Technical Manual for DC Inverter Air Conditioner

CATALOG

Part 1 General Information	5
1 Model Names of Indoor/Outdoor Units	5
2 External Appearance	6
2.1 Indoor Units	6
2.2 Outdoor Units	6
3 Nomenclature	7
Part 2 Indoor Units	
1 8-way Cassette Type (Compact)	8
1.1 Specifications	8
1.2 Dimensions	11
1.3 Service Space	12
1.4 Electrical Wiring Diagram	13
1.5 Air Velocity and Temperature Distributions	14
1.6 Sound Levels	15
1.7 Accessories (Options)	15
1.8 The Specification of Power	16
1.9 Installation Requirements of Indoor Unit	17
1) CEILING HOLE AND THE HOOK INSTALLATION	17
2) DRAINAGE PIPE INSTALLATION	19
3) INSTALLATION OF PANEL	21
2 Duct Type	23
2.1Specifications	23
2.2 Dimensions	27
2.3 Service Space	
2.4 Wiring Diagrams	
2.5 Sound Levels	
2.6 Accessories (Options)	
2.7 The Specification of Power	
2.8 Installation Requirements of Indoor Unit	31
1) Choice of air return ways	31
2) Hanging &Installation of Indoor Unit	
3) How to Mount Outlet Pipe	
4) Installation Method for Return Air Pipe	
5) Tips for Installation of Return Air Pipe and Outlet Pipe	
6) Installation of Drain Pipes	35
3 Ceiling& Floor Type	37
3.1 Specifications	
3.2 Wiring Diagrams	41
3.3 Air Velocity and Temperature Distributions	
3.4Sound Levels	44
3.5 Accessories (Options)	
3.6 The Specification of Power	45
3.7 Installation Requirements of Indoor Unit	45

1) Installation Space	45
2) FLOOR CONSOLE TYPE	46
3) UNDER CEILING TYPE	48
4) Installing indoor unit	49
5) DRAINAGE PIPE CONNECTION	50
Part 3 Outdoor Units	51
1.Specification	51
2 Sound Levels	55
3 Correction Curve of Capacity performance	55
1. Correction of Cooling Capacity	
2. Correction of Heating Capacity	
4. Normal Operation Temperature Range	58
5. Installation Dimension Drawing of Outdoor Unit	
6. Installation Requirements of Outdoor Unit	59
1. Hoisting and Transportation of Outdoor Unit	59
2. Installation Site of Outdoor Unit	
3. Installation Requirements of Side Air Outlet Outdoor Unit	60
7. Electrical Design	62
7.1. Specification of Power Supply	62
7.2. Electrical Wiring Diagram	64
8. Design and Installation of Connecting Pipes	67
8.1. Pipe length and drop height shall comply with the scope required below	67
8.2. Material and Size of the Pipes	67
8.3. Precautions for Installation:	68
8.4. Installation of Refrigerant Pipes	68
9. Heat Insulation Works	74
9.1. Insulation Materials and Thickness	74
9.2. Heat Insulation of Refrigerant Pipes	74
9.3. Heat Insulation of Drain Pipes	76
9.4. Precautions	76
Part 4 Maintenance	77
1. Troubleshooting of Inverter System	77
1.1. 8-way cassette; 4-way cassette	77
1.2. Ceiling & Floor	77
1.3. Duct	78
2. Fault Identification: Determine the fault type according to the symptom	79
3. Control System	81
3.1. Overview of Control System	81
3.2. Electrical Control of Outdoor Unit and Troubleshooting	
1) Main Control Board of Outdoor Unit(36K 48K 60K)	84
2) Spot-inspection Description of Outdoor Unit	
3) Display of Fault Codes	
18K ,24K outdoor PCB	
1 Compressor drive output, UVW	88
2 Monitor and test output	

