

THERMA V<sub>IM</sub>

Air-to-Water Heat Pump / Monobloc R32 / 50Hz 5BPM5-01B(Replaces 5BPM5-01A)

# TOTALHVAC SOLUTION PROVIDER ENGINEERING PRODUCT DATA BOOK



P/No.: MFL66101113



General Information
Product Data
Design and installation



# **General Information**

- 1.Features
- 2. Model Line Up
- 3. Nomenclature

# 1. Features

- High energy efficiency
- Easy installation
- Total solution for cooling, heating & hot water
- No refrigerant piping work
- · Fit for renovation of old boiler system
- Low operating cost and CO<sub>2</sub> emission



< UN4 Chassis >



< UN3 Chassis >

# 2. Model line up

		Model Name				
Category	Chassis	Capacity (kW)				
		5.5	7.0	9.0		
1 Phase Model 1 Ø, 220-240 V, 50 Hz	UN4	ZHBW056A0 [HM051M U43]	ZHBW076A0 [HM071M U43]	ZHBW096A0 [HM091M U43]		

Category	Chassis	12.0	14.0	16.0
1 Phase Model 1 Ø, 220-240 V, 50 Hz	UN3	ZHBW126A0 [HM121M U33]	ZHBW146A0 [HM141M U33]	ZHBW166A0 [HM161M U33]
3 Phase Model 3 Ø, 380-415 V, 50 Hz	ONS	ZHBW128A0 [HM123M U33]	ZHBW148A0 [HM143M U33]	ZHBW168A0 [HM163M U33]

# 3. Nomenclature

# **■** Global Name

Model Name	ZH	В	w	12	6	Α	0
No.	1	2	3	4	5	6	7

No.	Signification
1	ZH : Air-to-Water Heat Pump for R32
2	Classification
_	B : Monobloc
3	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

# 3. Nomenclature

# **■** European Name

Model Name	н	М	12	1	М	U3	3
No.	1	2	3	4	5	6	7

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  M : Mid Temperature
	Platform (Chassis code)
6	U3 : UN3 Chassis U4 : UN4 Chassis
_	Type of refrigerant
7	2 : R410A 3 : R32



# **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.Water Pump Capacity**

# 1. List of Functions

## **■** Basic functions of Unit

#### **♦** Water Side

Category	Functions	ZHBW056A0 [HM051M U43] ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43] ZHBW126A0 [HM121M U33] / ZHBW128A0 [HM123M U33] ZHBW146A0 [HM141M U33] / ZHBW148A0 [HM143M U33] ZHBW166A0 [HM161M U33] / ZHBW168A0 [HM163M U33]
Installation	Backup heater (Install kit)	O (Accessory)
Reliability	Self diagnosis	0
	Auto Restart	0
	Child lock	0
Convenience	Sleep mode	0
Convenience	Timer (on/off)	0
	Timer (weekly)	0
	Two thermistor control	X
	Anti-condensation on floor (cooling)	0
	Water pump on / off Control	0
	Flow switch control	0
	Thermostat interface (230V AC)	0
	Thermostat interface (24V AC)	X
	DHW(Domestic Hot Water) tank kit	O (Accessory)
	Therma V solar kit	O (Accessory)
	PHEX anti-freezing control	0
	Water pump anti-stuck function	0
Air to Water Heat	Weather compensation for heating and cooling (Auto mode)	0
Pump Functions	Slient operation	0
i unipi undidiis	Anti-overheating of water pipe	0
	Emergency operation	0
	Weather Dependent Operation with Thermostat	0
	Scheduler (DHW Tank Heater)	0
	Timer (Domestic Hot Water Tank Heater)	0
	Quick Domestic Hot Water Tank Heating	0
	Screed Drying Mode	0
	Sump Heater	0
	Base Pan Heater	0
	Integrated Dry Contact (CN-EXT)	0

#### **♦** Refrigerant Side

Category	Functions	ZHBW056A0 [HM051M U43] ZHBW076A0 [HM071M U43] ZHBW096A0 [HM091M U43] ZHBW126A0 [HM121M U33] ZHBW146A0 [HM141M U33] ZHBW166A0 [HM161M U33]	ZHBW128A0 [HM123M U33] ZHBW148A0 [HM143M U33] ZHBW168A0 [HM163M U33]
	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
	Wiring Error Check	X	X
Convenience	Peak Control	X	X
	Mode Lock	0	0
	Forced Cooling Operation (Outdoor Unit)	X	X
Network function	Network solution(LGAP)	0	0

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.

# 1. List of Functions

## ■ Accessory Compatibility List

	Category	Product	Remark	ZHBW056A0 [HM051M U43] ZHBW076A0 [HM071M U43] ZHBW096A0 [HM091M U43] ZHBW126A0 [HM121M U33] ZHBW146A0 [HM141M U33] ZHBW166A0 [HM161M U33] ZHBW128A0 [HM123M U33] ZHBW148A0 [HM143M U33] ZHBW168A0 [HM163M U33]
	Simple Contact	PDRYCB000	Simple Dry Contact	0
		PDRYCB400	2 Points Dry Contact (For Setback)	X
Dry Contact	Communication Type	PDRYCB300	8 Points Dry Contact (For Thermostat)	0
		PDRYCB500	Dry Contact for Modbus	X
	Remote temperature sensor	PQRSTA0	-	0
	Zone Controller	ABZCA	-	X
	Electronic thermostat	AQETC	-	X
	CTI (Communication transfer interface)	PKEC0	-	X
ETC	Group control wire	PZCWRCG3	0.25 m	X
	2-Remo Control Wire	PZCWRC2	0.25 m	X
	Extension wire	PZCWRC1	10 m	0
	Wi-Fi controller *	PWFMDD200	-	0
	Meter Interface Module	PENKTH000	Interface between IDU and Meter	0
	DHW tank kit (Split)	PHLTA	For Split	X
Accessory Kit	DHW tank kit (Monobloc)	PHLTB	For Monobloc	0
for AWHP	Solar thermal kit	PHLLA	-	0
	Backup heater	HA031M E1 / HA061M E1	-	0
	Drain pan	PHDPB	-	X
	AC EZ	PQCSZ250S0	AC EZ	X
	AC Ez Touch	PACEZA000	AC Ez Touch	0
	AC Smart	PACS4B000	AC Smart IV	0
Central	AG Gillait	PACS5A000	AC Smart 5	0
Controller	ACP	PACP4B000	ACP IV	0
	7.01	PACP5A000	ACP 5	0
	AC Manager **	PACM4B000	AC Manager IV	0
	/ to Manager	PACM5A000	AC Manager 5	0
	IDU PI485	PHNFP14A0	Connected with Indoor Units	X
		PSNFP14A0	Connected with Indoor Units	X
Gateway	ODU PI485	PMNFP14A1	PI 485 Gateway	0
	BACnet	PQNFB17C0	ACP BACnet	0
	Lonworks	PLNWKB000	ACP Lonworks	0

- 1. O: Possible, X: Impossible, -: Not applicable
- 2. \*: Some advanced functions controlled by individual controller cannot be operated.
  3. \*\*: ACP, AC Smart, ACP BACnet or ACP Lonworks is needed.
- 4. If you need more detail, please refer to the manual of product. (http://partner.lge.com/global : Home> Download> Manuals)

## ■ 1 phase Inverter (5.5 ~ 9 kW)

ı	Nominal Capa	acity and Non	ninal Input		ZHBW056A0 [HM051M U43]	ZHBW076A0 [HM071M U43]	ZHBW096A0 [HM091M U43]
-	-	Outdoor Temp. (°C) DB / WB	Leaving Water Temp. (°C)	-			
	Cooling	35 / 24	18	kW	5.50	7.00	9.00
	Cooling	33724	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	5.50	5.50
		2 / 1	35	kW	3.30	4.20	5.40
	Cooling	35 / 24	18	kW	1.20	1.56	2.14
	Cooling	35724	7	kW	1.96	2.59	3.46
Power Input	Heating	7/6	35	kW	1.22	1.56	2.15
			55	kW	2.04	2.04	2.04
		2/1	35	kW	0.94	1.20	1.54
EER	Cooling	35 / 24	18	W/W	4.60	4.50	4.20
LEK	Cooling	33724	7	W/W	2.80	2.70	2.60
		7/6	35	W/W	4.50	4.50	4.18
COP	Heating	776	55	W/W	2.70	2.70	2.70
		2/1	35	W/W	3.52	3.51	3.50
SCOP (Low temp	SCOP (Low temp. Average)				4.45	4.45	4.45
SCOP (High tem	SCOP (High temp. Average)				3.12	3.12	3.12
Rated Water Flow	w Rate (at LW	/T 35 °C)		LPM	15.8	20.1	25.9

Electri	cal Specifications	ZHBW056A0 [HM051M U43]	ZHBW076A0 [HM071M U43]	ZHBW096A0 [HM091M U43]	
Power Supply	Power Supply V,			220-240, 1, 50	220-240, 1, 50
Maximum Bunning Current	Cooling	Α	23.0	23.0	23.0
Maximum Running Current	Heating	Α	23.0	23.0	23.0
Peak Control	Cooling	Α	17.0	17.0	17.0
Running Current	Heating	Α	17.0	17.0	17.0
Pated Bunning Current	Cooling	Α	5.3	6.9	9.5
Rated Running Current	Heating	Α	5.4	6.9	9.6
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)	No × mm²	3 × 4.0	3 × 4.0	3 × 4.0

Technic	al Specification	ons	ZHBW056A0 [HM051M U43]	ZHBW076A0 [HM071M U43]	ZHBW096A0 [HM091M U43]	
Sound Power Level	Heating	Rated	dB(A)	60	60	60
Sound Pressure Level (at 1m)	Heating	Rated	dB(A)	50	50	50
Dimensions	Unit	$W \times H \times D$	mm	1,239 × 907 × 404	1,239 × 907 × 404	1,239 × 907 × 404
Differisions	Packed Unit	$W \times H \times D$	mm	1,364 × 1,055 × 461	1,364 × 1,055 × 461	1,364 × 1,055 × 461
Moight	Unit		kg	96.0	96.0	96.0
Weight	Packed Unit		kg	109.0	109.0	109.0

- 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 pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard. Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard. Therefore, these values can be increased owing to ambient conditions during operation.
- 4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation. For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35℃
- 5. This product contains Fluorinated greenhouse gases.
  - \* At least 25A circuit breaker can be used, but when using 3rd party product, connect external power.

