



CONFIDENTIAL

THERMA VTM

AIR-TO-WATER HEAT PUMP

SERVICE MANUAL

(Exploded View)

CAUTION

Before Servicing the unit, read the safety precautions in General SVC manual.
Only for authorized service personnel.

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1. Model Information

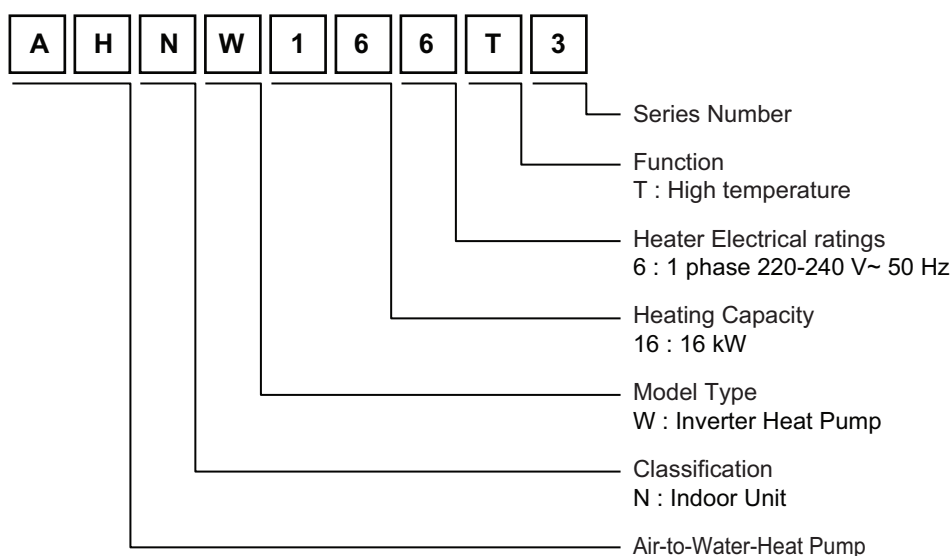
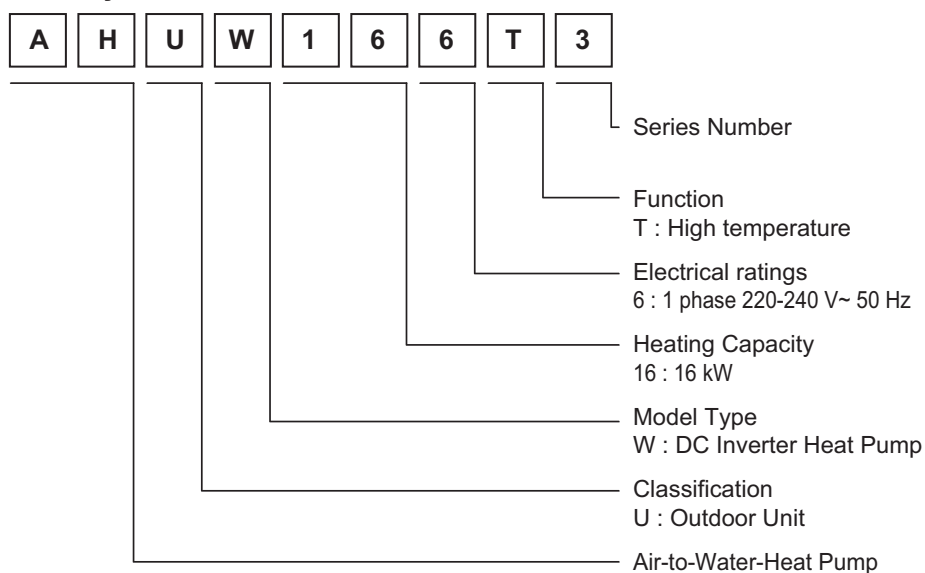
With advanced inverter technology, **THERMA V™** is suitable for applications like under floor heating, under floor cooling, and hot water generation. By Interfacing to various accessories user can customize the range of the application.

In this chapter, general information of **THERMA V™** is presented to identify the installation procedure. Before beginning installation, read this chapter carefully and find helpful information on installation.

1. Model Information

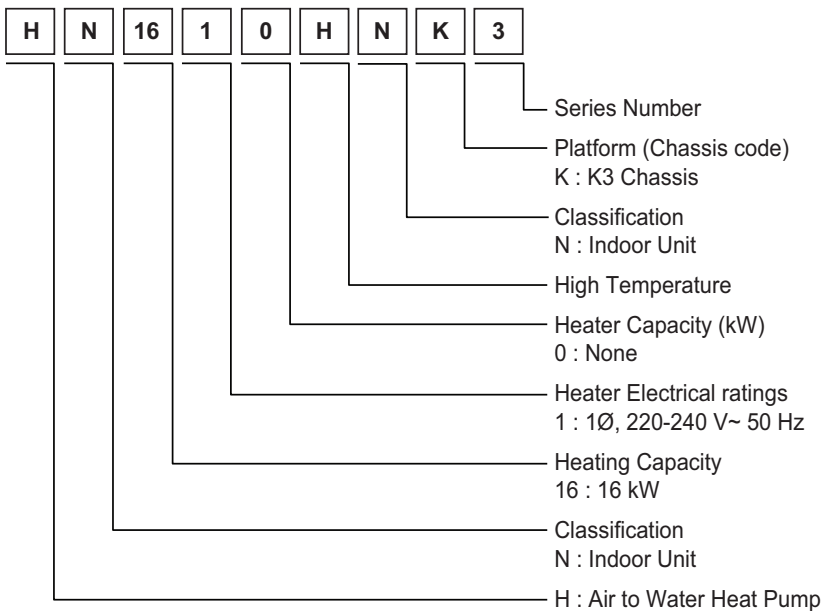
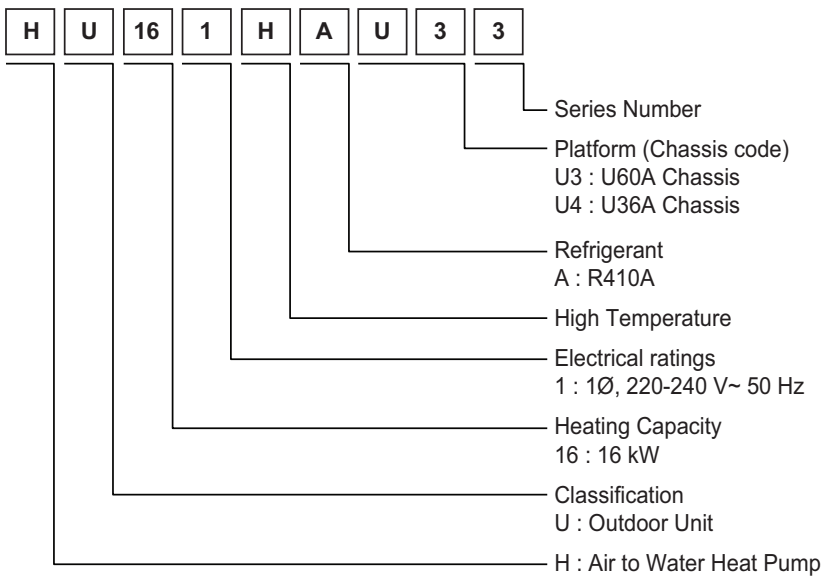
Model number nomenclature

Factory Model Name



- Additional Information : Serial number refers to the barcode on the product.
- Max allowable pressure High side : 4.2 MPa / Low side : 2.4 MPa
- Refrigerant : R410A, R134a

