

Air-to-Water Heat Pump / Monobloc R32 / 50Hz 5BPM5-01A

TOTALHVAC SOLUTION PROVIDER ENGINEERING PRODUCT DATA BOOK

LG Life's Good



General Information
Product Data
Design and installation



General Information

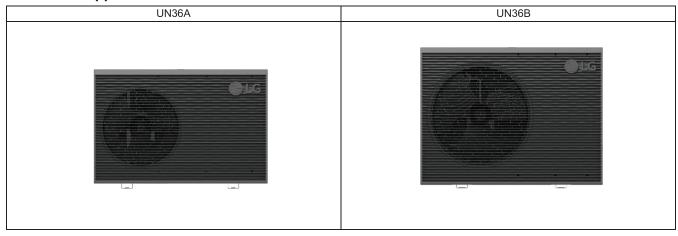
- 1.Model Line up
- 2. Nomenclature

1. Model line up

◆ Model line up

Category	Capacity (kW)	Chassis	Model Name
	5.5		ZHBW056A2 [HM051MRS UA40]
	7.0	UN36A	ZHBW076A2 [HM071MRS UA40]
1 Phase Model	9.0		ZHBW096A2 [HM091MRS UA40]
1 Ø, 220-240 V, 50 Hz	12.0		ZHBW126A2 [HM121MRS UB40]
	14.0	UN36B	ZHBW146A2 [HM141MRS UB40]
	16.0		ZHBW166A2 [HM161MRS UB40]
0.51	12.0		ZHBW128A2 [HM123MRS UB40]
3 Phase Model 3 Ø, 380-415 V, 50 Hz	14.0	UN36B	ZHBW148A2 [HM143MRS UB40]
5 5, 555 415 V, 56 112	16.0		ZHBW168A2 [HM163MRS UB40]

♦ External appearance



2. Nomenclature

■ Factory Model Name

Model Name	ZH	В	w	09	6	Α	2
No.	1	2	3	4	5	6	7

No.	Signification				
1	ZH : Air-to-Water Heat Pump for R32				
2	Classification				
	B : Monobloc				
	Model Type				
3	W : Inverter Heat Pump				
4	Heating Capacity (kW)				
4	Ex) 5 kW : '05', 16 kW : '16'				
	Electrical ratings				
5	6 : 1 Ø, 220-240 V, 50 Hz 8 : 3 Ø, 380-415 V, 50 Hz				
	Function				
6	A : General Heating Heat pump				
7	Series				

2. Nomenclature

■ Buyer Model Name

Model Name	Н	М	09	1	М	R	S	UA40
No.	1	2	3	4	5	6	7	8

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'					
	Electrical ratings					
4	1 : 1 Ø, 220-240 V, 50 Hz 3 : 3 Ø, 380-415 V, 50 Hz					
_	Leaving Water Combination					
5	M : Mid Temperature					
	Type of refrigerant					
6	A : R410A R : R32					
7	Function S:Solo					
8	Platform (Chassis code) UA40 : UN36A chassis UB40 : UN36B chassis					



Product Data

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

1. List of Functions

♦ Water side

Category	Functions	ZHBW056A2 [HM051MRS UA40]/ZHBW076A2 [HM071MRS UA40] ZHBW096A2 [HM091MRS UA40]/ZHBW126A2 [HM121MRS UB40] ZHBW146A2 [HM141MRS UB40]/ZHBW166A2 [HM161MRS UB40] ZHBW128A2 [HM123MRS UB40]/ZHBW148A2 [HM143MRS UB40] ZHBW168A2 [HM163MRS UB40]		
Installation	Backup heater (Install kit)	Accessory		
Installation	Domestic Hot Water Tank heater	Accessory		
Reliability	Self diagnosis	0		
	Auto Restart	0		
	Child lock	0		
Convenience	Sleep Timer	0		
Convenience	Turn On/Off Reservation	0		
	Schedule	0		
	Low noise operation	0		
Network	Network solution(LGAP)	0		
	Water Pump Pre-run / Over-run control	0		
	Water Pump Forced Operation	0		
	Water Pump Speed Control	0		
	Water Flow Detection by Flow Sensor	0		
	Water Flow Control	0		
	Water Pressure Monitoring	0		
	Thermostat interface (230V AC)	0		
	Thermostat interface (24V AC)	X		
	One Point Dry Contact Input (CN-EXT)	0		
	Digital output for external pump	0		
	Digital inputs for energy saving (Ready for Smart Grid)	0		
	Communication with LG ESS by Modbus	0		
	Anti-condensation on floor (cooling)	0		
Water Product	Anti-Freezing Control	0		
functions	Anti-overheating of water pipe	0		
idilodolio	Emergency operation	0		
	Weather Dependent Operation with Thermostat	0		
	Seasonal auto mode (heating and cooling)	0		
	DHW(Domestic Hot Water) tank kit	0		
	Scheduler (DHW Tank Heater)	0		
	Timer (Domestic Hot Water Tank Heater)	0		
	Quick Domestic Hot Water Tank Heating	0		
	DHW Recirculation	0		
	Tank Disinfection	0		
	Electric Heater Capacity Control	-		
	Solar thermal Function	Accessory(3rd party)		
	Screed Drying Mode	0		
	Current Flow Rate Monitoring	0		
	Energy Monitoring	0		
	Wi-Fi Control	Accessory		
	Modbus connectivity (without gateway)	0		
Special	Remote room temperature sensing	Accessory		
Functions	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)

1. List of Functions

♦ Refrigerant side

Category	Functions	ZHBW056A2 [HM051MRS UA40] ZHBW076A2 [HM071MRS UA40] ZHBW096A2 [HM091MRS UA40] ZHBW126A2 [HM121MRS UB40] ZHBW146A2 [HM141MRS UB40] ZHBW166A2 [HM161MRS UB40]	ZHBW128A2 [HM123MRS UB40] ZHBW148A2 [HM143MRS UB40] ZHBW168A2 [HM163MRS UB40]
	Defrost / Deicing	0	0
	High pressure switch	0	0
	Low pressure switch	X	X
Reliability	Phase protection	X	0
	Restart delay (3-minutes)	0	0
	Self diagnosis	0	0
	Soft start	X	X
	Test function	X	X
	Low Noise Operation	0	0
	Wiring Error Check	X	X
	Peak Control(Step 1&2)	0	0
Convenience	Peak Control(Step 3&4)	X	X
Convenience	Mode Lock	0	0
	Forced Cooling Operation (Outdoor Unit)	X	X
	Base Pan Heater	0	0
	SLC(Smart Load Control)	X	X
Network	Network solution(LGAP)	0	0

Note
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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)

1.List of Functions

■ Accessory Compatibility List

Category	Accessory Name	Model Name	Descriptions	ZHBW056A2 [HM051MRS UA40] ZHBW076A2 [HM071MRS UA40] ZHBW096A2 [HM091MRS UA40] ZHBW126A2 [HM121MRS UB40] ZHBW146A2 [HM121MRS UB40] ZHBW166A2 [HM141MRS UB40] ZHBW128A2 [HM123MRS UB40] ZHBW128A2 [HM143MRS UB40] ZHBW168A2 [HM163MRS UB40]
Remote Controller	Wired - RS3 (Standard III)	PREMTW101	White	0
Dry Contact	Simple	PDRYCB000	1 input port, AC 220 - 240V	0
Dry Contact	Thermostat	PDRYCB320	8 input port, For 3rd Party Thermostat (Analog Input)	0
Integration	Remote Temperature sensor	PQRSTA0	Room temperature sensor, NTC 10 $k\Omega$, include casing	0
Device	Group Control wire	PZCWRCG3	Cable Assembly for group control (Y-type cable : 0.25m,cable : 9.6m)	X
	Extension wire	PZCWRC1	Extension wire for IDU-wired remote controller (9.6m)	0
	2-Remo Control wire	PZCWRC2	Y-type cable to connect additional Remote Controller as slave	0
ETC	Wi-Fi Modem	PWFMDD200	Device to use ThinQ app include connection cable	0
	Wi-Fi Extension cable	PWYREW000	USB Extension cable : 10 m	0
	Meter Interface	PENKTH000	Interface to connect 3rd-party heat and/or watt meter to indoor unit by S0 or Modbus	0
	Solar-Thermal kit	PHLLA*	Limit Temperature : 96 °C	0
	IDU Drain Pan	PHDPB	For Hydro Unit	Х
		PHDPC	For Hydro Unit	X
	DHW tanks (Single coil)	OSHW-200F	200 L	0
		OSHW-300F	300 L	0
		OSHW-500F	500 L	0
	DHW tanks (Double coil)	OSHW-300FD	300 L	0
	DHW Heater kit	PHLTA	For Hydro Unit and Control Unit	X
		PHLTB	For Monobloc	0
	Wall mounted out- door air temp. sensor	PHATS0	For measuring outside temperature	0
Special Kit	Thermistor for Water Tank (Buffer Tank, DHW Tank)	PHRSTA0	Included in DHW Tank kit	0
	Thermostatic Mixing	OSHA-MV	3/4" DN20	0
	valve	OSHA-MV1	1" DN25	0
	3way valve	OSHA-3V	Diverting valve between space heating and DHW heating	0
	Thermistor for 2nd Circuit	PRSTAT5K10	NTC $5k\Omega$ sensor needed to control mixing circuit or if 3rd party backup heater is used	0
		HA031M E2	1Ø, 3kW (For Monobloc)	0
		HA061M E2	1Ø, 6kW (For Monobloc)	0
		HA063M E2	3Ø, 6kW (For Monobloc)	0
	Backup Heater	HA061B E1	1Ø, 6kW (For Hydrosplit, HN1600MB NK0)	Х
		HA061C E1	1Ø, 6kW (For Hydrosplit, HN1600MC NK1)	Х
		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.
- Some advanced functions controlled by individual controller cannot be operated.
 If there is a difference in development time between the product and the remote controller, some functions cannot be operated.

- It there is a uniferrice in development time between the product and the remote controller, some functions cannot be operated.
 Meter interface cannot be connected at the same time with 3rd-party controller.
 *: It includes double-sensor for solar tank. The collector sensor (PT1000) needs to be supplied locally.
 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)).