	DC Inverter
3 Electronic expansion valve interface	
4——Exhaust temperature sensor interface。	
5- — Temperature sensor interface of outdoor temperature and condenser tube	
6——Outdoor DC fan output	
7——Four way valve output interface	
8——Power input	
4) Description of Address DIP	89
3.3 TCA-48/60HRA/DV3 Electric Control Box (ECB)	89
3.4 TCA-36HRA/DV Electric Control Box (ECB)	91
3.5 Troubleshooting and Repair	92
3.6 Electrical Control and Troubleshooting of Indoor Unit	101
1). Description of Motherboard of Indoor Unit (cassette)	101
2) Description of Motherboard of Indoor Unit (Duct/ Ceiling & floor)	102
15—FUSE	
3) Troubleshooting Methods	105
3.7 System Maintenance	105
1). Maintenance of Indoor Unit	105
2). Maintenance of Outdoor Unit	106
3). System Maintenance prior to Seasonal Shutdown	106
4). System Maintenance prior to Seasonal Startup	107
Annexes	
Annex 1 Analysis of Common Faults of Compressors	108
Annex 2 Faults Not Resulted from Air Conditioner	111
Annex 3 Parameter Table of Temperature Sensor	112
Annex 4 Parameter Table of Temperature Sensor	

Part 1 General Information

1 Model Names of Indoor/Outdoor Units

1.1 R410A (capacity multiplied by 1000Btu/h)

Туре	Function	18	24	26	48	60
4-way cassette	cooling and heating	\checkmark	×	×	×	×
8-way cassette	cooling and heating	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Duct	cooling and heating	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Ceiling&floor	cooling and heating	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark

1.2 Outdoor Units

Model of outdoor unit and corresponding indoor unit

Universal Outdoor unit Model	Compressor type	Compressor Brand	Matched indoor units
			TCB- 18CHRA/DVI(Q4) TCA-18CHRA/DVI
TCA-18HRA/DVO	Rotary DC Inverter	GMCC	TCA-18D2HRA/DVI
			TCA-18ZHRA/DVI
			TCA-24CHRA/DVI
TCA-24HRA/DVO	Rotary DC Inverter	GMCC	TCA-24D2HRA/DVI
			TCA-24ZHRA/DVI
	Rotary DC Inverter		TCA-36CHRA/DVI
TCA-36HRA/DVO		GUANGZHUU	TCA-36D2HRA/DVI
			TCA-36ZHRA/DVI
			TCA-48CHRA/DVI
TCA-48HRA/DV3O	Rotary DC Inverter		TCA-48D2HRA/DVI
			TCA-48ZHRA/DVI
		CHANCZHOU	TCA-60CHRA/DVI
TCA-60HRA/DV3O	Rotary DC Inverter		TCA-60D2HRA/DVI
			TCA-60ZHRA/DVI

2 External Appearance

2.1 Indo or Units



2.2 Outdoor Units



36K

48K / 60K.





3 Nomenclature



Part 2 Indoor Units

1 8-way Cassette Type (Compact)

1.1 Specifications

CASSETTE INDOOR						
Model name	el Cassette Indoor		TCB- 18CHRA/DVI(Q4)	T C A -18 C HR A /D VI	T C A -24 C H R A /D VI	T C A -36 C H R A /D VI
Powersupp	ly	V/Ph/H z	220- 240V~/50Hz/1P	220- 240V~/50Hz/1P	220- 240V~/50Hz/1P	220- 240V~/50Hz/1P
	Capacity	Btu/h	18000	18000	24000	36000
	Capacity	w	5276	5274	7034	10550
Cooling	Input	w	1640	1635	2180	3080
	Rated current	A	7.1	7.2	9.9	15.00
	EER	w/w	3.22	3.32	3.22	3.43
	Capacity	Btu/h	19650	19800	26000	40000
	Capacity	w	5759	5820	7620	11700
Heating	Input	w	1720.00	1740.00	2350.00	3248
	Rated current	A	7.90	8.1	10.6	15.5
	СОР		3.35	3.34	3.34	3.60
	Number of row		2	2	2	2
	Fin spacing	mm	1.4	1.30	1.30	1.4
	Fin material		Hydrophilic	Hydrophilic	Hydrophilic	Hydrophilic
Indoor coil	Tube outside	mm	φ7	φ7	φ7	φ7
	Tube material		inner grooved	inner grooved	inner grooved	Innergroover tube
	Coil length x height x width	mm	1370×210×25.4	2019×168×25.4	2019×168×25.4	1930×252×25.4
	Number of circuit		5	6.00	8.00	12
	Brand		DONG FANG	Lifeng	Lifeng	Lifeng
	Model		Y S K 3 0 - 6 E 1	YDK54-6-5	Y D K 5 5 - 6 - 5	YDK56-6-6
Indoor fan	Input	w	50/46/42	84/62/38	130/108/43	143/117/103
motor	Running current	A	0.23/0.20/0.19	0.38/0.29/0.18	0.60/0.49/0.21	0.66/0.54/0.48
	Capacitor	mF	2.0	25	3.5	3.5
	Speed (Hi/Me/Lo)	rpm	900/800/700	500/420/315	700/615/330	720/580/500
Indoor air flo	ow (Hi/Me/Lo)	m³/h	800/750/600	1100/900/800	1300/1000/900	1660/1300/1100
Indoor noise	e level (Hi/Me/Lo)	dB(A)	41/38/34	42/39/35	44/41/37	45/43/40
Indoor	Unit (W xHxD)	mm	575x260x575	840×230×840	840×230×840	840x300x840
dimension	Packing (W xHxD)	mm	725x300x725	925x290x925	925x290x925	925x360x925

