Airwell

Just feel well

SERVICE MANUAL

Hydro box
R410A
English Manual

OVVA-090N-O1M25
OVVA-160N-O1M25
OVVA-310N-O1M25

IMPORTANT NOTE:
Read this manual carefully before installing or operating your new air conditioning unit. Make sure to save this manual for future reference.

24.AW.OVVA.R410A.090-310.SM.EN.09.29.Rev01

CONTENTS

1. Lineup

Hydro box

Appearance


Model	Power Supply	Capacity	Compatible outdoor unit model
OVVA-090N-O1M25	1PH, 220-240V~, 50/60Hz	7kW	VVTA, * VVEA, * VVFA
OVVA-160N-O1M25	1PH, 220-240V~, 50/60Hz	14kW	VVTA, * VVEA, * VVFA
OVVA-310N-O1M25	1PH, 220-240V~, 50/60Hz	28kW	VVTA, * VVEA, * VVFA

Note: VVEA, VVFA can be compatible from January 2nd, 2024.

Series	PCB Code	Program Checksum	EE Checksum
VVTA	0151800256F	B416 (V1.0)	731A (V07)
VVEA	0151800256FD	7BF1(V1.0)	6418(V08
VVFA	0151800421B	15DD(V5.6)	9372(V30)

2. Features and benefits

2.1 Low Operating Cost

- By using free renewable energy from the outside air as heat source, it is more energy efficient and environmental than oil and gas bilers. The operating cost is low by high efficiency heat pump and heat recovery technology.

2.2 Ultimate Comfort

- The hydro unit has a heating capacity of up to 28kW per module which can be used in conbination for bigger system demand.
- Water temperature range is from 5°C to 55°C provides comfort air to users.

2.3 Super Convenience

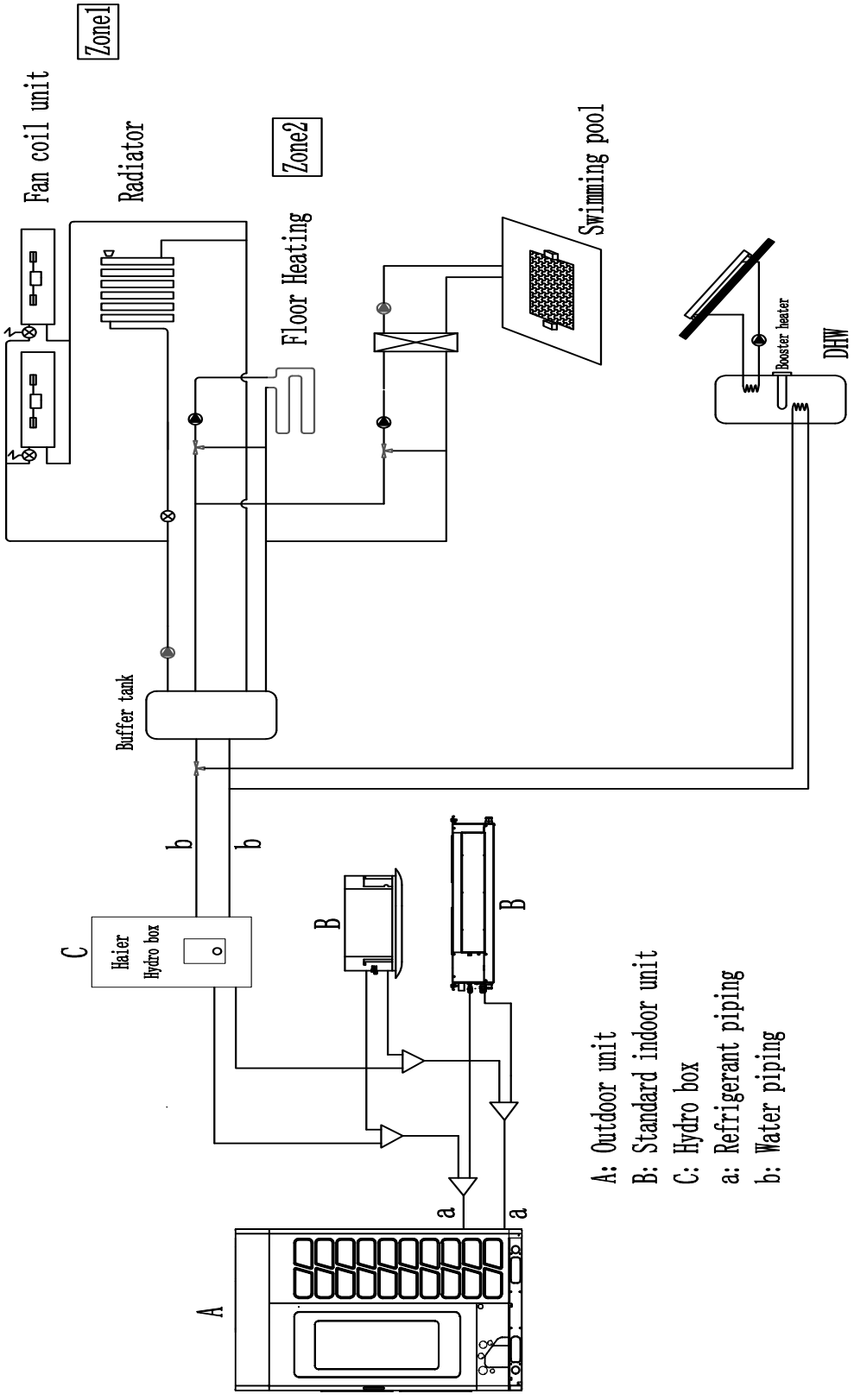
- Climate Curves
- Sterilization Function
- 5-inch colorful controller on the front panel and an optional wired controller
- Connectable to VVTA, VVEA and VVFA **2.4**

Intelligence

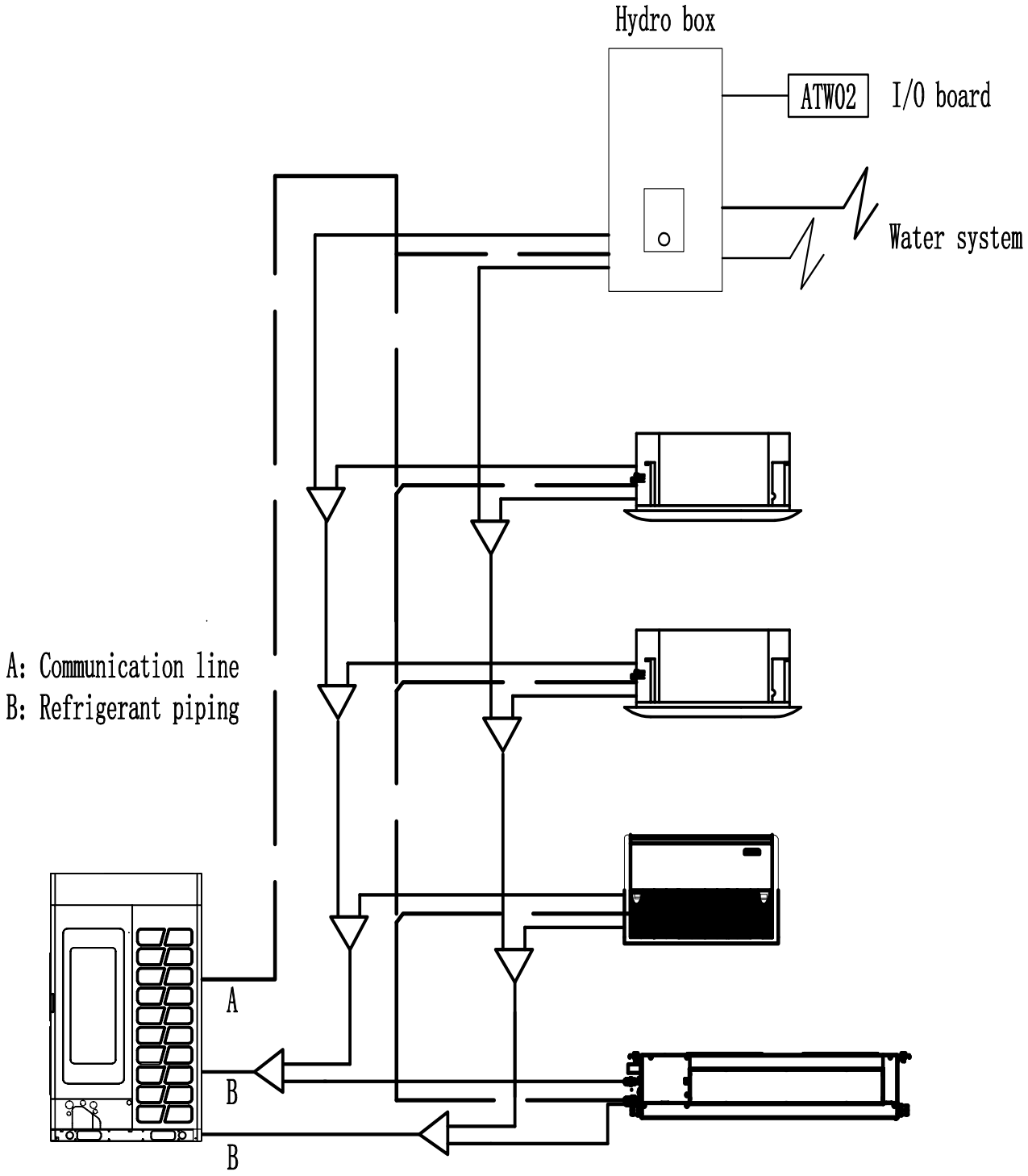
- Smart Grid Ready
- Easy 3rd Party BMS Solution
- Scheduling Programs
- Anti-freeze function

3. System Layout

3.1 System Layout



3.2 Product connection form



3.3 Product combination rate

1. Combination rate for heat pump models

Heat pump model		Hydro Box connection rate													
IDU connection rate		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	110%	120%	130%
	0%									80	90	100			
	10%														
	20%														
	30%														
	40%														
	50%	50	60	70	80	90	100	110	120	130					
	60%	60	70	80	90	100	110	120	130						
	70%	70	80	90	100	110	120	130							
	80%	80	90	100	110	120	130								
	90%	90	100	110	120	130									
	100%	100	110	120	130										
	110%	110	120	130											
	120%	120	130												
	130%	130													

Remark: The heat pump outdoor unit can be combined up to 130%, but it is recommended that the ratio of operation in the same operation mode be within 100%.

2. Combination rate for heat recovery models

Heat recovery model		Hydro Box connection rate													
IDU connection rate		0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	110%	120%	130%
	0%									80	90	100			
	10%														
	20%														
	30%														
	40%														
	50%	50	60	70	80	90	100	110	120	130					
	60%	60	70	80	90	100	110	120	130						
	70%	70	80	90	100	110	120	130							
	80%	80	90	100	110	120	130								
	90%	90	100	110	120	130									
	100%	100	110	120	130										
	110%	110	120	130											
	120%	120	130												
	130%	130													

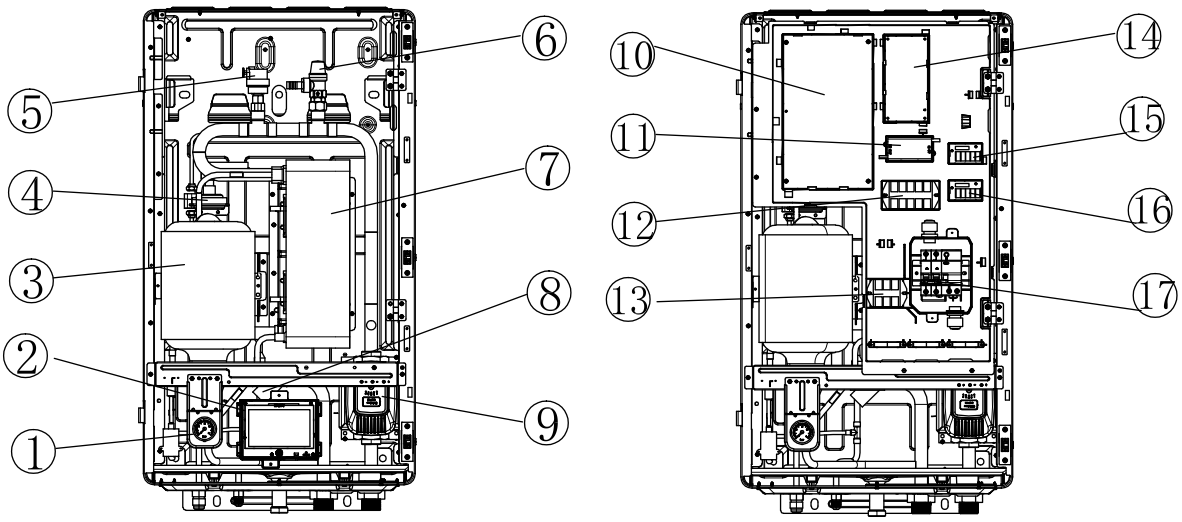
Remark: The outdoor unit of heat recovery model can be combined up to 130%, but the ratio of operation in the same operation mode is recommended to be within 100%.

4. Description Of Main Components

Structure
Panels and base are made from galvanized steel plate painted with epoxy powder to ensure total resistance to atmospheric pollution, condensate collection pan as standard.
Air cooled coils:
The coils are made from high performance and seamless copper tuber and high surface area aluminum fins to ensure optimum heat exchange capability. Condenser coil protection grill is standard.
Fan motor:
To achieve high efficiency heat exchange, the unit is equipment with the high performance axial-flow fans. The fan is driven directly by weather proof motor to ensure reliable operation, the fan motor is six-pole electric motor with built-in thermal cut-out.
Hydraulic module:
It is fully integrated and equipped with key hydraulic components such as plate-heat exchanger and water circulating pump.The water pressure difference switch is provided in the units to protect against damage to the water pump.
Power and control electrical panel
Power and control electrical panel constructed in accordance with IEC 204-1/EN60335-2-40, complete with compressor contactor,control via control panel.

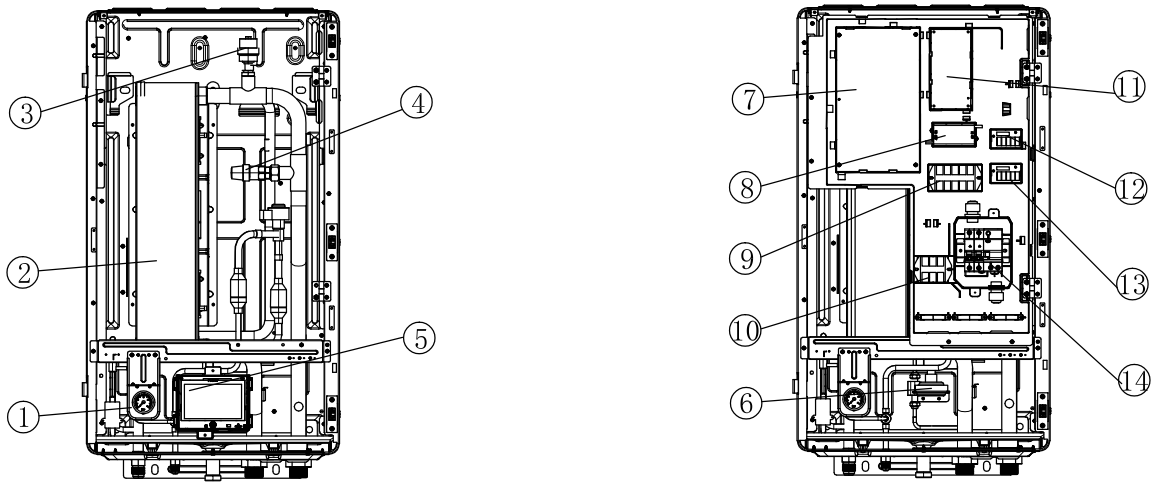
Part name	Model	abbr.	Function	Characteristics
Flow switch	All	/	Detect water flow	15.5KPa OFF/20Kpa ON
Water Pump	OVVA-090/160N-O1M25	Pump	Transport liquid	Pumping head:11m
Water pressure gauge	All	/	Detect water pressure	0-4bar
Expansion Vessel	OVVA-090/160N-O1M25	/	Pressure fluctuation of buffer system	5L
Water filter	All	/	Filter impurities in water	40 mesh
Plate heat exchanger	All	/	"Used to exchange the heat from refrigerant to water"	"Design pressure: water side:1.5MPa; Refrigerant side:4.2MPa"
Pressure relief valve	All	/	Reduce system pressure	"Operation pressure:0.55MPa"
Air purge valve	All	/	Release gas from heating system and water supply pipeline	/
Temp. sensor	All	Thi	Detect the in refrigerant temp. of heat exchanger	"R(25°C)=10KB (25/50°C)=3700K"
		Tho	Detect the out refrigerant temp. of heat exchanger	
		Twi	Detect the inlet water temp. of heat exchanger	
		Two	Detect the outlet water temp. of heat exchanger	
Electronic expansion valve	OVVA-090/160N-O1M25	PMV	Control the refrigerant flow	"SAGINOMIYA SEISAKUSHO,INC UKV-30D134 φ3.0 DC12V±10%"
	OVVA-310N-O1M25			"Shanghai Yinzhou Electromechanical Technology Co., Ltd PAM-B80YGHRSZ-1 φ5.0 DC12V±10%"

OVVA-090N-O1M25 OVVA-160N-O1M25



1. Water pressure gauge
2. Controller
3. Expansion Vessel
4. Flow switch
5. Air purge valve
6. Pressure relief valve
7. Plate heat exchanger
8. Water filter
9. Water Pump
10. Main PCB
11. Controller power supply terminal
12. Terminal strip
13. Relay PCB
14. Internal and external communication and ATW02 PCB
15. Pump control PCB
16. Leakage protector
17. Terminal strip

OVVA-310N-O1M25



1. Water pressure gauge
2. Plate heat exchanger
3. Air purge valve
4. Pressure relief valve
5. Controller
6. Flow switch
7. Main PCB
8. Controller power supply terminal
9. Terminal strip
10. Relay PCB
11. Internal and external communication and ATW02 PCB
12. Pump control PCB
13. Leakage protector
14. Terminal strip

5. Specifications

Item		Model	OVVA-090N-01M25	OVVA-160N-01M25	OVVA-310N-01M25
Power supply			1PH, 220-240V~, 50/60H	1PH, 220-240V~, 50/60H	1PH, 220-240V~, 50/60H
Cooling (1)	Cooling (1)	kW	7	14	28
	Power Input		130	130	16
	Current		0.38	0.38	0.1
Heating (2)	Heating (2)	kW	9	16	31
	Power Input		130	130	16
	Current		0.38	0.38	0.1
Cooling (3)	Cooling (3)	kW	5	8	9
	Power Input		130	130	16
	Current		0.38	0.38	0.1
Operating current		A	/	/	/
Max. operating current		A	/	/	/
Max. operating pressure (R/W)		Mpa	4.15/0.5	4.15/0.5	4.15/0.5
Max Power consumption	W		130	130	16
Max running current	A		0.38	0.38	0.1
Water pump	Brand		Shinhoo	Shinhoo	/
	Model		GPA25-11H	GPA25-11H	/
	Type		GPA	GPA	/
	Power Input	W	140	140	/
	Power output	W	130	130	/
Plate heat exchanger	Plate type		Plate	Plate	Plate
	Size(W*H*L)	mm	332.5*121*109.9	332.5*121*109.9	529*113*112
Expansion Vessel	Brand		ACOL	ACOL	/
	Volume	L	5	5	/
	MWP	Bar	10	10	/
Pressure Relief Valve		Bar	5	5	5
Air purge valve		Bar	5	5	5
Casing Colour	RAL or Other		Jasmine white	Jasmine white	Jasmine white
Heat-insulating material			Rubber	Rubber	Rubber
Installation place	Indoor/outdoor		Indoor	Indoor	Indoor
Combination ratio	Only hydro module	%	80-100%	80-100%	80-100%
	Hydro box+IDUs	%	50-130%(Hydro box 0-80%)	50-130%(Hydro box 0-80%)	50-130%(Hydro box 0-80%)
Operation range	Cooling Ambient Min. - Max.	°CDB	10~43	10~43	10~43
	Cooling Water side Min. - Max.	°C	5~20	5~20	5~20
	Heating Ambient Min. - Max.	°C	-20~24	-20~24	-20~24
	DHW Ambient Min. - Max.	°C DB	-20~35	-20~35	-20~35
	Water side Min. - Max. (Only hydro module)	°C DB	20~50	20~50	20~50
	Water side Min. - Max. (Hydro box+IDUs)	°C DB	20~45	20~45	20~45
Noise Level	Sound pressure level	dB(A)	Cooling 29/Heating 32	Cooling 29/Heating 32	Cooling 29/Heating 32
	Sound power level	dB	Cooling 43/Heating 46	Cooling 43/Heating 46	Cooling 43/Heating 46

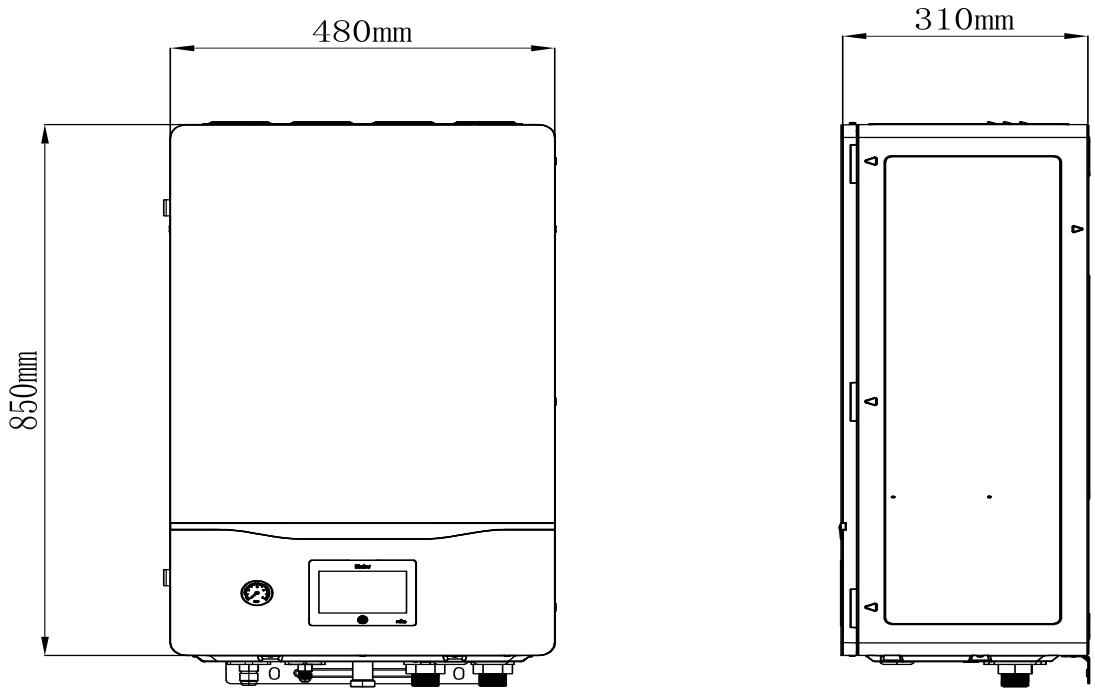
Item		Model	OVVA-090N-O1M25	OVVA-160N-O1M25	OVVA-310N-O1M25
Water filter type			'Y' shape copper filter/ 40 mesh	'Y' shape copper filter/ 40 mesh	'Y' shape copper filter/ 40 mesh
Water flow rate (Min-Rated)		L/min	1.085/1.548	1.926/2.752	3.731/5.332
Water pressure loss (At std water flow rate)		kPa	20	41.5	70
Water Design pressure		MPa	0.5	0.5	0.5
Pressure gage incl.			Yes	Yes	Yes
Flow switch incl.			Yes	Yes	Yes
Water circuit Piping diameter	Inlet	inch "	R1	R1	R1-1/4
	Outlet	inch "	R1	R1	R1-1/4
Drain pipe diameter		mm	20	20	20
Refrigerant Type			R410A	R410A	R410A
Refrigerant Design pressure		MPa	4.15MPa	4.15MPa	4.15MPa
Refrigerant circuit diameter					
Gas side - connection type		mm	15.88	15.88	19.05
Liquid side - connection type		mm	9.52	9.52	9.52
Remote controller included or not			No	No	No
Dimension (W*D*H)		mm	850 × 480 × 310	850 × 480 × 310	850 × 480 × 310
Packing (W*D*H)		mm	1020 × 580 × 460	1020 × 580 × 460	1020 × 580 × 460
Net weight		Kg	44	44	40
Gross weight		Kg	56	56	52
Main wire type #cores		Bar			
ODU compatibility		Bar	VVTA		
Max IDU			/	/	/
Expected piping restrictions if any					
"(1) Tamb 35°C - LWE 18°C (DT=5°C) (2) DB/WB 7°C/6°C - LWC 35°C (DT=5°C) "					
Mandatory regulation Requirement 1					
Mandatory regulation Requirement 2					
Mandatory regulation Requirement 3					

Note: If the user uses the built-in electric heating and water pump terminal blocks of the machine, the corresponding external electric heating and water pump power and current shall be added on this basis.

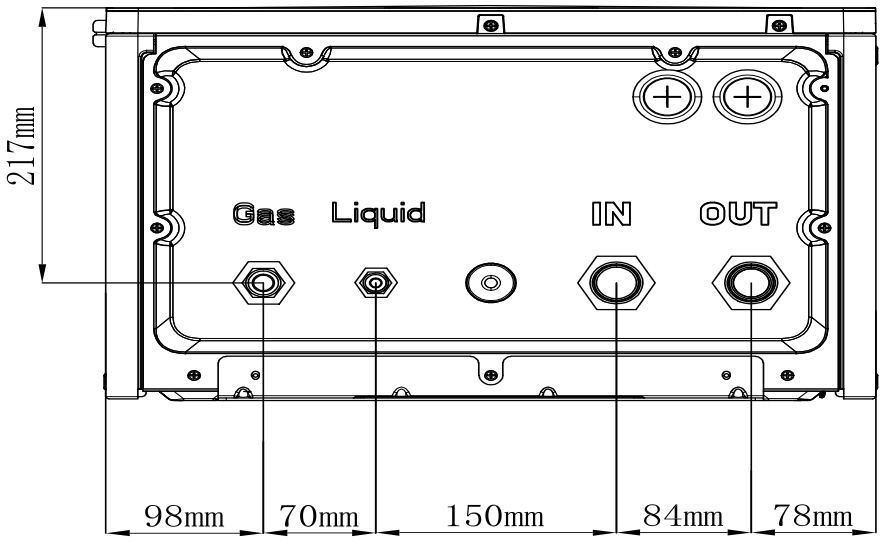
6. Dimensions

OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25

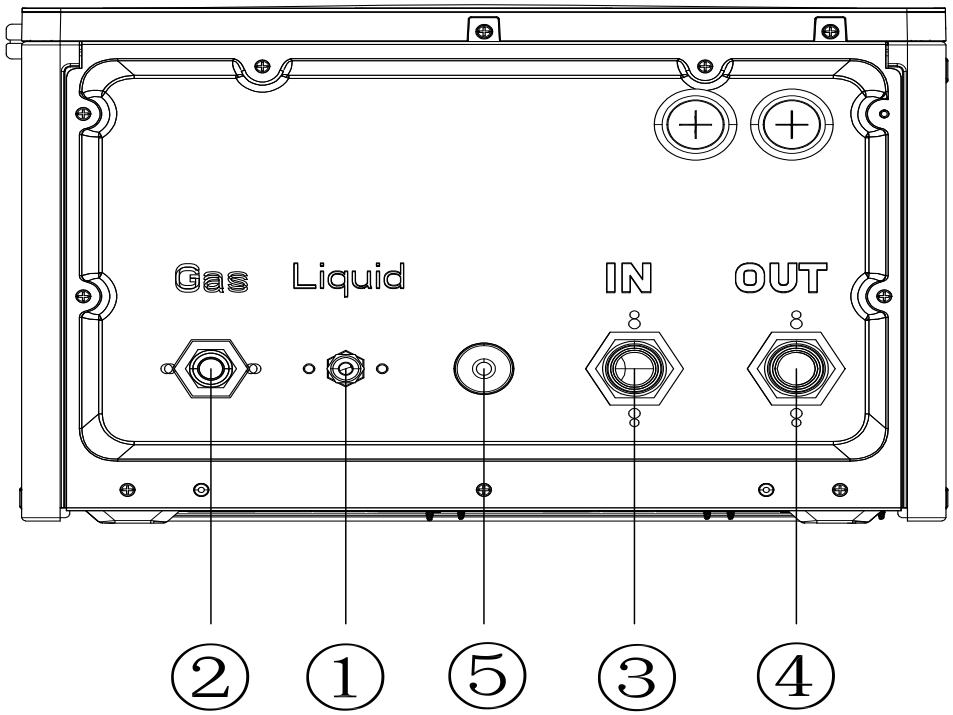
Unit: mm



Front View Side View



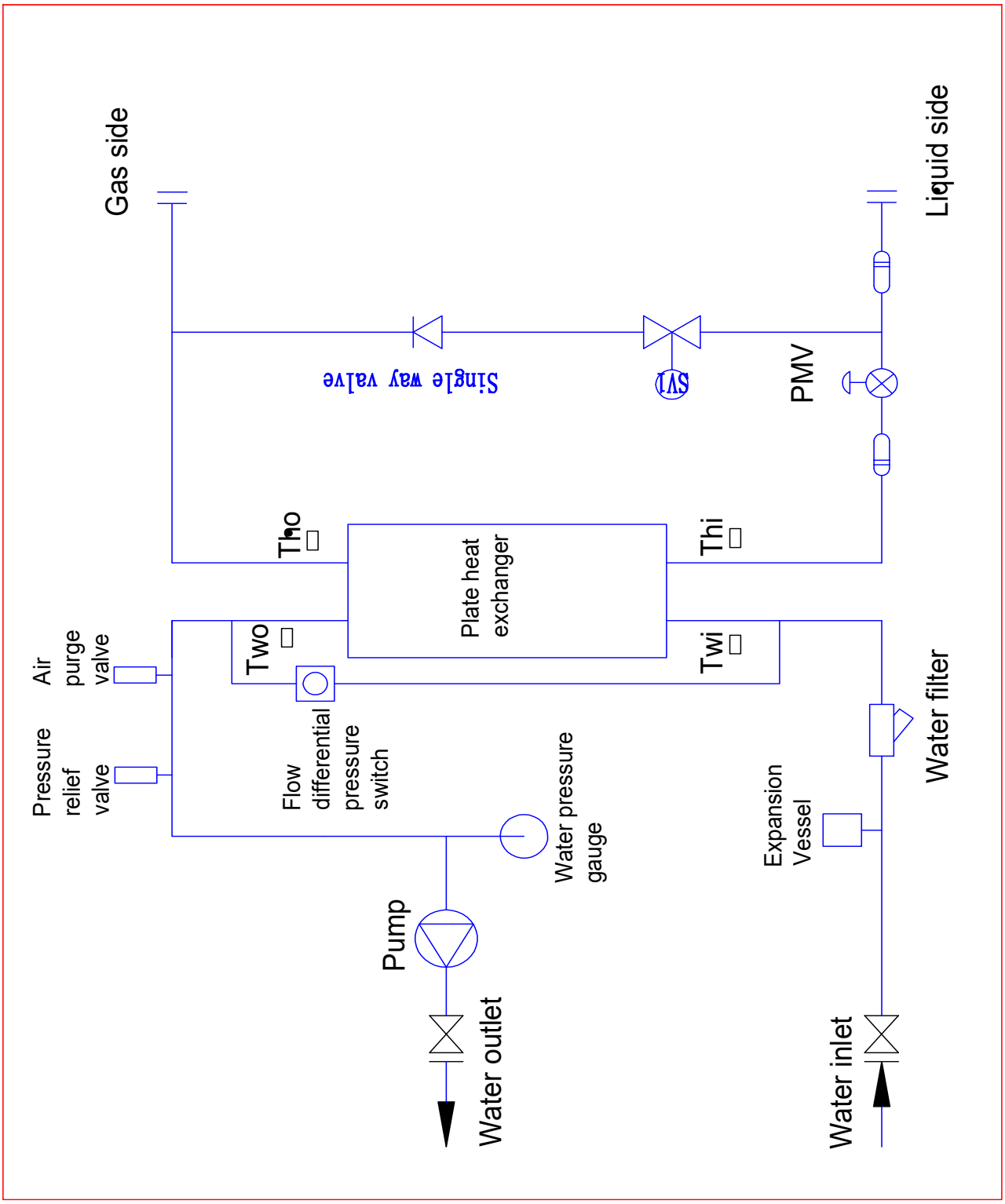
Bottom View



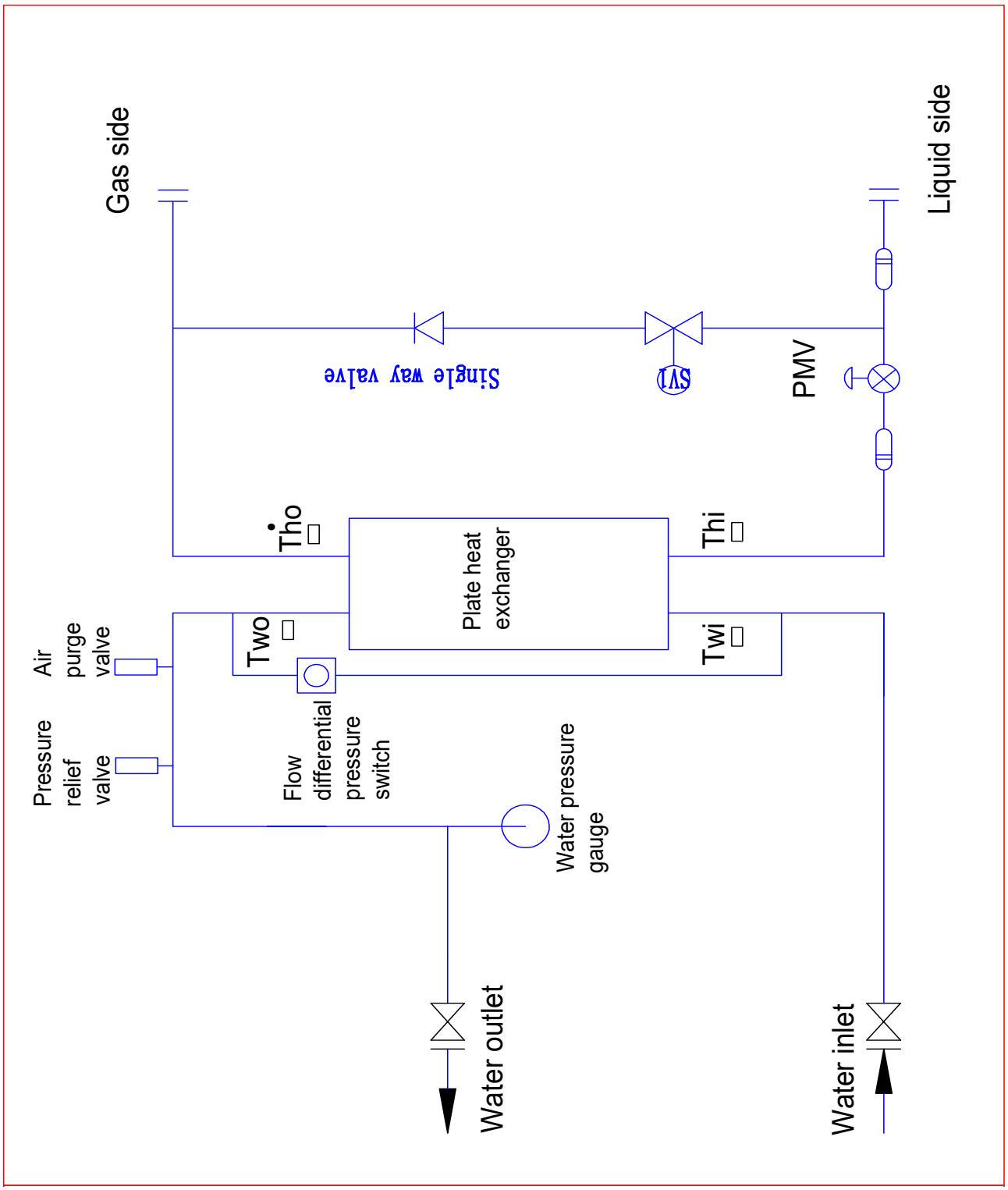
No.	Pipe Description	Connection Size (in.(mm))		
		OVVA-090N-O1M25	OVVA-160N-O1M25	OVVA-310N-O1M25
1	Refrigerant liquid pipe	3/8(9.52)	3/8(9.52)	3/8(9.52)
2	Refrigerant gas pipe	5/8(15.88)	5/8(15.88)	3/4(19.05)
3	Water inlet pipe	1	1	1-1/4
4	Water outlet pipe	1	1	1-1/4
5	Drain pipe	1	1	1

7. Piping Diagram

OVVA-090N-O1M25 OVVA-160N-O1M25



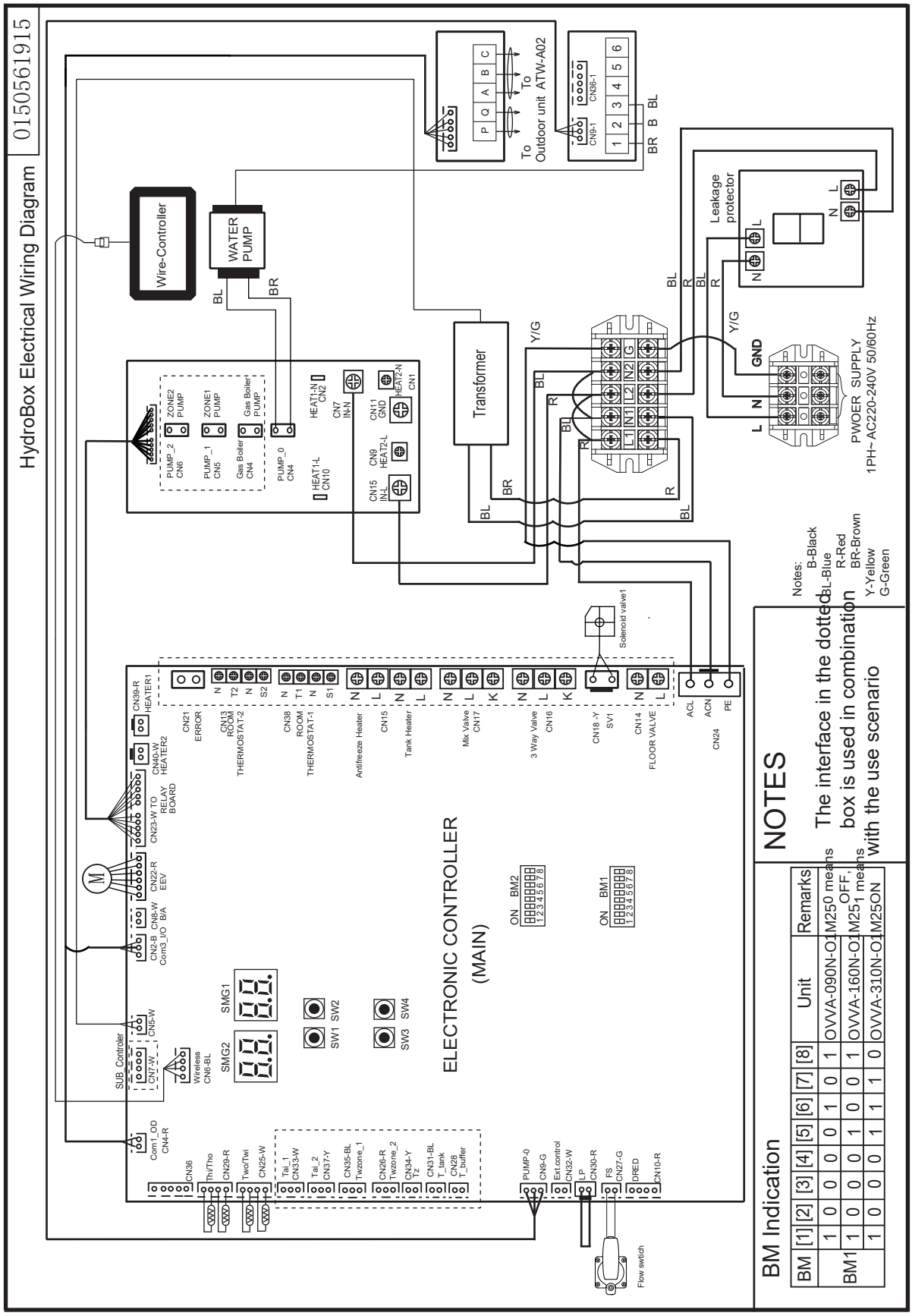
OVVA-310N-O1M25



Part name	Model	abbr.	Function	Characteristics
Flow switch	All	/	Detect water flow	15.5KPa OFF/20Kpa ON
Water Pump	OVVA-090/160N-01M25	Pump	Transport liquid	Pumping head:11m
Water pressure gauge	All	/	Detect water pressure	0-4bar
Expansion Vessel	OVVA-090/160N-01M25	/	Pressure fluctuation of buffer system	5L
Water filter	All	/	Filter impurities in water	40 mesh
Plate heat exchanger	All	/	"Used to exchange the heat from refrigerant to water"	Design pressure: water side:1.5MPa; Refrigerant side:4.2MPa
Pressure relief valve	All	/	Reduce system pressure	Operation pressure:0.55MPa
Air purge valve	All	/	Release gas from heating system and water supply pipeline	/
Temp. sensor	All	Thi	Detect the in refrigerant temp. of heat exchanger	R(25°C)=10KB (25/50°C)=3700K
		Tho	Detect the out refrigerant temp. of heat exchanger	
		Twi	Detect the inlet water temp. of heat exchanger	
		Two	Detect the outlet water temp. of heat exchanger	

8. Wiring Diagram

OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25



9. Electric Characteristics

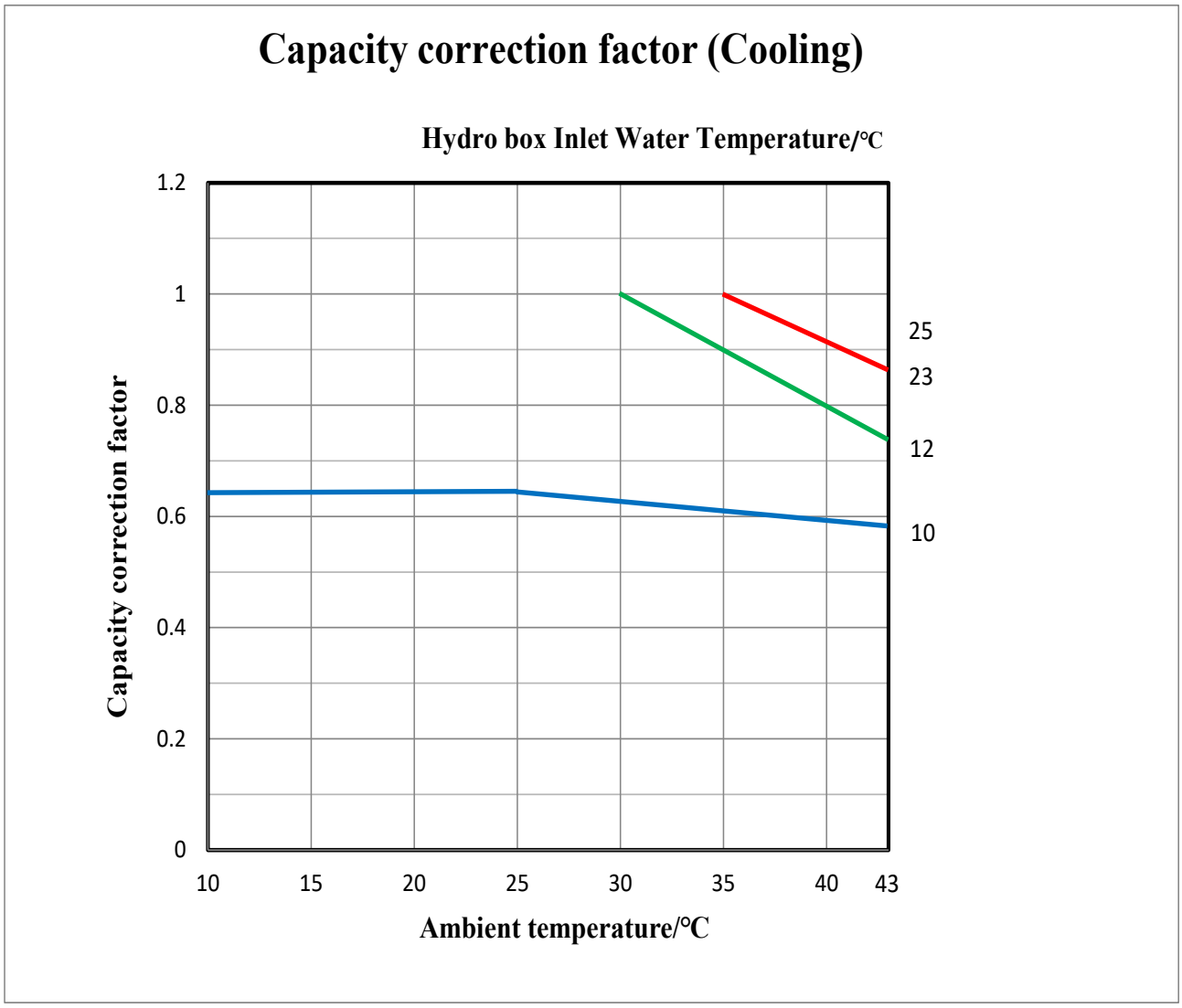
Model	Outdoor Unit			Power Supply		Electric Heater	
	Hz	Voltage	Phase	MCA	MFA	kW	FLA
OVVA-090N-O1M25	50/60	220~240V	1Ph	6	10	/	/
OVVA-160N-O1M25	50/60	220~240V	1Ph	6	10	/	/
OVVA-310N-O1M25	50/60	220~240V	1Ph	6	10	/	/

Remark:
MCA: Min. Current Amps. (A)
MFA: Max. Fuse Amps. (A)
MSC: Max. Starting Amps. (A)
OFM: Outdoor Fan Motor
FLA: Full Load Amps. (A)
kW: Rated Motor Output (kW)

10. Capacity Tables

10.1 Cooling capacity

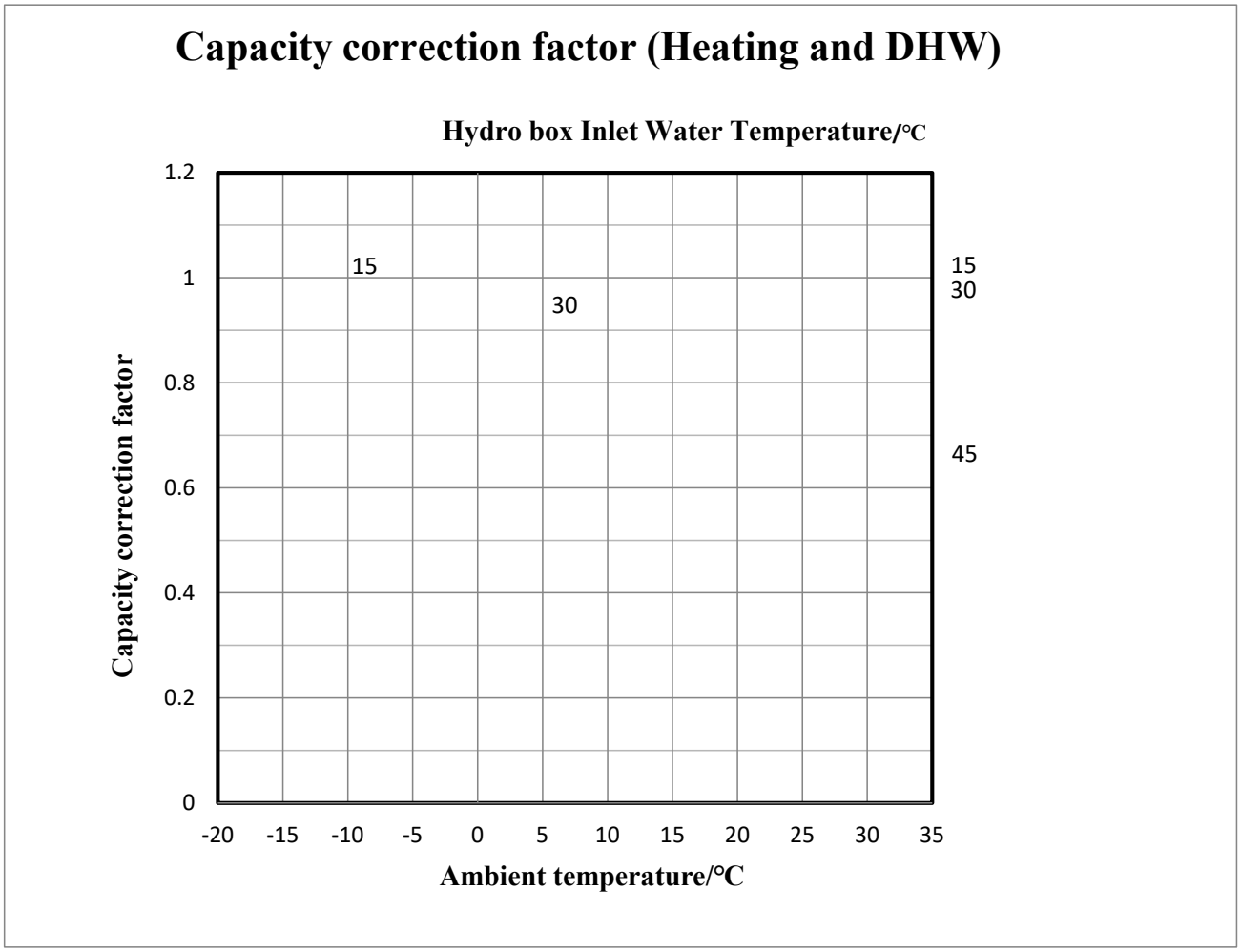
OVVA-090/160/310N-01M25



Note: In mixed mode only hydro box runs.