1. List of Functions

	Category	Product	Remark	ZHBW056A2 [HM051MRS UA40] ZHBW076A2 [HM071MRS UA40] ZHBW096A2 [HM091MRS UA40] ZHBW126A2 [HM121MRS UB40] ZHBW146A2 [HM141MRS UB40] ZHBW166A2 [HM161MRS UB40] ZHBW128A2 [HM123MRS UB40] ZHBW148A2 [HM143MRS UB40] ZHBW168A2 [HM163MRS UB40]
	AC EZ	PQCSZ250S0	AC EZ	Х
	AC Ez Touch	PACEZA000	AC Ez Touch	X
Central Controller	AC Smart	PACS5A000	AC Smart 5	X
	ACP	PACP5A000	ACP 5	X
	AC Manager **	PACM5A000	AC Manager 5	X
	IDII DIAGE	PHNFP14A0	Without case	Х
	IDU PI485	PSNFP14A0	With case	X
		PP485A00T	PI 485 Gateway	X
Gateway	ODU PI485	PMNFP14A1	PI 485 Gateway (Produced before 1st of Sep. of 2021)	Х
•	BACnet	PQNFB17C0	ACP BACnet	X
	Lonworks	PLNWKB000	ACP Lonworks	X
	Modbus	PMBUSB00A	-	0
	Cloud Gateway	PWFMDB200	Cloud (ThinQ, BECON)	0
	PDI	PPWRDB000	PDI Standard	Х
ETC	FUI	PQNUD1S40	PDI Premium	Х
	ACS IO Module	PEXPMB000	-	X

- 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))

■ 1 phase Inverter (5.5 ~ 9 kW)

Nominal Capacity and Nominal Input								
-	-	Outdoor Temp. (°C) DB / WB	Leaving Water Temp. (°C)	-	ZHBW056A2 [HM051MRS UA40]	ZHBW076A2 [HM071MRS UA40]	ZHBW096A2 [HM091MRS UA40]	
	Cooling	35 / 24	18	kW	5.50	7.00	9.00	
	Cooling	33 / 24	7	kW	5.50	7.00	9.00	
Capacity		7/6	35	kW	5.50	7.00	9.00	
	Heating	776	55	kW	5.50	5.75	6.00	
		2/1	35	kW	5.00	6.00	7.00	
	Cooling	35 / 24	18	kW	1.17	1.51	1.96	
		33 / 24	7	kW	1.67	2.19	3.00	
Power Input	Heating	7 / 6	35	kW	1.17	1.49	1.96	
			55	kW	2.04	2.13	2.22	
		2/1	35	kW	1.39	1.69	2.00	
EER	0 15	Cooling	35 / 24	18	W/W	4.70	4.65	4.60
EEK	Cooming	33 / 24	7	W/W	3.30	3.20	3.00	
		7/6	35	W/W	4.70	4.70	4.60	
COP	Heating	770	55	W/W	2.70	2.70	2.70	
		2/1	35	W/W	3.60	3.55	3.50	
SCOP (Low temp	. Average Cli	mate)*			4.46	4.48	4.55	
SCOP (Medium to	emp. Average	e Climate)*			3.20	3.20	3.20	
Rated Water Flow	/ Rate (at LW	T 35 °C)		LPM	15.8	20.1	25.9	

Electri	ical Specifications	ZHBW056A2 [HM051MRS UA40]	ZHBW076A2 [HM071MRS UA40]	ZHBW096A2 [HM091MRS UA40]	
Power Supply	V, Ø, Hz	220-240, 1, 50	220-240, 1, 50	220-240, 1, 50	
Peak Control Running Curren	Α	13.0	14.0	15.0	
Rated Running Current	Cooling	Α	5.1	6.5	8.5
Rated Rulling Current	Heating	А	5.1	6.5	8.5
Circuit breaker		А	16	20	25
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)	mm² x cores	4.0 x 3C	4.0 x 3C	4.0 x 3C

Techni	cal Specificati	ons	ZHBW056A2 [HM051MRS UA40]	ZHBW076A2 [HM071MRS UA40]	ZHBW096A2 [HM091MRS UA40]	
		Day Max.	dB(A)	63	64	64
Sound Power Level	Heating	Rated	dB(A)	57	57	57
		Low noise	dB(A)	54	55	55
Dimensions	Unit	$W \times H \times D$	mm	1,242 × 853 × 391	1,242 × 853 × 391	1,242 × 853 × 391
Differisions	Packed Unit	$W \times H \times D$	mm	1,330 × 1017 × 480	1,330 × 1017 × 480	1,330 × 1017 × 480
Weight	Unit		kg	94	94	94
vveignt	Packed Unit		kg	108	108	108
	Color		ı	Dawn Gray	Dawn Gray	Dawn Gray
Fotosion	RAL Code		-	RAL 7037	RAL 7037	RAL 7037
Exterior	Color of Front Grille		-	Dark dawn gray	Dark dawn gray	Dark dawn gray
	RAL Code of Front Grille		-	RAL 7012	RAL 7012	RAL 7012

- 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. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. Rated running currents are based on the declared values under the following conditions.
 - Heating : Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. $35\,^\circ\!\mathrm{C}$
 - Cooling: Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 55~80°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.

Technic	Technical Specifications (Water side)				ZHBW076A2 [HM071MRS UA40]	ZHBW096A2 [HM091MRS UA40]	
Operation Range	Cooling	Min. ~ Max.	°C	5 ~ 27	5 ~ 27	5 ~ 27	
(Leaving Water Temp.)	Heating	Min. ~ Max.	°C	15 ~ 65	15 ~ 65	15 ~ 65	
(Leaving Water Temp.)	DHW *	Min. ~ Max.	°C	15 ~ 80	15 ~ 80	15 ~ 80	
	Туре		-		Canned type for hot water circulation		
	Model		-	UPM3	BK 20-75 CHBL / GRUN	IDFOS	
	Model Type		-	BLDC			
Water Pump***	Steps of Pumping	Performance	-	Va	riable speed 10% to 10	0%	
	Power input (100% Capacity)	Min. / Rated	W	3 / 57	3 / 60	3 / 60	
	Water Flow Rate	Min. / Rated	ℓ/min	0 / 15.8	0 / 20.1	0 / 25.9	
	Туре		-	Canne	d type for hot water circ	culation	
	Model		-		ODM-061P / OH SUNC	3	
	Motor Type		-		BLDC		
Water Pump_2***	Steps of Pumping	Performance	-	Va	riable speed 10% to 10	0%	
. –	Power input (100% Capacity)	Min. / Rated	W	17 / 91.0 (55**)	17 / 98.0 (60**)	17 / 110.0 (65**)	
	Water Flow Rate	Min. / Rated	ℓ/min	0 / 15.8	0 / 20.1	0 / 25.9	
	Type		-	Brazed Plate HEX			
Heat Exchanger	Quantity		-	1	1	1	
	Number of Plate		EA	52	52	52	
	Water Volume		l	0.7	0.7	0.7	
	Volume	Max.	l	8	8	8	
Expansion Vessel	\A/- +	Max.	bar	3.2	3.2	3.2	
•	Water pressure	Pre-charged	bar	1	1	1	
	Model	<u> </u>		SIKA VVX20			
Flow Sensor****	Measuring range	Min. ~ Max.	ℓ/min	5~80	5~80	5~80	
Flow Sellsoi	Flow (Trigger point)	Min.	ℓ/min	5	5	5	
	Model		-	SEBA LGF-080-C20-E-C0.5V			
Flow Sensor_2****	Measuring range	Min. ~ Max.	ℓ/min	5~80	5~80	5~80	
1 low Selisoi_2	Flow (Trigger point)	Min.	ℓ/min	5	5	5	
	Model	1 1711111	_	•	Sensata OFM(2HMP)		
Water Pressure sensor	Measuring range	Min. ~ Max.	bar(G)	0 ~ 20	0 ~ 20	0 ~ 20	
Dining Congressions	Inlet		inch	Male PT 1" acco	ording to ISO 7-1 (taper	ed pipe threads)	
Piping Connections	Outlet		inch	Male PT 1" acco	ording to ISO 7-1 (taper	ed pipe threads)	
	Supply type		-	Loose	supply(externally insta	alled)	
Motor atrainer	Mesh size		-	30 mesh	30 mesh	30 mesh	
Water strainer	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	
	•		-	R	elief valve / Flow Sens	or	
Devices for Water Circui	t		-		Drain hose		
			-	Р	ressure Sensor / Air ve	nt	

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- 3. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. 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
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB). * DHW 55~80°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.

	al Specifications (F	Refrigerant sid	le)	ZHBW056A2 [HM051MRS UA40]	ZHBW076A2 [HM071MRS UA40]	ZHBW096A2 [HM091MRS UA40]
Operation Range	Cooling#	Min. ~ Max.	°C DB	5 ~ 48	5 ~ 48	5 ~ 48
(Outdoor Temp.)	Heating	Min. ~ Max.	°C DB	-25 ~ 35	-25 ~ 35	-25 ~ 35
	Туре	•	-		Hermetic Sealed Scrol	
Compressor	Model		Model × No.		RJB036MAA × 1	
Compressor	Motor Type		-		BLDC	
	Displacement		cm³/Rev.	31.6	31.6	31.6
	Туре		-	R32	R32	R32
Defriesesset		GWP (Global Warming Potential)		675.0	675.0	675.0
Refrigerant	Precharged Am	ount	g	1,400	1,400	1,400
	t-CO2 eq.		-	0.945	0.945	0.945
	Control		-	E	lectronic Expansion Val	ve
Refrigerant Oil	Туре		-	FW68D		
Reingerant Oil	Charged Volum	е	cc × No.	1,100	1,100	1,100
	Туре			Fin & Tube	Fin & Tube	Fin & Tube
	Quantity			1	1	1
Heat Exchanger		Row	EA	38	38	38
	Specification	Column	EA	2	2	2
		FPI	EA	18	18	18
Fan	Туре		-		Propeller	
i ali	Air Flow Rate	Rated	m³/min × No.	60.0 × 1	60.0 × 1	60.0 × 1
Fan Motor	Type		-		BLDC	
i all Motor	Output	•	W × No.	124 × 1	124 × 1	124 × 1

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- 3. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
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- 7. Rated running currents are based on the declared values under the following conditions.
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 - Cooling : Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 55~80°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.
- # This operation range includes not only the continuous operation range but also operative range.

■ 1 phase Inverter (12 ~ 16 kW)

N	ominal Capa	acity and Nom	ninal Input					
-	-	Outdoor Temp. (°C) DB / WB	Leaving Water Temp. (°C)	-	ZHBW126A2 [HM121MRS UB40]	ZHBW146A2 [HM141MRS UB40]	ZHBW166A2 [HM161MRS UB40]	
	Cooling	35 / 24	18	kW	12.00	14.00	16.00	
	Cooling	33 / 24	7	kW	12.00	14.00	15.00	
Capacity		7/6	35	kW	12.00	14.00	16.00	
	Heating	770	55	kW	11.00	11.50	12.00	
		2/1	35	kW	11.00	12.00	13.80	
	Cooling	35 / 24	18	kW	2.50	2.98	3.48	
			7	kW	3.75	4.52	5.00	
Power Input	Heating	7 / 6	35	kW	2.45	2.92	3.40	
			55	kW	3.79	4.04	4.29	
		2/1	35	kW	3.06	3.38	3.94	
EER	Cooling	25 / 24	18	W/W	4.80	4.70	4.60	
LEK	Cooling	35 / 24	7	W/W	3.20	3.10	3.00	
		7/6	35	W/W	4.90	4.80	4.70	
COP	Heating	776	55	W/W	2.90	2.85	2.80	
		2/1	35	W/W	3.60	3.55	3.50	
SCOP (Low temp	SCOP (Low temp. Average Climate)*					4.62	4.53	
SCOP ((Medium	temp. Averag	e Climate)*			3.47	3.46	3.45	
Rated Water Flow	/ Rate (at LW	T 35 °C)		LPM	34.5	40.3	46.0	

Elec	rical Specifications	ZHBW126A2 [HM121MRS UB40]	ZHBW146A2 [HM141MRS UB40]	ZHBW166A2 [HM161MRS UB40]	
Power Supply		V, Ø, Hz	220-240, 1, 50	220-240, 1, 50	220-240, 1, 50
Peak Control Running Curre	А	23.0	24.0	25.0	
Dated Dunning Current	Cooling	А	10.6	12.7	14.8
Rated Running Current	Heating	А	10.9	13.0	15.1
Circuit breaker	Α	40	40	40	
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)	mm² x cores	6.0 x 3C	6.0 x 3C	6.0 x 3C

Technical Specifications				ZHBW126A2 [HM121MRS UB40]	ZHBW146A2 [HM141MRS UB40]	ZHBW166A2 [HM161MRS UB40]
		Day Max.	dB(A)	65	66	66
Sound Power Level	Heating	Rated	dB(A)	60	61	61
		Low noise	dB(A)	56	57	57
Dimensions	Unit	WxHxD	mm	1,320 x 1,019 x 520	1,320 x 1,019 x 520	1,320 x 1,019 x 520
Differisions	Packed Unit	WxHxD	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	117.0	117.0	117.0
vveignt	Packed Unit		kg	134.0	134.0	134.0
	Color	Color		Dawn Gray	Dawn Gray	Dawn Gray
Exterior	RAL Code		-	RAL 7037	RAL 7037	RAL 7037
Exterior	Color of Front Grille		-	Dark dawn gray	Dark dawn gray	Dark dawn gray
	RAL Code of	Front Grille	-	RAL 7012	RAL 7012	RAL 7012

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- 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. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. Rated running currents are based on the declared values under the following conditions.
 - Heating : Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. 35 $^{\circ}\mathrm{C}$
 - Cooling : Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 55~80°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.

