THERMA V™

Air-to-Water Heat Pump
High Temp R410A /R134a (50Hz)
5BPU0-01E (Replace 5BPU0-01D)

LG TOTAL HVAC SOLUTION PROVIDER

ENGINEERING PRODUCT DATA BOOK

LG
Life's Good

P/No. : MFL66101107

THERMA V™

CONTENTS

THERMA V™

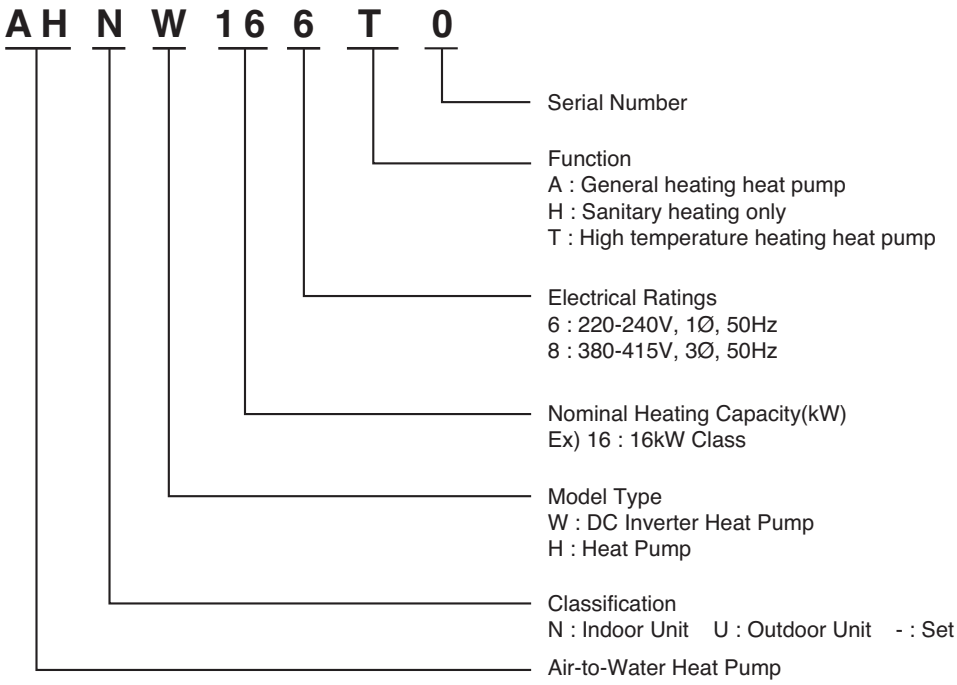
Part 1. Indoor Unit

1. Features

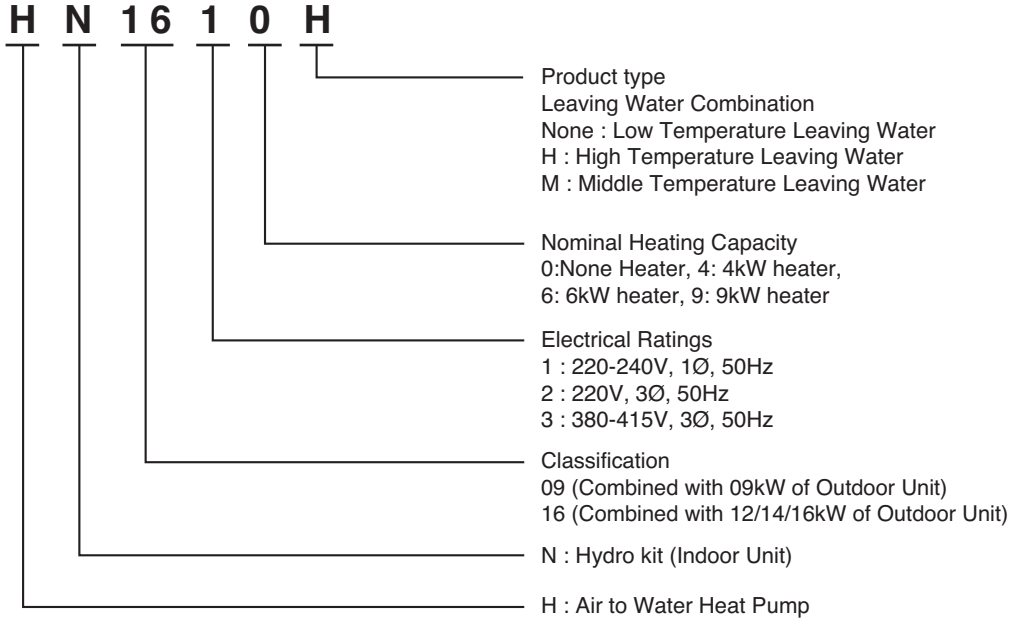
- Privіding eco-friendly heating
- High energy efficiency
- Easy installation
- Space heating and sanitary water heating

2. Nomenclature

2.1 Global Model Name



2.2 Europe Model Name



3. Specifications

Type				AHWP (High Temp)
Model				AHNW166T0
Power Supply			V, Ø, Hz	220-240, 1, 50
Input (Indoor Unit)	Cooling	Rated	kW	-
	Heating	Rated	kW	6.13
Casing				Painted Steel Plate
Dimensions	Body	W x H x D	mm	520 x 1,080 x 330
			inch	20-15/32 x 42-17/32 x 13
Net Weight	Body		kg (lbs)	94.0(207.2)
Heat Exchanger	Refrigerant to Water	Type	-	Blazed Plate HEX
		Quantity	EA	1
		Number of Plate	EA	76
		Rated Water Flow	*l* / min	23.0
		Minimum Water Flow	*l* / min	15.0 ± 1.5
		Maximum Pressure Resistance	kgf/ cm^2	45
	Refrigerant to Refrigerant	Type	-	Blazed Plate HEX
		Quantity	EA	1
		Number of Plate	EA	50
Compressor	Type		-	Twin Rotary inverter
	Model		Model x No.	EPT525DBA x 1
	Motor Type		-	BLDC
	Motor Output	Rated	W x No.	4,000 x 1
	Oil Type		-	FVC68D(PVE)
	Charged oil volume		cc	1,300
Refrigerant	Refrigerant to Water	Refrigerant name	-	R134a
		Precharged Amount	kg (lbs)	2.3(5.1)
		TCO2eq	-	4.8
		GWP	-	2,078.5
		Control	-	Electronic Expansion Valve
Temperature Control			-	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			-	Foamed polystrene
Safety Device			-	Fuse
Piping Connections	Water Side	Entering Side	mm(inch)	Male PT 25 (1)
		Leaving Side	mm(inch)	Male PT 25 (1)
	Refrigerant Side	Liquid Side	mm(inch)	9.52(3/8)
		Gas Side	mm(inch)	15.88(5/8)
Drain Piping Connection			mm(inch)	Male PT 25 (1)
Sound Pressure Level	Cooling		dB(A)	-
	Heating		dB(A)	43
Sound Power Level	Cooling		dB(A)	-
Power Supply Cable			No. x mm^2	2C x CV4.0
Communication cable			No. x mm^2	2C x VCTF-SB 1.0~1.5

Note :

1. Capacities are based on the following conditions:
   - Heating Temperature : Outdoor 7°C(44.6°F) DB / 6°C(42.8°F) WB
     Water Inlet 55°C(131°F) / Outlet 65°C(149°F)
   - Piping Length : Interconnected Pipe Length = 7.5m
   - Difference Limit of Elevation (Outdoor ~ Indoor Unit) is Zero.
2. Wiring cable size must comply with the applicable local and national codes.
3. Due to our policy of innovation some specifications may be changed without notification.
4. Sound Level Values are measured at Anechoic chamber.
   Therefore, these values can be increased owing to ambient conditions during operation.

4. Drawing

4.1 Internal

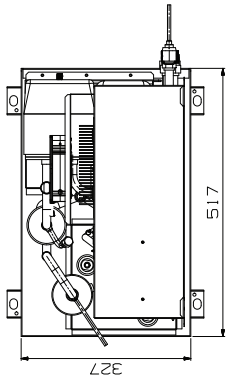
AWHP
AHNW166T0 (HN1610H)

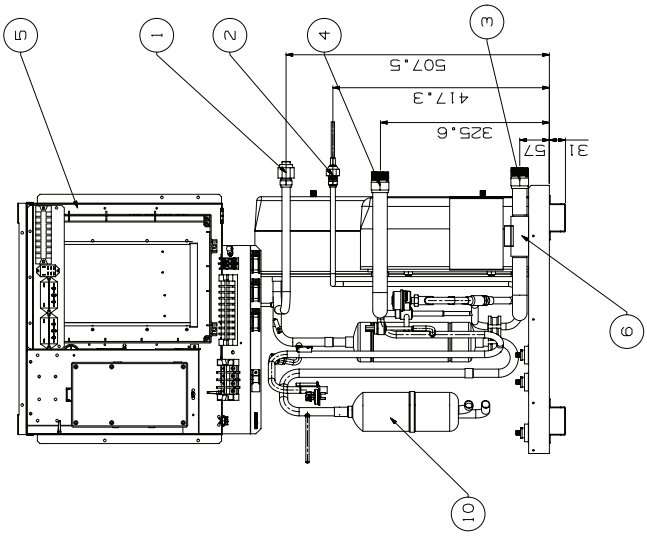
No	Name	Remarks
1	Refrigerant Pipe	Ø15.88mm
2	Refrigerant Pipe	Ø9.52mm
3	Entering Water Pipe	Male PT 1 inch
4	Leaving Water Pipe	Male PT 1 inch
5	Control Box	PCB and terminal blocks
6	Flow Swich	Minimum operation range at 23LPM
7	Plate heat Exchanger	Heat exchanger between refrigerant and water
8	Plate heat Exchanger	Heat exchanger between refrigerant and refrigerant
9	Compressor	EPT525DBA
10	Accumulator	Complex P76.2 T2.0