Buyer Model Name



- Additional Information : Serial number refers to the barcode on the product.
- Max allowable pressure High side / Low side : 4.32 MPa / 2.4 MPa
- Refrigerant : R32

Model name and related information

Model information		Heating(kW)*1	Power Source (Unit)
Phase [Φ]	Capacity [kW]	Capacity [kW]	
1	16	16.0	220-240 V~ 50 Hz

*1 : tested under EN 14511 Heating condition
(water out temperature 35°C at outdoor ambient temperature 7°C / 6°C)

2. Specification

Indoor

Indoor Unit				AHNW166T3
Operation Range (Leaving Water Temperature)	Heating	Min. ~ Max.	°C DB	25 - 80
Compressor	Type		-	Hermetic Motor Compressor
	Model		Model × No.	EPT525MBA × 1
	Motor Type		-	Twin Rotary
	Displacement		cm ³ /Rev.	52.5
Heat Exchanger	Water Circuit	Type	-	Brazed Plate HEX
		Quantity	-	1
		Number of Plate	EA	76
		Water Volume	ℓ	1.0
		Rated Water Flow (Min. ~ Max.)	ℓ/min	15 - 70
	Refrigerant Circuit	Type	~	Brazed Plate HEX
		Quantity	~	1
		Number of Plate	EA	50
Refrigerant	Type		-	R134a
	GWP (Global Warming Potential)		-	1 430.0
	Precharged Amount		g	1 800
	t-CO2 eq.		-	2.574
	Control		-	Electronic Expansion Valve
Refrigerant Oil	Type		-	FVC68D
	Charged Volume		cc	1 300
Strainer	Mesh size		-	28 mesh
	Material		-	Stainless Steel
Devices for Water Circuit			-	Flow Switch
Piping Connections	Water Circuit	Inlet	mm(Inch)	25.4 (Male PT 1)
		Outlet	mm(Inch)	25.4 (Male PT 1)
	Refrigerant Circuit	Liquid	mm(Inch)	Φ 9.52 (3/8)
		Gas	mm(Inch)	Φ 15.88 (5/8)
Sound Power Level	Heating	Rated	dB(A)	58
Sound Pressure Level (at 1m)	Heating	Rated	dB(A)	50
Dimensions	Unit	W × H × D	mm	520 x 1 074 x 330
	Packed Unit	W × H × D	mm	682 x 1 168 x 423
Weight	Unit		kg	84.0
	Packed Unit		kg	91.0

Electrical Specification			AHNW166T3
Power Supply		V, Ø, Hz	220-240, 1, 50
Maximum Power Input		W	4 750
Maximum Running Current		A	20.2
Wiring Connections	Power Cable (Included Earth)	mm ² x cores	4.0 x 3 (H07RN-F)
	Communication Cable (included Earth)	mm ² x cores	1.0~1.5 x 2 (VCTF-SB)

Specification

Note

1. Due to our policy of innovation some specifications may be changed without notification.
 2. Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
 3. Sound Level Values are measured at Noise Measuring chamber accordance with standard. Therefore, these values depend on the ambient conditions and values are normally higher in actual operation.
 4. Performances are based on the following conditions :
 - Heating : Inlet/Outlet Water Temp. 30°C/35°C, Outdoor Air Temp. 7°CDB / 6°CWB
 - Interconnected Pipe Length is standard length and difference of Elevation (Outdoor ~ Indoor Unit) is Zero.
 5. This product contains Fluorinated greenhouse gases.
 6. Sound Performances are based on the following conditions.
 - Sound Power Level : Measured according to EN14825.
 - Sound Pressure Level : Calculated value according to distance of sound power.
- * At least 25A circuit breaker can be used.

Outdoor

Nominal Capacity and Nominal Input				AHUW166T3 [HU161HA U33]
Category	Outdoor Temp. (°C) DB / WB	Leaving Water Temp. (°C)	-	
Capacity	7 / 6	35	kW	16.0
		55	kW	14.0
Power Input	7 / 6	35	kW	4.89
		55	kW	5.00
COP	7 / 6	35	W/W	3.27
		55	W/W	2.80
SCOP (Low temp. Average)				3.23
SCOP (High temp. Average)				3.01
Rated Water Flow Rate (at LWT 35°C)			LPM	46.0

Outdoor Units				AHUW166T3 [HU161HA U33]
Operation Range (Outdoor Temperature)	Heating	Min. ~ Max.	°C DB	-25 ~ 35
Compressor	Type	-		Hermetic Sealed Scroll
	Model	Model × No.		RJB036MAA × 1
	Motor Type	-		BLDC
	Displacement	cm ³ / Rev.		31.6
Refrigerant	Type	-		R410A
	GWP (Global Warming Potential)	-		2 078.5
	Precharged Amount	g		3 800
	t-CO2 eq.	-		7.90
	Control	-		Electronic Expansion Valve
Refrigerant Oil	Type	-		FVC68D
	Charged Volume	cc		1 000
Piping Connections	Gas	mm(Inch)		Φ 15.88 (5/8)
	Liquid	mm(Inch)		Φ 9.52 (3/8)
	Piping Length	Standard	m	5
		Max.	m	50
	Piping Level Difference	Max.	m	30
	Chargeless-Pipe Length	m		8
	Additional Charging Volume	g/m		40
Heat Exchanger	Type	-		Fin & Tube
	Quantity	EA		2
	Specification	Row	EA	2
		Column	EA	32
		FPI	EA	14
Fan	Type	-		Propeller
	Air Flow Rate	Rated	m ³ /min × No.	60.0 × 2
Fan Motor	Type	-		BLDC
	Output	W × No.		124 × 2

Note

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- Sound Level Values are measured at Noise Measuring chamber accordance with standard. Therefore, these values depend on the ambient conditions and values are normally higher in actual operation.
- Performances are based on the following conditions :
 - Heating : Inlet/Outlet Water Temp. 30°C/35°C, Outdoor Air Temp. 7°CDB / 6°CWB
 - Interconnected Pipe Length is standard length and difference of Elevation (Outdoor ~ Indoor Unit) is Zero.
- This product contains Fluorinated greenhouse gases.
- Sound Performances are based on the following conditions.
 - Sound Power Level : Measured according to EN14825.
 - Sound Pressure Level : Calculated value according to distance of sound power.

* At least 25A circuit breaker can be used.

Specification

Electrical Specifications			AHUW166T3 [HU161HA U33]
Power Supply		V, Ø, Hz	220-240, 1, 50
Maximum Power Input		W	4 400
Maximum Running Current		A	19.0
Peak Control Running Current		A	-
Rated Running Current		A	8.4
Wiring Connections	Power Supply Cable (included Earth)	mm ² x cores	4.0 x 3 (H07RN-F)

Technical Specifications				AHUW166T3 [HU161HA U33]
Sound Power Level	Heating	Rated	dB(A)	63
Sound Pressure Level (at 1m)	Heating	Rated	dB(A)	55
Dimensions	Unit	W × H × D	mm	950 X 1 380 X 330
	Packed Unit	W × H × D	mm	1 140 X 1 553 X 466
Weight	Unit		kg	89.0
	Packed Unit		kg	102.0

Note

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 - Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
 - Sound Level Values are measured at Noise Measuring chamber accordance with standard. Therefore, these values depend on the ambient conditions and values are normally higher in actual operation.
 - Performances are based on the following conditions :
 - Cooling : Inlet/Outlet Water Temp. 23°C/18°C, Outdoor Air Temp. 35°CDB / 24°CWB
 - Heating : Inlet/Outlet Water Temp. 30°C/35°C, Outdoor Air Temp. 7°CDB / 6°CWB
 - Interconnected Pipe Length is standard length and difference of Elevation (Outdoor ~ Indoor Unit) is Zero.
 - This product contains Fluorinated greenhouse gases.
 - Sound Performances are based on the following conditions.
 - Sound Power Level : Measured according to EN14825.
 - Sound Pressure Level : Calculated value according to distance of sound power.
- * DHW 55~80°C Operating is available only when the booster heater is operating.