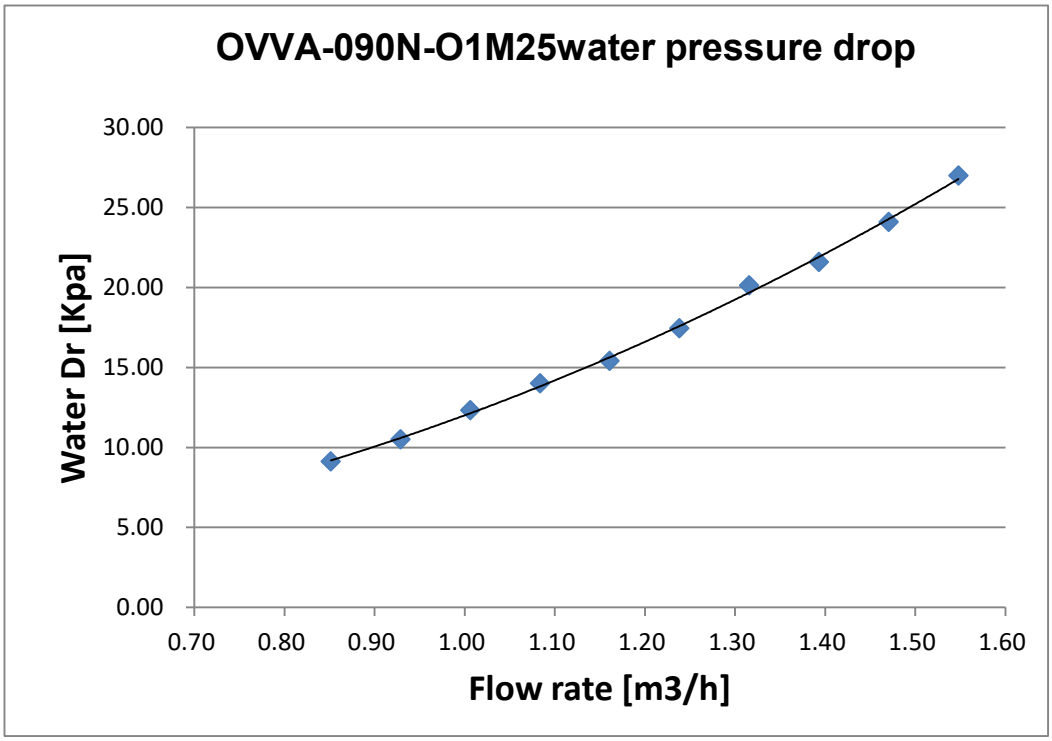
10.2 Heating capacity

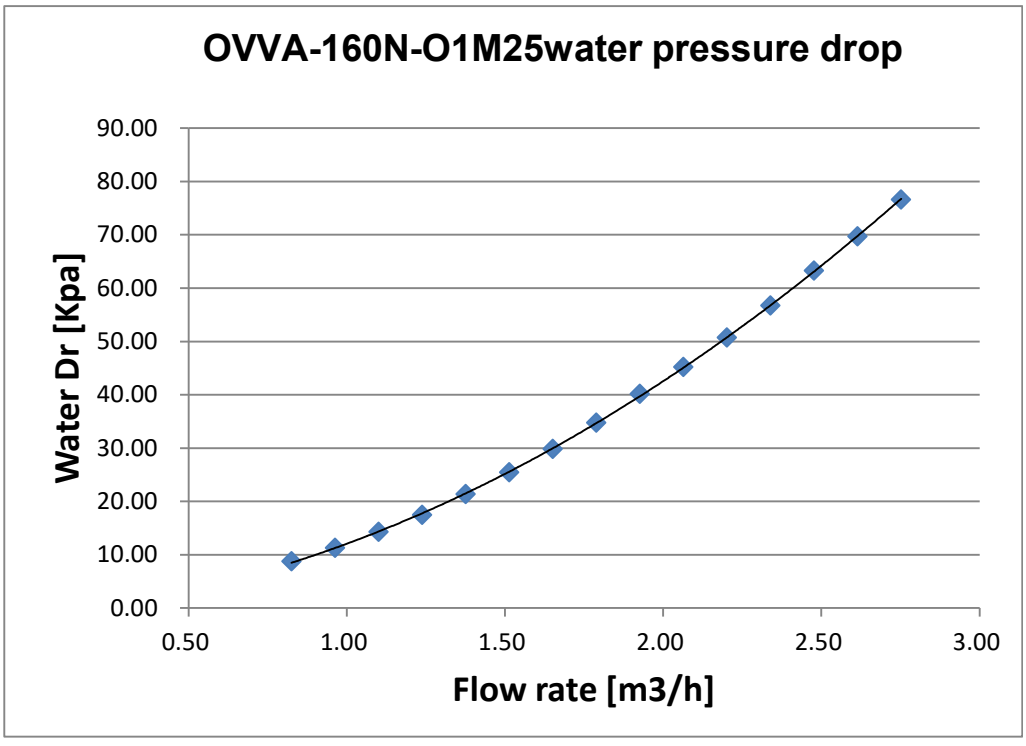
OVVA-090/160/310N-01M25

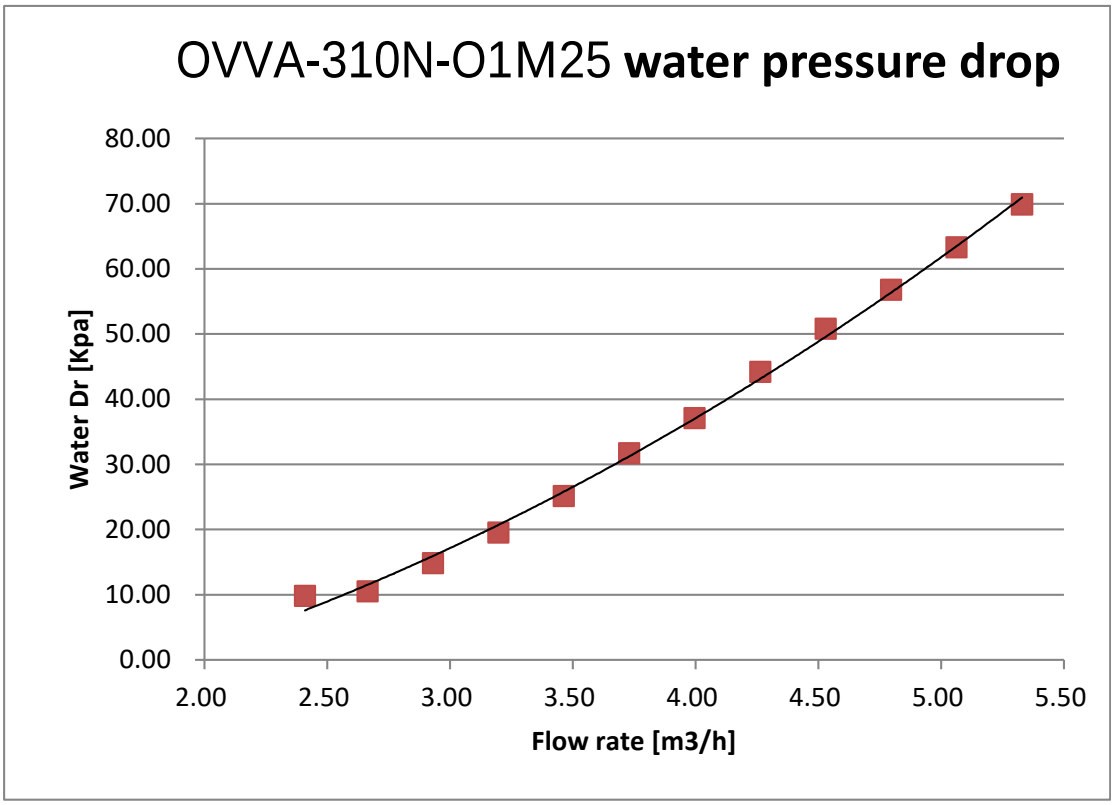


Note: In mixed mode only hydro box runs.

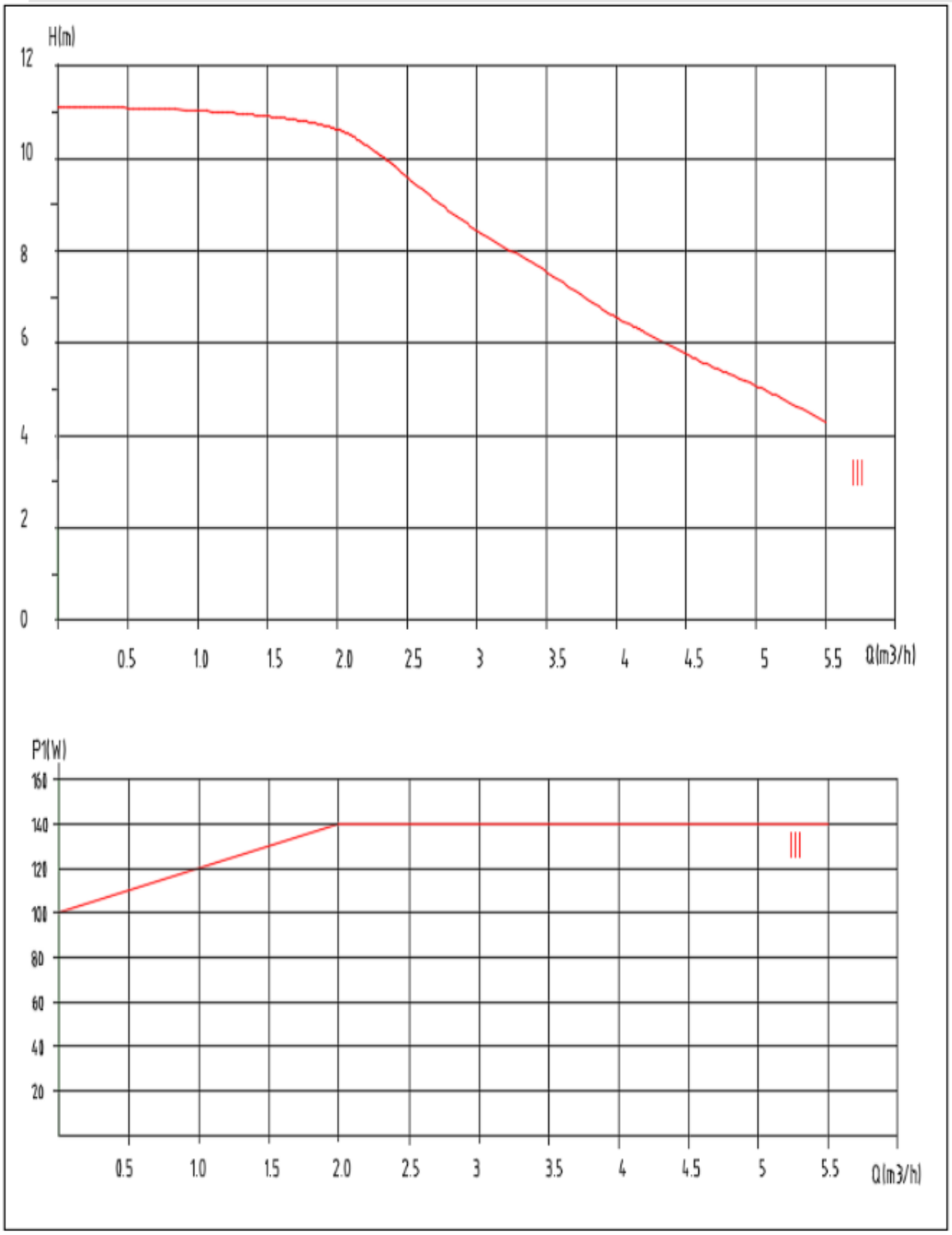
11. Water Pressure Drop






OVVA-310N-O1M25 water pressure drop
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Water Dr [Kpa]
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
Flow rate [m3/h]

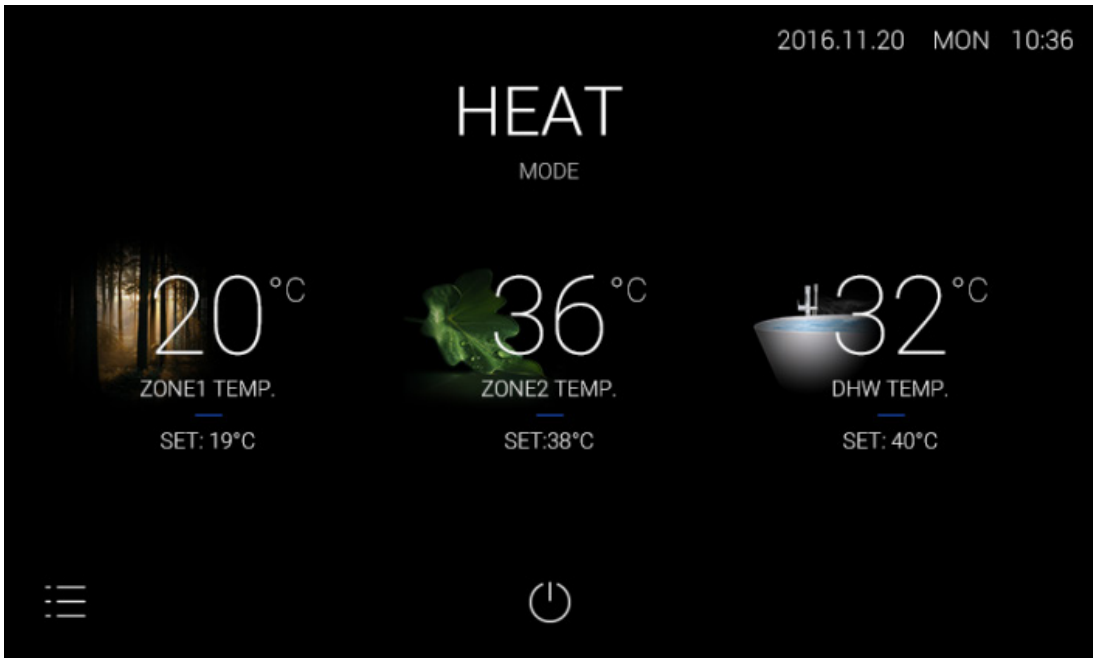
12. Water Pump Characteristic Curve



13. Controller Operation & Installation

Function introduction of controller

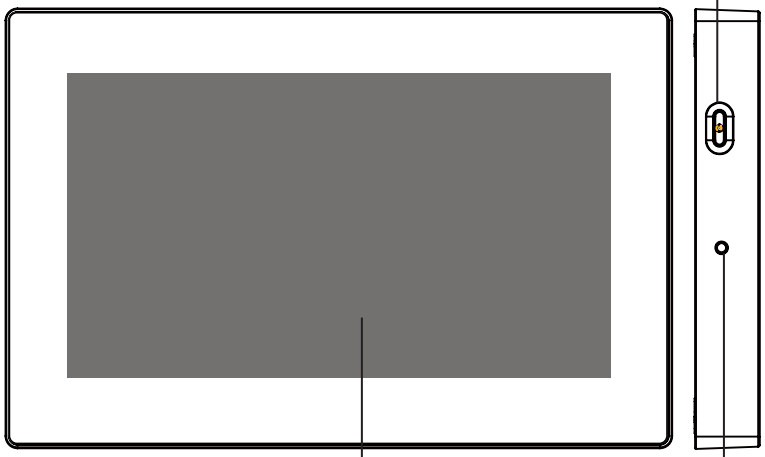
Main interface display



This controller can control all parts temperature of the split system, including Zone1, Zone2, DHW (Domestic Hot Water), and Pool.
During installation, Zone1, Zone2, DHW, and Pool can be set to ON or OFF.
Note: If one Zone in the system, set Zone 1 on; If two zones in the system, set Zone1 on and Zone 2 on.

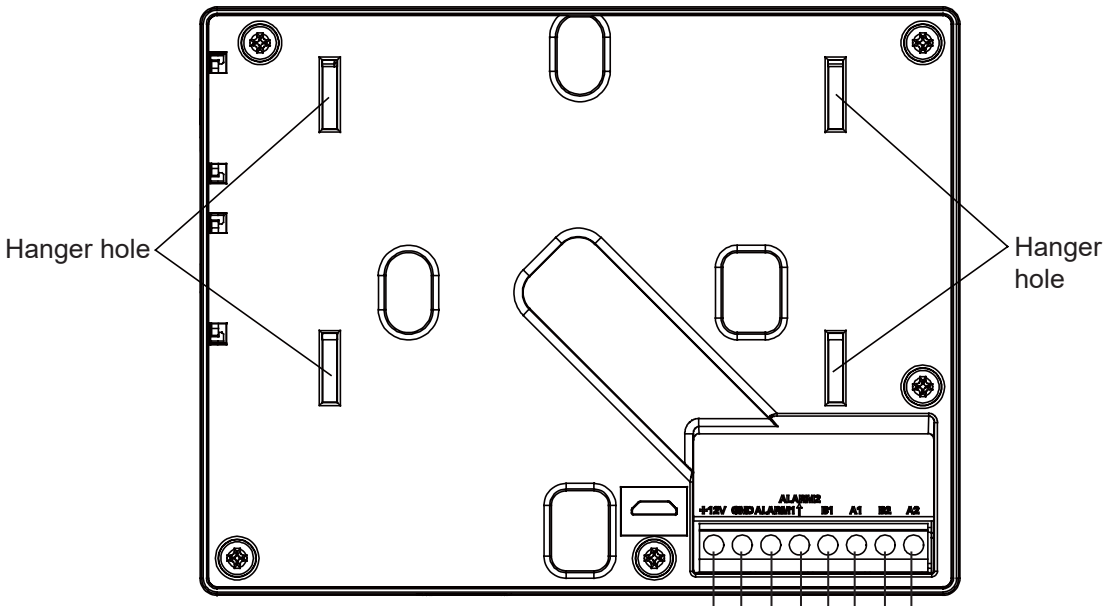
Part information for controller

Restart button ① :
Hold Restart button for 10s to restart controller. Check whether the controller software is normal.



Display / Touch area

Restart button ② :
Press to restart controller. Check whether the controller chip is normal.

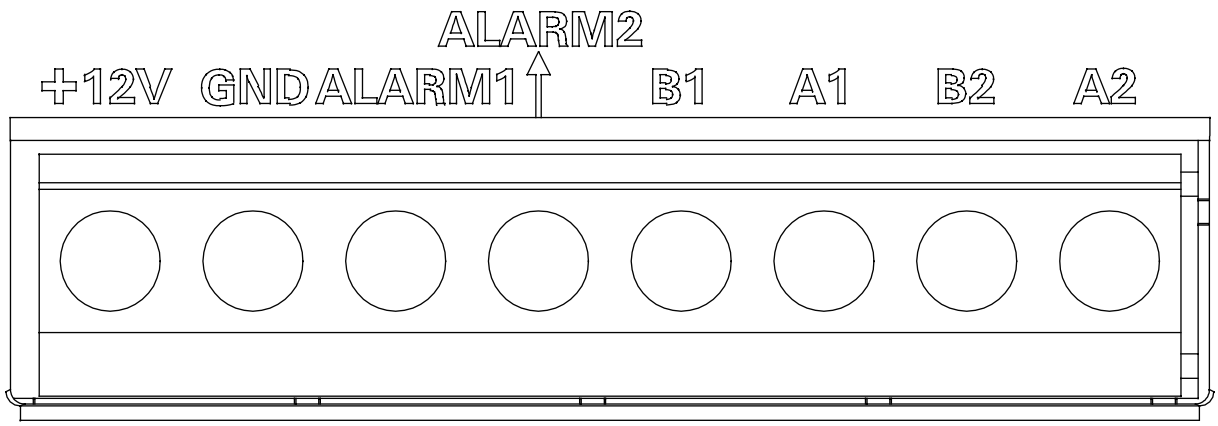


Power: 12V DC

Fire alarm linkage contact (Reserved)

Third party interface (Reserved)

Communication port

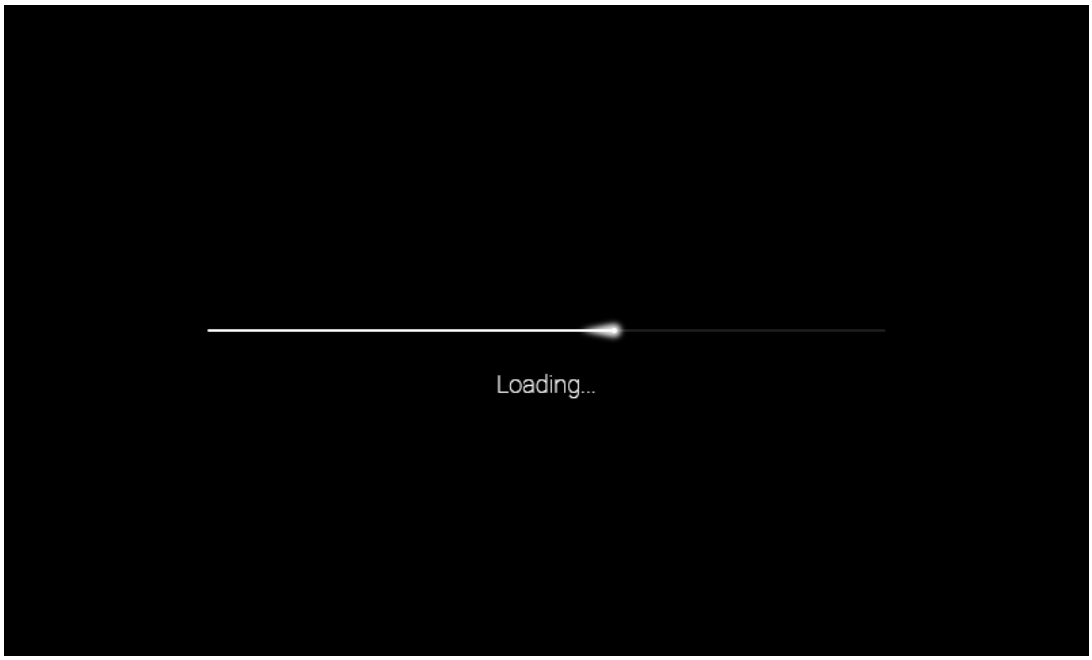


Power supply (12V, GND): 12V DC, please pay attention to “+, -” of power supply.
Fire alarm linkage contact (ALARM1, ALARM2): AC works normally when close the circuit and all AC turned off when open circuit. If no fire alarm linkage needed, should short circuit the ALARM1 and ALARM2.
Third party interface (B1, A1): A1 — 485+, B1—485-(Reserved port).
Communication port (B2, A2): It is used for connecting converter, please pay attention to “+, -”, A2—485+, B2—485-
Note: B1, A1are unavailable to the Split Controller; B2, A2are available.

Function operation

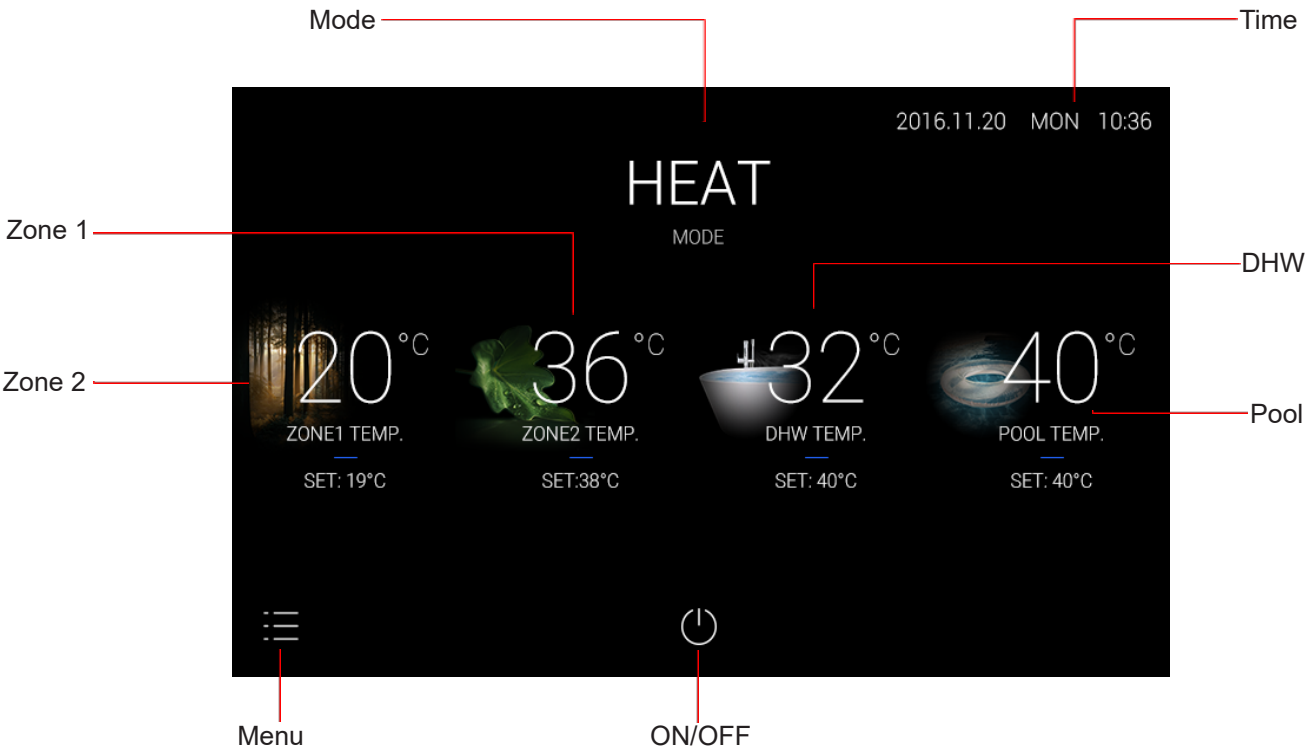
Initialization

After powering on, controller starts to search IDU (Indoor Unit) shown as picture 2 below:

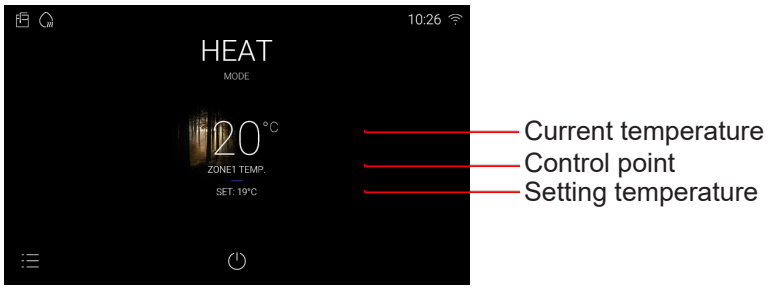


Main interface

When search is completed, the main interface will show as below. Picture 3 is the example. The interface display is subject to the "Equipment Installation" function in installation settings.



Picture 3



Picture 4

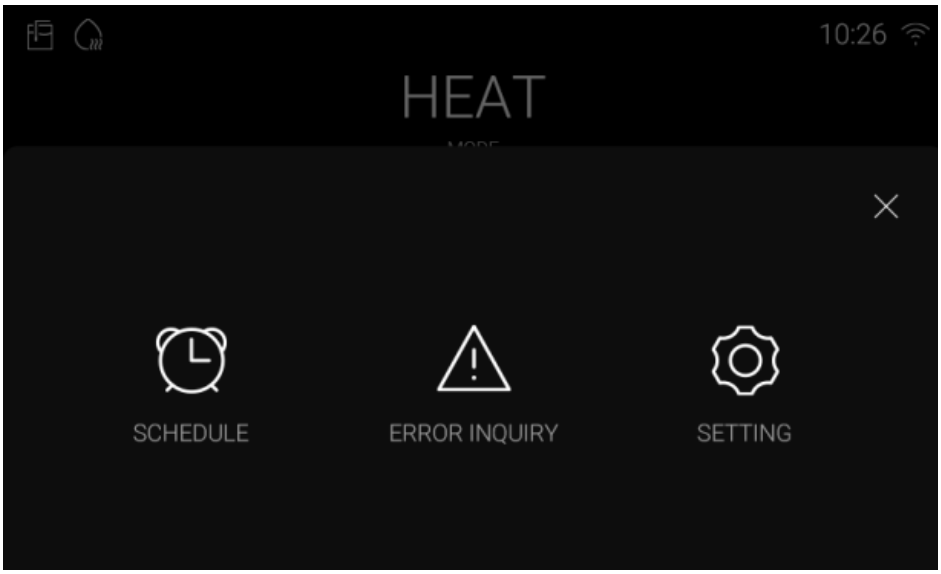
In the main interface, you can control ON/OFF, mode, and setting temperature. Click the mode area and slide left and right to change the unit operation mode. Click each current temperature area and slide left and right to adjust the set temperature.

Picture 5

Note:
During heating operation of the unit, the setting temperature of zone 1 is higher than zone 2; during cooling operation of the unit, the set temperature of zone 1 is lower than zone 2. If the temperature of the later adjustment exceeds the limit, the temperature in another area will change accordingly.
For example, in the heating mode, the set temperature of zone 1 is 45 °C, and the set temperature of zone 2 must be less than or equal to 45°C. If the set temperature of adjustment zone 2 is 48 °C, the set temperature of zone 1 will automatically change to 48 °C.
If a third-party controller is selected, the setting temperature of the point displays "Link", and the controller cannot change the set temperature, the temperature is determined by the third-party controller.

Menu

Tap the lower left menu icon , It will show the following interface:

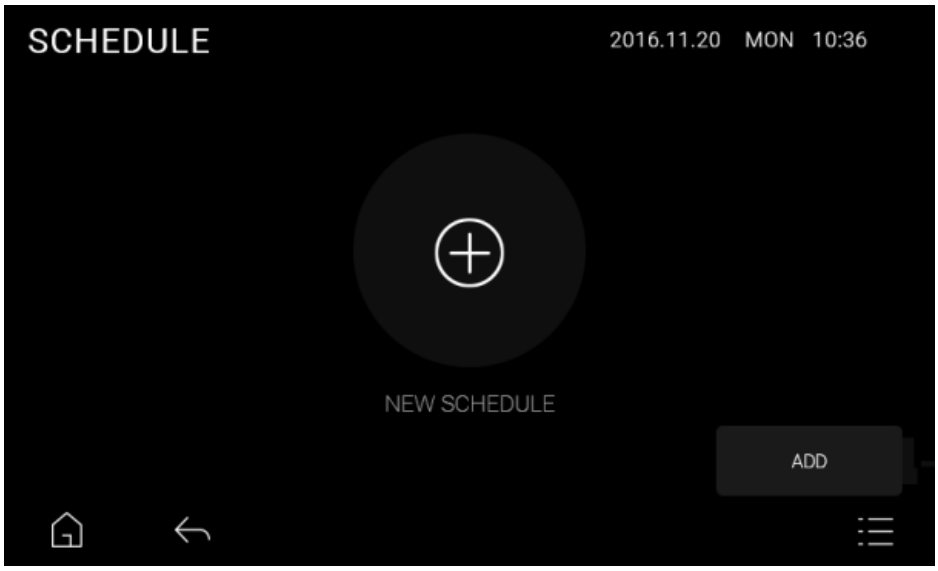


Picture 6

1. Schedule

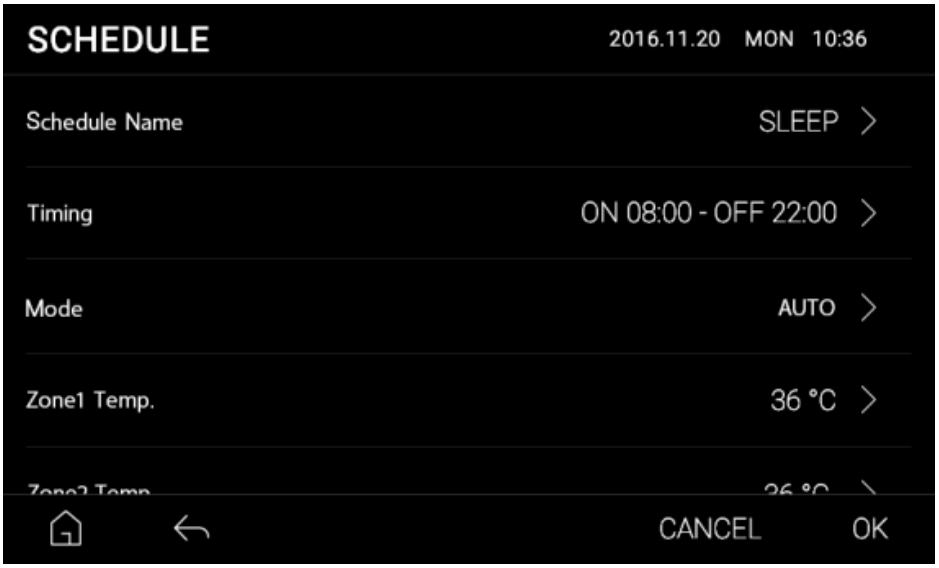
① Add

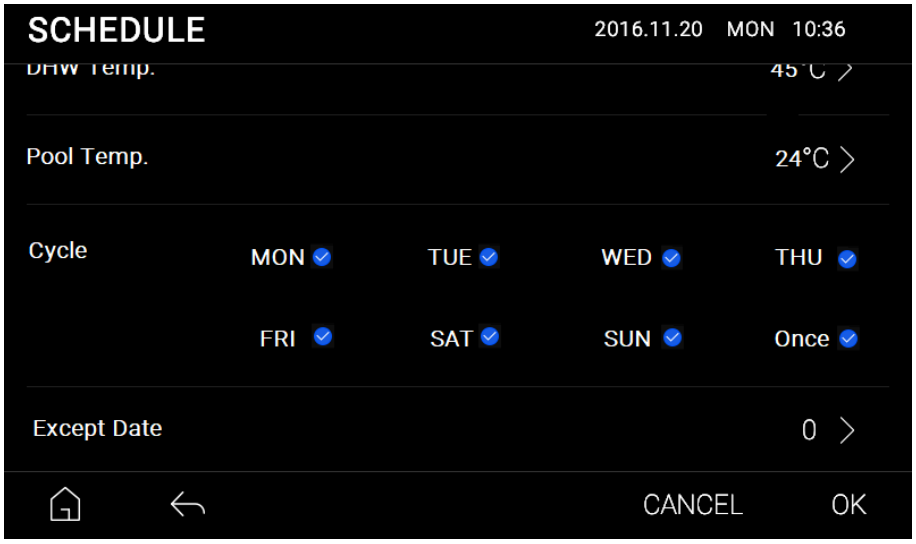
Tap on “SCHEDULE” in picture 6. If schedule has been set, the set of schedule information is displayed. If you enter schedule for the first time, it will be blank like below.



Picture 7

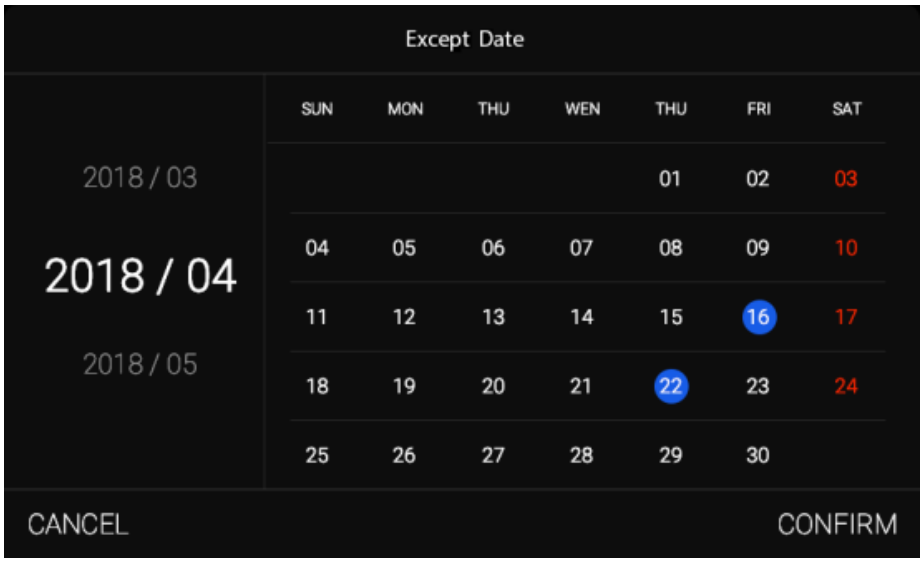
Tap the “+” icon in the center of the screen or the icon at the lower right corner, and tap “ADD” to add a new schedule. You can set schedule on (start) and off (end) time, mode, temperature, and cycle days, etc.





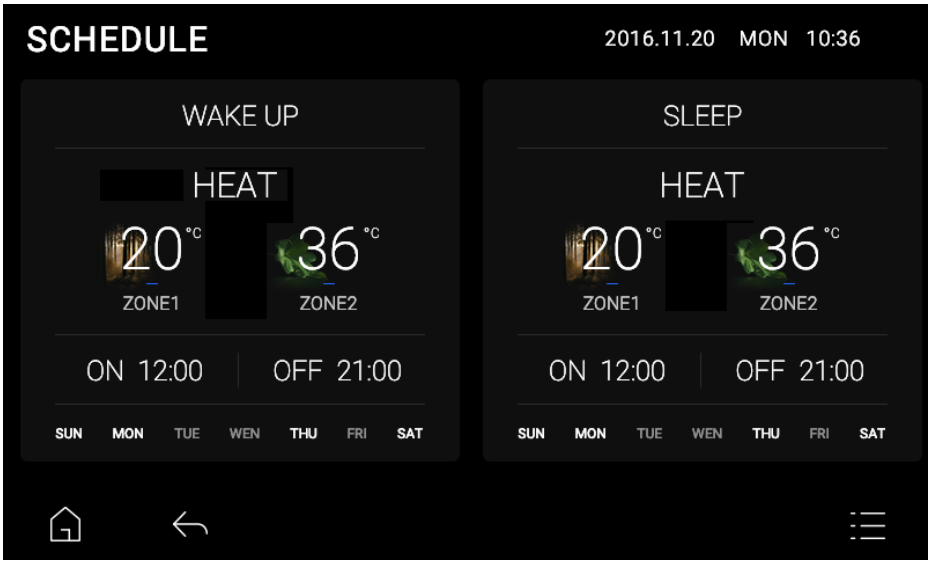
Picture 8

You can set except dates for the schedule in Picture 8. Schedule information is not executed on exceptional days.



Picture 9

Tap “OK” in Picture 8, the display interface is as follows. Repeat steps to add another schedule.

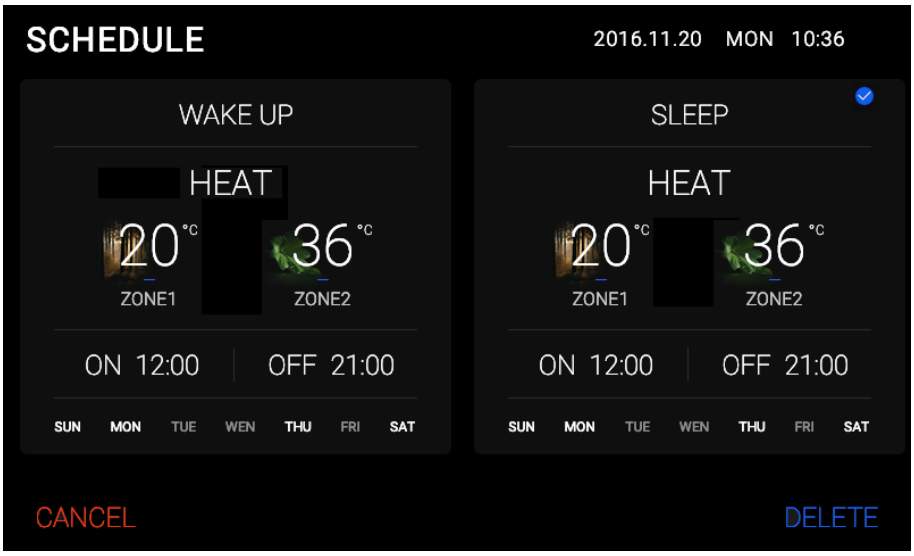


Picture 10

② Delete

First, tap the “DELETE” icon in the Picture 11, then small circle will appear like Picture 12; Second, select the schedules to be deleted. Last, press the “DELETE” icon in the lower right corner.

Picture 11



Picture 12

③ Unavailable

To make a schedule unavailable, tap on the “UNAVAILABLE” icon, see Picture 11. Tap the icon of the desired schedule(s) to unavailable. After tapping “UNAVAILABLE”, unavailable schedules are grayed out as seen in Picture 13.

Picture 13

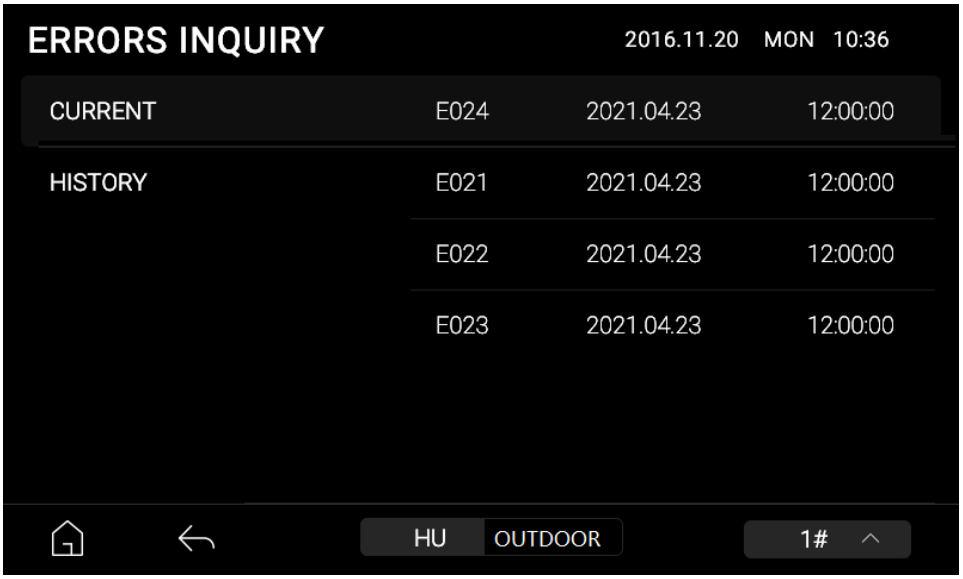
④ Available

To reactivate a schedule that is unavailable, then tap “AVAILABLE” as seen at the lower right of Picture 12. Tap the icon of the desired schedule(s) to reactivate. Then tap “AVAILABLE” at the lower right of the screen to reactivate the schedule information.

Picture 14

2. Error inquiry

Tap “ERROR INQUIRY” in menu to check errors. You can check the fault information of other units by select other indoor units number in the lower right corner of the screen.

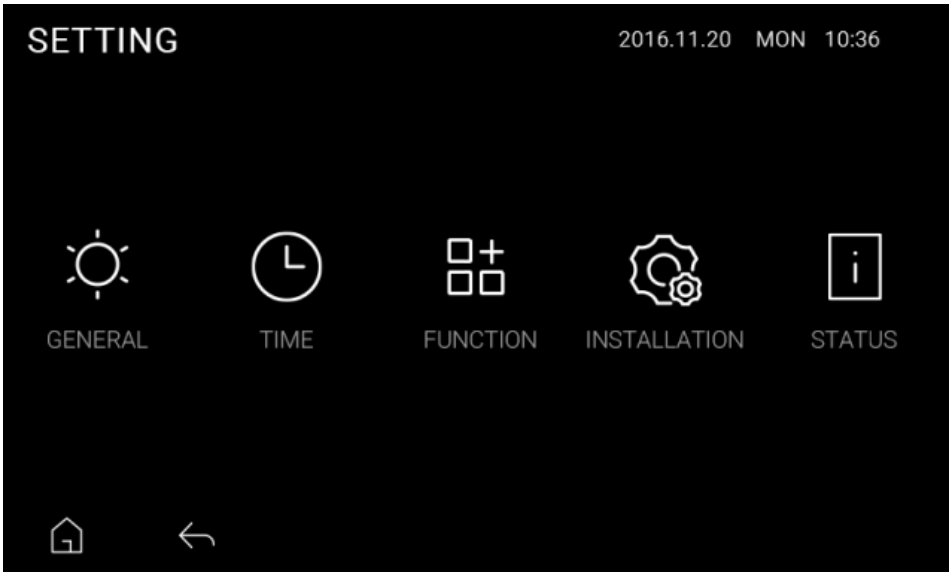


Picture 15

Click the middle position of the lower sidebar of the screen to view the outdoor units’ error parameters.

3. Setting

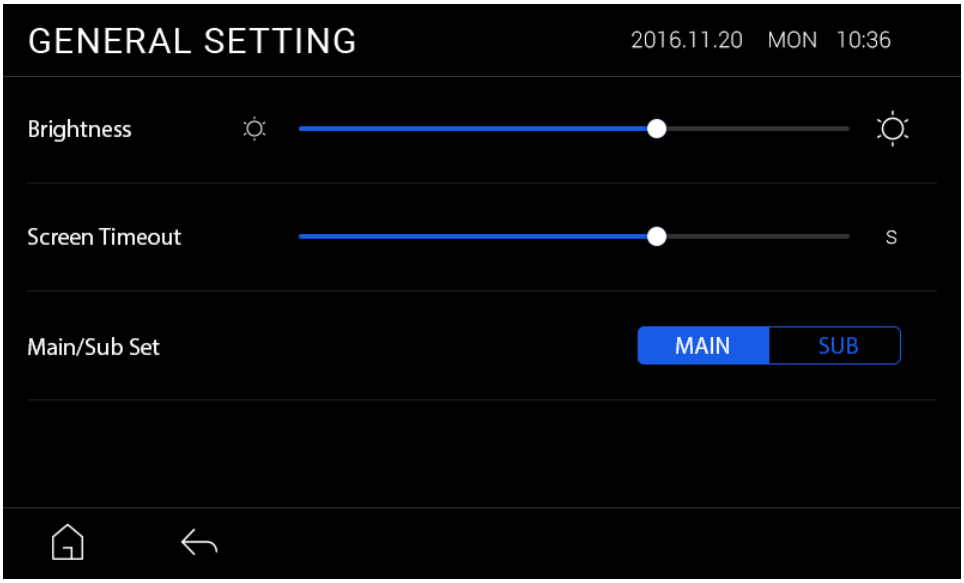
Tap “SETTING” on the interface of Picture 6 to enter the setting interface, shown in Picture 16.