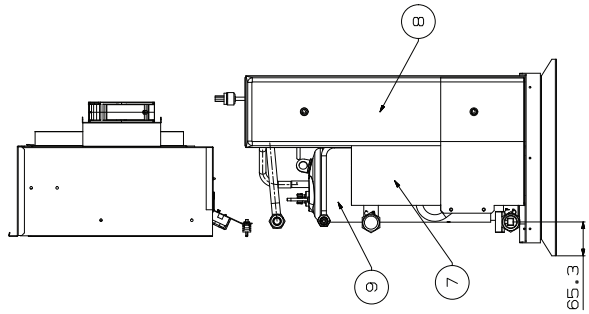
Notice : Item 8 and Item 8' will be applied exclusively

Note

1. Unit should be installed in compliance with the installation manual in the product box.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials to be supplied on the site must comply with the local regulations or international codes.
4. Electrical characteristics chapter should be considered for electrical work and design. Especially the capacity of power cable and circuit breaker for outdoor unit should be more than that of electrical characteristics chapter.







[Unit:mm]

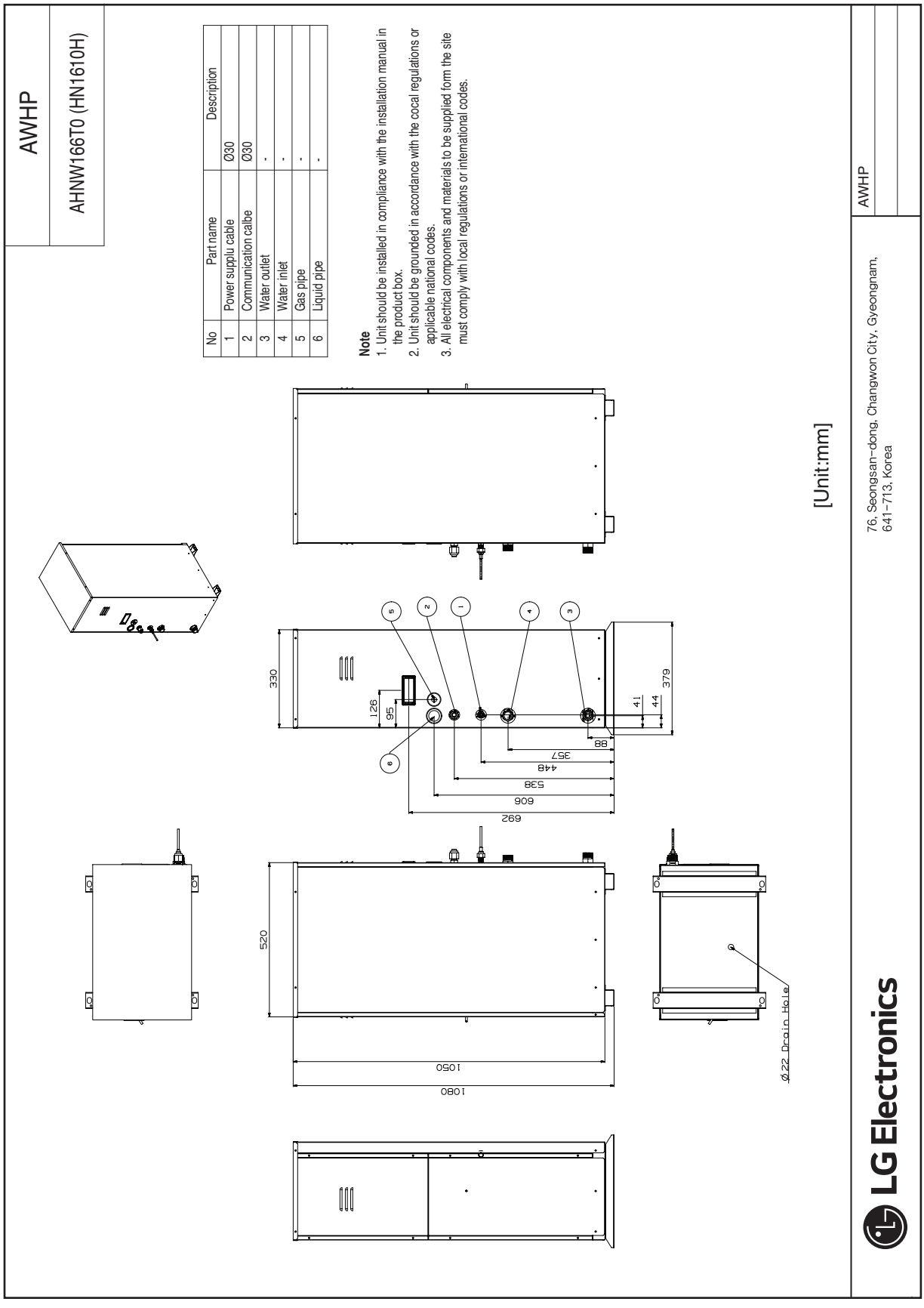
LG Electronics

76, Seongsan-dong, Changwon City, Gyeongnam, 641-713, Korea

AWHP

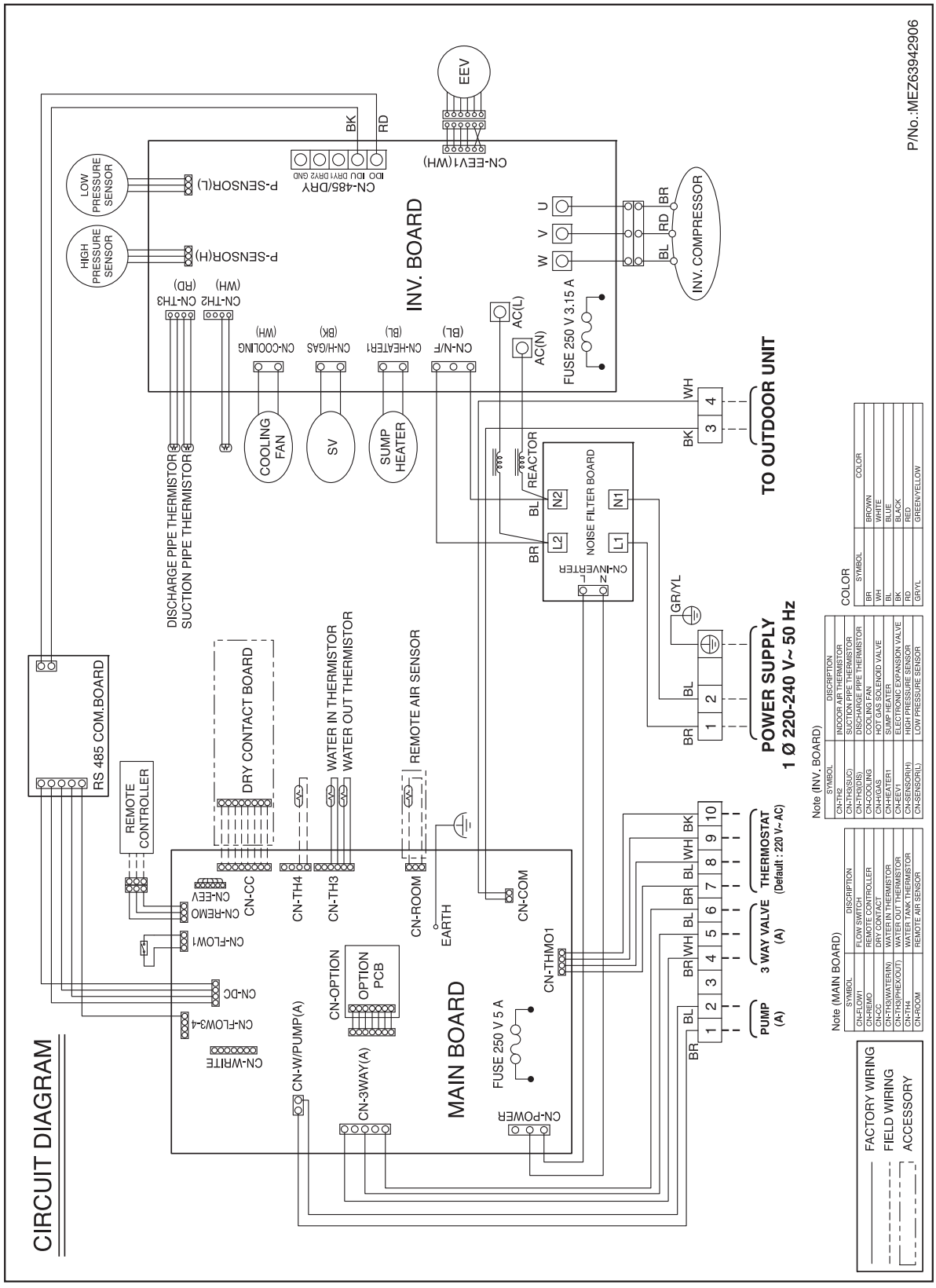
4. Drawing

4.2 External



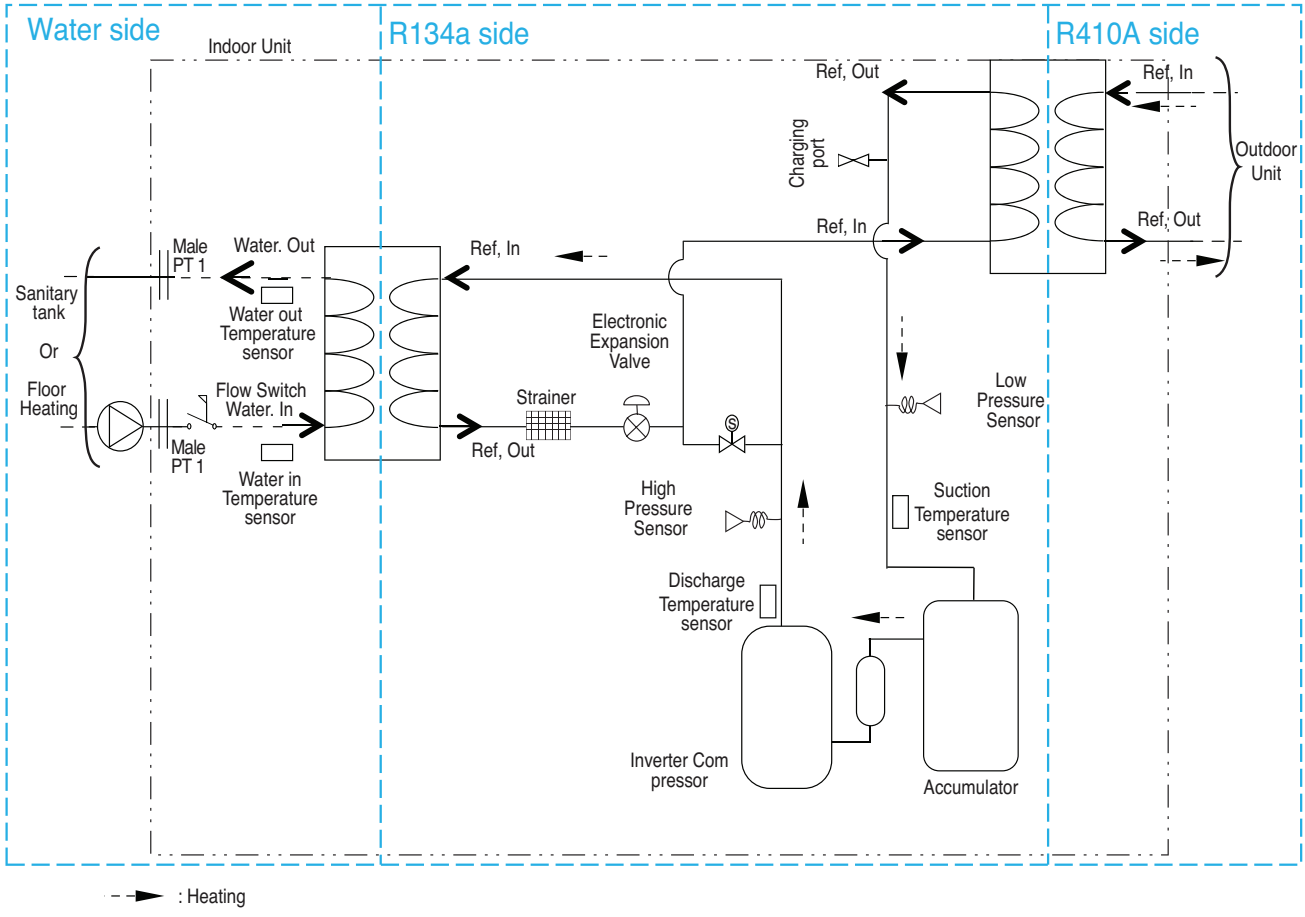
5. Wiring Diagram (External Connection)

