CHIGO

CENTRAL AIR-CONDITIONING

CMV MINI VRF SYSTEM

Outdoor Unit (3 Phase)

Technical Support Division

2016.7

GD CHIGO HEATING & VENTILATION EQUIPMENT CO., LTD.

Content

PART 1.

GENERAL INFORMATION

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1. CMV-mini introduction

1.1 Capacity Range

Models: 12.5KW, 14KW, 16KW, 18KW, 22.4KW, 26KW, 28KW, 33.5KW

12.5KW, 14KW, 16KW, 18KW

22.4KW, 26KW, 28KW, 33.5KW

1.2 Several core technologies make system high efficiency

1.2.1 High Efficiency DC inverter compressor

- High pressure chamber
  - Has small suction refrigerant superheat, refrigerant volume efficiency is high
  - Has large refrigerant discharge buffer volume, Low vibration and noise
- Neodymium permanent magnet rotor, has powerful magnetic force, large torque and high efficiency
- Concentrated winding, improving low frequency efficiency

1.2.2 High Efficiency DC motor

- High efficiency DC fan motor is from well-known brand
- Low noise and high efficiency because of high-density wire winding engineering
- Brushless with built-in sensor

1.2.3 Stepless Control

- DC fan motor can be stepless controlled by outdoor PCB according to system's operating temperature. And it is able to reduce the energy consumption and maintain the system in the best performance.

1.2.4 180˚ Sine Waveform Control

- The perfect combination of 180˚ Sine waveform rotor frequency drive control technology and excellent IPM inverters reduces the reactive loss of motor-driven, increases motor efficiency by 12%.

1.2.5 CCT Inner-grooved Tube

- CCT (Continuous Cooling Transformation) inner-grooved copper tube has high thermometric conductivity. Its inner-grooved fins break the refrigerant flow boundary layer to enhance refrigerant disturbance to increase heat-exchanging efficiency.

1.2.6 2-in-1 Refrigerant Flow Path Design

- Thanks to the 2-in-1 refrigerant flow path design, the liquid refrigerant volume proportion in the condenser outlet is highly increased, so the indoor unit's will produce more heat (or cool).

1.2.7 Supercooling Flow Path Design.

- Supercooling flow path design, separates the refrigerant inlet and outlet, increase the supercooling degree, reduce the effect of high temperature inlet gas refrigerant to low temperature outlet liquid refrigerant, therefore, the system efficiency will be greatly increased.

1.2.8 Cross Flow Fins.

- Has low air resistance and great heat transfer coefficient
- Frosting improved, frost on the heat-exchanger will be well-distributed, easy for defrosting.

1.2.9 Optimized internal structure.

- Thanks to the optimization pipeline design, 5% pressure drop is reduced.
- EER and COP increase, because of evaporating temperature increase and compressor work decrease.

1.3 Benefits for users

1.3.1 Excellent in EER and COP

- Thanks to DC devices (compressor and motor), piping optimization design and new control logic, system's EER and COP are observably increase.

1.3.2 Outstanding comfort ability

- Chigo CMV system have excellent cooling & heating performance, thanks to the high efficiency DC fan motor, DC compressor and optimized refrigerant flow control logic.
- Precisely room temperature control by adopting large pulse EXV. Indoor temperature fluctuation can be maintain within 0.5 ˚C, offers outstanding comfort ability.

1.3.3 Wide operation range.

- Cooling operating temperature is up to 50˚C, suitable for the hot region.
- Heating operating temperature is down to -20˚C. In the cold winter, CMV MINI VRF system can stably produce heat.

1.3.4 6 important technology to reduce noise

- Brushless DC motor
- Streamline air duct design
- Anti-vibration fan blade
- 180˚ Sine Waveform Control
- Circuit Silencer
- Low noise compressor

1.3.5 Fan reversal protection

- In standby, if the outdoor fan motor is rotating in opposite direction at a high speed by the wind or other natural factors, the unit can't start so as to keep the fan motor from broken down. It will start when the fan motor speed slow down. .

1.3.6 Intelligent defrosting program

- Program starts only when unit needs to. Whereas conventional unit's defrosting timing & duration is fixed, causing fluctuations in temperature and personal comfort.

1.3.7 Flexible for all kinds of rooms

- 11 types & 68 models of indoor units, suitable for all kinds of rooms.

1.3.8 Environment friendly

- Refrigerant R410A (HFC), low carbon footprint, no harm to Ozone.

1.4 Benefits for installers

1.4.1 New wired controller

- Bidirectional communication. Indoor unit's operating parameters (error code, temperature, address) can be inquired and displayed on the controller.
- Compact design
- 3" screen with white background light
- Timer function
- Electrical standard dimensions
- User can check the error code and inquiry unit status very easy, safe and convenient.

1.4.2 Addressing methods

- 2 addressing methods:
- Automatically addressing: system will distribute address to indoor unit automatically
- Manually setting by wireless remote controller
- Automatic addressing will reduce artificial faults by 35% and 5% manual works.

- 54% system failure were caused by communication faults.
- 65% communication faults were caused by address problems.
- Most of the address problems were: address setting forgotten, wrong settings, address repeat.

1.4.3 LED display on the PCB

- LED display on the PCB, it can show system's operation status and error codes.

1.4.4 Oil control technology

- Core oil control technology makes system safety & reliable.

1.4.5 Heavy duty coating

- The new application method of the anti-corrosion coating significantly improved thickness.
- Special coating can be customized to prevent rusting and spoiling.

1.4.6 3-phase power protector (Optional device)

- Protect the outdoor unit from instable voltage.

1.4.7 Easy installation

- Easy for the outdoor unit to transporting to roof floor by elevator due to its compact size.
- Communication wire length can be up to 1000m.

1.4.8 Long pipe & height difference.

- The longest pipe: 60m
- Height deference:
  - Maximum 30m, when outdoor units are higher than indoor units
  - Maximum 20m, when outdoor units are lower than indoor units
- Height difference between indoor units: 8m
- Length from first indoor distributor to last indoor unit: 20m

1.4.9 Use 2-core shielded wire as signal wire

- Saves installation cost.
- Reduces manual works.

1.5 Doctor Kit (CMV Maintenance software)

1.5.1 Easy to use and install

- Doctor Kit includes: 1 software and RS485-USB converter, easy to install
- Graphical interfaces, easy to use

1.5.2 Data monitoring

- We can use computer to inquiry outdoor unit's operating status, error codes when connecting to Doctor Kit.
- Compressors, sensors, valves operating parameter can be real-time monitored.

1.5.3 System operating curve

- System operating parameter curve can be real-time displayed.
- Commissioning results can be reported.

1.5.4 Troubleshooting

- Built-in with troubleshooting instruction, user can follow the instruction to solve the problem when error happens.
- User can also print out the instruction and take it to site to solve the problem step by step.

1.5.5 Automatic Data Backup

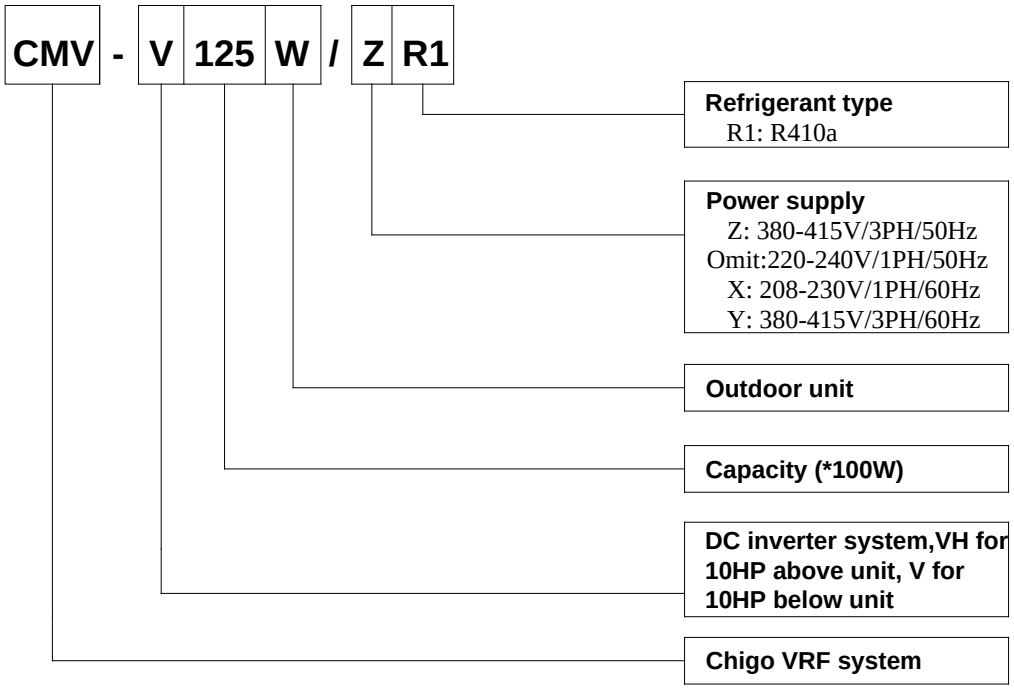
- Automatic Data Backup: all operating data will be saved on hard disk automatically. Data file can be exported easily by software.
- When system failure, user can send the data file to Chigo, Chigo's engineer will check and guide you to solve the problem.

1.5.6 Useful tools

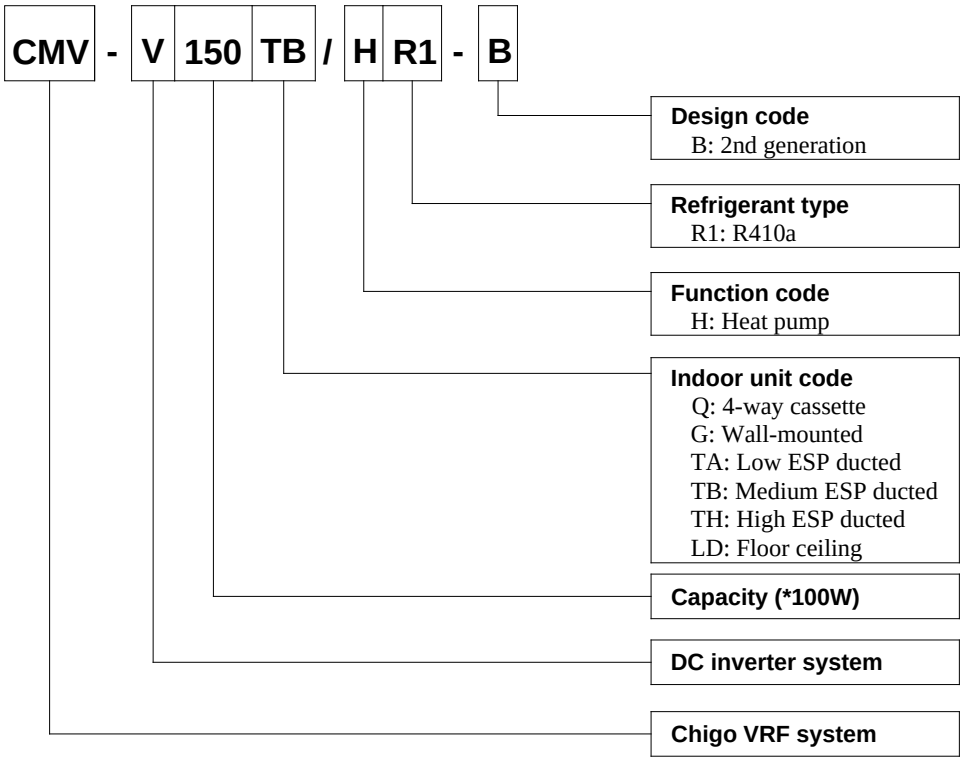
- Input the liquid pipe diameter and length, software will calculate the additional refrigerant charge volume.
- Charge volume can be saved for future reference.
- Discharge pressure can be monitored when charging refrigerant.