Technic	al Specifications (V	later side)		ZHBW056A0 [HM051M U43]	ZHBW076A0 [HM071M U43]	ZHBW096A0 [HM091M U43]	
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		-	GRUI	NDFOS UPM3K 20-75	CHBL	
Water Pump	Motor Type		-		BLDC		
water Fump	Steps of Pumping I	Performance	-	Vai	riable speed 10% to 10	0%	
	Power input	Min. / Rated	W	6 / 60	6 / 60	6 / 60	
	Water Flow Rate	Min. / Rated	ℓ/min	2.3 / 25.9	2.3 / 25.9	2.3 / 25.9	
	Туре	•	-		Brazed Plate HEX		
Heat Exchanger	Quantity		-	1	1	1	
l leat Exchanger	Number of Plate		EA	54	54	54	
	Water Volume		l	0.7	0.7	0.7	
	Volume	Max.	l	8	8	8	
Expansion Vessel	Water pressure	Max.	bar	3	3	3	
	,	Pre-charged	bar	1	1	1	
Piping Connections	Inlet		mm(inch)	Male PT 25(1)			
Tiping Connections	Outlet		mm(inch)		Male PT 25(1)		
Strainer	Mesh size		-	28 mesh	28 mesh	28 mesh	
	Material		-	Stainless Steel			
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0	
				Relief valve / Flow Switch			
Devices for Water Circuit			-	Drain hose			
			-	Pre	ssure gage / Air vent va	alve	

Technica	al Specifications (F	Refrigerant sid	le)	ZHBW056A0 [HM051M U43]	ZHBW076A0 [HM071M U43]	ZHBW096A0 [HM091M U43]
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 Scroll		
Compressor	Model		Model × No.		RJB036MAA × 1	
Compressor	Motor Type		-		BLDC	
	Displacement		cm³/Rev.	31.6	31.6	31.6
	Туре		-	R32	R32	R32
	GWP			675.0	675.0	675.0
Refrigerant	(Global Warmin	(Global Warming Potential)		075.0	075.0	073.0
Kenigerani	Precharged Am	ount	g	1,400	1,400	1,400
	t-CO2 eq.		-	0.945	0.945	0.945
	Control		-	Electronic Expansion Valve		
Refrigerant Oil	Туре		-	FW68D		
Keingerant On	Charged Volum	е	cc × No.	1,000	1,000	1,000
Fan	Туре	+ = ·		Propeller		
I all	Air Flow Rate	Rated	m³/min × No.	60.0 × 1	60.0 × 1	60.0 × 1
Fan Motor	Туре	Type		BLDC		
i all Motor	Output		W × No.	124 × 1	124 × 1	124 × 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 pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard. Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard. Therefore, these values can be increased owing to ambient conditions during operation.
- 4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation. For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35  $^\circ\!\text{C}$
- 5. This product contains Fluorinated greenhouse gases.

#### ■ 1 phase Inverter (12 ~ 16 kW)

1	Nominal Capa	acity and Nom	ninal Input				
-	-	Outdoor Temp. (°C) DB / WB	Leaving Water Temp. (°C)	-	ZHBW126A0 [HM121M U33]	ZHBW146A0 [HM141M U33]	ZHBW166A0 [HM161M U33]
	Cooling	35 / 24	18	kW	12.00	14.00	16.00
	Cooling	33724	7	kW	12.00	14.00	16.00
Capacity		7/6	35	kW	12.00	14.00	16.00
	Heating	776	55	kW	12.00	12.00	12.00
		2/1	35	kW	11.00	12.00	13.80
	Cooling	35 / 24	18	kW	2.61	3.26	4.00
	Cooling		7	kW	4.44	5.38	6.40
Power Input		7/6	35	kW	2.61	3.11	3.64
	Heating	, , , , , , , , , , , , , , , , , , ,	55	kW	4.29	4.29	4.29
		2/1	35	kW	3.13	3.42	3.94
EER	Cooling	35 / 24	18	W/W	4.60	4.30	4.00
LEK	Cooling	33724	7	W/W	2.70	2.60	2.50
		7/6	35	W/W	4.60	4.50	4.40
COP	Heating	776	55	W/W	2.80	2.80	2.80
		2/1	35	W/W	3.52	3.51	3.50
SCOP (Low temp. Average)					4.45	4.45	4.45
SCOP (High tem	p. Average)				3.18	3.18	3.18
Rated Water Flor	w Rate (at LW	T 35 °C)		LPM	34.5	40.3	46.0

Electri	cal Specifications	ZHBW126A0 [HM121M U33]	ZHBW146A0 [HM141M U33]	ZHBW166A0 [HM161M U33]	
Power Supply			220-240, 1, 50	220-240, 1, 50	220-240, 1, 50
Maximum Bunning Current	Cooling	Α	35.0	35.0	35.0
Maximum Running Current	Heating	Α	35.0	35.0	35.0
Peak Control	Cooling	Α	25.0	25.0	25.0
Running Current	Heating	Α	27.0	27.0	27.0
Rated Running Current	Cooling	Α	11.6	14.4	17.7
Rated Rulling Current	Heating	Α	11.6	13.8	16.1
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)	No × mm²	3 × 6.0	3 × 6.0	3 × 6.0

Technic	cal Specificati	ons	ZHBW126A0 [HM121M U33]	ZHBW146A0 [HM141M U33]	ZHBW166A0 [HM161M U33]	
Sound Power Level	Heating	Rated	dB(A)	63	63	63
Sound Pressure Level (at 1m)	Heating	Rated	dB(A)	52	52	52
Dimensions	Unit	W×H×D	mm	1,239 × 1,450 × 404	1,239 × 1,450 × 404	1,239 × 1,450 × 404
Differisions	Packed Unit	$W \times H \times D$	mm	1,364 × 1,602 × 461	1,364 × 1,602 × 461	1,364 × 1,602 × 461
Weight	Unit		kg	130.0	130.0	130.0
	Packed Unit		kg	145.0	145.0	145.0

- 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 pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard. Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard. Therefore, these values can be increased owing to ambient conditions during operation.
- 4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation. For max. capacities, refer to Performance Data.
- $5. \ This \ product \ contains \ Fluorinated \ greenhouse \ gases.$ 
  - \* At least 40A circuit breaker can be used, but when using 3rd party product, connect external power.

Technic	al Specifications (V	Vater side)		ZHBW126A0 [HM121M U33]	ZHBW146A0 [HM141M U33]	ZHBW166A0 [HM161M U33]	
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		-	GRUND	FOS UPML GEO 20-10	)5 CHBL	
Water Pump	Motor Type		-		BLDC		
water Fump	Steps of Pumping I	Performance	-	Var	riable speed 10% to 10	0%	
	Power input	Min. / Rated	W	14 / 140	14 / 140	14 / 140	
	Water Flow Rate	Min. / Rated	ℓ/min	5.0 / 46.0	5.0 / 46.0	5.0 / 46.0	
	Туре	•	-	Brazed Plate HEX			
Heat Exchanger	Quantity		-	1	1	1	
l leat Exchanger	Number of Plate		EA	76	76	76	
	Water Volume		l	1.0	1.0	1.0	
	Volume	Max.	l	8	8	8	
Expansion Vessel	Water pressure	Max.	bar	3	3	3	
		Pre-charged	bar	1	1	1	
Piping Connections	Inlet		mm(inch)	Male PT 25(1)			
Tiping Connections	Outlet		mm(inch)		Male PT 25(1)		
Strainer	Mesh size		-	28 mesh	28 mesh	28 mesh	
	Material		-		Stainless Steel		
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0	
				Relief valve / Flow Switch			
Devices for Water Circuit			-	Drain hose			
			-	Pre	ssure gage / Air vent va	alve	

Technica	l Specifications (F	efrigerant sid	ZHBW126A0 [HM121M U33]	ZHBW146A0 [HM141M U33]	ZHBW166A0 [HM161M U33]	
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 Scroll	
Compressor	Model		Model × No.		RJB036MAA × 1	
Compressor	Motor Type		-		BLDC	
	Displacement		cm³/Rev.	31.6	31.6	31.6
	Type		-	R32	R32	R32
	GWP			675.0	675.0	675.0
Refrigerant	(Global Warmin	(Global Warming Potential)		075.0	075.0	073.0
Reiligerani	Precharged Am	ount	g	2,400	2,400	2,400
	t-CO2 eq.		-	1.620	1.620	1.620
	Control		-	Electronic Expansion Valve		
Refrigerant Oil	Туре		-	FW68D		
Kenigerani Oli	Charged Volume	9	cc × No.	1,000	1,000	1,000
Fan	Туре	Type		Propeller		
Fall	Air Flow Rate	Rated	m³/min × No.	60.0 × 2	60.0 × 2	60.0 × 2
Fan Motor	Туре	Type		BLDC	BLDC	BLDC
Fan Motor	Output		W × No.	124 × 2	124 × 2	124 × 2

- 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 pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard. Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard. Therefore, these values can be increased owing to ambient conditions during operation.
- 4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation. For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35  $^\circ\!\text{C}$
- 5. This product contains Fluorinated greenhouse gases.
  - \* DHW 55~80  $^{\circ}$ C Operating is available only when the booster heater is operating.

#### ■ 3 phase Inverter (12 ~ 16 kW)

	Nominal Capa	acity and Non	ninal Input		ZHBW128A0 [HM123M U33]		
-	-	Outdoor Temp (°C) DB / WB	Leaving Waer Temp (°C)	-		ZHBW148A0 [HM143M U33]	ZHBW168A0 [HM163M U33]
	Cooling	35 / 24	18	kW	12.00	14.00	16.00
	Cooling	33724	7	kW	12.00	14.00	16.00
Capacity		7/6	35	kW	12.00	14.00	16.00
	Heating	776	55	kW	12.00	12.00	12.00
		2/1	35	kW	11.00	12.00	13.80
O line -	Cooling	35 / 24	18	kW	2.61	3.26	4.00
	Cooling		7	kW	4.44	5.38	6.40
Power Input		7/6	35	kW	2.61	3.11	3.64
	Heating	ng   '''	55	kW	4.29	4.29	4.29
		2/1	35	kW	3.13	3.42	3.94
EER	Cooling	35 / 24	18	W/W	4.60	4.30	4.00
EER	Cooling	35 / 24	7	W/W	2.70	2.60	2.50
		7/6	35	W/W	4.60	4.50	4.40
COP	Heating	776	55	W/W	2.80	2.80	2.80
		2/1	35	W/W	3.52	3.51	3.50
SCOP (Low temp. Average)					4.45	4.45	4.45
SCOP (High tem	np. Average)				3.18	3.18	3.18
Rated Water Flo	w Rate (at LW	T 35 °C)		LPM	34.5	40.3	46.0

Electr	ical Specifications	ZHBW128A0 [HM123M U33]	ZHBW148A0 [HM143M U33]	ZHBW168A0 [HM163M U33]	
Power Supply	V, Ø, Hz	380-415, 3, 50	380-415, 3, 50	380-415, 3, 50	
Maximum Running Current	Cooling	Α	15.0	15.0	15.0
	Heating	Α	15.0	15.0	15.0
Peak Control	Cooling	Α	10.0	10.0	10.0
Running Current	Heating	Α	12.0	12.0	12.0
Dated Dunning Compat	Cooling	Α	3.8	4.8	5.9
Rated Running Current	Heating	Α	3.8	4.6	5.4
Wiring Connections	Power Supply Cable (included Earth, H07RN-F)	No × mm²	5 × 4.0	5 × 4.0	5 × 4.0

Technical Specifications				ZHBW128A0 [HM123M U33]	ZHBW148A0 [HM143M U33]	ZHBW168A0 [HM163M U33]
Sound Power Level	Heating	Rated	dB(A)	63	63	63
Sound Pressure Level (at 1m)	Heating	Rated	dB(A)	52	52	52
Dimensions	Unit	W×H×D	mm	1,239 × 1,450 × 404	1,239 × 1,450 × 404	1,239 × 1,450 × 404
Differisions	Packed Unit	$W \times H \times D$	mm	1,364 × 1,602 × 461	1,364 × 1,602 × 461	1,364 × 1,602 × 461
Weight	Unit		kg	130.0	130.0	130.0
	Packed Unit		kg	145.0	145.0	145.0

- 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 pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard. Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard. Therefore, these values can be increased owing to ambient conditions during operation.
- 4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation. For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35  $^\circ\!\text{C}$
- 5. This product contains Fluorinated greenhouse gases.
  - \* At least 20A circuit breaker can be used, but when using 3rd party product, connect external power.