Technical Specifications (Water side)				ZHBW126A2 [HM121MRS UB40]	ZHBW146A2 [HM141MRS UB40]	ZHBW166A2 [HM161MRS UB40]	
Operation Range	Cooling	Min. ~ Max.	°C	5 ~ 27	5 ~ 27	5 ~ 27	
(Leaving Water Temp.)	Heating	Min. ~ Max.	°C	15 ~ 65	15 ~ 65	15 ~ 65	
(Leaving Water Temp.)	DHW *	Min. ~ Max.	°C	15 ~ 80	15 ~ 80	15 ~ 80	
	Type		-	Canne	d type for hot water cire	culation	
	Model		-	UPML	20-105 CHBL / GRUN	IDFOS	
	Motor Type		-	BLDC			
Water Pump***	Steps of Pumping I	Performance	-	Va	riable speed 10% to 10	0%	
	Power input (100% Capacity)	Min. / Rated	W	3.5 / 125	3.5 / 135	3.5 / 140	
	Water Flow Rate	Min. / Rated	ℓ/min	0 / 34.5	0 / 40.3	0 / 46.0	
	Туре		-	Canne	d type for hot water cire	culation	
	Model		-		ODM-061P / OH SUN	3	
	Motor Type		-		BLDC		
Water Pump_2***	Steps of Pumping I	Performance	-	Va	riable speed 10% to 10	0%	
	Power input (100% Capacity)	Min. / Rated	W	17 / 130	17 / 140	17 / 145	
	Water Flow Rate	Min. / Rated	ℓ/min	0 / 34.5	0 / 40.3	0 / 46.0	
	Type		-	Brazed Plate HEX			
	Quantity		_	1	1	1	
Heat Exchanger	Number of Plate		EA	76	76	76	
3	Water Volume		l	1.0	1.0	1.0	
	Volume	Max.	l	8	8	8	
Expansion Vessel	\\/-t-==================================	Max.	bar	3.2	3.2	3.2	
	Water pressure	Pre-charged	bar	1	1	1	
	Model		-	SIKA VVX20			
Flow Sensor****	Measuring range	Min. ~ Max.	ℓ/min	5~80	5~80	5~80	
Flow Sellsol	Flow (Trigger point)	Min.	ℓ/min	10	10	10	
	Model	•	-	SEBA LGF-080-C20-E-C0.5V		5V	
Flow Sensor_2****	Measuring range	Min. ~ Max.	ℓ/min	5~80	5~80	5~80	
	Flow (Trigger point)	Min.	ℓ/min	5	5	5	
	Model		_	-	Sensata OFM(2HMP		
Water Pressure sensor	Measuring range	Min. ~ Max.	bar(G)	0 ~ 20	0 ~ 20	0 ~ 20	
Piping Connections	Inlet		inch		ording to ISO 7-1 (taper		
Tiping Confederations	Outlet		inch		ording to ISO 7-1 (taper		
	Supply type		-	Loose	supply(externally insta		
Water strainer	Mesh size		-	30 mesh	30 mesh	30 mesh	
vvator straintor	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	
			-	R	elief valve / Flow Sens	or	
Devices for Water Circuit			-		Drain hose		
			-	P	ressure Sensor / Air ve	nt	

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- 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. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. 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
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB). * DHW 55~80°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.

Technic	al Specifications (I	Refrigerant sic	ZHBW126A2 [HM121MRS UB40]	ZHBW146A2 [HM141MRS UB40]	ZHBW166A2 [HM161MRS UB40]		
Operation Range	Cooling#	Min. ~ Max.	°C DB	5 ~ 48	5 ~ 48	5 ~ 48	
(Outdoor Temp.)	Heating	Min. ~ Max.	°C DB	-25 ~ 35	-25 ~ 35	-25 ~ 35	
	Туре		-		Hermetic Sealed Scrol		
Compressor	Model		Model × No.		RJB036MAA × 1		
Compressor	Motor Type		-		BLDC		
	Displacement		cm³/Rev.	31.6	31.6	31.6	
	Туре		-	R32	R32	R32	
D 61	GWP (Global Warmin	GWP (Global Warming Potential)		675.0	675.0	675.0	
Refrigerant	Precharged Am	ount	g	1,600	1,600	1,600	
	t-CO2 eq.		-	1,080	1,080	1,080	
	Control		-	Е	ectronic Expansion Val	ve	
Refrigerant Oil	Туре		-	FW68D			
Reingerant Oil	Charged Volum	е	cc × No.	1,100	1,100	1,100	
	Туре			Fin & Tube	Fin & Tube	Fin & Tube	
	Quantity			1	1	1	
Heat Exchanger		Row	EA	46	46	46	
	Specification	Column	EA	2	2	2	
		FPI	EA	18	18	18	
Fan	Туре	Туре			Propeller		
i aii	Air Flow Rate	Rated	m³/min × No.	100.0 x 1	100.0 x 1	100.0 x 1	
Fan Motor	Туре		-	BLDC	BLDC	BLDC	
i ali ivioloi	Output		W × No.	250 x 1	250 x 1	250 x 1	

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- 3. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. 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
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB). * DHW 55~80°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.
- # This operation range includes not only the continuous operation range but also operative range.

■ 3 phase Inverter (12 ~ 16 kW)

N	ominal Capa	city and Nom	inal Input				
-	-	Outdoor Temp (°C) DB / WB	Leaving Water Temp (°C)	-	ZHBW128A2 [HM123MRS UB40]	ZHBW148A2 [HM143MRS UB40]	ZHBW168A2 [HM163MRS UB40]
	Cooling	35 / 24	18	kW	12.00	14.00	16.00
	Cooling	35 / 24	7	kW	12.00	14.00	15.00
Capacity		7/6	35	kW	12.00	14.00	16.00
	Heating	776	55	kW	11.00	11.50	12.00
		2/1	35	kW	11.00	12.00	13.80
	Cooling	35 / 24	18	kW	2.50	2.98	3.48
	Cooling		7	kW	3.75	4.52	5.00
Power Input	Heating	7/6	35	kW	2.45	2.92	3.40
			55	kW	3.79	4.04	4.29
		2/1	35	kW	3.06	3.38	3.94
EER	Cooling	25 / 24	18	W/W	4.80	4.70	4.60
LEK	Cooling	35 / 24	7	W/W	3.20	3.10	3.00
		7/6	35	W/W	4.90	4.80	4.70
COP	Heating	776	55	W/W	2.90	2.85	2.80
		2/1	35	W/W	3.60	3.55	3.50
SCOP (Low temp	SCOP (Low temp. Average Climate)*					4.62	4.53
SCOP ((Medium t	temp. Averag	e Climate)*	<u> </u>		3.47	3.46	3.45
Rated Water Flow	/ Rate (at LW	T 35 °C)		LPM	34.5	40.3	46.0

Elect	ical Specifications	ZHBW128A2 [HM123MRS UB40]	ZHBW148A2 [HM143MRS UB40]	ZHBW168A2 [HM163MRS UB40]	
Power Supply	V, Ø, Hz	380-415, 3, 50	380-415, 3, 50	380-415, 3, 50	
Peak Control Running Curre	А	8.0	9.0	10.0	
Rated Running Current	Cooling	Α	3.5	4.2	4.9
Rated Rulling Current	Heating	А	3.6	4.3	5.0
Circuit breaker	•	Α	16	16	16
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)	mm² x cores	4.0 x 5C	4.0 x 5C	4.0 x 5C

Tecl	hnical Specification	ons	ZHBW128A2 [HM123MRS UB40]	ZHBW148A2 [HM143MRS UB40]	ZHBW168A2 [HM163MRS UB40]	
		Day Max.	dB(A)	65	66	66
Sound Power Level	Heating	Rated	dB(A)	60	61	61
		Low noise	dB(A)	56	57	57
Dimensions	Unit	$W \times H \times D$	mm	1,320 x 1,019 x 520	1,320 x 1,019 x 520	1,320 x 1,019 x 520
Dimensions	Packed Unit	$W \times H \times D$	mm	1,380 x 1,200 x 575	1,380 x 1,200 x 575	1,380 x 1,200 x 575
Weight	Unit	Unit		117.0	117.0	117.0
vveignt	Packed Unit		kg	134.0	134.0	134.0
	Color		-	Dawn Gray	Dawn Gray	Dawn Gray
Cutorian	RAL Code		-	RAL 7037	RAL 7037	RAL 7037
Exterior	Color of Front	Color of Front Grille		Dark dawn gray	Dark dawn gray	Dark dawn gray
	RAL Code of	Front Grille	_	RAL 7012	RAL 7012	RAL 7012

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- 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. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. Rated running currents are based on the declared values under the following conditions.
 - Heating: Outdoor Temp. 7°CDB / 6°CWB, Leaving Water Temp. 35 ℃
 - Cooling: Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
- * DHW 55~80°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.