Picture 16

1) General setting

You can change the Backlight brightness, Screensaver time, and Main/Sub controller switch by taping and dragging the slider.



Picture 17

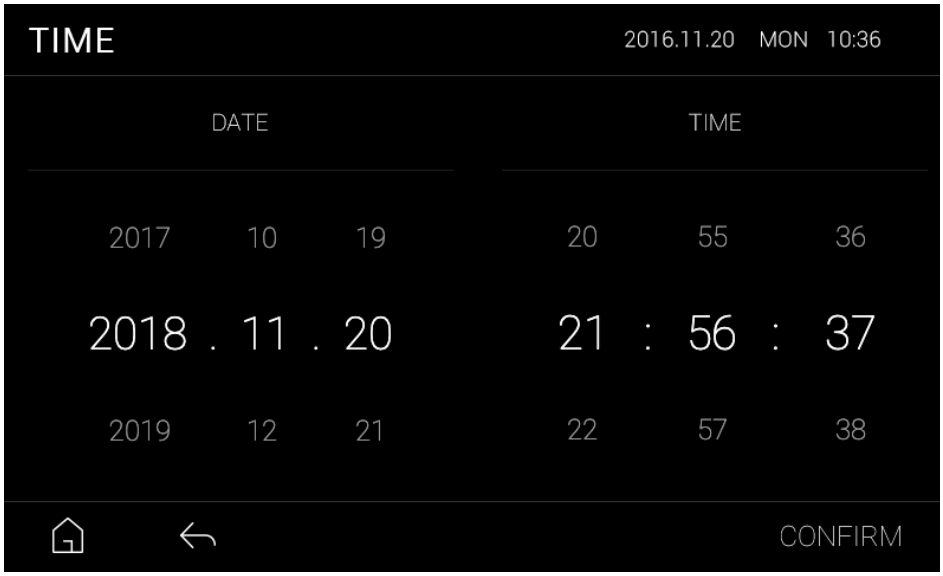
Note:

If the controller is set as a sub controller, the controller can only view the unit parameters and cannot change the unit operation status.

You can set any one of the controllers in the system as Main controller but be sure there is only one main controller in the system at any time. If you want to operate, please do this with the main controller.

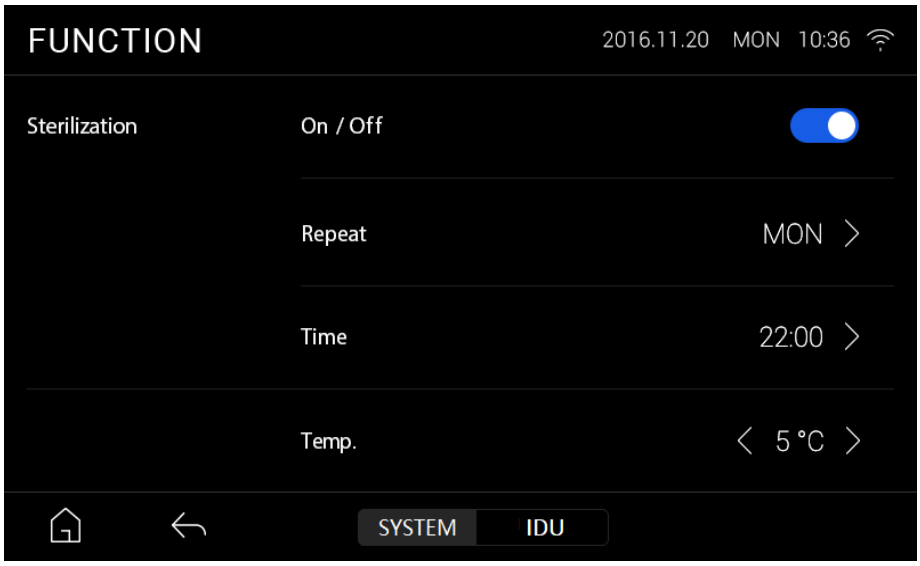
2) Time setting

You can adjust the date & clock time by slide numbers up and down. After adjusting the clock parameters, click the “CONFIRM” to confirm.



Picture 18

3) Function setting



Picture 19

Press “FUNCTION” icon to enter the function setting interface, shown in Picture 20. In this interface, you can turn on or off some common functions, and adjusting its working hours. In this interface, you can set following functions.

System functions of user setting

Function		Parameter Range	Default	Remarks
Sterilization 	Operation	On/Off	Off	When the unit is sterilizing, the sterilization icon is flashing displayed in the main interface
	Week	Monday ~ Sunday	Monday	
	Time	00:00~24:00	23:00	
	Temp.	50°C~75°C	75°C	
ECO (economy) Mode	Operation	On/Off	Off	It's only valid at heating mode. During the energy-saving operation of the unit, the outlet water temperature is △ T lower than the set temperature.
	Time	24 hours	22:00~07:00	
	△ T (Difference between energy saving temperature and actual temperature.)	-15°C~0°C	-5°C	
Holiday Mode	Operation	On/Off	Off	To save energy, a holiday period may be set to lower the temperature during the period.
	Date	Start date ~ End date	Current date~ Current date	
	Setting Temp. of Zone1	0°C~30°C	15°C	
	Setting Temp. of Zone2	0°C~30°C	15°C	
Quiet	Operation	On/Off	Off	To operate quietly during the preset period.
	Time1	Start time ~ End time	Current time~ Current time	
	Time2	Start time ~ End time	Current time~ Current time	
Turbo	Operation	On/Off	Off	Turbo mode is use to increase the capacity of heat pump to achieve higher target temperature.
	Timer	30min/60min/90min/ Continuous	60min	
Fast DHW		On/Off	Off	/
DHW Priority		On/Off	On	No matter what mode the unit is in, the domestic hot water shall be heated first.
Dry Concrete of Zone1		On/Off	Off	/
Dry Concrete of Zone2		On/Off	Off	/
IDU Antifreeze Protection		On/Off	On	/
IDU Antifreeze Temp.		0~15°C	5°C	/

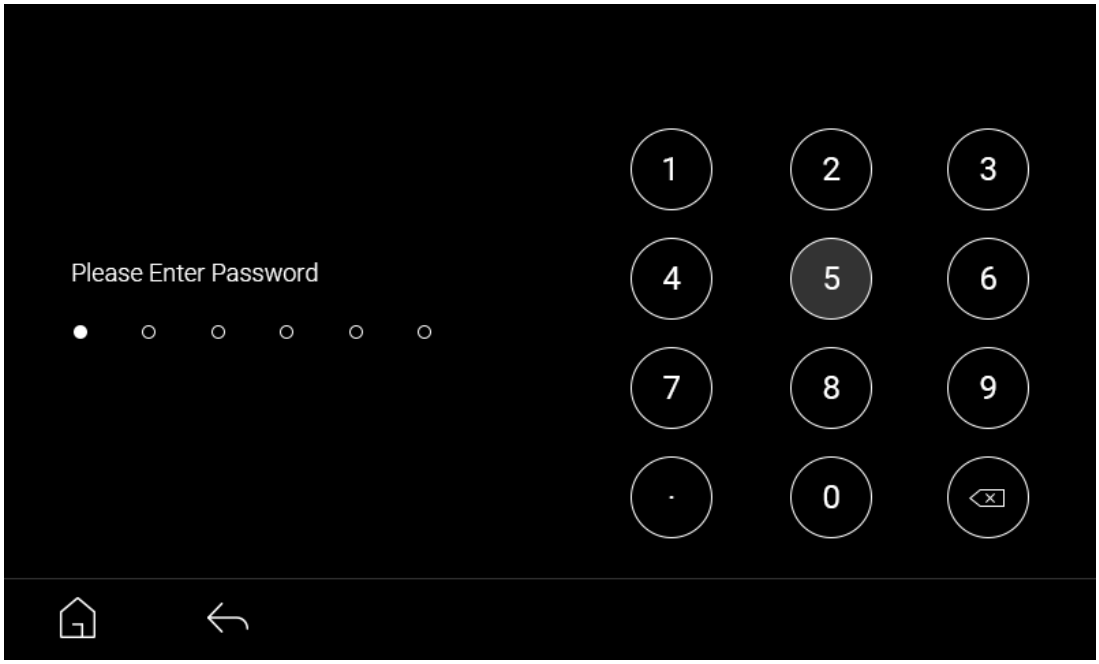
Click the middle position of the lower sidebar of the screen to set the functions of IDU (Indoor Units).
IDU functions of user setting

Function	Parameter Range	Default	Remarks
Force Defrost	On/Off	Off	Each IDU is controlled separately
Heater1 Electric Heating	Auto/Forced ON/Forced OFF	Auto	Each IDU is controlled separately
Heater2 Electric Heating	Auto/Forced ON/Forced OFF	Auto	Each IDU is controlled separately

Note:
① Do not use the system during sterilization in order to prevent scalding with hot water, or overheating of shower.
② Quiet function and Turbo function cannot be turned on at the same time.

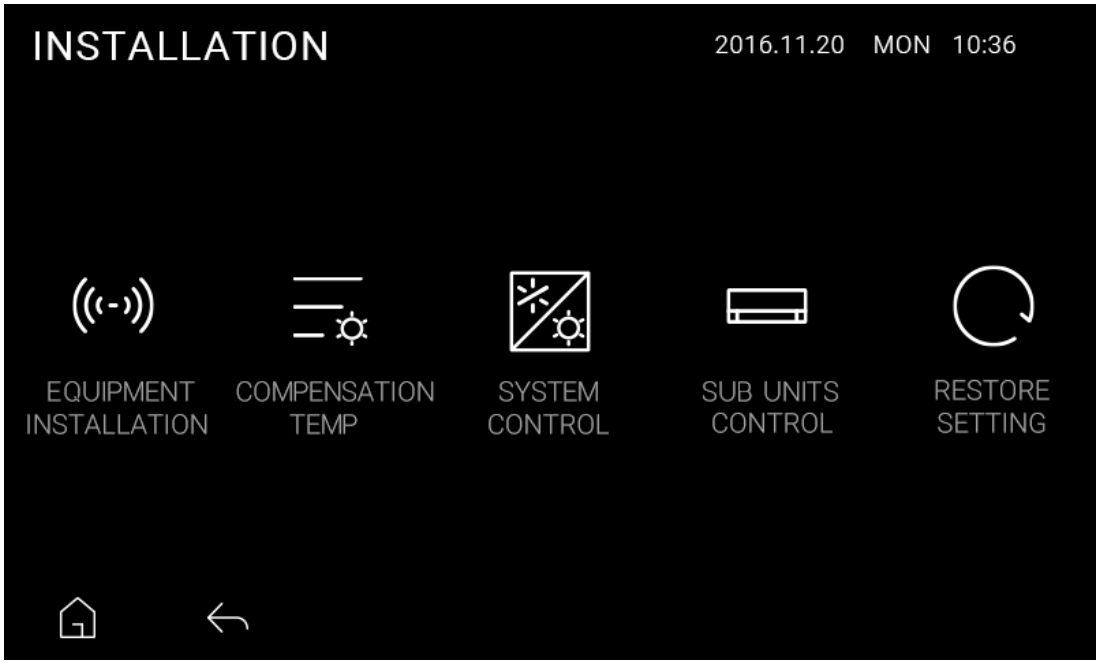
4) Installation

Tap “INSTALLATION” icon in Picture 16, then prompts to enter password interface.



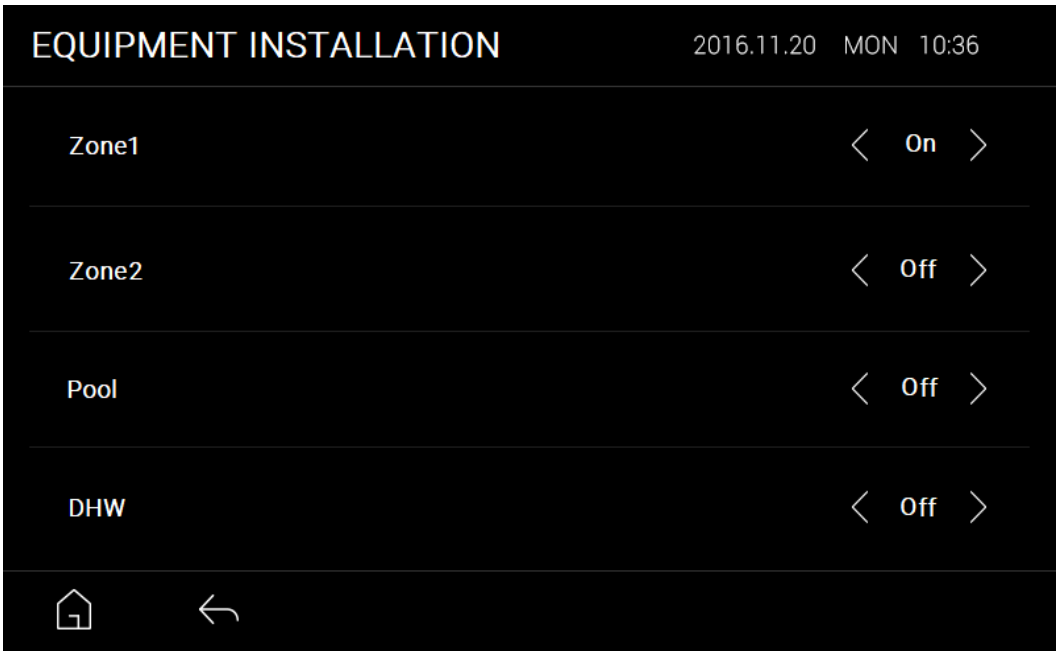
Picture 20

Enter the correct password (841226), go into Picture 21.



Picture 21

① Equipment installation



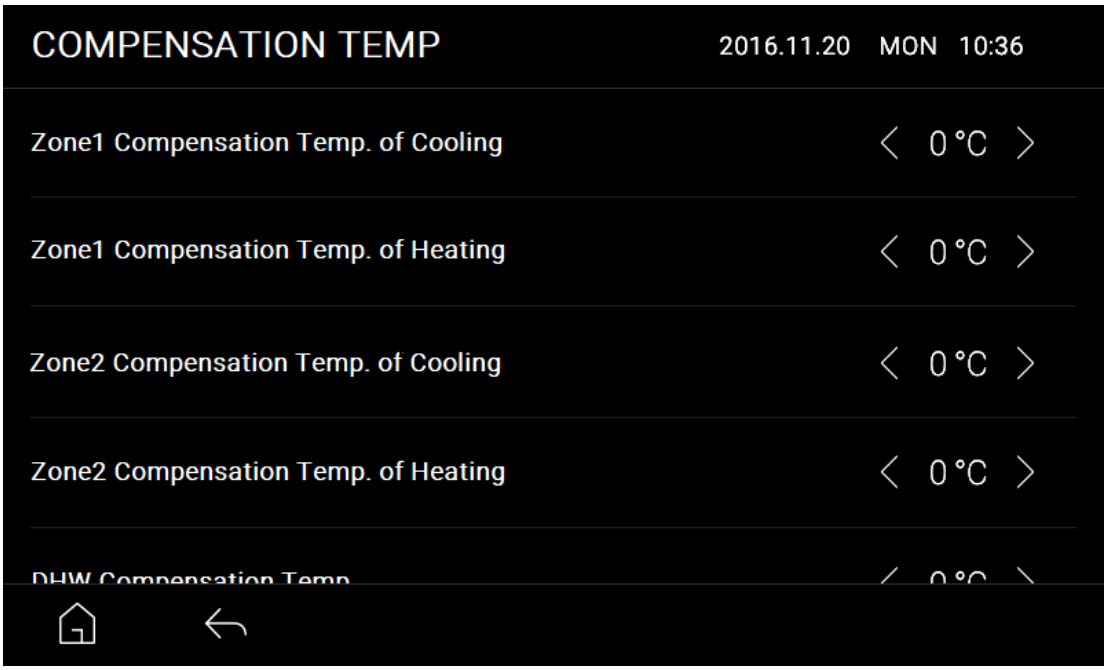
Picture 22

Tap “EQUIPMENT INSTALLATION” icon to enter the unit configuration interface. You can turn on or off the corresponding functions in this interface.

Function	Parameter Range	Default
Zone 1	ON/OFF	ON
Zone 2	ON/OFF	OFF
Pool	ON/OFF	OFF
DHW	ON/OFF	OFF
Buffer Tank	ON/OFF	OFF
Solar Thermistor	ON/OFF	OFF
Allow Cool Mode	ON/OFF	ON
Allow Cool Mode of Zone2	ON/OFF	OFF
SG Ready Control.	ON/OFF	OFF
Bivalent Connection	ON/OFF	OFF
Bivalent Connection Setting Temp.	-20°C~20°C	-10°C

Note: If one Zone in the system, set Zone 1 on; If two zones in the system, set Zone1 on and Zone 2 on.

② Compensation Temp.
Tap “COMPENSATION TEMP.” icon in Picture 22 to enter the compensation temperature setting interface. You can set the compensation temperature for each control object.

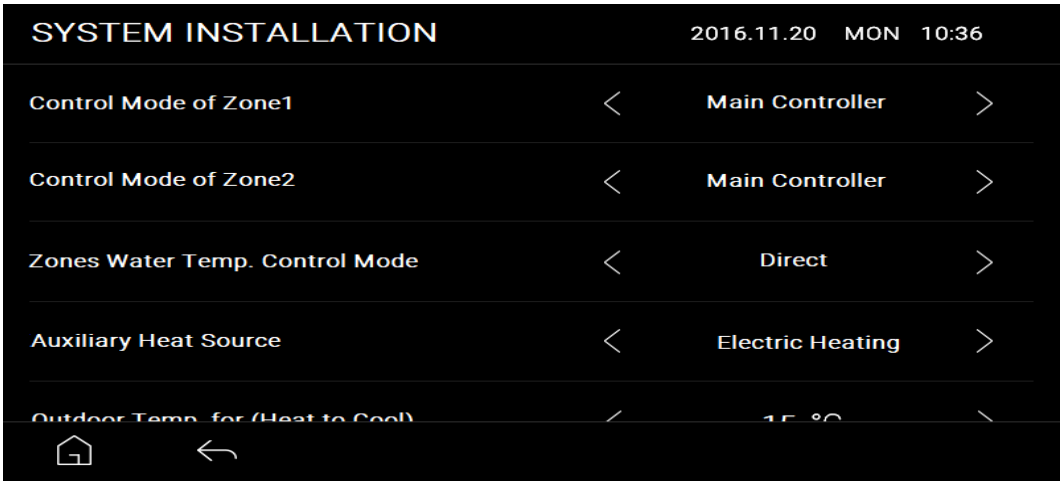


Picture 23

Function	Parameter Range	Default
Zone 1 Compensation Temp. of Cooling	-15~15°C	0°C
Zone 1 Compensation Temp. of Heating	-15~15°C	0°C
Zone 2 Compensation Temp. of Cooling	-15~15°C	0°C
Zone 2 Compensation Temp. of Heating	-15~15°C	0°C
DHW Compensation Temp.	-15~15°C	0°C
Swimming Pool Compensation Temp.	-15~15°C	0°C

Note: Actual target temperature of system=Set target temperature of controller + Compensation temperature

③ System installation
Tap “SYSTEM INSTALLATION” icon in Picture 22 to enter the system control parameters setting interface. You can set the operating parameters for the system.

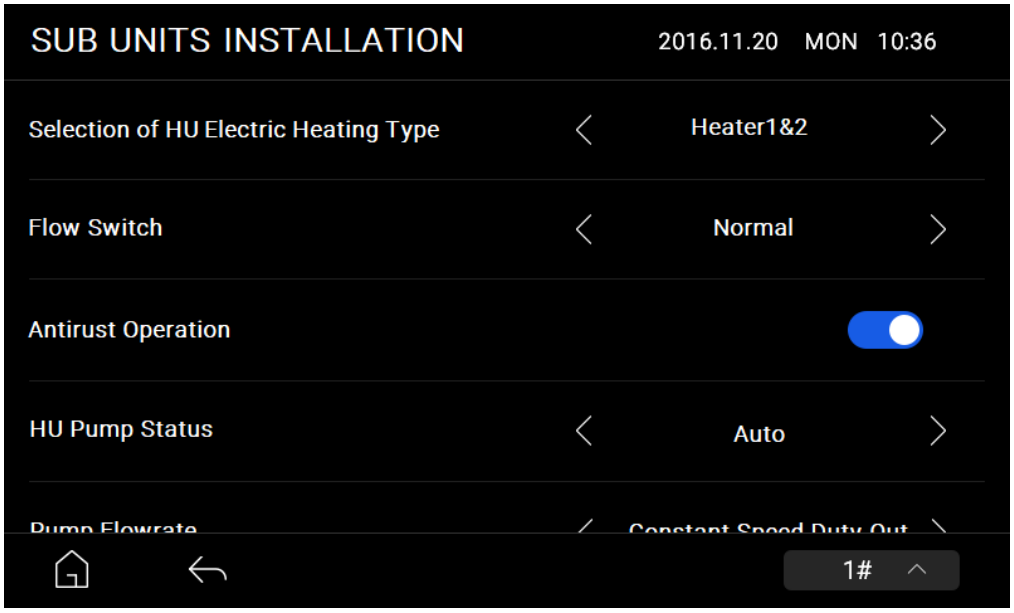


Picture 24

Function	Parameter Range	Default
Control Mode of Zone1	Main controller, Third party controller, IDU ambient Temp. sensor, Indoor controller	Main controller
Control Mode of Zone2	Main controller, Third party controller, IDU ambient Temp. sensor	Main controller
Zones Water Temp. Control Mode	Direct, Auto curve, Set curve	Direct
Auxiliary Heat Source	IDU Electric Heater, Boiler, IDU Electric Heater + Boiler	IDU electric Heating
Outdoor Temp. for (Heat to Cool)	0~30°C	15°C
Outdoor Temp. for (Cool to Heat)	0~30°C	10°C
DHW ON Temp.	30~55°C	45°C
Ambient Temp. of Heating Off	5~35°C	27°C
△ T for Heating ON	0~15°C	6°C
Outdoor Temp. for Heater ON	-20~15°C	0°C
Heater ON Delay Time	0~120min	60min
Heater ON △ T of Target Temp.	-10~2°C	-3°C
Heater OFF △ T of Target Temp.	-8~0°C	-1°C
Tank Re-heat Temp.	-12~2°C	-3°C
△ T for Cooling On	1~15°C	5°C
Travel Time of Mixing Valve	30s~90s	60s

Note:
a. Zones water temperature control mode is valid at zone1 and zone2.
b. Direct: set direct water temperature (fixed value).
c. Auto curve: set water temperature depends on outdoor ambient temperature. The unit automatically adjusts the set temperature according to the curve, which cannot be changed by users.
d. Set curve: set water temperature depends on outdoor ambient temperature. The unit automatically adjusts the set temperature according to the curve, and the curve can be changed by users.

④ Sub units control (1~8unit)
Tap “SUB UNITS CONTROL” icon in Picture 21 to enter the sub IDU parameters setting interface. You can set the operating parameters for the sub IDU unit. If the system contains multiple sub units, you can click the lower right corner of the screen to switch sub units number



Picture 25

Function	Parameter Range	Default
Selection of IDU Electric Heating Type	None, Heater 1, Heater2, Heater 1 +Heater2	Heater 1+ Heater2
Flow Switch	Normal, shielded	Normal
Antirust Operation	ON/OFF	ON
IDU Pump Status	Auto/Open/Close	Auto
Pump Flow Rate Control Mode	△ T Between Out and In Water, Max. Duty Out	Max. Duty Out
IDU Pump Duty Out	0%~100%	0%
Indoor Unit Reset	ON/OFF	OFF
Test Operation	None, Cooling Test, Heating Test	None
△ T of Cool Pump	0~15°C	5°C
△ T of Heat Pump	0~15°C	6°C

⑤ Restore setting

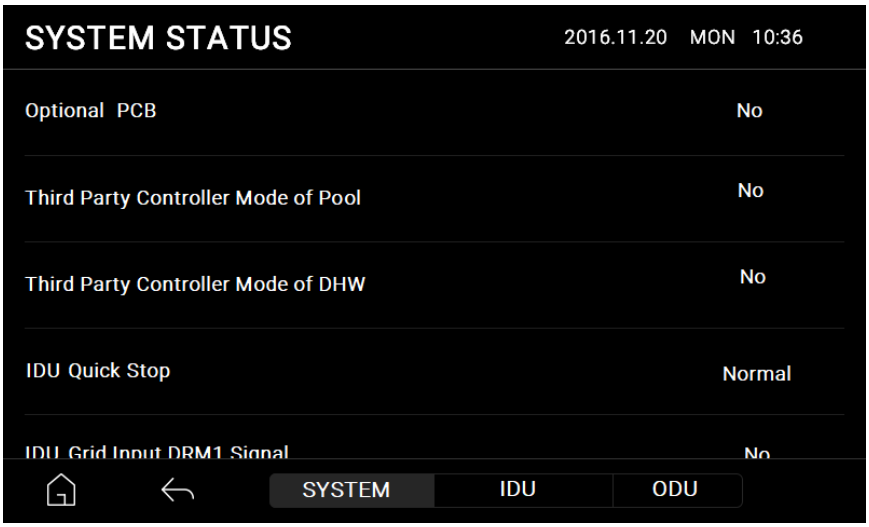
Tapping “RESTORE SETTING”, the system will be resettled to factory defaults and clear all settings.

Picture 26

If you click “YES” to reinitialize, the controller will restart. If you click “Cancel”, then exit POP.

5) Status

Tapping “STATUS” to enter status viewing interface. Click the tab at the bottom of the screen; you can select the parameter category to view. And click options in the lower right corner, you can select the specific object to view the parameters.

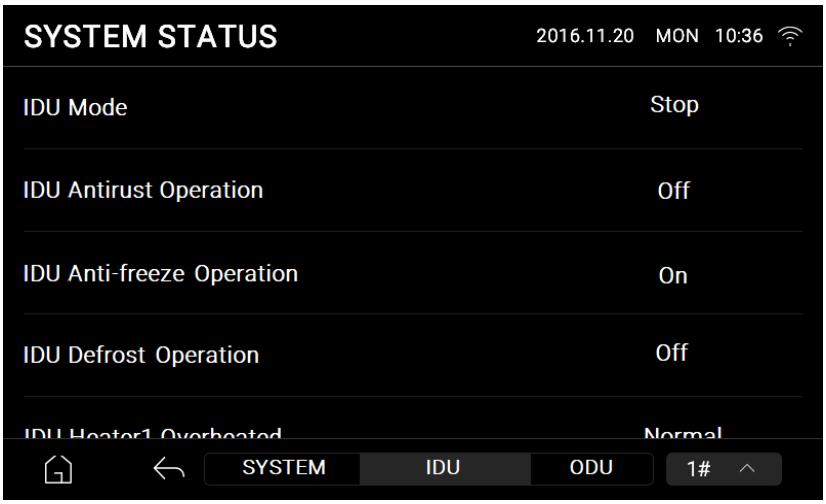


Picture 27

① System

Function	Display accuracy
Optional PCB	ON/OFF
Third Party Controller Mode of Pool	ON/OFF
Third Party Controller Mode of DHW	ON/OFF
IDU Quick Stop	Normal/Stop
IDU Grid Input DRM1 Signal	ON/OFF
IDU Grid Input DRM2 Signal	ON/OFF
IDU Grid Input DRM3 Signal	ON/OFF
Input Status of Water Make-up Micro Switch	ON/OFF
Status of Leakage Proof Electric Valve	ON/OFF
Solar Pump Output	ON/OFF
Solar Sensor Temp.	0.1°C
Gas Boiler Output	ON/OFF
Humidity	1%
Sampling Voltage	0.1°C
Third Party Controller Mode of Zone1	None/Cool/Heat
Pump1 Output of Zone1	ON/OFF
Zone1 Floor Valve State	ON/OFF
Zone1 Indoor Tai_1	0.1°C
Zone1 3Way Valve Twz-1 Temp.	0.1°C
Third Party Controller Mode of Zone2	None/Cool/Heat
Pump1 Output of Zone2	ON/OFF
Opening Status of Zone2 Water Mixing Valve	ON/OFF
Closed Status of Zone2 Water Mixing Valve	ON/OFF
Zone2 Indoor Tai_2	0.1°C
Zone2 Mixing Valves Twz-2 Temp.	0.1°C
Pump3 Output of Pool	ON/OFF
Pump4 Output of Pool	ON/OFF
Opening Status of Pool Water Mixing Valve	ON/OFF
Closed Status of Pool Water Mixing Valve	ON/OFF
Mixing Valve Temp. of Pool	0.1°C
Pool Temp.	0.1°C
Parameter Control of DHW	Wired Controller/Optional PCB
DHW 3Way Valve: ON/OFF	ON/OFF
Sterilization	ON/OFF
Tank Heater Output	ON/OFF
Buffer Tank Temp.	0.1°C
DHW Tank Temp.	0.1°C
0-10V Voltage	0.1V

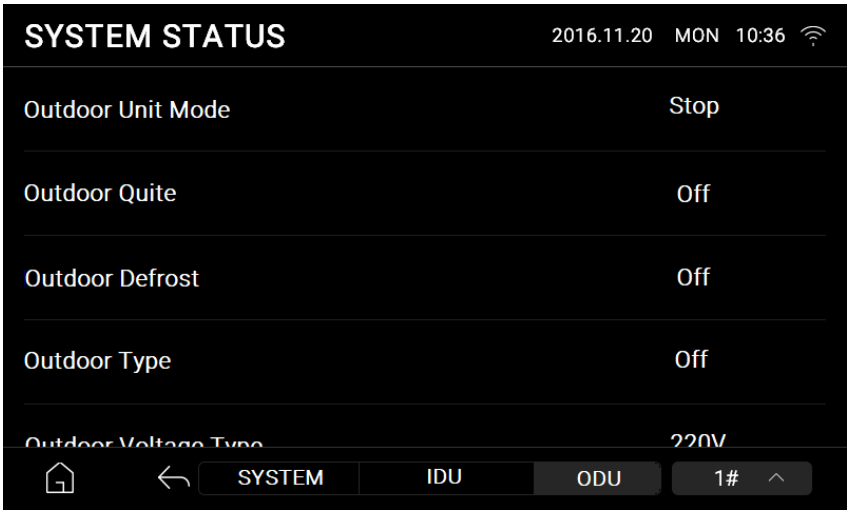
② IDU Status



Picture 28

Function	Display accuracy
IDU Mode	Stop, Cool, Heat, DHW, Pool
IDU Antirust Operation	On/Off
IDU Anti-freeze Operation	On/Off
IDU Defrost Operation	On/Off
IDU Heater1 Overheated	Normal, Overheated
IDU Heater2 Overheated	Normal, Overheated
IDU Heater1(1kW) Output	On/Off
IDU Heater2(3kW) Output	On/Off
IDU Antifreeze Heater Output	On/Off
IDU Pump	On/Off
IDU Solenoid Valve1	On/Off
IDU Solenoid Valve2	On/Off
IDU Flow Switch	On/Off
IDU Low Pressure Switch	On/Off
IDU Pump Duty	0~100%
IDU Pump Actual Speed	r/min
IDU PMV	1pls
IDU Antifreeze Tz Temp.	0.1°C
IDU Inlet Twi Temp.	0.1°C
IDU Effluent Two Temp.	0.1°C
IDU Liquid Pipe Thi Temp.	0.1°C
IDU Gas Pipe Tho Temp.	0.1°C
IDU Flow Meter	0.1L/min
IDU Capacity	0~16
Target Temp. of Indoor Valve	-64~63°C
IDU Cumulative Running Time	1h
IDU Continuous Running Time	1h
IDU Program Version	/
IDU EE Version	/

③ ODU Status



Picture 29

Function	Display accuracy
Outdoor Unit Mode	Stop/Coo/Heat
Outdoor Defrost	ON/OFF
Outdoor Type	/
Outdoor Voltage Type	380V/220V/208V/460V
Outdoor Frequency Type	50Hz/60Hz
Outdoor Refrigerating Capacity	0.5HP
Outdoor Compressor Target Frequency	1rps
Outdoor Compressor Actual Frequency	1rps
Outdoor Fan1 Speed	5rps
Outdoor Fan2 Speed	5rps
Outdoor Electronic Expansion Valve	1rps
Outdoor Target Pd Range	0~5kg
Outdoor Actual Pd Range	0~5kg
Outdoor Target Pd Saturation Temp.	0.1°C
Outdoor Actual Pd Saturation Temp.	0.1°C
Outdoor Target Ps Range	0~5kg
Outdoor Actual Ps Range	0~5kg
Outdoor Target Ps Saturation Temp.	0.1°C
Outdoor Actual Ps Saturation Temp.	0.1°C
Outdoor Td Temp.	0.1°C
Outdoor Ts Temp.	0.1°C
Outdoor Tao Temp.	0.1°C
Outdoor Tdef Temp.	0.1°C
Outdoor Toil Temp.	0.1°C
Outdoor Compressor Module Temp.	0.1°C
Outdoor Compressor Current	0.2A
Outdoor Compressor Voltage	4V
Outdoor Cumulative Running Time	1h
Outdoor Continuous Running Time	1h
Outdoor Program Version	/
Outdoor EE Version	/

Sub Controller Installation

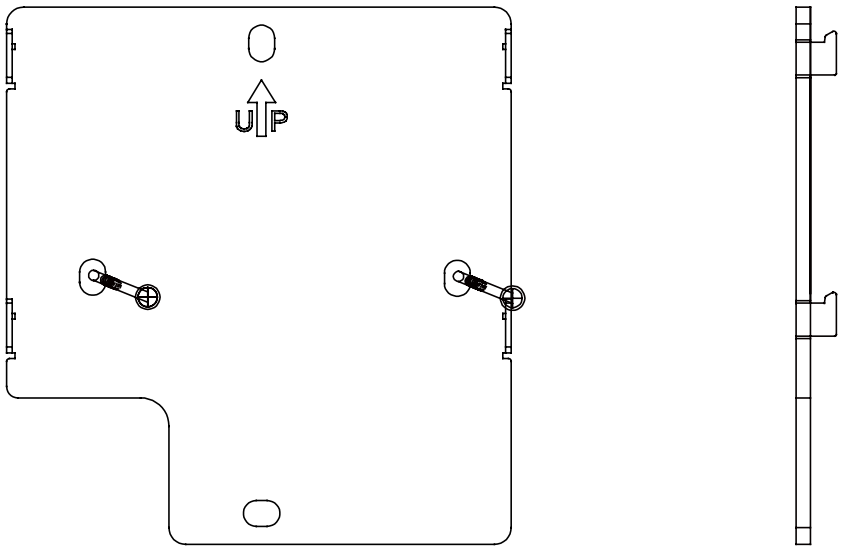
The unit can be connected to the sub controller. Only one main controller is allowed in the whole split system, and the rest controllers are sub. If the controller is set as a sub controller, the controller can only view the unit parameters and cannot change the unit operation status.

Installation condition

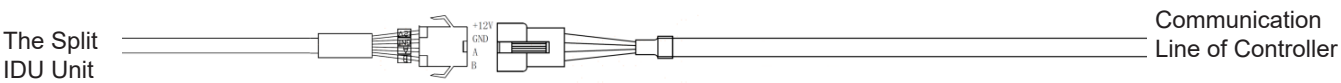
Don’t install near devices that produce electrical interference such as AC motor, radio transmitters like network routers and consumer electronics.
Other electrical noise producers could include computers, auto-door openers, elevators, or other equipment what can produce noise.
Don’t install in wet locations.
It will cause failure if you install in a place that shakes violently.
Don’t install in the place where it is exposed to direct sunlight or near to the heat. This will cause failure.

Mounting control

First, attach the mounting plate to the wall. Using a job box is preferred. Use A and B holes for an 86mm box, use C and D holes for a 120mm box. Please take note of the UP indicator.



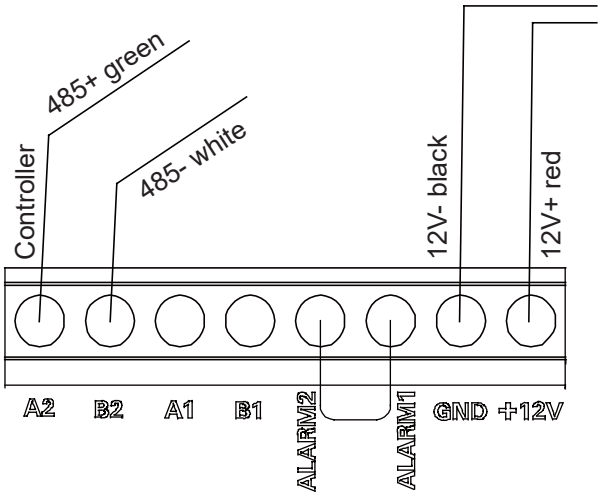
The hanging plate is placed in the direction of the illustration, where A/B is the location of the 86 cassette screws, and the C/D is the position of the 120 cassette screws. The pendant is fixed to the hole of the pendant, please pay attention to the UP direction.
The black terminal of the controller communication line is connected with the black harness terminal at the lower outgoing line port of the unit. The other end of the controller communication line is pressed on the wiring base of the controller, and the corresponding relationship is red~+12V, black~GND, green~A2 and white~B2.
Connection terminal between controller communication line and IDU:

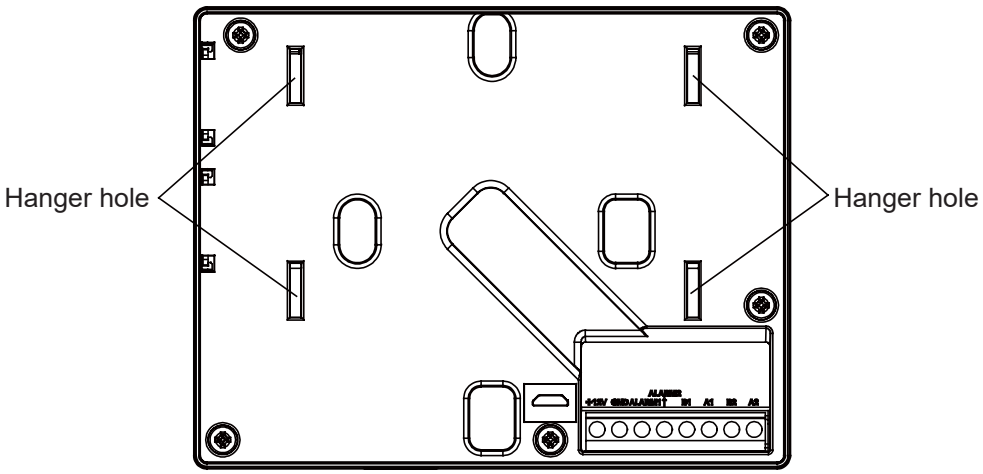


All of the power supply and communication 485 cables between each module and terminal module to the controller are double core shielded twisted-pair cable. Specific wiring as the table below:

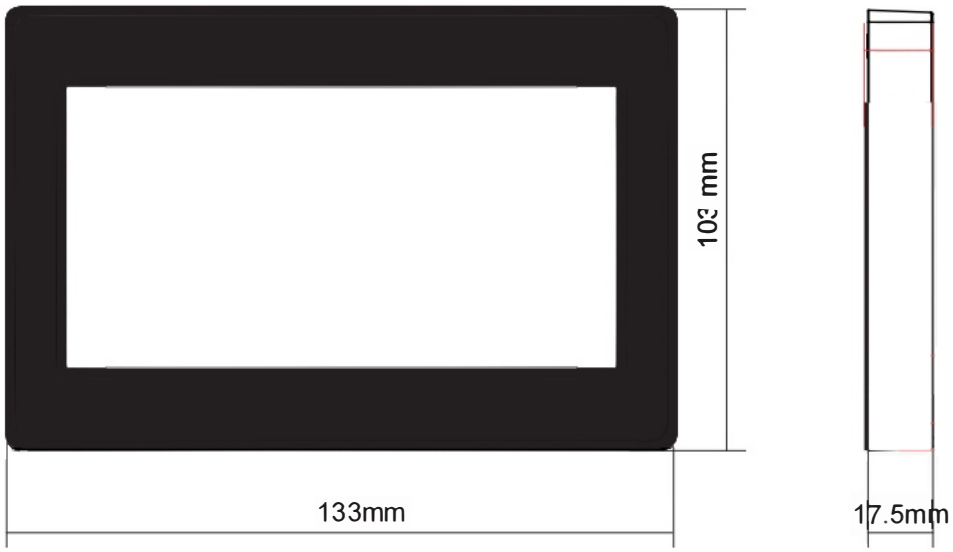
The length of signal line	Wiring dimension
≤100	0.3 mm2×4
100<x≤200	0.5 mm2×4
200<x≤300	0.75 mm2×4
300<x≤400	1.25 mm2×4
400<x≤500	2mm2×4

The communication line is connected with the controller





Controller Dimension:



Fix the screw through the bracket on the 86 cassettes and connect the connection. The red connects to the +12V and black to GND, the green connects to A2, and the white connects to B2. Please pay attention to the line order. Then the controller is fixed down.

Notes:

1. B1 and A1 are unavailable
2. B2 and A2 for 485 interface, access to split unit's 485 B and A, paying attention to line order.
3. ARALM1 and ALARM2 factory default is connected, if not be connected, then the main interface of the central controller will display alarm information, and all indoor units will be turned off.

14. Installation

EUROPEAN REGULATIONS CONFORMITY FOR THE MODELS

CE

All the products are in conformity with the following European provision:
-Low voltage Directive
-Electomagnetic Compatibility

ROHS

The products are fulfilled with the requirements in the directive 2011/65/EU of the European parliament and of council on the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment(EU RoHS Directive)

WEEE

In accordance with the directive 2012/19/EU of the European parliament, herewith we inform the consumer about the dis-posal requirements of the electrical and electronic products.

UKCA

All the products conform to the following UK provision
-Supply of Machinery (Safety) Regulations 2008
-Electrical and Electronic Equipment Regulations 2012

DISPOSAL REQUIREMENTS:

Your air conditioning product is marked with this symbol.This means that electrical and electronic products shall not be mixed with unsorted household waste.Do not try to dismantle the system yourself:the dismantling of the air conditioning system,treatment of the refrigerant,of oil and of other part must be done by a qualified installer in accordance with relevant local and national legislation. Air conditioners must be treated at a specialized treatment facility for reuse, recycling and recovery.By ensuring this product is disposed of correctly,you will help to prevent potential negative cons-equences for the environment and human health.Please contact the installer or local authority for more information.
Battery must be removed from the remote controller and dis-posed of separately in accordance with relevant local and national legislation.

⚠Warning

- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.
- Keep the appliance and its cord out of reach of children less than 8 years.
- Disconnect the appliance from its power source during maintenance service and when replacing parts.
- If the disconnection is not foreseen, a disconnection with a locking system in the isolated position shall be provided.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- We recommend that this appliances be installed properly by qualified installation technicians in accordance with the installation instructions provided with the unit.
- The appliance shall be installed in accordance with national wiring regulations.
- Wiring must be done by a qualified electrician. All the wiring must comply with the local electrical codes.
- Means for disconnection, such as circuit breaker, which can provide full disconnection in all poles, must be incorporated in the fixed wiring in accordance with the wiring rules. Use an ELB (Electric Leakage Breaker). If not used, it will cause an electric shock or a fire. Details of type and rating of fuses, or rating of circuit breakers / ELB is detailed in below part.
- The method of connection of the appliance to the electrical supply and interconnection of separate components is detailed in below part. The wiring diagram with a clear indication of the connections and wiring to external control devices and supply cord is detailed in below part. The cord of the H07RN-F type or the electrically equivalent type must be used for power connection and interconnection between outdoor unit and indoor unit. The size of the cord is detailed in below part.
- The information of dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures is detailed in below part.

Safety

Safety Precautions

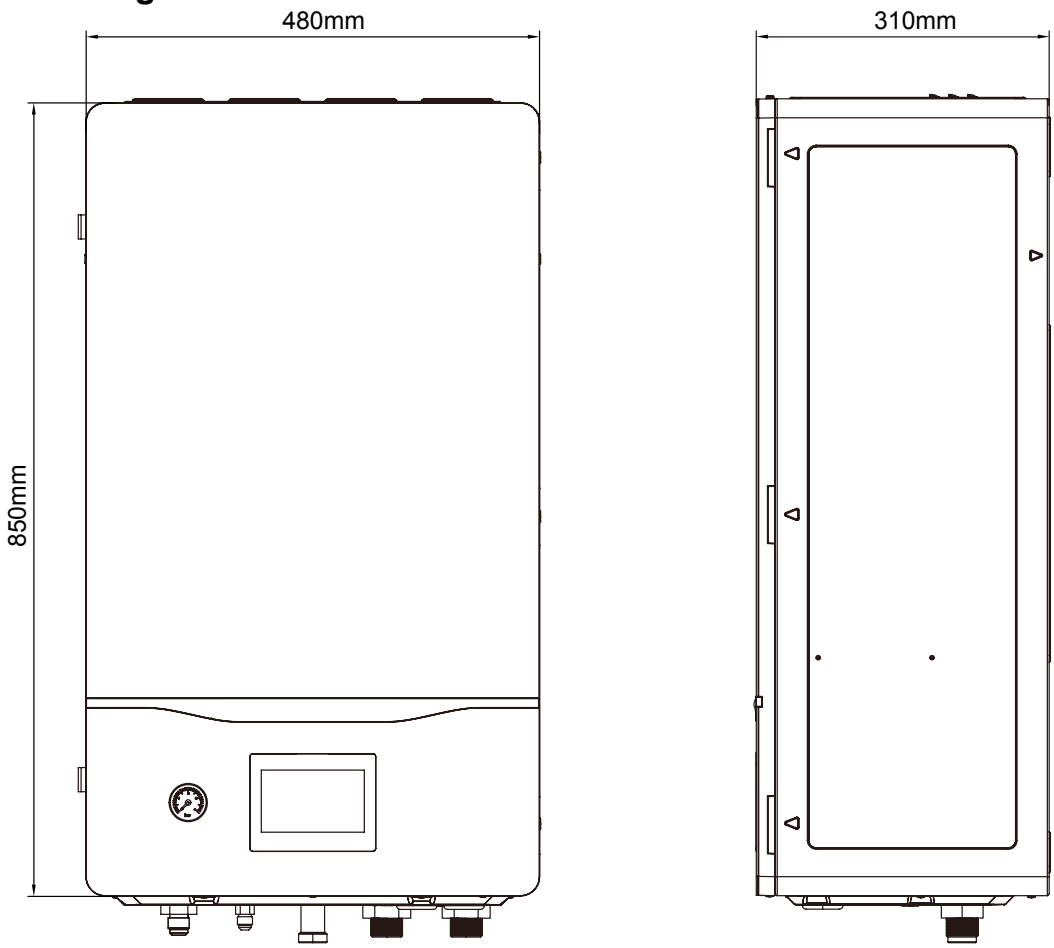
- Read the following "SAFETY PRECAUTIONS" carefully before installation.
- Electrical works and water installation works must be completed by a qualified electrician and qualified water system installer respectively in accordance with local and national building codes.
- The caution items stated here must be followed to minimize the risk of fire, electric shock or personal injury. Incorrect installation due to ignoring of the instruction will cause harm or damage.
- After completion of installation, confirm there is no leakage of water and refrigerant gas. It will cause water damage, electrical shock, fire, explosion or death and may generate toxic gas.
- The installing technician should carry out a trial running to confirm there is no abnormality about the system after completing the installation. Please remind the customer to keep the installation manual for future reference.
- If the unit is transferred to a new user, this manual shall also be transferred along with the machine.
- If there is any doubt about the installation procedure or operation, always contact the authorized dealer for advice and information.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. Any unfit or incompatible material may cause product damage, burst and serious injury.
- Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other electrical appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.
- Do not tie up the power supply cord into a bundle by band. Abnormal temperature rise on power supply cord may happen.
- Children should be prevented access to the equipment. Keep the package material away from children.
- Do not expose the appliance to heat, flame, sparks. or other sources of ignition. Else, it may explode and cause injury or death.
- Use only Airwell accessories and components with this equipment. Failure to use unapproved or 3rd party accessories could result in damage, electrical shock or fire.
- Do not add or replace refrigerant other than the specified, it may cause product damage, burst and Injury etc.
- Make sure installation is completed by authorized dealer or technician, installation done by the user it will cause water leakage, shock or fire.
- Take measures to protect the equipment against severe weather and earthquakes during installation.
- Install at a strong and firm location which is able to withstand weight of the set. If the strength is not enough or installation is not property done, the set will drop and cause injury.
- Tighten the flare nut with torque wrench according to specified method. If the flare nut is over tightened, the flare may break and cause refrigerant gas leakage.
- Make sure there is adequate ventilation in the room if refrigerant gas leakage occurs during operation. It may cause explosion or toxic gas generation.
- The unit is only for use in closed water system. An open water circuit may lead to excessive corrosion of water piping and risk of incubating bacteria colonies, especially Legionella in water.
- The piping installation work must be flushed before indoor unit is connected to remove contaminants. Contaminants may damage the Indoor Unit components.
- Both the liquid and gas refrigeration lines should be insulated or condensate water damage could occur.
- Consideration should be given for locating the outdoor equipment. Air discharging from equipment can damage plants and vegetation.
- Follow equipment clearance requirements when installing this equipment. Adequate clearance should be given for service access and maintenance.
- This system is multi supply appliance. All circuits must be disconnected before accessing the unit terminals.
- This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, may cause electrical shock in case of equipment breakdown or insulation breakdown.
- Do not install this appliance in a laundry room or other high humidity location. This condition will cause rust and damage to the unit.
- Make sure the insulation of power supply cord does not contact with hot part to prevent from insulation failure (melt).
- Do not apply excessive force to water pipes that may damage the pipes, it may cause water leakage and damage to other properties.
- Select an installation location which is easy for maintenance. Any incorrect installation, service or repair of this indoor unit may result in damage or injury to the unit and other properties.

