBW098B1 [HM093HFD UA41]	O	O
FHBW128B1 [HM123HFD UB41]	O	O
FHBW148B1 [HM143HFD UB41]	O	O
FHBW168B1 [HM163HFD UB41]	O	O

Note

O : Applied, X : Not Applied

* Indoor Units produced from 07/2026 are available.

1) Cascade Control Unit can only be combined with the same outdoor unit, and a minimum of 2 units and a maximum of 8 units can be installed.

ex) HM091HFD + HM091HFD (O) / HM091HFD + HM071HFD (X)

2. Nomenclature

■ Factory Model Name

-Outdoor unit

Model Name	FH	B	W	09	6	B	1
No.	1	2	3	4	5	6	7

No.	Signification
1	FH : Air-to-Water Heat Pump for R290
2	Classification B : Monobloc
3	Model Type W : Inverter Heat Pump
4	Heating Capacity (kW) Ex) 5 kW : '05', 16 kW : '16'
5	Electrical ratings 6 : 1 Ø, 220-240 V, 50 Hz 8 : 3 Ø, 380-415 V, 50 Hz
6	Function B : Hydrosplit
7	Series

-Indoor unit : Hydro unit

Model Name	F	H	N	W	1	6	X	0	A	V	1
No.	1	2	3	4	5	6	7	8	9	10	11

No.	Signification
1	F : R290
2	H : Air to Water Heat Pump Air Conditioner
3	N : Indoor Unit
4	W : DC Inverter H/P
5	Heating Capacity (kW) Ex) 5 kW : '05', 16 kW : '16'
6	
7	Electrical ratings X : 220~240/50/1, 380~415/50/3 (single-phase, three-phase common EU)
8	Electric heater capacity Ex) 6 kW : '06', 9 kW : '09' 0A : Capacity common heater
9	
10	V : Models with 3-way valve
11	Series

2. Nomenclature

-Indoor unit : Control unit / Cascade unit

Model Name	P	H	C	S	1
No.	1	2	3	4	5

No.	Signification
1	P : Part or Accessory
2,3	HL : Heating AWHP Accessory kit HC : Heating AWHP Control Kit
4	S : Single unit M : Multi units
5	Series

-Indoor unit : Combi unit

Model Name	F	H	N	W	20		X	0A		Y B	1
No.	1	2	3	4	5	6	7	8	9	10	11

No.	Signification
1	F : R290
2	H : Air to Water Heat Pump Air Conditioner
3	N : Indoor Unit
4	W : DC Inverter H/P
5	20 : Integrated Water Tank Capacity (200 Liter)
6	
7	X : Electrical ratings (For both 1Ø, 220-240V, 50 Hz and 3Ø, 380-415 V, 50 Hz)
8	0A : Capacity common heater
9	
10	Function - Y : Hydro split basic (1C) - B : Hydro split (2C, Buffer tank)
11	Series

2. Nomenclature

■ Buyer Model Name

-Outdoor unit

Model Name	H	M	09	1	H	F	D	UA4	1
No.	1	2	3	4	5	6	7	8	9

No.	Signification
1	H : Air-to-Water Heat Pump
2	Classification M : Monobloc type
3	Heating Capacity (kW) Ex) 5 kW : '05', 16 kW : '16'
4	Electrical ratings 1 : 1 Ø, 220-240 V, 50 Hz 3 : 3 Ø, 380-415 V, 50 Hz
5	Leaving Water Combination H : High Temperature
6	Type of refrigerant F : R290
7	Function D : Hydrosplit
8	Platform (Chassis code) UA4: UN36A Chassis UB4: UN36B Chassis
9	Series Number

-Indoor unit

Model Name	H	N	16	X	A	H	C	NK	1
No.	1	2	3	4	5	6	7	8	9

No.	Signification
1	H : Air to Water Heat Pump Air Conditioner
2	N : Indoor unit
3	Heating Capacity Ex) 16kW : '16'
4	Electrical ratings X : 220~240/50/1, 380~415/50/3 (single-phase, three-phase common EU)
5	Electric heater capacity Ex) 6 kW : '06', 9 kW : '09' A : Capacity common heater
6	Leaving Water Combination H : High Temperature
7	Function C : General function of Hydrosplit 2-Pipe
8	Platform (Chassis code) N : Indoor Unit K : K1, K3, K5 Chassis
9	Series Number

Product Data

Hydro Unit

Control Unit

Cascade Control Unit

Combi Unit

Monobloc

Hydro Unit

- 1. Specifications**
- 2. List of Functions**
- 3. Accessory Compatibility List**
- 4. Dimensions**
- 5. Piping Diagrams**
- 6. Wiring Diagrams**

1. Specifications

Category		Unit	FHNW16X0AV1 [HN16XAHK NK1]		
Major	Minor				
Classification	Chassis	-	K1		
Operation range(Leaving Water)	Cooling (min. ~ max.)	℃(DB)	5~27		
	Heating (min. ~ max.)	℃(DB)	15~75		
	Domestic hot water (min. ~ max.)	℃(DB)	15~80*		
Power supply	Case 1	V, Φ, Hz	220-240, 1, 50		
Current	Current (max.)	A	0.6		
Recommended circuit breaker(ELCB)	-	A	10		
Connecting cable	Power supply cable (H07RN-F)	mm ² × cores	0.75 x 3C		
	Communication cable (H07RN-F)	mm ² × cores	0.75 x 2C		
Electric backup heater	Type	-	Sheath		
	Power supply	V, Φ, Hz	220-240 V~ 50Hz		380-415 V3N~ 50Hz
	Number of heating coil	EA	3		
	Capacity combination	kW	3.0	3.0 + 3.0	3.0 + 3.0 + 3.0
	Heating steps	Step	1	2	3
	Rated running current	A	26	26	13
	Power cable (H07RN-F) (included earth)	mm ² × cores	4.0 X 3C	4.0 X 3C	2.5 X 5C
	Recommended circuit breaker (ELCB)	A	32	32	16
	Expansion tank	Volume (max.)	ℓ	12	
Water pressure (max.)		bar	3		
Water pressure (pre-charged)		bar	1		
Sound power level	Heating (rated)	dB(A)	39		
Water connecting pipes	Inlet	inch	Male PT 1" according to ISO 7-1(tapered pipe threads)		
	Outlet	inch	Male PT 1" according to ISO 7-1(tapered pipe threads)		
Dimensions	Net (W x H x D)	mm	420 x 700 x 299		
	Shipping (W x H x D)	mm	504 x 884 x 372		
Weight	Net	kg	33.6		
	Shipping	kg	37.9		
Exterior	Color of chassis	-	Essence White		
	RAL Code of chassis	-	RAL 9003		

Note

1. Due to our policy of innovation some specifications may be changed without notification.
2. Wiring cable size must comply with the applicable local and national code. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
3. Sound power level is measured on the rated condition in accordance with ISO 9614 standard.
Therefore, these values depend on the ambient conditions and values are normally higher in actual operation.
4. * DHW 65~80°C operating is available only when the booster heater is operating.

2. List of functions

Category	Functions	FHNW16X0AV1 [HN16XAHK NK1]
Reliability	Self diagnosis	O
Convenience	Auto Restart	O
	Child Lock	O
	Group Control	X
	Sleep Timer	X
	Turn On/Off Reservation	O
	Schedule	O
	Low Noise Operation	O
Installation	Electric Backup Heater	O
	Domestic Hot Water Tank heater	Accessory(3rd party)
Water Product functions	Water Pump Pre-run / Over-run control	O
	Water Pump Forced Operation	O
	Water Pump Speed Control	O
	Water Flow Detection by Flow Sensor	O
	Water Flow Control	O
	Water Pressure Monitoring	O
	Thermostat Interface (230V AC)	O
	Thermostat Interface (24V AC)	X
	One Point Dry Contact Input (CN-EXT)	O
	Digital Output For External Pump	O
	Digital inputs for energy saving (Ready for Smart Grid)	O
	Communication with LG ESS by Modbus	O
	Anti-Condensation on Floor (cooling)	O
	Anti-Freezing Control	O
	Anti-overheating Of Water Pipe	O
	Emergency Operation	O
	Weather dependent operation with thermostat	O
	Seasonal auto mode (heating and cooling)	O
	DHW(Domestic Hot Water) Tank Kit	O
	Scheduler (DHW Tank Heater)	O
	Timer (DHW Tank Heater)	O
	Quick DHW Tank Heating	O
	DHW Recirculation	O
	Tank Disinfection	O
	Electric Heater Capacity Control	O
	Solar thermal function	Accessory(3rd party)
	Screed Drying Mode	O
	Current Flow Rate Monitoring	O
	Energy Monitoring	O
Special Functions	Wi-Fi Control	O
	Modbus connectivity (without gateway)	O
	Remote room temperature sensing	Accessory
	Outdoor Temperature sensing	Accessory
	2nd Circuit (Mixing Circuit)	Accessory(3rd party)
	2-Remo control	Accessory

Note

1. O : Applied, X : Not applied

Accessory : Ordered and purchased separately the accessory package referring to the model name provided and install at field.

Accessory line-ups varies by region, so check your local catalogue or local sales material.

2. Solar thermal system requires the 3rd party accessory, PT-1000 sensor. (field supply)

3. Accessory Compatibility List

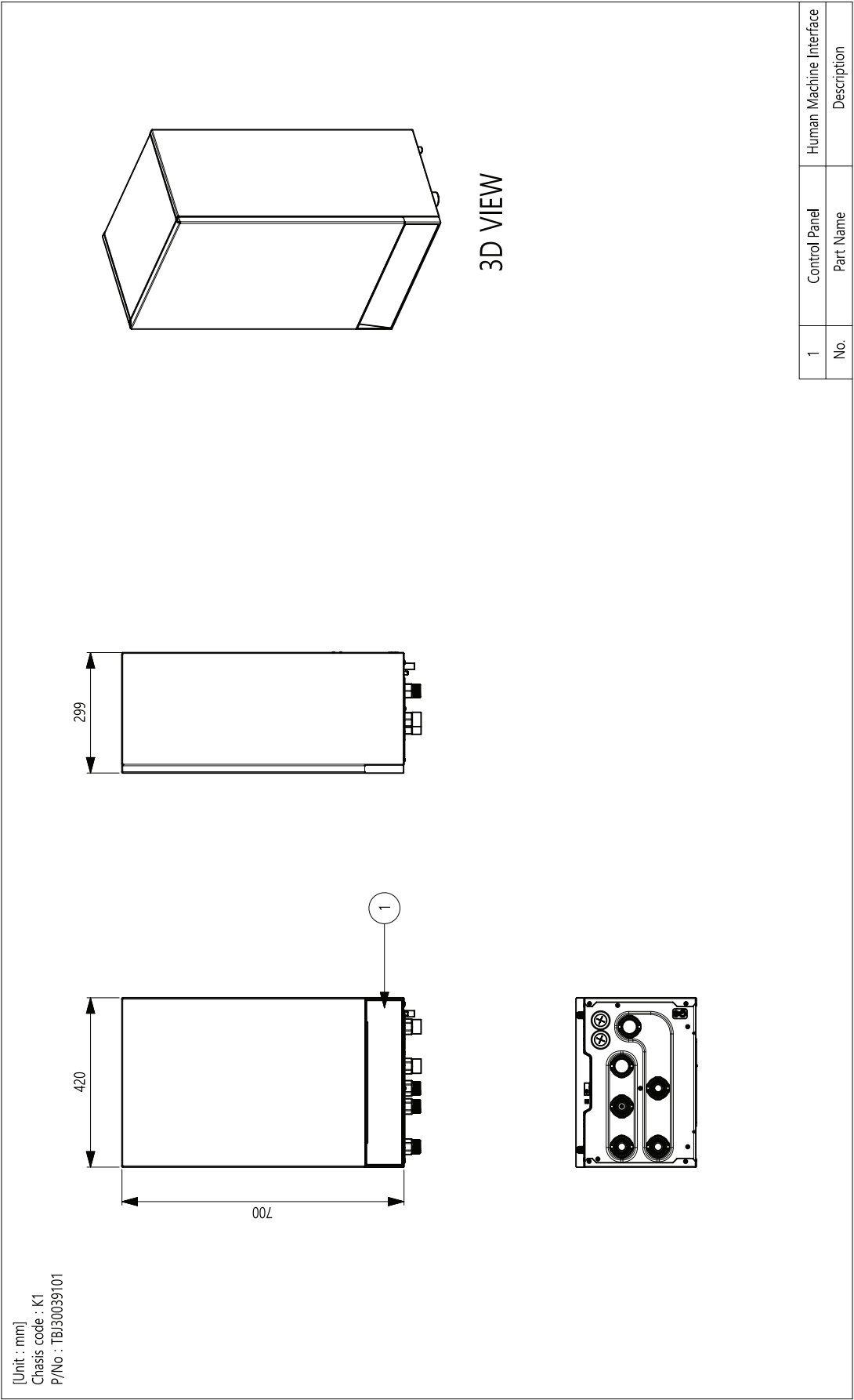
Category	Accessory Name	Model Name	Descriptions	FHNW16X0AV1 [HN16XAHC NK1]
Remote Controller	Wired - RS3 (Standard III)	PREMTW101	White	X
	Deluxe heating	PREMTW200	White	O
Dry Contact	Simple	PDRYCB000	1 input port, AC 220 - 240V	O
	Thermostat	PDRYCB320	8 input port, For 3rd Party Thermostat (Analog Input)	O
Integration Device	Remote Temperature sensor	PQRSTA0	Room temperature sensor, NTC 10kΩ, include casing	O
	Group Control wire	PZCWRCG3	Cable Assembly for group control (Y-type cable : 0.25m, cable : 9.6m)	X
ETC	Extension wire	PZCWRC1	Extension wire for IDU-wired remote controller (9.6m)	O
	2-Remo Control wire	PZCWRC2	Y-type cable to connect additional Remote Controller as slave	O
	Wi-Fi Modem	PWFMDD200	Device to use ThinQ app include connection cable	O
	Wi-Fi Extension cable	PWYREW000	USB Extension cable : 10 m	O
	Meter Interface	PENKTH000	Interface to connect 3rd-party heat and/or watt meter to indoor unit by S0 or Modbus	O
Special Kit	Solar-Thermal kit	PHLLA*	Limit Temperature : 96 °C	O
	IDU Drain Pan	PHDPB	For Hydro Unit	X
		PHDPC	For Hydro Unit	X
	DHW tanks (Single coil)	OSHW-200F	200 L	O
		OSHW-300F	300 L	O
		OSHW-500F	500 L	O
	DHW tanks (Double coil)	OSHW-300FD	300 L	O
	DHW Heater kit	PHLTA	For Hydro Unit and Control Unit(except for HN1639 NK3)	X
		PHLTB	For Hydro unit and Monobloc	O
		PHLTC	For Hydro Unit (HN1639 NK3)	X
	Wall mounted outdoor air temp. sensor	PHATS0	For measuring outside temperature	O
	Thermistor for Water Tank (Buffer Tank, DHW Tank)	PHRSTA0	Included in DHW Tank kit	O
	Thermostatic Mixing valve	OSHA-MV	3/4" DN20	O
		OSHA-MV1	1" DN25	O
	3way valve	OSHA-3V	Diverting valve between space heating and DHW heating	X
	Thermistor for 2nd Circuit	PRSTAT5K10	NTC 5kΩ sensor needed to control mixing circuit or if 3rd party backup heater is used	O
	Backup Heater	HA031M E1	1Ø, 3kW (For Monobloc)	X
		HA061M E1	1Ø, 6kW (For Monobloc)	X
		HA063M E1	3Ø, 6kW (For Monobloc)	X
		HA031M E2	1Ø, 3kW (For Monobloc)	X
		HA061M E2	1Ø, 6kW (For Monobloc)	X
		HA063M E2	3Ø, 6kW (For Monobloc)	X
		HA061B E1	1Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X
		HA061C E1	1Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X
		HA063B E1	3Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X
		HA063C E1	3Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X
	Cover plate	PDC-HK10	For Combi Unit and Hydro Unit Type indoor units	X

Note

1. O: Possible, X: Impossible, -: Not applicable, Embedded: Included with product.
2. Some advanced functions controlled by individual controller cannot be operated.
3. If there is a difference in development time between the product and the remote controller, some functions cannot be operated.
4. Meter interface cannot be connected at the same time with 3rd-party controller.
5. *: It includes double-sensor for solar tank. The collector sensor (PT1000) needs to be supplied locally.
6. If you need more detail, please refer to the control(**BECON**) PDB or the manual of product. (<http://partner.lge.com> > Select Your Region : Home > Doc.Library > Product > Control(BECON)).

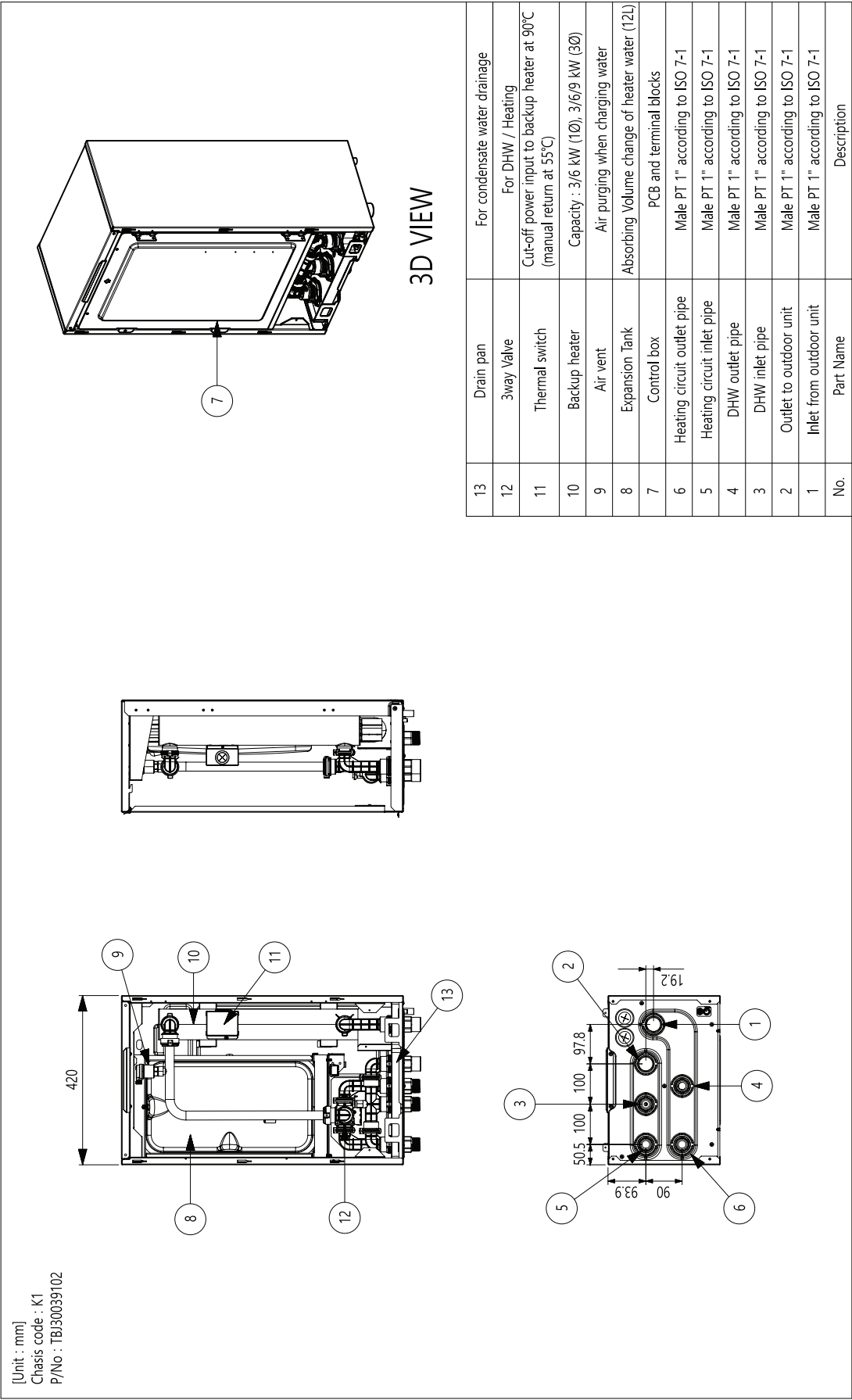
4. Dimensions

■ External : FHNW16X0AV1[HN16XAHC NK1]



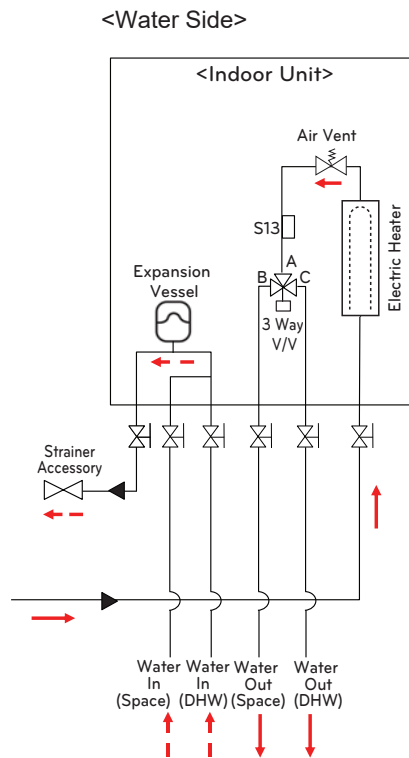
4. Dimensions

Internal : FHNW16X0AV1[HN16XAHC NK1]

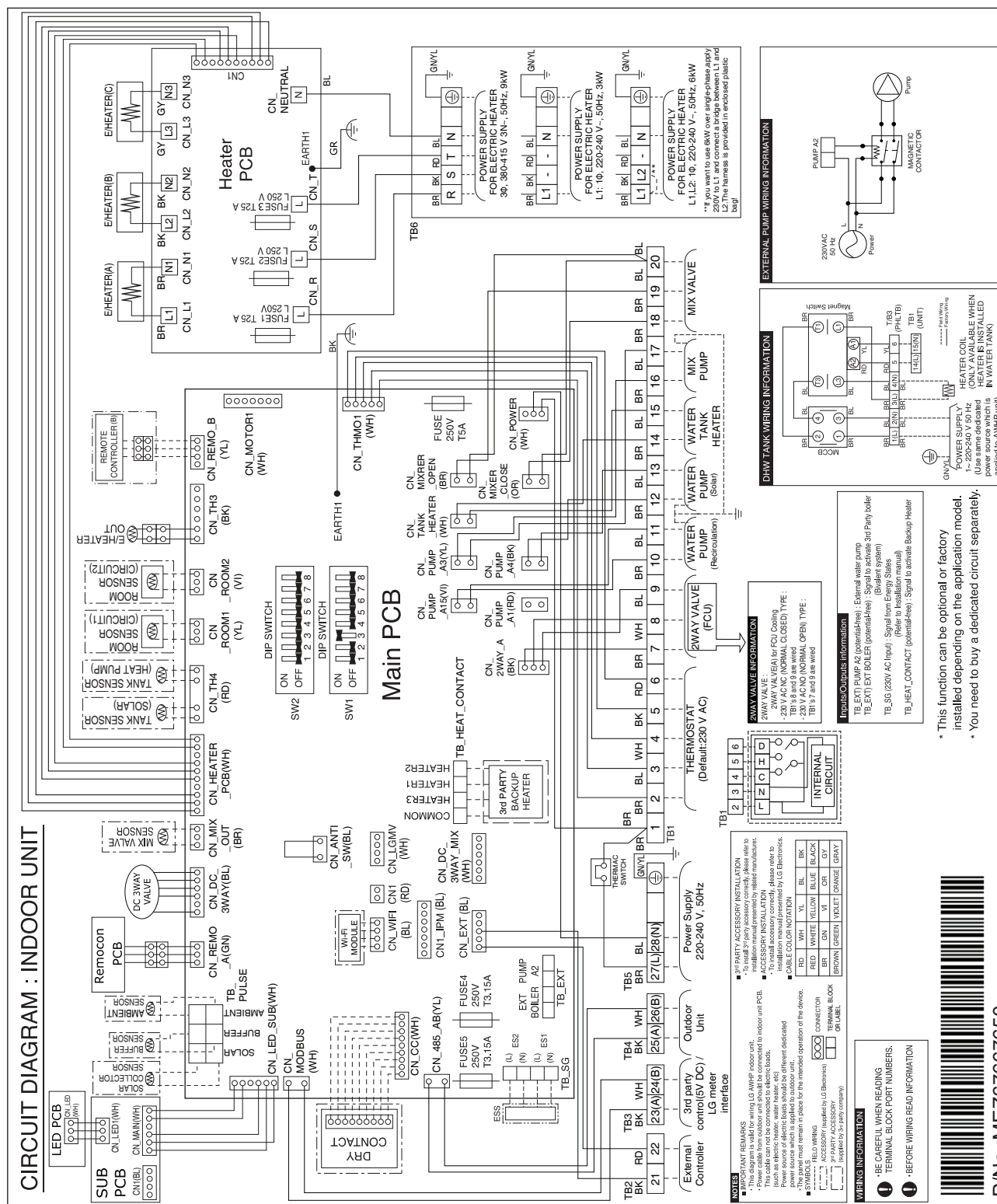


5. Piping Diagram

■ FHNW16X0AV1[HN16XAHC NK1]



* S13 : Electric backup heater outlet temp. sensor



Control Unit

- 1. Specifications**
- 2. List of Functions**
- 3. Accessory Compatibility List**
- 4. Dimensions**
- 5. Wiring Diagrams**

1. Specifications

Category		Unit	PHCS1 [PHCS1]
Major	Minor		
Classification	Chassis	-	Accessory
Operation range(Leaving Water)	Cooling (min. ~ max.)	°C(DB)	5~27
	Heating (min. ~ max.)	°C(DB)	15~75
	Domestic hot water (min. ~ max.)	°C(DB)	15 ~ 80*
Power supply	Case 1	V, Φ, Hz	220-240 V~ 50Hz
Current	Current (max.)	A	0.6
Recommended circuit breaker(ELCB)	-	A	10
Connecting cable	Power supply cable (H07RN-F)	mm ² × cores	0.75 x 3C
	Communication cable (H07RN-F)	mm ² × cores	0.75 x 2C
Dimensions	Net (W x H x D)	mm	420 x 490 x 141
	Shipping (W x H x D)	mm	466 x 580 x 184
Weight	Net	kg	8.2
	Shipping	kg	10.7
Exterior	Color of chassis	-	Essence White
	RAL Code of chassis	-	RAL 9003

Note

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3. * DHW 65~80°C Operating is available only when the booster heater is operating.

2. List of functions

Category	Functions	Availability
Reliability	Self diagnosis	O
Convenience	Auto Restart	O
	Child Lock	O
	Group Control	X
	Sleep Timer	X
	Turn On/Off Reservation	O
	Schedule	O
	Low Noise Operation	O
Installation	Electric Backup Heater	Accessory
	Domestic Hot Water Tank heater	Accessory(3rd party)
Water Product functions	Water Pump Pre-run / Over-run control	O
	Water Pump Forced Operation	O
	Water Pump Speed Control	O
	Water Flow Detection by Flow Sensor	O
	Water Flow Control	O
	Water Pressure Monitoring	O
	Thermostat Interface (230V AC)	O
	Thermostat Interface (24V AC)	X
	One Point Dry Contact Input (CN-EXT)	O
	Digital Output For External Pump	O
	Digital inputs for energy saving (Ready for Smart Grid)	O
	Communication with LG ESS by Modbus	O
	Anti-Condensation on Floor (cooling)	O
	Anti-Freezing Control	O
	Anti-overheating Of Water Pipe	O
	Emergency Operation	O
	Weather dependent operation with thermostat	O
	Seasonal auto mode (heating and cooling)	O
	DHW(Domestic Hot Water) Tank Kit	O
	Scheduler (DHW Tank Heater)	O
	Timer (DHW Tank Heater)	O
	Quick DHW Tank Heating	O
	DHW Recirculation	O
	Tank Disinfection	O
	Electric Heater Capacity Control	O
	Solar thermal function	Accessory(3rd party)
	Screed Drying Mode	O
	Current Flow Rate Monitoring	O
	Energy Monitoring	O
Special Functions	Wi-Fi Control	O
	Modbus connectivity (without gateway)	O
	Remote room temperature sensing	Accessory
	Outdoor Temperature sensing	Accessory
	2nd Circuit (Mixing Circuit)	Accessory(3rd party)
	2-Remo control	Accessory

Note

1. O : Applied, X : Not applied

Accessory : Ordered and purchased separately the accessory package referring to the model name provided and install at field.

Accessory line-ups varies by region, so check your local catalogue or local sales material.

2. Solar thermal system requires the 3rd party accessory, PT-1000 sensor. (field supply)

3. Accessory Compatibility List

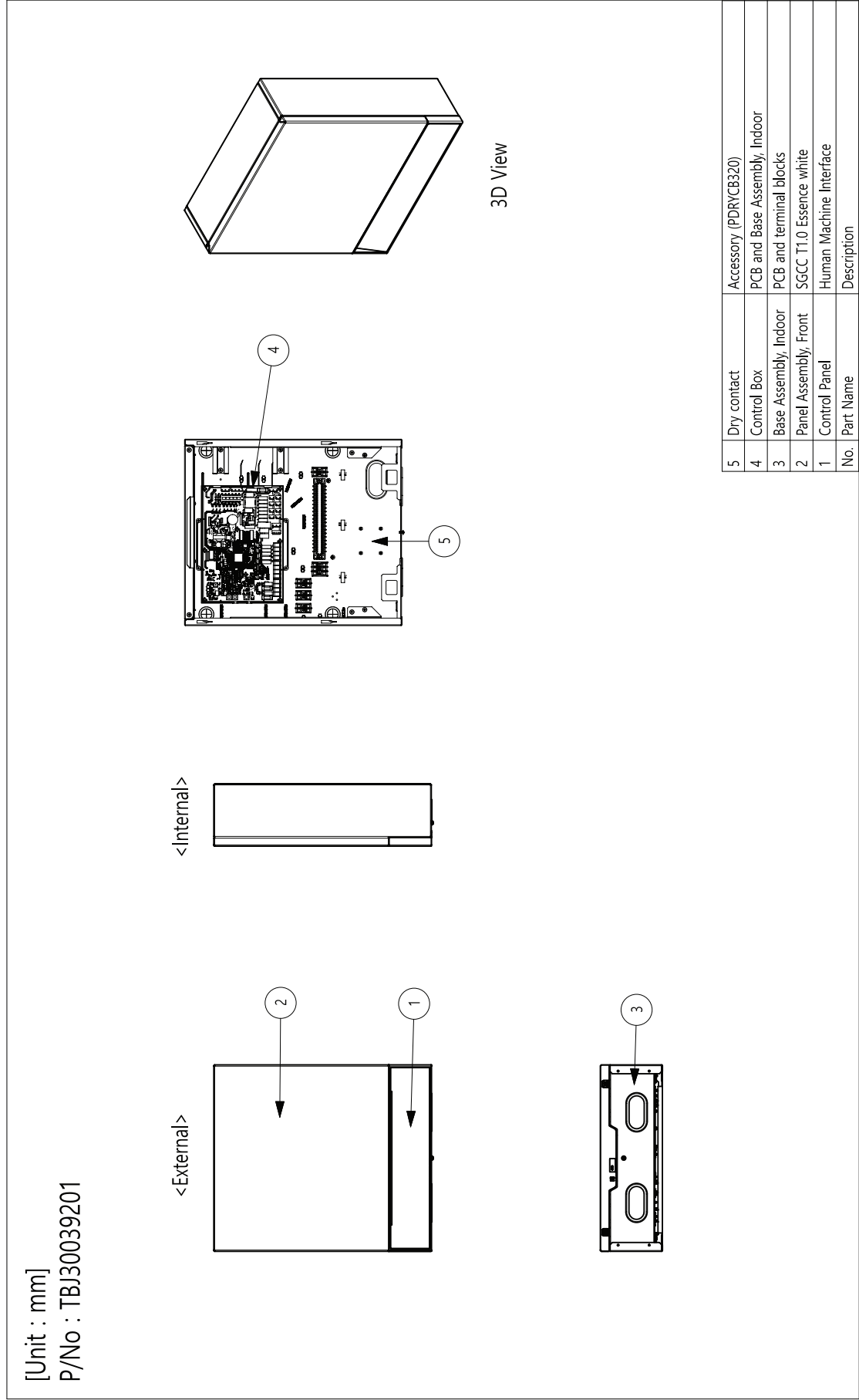
Category	Accessory Name	Model Name	Descriptions	PHCS1 [PHCS1]
Remote Controller	Wired - RS3 (Standard III)	PREMTW101	White	X
	Deluxe heating	PREMTW200	White	O
Dry Contact	Simple	PDRYCB000	1 input port, AC 220 - 240V	O
	Thermostat	PDRYCB320	8 input port, For 3rd Party Thermostat (Analog Input)	O
Integration Device	Remote Temperature sensor	PQRSTA0	Room temperature sensor, NTC 10kΩ, include casing	O
	Group Control wire	PZCWRCG3	Cable Assembly for group control (Y-type cable : 0.25m,cable : 9.6m)	X
ETC	Extension wire	PZCWRC1	Extension wire for IDU-wired remote controller (9.6m)	O
	2-Remo Control wire	PZCWRC2	Y-type cable to connect additional Remote Controller as slave	O
	Wi-Fi Modem	PWFMDD200	Device to use ThinQ app include connection cable	O
	Wi-Fi Extension cable	PWYREW000	USB Extension cable : 10 m	O
	Meter Interface	PENKTH000	Interface to connect 3rd-party heat and/or watt meter to indoor unit by S0 or Modbus	O
Special Kit	Solar-Thermal kit	PHLLA*	Limit Temperature : 96 °C	O
	IDU Drain Pan	PHDPB	For Hydro Unit	X
		PHDPC	For Hydro Unit	X
	DHW tanks (Single coil)	OSHW-200F	200 L	O
		OSHW-300F	300 L	O
		OSHW-500F	500 L	O
	DHW tanks (Double coil)	OSHW-300FD	300 L	O
	DHW Heater kit	PHLTA	For Hydro Unit and Control Unit(except for HN1639 NK3)	X
		PHLTB	For Hydro unit and Monobloc	O
		PHLTC	For Hydro Unit (HN1639 NK3)	X
	Wall mounted out-door air temp. sensor	PHATS0	For measuring outside temperature	O
	Thermistor for Water Tank (Buffer Tank, DHW Tank)	PHRSTA0	Included in DHW Tank kit	O
	Thermostatic Mixing valve	OSHA-MV	3/4" DN20	O
		OSHA-MV1	1" DN25	O
	3way valve	OSHA-3V	Diverting valve between space heating and DHW heating	O
	Thermistor for 2nd Circuit	PRSTAT5K10	NTC 5kΩ sensor needed to control mixing circuit or if 3rd party backup heater is used	O
	Backup Heater	HA031M E1	1Ø, 3kW (For Monobloc)	X
		HA061M E1	1Ø, 6kW (For Monobloc)	X
		HA063M E1	3Ø, 6kW (For Monobloc)	X
		HA031M E2	1Ø, 3kW (For Monobloc)	O
		HA061M E2	1Ø, 6kW (For Monobloc)	O
		HA063M E2	3Ø, 6kW (For Monobloc)	O
		HA061B E1	1Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X
		HA061C E1	1Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X
		HA063B E1	3Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X
		HA063C E1	3Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X
	Cover plate	PDC-HK10	For Combi Unit and Hydro Unit Type indoor units	X

Note

1. O: Possible, X: Impossible, -: Not applicable, Embedded: Included with product.
2. Some advanced functions controlled by individual controller cannot be operated.
3. If there is a difference in development time between the product and the remote controller, some functions cannot be operated.
4. Meter interface cannot be connected at the same time with 3rd-party controller.
5. *: It includes double-sensor for solar tank. The collector sensor (PT1000) needs to be supplied locally.
6. If you need more detail, please refer to the control(**BECON**) PDB or the manual of product. (<http://partner.lge.com> > Select Your Region : Home> Doc.Library> Product > Control(BECON)).