2. Nomenclature

2.1 Outdoor unit:



2.2 Indoor unit:



3. Outdoor units

3.1 External appearance

12.5KW/14KW/16KW/18KW


22.4KW/26KW/28KW/33.5KW


PART 2.

OUTDOOR UNITS

1. Specifications
2. Dimensions
3. Outdoor refrigerant circuit diagram
4. Electric characteristics
5. Outdoor unit wiring diagrams and field wiring
6. Operation limits
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8. Outdoor fan performance
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1. Specifications

1.1 Outdoor unit (12.5KW)

Model name			CMV-V125W/ZR1 CMV-V125W/YR1	CMV-V125W/ZR1-B CMV-V125W/YR1-B
Power supply			380~415V-3ph-50Hz 380~415V-3ph-60Hz	380~415V-3ph-50Hz 380~415V-3ph-60Hz
Max. connected indoor units		Pcs	7	7
Performance data				
Cooling	Capacity	kW	12.5	12.5
		Btu/h	42000	42000
		RT	3.5	3.5
	Power input	kW	3.38	3.38
	EER	W/W	3.69	3.69
Heating	Capacity	kW	14	14
		Btu/h	47000	47000
		RT	4.0	4.0
	Power input	kW	3.66	3.66
	COP	W/W	3.83	3.83
Max. input consumption		kW	6.3	6.3
Max. current		A	10	10
Capacity adjustment range			50%-130%	50%-130%
Compressor data				
DC Inverter compressor	Quantity		1	1
	Type		DC /Twin-rotary	DC /Twin-rotary
	Brand		Mitsubishi	GMCC
	frequency range	Hz	10～120Hz	12～120Hz
	Crankcase heater	W	35	35
Compressor oil	Model		FV50S	VG74
	Original oil volume	ml	870	1000
Fan data				
Fan motor	Type		DC	DC
	Brand		Panasonic /Nidec	Panasonic /Nidec
	Quantity		2	2
	Insulation class		E	E
	Protection class		IP24	IP24
	Power output	W	100*2	100*2
	Rated current	A	0.9*2	0.9*2
Fan blade	Material		ASG20	ASG20
	Type		Axial	Axial
	Drive		Direct-driven	Direct-driven
	Fan Quantity		2	2
	Air flow	m^3/h	8000	8000
	Vane Quantity		3	3
Physical data				
Outdoor coil	Fin type		Hydrophilic Aluminum	Hydrophilic Aluminum
	Tube outside diameter	mm	ϕ7.94	ϕ7.94
	Tube type		Inner-grooved copper tube	Inner-grooved copper tube
Refrigerant	Type		R410a	R410a
	Volume	kg	3100	3450
	Throttle type		EXV	EXV

Dimension (W*H*D)	Net	mm	900×1328×345	900×1328×345
	Packing	mm	964x1445x402	964x1445x402
Weight	Net	kg	93	93
	Gross	kg	104	104
Outdoor sound level		dB(A)	56	56
Maximum operating pressure		MPa	3.8	3.8
Piping & wiring data				
Pipe size	Liquid pipe	mm	Φ9.53(flaring nut)	Φ9.53(flaring nut)
	Gas pipe	mm	Φ15.9(flaring nut)	Φ15.9(flaring nut)
Max. pipe length	Total pipe length	m	100	100
	From OU to farthest IU	m	70	70
	From 1st indoor distributor to farthest IU	m	20	20
Max. vertical length	Between OU & IU (OU above IU)	m	30	30
	Between OU & IU (OU below IU)	m	20	20
	Between IUs	m	8	8
Connection wire	Power wire size	mm^2	5*2.5	5*2.5
	Signal wire type		2-core shielded cable	2-core shielded cable
	Signal wire size	mm^2	1	1
Operation temperature range				
Cooling	Outdoor side	℃	-5~50	-5~50
	Indoor side	℃	16~32	16~32
Heating	Outdoor side	℃	-20~30	-20~30
	Indoor side	℃	16~32	16~32

Notes:

1) *The cooling conditions: indoor temp.: 27˚C DB (80.6˚F), 19˚C WB (60˚F) outdoor temp.: 35˚C DB (95˚F) equivalent pipe length: 5m drop length: 0m.*
2) *The heating conditions: indoor temp.: 20˚C DB (68˚F), 15˚C WB (44.6˚F) outdoor temp.: 7˚C DB (42.8˚F) equivalent pipe length: 5m drop length: 0m.*
3) *Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.0 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.*
4) *The above data may be changed without notice for future improvement on quality and performance.*

1.2 Outdoor unit (14KW)

Model name			CMV-V140W/ZR1 CMV-V140W/YR1	CMV-V140W/ZR1-B CMV-V140W/YR1-B
Power supply			380~415V-3ph-50Hz 380~415V-3ph-60Hz	380~415V-3ph-50Hz 380~415V-3ph-60Hz
Max. connected indoor units		Pcs	8	8
Performance data				
Cooling	Capacity	kW	14	14
		Btu/h	47000	47000
		RT	4.0	4.0
	Power input	kW	3.98	3.98
	EER	W/W	3.52	3.52
Heating	Capacity	kW	16	16
		Btu/h	54000	54000
		RT	4.5	4.5
	Power input	kW	4.3	4.3
	COP	W/W	3.72	3.72
Max. input consumption		kW	6.3	6.3
Max. current		A	10	10
Capacity adjustment range			50%~130%	50%~130%
Compressor data				
DC Inverter compressor	Quantity		1	1
	Type		DC /Twin-rotary	DC /Twin-rotary
	Brand		Mitsubishi	GMCC
	frequency range	Hz	10~120Hz	12~120Hz
	Crankcase heater	W	35	35
Compressor oil	Model		FV50S	VG74
	Original oil volume	ml	870	1000
Fan data				
Fan motor	Type		DC	DC
	Brand		Panasonic /Nidec	Panasonic /Nidec
	Quantity		2	2
	Insulation class		E	E
	Protection class		IP24	IP24
	Power output	W	100*2	100*2
	Rated current	A	0.9*2	0.9*2
Fan blade	Material		ASG20	ASG20
	Type		Axial	Axial
	Drive		Direct-driven	Direct-driven
	Fan Quantity		2	2
	Air flow	m^3/h	8000	8000
	Vane Quantity		3	3
Physical data				
Outdoor coil	Fin type		Hydrophilic Aluminum	Hydrophilic Aluminum
	Tube outside diameter	mm	ϕ7.94	ϕ7.94
	Tube type		Inner-grooved copper tube	Inner-grooved copper tube
Refrigerant	Type		R410a	R410a
	Volume	kg	3450	3450
	Throttle type		EXV	EXV

Dimension (W*H*D)	Net	mm	900×1328×345	900×1328×345
	Packing	mm	964x1445x402	964x1445x402
Weight	Net	kg	93	93
	Gross	kg	104	104
Outdoor sound level		dB(A)	58	58
Maximum operating pressure		MPa	3.8	3.8
Piping & wiring data				
Pipe size	Liquid pipe	mm	ϕ9.53 (flaring nut)	ϕ9.53 (flaring nut)
	Gas pipe	mm	ϕ15.9 (flaring nut)	ϕ15.9 (flaring nut)
Max. pipe length	Total pipe length	m	100	100
	From OU to farthest IU	m	70	70
	From 1st indoor distributor to farthest IU	m	20	20
Max. vertical length	Between OU & IU (OU above IU)	m	30	30
	Between OU & IU (OU below IU)	m	20	20
	Between IUs	m	8	8
Connection wire	Power wire size	mm^2	5*2.5	5*2.5
	Signal wire type		2-core shielded cable	2-core shielded cable
	Signal wire size	mm^2	1	1
Operation temperature range				
Cooling	Outdoor side	℃	-5~50	-5~50
	Indoor side	℃	16~32	16~32
Heating	Outdoor side	℃	-20~30	-20~30
	Indoor side	℃	16~32	16~32

Notes:

5) The cooling conditions: indoor temp.: 27˚C DB (80.6˚F), 19˚C WB (60˚F) outdoor temp.: 35˚C DB (95˚F) equivalent pipe length: 5m drop length: 0m.

6) The heating conditions: indoor temp.: 20˚C DB (68˚F), 15˚C WB (44.6˚F) outdoor temp.: 7˚C DB (42.8˚F) equivalent pipe length: 5m drop length: 0m.

7) Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.0 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.

8) The above data may be changed without notice for future improvement on quality and performance.

1.3 Outdoor unit (16KW, 18KW)

Model name			CMV-V160W/ZR1 CMV-V160W/YR1	CMV-V180W/ZR1 CMV-V180W/YR1
Power supply			380~415V-3ph-50Hz 380~415V-3ph-60Hz	380~415V-3ph-50Hz 380~415V-3ph-60Hz
Max. connected indoor units		Pcs	9	10
Performance data				
Cooling	Capacity	kW	16	18
		Btu/h	54000	61000
		RT	4.5	5.2
	Power input	kW	4.58	5.19
	EER	W/W	3.5	3.47
Heating	Capacity	kW	18.5	20
		Btu/h	61000	63000
		RT	5.2	5.7
	Power input	kW	5.13	5.62
	COP	W/W	3.61	3.56
Max. input consumption		kW	6.3	7.0
Max. current		A	10	12.5
Capacity adjustment range			50%-130%	50%-130%
Compressor data				
DC Inverter compressor	Quantity		1	1
	Type		DC /Twin-rotary	DC /Twin-rotary
	Brand		Mitsubishi	Mitsubishi
	frequency range	Hz	10~120Hz	10~120Hz
	Crankcase heater	W	35	35
Compressor oil	Model		FV50S	FV50S
	Original oil volume	ml	1400	1400
Fan data				
Fan motor	Type		DC	DC
	Brand		Panasonic / Nidec	Panasonic / Nidec
	Quantity		2	2
	Insulation class		E	E
	Protection class		IP24	IP24
	Power output	W	100*2	100*2
	Rated current	A	0.9*2	0.9*2
Fan blade	Material		ASG20	ASG20
	Type		Axial	Axial
	Drive		Direct-driven	Direct-driven
	Fan Quantity		2	2
	Air flow	m^3/h	8000	8000
	Vane Quantity		3	3
Physical data				
Outdoor coil	Fin type		Hydrophilic Aluminum	Hydrophilic Aluminum
	Tube outside diameter	mm	ϕ9.52	ϕ7
	Tube type		Inner-grooved copper tube	Inner-grooved copper tube
Refrigerant	Type		R410a	R410a
	Volume	kg	4200	4550
	Throttle type		EXV	EXV

Dimension (W*H*D)	Net	mm	900×1328×345	900×1328×345
	Packing	mm	964x1445x402	964x1445x402
Weight	Net	kg	100	102
	Gross	kg	111	112
Outdoor sound level		dB(A)	58	58
Maximum operating pressure		MPa	3.8	3.8
Piping & wiring data				
Pipe size	Liquid pipe	mm	Φ9.53(flaring nut)	Φ9.53(flaring nut)
	Gas pipe	mm	Φ15.9(flaring nut)	Φ15.9(flaring nut)
Max. pipe length	Total pipe length	m	100	100
	From OU to farthest IU	m	70	70
	From 1st indoor distributor to farthest IU	m	20	20
Max. vertical length	Between OU & IU (OU above IU)	m	30	30
	Between OU & IU (OU below IU)	m	20	20
	Between IUs	m	8	8
Connection wire	Power wire size	mm^2	5*2.5	5*2.5
	Signal wire type		2-core shielded cable	2-core shielded cable
	Signal wire size	mm^2	1	1
Operation temperature range				
Cooling	Outdoor side	℃	-5~50	-5~50
	Indoor side	℃	16~32	16~32
Heating	Outdoor side	℃	-20~30	-20~30
	Indoor side	℃	16~32	16~32

Notes:

9) The cooling conditions: indoor temp.: 27˚C DB (80.6˚F), 19˚C WB (60˚F) outdoor temp.: 35˚C DB (95˚F) equivalent pipe length: 5m drop length: 0m.