Model : AHNW166T0 (HN1610H)



6. Piping Diagram

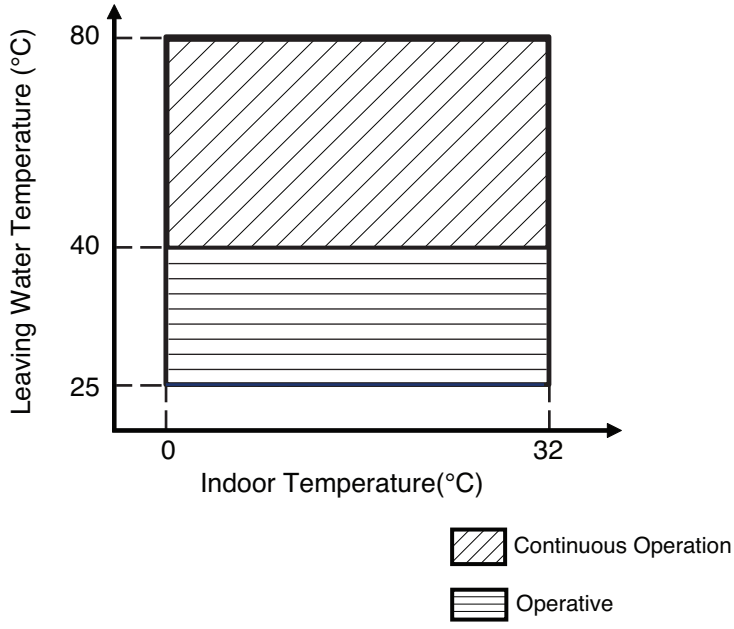
Model : AHNW166T0 (HN1610H)



7. Operation Range

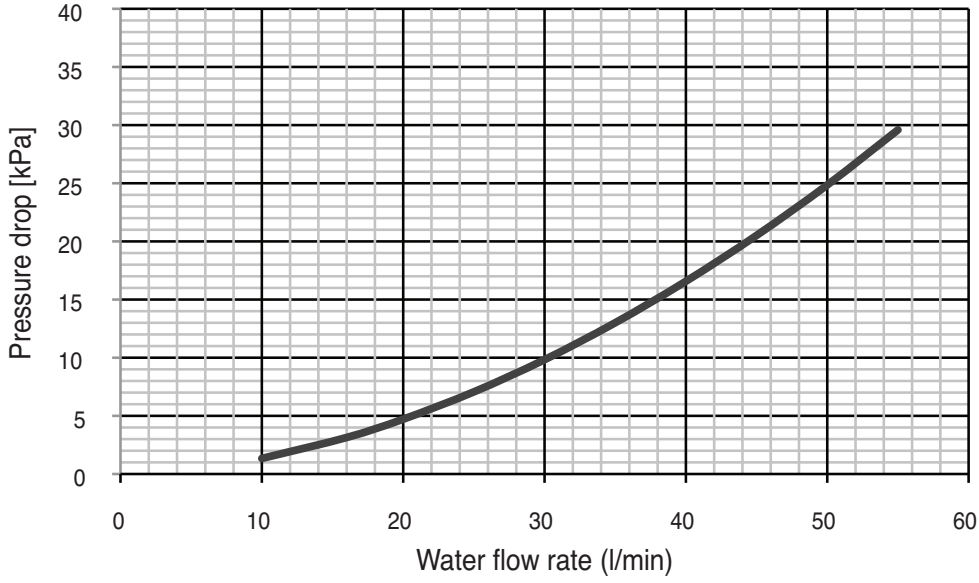
Model : AHNW166T0 (HN1610H)

Heating



8. Head loss by Water flow

Model : AHNW166T0 (HN1610H)



Wiring of Main Power Supply and Equipment Capacity

1. Separate power supply lines for the indoor units from outdoor unit..
2. Bear in mind ambient conditions (ambient temperature,direct sunlight, rain water,etc.) when proceeding with the wiring and connections.
3. 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%.
4. Specific wiring requirements should adhere to the wiring regulations of the region.
5. Power supply cords of parts of appliances for outdoor use should not be lighter than polychloroprene sheathed flexible cord.
6. Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.