3. Functions

Basic functions of Unit

Note

1. O : Applied, X : Not applied

Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

Indoor Unit

Category	Functions	AHNW166T3 [HN1610H NK3]
Installation	Backup heater (Operation)	O
Reliability	Self diagnosis	O
Convenience	Auto Restart	O
	Child lock	O
	Sleep mode	O
	Timer (on/off)	O
	Timer (weekly)	O
	Two thermistor control	X
Network function	Network solution(LGAP)	O
Air to Water Heat Pump Functions	Anti-condensation on floor (cooling)	O
	Digital output for external pump	O
	Flow sensor	O
	Thermostat interface (230V AC)	O
	Thermostat interface (24V AC)	X
	DHW(Domestic Hot Water) tank kit	O (Accessory)
	Therma V solar kit	O (Accessory)
	PHEX anti-freezing control	O
	Water pump anti-stuck function	O
	Weather compensation for heating and cooling (Auto mode)	O
	Low noise operation	X
	Anti-overheating of water pipe	O
	Emergency operation	O
	Weather Dependent Operation with Thermostat	O
	Scheduler (DHW Tank Heater)	X
	Timer (Domestic Hot Water Tank Heater)	X
	Quick Domestic Hot Water Tank Heating	X
	Screed Drying Mode	O
	Base Pan Heater	O
	Integrated Dry Contact (CN-EXT)	O

Outdoor Unit

Category	Functions	AHUW166T3 [HU161HA U33]
Reliability	Defrost / Deicing	O
	High pressure switch	O
	Low pressure switch	X
	Phase protection	X
	Restart delay (3-minutes)	O
	Self diagnosis	O
	Soft start	X
	Test function	X
Convenience	Wiring Error Check	X
	Peak Control	X
	Mode Lock	X
	Low noise operation	X
	Forced Cooling Operation (Outdoor Unit)	X
Network function	Network solution(LGAP)	O

Accessory Compatibility List

Indoor unit

Category		Product	Remark	AH166T3 [HN1610H NK3]
Dry Contact	Simple Contact	PDRYCB000	Simple Dry Contact	O
	Communication Type	PDRYCB400	2 Points Dry Contact (For Setback)	X
		PDRYCB300	For 3rd party Thermostat	O
		PDRYCB500	Dry Contact for Modbus	X
ETC	Remote temperature sensor	PQRSTA0	-	O
	Zone Controller	ABZCA	-	X
	Group control wire	PZCWRCG3	0.25 m	X
	2-Remo Control Wire	PZCWRC2	0.25 m	X
	Extension wire	PZCWRC1	10 m	O
	Wi-Fi controller *	PWFMDD200	-	O
	Meter Interface Module ***	PENKTH000	Interface between IDU and Meter	O
Accessory Kit for AWHP	DHW tanks (Single coil)	OSHW-200F	200L	O
		OSHW-300F	300L	O
		OSHW-500F	500L	O
	DHW tanks (Double coil)	OSHW-300FD	300L	O
		PHLTA	For Split	O
	DHW tank kit	PHLTB	For Monobloc	X
		PHRSTA0	included in PHLTA kit	O
	Mixing valve	OSHA-MV	3/4" DN20	O
		OSHA-MV1	1" DN20	O
	3way valve	OSHA-3V	-	O
	Solar thermal kit	PHLLA	-	O
	2nd Circuit Thermistor	PRSTAT5K10	-	O
	Backup heater	HA031M E1 / HA061M E1	For Monobloc	X
	Wired remote controller	PREMTW101	Including 2-remo cable	O

Note

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> Doc.Library> Product > Control\(BECON\)\)](http://partner.lge.com/global : Home> Doc.Library> Product > Control(BECON))))
- *** Meter interface cannot be connected at the same time with 3rd-party controller.

Outdoor unit

Category		Product	Remark	AHUW166T3 [HU161HA U33]
Central Controller	AC EZ	PQCSZ250S0	AC EZ	X
	AC Ez Touch	PACEZA000	AC Ez Touch	O
	AC Smart	PACS4B000	AC Smart IV	O
		PACS5A000	AC Smart 5	O
	ACP	PACP4B000	ACP IV	O
		PACP5A000	ACP 5	O
	AC Manager **	PACM4B000	AC Manager IV	O
		PACM5A000	AC Manager 5	O
Gateway	IDU PI485	PHNFP14A0	Connected with Indoor Units	X
	ODU PI485	PSNFP14A0	Connected with Indoor Units	X
		PMNFP14A1	PI 485 Gateway	O
	BACnet	PQNFB17C0	ACP BACnet	O
	Lonworks	PLNWKB000	ACP Lonworks	O
ETC	PDI	PPWRDB000	PDI Standard	O
		PQNUD1S40	PDI Premium	O
	ACS IO Module	PEXPMB000	-	X

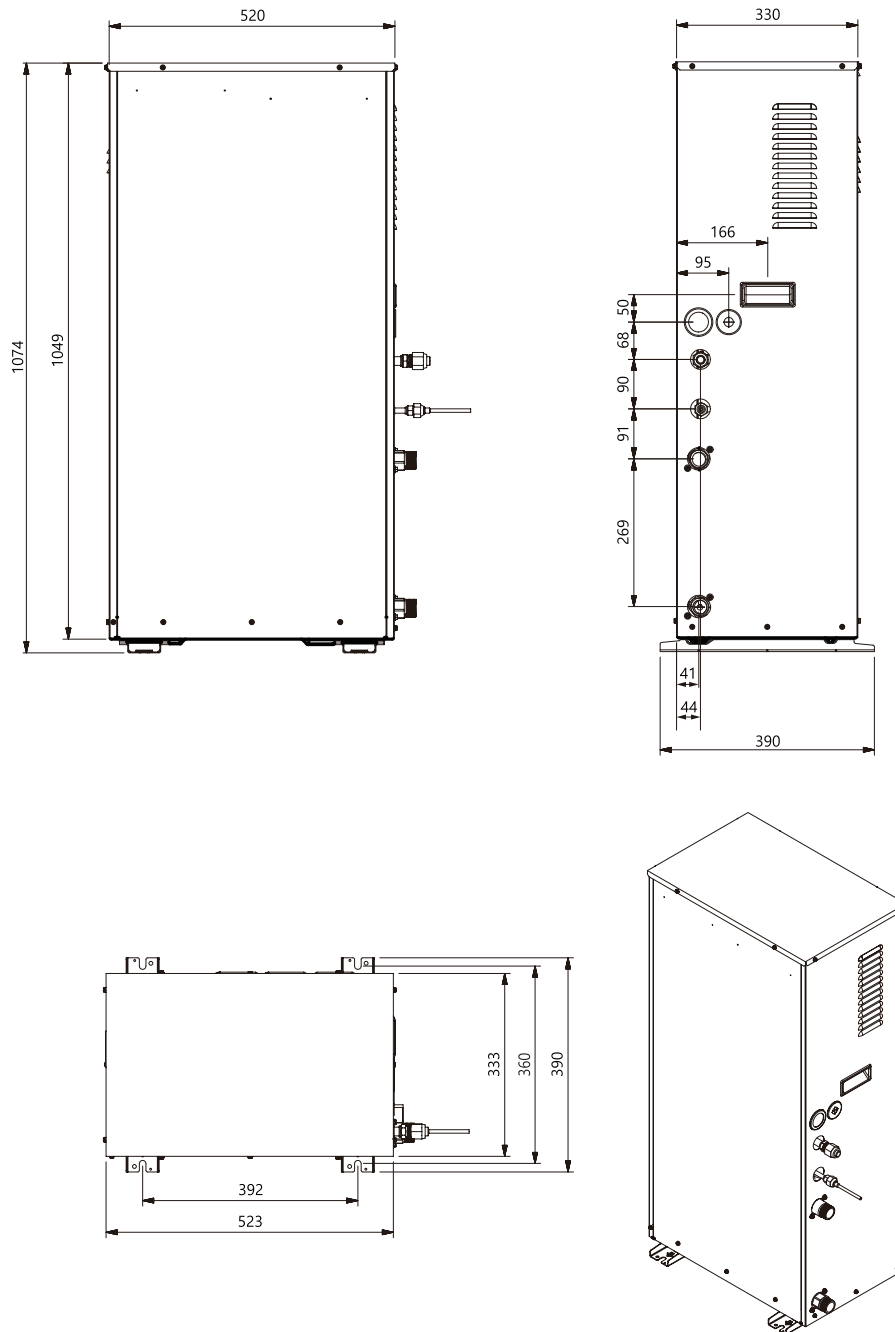
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4. Components