Technic	al Specifications (V	Vater side)		ZHBW128A0 [HM123M U33]	ZHBW148A0 [HM143M U33]	ZHBW168A0 [HM163M U33]
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		-	GRUND	FOS UPML GEO 20-10	)5 CHBL
Water Pump	Motor Type		-		BLDC	
water Fullip	Steps of Pumping I	Performance	-	Vai	riable speed 10% to 10	0%
	Power input	Min. / Rated	W	14 / 140	14 / 140	14 / 140
	Water Flow Rate	Min. / Rated	ℓ/min	5.0 / 46.0	5.0 / 46.0	5.0 / 46.0
	Туре	•	-	Brazed Plate HEX		
Heat Exchanger	Quantity		-	1	1	1
l leat Exchanger	Number of Plate		EA	76	76	76
	Water Volume		l	1.0	1.0	1.0
	Volume	Max.	l	8	8	8
Expansion Vessel	Water pressure	Max.	bar	3	3	3
		Pre-charged	bar	1	1	1
Piping Connections	Inlet		mm(inch)	Male PT 25(1)		
Tiping Connections	Outlet		mm(inch)		Male PT 25(1)	
Strainer	Mesh size		-	28 mesh	28 mesh	28 mesh
Ottaile	Material		-	Stainless Steel		
Relief Valve	Pressure Limit	Upper Limit	bar	3.0	3.0	3.0
				Relief valve / Flow Switch		
Devices for Water Circuit			-	Drain hose		
			-	Pre	ssure gage / Air vent va	alve

Technica	al Specifications (F	Refrigerant sid	ZHBW128A0 [HM123M U33]	ZHBW148A0 [HM143M U33]	ZHBW168A0 [HM163M U33]	
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 Scroll	
Compressor	Model		Model × No.		RJB036MAA × 1	
Compressor	Motor Type		-		BLDC	
	Displacement		cm³/Rev.	31.6	31.6	31.6
	Туре		-	R32	R32	R32
	GWP		_	675.0	675.0	675.0
Refrigerant	(Global Warmin	(Global Warming Potential)		075.0	073.0	073.0
Reingerant	Precharged Am	ount	g	2,400	2,400	2,400
	t-CO2 eq.		-	1.620	1.620	1.620
	Control		-	Electronic Expansion Valve		
Refrigerant Oil	Туре		-	FW68D		
Kenigerani On	Charged Volume	е	cc × No.	1,000	1,000	1,000
Fan	Туре		-	Propeller		
Fall	Air Flow Rate	Rated	m³/min × No.	60.0 × 2	60.0 × 2	60.0 × 2
Fan Motor	Туре	Туре		BLDC		
i all Motor	Output		W × No.	124 × 2	124 × 2	124 × 2

- 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 pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard. Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard. Therefore, these values can be increased owing to ambient conditions during operation.
- 4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation. For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35  $^\circ\!\text{C}$
- 5. This product contains Fluorinated greenhouse gases.

## ■ Backup Heater

	Electrical Specification		AHEH036A [HA031M E1]	AHEH066A [HA061M E1]
	Туре	-	Sheath	Sheath
	Number of Heating Coil	EA	1	2
	Capacity Combination	kW	3.0	3.0 + 3.0
Backup Heater	Operation	-	Automatic	Automatic
	Heating Steps	Step	1	2
	Power Supply	V, Ø, Hz	220-240, 1, 50	220-240, 1, 50
	Maximum Current	А	12.0	24.0
Wiring Connections	Power Cable (Included Earth, H07RN-F)	No. × mm²	3 × 1.5	3 × 4.0
Wiring Connections	Communication Cable (H07RN-F)	No. × mm²	4 × 0.75	4 × 0.75

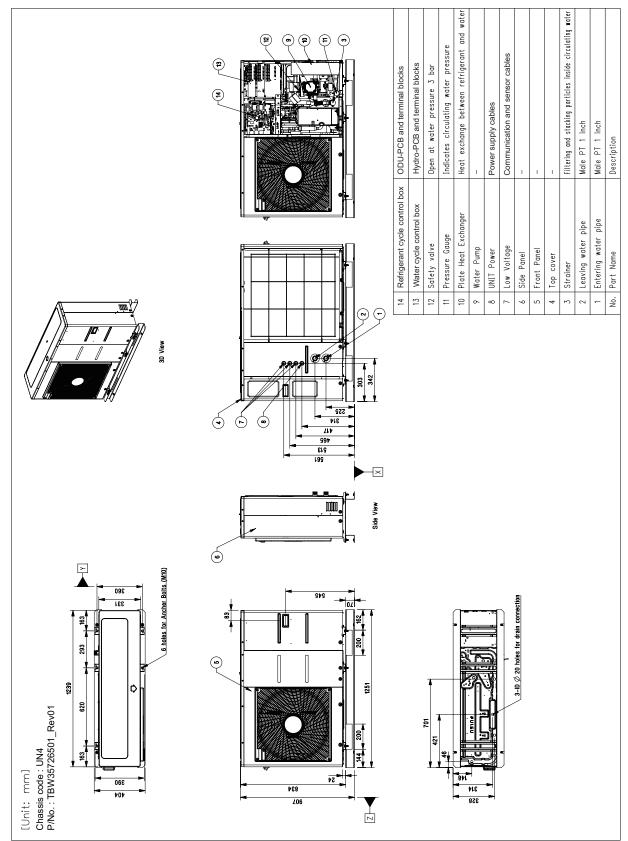
<sup>1.</sup> Due to our policy of innovation some specifications may be changed without notification.

<sup>2.</sup> 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. Dimensions

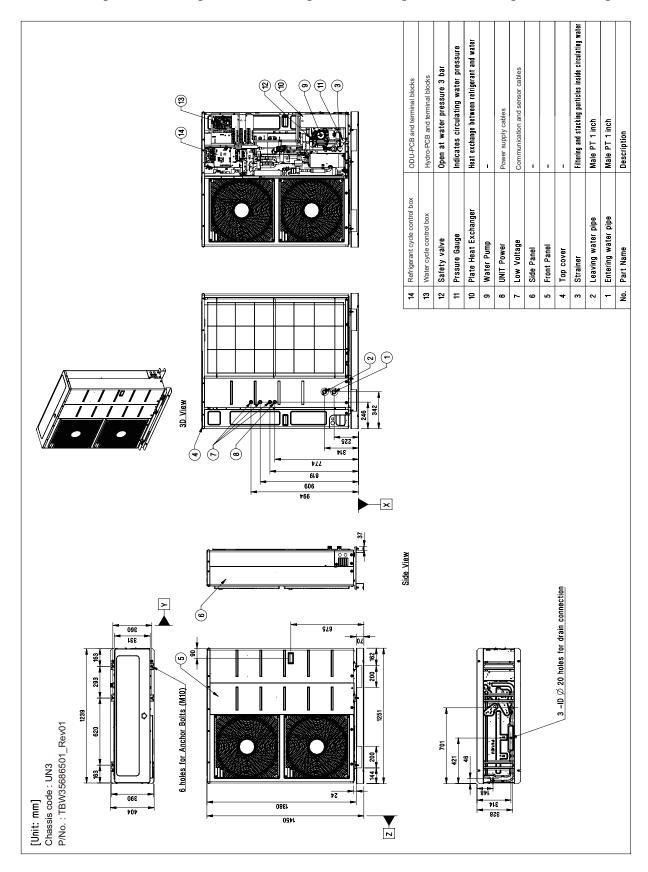
#### ■ Product

#### ◆ ZHBW056A0 [HM051M U43] / ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]



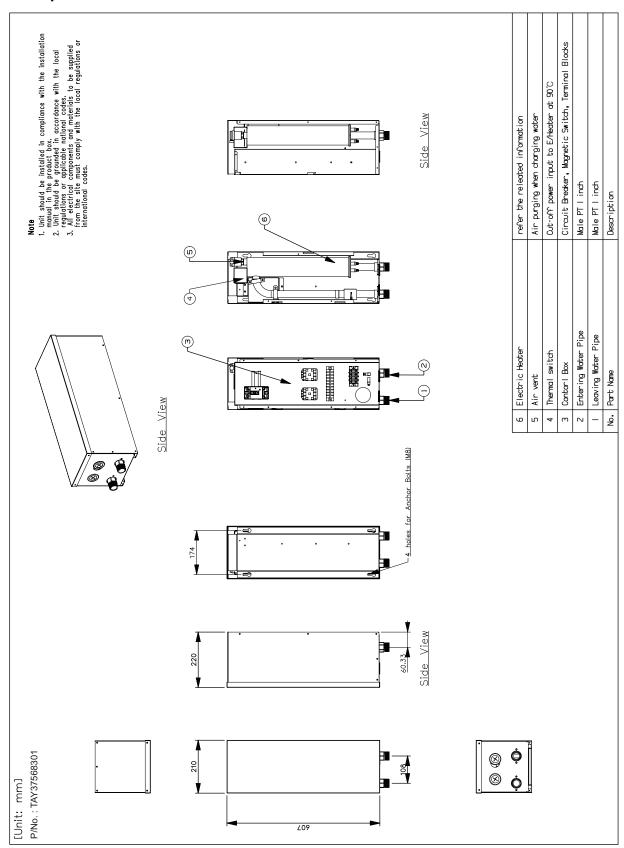
# 3. Dimensions

◆ ZHBW126A0 [HM121M U33] / ZHBW146A0 [HM141M U33] / ZHBW166A0 [HM161M U33] ZHBW128A0 [HM123M U33] / ZHBW148A0 [HM143M U33] / ZHBW168A0 [HM163M U33]