-	•					
Indoor	Net	kg	24	19	25	30
weight	Gross	kg	29	23	30	35
	Unit (W xHxD)	mm	650x30x650	950×45×950	950x45x950	950x45x950
Panel	Packing (W xHxD)	mm	735x130x735	1035×80×1035	1035×80×1035	1035×80×1035
	Net/Gross	kg	2.5/4.5	6/9	6/9	6/9
Refrigerant	Туре		R 4 1 0 A	R 4 1 0 A	R 4 1 0 A	R 4 1 0 A
Refrigerant	Liquid side	mm	6.35	6.35	9.52	9.52
pipe	Gas side	mm	12.70	12.70	15.88	19.05
Max.height d	irop	m	15.00	15	20.00	30.00
Max.length c	onnecting pipe	m	30.00	30.00	35.00	50.00
Refrigeran	t charge with long	m	22.00	22.00	50.00	50.00
Drainage w	ater pipe diameter	mm	O D 3 2	O D 3 2	O D 3 2	O D 3 2
Ambient	Cooling	°C	21~43	21~43	21~43	21~43
temperature range	Heating	°C	-7 ~ 24	-7 ~ 24	-7 ~ 24	-7 ~ 24
Designe pre	ssure	Mpa	4.2/1.5	4.2/1.5	4.2/1.5	4.2/1.5
Operation C	ontrol		Remote control	Remote control	Remote control	Remote control

Notes:

1. Nominal cooling capacities are based on the following conditions: Indoor temp: 27°CDB, 19°CWB; Outdoor temp: 35°CDB; Equivalent ref. piping: 7.5m (horizontal)

2. Nominal heating capacities are based on the following conditions:

Indoor tem p: 20°C DB; Outdoor tem p: 7°C DB; 6°C WB; Equivalent ref. piping: 7.5m (horizontal) 3. Actual noise level may differ, depending on the room structure, etc, since these noise values are from an anechoic room.

Remark: The above design and specification are subject to change without prior notice for product improvement.

Mar da Lucau a				
Modelname	Cassette Indoor		1CA-482HRA/DV31	TCA-60CHRA/DV31
Power supply		V/Ph/Hz	220-240V~/50Hz/3P	220-240V~/50Hz/3P
	Capacity	Btu/h	48000	60000
	Capacity	w	14000	17500
Cooling	Input	W	4220	5450
	Rated current	А	8.2	9.50
	EER	W /W	3.32	3.21
	Capacity	Btu/h	53000	63000
	Capacity	W	15530	18400
Heating	Input	W	4440	5443
	Rated current	А	9.1	10.10
	СОР	W /W	3.50	3.38
	Number of row		2	2
	Fin spacing	mm	1.4	1.4
	Fin material		Hydrophilic aluminium	Hydrophilic aluminium
Indoor coil	Tube outside diameter	mm	φ7	φ7
	Tube material		Innergroover tube type	Innergroover tube type
	Coil length x height x width	mm	1930×252×25.4	1930×252×25.4
	Number of circuit		12	12