4. Dimensions

PHCS1 [PHCS1]



PHCS1 [PHCS1]

[illegible]

Cascade Control Unit

- 1. Specifications**
- 2. List of Functions**
- 3. Accessory Compatibility List**
- 4. Dimensions**
- 5. Wiring Diagrams**

1. Specifications

Category		Unit	PHCM0 [PHCM0]
Major	Minor		
Classification	Chassis	-	Accessory
Operation range(Leaving Water)	Cooling (min. ~ max.)	°C(DB)	5~27
	Heating (min. ~ max.)	°C(DB)	15~70
	Domestic hot water (min. ~ max.)	°C(DB)	15 ~ 80*
Power supply	Case 1	V, Φ, Hz	220-230-240, 1, 50
Current	Current (max.)	A	0.6
Recommended circuit breaker(ELCB)	-	A	10
Connecting cable	Power supply cable (H07RN-F)	mm ² × cores	0.75 x 3C
	Communication cable (H07RN-F)	mm ² × cores	0.75 x 2C
Dimensions	Net (W x H x D)	mm	420 x 490 x 141
	Shipping (W x H x D)	mm	466 x 580 x 184
Weight	Net	kg	7.2
	Shipping	kg	9.7
Exterior	Color of chassis	-	Essence White
	RAL Code of chassis	-	RAL 9003

Note

1. Due to our policy of innovation some specifications may be changed without notification.
2. Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
3. * DHW 65~80°C Operating is available only when the booster heater is operating.

2. List of functions

Category	Functions	PHCM0 [PHCM0]
Reliability	Self diagnosis	O
Convenience	Auto Restart	O
	Child Lock	O
	Group Control	X
	Sleep Timer	O
	Turn On/Off Reservation	O
	Schedule	O
	Low Noise Operation	O
Installation	Electric Backup Heater	Accessory(3rd party)
	Domestic Hot Water Tank heater	Accessory(3rd party)
Water Product functions	Water Pump Pre-run / Over-run control	O
	Water Pump Forced Operation	O
	Water Pump Speed Control	-
	Water Flow Detection by Flow Sensor	O
	Water Flow Control	-
	Water Pressure Monitoring	O
	Thermostat Interface (230V AC)	O
	Thermostat Interface (24V AC)	-
	One Point Dry Contact Input (CN-EXT)	O
	Digital Output For External Pump	O
	Digital inputs for energy saving (Ready for Smart Grid)	O
	Communication with LG ESS by Modbus	O
	Anti-Condensation on Floor (cooling)	O
	Anti-Freezing Control	O
	Anti-overheating Of Water Pipe	O
	Emergency Operation	O
	Weather dependent operation with thermostat	O
	Seasonal auto mode (heating and cooling)	O
	DHW(Domestic Hot Water) Tank Kit	O
	Scheduler (DHW Tank Heater)	O
	Timer (DHW Tank Heater)	O
	Quick DHW Tank Heating	O
	DHW Recirculation	O
	Tank Disinfection	O
	Electric Heater Capacity Control	-
	Solar thermal function	Accessory(3rd party)
	Screed Drying Mode	O
	Current Flow Rate Monitoring	O
	Energy Monitoring	O
Special Functions	Wi-Fi Control	Accessory
	Modbus connectivity (without gateway)	O
	Remote room temperature sensing	X
	Outdoor Temperature sensing	Accessory
	2nd Circuit (Mixing Circuit)	Accessory(3rd party)
	2-Remo control	X

Note

1. O: Possible, X: Impossible, - : Not applicable

Accessory : Ordered and purchased separately the accessory package referring to the model name provided and install at field.

Accessory line-ups varies by region, so check your local catalogue or local sales material.

2. Solar thermal system requires the 3rd party accessory, PT-1000 sensor. (field supply)

3. Accessory Compatibility List

Category	Accessory Name	Model Name	Descriptions	PHCM0 [PHCM0]
Remote Controller	Wired - RS3 (Standard III)	PREMTW101	White	X
Dry Contact	Simple	PDRYCB000	1 input port, AC 220 - 240V	O
	Thermostat	PDRYCB320	8 input port, For 3rd Party Thermostat (Analog Input)	O
Integration Device	Remote Temperature sensor	PQRSTA0	Room temperature sensor, NTC 10kΩ, include casing	X
	Group Control wire	PZCWRCG3	Cable Assembly for group control (Y-type cable : 0.25m, cable : 9.6m)	X
ETC	Extension wire	PZCWRC1	Extension wire for IDU-wired remote controller (9.6m)	O
	2-Remo Control wire	PZCWRC2	Y-type cable to connect additional Remote Controller asslave	X
	Wi-Fi Modem	PWFMDD200	Device to use ThinQ app include connection cable	O
	Wi-Fi Extension cable	PWYREW000	USB Extension cable : 10 m	O
	Meter Interface	PENKTH000	Interface to connect 3rd-party heat and/or watt meter to indoor unit by S0 or Modbus	O
Special Kit	Solar-Thermal kit	PHLLA*	Limit Temperature : 96 °C	O
	IDU Drain Pan	PHDPB	For Hydro Unit	X
		PHDPC	For Hydro Unit	X
	DHW tanks (Single coil)	OSHW-200F	200 L	O
		OSHW-300F	300 L	O
		OSHW-500F	500 L	O
	DHW tanks (Double coil)	OSHW-300FD	300 L	O
	DHW Heater kit	PHLTA	For Hydro Unit and Control Unit(except for HN1639 NK3)	X
		PHLTC	For Hydro Unit (HN1639 NK3)	X
	Wall mounted outdoor air temp. sensor	PHATS0	For measuring outside temperature	O
	Thermistor for Water Tank (Buffer Tank, DHW Tank)	PHRSTA0	Included in DHW Tank kit	O
	Thermostatic Mixing valve	OSHA-MV	3/4" DN20	O
		OSHA-MV1	1" DN25	O
	3way valve	OSHA-3V	Diverting valve between space heating and DHW heating	X
	Thermistor for 2nd Circuit or E/Heater	PRSTAT5K10	NTC 5kΩ sensor needed to control mixing circuit or if 3rd party backup heater is used	O
	Backup Heater	HA031M E1	1Ø, 3kW (For Monobloc and Control Unit)	X
		HA061M E1	1Ø, 6kW (For Monobloc and Control Unit)	X
		HA063M E1	3Ø, 6kW (For Monobloc and Control Unit)	X
		HA031M E2	1Ø, 3kW (For Monobloc and Control Unit)	X
		HA061M E2	1Ø, 6kW (For Monobloc and Control Unit)	X
		HA063M E2	3Ø, 6kW (For Monobloc and Control Unit)	X
		HA061B E1	1Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X
		HA061C E1	1Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X
		HA063B E1	3Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X
		HA063C E1	3Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X
	Cover plate	PDC-HK10	For Combi Unit and Hydro Unit Type indoor units	X

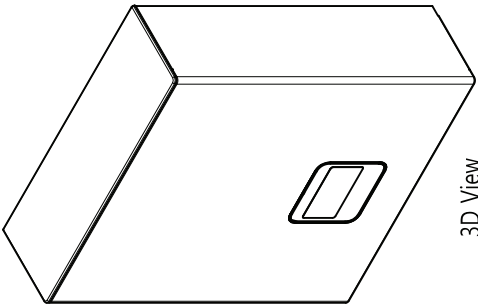
Note

1. O: Possible, X: Impossible, - : Not applicable, Embedded : Included with product.
2. Some advanced functions controlled by individual controller cannot be operated.
3. If there is a difference in development time between the product and the remote controller, some functions cannot be operated.
4. Meter interface cannot be connected at the same time with 3rd-party controller.
5. * : It includes double-sensor for solar tank. The collector sensor (PT1000) needs to be supplied locally.
6. If you need more detail, please refer to the control(**BECON**) PDB or the manual of product. (<http://partner.lge.com> > Select Your Region : Home> Doc.Library> Product > Control(BECON)).

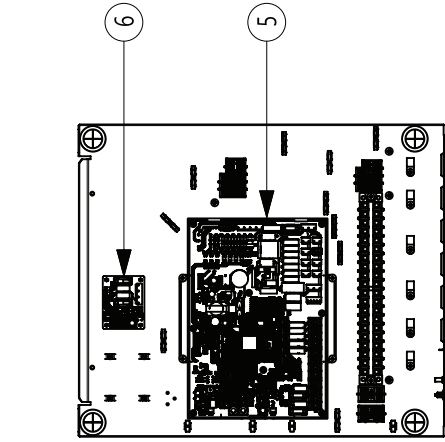
4. Dimensions

PHCM0 [PHCM0]

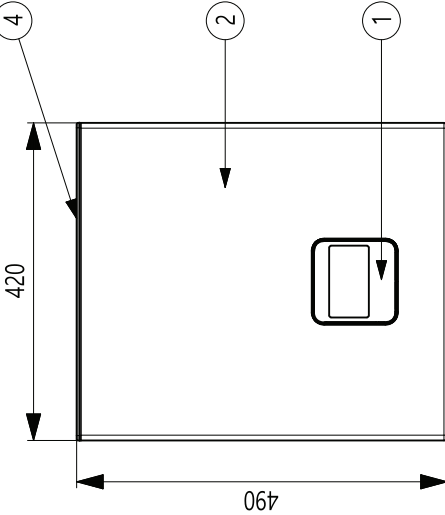
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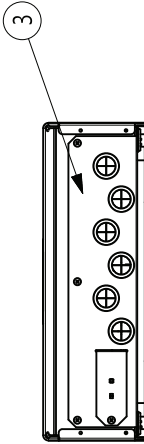
3D View



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<External>

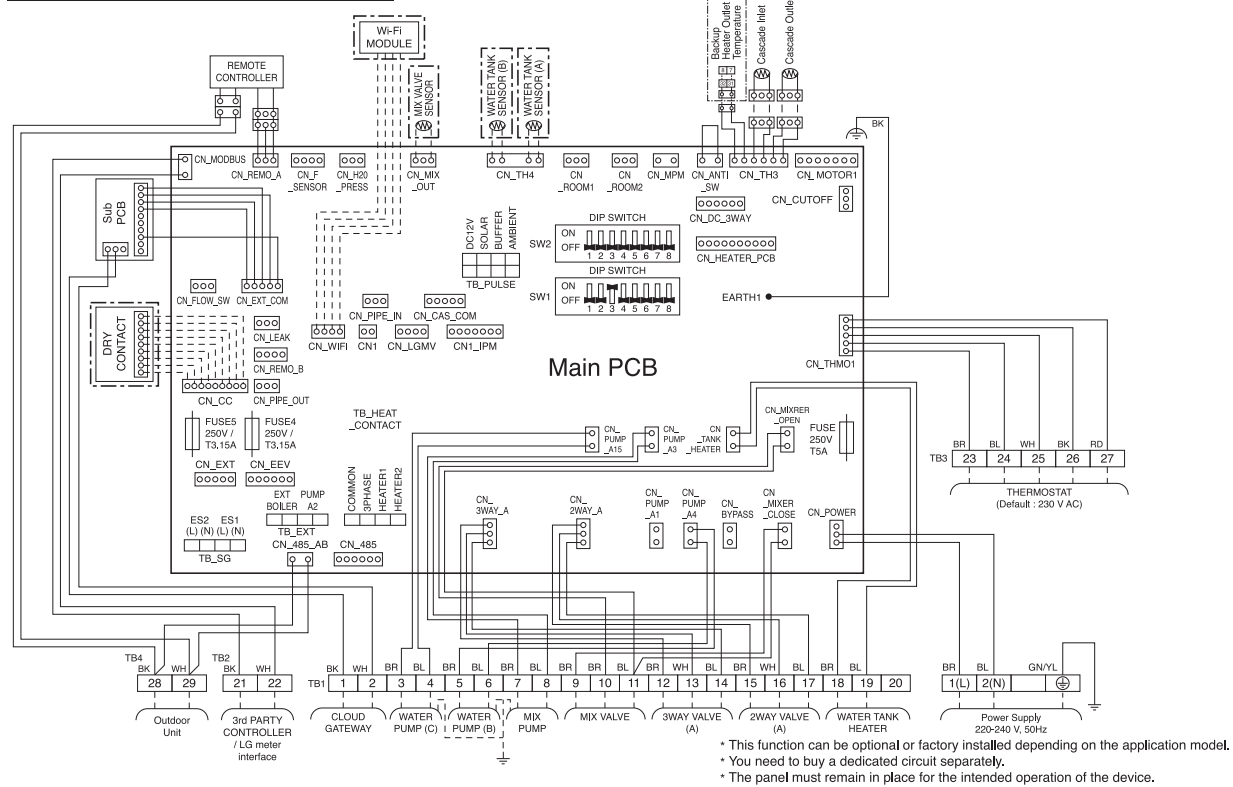


6	PCB Assembly,Sub	AWHP Cascade_Sub PCBA
5	PCB Assembly,Main	AWHP Cascade_Main PCBA
4	Cover	MOLD ABS
3	Base Assembly Indoor	PCB and terminal blocks
2	Panel Assembly Front	SGMCD1 M08 ESSENCE WHITE PCM
1	Remote Controller Assembly	Built-in Remote Controller
No.	Part Name	Description

5. Wiring Diagram

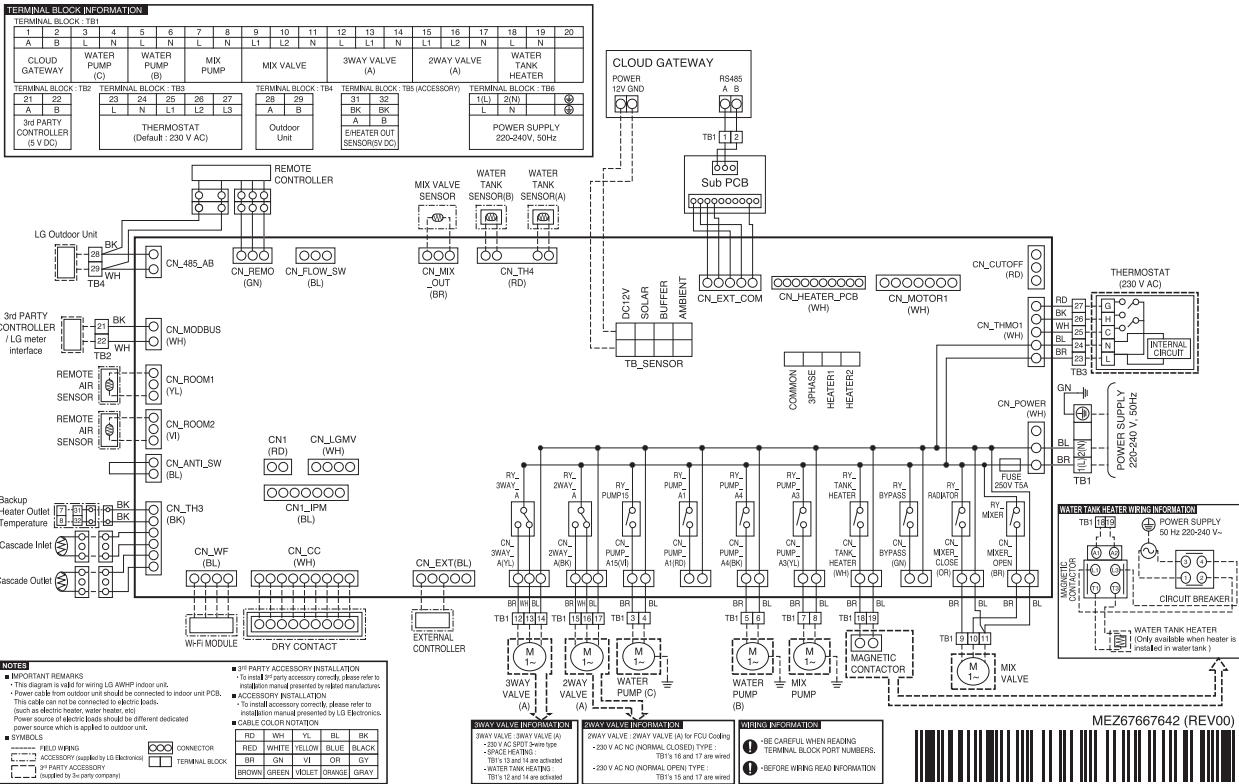
PHCM0 [PHCM0]

CIRCUIT DIAGRAM : INDOOR UNIT



- * This function can be optional or factory installed depending on the application model.
- * You need to buy a dedicated circuit separately.
- * The panel must remain in place for the intended operation of the device.

EXTERNAL CIRCUIT DIAGRAM : INDOOR UNIT



Combi unit

- 1. Specifications**
- 2. List of Functions**
- 3. Accessory Compatibility List**
- 4. Dimensions**
- 5. Piping Diagrams**
- 6. Wiring Diagrams**

1. Specifications

Category		Unit	FHNW20X0AB1 [HN20XAHB NK1]	FHNW20X0AY1 [HN20XAHY NK1]
Major	Minor			
Classification	Chassis	-	K5	K5
Power Supply	Case 1	V, Φ, Hz	50 Hz 220-240 V~	50 Hz 220-240 V~
	Running Current by Voltage	A	-	-
Electric Heater	Power Supply	V, Φ, Hz	220-240 V~ 50 Hz / 380-415 V3N~ 50Hz	220-240 V~ 50 Hz / 380-415 V3N~ 50Hz
	Power Input	W	6000 / 9000	6000 / 9000
Current	Current(MAX)	A	2.3	0.6
Cooling Operation Range(Leaving Water)	For Fan Coil Unit(Min ~ Max)	°C	5 ~ 27	5 ~ 27
	For under floor(Min ~ Max)	°C	16 ~ 27	16 ~ 27
Heating Operation Range(Leaving Water)	Space Heating(Min ~ Max)	°C	15 ~ 75	15 ~ 75
	Domestic Hot Water(Min ~ Max)	°C	15 ~ 80*	15 ~ 80*
Water Pump (1 Circuit)	Type	-	Canned type for hot water circulation	-
	Model(Maker,Name)	-	OH SUNG, ODM-061P	-
	Motor type	-	BLDC	-
	Steps of Pumping Performance	-	Variable speed 10% to 100%	-
	Power input(Min~Max)	W	17 ~ 152	-
	Max. Head	m	11.0	-
Water Pump (2 Circuit)	Type	-	Canned type for hot water circulation	-
	Model(Maker,Name)	-	OH SUNG, ODM-061P	-
	Motor type	-	BLDC	-
	Steps of Pumping Performance	-	Fixed speed 100% (not connect com.)	-
	Power input	W	152	-
	Max. Head	m	11.0	-
Expansion Tank	Volume(Max)	ℓ	12	12
	Water Pressure(Max)	bar	3	3
	Water Pressure(Pre-charged)	bar	1	1
Buffer Tank	Volume(Max)	ℓ	16	-
	Water Pressure(Max)	bar	3	-
Strainer	Mesh size	mesh	-	-
	Max. particle size	mm	-	-
	Material	-	-	-
Safety Valve(Water cycle)	Pressure Limit(Upper Limit)	bar	3	-
Safety Valve(DHW)	Pressure Limit(Upper Limit)	bar	10	10
3 Way Valve (DHW)	Model (Maker,Name)	-	Sanhua QSF-A02M20	Sanhua QSF-A02M20
	Motor Type	-	2-2 Step motor(DC 12V)	2-2 Step motor(DC 12V)
	Flow coefficient	Kvs	12	12
3 Way Valve (Mix)	Model (Maker,Name)	-	Sanhua QSF-A02M20	-
	Motor Type	-	2-2 Step motor(DC 12V)	-
	Flow coefficient	Kvs	12	-
Flow Sensor	Type	-	-	-
	Model(Maker,Name)	-	-	-
	Measuring Range(Min~Max)	ℓ/min	-	-
Water Pressure Sensor	Model(Maker,Name)	-	-	-
	Measuring Range(Min~Max)	bar(G)	-	-
DHW Tank	Type	-	Internal coil type integrated hot water tank	Internal coil type integrated hot water tank
	Water Volume	L	200	200
	Material	-	Duplex 2205	Duplex 2205
	Internal Thermal Protect limit	°C	85	85
	Pressure Limit(Max.)	MPa (bar)	1 (10)	1 (10)

1. Specifications

Category		Unit	FHNW20X0AB1 [HN20XAHB NK1]	FHNW20X0AY1 [HN20XAHY NK1]
Major	Minor			
DHW Tank Insulation	Material	-	Polyurethane foam	Polyurethane foam
	Thickness	mm	50	50
	Heat Loss	kWh/24h	-	-
Electric Backup Heater	Type	-	Sheath	Sheath
	Power Supply	V, Φ , Hz	220-240 V~ 50 Hz / 380-415 V3N~ 50Hz	220-240 V~ 50 Hz / 380-415 V3N~ 50Hz
	Number of Heating Coil	EA	3	3
	Capacity Combination	kW	3.0 + 3.0 / 3.0 + 3.0 + 3.0	3.0 + 3.0 / 3.0 + 3.0 + 3.0
	Rated Current	A	26 / 13	26 / 13
	Maximum Electrical Power	kW	6 / 9	6 / 9
	Power Supply Cable(H07RN-F)	mm ² × cores	4.0 X 3C / 2.5 X 5C	4.0 X 3C / 2.5 X 5C
Heat Exchanger(Water/DHW)	Type	-	Coil Heat Exchanger	Coil Heat Exchanger
	Quantity	EA	1	1
	Number of Plate	Sheet	-	-
	Surface area	m ²	1.81	1.81
Heat Exchanger(Refrigerant to Water)	Type	-	-	-
	Quantity	EA	-	-
	Number of Plate	Sheet	-	-
Water Connecting Pipes	Inlet (Heating water from ODU)	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
	Outlet (Return water to ODU)	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
	Inlet (Return 1 Circuit)	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
	Outlet (Heating 1 Circuit)	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
	Inlet (Return 2 Circuit)	-	Straight pipe (Cu 22 x 1.2mm)	-
	Outlet (Heating 2 Circuit)	-	Straight pipe (Cu 22 x 1.2mm)	-
DHW Connecting Pipes	Inlet	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
	Outlet	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
	Re-circulation	-	Straight pipe (Cu 22 x 1.2mm)	Straight pipe (Cu 22 x 1.2mm)
Sound Power Level	Heating(Rated)	dB(A)	42	39
	Net(W x H x D)	mm	600 x 1850 x 600	600 x 1850 x 600
	Shipping(W x H x D)	mm	660 x 2075 x 745	660 x 2075 x 745
Weight	Net	kg	131	111.5
	Shipping	kg	152	131.9
Exterior	Color	-	Essence White	Essence White
	RAL Code	-	RAL 9003	RAL 9003
Connecting Cable	Power and Communication cable(H07RN-F, included earth)	mm ² × cores	0.75 X 3C / 0.75 x 2C	0.75 X 3C / 0.75 x 2C

Note

1. Due to our policy of innovation some specifications may be changed without notification.
2. Wiring cable size must comply with the applicable local and national code. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
3. Sound power level is measured on the rated condition in accordance with ISO 9614 standard.
Therefore, these values depend on the ambient conditions and values are normally higher in actual operation.
4. * DHW 65~80°C operating is available only when the booster heater is operating.
5. The RAL Code may not accurately represent the actual color.

2. List of functions

Category	Functions	HN20XAHB NK1	HN20XAHY NK1
Reliability	Self Diagnosis	O	O
Convenience	Auto Restart	O	O
	Child Lock	O	O
	Group Control	X	X
	Sleep Timer	X	X
	Turn On/Off Reservation	O	O
	Schedule	O	O
	Low Noise Operation	O	O
Installation	Electric Backup Heater	O	O
	Domestic Hot Water Tank heater	O (by Electric Backup Heater)	O (by Electric Backup Heater)
Water Product functions	Water Pump Pre-run / Over-run control	O	O
	Water Pump Forced Operation	O	O
	Water Pump Speed Control	O	O
	Water Flow Detection by Flow Sensor	O	O
	Water Flow Control	O	O
	Water Pressure Monitoring	O	O
	Thermostat Interface (230V AC)	O	O
	Thermostat Interface (24V AC)	X	X
	One Point Dry Contact Input (CN-EXT)	O	O
	Digital Output For External Pump	O	O
	Digital inputs for energy saving (Ready for Smart Grid)	O	O
	Communication with LG ESS by Modbus	O	O
	Anti-Condensation on Floor (cooling)	O	O
	Anti-Freezing Control	O	O
	Anti-overheating Of Water Pipe	O	O
	Emergency Operation	O	O
	Weather dependent operation with thermostat	O	O
	Seasonal auto mode (heating and cooling)	O	O
	DHW(Domestic Hot Water) Tank Kit	O(Integrated)	O(Integrated)
	Scheduler (DHW Tank Heater)	O	O
	Timer (DHW Tank Heater)	O	O
	Quick DHW Tank Heating	O	O
	DHW Recirculation	O	O
	Tank Disinfection	O	O
	Electric Heater Capacity Control	O	O
	Solar thermal function	X	X
	Screed Drying Mode	O	O
	Current Flow Rate Monitoring	O	O
	Energy Monitoring	O	O
Special Functions	Wi-Fi Control	O	O
	Modbus connectivity (without gateway)	O	O
	Remote room temperature sensing	Accessory	Accessory
	Outdoor Temperature sensing	Accessory	Accessory
	2nd Circuit (Mixing Circuit)	O	Accessory(3rd party)
	2-Remo control	Accessory	Accessory

Note

1. O : Applied, X : Not applied

Accessory : Ordered and purchased separately the accessory package referring to the model name provided and install at field.

Accessory line-ups varies by region, so check your local catalogue or local sales material.

2. Solar thermal system requires the 3rd party accessory, PT-1000 sensor. (field supply)

3. Accessory Compatibility List

Category	Accessory Name	Model Name	Descriptions	FHNW20X0AB1 [HN20XAHB NK1]	FHNW20X0AY1 [HN20XAHY NK1]
Remote Controller	Wired - RS3 (Standard III)	PREMTW101	White	X	X
	Deluxe heating	PREMTW200	White	O	O
Dry Contact	Simple	PDRYCB000	1 input port, AC 220 - 240V	O	O
	Thermostat	PDRYCB320	8 input port, For 3rd Party Thermostat (Analog Input)	O	O
Integration Device	Remote Temperature sensor	PQRSTA0	Room temperature sensor, NTC 10kΩ, include casing	O	O
	Group Control wire	PZCWRCG3	Cable Assembly for group control (Y-type cable : 0.25m, cable : 9.6m)	X	X
ETC	Extension wire	PZCWRC1	Extension wire for IDU-wired remote controller (9.6m)	O	O
	2-Remo Control wire	PZCWRC2	Y-type cable to connect additional Remote Controller as slave	O	O
	Wi-Fi Modem	PWFMDD200	Device to use ThinQ app include connection cable	O	O
	Wi-Fi Extension cable	PWYREW000	USB Extension cable : 10 m	O	O
	Meter Interface	PENKTH000	Interface to connect 3rd-party heat and/or watt meter to indoor unit by S0 or Modbus	O	O
Special Kit	Solar-Thermal kit	PHLLA*	Limit Temperature : 96 °C	X	X
	IDU Drain Pan	PHDPB	For Hydro Unit	X	X
		PHDPC	For Hydro Unit	X	X
	Buffer Tank	SB006SAAN0	60 L	O	O
		SB010SAAN0	100 L	O	O
	DHW tanks (Single Coil)	SD020SASN0	200 L	X	X
		SD025SASN0	250 L	X	X
		SD030SASN0	300 L	X	X
	DHW tanks (Double Coil)	SD030SSSN0	300L	X	X
	DHW tanks (single Coil)with buffer	ST030SASN0	300 L	X	X
	DHW Heater kit	PHLTA	For Hydro Unit and Control Unit(except for HN1639 NK3)	X	X
		PHLTB	For Hydro unit and Monobloc	X	X
		PHLTC	For Hydro Unit (HN1639 NK3)	X	X
	Wall mounted outdoor air temp. sensor	PHATS0	For measuring outside temperature	O	O
	Thermistor for Water Tank (Buffer Tank, DHW Tank)	PHRSTA0	Included in DHW Tank kit	O	O
	Thermostatic Mixing valve	OSHA-MV	3/4" DN20	X	X
		OSHA-MV1	1" DN25	X	X
	3way valve	OSHA-3V	Diverting valve between space heating and DHW heating	X	X
	Thermistor for 2nd Circuit	PRSTAT5K10	NTC 5kΩ sensor needed to control mixing circuit or if 3rd party backup heater is used	X	O
	Backup Heater	HA031M E1	1Ø, 3kW (For Monobloc)	X	X
		HA061M E1	1Ø, 6kW (For Monobloc)	X	X
		HA063M E1	3Ø, 6kW (For Monobloc)	X	X
		HA031M E2	1Ø, 3kW (For Monobloc)	X	X
		HA061M E2	1Ø, 6kW (For Monobloc)	X	X
		HA063M E2	3Ø, 6kW (For Monobloc)	X	X
		HA061B E1	1Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X	X
		HA061C E1	1Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X	X
		HA063B E1	3Ø, 6kW (For Hydrosplit, HN1600MB NK0)	X	X
		HA063C E1	3Ø, 6kW (For Hydrosplit, HN1600MC NK1)	X	X
	Cover plate	PDC-HK10	For Combi Unit and Hydro Unit Type indoor units	X	X

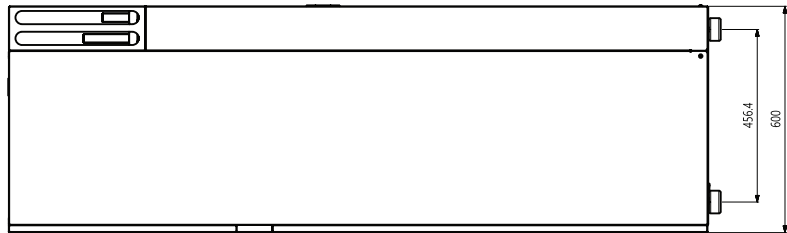
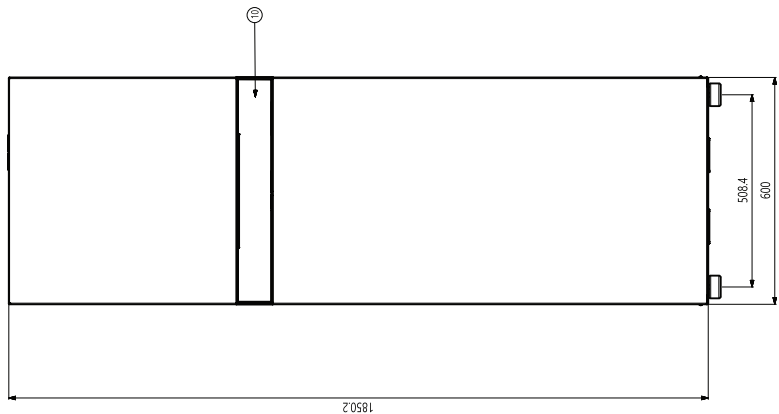
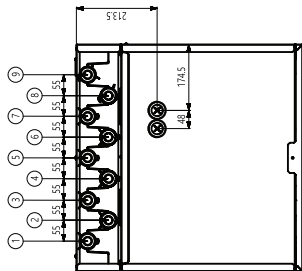
Note

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2. Some advanced functions controlled by individual controller cannot be operated.
3. If there is a difference in development time between the product and the remote controller, some functions cannot be operated.
4. Meter interface cannot be connected at the same time with 3rd-party controller.
5. * : It includes double-sensor for solar tank. The collector sensor (PT1000) needs to be supplied locally.
6. If you need more detail, please refer to the control(**BECON**) PDB or the manual of product. (<http://partner.lge.com> > Select Your Region : Home> Doc.Library> Product > Control(BECON)).