⚠ CAUTION

- **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.**

AHNW166T0

Model	Type	Hz	Volts	Voltage Range	Power Supply		Comp.		IFM	
					MCA	MFA	MSC	RLA	kW	FLA
AHNW166T0	K3	50	220-240	Max:264 Min:198	20	25	-	15.9	0.025	0.12

Note :

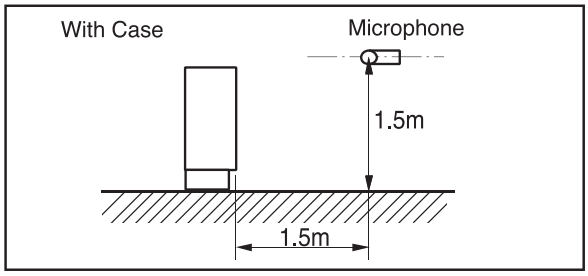
1. Voltage range
   Voltage supplied to the unit terminals should be within the minimum and maximum range
2. Maximum allowable voltage unbalance betweenphase is 2 %
3. FLA is measured as running current of fan motor(s) at rated test condition.
4. Select wire spec. based on the larger value of MCA.
5. MSC means the Max. current during the starting ofcompressor.
6. Recommended circuit breaker is ELCB
   (Earth Leakage Circuit Breaker)
7. MFA is used to select the circuit breaker and ground fault circuit interrupter (earth leakage circuit breaker)

Symbols:

MCA : Minimum Circuit Amperes (A)
MSC : Maximum Starting Current(A)
RLA : Rated Load Amperes (A)
OFM : Outdoor Fan Motor
IFM : Indoor Fan Motor
kW : Fan Motor rated output (kW)
FLA : Full Load Amperes (A)

10. Noise Criteria

Overall

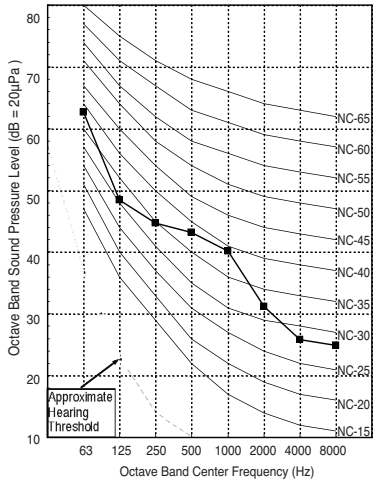


Notes:

- Sound measured at 1.5m away from the unit.
- Data is valid at free field condition
- Data is valid at nominal operating condition
- Reference acoustic pressure 0dB = 20μPa
- Sound level will vary depending on a range of factors such as the construction(acoustic absorption coefficient) of particular room in which the equipment is installed.

Model	Sound Pressure Level (dB(A))
AHNW166T0 (HN1610H)	43

AHNW166T0 (HN1610H)



THERMA V™

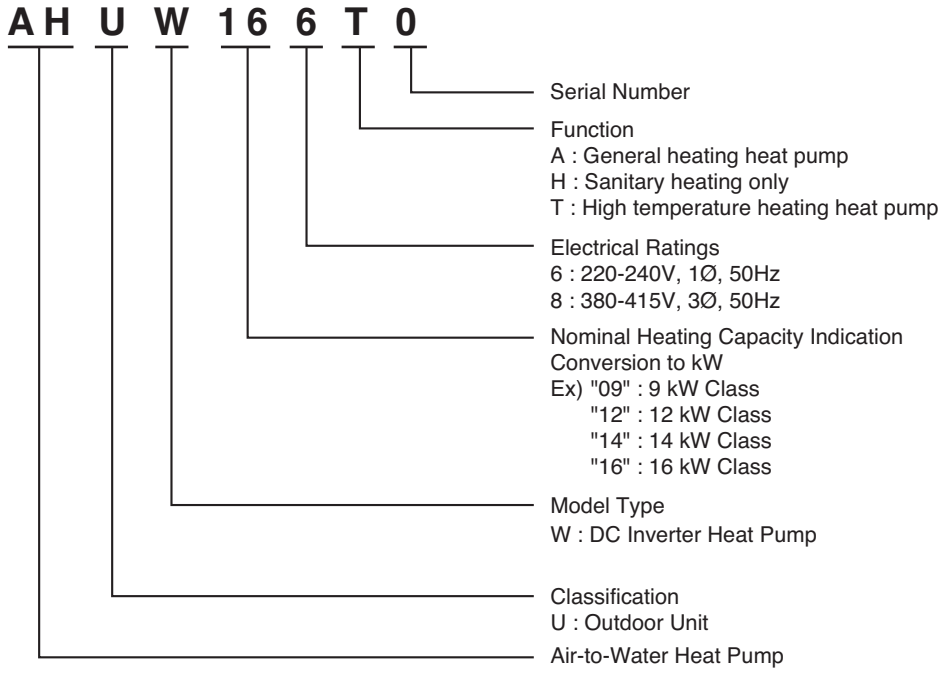
Part 2. Outdoor Unit

1. Features

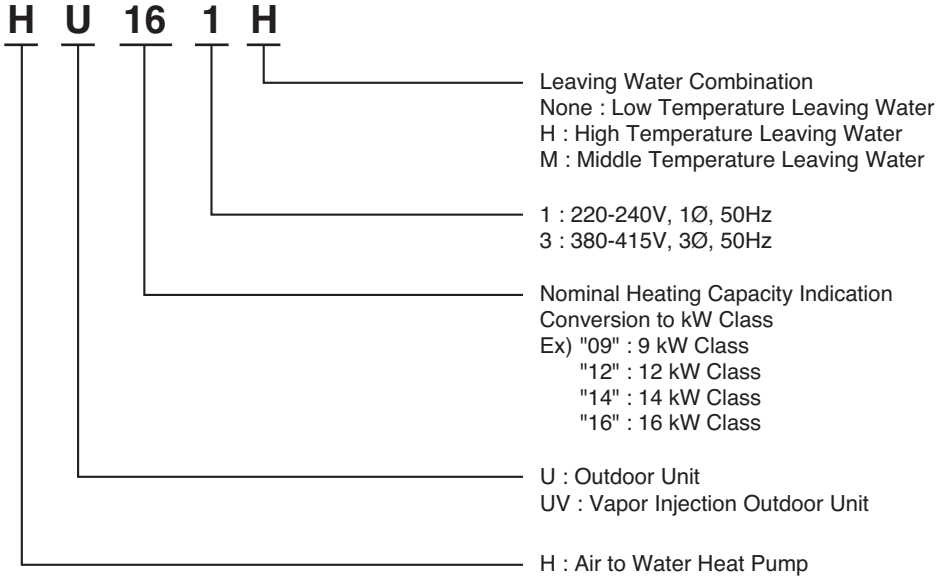
- Privіding eco-friendly heating
- High energy efficiency
- Easy installation
- Space heating and sanitary water heating

2. Nomenclature

2.1 Global Model Name



2.2 Europe Model Name



3. Specifications

Nominal Capacity and Nominal Input				AHUW166T0
Capacity [1]	Cooling	Rated	kW	-
		Rated	Btu/h	-
	Heating	Rated	kW	16.0
		Rated	Btu/h	54,600
Power Input [1]	Cooling	Rated	kW	-
	Heating	Rated	kW	6.13
EER	Cooling		W/W	-
COP	Heating		W/W	2.61