10) The heating conditions: indoor temp.: 20˚C DB (68˚F), 15˚C WB (44.6˚F) outdoor temp.: 7˚C DB (42.8˚F) equivalent pipe length: 5m drop length: 0m.

11) Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.0 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.

12) The above data may be changed without notice for future improvement on quality and performance.

1.4 Outdoor unit (22.4KW, 26KW, 28KW, 33.5KW)

Model name			CMV-VH224W/ZR1 CMV-VH224W/YR1	CMV-VH260W/ZR1 CMV-VH260W/YR1
Power supply			380~415V-3ph-50Hz 380~415V-3ph-60Hz	380~415V-3ph-50Hz 380~415V-3ph-60Hz
Max. connected indoor units		Pcs	13	15
Performance data				
Cooling	Capacity	kW	22.4	26
		Btu/h	76500	88700
		RT	6.4	7.4
	Power input	kW	6.74	7.54
	EER	W/W	3.32	3.45
Heating	Capacity	kW	25	28.5
		Btu/h	85300	97300
		RT	7.1	8.1
	Power input	kW	5.85	6.77
	COP	W/W	4.27	4.21
Max. input consumption		kW	10.2	10.5
Max. current		A	16.5	18.5
Capacity adjustment range			50%-130%	50%-130%
Compressor data				
DC Inverter compressor	Quantity		1	1
	Type		DC /Twin-rotary	DC /Twin-rotary
	Brand		Mitsubishi	Mitsubishi
	Frequency range	Hz	10～120	10～120
	Crankcase heater	W	35	35
Compressor oil	Model		FV50S	FV50S
	Original oil volume	ml	1700+2000	1700+2000
Fan data				
Fan motor	Type		Axial	Axial
	Brand		Nidec	Nidec
	Quantity		2	2
	Insulation class		E	E
	Protection class		IP24	IP24
	Power output	W	180*2	180*2
	Rated current	A	1.5*2	1.5*2
Fan blade	Material		ASG20	ASG20
	Type		Axial	Axial
	Drive		Direct-driven	Direct-driven
	Fan Quantity		2	2
	Air flow	m^3/h	8000	8000
	Vane Quantity		4	4
Physical data				
Outdoor coil	Fin type		Hydrophilic Aluminum	Hydrophilic Aluminum
	Tube outside diameter	mm	φ7	φ7
	Tube type		Inner-grooved copper tube	Inner-grooved copper tube
Refrigerant	Type		R410A	R410A
	Volume	kg	6100	6100
	Throttle type		EXV	EXV

Model name			CMV-VH224W/ZR1 CMV-VH224W/YR1	CMV-VH260W/ZR1 CMV-VH260W/YR1
Dimension (W*H*D)	Net	mm	1120*1549*528	1120*1549*528
	Packing	mm	1278*1696*560	1278*1696*560
Weight	Net	kg	145	145
	Gross	kg	165	165
Outdoor sound level		dB(A)	≤58	≤60
Maximum operating pressure		MPa	3.8	3.8
Piping & wiring data				
Pipe size	Liquid pipe	mm	φ9.52	φ9.52
	Gas pipe	mm	φ22.2	φ22.2
Max. pipe length	Total pipe length	m	120	120
	From OU to farthest IU	m	70	70
	From 1st indoor distributor to farthest IU	m	20	20
Max. vertical length	Between OU & IU (OU above IU)	m	30	30
	Between OU & IU (OU below IU)	m	20	20
	Between IUs	m	8	8
Connection wire	Power wire size	mm^2	5*6	5*6
	Signal wire type		2-core shielded cable	2-core shielded cable
	Signal wire size	mm^2	1	1
Operation temperature range				
Cooling	Outdoor side	℃	-5~50	-5~50
	Indoor side	℃	16~32	16~32
Heating	Outdoor side	℃	-20~30	-20~30
	Indoor side	℃	16~32	16~32

Notes:

1) *The cooling conditions: indoor temp.: 27˚C DB (80.6˚F), 19˚C WB (60˚F) outdoor temp.: 35˚C DB (95˚F) equivalent pipe length: 5m drop length: 0m.*
2) *The heating conditions: indoor temp.: 20˚C DB (68˚F), 15˚C WB (44.6˚F) outdoor temp.: 7˚C DB (42.8˚F) equivalent pipe length: 5m drop length: 0m.*
3) *Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.0 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.*
4) *The above data may be changed without notice for future improvement on quality and performance.*

Model name			CMV-VH280W/ZR1 CMV-VH280W/YR1	CMV-VH335W/ZR1 CMV-VH335W/YR1
Power supply			380~415V-3ph-50Hz 380~415V-3ph-60Hz	380~415V-3ph-50Hz 380~415V-3ph-60Hz
Max. connected indoor units		Pcs	16	19
Performance data				
Cooling	Capacity	kW	28	33.5
		Btu/h	95500	114300
		RT	7.96	9.52
	Power input	kW	9.11	10.42
	EER	W/W	3.07	3.21
Heating	Capacity	kW	31.5	37.5
		Btu/h	107400	127900
		RT	8.95	10.66
	Power input	kW	8.54	9.93
	COP	W/W	3.69	3.77
Max. input consumption		kW	12	12.5
Max. current		A	20	21.4
Capacity adjustment range			50%-130%	50%-130%
Compressor data				
DC Inverter compressor	Quantity		1	1
	Type		DC /Scroll	DC /Scroll
	Brand		Hitachi	Hitachi
	Frequency range	Hz	10~120	10~120
	Crankcase heater	W	40	40
Compressor oil	Model		FVC68D	FVC68D
	Original oil volume	ml	500+2000	500+2000
Fan data				
Fan motor	Type		Axial	Axial
	Brand		Nidec	Nidec
	Quantity		2	2
	Insulation class		E	E
	Protection class		IP24	IP24
	Power output	W	180*2	180*2
	Rated current	A	1.5*2	1.5*2
Fan blade	Material		ASG20	ASG20
	Type		Axial	Axial
	Drive		Direct-driven	Direct-driven
	Fan Quantity		2	2
	Air flow	m^3/h	9000	9000
	Vane Quantity		4	4
Physical data				
Outdoor coil	Fin type		Hydrophilic Aluminum	Hydrophilic Aluminum
	Tube outside diameter	mm	φ7	φ7
	Tube type		Inner-grooved copper tube	Inner-grooved copper tube
Refrigerant	Type		R410A	R410A
	Volume	kg	8000	8000
	Throttle type		EXV	EXV

Model name			CMV-VH280W/ZR1 CMV-VH280W/YR1	CMV-VH335W/ZR1 CMV-VH335W/YR1
Dimension (W*H*D)	Net	mm	1120*1549*528	1120*1549*528
	Packing	mm	1278*1696*560	1278*1696*560
Weight	Net	kg	176	176
	Gross	kg	196	196
Outdoor sound level		dB(A)	≤60	≤60
Maximum operating pressure		MPa	3.8	3.8
Piping & wiring data				
Pipe size	Liquid pipe	mm	φ12.7	φ12.7
	Gas pipe	mm	φ28.6	φ28.6
Max. pipe length	Total pipe length	m	120	120
	From OU to farthest IU	m	70	70
	From 1st indoor distributor to farthest IU	m	20	20
Max. vertical length	Between OU & IU (OU above IU)	m	30	30
	Between OU & IU (OU below IU)	m	20	20
	Between IUs	m	8	8
Connection wire	Power wire size	mm^2	5*6	5*6
	Signal wire type		2-core shielded cable	2-core shielded cable
	Signal wire size	mm^2	1	1
Operation temperature range				
Cooling	Outdoor side	℃	-5~50	-5~50
	Indoor side	℃	16~32	16~32
Heating	Outdoor side	℃	-20~30	-20~30
	Indoor side	℃	16~32	16~32

Notes:

5) The cooling conditions: indoor temp.: 27˚C DB (80.6˚F), 19˚C WB (60˚F) outdoor temp.: 35˚C DB (95˚F) equivalent pipe length: 5m drop length: 0m.

6) The heating conditions: indoor temp.: 20˚C DB (68˚F), 15˚C WB (44.6˚F) outdoor temp.: 7˚C DB (42.8˚F) equivalent pipe length: 5m drop length: 0m.

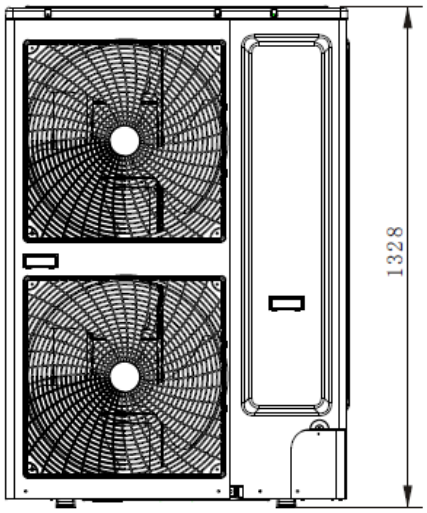
7) Sound level: Anechoic chamber conversion value, measured at a point 1 m in front of the unit at a height of 1.0 m. During actual operation, these values are normally somewhat higher as a result of ambient conditions.

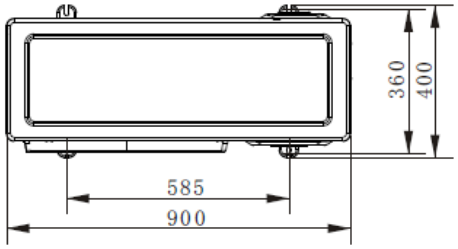
8) The above data may be changed without notice for future improvement on quality and performance.

2. Dimensions

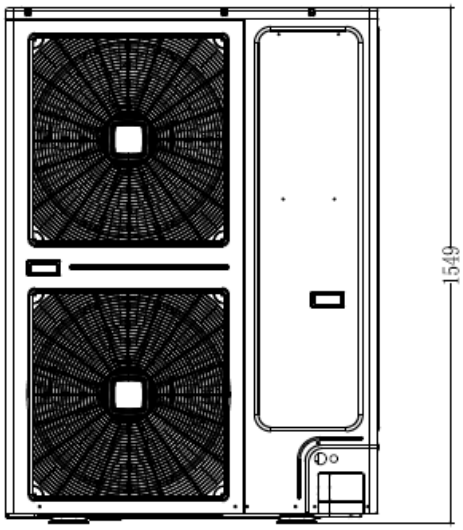
2.1 Unit dimension

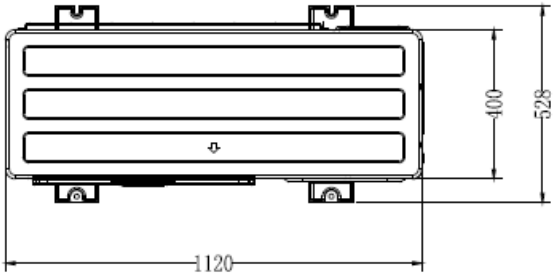
12.5KW, 14KW, 16KW, 18KW:



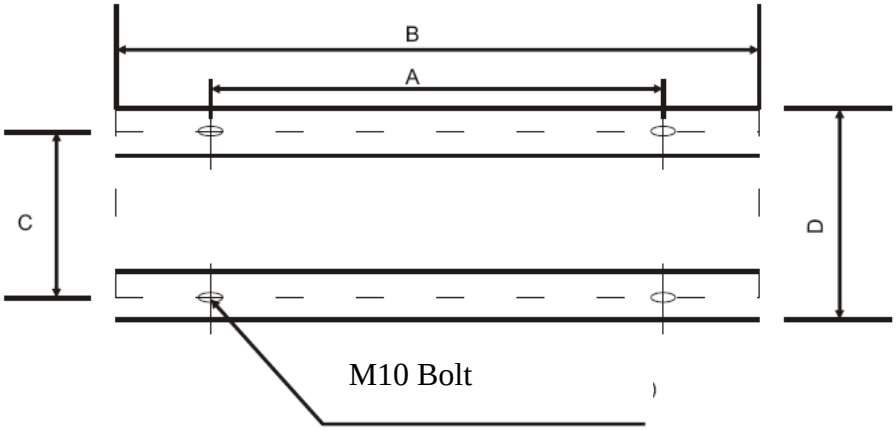


22.4KW, 26KW, 28KW, 33.5KW:





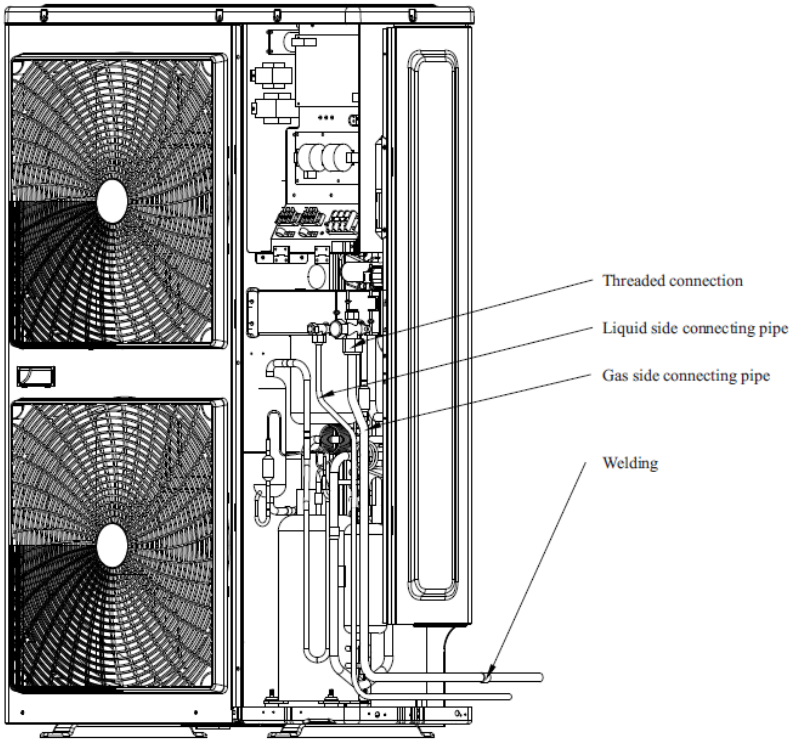
2.2 Installation base dimension



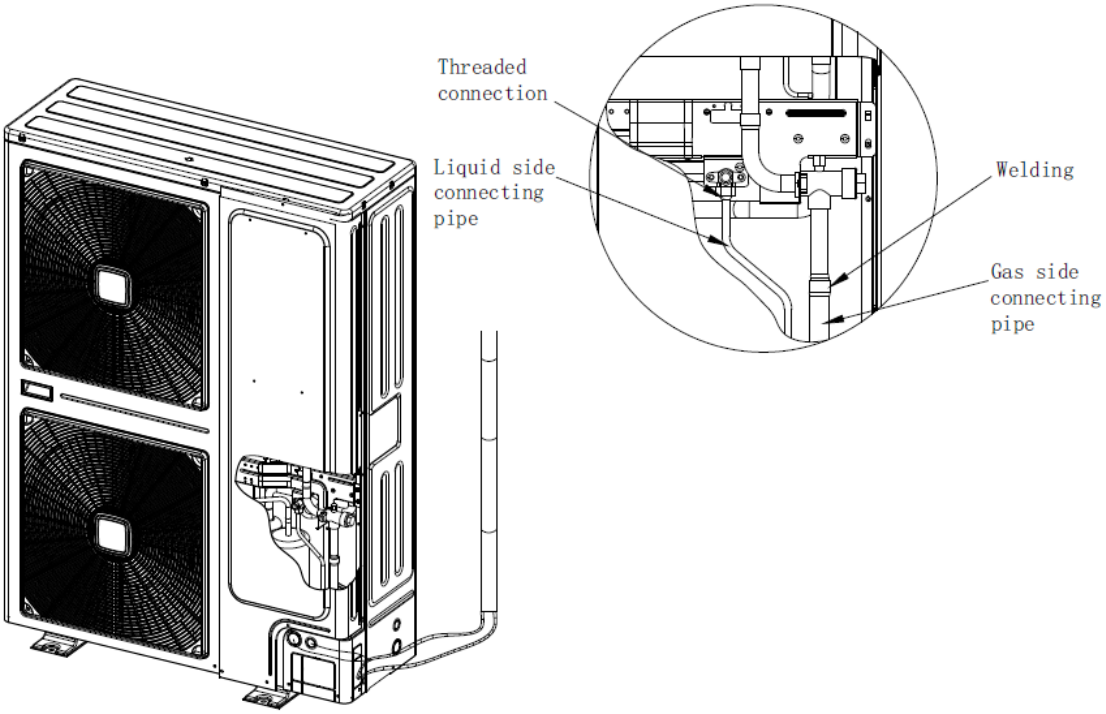
Capacity	A(mm)	B(mm)	C (mm)	D (mm)
12.5KW	585	880	360	424
14KW				
16KW				
18KW				
22.4KW	685	1100	494	560
26KW				
28KW				
33.5KW				

2.3 Valve explanation

12.5KW, 14KW, 16KW, 18KW:

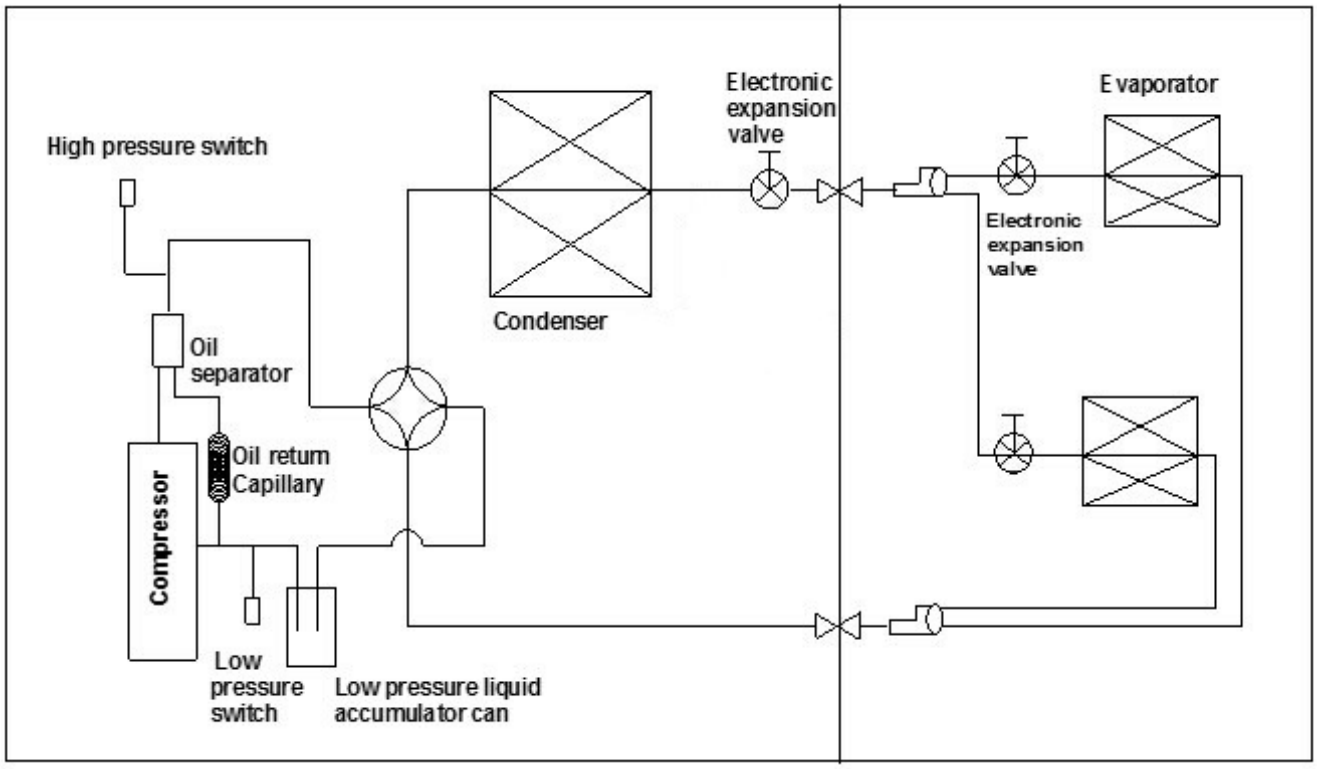


22.4KW, 26KW, 28KW, 33.5KW:



3. Outdoor refrigerant circuit diagram

3.1 Circuit diagram: 12.5KW, 14KW, 16KW,18KW, 22.4KW, 26KW



3.2 Key parts

3.2.1 Oil Separator

It is used to separate oil from high pressure & temperature gas refrigerant that is pumped out from compressor. The separation efficiency is up to 92%, it makes the oil return back to each compressor very soon.

3.2.2 Gas-liquid separator

It is used to store the liquid refrigerant and oil, it can protect the compressor from liquid hammer.

3.2.3 Four-way valve (ST)

Closes in cooling mode and opens in heating mode

3.2.4 EXV (Electromagnetic expansion valve)

a) Max. Open degree is 480 pulses.

b) Generally when system is electrified the EXV closes 700pulse first, then opens to 350 pulse and stand by. Then the unit is started, it opens to the right pulse.

c) When the running outdoor unit receives OFF signal, the EXV of auxiliary unit will stop while main unit is running and auxiliary unit is stopped at the same time. If all outdoor units are stopped, the EXV will close first, and then open to the pulse of stand-by.

3.2.5 Hi pressure switch

To protect the system when system high pressure up to 4.4MPa.

3.2.6 Low pressure switch

To protect the system when system low pressure low to 0.14MPa.

3.3 Key functions

3.3.1 Oil return program

a) When system start up for 140 minutes, oil return program will run. After that, every 8 hours continued operating this program will run.

b) The program will last for 3 minutes.

c) The outdoor EXV open to 480 pulse.

d) Action of indoor Fan and EXV.

		Running indoor unit	Stop or standby indoor unit	Fan only indoor unit
Cooling mode	EXV	Keep degree unchanged	300 pulse	300pulse
	Fan	Keep on	Keep off	Keep on
Heating mode	EXV	Keep degree unchanged	480 pulse	/
	Fan	Anti-cold wind	Keep off	/

3.3.2 Forced cooling program

a) After pressing it once, all indoor units and outdoor units will start cooling, no matter what mode they are running on, no matter whether they are ON or OFF.

b) During forced cooling mode.

i. All indoor EXVs open to 480 pulses.

ii. All indoor fans are in high speed.

iii. All outdoor fan motors are ON.

iv. Outdoor EXV opens to 480 pulses.

c) When the process is last for 1h or the button is pressed again, program will quit.

3.3.3 Defrost program

a) When any module's condenser temperature (T3) < -2, last for 40minutes, this outdoor unit sends defrost order to outdoor unit.

b) Before defrost, save current EXV opening pulses. EXV opening pulses will be recover when defrost program ends.

c) During defrosting.

i. All indoor EXVs open to 480 pulses.

ii. All indoor fans are anti-cold program.

iii. Compressor is ON.

iv. Outdoor fan motors are OFF

v. Outdoor EXVs open to 480 pulses.

d) It ends when in the following conditions :

i. The defrosting time is up to 10 minutes.

ii. All module's condenser temperature (T3)≥15 ℃.

iii. T3≥7℃ last for 60 seconds.

e) After defrost.

i. All indoor units' EXV recover to save pulse.

ii. All indoor fans return to normal control.

iii. Compressor returns to normal control.

iv. All outdoor fan motors return to normal control.

v. Outdoor EXVs return to normal control.