4. Dimensions

■ External : FHNW20X0AB1[HN20XAHB.NK1]

[Unit : mm]
P/No : TB30039501_rev01
Chassis code : K5

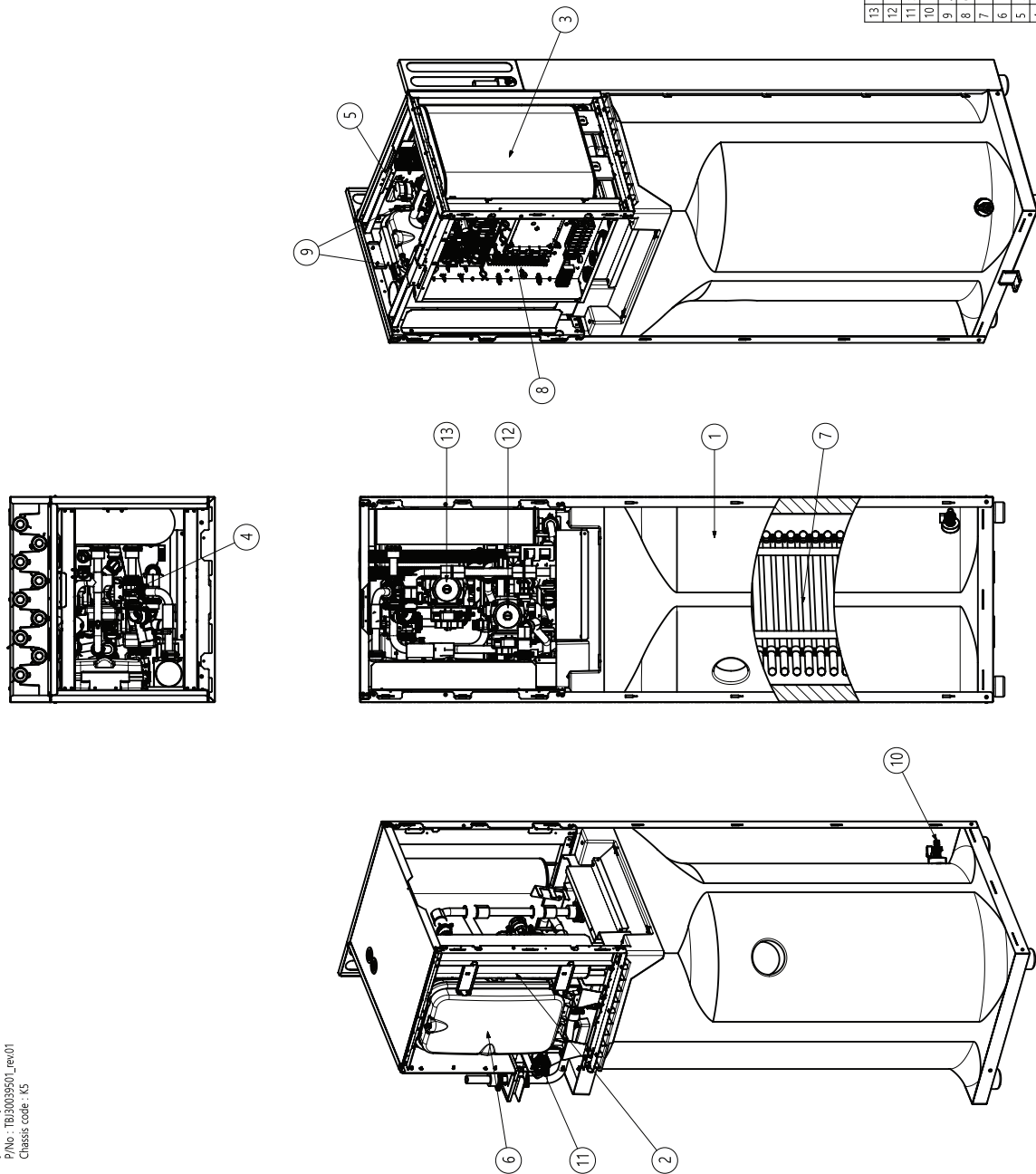


No.	Part Name	Description
10	Control Panel	Human Machine Interface
9	Inlet (Return 1 Circuit)	
8	Outlet (Heating 1 Circuit)	
7	Inlet (Domestic hot water)	
6	Outlet (Domestic hot water)	
5	Inlet (Return 2 Circuit)	
4	Outlet (Heating 2 Circuit)	
3	Outlet (Return water to ODU)	
2	Inlet (Heating water from ODU)	
1	DHW Re-circulation	
Straight pipe (Cu 22 x 1.2mm)		

4. Dimensions

Internal : FHNW20X0AB1 [HN20XAHB.NK1]

[Unit : mm]
P/No : TB33039501_rev01
Chassis code : KS

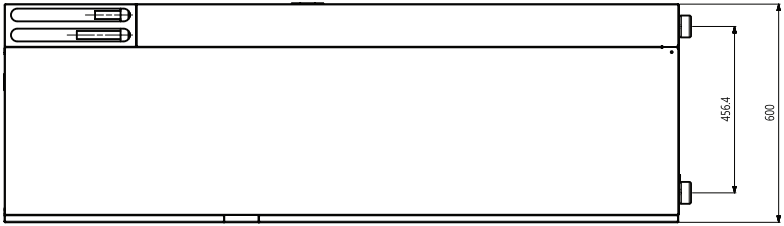
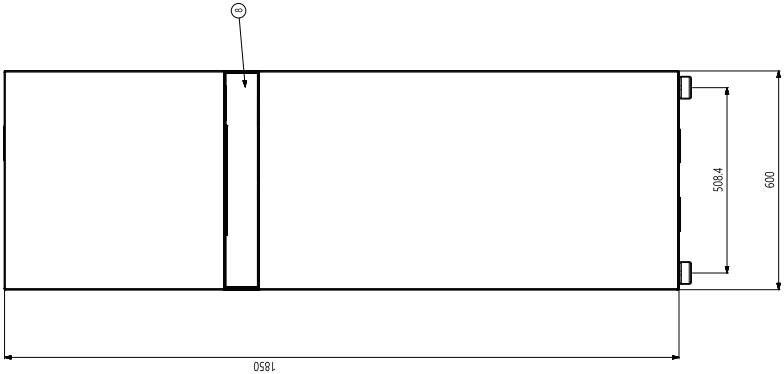
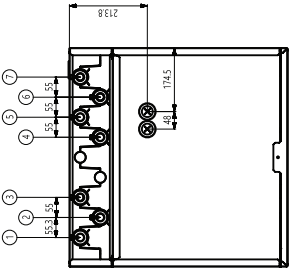


13	Pump (Mix)	Pump for mix zone
12	Pump (direct)	Pump for direct zone
11	Safety valve	For DHW (10 bar)
10	Drain Cock	Valve for DHW Tank drain
9	Air vent	For air purging
8	Control Box	PCBA and terminal blocks
7	Heat exchanger	Coil heat exchange(water/DHW)
6	Expansion vessel	T2L for Heating circuit
5	3Way Valve (Mix)	3way for mix zone
4	3Way valve (DHW)	3way valve for DHW and Heating circuit
3	Buffer Tank	16L
2	Heater	Electric heater
1	DHW Tank	Domestic hot water tank (200L)
No	Part Name	Description

4. Dimensions

■ External : FHNW20X0AY1[HN20XAHY.NK1]

[Unit : mm]
P/No : TB00039601_rev01
Chassis code : KS

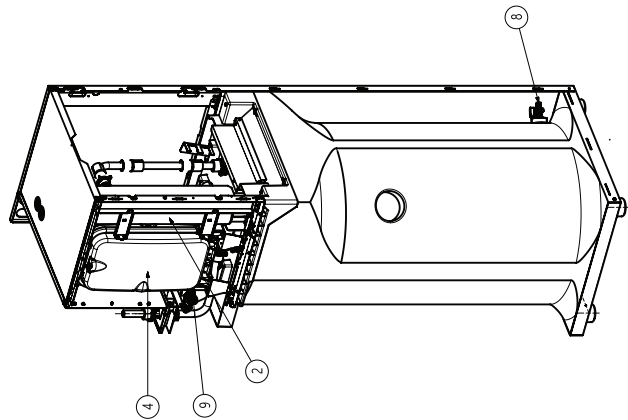
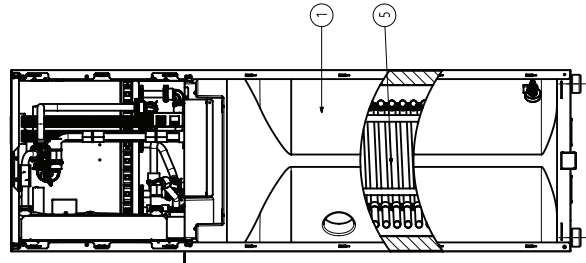
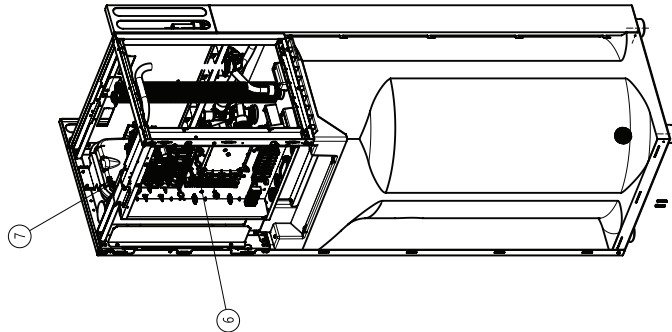
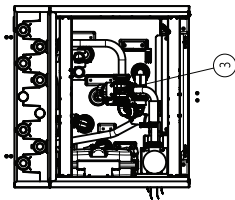


No.	Part Name	Description
8	Control Panel	Human Machine Interface
7	Inlet (Return Circuit)	
6	Outlet (Heating Circuit)	
5	Inlet (Domestic hot water)	
4	Outlet (Domestic hot water)	
3	Outlet (Return water to ODU)	
2	Inlet (Heating water from ODU)	
1	Re-circulation	
		Straight pipe (Cu 22 x 12mm)

4. Dimensions

Internal : FHNW20X0AY1 [HN20XAHY.NK1]

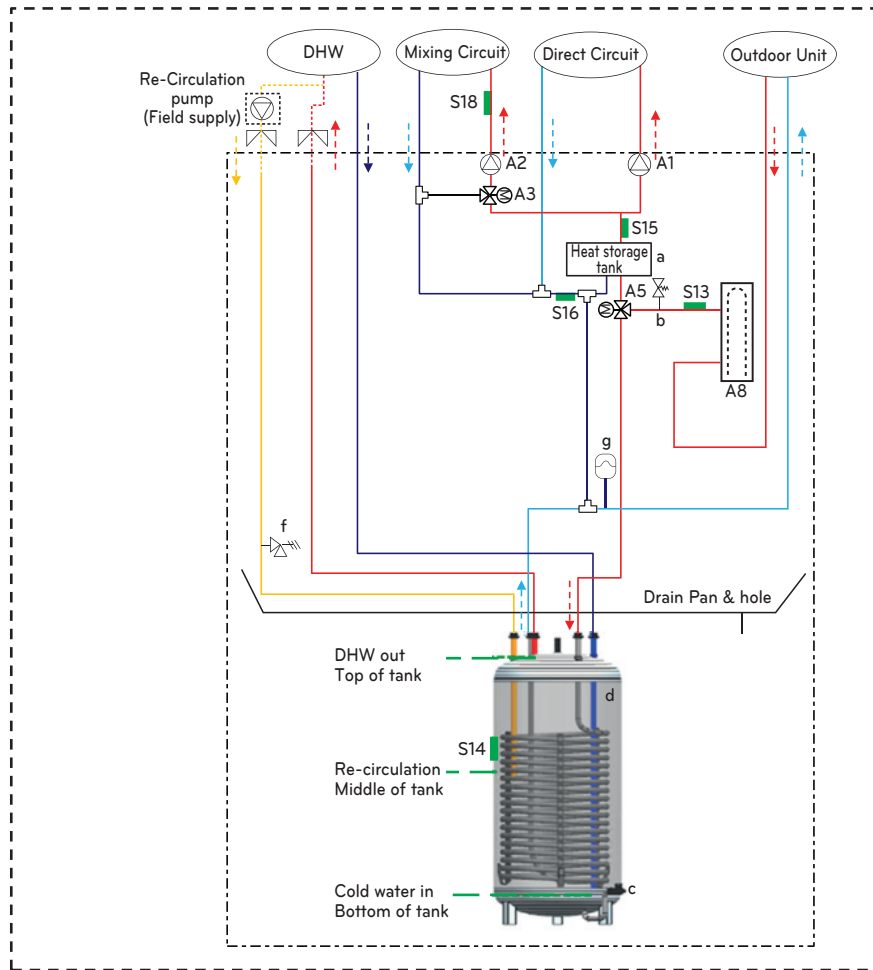
[Unit : mm]
P/Nr : TB3003960_1 rev01
Chassis code : K5



9	Safety valve	For DHW (10 bar)
8	Drain cock	Valve for DHW Tank drain
7	Air vent	for air purging
6	Control Box	PCBA and terminal blocks
5	Heat exchanger	Coil heat exchanger(water/DHW)
4	Expansion vessel	12L for Heating circuit
3	3way Valve (DHW)	3way valve for DHW and Heating circuit
2	Heater	Electric heater
1	DHW Tank	Domestic hot water tank (200L)
No.	Part Name	Description

5. Piping Diagram

■ FHNW20X0AB1 [HN20XAHB NK1]

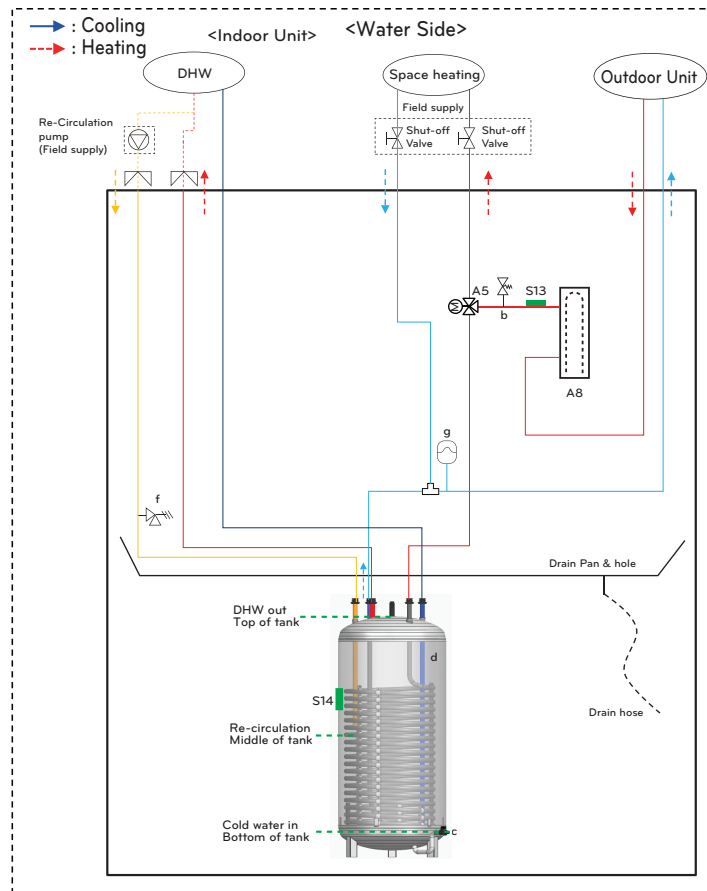


Description

Category	Symbol	Meaning
Water Side	A1	Secondary pump
	A2	Mix pump
	A3	3Way Valve (Mix)
	A5	3Way Valve
	A8	Electric backup heater
	S13	Electric backup heater outlet temp. sensor
	S14	DHW tank water temp. sensor
	S15	Buffer tank outlet water temp. sensor
	S16	Buffer tank inlet water temp. sensor
	S18	Mixing circuit outlet water temp. sensor
	a	Heat storage tank (Buffer tank, 16L)
	b	Air vent
	c	Drain valve
	d	DHW Tank (200L)
	f	Safety valve(DHW tank, 10bar)
	g	Expansion Tank(12L)

5. Piping Diagram

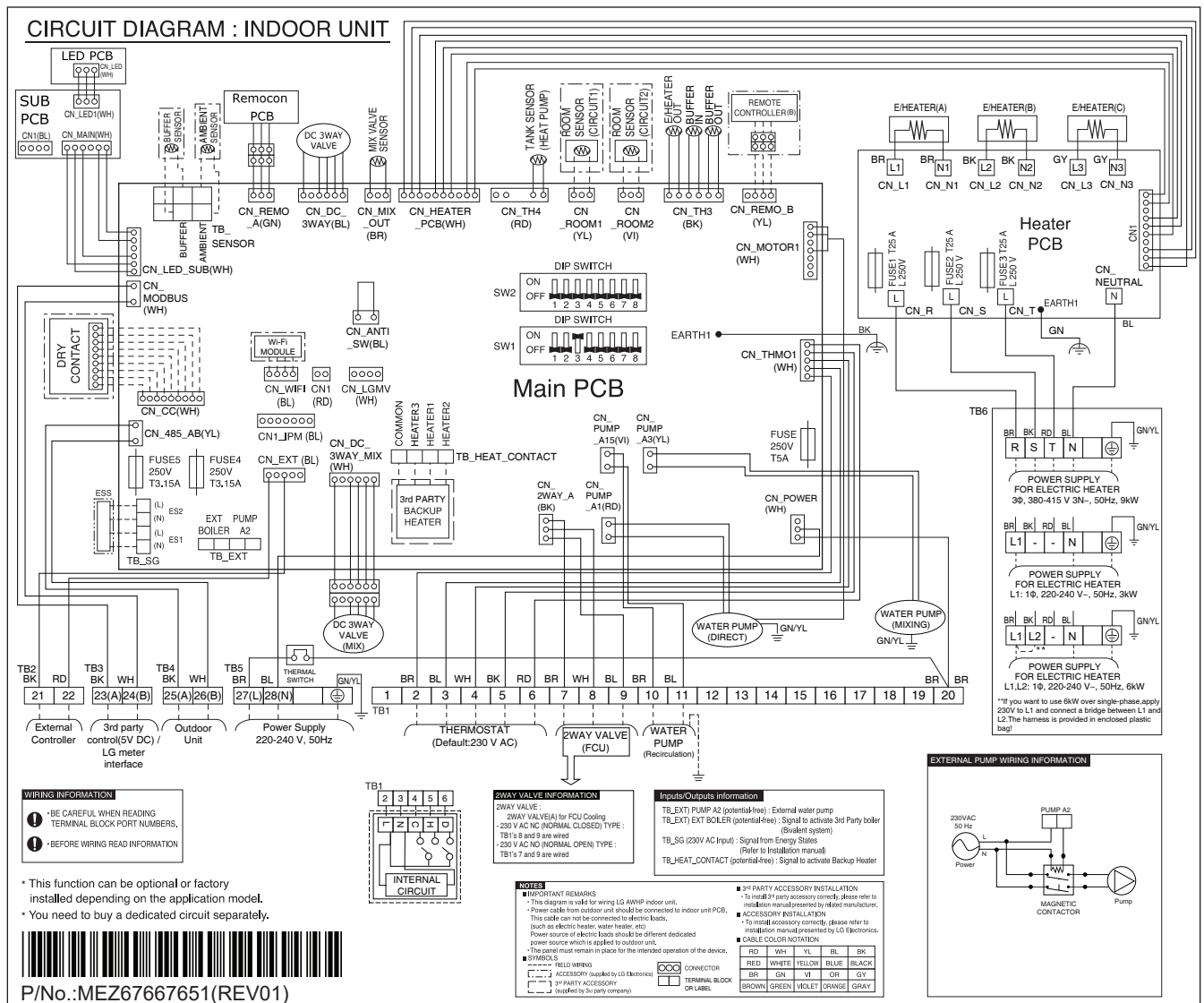
■ FHNW20X0AY1 [HN20XAHY NK1]



Description

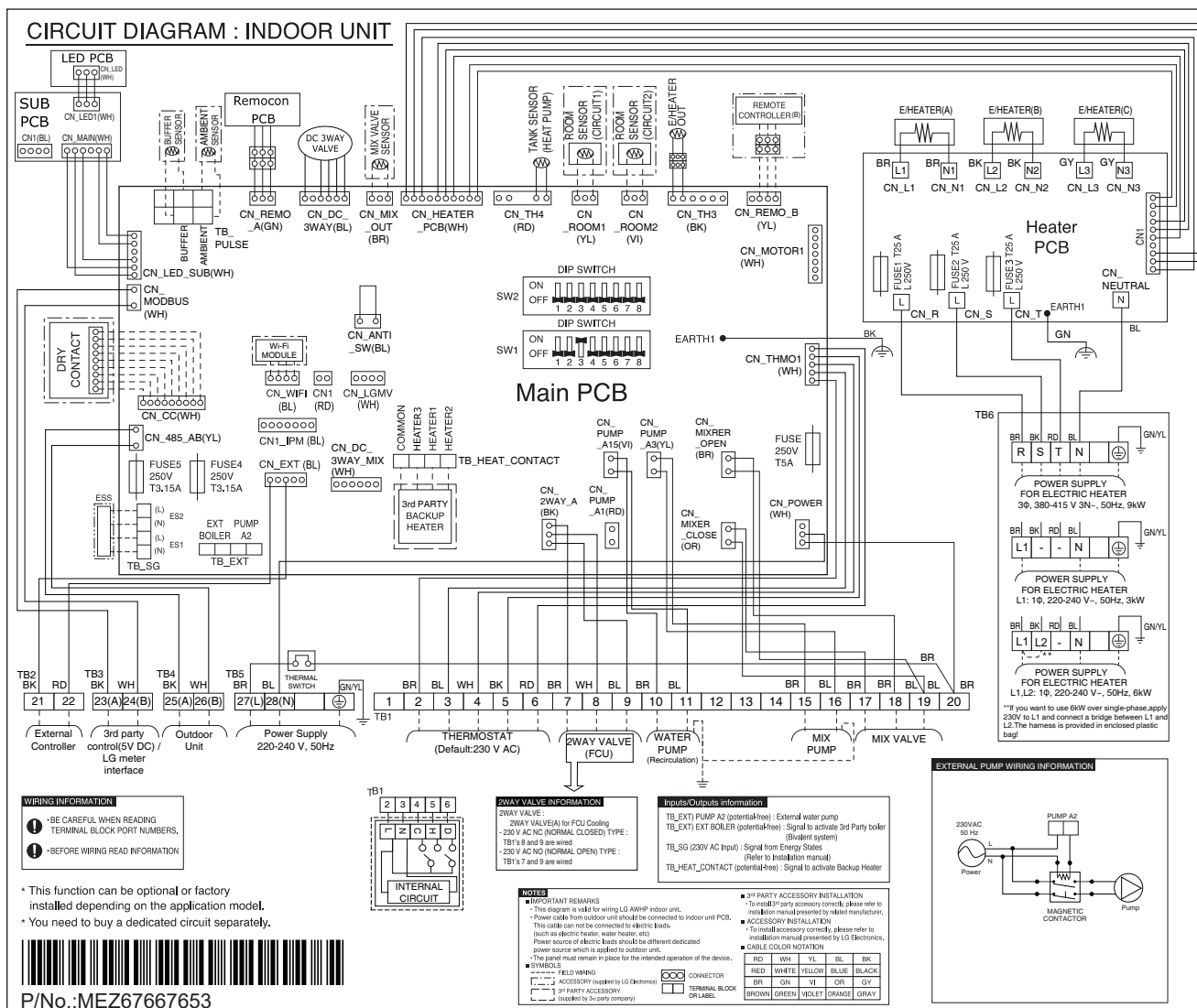
Category	Symbol	Meaning
Water Side	A5	3Way Valve
	A8	Electric backup heater
	S13	Electric backup heater outlet temp. sensor
	S14	DHW tank water temp. sensor
	b	Air vent
	c	Drain valve
	f	Safety valve(DHW tank, 10bar)
	g	Expansion Tank(12L)

FHNW20X0AB1 [HN20XAHB NK1]



6. Wiring Diagram

FHNW20X0AY1 [HN20XAHY NK1]



Monobloc

- 1. Specifications**
- 2. List of Functions**
- 3. Accessory Compatibility List**
- 4. Dimensions**
- 5. Piping Diagrams**
- 6. Wiring Diagrams**
- 7. Performance Data**
- 8. Operation Range**
- 9. Sound levels**
- 10. Hydraulic Performance**

1. Specification

■ 1 phase Inverter (5.5 ~ 9 kW)

Nominal Capacity and Nominal Input					FHBW056B1 [HM051HFD UA41]	FHBW076B1 [HM071HFD UA41]	FHBW096B1 [HM091HFD UA41]
-	-	Outdoor Temp.(°C)DB / WB	Leaving Water Temp.(°C)	-			
Capacity	Heating	7 / 6	35	KW	5.50	7.00	9.00
			55	KW	5.50	7.00	8.00
		2 / 1	35	KW	5.50	6.50	7.00
			-7	35	KW	5.50	7.00
		35		KW	5.50	5.70	6.00
		55		KW	5.50	7.00	8.00
	Cooling	35 / 24	18	KW	5.50	7.00	8.00
			7	KW	5.50	7.00	8.00
Power Input	Heating	7 / 6	35	KW	1.12	1.49	1.96
			55	KW	1.86	2.46	2.86
		2 / 1	35	KW	1.72	2.06	2.26
			-7	35	KW	1.93	3.41
		35		KW	1.93	2.01	2.14
		55		KW	2.89	3.78	4.44
	Cooling	35 / 24	18	KW	1.12	1.49	1.78
			7	KW	1.83	2.41	2.81
COP	Heating	7 / 6	35	W/W	4.90	4.70	4.60
			55	W/W	2.95	2.85	2.80
		2 / 1	35	W/W	3.20	3.15	3.10
			-7	35	W/W	2.85	2.05
		35		W/W	2.85	2.83	2.80
		55		W/W	1.90	1.85	1.80
EER	Cooling	35 / 24	18	W/W	4.90	4.70	4.50
			7	W/W	3.00	2.90	2.85
Seasonal space heating eff. Class			35	-	A+++	A+++	A+++
			55	-	A++	A++	A++
Seasonal space heating efficiency (ηs)			35	%	180	187	185
			55	%	140	141	143
SCOP(average climate)			35	W/W	4.58	4.75	4.70
			55	W/W	3.58	3.60	3.66
Water Flow Rate			Rated(at ΔT 5°C)	ℓ / min	15.8	20.1	25.9
Water Heating Efficiency (profile L)				%	130	130	130
Electrical Specifications					FHBW056B1 [HM051HFD UA41]	FHBW076B1 [HM071HFD UA41]	FHBW096B1 [HM091HFD UA41]
		Power Supply	V, Ø, Hz	220-240, 1, 50	220-240, 1, 50	220-240, 1, 50	
Peak Control Running Current	Heating		A	15	18	20	
	Cooling		A	7	10	13	
Rated Running Curent	Heating		A	4.9	6.5	8.5	
	Cooling		A	4.9	6.5	7.7	
Circuit breaker			A	20	25	25	
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)		mm ²	4.0 x 3C	4.0 x 3C	4.0 x 3C	
	Communication cable(H07RN-F)		mm ² x cores	0.75 x 2C	0.75 x 2C	0.75 x 2C	
Technical Specifications					FHBW056B1 [HM051HFD UA41]	FHBW076B1 [HM071HFD UA41]	FHBW096B1 [HM091HFD UA41]
Sound pressure level	Heating(rated, @5m)		dB(A)	31	32	34	
Sound power level	Heating	Low noise	dB(A)	52	53	55	
		Rated	dB(A)	53	54	56	
		Daytime max.	dB(A)	61	63	64	
Dimensions	Unit	W x H x D	mm	1,242 x 853 x 391	1,242 x 853 x 391	1,242 x 853 x 391	
	Packed Unit	W x H x D	mm	1,330 x 1,017 x 480	1,330 x 1,017 x 480	1,330 x 1,017 x 480	
Weight	Unit		kg	96	96	96	
	Packed Unit		kg	108.5	108.5	108.5	
Exterior	Color		-	Black STS silver solid	Black STS silver solid	Black STS silver solid	
	RAL Code		-	RAL 8019	RAL 8019	RAL 8019	
	Color of Front Grille		-	Light Graphite	Light Graphite	Light Graphite	
	RAL Code of Front Grille		-	RAL 8022	RAL 8022	RAL 8022	

1. Specification

Technical Specifications (Water side)				FHBW056B1 [HM051HFD UA41]	FHBW076B1 [HM071HFD UA41]	FHBW096B1 [HM091HFD UA41]
Operation Range (Leaving Water Temp.)	Cooling	Min.~ Max.	°C	5 ~ 27	5 ~ 27	5 ~ 27
	Heating	Min.~ Max.	°C	15 ~ 75	15 ~ 75	15 ~ 75
	DHW*	Min.~ Max.	°C	15 ~ 65(80*)	15 ~ 65(80*)	15 ~ 65(80*)
Water Pump***	Type		-	Canned type for hot water circulation		
	Model		-	OH SUNG, ODM-061P		
	Model Type		-	BLDC		
	Steps of Pumping Performance		-	Variable speed 10% to 100%		
	Power input (100% Capacity)	Min. / Rated	W	17 / 110	17 / 110	17 / 110
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 15.8	5 / 20.1	5 / 25.9
Water Pump_2***	Type		-	Canned type for hot water circulation		
	Model		-	GRUNDFOS, UPM*K 20-75 CHBL		
	Motor Type		-	BLDC		
	Steps of Pumping Performance		-	Variable speed 10% to 100%		
	Power input (100% Capacity)	Min. / Rated	W	3 / 60	3 / 60	3 / 60
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 15.8	5 / 20.1	5 / 25.9
Heat Exchanger	Type		-	Brazen Plate HEX		
	Quantity		-	1	1	1
	Number of Plate		EA	52	52	52
	Water Volume		ℓ	0.7	0.7	0.7
Flow Sensor****	Model		-	SIKA VVX20		
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	5	5	5
Flow Sensor_2****	Model		-	SEBALGF-080-C20-E-C0.5V		
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	5	5	5
Water Pressure sensor	Model		-	Sensata OFM(2HMP)		
	Measuring range	Min.~Max.	bar(G)	0 ~ 20	0 ~ 20	0 ~ 20
Piping Connections	Inlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads		
	Outlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads		
Water strainer	Supply type		-	Loose supply(externally installed)		
	Mesh size		-	30 mesh	30 mesh	30 mesh
	Max. particle size		mm	0.6	0.6	0.6
	Material			Stainless Steel		
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0

Note

- Due to our policy of innovation, some specifications may be changed without notification.
- Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
- Sound power level is measured in accordance with EN 12102-1 and ISO 9614.
 - Rated : This mode is measured on the rated condition in the semi-anechoic rooms. Therefore, these values may vary depending on operation conditions.
 - Daytime max : This mode is measured based on max. fan RPM and max. compressor Hz. that can be reached under outdoor air temperature 2°C.
 - Low noise : This mode lowers noise by limiting the compressor Hz. and fan RPM, and thus the performance may be limited.
- Performances are accordance with EN14511 and reflect ErP testing conditions. The values indicated above are the declared values at rated conditions acc. ErP regulation. For max. capacities, please refer to Performance Data.
- This product contains Fluorinated greenhouse gases.
- SCOP is in accordance with EN14825.
- Rated running currents are based on the declared values under the following conditions.
 - Heating : Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. 35°C
 - Cooling : Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 65~80°C Operating is available only when the booster heater is operating.
 - ** This is the power input i accordance with the 80% pump capacity setting at rated water flow rate. When the OH SUNG pump is set as 80% capacity, it's head is similar to that of the GRUNDFOS pump at rated water flow rate.
 - *** In the case of integrated water pump, either water pump or water pump 2 will be applied.
 - **** In the case of integrated flow sensor, either flow sensor or flow sensor 2 will be applied.
- The RAL Code may not accurately represent the actual color.

1. Specification

Technical Specifications (Refrigerant side)				FHBW056B1 [HM051HFD UA41]	FHBW076B1 [HM071HFD UA41]	FHBW096B1 [HM091HFD UA41]
Operation Range (Outdoor Temp.)	Cooling [#]	Min. ~ Max.	°C DB	5 ~ 48	5 ~ 48	5 ~ 48
	Heating	Min. ~ Max.	°C DB	-25 ~ 35	-25 ~ 35	-25 ~ 35
Compressor	Type	-		Twin Rotary		
	Model	Model x No.		EDTF420D×1		
	Motor Type	-		BLDC		
	Displacement	cm ³ /Rev.		41.5	41.5	41.5
Refrigerant	Type	-		R290	R290	R290
	GWP (Global Warming Potential)	-		0.02	0.02	0.02
	Precharged Amount	g		700	700	700
	t-CO ₂ eq.	-		-	-	-
	Control	-		Electronic Expansion Valve		
Refrigerant Oil	Type	-		PAG VG60		
	Charged Volume	CC x No.		830	830	830
Heat Exchanger	Type			Corrugate	Corrugate	Corrugate
	Quantity			1	1	1
	Specification	Row	EA	2	2	2
		Column	EA	38	38	38
		FPI	EA	18	18	18
Fan	Type	-		Propeller		
	Air Flow Rate	Rated	m/min x No.	60.0×1	60.0×1	60.0×1
Fan Motor	Type	-		BLDC		
	Output	W x No.		124×1	124×1	124×1

Note

This operation range includes not only the continuous operation range but also operative range.

