VRF AIR-CONDITIONER [HEAT RECOVERY]

VRF AIR-CONDITIONER
「HEAT RECOVERY」

Technical Handbook

CHV6 MINI URBAN HYPER HEAT

SERIES R32

BASIC MODELS

CHV6-RS36URBMHH
CHV6-RS48URBMHH
CHV6-RS60URBMHH

Dear user:
Thank you for choosing and using our products. For your better understanding and use of this product, be sure to read and comply with the following related matters before use.

IMPORTANT NOTICE

Signal words (danger, warning and caution) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words:

⚠ DANGER	:	A hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	:	A hazardous situation which, if not avoided, could result in death or serious injury .
⚠ CAUTION	:	Used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTE	:	Useful information for operation and/or maintenance.

- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.
- This manual gives a common description and information for this air conditioner which you operate as well for other models.
- Cooper&Hunter pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Cooper&Hunter cannot anticipate every possible circumstance that might involve a potential hazard. This air conditioner is designed for standard air conditioning only. Do not use this heat recovery air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process. Do not install the unit in the following places. It may cause a fire, deformation, corrosion or failure.
  - * Places where oil (including machinery oil) sprays
  - * Places where inflammable gas may generate or flow
  - * Places where a lot of sulfide gas drifts such as in hot spring.
  - * Places where strong salty wind blows such as coast regions, or places with high acidity or alkalinity.
- Do not install the unit in the place where silicon gas drifts. If the silicon gas attaches to the surface of heat exchanger, the fin surface repels water. As a result, drain water splashes outside of the drain pan and splashed water runs inside of electrical box. In the end, water leakage or electrical devices failure may occur.
- Do not install the unit in the place where the breeze directly catches the animals and plants. It could adversely affect the animals and plants.
- Installation and service engineering must comply with local standards, laws and regulations.
- As the "public inaccessible appliances", the indoor units are required to be installed at a height of no lower than 2.5m.
- The installation of the air conditioner can only be carried out by dealer or professional, and self installation by user may cause water leakage, electric shock or a fire.
- If you have any questions, contact your dealer or designated service center of Cooper&Hunter.
- To prevent the environment, please do not discard the product at will, and Cooper&Hunter can provide recycling services in accordance with the relevant provisions of the country and provide replaceable parts in accordance with national standard requirements.
- This air conditioner has been designed for the following temperatures. Operate the air conditioner within this range.

Temperture

°F°(C)

DX Indoor Unit		Maximum	Minimum
Space Cooling	Indoor	89(32) DB / 73(23) WB	69(21) DB / 59(15) WB
	Outdoor	126(52) DB*	23(-5) DB***
Space Heating	Indoor	86(30) DB	59(15) DB
	Outdoor	78(25.6) DB**	-13(-25) DB
DHW (Only Heating)	DHW Tank	109(43) DB	-13(-25) DB

DB: Dry Buld, WB: Wet Bulb

*126(52) DB: 118(48)~126(52) intermittent operation
**(78(25.6) DB: 73(23)~78(25.6) intermittent operation
***23(-5) DB: Installation of the Wind Guard (optional part) allows the system to operate at 5 °F(-15°C).

⚠ DANGER

- Do not perform installation work, refrigerant piping work, drain pump, drain piping and electrical wiring connection without referring to installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire. In case of a fire, cut off the power at the first time; do not touch the electrical parts by hand to avoid electric shock.
- These products are equipped with electrical parts. Do not pour water into the indoor or outdoor unit. Otherwise, it will cause a serious electrical failures.
- Do not open the service cover of the indoor or outdoor units without turning OFF the main power supply, otherwise it may cause a serious safety accident. (In any cases, users of the equipment are not allowed to open the service cover).
- Do not touch or adjust safety devices inside the indoor unit or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Refrigerant safety leakage standards for construction and operation systems are determined in accordance with local regulations or standards.
- Use an ELB (Earth Leakage Breaker,with an actuation time of 0.1 second or less) at or above medium induction speed, otherwise it may cause an electric shock or a fire.
- For installation, firmly connect the refrigerant pipe before the compressor starts operating.
- For maintenance, relocation and disposal, remove the refrigerant pipe after the compressor stops.
- Do not perform a short-circuit of the protection device such as a pressure switch when operating. It may cause a fire and explosion.

⚠ WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately 3.3ft. (1m) from the system.
- If circuit breaker is often activated, stop the system and contact your dealer or service contractor.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it leads electric shock. Do not connect the ground wiring to gas piping, water piping, lighting conductor or ground wiring for telephone.
- Before performing any brazing work, check to ensure that there is no flammable material around. When charging refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts and the like from rats or other small animals. If not, rats may gnaw at unprotected parts, which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.
- Provide a sufficiently strong foundation. If not, the unit may fall down and it may lead to injuries.
- Perform electrical work according to Installation Manual and all the relevant regulation and standards.
- If the instructions are not followed, an electrical failure and fire may occur due to insufficient capacity and inadequate performance. Use specified cables between units, otherwise, an electrical failure or a fire may occur.
- Ensure that the outdoor unit is not covered with ice and snow before use.
- This appliance is not intended for use by persons (including children aged under 8) with reduced physical, sensory or mental capacities, or lack of experience and knowledge, unless 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 maintenance shall not be made by children without supervision.
- The A-weighted emission sound pressure level at workstations does not exceed 70 dB(A).
- Cancer and reproductive harm-www.P65Warnings.ca.gov.
- Take measures to ensure that the refrigerant limitations in ASHRAE Standard 15 (Canada: 852) or other local codes, are followed. If refrigerant gas has leaked during the installation work, ventilate the room immediately.

⚠ CAUTION

- Do not step on or put any objects on the product.
- Do not put any foreign matters on the unit or inside the unit.
- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 9.8ft. (3m) from strong electromagnetic wave radiators such as medical equipment.
- Starting the unit after longtime idleness requires the compressor temperature to meet the starting requirements or reach a certain heating time.

NOTE:

- It is recommended that the room will be ventilated every 3 to 4 hours.
- In some cases, the heat pump air conditioner may not operate properly in the following cases.
  * In case that the power supplied by the power transformer is less than or equal to the electric power of the air conditioner.
  * In case that the large power-consuming equipment is too close to the power supply wiring for the air conditioner, so that large surge voltage may be inducted in the power supply wiring of the air conditioner.
- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, auxiliary heating equipment is recommended on the job site when the unit is installed in a low temperature region.
- The repair and maintenance of this air conditioner can only be carried out by the professionals.

CHECKING UPON DELIVERY

- Upon receiving this product, inspect it for any shipping damage.
  Claims for damage in a written form, either apparent or concealed, should be filled immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct. The standard utilization of the unit shall be explained in these instructions. Please contact your local agent, as the occasion arises.
- Cooper&Hunter's liability shall not cover defects arising from the alteration performed by a customer without Cooper&Hunter's consent in a written form.

-CONTENT-

DESIGN

1. Introduction 1
1.1 Line-Up of Outdoor Unit 1
1.2 Application Case 2
1.3 Optional Accessories 5

2. General Data 7
2.1 Key Parameter 7
2.2 Component Data 8
2.3 Safety and Control Device Setting 9
2.4 Sound Data 10
2.5 Dimensional Data 11
2.6 Structure 12
2.7 Electrical Data 13

3. Piping System 14
3.1 Connection of Refrigerant Pipes 14
3.2 Pipe Connection Design Giudance 14
3.3 Calculation of Additional Refrigerant 17
3.4 Piping Connection Branch Pipe Dimensions (optional) 19

4. Capacities and Selection Data 20
4.1 Procedure for Selection of the System 20
4.1.1 Unique features of the system 20
4.1.2 Selection parameters 21
4.1.3 Check points for system installation 21
4.1.4 Selection procedure example 23
4.2 Capacity Correction Based on Refrigerant Piping Length 25
4.3 Correction Factor According to Defrosting Operation 27

5. Control System 28
5.1 Regrigerant Cycle 28
5.2 Control Logic 29
5.3 Standard Operation Procedure Chart 30
5.4 Electrical Wiring Diagram 40

SERVICE

1. Troubleshooting 42
1.1 Initial Troubleshooting 42
1.1.1 Checking of Electrical Wiring and Power Suply 42
1.1.2 Checking of Rotary Switch and DIP Switch Setting 43
1.2 Troubleshooting Procedure 45
1.2.1 Checking of Using 7-Segment Display 45
1.2.2 Checking of Protection Control Information 55
1.2.3 Check Mode by Remote Control Switch 57
1.2.3.1 Check Mode 57
1.2.3.2 Alarm History Display 62
1.2.4 Failure of Power Supply to Indoor Unit/DHW Tank and Remote Control Switch 63
1.2.5 Abnormal Transmission between Remote Control Switch and Indoor Unit/DHW Tank 64
1.2.6 Abnormalities of Devices 65
1.2.7 Troubleshooting by Alarm Code 74
1.2.8 Function of DSWs and LEDs 127
1.2.8.1 Arrangement Inside Electrical Box 127
1.2.8.2 LEDS and SEGS on PCB 128
1.2.9 Checking of Inverter PCB 129
1.2.10 Checking Method of Electronic Expansion Valve 131
1.2.11 Checking of DC Fan motor 131
1.2.12 Checking of Electrical coil Resistance for each Electrical Components 132
1.2.13 Checking of Reversing Valve 132

2. Maintenance 133
2.1 Outdoor Unit - CHV6-RS36/48/60URBMHH 133

2.1.1 Removing Service Cover 133
2.1.2 Removing Air Outlet Grille 134
2.1.3 Removing Upper Cover 134
2.1.4 Removing Lower Service Cover and Rear Cover 135
2.1.5 Removing Outdoor Fan motor 136
2.1.6 Removing Electrical Box 138
2.1.7 Removing Compressor 139
2.1.8 Removing Pressure Switch and Pressure Sensor 142
2.1.9 Opening Electrical Box (Attaching P-Plate) 143
2.1.10 Removing Reversing Valve Coil 144
2.1.11 Removing Electronic Expansion Valve Coil 145
2.1.12 Removing Solenoid Valve Coil SVA 146
2.1.13 Removing Reversing Valve 147
2.1.14 Removing Electronic Expansion Valve and Solenoid Valve 148
2.1.15 Removing Printed Circuit Board (Outdoor Unit PCB) 149
2.1.16 Removing Inverter PCB 150
2.1.17 Removing Other Electrical Components 151
2.2 Main Parts 152
2.2.1 Inverter 152
2.2.2 Electronic Expansion Valve for Outdoor Units 156
2.2.3 Pressure Sensor 157
2.2.4 Pressure Switch 158
2.2.5 Reactor (DCL) 159

3. External Input/Output and Function Setting 160
3.1 DIP Switch Settings of Outdoor Unit 160
3.2 External Input/Output Setting Method 161
3.3 External Input and Output Setting 163
3.3.1 Input Fixing Heating Operation Mode (Control Function No.1), Input Fixing Cooling Operation Mode (Control Function No.2) 164
3.3.2 Input Demand Stoppage (Control Function No.3) 164
3.3.3 Input Outdoor Fan motor Start/Stop (Control Function No.4) 165
3.3.4 Input Forced Stoppage (Control Function No.5) 166
3.3.5 Input Demand Current Control 40, 60, 70, 80, 100% (Control Function No.6 to 10) 166
3.3.6 Output Operation Signal (Control Function No.1) 168
3.3.7 Output Alarm Signal (Control Function No.2) 168
3.3.8 Output Compressor ON Signal (Control Function No.3) 169
3.3.9 Output Defrosting Signal (Control Function No.4) 169
3.4 Function Setting 170
3.4.1 Function Setting Item 172
3.4.2 Circulator Function at Heating Thermo-OFF (Function Setting “FA”) 172
3.4.3 Night Shift (Function Setting “ni”) 172
3.4.4 Cancellation of Outdoor Ambient Temperature Limit for Heating (Function Setting “GH”) 174
3.4.5 Cancellation of Outdoor Ambient Temperature Limit for Cooling (Function Setting “GC”) 174
3.4.6 Change of Defrost Condition (Function Setting “Jo”) 175
3.4.7 SLo Defrost Setting (Function Setting “bJ”) 175
3.4.8 Priority Capacity Mode for Cooling (Function Setting “cU”) 175
3.4.9 Priority Capacity Mode for Heating (Function Setting “hU”) 176
3.4.10 Low Noise Setting (Function Setting “dB”) 176
3.4.11 Demand Function Setting (Function Setting “dE”) 177
3.4.12 Wave Function Setting (Function Setting “dE”) 177
3.4.13 Low Outlet Temperature Protection in Cooling Mode 1 (Function Setting “Fb”) 178
3.4.14 One key open valve (Function Setting “F8”) 178
3.4.15 One-Key Refrigerant Recovery 179

4. Field Work Insrtuction 182
4.1 Caution for Refrigerant Type 182
4.2 Maintenance Work 183
4.3 Service and Maintenance Record by 7-Segment Display 184
4.4 Service and Maintenance Record by Wired Controller 185
4.5 Service and Maintenance Record 187
4.6 Saturation Curve for Refrigerant 188

4.7 Mollier Chart for R32 189
5. Test Run 190
5.1 Test Run by Remote Control Switch 190
5.2 Test Run from Outdoor Unit Side 191
5.3 Checking at Test Run 193
5.4 Checking List from Refrigerant Cycle 194

APPENDIX

INSTALLATION

SUBMITTAL DATA SHEET

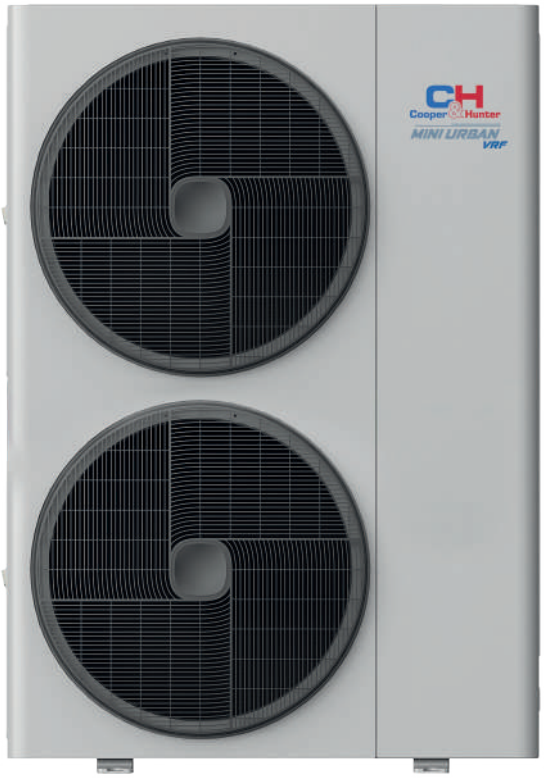
Design

1. Introduction

1.1 Line-Up Of Outdoor Unit

Capacity	RT	3	4	5
	kBtu	36	48	60
	kW	10.6	14.1	17.6
Model	Single Phase	CHV6-RS36URBMHH	CHV6-RS48URBMHH	CHV6-RS60URBMHH

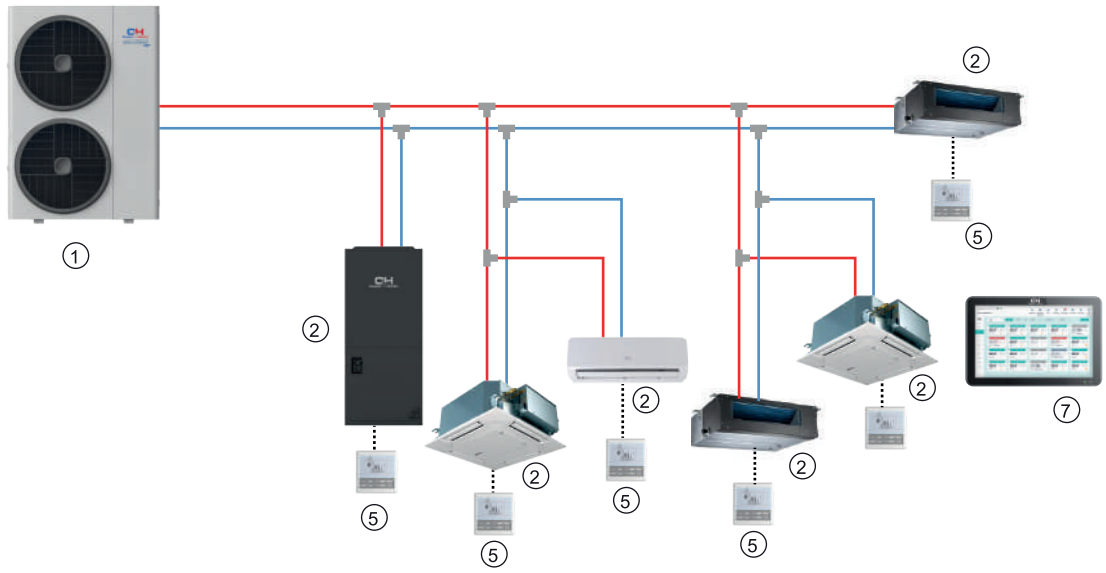
Model: CHV6-RS36/48/60URBMHH



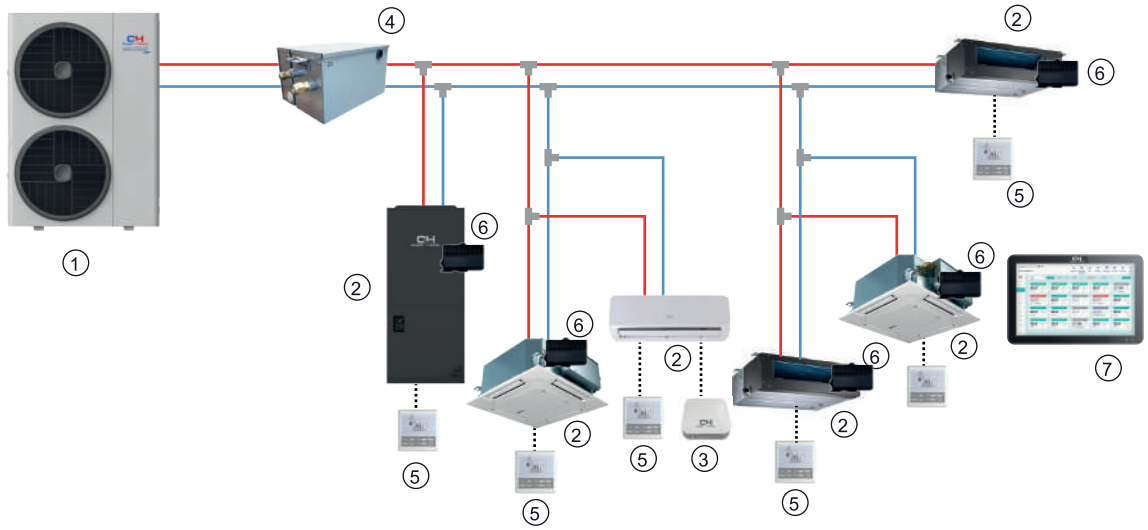
1.2 Application Case

There are 3 types of installation for the system, detils refer to the Section 2.3 “SPECIAL REQUIREMENT FOR R32 UNIT” in the APPENDIX INSTALLATION part.