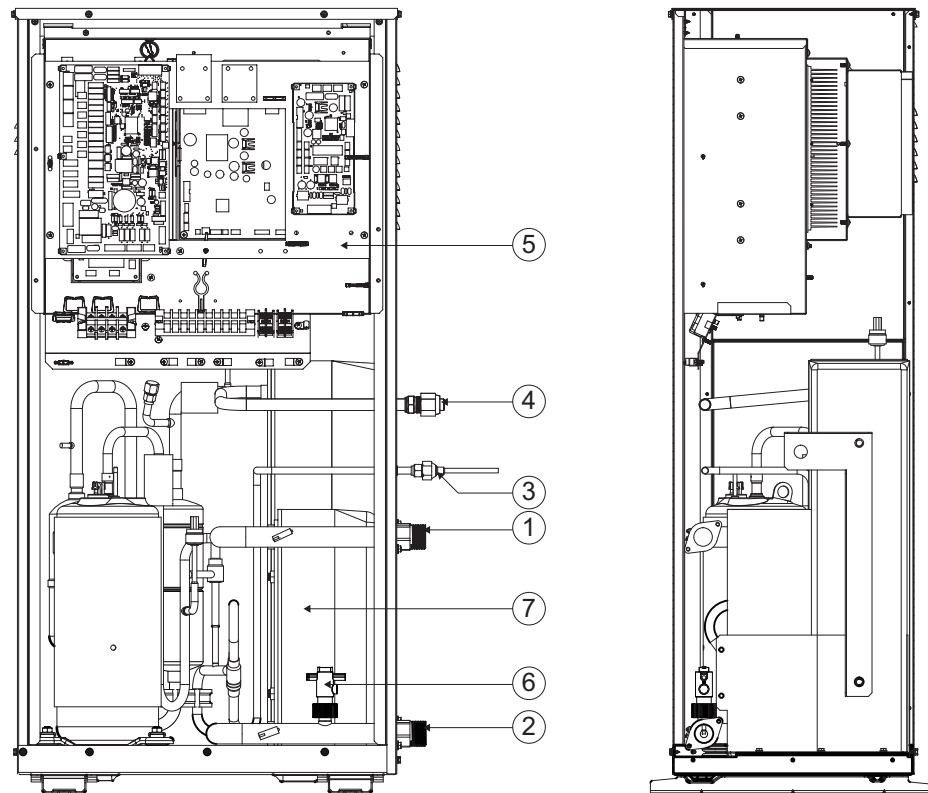
Indoor unit : External

(unit : mm)



Indoor unit : Internal

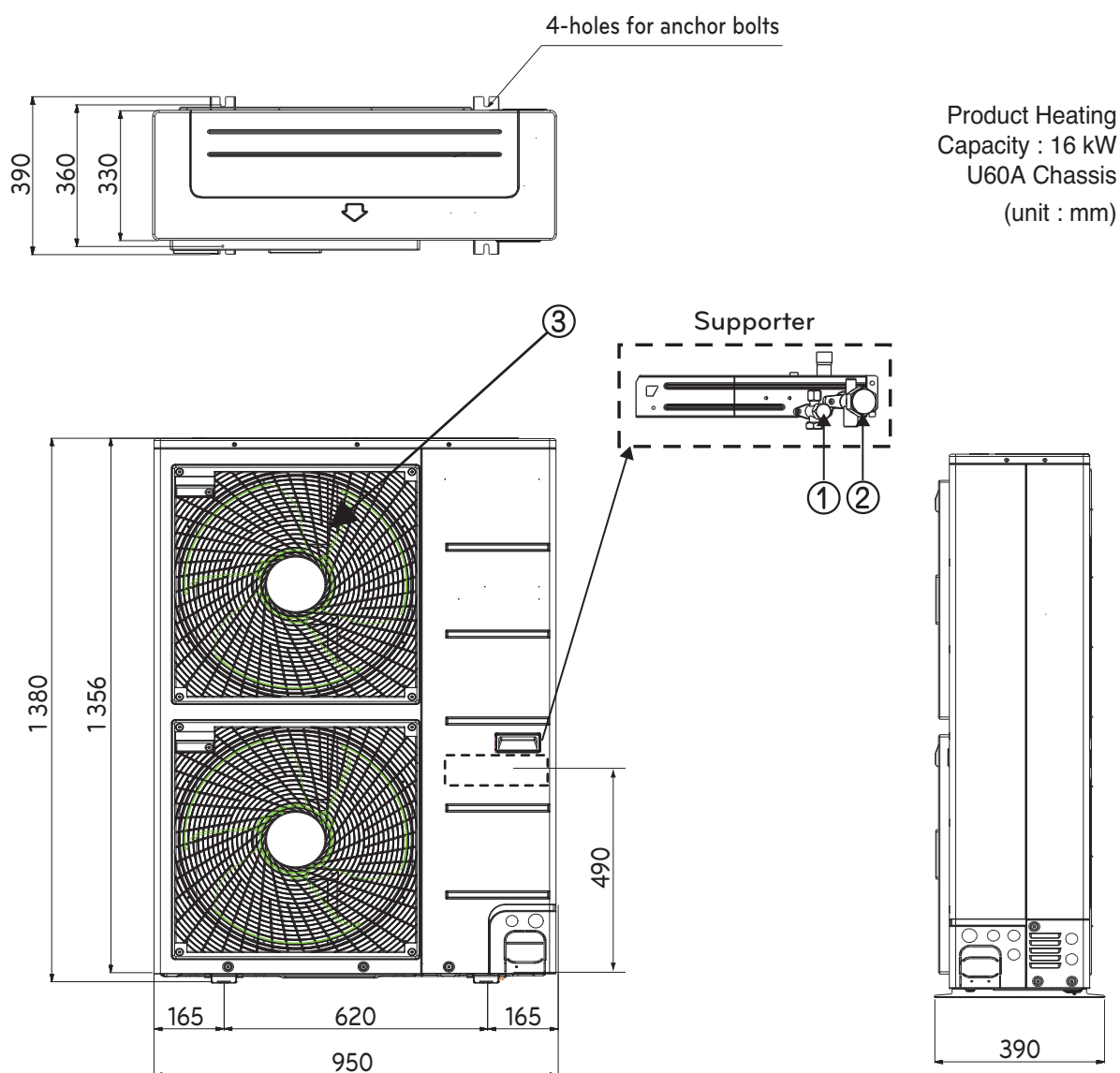
(unit : mm)