Safety

- Make sure that drainage piping is installed properly according to this instruction, preventing the water entering the room and cause damage to properties.
- Take use of the attached accessories parts and specified parts for installation. Otherwise, it will cause the drop of unit, water leakage, fire or electrical shock.
- This installation must be subjected to building regulation approval applicable to respective country that may require to notify the local authority before installation.
- For refrigeration system work, install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.
- Do not install the Indoor unit at place where leakage of flammable gas may occur. In case gas leakage and accumulates at surrounding of the unit, it may cause fire.
- Please use tap water and confirm that the water quality is not hard. If hard water quality is used, the lifespan of backup heater, heat exchanger, various valves, electric heating etc. will usually be shorten.
- Do not disconnect the power supply of the unit when it is not in operation. The water pump will run regularly for a period of time to avoid water freezing. Otherwise, freezing may occur and causes system damage.
- Be sure to drain the circulating water in the system out when the unit will be not in use for a long time. If the power supply is turned off directly without pumping out the circulating water in the system, the system will be damaged due to freezing. If the interval between the installation and putting into use exceeds 1 month, please pump out the circulating water in the system.
- Be sure to install earth leakage circuit breaker. If the earth leakage circuit breaker is not installed, it may cause electric shock or fire.
- Please set the water pump piping according to the installation instructions to ensure smooth drainage, and heat insulation of the piping to prevent condensate accumulation. Poor piping will lead to water leakage or poor function.
- Make sure that the unit must be at least 1m away from the TV or radio to avoid image interference or noise.

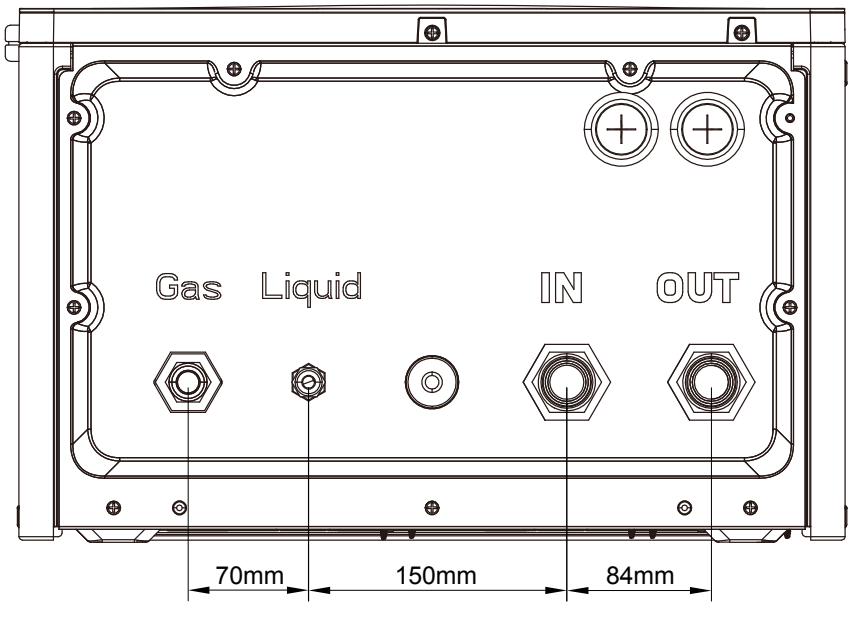
Installation Instructions

Dimension Diagram



Front View

Side View

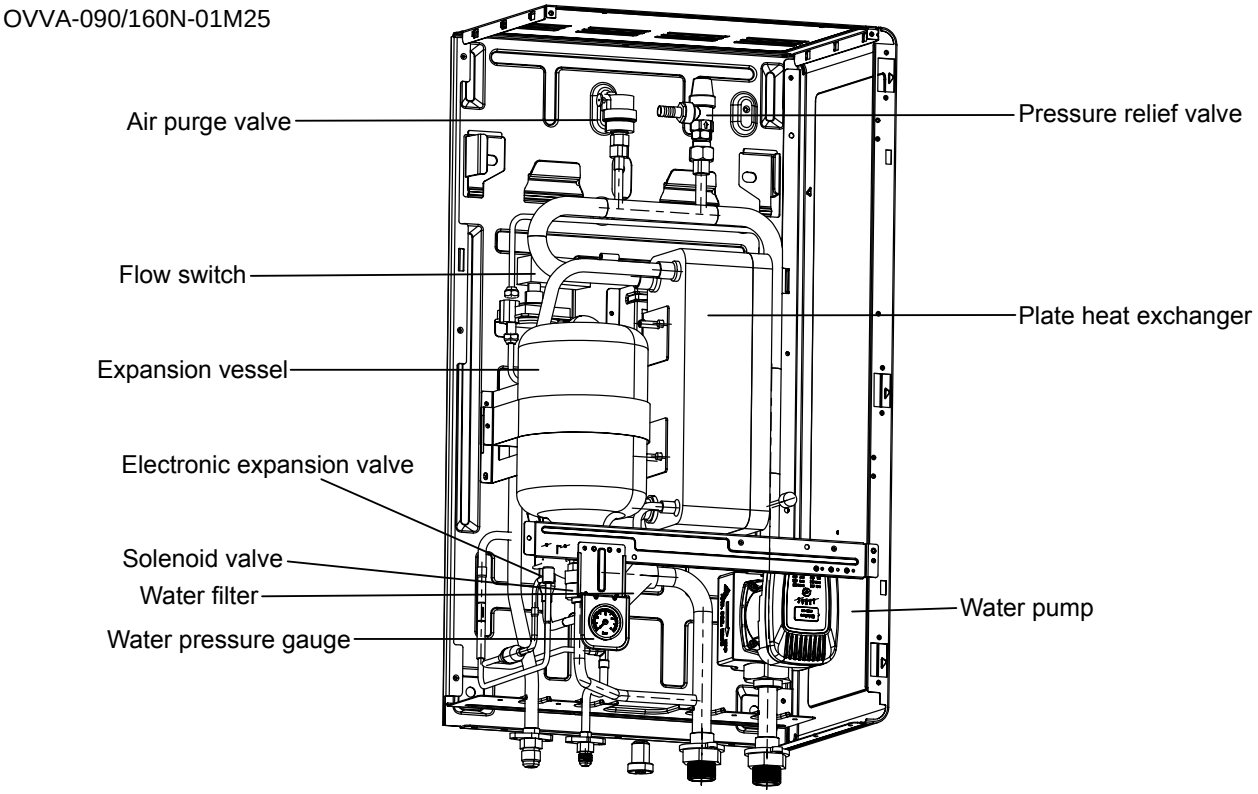


Bottom View

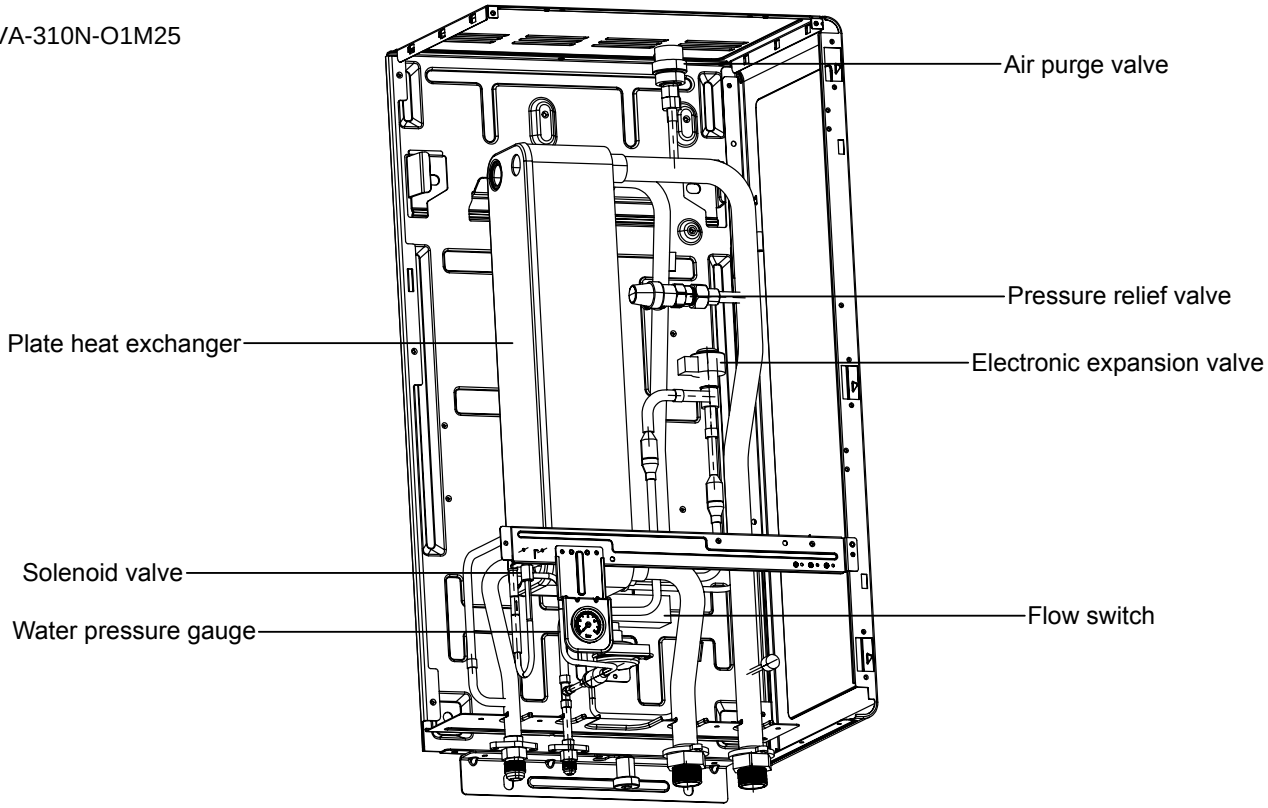
Installation Instructions

Main Components diagram

OVVA-090/160N-01M25



OVVA-310N-O1M25

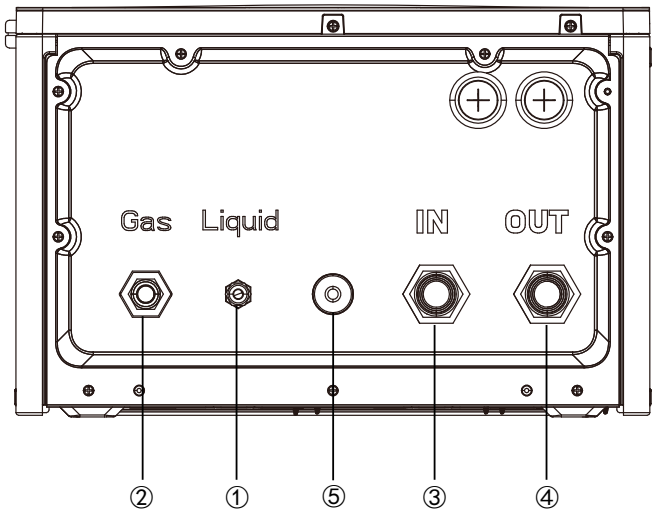


Installation Instructions

⚠ CAUTION

- Expansion tank should be overhauled once a year, Please replace and update in time if necessary.
- When the water capacity of the water system is more than 180L, an additional expansion tank is required.
- The air purge valve does not have a check function. When replacing the air purge valve, drain the water in the system to prevent water leakage.

Pipe Position Diagram



No.	Pipe Description	Connection Size (in.(mm))		
		OVVA-090N-O1M25	OVVA-160N-O1M25	OVVA-310N-O1M25
①	Refrigerant liquid pipe	3/8(9.52)	3/8(9.52)	3/8(9.52)
②	Refrigerant gas pipe	5/8(15.88)	5/8(15.88)	3/4(19.05)
③	Water inlet pipe	1	1	1-1/4
④	Water outlet pipe	1	1	1-1/4
⑤	Drain pipe	1	1	1

Installation Instructions

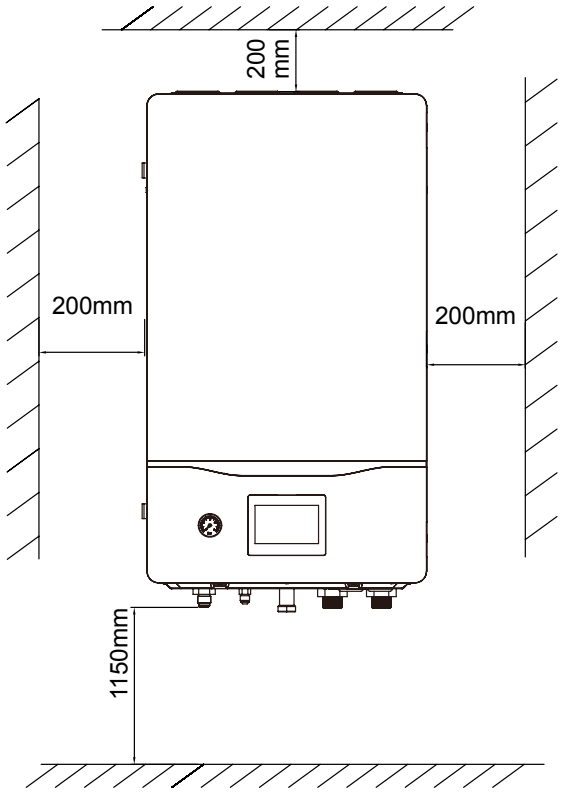
A. Select the Best Installation Location

The unit must be installed indoors, and the requirements are as follows.

- The indoor unit must be installed on a vertical wall.
- The mounting wall must be even and nonflammable, it must be strong and solid enough to hold the unit and prevent it from vibration.
- There should not be any heat source or steam near the indoor unit.
- A place where freezing, leakage of corrosive gas and flammable gas or dust, carbon fibre or flammable particals suspension will never occur around the unit.
- A place where the ventilation is enough.
- A place where drainage can be easily done (e.g. Utility room).
- A place where the operation noise will not cause discomfort to the user.
- Ensure there is enough clearance around the unit from wall, ceiling, or other equipment for service and air circulation.
- The recommended minimum installation height for indoor unit is 1150mm.

Note:

- If there's any possibility of small animals entering the unit from pipe outlet, then block it.
- Do not install the unit outdoors. The unit is designed for indoor installation only.
- When install electrical equipment at wooden building of metal lath or wire lath, according to electrical facility technical standard, no electrical contact between equipment and building is allowed.



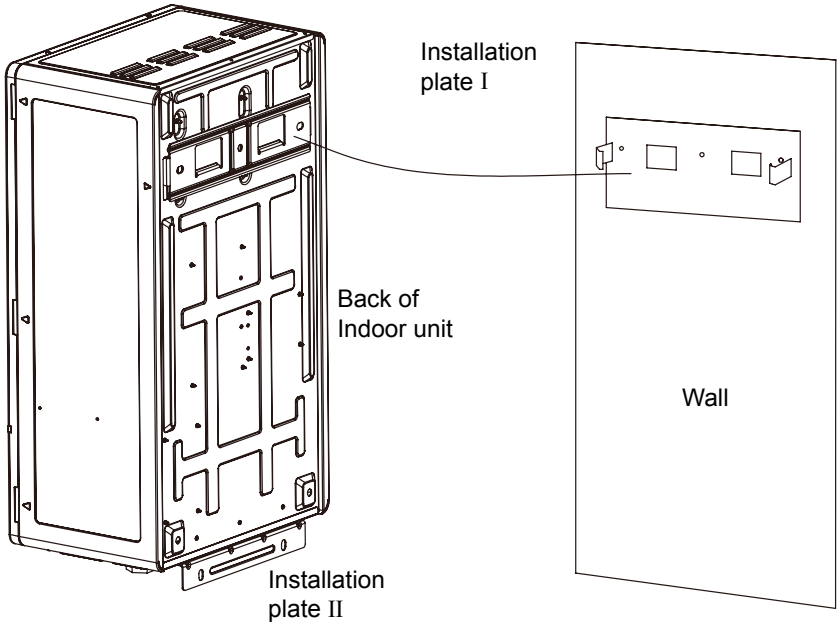
B. Fix the Installation Plate

- The distance between the center of installation plate and left or right wall shall be more than 440 mm.
- The distance from ground to the lower edge installation plate I should be more than 1800mm.
- Mount the installation plate I horizontally by aligning the marking thread and check with a level gauge.
- The installation plate I shall be fixed to the wall with 3 bolts of size M8.

Installation Instructions

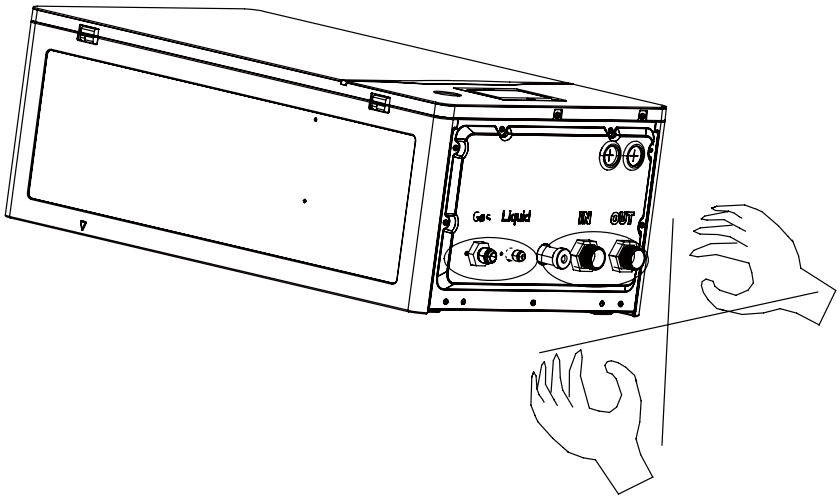
C. Indoor Unit Installation

- Secure the installation plate II to the bottom of the unit with 3 screws.
- Lift up the unit and hang the slots behind of the unit on the hook of the installation plate I.
- Fix the installation plate II on the wall with 3 bolts of size M8.



⚠ CAUTION

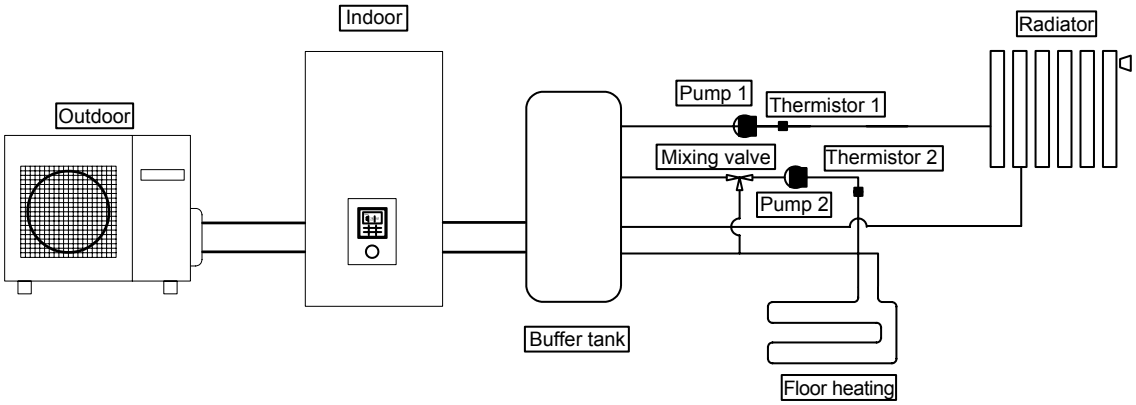
Do not lift the indoor unit by holding the refrigerant and water pipes to prevent damage of the pipes during the installation.



Installation Instructions

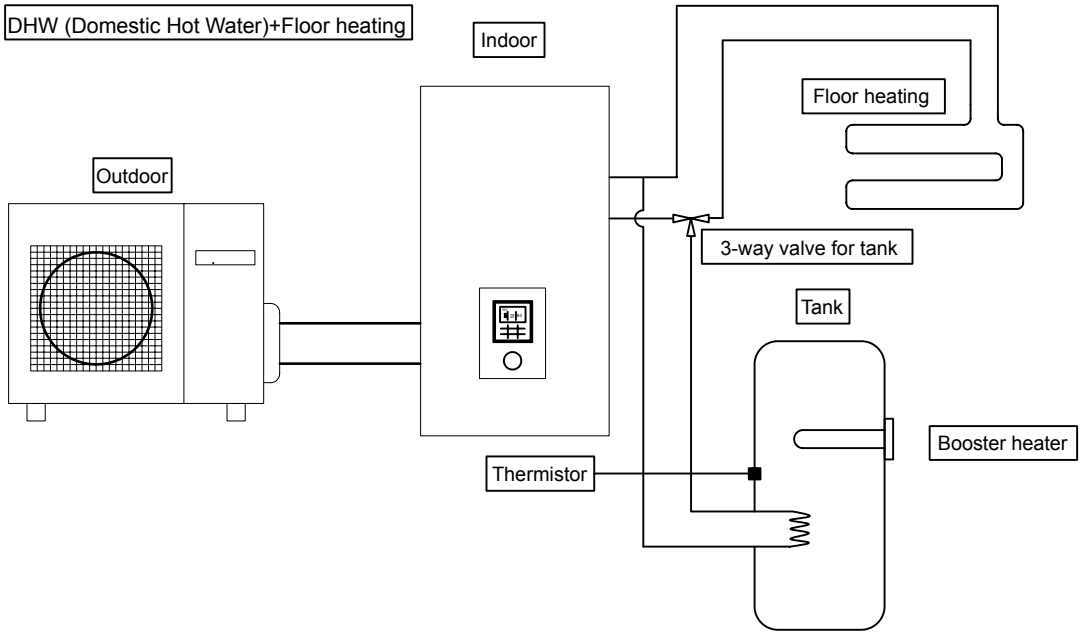
D. Water Piping Installation

Floor heating+Radiator



- Connect floor heating or radiator to 2 circuits through buffer tank as shown in figure.
- Install pumps and thermistors on both circuits.
- Install mixing valve in the circuit with lower temperature among the 2 circuits.(Generally, if install floor heating and radiator circuit, install mixing valve in floor heating circuit.)
- Remote controller is installed on indoor unit.

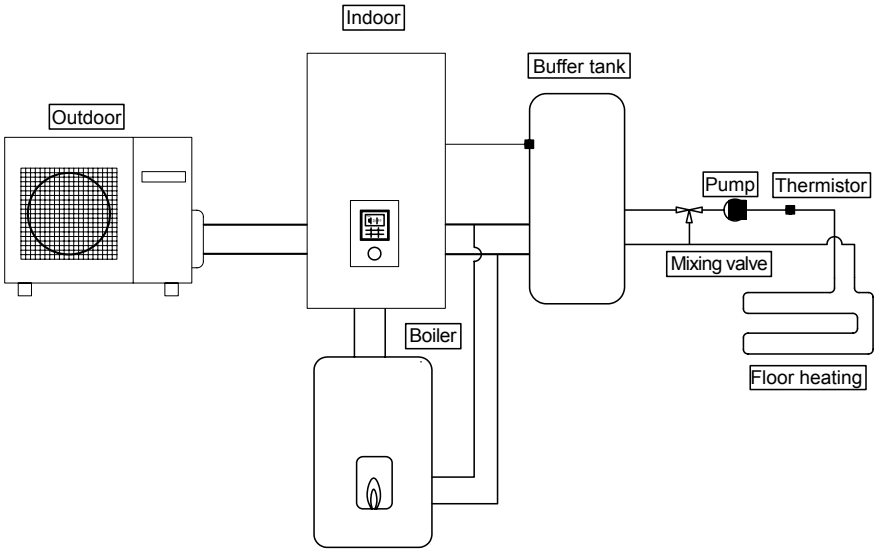
DHW (Domestic Hot Water)+Floor heating



- This is an application that connects the DHW tank to the indoor unit through 3-way valve.
- DHW tank's temperature is detected by tank thermistor.

Installation Instructions

Boiler connection



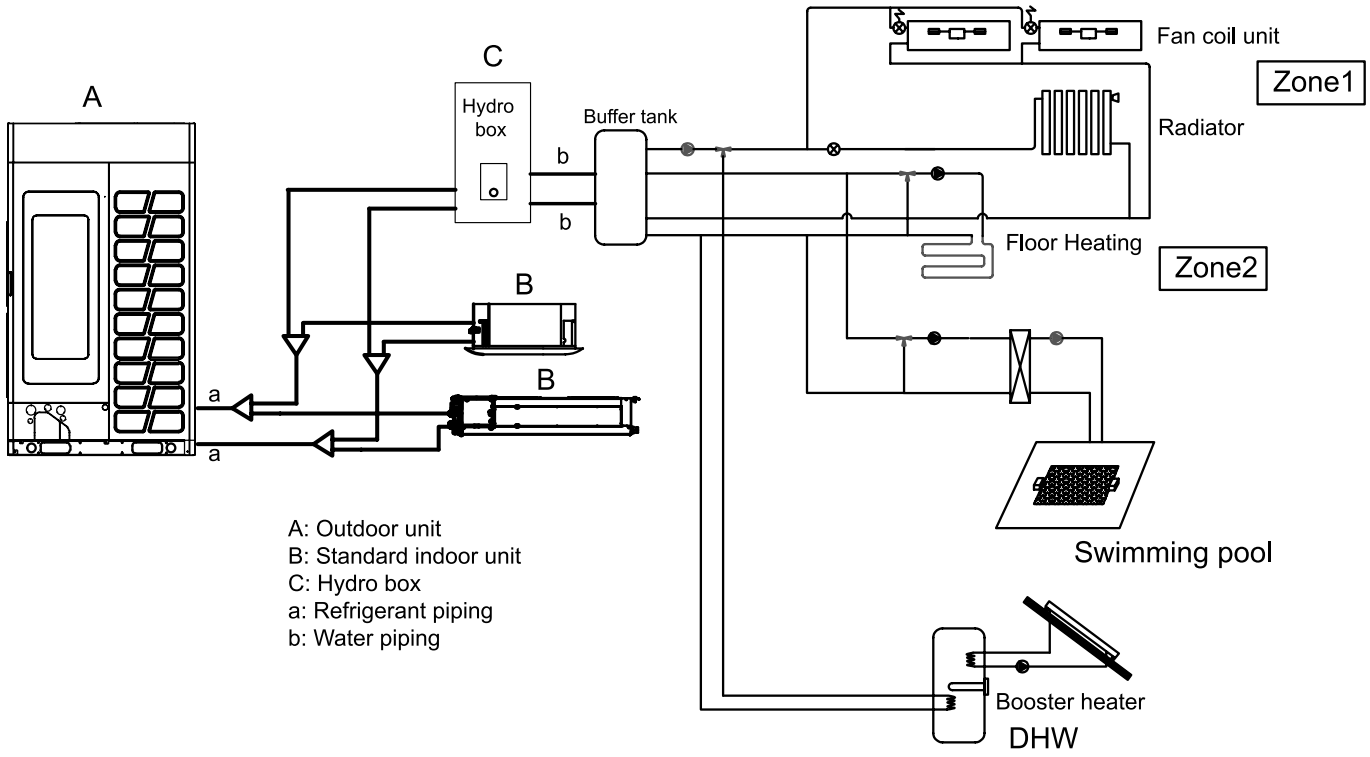
- This is an application that connects the boiler to the indoor unit, to compensate for insufficient capacity by operate boiler when outdoor temperature drops & heat pump capacity is insufficient.
- Boiler is connected parallel with heat pump against heating circuit.
- Besides that, an application that connects to the DHW tank's circuit to heat up tank's hot water is also possible.
- Depending on the settings of the boiler, it is recommended to install buffer tank as temperature of circulating water may get higher.
- Mixing valve、Thermistor、Thermistor1、Thermistor2、Pump1、Pump2、3-way valve need to be purchased locally.

External device	Maximum cable length	Remark
Floor valve	50 m	2 × min 1.5 mm²
Three-way valve	50 m	3 × min 1.5 mm²
Mixing valve	50 m	3 × min 1.5 mm²
Room thermostat	50 m	4 or 3 × min 0.5 mm²
Tank heater	50 m	2 × min 1.5 mm²
Extra pump	50 m	2 × min 1.5 mm²
Boiler contact	50 m	2 × min 1.5 mm²
External control	50 m	2 × min 0.5 mm²
Tank sensor	30 m	2 × min 0.3 mm², R25=10kΩ
Room sensor	30 m	2 × min 0.3 mm², R25=10kΩ
Buffer tank sensor	30 m	2 × min 0.3 mm², R25=10kΩ
DHW sensor	30 m	2 × min 0.3 mm², R25=10kΩ
SG signal	50 m	2 × min 0.3 mm²
Wired controller	100 m	4 × min 0.75 mm²

Sensor specification、R25=10K, B25/50=3700K

Installation Instructions

Floor heating + Radiator + DHW (Domestic Hot Water) + Swimming pool + Standard indoor unit



E. Product connection form

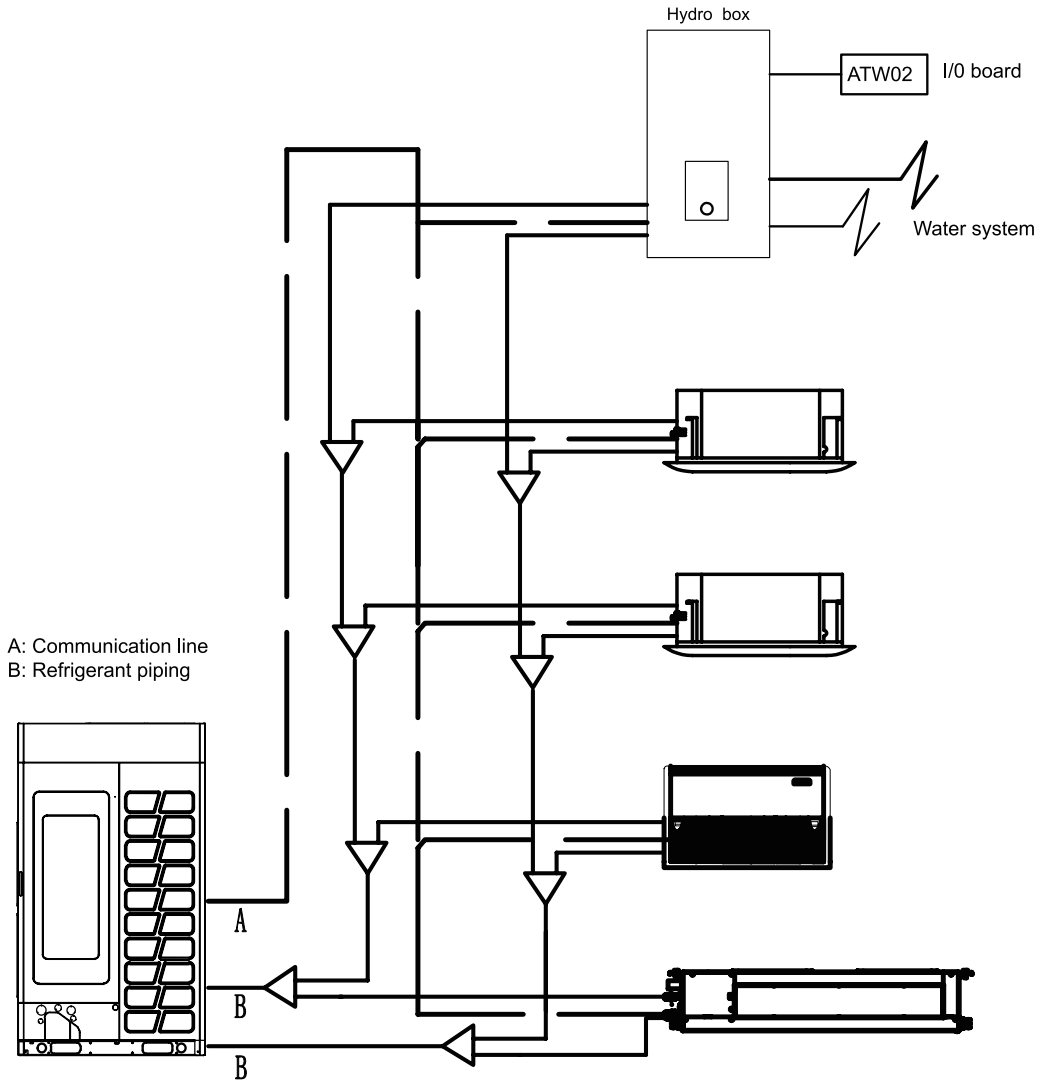
The Hydro box is connected with the standard indoor unit. As it involves the demand for hot water in summer, VIP settings need to be added to the control of heating mode and cooling mode. If there is no VIP setting, first come first or last come first; If there is VIP setting, the mode required by VIP setting is the main mode.

① When there is no VIP setting for the standard indoor unit, it is the same as the current common indoor unit control, with the first entry as the main or the last entry as the main (the same as the external unit dial setting);

② When setting VIP for Hydro Box, the input mode of Hydro Box is the main mode.

Installation Instructions

Floor heating + Radiator + DHW (Domestic Hot Water) + Swimming pool + Standard indoor unit



Note:

1. When the standard indoor unit and the Hydro Box are cooled at the same time and the return water temperature is less than 15 °C, the effect of the Hydro Box will be reduced, and it is not recommended to use both.
2. When the standard indoor unit and the Hydro Box are heated at the same time.

① If the floor heating (or fan panel) mode of the Hydro Box is used, the heating effect of the Hydro Box can be rapidly improved after the standard indoor unit is turned off; If the floor heating is turned on for the first time in winter, it takes 1-2 days to preheat the building.

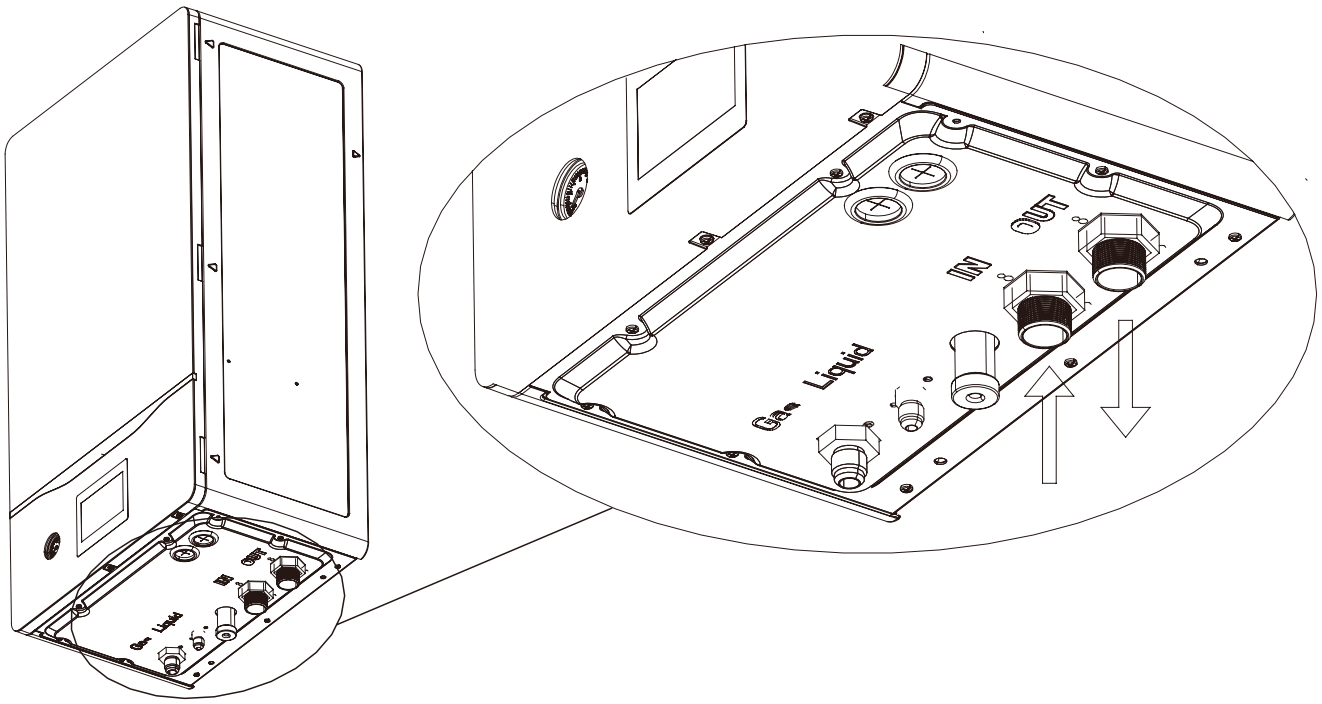
② When the water temperature of the Hydro Box is too low (Tw < 15°C) or too high (Tw > 45°C), the Hydro Box will be in standby mode in order not to affect the effect of the standard indoor unit. This mode is not the cause of the fault, so please do not worry.

Installation Instructions

- Make sure the water piping is connected complying the European regulations.
- Cover the pipe end to prevent dust entering the water piping when inserting it through a hole in the wall.
- Flush tap water through the water piping before connecting to indoor unit to ensure there is no impurities in the water system.
- Use two spanners to connect the water piping with the unit.
- The water piping should be covered insulation materials to reduce heat loss.
- Check the water leakage condition along the piping especially in connecting joint during trial running.

Note:

- Do not charge water to the system before completing the installation and insulating the piping in winter.
- Drain the water out of the system if the unit does not operate for a long time.
- Choose proper buffer tank and auxiliary electrical water heater to connect to the system.
- Do not over tighten, over tightening may cause water leakage.



Installation Instructions

E. Refrigerant Piping Installation

- Please make flare after inserting flare nut (located at joint portion of tube assembly) onto the copper pipe. (in case of using long piping)
- Do not use pipe wrench to open refrigerant piping. Flare nut may be broken and cause leakage. Use proper spanner or ring wrench.
- Connect the piping:
  - Align the center of piping and sufficiently tighten the flare nut with hands.
  - Be sure to use two spanners to tighten the connection. Further tighten the flare nut with torque wrench in specified torque as stated in table.

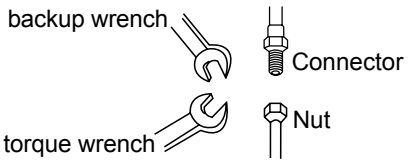
Note:

- Do not over tighten, over tightening may cause gas leakage.
- Do not pull and push refrigerant piping excessively, pipe deformation may cause refrigerant leakage.

Cutting and flaring the piping

- Please cut the pipe with pipe cutter and make sure there is no burrs remained, or gas leakage may be caused.
- Remove the burrs with reamer, and hold the pipe with end in a downward direction to avoid the metal powder entering the piping inside.
- Please make flare after inserting the flare nut onto the copper pipes.

Always use a backup wrench when tightening and loosening flare nuts. Tubing will twist if not properly supported.



The flare nut or the flare fitting will be damaged if the tubing is not properly aligned with the flare fitting when starting the flare nut. Do not use tools to start the flare nut, but use hands only to begin threading the nut.

F. Leakage test, Evacuation, Check valve operation, Additional refrigerant charging

- See it in the outdoor installation manual.

G. Charging the Water

Water quality requirement

It is necessary to analyse the quality of water by checking pH, electrical conductivity, ammonia ion content, sulphur content, and others. The following is the recommended standard water quality.

Contents	Unit	Value
Standard Quality pH(25°C)	/	7.5-9
Electrical conductivity {2}	μS/cm	10-500
Alcalinity HCO_3^-	mg/l	70-200
Sulphate SO_4^{2-}	mg/l	<70
Alcalinity /Sulphate HCO_3^-/ SO_4^{2-}	mg/l	>1.5
Ammonium NH_4^+	mg/l	<2
Free chlorine Cl_2	mg/l	<1
Hydrogen sulfide H_2S	mg/l	<0.05
Free carbon dioxide(aggressive) CO_2	mg/l	<5
Nitrate NO_3^-	mg/l	<100
Iron Fe	mg/l	<0.2
Aluminium Al	mg/l	<0.2
Manganese Mn	mg/l	<0.1
Chloride content Cl-	mg/l	≤50
Total Hardness $CaCO_3$	(°dH)	4.5-8.5
Ammonia NH_3	mg/l	<0.5

⚠ CAUTION

If the Chloride content (Cl-) in the circulating water of the system exceeds the required limits, please add zinc rod to the system to remove the excessive chloride.

Hydro box

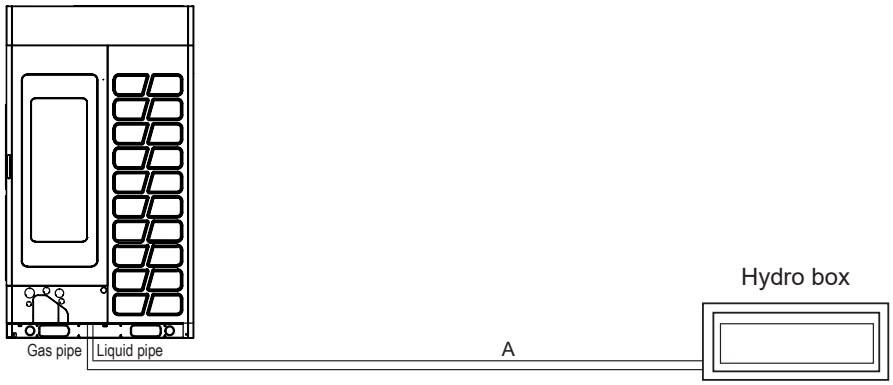
The outdoor units which can connect with the Hydro box are as following table:

Outdoor series	Model
ODU VRF	VVTA

Hydro box	Connecting method	Hydro box quantity	Outdoor unit selection (unit: kW)
OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25	Hydro box only	≤8	1. 80% X total outdoor rated capacity ≤ total indoor units rated capacity ≤ 100% X total outdoor rated capacity
	Together with general indoor units	≤8	1. 50% X total outdoor rated capacity ≤ total indoor units rated capacity ≤ 130% X total outdoor rated capacity 2. Total Hydro box rated capacity ≤ 80% X total outdoor rated capacity
Note: Indoor units include Hydro box and general indoor unit.			

One system with only one indoor unit which is Hydro box

Pipe specification



1. Pipe "A" diameter (between outdoor unit and indoor unit, diameter unit:mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
180<X≤300	Ø22.22	Brazed	Ø12.7	Flared	OVVA-310N-O1M25 gas / are Ø19.05/Ø9.52 liguid pipe diameters

1) When the pipe length between the outdoor unit and indoor unit>90m;

2) When height difference between indoor and outdoor units>40/50m(Outdoor unit is under/above);

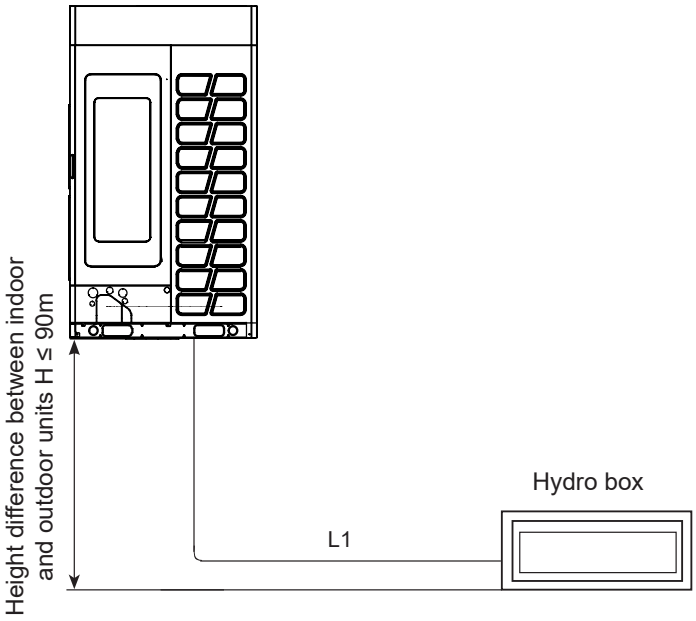
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “A” diameter rules.

Outdoor capacity (HP)	Main pipe A		Enlarged main pipe A	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
10	Ø22.22	Ø9.52	Ø25.4	Ø12.7
12	Ø22.22	Ø9.52	Ø25.4	Ø12.7

1) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.

2) Trigger upsizing rules: Englarge the pipe diameter as pipe “A” diameter rules, if no proper pipe, keep the original pipe.