Application Case 1: no need to install ③ (only for models with built-in refrigerant detector) and ④

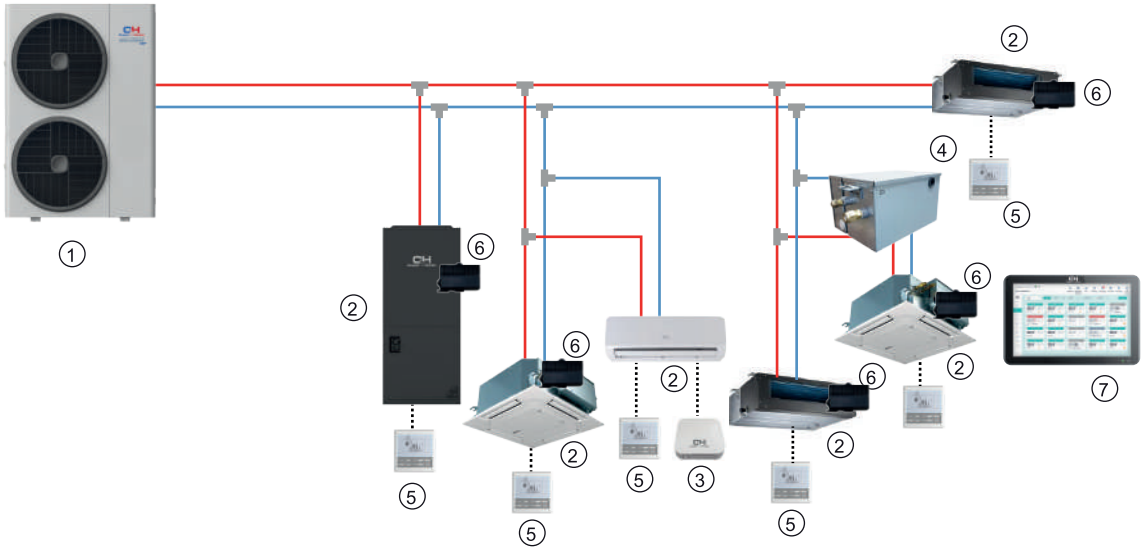


Application Case 2: no need to install ③ (only for models without built-in refrigerant detector) and ④, and install ④ before first branch.

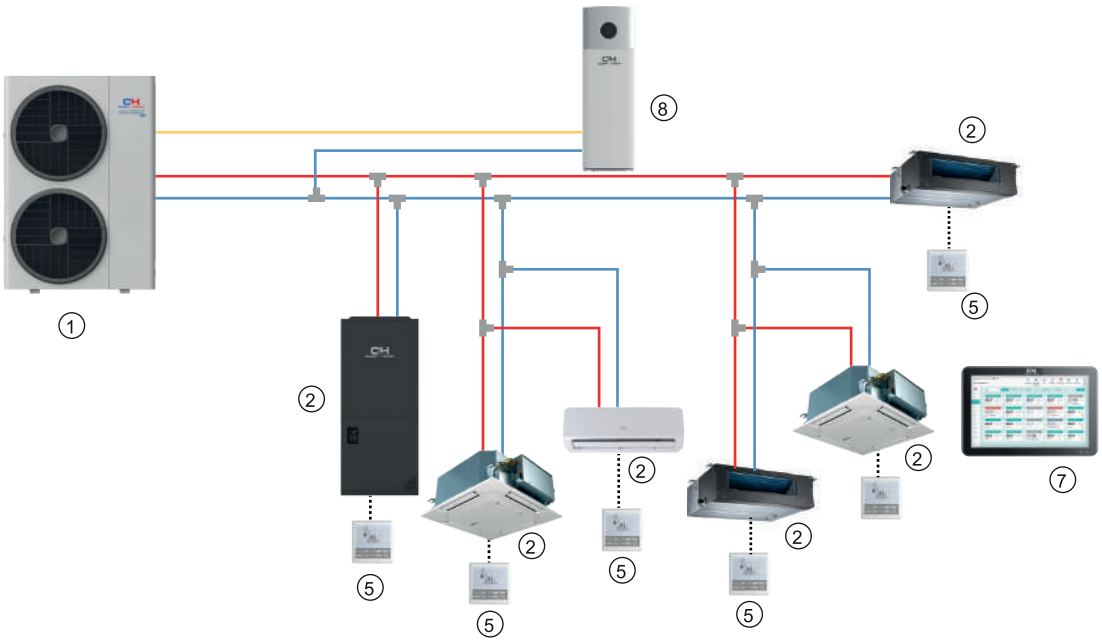


① Outdoor unit (OU)
② Indoor unit (IU)
③ Refrigerant Detector SPRD-ERD1
④ Refrigerant Shut-off Box (SPSOB-2/15)
⑤ Wired Controller
⑥ Built-in Refrigerant Sensor
⑦ Centralized controller

Application Case 3: no need to install ③ (only for models without built-in refrigerant detector) and ④, and install ④ after first branch.

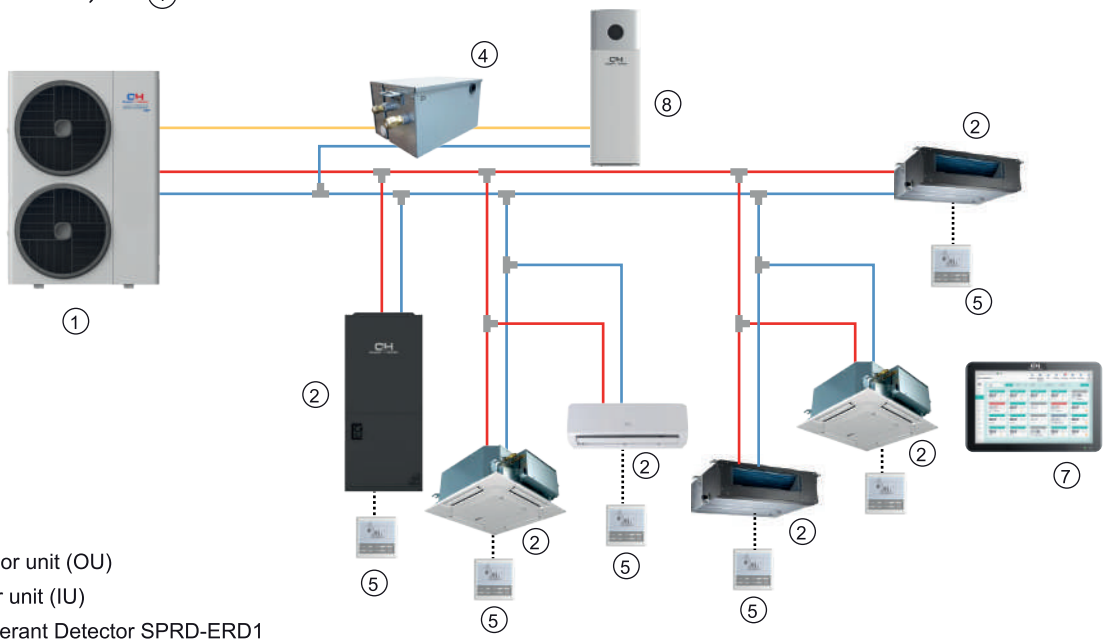


Application Case 4: the outdoor unit is connected with DHW Tank and no need to install ③ (only for models without built-in refrigerant detector) and ④.



① Outdoor unit (OU)
② Indoor unit (IU)
③ Refrigerant Detector SPRD-ERD1
④ Refrigerant Shut-off Box (SPRSOB-RS15)
⑤ Wired Controller
⑥ Built-in Refrigerant Sensor
⑦ Centralized controller

Application Case 4: the outdoor unit is connected with DHW Tank and no need to install ③ (only for models without built-in refrigerant detector) and ④.



① Outdoor unit (OU)
② Indoor unit (IU)
③ Refrigerant Detector SPRD-ERD1
④ Refrigerant Shut-off Box (SPRSOB-RS15)
⑤ Wired Controller
⑥ Built-in Refrigerant Sensor
⑦ Centralized controller
⑧ DHW Tank

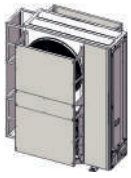
The following indoor units can be combined with the outdoor unit.

Table 1.1 Indoor Unit Type List

Type	Picture	Nominal Power (kBtu/h)																		
		05	07	09	12	14	15	17	18	19	22	24	27	28	30	36	38	42	48	54	60
4-Way Cassette Type				●	●		●			●		●			●		●		●	●	
Mini 4-Way Cassette Type		●	●	●	●		●	●		●											
Ceiling Ducted Type (DC)		●	●	●	●		●			●		●									
Wall-Mounted Type			●	●	●		●		●			●		●							
MPAHU				●	●				●			●			●	●		●	●	●	●

● : Available

1.3 Combiantion

Type	Picture	Model
Refrigerant Detector		SPRD-RS01
Refrigerant Shut-off Box		SPRSOB-RS15
Wind Guard		SH-SFA2F
Air Outlet Guide		SH-SF2AD

- The number of connectable indoor units with the outdoor unit is as follows. Comply with the condition as follows when installing the unit.

Outdoor Unit Capacity (kBtu/h)	Recommended Number of Connectable I.U.	Maximum Number of Connectable I.U.	Connectable Indoor Unit Capacity Ratio		Maximum Number of Connectable DHW Tank
			Minimum	Maximum	
CHV6-RS36URBMHH	7	9	50%	150%	1
CHV6-RS48URBMHH	8	11	50%	150%	1
CHV6-RS60URBMHH	9	12	50%	150%	1

NOTE:

1. The connectable indoor unit capacity ratio can be calculated as follows:
   Connectable Indoor Unit Capacity Ratio = Total Indoor Unit Capacity / Outdoor Unit Capacity
2. For multi-position Air Handler Unit Type That is connected with other type indoor unit, the capacity should be changed from 9 kBtu to 12 kBtu for 09 unit when calculate connectable indoor unit capacity ratio; the capacity should be changed from 18 kBtu to 24 kBtu for 18 unit
3. In cold areas (where the outdoor air temperature may be lower than 50°F/10°C) or areas with extremely high temperature (where the outdoor air temperature may be higher than 109°F/43°C), the recommended number of connected units is not encouraged to be exceeded and the capacity ratio is not recommended to be greater than 100%.
   Otherwise, under certain operating limits, the temperature difference between the inlet and outlet air temperatures of the indoor unit may decrease, or the indoor unit may not reach high wind operation for a long time when it is started.
4. For the system which all the indoor units operate simultaneously, the total indoor unit capacity should be not bigger than the outdoor unit capacity. Otherwise, a decrease in operating performance and an increase in the operating limit can result in an overload.
5. When the system's farthest indoor unit pipe length or total piping length exceeds the recommended value(A), it is recommended that the number of connected indoor units should not exceed the recommended number, and the capacity ratio should not exceed 100%. Otherwise, under certain operating limits, the temperature difference between the inlet and outlet air temperatures of the indoor unit may decrease, or the indoor unit may not reach high wind operation for a long time when it is started.
6. For the system under which all the indoor units do not operate simultaneously, the total indoor unit capacity is available up to 150% or the number of connectable indoor units can be up to maximum,but the performance of each indoor unit will be reduced.
7. The maximum number of connectable indoor units differs depending on the model, capacity, environment and installation location of connected indoor units.
8. A system configuration with a combination ratio of more than 150% is unacceptable. Alarm activation and operation failure may occur.
9. For optional spare parts, please contact your local salesperson.

Outdoor Unit Capacity (kBtu/h)	Recommended value (A)	
	Maximum Piping Length	Total Piping Length
CHV6-RS36URBMHH	279ft. (85m)	590ft. (180m)
CHV6-RS40URBMHH	279ft. (85m)	590ft. (180m)
CHV6-RS60URBMHH	279ft. (85m)	590ft. (180m)

2. General Data

2.1 Key Parameter

Model			CHV6-RS36URBMHH	CHV6-RS48URBMHH	CHV6-RS60URBMHH
Power Supply			208/230V 3PH 60Hz		
Cooling Operation 1	Rated Capacity	kW	10.6	14.1	17.6
		kBtu/h	36	48	60
	Power Consumption (Ducted/Non-ducted)	kW	2.88/2.77	4.00/4.00	5.71/5.45
	EER2 (Ducted/Non-ducted)	(Btu/h)/W	12.5/13	12/12	10.5/11
	SEER2 (Ducted/Non-ducted)	(Btu/h)/W	17.5/23	17/22	17/21.5
Heating Operation 1	Rated Capacity	kW	12.3	15.8	18.5
		Btu/h	42	54	63
	Power Input (Ducted/Non-ducted)*	kW	3.16/2.86	4.16/3.77	5.28/4.62
	COP 47°F (Ducted/Non-ducted)	kW/kW	3.90/4.30	3.80/4.20	3.50/4.00
	Low Temperature Heating Capacity 5°F	kW	12.3	15.8	18.5
		kBtu/h	42	54	63
	Power Input (Ducted/Non-ducted)*	kW	5.86/5.02	8.55/6.59	8.79/8.03
	COP 5°F (Ducted/Non-ducted)	kW/kW	2.10/2.46	1.86/2.40	2.10/2.30
	HSPF2°F (Ducted/Non-ducted)	(Btu/h)/W	10.1/10.8	10.1/10.8	10.1/11.0
Elecrtical Parameter	MCA	A	30.3	39.6	44.0
	MOP	A	40	50	60
Ventilation	Air Flow Rate	m³/min	100	100	127
		CFM	3534	3534	4488
	Fan Quantity	-	2	2	2
Sound Pressure Level 2	Normal Mode (Cooling/Heating)	dB(A)	50/53	52/54	57/58
Compressor	Type	-	Rotary		
	Quantity	PC	1	1	1
Refrigerant	Type	-	R32	R32	R32
	Pre-charged Quantity	kg	2.9	2.9	3.5
		lbs.	6.4	6.4	7.7
Weight	Net Weight	kg	113.4	113.4	121.1
		lbs.	249.5	249.5	266.6
	Gross Weight	kg	125.0	125.0	133.0
		lbs.	275.0	275.0	293.0
Dimensions	External (HxWxD)	mm	1380 x 950 x 370	1380 x 950 x 370	1380 x 950 x 370
		in.	54 $^{11}/_{32}$ x 37 $^{13}/_{32}$ x 14 $^{9}/_{16}$	54 $^{11}/_{32}$ x 37 $^{13}/_{32}$ x 14 $^{9}/_{16}$	54 $^{11}/_{32}$ x 37 $^{13}/_{32}$ x 14 $^{9}/_{16}$
	Packing (HxWxD)	mm	1531 x 1070 x 515	1531 x 1070 x 515	1531 x 1070 x 515
		in.	60 $^{9}/_{32}$ x 42 $^{1}/_{8}$ x 20 $^{9}/_{32}$	60 $^{9}/_{32}$ x 42 $^{1}/_{8}$ x 20 $^{9}/_{32}$	60 $^{9}/_{32}$ x 42 $^{1}/_{8}$ x 20 $^{9}/_{32}$
Model			CHV6-RS36URBMHH	CHV6-RS48URBMHH	CHV6-RS60URBMHH
Ref. Piping	Gas for Indoor Unit	mm	Φ15.88	Φ15.88	Φ15.88
		in.	5/8	5/8	5/8
	Gas for DHW Tank	mm	Φ12.7	Φ12.7	Φ12.7
		in.	1/2	1/2	1/2
	Liquid	mm	Φ9.53	Φ9.53	Φ9.53
		in.	3/8	3/8	3/8
Connectable Indoor Units	Quantity	PC	9	11	12
Ref. Piping	Height Difference Between ODU and IDU	m	50	50	50
		ft.	164	164	164
		m	40	40	40
		ft.	131	131	131
	Height Difference Between IDUs	m	15.0	15.0	15.0
		ft.	49.0	49.0	49.0
	Max. Piping Length	m	85	85	85
		ft.	279	279	279
Operation Range	Cooling Mode	°C DB	-5~52	-5~52	-5~52
		°F DB	23~125.6	23~125.6	23~125.6
	Heating Mode	°C WB	-25~26	-25~26	-25~26
		°F WB	-13~78	-13~78	-13~78
	DHW Mode	°C WB	-25~43	-25~43	-25~43
		°F WB	-13~109	-13~109	-13~109

NOTES:

1. The above cooling and heating capacities show the capacities when the outdoor unit operating with the 100% rating of indoor units.

Cooling Operation Conditions		Heating Operation Conditions	Nominal Heating Condition	Low. Temp.Heating Condition
Indoor Air Inlet Termperature:	80°F DB (26.7°C DB) 67°F WB (19.4°C WB)	Indoor Air Inlet Termperature:	70°F DB (21.1°C DB)	70°F DB (21.1°C DB)
Outdoor Air Inlet Termperature:	95°F DB (35°C DB)	Outdoor Air Inlet Termperature:	47°F DB (8.3°C DB) 43°F WB (6.1°C WB)	5°F DB (-15°C DB) 3°F WB (-16.1°C WB)

2. The sound pressure levels is measured in an anechoic chamber so that reflected echo should be taken into consideration in the field.

* For AHRI rating, refer to the AHRI website http://ahridirectory.org.

2.2 Component Data

Outdoor Heat Exchanger, Fan and Fan Motor

Model				CHV6-RS36URBMHH	CHV6-RS48URBMHH	CHV6-RS60URBMHH
Heat Exchanger	Heat exchanger type		-	Multi-way cross-flow finned tube type		
	Tube	Material	-	Copper		
		Outside diameter	in.(mm)	9/32 (7)		
		Rows	-	3	2	2.5
	Fin	Material	-	Aluminum		
		Pitch	in.(mm)	1/16 (1.65)	1/16 (1.65)	1/16 (1.65)
	Quantity		-	1	1	1
	Max. operating pressure		psi(MPa)	624 (4.30)		
	Max. frontal area		ft.²(m²)	14.39 (1.34)	14.39 (1.34)	14.39 (1.34)
Fan Part	Fan	Type	-	Axial-flow Fan		
		Quantity	-	2	2	2
		Outside diameter	in.(mm)	21 7/16 (544)	21 7/16 (544)	21 7/16 (544)
	Fan motor	Type	-	Waterproof brushless DC motor		
		Start-up mode	-	Soft driving		
		Nominal output power	W	60+60	60+60	60+60
		Quantity	-	2	2	2
		Insulation grade	-	E	E	E

Parameters of Compressor and Fan Motor

Compressor Model			WHP23000GEKPC8FQC
Design Pressure	High Side	psi(Mpa)	624 (4.30)
	Low Side	psi(Mpa)	320 (2.21)
Design Pressure	Model	-	Brushless DC motor
	Start-up Mode	-	VFD
	Polarities	-	8
	Insulation Grade	-	B
Refrigerator Oil	Brand	-	ACS-68R
	Volume	L	1.8±0.02

Outdoor Unit Models	Compressor		Fan Motor	
	Model	Quantity	Model	Degree of Protection
CHV6-RS36URBMHH	WHP23000GEKPC8FQC	1	WZ-138-10A-D3	IP24
CHV6-RS48URBMHH				
CHV6-RS60URBMHH				

2.3 Safety and Control Device Setting

- Compressor Protection
  The compressor is protected by the following devices and their combinations.