Technical \$	Specifications (Wat	er side)		ZHBW128A2 [HM123MRS UB40]	ZHBW148A2 [HM143MRS UB40]	ZHBW168A2 [HM163MRS UB40]
Operation Range	Cooling	Min. ~ Max.	°C	5 ~ 27	5 ~ 27	5 ~ 27
(Leaving Water Temp.)	Heating	Min. ~ Max.	°C	15 ~ 65	15 ~ 65	15 ~ 65
(Leaving Water Temp.)	DHW *	Min. ~ Max.	°C	15 ~ 80	15 ~ 80	15 ~ 80
	Туре	•	-	Canne	d type for hot water	circulation
	Model		-	UPML 20-105 CHBL / GRUNDFOS		
\\\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-	Motor Type		-		BLDC	
Water Pump***	Steps of Pumping I	Performance	-	Varia	ble speed 10% to 10	00%
	Power input (100% Capacity)	Min. / Rated	W	3.5 / 125	3.5 / 135	3.5 / 140
	Water Flow Rate	Min. / Rated	ℓ/min	0 / 34.5	0 / 40.3	0 / 46.0
	Туре		-	Canned to	pe for hot water cir	culation
	Model		-	Ö	DM-061P / OH SUN	NG
	Motor Type		-		BLDC	
Water Pump_2***	Steps of Pumping I	Performance	-	Varia	able speed 10% to	100%
\ <u></u>	Power input (100% Capacity)	Min. / Rated	W	17 / 130	17 / 140	17 / 145
	Water Flow Rate	Min. / Rated	ℓ/min	0 / 34.5	0 / 40.3	0 / 46.0
	Туре		-		Brazed Plate HEX	
	Quantity		-	1	1	1
Heat Exchanger	Number of Plate		EA	76	76	76
1	Water Volume		l	1.0	1.0	1.0
	Volume	Max.	l	8	8	8
Expansion Vessel	\A/- +	Max.	bar	3.2	3.2	3.2
·	Water pressure	Pre-charged	bar	1	1	1
	Model		=	SIKA VVX20		
Flow Sensor****	Measuring range	Min. ~ Max.	ℓ/min	5 ~ 80	5~80	5~80
Flow Sellsol	Flow (Trigger point)	Min.	ℓ/min	10	10	10
	Model		-	SEBA LGF-080-C20-E-C0.5V		
Flow Sensor_2****	Measuring range	Min. ~ Max.	ℓ/min	5~80	5~80	5~80
	Flow (Trigger point) Min.	ℓ/min	10	10	10
	Model	,,	_		Sensata OFM(2HMF	
Water Pressure sensor	Measuring range	Min. ~ Max.	bar(G)	0 ~ 20	0~20	0~20
	Inlet	Will. Wax.	inch		ding to ISO 7-1 (tap	
Piping Connections	Outlet		inch	Male PT 1" accor	ding to ISO 7-1 (tap	ered pipe threads)
	Supply type		-		ose supply(external	
	Mesh size		_	30 mesh	30 mesh	30 mesh
Water strainer	Max. particle size		mm	0.6	0.6	0.6
	Material		-	Stainless Steel	Stainless Steel	Stainless Steel
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0
TOHEL VALVE	I 1633016 LIIIII	Opper Limit	- Jai		lief valve / Flow Ser	
Devices for Water Circui	t		_	1/6	Drain hose	1001
Devices for water Circui	·		_	Dro	essure Sensor / Air v	/ent
			_	I FIE	Source Oction / All V	CITE

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- 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. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. Rated running currents are based on the declared values under the following conditions.

 - Cooling: Outdoor Temp. 35°C(DB) / 24°C(WB), Leaving Water Temp. 18°C
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
 - * DHW 55~80°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.

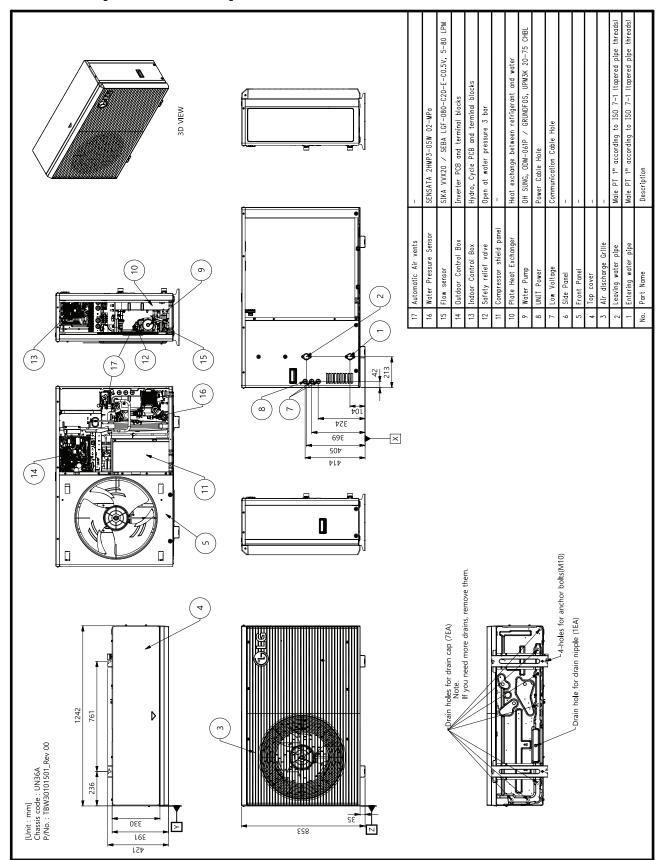
	Specifications (F			ZHBW148A2 [HM143MRS UB40]	ZHBW168A2 [HM163MRS UB40]	
Operation Range	Cooling#	Min. ~ Max.	°C DB	5 ~ 48	5 ~ 48	5 ~ 48
(Outdoor Temp.)	Heating	Min. ~ Max.	°C DB	-25 ~ 35	-25 ~ 35	-25 ~ 35
	Туре		-		Hermetic Sealed Scr	oll o
Compressor	Model		Model × No.		RJB036MAA × 1	
Compressor	Motor Type		-	BLDC	BLDC	BLDC
	Displacement		cm³/Rev.	31.6	31.6	31.6
	Туре		-	R32	R32	R32
Defilment	GWP (Global Warming Potential)		-	675.0	675.0	675.0
Refrigerant	Precharged Am	ount	g	1,600	1,600	1.600
	t-CO2 eq.		-	1,080	1,080	1,080
	Control		-		ctronic Expansion Val	/e
Refrigerant Oil	Туре		-	FW68D	FW68D	FW68D
rteingerant on	Charged Volum	Charged Volume		1,100	1,100	1,100
	Туре			Fin & Tube	Fin & Tube	Fin & Tube
	Quantity			1	1	1
Heat Exchanger		Row	EA	46	46	46
	Specification	Column	EA	2	2	2
		FPI	EA	18	18	18
Fan	Туре		-	Propeller	Propeller	Propeller
1 411	Air Flow Rate	Rated	m³/min × No.	100.0 x 1	100.0 x 1	100.0 x 1
Fan Motor	Туре		-	BLDC	BLDC	BLDC
T dil Motor	Output		W × No.	250 x 1	250 x 1	250 x 1

- 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. 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.
- 4. 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.
- 5. This product contains Fluorinated greenhouse gases.
- 6. SCOP is in accordance with EN14825.
- 7. 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
- 8. All installation sites must be equipped with an earth leakage circuit breaker (ELCB).
- * DHW 55~80°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.
- # This operation range includes not only the continuous operation range but also operative range.

3. Dimensions

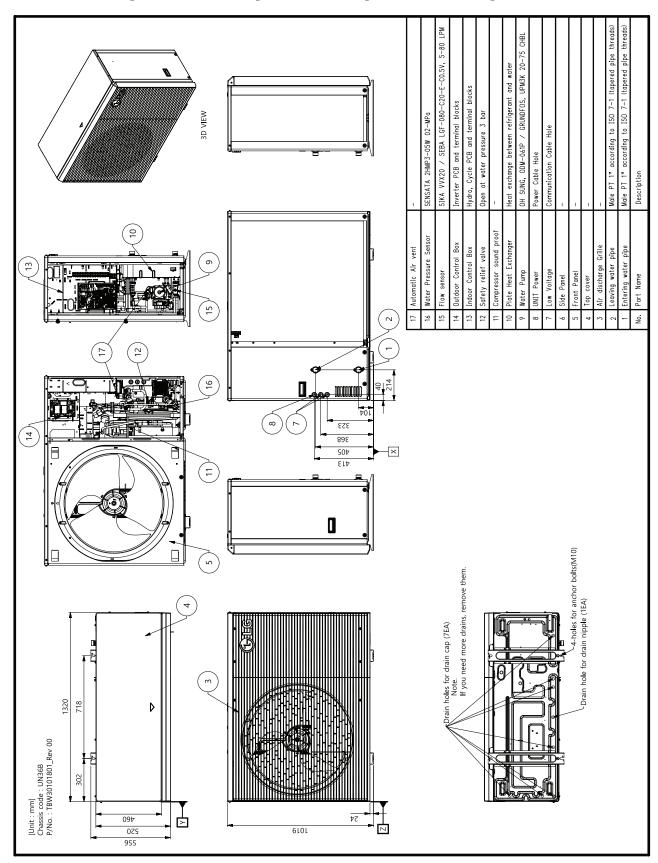
■ Product

◆ ZHBW056A2 [HM051MRS UA40] / ZHBW076A2 [HM071MRS UA40] / ZHBW096A2 [HM091MRS UA40]



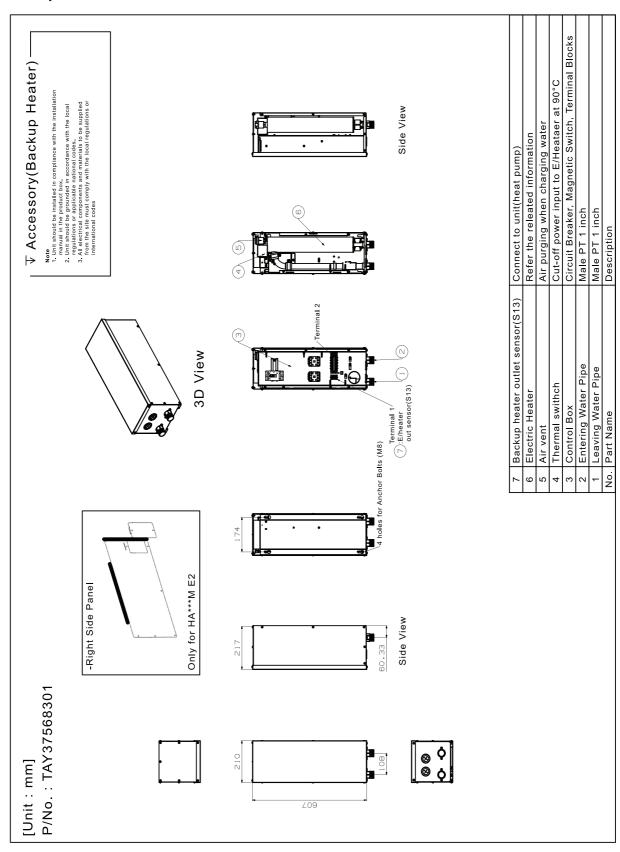
3. Dimensions

◆ ZHBW126A2 [HM121MRS UB40] / ZHBW146A2 [HM121MRS UB40] / ZHBW166A2 [HM161MRS UB40] / ZHBW128A2 [HM123MRS UB40] / ZHBW148A2 [HM143MRS UB40] / ZHBW168A2 [HM163MRS UB40]