	Brand		Lifeng	Lifeng
	Model		YDK56-6-6	YDK56-6-6
	Input	w	143/117/103	143/117/103
Indoor fan motor	Running current	А	0.66/0.54/0.48	0.66/0.54/0.48
	Capacitor	mF	3.5	3.5
	Speed (Hi/Me/Lo)	rpm	720/580/500	720/580/500
Indoor air flow (Hi/Me/	Lo)	m³/h	1660/1300/1100	1700/1300/1100
Indoor noise level (Hi/	Me/Lo)	dB(A)	47/45/42	50/47/45
	Unit (W xHxD)	mm	840x300x840	840x300x840
Indoor dimension	Packing (W xHxD)	mm	925x360x925	925x360x925
	Net	kg	30	31
Indoor weight	Gross	kg	35	36
	Unit (W xHxD)	mm	950x45x950	950x45x950
Panel	Packing (W xHxD)	mm	1035×80×1035	1035×80×1035
	Net/Gross	kg	6/9	6/9
Refrigerant	Туре		R 4 1 0 A	R 4 1 0 A
	Liquid side	mm	9.52	9.52
Refrigerant pipe	Gas side	mm	19.05	19.05
Max.height drop		m	30.00	30.00
Max.length conneting	pipe	m	50.00	50.00
Refrigerant charge wit	h long pipe	m/g	20.00	20.00
Drainage water pipe diameter		mm	O D 3 2	O D 3 2
Ambient temperature	Cooling	°C	21~43	21~43
range	Heating	C	-7 ~ 24	-7 ~ 24
Operation Control			Remote control	Remote control

Notes:

Notes: capacities are based on the following conditions: Outdoor temp: 35°CDB; Equivalent ref. piping: 7.5m (horizontal) capacities are based on the following conditions: temp: 7°CDB, 6°CWB; Equivalent ref. piping: 7.5m (horizontal) the room structure, etc, since these noise values are from an anechoic room.

ation are subject to change without prior notice for product improvement.

121

1.2 Dimensions



CONSTITUTION OF PANEL



1.PANEL 2.AIR FLOW LOUVER 3.INFRARED SIGNAL RECEIVER 4.DISPLAY PANEL 5.AIR-IN GRILLE

1.3 Service Space



A>330mm

	Wall material	Flammable material	Fire-proof material or other nonflammable materials other than metal	Fire-proof structure
	Up(B)	Above 5cm	Above 5cm	Above 5cm
	Sides(C)	Above 100cm	Above 100cm	

HEIGHT BETWEEN CEILI NG AND FLO OR

The installat ion height b etween ceiling and floor must be 2.7m~3.2m.

1.4 Electrical Wiring Diagram



1.5 Air Velocity and Temperature Distributions



Airflow velocity



1.6 Sound Levels



Madal	Noise leve l dB(A)				
Widder	Н	М	L		
TCA-1 8CHRA/DVI	42	39	35		
TCA-2 4CHRA/DVI	44	41	37		
TCA-3 6CHRA/DVI	45	43	40		
TCA-4 8CHRA/DVI	47	45	42		
TCA-6 0CHRA/DVI	50	50	45		

1.7 Accessories (Options

	Name	Shape	Quantity
INSTALLATION FITTINGS	Installation paper board		1
Tubing & Fittings	Soundproof / insulation s heath	(0)	2
	Connecting pipe group		1
Drainpipe Fitti ngs	Out-let pipe sheath	Ó	1
	Out-let pipe clasp		1
	Drain joint	S	1
	Seal ring		1
Remote controller & Its Fram e	Remote controller & Its Fr ame		1

	Remote controller holder		1
	Mounting screw(ST2.9×10-C-H)	E DIM	2
	Alkaline dry batteries (AM4)	Œ	2
Others	Owner's manual		1
Others	Installation manual		1
Installation accessory (The product you have might	Expansible hook		4
accessories	Installation hook		4
	Orifice		1