(1) High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.

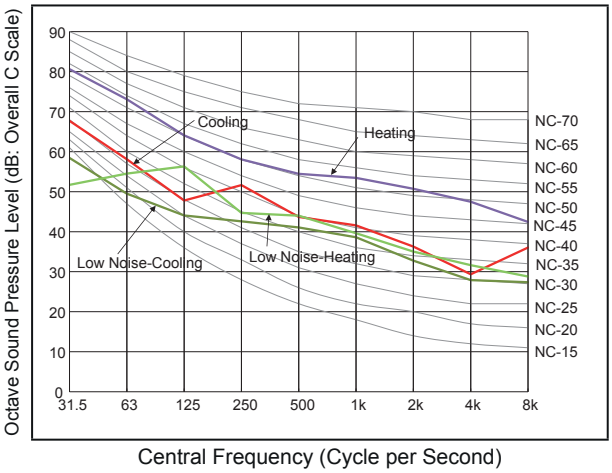
(2) Oil Heater: This band type heater protects against oil foaming during cold starting, as it is energized while the compressor is stopped.

Model			CHV6-RS36URBMHH	CHV6-RS48URBMHH	CHV6-RS60URBMHH
Compressor Pressure switch			"Reset automatically and non-adjustable		
High	Open	psi (Mpa)	624 (4.30)	624 (4.30)	624 (4.30)
	Close	psi (Mpa)	551 (3.80)	551 (3.80)	551 (3.80)
Capacity of circuit breaker		A	63	63	63
CCP Timer setting		min.	Non-adjustable		
			3	3	3

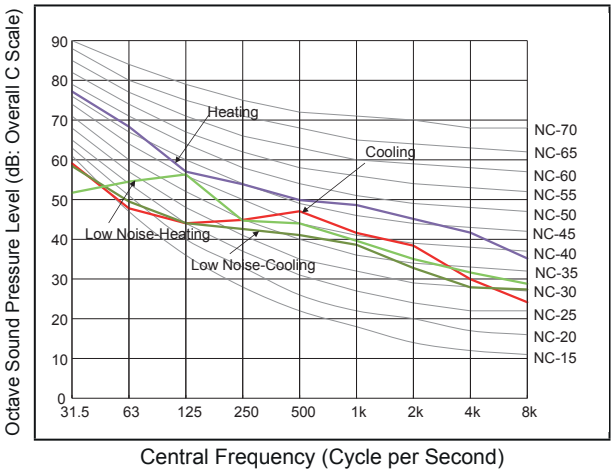
2.4 Sound Data

Measurement point: 3.3ft. (1m) from the service cover surface and 4.9ft. (1.5m) from floor level.

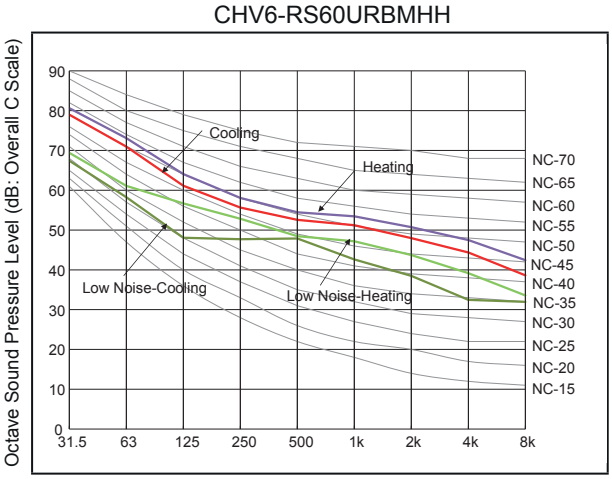
CHV6-RS36URBMHH



CHV6-RS48URBMHH



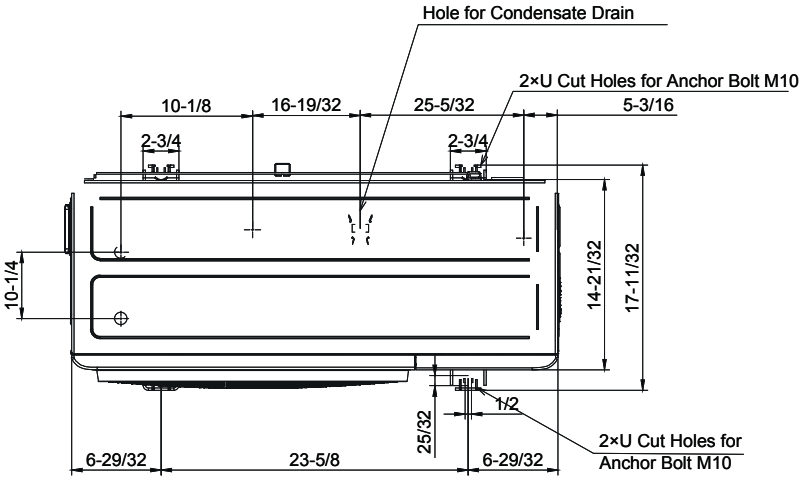
CHV6-RS60URBMHH

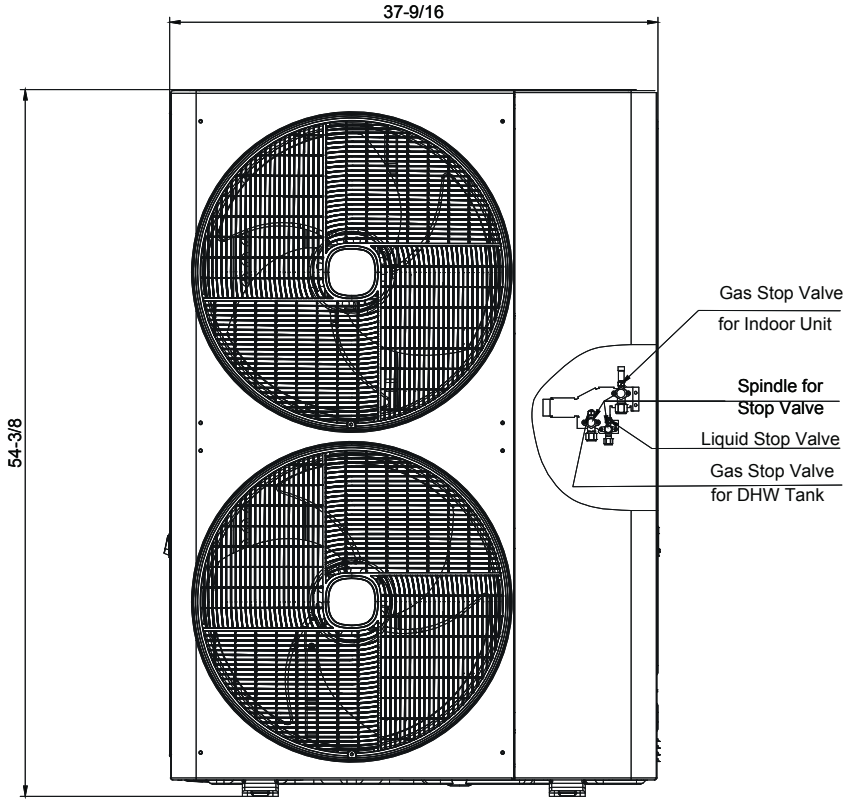


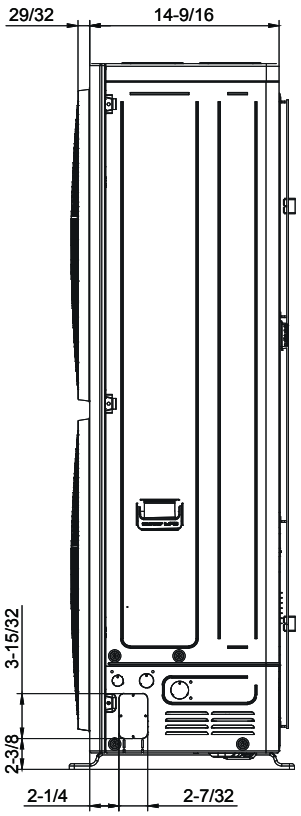
2.5 Dimension Data

Model: CHV6-RS36/48/60URBMHH

unit: in.

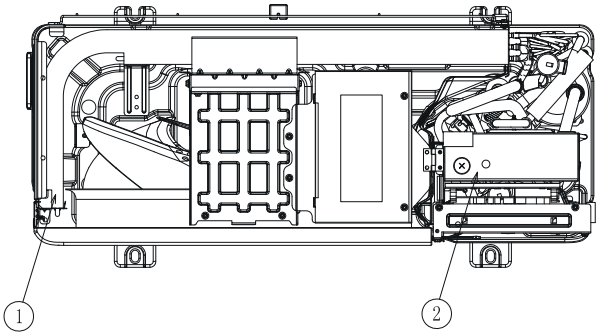


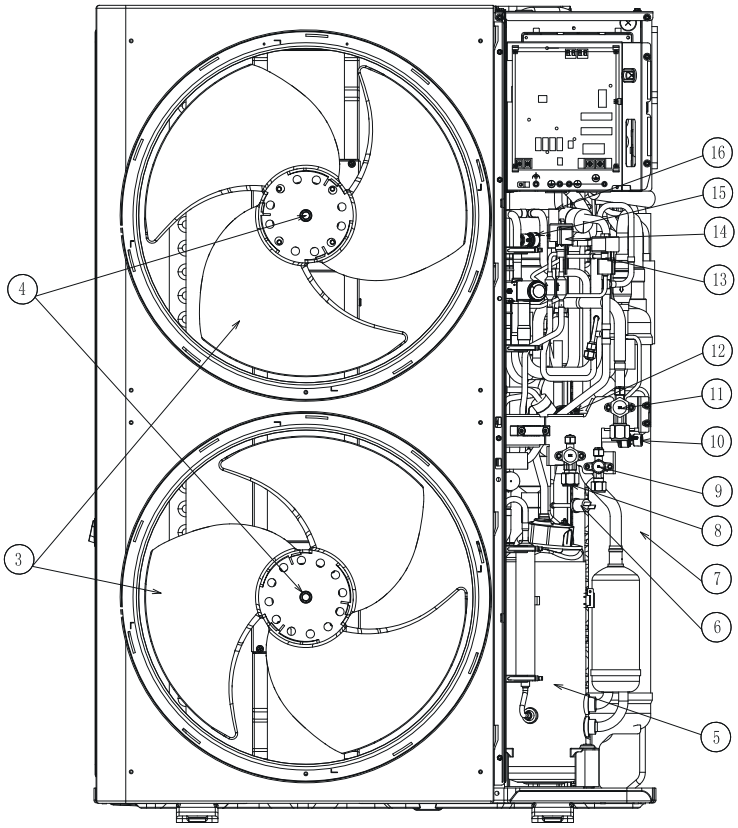


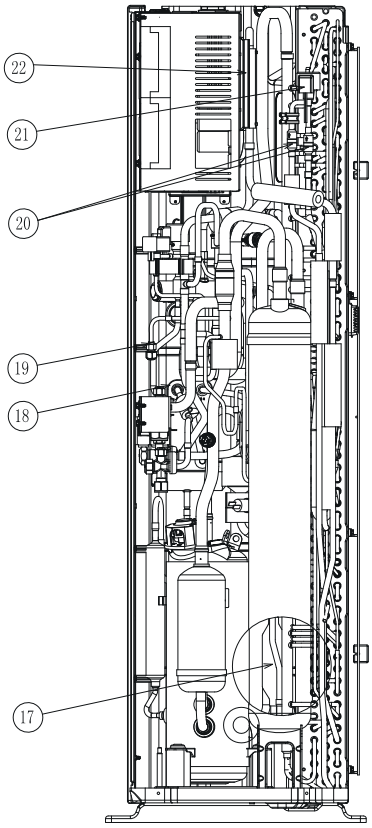


2.6 Structure

Model: CHV6-RS36/48/60URBMHH







Mark	Part Name	Mark	Part Name	Mark	Part Name
1	Heat Exchanger	9	Liquid Stop Valve	17	Oil Separator
2	Electrical Box	10	Low Pressure Sensor (Ps)	18	Plate Heat Exchanger
3	Propeller Fan	11	Gas Stop Valve for Indoor Unit	19	Check Joint
4	Fan motor	12	Capillary Tube	20	Strainer
5	Compressor	13	Solenoid Valve (SVA)	21	Electronic Expansion Valve (EVO)
6	High Pressure Switch (PSH)	14	Electronic Expansion Valve (EVB)	22	Refrigerant Cooler
7	Accumulator	15	High Pressure Sensor (Pd)		
8	Gas Stop Valve for DHW Tank	16	Pressure Relief Valve		

2.7 Electrical Data

Electrical Data and Recommended Wiring, Fuse Size

Model	Outdoor Unit					Wiring Size	GLB	
	Hz (Hz)	Voltage (V)	MCA (A)	MOP (A)	Fuse (A)	Communication Cable (AWG)	Nominal Current (A)	Nominal Sensitive Current (mA)
CHV6-RS36URBMHH	60	208/230	30.3	40	40	18	40	30
CHV6-RS48URBMHH	60	208/230	40.9	50	50	18	50	30
CHV6-RS60URBMHH	60	208/230	44.0	60	60	18	60	30

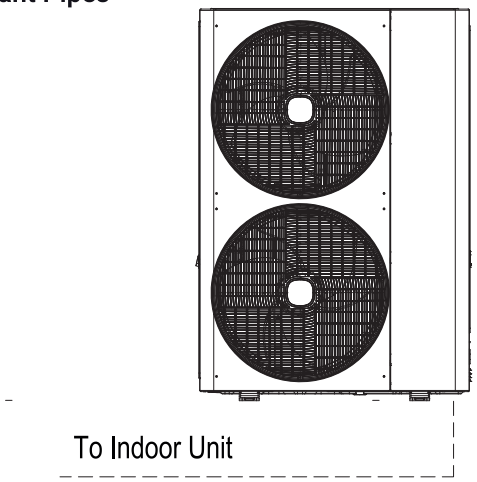
*1 Refer to the NOTES for selection of the power source cable size.
GLB: Ground Leakage

Breaker NOTES:

- Field wiring shall conform to local laws and regulations, and all wiring operations must be performed by qualified professionals.
- Refer to relevant standards for noted power cord size.
- Power cord selection shall be compliant with requirements stated in UL62 and C22.2 No.49, while the power cord shall be made from copper conductor.
- The wiring specifications for weak-current communication loop shall comply with local regulations, and the shielding layer needs to be earthed.
- Ensure communication cable is a minimum of AWG18 (0.82mm2), 2-Conductor, Stranded Copper.
- A switch that can ensure all-pole disconnection shall be installed between power supply and air conditioning unit in such a manner that the contact spacing shall not be less than 1/8 in. (3mm).
- Once the power cord is damaged, the dealer or the professionals from designated maintenance department must be contacted in a timely manner for repair and replacement.
- For the installation of power cord, the earth wire must be longer than the current-carrying conductor.
- Select appropriate sized breakers / fuses / overcurrent protection switches and wiring according to the table above and local codes. Select power cord size based on the value of the MCA.

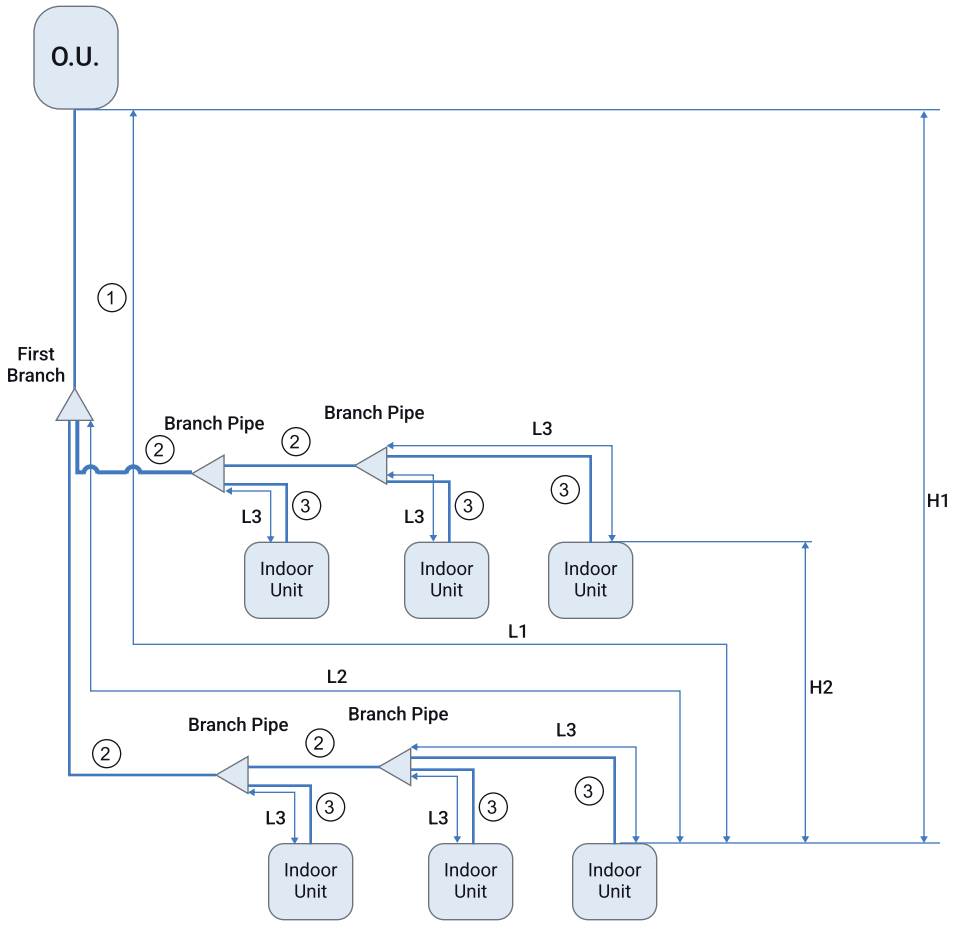
3. Piping System

3.1 Connection of Refrigerant Pipes



Model		36	48	60
Tube Size Φ in.(mm)	High/Low Gas	5/8 (15.88)	5/8 (15.88)	5/8 (15.88)
	High Gas	1/2 (12.7)	1/2 (12.7)	1/2 (12.7)
	Liquid	3/8 (9.53)	3/8 (9.53)	3/8 (9.53)

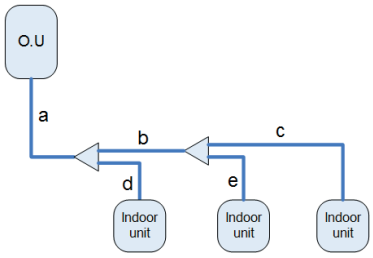
3.2 Pipe Connection Design Guidance



Unit: ft. (m.)