1. Specification

■ 1 phase Inverter (12 ~ 16 kW)

Nominal Capacity and Nominal Input					FHBW126B1 [HM121HFD UB41]	FHBW146B1 [HM141HFD UB41]	FHBW166B1 [HM161HFD UB41]
-	-	Outdoor Temp.(°C)DB / WB	Leaving Water Temp.(°C)	-			
Capacity	Heating	7 / 6	35	KW	12.00	14.00	16.00
			55	KW	12.00	13.00	14.00
		2 / 1	35	KW	12.00	12.50	13.00
			-7	35	KW	12.00	12.50
		35		KW	10.00	10.50	11.00
		55		KW	10.00	11.00	12.00
	Cooling	35 / 24	18	KW	12.00	12.50	13.00
			7	KW	10.50	11.00	11.50
Power Input	Heating	7 / 6	35	KW	2.61	3.11	3.64
			55	KW	4.07	4.48	5.00
		2 / 1	35	KW	3.87	4.10	4.33
			-7	35	KW	4.80	5.00
		35		KW	3.45	3.62	3.79
		55		KW	5.26	5.95	6.67
	Cooling	35 / 24	18	KW	2.55	2.72	2.89
			7	KW	3.28	3.49	3.71
COP	Heating	7 / 6	35	W/W	4.60	4.50	4.40
			55	W/W	2.95	2.90	2.80
		2 / 1	35	W/W	3.10	3.05	3.00
			-7	35	W/W	2.50	2.50
		35		W/W	2.90	2.90	2.90
		55		W/W	1.90	1.85	1.80
EER	Cooling	35 / 24	18	W/W	4.70	4.60	4.50
			7	W/W	3.20	3.15	3.10
Seasonal space heating eff. Class			35	-	A+++	A+++	A+++
			55	-	A++	A++	A++
Seasonal space heating efficiency (ηs)			35	%	187	191	189
			55	%	143	143	141
SCOP(average climate)			35	W/W	4.75	4.85	4.80
			55	W/W	3.65	3.65	3.60
Water Flow Rate			Rated(at ΔT 5℃)	ℓ / min	34.5	40.3	46.0
Water Heating Efficiency (profile L)				%	130	130	130
Electrical Specifications					FHBW126B1 [HM121HFD UB41]	FHBW146B1 [HM141HFD UB41]	FHBW166B1 [HM161HFD UB41]
Power Supply		V, Ø, Hz		220-240, 1,50	220-240, 1,50	220-240, 1,50	
Peak Control Running Current	Heating	A		24.0	25.0	26.0	
	Cooling	A		18.0	19.0	20.0	
Rated Running Curent	Heating	A		13.6	16.2	19.0	
	Cooling	A		13.3	14.2	15.1	
Circuit breaker		A		32	32	32	
Wiring Connections	Power Supply Cable (included Earth,H07RN-F)		mm ²	4.0 x 3C	4.0 x 3C	4.0 x 3C	
	Communication cable(H07RN-F)		mm ² x cores	0.75 x 2C	0.75 x 2C	0.75 x 2C	
Technical Specifications					FHBW126B1 [HM121HFD UB41]	FHBW146B1 [HM141HFD UB41]	FHBW166B1 [HM161HFD UB41]
Sound pressure level	Heating(rated,@5m)		dB(A)	34	35	37	
Sound power level	Heating	Low noise	dB(A)	56	56	57	
		Rated	dB(A)	56	57	59	
		Daytime max.	dB(A)	65	66	66	
Dimensions	Unit	W x H x D	mm	1,320 x 1019 x 520	1,320 x 1019 x 520	1,320 x 1019 x 520	
	Packed Unit	W x H x D	mm	1,380 x 1,200 x 575	1,380 x 1,200 x 575	1,380 x 1,200 x 575	
Weight	Unit	kg		125	125	125	
	Packed Unit	kg		141	141	141	
Exterior	Color		-	Black STS silver solid	Black STS silver solid	Black STS silver solid	
	RAL Code		-	RAL8019	RAL8019	RAL8019	
	Color of Front Grille		-	Light Graphite	Light Graphite	Light Graphite	
	RAL Code of Front Grille		-	RAL 8022	RAL 8022	RAL 8022	

1. Specification

Technical Specifications (Water side)				FHBW126B1 [HM121HFD UB41]	FHBW146B1 [HM141HFD UB41]	FHBW166B1 [HM161HFD UB41]
Operation Range (Leaving Water Temp.)	Cooling	Min.~ Max.	°C	5 ~ 27	5 ~ 27	5 ~ 27
	Heating	Min.~ Max.	°C	15 ~ 75	15 ~ 75	15 ~ 75
	DHW*	Min.~ Max.	°C	15 ~ 80	15 ~ 80	15 ~ 80
Water Pump***	Type		-	Canned type for hot water circulation		
	Model		-	OH SUNG, ODM-061P		
	Model Type		-	BLDC		
	Steps of Pumping Performance		-	Variable speed 10% to 100%		
	Power input (100% Capacity)	Min. / Rated	W	17 / 110	17 / 110	17 / 110
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 34.5	5 / 40.3	5 / 46.0
Water Pump_2***	Type		-	Canned type for hot water circulation		
	Model		-	GRUNDFOS, UPML 20-105 CHBL		
	Motor Type		-	BLDC		
	Steps of Pumping Performance		-	Variable speed 10% to 100%		
	Power input (100% Capacity)	Min. / Rated	W	3.5 / 125	3.5 / 135	3.5 / 140
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 34.5	5 / 40.3	5 / 46.0
Heat Exchanger	Type		-	Brazen Plate HEX		
	Quantity		-	1	1	1
	Number of Plate		EA	76	76	76
	Water Volume		ℓ	1	1	1
Flow Sensor****	Model		-	SIKA VVX20		
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	10	10	10
Flow Sensor_2****	Model		-	SEBALGF-080-C20-E-C0.5V		
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	10	10	10
Water Pressure sensor	Model		-	Sensata OFM(2HMP)		
	Measuring range	Min.~Max.	bar(G)	0 ~ 20	0 ~ 20	0 ~ 20
Piping Connections	Inlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads		
	Outlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads		
Water strainer	Supply type		-	Loose supply(externally installed)		
	Mesh size		-	30 mesh	30 mesh	30 mesh
	Max. particle size		mm	0.6	0.6	0.6
	Material			Stainless Steel		
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0

Note

- Due to our policy of innovation, some specifications may be changed without notification.
- Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
- Sound power level is measured in accordance with EN 12102-1 and ISO 9614.
 - Rated : This mode is measured on the rated condition in the semi-anechoic rooms. Therefore, these values may vary depending on operation conditions.
 - Daytime max : This mode is measured based on max. fan RPM and max. compressor Hz. that can be reached under outdoor air temperature 2°C.
 - Low noise : This mode lowers noise by limiting the compressor Hz. and fan RPM, and thus the performance may be limited.
- Performances are accordance with EN14511 and reflect ErP testing conditions. The values indicated above are the declared values at rated conditions acc. ErP regulation. For max. capacities, please refer to Performance Data.
- This product contains Fluorinated greenhouse gases.
- SCOP is in accordance with EN14825.
- Rated running currents are based on the declared values under the following conditions.
 - Heating : Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. 35°C
 - Cooling : Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 65~80°C Operating is available only when the booster heater is operating.
 - ** This is the power input i accordance with the 80% pump capacity setting at rated water flow rate. When the OH SUNG pump is set as 80% capacity, it's head is similar to that of the GRUNDFOS pump at rated water flow rate.
 - *** In the case of integrated water pump, either water pump or water pump 2 will be applied.
 - **** In the case of integrated flow sensor, either flow sensor or flow sensor 2 will be applied.
- The RAL Code may not accurately represent the actual color.

1. Specification

Technical Specifications (Refrigerant side)				FHBW126B1 [HM121HFD UB41]	FHBW146B1 [HM141HFD UB41]	FHBW166B1 [HM161HFD UB41]
Operation Range (Outdoor Temp.)	Cooling [#]	Min. ~ Max.	°C DB	5 ~ 48	5 ~ 48	5 ~ 48
	Heating	Min. ~ Max.	°C DB	-25 ~ 35	-25 ~ 35	-25 ~ 35
Compressor	Type	-		Twin Rotary		
	Model	Model x No.		EDTQ750Dx1		
	Motor Type	-		BLDC		
	Displacement	cm ³ /Rev.		75	75	75
Refrigerant	Type	-		R290	R290	R290
	GWP (Global Warming Potential)	-		0.02	0.02	0.02
	Precharged Amount	g		1000	1000	1000
	t-CO ₂ eq.	-		-	-	-
	Control	-		Electronic Expansion Valve		
Refrigerant Oil	Type	-		PAG VG60		
	Charged Volume	CC x No.		1250	1250	1250
Heat Exchanger	Type			Corrugate	Corrugate	Corrugate
	Quantity			1	1	1
	Specification	Row	EA	2	2	2
		Column	EA	46	46	46
		FPI	EA	18	18	18
Fan	Type	-		Propeller		
	Air Flow Rate	Rated	m/min x No.	100.0x1	100.0x1	100.0x1
Fan Motor	Type	-		BLDC		
	Output	W x No.		250x1	250x1	250x1

Note

This operation range includes not only the continuous operation range but also operative range.

1. Specification

■ 3 phase Inverter (7 ~ 9 kW)

Nominal Capacity and Nominal Input					FHBW078B1 [HM073HFD UA41]	FHBW098B1 [HM093HFD UA41]
-	-	Outdoor Temp.(°C)DB / WB	Leaving Water Temp.(°C)	-		
Capacity	Heating	7 / 6	35	KW	7.00	9.00
			55	KW	7.00	8.00
		2 / 1	35	KW	6.50	7.00
			-7	35	KW	7.00
		35		KW	5.70	6.00
		55		KW	7.00	8.00
	Cooling	35 / 24		18	KW	7.00
			7	KW	7.00	8.00
Power Input	Heating	7 / 6	35	KW	1.49	1.96
			55	KW	2.46	2.86
		2 / 1	55	KW	2.06	2.26
			-7	35	KW	3.41
		35		KW	2.01	2.14
		55		KW	3.78	4.44
	Cooling	35 / 24		18	KW	1.49
			7	KW	2.41	2.81
COP	Heating	7 / 6	35	W/W	4.70	4.60
			55	W/W	2.85	2.80
		2 / 1	35	W/W	3.15	3.10
			-7	35	W/W	2.05
		35		W/W	2.83	2.80
		55		W/W	1.85	1.80
EER	Cooling	35 / 24		18	W/W	4.70
			7	W/W	2.90	2.85
Seasonal space heating eff. Class			35	-	A+++	A+++
			55	-	A++	A++
Seasonal space heating efficiency (ηs)			35	%	187	185
			55	%	141	143
SCOP(average climate)			35	W/W	4.75	4.70
			55	W/W	3.60	3.66
Water Flow Rate			Rated(at ΔT 5°C) ℓ / min		20.1	25.9
Water Heating Efficiency (profile L)				%	130	130
Electrical Specifications					FHBW078B1 [HM073HFD UA41]	FHBW098B1 [HM093HFD UA41]
		Power Supply		V,Ø,HZ	380-415,3,50	380-415,3,50
Peak Control Running Current	Heating		A		8	9
	Cooling		A		7	8
Rated Running Curent	Heating		A		2.8	4.0
	Cooling		A		2.8	3.3
Circuit breaker			A		16	16
Wiring Connections	Power Supply Cable (included Earth,H07RN-F)		mm ²		2.5 x 5C	2.5 x 5C
	Communication cable(H07RN-F)		mm ² x cores		0.75 x 2C	0.75 x 2C
Technical Specifications					FHBW078B1 [HM073HFD UA41]	FHBW098B1 [HM093HFD UA41]
Sound pressure level	Heat ing(rated,@5m)			dB(A)	32	34
Sound power level	Heating	Low noise	dB(A)		53	55
		Rated	dB(A)		54	56
		Daytime max.	dB(A)		63	64
Dimensions	Unit	W x H x D	mm		1,242 x 853 x 391	1,242 x 853 x 391
	Packed Unit	W x H x D	mm		1,330 x 1,017 x 480	1,330 x 1,017 x 480
Weight	Unit		kg		97.5	97.5
	Packed Unit		kg		110	110
Exterior	Color		-		Black STS silver solid	Black STS silver solid
	RAL Code		-		RAL 8019	RAL 8019
	Color of Front Grille		-		Light Graphite	Light Graphite
	RAL Code of Front Grille		-		RAL 8022	RAL 8022

1. Specification

Technical Specifications (Water side)				FHBW078B1 [HM073HFD UA41]	FHBW098B1 [HM093HFD UA41]
Operation Range (Leaving Water Temp.)	Cooling	Min.~ Max.	°C	5 ~ 27	5 ~ 27
	Heating	Min.~ Max.	°C	15 ~ 75	15 ~ 75
	DHW*	Min.~ Max.	°C	15 ~ 65(80*)	15 ~ 65(80*)
Water Pump***	Type		-	Canned typr for hot water circulation	
	Model		-	OH SUNG, ODM-061P	
	Model Type		-	BLDC	
	Steps of Pumping Performance		-	Variable speed 10% to 100%	
	Power input (100% Capacity)	Min. / Rated	W	17 / 110	17 / 110
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 20.1	5 / 25.9
Water Pump_2***	Type		-	Canned typr for hot water circulation	
	Model		-	GRUNDFOS, UPM*K 20-75 CHBL	
	Motor Type		-	BLDC	
	Steps of Pumping Performance		-	Variable speed 10% to 100%	
	Power input (100% Capacity)	Min. / Rated	W	3 / 60	3 / 60
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 20.1	5 / 25.9
Heat Exchanger	Type		-	Braze Plate HEX	
	Quantity		-	1	1
	Number of Plate		EA	52	52
	Water Volume		ℓ	0.7	0.7
Flow Sensor****	Model		-	SIKA VVX20	
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	5	5
Flow Sensor_2****	Model		-	SEBALGF-080-C20-E-C0.5V	
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	5	5
Water Pressure sensor	Model		-	Sensata OFM(2HMP)	
	Measuring range	Min.~Max.	bar(G)	0 ~ 20	0 ~ 20
Piping Connections	Inlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads	
	Outlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads	
Water strainer	Supply type		-	Loose supply(externally installed)	
	Mesh size		-	30 mesh	30 mesh
	Max. particle size		mm	0.6	0.6
	Material			Stainless Steel	
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0

Note

- Due to our policy of innovation, some specifications may be changed without notification.
- Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
- Sound power level is measured in accordance with EN 12102-1 and ISO 9614.
 - Rated : This mode is measured on the rated condition in the semi-anechoic rooms. Therefore, these values may vary depending on operation conditions.
 - Daytime max : This mode is measured based on max. fan RPM and max. compressor Hz. that can be reached under outdoor air temperature 2°C.
 - Low noise : This mode lowers noise by limiting the compressor Hz. and fan RPM, and thus the performance may be limited.
- Performances are accordance with EN14511 and reflect ErP testing conditions. The values indicated above are the declared values at rated conditions acc. ErP regulation. For max. capacities, please refer to Performance Data.
- This product contains Fluorinated greenhouse gases.
- SCOP is in accordance with EN14825.
- Rated running currents are based on the declared values under the following conditions.
 - Heating : Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. 35°C
 - Cooling : Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 65~80°C Operating is available only when the booster heater is operating.
 - ** This is the power input i accordance with the 80% pump capacity setting at rated water flow rate. When the OH SUNG pump is set as 80% capacity, it's head is similar to that of the GRUNDFOS pump at rated water flow rate.
 - *** In the case of integrated water pump, either water pump or water pump 2 will be applied.
 - **** In the case of integrated flow sensor, either flow sensor or flow sensor 2 will be applied.
- The RAL Code may not accurately represent the actual color.

1. Specification

Technical Specifications (Refrigerant side)				FHBW078B1 [HM073HFD UA41]	FHBW098B1 [HM093HFD UA41]
Operation Range (Outdoor Temp.)	Cooling [#]	Min.~ Max.	°C DB	5 ~ 48	5 ~ 48
	Heating	Min.~ Max.	°C DB	-25 ~ 35	-25 ~ 35
Compressor	Type		-	Twin Rotary	
	Model		Model x No.	EDTF420D×1	
	Motor Type		-	BLDC	
	Displacement		cm ³ /Rev.	41.5	41.5
Refrigerant	Type		-	R290	R290
	GWP (Global Warming Potential)		-	0.02	0.02
	Precharged Amount		g	700	700
	t-CO2 eq.		-	-	-
	Control		-	Electronic Expansion Valve	
Refrigerant Oil	Type		-	PAG VG60	
	Charged Volume		CC x No.	830	830
Heat Exchanger	Type		-	Corrugate	Corrugate
	Quantity		-	1	1
	Specification	Row	EA	2	2
		Column	EA	38	38
		FPI	EA	18	18
Fan	Type		-	Propeller	
	Air Flow Rate	Rated	m/min x No.	60.0×1	60.0×1
Fan Motor	Type		-	BLDC	
	Output		W x No.	124×1	124×1

Note

This operation range includes not only the continuous operation range but also operative range.

1. Specification

■ 3 phase Inverter (12 ~ 16 kW)

Nominal Capacity and Nominal Input					FHBW128B1 [HM123HFD UB41]	FHBW148B1 [HM143HFD UB41]	FHBW168B1 [HM163HFD UB41]
-	-	Outdoor Temp.(°C)DB / WB	Leaving Water Temp.(°C)	-			
Capacity	Heating	7 / 6	35	KW	12.00	14.00	16.00
			55	KW	12.00	13.00	14.00
		2 / 1	35	KW	12.00	12.50	13.00
			-7	35	KW	12.00	12.50
		35		KW	10.00	10.50	11.00
		55		KW	10.00	11.00	12.00
	Cooling	35 / 24		18	KW	12.00	12.50
			7	KW	10.50	11.00	11.50
Power Input	Heating	7 / 6	35	KW	2.61	3.11	3.64
			55	KW	4.07	4.48	5.00
		2 / 1	35	KW	3.87	4.10	4.33
			-7	35	KW	4.80	5.00
		35		KW	3.45	3.62	3.79
		55		KW	5.26	5.95	6.67
	Cooling	35 / 24		18	KW	2.55	2.72
			7	KW	3.28	3.49	3.71
COP	Heating	7 / 6	35	W/W	4.60	4.50	4.40
			55	W/W	2.95	2.90	2.80
		2 / 1	35	W/W	3.10	3.05	3.00
			-7	35	W/W	2.50	2.50
		35		W/W	2.90	2.90	2.90
		55		W/W	1.90	1.85	1.80
EER	Cooling	35 / 24		18	W/W	4.70	4.60
			7	W/W	3.20	3.15	3.10
Seasonal space heating eff. Class			35	-	A+++	A+++	A+++
			55	-	A++	A++	A++
Seasonal space heating efficiency (ηs)			35	%	187	191	189
			55	%	143	143	141
SCOP(average climate)			35	W/W	4.75	4.85	4.80
			55	W/W	3.65	3.65	3.60
Water Flow Rate			Rated(at ΔT 5°C)	ℓ / min	34.5	40.3	46.0
Water Heating Efficiency (profile L)				%	130	130	130
Electrical Specifications					FHBW128B1 [HM123HFD UB41]	FHBW148B1 [HM143HFD UB41]	FHBW168B1 [HM163HFD UB41]
Power Supply				V,Ø,Hz	380-415,3,50	380-415,3,50	380-415,3,50
Peak Control Running Current	Heating			A	9.0	10.0	11.0
	Cooling			A	6.0	7.0	8.0
Rated Running Curent	Heating			A	3.8	4.5	5.2
	Cooling			A	3.7	3.9	4.2
Circuit breaker				A	16	16	16
Wiring Connections	Power Supply Cable (included Earth,H07RN-F)			mm ²	2.5 x 5C	2.5 x 5C	2.5 x 5C
	Communication cable(H07RN-F)			mm ² x cores	0.75 x 2C	0.75 x 2C	0.75 x 2C
Technical Specifications					FHBW128B1 [HM123HFD UB41]	FHBW148B1 [HM143HFD UB41]	FHBW168B1 [HM163HFD UB41]
Sound pressure level	Heating(rated,@5m)			dB(A)	34	35	37
Sound power level	Heating	Low noise	dB(A)	55	56	57	
		Rated	dB(A)	56	57	59	
		Daytime max.	dB(A)	65	66	66	
Dimensions	Unit	W x H x D	mm	1,320 x 1019 x 520	1,320 x 1019 x 520	1,320 x 1019 x 520	
	Packed Unit	W x H x D	mm	1,380 x 1,200 x 575	1,380 x 1,200 x 575	1,380 x 1,200 x 575	
Weight	Unit			kg	125	125	125
	Packed Unit			kg	141	141	141
Exterior	Color			-	Black STS silver solid	Black STS silver solid	Black STS silver solid
	RAL Code			-	RAL 8019	RAL 8019	RAL 8019
	Color of Front Grille			-	Light Graphite	Light Graphite	Light Graphite
	RAL Code of Front Grille			-	RAL 8022	RAL 8022	RAL 8022

1. Specification

Technical Specifications (Water side)				FHBW128B1 [HM123HFD UB41]	FHBW148B1 [HM143HFD UB41]	FHBW168B1 [HM163HFD UB41]
Operation Range (Leaving Water Temp.)	Cooling	Min.~ Max.	°C	5 ~ 27	5 ~ 27	5 ~ 27
	Heating	Min.~ Max.	°C	15 ~ 75	15 ~ 75	15 ~ 75
	DHW*	Min.~ Max.	°C	15 ~ 80	15 ~ 80	15 ~ 80
Water Pump***	Type		-	Canned type for hot water circulation		
	Model		-	OH SUNG, ODM-061P		
	Model Type		-	BLDC		
	Steps of Pumping Performance		-	Variable speed 10% to 100%		
	Power input (100% Capacity)	Min. / Rated	W	17 / 110	17 / 110	17 / 110
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 34.5	5 / 40.3	5 / 46.0
Water Pump_2***	Type		-	Canned type for hot water circulation		
	Model		-	GRUNDFOS, UPML 20-105 CHBL		
	Motor Type		-	BLDC		
	Steps of Pumping Performance		-	Variable speed 10% to 100%		
	Power input (100% Capacity)	Min. / Rated	W	3.5 / 125	3.5 / 135	3.5 / 140
	Water Flow Rate	Min. / Rated	ℓ/min	5 / 34.5	5 / 40.3	5 / 46
Heat Exchanger	Type		-	Brazen Plate HEX		
	Quantity		-	1	1	1
	Number of Plate		EA	76	76	76
	Water Volume		ℓ	1	1	1
Flow Sensor****	Model		-	SIKA VVX20		
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	10	10	10
Flow Sensor_2****	Model		-	SEBALGF-080-C20-E-C0.5V		
	Measuring range	Min.~Max.	ℓ/min	5 ~ 80	5 ~ 80	5 ~ 80
	Flow (Trigger point)	Min.	ℓ/min	10	10	10
Water Pressure sensor	Model		-	Sensata OFM(2HMP)		
	Measuring range	Min.~Max.	bar(G)	0 ~ 20	0 ~ 20	0 ~ 20
Piping Connections	Inlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads		
	Outlet		inch	Male PT 1"according to 1S0 7-1 Capered pipe threads		
Water strainer	Supply type		-	Loose supply(externally installed)		
	Mesh size		-	30 mesh	30 mesh	30 mesh
	Max. particle size		mm	0.6	0.6	0.6
	Material			Stainless Steel		
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0

Note

- Due to our policy of innovation, some specifications may be changed without notification.
- Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
- Sound power level is measured in accordance with EN 12102-1 and ISO 9614.
 - Rated : This mode is measured on the rated condition in the semi-anechoic rooms. Therefore, these values may vary depending on operation conditions.
 - Daytime max : This mode is measured based on max. fan RPM and max. compressor Hz. that can be reached under outdoor air temperature 2°C.
 - Low noise : This mode lowers noise by limiting the compressor Hz. and fan RPM, and thus the performance may be limited.
- Performances are accordance with EN14511 and reflect ErP testing conditions. The values indicated above are the declared values at rated conditions acc. ErP regulation. For max. capacities, please refer to Performance Data.
- This product contains Fluorinated greenhouse gases.
- SCOP is in accordance with EN14825.
- Rated running currents are based on the declared values under the following conditions.
 - Heating : Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. 35°C
 - Cooling : Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 65~80°C Operating is available only when the booster heater is operating.
 - ** This is the power input i accordance with the 80% pump capacity setting at rated water flow rate. When the OH SUNG pump is set as 80% capacity, it's head is similar to that of the GRUNDFOS pump at rated water flow rate.
 - *** In the case of integrated water pump, either water pump or water pump 2 will be applied.
 - **** In the case of integrated flow sensor, either flow sensor or flow sensor 2 will be applied.
- The RAL Code may not accurately represent the actual color.

1. Specification

Technical Specifications (Refrigerant side)				FHBW128B1 [HM123HFD UB41]	FHBW148B1 [HM143HFD UB41]	FHBW168B1 [HM163HFD UB41]
Operation Range (Outdoor Temp.)	Cooling [#]	Min.~ Max.	°C DB	5 ~ 48	5 ~ 48	5 ~ 48
	Heating	Min.~ Max.	°C DB	-25 ~ 35	-25 ~ 35	-25 ~ 35
Compressor	Type	-		Twin Rotary		
	Model	Model x No.		EDTQ750D×1		
	Motor Type	-		BLDC		
	Displacement	cm ³ /Rev.		75	75	75
Refrigerant	Type	-		R290	R290	R290
	GWP (Global Warming Potential)	-		0.02	0.02	0.02
	Precharged Amount	g		1000	1000	1000
	t-CO2 eq.	-		-	-	-
	Control	-		Electronic Expansion Valve		
Refrigerant Oil	Type	-		PAG VG60		
	Charged Volume	CC x No.		1250	1250	1250
Heat Exchanger	Type			Corrugate	Corrugate	Corrugate
	Quantity			1	1	1
	Specification	Row	EA	2	2	2
		Column	EA	46	46	46
		FPI	EA	18	18	18
Fan	Type	-		Propeller		
	Air Flow Rate	Rated	m/min x No.	100.0x1	100.0x1	100.0x1
Fan Motor	Type	-		BLDC		
	Output	W x No.		250x1	250x1	250x1

Note

This operation range includes not only the continuous operation range but also operative range.

2. List of Functions

Category	Functions	FHBW056B1 [HM051HFD UA41] FHBW076B1 [HM071HFD UA41] FHBW096B1 [HM091HFD UA41] FHBW126B1 [HM121HFD UB41] FHBW146B1 [HM141HFD UB41] FHBW166B1 [HM161HFD UB41]	FHBW078B1 [HM073HFD UA41] FHBW098B1 [HM093HFD UA41] FHBW128B1 [HM123HFD UB41] FHBW148B1 [HM143HFD UB41] FHBW168B1 [HM163HFD UB41]
Reliability	Defrost / Deicing	O	O
	High pressure switch	O	O
	Low pressure switch	X	X
	Phase protection	X	O
	Restart delay (3-minutes)	O	O
	Self diagnosis	O	O
	Soft start	X	X
Convenience	Test function	X	X
	Low Noise Operation	O	O
	Wiring Error Check	X	X
	Peak Control(Step 1&2)	O	O
	Mode Lock	X	X
	Forced Cooling Operation (Outdoor Unit)	X	X
	Base Pan Heater	O	O
	SLC(Smart Load Control)	X	X
Network	Network solution(LGAP)	O	O

Note

1. O : Applied, X : Not applied

3. Accessory Compatibility List

Category		Product	Remark	FHBW056B1 [HM051HFD UA41] FHBW076B1 [HM071HFD UA41] FHBW096B1 [HM091HFD UA41] FHBW078B1 [HM073HFD UA41] FHBW098B1 [HM093HFD UA41] FHBW126B1 [HM121HFD UB41] FHBW146B1 [HM141HFD UB41] FHBW166B1 [HM161HFD UB41] FHBW128B1 [HM123HFD UB41] FHBW148B1 [HM143HFD UB41] FHBW168B1 [HM163HFD UB41]
Central Controller	AC EZ	PQCSZ250S0	AC EZ	X
	AC Ez Touch	PACEZA000	AC Ez Touch	X
	AC Smart	PACS5A000	AC Smart 5	X
	ACP	PACP5A000	ACP 5	X
	AC Manager **	PACM5A000	AC Manager 5	X
Gateway	IDU PI485	PHNFP14A0	Without case	X
		PSNFP14A0	With case	X
	ODU PI485	PP485A00T	PI 485 Gateway	X
		PMNFP14A1	PI 485 Gateway (Produced before 1st of Sep. of 2021)	X
	BACnet	PQNFB17C0	ACP BACnet	X
	Lonworks	PLNWKB000	ACP Lonworks	X
	Modbus	PMBUSB00A	-	O
ETC	PDI	PPWRDB000	PDI Standard	X
		PQNUD1S40	PDI Premium	X
	ACS IO Module	PEXPMB000	-	X
	Cascade control	PHCM0	Cascade control unit	O

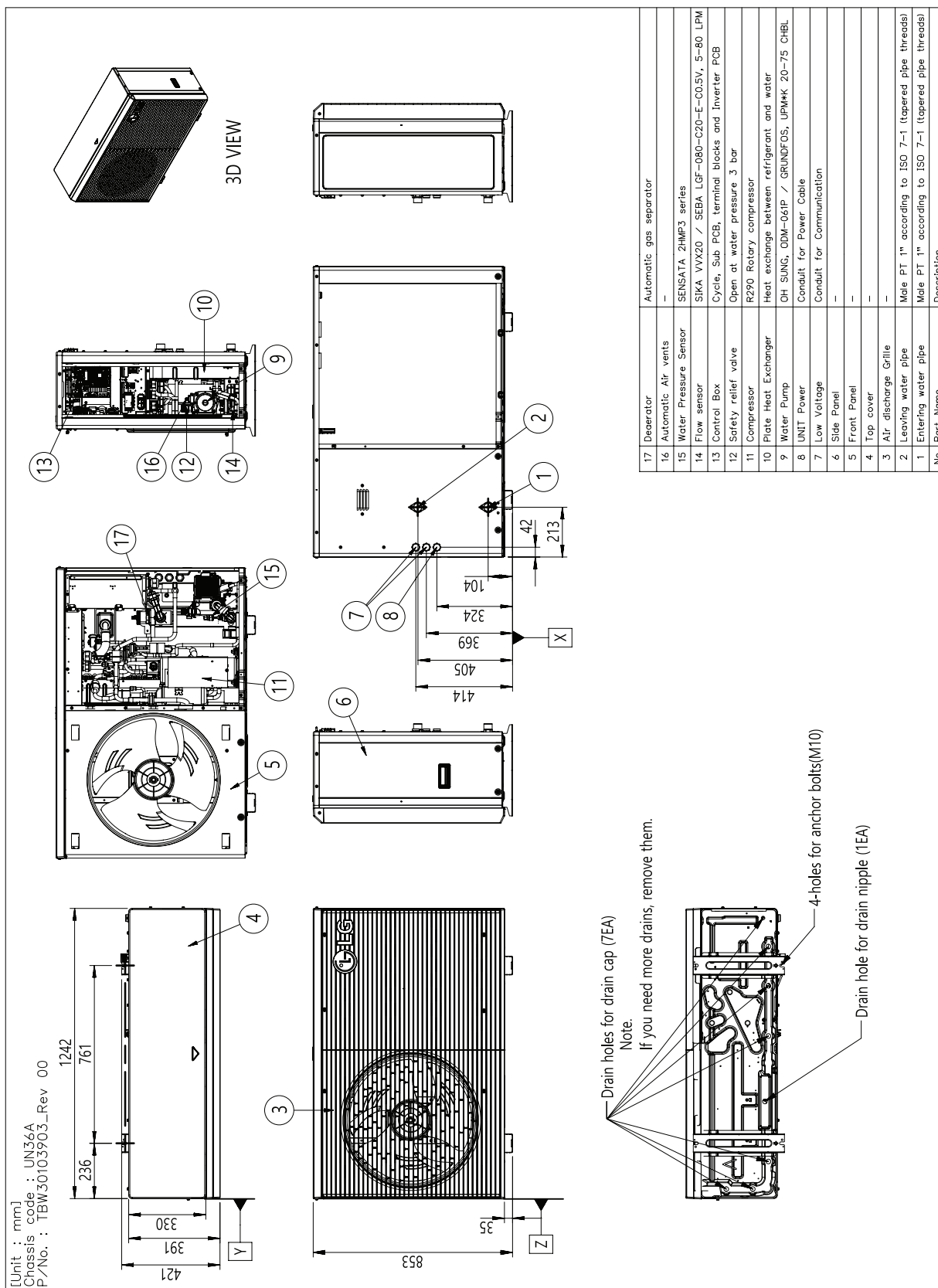
Note

1. O: Possible, X: Impossible, - : Not applicable
2. **: ACP or AC Smart is needed.
3. If you need more detail, please refer to the manual of product.
(<http://partner.lge.com> > Select Your Region : Home> Doc.Library> Product > Control(BECON))

4. Dimensions

■ Product

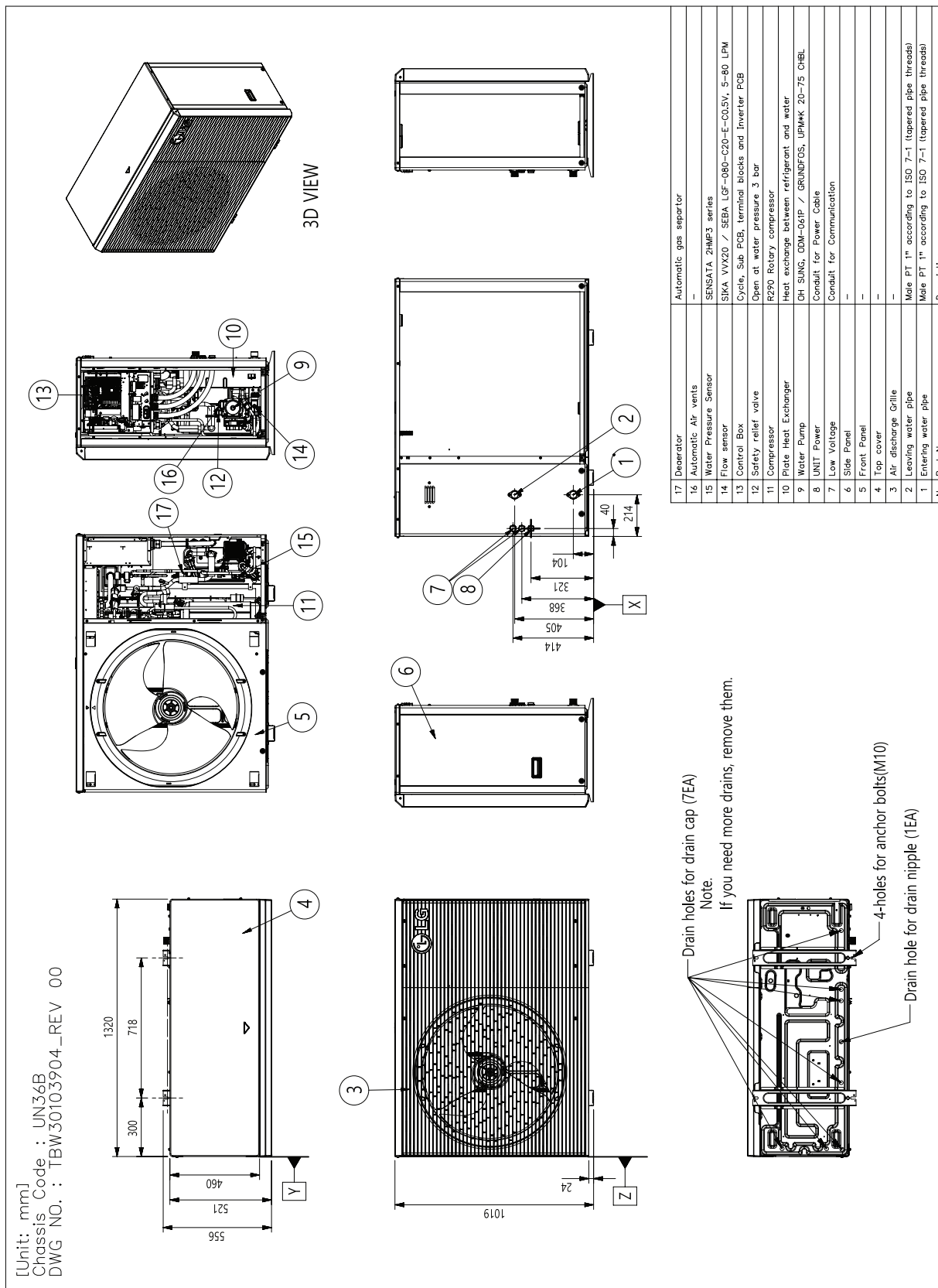
- ◆ FHBW056B1 [HM051HFD UA41] / FHBW076B1 [HM071HFD UA41] /
FHBW096B1 [HM091HFD UA41] / FHBW078B1 [HM073HFD UA41] /
FHBW098B1 [HM093HFD UA41]