1.8 The Specification of Power

М	ODEL	TCA-18CHRA	TCA-24CHRA	TCA-36CHRA	TCA-48CHRA	TCA-60CHRA
		/DV	/DV	/DV	/DV3	/DV3
INDOOR	PHASE	1-PHASE	1-PHASE	1-PHASE	3-PHASE	3-PHASE
UNIT	FREQUENCY	220-240V	220-240V	220-240V	220-240V	220-240V
POWER	AND VOLT	50Hz	50Hz	50Hz	50Hz	50Hz
	POWER					
	WIRING	3*2.5	3*2.5	3*2.5	3*2.5	3*2.5
	(MM ²)					
	CIRCUIT	15	15	15	15	15
	BREAKER (A)	15	15	15	15	15
OUTDOOR	PHASE	1-PHASE	1-PHASE	1-PHASE	3- PHASE	3- PHASE
UNIT	FREQUENCY	220 2401/ 5047				
POWER	AND VOLT	220-2407 30H2	220-2407 2002	220-2407 2002	3800 3002	380V 30HZ
	POWER					
	WIRING	3*4.0	3*4.0	3*4.0	4*4.0	4*4.0
	(MM ²)					
	CIRCUIT	20	20	20	20	20
	BREAKER (A)	50	30	50	30	30
INDOOR/	OUTDOOR					
CONNECTION WIRING(WEAK ELECTRIC		3*0 75	3*0 75	2*0 75	2*0 75	3*0 75
		5 0.75	5 0.75	5 0.75	5 0.75	5 0.75
SIGNA	L((MM ²)					
INDOOR/OUTDOOR						
CONNECTION		2*7 5	2*7 5	2*2 5	2*2 5	2*2 5
WIRING	G(STRANG	5 2.5	5 2.5	5 2.5	5 2.5	5 2.5
ELECTRIC SI	GNAL((MM ²)					

1.9 Installation Requirements of Indoor Unit

1) CEILING HOLE AND THE HOOK INSTALLATION

Preparation Work on the Ceiling

Installation methods should be changed under the different construction structure. Please consult the professional for the detailed information. After opening a hole, the ceiling should be horizontal and strong to prevent vibration. Cut the beams at the hole and remove them . Reinforcing the beams that have been cut and the beams fixing the ceiling .Installation of the hanging screw bolt. Bolt with M10 whorl is to be used. The center distance between the bolts is decided by the size of the unit. Use the following method to install:

Wooden construction

Put the square timber over the roof beam, then install the hanging screw bolts.



For finished concrete bricks

Install the hanging hook with expansible bolt into the concrete deep to 45~50mm to prevent loose.



New Concrete Bricks

Inlaying or embedding the screw bolts.





Steel bar

Pipe hanging and embedding screw bolt (Pipe hanging and embedding screw bolt)

Steel roof beam structure Install the supporting angle steel.



Overhanging the indoor unit

Adjust the gasket (down side) to 90mm over the ceiling.



Install the hanging bolt into T groove of the hanging tool. Overhang the indoor unit and ensure it is level using a level in dicator.



2) DRAINA GE PIPE INSTALLATIO N

CAUTION

The drain pipe of indoor unit must have the heat insulation , or it will condense dew, as well as the connections of the indoor unit. The declivity of the drain pipe downwards should be over 2/100, and no winding and bending. The total length of the drain pipe when pulled out traversely should not exceed 20m , when the pipe is over long, a prop stand must be installed every 1.5 to 2m to prevent winding. Refer to the following figures about the installation of the pipes. Do not impose any pr essure on the connection part of the drainage pipe .



Drainage Pipe Material, Heat-insulating Material

The listed material should be used:

Drainage Pipe Material	Polyvinyl c hloride pipe (f32mm outer diameter)
Heat Insulation Material	Foamed po lyethylene insulation plate (10mm thick ness)

Flexible Hose

Measure diameter of the hard pipe using cutting method, and adjust the joining angle. Pull out the flexible hose, do not over deform than illustrated below. Be sure to bind it with the attached band. Ple ase place the flexible hose horizontally.



Connection Procedure

Connect the transparent pipe with the polyvinyl chloride pipe. Use polyvinyl chloride glue at the conn ection part of the drain age pipe, be sure no water leakage.Paste glue at the front 40m m of the polyvinyl chloride pipe, insert it into the transparent pipe. It needs 10 minutes for the glue to dry. Do not impose pressure on the connection during the drying period.

Heat Insulat ion

Wrap the fle xible hose carefully with the attached heat insulation material rom the start to the end (to indoor part)



Drainage Upward

To make sure that the drainage pipe would not be slanteddownward, lead it upward to a height 360mmmaximum, then downward lead it.



Drainage Test

Check whet her the drain pipe is unhindered before testing.

1) Stow water from sprue to check.

2) Stow 600cc water with pot or hose from sprueslowly, preventing touchng the drain pump motor.