4. Electric characteristics

Model	Outdoor Unit				Power Supply		Compressor	Fan Motor.	
	Hz	Voltage	Min.	Max.	TOC	MFC	LRC	Output	FLC
12.5KW	50	380~415	342	437	25	20	/	0.1*2	1.6
14KW	50	380~415	342	437	25	20	/	0.1*2	1.6
16KW	50	380~415	342	437	25	20	/	0.1*2	1.6
18KW	50	380~415	342	437	25	20	/	0.1*2	1.6
22.4KW	50	380~415	342	437	25	20	/	0.1*2	1.6
26KW	50	380~415	342	437	25	20	/	0.1*2	1.6
28KW	50	380~415	342	437	25	20	/	0.1*2	1.6
33.5KW	50	380~415	342	437	25	20	/	0.1*2	1.6
12.5KW	60	380~415	342	437	25	20	/	0.1*2	1.6
14KW	60	380~415	342	437	25	20	/	0.1*2	1.6
16KW	60	380~415	342	437	25	20	/	0.1*2	1.6
18KW	60	380~415	342	437	25	20	/	0.1*2	1.6
22.4KW	60	380~415	342	437	25	20	/	0.1*2	1.6
26KW	60	380~415	342	437	25	20	/	0.1*2	1.6
28KW	60	380~415	342	437	25	20	/	0.1*2	1.6
33.5KW	60	380~415	342	437	25	20	/	0.1*2	1.6

Remark:

- *Min.: Permitted minimum operating voltage, lower than this value may damage the system*
- *Max.: Permitted maximum operating voltage, higher than this value may damage the system*
- *TOC: Total Over-Current (A)*
- *MFC: Maximum Fuse Current (A)*
- *LRC: Locked Rotor Current (A)*
- *FLC: Full Load Current (A)*
- *Output: Fan motor rated power Output (kW)*

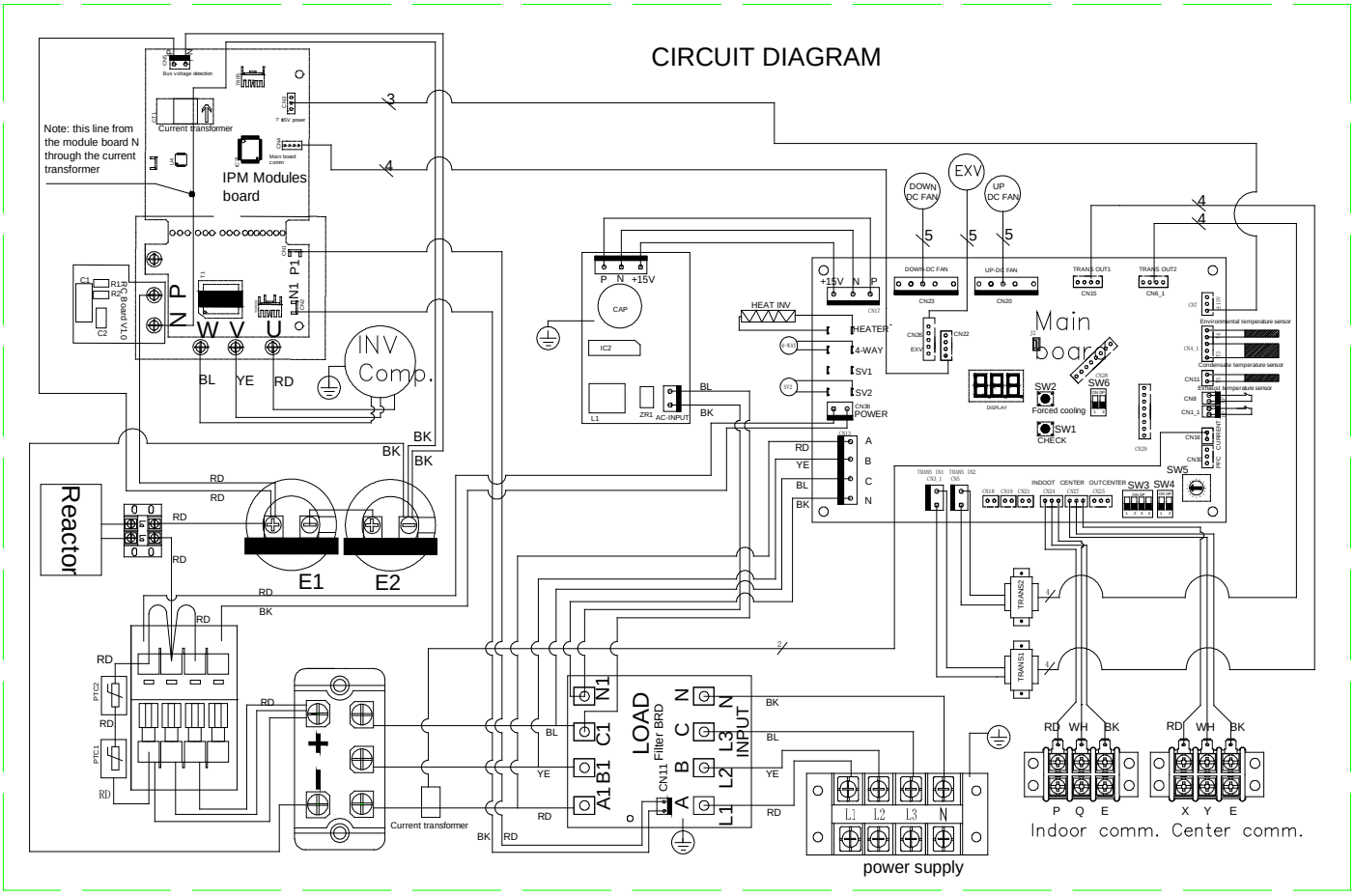
Notes:

- *RLC is based on the following conditions, indoor temperature 27˚C DB/19˚C WB, outdoor temperature 35˚C DB*
- *TOC means the total value of each Over-Current set.*
- *MSC means the Maximum current during the starting of compressor.*
- *Maximum allowable voltage variation between phases is 2%*
- *Selection wire size based on the larger value of MC or TOC*
- *MFC is used to select the circuit breaker and the ground fault circuit interrupter (earth circuit breaker).*

5. Outdoor unit wiring diagrams and field wiring

5.1 Outdoor unit electrical control box wiring diagram

- 12.5KW,14KW,16KW,18KW

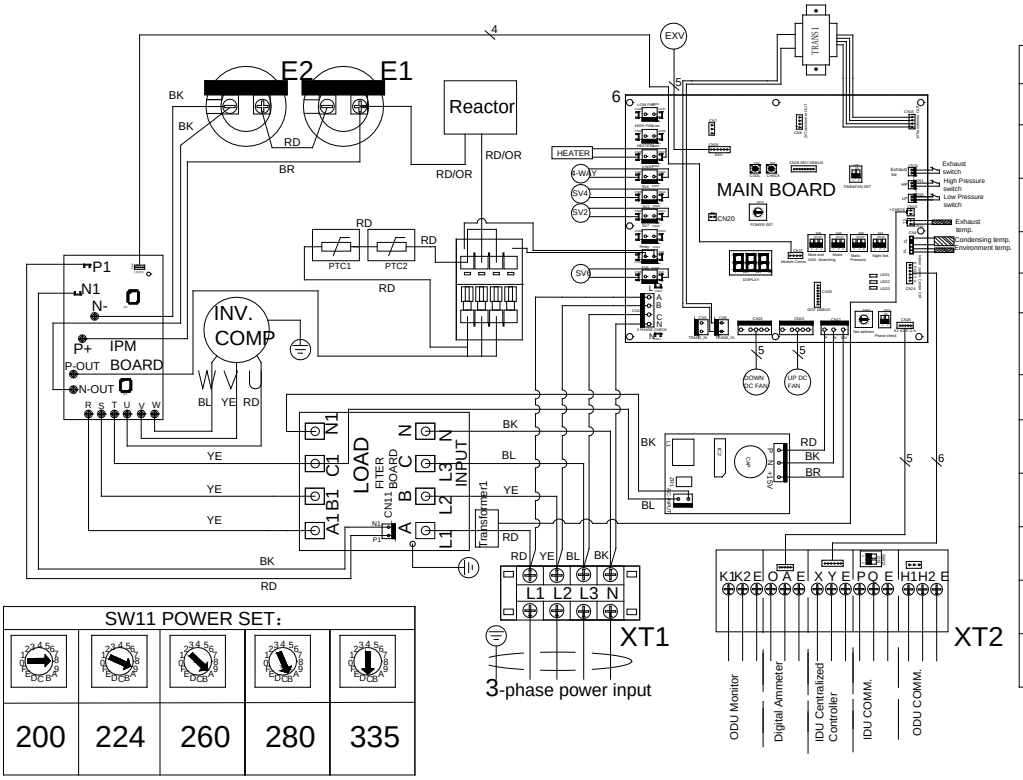


Caution: *1. The E1 E2 electrolytic capacitors must finish releasing electricity after outage.*

2. The Mutual reactors must be through with power cord

.

- 22.4KW, 26KW, 28KW, 33.5KW:



PTC	PTC
E1	Electrolytic Capacitor
E2	Electrolytic Capacitor
XT1	Main Power Terminal
XT2	Comm. Terminal
SV1	Module Solenoid Valve
SV2	Bypass Solenoid Valve
SV4	Oil Balance Solenoid Valve
SV6	Flow valve
SV7	Flow valve
4-WAY	4-WAY VALVE
RELAY	Start contactor control
HEATER	HEATER

SW11 POWER SET:

200	224	260	280	335

Caution1: The E1 E2 electrolytic capacitors must finish releasing electricity after outage.

Caution 2: Power line should cross the transformer.