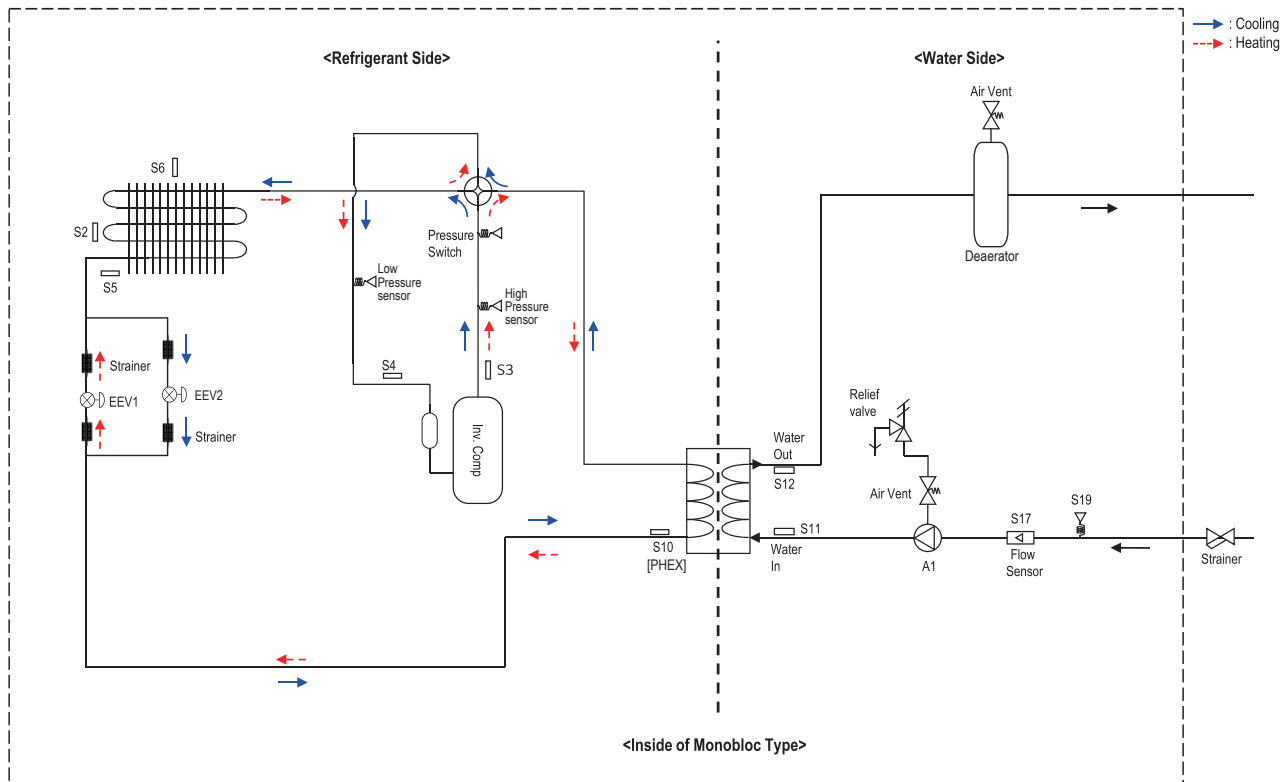
4. Dimensions

■ Product

- ◆ FHBW126B1 [HM121HFD UB41] / FHBW146B1 [HM141HFD UB41] /
FHBW166B1 [HM161HFD UB41] / FHBW128B1 [HM123HFD UB41] /
FHBW148B1 [HM143HFD UB41] / FHBW168B1 [HM163HFD UB41]



5. Piping Diagram

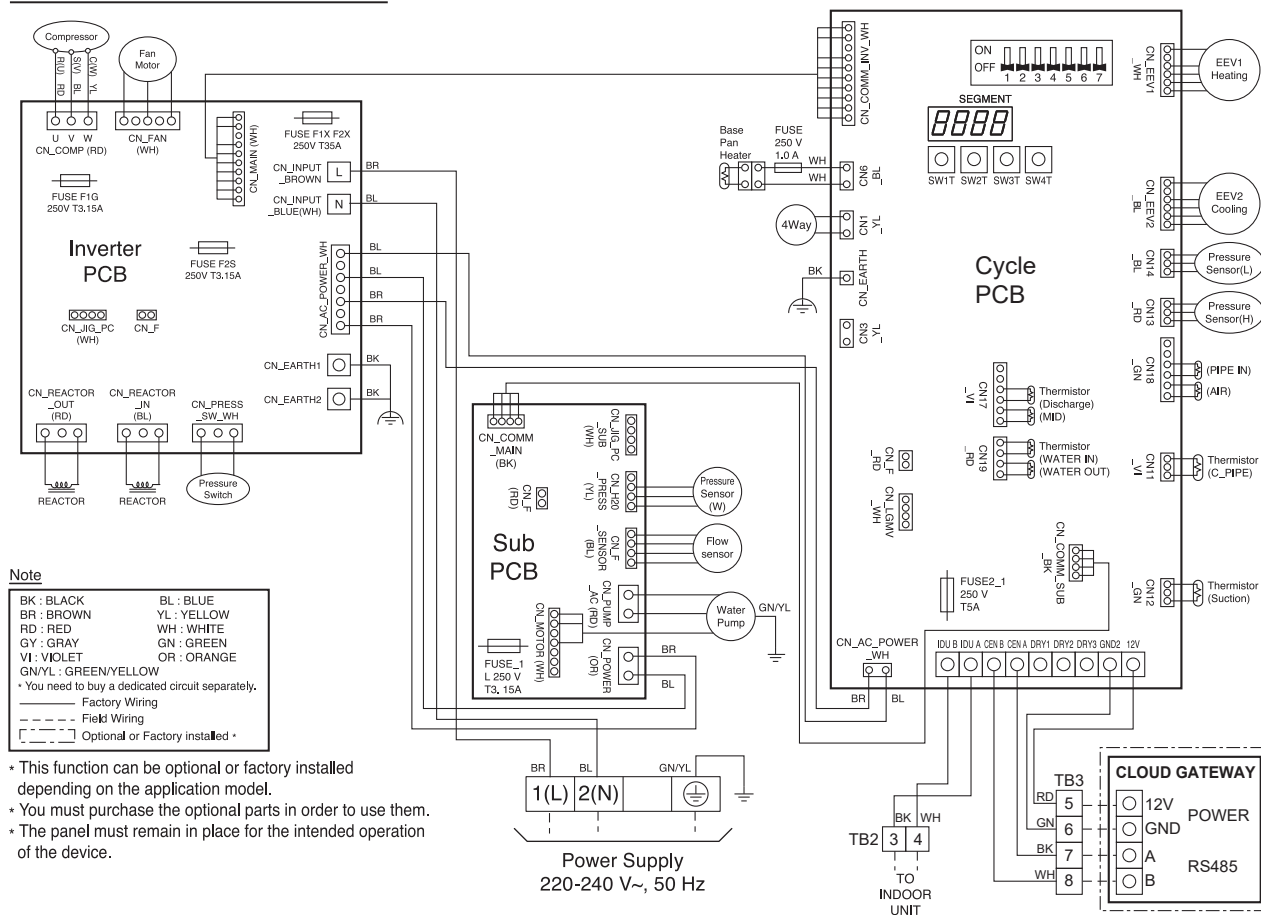


Category	Symbol	Meaning
Refrigerant side	S10	PHEX liquid temp. sensor
	S3	Compressor-discharge pipe temperature sensor
	S4	Compressor-suction pipe temperature sensor
	S2	Outdoor-HEX middle temp. sensor
	S5	Outdoor-HEX temp. sensor
	S6	Outdoor air temperature sensor
	EEV1	Electronic Expansion Valve (Heating)
	EEV2	Electronic Expansion Valve (Cooling)
Water Side	S11	Inlet water temperature sensor
	S12	Outlet water temperature sensor
	S17	Flow sensor
	S19	Water pressure sensor
	A1	Main Water Pump

6. Wiring Diagram

- ◆ FHBW056B1 [HM051HFD UA41] / FHBW076B1 [HM071HFD UA41] /
FHBW096B1 [HM091HFD UA41]

OUTDOOR WIRING DIAGRAM

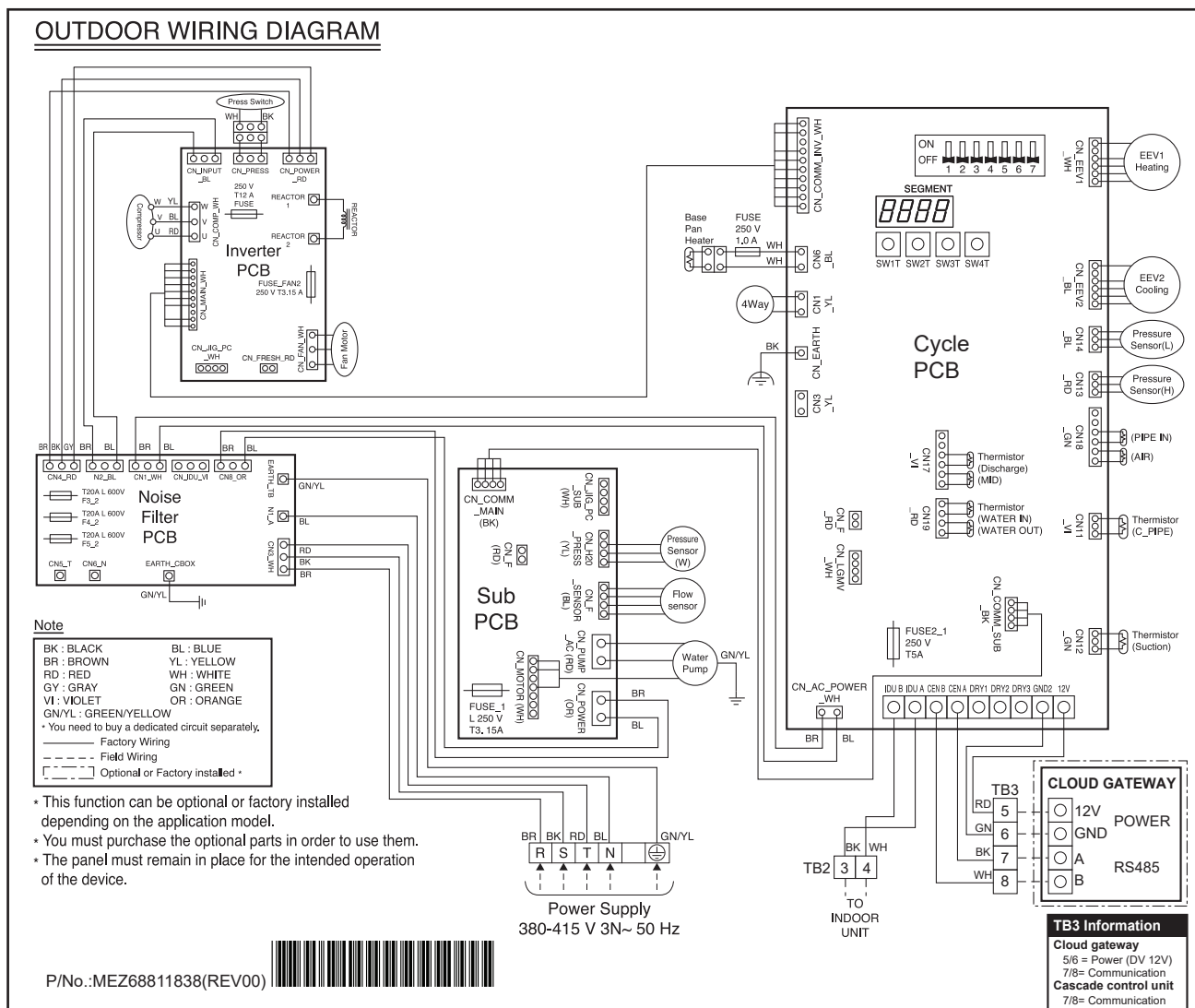


P/No.:MEZ68811837(REV00)



6. Wiring Diagram

◆ FHBW078B1 [HM073HFD UA41] / FHBW098B1 [HM093HFD UA41]

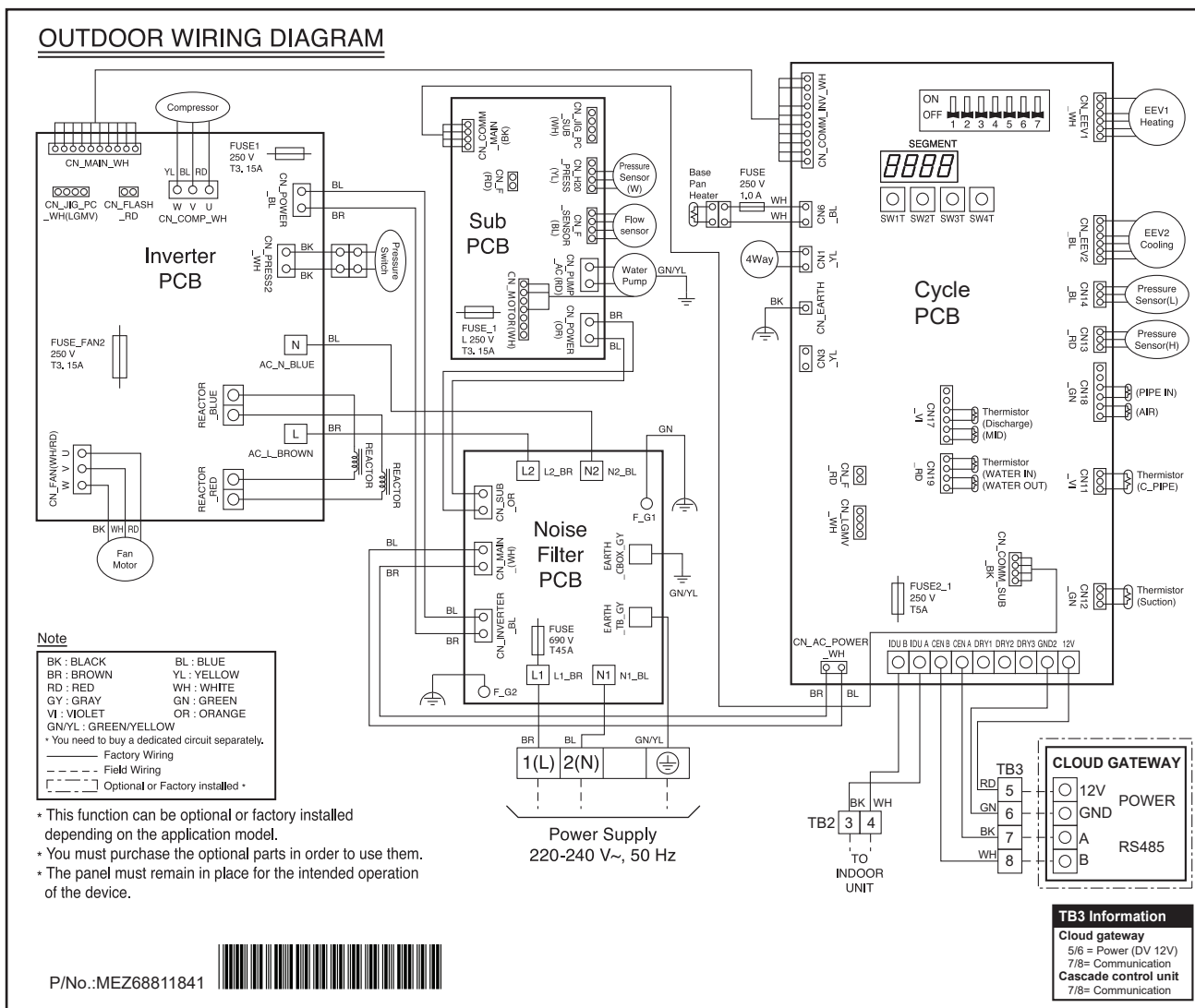


P/No.:MEZ68811838(REV00)



6. Wiring Diagram

- ◆ FHBW126B1 [HM121HFS UB41] / FHBW146B1 [HM141HFS UB41] /
FHBW166B1 [HM161HFS UB41]



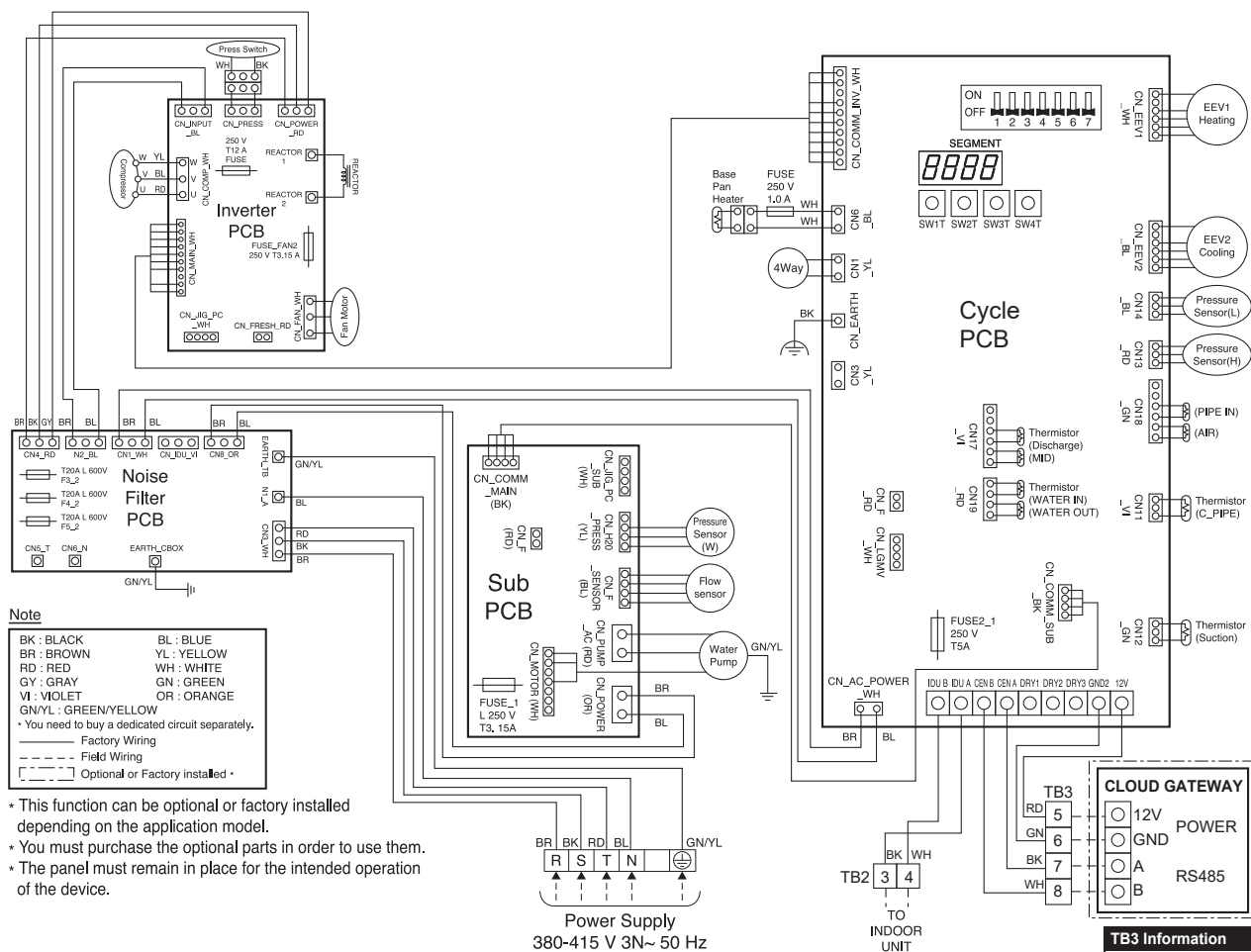
P/No.:MEZ68811841



6. Wiring Diagram

- ◆ FHBW128A1 [HM123HFS UB41] / FHBW148A1 [HM143HFS UB41] /
FHBW168A1 [HM163HFS UB41]

OUTDOOR WIRING DIAGRAM

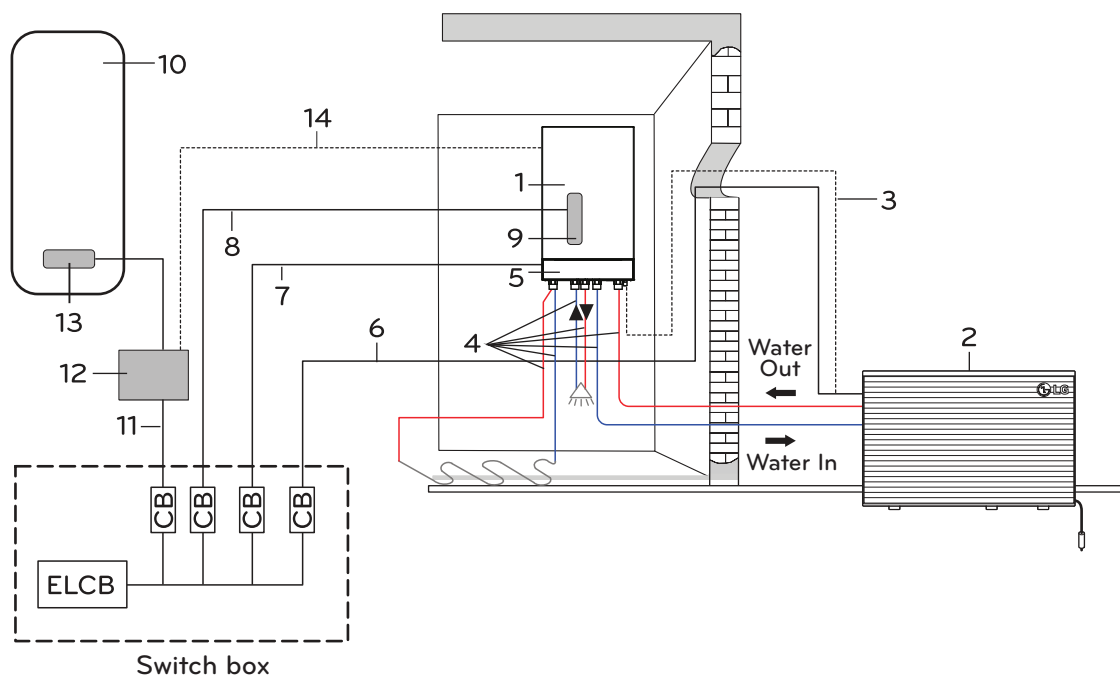


P/No.:MEZ68811838(REV00)



■ Field Wiring

◆ For Hydro Unit type



※ It can be different by model.

Description

No	Name	No	Name
1	Hydro unit	9	Backup heater
2	Outdoor unit	10	DHW tank*
3	Communication cable	11	Power supply DHW boost heater*
4	Heating water pipes	12	DHW tank kit (PHLTB)*
5	HMI	13	DHW boost heater*
6	Power supply outdoor unit	14	Connecting cable for DHW tank kit
7	Power supply indoor unit	*Optional	
8	Power supply backup heater*		

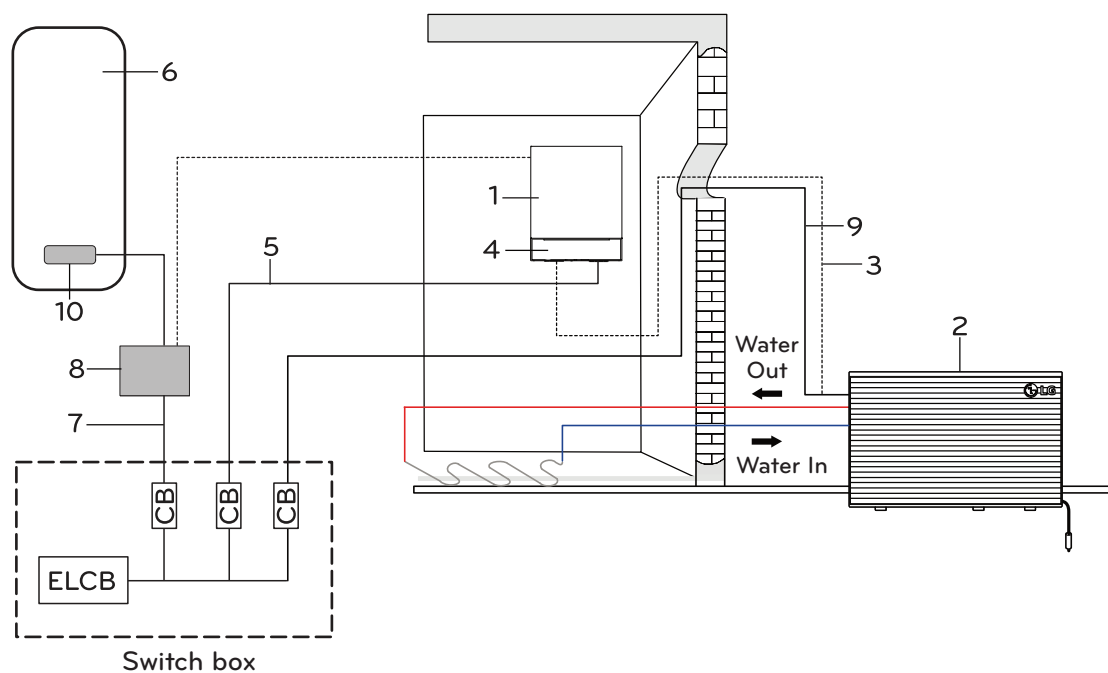
ELCB : Earth-leakage circuit breaker

CB : Circuit breaker

6. Wiring Diagram

■ Field Wiring

◆ For Control Unit type



Description

No	Name	No	Name
1	Control Unit	7	Power supply DHW boost heater*
2	Outdoor unit	8	DHW tank kit (PHLTB)*
3	Communication cable	9	Power supply outdoor unit
4	HMI	10	DHW boost heater*
5	Power supply indoor unit	11	Connecting cable for DHW tank kit
6	DHW tank*	*Optional	

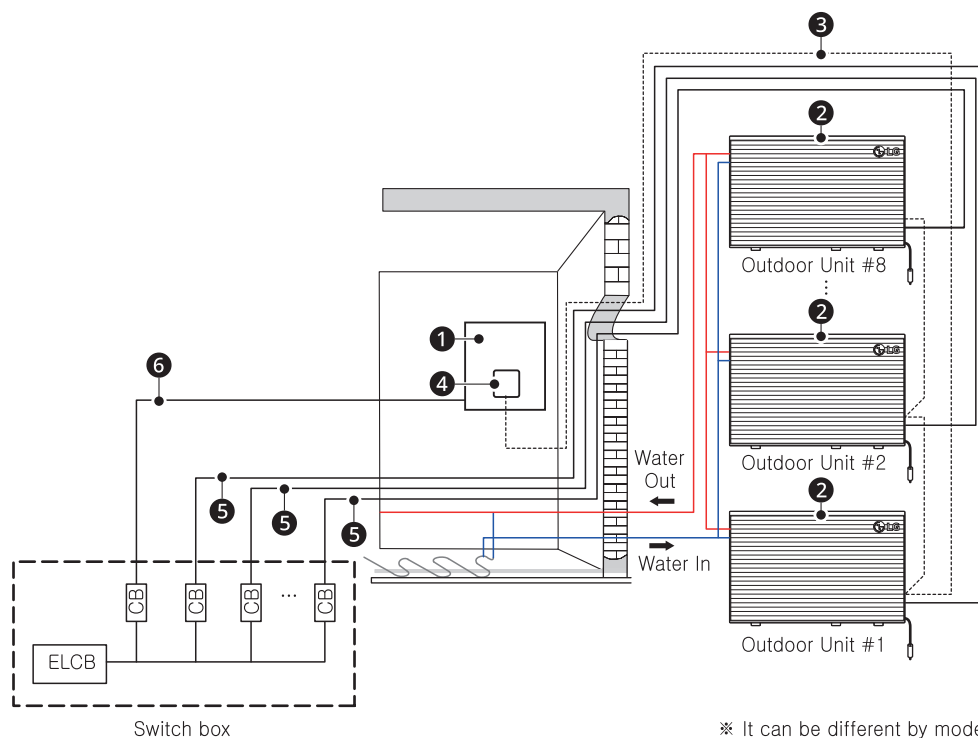
ELCB : Earth-leakage circuit breaker

CB : Circuit breaker

6. Wiring Diagram

■ Field Wiring

◆ For Cascade Control Unit type



No.	Name	No.	Name
1	Cascade Control unit	6	Power supply indoor unit
2	Outdoor unit	* Optional ELCB : Earth-leakage circuit breaker CB : Circuit breaker	
3	Communication cable		
4	Remote controller		
5	Power supply outdoor unit		

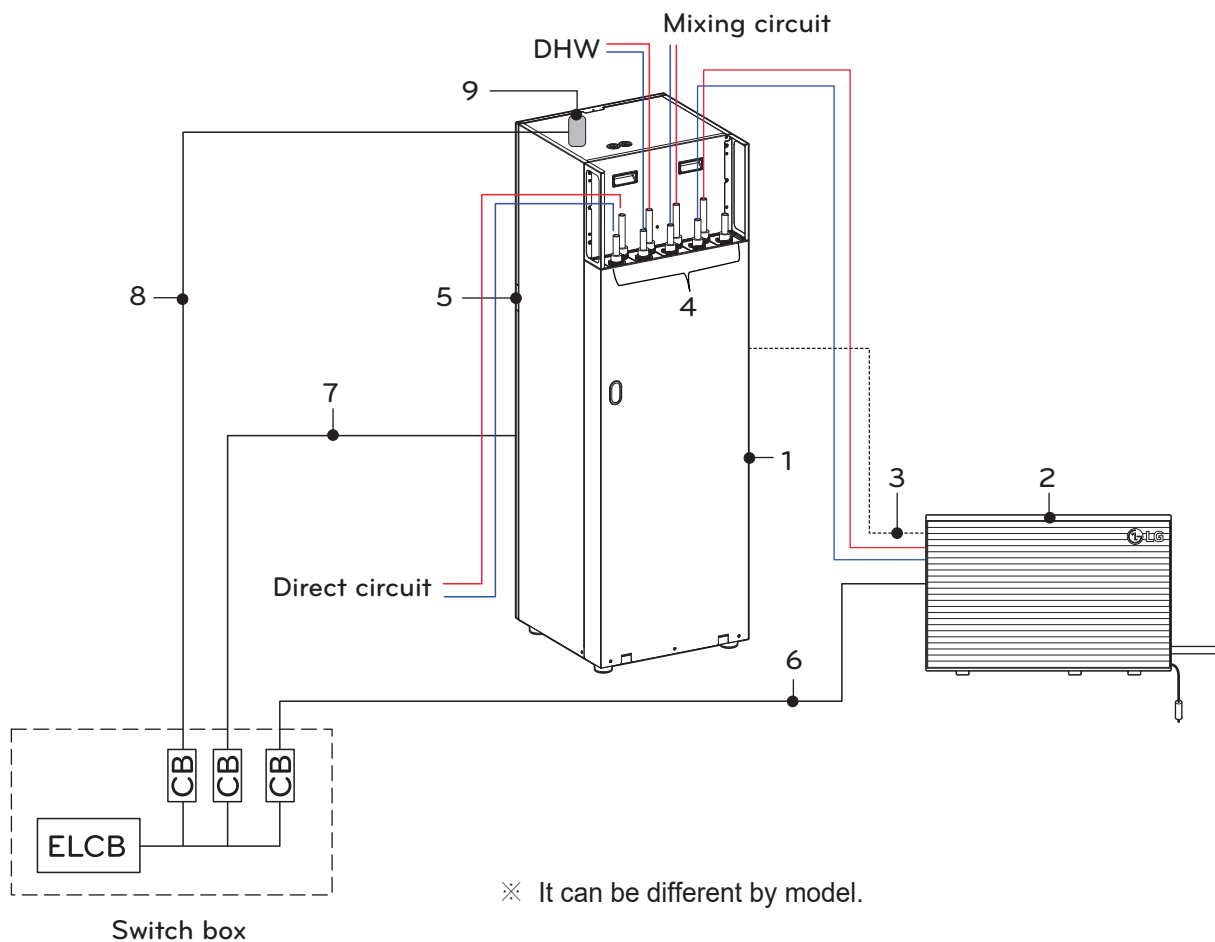
Note

1. Voltage supplied to the unit terminals should be within the minimum and maximum range.
2. Maximum allowable voltage unbalance between phase is 2%.
3. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).