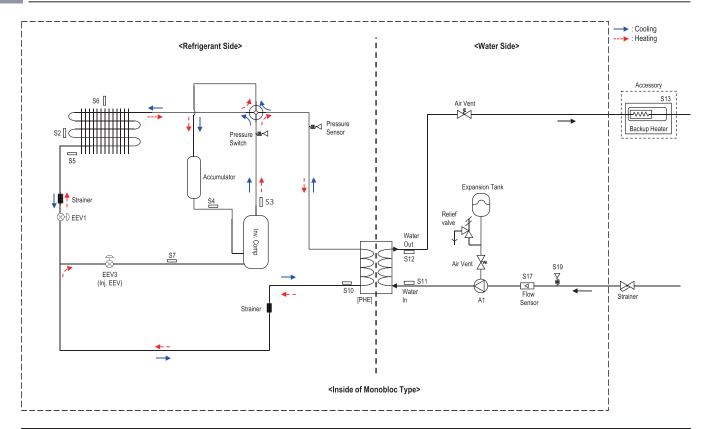


3. Dimensions

■ Backup Heater



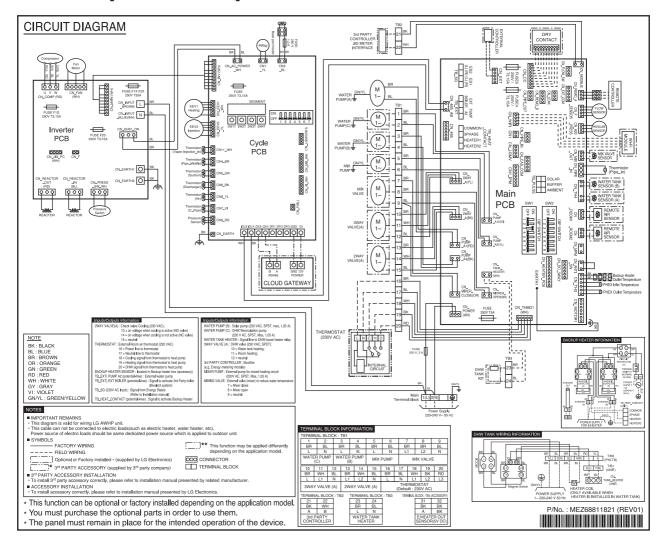
4. Piping Diagram



Category	Symbol	Meaning	PCB Connector
	S10	PHEX liquid temp. sensor	CN_PIPE/IN
	S7	Compressor-injection pipe temperature sensor	CN_VI_IN
	S3	Compressor-discharge pipe temperature sensor	CN_DISCHA
	S4	Compressor-suction pipe temperature sensor	CN_SUCTION
Refrigerant side	S2	Outdoor-HEX middle temp. sensor	CN_MID
	S5	Outdoor-HEX temp. sensor	CN_C_PIPE
	S6	Outdoor air temperature sensor	CN_AIR
	EEV1	Electronic Expansion Valve (Heating&Cooling)	CN_EEV1(WH)
	EEV3	Electronic Expansion Valve (Injection)	CN_EEV3(YL)
	S11	Inlet water temperature sensor	
	S12	Outlet water temperature sensor	CN_TH3
Water Side	S13	Electric backup heater outlet (Accessory kit)	
vvaler Side	S17	Flow sensor	CN_F_SENSOR
	S19	Water pressure sensor	CN_H20_PRESS
	A1	Main Water Pump	CN_PUMP_A1

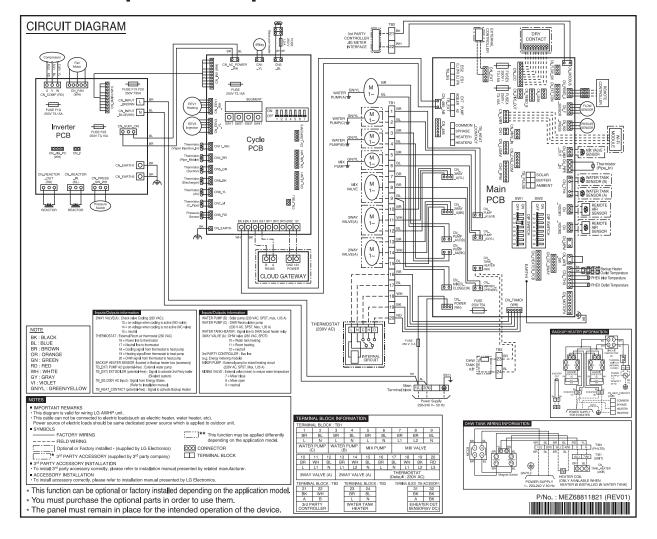
5. Wiring Diagram

◆ ZHBW056A2 [HM051MRS UA40] / ZHBW076A2 [HM071MRS UA40] / ZHBW096A2 [HM091MRS UA40]



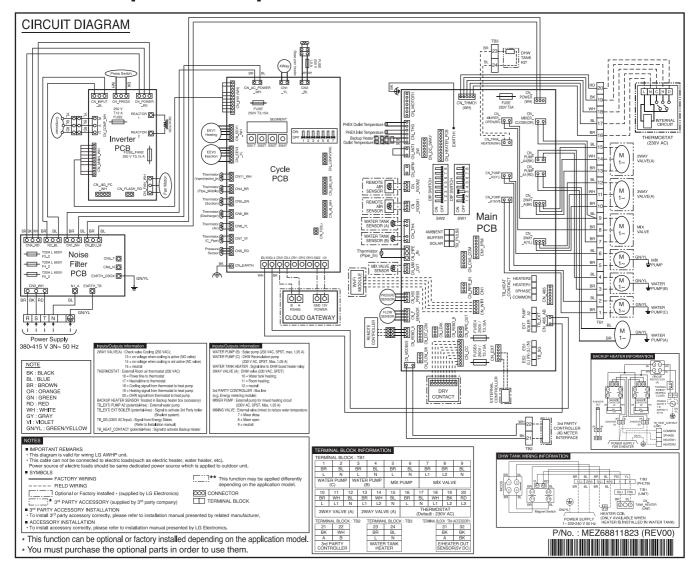
5. Wiring Diagram

◆ ZHBW126A2 [HM121MRS UB40] / ZHBW146A2 [HM141MRS UB40] / ZHBW166A2 [HM161MRS UB40]



5. Wiring Diagram

◆ ZHBW128A2 [HM123MRS UB40] / ZHBW148A2 [HM143MRS UB40] / ZHBW168A2 [HM163MRS UB40]



6.1 Cooling Operation

■ Maximum Cooling Capacity

◆ ZHBW056A2 [HM051MRS UA40]

Outdoor						Wat	ter flow ra	ate 15.81 I	_PM					
Temperature	LWT	7 °C	LWT	10 °C	LWT	13 °C	LWT	15 °C	LWT	18 °C	LWT	20 °C	LWT	22 °C
[°C DB]	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER
10	5.50	5.27	5.50	5.97	5.50	6.45	5.50	6.84	5.50	7.43	5.50	7.83	5.50	8.22
20	5.50	4.48	5.50	5.05	5.50	5.44	5.50	5.76	5.50	6.24	5.50	6.56	5.50	6.88
30	5.50	3.18	5.50	3.70	5.50	4.07	5.50	4.37	5.50	4.81	5.50	5.11	5.50	5.40
35	5.50	3.30	5.50	3.67	5.50	3.92	5.50	4.13	5.50	4.70	5.50	4.65	5.50	4.86
40	5.29	2.66	5.32	3.00	5.36	3.24	5.38	3.44	5.41	3.73	5.43	3.93	5.45	4.13
45	5.09	2.01	5.15	2.34	5.21	2.56	5.25	2.75	5.31	3.02	5.36	3.21	5.40	3.39

◆ ZHBW076A2 [HM071MRS UA40]

Outdoor						Wat	ter flow ra	te 20.12 l	_PM					
Temperature	LWT	7 °C	LWT	10 °C	LWT	13 °C	LWT	15 °C	LWT	18 °C	LWT	20 °C	LWT	22 °C
[°C DB]	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER
10	7.00	4.91	7.00	5.65	7.00	6.17	7.00	6.59	7.00	7.21	7.00	7.63	7.00	8.05
20	7.00	4.23	7.00	4.82	7.00	5.23	7.00	5.56	7.00	6.07	7.00	6.40	7.00	6.74
30	7.00	3.54	7.00	3.98	7.00	4.29	7.00	4.54	7.00	4.92	7.00	5.17	7.00	5.42
35	7.00	3.20	7.00	3.57	7.00	3.82	7.00	4.03	7.00	4.50	7.00	4.55	7.00	4.76
40	6.36	2.60	6.45	2.94	6.55	3.17	6.61	3.36	6.71	3.65	6.77	3.84	6.84	4.04
45	5.71	1.99	5.82	2.30	5.92	2.52	5.99	2.70	6.10	2.96	6.17	3.14	6.24	3.31

◆ ZHBW096A2 [HM091MRS UA40]

Outdoor						Wat	ter flow ra	ite 25.87 L	_PM					
Temperature	LWT	7 °C	LWT	10 °C	LWT	13 °C	LWT	15 °C	LWT	18 °C	LWT	20 °C	LWT	22 °C
[°C DB]	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER
10	9.00	4.55	9.00	5.34	9.00	5.89	9.00	6.33	9.00	7.00	9.00	7.44	9.00	7.89
20	9.00	3.97	9.00	4.59	9.00	5.02	9.00	5.37	9.00	5.90	9.00	6.25	9.00	6.60
30	9.00	3.39	9.00	3.84	9.00	4.16	9.00	4.41	9.00	4.79	9.00	5.05	9.00	5.31
35	9.00	3.10	9.00	3.47	9.00	3.72	9.00	3.93	9.00	4.20	9.00	4.45	9.00	4.66
40	7.66	2.54	7.66	2.87	7.65	3.10	7.65	3.29	7.65	3.57	7.65	3.76	7.65	3.95
45	6.31	1.98	6.35	2.27	6.39	2.48	6.42	2.65	6.45	2.90	6.48	3.07	6.51	3.23

- 1. DB : Dry bulb temperature($^{\circ}$ C), LWT : Leaving water temperature($^{\circ}$ 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.

◆ ZHBW126A2 [HM121MRS UB40] / ZHBW128A2 [HM123MRS UB40]

Outdoor						Wa	ter flow r	ate 34.5 L	.PM					
Temperature	LWT	7 °C	LWT	10 °C	LWT	13 °C	LWT	15 °C	LWT	18 °C	LWT	20 °C	LWT	22 °C
[°C DB]	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER
10	12.00	5.22	12.00	5.60	12.00	5.87	12.00	6.09	12.00	6.42	12.00	6.64	12.00	6.85
20	12.00	4.45	12.00	4.78	12.00	5.02	12.00	5.20	12.00	5.49	12.00	5.67	12.00	5.86
30	12.00	3.68	12.00	3.96	12.00	4.16	12.00	4.32	12.00	4.55	12.00	4.71	12.00	4.87
35	12.00	3.30	12.00	3.55	12.00	3.73	12.00	3.87	12.00	4.75	12.00	4.23	12.00	4.38
40	11.05	2.81	11.19	3.06	11.33	3.23	11.43	3.37	11.57	3.58	11.67	3.72	11.76	3.85
45	10.10	2.33	10.37	2.57	10.64	2.73	10.83	2.86	11.10	3.07	11.28	3.20	11.46	3.33

◆ ZHBW146A2 [HM141MRS UB40] / ZHBW148A2 [HM143MRS UB40]

Outdoor						Wa	ter flow r	ate 40.3 L	.PM					
Temperature	LWT	7 °C	LWT	10 °C	LWT	13 °C	LWT	15 °C	LWT	18 °C	LWT	20 °C	LWT	22 °C
[°C DB]	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER
10	12.50	4.93	12.80	5.33	13.10	5.61	13.30	5.84	13.60	6.18	13.80	6.40	14.00	6.63
20	14.00	4.28	14.00	4.61	14.00	4.84	14.00	5.03	14.00	5.31	14.00	5.50	14.00	5.69
30	14.00	3.63	14.00	3.89	14.00	4.08	14.00	4.23	14.00	4.45	14.00	4.60	14.00	4.75
35	14.00	3.30	14.00	3.53	14.00	3.69	14.00	3.82	14.00	4.30	14.00	4.15	14.00	4.28
40	12.35	2.81	12.60	3.04	12.84	3.20	13.01	3.32	13.26	3.52	13.42	3.64	13.59	3.77
45	10.69	2.32	11.19	2.54	11.69	2.70	12.02	2.82	12.51	3.01	12.84	3.14	13.17	3.26