Description

No	Name	Remark
1	Leaving Water Pipe	Male PT 1 inch
2	Entering Water Pipe	Male PT 1 inch
3	Refrigerant Pipe	Ø 9.52 mm
4	Refrigerant Pipe	Ø 15.88 mm
5	Control Box	PCB and terminal blocks
6	Flow Switch	Minimum operation range at 15 LPM.
7	Plate Heat Exchanger	Heat exchange between refrigerant and water

Outdoor unit : External

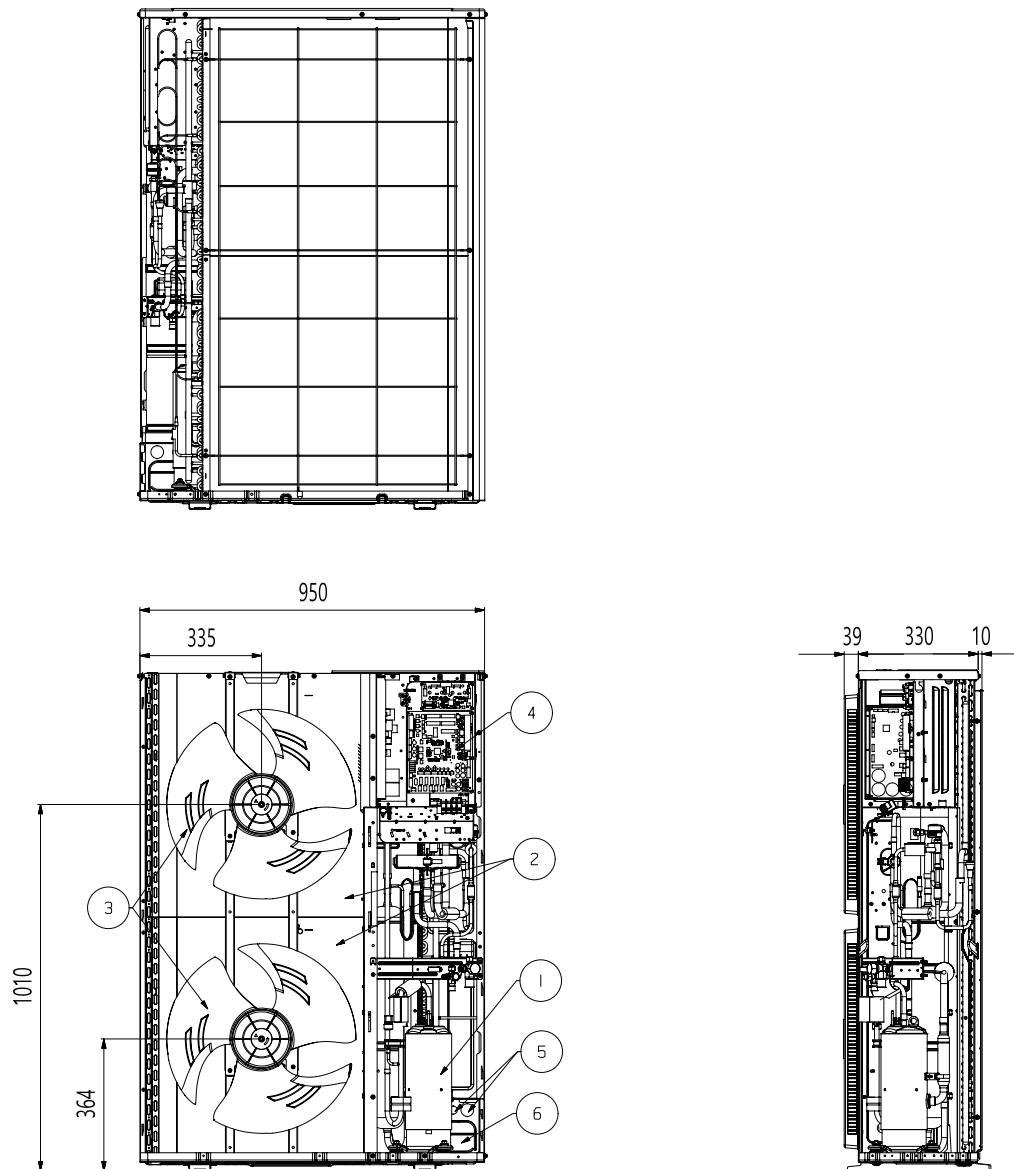


Description

No	Name
1	Liquid-side Service Valve
2	Gas-side Service Valve
3	Air discharge Grill

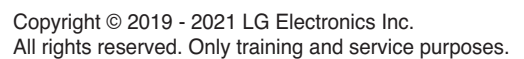
Outdoor unit : Internal

(unit : mm)