6. Wiring Diagram

■ Field Wiring

◆ For Combi Unit 2C type



Description

No	Name	No	Name
1	Combi unit 2C	6	Power supply outdoor unit
2	Outdoor unit	7	Power supply indoor unit
3	Communication cable	8	Power supply backup heater*
4	Heating water pipes	9	Backup heater
5	HMI	* Optional	

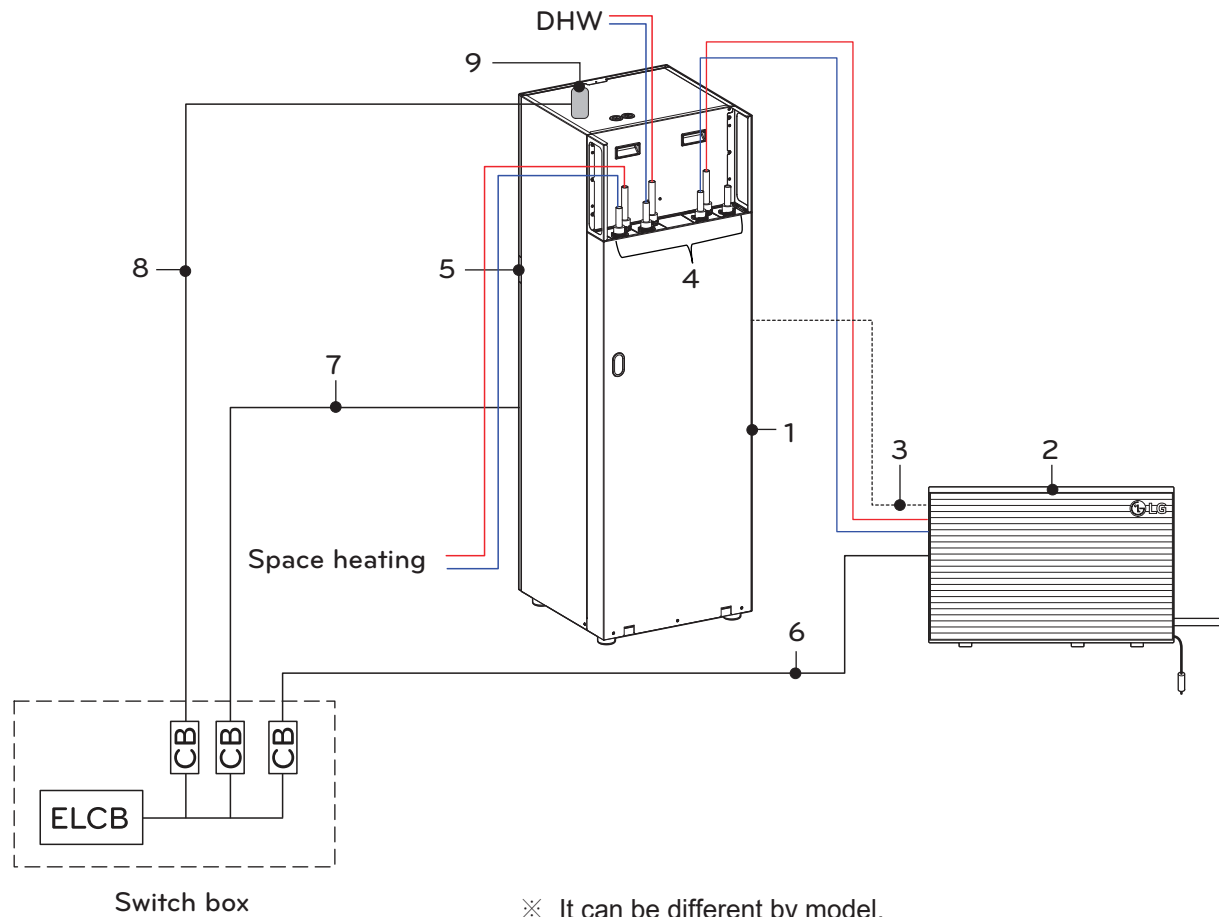
ELCB : Earth-leakage circuit breaker

CB : Circuit breaker

6. Wiring Diagram

■ Field Wiring

◆ For Combi Unit 1C type



Description

No	Name	No	Name
1	Combi unit 1C	6	Power supply outdoor unit
2	Outdoor unit	7	Power supply indoor unit
3	Communication cable	8	Power supply backup heater*
4	Heating water pipes	9	Backup heater
5	HMI	* Optional	

ELCB: Earth-leakage circuit breaker

CB : Circuit breaker

7. Performance Data

7.1 Cooling Operation

■ Maximum Cooling Capacity

◆ FHBW056B1 [HM051HFD UA41]

Outdoor Temp. [°C DB]	Water flow rate 15.8 LPM													
	LWT 7°C		LWT 10°C		LWT 13°C		LWT 15°C		LWT 18°C		LWT 20°C		LWT 22°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
20	5.50	3.99	5.50	4.52	5.50	5.05	5.50	5.41	5.50	5.95	5.50	6.31	5.50	6.68
30	5.50	3.25	5.50	3.67	5.50	4.09	5.50	4.38	5.50	4.81	5.50	5.10	5.50	5.39
35	5.50	3.00	5.50	3.26	5.50	3.63	5.50	3.88	5.50	4.25	5.50	4.50	5.50	4.75
40	4.91	2.55	5.50	2.86	5.50	3.17	5.50	3.88	5.50	3.70	5.50	3.91	5.50	4.13
45	4.67	2.20	5.05	2.46	5.50	2.72	5.50	2.89	5.50	3.15	5.50	3.33	5.50	3.50

◆ FHBW076B1 [HM071HFD UA41] / FHBW078B1[HM073HFD UA41]

Outdoor Temp. [°C DB]	Water flow rate 20.1 LPM													
	LWT 7°C		LWT 10°C		LWT 13°C		LWT 15°C		LWT 18°C		LWT 20°C		LWT 22°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
20	7.00	4.04	7.00	4.56	7.00	5.09	7.00	5.45	7.00	5.99	7.00	6.36	7.00	6.72
30	7.00	3.03	7.00	3.71	7.00	4.12	7.00	4.40	7.00	4.83	7.00	5.12	7.00	5.41
35	7.00	2.90	7.00	3.31	7.00	3.67	7.00	3.91	7.00	4.28	7.00	4.53	7.00	4.78
40	6.25	2.63	7.00	2.93	7.00	3.23	7.00	3.44	7.00	3.75	7.00	3.96	7.00	4.17
45	5.94	2.30	6.42	2.55	7.00	2.80	7.00	2.97	7.00	3.22	7.00	3.39	7.00	3.55

◆ FHBW096B1 [HM091HFD UA41] / FHBW098B1[HM093HFD UA41]

Outdoor Temp. [°C DB]	Water flow rate 25.9 LPM													
	LWT 7°C		LWT 10°C		LWT 13°C		LWT 15°C		LWT 18°C		LWT 20°C		LWT 22°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
20	9.00	3.94	9.00	4.48	9.00	5.01	9.00	5.37	9.00	5.91	9.00	6.27	9.00	6.63
30	9.00	3.20	9.00	3.63	9.00	4.07	9.00	4.35	9.00	4.78	9.00	5.07	9.00	5.36
35	8.00	2.85	8.89	3.21	9.00	3.59	9.00	3.84	9.00	4.22	9.00	4.47	9.00	4.72
40	8.00	2.47	8.26	2.79	8.52	3.12	8.69	3.33	9.00	3.65	9.00	3.87	9.00	4.09
45	7.54	2.10	7.63	2.37	7.73	2.64	7.80	2.82	7.90	3.09	7.96	3.27	8.03	3.45

Note

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liter per minute (ℓ/min)
2. TC : Total capacity(kW), EER: Energy efficiency ratio(kW/kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN14511.
 - Rated values are based on standard conditions, and it can be found on specifications.
 - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
 - In accordance with the test standard(or nations), the results may vary.
5. The Shaded areas are not guaranteed continuous operation.

7. Performance Data

7.1 Cooling Operation

■ Maximum Cooling Capacity

◆ FHBW126B1 [HM121HFD UB41] / FHBW128B1[HM123HFD UB41]

Outdoor Temp. [°C DB]	Water flow rate 34.5 LPM													
	LWT 7°C		LWT 10°C		LWT 13°C		LWT 15°C		LWT 18°C		LWT 20°C		LWT 22°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
20	12.00	4.41	12.00	4.82	12.00	5.23	12.00	5.50	12.00	5.90	12.00	6.17	12.00	6.44
30	10.06	3.48	10.79	3.88	11.53	4.28	12.00	4.54	12.00	4.93	12.00	5.16	12.00	5.38
35	9.01	3.02	9.65	3.41	10.36	3.81	10.96	4.10	12.00	4.70	12.00	4.78	12.00	4.86
40	7.95	2.55	8.37	2.92	8.79	3.30	9.07	3.54	9.37	3.90	9.43	4.12	9.42	4.33
45	6.89	2.09	7.04	2.43	7.19	2.77	7.29	3.00	7.43	3.34	7.53	3.57	7.63	3.80

◆ FHBW146B1 [HM141HFD UB41] / FHBW148B1[HM143HFD UB41]

Outdoor Temp. [°C DB]	Water flow rate 40.3 LPM													
	LWT 7°C		LWT 10°C		LWT 13°C		LWT 15°C		LWT 18°C		LWT 20°C		LWT 22°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
20	12.84	4.29	14.00	4.74	14.00	5.19	14.00	5.48	14.00	5.93	14.00	6.22	14.00	6.52
30	10.61	3.46	11.50	3.86	12.39	4.27	12.98	4.53	13.76	4.93	14.00	5.17	14.00	5.42
35	9.50	3.04	10.28	3.42	11.10	3.81	11.75	4.08	13.75	4.60	12.78	4.69	12.60	4.87
40	8.39	2.62	8.95	2.97	9.51	3.32	9.88	3.55	10.35	3.89	10.55	4.11	10.70	4.32
45	7.28	2.20	7.58	2.51	7.89	2.82	8.09	3.03	8.39	3.35	8.60	3.56	8.80	3.77

◆ FHBW166B1 [HM161HFD UB41] / FHBW168B1[HM163HFD UB41]

Outdoor Temp. [°C DB]	Water flow rate 46 LPM													
	LWT 7°C		LWT 10°C		LWT 13°C		LWT 15°C		LWT 18°C		LWT 20°C		LWT 22°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
20	13.50	4.25	14.82	4.72	16.00	5.19	16.00	5.50	16.00	5.97	16.00	6.29	16.00	6.60
30	11.16	3.47	12.20	3.87	13.24	4.28	13.93	4.54	14.91	4.94	15.49	5.20	16.00	5.45
35	9.99	3.08	10.89	3.45	11.83	3.82	12.53	4.07	14.30	4.50	13.88	4.67	14.01	4.88
40	8.83	2.70	9.52	3.02	10.21	3.35	10.68	3.57	11.32	3.89	11.68	4.10	11.99	4.30
45	7.66	2.31	8.12	2.59	8.58	2.88	8.89	3.07	9.36	3.35	9.67	3.54	9.98	3.73

Note

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liter per minute (ℓ/min)
2. TC : Total capacity(kW), EER: Energy efficiency ratio(kW/kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN14511.
 - Rated values are based on standard conditions, and it can be found on specifications.
 - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
 - In accordance with the test standard(or nations), the results may vary.
5. The Shaded areas are not guaranteed continuous operation.

7. Performance Data

7.2 Heating Operation

■ Maximum Heating Capacity (Include defrost effect)

◆ FHBW056B1 [HM051HFD UA41]

Outdoor Temp. [°C DB]	Water flow rate 15.8 LPM								Water flow rate 9.9 LPM				Water flow rate 7.9 LPM							
	LWT 30°C		LWT 35°C		LWT 40°C		LWT 45°C		LWT 50°C		LWT 55°C		LWT 60°C		LWT 65°C		LWT 70°C		LWT 75°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25	4.98	2.00	4.85	1.90	4.72	1.69	4.59	1.69	4.47	1.59	4.34	1.48	4.21	1.38						
-20	5.50	2.21	5.29	2.10	5.09	1.92	4.90	1.92	4.69	1.81	4.45	1.57	4.11	1.54	3.66	1.35				
-15	5.50	2.37	5.50	2.30	5.50	2.15	5.21	2.15	4.94	2.05	4.83	1.69	4.29	1.66	3.89	1.62	3.49	1.47	3.10	1.32
-7	5.50	2.54	5.50	2.85	5.50	2.60	5.50	2.53	5.50	2.47	5.50	1.90	4.68	1.86	4.23	1.84	3.77	1.81	3.31	1.62
-4	5.50	2.66	5.50	2.87	5.50	2.80	5.50	2.80	5.50	2.68	5.50	2.36	4.85	2.34	4.36	2.15	3.88	1.94	3.39	1.73
-2	5.50	2.77	5.50	2.97	5.50	2.96	5.50	2.96	5.50	2.82	5.50	2.63	4.97	2.45	4.45	2.25	3.95	2.03	3.44	1.80
2	5.50	3.17	5.50	3.20	5.50	3.30	5.50	3.30	5.50	3.12	5.50	2.76	5.19	2.70	4.63	2.47	4.08	2.21	3.55	1.95
7	5.50	4.78	5.50	4.90	5.50	3.79	5.50	3.79	5.50	3.57	5.50	2.95	5.50	2.85	4.83	2.75	4.25	2.45	3.68	2.14
10	5.50	4.97	5.50	5.00	5.50	4.09	5.50	4.09	5.50	3.84	5.50	3.58	5.50	3.25	4.95	2.92	4.35	2.59	3.76	2.25
15	5.50	5.19	5.50	5.10	5.50	4.60	5.50	4.60	5.50	4.29	5.50	3.95	5.50	3.59	5.15	3.21	4.52	2.83	3.89	2.44
18	5.50	5.68	5.50	5.49	5.50	4.91	5.50	4.91	5.50	4.56	5.50	4.19	5.50	3.79	5.27	3.39	4.62	2.97	3.92	2.55
20	5.50	6.02	5.50	5.77	5.50	5.13	5.50	5.13	5.50	4.75	5.50	4.35	5.50	3.93	5.35	3.50	4.69	3.07	3.96	2.63
35	5.50	8.62	5.50	8.02	5.50	6.81	5.50	6.81	5.50	6.21	5.50	5.60	5.50	5.00	5.50	4.40	5.20	3.80	4.00	3.19

◆ FHBW076B1 [HM071HFD UA41] / FHBW078B1[HM073HFD UA41]

Outdoor Temp. [°C DB]	Water flow rate 20.1 LPM								Water flow rate 12.6 LPM				Water flow rate 10.0 LPM							
	LWT 30°C		LWT 35°C		LWT 40°C		LWT 45°C		LWT 50°C		LWT 55°C		LWT 60°C		LWT 65°C		LWT 70°C		LWT 75°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25	6.34	1.95	6.17	1.85	6.01	1.75	5.85	1.65	5.68	1.55	5.42	1.41	5.36	1.35						
-20	7.00	2.15	6.73	2.05	6.48	1.96	6.23	1.87	5.97	1.77	5.86	1.58	5.23	1.50	4.65	1.32				
-15	7.00	2.31	7.00	2.24	7.00	2.18	6.63	2.10	6.29	2.00	6.12	1.65	5.36	1.60	4.85	1.50	4.44	1.42	3.95	1.28
-7	7.00	2.48	7.00	2.58	7.00	2.47	7.00	2.34	7.00	2.12	7.00	1.85	5.95	1.75	5.38	1.65	4.80	1.53	4.21	1.43
-4	7.00	2.59	7.00	2.75	7.00	2.79	7.00	2.72	7.00	2.59	7.00	2.43	6.17	2.25	5.55	2.07	4.93	1.87	4.31	1.67
-2	7.00	2.70	7.00	2.89	7.00	2.94	7.00	2.86	7.00	2.71	7.00	2.53	6.32	2.35	5.67	2.16	5.02	1.95	4.38	1.74
2	7.00	3.98	7.00	3.01	7.00	3.30	7.00	3.17	7.00	2.98	7.00	2.70	6.61	2.57	5.89	2.35	5.20	2.12	4.51	1.88
7	7.00	3.77	7.00	4.70	7.00	3.85	7.00	3.30	7.00	3.16	7.00	2.85	7.00	2.73	6.15	2.61	5.41	2.34	4.68	2.06
10	7.00	4.18	7.00	4.73	7.00	4.13	7.00	3.87	7.00	3.60	7.00	3.33	7.00	3.05	6.30	2.77	5.54	2.47	4.78	2.17
15	7.00	4.85	7.00	4.78	7.00	4.58	7.00	4.31	7.00	4.01	7.00	3.69	7.00	3.37	6.55	3.03	5.75	2.69	4.95	2.35
18	7.00	5.28	7.00	5.12	7.00	4.88	7.00	4.59	7.00	4.26	7.00	3.92	7.00	3.56	6.71	3.20	5.88	2.83	5.05	2.46
20	7.00	5.58	7.00	5.36	7.00	5.09	7.00	4.78	7.00	4.43	7.00	4.07	7.00	3.69	6.81	3.31	4.96	2.92	5.11	2.53
35	7.00	7.90	7.00	7.37	7.00	6.83	7.00	6.29	7.00	5.75	7.00	5.22	7.00	4.68	7.00	4.14	6.62	3.61	5.20	3.07

◆ FHBW096B1 [HM091HFD UA41] / FHBW098B1[HM093HFD UA41]

Outdoor Temp. [°C DB]	Water flow rate 25.9 LPM								Water flow rate 16.2 LPM				Water flow rate 12.9 LPM							
	LWT 30°C		LWT 35°C		LWT 40°C		LWT 45°C		LWT 50°C		LWT 55°C		LWT 60°C		LWT 65°C		LWT 70°C		LWT 75°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25	6.65	1.90	6.92	1.81	6.89	1.71	6.86	1.61	6.82	1.51	6.79	1.42	6.47	1.32						
-20	8.09	2.09	7.74	2.00	7.51	1.92	7.32	1.83	7.16	1.72	6.98	1.60	6.72	1.55	6.35	1.28				
-15	9.00	2.25	8.45	2.19	8.08	2.13	7.77	2.05	7.50	1.94	7.35	1.73	6.93	1.67	6.60	1.59	6.26	1.38	5.69	1.24
-7	9.00	2.41	9.00	2.53	8.80	2.60	8.38	2.47	8.05	2.34	8.00	1.80	7.34	1.75	6.95	1.72	6.54	1.69	5.72	1.51
-4	9.00	2.52	9.00	2.69	8.87	2.73	8.56	2.64	8.25	2.50	8.00	2.24	7.52	2.16	7.09	1.99	6.65	1.80	5.75	1.62
-2	8.20	2.63	8.30	2.82	8.30	2.86	8.20	2.77	8.10	2.62	8.00	2.44	7.64	2.26	7.19	2.07	6.72	1.88	5.80	1.68
2	8.00	2.97	8.00	3.10	8.10	3.19	8.10	3.05	8.10	2.85	8.00	2.64	7.90	2.45	7.38	2.25	6.86	2.04	5.83	1.82
7	9.00	3.60	9.00	4.60	9.00	3.69	9.00	3.42	9.00	3.17	9.00	2.70	8.24	2.65	7.63	2.47	7.04	2.24	5.85	1.99
10	9.00	3.95	9.00	4.50	9.00	3.92	9.00	3.65	9.00	3.38	9.00	3.10	8.39	2.86	7.77	2.62	7.15	2.36	5.90	2.10
15	9.00	4.53	9.00	4.48	9.00	4.30	9.00	4.04	9.00	3.75	9.00	3.46	8.64	3.16	7.99	2.87	7.33	2.57	6.06	2.27
18	9.00	4.90	9.00	4.77	9.00	4.56	9.00	4.28	9.00	3.98	9.00	3.66	8.81	3.34	8.13	3.02	7.43	2.70	6.22	2.37
20	9.00	5.16	9.00	4.98	9.00	4.74	9.00	4.45	9.00	4.13	9.00	3.80	8.93	3.46	8.23	3.12	7.50	2.78	6.30	2.44
35	9.00	7.24	9.00	6.77	9.00	6.29	9.00	5.81	9.00	5.33	9.00	4.86	9.00	4.38	9.00	3.90	8.07	3.43	6.35	2.95

Note

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liter per minute (ℓ/min)
2. TC : Total capacity(kW), EER: Energy efficiency ratio(kW/kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN14511.
 - Rated values are based on standard conditions, and it can be found on specifications.
 - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
 - In accordance with the test standard(or nations), the results may vary.
5. The Shaded areas are not guaranteed continuous operation.

7. Performance Data

7.2 Heating Operation

■ Maximum Heating Capacity (Include defrost effect)

◆ FHBW126B1 [HM121HFD UB41] / FHBW128B1[HM123HFD UB41]

Outdoor Temp. [°C DB]	Water flow rate 34.5 LPM								Water flow rate 21.6 LPM				Water flow rate 17.3 LPM		Water flow rate 11.5 LPM					
	LWT 30°C		LWT 35°C		LWT 40°C		LWT 45°C		LWT 50°C		LWT 55°C		LWT 60°C		LWT 65°C		LWT 70°C		LWT 75°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25	8.97	2.04	8.70	1.92	8.43	1.79	8.16	1.67	7.90	1.54	7.63	1.42	7.36	1.29						
-20	9.85	2.53	9.53	2.36	9.18	2.20	8.82	2.04	8.45	1.88	8.07	1.72	7.68	1.57	7.29	1.42				
-15	10.75	3.01	10.37	2.81	9.95	2.61	9.49	2.42	9.01	2.22	8.52	2.02	8.01	1.83	7.50	1.62	6.98	1.42	6.48	1.21
-7	12.00	3.40	12.00	3.17	11.26	2.94	10.62	2.72	10.13	2.49	10.00	2.26	8.56	2.02	7.87	1.77	7.17	1.52	6.46	1.25
-4	12.00	3.66	12.00	3.41	11.81	3.16	11.07	2.92	10.50	2.68	10.30	2.43	8.77	2.17	8.01	1.90	7.24	1.61	6.45	1.31
-2	12.00	3.83	12.00	3.57	12.00	3.31	11.37	3.06	10.74	2.80	10.51	2.54	8.91	2.27	8.11	1.98	7.29	1.68	6.45	1.35
2	12.00	4.17	12.00	3.87	12.00	3.60	11.97	3.33	11.00	3.05	10.90	2.77	9.19	2.48	8.31	2.16	7.42	1.82	6.44	1.43
7	12.00	5.11	12.00	4.60	12.00	4.41	12.00	4.09	11.52	3.76	11.35	3.41	9.53	3.05	8.58	2.68	7.63	2.28		
10	12.00	5.41	12.00	5.01	12.00	4.67	12.00	4.33	11.80	3.98	10.73	3.61	9.72	3.24	8.73	2.86	7.76	2.46		
15	12.00	5.92	12.00	5.51	12.00	5.12	12.00	4.74	12.00	4.35	11.09	3.96	10.02	3.57	8.98	3.17	7.99	2.77		
18	12.00	6.23	12.00	5.80	12.00	5.39	12.00	4.99	12.00	4.58	11.28	4.17	10.18	3.77	9.12	3.36	8.15	2.97		
20	12.00	6.43	12.00	5.99	12.00	5.57	12.00	5.15	12.00	4.73	11.41	4.31	10.29	3.90	9.20	3.48	7.93	2.99		
35	12.00	7.91	12.00	7.40	12.00	6.89	12.00	6.37	12.00	5.86	12.00	5.35	10.81	4.83	9.43	4.32				

◆ FHBW146B1 [HM141HFD UB41] / FHBW148B1[HM143HFD UB41]

Outdoor Temp. [°C DB]	Water flow rate 40.3 LPM								Water flow rate 25.2 LPM				Water flow rate 20.1 LPM		Water flow rate 13.4 LPM					
	LWT 30°C		LWT 35°C		LWT 40°C		LWT 45°C		LWT 50°C		LWT 55°C		LWT 60°C		LWT 65°C		LWT 70°C		LWT 75°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25	9.40	2.01	9.15	1.89	8.90	1.78	8.65	1.66	8.40	1.54	8.15	1.43	7.90	1.31						
-20	10.27	2.50	9.94	2.34	9.60	2.19	9.26	2.04	8.92	1.89	8.57	1.73	8.23	1.59	7.90	1.44				
-15	11.14	2.99	10.74	2.80	10.32	2.61	9.88	2.42	9.44	2.23	8.99	2.04	8.54	1.85	8.09	1.65	7.66	1.45	7.29	1.24
-7	12.56	3.39	12.50	3.16	11.92	2.94	11.31	2.72	11.15	2.51	11.00	2.28	9.02	2.06	8.39	1.82	7.74	1.56	7.09	1.30
-4	13.11	3.65	13.04	3.40	12.40	3.16	11.70	2.93	11.42	2.70	11.13	2.46	9.21	2.21	8.50	1.95	7.77	1.67	7.02	1.37
-2	13.49	3.82	13.40	3.56	12.72	3.31	11.97	3.07	11.62	2.83	11.26	2.58	9.33	2.32	8.58	2.04	7.79	1.74	6.97	1.42
2	14.00	4.16	13.68	3.85	12.89	3.60	12.04	3.35	11.70	3.09	11.35	2.82	9.58	2.54	8.75	2.24	7.87	1.91	6.87	1.51
7	14.00	5.09	14.00	4.50	13.66	4.41	12.66	4.13	12.07	3.82	11.48	3.49	9.91	3.16	9.00	2.80	8.06	2.42		
10	14.00	5.40	14.00	4.99	14.00	4.69	13.00	4.38	12.26	4.05	11.52	3.72	10.12	3.37	9.17	3.01	8.21	2.62		
15	14.00	5.93	14.00	5.54	14.00	5.17	13.53	4.82	12.60	4.46	11.66	4.10	10.45	3.74	9.45	3.37	8.47	2.99		
18	14.00	6.24	14.00	5.84	14.00	5.46	13.84	5.08	12.76	4.71	11.70	4.34	10.65	3.97	9.62	3.59	8.66	3.24		
20	14.00	6.45	14.00	6.04	14.00	5.65	14.00	5.26	12.94	4.88	11.85	4.50	10.78	4.12	9.72	3.75	8.48	3.28		
35	14.00	7.97	14.00	7.52	14.00	7.06	14.00	6.61	14.00	6.16	12.89	5.71	11.53	5.26	10.17	4.82				

◆ FHBW166B1 [HM161HFD UB41] / FHBW168B1[HM163HFD UB41]

Outdoor Temp. [°C DB]	Water flow rate 46 LPM								Water flow rate 28.8 LPM				Water flow rate 23 LPM		Water flow rate 15.3 LPM					
	LWT 30°C		LWT 35°C		LWT 40°C		LWT 45°C		LWT 50°C		LWT 55°C		LWT 60°C		LWT 65°C		LWT 70°C		LWT 75°C	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25	9.82	1.98	9.59	1.88	9.36	1.77	9.13	1.66	8.90	1.55	8.67	1.45	8.44	1.34						
-20	10.83	2.49	10.52	2.34	10.20	2.19	9.86	2.04	9.51	1.89	9.17	1.74	8.84	1.60	8.55	1.46				
-15	11.84	3.00	11.45	2.80	11.03	2.61	10.58	2.42	10.12	2.23	9.65	2.04	9.20	1.85	8.76	1.66	8.37	1.46	8.10	1.28
-7	14.02	3.42	13.50	3.18	12.90	2.96	12.22	2.73	12.11	2.51	12.00	2.28	9.71	2.04	9.04	1.80	8.38	1.57	7.72	1.34
-4	14.67	3.69	14.12	3.42	13.44	3.18	12.68	2.94	12.37	2.70	12.07	2.45	9.90	2.20	9.14	1.94	8.37	1.68	7.58	1.42
-2	15.10	3.86	14.56	3.58	13.82	3.33	12.97	3.08	12.54	2.84	12.12	2.58	10.01	2.31	9.20	2.04	8.36	1.76	7.48	1.47
2	15.39	4.21	14.94	3.87	14.03	3.62	13.56	3.37	12.87	3.11	12.19	2.83	10.25	2.54	9.33	2.25	8.37	1.94	7.29	1.58
7	16.00	5.16	16.00	4.40	14.89	4.45	13.66	4.18	12.99	3.86	12.31	3.53	10.53	3.19	9.52	2.85	8.49	2.49		
10	16.00	5.50	16.00	5.04	15.20	4.75	13.97	4.45	13.20	4.12	12.43	3.78	10.69	3.43	9.64	3.08	8.58	2.72		
15	16.00	6.07	16.00	5.66	15.57	5.29	14.00	4.94	13.23	4.58	12.78	4.21	10.95	3.85	9.84	3.49	8.76	3.15		
18	16.00	6.41	16.00	6.00	15.81	5.61	14.64	5.23	13.44	4.86	12.97	4.48	11.10	4.11	9.95	3.75	8.90	3.43		
20	16.00	6.63	16.00	6.22	16.00	5.82	14.79	5.43	13.58	5.05	13.09	4.67	11.18	4.29	10.02	3.93	8.65	3.51		
35	16.00	8.27	16.00	7.83	16.00	7.38	16.00	6.94	14.51	6.50	13.81	6.06	11.60	5.61	10.21	5.17				

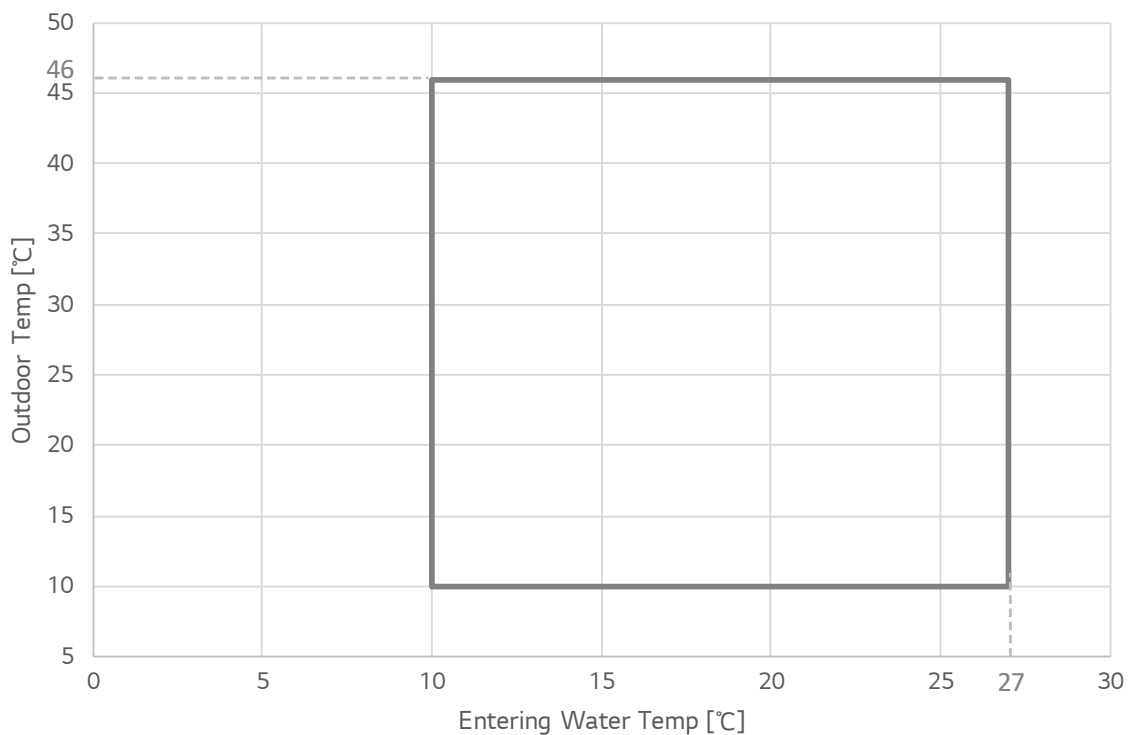
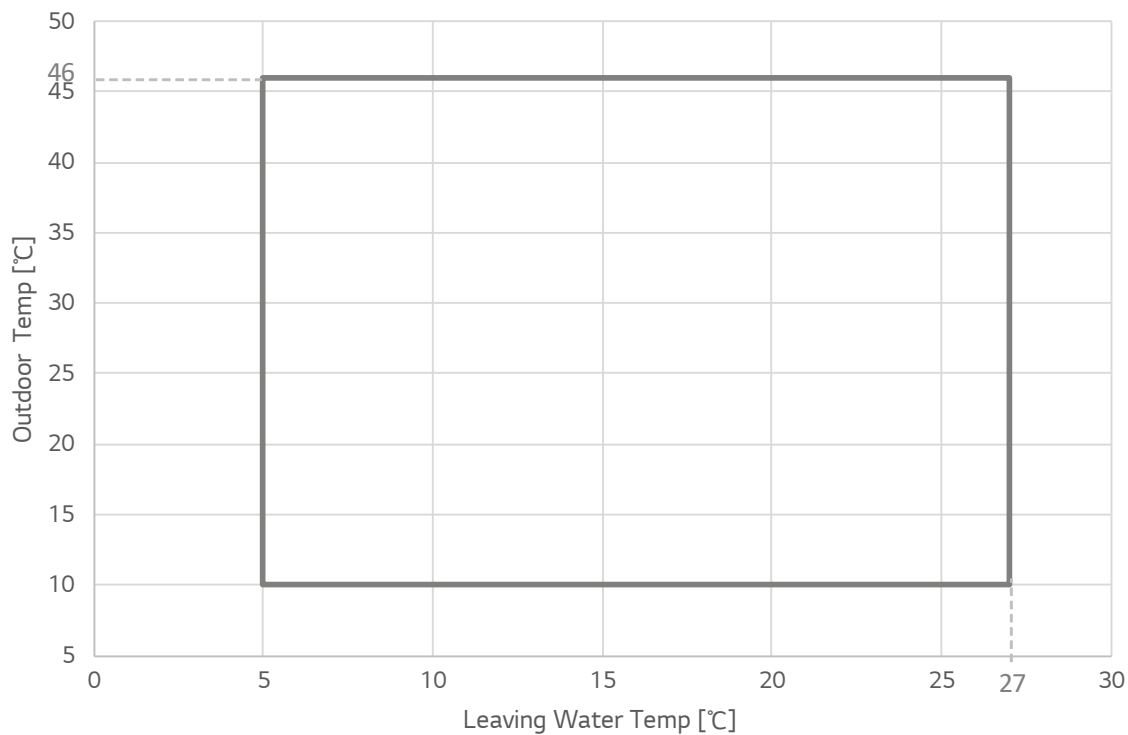
Note

- DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liter per minute (ℓ/min)
- TC : Total capacity(kW), EER: Energy efficiency ratio(kW/kW), COP : Coefficient of performance (kW/kW)
- Direct interpolation is permissible. Do not extrapolate.
- Measuring procedure follows EN14511.
 - Rated values are based on standard conditions, and it can be found on specifications.
 - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
 - In accordance with the test standard(or nations), the results may vary.
- The Shaded areas are not guaranteed continuous operation.