SW4 Function definition:

	Night silent mode duration 6h~8h(default)
	Night silent mode duration 8h~10h
	Night silent mode duration 6h~12h
	Night silent mode duration 8h~8h

SW5 SILENT MODE SET	
SW5	Forced silent mode off (default)
SW5	Forced silent mode

SW8 Function definition:

	Night silent mode ON and automatic addressing ON (default)
	Night silent mode ON and automatic addressing OFF
	Night silent mode OFF and automatic addressing ON
	Night silent mode OFF and automatic addressing off

SW9 Function definition:

	Heating priority (default)
	Cooling priority
	First start mode priority
	Heating only
	Cooling only

SW12 Function definition:

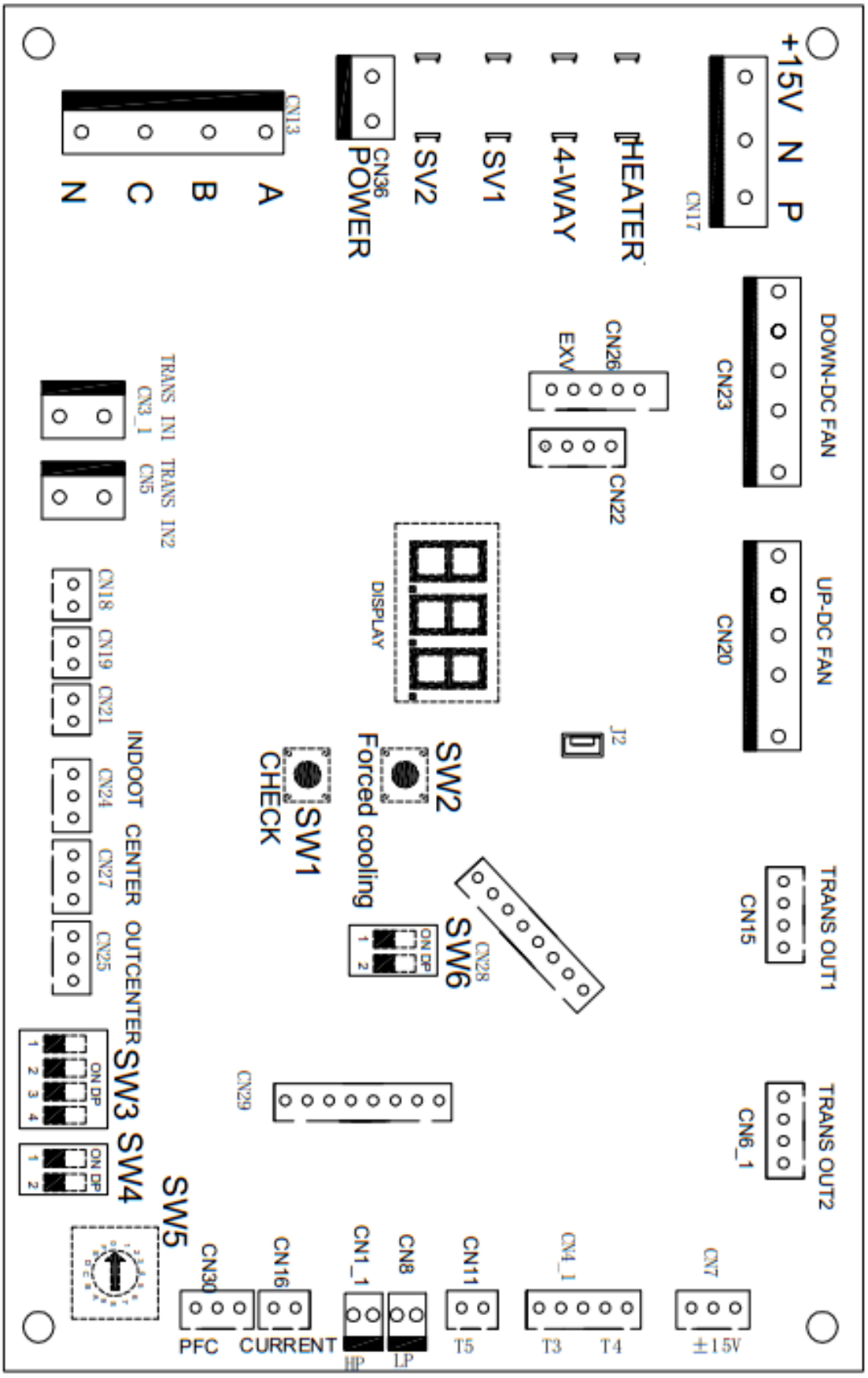
	Tested Three-phase （3N～380V）
	Not-tested Three-phase （Not 3N～380V）

SW7 START TIME	
SW7 ON	SW7 ON
12MIN (default)	3MIN

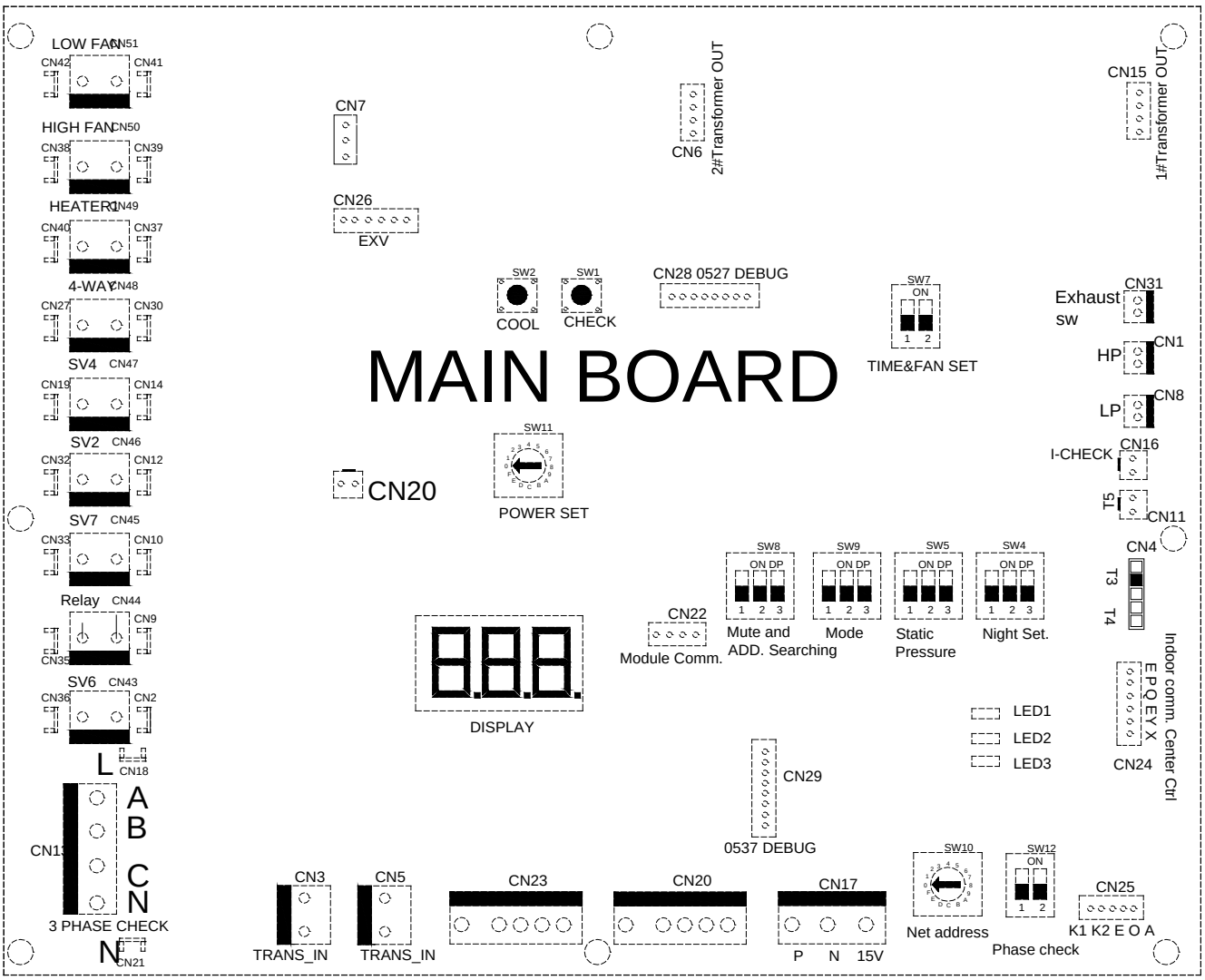
SW10 NET ADDRESS
SW10
ADDRESS 0 (DEFAULT)

5.2 PCB enlarged view

12.5KW, 14KW, 16KW, 18KW

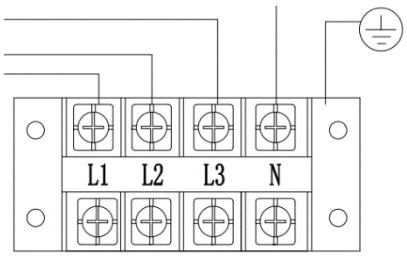


22.4KW, 26KW, 28KW, 33.5KW

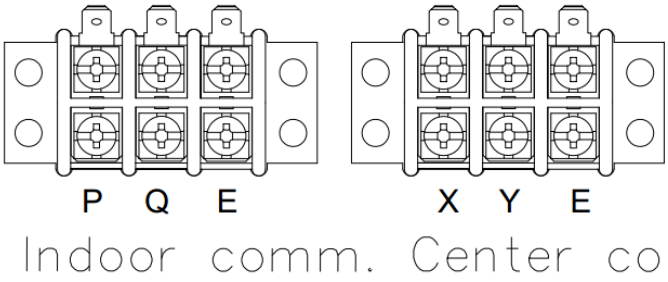


5.3 Field wiring

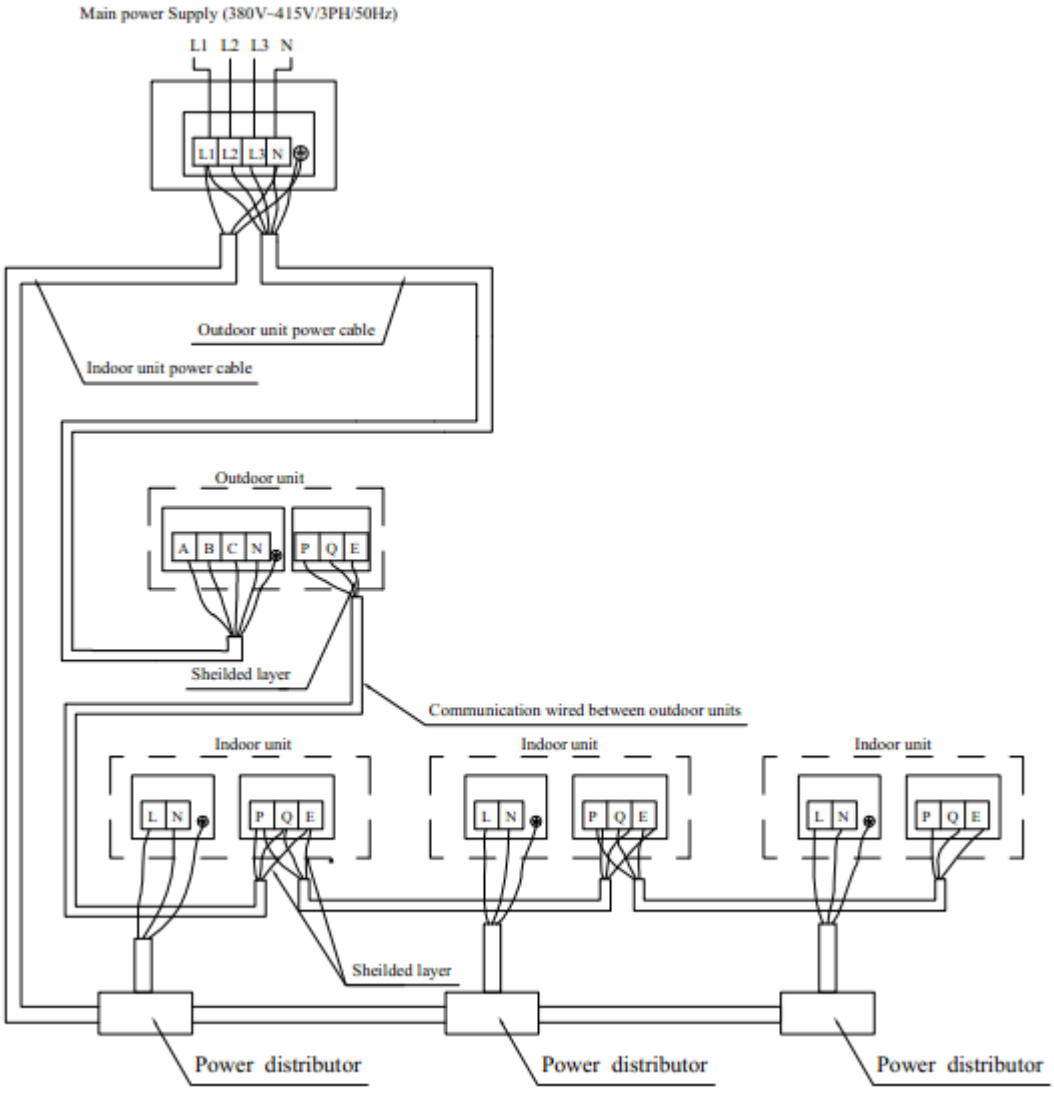
1) Power supply terminals



2) Communication terminals



3) Wiring between indoor and outdoor unit



Note:

a) The signal connecting line between indoor and outdoor units and indoor units has polarity. When connecting, be careful to prevent error connection.

b) Signal line shall adopt three-core shielded wire with an area above 0.75 mm^2.

c) Do not bind signal line and copper pipe together with belting.

d) Make sure that the shield metal layer should be grounded well indoor control box in order to prevent interference.