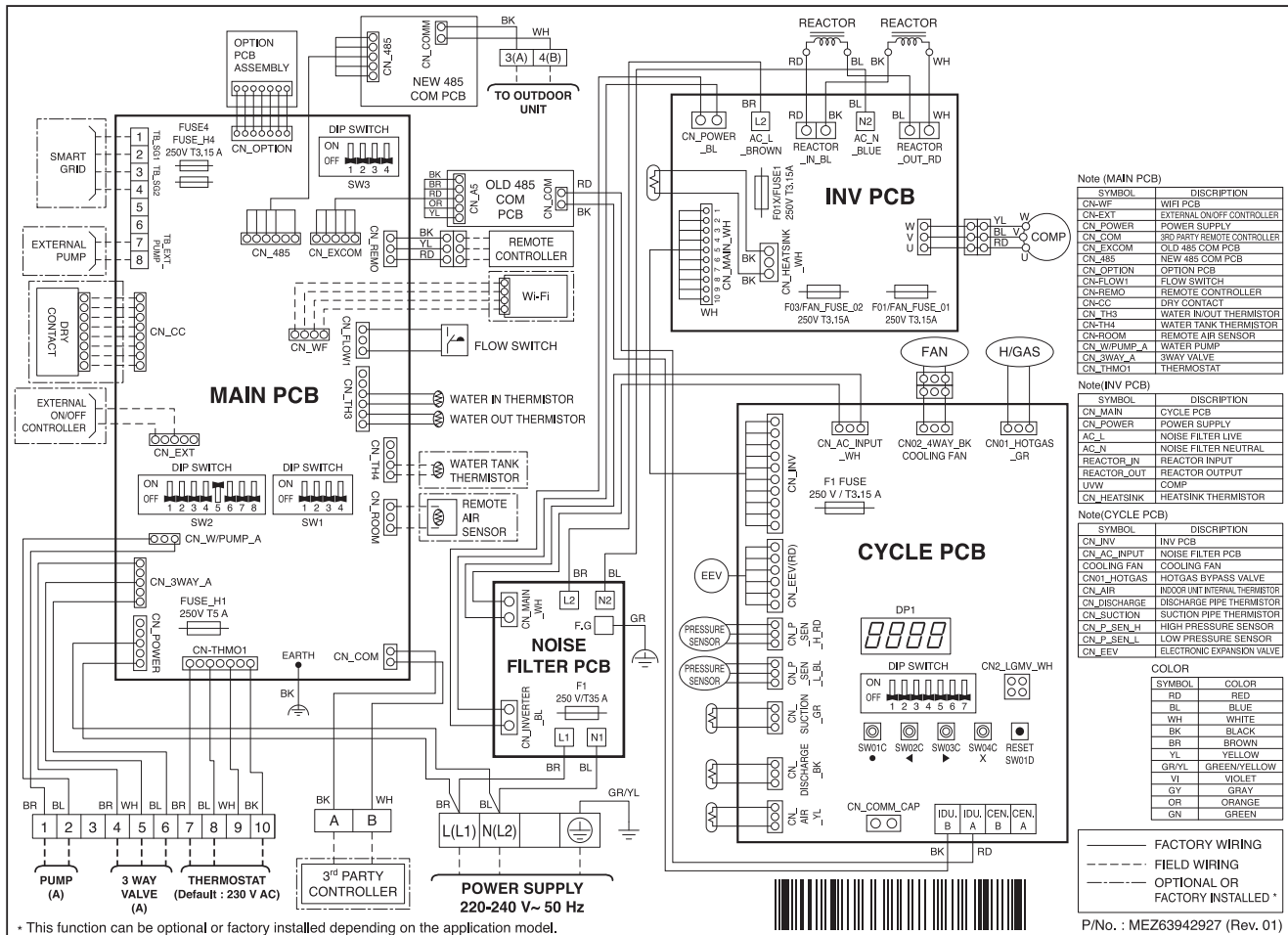
Description

No	Name	Remark
1	Compressor	Increase pressure of the refrigerant.
2	Fin tube Heat Exchanger	Heat exchange between refrigerant and air.
3	Fan	Circulating the air.
4	Control Box	PCB and terminal blocks.
5	Power and Communication Cable Hole	Connect to terminal blocks.
6	Pipe Routing Hole	The pipes can be connectable in three directions.