Allowable piping length and height difference between indoor and outdoor

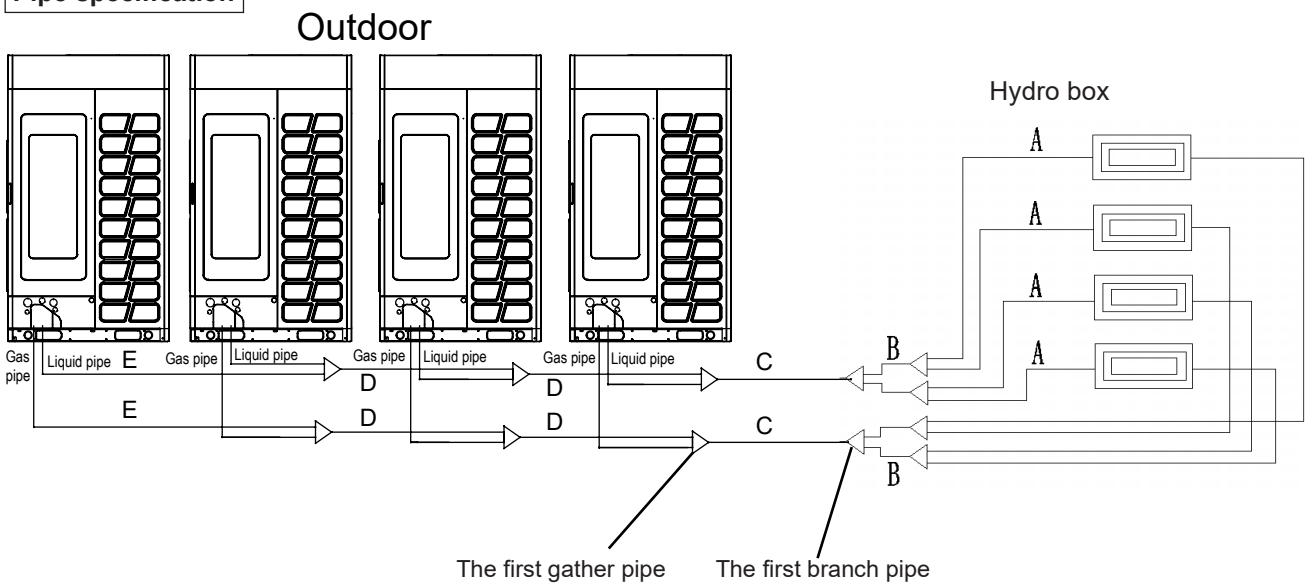


Pipe length and height difference (m)		Allowable value	For example
Single way total pipe length		≤220	L1
Height difference between indoor and outdoor unit	Outdoor unit above	≤90*1	H
	Outdoor unit under	≤110*2	

*1. Standard height difference≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When indoor rated capacity and outdoor rated capacity combination ratio≤100%,
the outdoor corrected capacity =outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB;
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "A" diameter rules;
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*2. Standard height difference≤40m, if >40m, please refer to *1 rules.
*If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
All pipes only are allowed to upsize once.
Please purchase the pipe reducer from local supplier.

One VRF system with multiple indoor units which are Hydro box

Pipe specification



1. Pipe "A" diameter (between indoor units and branch pipe, diameter unit: mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
56<X≤180	Ø15.88	Flared	Ø9.52	Flared	OVVA-310N-O1M25gas/liquid pipe diameters are Ø19.05/Ø9.52
180<X≤300	Ø22.22	Brazed	Ø12.7		
300<X≤600	Ø28.58		Ø12.7		

1) When pipe length between indoor units and the nearest branch pipe>15m;
2) When pipe length between first branch pipe and the farthest indoor >40m;
3) When the height difference between indoor units >18m;
If the pipe is in one of above three conditions, adjust the pipe diameter as following:
(1) 5.6kW<indoor rated capacity≤18kW, change gas/liquid pipe diameter to Ø19.05/Ø9.52;
(2) 18kW<Indoor rated capacity, OVVA-310N-O1M25 gas/liquid pipe diameter change to Ø22.22/ Ø12.7.Please purchase the pipe reducer from local supplier.

2. Pipe “B” diameter (between branch pipes, diameter unit: mm)

Total indoor capacity after the branch pipe (kW)	Gas pipe (mm)	Liquid pipe (mm)
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7
45.0kW≤ X <71.0kW	Ø28.58	Ø15.88
71.0kW≤ X <101.0kW	Ø31.8	Ø19.05
101.0kW≤ X <158.0kW	Ø38.1	Ø19.05
158.0kW≤ X <186.0kW	Ø41.3	Ø19.05
186.0kW≤ X <240.0kW	Ø44.5	Ø22.22
240.0kW≤ X <275.0kW	Ø50.8	Ø25.4
275.0kW≤ X <320.0kW	Ø54.1	Ø25.4

1) When pipe length between the first branch pipe and the farthest indoor unit>40m, pipe "B"(both gas&liquid pipe) diameter should be enlarged one size (not applicable for Ø54.1&Ø66.7)

*Size enlarged as following order:

Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.8-Ø38.1-Ø41.3-Ø44.5-Ø50.8-Ø54.1

2) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.

Exceptional case: If there's no Ø31.8 and Ø38.1, Ø34.9 can be used to replace Ø31.8. If there's no Ø44.5 and Ø50.8, Ø54.1 can be used to replace Ø44.5.

3) Trigger upsizing rules: If you can't get the one size larger pipe on-site, keep the original pipe.

3. Pipe “C” diameter (main pipe, between outdoor first gather pipe and the first branch pipe, diameter unit:mm)

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
8	Ø19.05	Ø9.52	Ø22.22	Ø12.7
10	Ø22.22	Ø9.52	Ø25.4	Ø12.7
12	Ø25.4	Ø12.7	Ø28.58	Ø15.88
14	Ø25.4	Ø12.7	Ø28.58	Ø15.88
16	Ø28.58	Ø12.7	Ø31.8	Ø15.88
18	Ø28.58	Ø15.88	Ø31.8	Ø19.05
20	Ø28.58	Ø15.88	Ø31.8	Ø19.05
22	Ø28.58	Ø15.88	Ø31.8	Ø19.05
24	Ø28.58	Ø15.88	Ø31.8	Ø19.05
26	Ø28.58	Ø15.88	Ø31.8	Ø19.05
28	Ø28.58	Ø15.88	Ø31.8	Ø19.05
30	Ø31.8	Ø19.05	Ø38.1	Ø22.22
32	Ø31.8	Ø19.05	Ø38.1	Ø22.22
34	Ø31.8	Ø19.05	Ø38.1	Ø22.22
36	Ø38.1	Ø19.05	Ø38.1	Ø22.22
38	Ø38.1	Ø19.05	Ø38.1	Ø22.22
40	Ø38.1	Ø19.05	Ø38.1	Ø22.22
42	Ø38.1	Ø19.05	Ø38.1	Ø22.22
44	Ø38.1	Ø19.05	Ø38.1	Ø22.22

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
46	Ø38.1	Ø19.05	Ø38.1	Ø22.22
48	Ø38.1	Ø19.05	Ø38.1	Ø22.22
50	Ø38.1	Ø19.05	Ø38.1	Ø22.22
52	Ø38.1	Ø19.05	Ø38.1	Ø22.22
54	Ø38.1	Ø19.05	Ø41.3	Ø22.22
56	Ø38.1	Ø19.05	Ø41.3	Ø22.22
58	Ø41.3	Ø19.05	Ø44.5	Ø22.22
60	Ø41.3	Ø19.05	Ø44.5	Ø22.22
62	Ø41.3	Ø19.05	Ø44.5	Ø22.22
64	Ø41.3	Ø19.05	Ø44.5	Ø22.22
66	Ø41.3	Ø19.05	Ø44.5	Ø22.22
68	Ø44.5	Ø22.22	Ø50.8	Ø25.4
70	Ø44.5	Ø22.22	Ø50.8	Ø25.4
72	Ø44.5	Ø22.22	Ø50.8	Ø25.4
74	Ø44.5	Ø22.22	Ø50.8	Ø25.4
76	Ø44.5	Ø22.22	Ø50.8	Ø25.4
78	Ø44.5	Ø22.22	Ø50.8	Ø25.4
80	Ø44.5	Ø22.22	Ø50.8	Ø25.4

1) When the pipe length between the first gather pipe and the farthest indoor unit>90m;
2) When height difference between indoor and outdoor units>40/50m(Outdoor unit is under/above);
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “C” diameter rules.
3) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.
4) Trigger upsizing rules: Enlarge the pipe diameter as pipe “C” diameter rules, if no proper pipe, keep the original pipe.

4. Pipe “D” diameter (between gather pipes, diameter unit: mm)

Total horse power of connected outdoors	Gas pipe	Liquid pipe
X≤16HP	Ø28.58	Ø12.7
16HP<X≤26HP	Ø28.58	Ø15.88
26HP<X≤34HP	Ø31.8	Ø19.05
34HP<X≤56HP	Ø38.1	Ø19.05
56HP<X≤66HP	Ø41.3	Ø19.05
66HP<X≤84HP	Ø44.5	Ø22.22

No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.

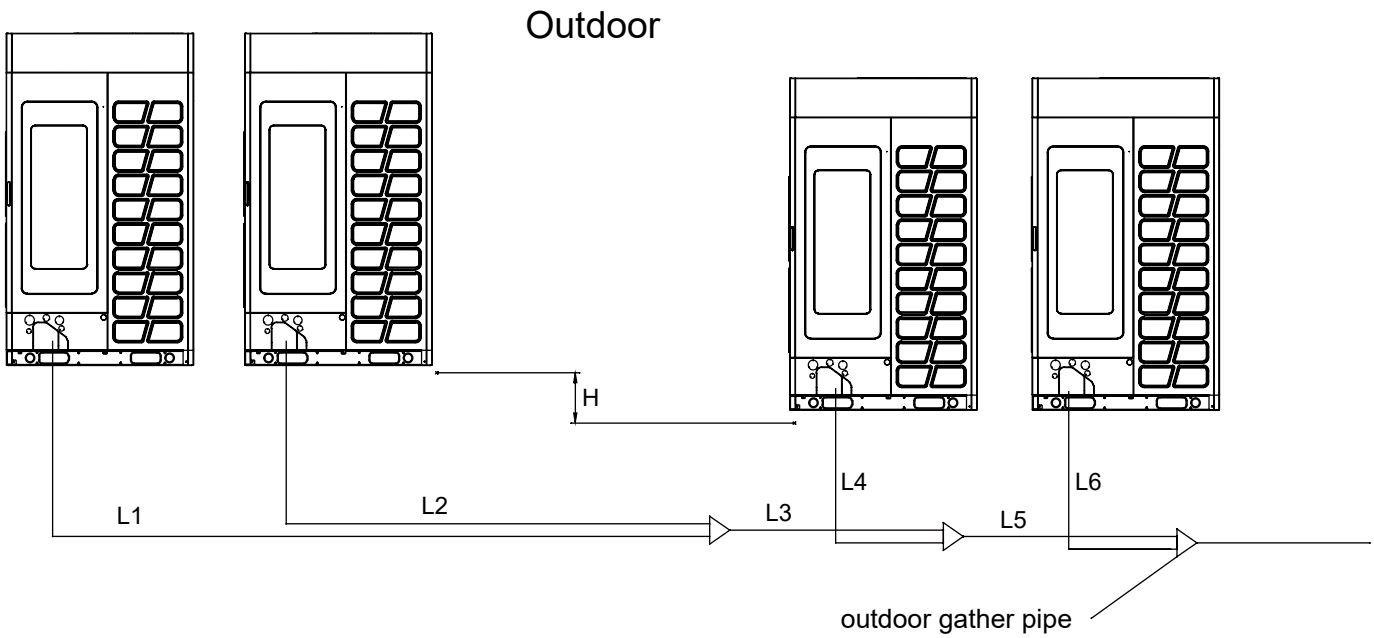
5. Pipe “E” diameter (between outdoor and the gather pipe, diameter unit: mm)

Outdoor(HP)	Gas pipe		Liquid pipe	
	Pipe diameter	Connection method	Pipe diameter	Connection method
8	Ø19.05	Flared	Ø9.52	Flared
10	Ø22.22	Brazed	Ø9.52	
12	Ø25.4		Ø12.7	
14	Ø25.4		Ø12.7	
16	Ø28.58		Ø12.7	
18	Ø28.58		Ø15.88	
20	Ø28.58		Ø15.88	
22	Ø28.58		Ø15.88	
24	Ø28.58		Ø15.88	
26	Ø28.58		Ø15.88	

No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.

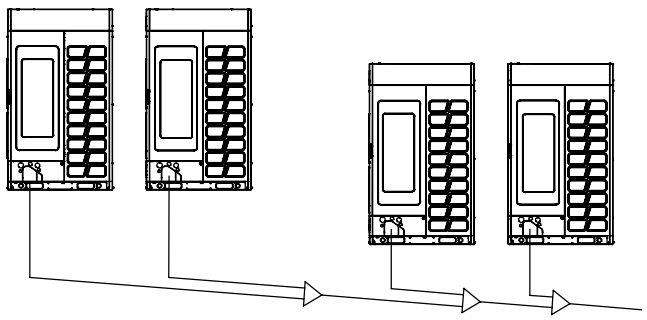
Installation procedure

Pipe length between outdoor units



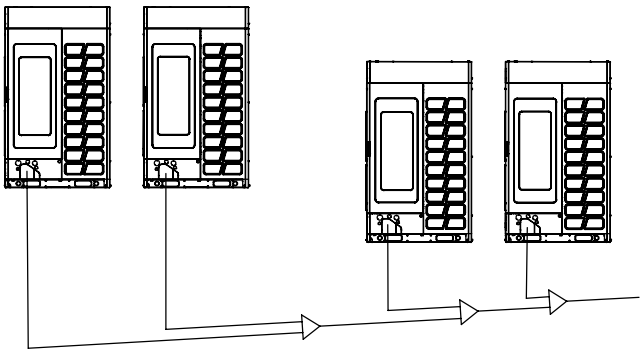
1. Pipe length between outdoor units and the first gather pipe should be≤10m; L1+L3+L5≤10m; L2+L3+L5≤10m; L4+L5≤10m; L6≤10m.
2. Height difference between outdoor units: H≤5m.
3. The gather pipe must be placed horizontally or in accordance with the installation of a certain angle (level angle less than 15 degrees). The first gather pipe can be vertical installed.
4. All horizontal piping connect the outdoor unit cannot be higher than the outdoor stop valve.

Proper installation

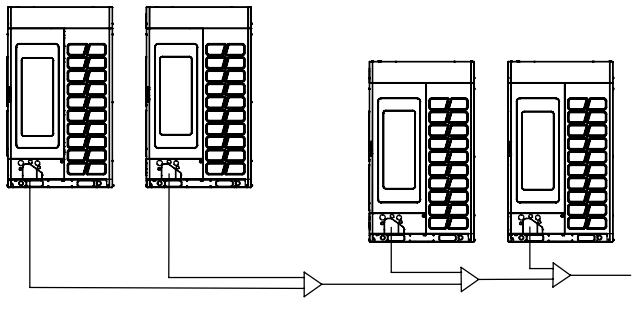


Wrong installation

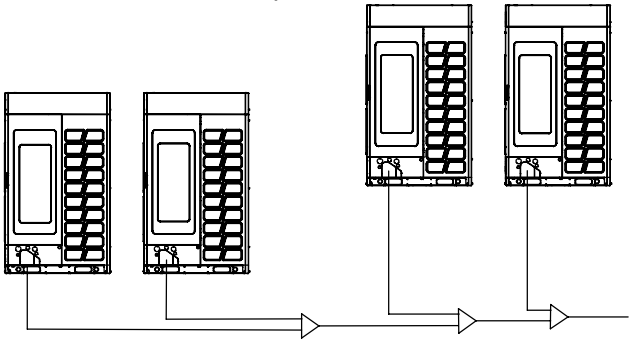
The lubricating oil will accumulate to the lowest outdoor unit

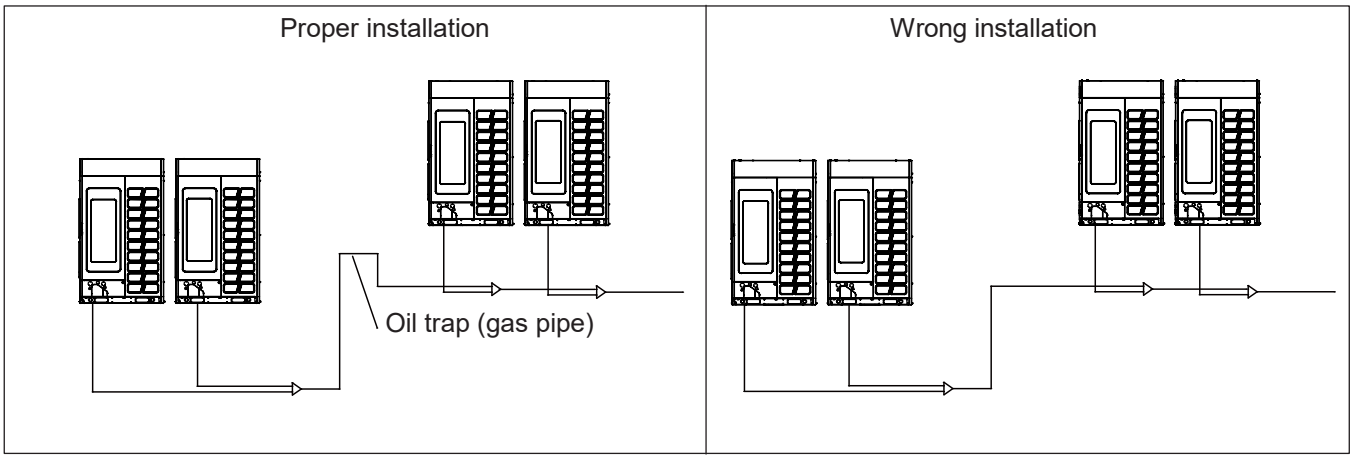


Proper installation

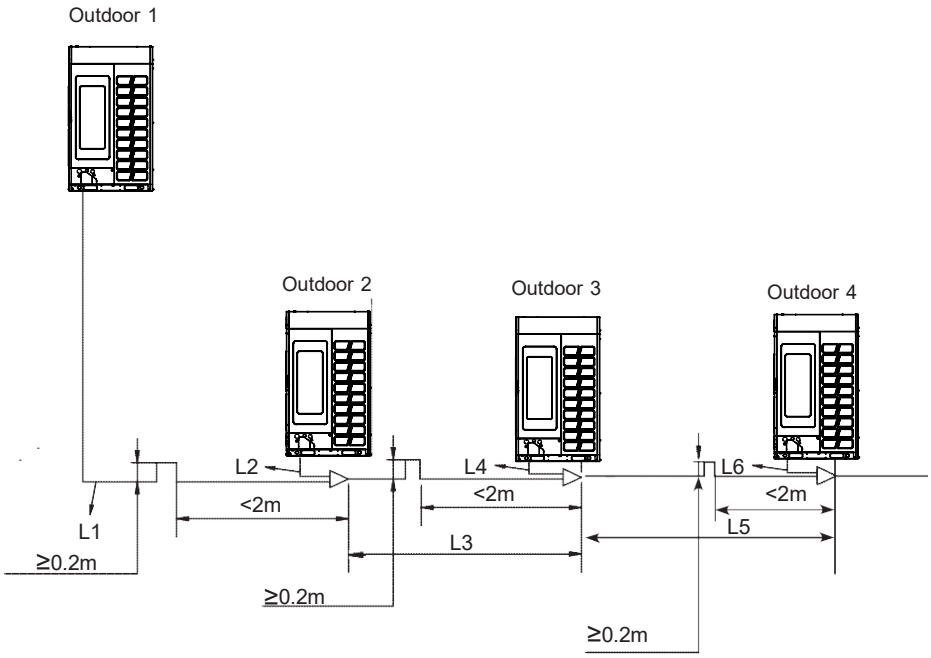


Proper installation

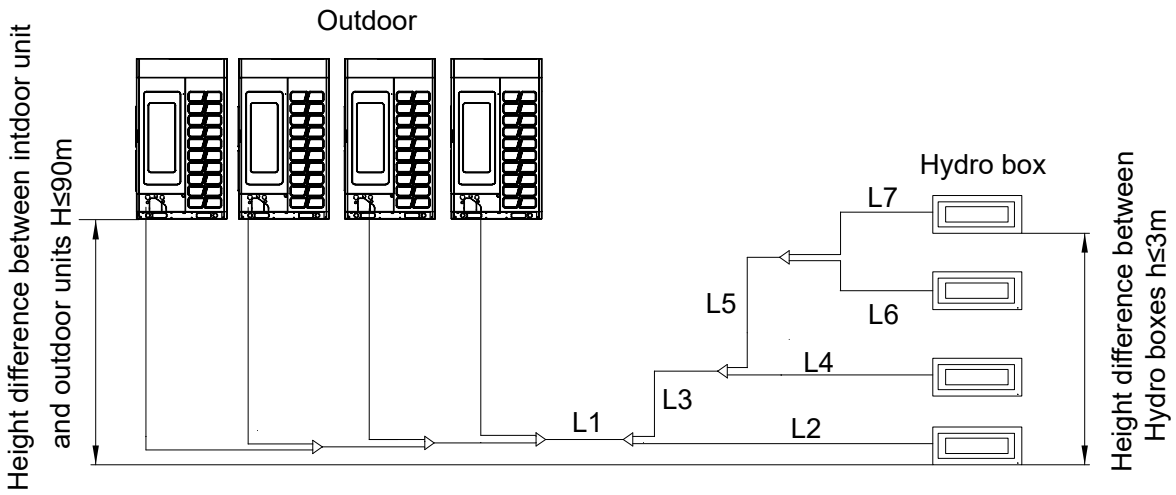




5. When the distance between outdoors(L1, L3, L5) is >2m, the oil trap must be set (upright gas pipe height≥0.2m), as the figure:



Allowable pipe length and height difference between indoor (Hydro box only) and outdoor units



Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤550	L1+2*(L3+L5)+L2+L4+L6+L7
Pipe length between the first gather pipe to the farthest indoor unit	Actual length	≤220*[1]	L1+L3+L5+L7
	Equivalent length	≤260	
Pipe length between first gather pipe and first branch pipe(Main pipe)		≤130	L1
Pipe length between the first branch pipe and the farthest indoor unit		≤90*[2]	L3+L5+L7
Pipe length between indoor units and the nearest branch pipe		≤40*[3]	L2/L4/L6/L7
Pipe length difference between the nearest indoor unit and the farthest indoor unit		≤40	L3+L5+L7-L2
Height difference between indoor and outdoor units	Outdoor unit above	≤90*[4]	H
	Outdoor unit under	≤110*[5]	
Height difference between Hydro boxes		≤3	h

Note:
*1. Standard length≤90m, if >90m, englarge the pipe diameter as pipe “C” diameter rules.
*2. Standard length≤40m, if >40m, the pipe between the first branch and the farthest indoor unit need to enlarge one size (refer to pipe "A" &"B" diameter rules).
*3. Standard length ≤15m, if >15m, the pipe between indoor units and the nearest branch pipe need to enlarge one size (refer to pipe "A" diameter rules).
*4. Standard height difference≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When rated indoor and outdoor capacity combination ratio≤100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB.
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "C" diameter rules.
4) If single way total pipe length>500m, need to add compressor oil 0.3L/100m(pipe length less than 100m, count as 100m).
For example, if the total pipe length is 520m, then we should add 0.3L compressor oil.
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*5. Standard height difference≤40m, if >40m, please refer to *4 rules.
* From the first gather pipe to indoor unit, the size of pipe diameter should be large to small, upstream pipe diameter≥ downstream pipe diameter; If pipe(no upsizing) diameter<downstream pipe diameter, the diameter of the pipe should enlarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
* All pipes only are allowed to upsize once.

Branch pipe

The first branch pipe selection:

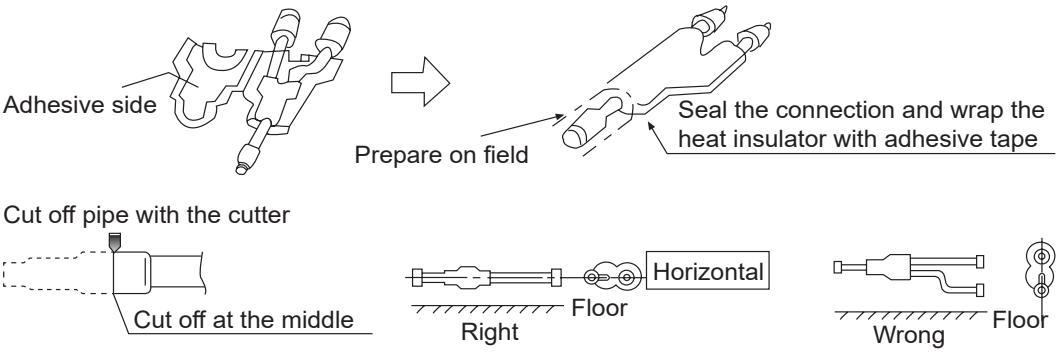
Total outdoor unit capacity (100W)	Model
X≤335	TAU335
335<X ≤506	TAU506
506<X ≤730	TAU730
730<X ≤1350	TAU1350
1350<X	TAU2040

Gather pipe

Total outdoor unit quantity	Model
2	TBS20
3	TBS30
4	TBS30 & TAU2040

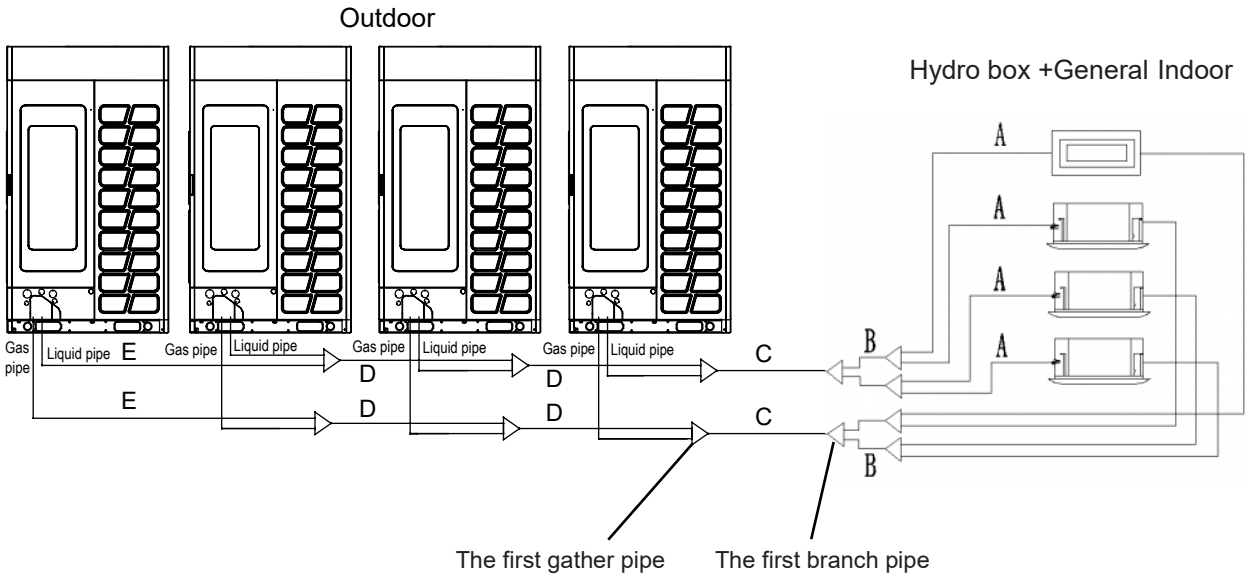
Note:

1. Please install the branch/gather pipe (gas/liquid side) in horizontal or vertical direction.
2. It's not allowed to connect branch pipe or indoor unit after the branch pipe within 50cm.
3. The pipe should keep straight(pipe length>50cm) if there is other branch pipe connecting the upstream branch pipe.



VRF system includes Hydro box & general indoor units

Pipe specification



6. Pipe "A" diameter (between indoor units and branch pipe, diameter unit: mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
X≤28	Ø9.52	Flared	Ø6.35	Flared	1. 5 K / 7 K / 9 K gas/liquid pipe diameter are Ø12.7/Ø6.35 2. 7K,9K gas/liquid pipe diameter are Ø25.4/Ø9.52 3.OVVA-310N-O1M25gas/liquid pipe diameter are Ø19.05/Ø9.52
28<X≤56	Ø12.7		Ø6.35		
56<X≤180	Ø15.88		Ø9.52		
180<X≤300	Ø22.22	Brazed	Ø12.7		
300<X≤600	Ø28.58		Ø12.7		

1) When pipe length between indoor units and the nearest branch pipe>15m;
4) When pipe length between first branch pipe and the farthest indoor >40m;
5) When the height difference between indoor units >18m;
If the pipe is in one of above three conditions, adjust the pipe diameter as following:
(3) Indoor rated capacity≤5.6kW, change gas/liquid pipe diameter to Ø15.88/Ø9.52;
(4) 5.6kW<indoor rated capacity≤18kW, change gas/liquid pipe diameter to Ø19.05/Ø9.52;
(5) 18kW<Indoor rated capacity, keep the original gas/liquid pipe diameter(Ø22.22/Ø12.7);
Exceptional case: 7 K / 9 K gas/liquid pipe diameter change to Ø25.4/Ø12.7.OVVA-310N-O1M25 gas/liquid pipe diameter change to Ø22.22/Ø12.7.
Please purchase the pipe reducer from local supplier.

7. Pipe “B” diameter (between branch pipes, diameter unit: mm)

Total indoor capacity after the branch pipe (kW)	Gas pipe (mm)	Liquid pipe (mm)
X<14.0kW	Refer to Pipe "A" diameter rules	
14.0kW≤ X <16.8kW	Ø15.88	Ø9.52
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7
45.0kW≤ X <71.0kW	Ø28.58	Ø15.88
71.0kW≤ X <101.0kW	Ø31.8	Ø19.05
101.0kW≤ X <158.0kW	Ø38.1	Ø19.05
158.0kW≤ X <186.0kW	Ø41.3	Ø19.05
186.0kW≤ X <240.0kW	Ø44.5	Ø22.22
240.0kW≤ X <275.0kW	Ø50.8	Ø25.4
275.0kW≤ X <320.0kW	Ø54.1	Ø25.4
≥320.0kW	Ø66.7	Ø25.4

4) When pipe length between the first branch pipe and the farthest indoor unit>40m, pipe "B"(both gas & liquid pipe) diameter should be enlarged one size (not applicable for Ø54.1&Ø66.7).

*Size enlarged as following order:

Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.8-Ø38.1-Ø41.3-Ø44.5-Ø50.8-Ø54.1

5) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.

Exceptional case: If there's no Ø31.8 and Ø38.1, Ø34.9 can be used to replace Ø31.8. If there's no Ø44.5 and Ø50.8, Ø54.1 can be used to replace Ø44.5.

6) Trigger upsizing rules: If you can't get the one size larger pipe on-site, keep the original pipe.

8. Pipe “C” diameter (main pipe, between outdoor first gather pipe and the first branch pipe, diameter unit:mm)

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
8	Ø19.05	Ø9.52	Ø22.22	Ø12.7
10	Ø22.22	Ø9.52	Ø25.4	Ø12.7
12	Ø25.4	Ø12.7	Ø28.58	Ø15.88
14	Ø25.4	Ø12.7	Ø28.58	Ø15.88
16	Ø28.58	Ø12.7	Ø31.8	Ø15.88
18	Ø28.58	Ø15.88	Ø31.8	Ø19.05
20	Ø28.58	Ø15.88	Ø31.8	Ø19.05
22	Ø28.58	Ø15.88	Ø31.8	Ø19.05
24	Ø28.58	Ø15.88	Ø31.8	Ø19.05
26	Ø28.58	Ø15.88	Ø31.8	Ø19.05
28	Ø28.58	Ø15.88	Ø31.8	Ø19.05
30	Ø31.8	Ø19.05	Ø38.1	Ø22.22
32	Ø31.8	Ø19.05	Ø38.1	Ø22.22
34	Ø31.8	Ø19.05	Ø38.1	Ø22.22
36	Ø38.1	Ø19.05	Ø38.1	Ø22.22
38	Ø38.1	Ø19.05	Ø38.1	Ø22.22
40	Ø38.1	Ø19.05	Ø38.1	Ø22.22
42	Ø38.1	Ø19.05	Ø38.1	Ø22.22
44	Ø38.1	Ø19.05	Ø38.1	Ø22.22
46	Ø38.1	Ø19.05	Ø38.1	Ø22.22
48	Ø38.1	Ø19.05	Ø38.1	Ø22.22
50	Ø38.1	Ø19.05	Ø38.1	Ø22.22
52	Ø38.1	Ø19.05	Ø38.1	Ø22.22
54	Ø38.1	Ø19.05	Ø41.3	Ø22.22

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
56	Ø38.1	Ø19.05	Ø41.3	Ø22.22
58	Ø41.3	Ø19.05	Ø44.5	Ø22.22
60	Ø41.3	Ø19.05	Ø44.5	Ø22.22
62	Ø41.3	Ø19.05	Ø44.5	Ø22.22
64	Ø41.3	Ø19.05	Ø44.5	Ø22.22
66	Ø41.3	Ø19.05	Ø44.5	Ø22.22
68	Ø44.5	Ø22.22	Ø50.8	Ø25.4
70	Ø44.5	Ø22.22	Ø50.8	Ø25.4
72	Ø44.5	Ø22.22	Ø50.8	Ø25.4
74	Ø44.5	Ø22.22	Ø50.8	Ø25.4
76	Ø44.5	Ø22.22	Ø50.8	Ø25.4
78	Ø44.5	Ø22.22	Ø50.8	Ø25.4
80	Ø44.5	Ø22.22	Ø50.8	Ø25.4
82	Ø44.5	Ø22.22	Ø50.8	Ø25.4
84	Ø44.5	Ø22.22	Ø50.8	Ø25.4
86	Ø50.8	Ø25.4	Ø54.1	Ø25.4
88	Ø50.8	Ø25.4	Ø54.1	Ø25.4
90	Ø50.8	Ø25.4	Ø54.1	Ø25.4
92	Ø50.8	Ø25.4	Ø54.1	Ø25.4
94	Ø50.8	Ø25.4	Ø54.1	Ø25.4
96	Ø50.8	Ø25.4	Ø54.1	Ø25.4
98	Ø54.1	Ø25.4	Ø54.1	Ø25.4
100	Ø54.1	Ø25.4	Ø54.1	Ø25.4
102	Ø54.1	Ø25.4	Ø54.1	Ø25.4
104	Ø54.1	Ø25.4	Ø54.1	Ø25.4

1) When the pipe length between the first gather pipe and the farthest indoor unit>90m;
2) When height difference between indoor and outdoor units>40/50m(Outdoor unit is under/above);
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “C” diameter rules.
3) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.
4) Trigger upsizing rules: Enlarge the pipe diameter as pipe “C” diameter rules, if no proper pipe, keep the original pipe.

9. Pipe “D” diameter (between gather pipes, diameter unit: mm)

Total horse power of connected outdoors	Gas pipe	Liquid pipe
X≤16HP	Ø28.58	Ø12.7
16HP<X≤26HP	Ø28.58	Ø15.88
26HP<X≤34HP	Ø31.8	Ø19.05
34HP<X≤56HP	Ø38.1	Ø19.05
56HP<X≤66HP	Ø41.3	Ø19.05
66HP<X≤84HP	Ø44.5	Ø22.22

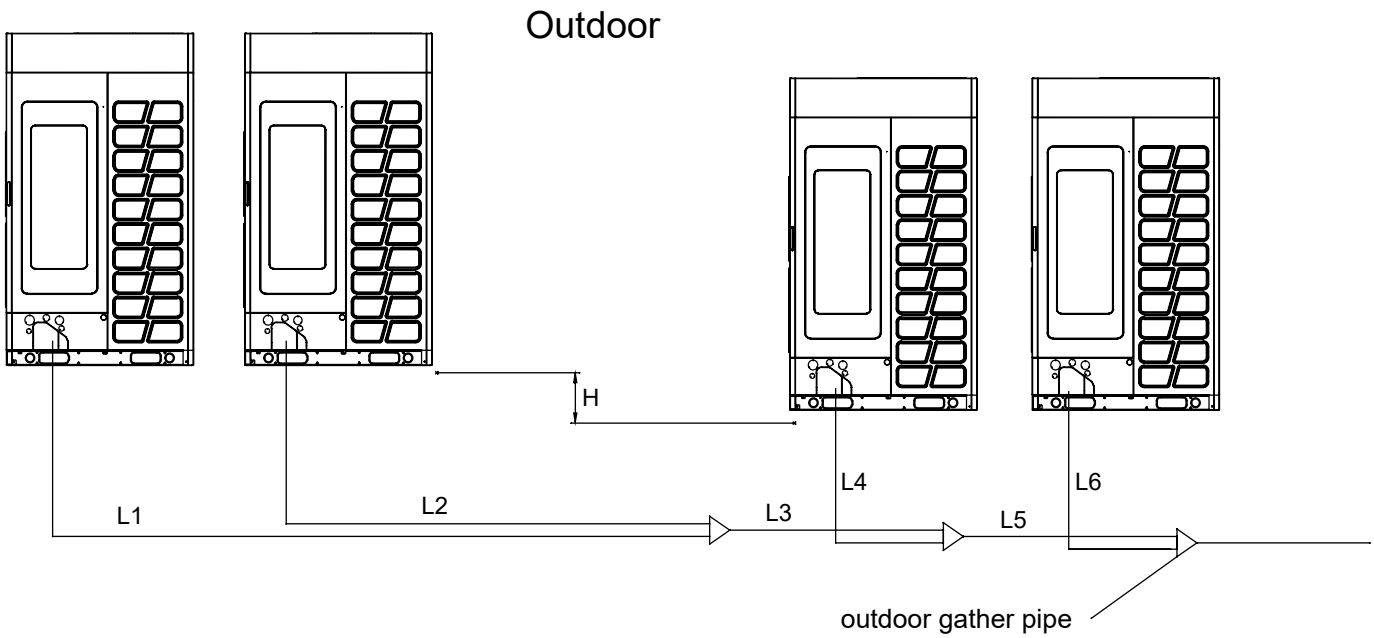
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.

10. Pipe “E” diameter (between outdoor and the gather pipe, diameter unit: mm)

Outdoor(HP)	Gas pipe		Liquid pipe	
	Pipe diameter	Connection method	Pipe diameter	Connection method
8	Ø19.05	Flared	Ø9.52	Flared
10	Ø22.22	Brazed	Ø9.52	
12	Ø25.4		Ø12.7	
14	Ø25.4		Ø12.7	
16	Ø28.58		Ø12.7	
18	Ø28.58		Ø15.88	
20	Ø28.58		Ø15.88	
22	Ø28.58		Ø15.88	
24	Ø28.58		Ø15.88	
26	Ø28.58		Ø15.88	

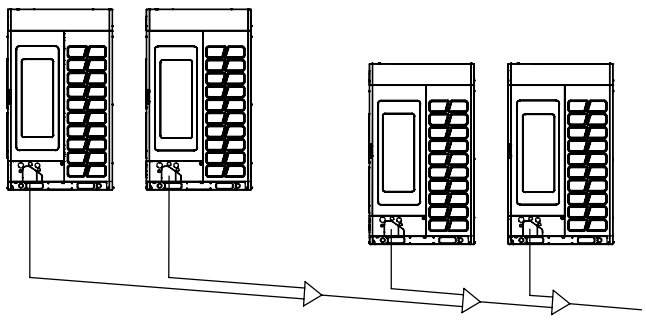
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.

Pipe length between outdoor units

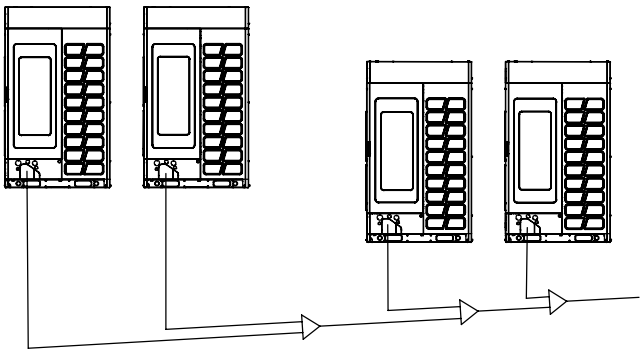


1. Pipe length between outdoor units and the first gather pipe should be≤10m; L1+L3+L5≤10m; L2+L3+L5≤10m; L4+L5≤10m; L6≤10m.
2. Height difference between outdoor units: H≤5m.
3. The gather pipe must be placed horizontally or in accordance with the installation of a certain angle (level angle less than 15 degrees). The first gather pipe can be vertical installed.
4. All horizontal piping connect the outdoor unit cannot be higher than the outdoor stop valve.

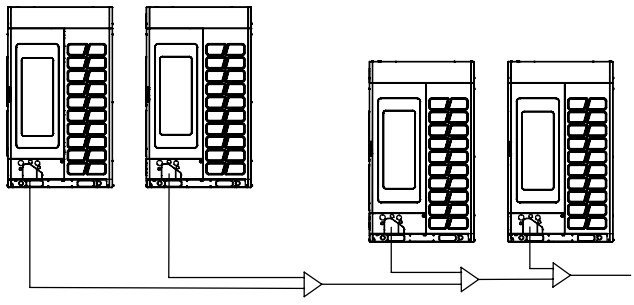
Proper installatio



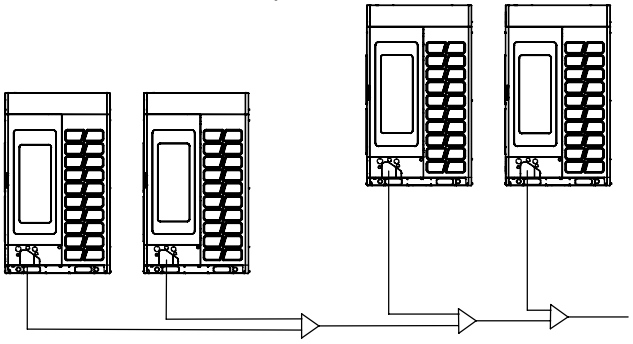
Wrong installation
The lubricating oil will accumulate to the lowest outdoor unit

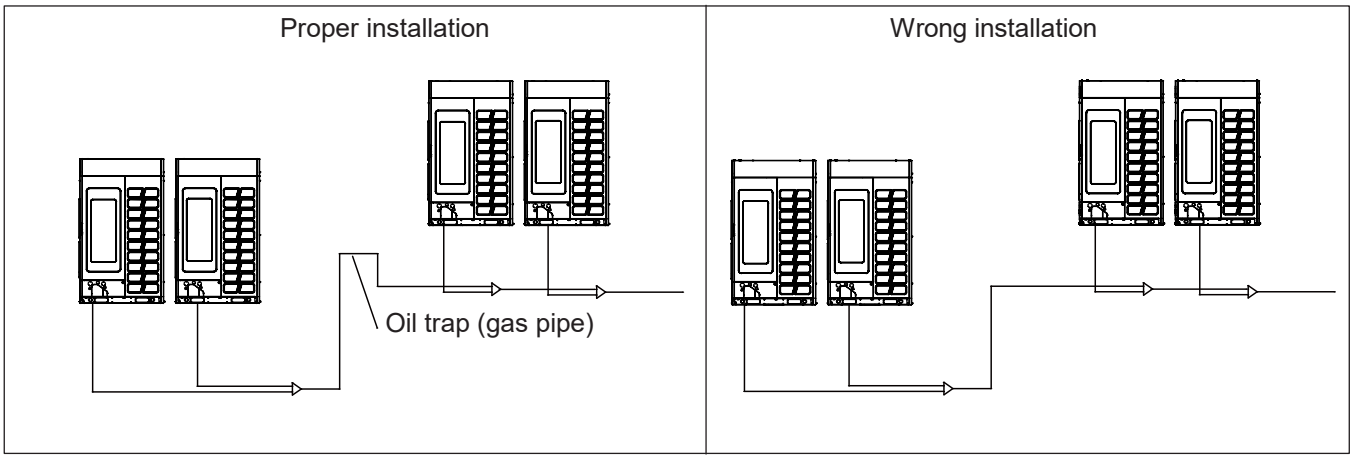


Proper installatio

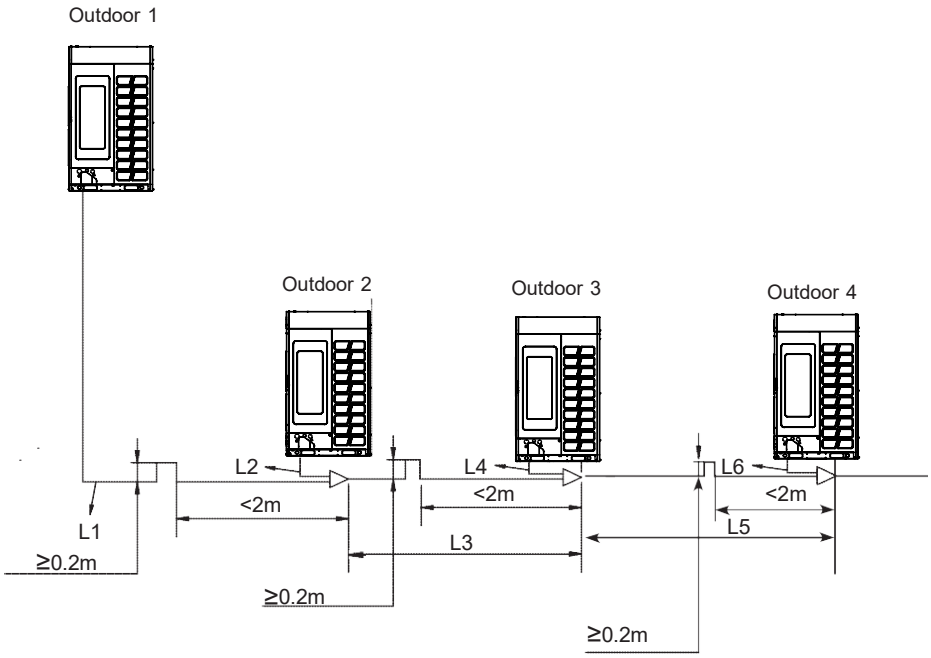


Proper installatio

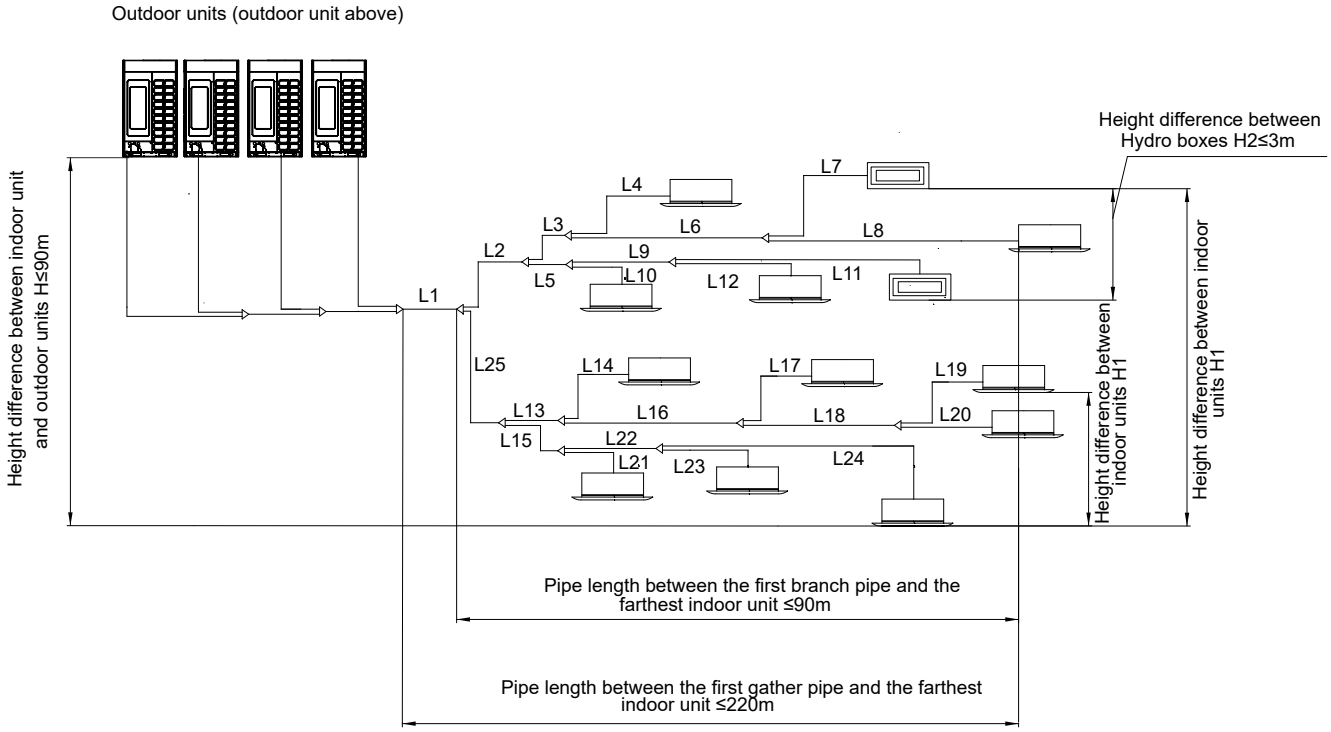




5. When the distance between outdoors(L1, L3, L5) is >2m, the oil trap must be set (upright gas pipe height≥0.2m), as the figure:



Allowable pipe length and height difference between indoor (Hydro box + general) and outdoor units



Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤1000	L1+2*(L2+L3+L6+L5+L9+L25+L13+L15+L16+L18+L22)+L4+L7+L8+L10+L11+L12+L14+L17+L19+L20+L21+L23+L24
Pipe length between the first gather pipe to the farthest indoor unit	Actual length	≤220*1	L1+L2+L3+L6+L8
	Equivalent length	≤260	
Pipe length between first gather pipe and first branch pipe (Main pipe)		≤130	L1
Pipe length between the first branch pipe and the farthest indoor unit		≤90*2	L2+L3+L6+L8
Pipe length between indoor units and the nearest branch pipe		≤40*3	L4/L7/L8/L10/L11/L12/L14/L17/L19/L20/L21/L23/L24
Pipe length difference between the nearest indoor unit and the farthest indoor unit		≤40	L2+L3+L6+L8-L2-L5-L10
Height difference between indoor and outdoor units	Outdoor unit above	≤90*4	H
	Outdoor unit under	≤110*5	
Height difference between indoor units	Outdoor unit above	≤3(30*6)	H1
	Outdoor unit under	≤10(30*6)	
Height difference between Hydro boxes		≤3	H2

Note:
*1. Standard length≤90m, if >90m, englarge the pipe diameter as pipe “C” diameter rules.
*2. Standard length≤40m, if >40m, the pipe between the first branch and the farthest indoor unit need to enlarge one size (refer to pipe "A" &"B" diameter rules).
*3. Standard length ≤15m, if >15m, the pipe between indoor units and the nearest branch pipe need to enlarge one size (refer to pipe "A" diameter rules).
*4. Standard height difference≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When rated indoor and outdoor capacity combination ratio≤100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
When rated indoor and outdoor capacity combination ratio>100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at that indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB;
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "C" diameter rules.
4) If single way total pipe length>500m, need to add compressor oil 0.3L/100m(pipe length less than 100m, count as 100m).
For example, if the total pipe length is 620m, then we should add 0.6L compressor oil.
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*5. Standard height difference≤40m, if >40m, please refer to *4 rules.
*6. 1) If general indoor unit and Hydro box are not operating at the same time, the height difference between general indoor units can reach up to 30m.
2) General indoor unit standard height difference≤18m, if >18m, the pipe length between farthest general indoor unit and the nearest branch pipe need to enlarge one size, refer to pipe "A" diameter rules.
3) Set IDU high drop mode from outdoor PCB(if outdoor PCB has this function).
* From the first gather pipe to indoor unit, the size of pipe diameter should be large to small, upstream pipe diameter≥ downstream pipe diameter; If pipe(no upsizing) diameter<downstream pipe diameter, the diameter of the pipe should enlarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
* All pipes only are allowed to upsize once.