3) After the preparation work, disconnect the water level switch, power 20-240VAC to of terminal board, and the drain pump start up immediately.

4) After drain pump run 2 min., reset he water level pin, and t e drain pump motor will stop after running 1 min..



Motor Sound Test

The drainage test is doing during checking the drain pump motor running sound . Reset the water level switch connection to the original position after the drainage test .

3) INSTALLATION OF PANEL

1 BODY DIMENSION:



2 INSTALLATION OF PANEL

1.Please screw M10 gasket and M6 *20 bolt at the corner of indoor unit ,before scre wing them fasten ,screw other two a dditional bolts which locates red bolt s howing as figure and notice that the direction of red arrow on the electrica I box aligns the one on the panel.

2.Please connect step motor wire, display board wire to the electrical box according to ELECTRIC WIRING DIAGRAM on the electrical box.

3. Then screw the other two M6*2 0 bolt with M10 gasket through the hole of panel into outdoor unit 4 4. Adjust t he location and direction of panel to tally louver of panel with outlet of outdoor, screw all the

bolts fasten to make the panel and outdoor unit Pressed to gether.

5.Return the air-in grille and panel back to the outdoor unit.



2 Duct Type

2.1Specifications

Model			TCA-18D2HRA/DVI	TCA-24D2HRA/DV3I	
Туре					
Control type			Rem	ote Controller	
Static proceuro	Standard	Da	40	50	
Static pressure	Range	Pd	0~40	0~50	
	Capacity	Btu/h(W)	18(5274)	24(7074)	
Cooling	Input	W	1635	2180	
capacity	Current	А	7.2	9.9	
	EER	W/W	3.22	3.22	
	Capacity	Btu/h(W)	19800(5800)	26000(7620)	
Heating	Input	W	1810	2350	
capacity	Current	А	8.1	10.6	
	СОР	W/W	3.43	3.34	
Indoor noise	High	dB(A)	43	46	
level at cooling(sound	Med.	dB(A)	40	41	
pressure level)	Low	dB(A)	36	37	
Refrigerant type/Quantity	Туре		R410A	R410A	
Design pressure		MPa	4.2/1.5	4.2/1.5	
Electrical Data					
Power supply			220-240V~/50Hz	220-240V~/50Hz	
Voltage Range		V	220~240	220~240	
Refrigerating Sys	stem				
	Model		YSK68-4P-5	YSK74-4P-5	
la de en feir	Qty		1	1	
motor	Input	W	98/86/72/66	190/136/104/82	
motor	Capacitor	uF	4	5	
	Speed (Hi/Mid/Lo)	r/min	1140/1000/775/660	990/830/720/640	
	Number of rows		3	3	
Indoor coil	Fin spacing	mm	1.4	1.4	
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	
	Tube outside diameter .and type	mm	Φ7,inner grooved tube	Φ7,inner grooved tube	

	Coil	mm	761×252×38.1	761×252×50.8		
	Number of circuits		6	6		
Ean Sustam				<u> </u>		
ran system		1/6				
Indoor air circula	tion(Cooling/Heating)	L/S	1100/000/700	1200/1100/000		
Indoor fan tyno		1113/11	Contrifugal	Contrifugal		
			Centrilugar	Centinugai		
Connections	Liquid	mm	6 35	9.52		
Pine	Gas	mm	12 7	15.88		
Max, height drop	(high head)	m	15	30		
Max. length of co	onnecting pipe	m	30	50		
Refrigerant charg	re with long nine	g/m	22	50		
Drainage Pipe	50 mm 10110 p.p.0	8, mm	0.D32	0.D 32		
Others						
Net dimensions	(W x H x D)	mm	920×210×570	920×270×570		
Net weight	. ,	kg	23	27		
Packing dimensio	ons (W x H x D)	mm	1115×280×690	1115×340×690		
Gross weight kg			23	26		
Note						
Specifications are based on the following conditions:						
Cooling: Indoor	temperature 27°C DB	/19℃WB,ai	nd outdoor temperatur	e 35℃ DB/24℃ WB		
Heating: Indoor	temperature 20 $^\circ\!\!\!\mathrm{C}$ DB	/15℃WB,a	nd outdoor temperatu	re 7℃ DB/6℃ WB.		
Voltage:220V.						
Sound Level: In	door unit sound pressu	ire level,me	asured at a point 1.5m	downward from the un	nit center.	
Outdoor unit so	ound pressure level,me	asured at a	point 1.0m in front of	the unit.		
Optional simple	e wired controller; Univ	versal remot	e controller; auto-resta	art(optional); Timer:onl	y one circle.	
Due to ongoing	product development	, specificatio	ons are subject to chan	ge without notice.		
Model			TCA-36D2HRA/DV	TCA-48D2HRA/DV3	TCA-60D2HRA/DV3	
Туре						
Control type			Remo	ote Controller		
Static pressure	Standard	Pa	80	100	100	
	Range	14	0~80	0~100	0~100	
	Capacity	Btu/h(W)	36000(10550)	48000(14000)	60000(17500)	
Cooling	Input	W	3050	4180	5420	
capacity	Current	А	15.0	8.2	9.5	
	EER	W/W	3.46	3.35	3.23	
Heating	Capacity	Btu/h(W)	40000(11700	53000(15530)	63000(18400)	
capacity	Input	W	3224	4440	5460	
/	Current	А	15.5	9.1	10.1	