8. Operation Range

8.1 Cooling

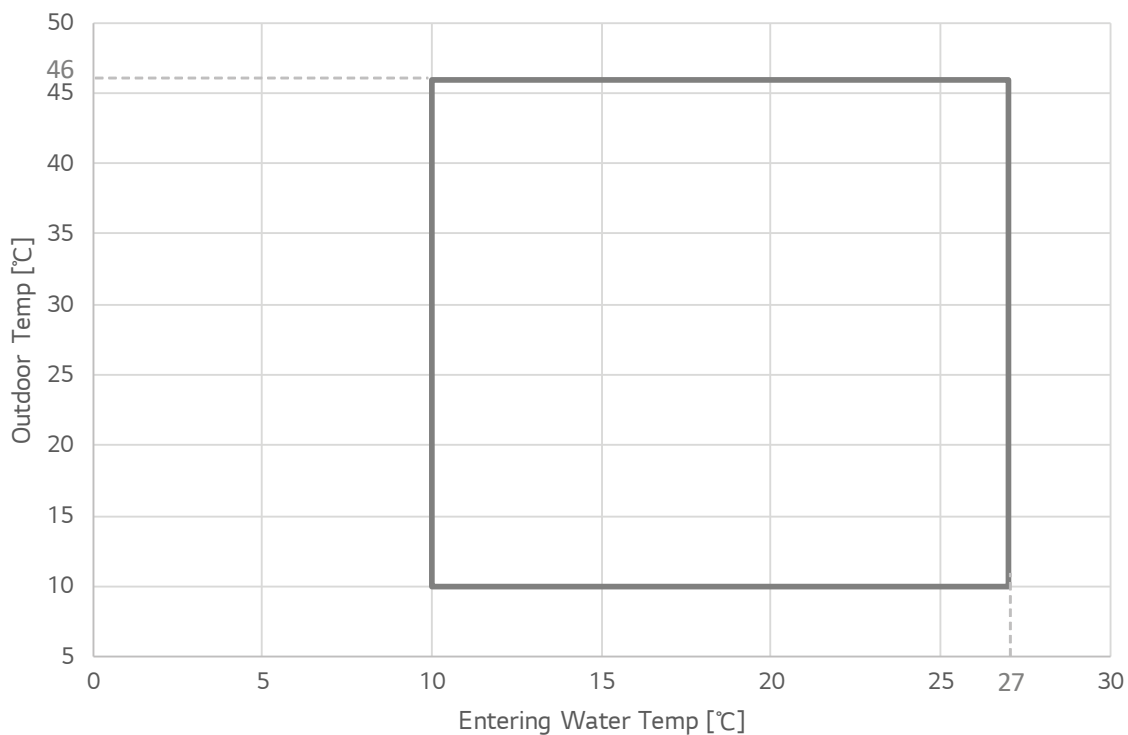
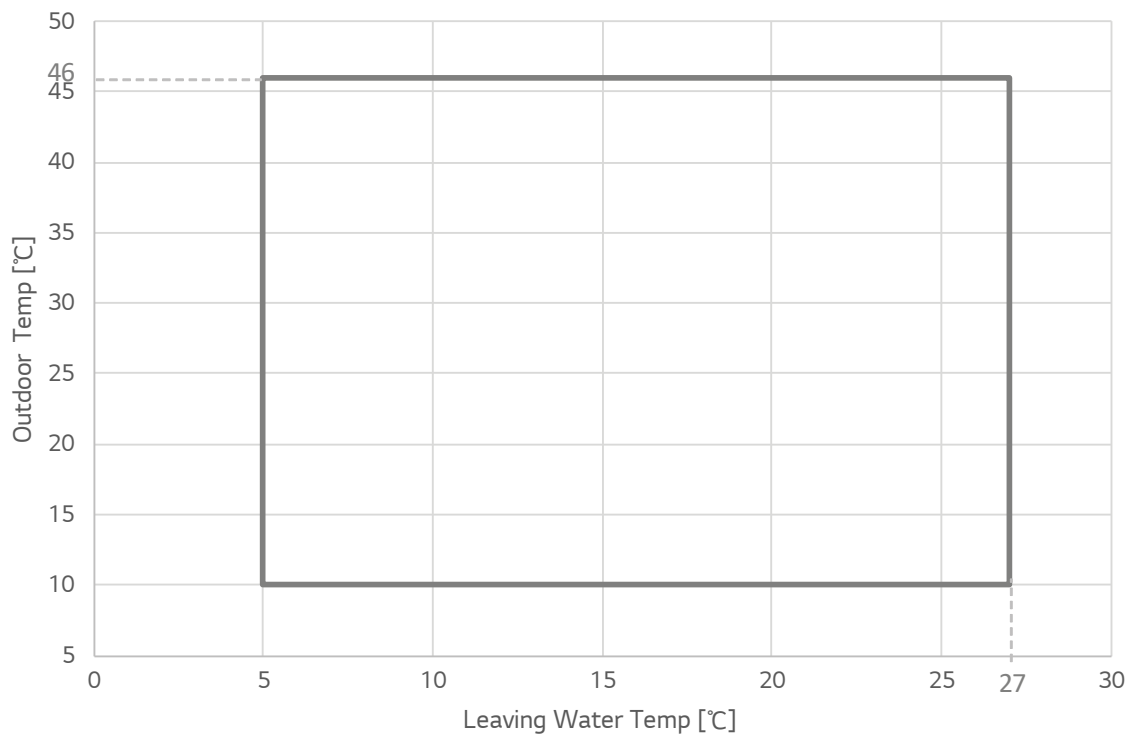
■ FHBW056B1 [HM051HFD UA41] / FHBW076B1 [HM071HFD UA41] /
FHBW096B1 [HM091HFD UA41] / FHBW078B1 [HM073HFD UA41] /
FHBW098B1 [HM093HFD UA41]



8. Operation Range

8.1 Cooling

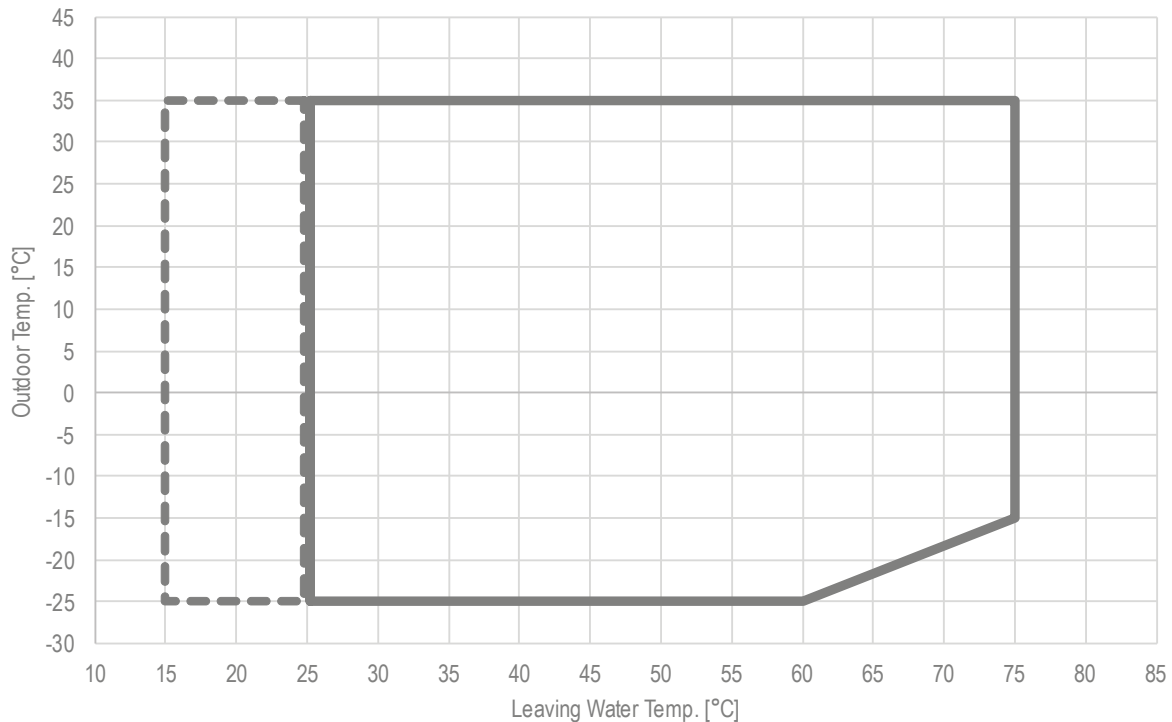
■ FHBW126B1 [HM121HFD UB41] / FHBW146B1 [HM141HFD UB41] /
FHBW166B1 [HM161HFD UB41] / FHBW128B1 [HM123HFD UB41] /
FHBW148B1 [HM143HFD UB41] / FHBW168B1 [HM163HFD UB41]



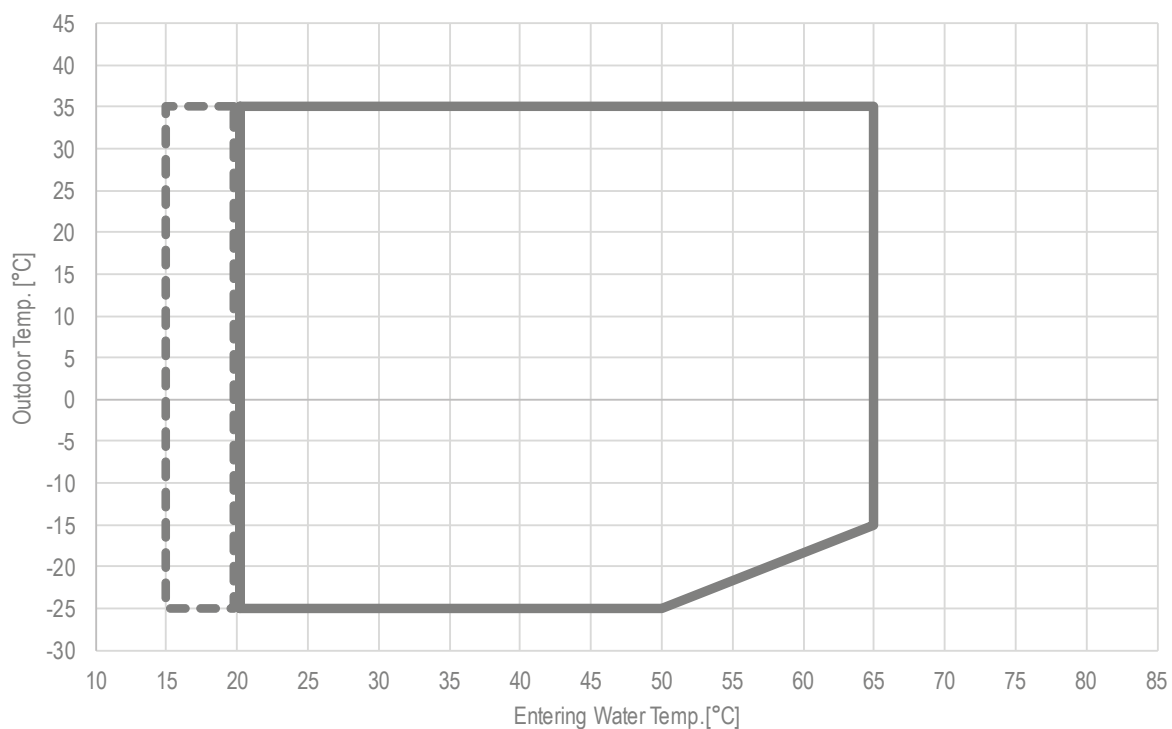
8. Operation Range

8.2 Heating

■ FHBW056B1 [HM051HFD UA41] / FHBW076B1 [HM071HFD UA41] /
FHBW096B1 [HM091HFD UA41] / FHBW078B1 [HM073HFD UA41] /
FHBW098B1 [HM093HFD UA41]



--- Electric heater required to achieve temp.

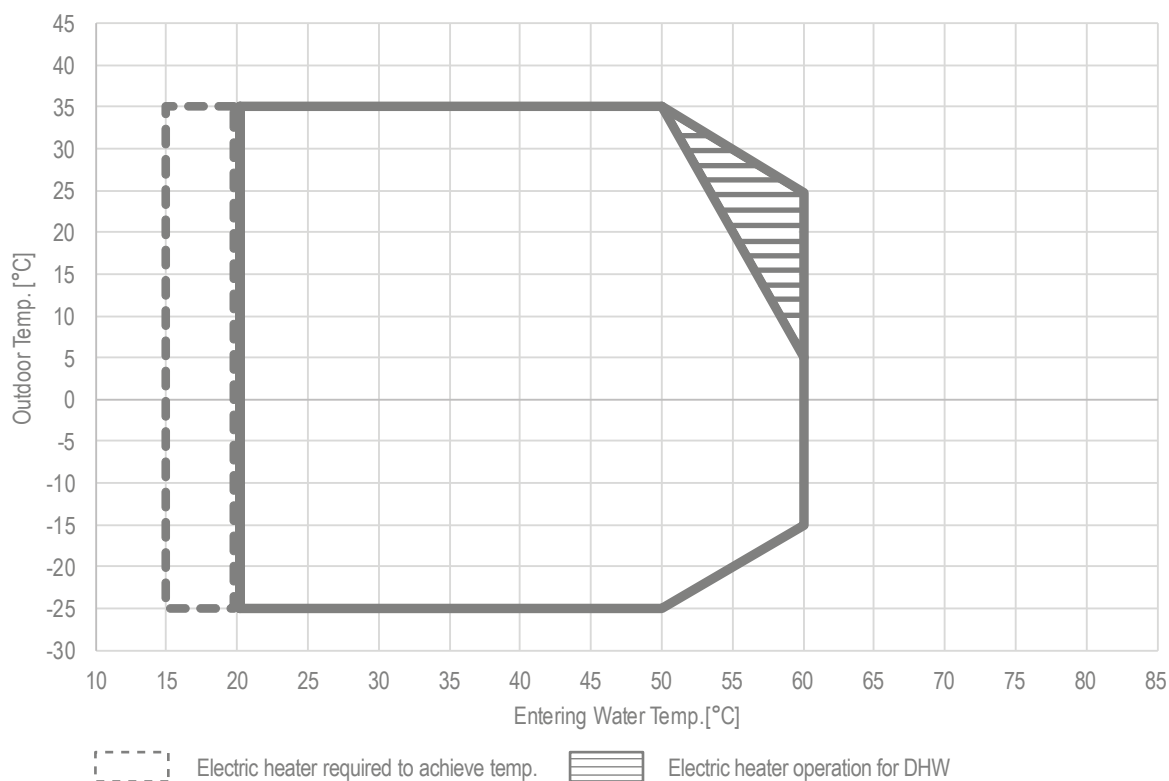
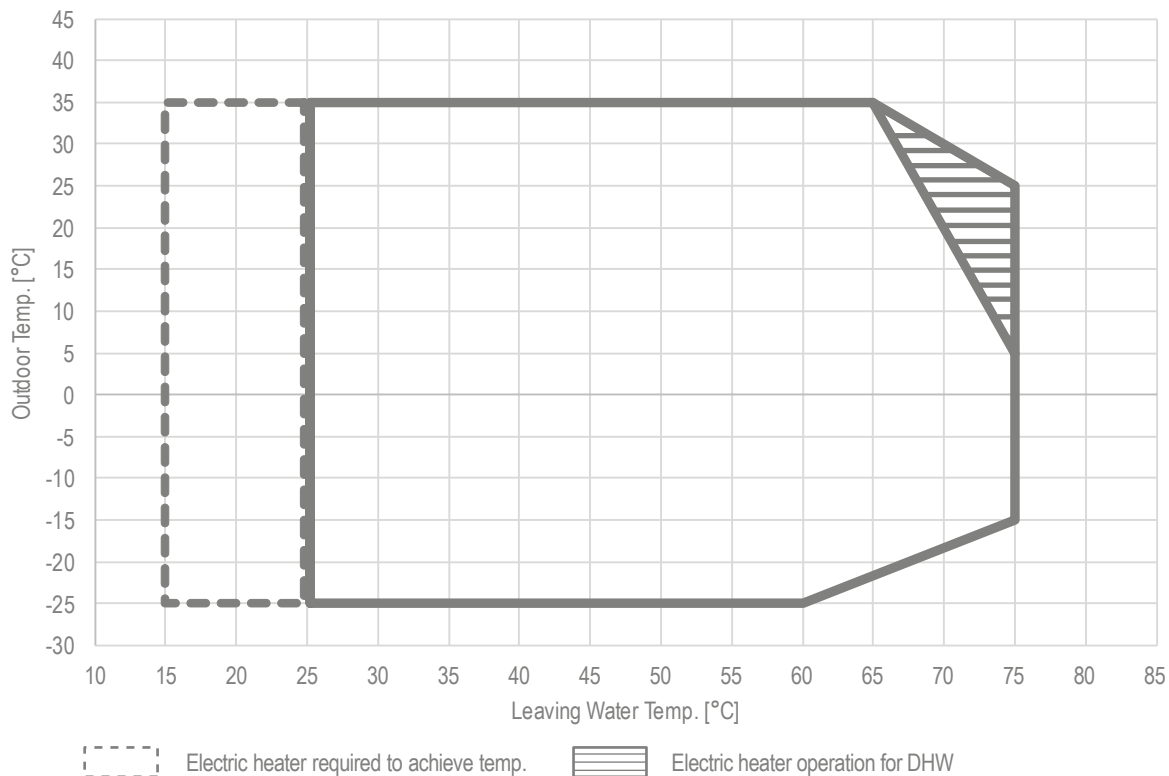


--- Electric heater required to achieve temp.

8. Operation Range

8.2 Heating

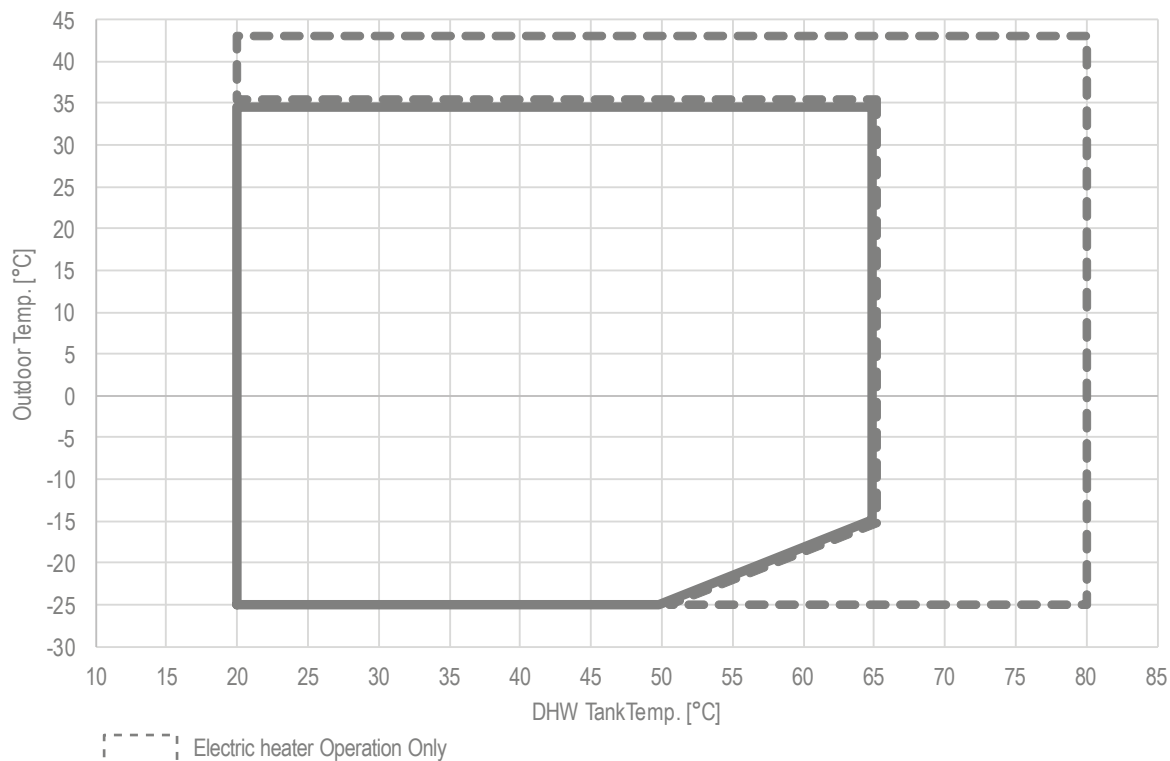
■ FHBW126B1 [HM121HFD UB41] / FHBW146B1 [HM141HFD UB41] /
FHBW166B1 [HM161HFD UB41] / FHBW128B1 [HM123HFD UB41] /
FHBW148B1 [HM143HFD UB41] / FHBW168B1 [HM163HFD UB41]



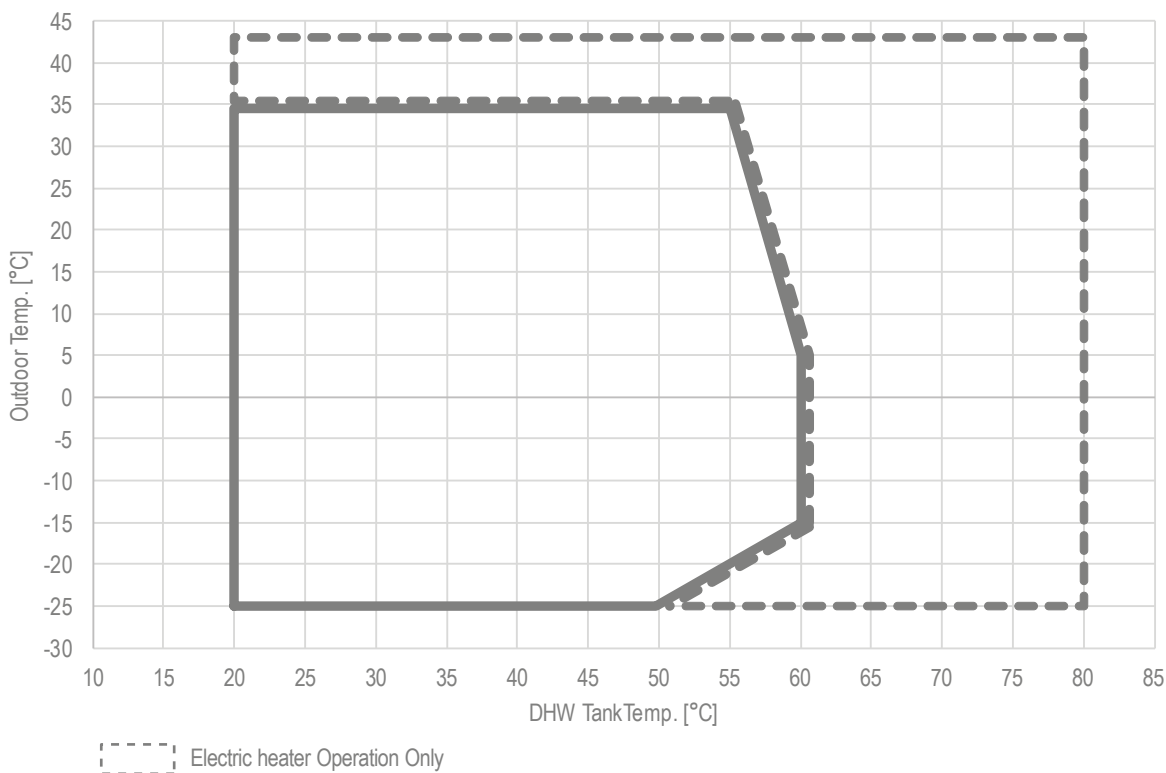
8. Operation Range

8.3 DHW

■ FHBW056B1 [HM051HFD UA41] / FHBW076B1 [HM071HFD UA41] /
FHBW096B1 [HM091HFD UA41] / FHBW078B1 [HM073HFD UA41] /
FHBW098B1 [HM093HFD UA41]



■ FHBW126B1 [HM121HFD UB41] / FHBW146B1 [HM141HFD UB41] /
FHBW166B1 [HM161HFD UB41] / FHBW128B1 [HM123HFD UB41] /
FHBW148B1 [HM143HFD UB41] / FHBW168B1 [HM163HFD UB41]



9. Sound levels

9.1 Sound power level

Note

1. Data is valid at diffuse field condition.
2. Reference acoustic intensity $0\text{dB} = 10\text{E-}6\mu\text{W/m}^2$
3. Sound power level is measured on the rated condition in the reverberation rooms. Refer to the Model Specifications for nominal conditions(Power source and Ambient temperature, etc)
4. Sound levels can be increased in accordance with installation and operating conditions.
5. Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of particular installed place in which the equipment is installed.
6. Sound power level is measured in accordance with EN 12102-1 and ISO 9614.
 - Rated : This mode is measured on the rated condition in the semi-anechoic rooms. Therefore, these values may vary depending on operation conditions.
 - Daytime max : This mode is measured based on max. fan RPM and max. compressor Hz. that can be reached under outdoor air temperature 2°C .
 - Low noise : This mode lowers noise by limiting the compressor Hz. and fan RPM, and thus the performance may be limited.

Model	Heating [dB(A)]		
	Day max	Rated	Low noise
FHBW056B1 [HM051HFD UA41]	61	53	52
FHBW076B1 [HM071HFD UA41]	63	54	53
FHBW096B1 [HM091HFD UA41]	64	56	55
FHBW078B1 [HM073HFD UA41]	63	54	53
FHBW098B1 [HM093HFD UA41]	64	56	55

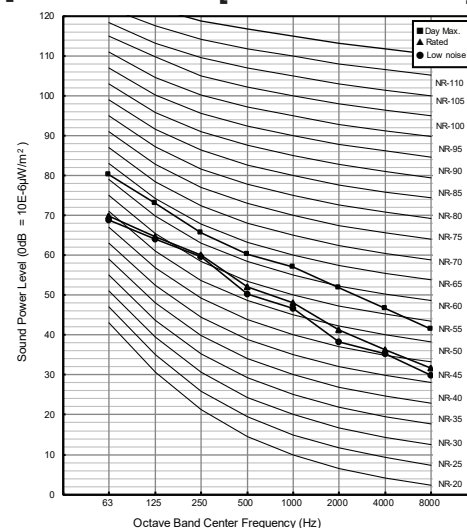
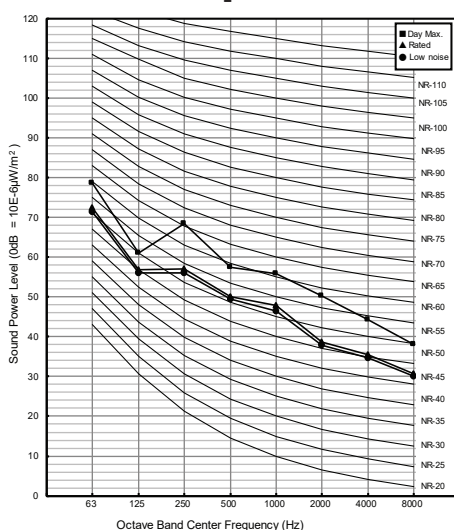
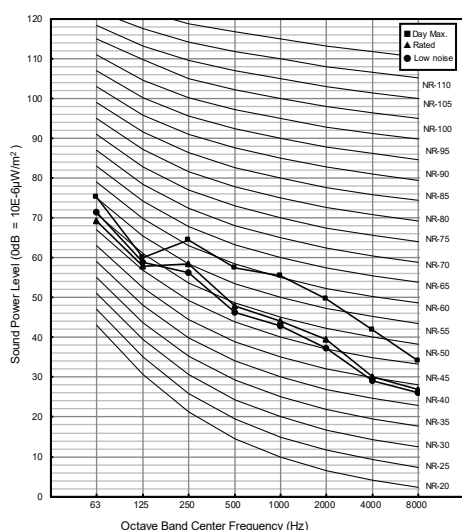
FHBW056B1 [HM051HFD UA41]

FHBW076B1 [HM071HFD UA41]

FHBW096B1 [HM091HFD UA41]

FHBW078B1 [HM073HFD UA41]

FHBW098B1 [HM093HFD UA41]



9. Sound levels

Model	Heating [dB(A)]		
	Day max	Rated	Low noise
FHBW126B1 [HM121HFD UB41]	65	56	55
FHBW146B1 [HM141HFD UB41]	66	57	56
FHBW166B1 [HM161HFD UB41]	66	59	57
FHBW128B1 [HM123HFD UB41]	65	56	55
FHBW148B1 [HM143HFD UB41]	66	57	56
FHBW168B1 [HM163HFD UB41]	66	59	57

FHBW126B1 [HM121HFD UB41]

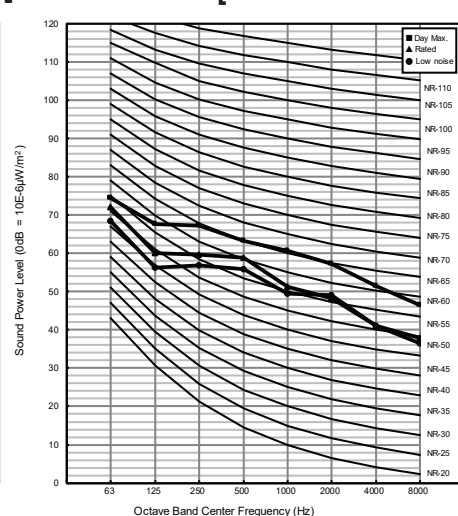
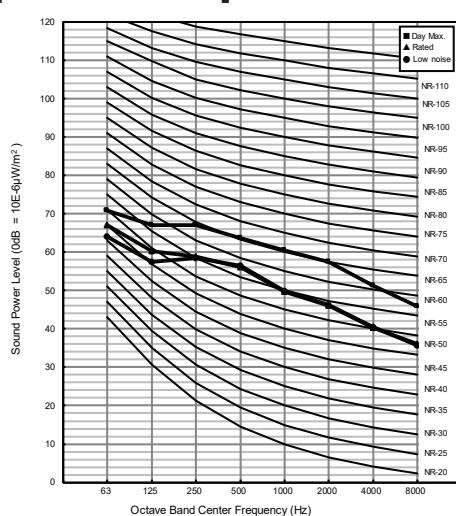
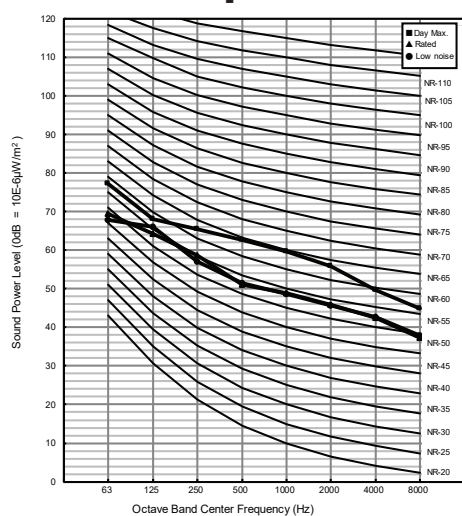
FHBW146B1 [HM141HFD UB41]

FHBW166B1 [HM161HFD UB41]

FHBW128B1 [HM123HFD UB41]

FHBW148B1 [HM143HFD UB41]

FHBW168B1 [HM163HFD UB41]



10. Hydraulic Performance

The water pump is variable type which is capable to change flow rate, so it may be required to change default water pump capacity in case of noise by water flow. In most case, however, it is strongly recommended to set capacity as Maximum.

■ Pressure Drop

◆ For GRUNDFOS Water Pump

Capacity [kW]	Rated flow-rate [LPM]	Pump Head [m] (at rated flow- rate)	Product pressure drop [m] (Plate heat exchanger)	Serviceable Head [m]	Min. flow-rate [LPM] (Recommend)
5	15.8	7.5	0.2	7.3	15
7	20.1	7.3	0.3	7.0	
9	25.9	6.1	0.4	5.7	
12	34.5	9.8	0.8	9.0	20
14	40.3	9.3	1.1	8.2	
16	46.0	9.0	1.4	7.6	

◆ For OH SUNG Water Pump

Capacity [kW]	Rated flow-rate [LPM]	Pump Head [m] (at rated flow- rate)	Product pressure drop [m] (Plate heat exchanger)	Serviceable Head [m]	Min. flow-rate [LPM] (Recommend)
5	15.8	7.6	0.2	7.4	15
7	20.1	7.1	0.3	6.8	
9	25.9	6.1	0.4	5.7	
12	34.5	9.7	0.8	8.9	20
14	40.3	9.1	1.1	8.0	
16	46.0	8.3	1.4	6.9	

Note

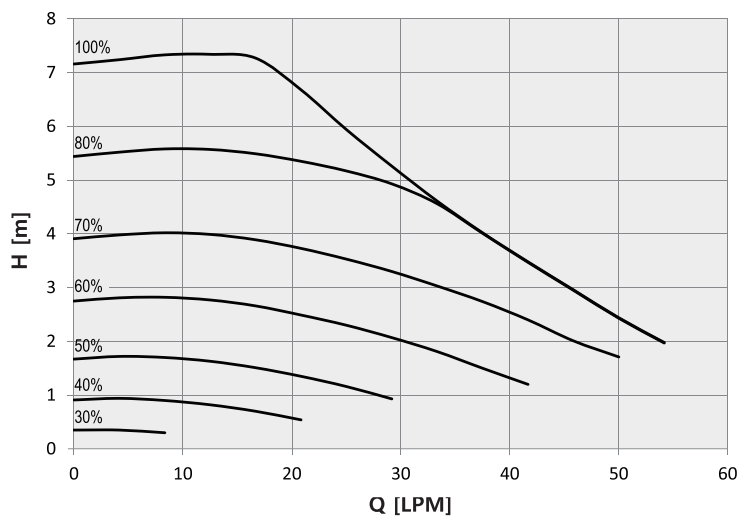
- To secure enough water flow rate, do not set water pump capacity as Minimum.
It can lead unexpected flow rate error CH14.
- When installing the product, install additional pump in consideration of the pressure loss and pump performance.
- If flow-rate is low, overloading of product can occur.