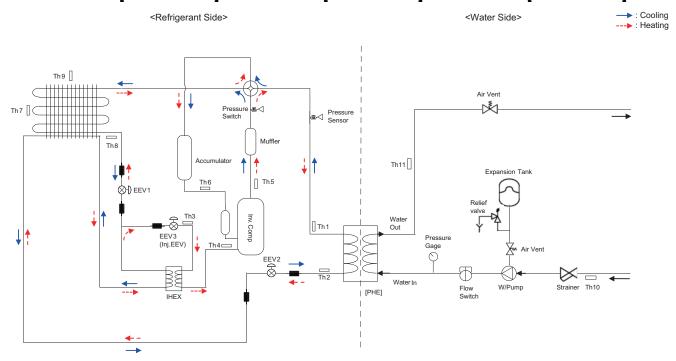
# 3. Dimensions

## ■ Backup Heater



# 4. Piping Diagram

# ◆ ZHBW056A0 [HM051M U43] / ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]

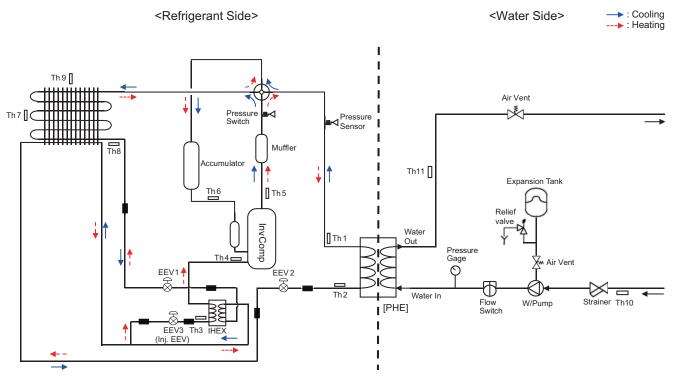


<Inside of Monobloc Product>

Category	Symbol	Meaning	PCB Connector
	Th1	PHEX gas temp. sensor	CN_PIPE/OUT
	Th2	PHEX liquid temp. sensor	CN_PIPE/IN
	Th3	Inlet IHEX temperature sensor	CN_VI_IN
	Th4	Outlet IHEX temperature sensor	CN_VI_OUT
	Th5	Compressor-discharge pipe temperature sensor	CN_DISCHA
Refrigerant side	Th6	Compressor-suction pipe temperature sensor	CN_SUCTION
Reingerant side	Th7	Outdoor-HEX middle temp. sensor	CN_MID
	Th8	Outdoor-HEX temp. sensor	CN_C_PIPE
	Th 9	Outdoor air temperature sensor	CN_AIR
	EEV1	Electronic Expansion Valve (Heating)	CN_EEV1(WH)
	EEV2	Electronic Expansion Valve (Cooling)	CN_EEV2(BL)
	EEV3	Electronic Expansion Valve (Injection)	CN_EEV3(YL)
Water Side	Th 10	Inlet water temperature sensor	CN TH3
Water Side	Th 11	Outlet water temperature sensor	ON_1113

# 4. Piping Diagram

◆ ZHBW126A0 [HM121M U33] / ZHBW146A0 [HM141M U33] / ZHBW166A0 [HM161M U33] ZHBW128A0 [HM123M U33] / ZHBW148A0 [HM143M U33] / ZHBW168A0 [HM163M U33]

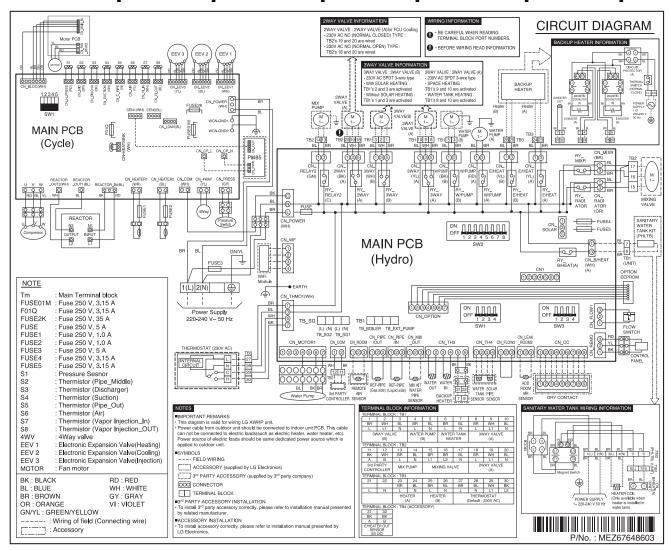


<Inside of Monobloc Product>

Category	Symbol	Meaning	PCB Connector
	Th1	PHEX gas temp. sensor	CN_PIPE/OUT
	Th2	PHEX liquid temp. sensor	CN_PIPE/IN
	Th3	Inlet IHEX temperature sensor	CN_VI_IN
	Th4	Outlet IHEX temperature sensor	CN_VI_OUT
	Th5	Compressor-discharge pipe temperature sensor	CN_DISCHA
Refrigerant side	Th6	Compressor-suction pipe temperature sensor	CN_SUCTION
Reingerant side	Th7	Outdoor-HEX middle temp. sensor	CN_MID
	Th8	Outdoor-HEX temp. sensor	CN_C_PIPE
	Th 9	Outdoor air temperature sensor	CN_AIR
	EEV1	Electronic Expansion Valve (Heating)	CN_EEV1_WH
	EEV2	Electronic Expansion Valve (Cooling)	CN_EEV2_BL
	EEV3	Electronic Expansion Valve (Injection)	CN_EEV_MAIN_VI
Water Side	Th 10	Inlet water temperature sensor	CN TH3
Water Side	Th 11	Outlet water temperature sensor	CIV_III3

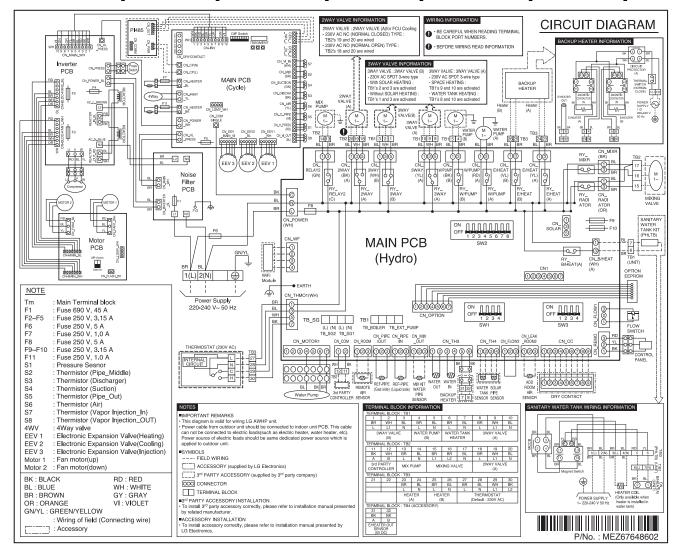
# 5. Wiring Diagram

#### ◆ ZHBW056A0 [HM051M U43] / ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]



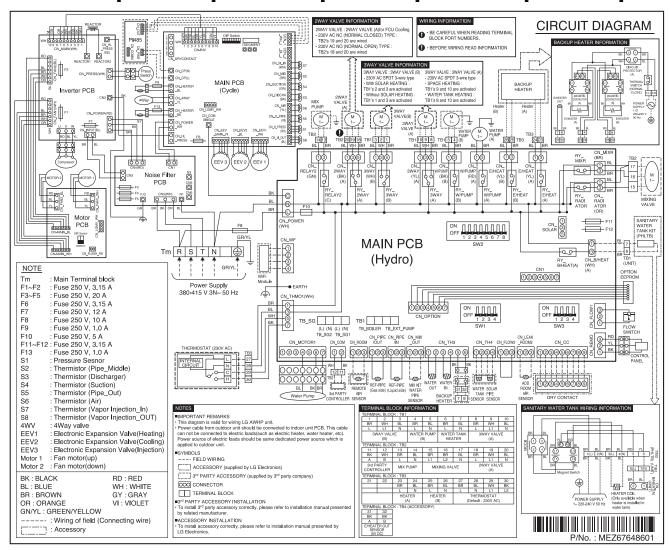
# 5. Wiring Diagram

#### ◆ ZHBW126A0 [HM121M U33] / ZHBW146A0 [HM141M U33] / ZHBW166A0 [HM161M U33]



# 5. Wiring Diagram

#### ◆ ZHBW128A0 [HM123M U33] / ZHBW148A0 [HM143M U33] / ZHBW168A0 [HM163M U33]



# **6.1 Cooling Operation**

## **■** Maximum Cooling Capacity

#### **◆ ZHBW056A0 [HM051M U43]**

Outdoor						Wa	ter flow r	ate 15.8 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	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
10	5.16	4.43	5.65	4.86	6.14	5.29	6.47	5.58	6.96	6.01	7.29	6.30	7.62	6.59
20	5.29	3.78	5.59	4.23	5.89	4.69	6.08	4.99	6.38	5.45	6.58	5.75	6.77	6.05
30	5.43	3.13	5.53	3.60	5.63	4.08	5.69	4.40	5.79	4.88	5.86	5.20	5.92	5.52
35	5.50	2.80	5.50	3.29	5.50	3.78	5.50	4.11	5.50	4.60	5.50	4.93	5.50	5.25
40	5.57	2.47	5.50	2.95	5.43	3.42	5.38	3.74	5.31	4.21	5.27	4.52	5.22	4.84
45	5.64	2.15	5.50	2.60	5.36	3.06	5.27	3.36	5.13	3.82	5.04	4.12	4.94	4.42

#### **◆ ZHBW076A0 [HM071M U43]**

Outdoor						Wa	ter flow r	ate 20.1 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	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
10	6.56	4.33	7.19	4.75	7.82	5.18	8.24	5.46	8.86	5.88	9.28	6.16	9.70	6.44
20	6.74	3.68	7.11	4.13	7.49	4.58	7.74	4.88	8.12	5.33	8.37	5.63	8.62	5.93
30	6.91	3.03	7.04	3.50	7.16	3.98	7.25	4.30	7.37	4.78	7.46	5.09	7.54	5.41
35	7.00	2.70	7.00	3.19	7.00	3.68	7.00	4.01	7.00	4.50	7.00	4.83	7.00	5.15
40	7.09	2.37	7.00	2.85	6.91	3.32	6.85	3.63	6.76	4.10	6.70	4.42	6.65	4.73
45	7.18	2.05	7.00	2.50	6.82	2.95	6.70	3.25	6.53	3.70	6.41	4.01	6.29	4.31

#### **◆ ZHBW096A0 [HM091M U43]**

Outdoor						Wa	ter flow r	ate 25.9 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	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
10	8.44	4.04	9.24	4.44	10.05	4.83	10.59	5.09	11.40	5.49	11.93	5.75	12.47	6.01
20	8.66	3.47	9.15	3.88	9.63	4.29	9.95	4.56	10.44	4.97	10.76	5.25	11.08	5.52
30	8.89	2.89	9.05	3.32	9.21	3.74	9.32	4.03	9.48	4.46	9.59	4.74	9.69	5.03
35	9.00	2.60	9.00	3.04	9.00	3.47	9.00	3.76	9.00	4.20	9.00	4.49	9.00	4.78
40	9.11	2.31	9.00	2.73	8.89	3.16	8.81	3.44	8.70	3.86	8.62	4.14	8.54	4.42
45	9.23	2.02	9.00	2.43	8.77	2.84	8.62	3.11	8.39	3.52	8.24	3.79	8.09	4.06

- 1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liters per minute ( $\ell$ /min)
- 2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
- 3. Direct interpolation is permissible. Do not extrapolate.
- 4. Measuring procedure follows EN-14511.
  - 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.