◆ ZHBW166A2 [HM161MRS UB40] / ZHBW168A2 [HM163MRS UB40]

	_			-			_			-				
Outdoor						Wa	iter flow r	ate 46.0 L	.PM					
Temperature	LWT	7 °C	LWT	10 °C	LWT	13 °C	LWT	15 °C	LWT	18 °C	LWT	20 °C	LWT	22 °C
[°C DB]	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER	TC	EER
10	13.00	4.64	13.60	5.05	14.20	5.35	14.60	5.58	15.20	5.94	15.60	6.17	16.00	6.41
20	16.00	4.02	16.00	4.37	16.00	4.61	16.00	4.81	16.00	5.10	16.00	5.30	16.00	5.50
30	16.00	3.41	16.00	3.68	16.00	3.88	16.00	4.03	16.00	4.27	16.00	4.42	16.00	4.58
35	16.00	3.10	16.00	3.34	16.00	3.51	16.00	3.65	16.00	4.00	16.00	3.99	16.00	4.12
40	13.60	2.70	13.96	2.92	14.32	3.08	14.56	3.20	14.92	3.39	15.16	3.52	15.40	3.64
45	11.20	2.29	11.76	2.50	12.32	2.64	12.69	2.76	13.25	2.93	13.62	3.05	14.00	3.16

- 1. DB : Dry bulb temperature(℃), LWT : Leaving water temperature(℃), 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.

6.2 Heating Operation

■ Maximum Heating Capacity (Include defrost effect)

◆ ZHBW056A2 [HM051MRS UA40]

Outdoor			Wate	er flow rate 15.8	31 LPM					Water flow r	ate 9.9 LPM			Water flow r	ate 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
Temperature	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25 ℃ DB	5.50	2.02	5.50	1.88	5.50	1.74	5.50	1.60								
-20 ℃ DB	5.50	2.57	5.50	2.38	5.50	2.19	5.50	2.00	5.23	1.82						
-15 ℃ DB	5.50	2.71	5.50	2.50	5.50	2.33	5.50	2.16	5.23	2.04	5.23	1.93				
-7 ℃ DB	5.50	3.15	5.50	2.95	5.50	2.63	5.50	2.30	5.50	2.15	5.50	1.99	5.50	1.93		
-4 ℃ DB	5.50	3.31	5.50	3.12	5.50	2.93	5.50	2.77	5.50	2.58	5.50	2.39	5.50	2.10	5.50	1.93
-2 ℃ DB	5.50	3.46	5.50	3.23	5.50	3.04	5.50	2.84	5.50	2.66	5.50	2.48	5.50	2.21	5.50	2.03
2 ℃ DB	5.50	3.64	5.50	3.46	5.50	3.26	5.50	3.05	5.50	2.85	5.50	2.64	5.50	2.44	5.50	2.24
7 ℃ DB	5.50	5.02	5.50	4.70	5.50	4.15	5.50	3.59	5.50	3.23	5.50	2.86	5.50	2.68	5.50	2.49
10 ℃ DB	5.50	5.87	5.50	5.41	5.50	4.69	5.50	3.97	5.50	3.55	5.50	3.57	5.50	3.11	5.50	2.64
15 ℃ DB	5.50	6.43	5.50	5.92	5.50	5.21	5.50	4.50	5.50	4.03	5.50	3.91	5.50	3.40	5.50	2.90
18 ℃ DB	5.50	6.76	5.50	6.23	5.50	5.52	5.50	4.82	5.50	4.32	5.50	4.11	5.50	3.58	5.50	3.05
20 ℃ DB	5.50	6.98	5.50	6.43	5.50	5.73	5.50	5.03	5.50	4.51	5.50	4.25	5.50	3.70	5.50	3.15
35 ℃ DB	5.50	8.65	5.50	7.97	5.50	7.30	5.50	6.62	5.50	5.95	5.50	5.27	5.50	4.60	5.50	3.92

◆ ZHBW076A2 [HM071MRS UA40]

Outdoor			Wa	ater flow rate 2	0.12 LPM					Water flow ra	ate 12.6 LPM			Water flow ra	ate 10.0 LPM	
Temperature	LWT	30°C	LWT	35°C	LWT	40°C	LWT	45°C	LWT	50°C	LWT	55°C	LWT	60°C	LWT	65°C
remperature	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25 ℃ DB	5.85	1.98	5.85	1.84	5.85	1.69	5.85	1.55								
-20 ℃ DB	6.43	2.53	6.43	2.34	6.43	2.15	6.43	1.96	6.10	1.76						
-15 ℃ DB	7.00	2.68	7.00	2.45	7.00	2.28	7.00	2.11	6.65	2.00	6.65	1.89				
-7 ℃ DB	7.00	3.16	7.00	2.92	7.00	2.58	7.00	2.24	7.00	2.10	7.00	1.95	7.00	1.89		
-4 ℃ DB	7.00	3.35	7.00	3.09	7.00	2.89	7.00	2.73	7.00	2.54	7.00	2.35	7.00	2.06	7.00	1.89
-2 ℃ DB	7.00	3.50	7.00	3.20	7.00	3.00	7.00	2.80	7.00	2.62	7.00	2.44	7.00	2.17	7.00	1.99
2 ℃ DB	7.00	3.56	7.00	3.43	7.00	3.22	7.00	3.02	7.00	2.81	7.00	2.61	7.00	2.40	7.00	2.20
7 ℃ DB	7.00	4.97	7.00	4.70	7.00	4.11	7.00	3.52	7.00	3.17	7.00	2.81	7.00	2.63	7.00	2.45
10 ℃ DB	7.00	5.83	7.00	5.37	7.00	4.62	7.00	3.86	7.00	3.46	7.00	3.53	7.00	3.06	7.00	2.60
15 ℃ DB	7.00	6.38	7.00	5.88	7.00	5.14	7.00	4.41	7.00	3.95	7.00	3.87	7.00	3.36	7.00	2.86
18 ℃ DB	7.00	6.72	7.00	6.19	7.00	5.46	7.00	4.73	7.00	4.24	7.00	4.07	7.00	3.54	7.00	3.01
20 ℃ DB	7.00	6.94	7.00	6.39	7.00	5.67	7.00	4.95	7.00	4.43	7.00	4.21	7.00	3.66	7.00	3.11
35 ℃ DB	7.00	8.60	7.00	7.93	7.00	7.25	7.00	6.58	7.00	5.90	7.00	5.23	7.00	4.55	7.00	3.88

◆ ZHBW096A2 [HM091MRS UA40]

Outdoor			W	ater flow rate 2	5.87 LPM					Water flow ra	ate 16.2 LPM			Water flow r	ate 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
Temperature	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25 ℃ DB	6.20	1.97	6.20	1.82	6.20	1.68	6.20	1.53								
-20 ℃ DB	7.60	2.50	7.60	2.31	7.60	2.12	7.60	1.93	7.22	1.74						
-15 ℃ DB	9.00	2.64	9.00	2.43	9.00	2.25	9.00	2.07	8.55	1.96	8.55	1.80				
-7 ℃ DB	9.00	3.06	9.00	2.89	9.00	2.68	9.00	2.19	9.00	2.10	9.00	1.84	9.00	1.82		
-4 ℃ DB	9.00	3.22	9.00	3.05	9.00	2.84	9.00	2.67	9.00	2.48	9.00	2.29	9.00	2.00	9.00	1.85
-2 ℃ DB	9.00	3.46	9.00	3.15	9.00	2.94	9.00	2.75	9.00	2.57	9.00	2.38	9.00	2.12	9.00	1.95
2 ℃ DB	9.00	3.53	9.00	3.36	9.00	3.16	9.00	2.95	9.00	2.75	9.00	2.55	9.00	2.35	9.00	2.15
7 ℃ DB	9.00	4.89	9.00	4.60	9.00	4.04	9.00	3.48	9.00	3.12	9.00	2.76	9.00	2.58	9.00	2.40
10 ℃ DB	9.00	5.46	9.00	5.27	9.00	4.48	9.00	3.70	9.00	3.41	9.00	3.46	9.00	3.00	9.00	2.55
15 ℃ DB	9.00	6.05	9.00	5.77	9.00	5.01	9.00	4.25	9.00	3.88	9.00	3.79	9.00	3.29	9.00	2.80
18 ℃ DB	9.00	6.41	9.00	6.07	9.00	5.32	9.00	4.58	9.00	4.17	9.00	3.99	9.00	3.47	9.00	2.95
20 ℃ DB	9.00	6.64	9.00	6.27	9.00	5.53	9.00	4.80	9.00	4.36	9.00	4.12	9.00	3.59	9.00	3.05
35 ℃ DB	9.00	8.43	9.00	7.77	9.00	7.11	9.00	6.44	9.00	5.78	9.00	5.12	9.00	4.46	9.00	3.80

- 1. DB : Dry bulb temperature($^{\circ}$ C), LWT : Leaving water temperature($^{\circ}$ 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.

◆ ZHBW126A2 [HM121MRS UB40] / ZHBW128A2 [HM123MRS UB40]

Outdoor			- \	Vater flow rate	34.5 LPM					Water flow ra	ate 21.6 LPM			Water flow ra	ate 17.3 LPM	
Temperature	LWT	30°C	LWT	35°C	LWT	40°C	LWT	45°C	LWT	50°C	LWT	55°C	LWT	60°C	LWT	65°C
remperature	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25 ℃ DB	9.50	2.13	9.50	1.97	9.50	1.81	9.50	1.65								
-20 ℃ DB	10.75	2.68	10.75	2.47	10.75	2.27	10.75	2.07	10.21	1.87						
-15 ℃ DB	12.00	2.77	12.00	2.55	12.00	2.34	12.00	2.14	11.50	2.07	11.50	2.00				
-7 ℃ DB	12.00	3.22	12.00	3.16	12.00	2.82	12.00	2.44	12.00	2.26	12.00	2.08	12.00	2.03		
-4 ℃ DB	12.00	3.39	12.00	3.29	12.00	3.00	12.00	2.68	12.00	2.49	12.00	2.31	12.00	2.21	12.00	2.06
-2 ℃ DB	12.00	3.50	12.00	3.38	12.00	3.11	12.00	2.84	12.00	2.65	12.00	2.46	12.00	2.32	12.00	2.16
2 ℃ DB	12.00	3.73	12.00	3.55	12.00	3.35	12.00	3.15	12.00	2.95	12.00	2.76	12.00	2.56	12.00	2.36
7 ℃ DB	12.00	5.15	12.00	4.90	12.00	4.37	12.00	3.83	12.00	3.50	12.00	3.16	12.00	2.88	12.00	2.61
10 ℃ DB	12.00	5.82	12.00	5.29	12.00	4.76	12.00	4.24	12.00	3.76	12.00	3.67	12.00	3.21	12.00	2.76
15 ℃ DB	12.00	6.39	12.00	5.83	12.00	5.28	12.00	4.73	12.00	4.21	12.00	4.00	12.00	3.50	12.00	3.01
18 ℃ DB	12.00	6.73	12.00	6.16	12.00	5.59	12.00	5.02	12.00	4.48	12.00	4.20	12.00	3.68	12.00	3.15
20 ℃ DB	12.00	6.96	12.00	6.38	12.00	5.80	12.00	5.21	12.00	4.66	12.00	4.34	12.00	3.80	12.00	3.25
35 ℃ DB	12.00	8.68	12.00	8.01	12.00	7.34	12.00	6.68	12.00	6.01	12.00	5.34	12.00	4.67	12.00	4.00