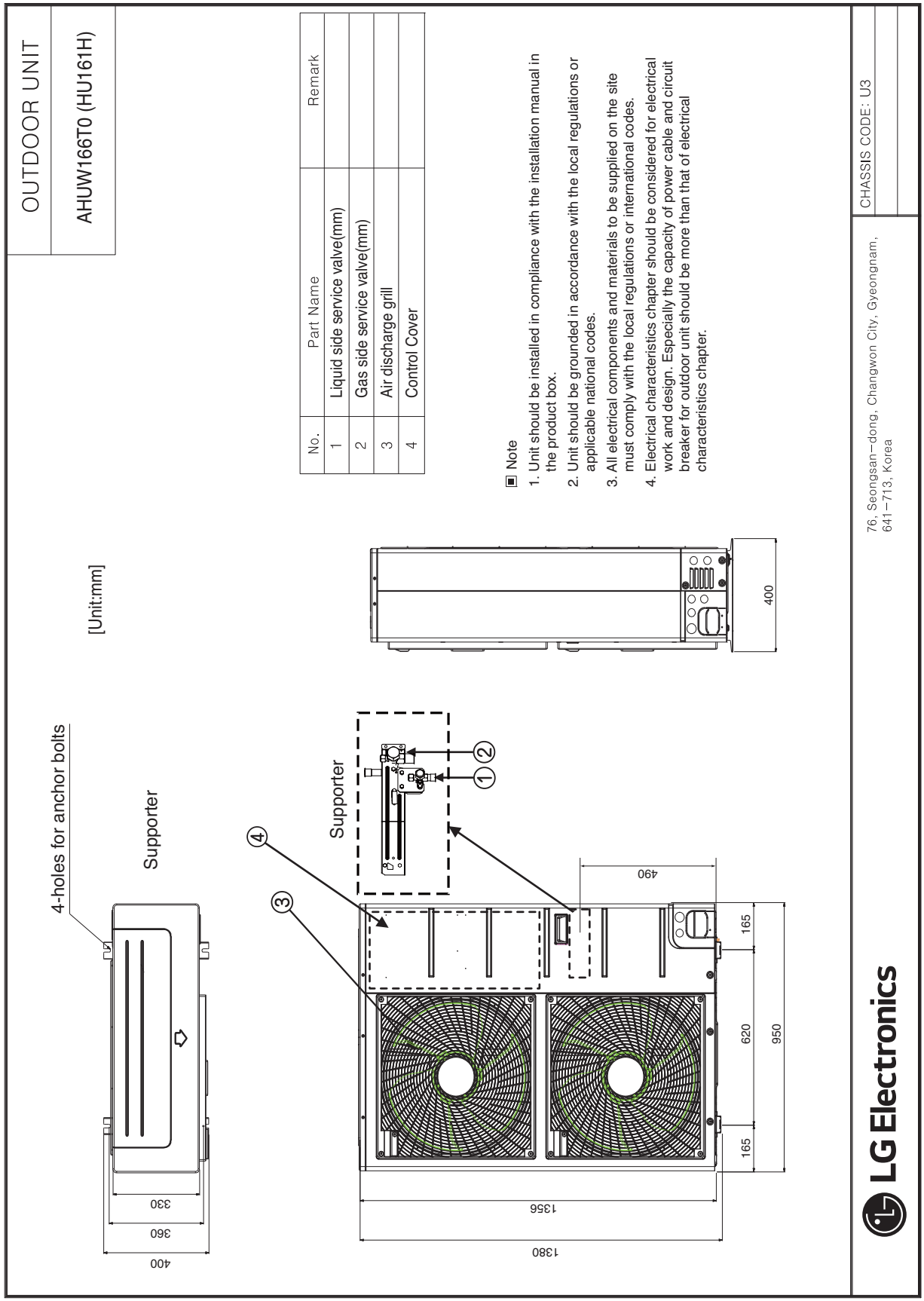
Outdoor Units				AHUW166T0
Operation Range (Outdoor Temperature)	Cooling	Min. ~ Max.	°C(°F) DB	-
	Heating	Min. ~ Max.	°C(°F) DB	-15(5)~35(95)
	Domestic Hot Water	Min. ~ Max.	°C(°F)	25(77)~80(176)
Compressor	Type		-	Hermetic Motor Compressor
	Model		Model x No.	GPT442MBA x 1
	Motor Type		-	BLDC
	Motor Output	Rated	W x No.	4,000 x 1
Refrigerant	Type		-	R410A
	Precharged Amount		kg (lbs)	3.5(7.7)
	TCO2eq		-	7.3
	GWP		-	2,078.5
	Chargeless-Pipe Length		m(ft)	10.0(32.8)
	Additional Charging Volume		g/m(oz/ft)	60(0.645)
	Control		-	Electronic Expansion Valve
Refrigerant Oil	Type		-	FVC68D(PVE)
	Charged Volume		cc x No.	1,300
Heat Exchanger	Quantity		EA	2
	Specifications	Row	EA	2
		Column	EA	32
		Fins per Inch	EA	14
Fan	Type		-	Propeller
	Air Flow Rate	Rated	m^3/min x No.	110
		Rated	ft^3/min x No.	3,884
Fan Motor	Type		-	BLDC
	Output		W x No.	124 x 2
Sound Pressure Level	Cooling	Rated	dB(A)	-
	Heating	Rated	dB(A)	53
Sound Power Level	Cooling	Rated	dB(A)	-
Piping Connections	Liquid	Type	-	Flare
		Outer Dia.	mm(inch)	9.52(3/8)
	Gas	Type	-	Flare
		Outer Dia.	mm(inch)	15.88(5/8)
Piping Length		Min.	m(ft)	5(16.4)
		Standard	m(ft)	7.5(24.6)
		Max.	m(ft)	50(164)
Piping Level Difference	Outdoor Unit ~ Indoor Unit	Max.	m(ft)	30(98.4)
Dimensions	Body	W x H x D	mm	950 X 1,380 X 330
		W x H x D	inch	37-13/32 X 54-11/32 X 13
Weight	Body		kg (lbs)	105.0(231.4)

Electrical Specification			AHUW166T0
Power Supply		V, Ø, Hz	220-240, 1, 50
Maximum Running Current	Cooling	A	-
	Heating	A	19.0
Wiring Connections	Power Supply Cable (Included Earth)	No. x mm^2	3C x H05RN-F 6.0

Note :

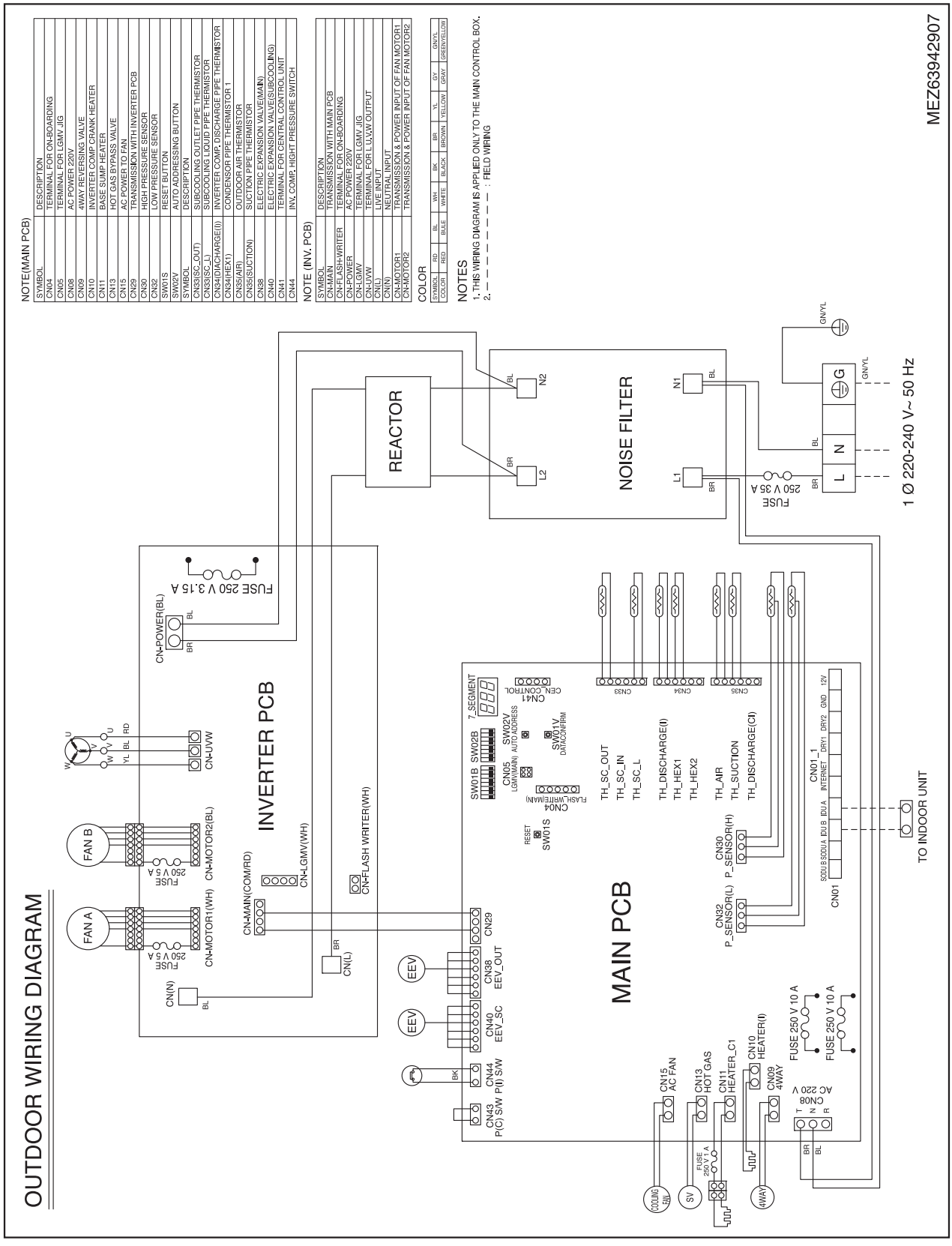
1. Capacities and power inputs are based on the following conditions:
   - Heating Temperature : Outdoor 7°C(44.6°F) DB / 6°C(42.8°F) WB
     Water Inlet 55°C(131°F) / Outlet 65°C(149°F)
   - Piping Length : Interconnected Pipe Length = 7.5m
   - Difference Limit of Elevation (Outdoor ~ Indoor Unit) is Zero.
2. Wiring cable size must comply with the applicable local and national codes.
3. Due to our policy of innovation some specifications may be changed without notification.
4. Sound Level Values are measured at Anechoic chamber. Therefore, these values can be increased owing to ambient conditions during operation.
5. This product contains Fluorinated Greenhouse Gases.