#### **◆ ZHBW126A0 [HM121M U33] / ZHBW128A0 [HM123M U33]**

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	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
10	11.25	4.43	12.33	4.86	13.40	5.29	14.12	5.58	15.20	6.01	15.91	6.30	16.63	6.59
20	11.55	3.74	12.20	4.20	12.84	4.67	13.27	4.98	13.92	5.45	14.35	5.76	14.78	6.07
30	11.85	3.05	12.07	3.55	12.28	4.05	12.42	4.38	12.64	4.88	12.78	5.22	12.93	5.55
35	12.00	2.70	12.00	3.22	12.00	3.74	12.00	4.08	12.00	4.60	12.00	4.95	12.00	5.29
40	12.15	2.35	12.00	2.85	11.85	3.35	11.75	3.68	11.59	4.17	11.49	4.50	11.39	4.83
45	12.30	2.01	12.00	2.48	11.69	2.95	11.49	3.27	11.19	3.74	10.99	4.06	10.78	4.37

#### ◆ ZHBW146A0 [HM141M U33] / ZHBW148A0 [HM143M U33]

Outdoor						Wa	ter flow ra	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	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
10	13.13	4.14	14.38	4.54	15.64	4.95	16.47	5.22	17.73	5.62	18.57	5.89	19.40	6.16
20	13.48	3.52	14.23	3.95	14.98	4.38	15.48	4.66	16.24	5.09	16.74	5.38	17.24	5.66
30	13.83	2.91	14.08	3.36	14.33	3.81	14.49	4.11	14.75	4.56	14.91	4.87	15.08	5.17
35	14.00	2.60	14.00	3.06	14.00	3.53	14.00	3.84	14.00	4.30	14.00	4.61	14.00	4.92
40	14.18	2.29	14.00	2.74	13.82	3.18	13.70	3.48	13.53	3.93	13.41	4.22	13.29	4.52
45	14.35	1.98	14.00	2.41	13.64	2.84	13.41	3.13	13.05	3.55	12.82	3.84	12.58	4.13

#### ◆ ZHBW166A0 [HM161M U33] / ZHBW168A0 [HM163M U33]

Outdoor						Wa	ter flow ra	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	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP
10	15.00	3.85	16.43	4.23	17.87	4.60	18.83	4.85	20.26	5.23	21.22	5.48	22.17	5.73
20	15.40	3.31	16.26	3.70	17.12	4.09	17.70	4.35	18.56	4.74	19.13	5.00	19.70	5.26
30	15.80	2.77	16.09	3.17	16.37	3.57	16.57	3.84	16.85	4.25	17.04	4.51	17.23	4.78
35	16.00	2.50	16.00	2.91	16.00	3.32	16.00	3.59	16.00	4.00	16.00	4.27	16.00	4.55
40	16.20	2.23	16.00	2.63	15.80	3.02	15.66	3.29	15.46	3.68	15.32	3.95	15.19	4.21
45	16.40	1.96	16.00	2.34	15.59	2.73	15.32	2.98	14.92	3.37	14.65	3.62	14.38	3.88

- 1. DB : Dry bulb temperature( $^{\circ}$ ), LWT : Leaving water temperature( $^{\circ}$ ), LPM : Liters per minute ( $^{\ell}$ /min) 2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
- 3. Direct interpolation is permissible. Do not extrapolate.
- 4. Measuring procedure follows EN-14511.
- 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.

# **6.2 Heating Oparation**

#### ■ Maximum Heating Capacity (Include defrost effect)

#### ◆ ZHBW056A0 [HM051M U43]

Outdoor			Wat	er flow r	ate 34.5 l	_PM			Wat	er flow ra	ate 21.6 l	-PM	Wat	er flow r	ate 17.3 I	_PM
Temperatu	LWT	30 °C	LWT	35 °C	LWT	40 °C	LWT	45 °C	LWT	50 °C	LWT	55 °C	LWT	60 °C	LWT	65 °C
re [°C DB]	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	COP	TC	СОР
-25	3.79	1.88	3.67	1.75	3.54	1.63	3.42	1.50	-	-	-	-	-	-	-	-
-20	4.22	2.51	4.09	2.01	3.96	1.86	3.83	1.72	3.70	1.57	-	-	-	-	-	-
-15	4.66	2.42	4.52	2.27	4.38	2.10	4.25	1.93	4.11	1.77	3.97	1.60	-	-	-	-
-7	5.50	3.18	5.50	2.99	5.50	2.79	5.50	2.60	5.50	2.41	5.50	2.21	5.50	2.02	-	-
-4	5.50	3.36	5.50	3.14	5.50	2.93	5.50	2.71	5.50	2.49	5.50	2.28	5.50	2.06	5.50	1.91
-2	5.50	3.51	5.50	3.25	5.50	3.04	5.50	2.83	5.50	2.63	5.50	2.42	5.50	2.21	5.50	2.01
2	5.50	3.52	5.50	3.45	5.50	3.25	5.50	3.04	5.50	2.83	5.50	2.63	5.50	2.42	5.50	2.21
7	5.50	4.84	5.50	4.50	5.50	4.16	5.50	3.82	5.50	3.49	5.50	3.15	5.50	2.81	5.50	2.47
10	5.50	5.14	5.50	4.78	5.50	4.42	5.50	4.06	5.50	3.70	5.50	3.35	5.50	2.99	5.50	2.63
15	5.50	6.12	5.50	5.66	5.50	5.20	5.50	4.73	5.50	4.27	5.50	3.81	5.50	3.35	5.50	2.88
18	5.50	6.45	5.50	5.96	5.50	5.48	5.50	4.99	5.50	4.50	5.50	4.01	5.50	3.53	5.50	3.04
20	5.50	6.67	5.50	6.17	5.50	5.66	5.50	5.16	5.50	4.65	5.50	4.15	5.50	3.65	5.50	3.14
35	5.50	8.31	5.50	7.68	5.50	7.05	5.50	6.43	5.50	5.80	5.50	5.17	5.50	4.54	5.50	3.91

#### **♦ ZHBW076A0 [HM071M U43]**

		-		-												
Outdoor			Wat	er flow r	ate 40.3 l	_PM			Wat	er flow r	ate 25.2 l	-PM	Wat	er flow r	ate 20.1 l	_PM
Temperatu	LWT	30 °C	LWT	35 °C	LWT	40 °C	LWT	45 °C	LWT	50 °C	LWT	55 °C	LWT	60 °C	LWT	65 °C
re [°C DB]	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	COP	TC	COP	TC	СОР
-25	4.82	1.99	4.67	1.73	4.51	1.48	4.36	1.22	-	-	-	-	-	-	-	-
-20	5.38	2.47	5.21	1.98	5.05	1.77	4.88	1.56	4.72	1.35	-	-	-	-	-	-
-15	5.93	2.38	5.76	2.22	5.58	2.06	5.41	1.90	5.23	1.74	5.06	1.58	-	-	-	-
-7	7.00	3.15	7.00	2.96	7.00	2.77	7.00	2.58	7.00	2.38	7.00	2.19	7.00	2.00	-	-
-4	7.00	3.33	7.00	3.11	7.00	2.90	7.00	2.68	7.00	2.47	7.00	2.25	7.00	2.04	7.00	1.89
-2	7.00	3.51	7.00	3.21	7.00	3.01	7.00	2.81	7.00	2.60	7.00	2.40	7.00	2.19	7.00	1.99
2	7.00	3.52	7.00	3.42	7.00	3.21	7.00	3.01	7.00	2.81	7.00	2.60	7.00	2.40	7.00	2.19
7	7.00	4.69	7.00	4.50	7.00	4.16	7.00	3.82	7.00	3.47	7.00	3.13	7.00	2.79	7.00	2.45
10	7.00	5.14	7.00	4.78	7.00	4.42	7.00	4.05	7.00	3.69	7.00	3.33	7.00	2.96	7.00	2.60
15	7.00	6.02	7.00	5.57	7.00	5.12	7.00	4.67	7.00	4.21	7.00	3.76	7.00	3.31	7.00	2.86
18	7.00	6.34	7.00	5.87	7.00	5.39	7.00	4.92	7.00	4.44	7.00	3.96	7.00	3.49	7.00	3.01
20	7.00	6.56	7.00	6.07	7.00	5.57	7.00	5.08	7.00	4.59	7.00	4.10	7.00	3.60	7.00	3.11
35	7.00	8.17	7.00	7.56	7.00	6.95	7.00	6.33	7.00	5.72	7.00	5.10	7.00	4.49	7.00	3.88