◆ ZHBW146A2 [HM141MRS UB40] / ZHBW148A2 [HM143MRS UB40]

Outdoor				Water flow rate	e 40.25 LPM					Water flow ra	ate 25.2 LPM			Water flow ra	ate 20.1 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
Temperature	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25 ℃ DB	10.00	2.09	10.00	1.93	10.00	1.78	10.00	1.62								
-20 ℃ DB	12.00	2.62	12.00	2.42	12.00	2.23	12.00	2.03	11.40	1.83						
-15 °C DB	14.00	2.70	14.00	2.50	14.00	2.28	14.00	2.05	13.30	2.00	13.30	1.95				
-7 ℃ DB	14.00	3.24	14.00	2.83	14.00	2.76	14.00	2.25	14.00	2.16	14.00	2.06	14.00	1.98		
-4 °C DB	14.00	3.45	14.00	3.05	14.00	2.94	14.00	2.53	14.00	2.40	14.00	2.27	14.00	2.15	14.00	2.00
-2 °C DB	14.00	3.58	14.00	3.20	14.00	3.06	14.00	2.72	14.00	2.57	14.00	2.42	14.00	2.27	14.00	2.10
2 ℃ DB	14.00	3.85	14.00	3.50	14.00	3.30	14.00	3.10	14.00	2.90	14.00	2.70	14.00	2.50	14.00	2.30
7 ℃ DB	14.00	5.04	14.00	4.80	14.00	4.26	14.00	3.72	14.00	3.39	14.00	3.05	14.00	2.80	14.00	2.55
10 ℃ DB	14.00	5.65	14.00	5.11	14.00	4.57	14.00	4.02	14.00	3.66	14.00	3.60	14.00	3.15	14.00	2.70
15 ℃ DB	14.00	6.22	14.00	5.66	14.00	5.09	14.00	4.53	14.00	4.11	14.00	3.93	14.00	3.44	14.00	2.95
18 ℃ DB	14.00	6.56	14.00	5.99	14.00	5.41	14.00	4.84	14.00	4.38	14.00	4.13	14.00	3.61	14.00	3.10
20 ℃ DB	14.00	6.79	14.00	6.21	14.00	5.62	14.00	5.04	14.00	4.56	14.00	4.26	14.00	3.73	14.00	3.20
35 ℃ DB	14.00	8.52	14.00	7.86	14.00	7.21	14.00	6.56	14.00	5.91	14.00	5.25	14.00	4.60	12.50	3.95

◆ ZHBW166A2 [HM161MRS UB40] / ZHBW168A2 [HM163MRS UB40]

Outdoor Temperature		Water flow rate 46 LPM							Water flow rate 28.8 LPM				Water flow rate 23.0 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	
	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
-25 ℃ DB	10.50	1.96	10.50	1.84	10.50	1.72	10.50	1.60								
-20 °C DB	13.25	2.48	13.25	2.32	13.25	2.15	13.25	1.98	12.59	1.82						
-15 ℃ DB	16.00	2.58	14.40	2.45	14.40	2.23	14.40	2.01	13.68	1.97	13.68	1.94				
-7 °C DB	16.00	3.17	16.00	2.70	16.00	2.44	16.00	2.17	16.00	2.09	16.00	2.01	16.00	1.94		
-4 °C DB	16.00	3.35	16.00	2.93	16.00	2.69	16.00	2.45	16.00	2.34	16.00	2.22	16.00	2.11	16.00	1.95
-2 °C DB	16.00	3.47	16.00	3.09	16.00	2.86	16.00	2.64	16.00	2.50	16.00	2.36	16.00	2.22	16.00	2.05
2 ℃ DB	16.00	3.71	16.00	3.40	16.00	3.21	16.00	3.02	16.00	2.83	16.00	2.63	16.00	2.44	16.00	2.25
7 ℃ DB	16.00	4.88	16.00	4.70	16.00	4.16	16.00	3.61	16.00	3.26	16.00	2.91	16.00	2.71	16.00	2.50
10 °C DB	16.00	5.48	16.00	4.96	16.00	4.44	16.00	3.91	16.00	3.53	16.00	3.51	16.00	3.08	16.00	2.65
15 ℃ DB	16.00	6.06	16.00	5.51	16.00	4.96	16.00	4.42	16.00	3.99	16.00	3.84	16.00	3.37	16.00	2.90
18 ℃ DB	16.00	6.40	16.00	5.84	16.00	5.28	16.00	4.72	16.00	4.26	16.00	4.04	16.00	3.55	16.00	3.05
20 ℃ DB	16.00	6.63	16.00	6.06	16.00	5.49	16.00	4.92	16.00	4.44	16.00	4.18	16.00	3.66	16.00	3.15
35 ℃ DB	16.00	8.35	16.00	7.71	16.00	7.08	16.00	6.44	16.00	5.81	16.00	5.17	16.00	4.54	13.00	3.90

- 1. DB : Dry bulb temperature($^{\circ}$ C), LWT : Leaving water temperature($^{\circ}$ 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.
- 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. 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.

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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.

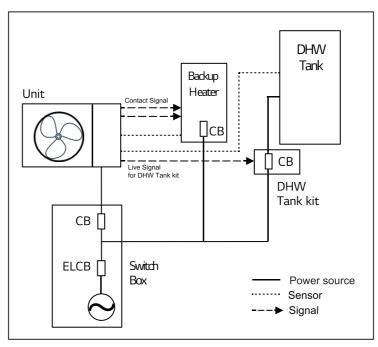
7. Electric Characteristics

Outdoor Unit	Phase / Volts / Hz	Voltage range		
ZHBW056A2 [HM051MRS UA40]				
ZHBW076A2 [HM071MRS UA40]	1 Ø / 220-240 V / 50 Hz			
ZHBW096A2 [HM091MRS UA40]		Min. : 198		
ZHBW126A2 [HM121MRS UB40]		Max. : 264		
ZHBW146A2 [HM141MRS UB40]	1 Ø / 220-240 V / 50 Hz			
ZHBW166A2 [HM161MRS UB40]				
ZHBW128A2 [HM123MRS UB40]		M: 040		
ZHBW148A2 [HM143MRS UB40]	3 Ø / 380-415 V / 50 Hz	Min. : 342 Max. : 457		
ZHBW168A2 [HM163MRS UB40]		Max 401		

Packup Heater	Power Supply for Heater					
Backup Heater	Phase / Volts / Hz	Capacity (kW)				
AHEH036D [HA031M E2]	1 Ø / 220-240 V / 50 Hz	3				
AHEH066D [HA061M E2]	1 Ø / 220-240 V / 50 FIZ	3+3				
AHEH068D [HA063M E2]	3 Ø / 380-415 V / 50 Hz	2+2+2				

DHW Boost Heater	Power Supply for DHW Boost Heater					
DRW Boost neater	Phase / Volts / Hz	Capacity (kW)				
Integral part of DHW tanks [OSHW-x00F(D)]	1 Ø / 220-240 V / 50 Hz	2.4				

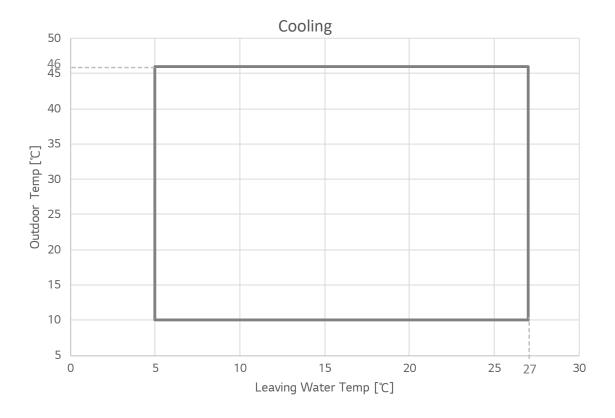
[Power Supply for Heat pump, Backup heater and DHW boost heater]

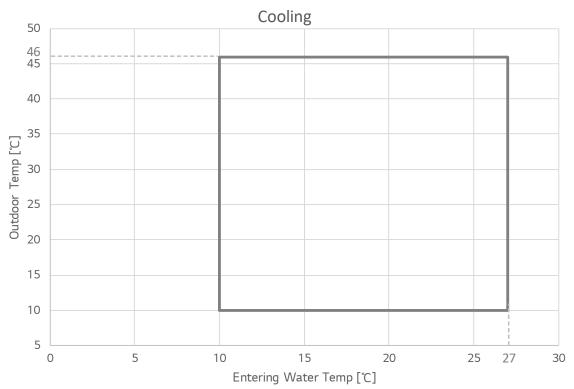


- 1. Voltage supplied to the unit terminals should be within the minimum and maximum range.
- 2. Maximum allowable voltage unbalance between phase is 2%.

8. Operation Range

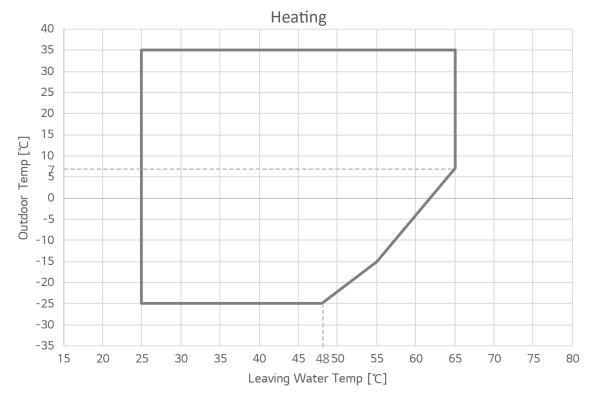
■ Cooling

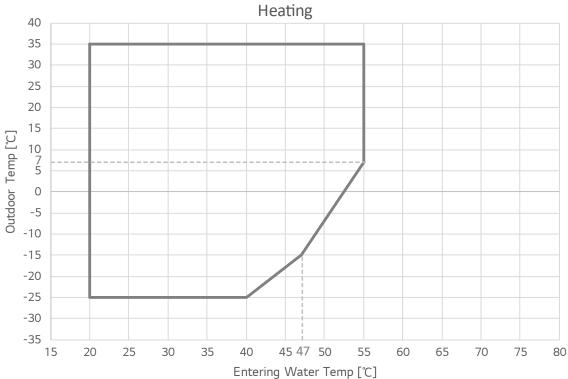




8. Operation Range

Heating





- DHW Heat pump operation : max. 55 °C
- DHW operation with booster heater : max. 80 °C