4. Drawing


OUTDOOR UNIT
AHUW166T0 (HU161H)
[Unit:mm]
No. | Part Name | Remark
1 | Liquid side service valve(mm) |
2 | Gas side service valve(mm) |
3 | Air discharge grill |
4 | Control Cover |
Note
1. Unit should be installed in compliance with the installation manual in the product box.
2. Unit should be grounded in accordance with the local regulations or applicable national codes.
3. All electrical components and materials to be supplied on the site must comply with the local regulations or international codes.
4. Electrical characteristics chapter should be considered for electrical work and design. Especially the capacity of power cable and circuit breaker for outdoor unit should be more than that of electrical characteristics chapter.
4-holes for anchor bolts
Supporter
Supporter
400
360
330
1380
1356
490
165
620
165
950
400
LG Electronics
76, Seongsan-dong, Changwon City, Gyeongnam, 641-713, Korea
CHASSIS CODE: U3

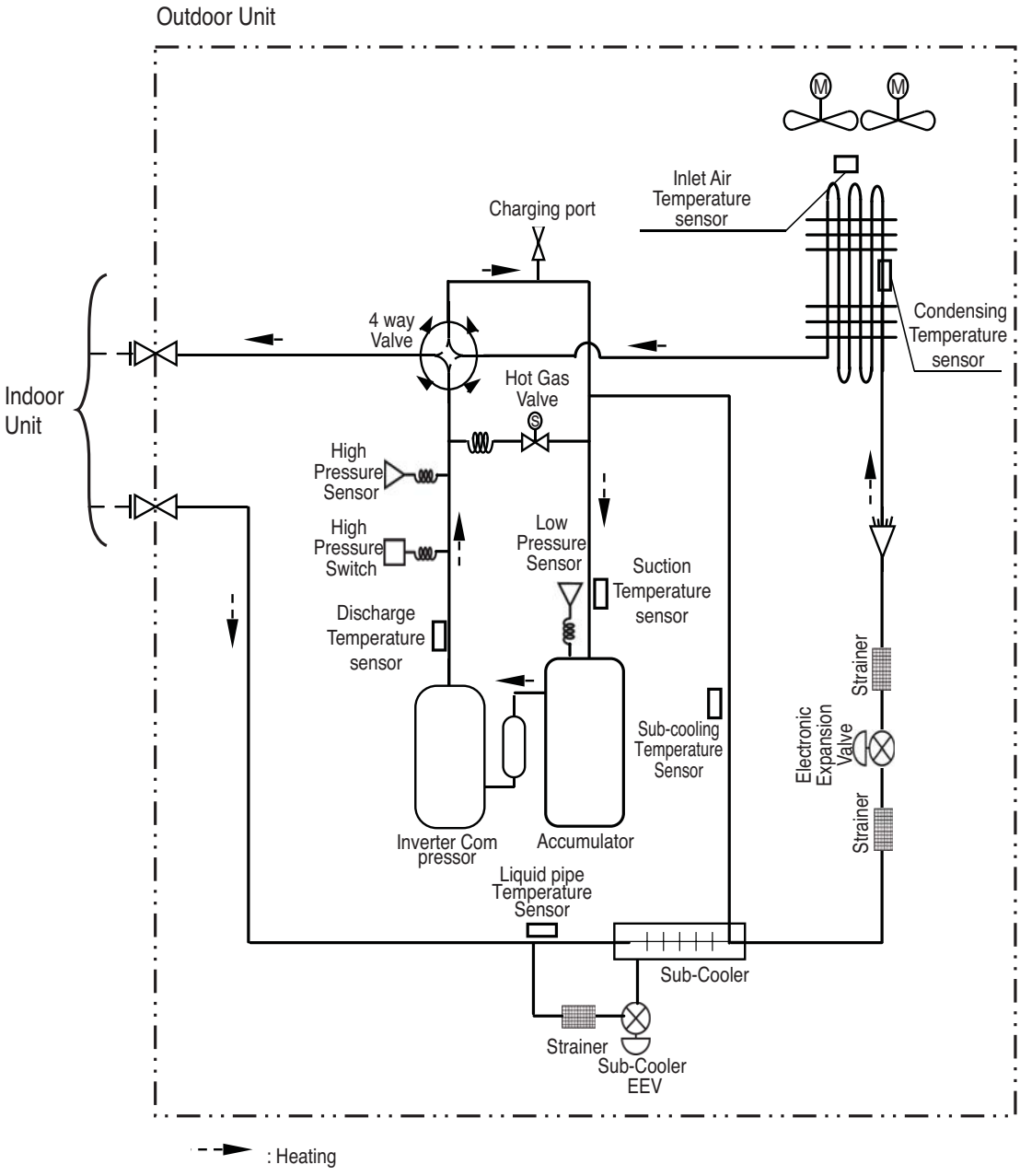
5. Wiring Diagram

Model : AHUW166T0 (HU161H)



6. Piping Diagram

Model : AHUW166T0 (HU161H)



7. Performance Data

7.1 Heating Operation

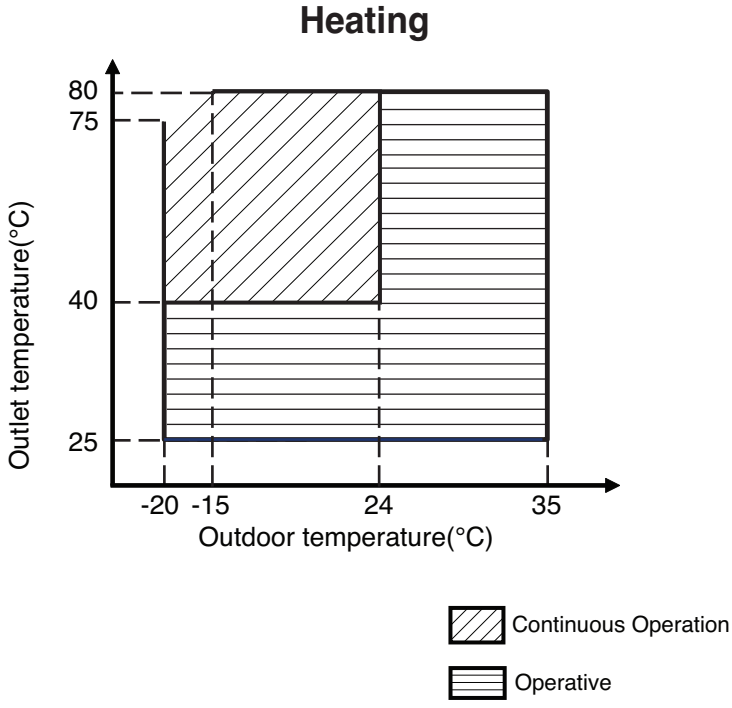
EWT(℃)/LWT(℃) / ODT(°C DB)	40/45		45/55		55/65		65/75		70/80	
	TC (kW)	PI (kW)	TC (kW)	PI (kW)	TC (kW)	PI (kW)	TC (kW)	PI (kW)	TC (kW)	PI (kW)
-15	16.3	6.75	15.5	7.05	14.2	7.51	13.1	7.54	12.9	7.54
-7	16.5	5.83	16.0	6.36	15.1	7.20	14.0	7.50	13.7	7.38
-2	16.8	5.91	16.6	6.33	15.7	6.96	14.3	7.05	13.4	6.84
*2	11.9	4.19	13.3	5.19	14.6	6.81	14.2	7.24	13.3	6.80
7	16.8	5.06	16.6	5.42	16.0	6.13	16.2	7.00	14.6	6.70
12	16.3	4.63	16.5	5.12	16.4	5.98	16.1	6.72	15.0	6.55
15	16.3	4.50	16.4	4.98	16.4	5.85	16.1	6.59	15.1	6.53
20	16.4	4.22	16.4	4.59	16.1	5.34	16.0	6.12	15.3	6.22
24	16.8	4.14	16.5	4.35	16.1	4.91	16.3	5.89	15.7	6.26

ODT = Outdoor temperature
EWT = Entering water temperature
LWT = Leaving water temperature
TC: Total Capacity
* : Total Capacity (Averaged value including defrost effect, kW)
PI = Power Input (Outdoor unit + Indoor unit)

Water mass flow rate varies to meet declared EWT, LWT and capacity.
Relative humidity is 85% for ODT > 0°C.

8. Operation Range

Model : AHUW166T0 (HU161H)



9. Electric Characteristics

Wiring of Main Power Supply and Equipment Capacity

1. Separate power supply lines for the indoor units from outdoor unit..
2. Bear in mind ambient conditions (ambient temperature,direct sunlight, rain water,etc.) when proceeding with the wiring and connections.
3. 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%.
4. Specific wiring requirements should adhere to the wiring regulations of the region.
5. Power supply cords of parts of appliances for outdoor use should not be lighter than polychloroprene sheathed flexible cord.
6. Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.

⚠ CAUTION

- **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.**

AHUW166T0

Model	Type	Hz	Volts	Voltage Range	Power Supply		COMP		OFM	
					MCA	MFA	MSC	RLA	kW	FLA
AHUW166T0	U3	50	220-240	Max:264 Min:198	19	25	-	14.4	0.25	0.95

Note :

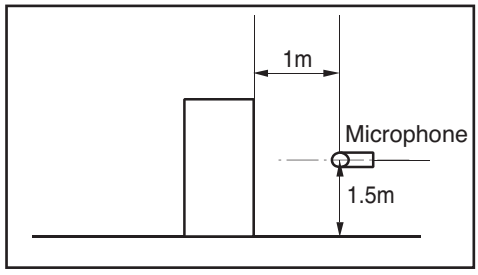
1. Voltage range
   Voltage supplied to the unit terminals should be within the minimum and maximum range
2. Maximum allowable voltage unbalance between-phase is 2 %
3. FLA is measured as running current of fan motor(s) at rated test condition.
4. Select wire spec. based on the larger value of MCA.
5. MSC means the Max. current during the starting of-compressor.
6. Recommended circuit breaker is ELCB
   (Earth Leakage Circuit Breaker)
7. MFA is used to select the circuit breaker and ground fault circuit interrupter (earth leakage circuit breaker)

Symbols:

MCA : Minimum Circuit Amperes (A)
MSC : Maximum Starting Current(A)
RLA : Rated Load Amperes (A)
OFM : Outdoor Fan Motor
IFM : Indoor Fan Motor
kW : Fan Motor rated output (kW)
FLA : Full Load Amperes (A)

10. Noise Criteria

Overall



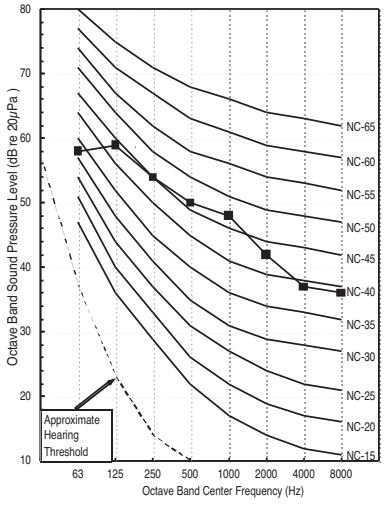
Notes:
- Sound measured at 1m away with 1.5m height.
- Data is valid at free field condition.
- Data is valid at nominal operation condition.
- Reference acoustic pressure acoustic 0dB = 20μPa.
- Sound level will vary depending on a range of factors such as the construction(acoustic absorption coefficient) of particular room in which the equipment is installed.
- The operating conditions are assumed to be standard.