#### **♦ ZHBW096A0 [HM091M U43]**

Outdoor			10/04	-	-t- 4C 0 I	DM			18/04	au flass u	-4- 20 0 1	DM	18/04	au flass	-t- 22 A I	DM
Outdoor				er flow r						er flow r				er flow r		
Temperatu	LWT	30 °C	LWT	35 °C	LWT	40 °C	LWT	45 °C	LWT	50 °C	LWT	55 °C	LWT	60 °C	LWT	65 °C
re [°C DB]	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР
-25	6.20	1.95	6.00	1.70	5.80	1.45	5.60	1.20	-	-	-	-	-	-	-	-
-20	6.91	2.45	6.70	1.96	6.49	1.75	6.28	1.54	6.06	1.33	-	-	-	-	-	-
-15	7.63	2.39	7.40	2.22	7.18	2.05	6.95	1.89	6.73	1.72	6.50	1.55	-	-	-	-
-7	9.00	3.09	9.00	2.90	9.00	2.71	9.00	2.53	9.00	2.34	9.00	2.15	9.00	1.96	-	-
-4	9.00	3.26	9.00	3.05	9.00	2.84	9.00	2.63	9.00	2.42	9.00	2.21	9.00	2.00	9.00	1.85
-2	9.00	3.51	9.00	3.15	9.00	2.95	9.00	2.75	9.00	2.55	9.00	2.35	9.00	2.15	9.00	1.95
2	9.00	3.52	9.00	3.35	9.00	3.15	9.00	2.95	9.00	2.75	9.00	2.55	9.00	2.35	9.00	2.15
7	9.00	4.70	9.00	4.18	9.00	3.88	9.00	3.59	9.00	3.29	9.00	2.99	9.00	2.70	9.00	2.40
10	9.00	4.76	9.00	4.44	9.00	4.13	9.00	3.81	9.00	3.50	9.00	3.18	9.00	2.87	9.00	2.55
15	9.00	6.07	9.00	5.60	9.00	5.13	9.00	4.67	9.00	4.20	9.00	3.73	9.00	3.27	9.00	2.80
18	9.00	6.39	9.00	5.90	9.00	5.41	9.00	4.92	9.00	4.43	9.00	3.93	9.00	3.44	9.00	2.95
20	9.00	6.61	9.00	6.10	9.00	5.59	9.00	5.08	9.00	4.58	9.00	4.07	9.00	3.56	9.00	3.05
35	9.00	8.23	9.00	7.60	9.00	6.97	9.00	6.33	9.00	5.70	9.00	5.07	9.00	4.43	9.00	3.80

- 1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liters per minute (ℓ/min)
  2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
  3. Direct interpolation is permissible. Do not extrapolate.

- 4. Measuring procedure follows EN-14511.
  - 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 the operative areas.

#### **◆ ZHBW126A0 [HM121M U33] / ZHBW128A0 [HM123M U33]**

Outdoor	Water flow rate 34.5 LPM								Wat	er flow r	ate 21.6 L	-PM	Water flow rate 17.3 LPM			
Temperatu	LWT 30 °C		LWT 35 °C		LWT 40 °C		LWT 45 °C		LWT 50 °C		LWT 55 °C		LWT 60 °C		LWT 65 °C	
re [°C DB]	TC	COP	TC	COP	TC	COP	TC	СОР	TC	COP	TC	COP	тс	COP	TC	СОР
-25	8.75	2.13	8.50	1.85	8.25	1.58	8.00	1.30	-	-	-	-	-	-	-	-
-20	10.13	2.34	10.00	2.13	9.88	1.91	9.75	1.70	9.63	1.49	-	-	-	-	-	-
-15	11.50	2.55	11.50	2.40	11.50	2.25	11.50	2.10	11.50	1.95	11.50	1.80	-	-	-	-
-7	12.00	3.15	12.00	3.00	12.00	2.85	12.00	2.70	12.00	2.55	12.00	2.40	12.00	2.25	-	-
-4	12.00	3.36	12.00	3.17	12.00	2.97	12.00	2.78	12.00	2.59	12.00	2.39	12.00	2.20	12.00	2.05
-2	12.00	3.47	12.00	3.28	12.00	3.09	12.00	2.90	12.00	2.71	12.00	2.53	12.00	2.34	12.00	2.15
2	12.00	3.69	12.00	3.50	12.00	3.31	12.00	3.12	12.00	2.93	12.00	2.73	12.00	2.54	12.00	2.35
7	12.00	4.93	12.00	4.60	12.00	4.27	12.00	3.93	12.00	3.60	12.00	2.80	12.00	2.60	12.00	2.60
10	12.00	5.22	12.00	4.87	12.00	4.51	12.00	4.16	12.00	3.81	12.00	3.46	12.00	3.10	12.00	2.75
15	12.00	5.99	12.00	5.56	12.00	5.13	12.00	4.71	12.00	4.28	12.00	3.85	12.00	3.43	12.00	3.00
18	12.00	6.29	12.00	5.84	12.00	5.39	12.00	4.94	12.00	4.49	12.00	4.05	12.00	3.60	12.00	3.15
20	12.00	6.49	12.00	6.02	12.00	5.56	12.00	5.10	12.00	4.64	12.00	4.17	12.00	3.71	12.00	3.25
35	12.00	7.98	12.00	7.41	12.00	6.84	12.00	6.28	12.00	5.71	12.00	5.14	12.00	4.57	12.00	4.00

#### ◆ ZHBW146A0 [HM141M U33] / ZHBW148A0 [HM143M U33]

Outdoor	Water flow rate 40.3 LPM								Wat	er flow r	ate 25.2 L	-PM	Water flow rate 20.1 LPM			
Temperatu	LWT 30 °C		LWT 35 °C		LWT 40 °C		LWT 45 °C		LWT 50 °C		LWT 55 °C		LWT 60 °C		LWT 65 °C	
re [°C DB]	TC	COP	TC	СОР	TC	COP	TC	СОР	TC	COP	TC	СОР	TC	СОР	TC	COP
-25	9.25	2.08	9.00	1.80	8.75	1.53	8.50	1.25	-	-	-	-	-	-	-	-
-20	10.63	2.26	10.50	2.05	10.38	1.84	10.25	1.63	10.13	1.41	-	-	-	-	-	-
-15	12.00	2.45	12.00	2.30	12.00	2.15	12.00	2.00	12.00	1.85	12.00	1.70	-	-	-	-
-7	14.00	3.12	14.00	2.95	14.00	2.79	14.00	2.63	14.00	2.46	14.00	2.30	14.00	2.14	-	-
-4	14.00	3.30	14.00	3.10	14.00	2.90	14.00	2.70	14.00	2.50	14.00	2.30	14.00	2.10	14.00	1.95
-2	14.00	3.39	14.00	3.20	14.00	3.01	14.00	2.82	14.00	2.63	14.00	2.43	14.00	2.24	14.00	2.05
2	14.00	3.65	14.00	3.40	14.00	3.21	14.00	3.02	14.00	2.83	14.00	2.63	14.00	2.44	14.00	2.25
7	14.00	4.83	14.00	4.50	14.00	4.17	14.00	3.83	14.00	3.50	14.00	2.78	14.00	2.50	14.00	2.50
10	14.00	5.12	14.00	4.77	14.00	4.42	14.00	4.06	14.00	3.71	14.00	3.36	14.00	3.00	14.00	2.65
15	14.00	6.02	14.00	5.57	14.00	5.13	14.00	4.68	14.00	4.24	14.00	3.79	14.00	3.35	14.00	2.90
18	14.00	6.33	14.00	5.86	14.00	5.39	14.00	4.92	14.00	4.45	14.00	3.99	14.00	3.52	14.00	3.05
20	14.00	6.53	14.00	6.05	14.00	5.57	14.00	5.08	14.00	4.60	14.00	4.12	14.00	3.63	14.00	3.15
35	14.00	8.09	14.00	7.49	14.00	6.89	14.00	6.29	14.00	5.70	14.00	5.10	14.00	4.50	14.00	3.90

#### ◆ ZHBW166A0 [HM161M U33] / ZHBW168A0 [HM163M U33]

		-		-			-			-							
Outdoor		Water flow rate 46.0 LPM									Water flow rate 28.8 LPM				Water flow rate 23.0 LPM		
Temperatu	LWT 30 °C		LWT 35 °C		LWT 40 °C L		LWT	LWT 45 °C		LWT 50 °C		LWT 55 °C		LWT 60 °C		65 °C	
re [°C DB]	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	TC	СОР	
-25	10.50	1.96	10.00	1.70	9.50	1.44	9.00	1.18	-	-	-	-	-	-	-	-	
-20	12.30	2.33	11.75	1.94	11.44	1.74	11.13	1.55	10.75	1.34	-	-	-	-	-	-	
-15	14.10	2.70	13.50	2.18	13.38	2.05	13.25	1.92	13.13	1.78	13.00	1.65	-	-	-	-	
-7	16.00	2.96	16.00	2.80	16.00	2.64	16.00	2.48	16.00	2.31	16.00	2.15	16.00	1.99	-	-	
-4	16.00	3.18	16.00	2.98	16.00	2.79	16.00	2.59	16.00	2.40	16.00	2.20	16.00	2.01	16.00	1.79	
-2	16.00	3.51	16.00	3.11	16.00	2.90	16.00	2.70	16.00	2.50	16.00	2.30	16.00	2.10	16.00	1.90	
2	16.00	3.52	16.00	3.35	16.00	3.14	16.00	2.93	16.00	2.73	16.00	2.52	16.00	2.31	16.00	2.10	
7	16.00	4.74	16.00	4.40	16.00	4.06	16.00	3.72	16.00	3.38	16.00	2.75	16.00	2.40	16.00	2.36	
10	16.00	5.05	16.00	4.69	16.00	4.33	16.00	3.96	16.00	3.60	16.00	3.24	16.00	2.88	16.00	2.51	
15	16.00	5.67	16.00	5.54	16.00	5.08	16.00	4.62	16.00	4.16	16.00	3.69	16.00	3.23	16.00	2.77	
18	16.00	6.34	16.00	5.85	16.00	5.36	16.00	4.87	16.00	4.39	16.00	3.90	16.00	3.41	16.00	2.93	
20	16.00	6.56	16.00	6.05	16.00	5.55	16.00	5.05	16.00	4.54	16.00	4.04	16.00	3.53	16.00	3.03	
35	16.00	8.23	16.00	7.60	16.00	6.96	16.00	6.33	16.00	5.70	16.00	5.07	16.00	4.43	16.00	3.80	

- 1. DB : Dry bulb temperature( $^{\circ}$ C), LWT : Leaving water temperature( $^{\circ}$ C), LPM : Liters per minute ( $\ell$ /min)
- 2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
- 3. Direct interpolation is permissible. Do not extrapolate.
- 4. Measuring procedure follows EN-14511.
  - 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 the operative areas.

## 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.

#### 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

- Some installation site may 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.