9. Sound levels

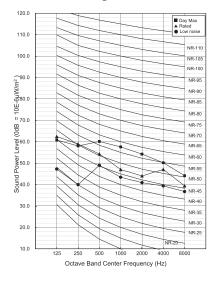
9.1 Sound power level

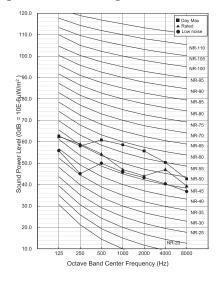
Note

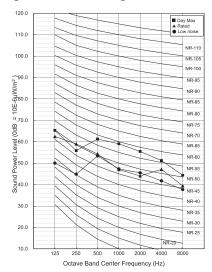
- 1. Data is valid at diffuse field condition.
- 2. Reference acoustic intensity 0dB = 10E-6µW/m²
- 3. Sound power level is measured on the rated condition in the reverberation rooms. Refer to the Model Specifications for nominal conditions(Power source and Ambient temperature, etc)
- 4. Sound levels 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 in 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)]					
Model	Day max	Rated	Low noise			
ZHBW056A2 [HM051MRS UA40]	63	57	54			
ZHBW076A2 [HM071MRS UA40]	64	57	55			
ZHBW096A2 [HM091MRS UA40]	64	57	55			
ZHBW126A2 [HM121MRS UB40]	65	60	56			
ZHBW146A2 [HM141MRS UB40]	66	61	57			
ZHBW166A2 [HM161MRS UB40]	66	61	57			
ZHBW128A2 [HM123MRS UB40]	65	60	56			
ZHBW148A2 [HM143MRS UB40]	66	61	57			
ZHBW168A2 [HM163MRS UB40]	66	61	57			

ZHBW056A2 [HM051MRS UA40] ZHBW076A2 [HM071MRS UA40] ZHBW096A2 [HM091MRS UA40]

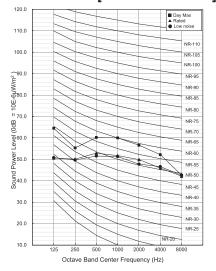




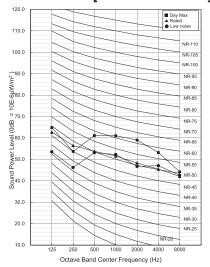


9. Sound levels

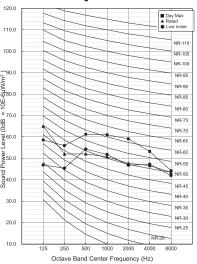
ZHBW126A2 [HM121MRS UB40] ZHBW128A2 [HM123MRS UB40]



ZHBW146A2 [HM141MRS UB40] ZHBW148A2 [HM143MRS UB40]



ZHBW166A2 [HM161MRS UB40] ZHBW168A2 [HM163MRS UB40]



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		
7	20.1	7.3	0.3	7.0	15	
9	25.9	6.1	0.4	5.7		
12	34.5	9.8	0.8	9.0		
14	40.3	9.3	1.1	8.2	20	
16	46.0	9.0	1.4	7.6		

♦ For OH SUNG Water Pump

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

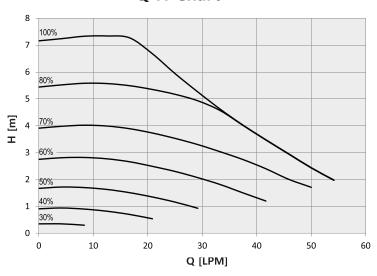
Note

- 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

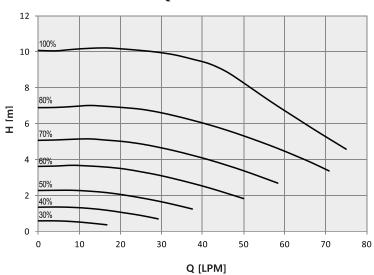
- GRUNDFOS Water Pump (UPM3K 20 75 CHBL)
- ◆ UN36A Chassis (5, 7, 9 kW)

Q-H Chart



- GRUNDFOS Water Pump (UPML 20 105 CHBL)
- ◆ UN36B Chassis (12, 14, 16 kW)

Q-H Chart



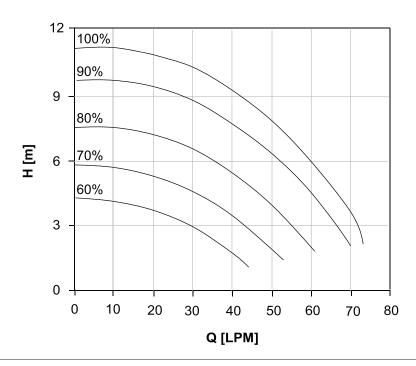
Note

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

10. Hydraulic Performance

- 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.



Design and installation

- 1.Refrigerant R32
- 2. Select the Best Location
- 3. Foundation for Installation
- **4.Water Control**
- **5.Water Piping System**

1. Refrigerant R32

The refrigerant R32 has the higher efficiency and more friendly for environment in comparison with R410A. It has a lower GWP (Global Warming Potential) value, and higher efficiency than R410A. The Ozone Depletion Potential (ODP) of R32 is 0, and Global Warming Potential(GWP) is 675.

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 R410A can be used.

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WARNING

- This product contains fluorinated greenhouse gases (Refrigerant type: R32). Do NOT emit refrigerant gases into the atmosphere.
- The refrigerant R32 is Slightly Flammable gas. 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 are some leak, turn off any combustible 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 R32 as refrigerant. Other substances may cause explosions and accidents.

A

CAUTION

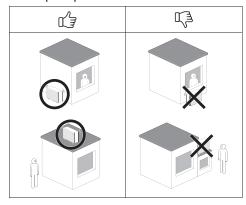
- The wall thickness of the piping should comply with the relevant local and national regulations for the designed pressure.
- For high-pressure refrigerant, any unapproved pipe must not be used.
- Do not heat pipes more than necessary to prevent them from softening.

2. Selection of the best Location

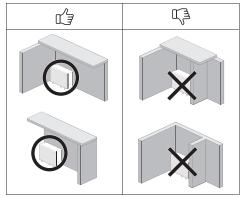
2.1 Best Location

- 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



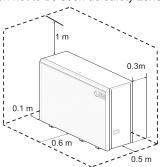
- For good ventilation



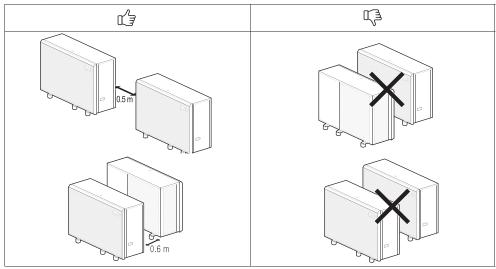
* Please do not block the slits in the exterior panels.

- 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.



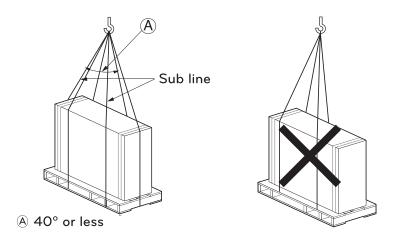
- Multiple installation

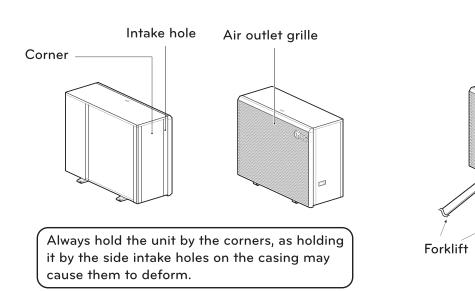


* It can be different by model.

2. Selection of the best Location

2.2 Lifting Method





* It can be different by model.

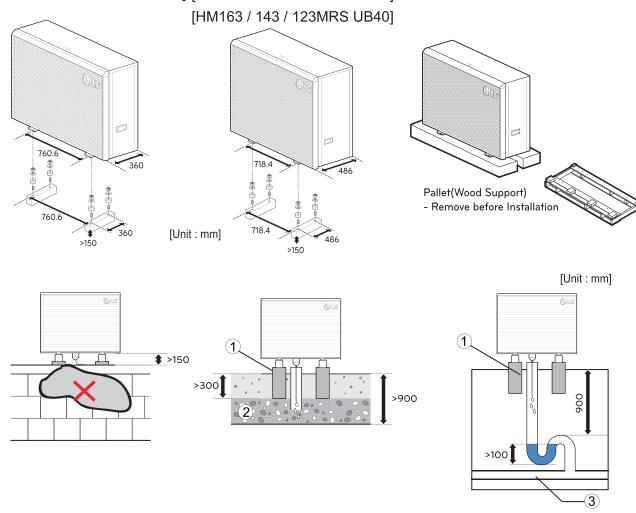
A CAUTION

- 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 / 051MRS UA40] [HM161 / 141 / 121MRS UB40]



- 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.



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

MARNING

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
- 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	0 (mg/L)			
Total hardness		4 ~ 8.				
Total Handhood		71.4 ~ 15	1.7 (mg/L)			
Iron (Fe)		≤ 0.2	\leq 0.2 (mg/L)			
Sulphate (SO ₄ ²⁻)	≤ 100 (mg/L)					
Nitrite (NO ₃ ⁻)	≤ 100 (mg/L)					
Free chlorine (Cl ₂)	≤ 1 (mg/L)					
	ppm		STS316	STS304		
	pH7	15℃	3,000	180		
		40℃	500	50		
		60℃	200	30		
Chlorides (Cl⁻)		208	125	20		
	рН9	15℃	18,000	700		
		40℃	2,600	250		
		60℃	1,000	170		
		80℃	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)							
Antineeze type	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%	-	-		

A CAUTION

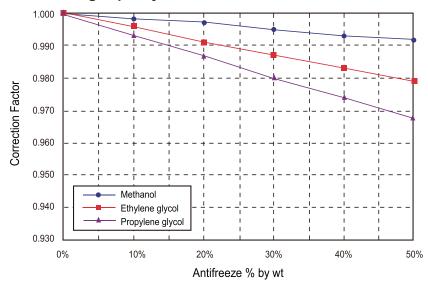
- Use only one of the above antifreeze.
- If a antifreeze is used, pressure drop and capability degradation of the system can be occurred.
- If one of antifreezes is used, corrosion can be occurred. So please add corrosion inhibitor.
- Please check the concentration of the antifreeze periodically to 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

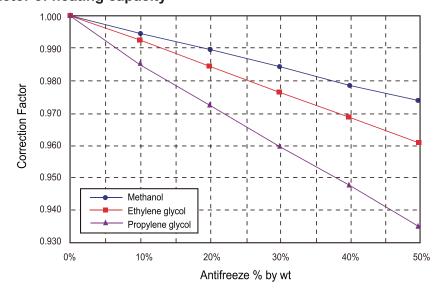
4.3 Capacity correction factor by antifreeze

Antifreeze Type	ltem	Antifreeze % by wt					
Antineeze Type		10%	20%	30%	40%	50%	
	Cooling	0.998	0.997	0.995	0.993	0.992	
Methanol	Heating	0.995	0.990	0.985	0.979	0.974	
	Pressure Drop	1.023	1.057	1.091	1.122	1.160	
	Cooling	0.996	0.991	0.987	0.983	0.979	
Ethylene glycol	Heating	0.993	0.985	0.977	0.969	0.961	
	Pressure Drop	1.024	1.068	1.124	1.188	1.263	
	Cooling	0.993	0.987	0.980	0.974	0.968	
Propylene glycol	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.

M WARNING

Water condensation on the floor

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





Air Solution

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The air conditioners manufactured by LG have received ISO9001 certificate for quality assurance and ISO14001 certificate for environmental management system.

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