Water volume:According to the cooling capacity,5L/kW

Modle	OVVA-090N-O1M25	OVVA-160N-O1M25	OVVA-310N-O1M25
Cooling capacity	7kW	14kW	28kW
Water volume	35L	70L	140L

Branch pipe

The first branch pipe selection:

Total outdoor unit capacity (100W)	Model
X≤335	TAU335
335<X ≤506	TAU506
506<X ≤730	TAU730
730<X ≤1350	TAU1350
1350<X	TAU2040

Branch pipes after the first branch pipe selection:

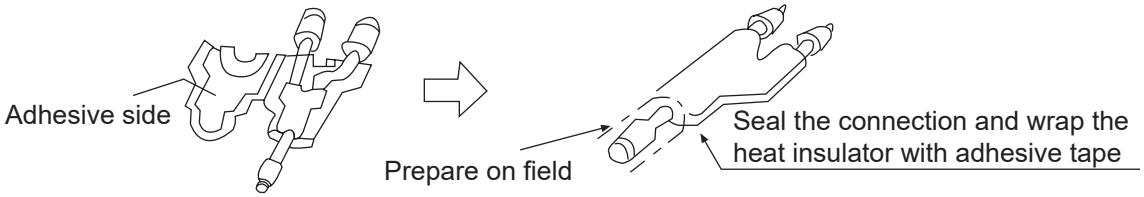
Total indoor unit capacity (100W)	Model
X≤335	TAU335
335<X ≤506	TAU506
506<X ≤730	TAU730
730<X ≤1350	TAU1350
1350<X	TAU2040

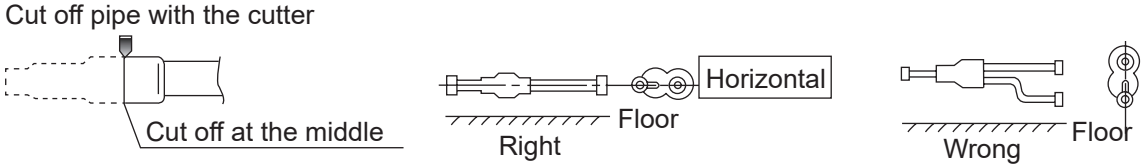
Gather pipe

Total outdoor unit quantity	Model
2	TBS20
3	TBS30
4	TBS30 & TAU2040

Note:

1. Please install the branch/gather pipe (gas/liquid side) in horizontal or vertical direction.
2. It's not allowed to connect branch pipe or indoor unit after the branch pipe within 50cm.
3. The pipe should keep straight(pipe length>50cm) if there is other branch pipe connecting the upstream branch pipe.





Hydro box

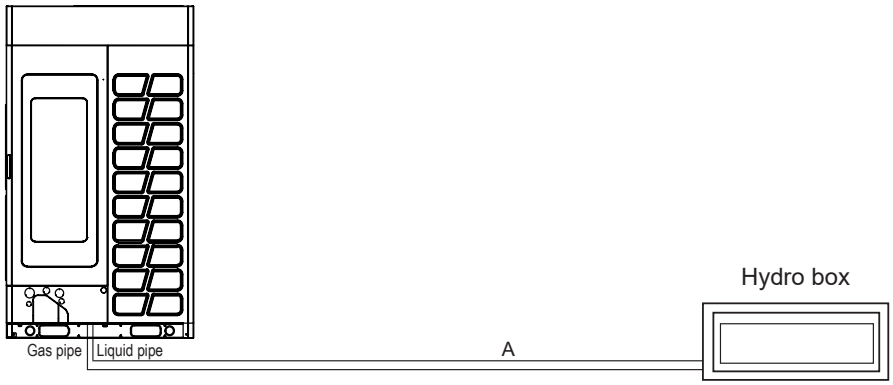
The outdoor units which can connect with the Hydro box are as following table:

Outdoor series	Model
VVTA	VVTA-250-735R-01T32

Hydro box	Connecting method	Hydro box quantity	Outdoor unit selection (unit: kW)
OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25	Hydro box only	≤8	1. 80% X total outdoor rated capacity ≤ total indoor units rated capacity ≤ 100% X total outdoor rated capacity
	Together with general indoor units	≤8	1. 50% X total outdoor rated capacity ≤ total indoor units rated capacity ≤ 130% X total outdoor rated capacity 2. Total Hydro box rated capacity ≤ 80% X total outdoor rated capacity
Note: V R F system includes Hydro box & general indoor units.			

One system with only one indoor unit which is Hydro box

Pipe specification



1. Pipe "A" diameter (between outdoor unit and indoor unit, diameter unit:mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
180<X≤300	Ø22.22	Brazed	Ø12.7	Flared	OVVA-310N-O1M25 gas / are Ø19.05/Ø9.52 liguid pipe diameters

1) When the pipe length between the outdoor unit and indoor unit>90m;

2) When height difference between indoor and outdoor units>40/50m(Outdoor unit is under/above);

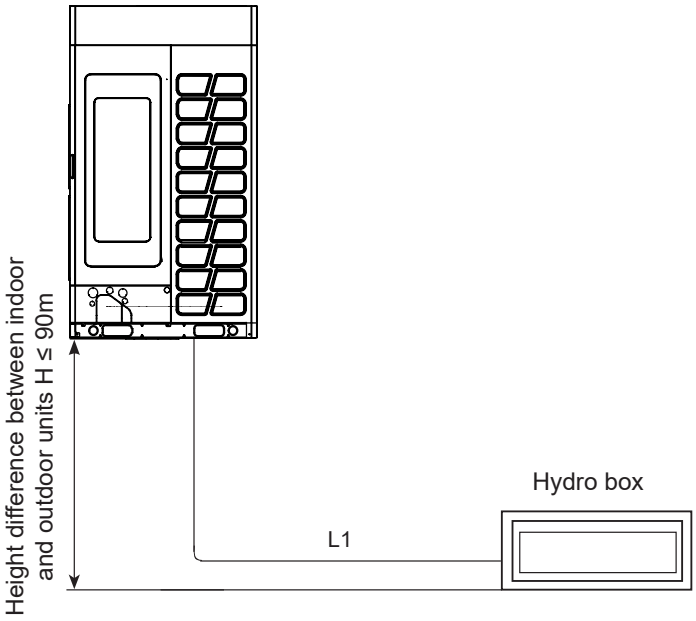
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “A” diameter rules.

Outdoor capacity (HP)	Main pipe A		Enlarged main pipe A	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
10	Ø22.22	Ø9.52	Ø25.4	Ø12.7
12	Ø22.22	Ø9.52	Ø25.4	Ø12.7

1) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.

2) Trigger upsizing rules: Englarge the pipe diameter as pipe “A” diameter rules, if no proper pipe, keep the original pipe.

Allowable piping length and height difference between indoor and outdoor

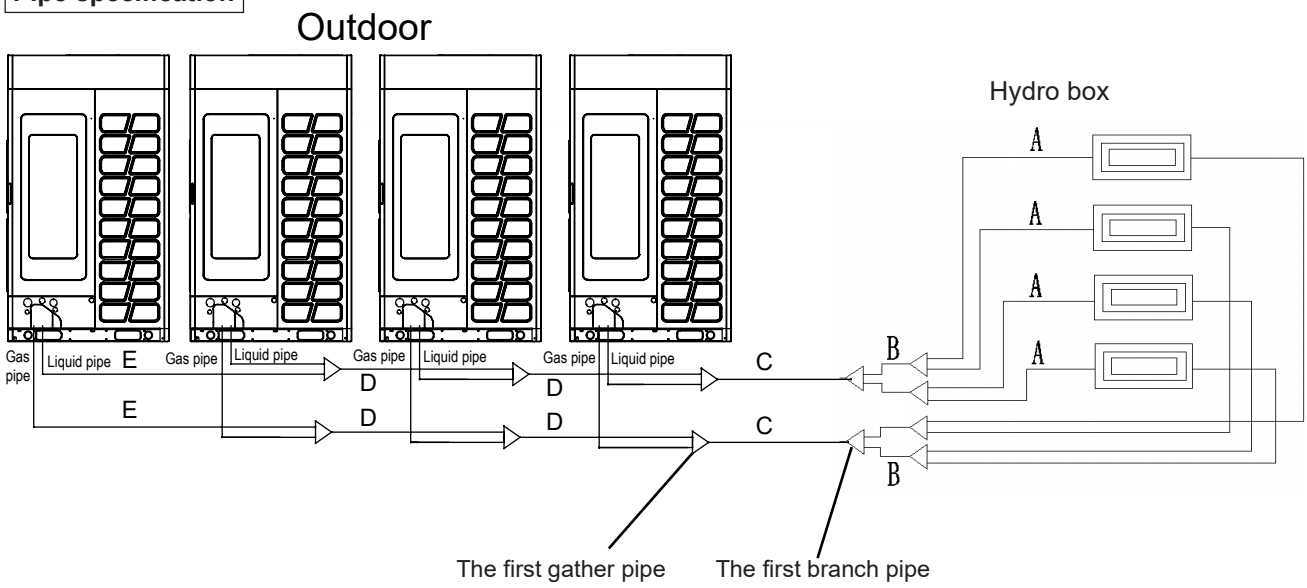


Pipe length and height difference (m)		Allowable value	For example
Single way total pipe length		≤220	L1
Height difference between indoor and outdoor unit	Outdoor unit above	≤90*1	H
	Outdoor unit under	≤110*2	

*1. Standard height difference≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When indoor rated capacity and outdoor rated capacity combination ratio≤100%,
the outdoor corrected capacity =outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB;
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "A" diameter rules;
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*2. Standard height difference≤40m, if >40m, please refer to *1 rules.
*If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
All pipes only are allowed to upsize once.
Please purchase the pipe reducer from local supplier.

One VRF system with multiple indoor units which are Hydro box

Pipe specification



1. Pipe "A" diameter (between indoor units and branch pipe, diameter unit: mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
56<X≤180	Ø15.88	Flared	Ø9.52	Flared	OVVA-310N-O1M25gas/liquid pipe diameters are Ø19.05/Ø9.52
180<X≤300	Ø22.22	Brazed	Ø12.7		
300<X≤600	Ø28.58		Ø12.7		

1) When pipe length between indoor units and the nearest branch pipe>15m;
2) When pipe length between first branch pipe and the farthest indoor >40m;
3) When the height difference between indoor units >18m;
If the pipe is in one of above three conditions, adjust the pipe diameter as following:
(1) 5.6kW<indoor rated capacity≤18kW, change gas/liquid pipe diameter to Ø19.05/Ø9.52;
(2) 18kW<Indoor rated capacity, OVVA-310N-O1M25 gas/liquid pipe diameter change to Ø22.22/ Ø12.7.Please purchase the pipe reducer from local supplier.

2. Pipe “B” diameter (between branch pipes, diameter unit: mm)

Total indoor capacity after the branch pipe (kW)	Gas pipe (mm)	Liquid pipe (mm)
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7
45.0kW≤ X <71.0kW	Ø28.58	Ø15.88
71.0kW≤ X <101.0kW	Ø31.8	Ø19.05
101.0kW≤ X <158.0kW	Ø38.1	Ø19.05
158.0kW≤ X <186.0kW	Ø41.3	Ø19.05
186.0kW≤ X <240.0kW	Ø44.5	Ø22.22
240.0kW≤ X <275.0kW	Ø50.8	Ø25.4
275.0kW≤ X <320.0kW	Ø54.1	Ø25.4

1) When pipe length between the first branch pipe and the farthest indoor unit>40m, pipe "B"(both gas & liquid pipe) diameter should be enlarged one size (not applicable for Ø54.1&Ø66.7)

*Size enlarged as following order:

Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.8-Ø38.1-Ø41.3-Ø44.5-Ø50.8-Ø54.1

2) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.

Exceptional case: If there's no Ø31.8 and Ø38.1, Ø34.9 can be used to replace Ø31.8. If there's no Ø44.5 and Ø50.8, Ø54.1 can be used to replace Ø44.5.

3) Trigger upsizing rules: If you can't get the one size larger pipe on-site, keep the original pipe.

3. Pipe “C” diameter (main pipe, between outdoor first gather pipe and the first branch pipe, diameter unit:mm)

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
8	Ø19.05	Ø9.52	Ø22.22	Ø12.7
10	Ø22.22	Ø9.52	Ø25.4	Ø12.7
12	Ø25.4	Ø12.7	Ø28.58	Ø15.88
14	Ø25.4	Ø12.7	Ø28.58	Ø15.88
16	Ø28.58	Ø12.7	Ø31.8	Ø15.88
18	Ø28.58	Ø15.88	Ø31.8	Ø19.05
20	Ø28.58	Ø15.88	Ø31.8	Ø19.05
22	Ø28.58	Ø15.88	Ø31.8	Ø19.05
24	Ø28.58	Ø15.88	Ø31.8	Ø19.05
26	Ø28.58	Ø15.88	Ø31.8	Ø19.05
28	Ø28.58	Ø15.88	Ø31.8	Ø19.05
30	Ø31.8	Ø19.05	Ø38.1	Ø22.22
32	Ø31.8	Ø19.05	Ø38.1	Ø22.22
34	Ø31.8	Ø19.05	Ø38.1	Ø22.22
36	Ø38.1	Ø19.05	Ø38.1	Ø22.22
38	Ø38.1	Ø19.05	Ø38.1	Ø22.22
40	Ø38.1	Ø19.05	Ø38.1	Ø22.22
42	Ø38.1	Ø19.05	Ø38.1	Ø22.22
44	Ø38.1	Ø19.05	Ø38.1	Ø22.22

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
46	Ø38.1	Ø19.05	Ø38.1	Ø22.22
48	Ø38.1	Ø19.05	Ø38.1	Ø22.22
50	Ø38.1	Ø19.05	Ø38.1	Ø22.22
52	Ø38.1	Ø19.05	Ø38.1	Ø22.22
54	Ø38.1	Ø19.05	Ø41.3	Ø22.22
56	Ø38.1	Ø19.05	Ø41.3	Ø22.22
58	Ø41.3	Ø19.05	Ø44.5	Ø22.22
60	Ø41.3	Ø19.05	Ø44.5	Ø22.22
62	Ø41.3	Ø19.05	Ø44.5	Ø22.22
64	Ø41.3	Ø19.05	Ø44.5	Ø22.22
66	Ø41.3	Ø19.05	Ø44.5	Ø22.22
68	Ø44.5	Ø22.22	Ø50.8	Ø25.4
70	Ø44.5	Ø22.22	Ø50.8	Ø25.4
72	Ø44.5	Ø22.22	Ø50.8	Ø25.4
74	Ø44.5	Ø22.22	Ø50.8	Ø25.4
76	Ø44.5	Ø22.22	Ø50.8	Ø25.4
78	Ø44.5	Ø22.22	Ø50.8	Ø25.4
80	Ø44.5	Ø22.22	Ø50.8	Ø25.4

1) When the pipe length between the first gather pipe and the farthest indoor unit>90m;
2) When height difference between indoor and outdoor units>40/50m(Outdoor unit is under/above);
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “C” diameter rules.
3) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.
4) Trigger upsizing rules: Enlarge the pipe diameter as pipe “C” diameter rules, if no proper pipe, keep the original pipe.

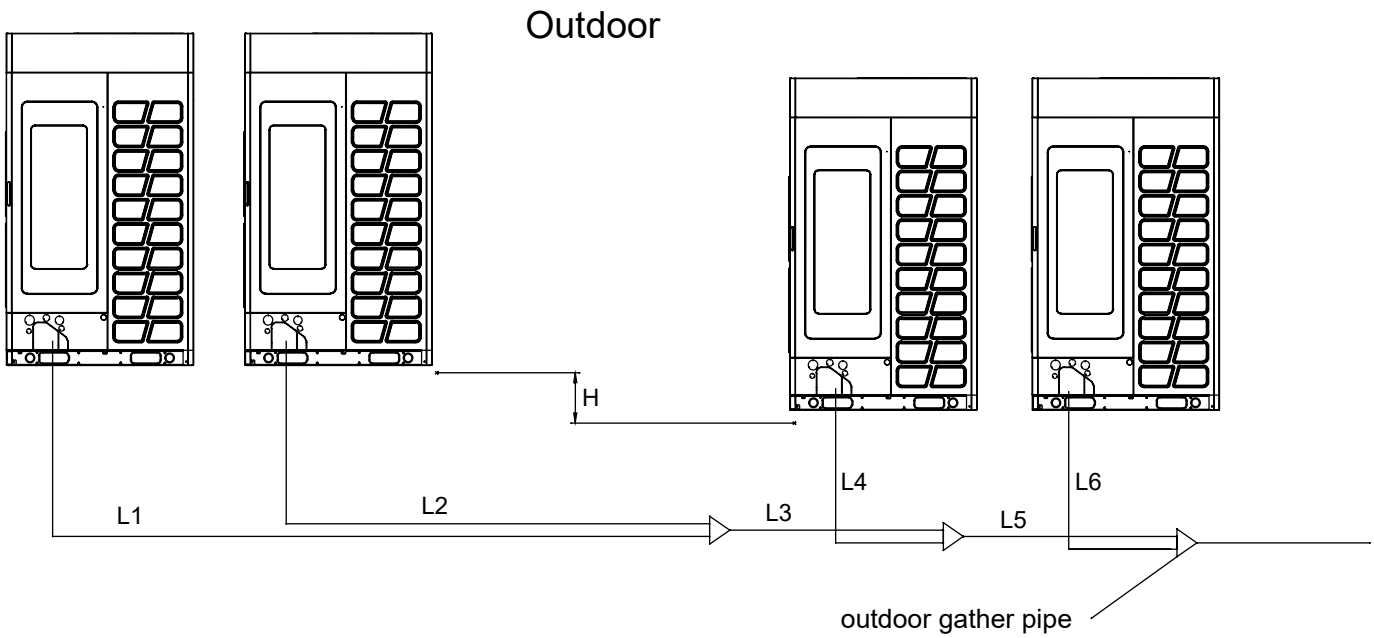
4. Pipe “D” diameter (between gather pipes, diameter unit: mm)

Total horse power of connected outdoors	Gas pipe	Liquid pipe
X≤16HP	Ø28.58	Ø12.7
16HP<X≤26HP	Ø28.58	Ø15.88
26HP<X≤34HP	Ø31.8	Ø19.05
34HP<X≤56HP	Ø38.1	Ø19.05
56HP<X≤66HP	Ø41.3	Ø19.05
66HP<X≤84HP	Ø44.5	Ø22.22
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.		

5. Pipe “E” diameter (between outdoor and the gather pipe, diameter unit: mm)

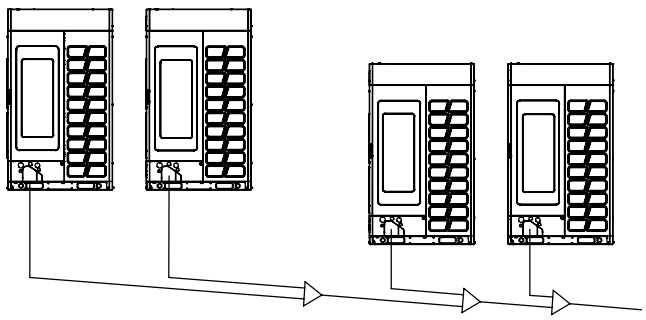
Outdoor(HP)	Gas pipe		Liquid pipe	
	Pipe diameter	Connection method	Pipe diameter	Connection method
8	Ø19.05	Flared	Ø9.52	Flared
10	Ø22.22	Brazed	Ø9.52	
12	Ø25.4		Ø12.7	
14	Ø25.4		Ø12.7	
16	Ø28.58		Ø12.7	
18	Ø28.58		Ø15.88	
20	Ø28.58		Ø15.88	
22	Ø28.58		Ø15.88	
24	Ø28.58		Ø15.88	
26	Ø28.58		Ø15.88	
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.				

Pipe length between outdoor units

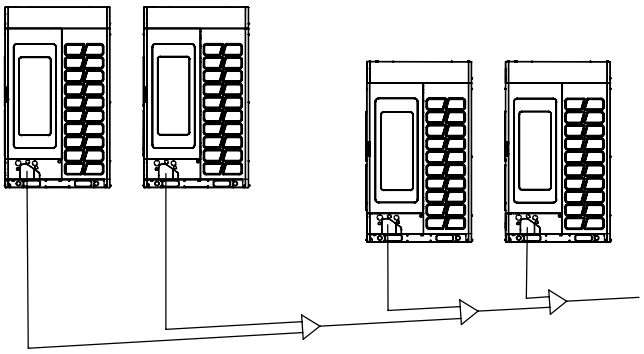


1. Pipe length between outdoor units and the first gather pipe should be≤10m; L1+L3+L5≤10m; L2+L3+L5≤10m; L4+L5≤10m; L6≤10m.
2. Height difference between outdoor units: H≤5m.
3. The gather pipe must be placed horizontally or in accordance with the installation of a certain angle (level angle less than 15 degrees). The first gather pipe can be vertical installed.
4. All horizontal piping connect the outdoor unit cannot be higher than the outdoor stop valve.

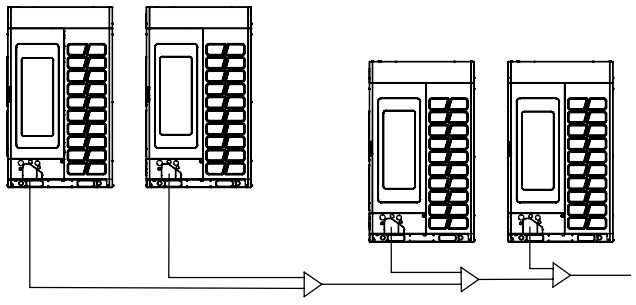
Proper installatio



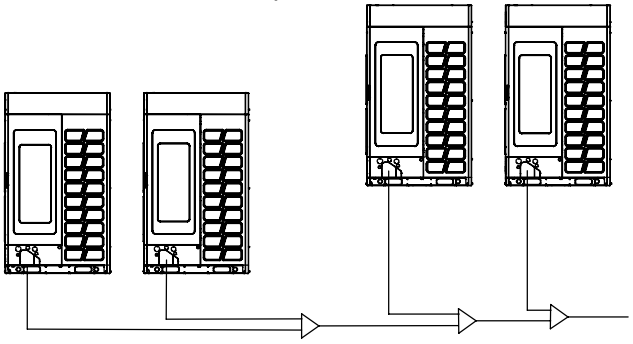
Wrong installation
The lubricating oil will accumulate to the lowest outdoor unit

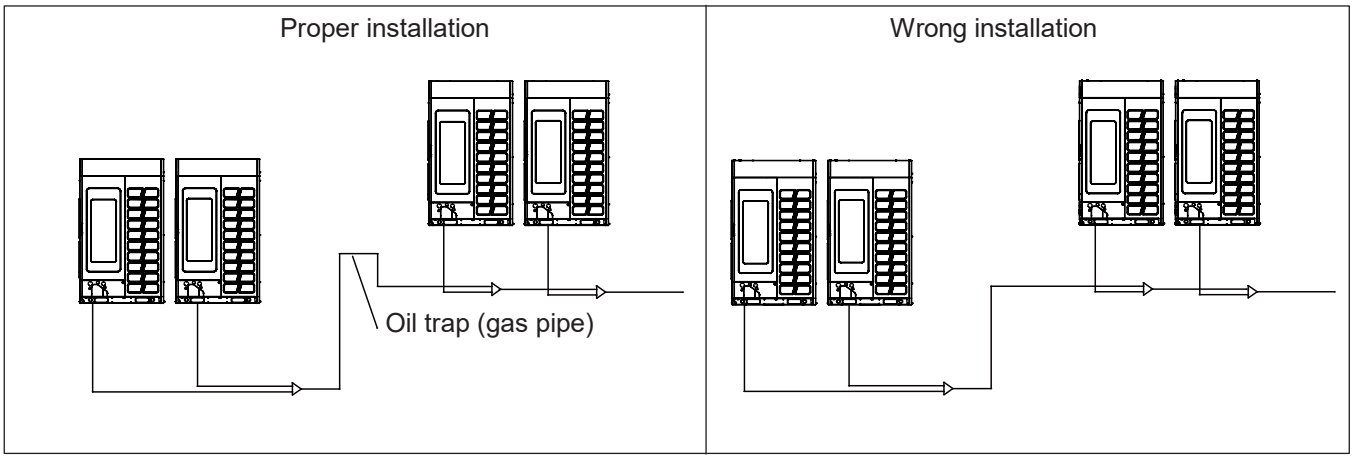


Proper installatio

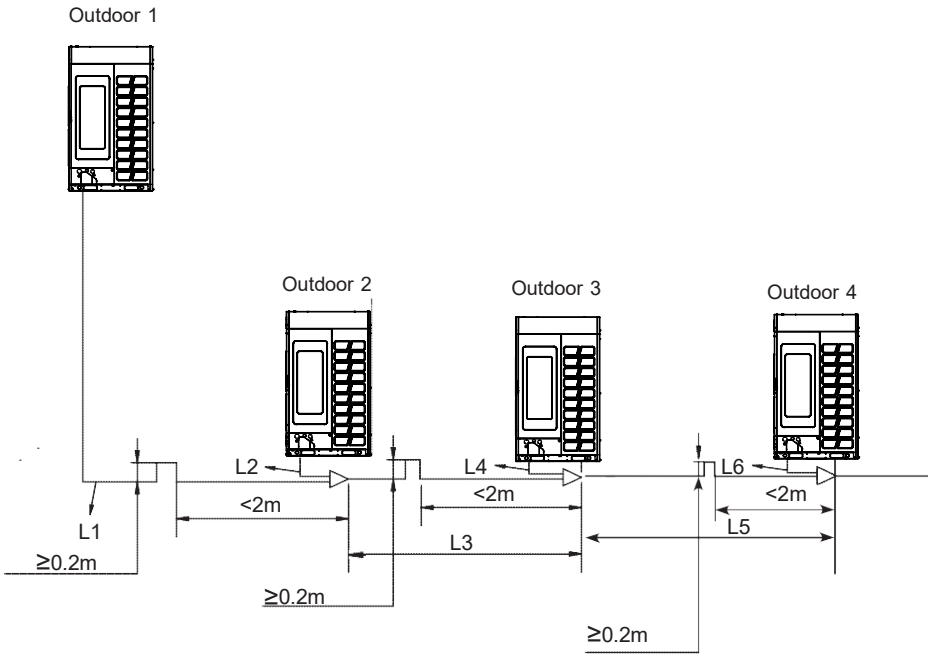


Proper installatio

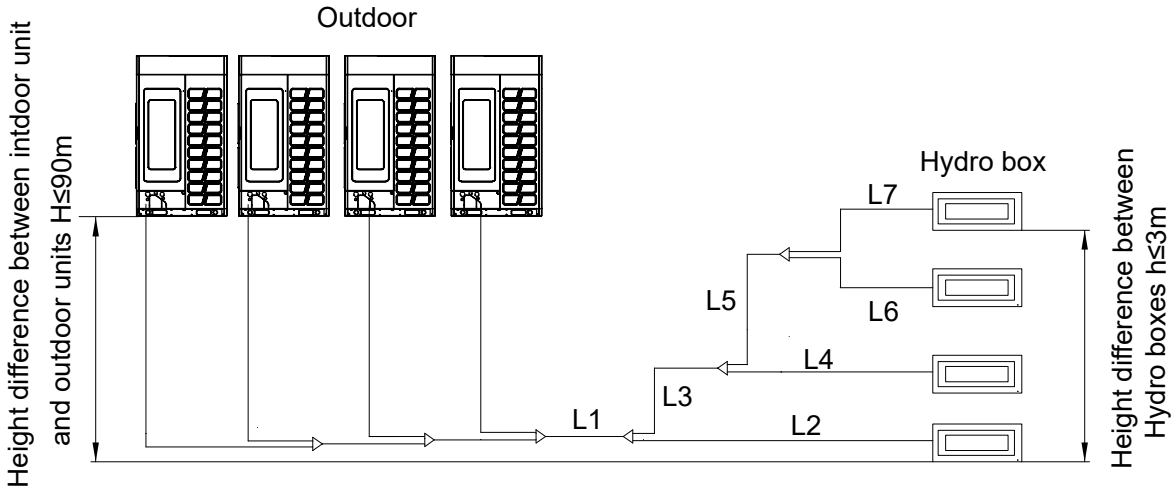




5. When the distance between outdoors(L1, L3, L5) is >2m, the oil trap must be set (upright gas pipe height≥0.2m), as the figure:



Allowable pipe length and height difference between indoor (Hydro box only) and outdoor units



Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤550	L1+2*(L3+L5)+L2+L4+L6+L7
Pipe length between the first gather pipe to the farthest indoor unit	Actual length	≤220*[1]	L1+L3+L5+L7
	Equivalent length	≤260	
Pipe length between first gather pipe and first branch pipe(Main pipe)		≤130	L1
Pipe length between the first branch pipe and the farthest indoor unit		≤90*[2]	L3+L5+L7
Pipe length between indoor units and the nearest branch pipe		≤40*[3]	L2/L4/L6/L7
Pipe length difference between the nearest indoor unit and the farthest indoor unit		≤40	L3+L5+L7-L2
Height difference between indoor and outdoor units	Outdoor unit above	≤90*[4]	H
	Outdoor unit under	≤110*[5]	
Height difference between Hydro boxes		≤3	h

Note:
*1. Standard length≤90m, if >90m, englarge the pipe diameter as pipe “C” diameter rules.
*2. Standard length≤40m, if >40m, the pipe between the first branch and the farthest indoor unit need to enlarge one size (refer to pipe "A" &"B" diameter rules).
*3. Standard length ≤15m, if >15m, the pipe between indoor units and the nearest branch pipe need to enlarge one size (refer to pipe "A" diameter rules).
*4. Standard height difference≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When rated indoor and outdoor capacity combination ratio≤100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB.
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "C" diameter rules.
4) If single way total pipe length>500m, need to add compressor oil 0.3L/100m(pipe length less than 100m, count as 100m).
For example, if the total pipe length is 520m, then we should add 0.3L compressor oil.
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*5. Standard height difference≤40m, if >40m, please refer to *4 rules.
* From the first gather pipe to indoor unit, the size of pipe diameter should be large to small, upstream pipe diameter≥ downstream pipe diameter; If pipe(no upsizing) diameter<downstream pipe diameter, the diameter of the pipe should enlarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
* All pipes only are allowed to upsize once.

Branch pipe

The first branch pipe selection:

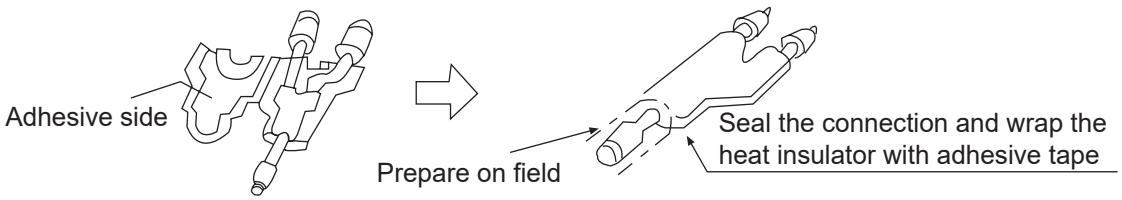
Total outdoor unit capacity (100W)	Model
X≤335	TAU335
335<X ≤506	TAU506
506<X ≤730	TAU730
730<X ≤1350	TAU1350
1350<X	TAU2040

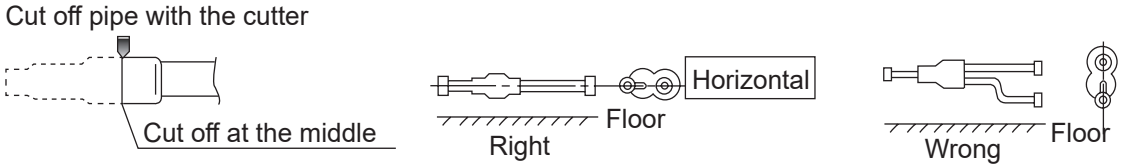
Gather pipe

Total outdoor unit quantity	Model
2	TBS20
3	TBS30
4	TBS30 & TAU2040

Note:

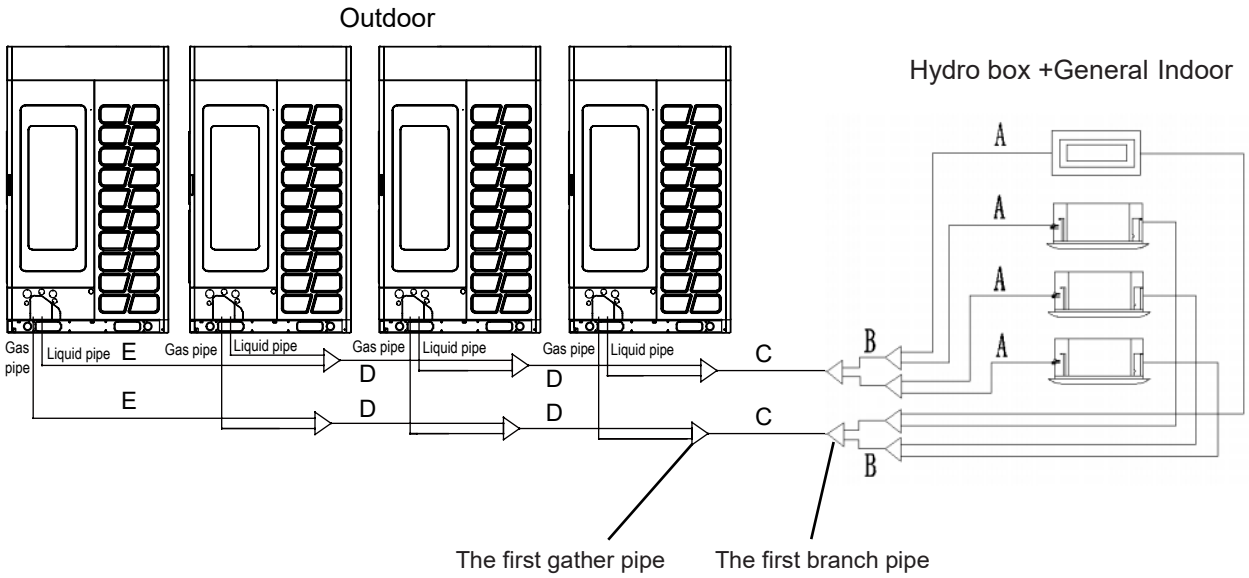
1. Please install the branch/gather pipe (gas/liquid side) in horizontal or vertical direction.
2. It's not allowed to connect branch pipe or indoor unit after the branch pipe within 50cm.
3. The pipe should keep straight(pipe length>50cm) if there is other branch pipe connecting the upstream branch pipe.





VRF system includes Hydro box & general indoor units

Pipe specification



6. Pipe "A" diameter (between indoor units and branch pipe, diameter unit: mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
X≤28	Ø9.52	Flared	Ø6.35	Flared	1. 5 K / 7 K / 9 K gas/liquid pipe diameter are Ø12.7/Ø6.35 2. 7K,9K gas/liquid pipe diameter are Ø25.4/Ø9.52 3.OVVA-310N-O1M25gas/liquid pipe diameter are Ø19.05/Ø9.52
28<X≤56	Ø12.7		Ø6.35		
56<X≤180	Ø15.88		Ø9.52		
180<X≤300	Ø22.22	Brazed	Ø12.7		
300<X≤600	Ø28.58		Ø12.7		

1) When pipe length between indoor units and the nearest branch pipe>15m;
4) When pipe length between first branch pipe and the farthest indoor >40m;
5) When the height difference between indoor units >18m;
If the pipe is in one of above three conditions, adjust the pipe diameter as following:
(3) Indoor rated capacity≤5.6kW, change gas/liquid pipe diameter to Ø15.88/Ø9.52;
(4) 5.6kW<indoor rated capacity≤18kW, change gas/liquid pipe diameter to Ø19.05/Ø9.52;
(5) 18kW<Indoor rated capacity, keep the original gas/liquid pipe diameter(Ø22.22/Ø12.7);
Exceptional case: 7 K / 9 K gas/liquid pipe diameter change to Ø25.4/Ø12.7.OVVA-310N-O1M25 gas/liquid pipe diameter change to Ø22.22/Ø12.7.

Please purchase the pipe reducer from local supplier.

7. Pipe “B” diameter (between branch pipes, diameter unit: mm)

Total indoor capacity after the branch pipe (kW)	Gas pipe (mm)	Liquid pipe (mm)
X<14.0kW	Refer to Pipe "A" diameter rules	
14.0kW≤ X <16.8kW	Ø15.88	Ø9.52
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7
45.0kW≤ X <71.0kW	Ø28.58	Ø15.88
71.0kW≤ X <101.0kW	Ø31.8	Ø19.05
101.0kW≤ X <158.0kW	Ø38.1	Ø19.05
158.0kW≤ X <186.0kW	Ø41.3	Ø19.05
186.0kW≤ X <240.0kW	Ø44.5	Ø22.22
240.0kW≤ X <275.0kW	Ø50.8	Ø25.4
275.0kW≤ X <320.0kW	Ø54.1	Ø25.4
≥320.0kW	Ø66.7	Ø25.4

4) When pipe length between the first branch pipe and the farthest indoor unit>40m, pipe "B"(both gas & liquid pipe) diameter should be enlarged one size (not applicable for Ø54.1&Ø66.7)

*Size enlarged as following order:

Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.8-Ø38.1-Ø41.3-Ø44.5-Ø50.8-Ø54.1

5) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.

Exceptional case: If there's no Ø31.8 and Ø38.1, Ø34.9 can be used to replace Ø31.8. If there's no Ø44.5 and Ø50.8, Ø54.1 can be used to replace Ø44.5.

6) Trigger upsizing rules: If you can't get the one size larger pipe on-site, keep the original pipe.

8. Pipe “C” diameter (main pipe, between outdoor first gather pipe and the first branch pipe, diameter unit:mm)

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
8	Ø19.05	Ø9.52	Ø22.22	Ø12.7
10	Ø22.22	Ø9.52	Ø25.4	Ø12.7
12	Ø25.4	Ø12.7	Ø28.58	Ø15.88
14	Ø25.4	Ø12.7	Ø28.58	Ø15.88
16	Ø28.58	Ø12.7	Ø31.8	Ø15.88
18	Ø28.58	Ø15.88	Ø31.8	Ø19.05
20	Ø28.58	Ø15.88	Ø31.8	Ø19.05
22	Ø28.58	Ø15.88	Ø31.8	Ø19.05
24	Ø28.58	Ø15.88	Ø31.8	Ø19.05
26	Ø28.58	Ø15.88	Ø31.8	Ø19.05
28	Ø28.58	Ø15.88	Ø31.8	Ø19.05
30	Ø31.8	Ø19.05	Ø38.1	Ø22.22
32	Ø31.8	Ø19.05	Ø38.1	Ø22.22
34	Ø31.8	Ø19.05	Ø38.1	Ø22.22
36	Ø38.1	Ø19.05	Ø38.1	Ø22.22
38	Ø38.1	Ø19.05	Ø38.1	Ø22.22
40	Ø38.1	Ø19.05	Ø38.1	Ø22.22
42	Ø38.1	Ø19.05	Ø38.1	Ø22.22
44	Ø38.1	Ø19.05	Ø38.1	Ø22.22
46	Ø38.1	Ø19.05	Ø38.1	Ø22.22
48	Ø38.1	Ø19.05	Ø38.1	Ø22.22
50	Ø38.1	Ø19.05	Ø38.1	Ø22.22
52	Ø38.1	Ø19.05	Ø38.1	Ø22.22
54	Ø38.1	Ø19.05	Ø41.3	Ø22.22

Outdoor capacity (HP)	Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
56	Ø38.1	Ø19.05	Ø41.3	Ø22.22
58	Ø41.3	Ø19.05	Ø44.5	Ø22.22
60	Ø41.3	Ø19.05	Ø44.5	Ø22.22
62	Ø41.3	Ø19.05	Ø44.5	Ø22.22
64	Ø41.3	Ø19.05	Ø44.5	Ø22.22
66	Ø41.3	Ø19.05	Ø44.5	Ø22.22
68	Ø44.5	Ø22.22	Ø50.8	Ø25.4
70	Ø44.5	Ø22.22	Ø50.8	Ø25.4
72	Ø44.5	Ø22.22	Ø50.8	Ø25.4
74	Ø44.5	Ø22.22	Ø50.8	Ø25.4
76	Ø44.5	Ø22.22	Ø50.8	Ø25.4
78	Ø44.5	Ø22.22	Ø50.8	Ø25.4
80	Ø44.5	Ø22.22	Ø50.8	Ø25.4
82	Ø44.5	Ø22.22	Ø50.8	Ø25.4
84	Ø44.5	Ø22.22	Ø50.8	Ø25.4
86	Ø50.8	Ø25.4	Ø54.1	Ø25.4
88	Ø50.8	Ø25.4	Ø54.1	Ø25.4
90	Ø50.8	Ø25.4	Ø54.1	Ø25.4
92	Ø50.8	Ø25.4	Ø54.1	Ø25.4
94	Ø50.8	Ø25.4	Ø54.1	Ø25.4
96	Ø50.8	Ø25.4	Ø54.1	Ø25.4
98	Ø54.1	Ø25.4	Ø54.1	Ø25.4
100	Ø54.1	Ø25.4	Ø54.1	Ø25.4
102	Ø54.1	Ø25.4	Ø54.1	Ø25.4
104	Ø54.1	Ø25.4	Ø54.1	Ø25.4

1) When the pipe length between the first gather pipe and the farthest indoor unit>90m;
2) When height difference between indoor and outdoor units>40/50m(Outdoor unit is under/above);
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “C” diameter rules.
3) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.
4) Trigger upsizing rules: Enlarge the pipe diameter as pipe “C” diameter rules, if no proper pipe, keep the original pipe.

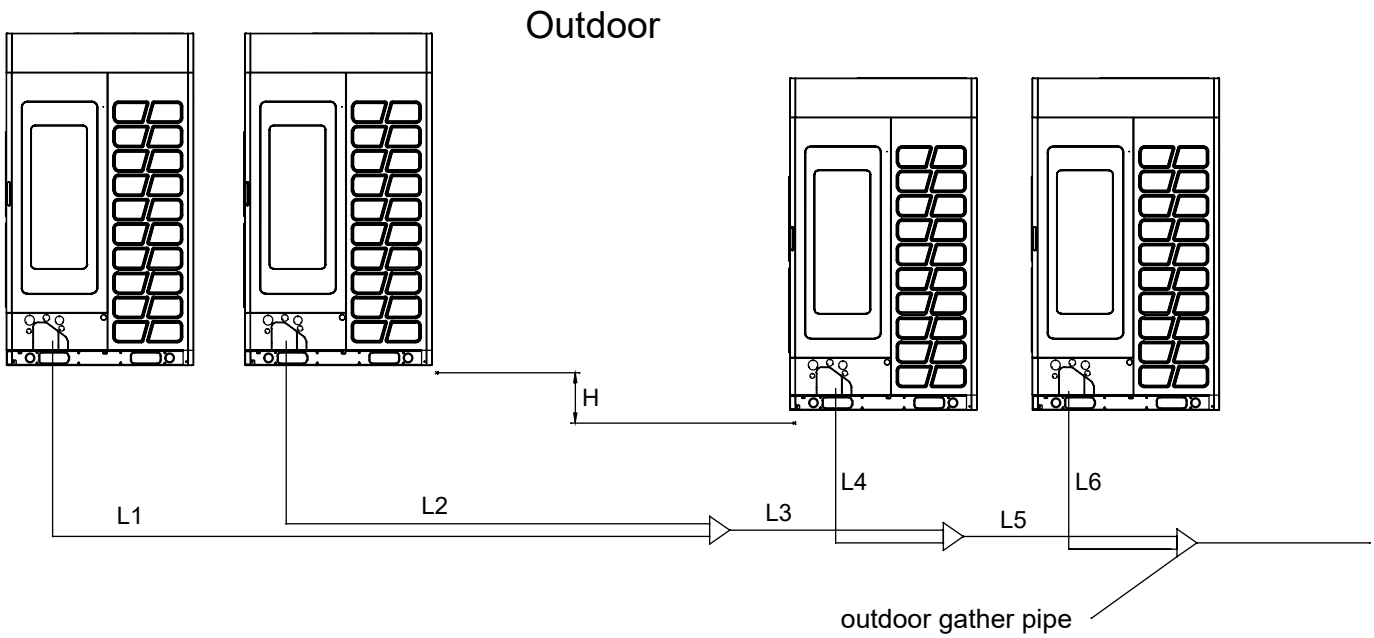
9. Pipe “D” diameter (between gather pipes, diameter unit: mm)

Total horse power of connected outdoors	Gas pipe	Liquid pipe
X≤16HP	Ø28.58	Ø12.7
16HP<X≤26HP	Ø28.58	Ø15.88
26HP<X≤34HP	Ø31.8	Ø19.05
34HP<X≤56HP	Ø38.1	Ø19.05
56HP<X≤66HP	Ø41.3	Ø19.05
66HP<X≤84HP	Ø44.5	Ø22.22
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.		