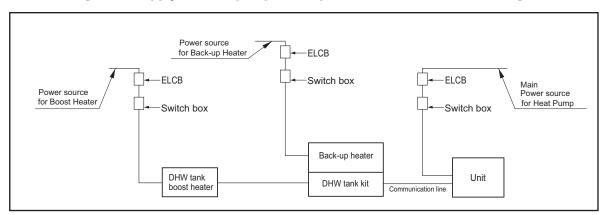
# 7. Electric Characteristics

Outdoor Unit	Phase / Volts / Hz	Voltage range	
ZHBW056A0 [HM051M U43]			
ZHBW076A0 [HM071M U43]	1 Ø / 220-240 V / 50 Hz		
ZHBW096A0 [HM091M U43]		Min. : 198	
ZHBW126A0 [HM121M U33]		Max. : 264	
ZHBW146A0 [HM141M U33]	1 Ø / 220-240 V / 50 Hz		
ZHBW166A0 [HM161M U33]			
ZHBW128A0 [HM123M U33]		M: 040	
ZHBW148A0 [HM143M U33]	3 Ø / 380-415 V / 50 Hz	Min. : 342 Max. : 457	
ZHBW168A0 [HM163M U33]		IVIGA 407	

Pookup Hostor	Power Supply for Heater						
Backup Heater	Phase / Volts / Hz	Capacity (kW)					
AHEH036A [HA031M E1]	1 Ø / 220-240 V / 50 Hz	3					
AHEH066A [HA061M E1]	1 Ø / 220-240 V / 50 H2	3+3					

DHW Boost Heater	Power Supply for DHW Boost Heater						
Drivi 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]



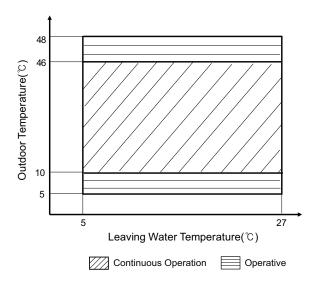
- 1. Voltage supplied to the unit terminals should be within the minimum and maximum range.
- 2. Maximum allowable voltage unbalance between phase is 2%.

# 8. Operation Range

## ■ Cooling

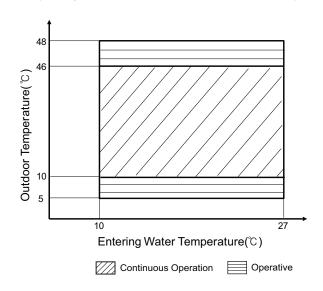
Cooling

(Settings : Outlet temp. control / Fan coil unit used)



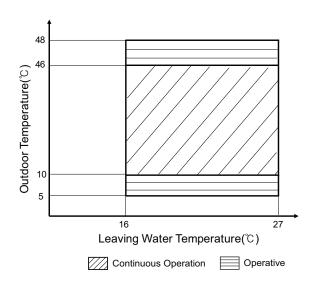
Cooling

(Settings: Inlet temp. control / Fan coil unit used)



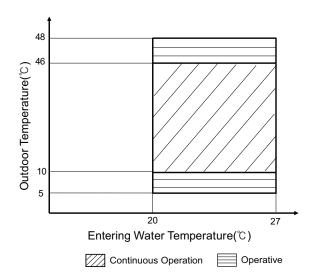
Cooling

(Settings: Outlet temp. control / Fan coil unit not used)



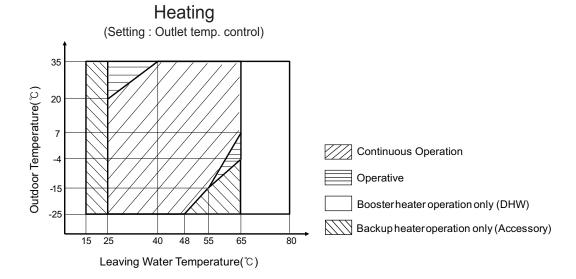
Cooling

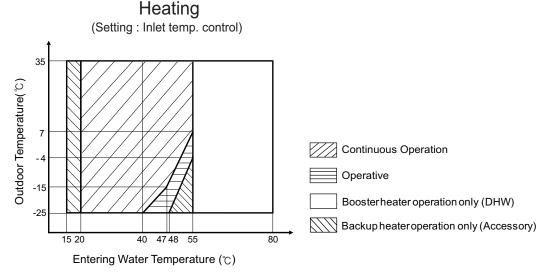
(Settings: Inlet temp. control / Fan coil unit not used)



# 8. Operation Range

# ■ Heating





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

# 9. Sound levels

# 9.1 Sound power level

#### Note

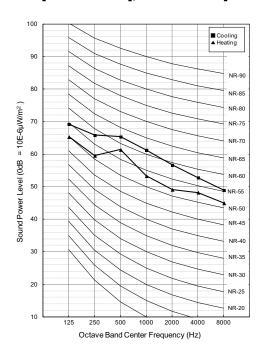
- 1. Data is valid at diffuse field condition.
- 2. Reference acoustic intensity 0dB = 10E-6µW/m<sup>2</sup>
- 3. Sound power level is measured on the rated condition in the reverberation rooms. Refer to the Model Specifications for nominal conditions(Power source and Ambient temperature, etc)
- 4. Sound levels can be increased in accordance with installation and operating conditions. (Operating conditions include some functional condition like Static pressure mode, air guide use, Room target temperature setting, etc and these functions are different in accordance with each model.)
- 5. Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of particular room in which the equipment in installed.

	Sound Power Level [dB(A)]				
Model	Heating (at rated condition)				
ZHBW056A0 [HM051M U43]	60				
ZHBW076A0 [HM071M U43]	60				
ZHBW096A0 [HM091M U43]	60				
ZHBW126A0 [HM121M U33]	63				
ZHBW146A0 [HM141M U33]	63				
ZHBW166A0 [HM161M U33]	63				
ZHBW128A0 [HM123M U33]	63				
ZHBW148A0 [HM143M U33]	63				
ZHBW168A0 [HM163M U33]	63				

ZHBW056A0 [HM051M U43] ZHBW076A0 [HM071M U43] ZHBW096A0 [HM091M U43]

100 ■ Cooling ▲ Heating 80 Sound Power Level (0dB =  $10E-6\mu W/m^2$ 70 NR-65 NR-55 40 NR-45 30 NR-35 NR-30 20 NR-20 10 2000 Octave Band Center Frequency (Hz)

ZHBW126A0 [HM121M U33], ZHBW128A0 [HM123M U33] ZHBW146A0 [HM141M U33], ZHBW148A0 [HM143M U33] ZHBW166A0 [HM161M U33], ZHBW168A0 [HM163M U33]



# 10. Water pump Capacity

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

Capacity [kW]	Rated flow-rate [LPM]	Pump Head [m] (at rated flow- rate)	Product pressure drop [m] (Plate heat exchanger)	Serviceable Head [m]
5	14.37	7.5	0.2	7.3
7	20.12	7.3	0.3	7.0
9	25.87	6.1	0.4	5.7
12	34.50	9.8	0.8	9.0
14	40.25	9.3	1.1	8.2
16	46.00	9.0	1.4	7.6

- 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.



# **Design and installation**

- 1. Alternative Refrigerant R32
- 2. Select the Best Location
- 3.Installation Space
- **4.Water Control**
- **5.Lifting Method**
- 6.Installation
- 7. Electrical Wiring
- 8. Starting Operation

## 1. Alternative 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.

## $\Lambda$

#### 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 room 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 room, 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.

## Λ

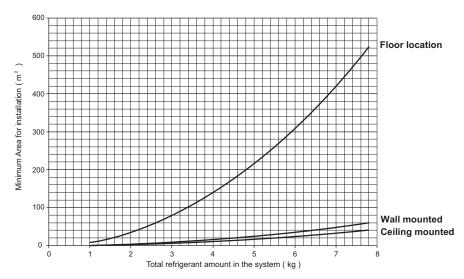
#### **CAUTION**

- 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.

# 1. Alternative Refrigerant R32

#### ■ Minimum Floor Area for Installation

- The unit should be installed, operated and stored in a room with a floor area larger than the minimum area. Use the graph of table to determine the minimum area.
- Pipe-work shall be protected from physical damage and shall not be installed in an unventilated space, if that space is smaller than minimum area for installation.



Total refrigerant amount in the system = factory refrigerant charge + additional refrigerant amount

Refrigerant Amount		Minimum Area (m²)	
(kg)	Floor location	Wall mounted	Ceiling Mounted
1.0	8.58	0.95	0.64
1.224	12.90	1.43	0.956
1.4	16.82	1.87	1.25
1.6	21.97	2.44	1.63
1.8	27.80	3.09	2.07
2.0	34.32	3.81	2.55
2.2	41.53	4.61	3.09
2.4	49.42	5.49	3.68
2.6	58.00	6.44	4.31
2.8	67.27	7.47	5.00
3.0	77.22	8.58	5.74
3.2	87.86	9.76	6.54
3.4	99.19	11.02	7.38
3.6	111.20	12.36	8.27
3.8	123.90	13.77	9.22
4.0	137.29	15.25	10.21
4.2	151.36	16.82	11.26
4.4	166.12	18.46	12.36
4.6	181.56	20.17	13.50
4.8	197.70	21.97	14.70
5.0	214.51	23.83	15.96
5.2	232.02	25.78	17.26
5.4	250.21	27.80	18.61
5.6	269.09	29.90	20.01
5.8	288.65	32.07	21.47
6.0	308.90	34.32	22.98
6.2	329.84	36.65	24.53
6.4	351.46	39.05	26.14
6.6	373.77	41.53	27.80
6.8	396.76	44.08	29.51
7.0	420.45	46.72	31.27
7.2	444.81	49.42	33.09
7.4	469.87	52.21	34.95
7.6	495.61	55.07	36.86
7.8	522.04	58.00	38.83

### 2. Select the Best Location

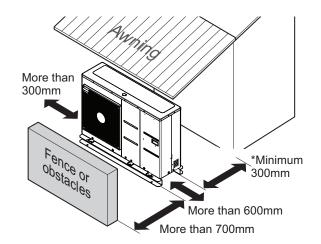
Select space for installing unit, which will meet the following conditions:

- · No direct thermal radiation from other heat sources
- · No possibility of annoying neighbors by noise from unit
- · No exposition to strong wind
- With strength which bears weight of unit
- Note that drain flows out of unit when heating (Heat pump model)
- · With space for air passage and service work shown next
- Because of the possibility of fire, do not install unit to the space where generation, inflow, stagnation, and leakage of combustible gas is expected.
- Avoid unit installation in a place where acidic solution and spray (sulfur) are often used.
- · Do not use unit under any special environment where oil, steam and sulfuric gas exist.
- It is recommended to fence round the unit in order to prevent any person or animal from accessing the unit.
- If installation site is area of heavy snowfall, then the following directions should be observed.
  - Make the foundation as high as possible.
  - Fit a snow protection hood.
- Select installation location considering following conditions to avoid bad condition when additionally performing defrost operation.
  - 1. Install the unit at a place well ventilated and having a lot of sunshine in case of installing the product at a place with a high humidity in winter (near beach, coast, lake, etc).
  - 2. Performance of heating will be reduced and pre-heat time of the unit may be lengthened in case of installing the unit in winter at following location:
    - 1) Shade position with a narrow space
    - 2) Location with much humidity around.
    - Location where liquid gathers since the floor is not even.
- When installing the unit in a place that is constantly exposed to a strong wind like a coast or on a high story of a building, secure a normal fan operation by using a duct or a wind shield.
  - 1. Install the unit so that its discharge port faces to the wall of the building. Keep a distance 300 mm or more between the unit and the wall surface.
  - 2. Supposing the wind direction during the operation season of the unit, install the unit so that the discharge port is set at right angle to the wind direction.