Item		Mark	Allowable Piping Length		
Total Piping Length			3RT	4RT	5RT
		-	590 (180)	590 (180)	590 (180)
Total Piping Length	Actual Length	L1	278 (85)	278 (85)	278 (85)
	Equivalent Length		347 (106)	347 (106)	347 (106)
Maximum Piping Length between Branch of 1st Branch and Each Indoor Unit		L2	131 (40)	131 (40)	131 (40)
Maximum Piping Length between Each Branch and Each Indoor Unit		L3	131 (40)	131 (40)	131 (40)
Height Difference between Outdoor Unit and Indoor Units	Outdoor Unit is Higher	H1	164 (50)	164 (50)	164 (50)
	Outdoor Unit is Lower		131 (40)	131 (40)	131 (40)
Height Difference between Indoor Units		H2	49 (15)	49 (15)	49 (15)
Number of Main Branch Pipe		-	2 or less		

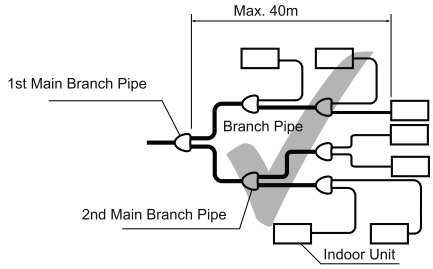
Item	Mark	Allowable Piping Length
Total Piping Length	a+b+c+d+e	The total amount of all piping actual lenght
Maximum Piping Length	a+b+c	The actual piping length between the stop valve of the outdoor unit and the terminal indoor unit
Piping Length	-	The actual length of pipe takes no account for equivalent lengths for pressure drops of elbows
Equivalent Piping Length	-	The combination of the straight pipe length plus the equivalent length of elbows and other pressure drop calculations



NOTE:

Comply with the following conditions when installing the unit.

1. Allowable total piping length may not reach maximum because of the limitation of maximum additional refrigerant amount. Make sure the additional refrigerant volume does not exceed the maximum additional refrigerant amount.
2. If the piping length (L3) between each branch and indoor unit is considerably longer than other indoor unit, refrigerant may not flow well, lessening performance compared to other models.
3. It is allowable to make one or two main branch pipes.
   The word “Main Branch Pipe” indicates the branch pipe with both branches connected to another branch pipe.



If the number of “Main Branch Pipe” exceeds 2, please contact technical support engineer of Cooper&Hunter.

① Pipes between outdoor units refer to section 3.1.

First branch:

Outdoor Unit Capacity (kBtu/h)	Branch Pipe Model
36 ~ 60	SPBPK-102HP

NOTE:

When maximum length of equivalent refrigerant pipe (L1) from the outdoor unit pipe to the indoor unit is over 100m, the pipe size of gas line from outdoor unit to first branch should be increased one size with the reducer (filed-supplied).

② Pipe after first branch

Total Indoor Unit Capacity (kBtu/h)	Gas Φ in.(mm)	Liquid Φ in.(mm)	Branch Pipe Model
Q < 54	5/8 (15.88)	3/8 (9.53)	SPBPK-102HP

NOTE:

If the branch pipe size is larger than the first branch, adjust the branch pipe size to the first branch. In case that the selected pipe size after the fisrt branch is larger than the pipe size before the first branch, use the same pipe size as the one before the first branch.

③ Pipe between last branch and indoor unit

(1) The pipe diameter should be the same as the indoor unit piping connection size, details refer to the technical catalog of indoor unit.

(2) When the liquid piping length is longer than 15m, use Φ 3/8 in.(9.53mm) pipe and reducer (field-supplied) instead of Φ 1/4 in. (6.35mm) pipe.

3.3 Calculation of Additional Refrigerant

Although refrigerant has been charged into this unit, additional refrigerant charge is required. Determine the additional refrigerant quantity according to the following procedure, and charge it into the system. Record the additional refrigerant quantity to facilitate maintenance and servicing activities thereafter.

CHV6-RS36/48/60URBMHH

Calculating Method of Additional Refrigerant Charge (W kg)

W1: Additional refrigerant charge for liquid piping	Pipe Diameter [inch(mm)]	Total Piping Length [ft(m)]	Refrigerant Charge [lbs/ft (kg/m)]	Additional Charge for liquid piping[lbs (kg)]
	1/2(12.7)		×0.063(0.093)	
	3/8(9.53)		×0.031(0.046)	
	1/4(6.35)		×0.013(0.019)	
	Total Additional Charge For Liquid Piping (W1) [lbs(kg)] = ∑ Total liquid piping length * refrigerant charge amount per meter			

W2: Additional refrigerant charge for indoor unit

Table of Additional refrigerant charge per each indoor unit [lbs(kg)/unit]

Capacity / Type	05	07	09	12	15	17	18 (19)	24	27 (28)	30	36	38	42	48	54	60
4-way Cassette Type			0.55 (0.25)	0.55 (0.25)	0.55 (0.25)		0.55 (0.25)	0.73 (0.33)		1.06 (0.48)		1.32 (0.60)		1.32 (0.60)	1.32 (0.60)	
Mini 4-way Cassette Type	0.31 (0.14)	0.31 (0.14)	0.42 (0.19)	0.42 (0.19)	0.57 (0.26)	0.57 (0.26)	0.57 (0.26)									
Ceiling Ducted Type	0.26 (0.12)	0.26 (0.12)	0.42 (0.19)	0.42 (0.19)	0.51 (0.23)		0.68 (0.31)	0.73 (0.33)								
Wall Mounted Type		0.42 (0.19)	0.42 (0.19)	0.42 (0.19)	0.55 (0.25)		0.71 (0.32)	0.71 (0.32)	0.71 (0.32)							
Multi-position Air Handler Unit Type			0.56 (0.26)	0.56 (0.26)			0.88 (0.40)	0.88 (0.40)		1.32 (0.60)	1.32 (0.60)		1.32 (0.60)	1.97 (0.90)	1.97 (0.90)	1.97 (0.90)
DHW Tank																1.10 (0.50)

Additional refrigerant charge for indoor unit (W2) [lbs(kg)] =
∑ number of the IU * refrigerant charge amount per corresponding IU

Total additional refrigerant charge can be calculated as follows: W=W1+W2=

Maximum Additional Refrigerant Charge

Total additional charge must not exceed the maximum additional refrigerant charge indicated in the following table. Accordingly, allowable total piping length may become shorter than maximum value due to the limitation of maximum additional refrigerant amount

Ref. Charge of O.U.

Outdoor Unit Models	W0: Outdoor unit refrigerant charge lbs.(kg)	Maximum additional refrigerant charge lbs.(kg)
CHV6-RS36URBMHH	4.4(2)	12.1(5.5)
CHV6-RS48URBMHH	4.4(2)	12.1(5.5)
CHV6-RS60URBMHH	4.4(2)	12.1(5.5)

NOTES:

- W0 is outdoor unit refrigerant charge before shipment.

1. Charging Work
   Charge refrigerant (R32) into the system according to INSTALLATION chapter.

Record of Additional Charge

Total refrigerant charge of this system is calculated in the following formula.

Total Ref. Charge = W + Wo

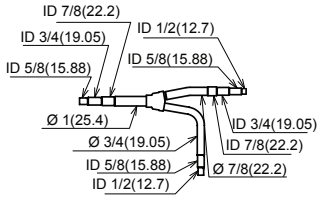
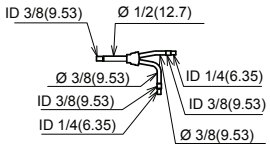
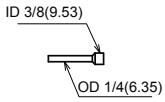
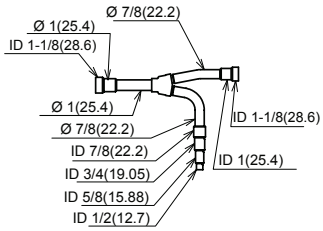
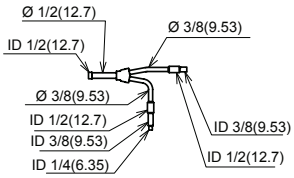
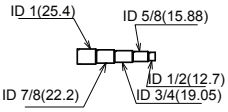
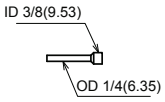
This System = ☐ + ☐ = ☐ lbs.(kg)

Total Additional Charge(W): ☐ lbs.(kg)

Total Refrigerant Charge: ☐ lbs.(kg)

Date of Charging: ☐ / ☐ / ☐

3.6 Piping Connection Kit Dimensions (optional)

Models	Gas Line	Liquid Line	Reducer for Gas Line	Reducer for Liquid Line
SPBPK-102HP				 (2 unit)
SPBPK-162HP			 (1 unit)	 (1 unit)

Unit: mm, ID: Inner Diameter, OD: Outer Diameter

4. Capacities and Selection Data

4.1 Procedure for Selection of the System

This section explains the procedure to select the most suitable outdoor unit , with the values to be taken into account and the necessary steps to be carried out.

This procedure allows to select the unit with the best characteristics to provide the greatest level of efficiency and comfort, considering the building layout, the specifications of the indoor units to be installed and the distribution of air and refrigerant flows.

The ease of access for installation and maintenance work must Ьe taken into account when selecting the location for installation of the outdoor unit.

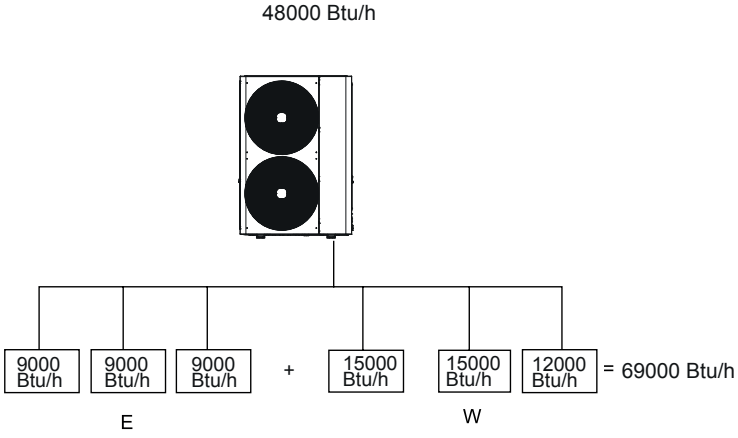
4.1.1 Unique features of the system

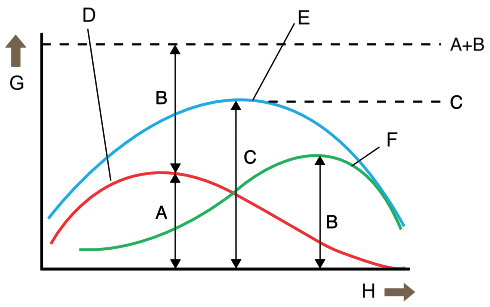
The system boasts some unique features that must be taken into account before selecting the outdoor unit.

Possibility of installing a reduced total unit capacity

In comparison with other air conditioning systems requiring the indoor and outdoor nominal capacities to be equal, the system allows the connection of a total combined indoor capacity as low as 50% and as high as 150% of the nominal capacity of the outdoor unit. This possibility is explained in the following example:

The diagram shows a typical building with a morning peak heat load on the east zone equivalent to a 57,300 Btu/h unit. In the afternoon, a peak equivalent to a 64,400 Btu/h unit occurs on the west zone.





Indoor unit capacity
E: East zone (57,300 Btu/h)
W: West zone (64,400 Btu/h)

A: morning peak heat load in the eastern area
B: evening peak heat load in the western area
C: maximum simultaneous load for the entire building
D: eastern area load

E: total load
F: western area load
G: load
H: time

In this case, a conventional system would require the installation of a 69000 Btu/h outdoor unit, matching the total installed indoor capacity (27000 Btu/h + 42000 Btu/h). However, the maximum simultaneous load in the whole building occurs at noon, and is equal to 48000 Btu/h of unit capacity. Therefore, a 48000 Btu/h outdoor unit could be selected, directing its capacity to either the east or the west zone as dictated by the system controls.

NOTE:

- The maximum required loads of east and west zone must not be simultaneous.
- In systems in which all the indoor units are operated simultaneously, the total indoor capacity must not exceed the nominal capacity of the outdoor unit. Otherwise, poor performance or a narrowing of the operation range in overload conditions may occur.
- The lowest total capacity ratio varies based on the outdoor unit selected, Please refer to the section 1.2 for details.

The ratio of total combined capacity is calculated with the following formula:

Ratio of total combined capacity = (Total capacity of the indoor units / Capacity of the outdoor unit) x 100% = (69000 Btu/h / 48000 Btu/h) x 100% ≈ 143%

4.1.2 Selection Parameters

To select the outdoor units, it will be necessary to consult and/or use a series of parameters shown in tables and graphics presented in the different chapters of this handbook. A summarized list is shown below:

For cooling and heating capacities: manual of "Engineering Data".

For cooling correction factor depending on the piping length: 4.2 "Capacity Correction Based on Refrigerant Piping Length".

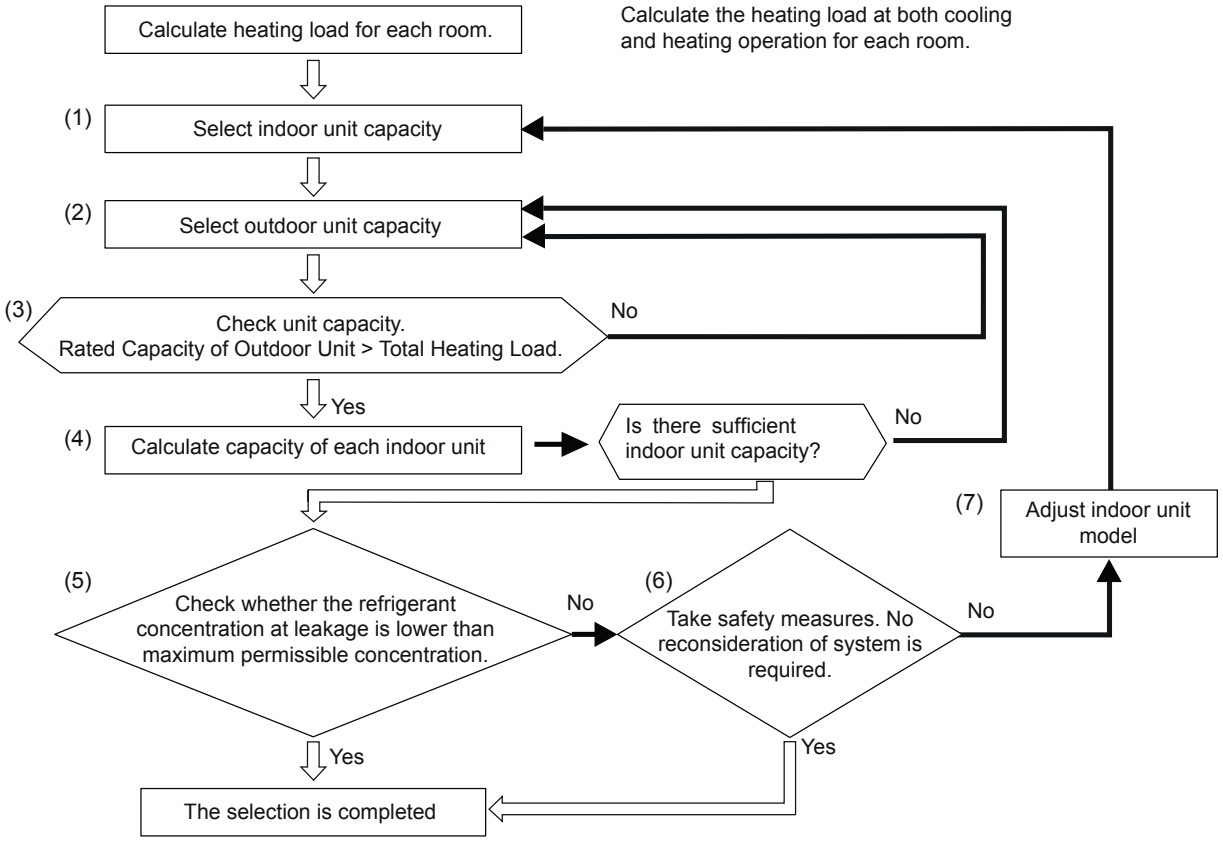
For heating correction factor depending on the piping length: 4.2 "Capacity Correction Based on Refrigerant Piping Length".

For sensible heat factor: VRF Indoor Units Technical Catalog.

In case of an installation with ducts (outdoor unit with SDL(H)SP indoor unit) the fan performance for duct calculations should be considered. The SDHSP units are designed with difference static pressure ranges in order to fulfill all installation necessities.

4.1.3 Check points for system installation

For selecting the unit capacity, perform the system selection with checking the refrigerant concentration at leakage in order not to exceed the maximum permissible concentration.



1. Selecting indoor unit capacity.
   Set temporarily the indoor unit model and capacity in each room as following:

Heating Load for each room < Capacity of Indoor Unit

At this time, consider the correction factor according to room temperature.
Then, sum up each indoor unit capacit (The calculation is required for cooling and heating operation).

Indoor unit capacity = Rated capacity x correction Factor (room temperature)

Correction factor according to room temperature: When the estimated load for each room differs from the rated capacity (cooling: 80.0°F (26.7°C)DB / 67.0°F (19.4 C) WB; heating: 70.0°F (21.1°C)DB, select the outdoor unit capacity at the estimated load from the manual of Engineering Data.

Correction Factor (room temperature) = Outdoor unit capacity at estimated load / Rated outdoor unit capacity

(2) Selecting outdoor unit capacity
Set temporarily the outdoor unit capacity according to the total connectable indoor unit capacity at the item (1). Then, calculate maximum outdoor unit capacity with considering the correction factors according to temperature condition, piping length and lift, and defrosting correction factor (for heating operation).
The calculation is required for cooling and heating operation

Outdoor unit capacity = Outdoor unit capacity at estimated load x Correction factors

Outdoor unit capacity at estimated load:
When calculating heating load for outdoor unit, check the ambient temperature. If the ambient temperature differs from the temperature indicated in the rated capacity
(cooling: 95.0°F(35°C) DB; heating: 47.0°F(8.3°C)DB / 43.0°F(6.1°C)WB), select the outdoor unit capacity at the estimated load from the manual of Engineering Data.

Correction factor according to piping length:

- Select the correction factor according to 4.2 "Capacity Correction Based on Refrigerant Piping Length".