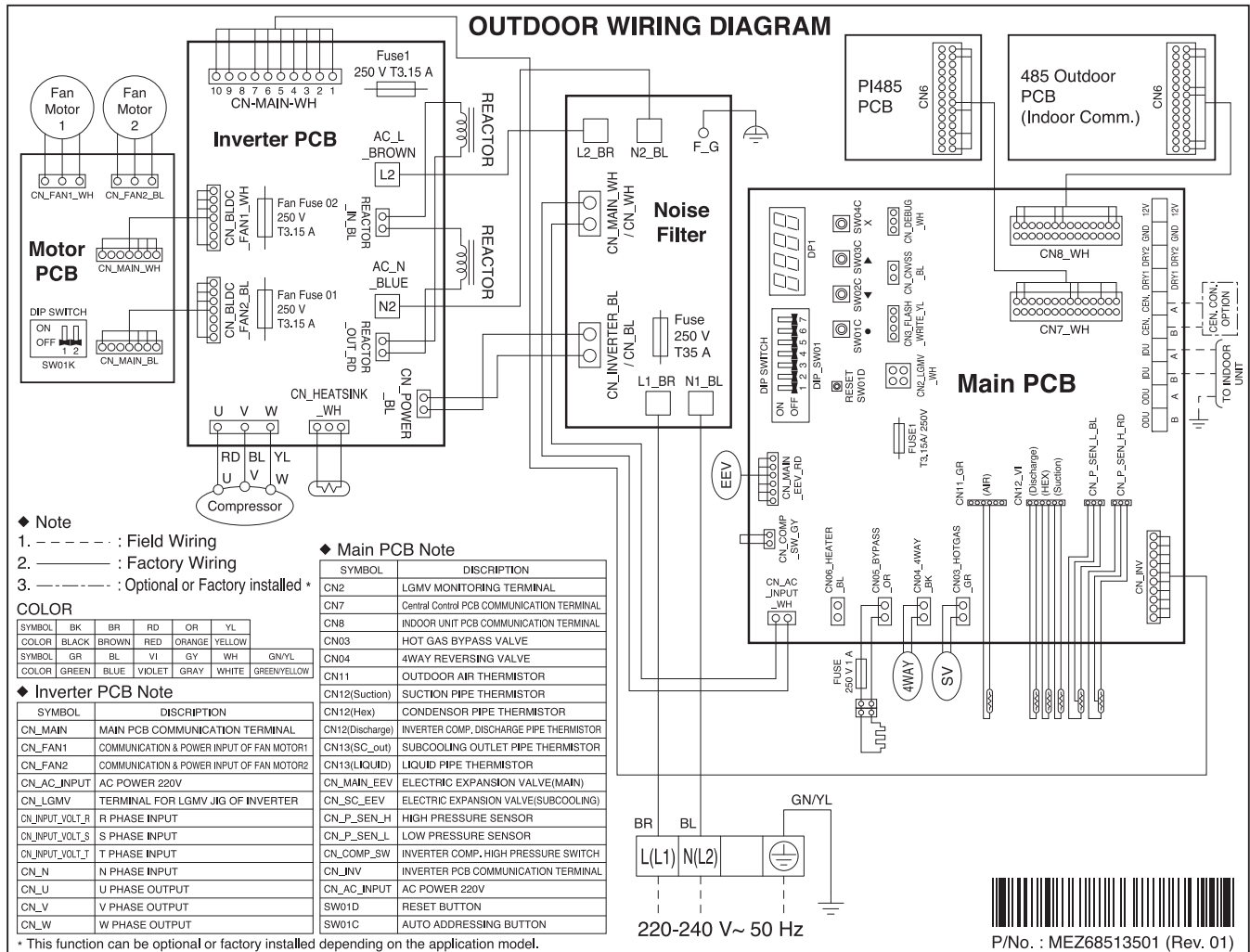


7. Wiring Diagrams

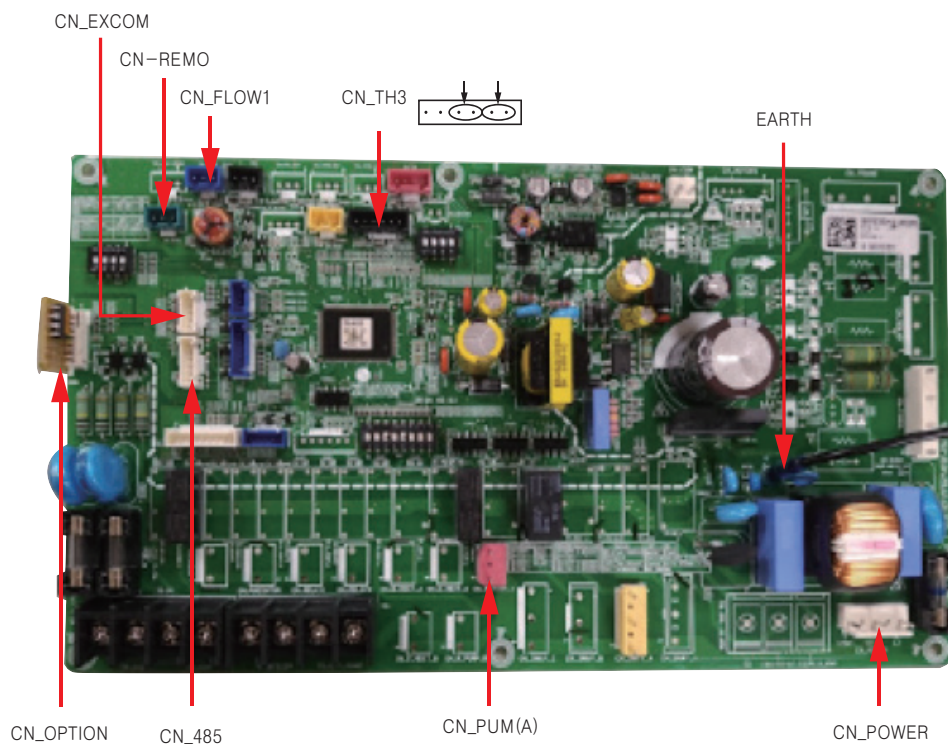
Indoor Unit



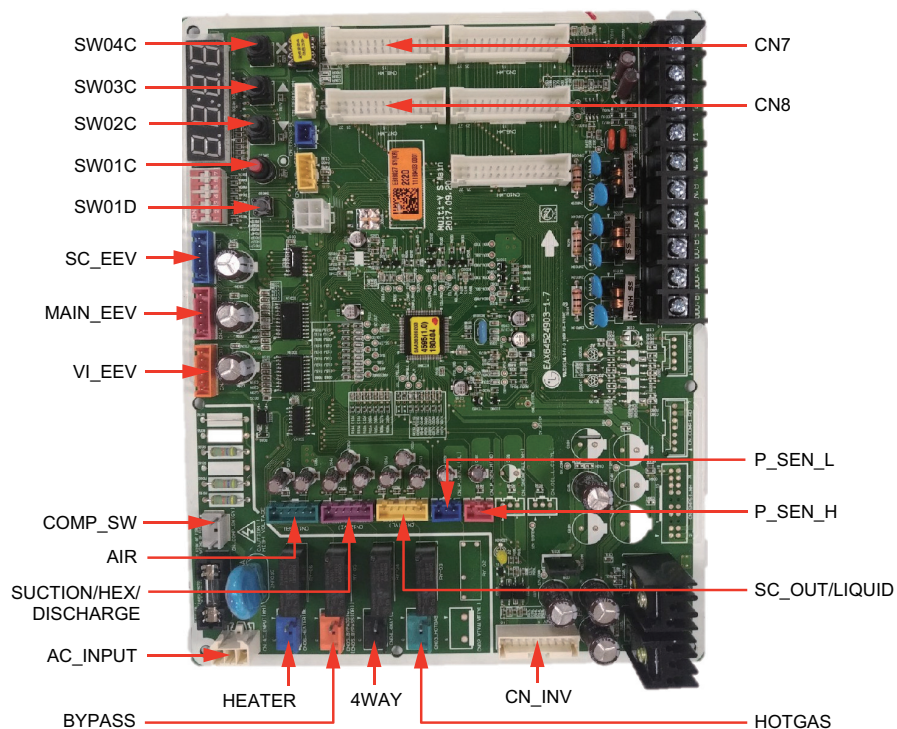
Outdoor Unit(Including field wiring)



Indoor PCB



Outdoor PCB

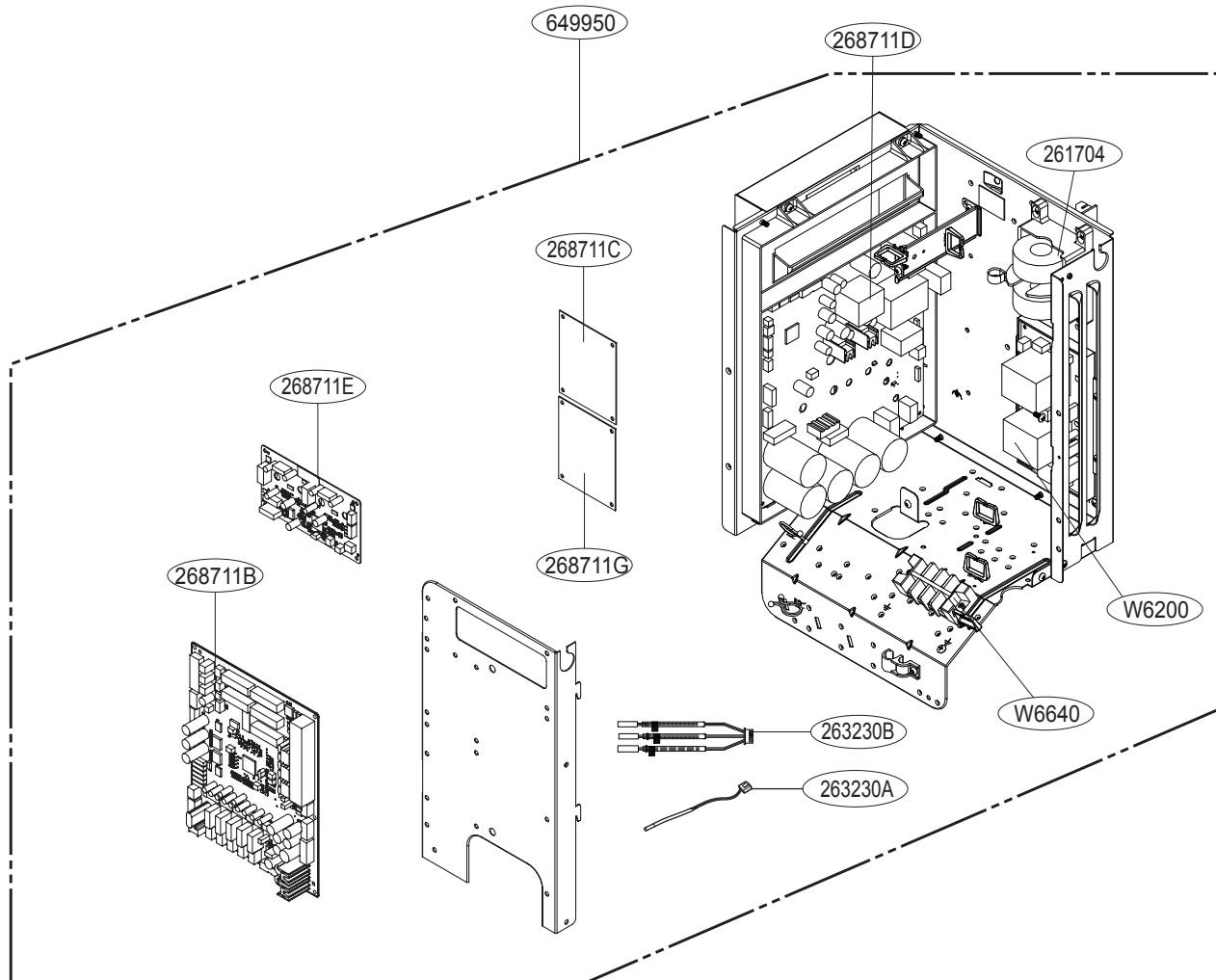


Indoor Unit



Description	P/No.	Location No.	Q'ty	Remark
Nut,Customized	FAD33370603	W1NZZ	3	For Base Pan and Comp. Assembly.
Bolt,Common	3A00255J	W1BHC	1	For Solenoid and Valve,Solenoid Assembly.