## 3. Installation Space

### 3.1 General considerations

- If an awning is built over the unit to prevent direct sunlight or rain exposure, make sure that heat radiation from the condenser is not restricted.
- Ensure that the spaces indicated by arrows around front, back and side of the unit.
- Do not place animals and plants in the path of the warm or cold air.
- Take the unit weight into account and select a place where noise and vibration are minimum.
- Select a place so that the air flow and noise from the unit do not disturb neighbors.
- Place that can sufficiently endure the weight and vibration of the outdoor unit and where even installation is possible.
- · Place that has no direct influence of snow or rain.
- · Place with no danger of extreme snowfall or icicle drop.
- Place without weak floor or base such as decrepit part of the building or with a lot of snow accumulation.



\* Please secure the space to install the shut-off valve and strainer.

### 4. Water Control

## 4.1 Water quality

Water quality should be complied with EN 98/83 EC Directives. Detailed water quality condition can be found in EN 98/83 EC Directives.

## **A** 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.

## 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.

Antifracza typo	Antifreeze mixing ratio (by volume)					
Antifreeze 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

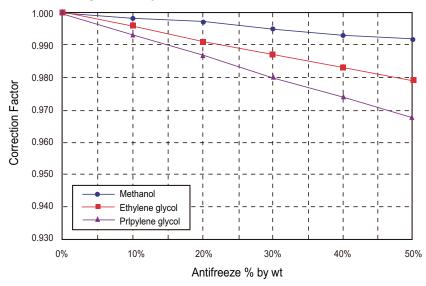
- · Use only one of the above antifreeze.
- If a antifreeze is used, pressure drop and capability degradation of the system can be occurred.
- If one of antifreezes is used, corrosion can be occurred. So please add corrosion inhibitor.
- Please check the concentration of the antifreeze periodically to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

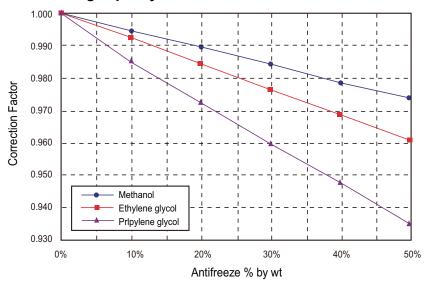
# 4.3 Capacity correction factor by antifreeze

Antifranza Tuna	Item	Antifreeze % by wt				
Antifreeze 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
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

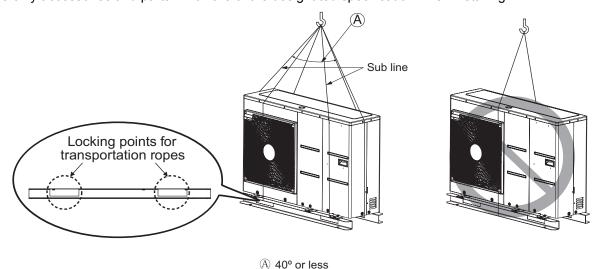


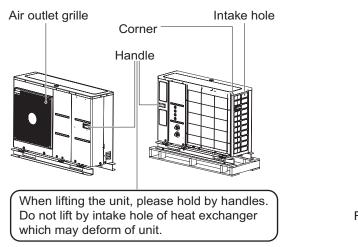
### Correction factor of heating capacity

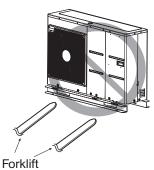


## 5. Lifting Method

- When carrying the suspended unit, pass the ropes under the unit and use the two suspension points each at the front and rear.
- · Always lift the unit with ropes attached at four points so that impact is not applied to the unit.
- Attach the ropes to the unit at an angle of 40° or less.
- · Use only accessories and parts which are of the designated specification when installing.







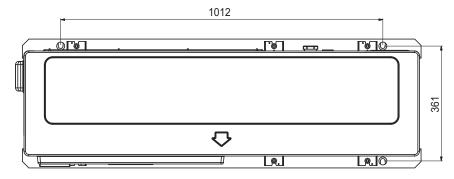
## **A** CAUTION

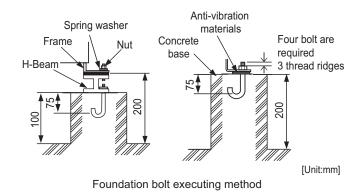
- Do not have only one person carry product if it is more than 20 kg.
- PP bands are used to pack some products. Do not use them as a mean for transportation because they
  are dangerous.
- Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.
- Tear plastic 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.
- Place extra cloth or bodards 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.

### 6. Installation

### 6.1 Foundation for Installation

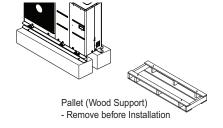
- Check the strength and level of the installation ground so that the unit will not cause anyoperating vibration or noise after installation.
- Fix the unit securely by means of the foundation bolts.
   (Prepare 4sets of M12 foundation bolts, nuts and washers each which are available on the market.)
- · It is best to screw in the foundation bolts until their length are 20mm from the foundationsurface.





## **M** WARNING

- Be sure to remove the Pallet(Wood Support) of the bottom side
  of the outdoor unit Base Pan before fixing the bolt. It may cause
  the unstable state of the outdoor settlement, and may cause
  freezing of the heat exchanger resulting in abnormal operations.
- Be sure to remove the Pallet(Wood Support) of the bottom side of the outdoor unit before welding. Not removing Pallet(Wood Support) causes hazard of fire during welding.



### 6. Installation

### 6.2 Water Piping and water Circuit Connection

#### 6.2.1 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.

### 6.2.2 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.

Configuration of water circuit is shown in 6.3 Installation Scenes. All connections should be complied with presented diagram.

#### 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 indoor 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 tefron 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  $^{\circ}$ 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.

 Before starting water charging, these two shut-off valves should be assembled with water inlet and outlet pipe of the indoor unit.

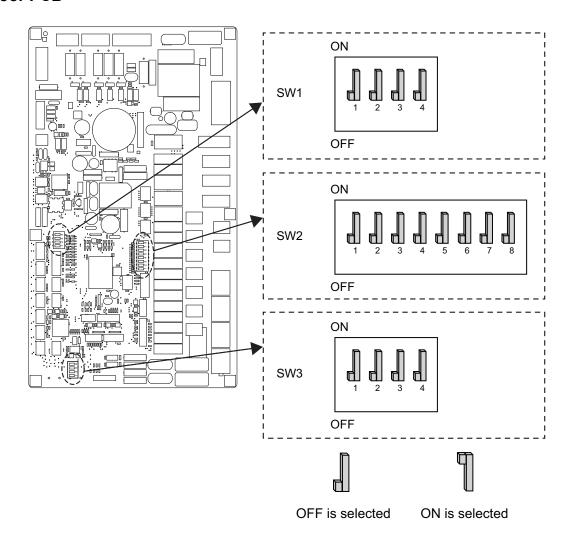
## 7. Electrical Wiring

## 7.1 Dip switch information

Turn off electric power supply before setting DIP switch

• Whenever adjusting DIP switch, turn off electric power supply to avoid electric shock.

### **■** Indoor PCB





### ♦ Option Switch 1

Description	Setting	Default
MODBUS Communication Type	1 As Master	4
	1 As Slave	1
Reserved	Reserved 2 2	2
Reserved	Reserved 3 3	3 🖟
Reserved	Reserved 4 4	4

### ♦ Option Switch 3

Description	Setting		Default	
(Dometa) Doom eir eeneer	1	LG Room sensor is not installed	<b>4</b> N	
(Remote) Room air sensor	1 🖣	Remote sensor is installed	1	
Antifreeze mode	2	Antifreeze mode not used	2	
Antilleeze mode	2 ¶	Antifreeze mode used	2	
Reserved	1 1 3 3	Reserved	3 🖟	
Reserved	1 ¶	Not Use	4 📗	

# 7. Electrical Wiring

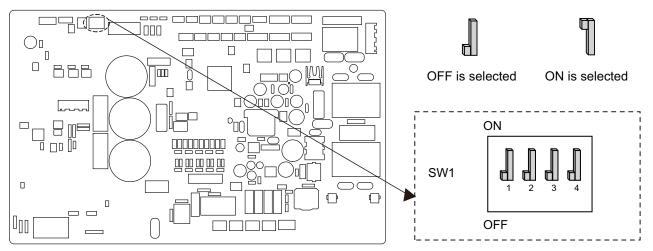
## ♦ Option Switch 2

Description		Default	
Role when central	1 🌡	As Master	
controller is equipped	1 🗍	As Slave	1 📗
	2 3	Heat pump is installed (Heating(Cooling) circuit only)	
Accessory installation information	2 3	Heat pump + DHW tank is installed	2
	2 3	Heat pump + DHW tank + Solar thermal system is installed	2 📗
	2 3	DHW tank is installed (no Heating (Cooling) circuit)	
Cycle	4		4 10
5,515	4 ¶	Heating & Cooling	4
Flow Switch	5 📗	Always	5 📗
Detection	5	While water pump is on	2 @
	6 7	Backup Heater is not used	
Selecting Backup Heater capacity	6 7	1Ø model : Half capacity is used 3Ø model : 1/3 capacity is used	6 📗
	6 7	Unused	7
	6 7	Full capacity is used	
Thermostat installation	8 📗	Thermostat is NOT installed	_ m
information	8	Thermostat is installed	8

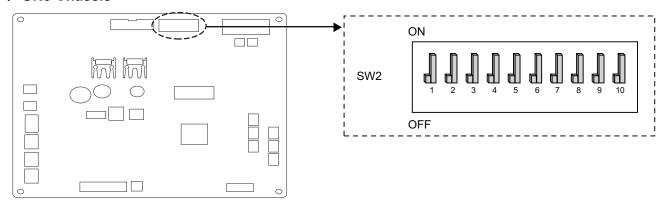
## 7. Electrical Wiring

### Outdoor PCB

### **♦ UN4 Chassis**



#### **♦ UN3 Chassis**



#### ◆ Peak Control

Description	Setting	Default
Peak Control	3 Max Mode	
	3 Peak Control	3





#### **Air Solution**

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

Copyright © 2018 LG Electronics Inc. All Rights Reserved. Printed in Korea August / 2018 The air conditioners manufactured by LG have received ISO9001 certificate for quality assurance and ISO14001 certificate for environmental management system.

The specifications, designs, and information in this brochure are subject to change without notice.