Correction factor according to defrosting condition (for heating operation):

- Select the correction factor according to 4.3 "Correction Factor According to Defrosting Operation".

(3) Checking unit capacity.
Compare the outdoor unit capacity calculated in the item (2) with the total heating load.

(4) Calculating each indoor unit capacity.
Recalculate the indoor unit capacity as follows. (The calculation is required for cooling and heating operation.)

Unit capacity for each room = Outdoor Unit Capacity (value at item 2) x (indoor unit capacity in concerned room / Total indoor unit capacity)

If the outdoor unit capacity is insufficient against the necessary heating load for each room, recalculate it from the item (2) after the outdoor unit capacity is increased.

(5) Checking Refrigerant Concentration at Refrigerant Leakage < Permissible Refrigerant Concentration, Please refer to section 2.3 for details.

(6) Taking Safety Measure (Reconsideration of system is not required). Please refer to section 2.3 for details.

(7) Correction of outdoor unit model if the condition of both (5) and (6) are negative.

NOTE:

- When select the temperature, consider that the ambient temperature increases by short circuit. Especially, if multiple outdoor units are installed or there is obstacle around the outdoor unit, pay attention to increase the ambient temperature.
- For selecting temperature at the heating operation in the ducted and cassette indoor unit type, consider the temperature irregularity between the floor and the ceiling surface. The temperature around the ceiling surface normally becomes 36ºF higher than the floor surface during the heating operation
- For selecting indoor unit capacity, if the sensible heating load is considered, consider the sensible heat factor together.
- In the case that the total indoor unit capacity exceeds the outdoor unit capacity, the temperature is low or the piping length is long, if the indoor units operate simultaneously, the air outlet temperature decreases so that may be felt uncomfortably. Therefore, the facility should be designed that the cooling/heating capacity for indoor unit calculated from the cooling/heating capacity for system is more than the heating load.

4.1.4 Selection procedure example

Given conditions

Once considered the system possibilities, it's the moment to start with the selection procedure. In order to do this, it has been assumed an installation consisting of several rooms with different required cooling loads and temperature conditions.

Total load required for each room

Concept	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7
Estimated cooling load (Btu/h)	5300	4600	4600	4600	5300	4600	4600
Estimated cooling load (Btu/h)	5960	5100	5100	5100	5960	5100	5100

Temperature condition unit: °F °(C)

Operating conditions		Cooling	Heating
Indoor air inlet temperature	DB (°F)	80.0	70.0
	WB (°F)	67.0	-
Outdoor air inlet temperature	DB (°F)	86.0	34.0
	WB (°F)	-	32.0

DB: dry bulb; WB: wet bulb.

Piping dimensions:

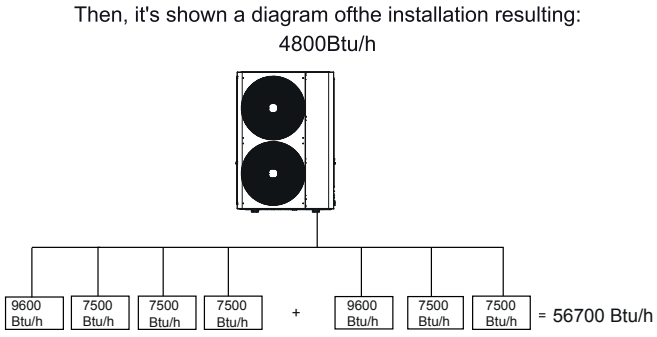
Equivalent pipe length between outdoor unit and indoor units: 197ft.
Pipe height: 82 ft.

Appropriate selection of indoor units and nominal capacity

Example: selection ofi SDHSP ducted indoor units.
The pre-selected capacity of the different indoor units has not been the immediately higher in all the units, in order to apply a safety factor considering the different correction factors existing, which will reduce the capacity.

Concept	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7
Model selected	09SDLSP	07SDLSP	07SDLSP	07SDLSP	09SDLSP	07SDLSP	07SDLSP
Nominal cooling load (Btu/h)	9600	7500	7500	7500	9600	7500	7500
Nominal cooling load (Btu/h)	11300	8500	8500	8500	11300	8500	8500

Then, it's shown a diagram ofthe installation resulting:



The resulting total indoor unit capacity is 56700 Btu/h. The outdoor unit with the exact capacity is the 56700 Btu/h model, but the possibility "Reduced total outdoor unit capacity" allows the CHV6-RS48URBMHH model (nominal capacity: 48000 Btu/h) to be selected. Thus, it is allowed at the outdoor unit to be up to 15% smaller capacity when compared with other air conditioning systems.

Total combination capacity = (Total indoor unit capacity / Outdoor unit capacity) x 100% = (56700Btu/h I 48000Btu/h) x100%"' 118%

NOTE:

The maximum simultaneous load on the installation must not ьe higher than 48000 Btu/h for this example. To determine the outdoor unit pre-selected nominal cooling and heating capacity, it's necessary refer to manual of Engineering Data, in which the total capacity combination (118%) and the temperature condition have been taken into consideration.

Concept	Room 1+2+3+4+5+6+7	Outdoor init pre-selected (~ 119%)
Total nominal cooling loas (Btu/h)	56700	50160
Total nominal heating loas (Btu/h)	65100	51940

NOTE:

- If the air inlet temperature for the indoor unit or outdoor unit is not contained in the capacity tables, an interpolation should be carried out using the values above and below those of the air inlet temperature.
- If the total combination capacity is not shown in the capacity tables (for example, 118%), an interpolation should be carried out using the values above and below (110% and 120%) those of the total combination

Next step will be the capacity correction using the different correction factors shown in this chapter.
Correction factor according to piping length:

According to 4.2 “Capacity Correction Based on Refrigerant Piping Length”

- Cooling capacity correction factor depending on the pipe length =0.870.
- Heating capacity correction factor depending on the pipe length =0.954.

Correction factor according to defrosting condition (for heating operation):

According to 4.3 “Correction Factor According to Defrosting Operation ”

- Outdoor inlet air temp.(ºC DB)=1, then Defrost correction factor = 0.857.

Actual capacity of the outdoor unit

Actual maximum capacity of the outdoor unit = (Outdoor unit pre-selected capacity) x (Correction factor according to pipe length and height) x (Correction factor according to defrosting operation) x (Correction factor according to altitude)

Cooling: (50160 Btu/h) x (0.870) x (1.0) = 43639 Btu/h.

Heating: (50294 Btu/h) x (0.954) x (0.857) = 41119 Btu/h.

Actual capacity of each indoor unit

Actual capacity of each indoor unit = (Actual maximum capacity of the outdoor unit) x (Nominal capacity of each indoor units / Total nominal capacity of each indoor unit)

Example:

07SDLSP

Cooling: 43639 x (7500 / (9600 + 7500 + 7500+ 7500 + 9600 + 7500 + 7500)) = 5772 Btu/h

Heating: 41119 x (8500 / (11300 + 8500 + 8500 + 8500 + 11300 + 8500 + 8500)) = 5368 Btu/h

09SDLSP

Cooling: 43639 x (9600 / (9600 + 7500 + 7500+ 7500 + 9600 + 7500 + 7500)) = 7388 Btu/h

Heating: 41119 x (11300 / (11300 + 8500 + 8500 + 8500 + 11300 + 8500 + 8500)) = 7137 Btu/h

Results

Concept	Room 1	Room 2	Room 3	Room 4	Room 5	Room 6	Room 7
Model selected	09SDLSP	07SDLSP	07SDLSP	07SDLSP	09SDLSP	07SDLSP	07SDLSP
Actual cooling capacity (Btu/h)	7388	5772	5772	5772	7388	5772	5772
Actual heating capacity (Btu/h)	7137	5368	5368	5368	7137	5368	5368
Estimated cooling load (Btu/h)	5300	4600	4600	4600	5300	4600	4600
Estimated heating load (Btu/h)	5960	5100	5100	5100	5960	5100	5100

Concept	Room 1+2+3+4+5+6+7
Actual total cooling capacity (Btu/h)	43636
Actual total heating capacity (Btu/h)	41114
Estimatedl total cooling load (Btu/h)	33600
Estimatedl total heating load (Btu/h)	37420

As can ne seen, the actual total cooling and heating capacity are higher than the estimated total cooling and heating load. Therefore, it can ne said that the CHV6-RS48URBMHH unit meets the minimum cooling and heating requirements set for the system.

NOTE:

If the actual total cooling I heating capacity calculated is lower than the estimated total cooling I heating load, the calculation must be done again with the unit immediately.

4.2 Capacity Correction Based on Refrigerant Piping Length

< Cooling Capacity >

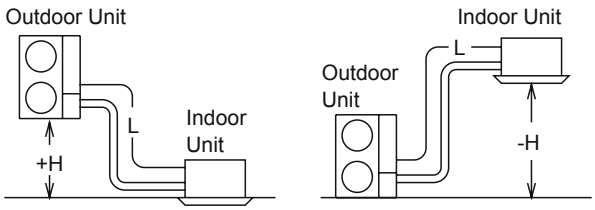
Correction factor for cooling capacity according to piping length.

The cooling capacity should be corrected according to the following formula:
CCA=CCxF
CCA: actual corrected cooling capacity
CC: cooling capacity in the performance table
F: correction factor based on the equivalent piping length

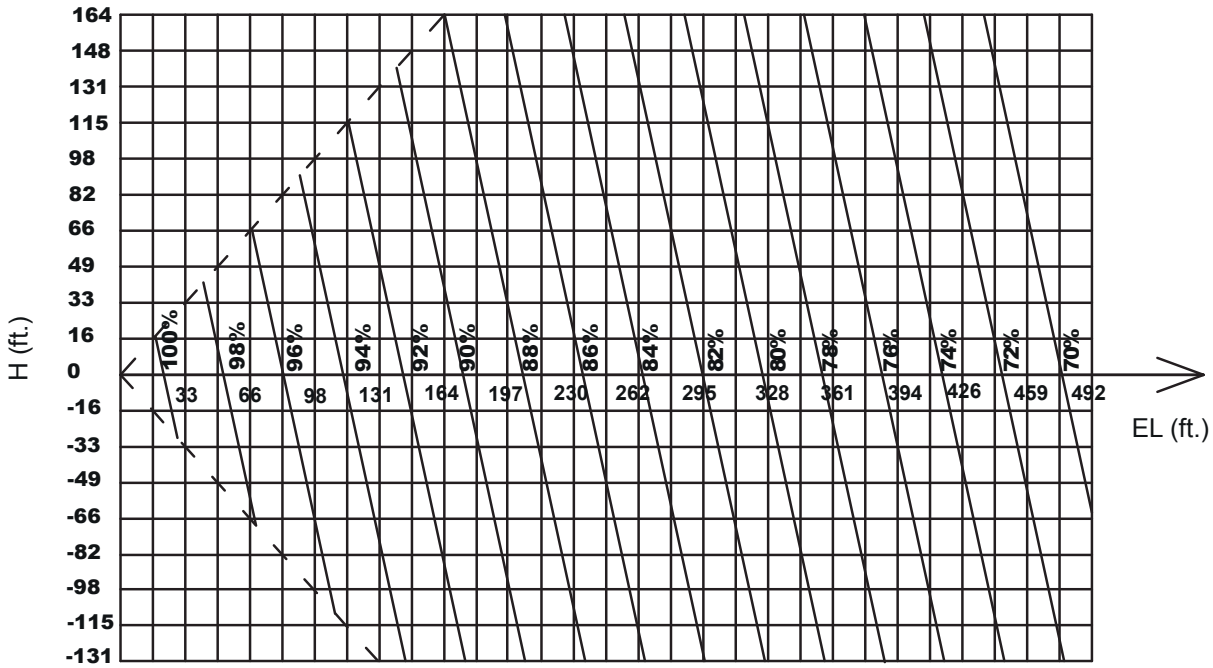
The correction factors are shown in the following figure.

Equivalent piping length for

- one 90° elbow is 1.6ft. (0.5m).
- one 180° bend is 4.9ft. (1.5m).
- one branch pipe is 1.6ft. (0.5m).



H: Vertical Distance between Indoor unit and Outdoor Unit
EL: Equivalent Total Distance between Indoor Unit and Outdoor Unit (Equivalent One-Way Piping Length)
H>0: Position of Outdoor Unit Higher than Position of Indoor Unit
L: Cctual One-Way Piping Length between Indoor Unit and Outdoor Unit
*H and EL please refer to refrigerant Piping Work



< Heating Capacity >

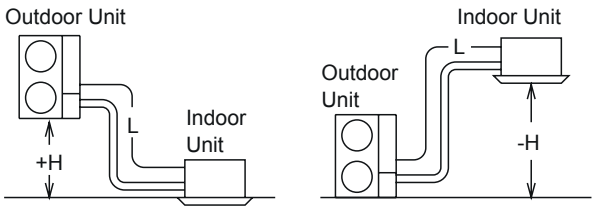
Correction factor for cooling capacity according to piping length.

The heating capacity should be corrected according to the following formula:
HCA=HCxF
CHCA: actual corrected heating capacity
HC: heating capacity in the performance table
F: correction factor based on the equivalent piping length

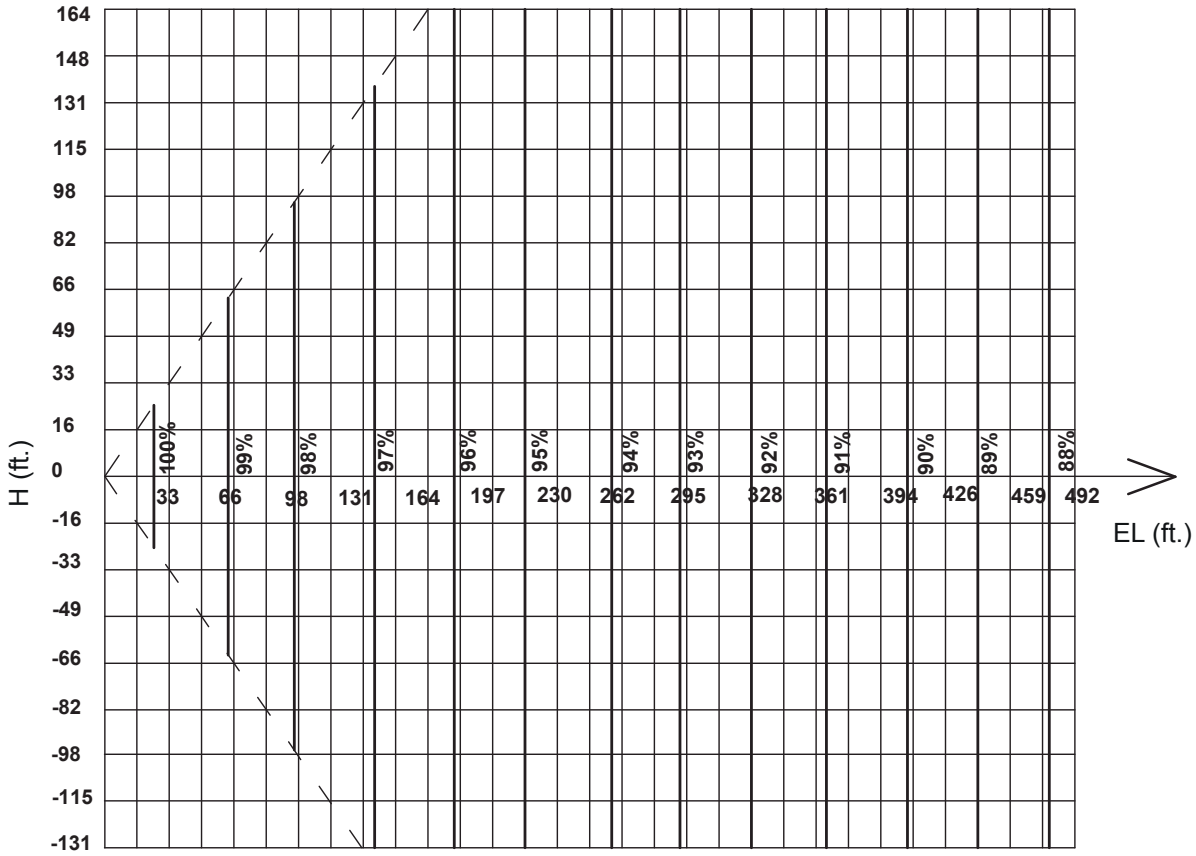
The correction factors are shown in the following figure.

Equivalent piping length for

- one 90° elbow is 1.6ft. (0.5m).
- one 180° bend is 4.9ft. (1.5m).
- one branch pipe is 1.6ft. (0.5m).



H: Vertical Distance between Indoor unit and Outdoor Unit
EL: Equivalent Total Distance between Indoor Unit and Outdoor Unit (Equivalent One-Way Piping Length)
H>0: Position of Outdoor Unit Higher than Position of Indoor Unit
L: Cctual One-Way Piping Length between Indoor Unit and Outdoor Unit
*H and EL please refer to refrigerant Piping Work

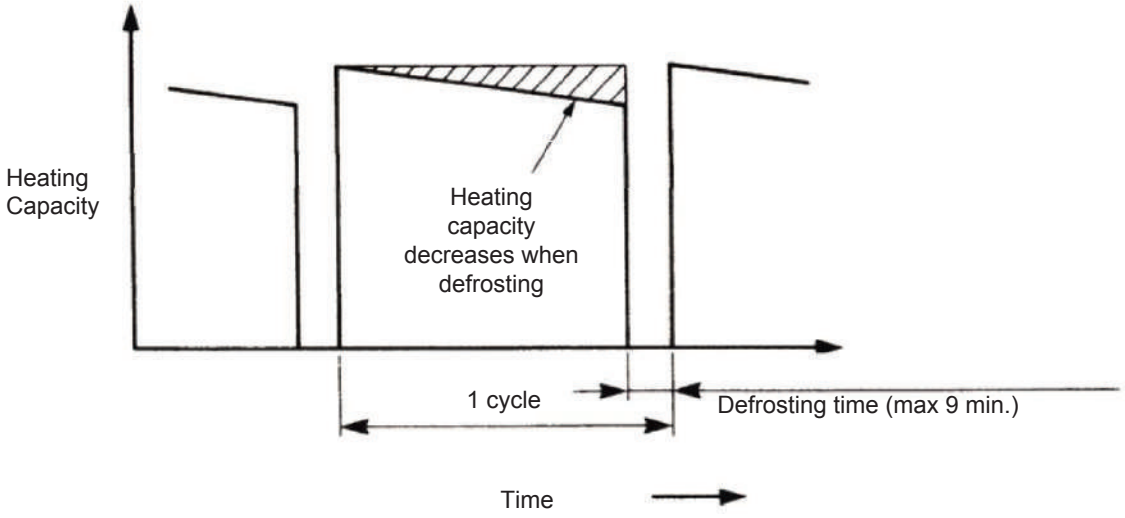


4.3 Correction Factor According to Defrosting Operation

The heating capacity in the preceding paragraph excludes the condition of the frost or the defrosting operation period.