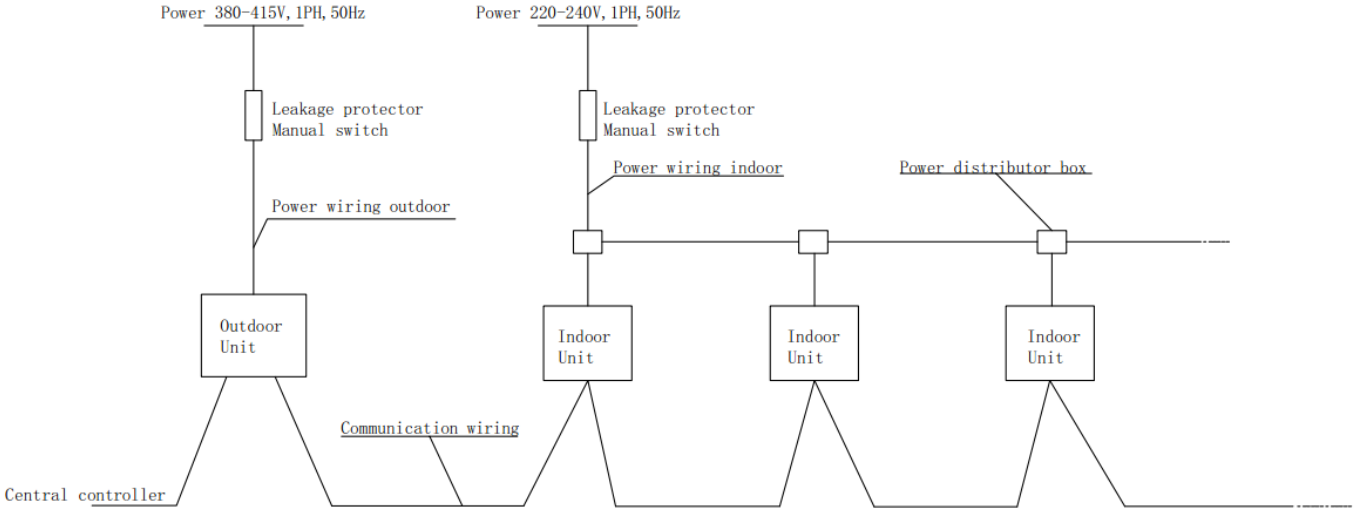
e) it's forbidden to connect 200V or above high-volt live wire to the communication terminal.

5.4 Outdoor unit power wiring

5.4.1 Separately power supply (without power facility)

Model name	Power supply	Minimum power cable diameter (L is cable length)		Manual switch		Circuit breaker
		Size (mm^2)	Ground wire (mm^2)	Capacity (A)	Fuse (A)	
12.5KW	380V~415V 3 phase 50Hz/60Hz	5*2.5	2.5	25	20	0.1A under 0.1second
14KW						
16KW						
18KW						
22.4KW		5*6	6	40	35	0.1A under 0.1second
26KW						
28KW						
33.5KW						

5.4.2 With power facilities:



Note:

- *Select power wire for these five models separately according to relevant standard.*
- *The wiring diameter and the length in the table indicate the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.*

6. Operation limits

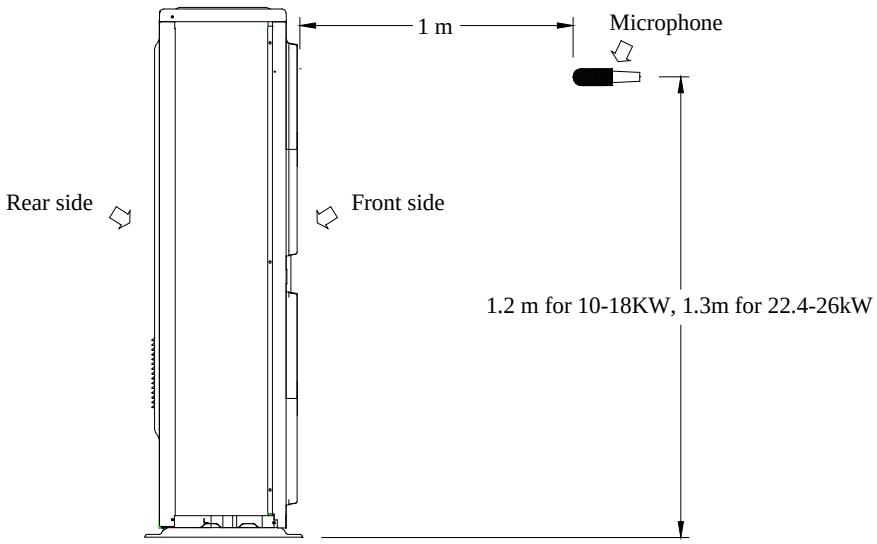
Operation mode	Outdoor temperature	Indoor temperature
Cooling	-5°C ~ 50C	16°C ~ 32°C
Heating	-20°C ~ 30°C	16°C ~ 32°C

Notes:

- *If the unit is operating beyond above condition, protection device will be activated; even then the units will abnormality run.*

7. Operation sound Levels

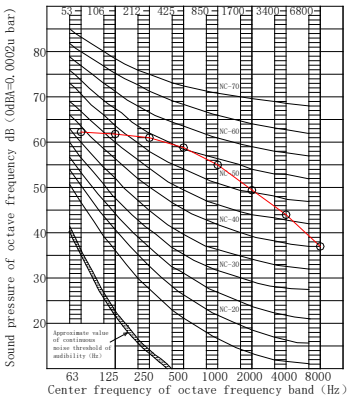
7.1 Testing method and sound levels



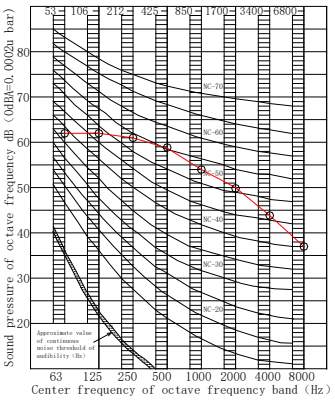
Test value

Outdoor unit	Sound level dB(A)
12.5KW	56
14KW	58
16KW	58
18KW	58
22.4KW	58
26KW	60
28KW	60
33.5KW	60

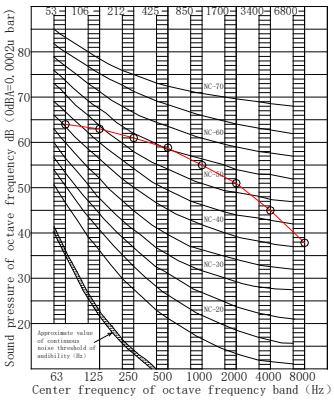
7.2 NC curve(Double click the diagram to check the CAD)



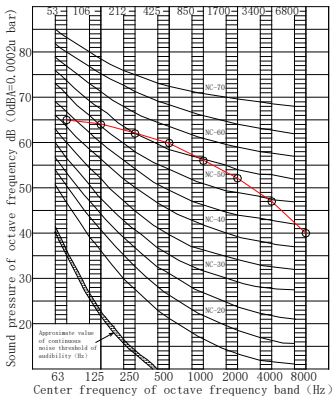
10/12.5 KW



14/16/18/22.4 KW



26 KW



28/33.5 KW

8. Functional parts and safety devices

Table 1.

Item	Symbol	Name		CMV-V125W/ZR1 CMV-V125W/YR1	CMV-V125W/ZR1-B CMV-V125W/YR1-B
Compressor	Inverter	Inverter compressor		TNB306FPNMC	ATF310D43UMT
	Compressor Safety OLP	Starting current		/	/
	CCH	Crank case heater		35W	
Motor and security devices	Motor	Fan motor	Model	DR-380-100-8	
			Output power	100*2	
		Safety thermostat	On	120℃	
			Off	/	
	HP	High pressure switch		OFF:44(±1)kg/cm^2 ON:32(±1)kg/cm^2	
	LP	Low pressure switch		OFF:1.4(±1)kg/cm^2 ON:3.0(±1)kg/cm^2	
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25°C=5KΩ	
	Discharge thermostat	Thermostat (Inverter discharge)		BW120°C ON:120°C OFF:90°C	
Functional parts	PMV	Electronic expansion valve		UKV-32D210 (Foshan Hualu)	
	4-W/V	4-way valve		TB-STF-B01-R410A (Foshan Hualu)	
	SV	Solenoid valve		FDF6A42. (Zhejiang Sanhua)	

Table 2.

Item	Symbol	Name		CMV-V140W/ZR1 CMV-V140W/YR1	CMV-V140W/ZR1-B CMV-V140W/YR1-B
Compressor	Inverter	Inverter compressor		TNB306FPNMC	ATF310D43UMT
	Compressor Safety OLP	Starting current		/	/
	CCH	Crank case heater		35W	
Motor and security devices	Motor	Fan motor	Model	DR-380-100-8	
			Output power	100W*2	
		Safety thermostat	On	120℃	
			Off	/	
	HP	High pressure switch		OFF:44(±1)kg/cm^2 ON:32(±1)kg/cm^2	
	LP	Low pressure switch		OFF:1.4(±1)kg/cm^2 ON:3.0(±1)kg/cm^2	
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25°C=5KΩ	
	Discharge thermostat	Thermostat (Inverter discharge)		BW120°C ON:120°C OFF:90°C	
Functional parts	PMV	Electronic expansion valve		UKV-32D210 (Foshan Hualu)	
	4-W/V	4-way valve		TB-STF-B01-R410A (Foshan Hualu)	
	SV	Solenoid valve		FDF6A42. (Zhejiang Sanhua)	

Table 3.

Item	Symbol	Name		CMV-V160W/ZR1 CMV-V160W/YR1	CMV-V180W/ZR1 CMV-V180W/YR1
Compressor	Inverter	Inverter compressor		LNB42FSAMC	LNB42FSAMC
	Compressor Safety OLP	Starting current		/	/
	CCH	Crank case heater		35W	
Motor and security devices	Motor	Fan motor	Model	DR-380-100-8	
			Output power	100W*2	
		Safety thermostat	On	120℃	
			Off	/	
	HP	High pressure switch		OFF:44(±1)kg/cm^2 ON:32(±1)kg/cm^2	
	LP	Low pressure switch		OFF:1.4(±1)kg/cm^2 ON:3.0(±1)kg/cm^2	
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25°C=5KΩ	
	Discharge thermostat	Thermostat (Inverter discharge)		BW120°C ON:120°C OFF:90°C	
Functional parts	PMV	Electronic expansion valve		UKV-32D210 (Foshan Hualu)	
	4-W/V	4-way valve		TB-STF-B01-R410A (Foshan Hualu)	
	SV	Solenoid valve		FDF6A42. (Zhejiang Sanhua)	

Table 4.