Model	1Ø, 220-240V, 50Hz
	Heating
AHUW166T0 (HU161H)	53

Sound pressure level

■ Heating(1Ø)

AHUW166T0 (HU161H)



Approximated SPL at specific distance : SPL[dB] = A + 20xLog(B/C)
where A[dB] : SPL at 1m distance
B[m] : 1m
C[m] : specific distance

THERMA V™

Part 3. Accessories

1. Dry Contact (PQDSA)
2. Remote Temperature Sensor (PQRSTA0)
3. Sanitary Water Tank Kit(PHLTA)
4. Solar Thermal Kit(PHLLA / PHLLB)

1. Dry Contact (PQDSA)

1.1 Overview

LG Dry Contact is a solution for automatic control of air conditioning system at the owner's behest.
In simple words, it's a switch which can be used to turn the unit On/Off after getting the signal from external sources like key-in lock, door or window switch etc specially used in Hotel rooms.

It's a small PCB that either can be fit inside the control box of Indoor unit or can be outside the unit in a plastic case if there is no sufficient space inside the Indoor unit.

Apart from simple installation, all connecting wires & an additional small PDB for looping is provided along with Dry Contact.

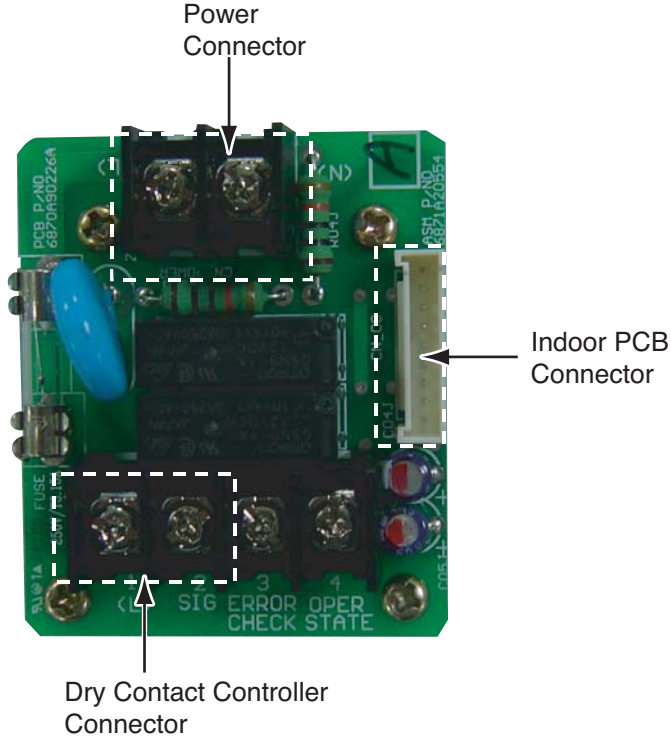
Dry Contact can be used in two ways.

1. It can be used to actually turn On/Off the system on receiving the signal from the source.
   In this case, user doesn't need to use remote controller anymore to turn On/Off the system.
   However all the further settings like temperature, fan speed, mode etc can be done through remote controller only.
2. Other way is almost similar as above but in this case, after getting the On signal from the external source, user has to turn On the system from remote controller only. Dry contact just activates the system.
   However system can be turned Off directly from the external source. So only On mode is different here.

So in both of above conditions, system can't be operated without signal from external source which prevents unnecessary use of system & facilitates its operation only when its required.

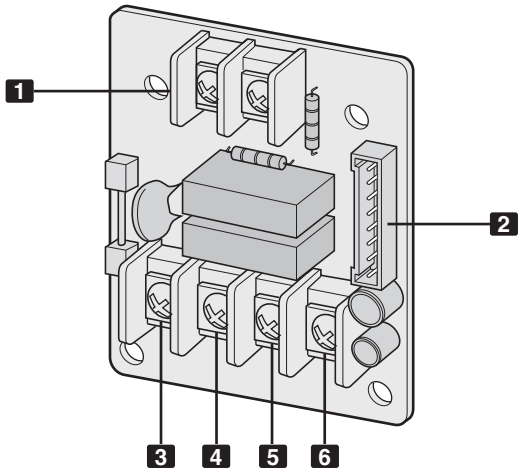
These settings can be selected from the remote controller whose details have been explained in the later part of this manual

So depending upon the requirement, Dry Contact offers a variety of applications to suit the customer's requirement in the best possible way.



1. Dry Contact (PQDSA)

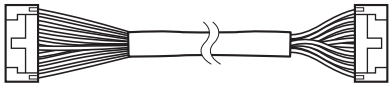
1.2 Part Description

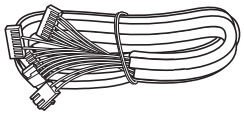


1. CN-POWER : AC 220V Connector
2. CN-CC : Indoor PCB Connector
3. CN_DRY (L) : DRY CONTROLLER Connector
4. CN_DRY (SIG) : DRY CONTROLLER Connector
5. CN_DRY (ERROR CHECK) : ERROR Check Display Connector
6. CN_DRY(OPER STATE): Operation Display Connector

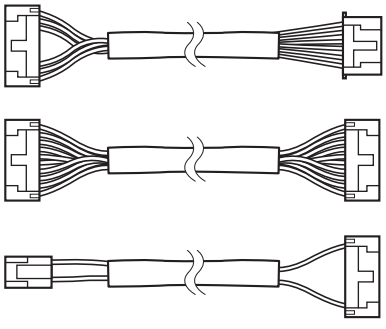
1.2.1 Accessory

Cable 1EA
(for Central controller)

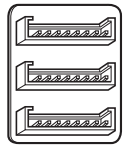




Cable 3EA
(for connecting with indoor unit)



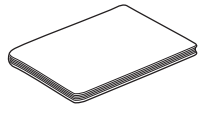
[Structure of each cable]



Connecting PCB
(6871A30056A)
***for Central Controller**

Dry contact
(For installation, 4EA)

Dry contact - 4EA
(For assembly the case)



User/Installation
Manual

NOTE

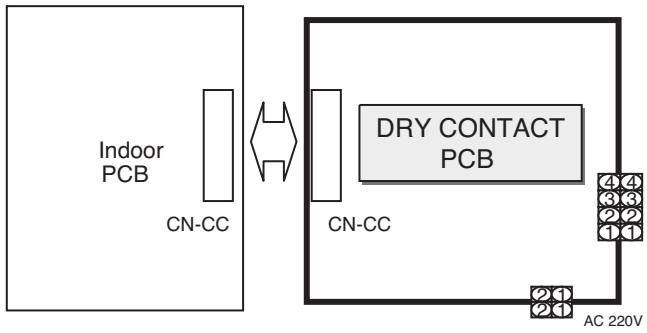
- These cable using for connection between Dry contact and Indoor unit.
- So before using these things Please check the connector type first and use cables on proper indoor unit.

1. Dry Contact (PQDSA)

1.3 Installation Guide

1.3.1 Step 1

Connect CN-CC with Indoor PCB by the cable(provided)
- Connection of Dry contact only



1. Dry Contact (PQDSA)

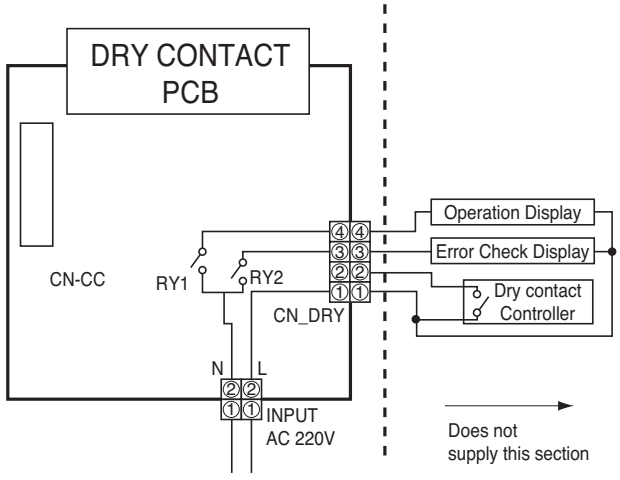
1.3.2 Step 2

Dry Contact is a solution for automatic control of HVAC system at the owner's best.
In simple words, it's a switch which can be used to turn the unit On/Off after getting the signal from external sources like key-in lock, door or window switch etc specially used in Hotel rooms.