10. Hydraulic Performance

■ GRUNDFOS Water Pump (UPM3K 20 - 75 CHBL)

◆ UN36A Chassis (5, 7, 9 kW)

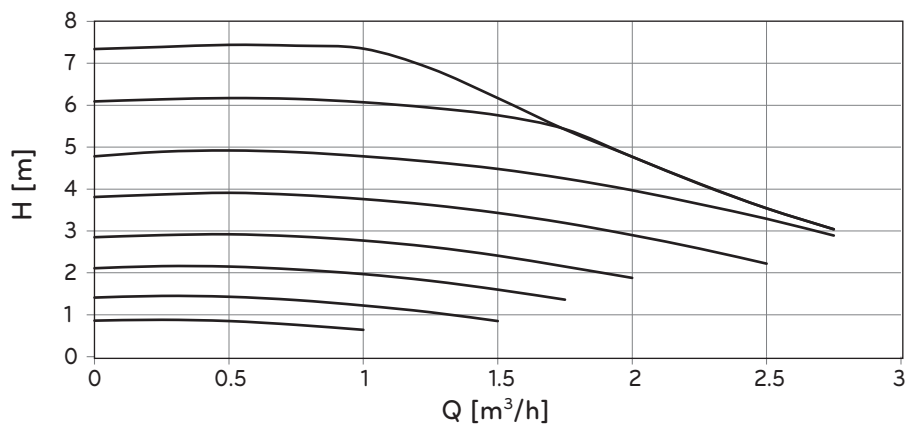
Q-H Chart



■ GRUNDFOS Water Pump (UPM4K 20 – 75 CHBL)

◆ UN36A Chassis(5,7,9kw)

Q-H Chart



Note

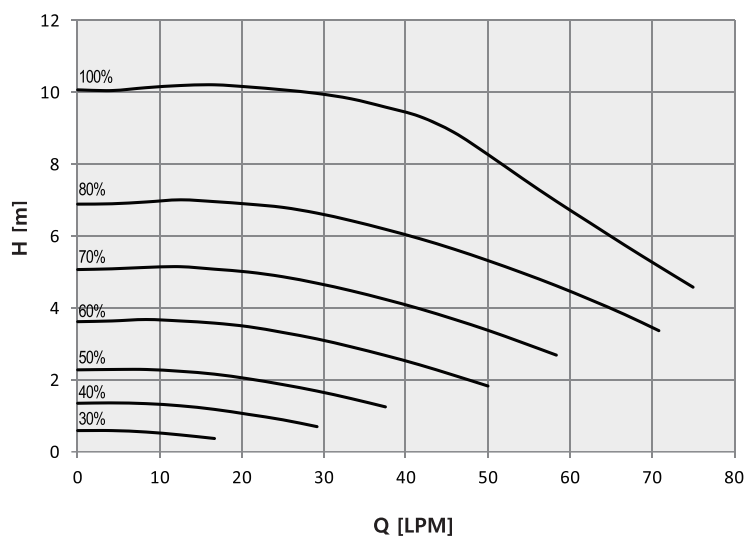
Performance test based on standard ISO 9906 with pre-pressure 2.0 bar and liquid temperature 20°C.

10. Hydraulic Performance

■ GRUNDFOS Water Pump (UPML 20 - 105 CHBL)

◆ UN36B Chassis (12, 14, 16 kW)

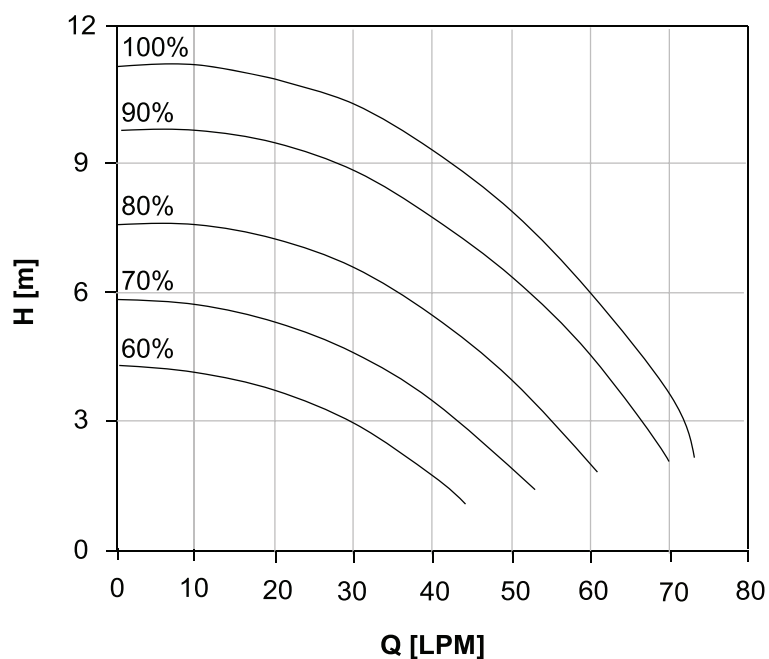
Q-H Chart



■ OH SUNG Water Pump (ODM - 061P)

◆ UN36A Chassis (5, 7, 9 kW) / UN36B Chassis (12, 14, 16 kW)

Q-H Chart



Note

Performance test based on standard ISO 9906 with pre-pressure 2.0 bar and liquid temperature 20°C.

THERMA VTM

Monobloc Type

Design and installation

- 1. Information of Refrigerant**
- 2. Select the Best Location**
- 3. Foundation for Installation**
- 4. Water Control**
- 5. Water Piping System**
- 6. Electric Characteristics**

1. Information of Refrigerant

■ Refrigerant R290

- The refrigerant R290 has a lower GWP(Global Warming Potential)value than R32.
- The Ozone Depletion Potential (ODP) of R290 is 0, and Global Warming Potential(GWP) is 0.02.
- Refrigerant piping consists of copper/steel pipes, joints, and other fittings. All components must be selected and installed in conformity with the standards pertaining to the Refrigeration Safety Regulation.
- Same piping as for R32 can be used.
- The place where the unit shall be connected to the outdoor unit.
- The place where the unit is not affected by an electrical noise.
- The place where there should not be any heat source or steam near the unit.

WARNING

- This product contains flammable gases (Refrigerant type : R290).
DO NOT emit refrigerant gases into the atmosphere.
 - The refrigerant R290 has Higher Flammability than R32. But It does not leak normally. If the refrigerant leaks in the installed place and contact with burning energy, it may cause fire, or a harmful gas.
 - If there is some leak, turn off any combustion devices, ventilate the installed place, and contact the dealer from which you purchased the unit. Do not use the unit until the refrigerant leaked is repaired.
 - Only use R290 as refrigerant. Other substances may cause explosions and accidents.
-

CAUTION

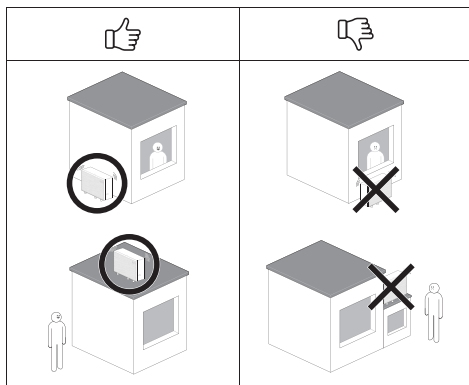
- The wall thickness of the piping should comply with the relevant local and national regulations for the designed pressure.
 - Any unapproved pipe must not be used.
 - Do not heat pipes more than necessary to prevent them from softening.
-

2. Selection of the best Location

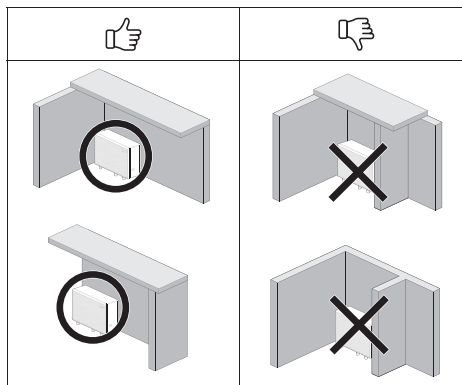
2.1 Best Location

- The outdoor unit is installed outside to exchange heat with ambient air.
- Therefore, it is important to secure proper space around the outdoor unit and care for specific external conditions. This chapter presents a guide to install the outdoor unit, make a route to connect with the indoor, and what to do when installed around seaside.

- For quiet place



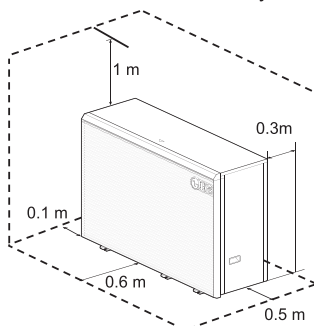
- For good ventilation



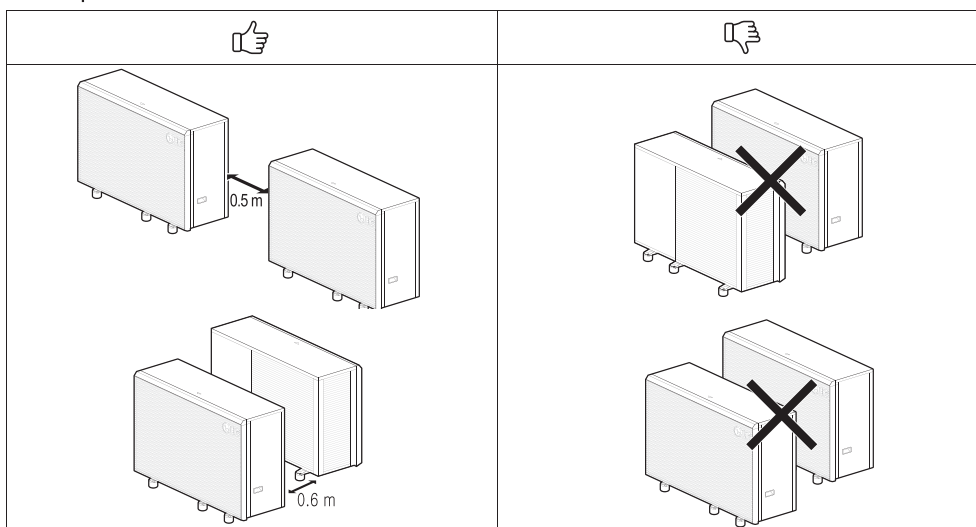
※ Please do not block the slits in the exterior panels.

- Minimum operation space

Following distances around the outdoor unit must be respected under any condition for normal operation.
The distances are only for operation not to be seen as safety zone.



- Multiple installation



※ It can be different by model.

2. Selection of the best Location

2.2 Safety zone

Since the outdoor unit contains flammable refrigerant, a separate safety zone must be defined near the outdoor unit.



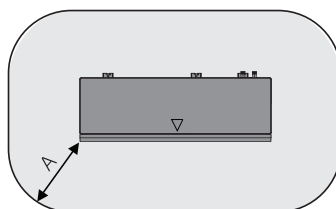
⚠ CAUTION

Be very careful for Safety Zone

- There must be no building openings. (windows, doors, roof windows, etc.)
- There must be no external and outlet air openings. (e.g. intakes of central ventilation system)
- There should be no building boundaries, adjacent buildings, passageways, or roads.
- Drainage system inlets, pump shafts, downspouts, and bath lakes should not be present.
- Other grooves, bottoms and shafts must not be present.
- There should be no Roof avalanches.
- Ignition sources must not be used.
- No parts should have a surface temperature higher than 360 °C.
- Open flames are strongly prohibited!

Above special safety precautions must be taken within the areas marked below.

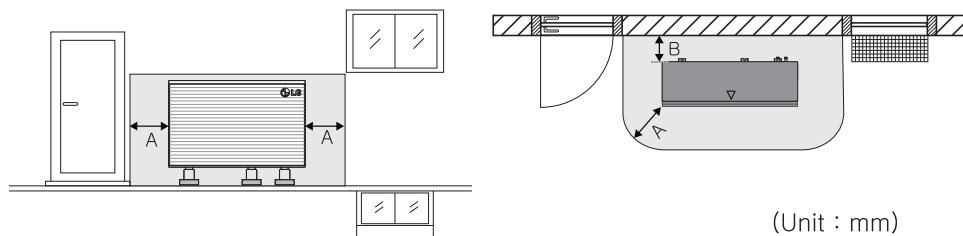
1. Ground installation no obstacle



(Unit : mm)

A	1 000
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2. Ground installation in front of the wall

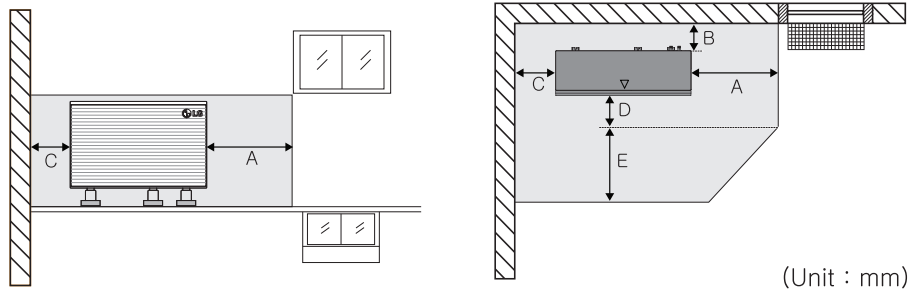


(Unit : mm)

A	1 000
B	300

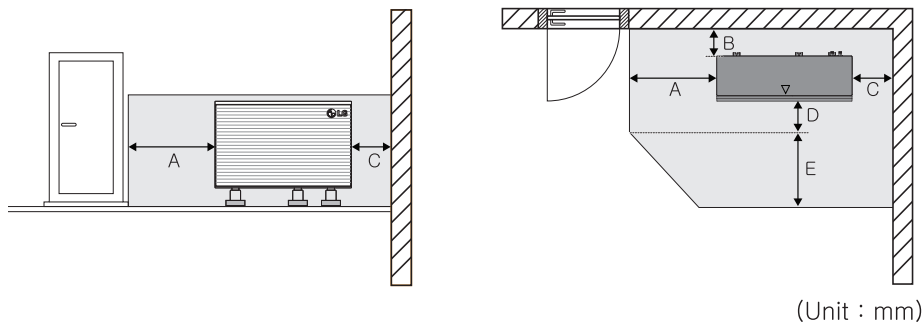
2. Selection of the best Location

3. Ground installation in a corner with wall at the left side



A	1 000	D	600
B	300	E	1 800
C	500	—	—

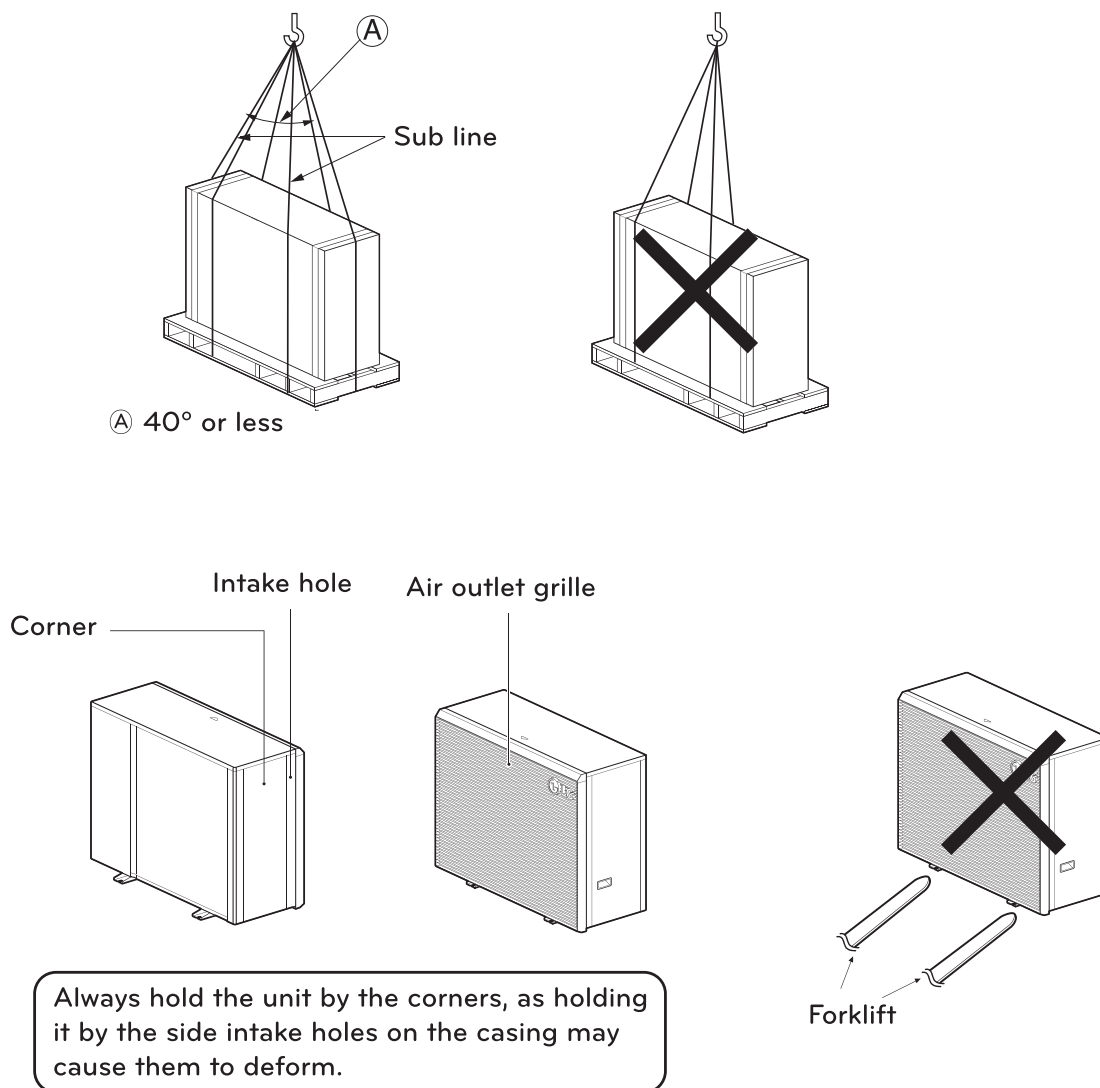
4. Ground installation in a corner with wall at the right side



A	1 000	D	600
B	300	E	1 800
C	500	—	—

2. Selection of the best Location

2.3 Lifting Method



※ It can be different by model.

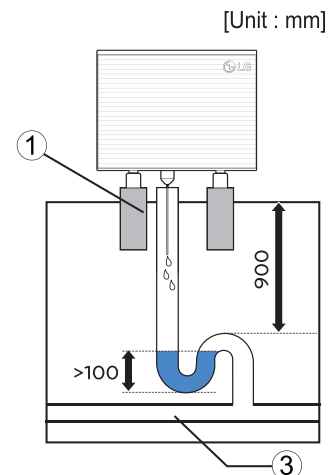
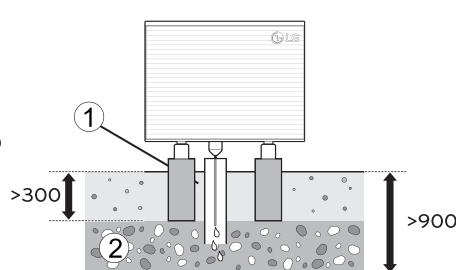
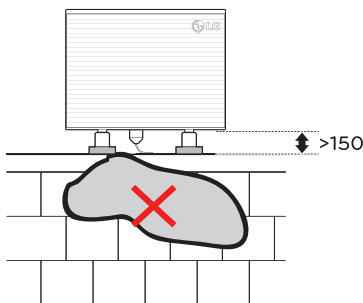
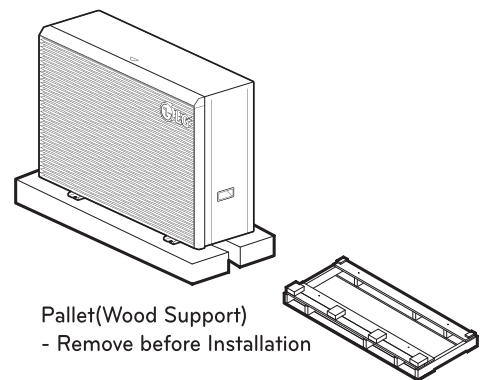
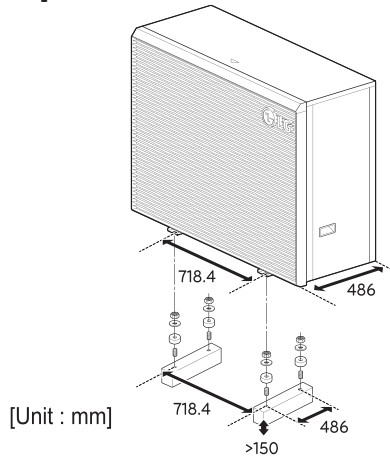
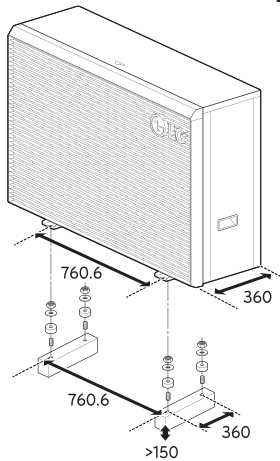
CAUTION

- Be very careful while carrying the product.
- PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.
- Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.
- Tear plastic packaging bag and scrap it so that children cannot play with it. Otherwise plastic packaging bag may suffocate children to death.
- When carrying in Outdoor Unit, be sure to support it at four points. Carrying in and lifting with 3-point support may make Outdoor Unit unstable, resulting in a fall.
- Use 2 belts of at least 8m(26.2ft) long.
- Place extra cloth or boards in the locations where the casing comes in contact with the sling to prevent damage.
- Hoist the unit making sure it is being lifted at its center of gravity.

3. Foundation for Installation

- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- Fix the unit securely by means of the foundation bolts. Prepare 6sets of M12 foundation bolts, nuts and washers available on the market.
- It is best to screw in the foundation bolts until their length are 20 mm from the foundation surface.
- When installing the unit on the ground, install a separate pedestal with enough height to install the drain nipple and higher than the average snowfall in your area.

[HM091 / 071 / 051HFD UA41] [HM121 / 141 / 161HFD UB41]
[HM093 / 073HFD UA41] [HM123 / 143 / 163HFD UB41]



1. Section of condensate drain pipe exposed to open air must be insulated.
2. If condensate is drained into a gravel-bed, the pipe must be directed into frost-free area. The gravel must be able to absorb up to 100 ℓ of condensate per day.
3. If condensate water is drained into a rainwater sewer or other drainage pipe, note the slope of the pipe and make sure the pipe is frost-free.

⚠ CAUTION

- Do not connect to a sewer that is connected to the interior, as leaked refrigerant may enter the building.

⚠ WARNING

- Be sure that condensate does not discharge onto road to avoid accumulated freezing of condensate.

4. Water Control

4.1 Water quality

Water quality should be complied with EN 98/83 EC Directives.

CAUTION

- If the product is installed at existing hydraulic water loop, it is important to clean hydraulic pipes to remove sludge and scale.
- Installing sludge strainer in the water loop is very important to prevent performance degrade.
- Chemical treatment to prevent rust should be performed by installer.
- It is strongly recommended to install an additional filter on the heating water circuit. Especially to remove metallic particles from the heating piping, it is advised to use a magnetic or cyclone filter, which can remove small particles. Small particles may damage the unit and will NOT be removed by the standard filter of the heat pump system.
- Water quality check should be implemented before completing the installation of system.
Detailed guide can be found in the table as below.

Water contents	Value			
pH	7.5 ~ 9.0			
Conductivity	10 ~ 500 uS/cm			
TDS (Total dissolved solids)	8 ~ 400 ppm			
Alkalinity (HCO ₃ ⁻)	60 ~ 300 (mg/L)			
Total hardness	4 ~ 8.5 °dH			
	71.4 ~ 151.7 (mg/L)			
Iron (Fe)	≤ 0.2 (mg/L)			
Sulphate (SO ₄ ²⁻)	≤ 100 (mg/L)			
Nitrite (NO ₃ ⁻)	≤ 100 (mg/L)			
Free chlorine (Cl ₂)	≤ 1 (mg/L)			
Chlorides (Cl ⁻)	ppm		STS316	STS304
	pH7	15 °C	3,000	180
		40 °C	500	50
		60 °C	200	30
		80 °C	125	20
	pH9	15 °C	18,000	700
		40 °C	2,600	250
		60 °C	1,000	170
		80 °C	550	130

4. Water Control

4.2 Frost protection

In areas of the country where entering water temperatures drop below 0 °C, the water pipe must be protected by using an approved antifreeze solution. Consult your heat pump unit supplier for locally approved solutions in your area.

Calculate the approximate volume of water in the system. And add the water volume contained in the heat pump to this total volume.

Antifreeze type	Antifreeze mixing ratio (by volume)					
	0°C	-5°C	-10°C	-15°C	-20°C	-25°C
Methanol	0%	6%	12%	16%	24%	30%
Ethylene glycol	0%	12%	20%	30%	-	-
Propylene glycol	0%	17%	25%	33%	-	-



CAUTION

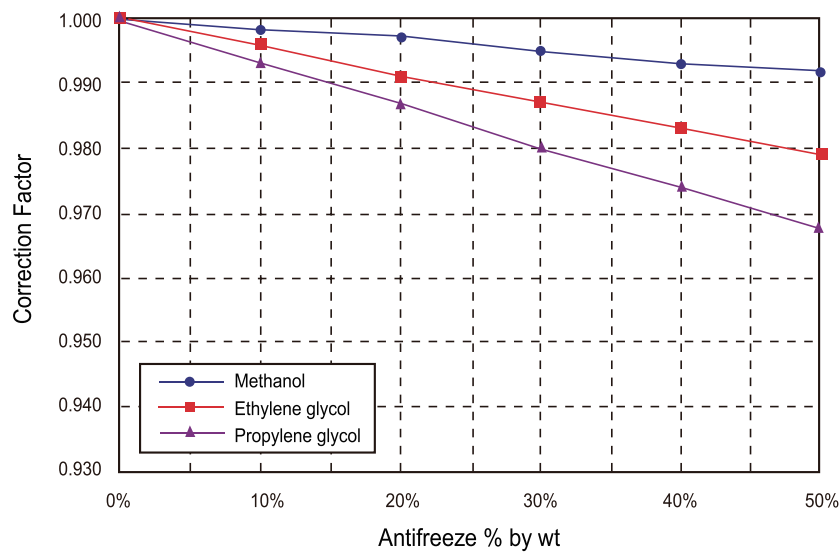
- Use only one of the above antifreeze.
- If a antifreeze is used, pressure drop and capability degradation of the system can be occurred.
- If one of antifreezes is used, corrosion can be occurred. So please add corrosion inhibitor.
- Please check the concentration of the antifreeze periodically to keep same concentration.
- When the antifreeze is used (for installation or operation), take care to ensure that antifreeze must not be touched.
- Ensure to respect all laws and norms of your country about antifreeze usage.

4. Water Control

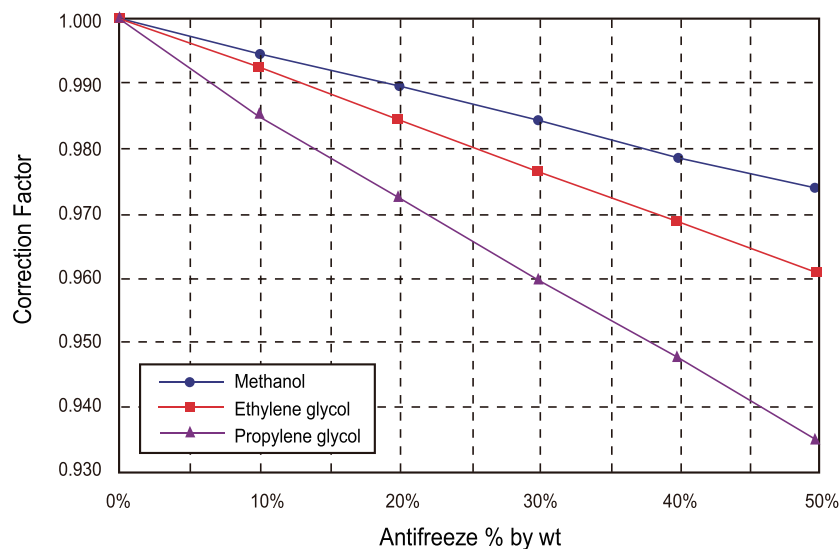
4.3 Capacity correction factor by antifreeze

Antifreeze Type	Item	Antifreeze % by wt				
		10%	20%	30%	40%	50%
Methanol	Cooling	0.998	0.997	0.995	0.993	0.992
	Heating	0.995	0.990	0.985	0.979	0.974
	Pressure Drop	1.023	1.057	1.091	1.122	1.160
Ethylene glycol	Cooling	0.996	0.991	0.987	0.983	0.979
	Heating	0.993	0.985	0.977	0.969	0.961
	Pressure Drop	1.024	1.068	1.124	1.188	1.263
Propylene glycol	Cooling	0.993	0.987	0.980	0.974	0.968
	Heating	0.966	0.973	0.960	0.948	0.935
	Pressure Drop	1.040	1.098	1.174	1.273	1.405

◆ Correction factor of cooling capacity



◆ Correction factor of heating capacity



5. Water Piping System

5.1 Water Piping and water Circuit Connection

5.1.1 General considerations

- Followings are should be considered before beginning water circuit connection.
- Service space should be secured.
- Water pipes and connections should be cleaned using water.
- Space for installing external water pump should be provided if internal water pump capacity is not enough for installation field.
- Never connect electric power while proceeding water charging.

5.1.2 Water piping and water circuit connection

1. **Definition of terms are as follow :**

- Water piping : Installing pipes where water is flowing inside the pipe.
- Water circuit connecting : Making connection between the unit and water pipes or between pipes and pipes. Connecting valves or elbows are, for example, in this category.
- A buffer tank should be installed to reduce sudden load fluctuations. (Please refer to the product installation manual guide)

2. **While installing water pipes, followings should be considered :**

- While inserting or putting water pipes, close the end of the pipe with pipe cap to avoid dust entering.
- When cutting or welding the pipe, always be careful that inner section of the pipe should not be defective. For example, no weldments or no burrs are found inside the pipe.
- Drain piping should be provided in case of water discharge by the operation of the safety valve. This situation can be happened when the internal pressure is over 3.0 bar and water inside the unit will be discharged to drain hose.

3. **While connecting water pipes, followings should be considered :**

- Pipe fittings (e.g. L-shape elbow, T-shape tee, diameter reducer, etc) should be tightened strongly to be free from water leakage.
- Connected sections should be leakage-proof treatment by applying teflon tape, rubber bushing, sealant solution, etc.
- Appropriate tools and tooling methods should be applied to prevent mechanical breakage of the connections.
- Operation time of flow control valve(e.g. 3way valve or 2way valve) should be less than 90 seconds.
- Drain hose should be connected with drain piping.

WARNING

• **Water condensation on the floor**

If underfloor cooling is performed, it is very important to keep leaving water temperature higher than 16 °C. Otherwise, dew condensation can occur on the floor. If floor is in humid environment, do not set leaving water temperature below 18 °C.

• **Water condensation on the radiator**

While cooling operation, cold water may not flow to the radiator. If cold water enters to the radiator, dew generation on the surface of the radiator can be occurred. Use 2way-valve to block circuits from cooling operation.

• **Drainage**

While cooling operation, condensed dew can drop down to the bottom of the unit. The condensing water must be sufficiently drained from the unit and dissipated frost-free.

6. Electric Characteristics

■ Wiring of Main Power Supply and Equipment Capacity

1. Bear in mind ambient conditions (ambient temperature, direct sunlight, rain liquid, etc.) when proceeding with the wiring and connections
2. The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker taking into account the line voltage drops. Make sure the power-supply voltage does not drop more than 10%.
3. Specific wiring requirements should adhere to the wiring regulations of the region.
4. Power supply cords of parts of appliances for outdoor use should not be lighter than polychloroprene sheathed flexible cord.
5. Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.

WARNING

- Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.
- Make sure to use specified wires for connections so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.
- Make sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.

CAUTION

- All installation site must require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.
- Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.

Outdoor Unit	Phase / Volts / Hz	Voltage range
FHBW056B1 [HM051HFD UA41]	1 Ø / 220-240 V / 50 Hz	Min. : 187 Max. : 276
FHBW076B1 [HM071HFD UA41]		
FHBW096B1 [HM091HFD UA41]		
FHBW126B1 [HM121HFD UB41]		
FHBW146B1 [HM141HFD UB41]		
FHBW166B1 [HM161HFD UB41]	3 Ø / 380-415 V / 50 Hz	Min. : 342 Max. : 456
FHBW078B1 [HM073HFD UA41]		
FHBW098B1 [HM093HFD UA41]		
FHBW126B1 [HM121HFD UB41]		
FHBW146B1 [HM141HFD UB41]		
FHBW166B1 [HM161HFD UB41]		

Note

1. Voltage supplied to the unit terminals should be within the minimum and maximum range.
2. Maximum allowable voltage unbalance between phase is 2%.



Air Solution
LG Electronics Inc, 128, Yeoui-daero,
Yeongdeungpo-gu, Seoul, Korea
(07336)
<http://partner.lge.com>

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Air Solution

LG Electronics Inc, 128, Yeoui-daero,
Yeongdeungpo-gu, Seoul, Korea
(07336)

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