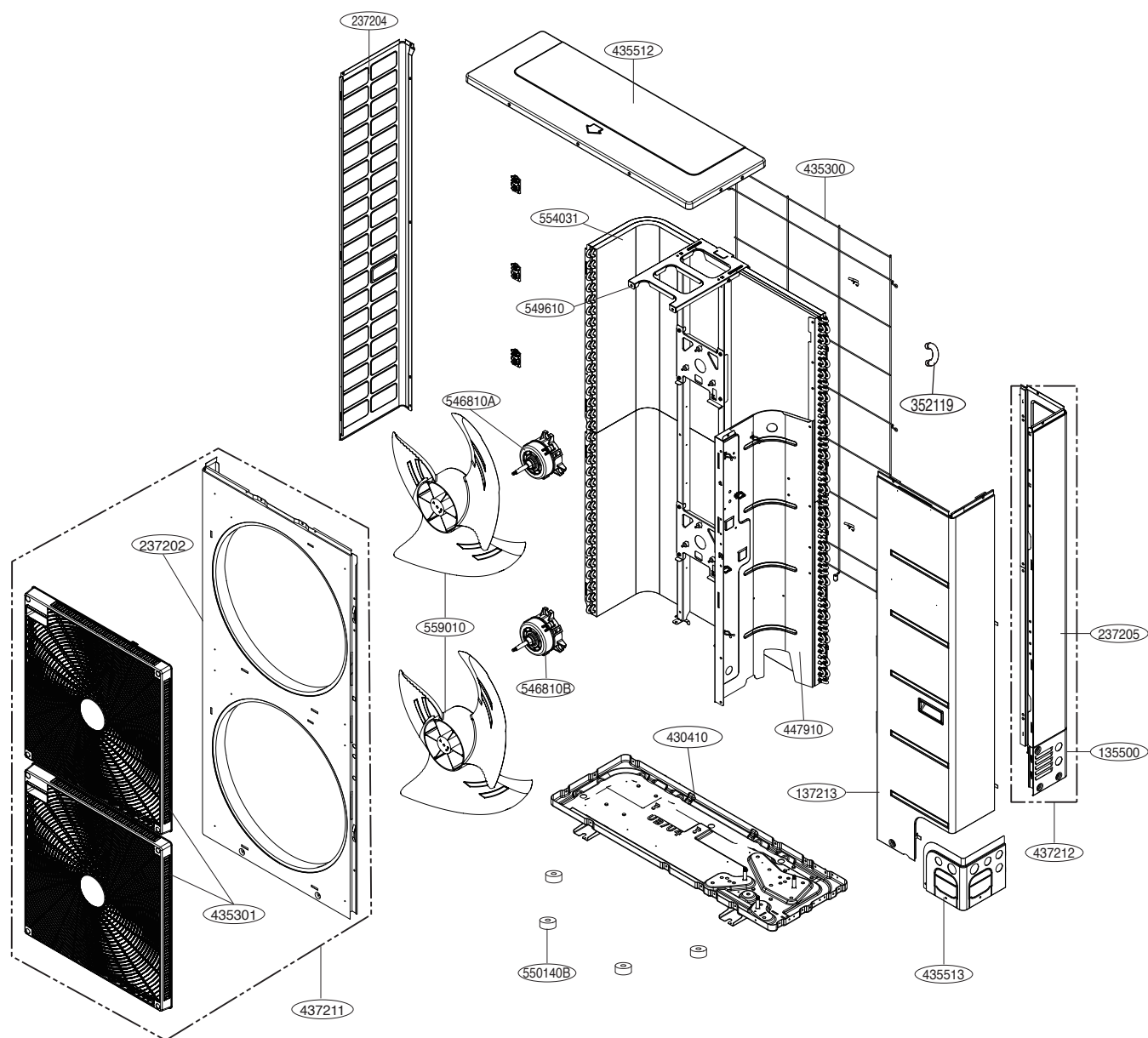
Outdoor Unit



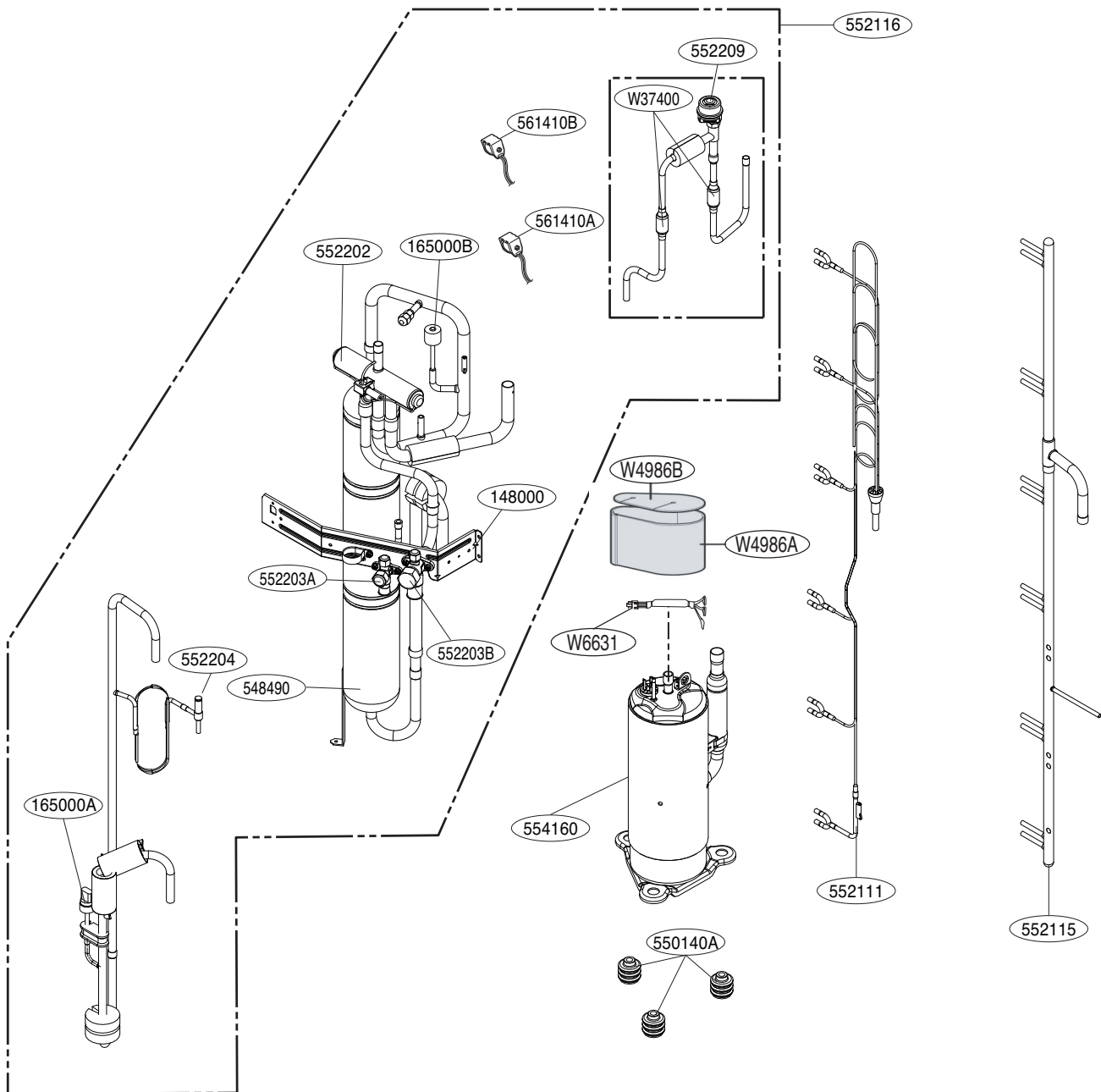
Thermistor Assembly,NTC

Location No.	Thermistor Description	Housing Color
263230A	Outdoor air temperature sensor	Green
263230B	Compressor In, Out, Outdoor-HEX, temperature sensor	Violet

Outdoor Unit



Outdoor Unit





P/NO : MFL67212914