In consideration of the frost or the defrosting operation, the heating capacity is corrected by the equation below.
Corrected Heating Capacity = Correction Factor x Heating Capacity.

Outdoor Inlet Air Temp. (°F°(C)DB) (Humidity=85% RH)	20 (-7)	23 (-5)	26 (-3)	32 (0)	38 (3)	41 (5)	44 (7)
Correction Factor	0.95	0.93	0.88	0.85	0.87	0.90	1.0



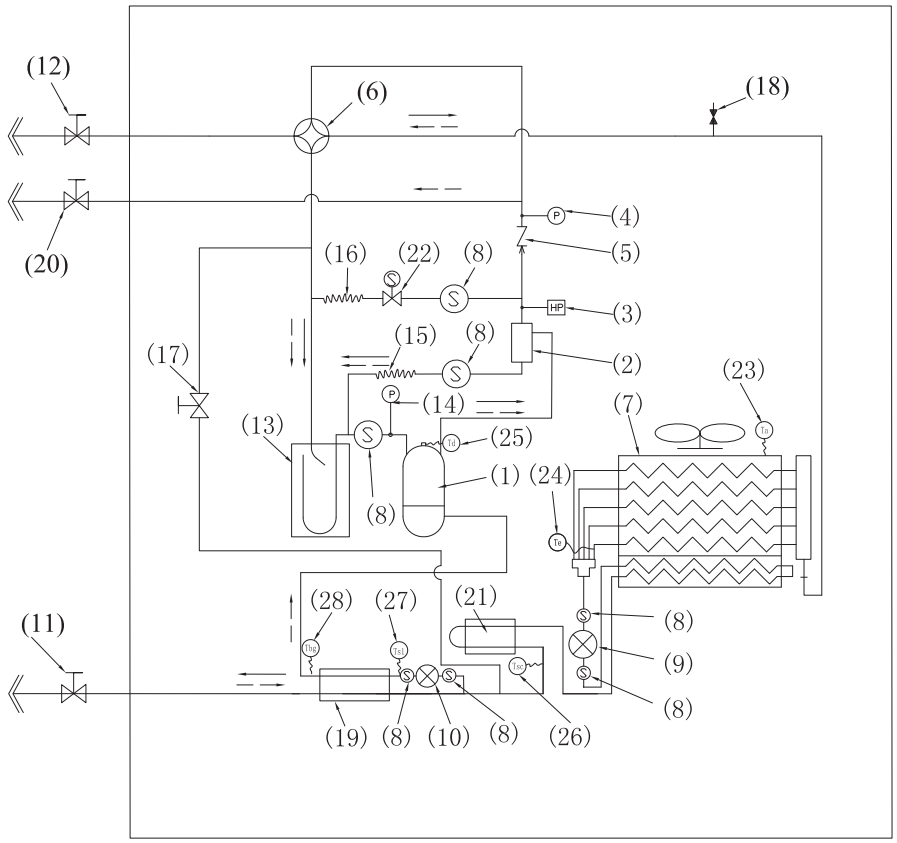
NOTE:

- The correction factor is not available for special conditions like snowfall or operation in a transitional period.
- When the outdoor inlet air temperature is higher than 44ºF (7 ºC), this correction coefficient is 1.0. And when the outdoor inlet air temperature is lower than 20ºF (-7 ºC), this correction coefficient is 0.95.
- If the outdoor inlet air temperature is not shown in the above table (for example, 34ºF (1 ºC)), an interpolation should be carried out using the values before and after (32ºF (0 ºC) and 38ºF (3 ºC)) the outdoor inlet air temperature.

5. Control System

5.1 Refrigerant Cycle

CHV6-RS36/48/60URBMHH



Cooling
Heating
Field Refrigerant Piping
Flare Connection

Refrigerant flow direction (Cooling)
Refrigerant flow direction (Heating)
Field refrigerant Piping
Flare connection
Brazing connection

Mark	Part Name	Mark	Part Name	Mark	Part Name
1	Compressor	11	Liquid Stop Valve	21	Refrigerant Cooler
2	Oil Separator	12	Gas Stop Valve for Indoor Unit	22	Solenoid Valve (SVA)
3	High Pressure Switch (PSH)	13	Accumulator	23	Outdoor Unit Ambient Thermistor (Ta)
4	High Pressure Sensor (Pd)	14	Low Pressure Sensor (Ps)	24	Heat Exchanger Liquid Pipe Thermistor (Te)
5	Check Valve	15	Capillary Tube	25	Compressor Discharge Gas Thermistor (Td)
6	Reversing Valve (RVR)	16	Capillary Tube (SVA)	26	Sub Cooling Main Pipe Inlet Thermistor (Tsc)
7	Heat Exchanger	17	Pressure Relief Valve	27	Sub Cooling Bypass Pipe Inlet Thermistor (Ts1)
8	Strainer	18	Check Joint	28	Sub Cooling Bypass Pipe Outlet Thermistor (Tbg)
9	Electronic Expansion Valve (EVO)	19	Plate Heat Exchanger		
10	Electronic Expansion Valve (EVB)	20	Gas Stop Valve for DHW Tank		

5.2 Control Logic

(1) Cycle Control

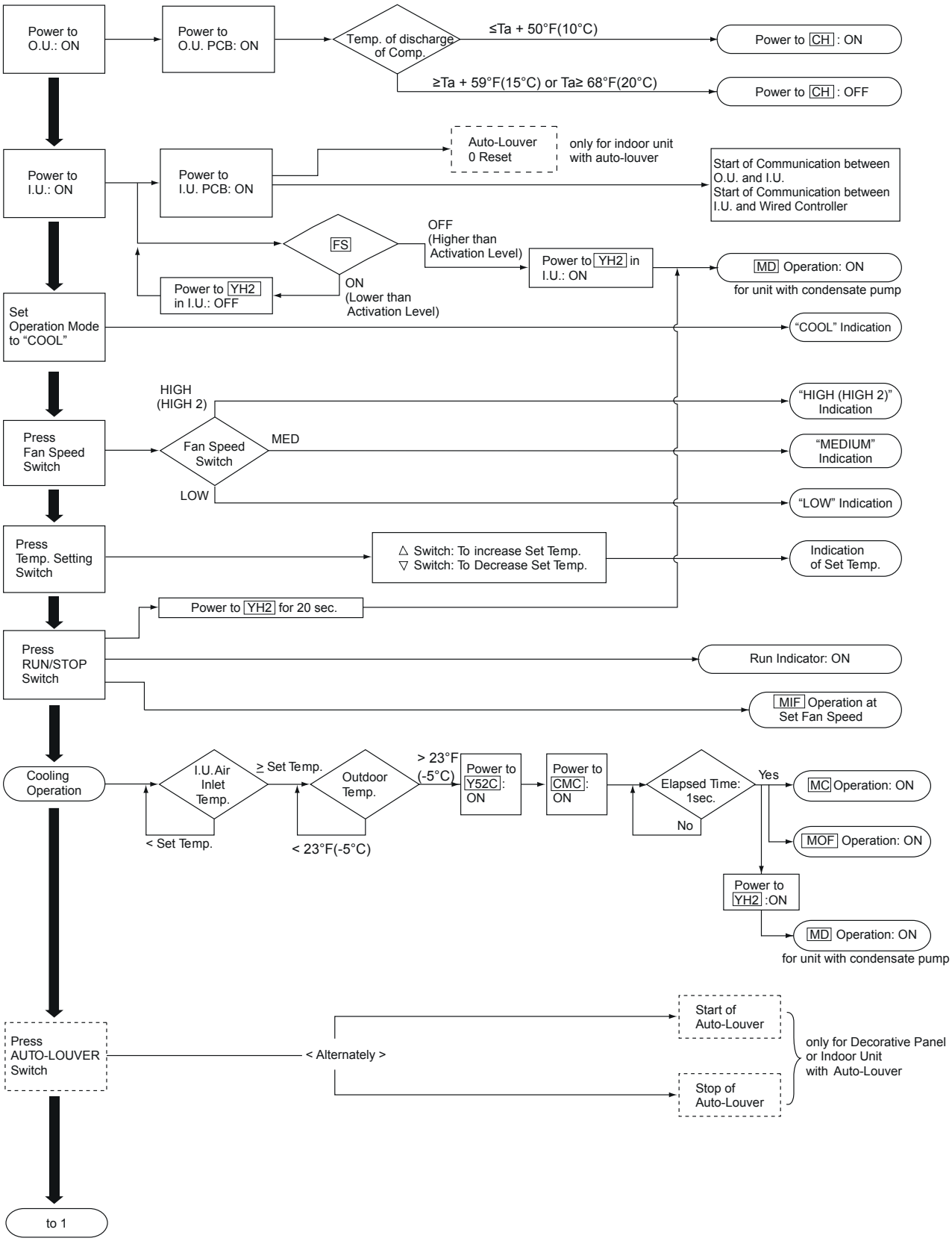
No.	Item		Details
1	Cooling Operation	Comp. Frequency Control	To determine the compressor frequency depending on (a), (b), and (c)
		I.U. Elecrtonic Exp. Valve Control	• Quasi PI Control: To determine the I.U. electronic expansion valve opening so as to keep (d) at an optimum value. To change the I.U. electronic expansion valve opening when the number of operating indoor units is changed.
		O.U. Elecrtonic Exp. Valve Control	EVO: 480pls (Fully Opened)
		Outdoor Fan Control	To control the fan steps so that High Pressure is within a stable temperature range
		Reversing Valve Control	Reversing Valve: OFF
		Control of Solenoid Valve for High/Low Pressure Bypass (SVA)	At Start-up and when High Pressure Increase Protection activated: ON
		High/Low Pressure Control	SVA: ON (during Operation Stop)
		DHW Tank Electronic Exp. Valve	Connected The DHW Tank: EVW opening is adjusted to achieve the target value of HEX. SC.
2	Heating Operation	Comp. Frequency Control	• PI Control: To determine the compressor frequency so as to keep High Pressure. To determine the compressor frequency from (a) and(c) when heating operation is started or the number of operating indoor units is changed.
		I.U. Elecrtonic Exp. Valve (EVI) Control	• To determine the I.U. electronic expansion valve opening so that the indoor liquid pipe temperature (trl) is at an optimum level. To change the I.U. electronic expansion valve opening when the number of operating indoor units is changed.
		O.U. Elecrtonic Exp. Valve (EVO) Control	• Quasi PI Control: To determine the O.U. electronic expansion valve opening so as to keep the temperature at the top of the compressor at an optimum level. When Operating Indoor Unit Number Changed: To determine the O.U. electronic expansion valve opening from the compressor frequency ratio before/after the change and Quasi PI Control.
		Outdoor Fan Control	The fan steps are dependent on Ta in the beginning. After that to control the fan steps so that Pd is within a stable pressure range.
		Reversing Valve Control	Reversing Valve: ON
		Control of Solenoid Valve for High/Low Pressure Bypass (SVA)	At Start-up and when High Pressure Increase Protection activated: ON
		High/Low Pressure Control	SVA: ON (During Operation Stop)
		DHW Tank Electronic Exp. Valve	Connected The DHW Tank: When only the DHW Tank is ON, EVW=2000pls; When the DHW Tank and IU heating are turned ON simultaneously, EVW opening is adjusted by the room temperature.
3	Defrost Operation	Comp. Frequency Control	Fixed Compressor Frequency
		I.U. Elecrtonic Exp. Valve Control	To determine the I.U. electronic expansion valve opening depending on the discharge temperature of the compressor (Td)
		O.U. Elecrtonic Exp. Valve Control	EVO: 480pls (Fully Opened)
		Outdoor Fan Control	To stop the outdoor fan
		Reversing Valve Control	Reversing Valve: OFF
		Control of Solenoid Valve for High/Low Pressure Bypass (SVA)	At Start-up: ON
4	Comp. Preheating Control		Electromagnetic heating Control

a Difference between Indoor Inlet Air Temperature and Setting Temperature
b Amount of Temperature Difference Change
c Capacity Ratio between Operating Indoor Unit and Outdoor Unit
d Temperature Difference between Indoor Gas Pipe and Indoor Liquid Pipe
(= Indoor Gas Pipe Temperature - Indoor Liquid Pipe Temperature)

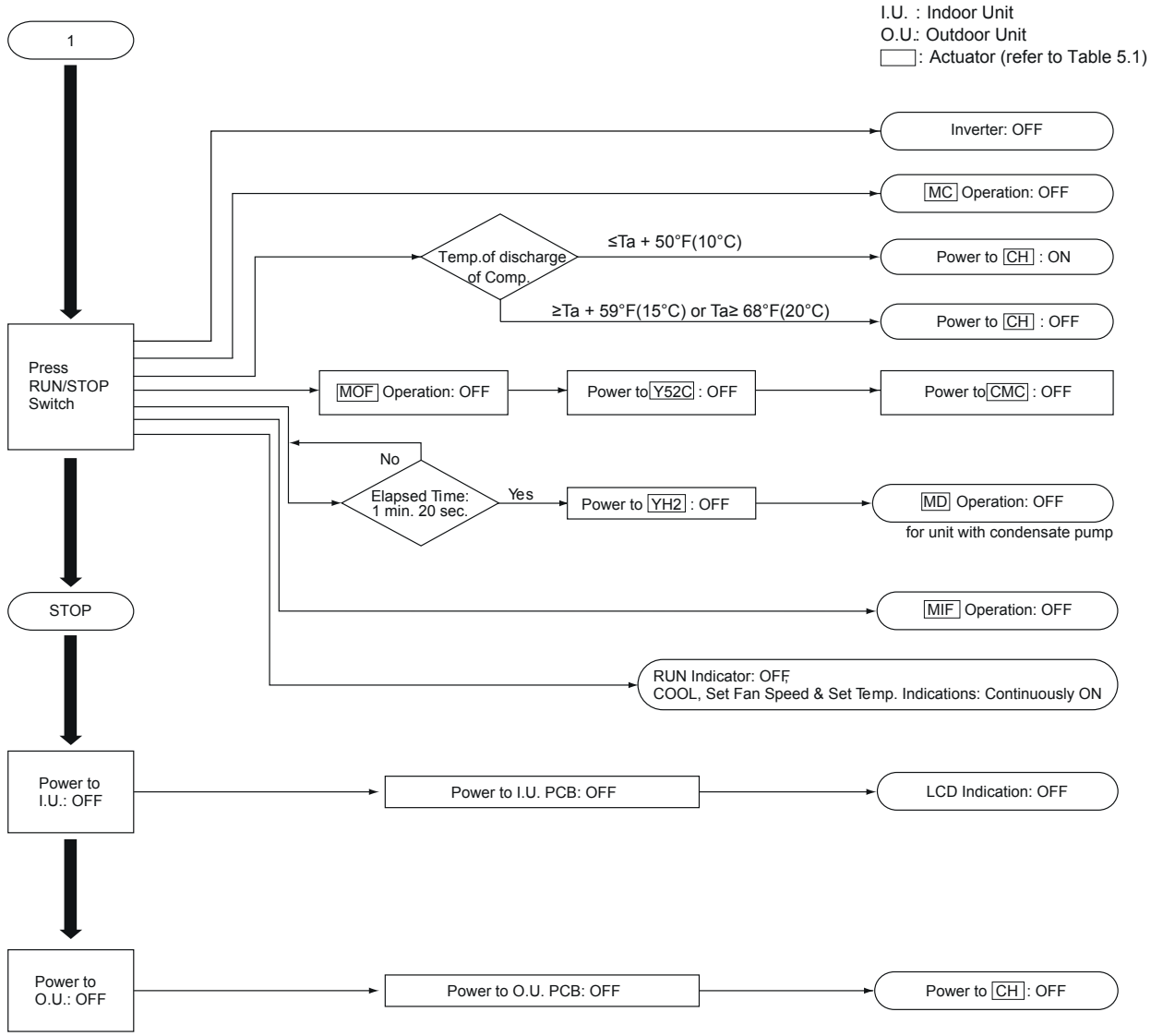
5.3 Standard Operation Procedure Chart

Cooling Operation

I.U. : Indoor Unit
O.U.: Outdoor Unit
[ ] : Actuator (refer to Table 5.1)