	СОР	w/w	3.63	3.50	3.37
Indoor noise	High	dB(A)	47	49	51
level at cooling(sound	Med.	dB(A)	44	47	49
pressure level)	Low	dB(A)	40	44	46
Refrigerant type/Quantity	Туре		R410A	R410A	R410A
Design pressure		MPa	4.2/1.5	4.2/1.5	4.2/1.5
Electrical Data					
Power supply			220-240V~/50Hz	220-240V~/50Hz	220-240V~/50Hz
Voltage Range		V	220~240	220~240	220~240
Refrigerating Sys	stem				
	Model		YSK140-4P-5	YSK170-4P-2	YSK180-4P-5
la de en feir	Qty		1	1	1
indoor fan	Input	W	268/218/156	326/248/182	326/268/204
motor	Capacitor	uF/ V	10	10	10
	Speed (Hi/Mid/Lo)	r/min	1000/940/760	1100/980/690	1025/895/750
	Number of rows		3	3	4
	Fin spacing	mm	1.4	1.4	1.4
	Fin true e		Hydrophilic	Hydrophilic	Hydrophilic
Indoor coil	rintype		aluminium	aluminium	aluminium
	Tube outside diameter .and type	mm	Ф7,inner grooved tube	Φ7,inner grooved tube	Φ7,inner grooved tube
	Coil length×height×width	mm	927.8×822×36.4	1058×378×50.8	1058×378×50.8
	Number of circuits		7	8	8
Fan System	·			•	
		L/S	458/402/291	555/472/347	661/500/416
Indoor air circula	ition(Cooling/Heating)	m3/h	1650/1450/1050	2000/1700/1250	2200/1800/1500
Indoor fan type		•	Centrifugal	Centrifugal	Centrifugal
Connections					
Connecting	Liquid	mm	9.52	9.52	9.52
Pipe	Gas	mm	19.05	19.05	19.05
Max. height drop (high head)		m	30	30	30
Max. length of co	onnecting pipe	m	50	50	50
Refrigerant char	ge with long pipe	g/m	50	50	50
Drainage Pipe		mm	0.D 25	O.D25	0.D25
Others					

Net dimensions (W x H x D)	mm	1140×270×710	1200×300×800	1200×300×800				
Net weight	kg	35	45	45				
Packing dimensions (W x H x D)	mm	1345×360×830	1405x375x925	1405x375x925				
Gross weight	kg	40	52	52				
Loading Capacity								
Note								
Specifications are based on the following conditions:								
Cooling: Indoor temperature 27 $^\circ\!\!\mathrm{C}$ DB,	/19℃WB,a	nd outdoor temperatu	re 35℃ DB/24℃ WB					
Heating: Indoor temperature 20 $^\circ\!\mathrm{C}$ DB	/15℃WB,a	nd outdoor temperatu	re 7℃ DB/6℃ WB.					
Voltage:220V.								
Sound Level: Indoor unit sound pressure level, measured at a point 1.5m downward from the unit center.								
Outdoor unit sound pressure level, measured at a point 1.0m in front of the unit.								
Optional simple wired controller; Universal remote controller; auto-restart(optional); Timer:only one circle.								
Due to ongoing product development,	, specificati	ons are subject to chan	Due to ongoing product development, specifications are subject to change without notice.					