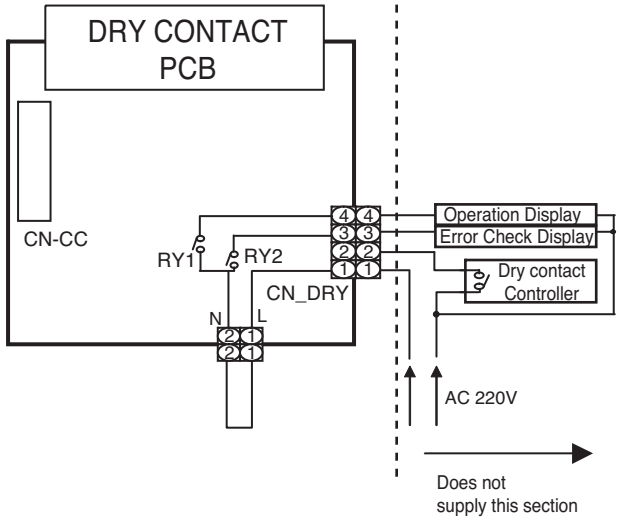
How to Install Dry Contact

Connect CN_DRY with Control Unit.

- To apply power source through Dry Contact PCB.



- To apply power source directly to external source.

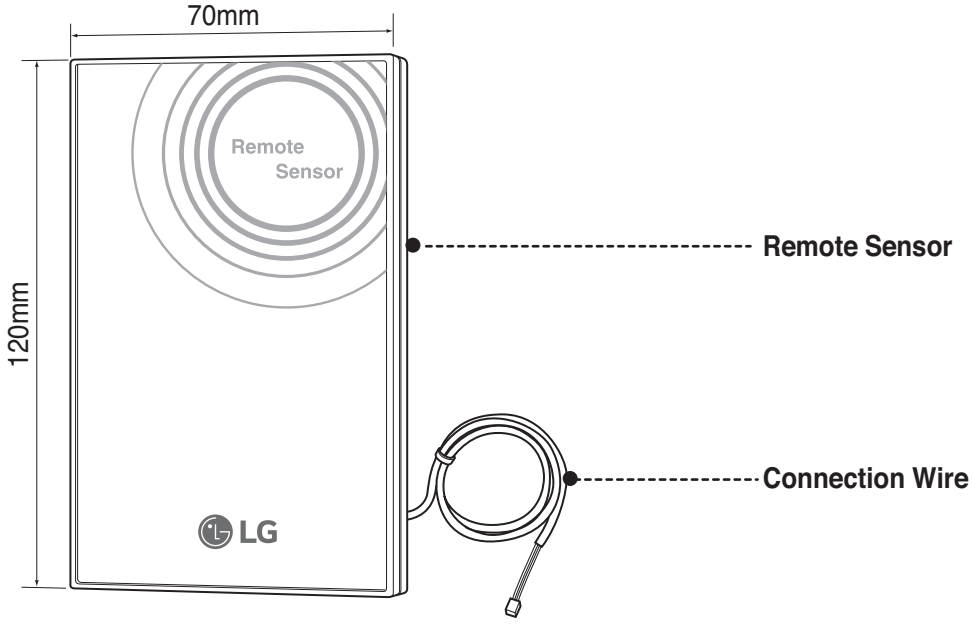


2. Remote Temperature Sensor (PQRSTA0)

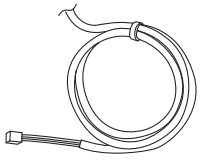
2.1 Part Description

Remote temperature sensor can be installed any place a user wants to detect the temperature.

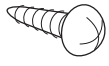
2.1.1 Remote Sensor



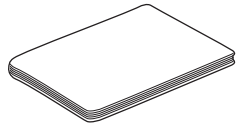
2.1.2 Parts



Connection wire
15m(1EA)



Fixing screw for
Remote Sensor(2EA)



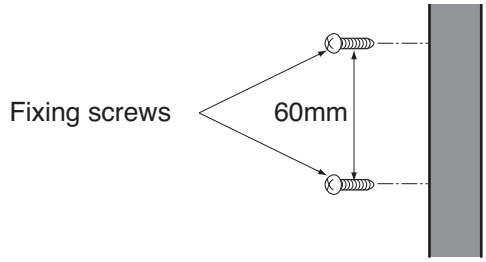
Installation Manual

2. Remote Temperature Sensor (PQRSTA0)

2.2 Installation Method

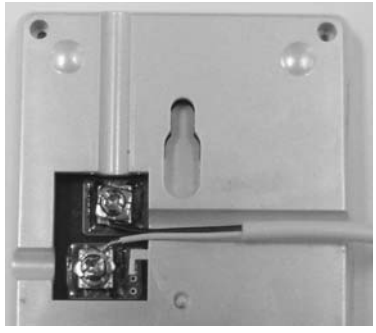
2.2.1 How to use

1. After deciding where the remote temperature sensor is installed, decide the location and height of the fixing screws.
   (Interval between the screws : 60mm)



2. Insert the connector of the connection wire into the space for the connector in place of the room temperature sensor. (CN_ROOM)
3. Separately, set the option code of the attached controller on the indoor unit.
   In detail, refer to "installer setting mode" in the owner's manual.

2.2.2 How to connect the remote temperature sensor and the connection wire

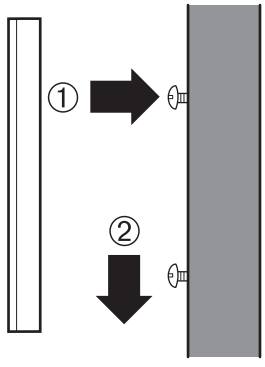


The Connection wire does not matter if you change the color of the wire because of non-polar

2.2.3 How to install the remote temperature sensor on the wall

Integrate the remote temperature sensor with the screws as the order of arrows.

Fixing the
Remote Sensor



⚠CAUTION

1. Choose the place where the average temperature can be measured for the place the indoor unit operates.
2. Avoid direct sunlight.
3. Choose the place where the cooling/heating devices do not affect the remote sensor.
4. Choose the place where the outlet of the cooling fan do not affect the remote sensor.
5. Choose the place where the remote sensor isn't affected when door is open.

3. Sanitary Water Tank Kit(PHLTA)

- Must be used for communication of sanitary water tank and indoor unit.

3.1 Part Description

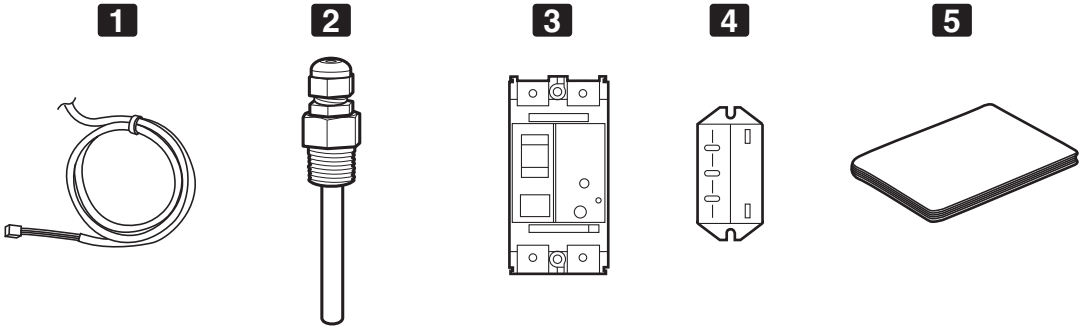
1 Sensor (Thermister) : This sensor (RHRSTA0) can be supplied separately.

2 Sensor Adaptor
- It can be attached on the sanitary water tank
- Thermister is inserted in the sensor adaptor
- connection 1/2"(12.7mm) BSP

3 ELB (Earth Leakage Breaker) 40A

4 Relay contactor

5 Installation Manual



4. Solar Thermal Kit(PHLLA / PHLLB)

- Must be used for communication of solar thermal component and indoor unit.

4.1 Model

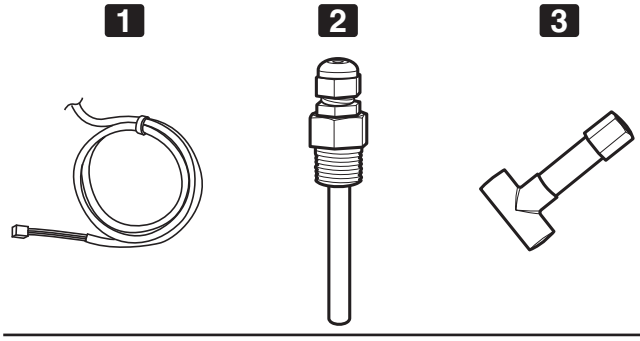
- PHLLA : Sensor's limit temperature 100°C
- PHLLB : Sensor's limit temperature 120°C

4.2 Part Description

1 Sensor (Thermister)

2 Sensor Adaptor
- It can be attached on T type pipe fitting attatched in the pipe of solar thermal component
- Thermister is inserted in the sensor adaptor
- connection 1/2"(12.7mm) BSP

3 T type pipe fitting (option)



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P/No.: MFL66101107

LG Electronics

Air Conditioner
20 Yeouido-dong, Yeongdeungpo-gu,
Yeouido P.O.Box 335 Seoul,
150-721, Korea.
http://www.lgeaircon.com

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