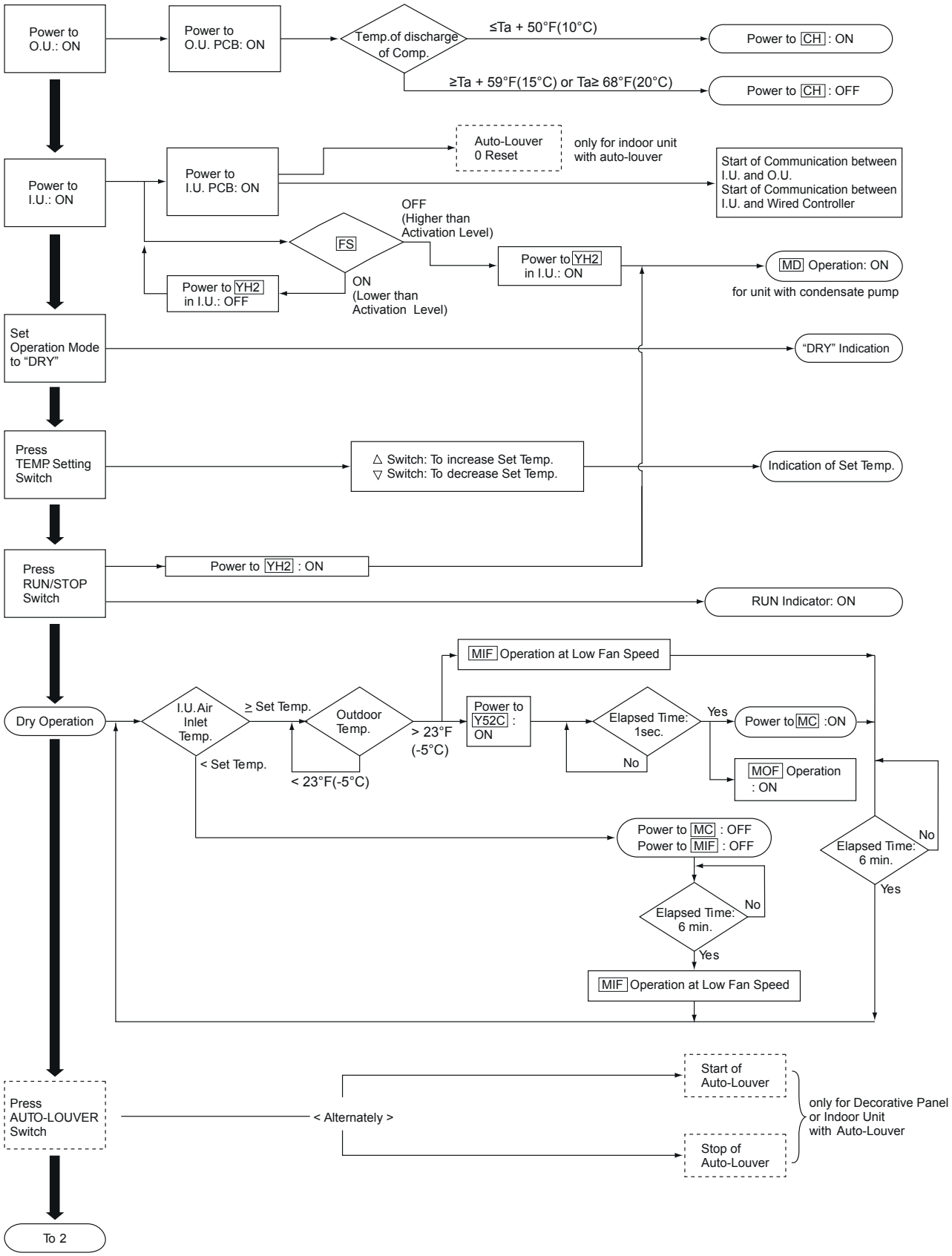


Cooling Operation



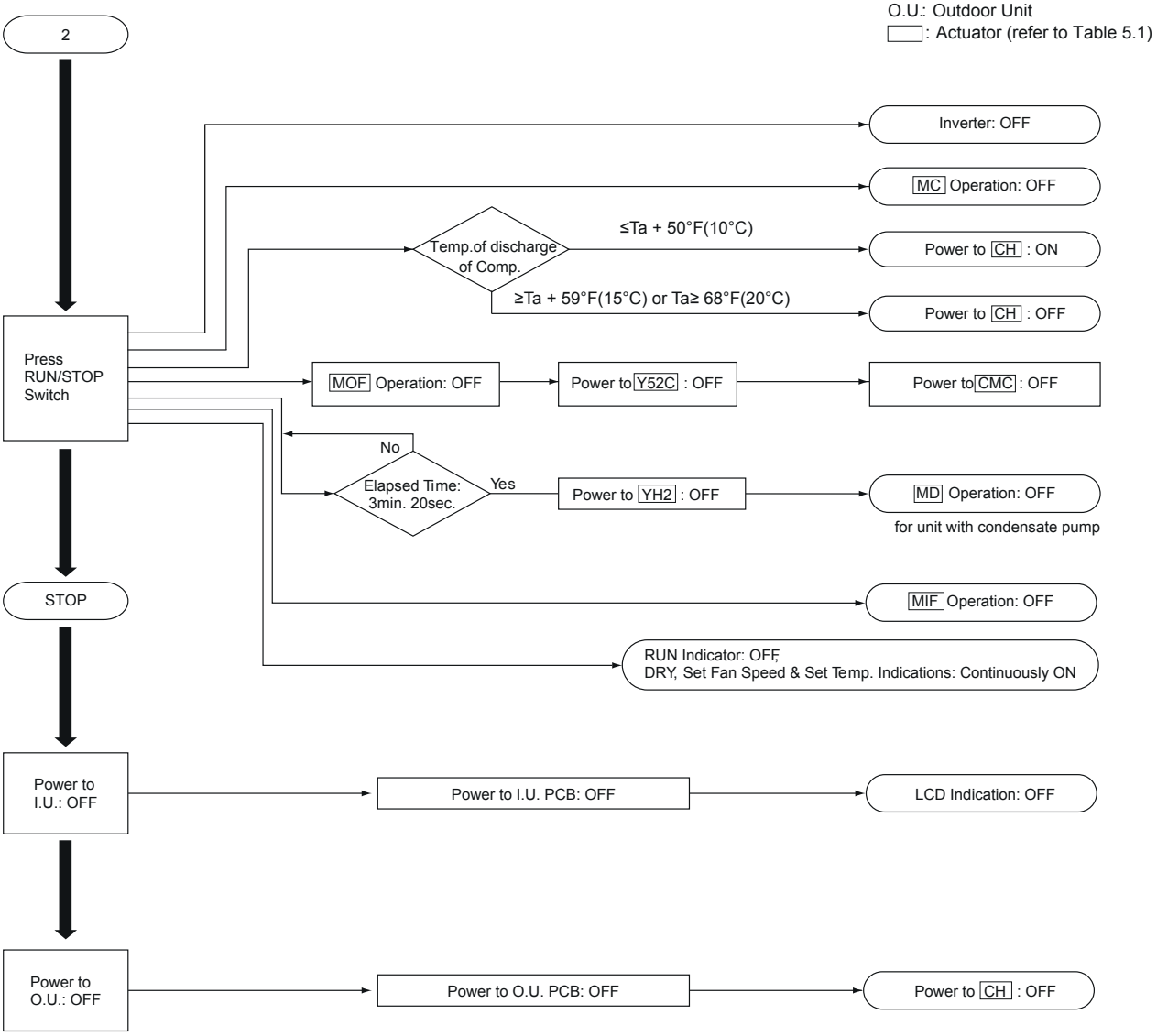
Dry Operation

I.U. : Indoor Unit
O.U.: Outdoor Unit
[ ]: Actuator (refer to Table 5.1)



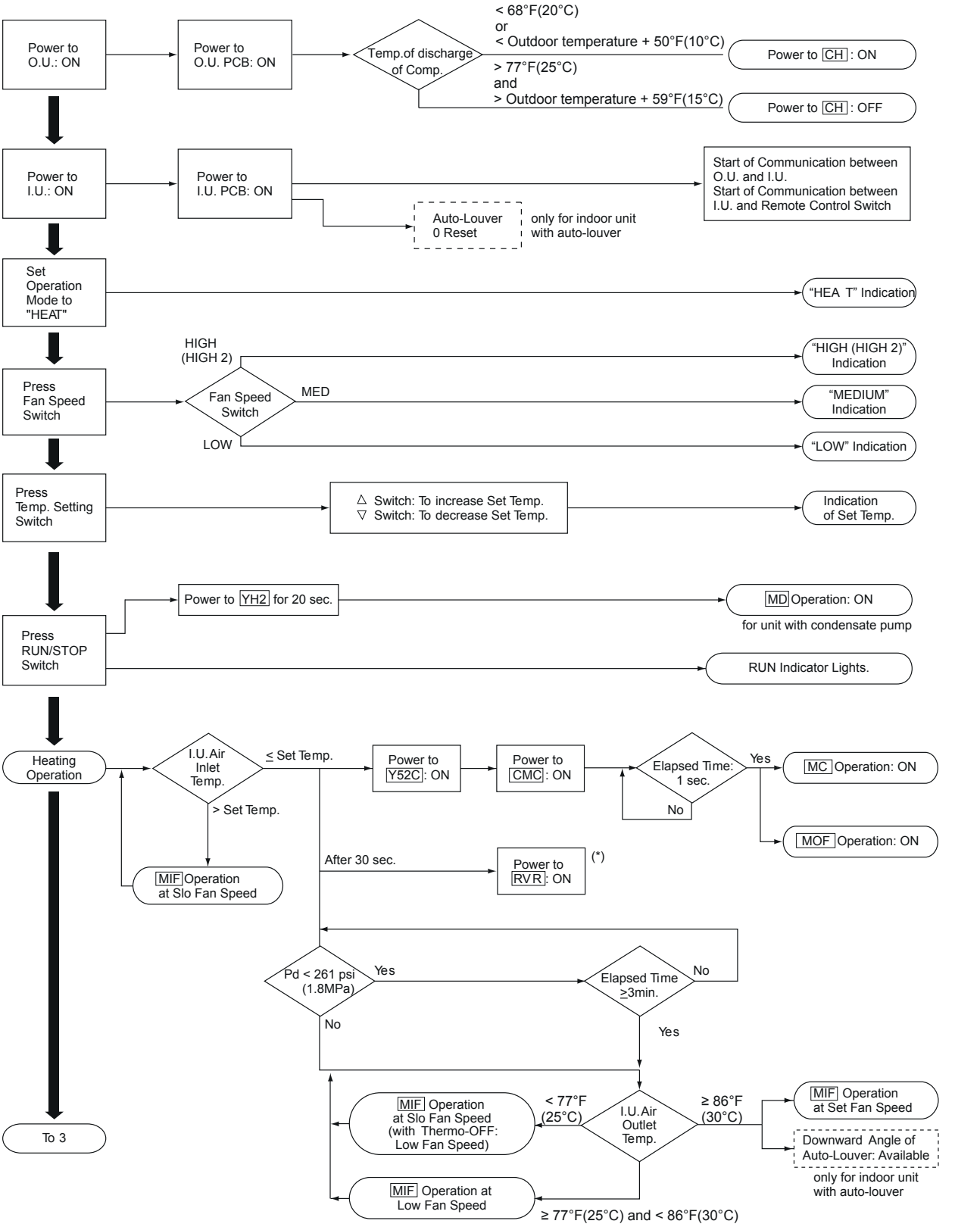
Dry Operation

I.U. : Indoor Unit
O.U.: Outdoor Unit
[ ]: Actuator (refer to Table 5.1)



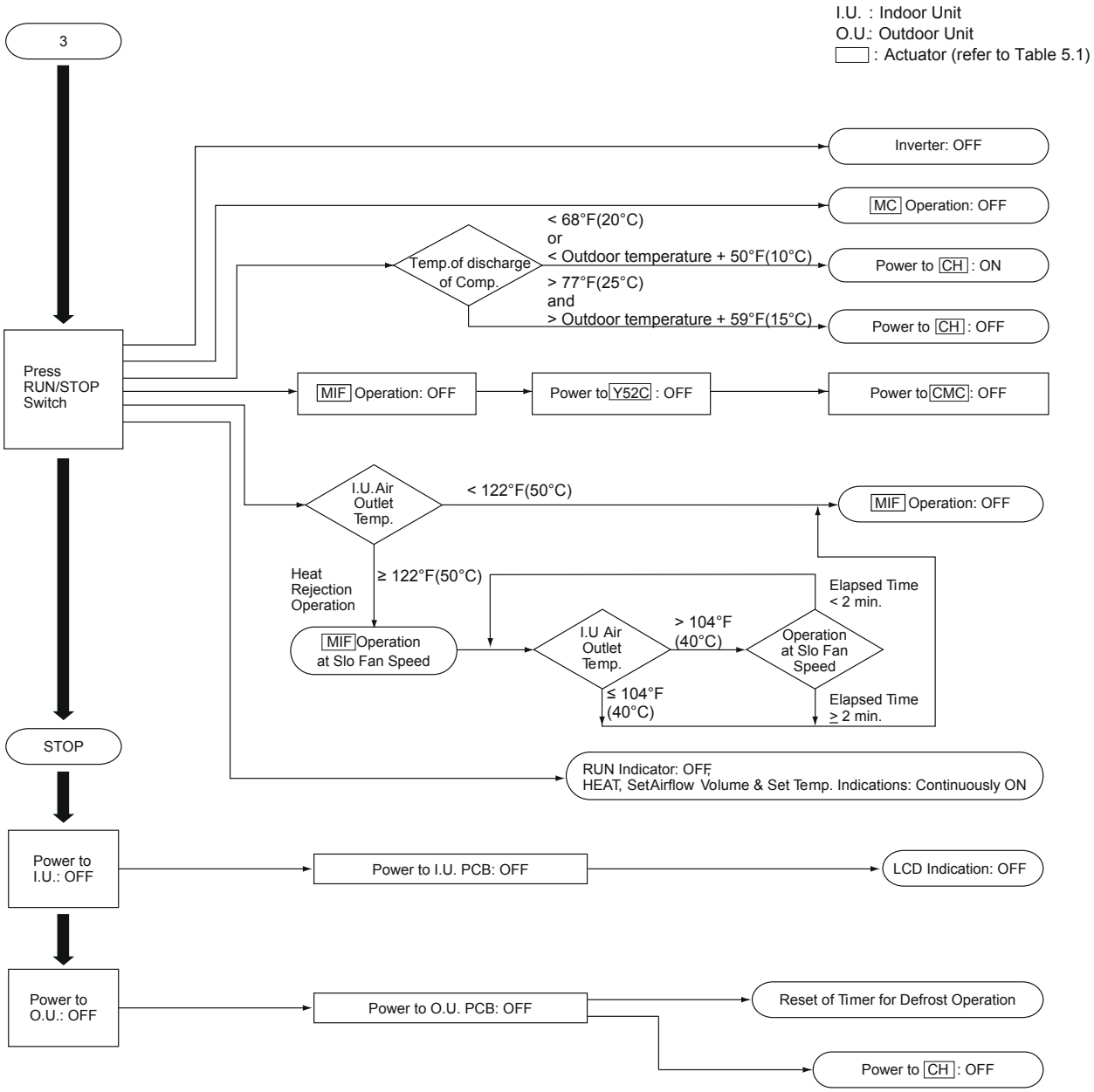
Heating Operation

I.U. : Indoor Unit
O.U.: Outdoor Unit
[ ]: Actuator (refer to Table 5.1)

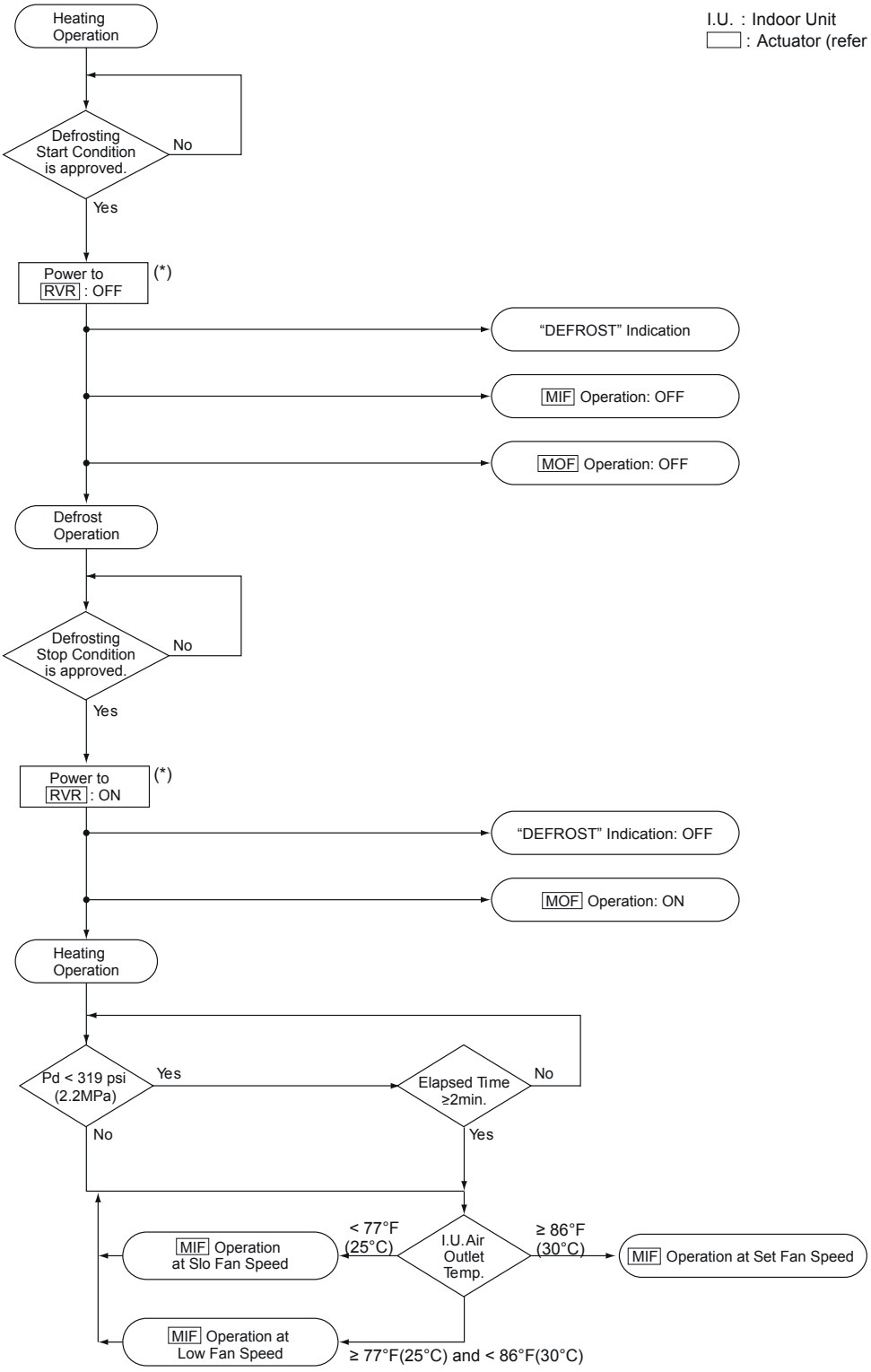


(*) Refer to Service Manual for the timing diagram of the reversing valve.

Heating Operation



Defrost Operation



(*) Refer to Service Manual for the timing diagram of the reversing valve.

Table 5.1

CH	Electromagnetic Heating	in O.U.
FS	Float Switch	in I.U.
YH2	Relay for Condensate Pump Motor	in I.U.
MD	Condensate Pump Motor	in I.U.
MIF	Indoor Fan Motor	in I.U.
Y52C	Relay for Magnet Switch	in O.U.
CMC	Magnet Switch	in O.U.
MC	Compressor Motor	in O.U.
MOF	Outdoor Fan Motor	in O.U.
RVR	Reversing Valve	in O.U.

Part name	Mark	Port	Purpose
Electronic Expansion Valve of Outdoor Unit	EVO	CN5A (MV1)	During heating, throttle the liquid refrigerant
Electronic Expansion Valve for Plate Type HEX	EVB	CN5B (MV2)	Controlling superheat of the sub cooling bypass pipe
High Pressure Sensor of Outdoor Unit	Pd	CN4 (Pd)	Measure the discharge pressure of the compressor
Low Pressure Sensor of Outdoor Unit	Ps	CN9 (Ps)	Measure the suction pressure of the compressor
High Pressure Switch of Outdoor Unit	PSH	PCN401 (64H1)	Prevent the system pressure from exceeding 624psi (4.3MPa)
Thermistor for Discharge Gas Temperature	Td	THM9 (Td)	Measure the compressor discharge temperature
Thermistor for Heat Exchanger Liquid Pipe Temperature	Te	THM8 (Te)	Measure the evaporation temperature of the system during heating operation
Thermistor for Outdoor Unit Ambient	Ta	THM7 (Ta)	Measure the outdoor ambient temperature
Thermistor for Sub Cooling Main Pipe Inlet Temperature	Tsc	THM19 (Tsc)	Measure the sub cooling main pipe inlet temperature
Thermistor for Sub Cooling Bypass Pipe Inlet Temperature	Ts1	THM20 (Ts1)	Measure the sub cooling bypass pipe inlet temperature
Thermistor for Sub Cooling Bypass Pipe Outlet Temperature	Tbg	THM10 (Tbg)	Measure the sub cooling bypass pipe outlet temperature
Reversing Valve of Outdoor Unit	RVR	PCN6 (21)	Change the status of outdoor heat exchanger (evaporator or condenser)
Solenoid Valve for Hot Gas Bypass	SVA	PCN7 (20A)	When the system pressure is too high or too low, balance the system pressure

< Defrost Operation >

The following defrost operations, “Standard Defrost”, “Forced Defrost” and “Manual Defrost” are available.