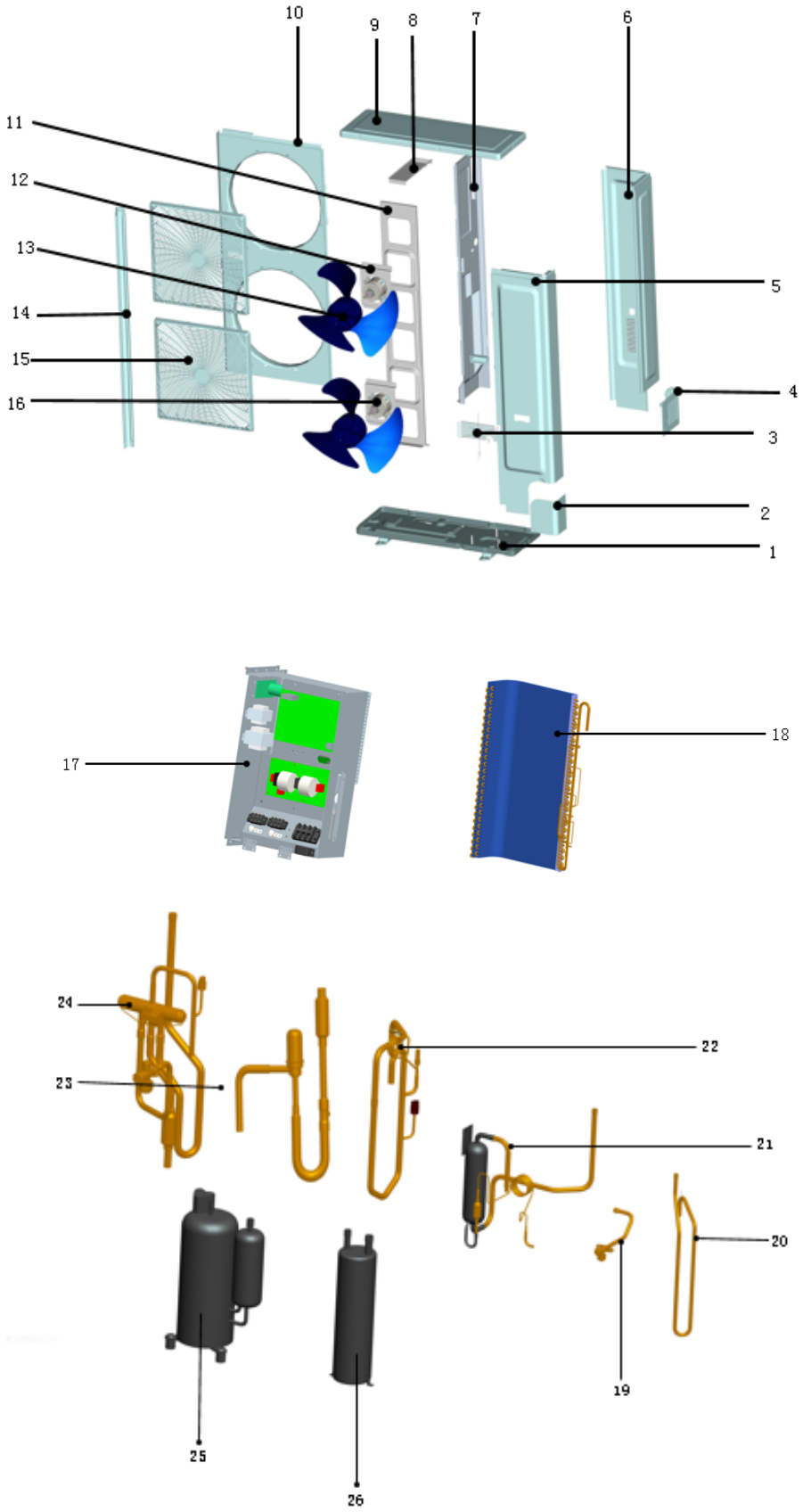
Item	Symbol	Name		CMV-VH224W/ZR1 CMV-VH224W/YR1	CMVH-V260W/ZR1 CMVH-V260W/YR1
Compressor	Inverter	Inverter compressor		LNB53FCAMC	LNB53FCAMC
	Compressor Safety OLP	Starting current		/	/
	CCH	Crank case heater		35W	
Motor and security devices	Motor	Fan motor	Model	DR-310-180-8	
			Output power	180*2	
		Safety thermostat	On	110℃	
			Off	/	
	HP	High pressure switch		OFF:44(±1)kg/cm^2 ON:32(±1)kg/cm^2	
	LP	Low pressure switch		OFF:1.4(±1)kg/cm^2 ON:3.0(±1)kg/cm^2	
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25°C=5KΩ	
	Discharge thermostat	Thermostat (Inverter discharge)		BW120°C ON:120°C OFF:90°C	
Functional parts	PMV	Electronic expansion valve		UKV-32D210 (Foshan Hualu)	
	4-W/V	4-way valve		TB-STF-B01-R410A (Foshan Hualu), SHF-20A(Sanhua), DHF-20\R410A(Chunhui)	
	SV	Solenoid valve		FDF2A73 (Zhejiang Sanhua)	

Table 5.

Item	Symbol	Name		CMV-VH280W/ZR1 CMV-VH280W/YR1	CMVH-V335W/ZR1 CMVH-V335W/YR1
Compressor	Inverter	Inverter compressor		E655DHD-65D2YG	E655DHD-65D2YG
	Compressor Safety OLP	Starting current		/	/
	CCH	Crank case heater		35W	
Motor and security devices	Motor	Fan motor	Model	DR-310-180-8	
			Output power	180*2	
		Safety thermostat	On	110℃	
			Off	/	
	HP	High pressure switch		OFF:44(±1)kg/cm^2 ON:32(±1)kg/cm^2	
	LP	Low pressure switch		OFF:1.4(±1)kg/cm^2 ON:3.0(±1)kg/cm^2	
Temperature sensor	T3,T4	Temperature sensor (condenser outlet/ambient temperature)		25°C=5KΩ	
	Discharge thermostat	Thermostat (Inverter discharge)		BW120°C ON:120°C OFF:90°C	
Functional parts	PMV	Electronic expansion valve		UKV-32D210 (Foshan Hualu)	
	4-W/V	4-way valve		TB-STF-B01-R410A (Foshan Hualu), SHF-20A(Sanhua), DHF-20\R410A(Chunhui)	
	SV	Solenoid valve		FDF2A73 (Zhejiang Sanhua)	

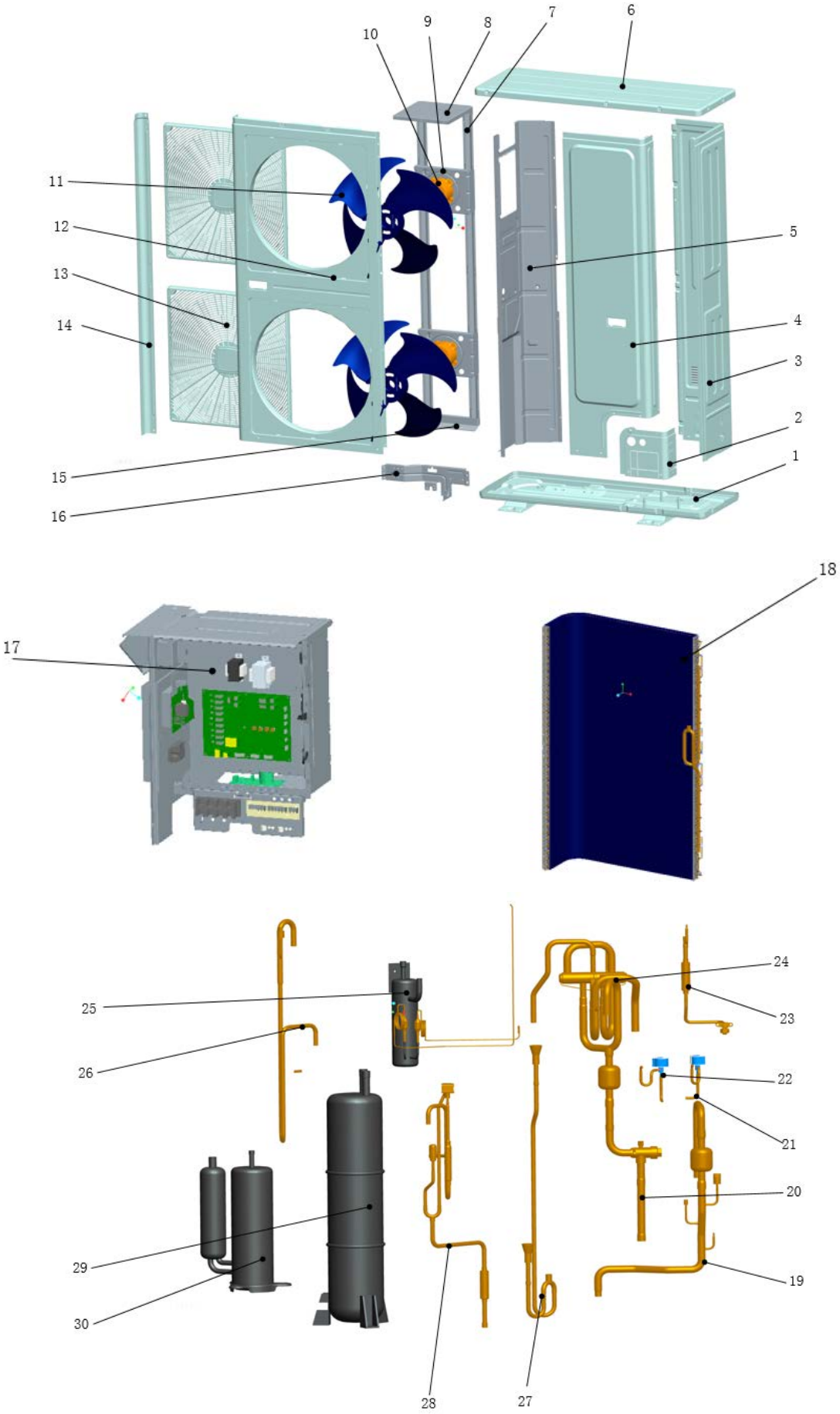
3 Exploded view

12.5KW, 14KW, 16KW, 18KW:



No.	Part name	Quantity	No.	Part name	Quantity
1	Chassis assembly	1	16	Uniaxial outdoor motor	2
2	The right side of the valve plate	1	17	Electronic control unit	1
3	Valve seat plate	1	17.1	Electric control board	1
4	Posterior valve plate	1	17.2	IPM module board	1
5	The right side plate	1	17.3	PFC board	1
6	The back plate	1	17.4	Single-phase filter plate	1
7	The baffle plate welding assembly	1	18	Condenser	1
8	Motor frame connecting plate	1	19	The high pressure stop valve assembly	1
9	The top cover with cotton component	1	20	Exhaust pipe assembly A	1
10	front panel	1	21	Exhaust pipe assembly B	1
11	Assembly welding motor bracket	1	22	Return pipe assembly	1
12	The motor fixing plate welding assembly	2	23	Electronic expansion valve assembly	1
13	Axial flow fan	2	24	The four valve assembly	1
14	frame	1	25	compressor	1
15	mesh enclosure	2	26	gas-liquid separator	1

22.4KW, 26KW, 28KW, 33.5KW:



No.	Part name	Quantity	No.	Part name	Quantity
1	Chassis assembly	1	16	Valve seat plate	1
2	Pipe cover	1	17	Electronic control unit	1
3	Right rear side panel assembly	1	18	Condenser	1
4	Right front side plate assembly	1	19	Return air tube assembly	1
5	Medium plate assembly	1	20	Low pressure ball valve assembly	1
6	Upper cover plate	1	21	SV4 solenoid valve assembly	1
7	Motor bracket assembly	2	22	SV2 solenoid valve assembly	1
8	Motor bracket mounting plate	1	23	High pressure stop valve assembly	1
9	Motor mounting base	2	24	Four way valve welding assembly	1
10	Single axis outdoor DC motor	2	25	Oil separator welding assembly	1
11	Axial flow fan	2	26	Exhaust pipe assembly	1
12	Front panel	1	27	Three way component	1
13	Front net cover	2	28	Electronic expansion valve assembly	1
14	Column	1	29	Gas liquid separator	1
15	Motor support plate	1	30	Frequency conversion compressor	1