10. Pipe “E” diameter (between outdoor and the gather pipe, diameter unit: mm)

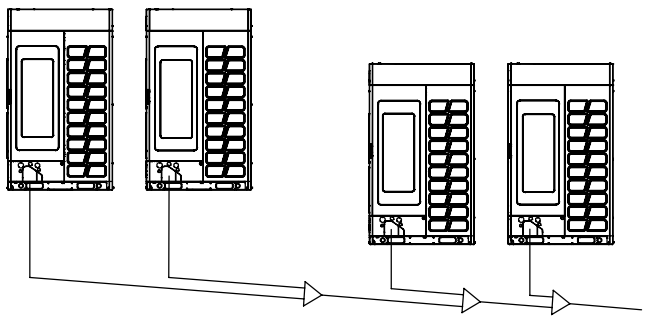
Outdoor(HP)	Gas pipe		Liquid pipe	
	Pipe diameter	Connection method	Pipe diameter	Connection method
8	Ø19.05	Flared	Ø9.52	Flared
10	Ø22.22	Brazed	Ø9.52	
12	Ø25.4		Ø12.7	
14	Ø25.4		Ø12.7	
16	Ø28.58		Ø12.7	
18	Ø28.58		Ø15.88	
20	Ø28.58		Ø15.88	
22	Ø28.58		Ø15.88	
24	Ø28.58		Ø15.88	
26	Ø28.58		Ø15.88	
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.				

Pipe length between outdoor units



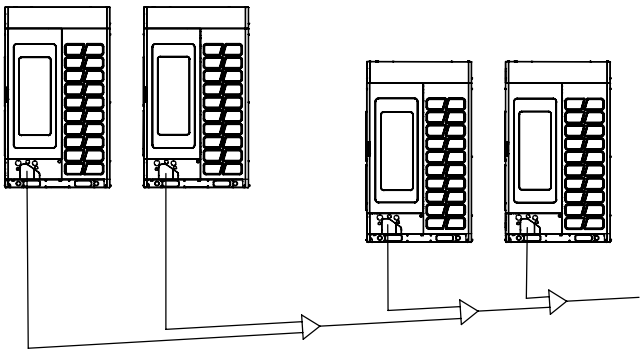
1. Pipe length between outdoor units and the first gather pipe should be≤10m; L1+L3+L5≤10m; L2+L3+L5≤10m; L4+L5≤10m; L6≤10m.
2. Height difference between outdoor units: H≤5m.
3. The gather pipe must be placed horizontally or in accordance with the installation of a certain angle (level angle less than 15 degrees). The first gather pipe can be vertical installed.
4. All horizontal piping connect the outdoor unit cannot be higher than the outdoor stop valve.

Proper installation

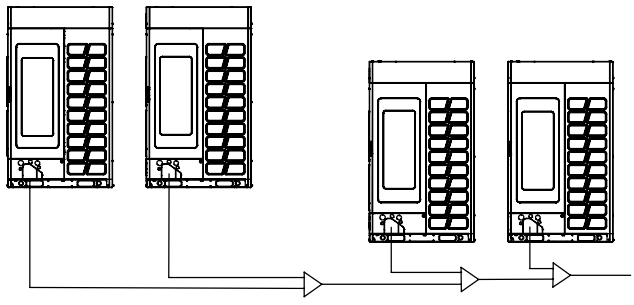


Wrong installation

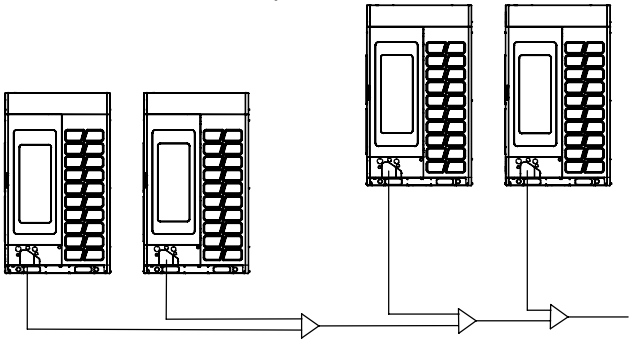
The lubricating oil will accumulate to the lowest outdoor unit

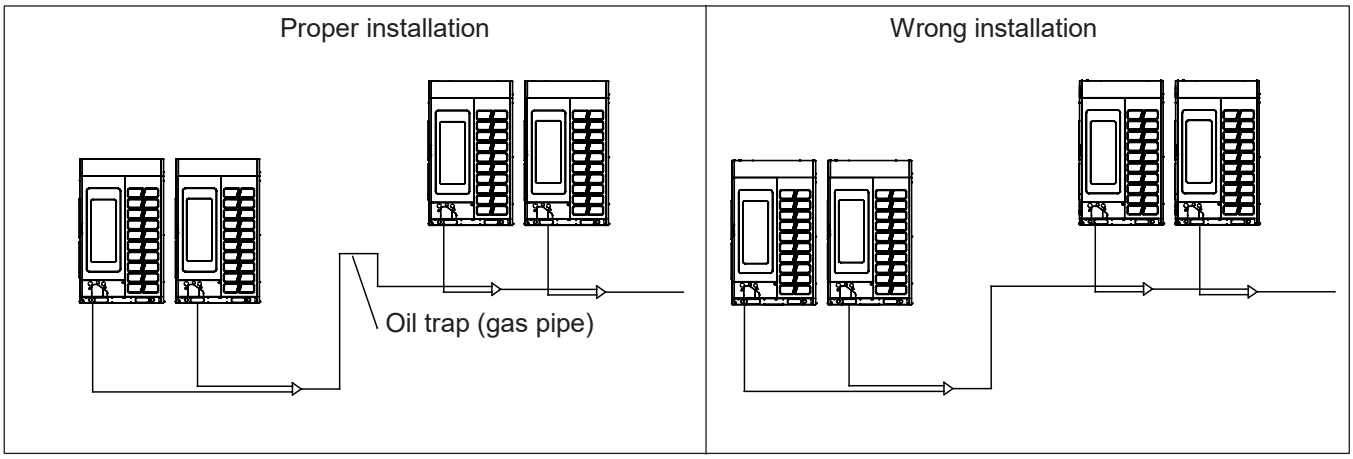


Proper installation

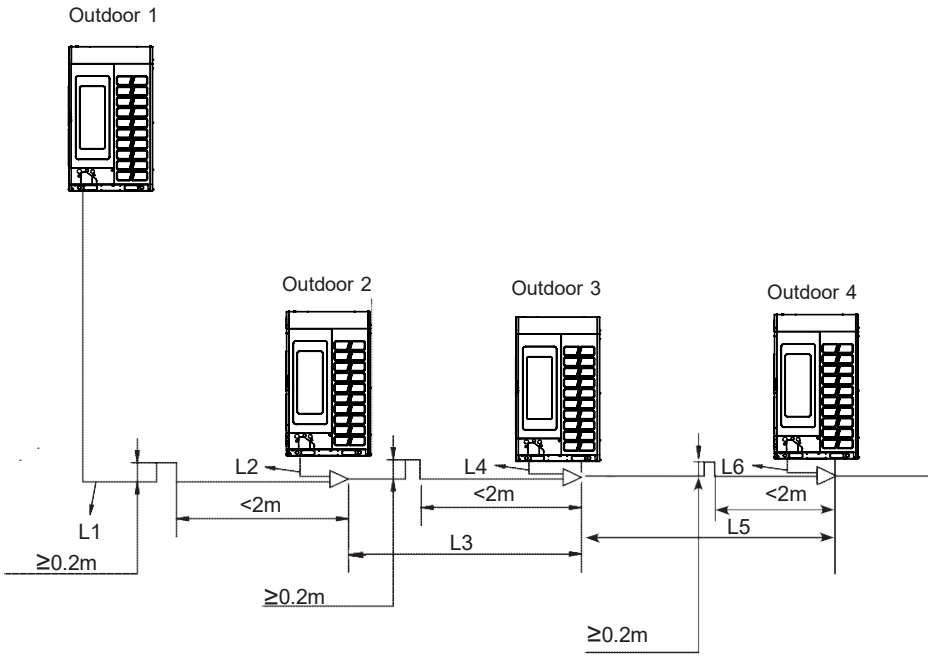


Proper installation

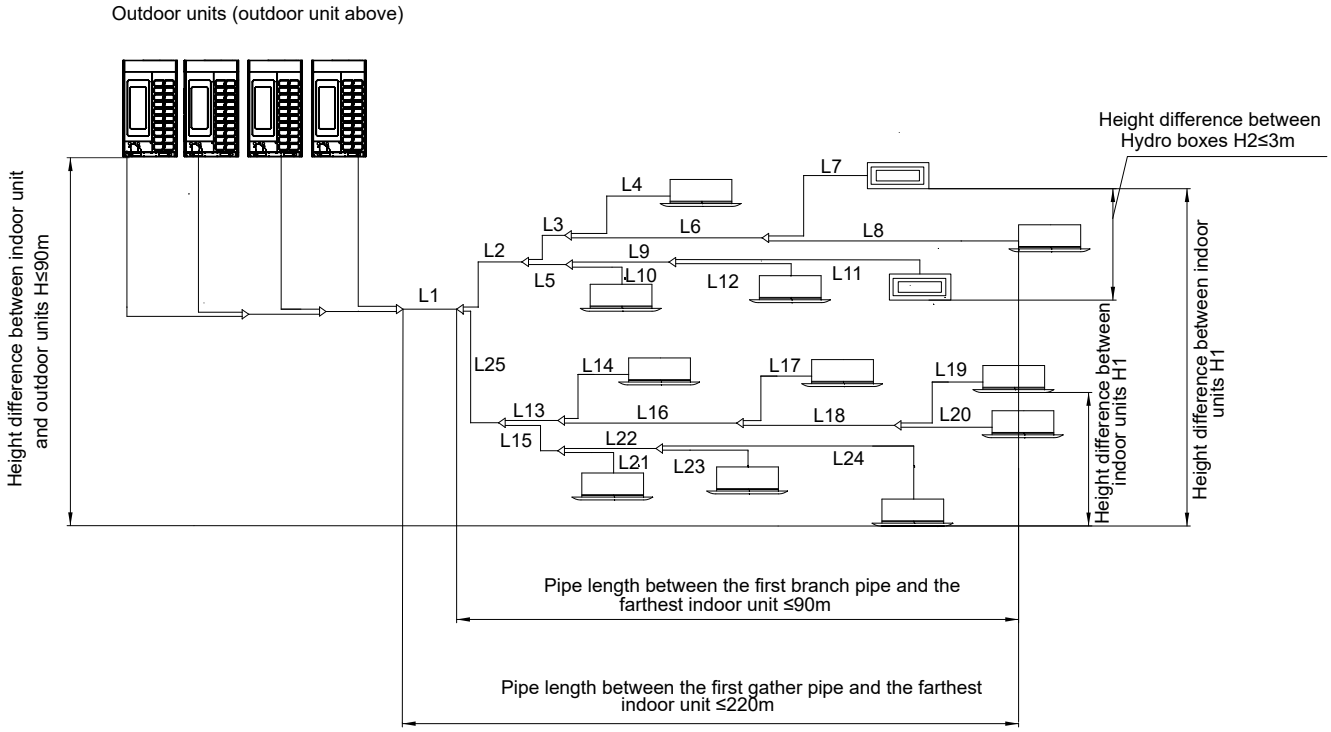




5. When the distance between outdoors(L1, L3, L5) is >2m, the oil trap must be set (upright gas pipe height≥0.2m), as the figure:



Allowable pipe length and height difference between indoor (Hydro box + general) and outdoor units



Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤1000	L1+2*(L2+L3+L6+L5+L9+L25+L13+L15+L16+L18+L22)+L4+L7+L8+L10+L11+L12+L14+L17+L19+L20+L21+L23+L24
Pipe length between the first gather pipe to the farthest indoor unit	Actual length	≤220*1	L1+L2+L3+L6+L8
	Equivalent length	≤260	
Pipe length between first gather pipe and first branch pipe (Main pipe)		≤130	L1
Pipe length between the first branch pipe and the farthest indoor unit		≤90*2	L2+L3+L6+L8
Pipe length between indoor units and the nearest branch pipe		≤40*3	L4/L7/L8/L10/L11/L12/L14/L17/L19/L20/L21/L23/L24
Pipe length difference between the nearest indoor unit and the farthest indoor unit		≤40	L2+L3+L6+L8-L2-L5-L10
Height difference between indoor and outdoor units	Outdoor unit above	≤90*4	H
	Outdoor unit under	≤110*5	
Height difference between indoor units	Outdoor unit above	≤3(30*6)	H1
	Outdoor unit under	≤10(30*6)	
Height difference between Hydro boxes		≤3	H2

Note:
*1. Standard length≤90m, if >90m, englarge the pipe diameter as pipe “C” diameter rules.
*2. Standard length≤40m, if >40m, the pipe between the first branch and the farthest indoor unit need to enlarge one size (refer to pipe "A" &"B" diameter rules).
*3. Standard length ≤15m, if >15m, the pipe between indoor units and the nearest branch pipe need to enlarge one size (refer to pipe "A" diameter rules).
*4. Standard height difference≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When rated indoor and outdoor capacity combination ratio≤100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
When rated indoor and outdoor capacity combination ratio>100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at that indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB;
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "C" diameter rules.
4) If single way total pipe length>500m, need to add compressor oil 0.3L/100m(pipe length less than 100m, count as 100m).
For example, if the total pipe length is 620m, then we should add 0.6L compressor oil.
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*5. Standard height difference≤40m, if >40m, please refer to *4 rules.
*6. 1) If general indoor unit and Hydro box are not operating at the same time, the height difference between general indoor units can reach up to 30m.
2) General indoor unit standard height difference≤18m, if >18m, the pipe length between farthest general indoor unit and the nearest branch pipe need to enlarge one size, refer to pipe "A" diameter rules.
3) Set IDU high drop mode from outdoor PCB(if outdoor PCB has this function).
* From the first gather pipe to indoor unit, the size of pipe diameter should be large to small, upstream pipe diameter≥ downstream pipe diameter; If pipe(no upsizing) diameter<downstream pipe diameter, the diameter of the pipe should enlarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
* All pipes only are allowed to upsize once.

Water volume:According to the cooling capacity,5L/kW

Modle	OVVA-090N-O1M25	OVVA-090N-O1M25	OVVA-090N-O1M25
Cooling capacity	7kW	14kW	28kW
Water volume	35L	70L	140L

Branch pipe

The first branch pipe selection:

Total outdoor unit capacity (100W)	Model
X≤335	TAU335
335<X ≤506	TAU506
506<X ≤730	TAU730
730<X ≤1350	TAU1350
1350<X	TAU2040

Branch pipes after the first branch pipe selection:

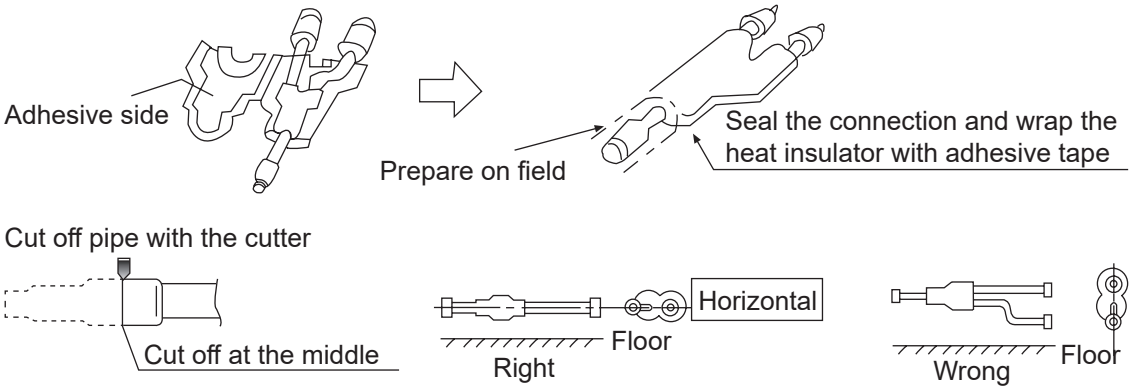
Total indoor unit capacity (100W)	Model
X≤335	TAU335
335<X ≤506	TAU506
506<X ≤730	TAU730
730<X ≤1350	TAU1350
1350<X	TAU2040

Gather pipe

Total outdoor unit quantity	Model
2	TBS20
3	TBS30
4	TBS30 & TAU2040

Note:

1. Please install the branch/gather pipe (gas/liquid side) in horizontal or vertical direction.
2. It's not allowed to connect branch pipe or indoor unit after the branch pipe within 50cm.
3. The pipe should keep straight(pipe length>50cm) if there is other branch pipe connecting the upstream branch pipe.



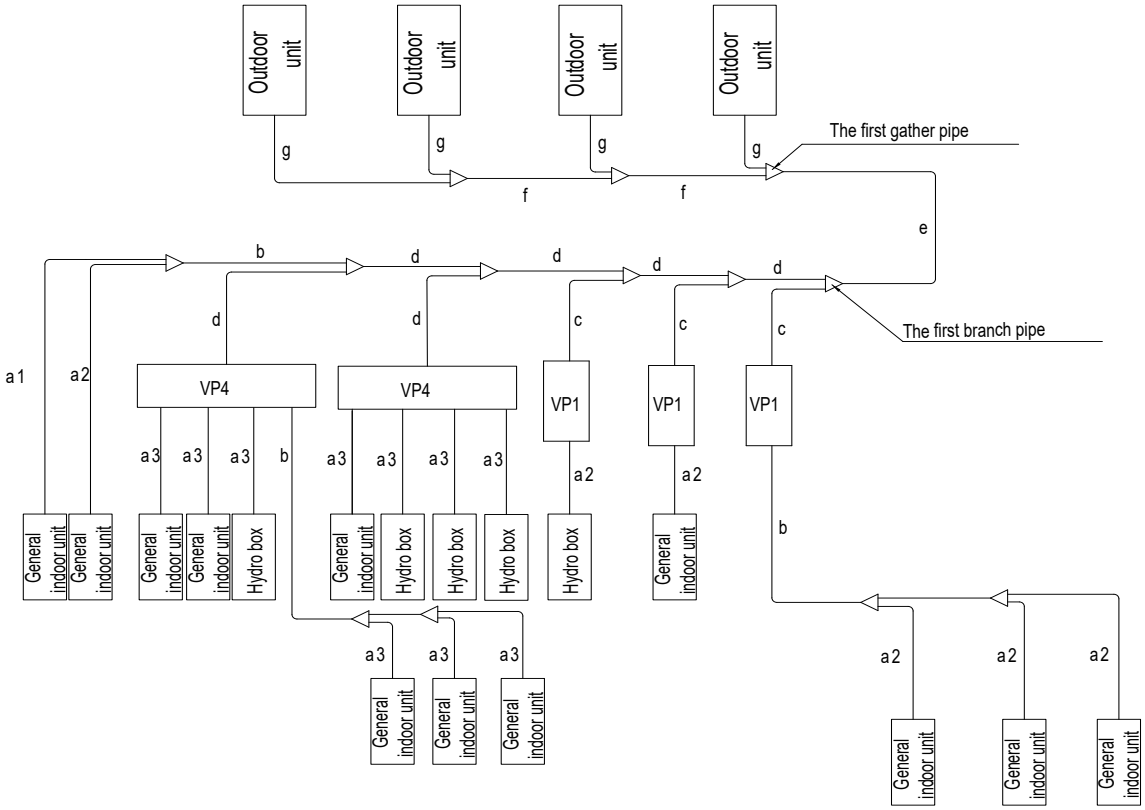
Hydro box

The outdoor units which can connect with the Hydro box are as following table:

Outdoor series	Model
VVEA	VVEA-250-615R-01T32

Hydro box	Connecting method	Hydro box quantity	Outdoor unit selection (unit: kW)
OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25	Hydro box only	≤8	1. 80% X total outdoor rated capacity ≤ total indoor unit rated capacity ≤ 100% X total outdoor rated capacity
	Together with general indoor units	≤8	1.50% X total outdoor rated capacity ≤ total indoor unit rated capacity ≤ 130% X total outdoor rated capacity 2.Total Hydro box rated capacity ≤ 80% X total outdoor rated capacity
Note: Indoor units include Hydro box and general indoor unit			

Pipe specification



1.Pipe "a (a1/a2/a3)" diameter (between indoor and branch pipe/VP box, diameter unit:mm)

Indoor rated capacity (x100w)	Gas pipe pipe e	Connecting method	Liquid pipe	Connecting method	Note
X≤28	Ø9.52	Flared	Ø6.35	Flared	1. 5k/7k/9k gas/liquid pipe diameter are Ø12.7/Ø6.35. 2. 7 k / 9 k gas/liquid pipe diameter are Ø25.4/ Ø9.52. 3.OVVA-310N-O1M25 gas/liquid pipe diameters are Ø19.05/Ø9.52.
28<X≤56	Ø12.7		Ø6.35		
56<X≤180	Ø15.88		Ø9.52		
180<X≤300	Ø22.22	Brazed	Ø12.7		
300<X≤600	Ø28.58		Ø12.7		
1) When the pipe length between cooling only indoor and nearest branch pipe(a1)>15m; Or indoor and VP1 box upstream nearest branch pipe (a2+c or a2+b+c)>15m; Or indoor and the nearest VP4 box (a3 or a3+b)>15m; 2) When pipe length between first branch pipe and farthest indoor >40m; 3) When height difference between indoor units >18m; If the pipe is in one of above three conditions, adjust the pipe diameter as following: (1) Indoor rated capacity ≤5.6kW, change gas/liquid pipe diameter to Ø15.88/Ø9.52; (2) 5.6kW<Indoor rated capacity≤18kW, change gas/liquid pipe diameter to Ø19.05/Ø9.52; (3) 18kW<Indoor rated capacity, keep the origianl gas/liquid pipe diameter to (Ø22.22/Ø12.7). Exceptional case: 7k/9k change gas/liquid pipe diameter to Ø25.4/Ø12.7. OVVA-310N-O1M25 gas/liquid pipe diameter change to Ø22.22/Ø12.7; Please purchase the pipe reducer from local supplier.					

2. Pipe “b” diameter (between branch pipes and branch pipe to VP box(applicable for two pipe), diameter unit:mm)

Total indoor capacity after the branch pipe	Gas pipe	Liquid pipe
X<14.0kW	Refer to Pipe "a" diameter rules	
14.0kW≤ X <16.8kW	Ø15.88	Ø9.52
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7
45.0kW≤ X <71.0kW	Ø28.58	Ø15.88
71.0kW≤ X <101.0kW	Ø31.8	Ø19.05
101.0kW≤ X <158.0kW	Ø38.1	Ø19.05
158.0kW≤ X <186.0kW	Ø41.3	Ø19.05
186.0kW≤ X <240.0kW	Ø44.5	Ø22.22
240.0kW≤ X <275.0kW	Ø50.8	Ø25.4
275.0kW≤ X <320.0kW	Ø54.1	Ø25.4

1) When pipe length between the first branch and the farthest indoor unit >40m, pipe"a"&"b"&"c"&"d" (both suction gas pipe&liquid pipe&HP gas pipe) diameter should be enlarged one size (not applicable for Ø54.1)
*Size enlarged as following order (unit, mm):
Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.8-Ø38.1-Ø41.3-Ø44.5-Ø50.8-Ø54.1
2) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.
Excepetional case: If there's no Ø31.8 and Ø38.1, Ø34.9 can be used to replace Ø31.8. If there's no Ø44.5 and Ø50.8, Ø54.1 can be used to replace Ø44.5.
3) Trigger upsizing rules:If you can't get the one size larger pipe on-site, keep the original pipe.

3. Pipe "c" diameter (between VP1 and branch pipe/VP4 box, diameter unit:mm)

VP1	Suction gas pipe	HP gas pipe	Liquid pipe
112B/C	Ø15.88	Ø12.7	Ø9.52
180B/C	Ø15.88	Ø15.88	Ø9.52
280B/C	Ø22.22	Ø19.05	Ø9.52

If the downsteam gas pipe diameter >upsteam suction gas pipe diamete, both upstream suction gas pipe and HP gas pipe diameter should be enlarged one size; If the downsteam liquid pipe diameter >upsteam liquid pipe, liquid pipe diameter should be enlarged one size.

4. Pipe "d" diameter (between branch pipes/VP4 box and branch pipe(branch pipe to applicable for three pipe), diameter unit:mm)

Total indoor capacity after the branch pipe	Suction gas pipe	HP gas pipe	Liquid pipe
X <16.8kW	Ø15.88	Ø12.7	Ø9.52
16.8kW≤X<22.4kW	Ø19.05	Ø15.88	Ø9.52
22.4kW≤X<33.5kW	Ø22.22	Ø19.05	Ø9.52
33.5kW≤X<47.0kW	Ø28.58	Ø25.4	Ø12.7
47.0kW≤X<71.0kW	Ø28.58	Ø25.4	Ø15.88
71.0kW≤X<101.0kW	Ø31.8	Ø28.58	Ø19.05
101.0kW≤ X <158.0kW	Ø38.1	Ø31.8	Ø19.05
158.0kW≤ X <186.0kW	Ø41.3	Ø38.1	Ø19.05
186.0kW≤ X <240.0kW	Ø44.5	Ø41.3	Ø22.22
240.0kW≤ X <275.0kW	Ø50.8	Ø44.5	Ø25.4
275.0kW≤ X <320.0kW	Ø54.1	Ø50.8	Ø25.4

1) When pipe length between the first branch pipe and farthest indoor unit >40m, pipe"a"&"b"&"c"&"d" (both suction gas pipe&liquid pipe&HP gas pipe) diameter should be enlarged one size(not applicable for Ø54.1)
*Size enlarged as following order:
Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.8-Ø38.1-Ø41.3-Ø44.5-Ø50.8-Ø54.1
2) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.
Excepetional case: If there's no Ø31.8 and Ø38.1, Ø34.9 can be used to replace Ø31.8. If there's no Ø44.5 and Ø50.8 can be used to replace Ø44.5.
3) Trigger upsizing rules: If you can't get the one size larger pipe on-site, keep the original pipe.

5. Pipe "e" diameter (main pipe, between the first gather pipe and the first branch pipe/VP box, diameter unit:mm)

Outdoor Capacity (HP)	Main pipe			Enlarged main pipe		
	Suction gas pipe	HP gas pipe	Liquid pipe	Suction gas pipe	HP gas pipe	Liquid pipe
8	Ø19.05	Ø19.05	Ø9.52	Ø22.22	Ø22.22	Ø12.70
10	Ø22.22	Ø19.05	Ø9.52	Ø25.40	Ø22.22	Ø12.70
12	Ø25.40	Ø22.22	Ø12.70	Ø28.58	Ø25.40	Ø15.88
14	Ø25.40	Ø22.22	Ø12.70	Ø28.58	Ø25.40	Ø15.88
16	Ø28.58	Ø25.40	Ø12.70	Ø31.80	Ø28.58	Ø15.88
18	Ø28.58	Ø25.40	Ø15.88	Ø31.80	Ø28.58	Ø19.05
20	Ø28.58	Ø25.40	Ø15.88	Ø31.80	Ø28.58	Ø19.05
22	Ø28.58	Ø25.40	Ø15.88	Ø31.80	Ø28.58	Ø19.05
24	Ø28.58	Ø25.40	Ø15.88	Ø31.80	Ø28.58	Ø19.05
26	Ø28.58	Ø25.40	Ø15.88	Ø31.80	Ø28.58	Ø19.05
28	Ø28.58	Ø25.40	Ø15.88	Ø31.80	Ø28.58	Ø19.05
30	Ø31.80	Ø28.58	Ø19.05	Ø38.10	Ø31.80	Ø22.22
32	Ø31.80	Ø28.58	Ø19.05	Ø38.10	Ø31.80	Ø22.22
34	Ø31.80	Ø28.58	Ø19.05	Ø38.10	Ø31.80	Ø22.22
36	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
38	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
40	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
42	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
44	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
46	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
48	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
50	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
52	Ø38.10	Ø31.80	Ø19.05	Ø38.10	Ø38.10	Ø22.22
54	Ø38.10	Ø31.80	Ø19.05	Ø41.30	Ø38.10	Ø22.22
56	Ø38.10	Ø31.80	Ø19.05	Ø41.30	Ø38.10	Ø22.22
58	Ø41.30	Ø38.10	Ø19.05	Ø44.50	Ø41.30	Ø22.22
60	Ø41.30	Ø38.10	Ø19.05	Ø44.50	Ø41.30	Ø22.22
62	Ø41.30	Ø38.10	Ø19.05	Ø44.50	Ø41.30	Ø22.22
64	Ø41.30	Ø38.10	Ø19.05	Ø44.50	Ø41.30	Ø22.22
66	Ø41.30	Ø38.10	Ø19.05	Ø44.50	Ø41.30	Ø22.22
68	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
70	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
72	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
74	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
76	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
78	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
80	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
82	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
84	Ø44.50	Ø41.30	Ø22.22	Ø50.80	Ø44.50	Ø25.40
86	Ø50.80	Ø44.50	Ø25.40	Ø54.10	Ø50.80	Ø25.40
88	Ø50.80	Ø44.50	Ø25.40	Ø54.10	Ø50.80	Ø25.40

1) When pipe length between the first gather pipe and the farthest indoor unit >90m;
2) When height difference between indoor and outdoor units >40/50m (Outdoor unit is under/above);
If the pipe is in one of above two conditions, adjust the pipe diameter as pipe “e” diameter rules.
3) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.
4) Trigger upsizing rules: Englarge the pipe diameter as pipe “e” diameter rules, if no proper pipe, keep the original pipe

6. Pipe "f" diameter (between gather pipes, diameter unit:mm)

Total horse power of connected outdoors	Suction gas pipe	Hp gas pipe	Liquid pipe
X≤16HP	Ø28.58	Ø25.40	Ø12.70
16HP<X≤26HP	Ø28.58	Ø25.40	Ø15.88
26HP<X≤34HP	Ø31.80	Ø28.58	Ø19.05
34HP<X≤56HP	Ø38.10	Ø31.80	Ø19.05
56HP<X≤66HP	Ø41.30	Ø38.10	Ø19.05
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.			

7. Pipe “g” diameter (between outdoor units and the nearest gather pipe, diameter unit:mm)

Outdoor(HP)	Suction gas pipe		HP gas pipe		HP gas pipe	
	Pipe diameter	Connecting method	Pipe diameter	Connecting method	Pipe diameter	Connecting method
8	Ø19.05	Flared	Ø19.05	Flared	Ø9.52	Flared
10	Ø22.22	Brazed	Ø19.05		Ø9.52	
12	Ø25.4		Ø22.22	Brazed	Ø12.7	
14	Ø25.4		Ø22.22		Ø12.7	
16	Ø28.58		Ø25.40		Ø12.7	
18	Ø28.58		Ø25.40		Ø15.88	
20	Ø28.58		Ø25.40		Ø15.88	
22	Ø28.58		Ø25.40		Ø15.88	
No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied.						

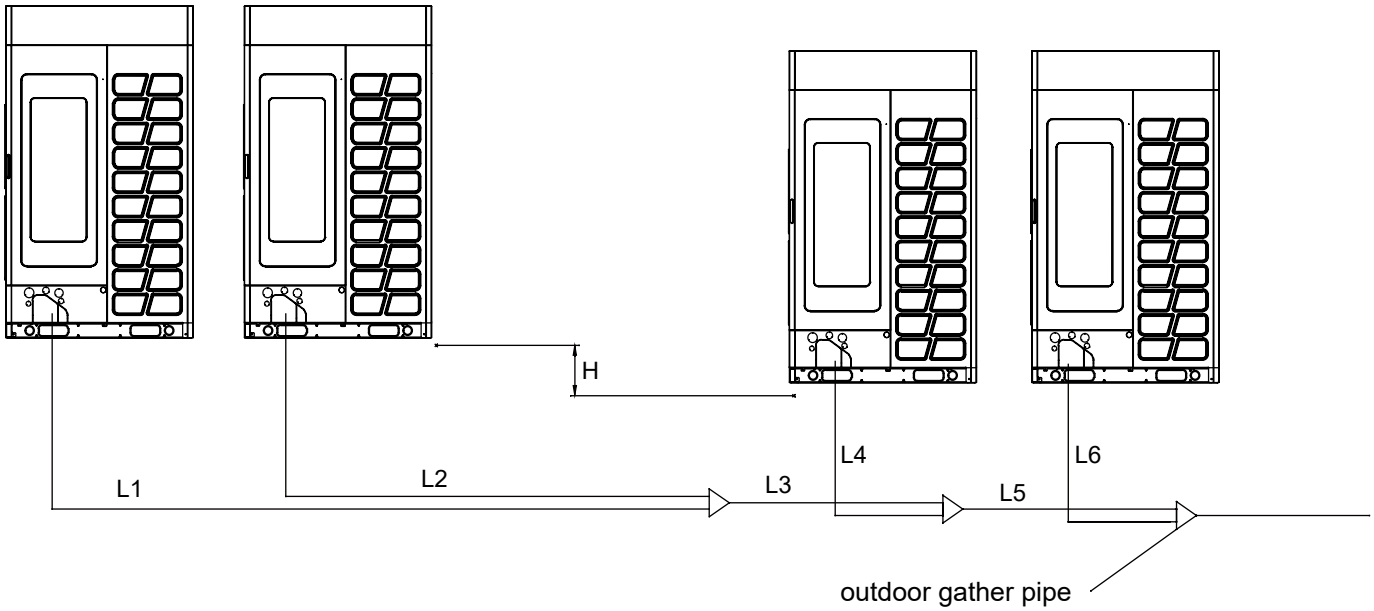
Copper pipe selection:

Material	Type pipe: soft pipe				
Pipe Diameter (mm)	Ø6.35	Ø9.52	Ø12.7	Ø15.88	Ø19.05
MinimumThickness (mm)	0.8	0.8	1.0	1.0	1.0

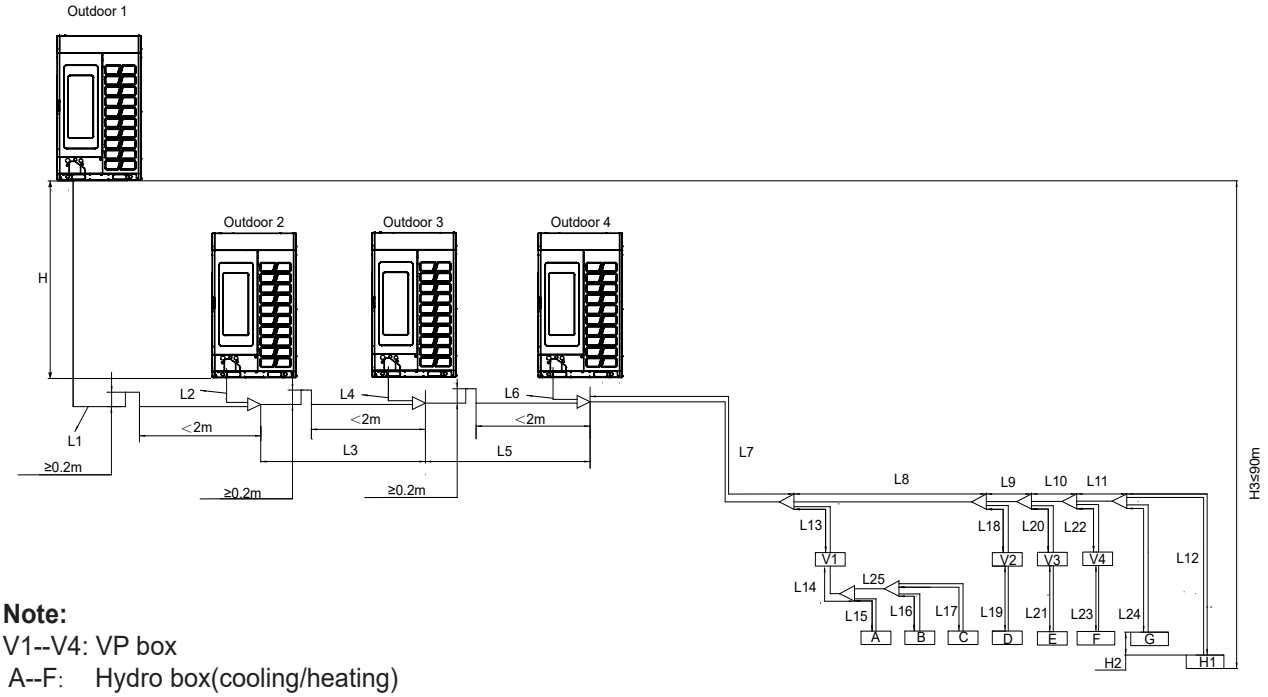
Material	Hard pipe					
Pipe Diameter (mm)	Ø19.05	Ø22.22	Ø25.4	Ø28.58	Ø31.8	Ø34.9
MinimumThickness (mm)	1.0	1.2	1.2	1.2	1.2	1.2
Pipe Diameter (mm)	Ø38.1	Ø41.3	Ø44.5	Ø50.8	Ø54.1	Ø66.7
MinimumThickness (mm)	1.5	1.5	1.5	1.8	1.8	1.8

Allowable pipe length and height difference between indoor (Hydro box only) and outdoor units

1. Pipe length between outdoor units



1. Pipe length between outdoor units and gather pipe should be ≤10m; L1+L3+L5 ≤10m; L2+L3+L5 ≤10m; L4+L5 ≤10m; L6 ≤10m.
2. Height difference between outdoors: H ≤0.5m.
3. The gather pipe must be placed horizontally or in accordance with the installation of a certain angle (level angle less than 15 degrees). The first gather pipe can be vertical installed.
4. All horizontal piping connect the outdoor unit cannot be higher than the height of the stop valve.
5. When the distance between outdoors (L1, L3, L5) is >2m, the oil trap must be set (upright suction gas pipe and HP gas pipe height≥0.2m), as the figure:



Note:

V1--V4: VP box

A--F: Hydro box(cooling/heating)

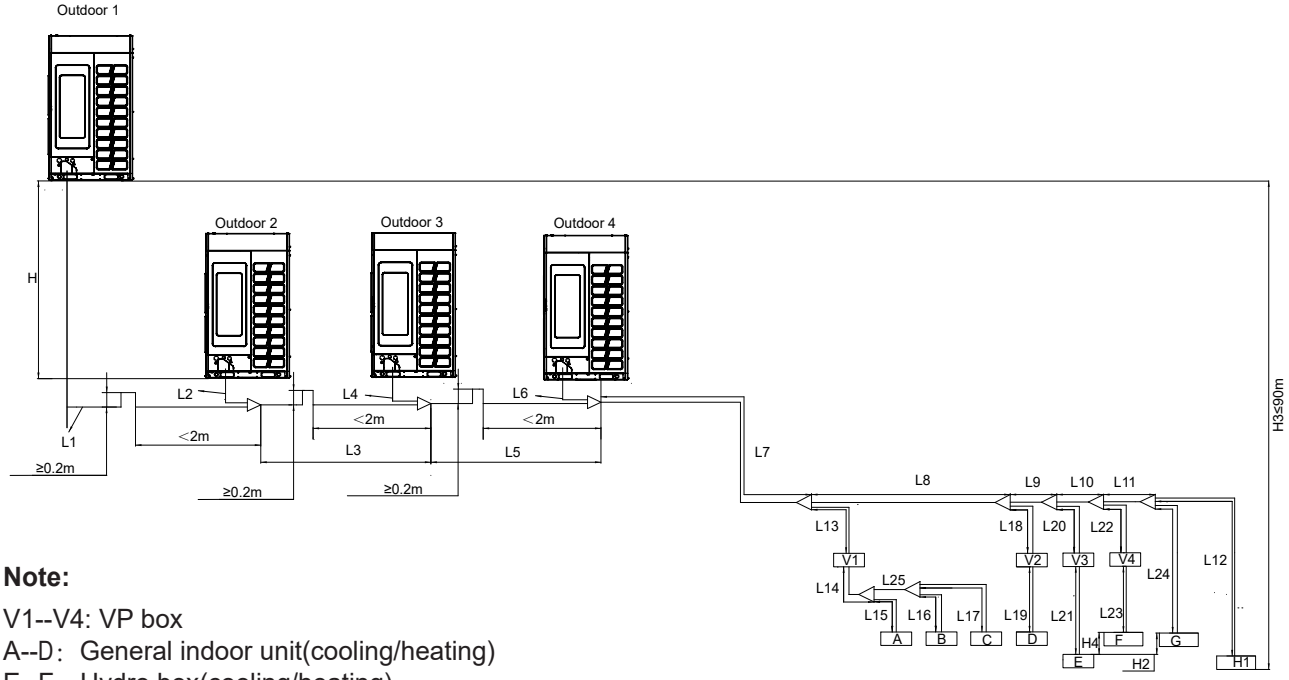
G--H1: Hydro box(cooling only)

2. Applicable range

Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤550	L7+2*(L8+L9+L10+L11+L13+L14+L25)+L12+L18+ L19+L20+L21+L22+L23+L24+L15+L16+L17
Pipe length between the first gather pipe to the farthest indoor unit	Actual length	≤220*[1]	L7+L8+L9+L10+L11+L24
	Equivalent length	≤260	
Pipe length between first gather pipe and first branch pipe		≤130	L7
Pipe length between the first branch pipe to the farthest indoor unit		≤90*[2]	L8+L9+L10+L11+L24
Pipe length between Indoor units and VP box upstream nearest branch pipe		≤30*[3]	L12/L24/ L13+L14+L15/L13+L14+L25+L16/ L13+L14+L25+L17/L18+L19/L20+L21/L22+L23
Pipe length difference between the nearest indoor unit and the farthest indoor unit		≤40	L8+L9+L10+L11+L24-L13-L14-L15
Height difference between outdoor unit and indoor units	Outdoor unit above	≤90*[4]	H3
	Outdoor unit under	≤110*[5]	
Height difference between Hydro boxes		≤3	H2

Note:
*1. Standard length≤90m, if >90m, englarge the pipe diameter as pipe “e” diameter rules.
*2. Standard length≤40m, if >40m, the pipe between the first branch and the farthest indoor unit need to enlarge one size(refer to pipe "a" &"b" &"c"&"d"diameter rules).
*3. Standard length≤15m, if >15m, the pipe between cooling only indoor and nearest branch pipe/indoor units and VP1 box upstream nearest branch pipe/indoor units and nearest VP4 box need to enlarge one size (refer to pipe "a" diameter rules).
*4. Standard height difference ≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When rated indoor and outdoor capacity combination ratio≤100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB.
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "C" diameter rules.
4) If single way total pipe length>500m, need to add compressor oil 0.3L/100m(pipe length less than 100m, count as 100m).
For example, if the total pipe length is 520m, then we should add 0.3L compressor oil.
If>70m, please contact the local qulified serviceman or supplier. (If>70m, there is same warning in selection software poping up).
*5. Standard height difference ≤40m, if >40m, please refer to *4 rules.
*From the first gather pipe to indoor unit, the size of pipe should be large to small, upstream suction gas pipe diameter ≥downstream suction gas pipe diameter, upstream HP gas pipe diameter ≥downstream HP gas pipe diameter, upstream liquid pipe diameter ≥downstream liquid pipe diameter;
If upstream pipe (no upsizing) diameter <downstream pipe diameter, the diameter of the pipe should enlarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
*All pipes only can upsize once.
*VP4 box is considered as a branch.
*Height difference of different branch indoor units of one VP4 box≤5m.

Allowable pipe length and height difference between indoor (Hydro box + general) and outdoor units



Note:

V1--V4: VP box
A--D：General indoor unit(cooling/heating)
E--F：Hydro box(cooling/heating)
G: General indoor unit(cooling only)
H1: Hydro box(cooling only)

1. Applicable range

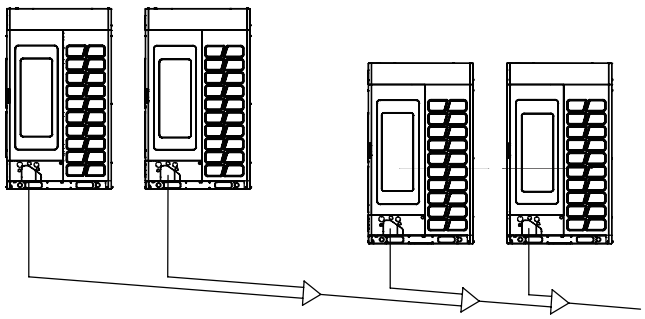
Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤1000	L7+2*(L8+L9+L10+L11+L13+L14+L25)+L12+L18+L19+L20+L21+L22+L23+L24+L15+L16+L17
Pipe length between the first gather pipe to the farthest indoor unit	Actual length	≤220*[1]	L7+L8+L9+L10+L11+L24
	Equivalent length	≤260	
Pipe length between first gather pipe and first branch pipe		≤130	L7
Pipe length between the first branch pipe to the farthest indoor unit		≤90*[2]	L8+L9+L10+L11+L24
Pipe length between Indoor units and VP box upstream nearest branch pipe		≤30*[3]	L12/L24/ L13+L14+L15/L13+L14+L25+L16/ L13+L14+L25+L17/L18+L19/L20+L21/L22+L23
Pipe length difference between the nearest indoor unit and the farthest indoor unit		≤40	L8+L9+L10+L11+L24-L13-L14-L15
Height difference between outdoor unit and indoor units	Outdoor unit above	≤90*[4]	H3
	Outdoor unit under	≤110*[5]	
Height difference between indoor units	Outdoor unit above	≤3(30*[6])	H2
	Outdoor unit under	≤10(30*[6])	
Height difference between Hydro boxes		≤3	H4

Note:
*1. Standard length≤90m, if >90m, englarge the pipe diameter as pipe “e” diameter rules.
*2. Standard length≤40m, if >40m, the pipe between the first branch and the farthest indoor unit need to enlarge one size(refer to pipe "a" &"b" &"c"&"d"diameter rules).
*3. Standard length≤15m, if >15m, the pipe between cooling only indoor and nearest branch pipe/indoor units and VP1 box upstream nearest branch pipe/indoor units and nearest VP4 box need to enlarge one size (refer to pipe "a" diameter rules).
*4. Standard height difference ≤50m, if 50m<X≤70m, need meet following conditions:
1) Indoor rated capacity/outdoor corrected capacity≤130%;
Outdoor corrected capacity:
When rated indoor and outdoor capacity combination ratio≤100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at 100% indoor units combination ratio X correction factor for piping length and height difference.
When rated indoor and outdoor capacity combination ratio>100%,
the outdoor corrected capacity = outdoor units obtained from capacity table at that indoor units combination ratio X correction factor for piping length and height difference.
2) Set long pipe mode from outdoor PCB.
3) Gas pipe and liquid pipe of main pipe need to enlarge one size, refer to pipe "C" diameter rules.
4) If single way total pipe length>500m, need to add compressor oil 0.3L/100m(pipe length less than 100m, count as 100m).
For example, if the total pipe length is 620m, then we should add 0.6L compressor oil.
If>70m, please contact the local qulified serviceman or supplier.(If>70m, there is same warning in selection software poping up).
*5. Standard height difference ≤40m, if >40m, please refer to *4 rules.
*6. General indoor unit standard height difference≤18m, if >18m,
1) If general indoor unit and Hydro box are not operating at the same time, the height difference between general indoor units can reach up to 30m.
2) The farthest general indoor to the nearest branch/VP box pipe need to enlarge one size, refer to pipe "a" diameter rules.
3) Set indoor unit high drop mode from outdoor PCB (if outdoor PCB has this function).
4) Indoor rated capacity/outdoor corrected capacity ≤100%.
* From the first gather pipe to indoor unit, the size of pipe should be large to small, upstream suction gas pipe diameter ≥downstream suction gas pipe diameter, upstream HP gas pipe diameter ≥downstream HP gas pipe diameter, upstream liquid pipe diameter ≥downstream liquid pipe diameter;
If upstream pipe (no upsizing) diameter <downstream pipe diameter, the diameter of the pipe should enlarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
If you don't have the proper pipe on-site, but a larger pipe available, regarding you conduct upsizing once.
* All pipes only can upsize once.
* VP4 box is considered as a branch.
* Height difference of different branch indoor units of one VP4 box≤5m.