(1) Standard Defrost
This operation starts according to the outdoor temperature, the outdoor evaporating temperature and the operating time.

(2) Forced Defrost
This operation starts when the indoor unit repeats Thermo-ON/OFF* operation and therefore cannot start the “Standard Defrost.”

(3) Manual Defrost
This operation starts when the push switch “PSW1” on the outdoor unit PCB is pressed for more than 3 seconds during maintenance, etc. (This function cannot be used when the pressure and the outdoor evaporating temperature is high or at the beginning of the operation.)

NOTE:
Do not repeatedly use “Manual Defrost” frequently.

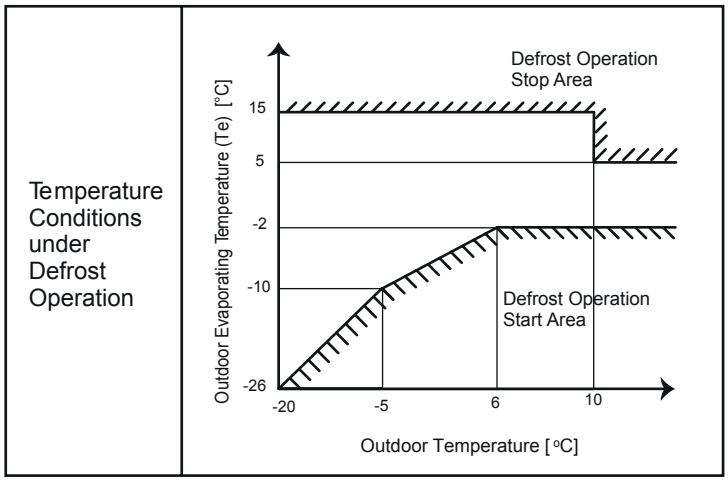
* Thermo-ON: The outdoor unit and some indoor units are running.
Thermo-OFF: The outdoor unit and some indoor units stay on, but don’t run.

< Condition for Starting Defrost Operation >

The following defrost operations, “Standard Defrost”, “Forced Defrost” and “Manual Defrost” are available.

(1) Standard Defrost

(a) Temperature Condition



(b) Condition of Operating Time for Defrost Operation
Start The defrost operation starts when the temperature condition shown in “(a) Temperature Condition” is met after a heating operation of 30 to 120 minutes. The heating operation time is determined by estimating the amount of frost on the heat exchanger.

(2) Forced Defrost
The “Forced Defrost” starts when all the following conditions are met.

(a) The reversing valve is “ON” for more than 120 minutes.

(b) The outdoor temperature is 50°F (10 °C) or lower.

(c) The accumulated heating operation time is more than 60 minutes.
(The accumulated time is reset when the operation is stopped or the defrost operation is performed.)

(d) The compressor is operated continuously for more than 90 seconds.

(e) The outdoor evaporating temperature is lower than 41°F (5°C) right before the operation starts.

(f) The pressure switch for control is “OFF”.

< Condition for Completing Defrost Operation >

The defrost operation stops when any of the following conditions is met.

(1) The outdoor evaporating temperature reaches 77°F (25°C) within 2 minutes after the defrost operation starts.

(2) The outdoor evaporating temperature reaches 59°F (15°C) (the outdoor temperature < 50°F (10 °C)) and high pressure reaches 1.5MPa after a lapse of 2 minutes or more from the defrost operation start.

(3) The outdoor evaporating temperature reaches 41°F (5°C) (the outdoor temperature > 50°F (10 °C)) after a lapse of 2 minutes or more from the defrost operation start.

(4) The temperature at the top of the compressor reaches 270°F (132°C).

(5) The pressure switch for control is “ON”.

(6) The high pressure reaches 478 psi (3.3MPa) within 20 seconds after the defrost operation starts.

(7) The high pressure reaches 450 psi (3.1MPa) after a lapse of 2 minutes or more from the defrost operation start.

(8) More than 9 minutes have passed from the defrost operation start.

NOTE:
The defrost operation does not start immediately even if the above conditions are met, because these conditions may be met temporarily depending on the refrigerant system variability.
The defrost operations start when these conditions are met continuously for a certain period of time.

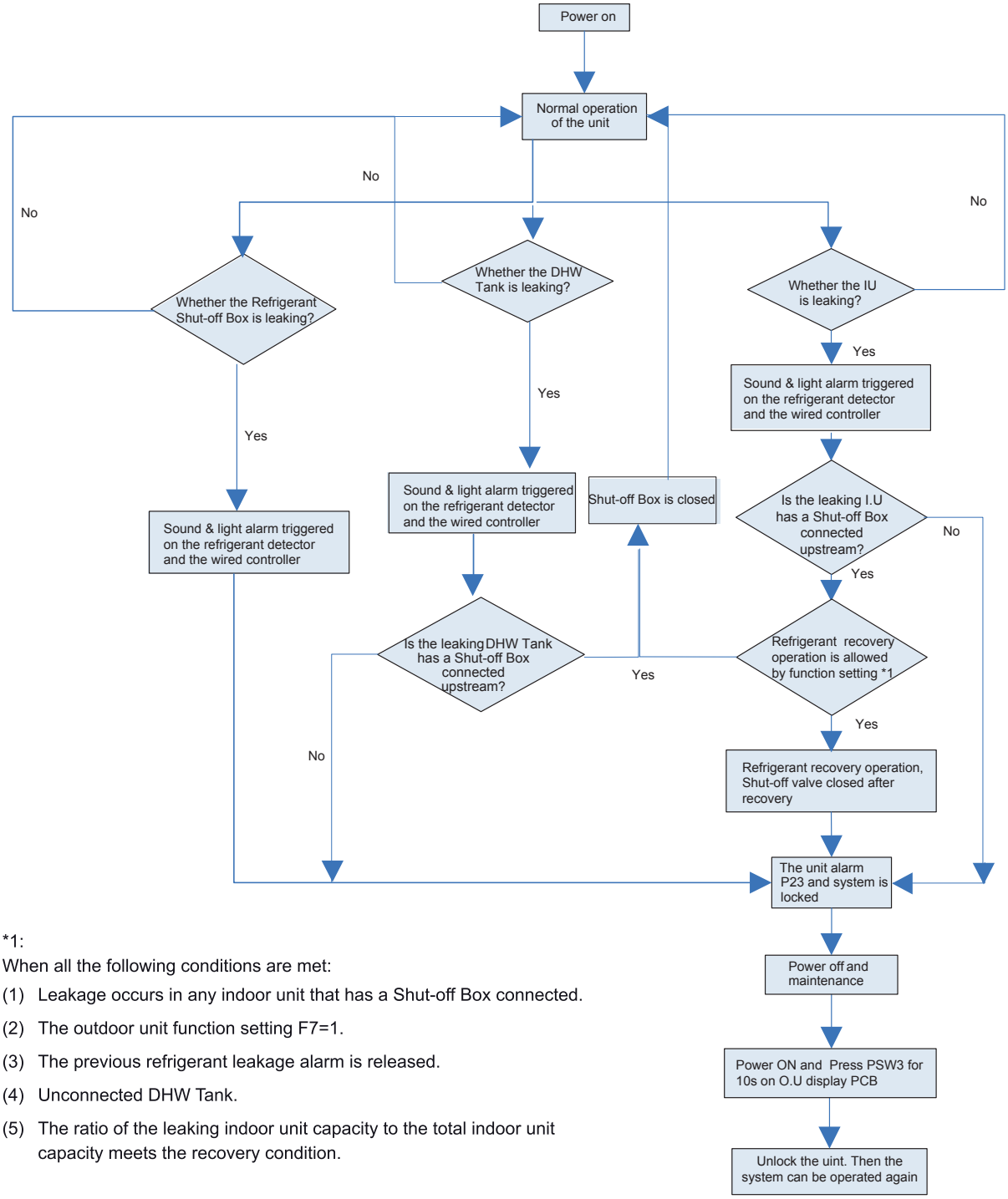
Refrigerant leakage protection control

The unit has complete functions for refrigerant leakage detection, alarm, recovery, and linkage, further enhancing safety.
The specific control process is shown in the following figure:

① If a refrigerant shut-off box is installed in the system, the unit will perform refrigerant recovery. After the recovery is completed, it will be shut off and an alarm will be triggered to shut down.

② If there is no refrigerant shut-off box installed, an alarm will be triggered and the unit will be shut down directly.

③ If there is a leakage in the refrigerant shut-off box, it will directly alarm and shut down.



*1:
When all the following conditions are met:

(1) Leakage occurs in any indoor unit that has a Shut-off Box connected.

(2) The outdoor unit function setting F7=1.

(3) The previous refrigerant leakage alarm is released.

(4) Unconnected DHW Tank.

(5) The ratio of the leaking indoor unit capacity to the total indoor unit capacity meets the recovery condition.

NOTE:

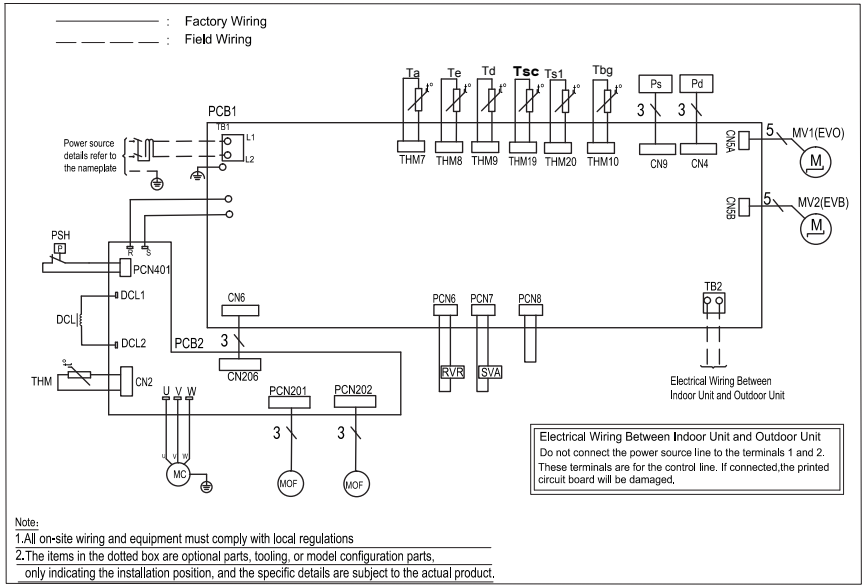
Only after professional service personnel repair it and press PSW3 for 10 seconds on O.U. display PCB to release the leakage alarm, can the unit operate normally.

5.4 Electrical Wiring Diagram

Model: CHV6-RS36/48/60URBMHH

⚠ WARNING | ⚠ Before inspecting the electrical parts set the Operation Switch to OFF, and cut OFF the power supply.
Warning:Do not power on and carry out maintenance unless the unit has been powered off for at least 10 minutes.

[ELECTRICAL WIRING DIAGRAM]



Note:
1.All on-site wiring and equipment must comply with local regulations
2.The items in the dotted box are optional parts, tooling, or model configuration parts, only indicating the installation position, and the specific details are subject to the actual product.

[Refrigerant Charging Quantity(R32)]

No.	Name	Calculating Method																Additional Charge (lbs.)
1	W1	Additional refrigerant charge calculation for liquid piping																W1=W11+W12+W13 = lbs.
		Pipe Diameter[in.(mm)]		Total Piping Length(ft.)		Additional Charge [lbs./ft.(kg/m)]				Additional Charge (lbs.)								
		W11	1/2(12.7)		ft.	×0.063(0.093)=												
		W12	3/8(9.53)		ft.	×0.031(0.046)=												
		W13	1/4(6.35)		ft.	×0.013(0.019)=												
2	W2	Additional refrigerant charge calculation for indoor unit [W2 lbs.(kg)]																W2 = lbs.
		Indoor Unit Type	05	07	09	12	15	17	18	19	24	28	30	36	38	42	48	54	60	
		Low-height Ceiling Ducted Type	0.26 (0.12)	0.26 (0.12)	0.42 (0.19)	0.42 (0.19)	0.51 (0.23)			0.88 (0.31)	0.73 (0.33)									
		4-Way Cassette Type			0.55 (0.25)	0.55 (0.25)	0.55 (0.25)			0.55 (0.25)	0.73 (0.33)		1.06 (0.48)		1.32 (0.60)		1.32 (0.60)	1.32 (0.60)		
		Mini 4-Way Cassette Type	0.31 (0.14)	0.31 (0.14)	0.42 (0.19)	0.42 (0.19)	0.57 (0.26)	0.57 (0.26)		0.57 (0.26)										
		Wall Mounted Type		0.42 (0.19)	0.42 (0.19)	0.42 (0.19)	0.55 (0.25)			0.71 (0.32)	0.71 (0.32)	0.71 (0.32)								
		Multi-psoition Air Handler Unit Type			0.56 (0.26)	0.56 (0.26)			0.88 (0.40)		0.88 (0.40)		1.32 (0.60)	1.32 (0.60)		1.32 (0.60)	1.97 (0.90)	1.97 (0.90)	1.97 (0.90)	
		DHW Tank																	1.10 (0.50)	
3	W	Total Ref. Charge of This System = W1+W2																		W = lbs.

Note: Ensure that the total additional charge should not be exceeded the max.additional refrigerant charge quantity as shown in the table below.
Max. Additional Refrigerant Charge Quantity

Capacity(kBtu/h)	36	48	60	W≤Wmax
Max. Additional Ref. Charge(Wmax)[lbs.(kg)]	14.3(6.5)			

[Alarm Code Table]

CODE	CONTENT OF ABNORMALITY	LEADING CAUSE
01	Activation of Protection Device(Float Switch)	Activation of Float Switch(High Water Level in Drain Pan,Abnormality of Drain Pipe, Float Switch or Drain Pan)
02	Activation of Protection Device(High Pressure Cut)	Activation of PSH (Pipe Clogging, Excessive Refrigerant, Inert Gas Mixing)
03	Abnormality between Indoor and Outdoor	Incorrect Wiring,Loose Terminals,Disconnected Wire,Blowout of Fuse,Outdoor Unit Power OFF
04	Abnormality between Inverter PCB and Outdoor Unit PCB	Inverter PCB - Outdoor Unit PCB Transmission Failure(Loose Connector, Wire Breaking, Blowout of Fuse)
05	Abnormal Power Supply Phases	Incorrect Power Supply, Connection to Reversed Phase, Open-Phase
06	Abnormal Voltage	Outdoor Voltage Drop,Insufficient Power Capacity
07	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge, Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Opened Position (Disconnect Connector)
08	Increase in Discharge Gas Temperature	Insufficient Refrigerant Charge, Pipe Clogging Failure of Thermistor, Incorrect Wiring, Incorrect Piping Connection, Expansion Valve Locking at Closed Position (Disconnect Connector)
11	Inlet Air Thermistor/ Inlet Water Thermistor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
12	Outlet Air Thermistor/ Outlet Water Thermistor	
13	Freeze Protection Thermistor	
14	Gas Piping Thermistor	
16	Abnormality of Remote Control Thermistor	
17	Abnormality of Thermistor in Wire Controller	
19	Activation of Protection Device for Indoor Fan	Fan Motor Overheat,Stalling
21	Abnormality of High Pressure Sensor	Incorrect Wiring, Disconnecting Wiring Breaking Wire, Short Circuit
22	Abnormality of Outdoor Air Thermistor	
23	Discharge Gas Thermistor on Top of Compressor	
24	Heat Exchanger Liquid Pipe Thermistor or Tsc Thermistor	
25	Abnormality of Tsc Thermistor	
27	Abnormality of Vapor Injection Pipe Thermistor	
29	Abnormality of Low Pressure Sensor	
31	Incorrect Capacity Setting of Outdoor Unit and Indoor Unit/water module	Incorrect Capacity Code Setting of Combination Excessive or Insufficient Indoor Unit /Water Module Total Capacity Code
35	Incorrect Setting of Indoor Unit No.	Duplication of Indoor Unit No. in same Ref. Gr.
36	Incorrect of Indoor Unit Combination	The brand or series of indoor unit and outdoor unit are inconsistent.
38	Abnormality of Picking up Circuit for Protection in Outdoor Unit	Failure of Protection Detecting Device (Incorrect Wiring of Outdoor Unit PCB)
46	Activation of Protection Device for High-Pressure Decrease	Insufficient Refrigerant, Blow by the Reverse Valve
47	Activation of Low Pressure Decrease Protection Device (Vacuum Operation Protection)	Insufficient Refrigerant, Refrigerant Piping, Clogging, Expansion Valve Locking at Open Position (Loose Connector)
48	Activation of Inverter Overcurrent Protection Device	Overload Operation, Compressor Failure
51	Abnormal Inverter Current Sensor	Current Sensor Failure
53	Inverter Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short Circuit)
54	Abnormality of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging, Fan Motor Failure
55	Inverter Failure	Inverter PCB Failure
57	Activation of Fan Controller Protection	
5A	Activation of Fan Controller Temperature Protection	Incorrect Wiring between PCB,Driver IC and Fan-motor (Broken,wrong wiring) Overload operation of Fan Controller, Fan Motor controller Failure
5B	Overcurrent of Fan Controller	
5C	Abnormality of Picking up Circuit for Fan Controller	
EE	Compressor Protection Alarm (It is can not be reset from remote controller)	This alarm code appears when the following alarms* occurs three times within 6 hours. *02, 07, 08, 43 to 45, 47
A6	Abnormality of Refrigerant Cooling Module Temperature	Over 64 Number is Set for Address or Refrigerant Cycle.
b1	Incorrect Setting of Unit and Refrigerant Cycle No.	Over 64 Number is Set for Address or Refrigerant Cycle.
b5	Incorrect Indoor Unit Connection Number Setting	More than 17 Non-Corresponding to H-Net Units are Connected to One System.

MARK	NAME
MC	Motor for Compressor
MOF	Motor for Outdoor Fan
FU	Fuse
MV	Micro-Computer Control Expansion Valve
RVR	Reversing Valve Relay
SVA	Solenoid Valve for Hot Gas Bypass
PSH	High Pressure Switch
P_d	Refrigerant pressure sensor (vent side)
P_s	Refrigerant pressure sensor
TB	Terminal Board
PCB	Printed circuit board
THM	Thermistor
DCL	Reactor
CN、PCN	Connector
NF	Noise Filter
PSW	Push switch on PCB3
DSW	Dip switch on PCB3
	Functional earthing
	Protective earthing
	terminal

[DSW settings (before shipment)]