3. Pipe length between outdoor units

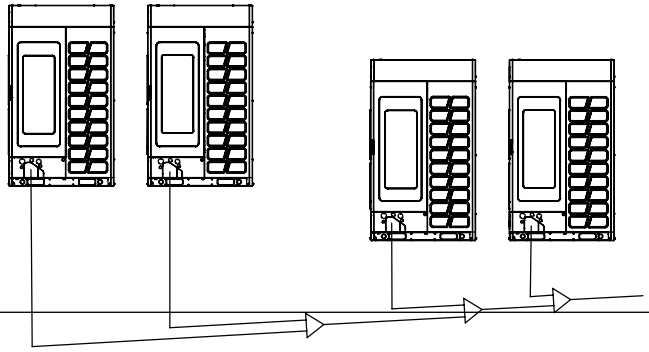
1. The gather pipe must be placed horizontally or in accordance with the installation of a certain angle (level angle less than 15 degrees). The first gather pipe can be vertical installed.
2. All horizontal piping connect the outdoor unit cannot be higher than the stop valve.

Proper installation

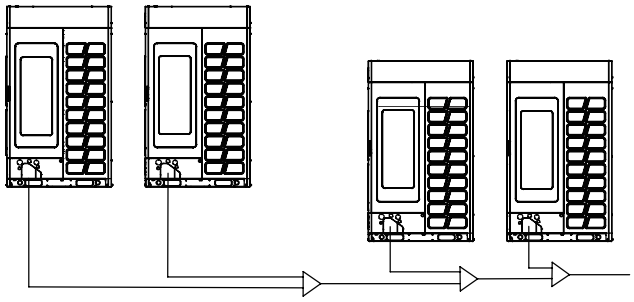


Wrong installation

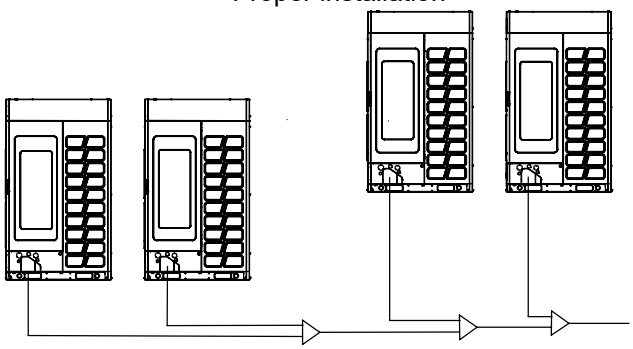
The lubricating oil will accumulate to the lowest outdoor unit



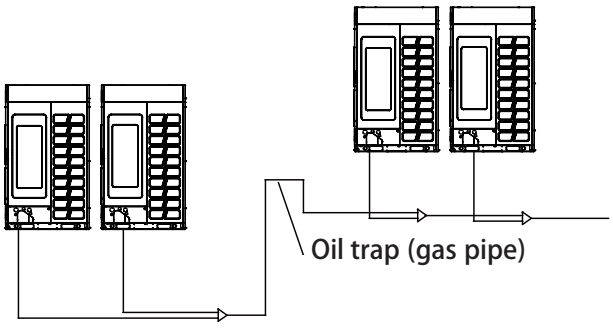
Proper installation



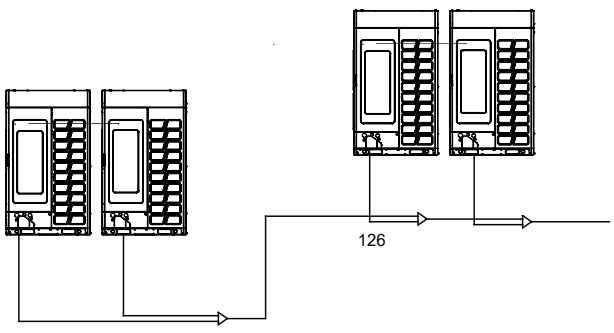
Proper installation



Proper installation



Wrong installation



Branch pipe

The first branch pipe selection:

Total Outdoor Unit Capacity (100W)	Model	
	3 Pipes	2 Pipes
X≤335	TAU335HR	TAU335
335<X ≤506	TAU506HR	TAU506
506<X ≤730	TAU730HR	TAU730
730<X ≤1350	TAU1350HR	TAU1350
1350<X	TAU2040HR	TAU2040

Branch pipes after the first branch pipe selection:

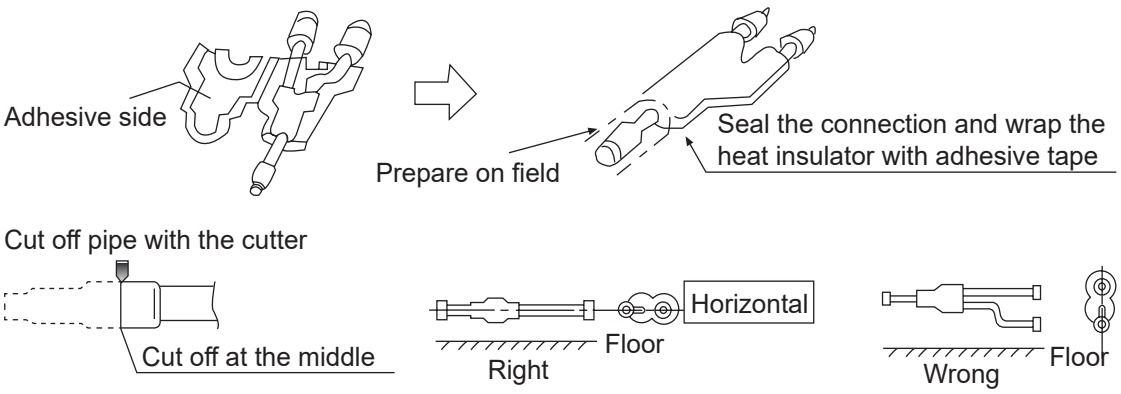
Total Indoor Unit Capacity (100W)	Model	
	3 Pipes	2 Pipes
X≤335	TAU335HR	TAU335
335<X ≤506	TAU506HR	TAU506
506<X ≤730	TAU730HR	TAU730
730<X ≤1350	TAU1350HR	TAU1350
1350<X	TAU2040HR	TAU2040

Gather pipe

Total Outdoor Unit Quantity	Model
2	TBS20HR
3	TBS30HR
4	TBS40HR

Note:

1. Please install the branch/gather pipe (suction gas/liquid/HP gas pipe) in horizontal or vertical direction.
2. It's not allowed to connect branch pipe or indoor unit/VP box after the branch pipe within 50cm.
3. The pipe should keep straight (pipe length >50cm) if there is other branch pipe/VP box connecting the upstream branch pipe/VP box.



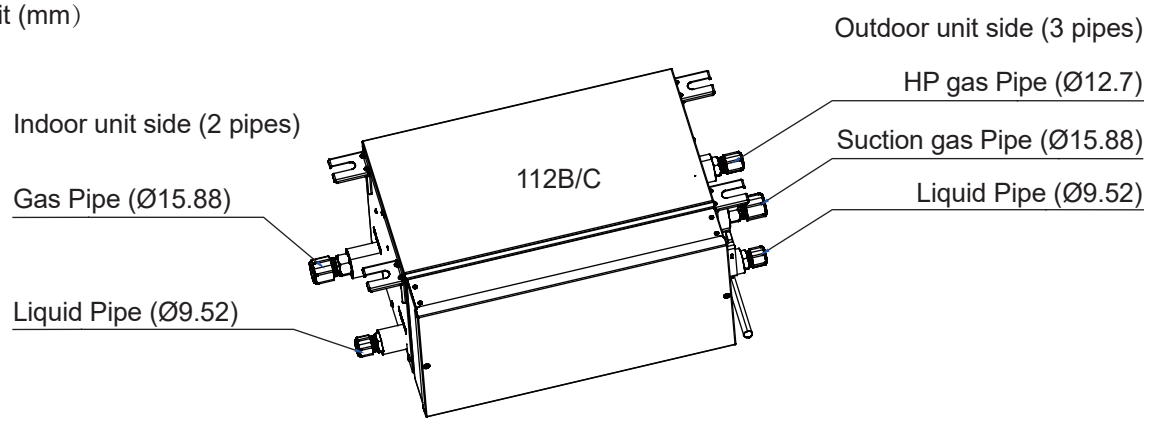
Part 1 . One by one valve box

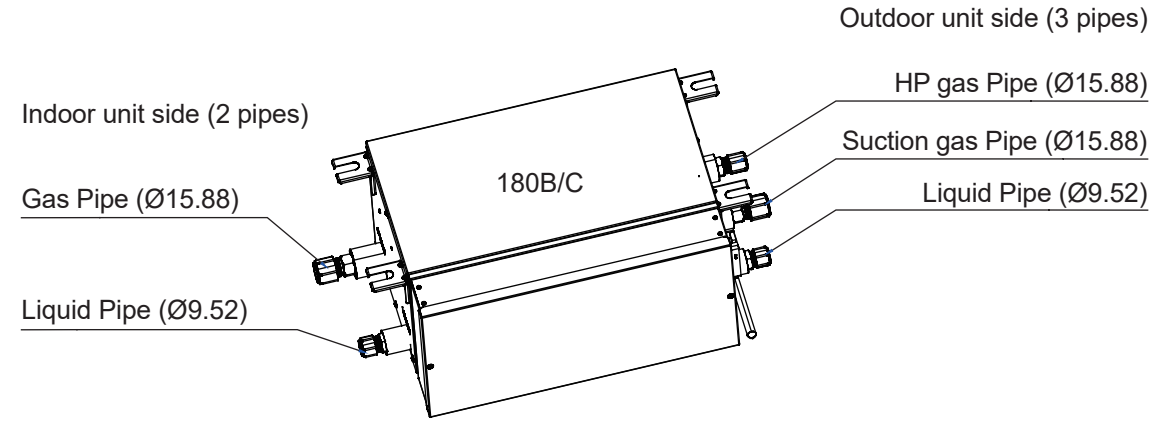
1. Specification

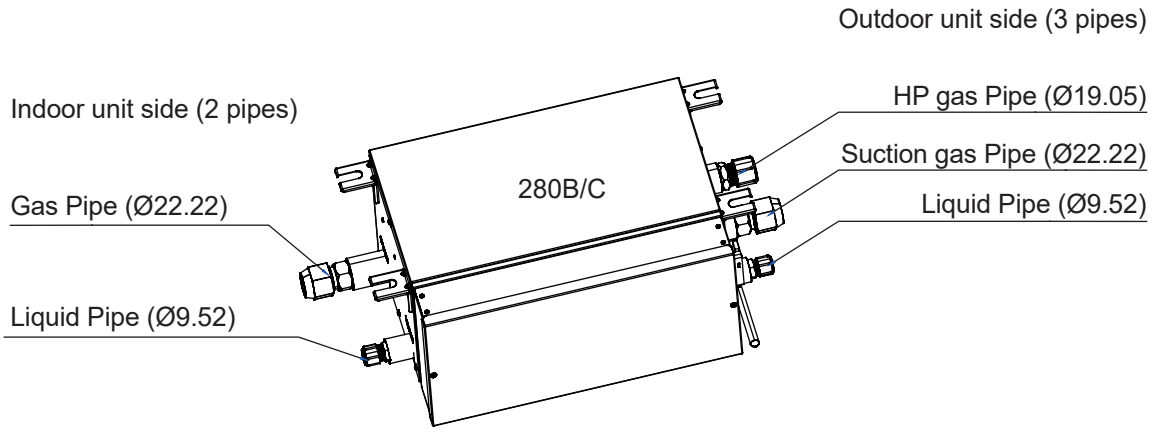
Model		VP1-112B/C	VP1-180B/C	VP1-280B/C
Power Supply		1/220-230/50/60		
Max. number of branch port		1	1	1
Connectable indoor units of each branch port		5	8	8
Total number of connectable indoor units		5	8	8
Branch capacity of connectable indoor units	kW	x≤11.2	11.2<x≤18	18<x≤28
Total capacity of of connectable indoor units	kW	x≤11.2	11.2<x≤18	18<x≤28
Net dimension (W×H×D)	(mm×mm×mm)	388×200×275	388×200×275	388×200×275
Shipping dimension (W×H×D)	(mm×mm×mm	608×271×340	608×271×340	608×271×340
Net/Gross weight	kg	8.6/10.8	8.6/10.9	9.3/12.0
Liquid pipe(Connect to outdoor unit)	mm	9.52	9.52	9.52
Suction gas pipe(Connect to outdoor unit)	mm	15.88	15.88	22.22
HP Gas pipe(Connect to outdoor unit)	mm	12.7	15.88	19.05
Liquid pipe(Connect to indoor unit)	mm	9.52	9.52	9.52
Gas pipe(Connect to indoor unit)	mm	15.88	15.88	22.22

2. Installation

Unit (mm)





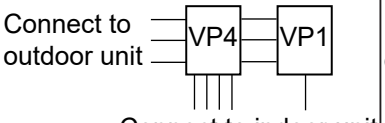
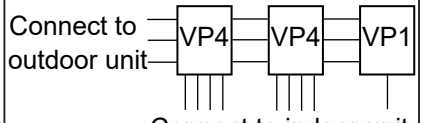


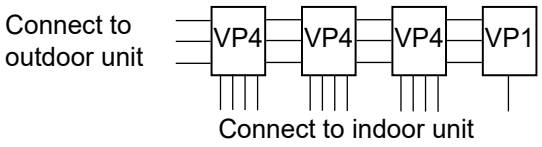
Part 2 . One by four valve box

1. Specification

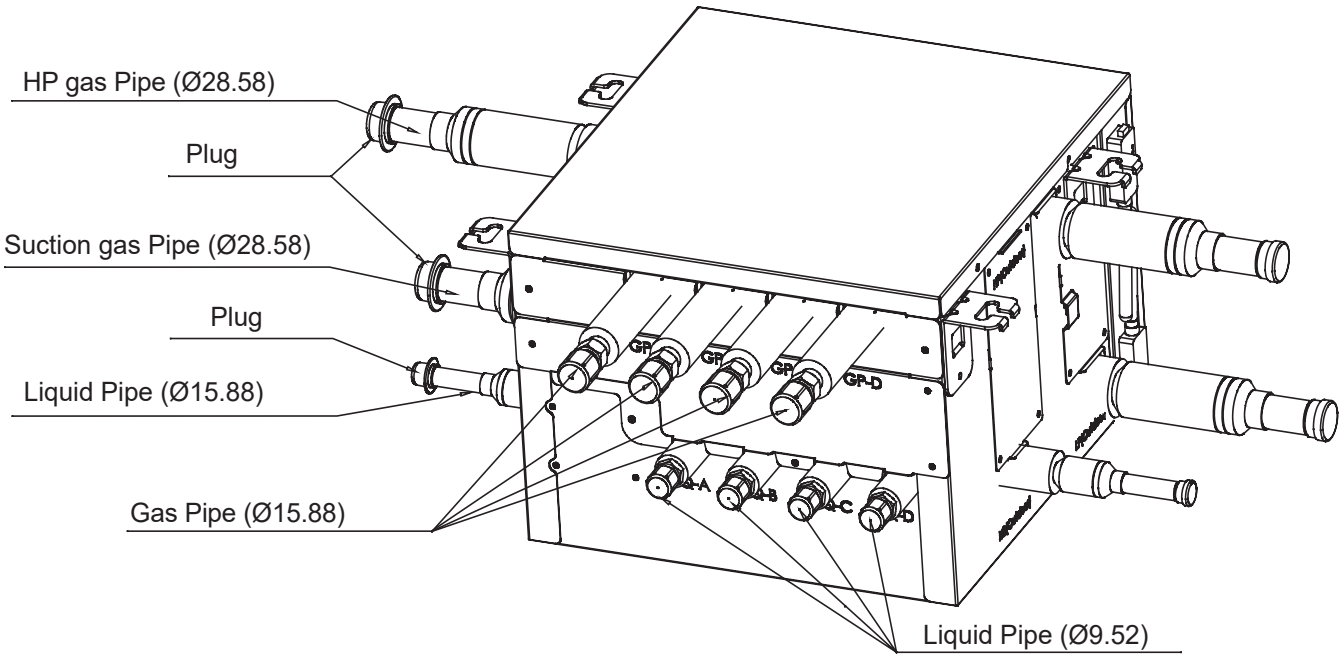
Model		VP4-450B/C
Power Supply		1/220~240/50/60
Max. number of branch port		4
Connectable indoor units of each branch port		5
Net dimension (W×H×D)	mm	396×290×411
Net/Gross weight	kg	19/27
Liquid pipe(Connect to outdoor unit)	mm	15.88
Suction gas pipe(Connect to outdoor unit)	mm	28.58
HP Gas pipe(Connect to outdoor unit)	mm	28.58
Liquid pipe(Connect to indoor unit)	mm	9.52×4
Gas pipe(Connect to indoor unit)	mm	15.88×4

	VP4-450B/C*1	VP4-450B/C *2	VP4-450B/C *3	VP4-450B/C *4
Connectable indoor units of each branch port	≤5	≤5	≤5	≤5
Total number of connectable indoor units	≤20	≤40	≤60	≤64
Branch capacity of connectable indoor units	≤16kW	≤16kW	≤16kW	≤16kW
Total capacity of of connectable indoor units	≤45kW	≤71kW	≤71kW	≤71kW

	VP4-450B/C *1+VP1	VP4-450B/C *2+VP1
Connectable indoor units of each branch port	VP4-450B/C≤5 VP1-112B/C≤5 VP1-180B/C≤8 VP1-280B/C≤8	VP4-450B/C≤5 VP1-112B/C≤5 VP1-180B/C≤8 VP1-280B/C≤8
Total number of connectable indoor units	≤28	≤48
Branch capacity of connectable indoor units	VP4-450B/C≤16kW VP1-112B/C≤11.2kW 11.2kW<VP1-180B/C≤18kW 18kW<VP1-280B/C≤28kW	VP4-450B/C≤16kW VP1-112B/C≤11.2kW 11.2kW<VP1-180B/C≤18kW 18kW<VP1-280B/C≤28kW
Total capacity of of connectable indoor units	≤71kW	≤71kW
Sketch Map		

	VP4-450B/C *3+VP1
Connectable indoor units of each branch port	VP4-450B/C≤5 VP1-112B/C≤5 VP1-180B/C≤8 VP1-280B/C≤8
Total number of connectable indoor units	≤64
Branch capacity of connectable indoor units	VP4-450B/C≤16kW VP1-112B/C≤11.2kW 11.2kW<VP1-180B/C≤18kW 18kW<VP1-280B/C≤28kW
Total capacity of of connectable indoor units	≤71kW
Sketch Map	

2. Installation



*Note:
Outdoor unit side:
HP: HP gas pipe
LP: Suction gas pipe
LQ: Liquid pipe

Indoor unit side:
GP: Gas pipe
LQ: Liquid pipe

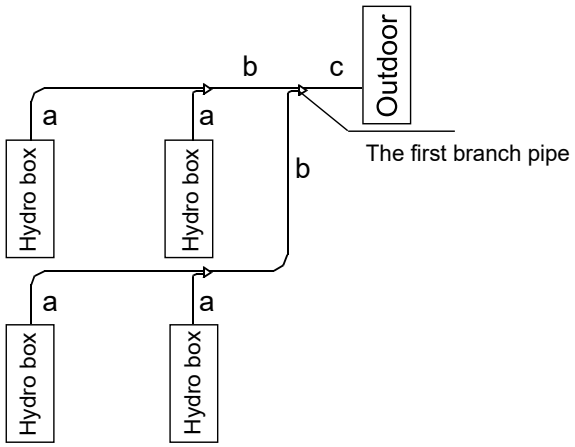
Hydro box

The outdoor units which can connect with the Hydro box are as following table:

Outdoor series	Model
VVFA	VVFA-125-335R-01M22

Hydro box	Connecting method	Hydro box quantity	Outdoor unit selection (unit: kW)
OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25	Hydro box only	≤4	1. 80% X total outdoor rated capacity ≤ total indoor unit rated capacity ≤ 100% X total outdoor rated capacity (The minimum number of Hydro boxes ≥2)
	Together with general indoor units	≤3	1.50% X total outdoor rated capacity ≤ total indoor unit rated capacity ≤ 130% X total outdoor rated capacity 2.Total Hydro box rated capacity ≤ 80% X total outdoor rated capacity
Note: Indoor units include Hydro box and general indoor unit.			

Pipe specification



1. Pipe "a" diameter (between Hydro box and branch pipe, diameter unit: mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
56<X≤180	Ø15.88	Flared	Ø9.52	Flared	OVVA-310N-O1M25 gas/liquid pipe diameter are Ø19.05/Ø9.52
180<X≤300	Ø22.22	Brazed	Ø12.7		

2. Pipe “b” diameter (between branch pipes, diameter unit: mm)

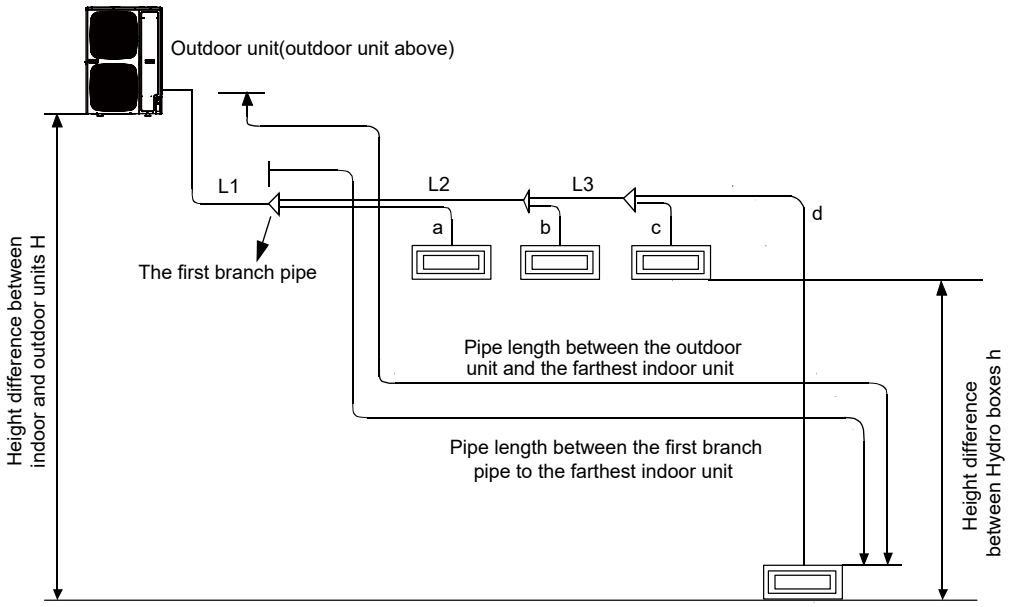
Total indoor capacity after the branch pipe (kW)	Gas pipe	Liquid pipe
X<14.0kW	Refer to Pipe "a" diameter rules	
14.0kW≤ X <16.8kW	Ø15.88	Ø9.52
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7

3. Pipe “c” diameter (main pipe, between outdoor unit and the first branch pipe, diameter unit: mm)

Outdoor model	Outdoor unit side(factory default)		Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
VVFA-220R-01T32	Ø19.05	Ø12.7	Ø19.05	Ø9.52	Ø22.22	Ø12.7
VVFA-280R-01T32	Ø19.05	Ø12.7	Ø22.22	Ø9.52	Ø25.4	Ø12.7
VVFA-335R-01T32	Ø19.05	Ø12.7	Ø25.4	Ø9.52	Ø28.58	Ø12.7

1) When pipe length between the outdoor unit and the farthest indoor unit>80m, adjust the main pipe diameter as pipe “c” diameter rules.
2) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.
3) Trigger upsizing rules: Englarge the pipe diameter as pipe “c” diameter rules, if you can't get the one size larger pipe on-site, keep the original pipe.

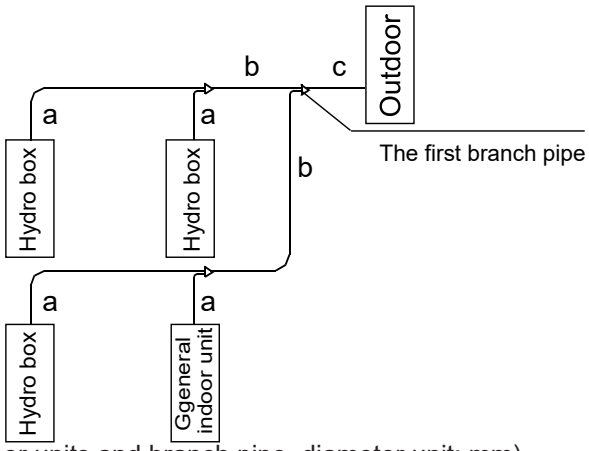
Allowable pipe length and height difference between indoor (Hydro box only) and outdoor units



Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤195	L1+L2+L3+a +b+c+d
Pipe length between the outdoor unit and the farthest indoor unit		≤150*1	L1+L2+L3+d
Pipe length between outdoor unit and the first branch pipe (Main pipe)		≤110	L1
Pipe length between the first branch pipe and the farthest indoor unit		≤40	L2+L3+d
Pipe length between indoor unit and the nearest branch pipe		≤15	a/b/c/d
Height difference between outdoor unit and indoor units	Outdoor unit above	≤50	H
	Outdoor unit under	≤40	
Height difference between Hydro boxes		≤3	h

Note:
*1. When the pipe length between the outdoor unit and the farthest indoor unit >80m, adjust the main pipe diameter as pipe "c" diameter rules. If you can't get the one size larger pipe onsite, keep the original pipe.
*From the outdoor unit to indoor unit, the size of pipe diameter should be large to small, the upstream pipe diameter and downstream pipe diameter; If pipe(no upsizing) diameter<downstream pipe diameter, the diameter of the pipe should eniarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
* Size enlarged as following order: Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.80.
* All pipes only are allowed to upsize once.

Pipe specification



1. Pipe "a" diameter (between indoor units and branch pipe, diameter unit: mm)

Indoor rated capacity (x100w)	Gas pipe	Connecting method	Liquid pipe	Connecting method	Note
X≤28	Ø9.52	Flared	Ø6.35	Flared	OVVA-310N-O1M25 gas/ liquid pipe diameter are Ø19.05/ Ø9.52
28<X≤56	Ø12.7		Ø6.35		
56<X≤180	Ø15.88		Ø9.52		
180<X≤300	Ø22.22	Brazed	Ø12.7		

2. Pipe “b” diameter (between branch pipes, diameter unit: mm)

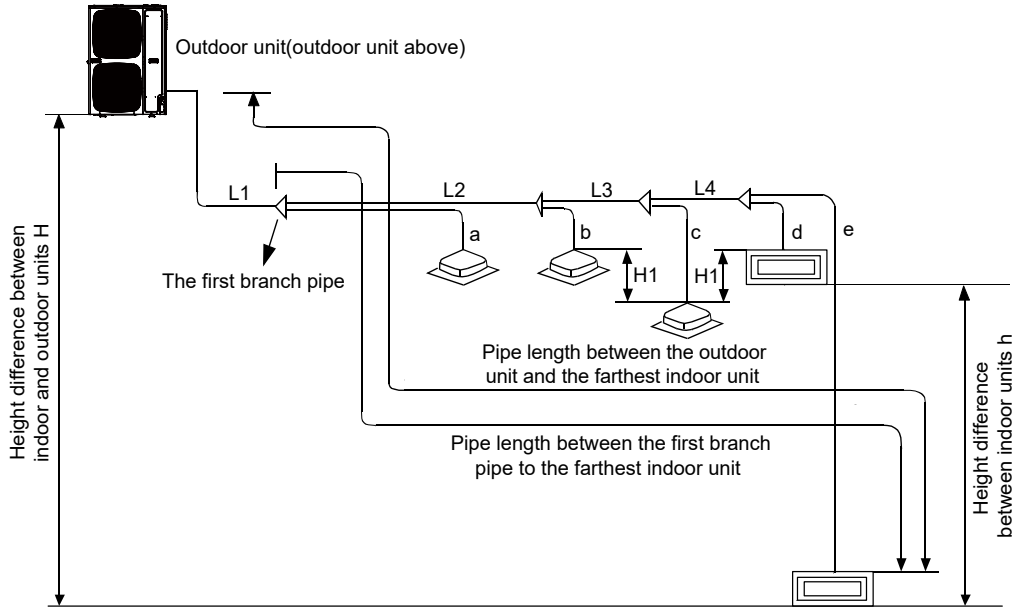
Total indoor capacity after the branch pipe (kW)	Gas pipe	Liquid pipe
X<14.0kW	Refer to Pipe "a" diameter rules	
14.0kW≤ X <16.8kW	Ø15.88	Ø9.52
16.8kW≤ X <28.0kW	Ø19.05	Ø9.52
28.0kW≤ X <33.5kW	Ø22.22	Ø9.52
33.5kW≤ X <45.0kW	Ø28.58	Ø12.7

3. Pipe “c” diameter (main pipe, between outdoor unit and the first branch pipe, diameter unit: mm)

Outdoor model	Outdoor unit side(factory default)		Main pipe		Enlarged main pipe	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
VVFA-220R-01T32	Ø19.05	Ø12.7	Ø19.05	Ø9.52	Ø22.22	Ø12.7
VVFA-280R-01T32	Ø19.05	Ø12.7	Ø22.22	Ø9.52	Ø25.4	Ø12.7
VVFA-335R-01T32	Ø19.05	Ø12.7	Ø25.4	Ø9.52	Ø28.58	Ø12.7

1) When pipe length between the outdoor unit and the farthest indoor unit>80m, adjust the main pipe diameter as pipe “c” diameter rules.
2) No upsizing condition: If you don't have the proper pipe on-site, you could choose the one size larger pipe. If the upsizing is impossible, the design condition is not satisfied. If you use the larger one, regarding you conduct upsizing once, do not upsize repeatedly.
3) Trigger upsizing rules: Englarge the pipe diameter as pipe “c” diameter rules, if you can't get the one size larger pipe on-site, keep the original pipe.

Allowable pipe length and height difference between indoor (Hydro box + general) and outdoor units



Pipe length and height difference(m)		Allowable value	For example
Single way total pipe length		≤300	L1+L2+L3+L4+a +b+c+d+e
Pipe length between the outdoor unit and the farthest indoor unit		≤150*1	L1+L2+L3+L4+e
Pipe length between outdoor unit and the first branch pipe (Main pipe)		≤110	L1
Pipe length between the first branch pipe and the farthest indoor unit		≤40	L2+L3+L4+e
Pipe length between indoor unit and the nearest branch pipe		≤15	a/b/c/d/e
Height difference between indoor unit and outdoor units	Outdoor unit above	≤50	H
	Outdoor unit under	≤40	
Height difference between indoor units		≤3(15*2)	H1
Height difference between Hydro boxes		≤3	h

Note:
*1. When the pipe length between the outdoor unit and the farthest indoor unit >80m, adjust the main pipe diameter as pipe "c" diameter rules. If you can't get the one size larger pipe onsite, keep the original pipe.
*2. If general indoor unit and Hydro box are not operating at the same time, the height difference between general indoor units can reach up to 15m.
*From the outdoor unit to indoor unit, the size of pipe diameter should be large to small, the upstream pipe diameter and downstream pipe diameter; If pipe(no upsizing) diameter<downstream pipe diameter, the diameter of the pipe should eniarge one size. If you can't get the one size larger pipe on-site, keep the original pipe.
* Size enlarged as following order: Ø6.35-Ø9.52-Ø12.7-Ø15.88-Ø19.05-Ø22.22-Ø25.4-Ø28.58-Ø31.80.
* All pipes only are allowed to upsize once.

Branch pipe

The first branch pipe selection:

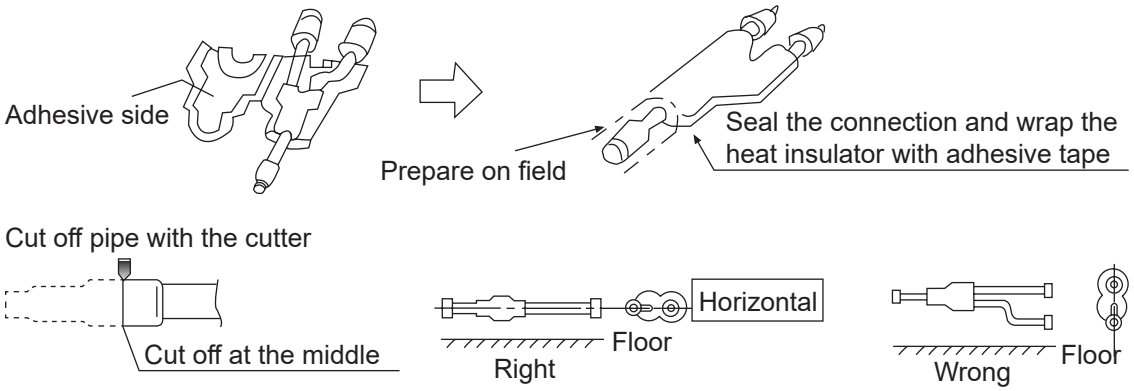
Outdoor unit capacity (x100W)	Model
X≤335	TAU335
335<X≤506	TAU506

Branch pipes after the first branch pipe selection:

Total indoor unit capacity (x100W)	Model
X≤335	TAU335
335<X≤506	TAU506

Note:

1. Please install the branch pipe (gas/liquid side) in horizontal or vertical direction.
2. It's not allowed to connect branch pipe or indoor unit after the branch pipe within 50cm.
3. The pipe should keep straight(pipe length>50cm)if there is other branch pipe connecting the upstream branch pipe.



15. Accessories

Attached Accessories

No.	Accessories part	Qty.	Remarks	Place position
1	Installation plate I	1	/	Fixed on wooden base
2	Installation plate II	1	/	Fixed on wooden base
3	Installation manual	1	/	Accessory bag
4	Water filter	1	Only for OVVA-310N-O1M25	Accessory bag

Only for OVVA-090/160N-O1M25 - List of optional parts

Part	Remarks
Electric heating	Optional

Only for OVVA-310N-O1M25 - List of optional parts

Part	Remarks
Electric heating	Optional
Expansion vessel	Acquired separately
Water pump	Acquired separately
Water filter	Accessory

Note: It recommends that a water pump and a water filter are maintained periodically.

Attachments:

Components	Specifications	Type	
		OVVA-090/160N-O1M25	OVVA-310N-O1M25
Heat exchanger	Plate	Standard	Standard
Pressure relief valve	5 bar	Standard	Standard
Water pump	/	Standard	Acquired separately
Air purge valve	Automatic	Standard	Standard
Flow switch	/	Standard	Standard
Expansion vessel	5 L	Standard	Acquired separately
Water filter	Y type	Standard	Accessory
Water pressure gauge	/	Standard	Standard
Control panel	/	Standard	Standard

Parameters:

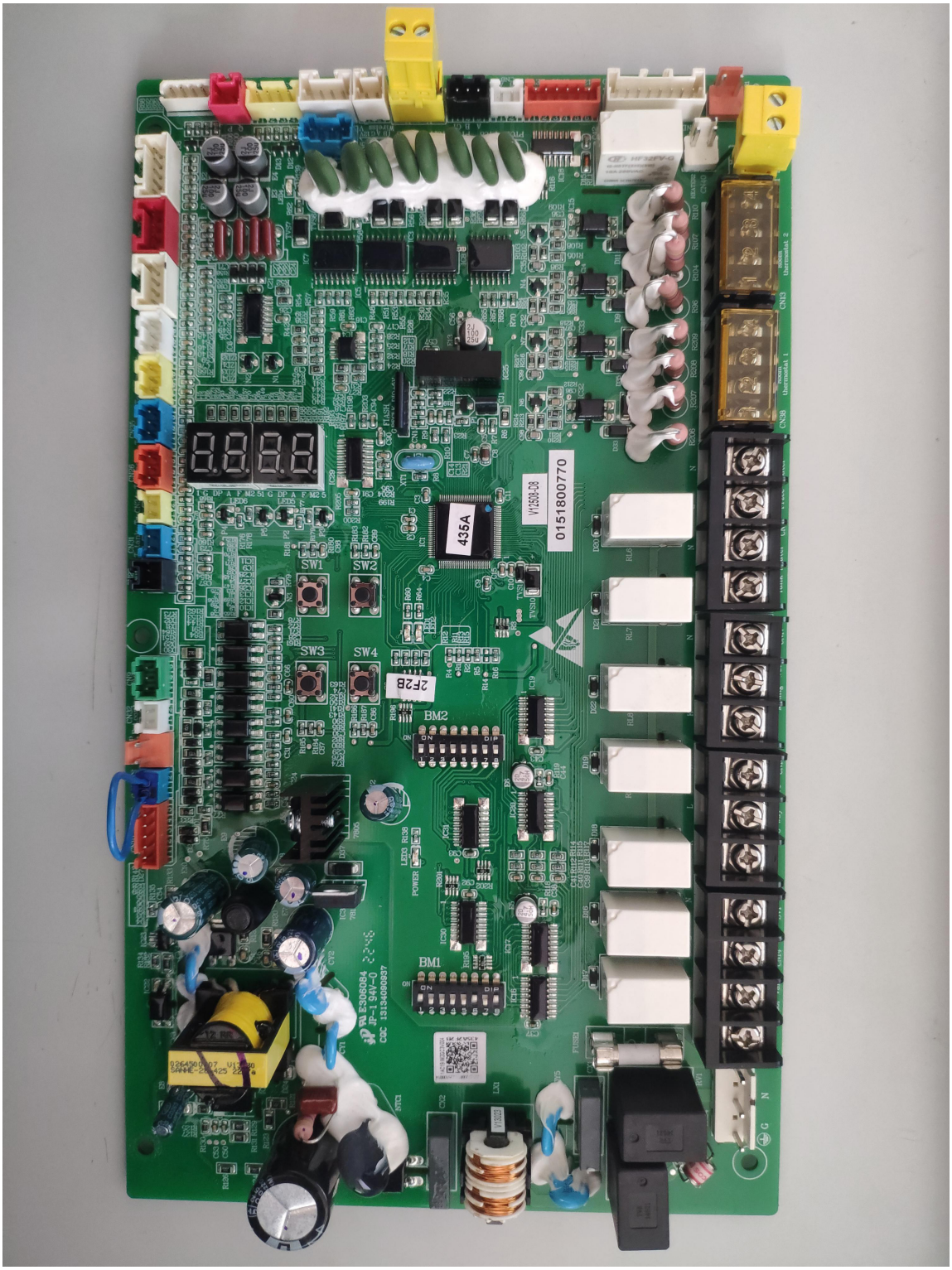
Model Code		OVVA-090N-O1M25	OVVA-160N-O1M25	OVVA-310N-O1M25
Nominal capacity	Cooling (1)	7 kw	14 kw	28 kw
	Heating (2)	9 kw	16 kw	31 kw
Dimensions Unit	H x W x D	850 × 480 × 310 mm	850 × 480 × 310 mm	850 × 480 × 310 mm
Installation place	Indoor/outdoor	Indoor	Indoor	Indoor
Combination ratio Hydro box+IDUs	%	50-130%(Hydro box 0-80%)	50-130%(Hydro box 0-80%)	50-130%(Hydro box 0-80%)
Cooling Ambient Min. - Max.	°C	10~43	10~43	10~43
Cooling Water side Min. - Max.	°C	5~20	5~20	5~20
Heating Ambient Min. - Max.	°C	-20~24	-20~24	-20~24
Water side Min. - Max.	°C	20~50	20~50	20~50
Water filter type	/	'Y' shape copper filter/ 40 mesh	'Y' shape copper filter/ 40 mesh	'Y' shape copper filter/ 40 mesh(Optional)
Heat exchanger	/	Plate type	Plate type	Plate type
Water flow rate Min-Standard	L/min	18/26	32/46	63/90

Model Code		OVVA-090N-O1M25	OVVA-160N-O1M25	OVVA-310N-O1M25
Water Design pressure	MPa	0.5	0.5	0.5
Pressure relief valve incl.	Bar	5 bar	5 bar	5 bar
Expansion vessel	L	5	5	No
Water circuit Piping diameter Inlet	inch	R1	R1	R1-1/4
Water circuit Piping diameter Outlet	inch	R1	R1	R1-1/4
Refrigerant Type	/	R410A	R410A	R410A
Refrigerant Design pressure	MPa	4.15MPa	4.15MPa	4.15MPa
Gas side - connection type	mm	15.88	15.88	19.05
Liquid side - connection type	mm	9.52	9.52	9.52
Power supply	Ph / Hz / V	1/ 50/60/ 220~240	1/ 50/60/ 220~240	1/ 50/60/ 220~240

16. PCB Photo

Main control board

PCB code: 0151800770



Terminal function control logic

	Port	Package	Port Definition	Function Description	Colour
Main control board function port	CN4	2pin	COM_OD	communication between ID & ODU	Red
	CN7	4pin	Wireless	Master & slave controller	White
	CN3	2pin	Modbus	Modbus	Yellow
	CN2	3pin	COM_I/O	Extended communication	black
	CN22	6pin	EEV	Electronic expansion valve	Red
	CN23	8pin	to relay board	Load board relay board communication	White
	CN36	5pin	FM	Flow meter	White
	CN29	4pin	THI/THO	Gas & liquid pipe sensor	Red
	CN25	4pin	TWI/TWO	Water inlet/outlet sensor	White
	CN9	3pin	PUMP_0	Water pump PWM signal	Red
	CN30	2pin	LP	Low pressure switch	Red
	CN27	2pin	FS	Flow switch	Blue
load relay function port	CN6	2pin	PUMP_2	Zone 2 water pump signal	/
	CN5	2pin	PUMP_1	Zone 1 water pump signal	/
	CN4	2pin	GAS_BOILER	Strong current signal of gas boiler	/
	CN3	2pin	PUMP_0	Standard water pump	/
	CN2	/	HEATER1-N	1KW electric heating live line	/
	CN10	/	HEATER1-L	1KW electric heating null line	/
	CN1	/	HEATER2-N	3 KW electric heating live line	/
	CN9	/	HEATER2-L	3KW electric heating null line	/
	CN15	/	IN-L	Power input live line	/
	CN7	/	IN-N	Power input null line	/
	CN11	/	GND	Grounding port	/

17. Dip Switch Setting

OVVA-090N-O1M25 OVVA-160N-O1M25 OVVA-310N-O1M25

- Please turn off the power supply before opening the cover of the electric cabinet and changing the dial code.
- The capacity setting of indoor and outdoor unit must be matched, for example, the outdoor unit model is AW042SSCHA, then the indoor unit capacity must be set according to 042 in the list.
- In the following table, 1 is ON, 0 is OFF.

① BM1 introduction

BM1_1	HU type	[1]	Unit type			
		0	HU*WAMNA			
		1	OVVA-**N-O1M25			
BM1_2 BM1_3 BM1_4	Reserved	[2]	[3]	[4]	Default	
		0	0	0	Default	
BM1_5 BM1_6 BM1_7 BM1_8	Unit Model selection	[5]	[6]	[7]	[8]	Unit Model
		0	1	0	1	OVVA-090N-O1M25
		1	0	0	1	OVVA-160N-O1M25
		1	1	1	0	OVVA-310N-O1M25

② BM2 introduction

BM 2_1	Indoor communication address setting mode	0	Automatic setting (default)					
		1	Dial set address					
BM 2_2	Reserved	0	Reserved (default)					
		1	Reserved					
BM 2_3 BM 2_4 BM 2_5 BM 2_6 BM 2_7 BM 2_8	Indoor communication address	[3]	[4]	[5]	[6]	[7]	[8]	Address
		0	0	0	0	0	0	0# (default)
		0	0	0	0	0	1	1#
		0	0	0	0	1	0	2#
		…	…	…	…	…	…	……

18. Main Control Logic

1. freeze-proofing Function

Starting conditions: When the hydro box is in cold operation of the external machine, Tho&Thi ≤ 1 °C lasts for 3 minutes or Thi ≤ - 8 °C lasts for 90 seconds;

End condition: min {Tho, Thi} ≥ 10 °C for 60s.

2. Bypass valve SV1 control

When HU is in any state (startup, shutdown, standby) and the external machine is working, the external machine heat 4WV OFF Thi ≤ - 15 °C lasts for 3min or other external machine conditions (refrigeration/heating 4WV ON) Thi ≤ - 8 °C lasts for 90s, and the PMV is closed to 5pls (higher than the external machine priority)&the bypass valve SV1 is opened; When Thi ≥ 2 °C lasts 10s, automatic control will be resumed.

3. Low voltage Ps Protection

Starting conditions: When Ps < 0.6MPa&min {Twi, Two} < 5 °C lasts for 1min, the hydro box changes from Thermo ON to Thermo OFF; Other air conditioning controls in the system remain unchanged;

End condition:When Ps ≥ 0.65MPa or min {Twi, Two} ≥ 7 °C for 30s, the hydro box changes from Thermo OFF to Thermo ON, and other air conditioning controls in the system remain unchanged.

4. Mixed connection special control

When the hydro box is mixed with the ordinary air conditioner and the heating of them are both Thermo ON, in order to prevent the high (or low) water temperature of the hydro box from affecting the heating effect of the ordinary air conditioner, the following controls are required.

When any of the following conditions is met, the Hydro box switches to hot standby mode:

· Two < 15 °C and Tao < 5 °C

OR

· Two > 45 °C

19. Error Code

Code	Error code definition	Notes
1	in water temp.sensor(Twi)failure	Restorable
2	out water temp.sensor(Two)failure	Restorable
3	in refrigerant temp.sensor(Thi)failure	Restorable
4	out refrigerant temp.sensor(Tho)failure	Restorable
5	EEPROM failure	Unrecoverable
6	Communication failure with outdoor unit	Restorable
7	communication failure with wired controller	Restorable
8	WS abnormal	Restorable If it occurs 3 times in an hour, lock the failure
9	Duplicate mailing address OR connect incorrect outdoor unit	Restorable
10	Tank water temp.sensor(Ttank)failure	Restorable
11	IO PCB communication failure	Restorable
12	HU zone2 behind water mixing valve temp.sensor failure	Restorable
14	low pressure abnormal	Restorable
15	antifreeze failure	Restorable If it occurs 3 times in an hour, lock the failure
16	HU in/out water temp. too high	Restorable
17	HU zone1 room temp.sensor failure	Restorable
18	HU zone2 room temp.sensor failure	Restorable
20	Outdoor failure	

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Just feel well

WARNING :
The design and specifications are subject to change without prior notice for product improvement. Consult with the sales agency or manufacturer for details.

ATTENTION :
Le design et les données techniques sont donnés à titre indicatif et peuvent être modifiés sans préavis.

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