2.2 Dimensions

1. The positioning of celling hole, indoor unit and hanging screw bolts .



Air inlet size



Position size of descens ional ventilation opening.







												Siz	e of
	C	Dut line	dimen	sion	Air	outlet o	pening	size	Air ret	urn oper	ning size	mount	ed lug
	А	В	С	D	Е	F	G	Н	I	J	К	L	М
18	920	210	635	570	65	713	35	119	815	200	80	960	350
2 4	920	270	635	570	65	713	35	179	815	260	20	960	350
36	1140	270	775	710	65	933	35	179	1035	260	45	1240	500
4 8/ 60	1200	300	865	800	80	968	40	204	1094	268	45	1240	500

2.3 Service Space



2.4 Wiring Diagrams



2.5 Sound Levels



Madal	Noise level dB(A)				
Woder	Н	М	L		
TCA-18D2HRA/DVI	43	40	36		
TCA-24D2HRA/DVI	46	41	37		
TCA-36D2HRA/DVI	47	44	40		
TCA-48D2HR A/DV3I	49	47	44		
TCA-60D2HR A/DV3I	51	49	46		

2.6 Acce ssories (Options)

	Name	Shape	Quantity
	S oundproof / insulation sheath	0	2
lubing & Fittings	Binding tape		1
	S eal sponge		1
Drainpipe Fittings	Drain joint		1
(for cooling & heating)	S eal ring	0	1
	Remote controller		1
Kemole controller & its Frame	Frame		1

	Mounting screw(ST2.9 10-C-H)	S Martin	2
	Alkaline dry batteries (AM 4)	Œ	2
	Remote controller manual		1
Wired control ler & Its Frame	W ired controller		1
Othore	Owner' s manual		1
Others	In stallation manual		1
EMS & It's fitting	Magnetic ring (twist the electric wires L and N around it to five circles)		1

2.7 The Specification of Power

	MODEL	TCA-18D2HR A/DV	TCA -24D2HRA/D V3	
INDOOR	PHASE	1-PHASE	1-PHASE	
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	220-240V 50Hz	
POWER	POWER WIRING (M M ²)	3*2.5	3*2.5	
	CIRC UIT BREAKER (A)	15	15	
OUTDOOR	PHASE	1-PHASE	3- PHASE	
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	380V 50Hz	
POWER	POWER WIRING (M M ²)	3*4.0	4*4.0	
	CIRC UIT BREAKER (A)	30	30	
INDO OR/OUTDOO R CONNECTION WIRING(WEAK ELECT RIC SIGNAL((MM ²)		3*0.75	3*0.75	
INDC WIRING(INDO OR/OUTDOO R CONNECTION WIRING(STRANG ELECTRIC SIGNAL (MM ²)		3*2.5	

MOD EL		TCA-36D2HR A/DV	TCA -48D2HRA/D V3	TCA-6 0D2HRA/DV3
INDOOR	PHASE	1-PHASE	1-PHASE	1 -PHASE
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	220-240V 50Hz	220-240V 50Hz
POWER	POWER WIRING (M M ²)	3*2.5	3*2.5	3*2.5
	CIRC UIT BREAKER (A)	15	15	15
OUTDOOR	PHASE	1-PHASE	3- PHASE	3- PHASE
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	380V 50Hz	38 0V 50Hz
POWER	POWER WIRING (M M ²)	3*4.0	4*4.0	4*4.0
	CIRC UIT BREAKER (A)	30	30	30
INDO OR/OUTDOO R CONNECTION WIRING(WEAK ELECT RIC SIGNAL((MM ²)		3*0.75	3*0.75	3*0.75

INDO OR/OUTDOO R CONNECTION	3*2.5	3*2.5	3*2.5
WIRING(STRANG ELECTRIC SIGNAL (MM ²)			

2.8 Installation Requirements of Indoor Unit

1) Choice of air return ways

This indoor unit is fitted with downward air return, which can be change to its backward counterpart if necessary. Please follow the steps below(2-5) to change it into the mode of air return backward(6). 1.Air return downward



1. Loose the nut and dismantle flannel plate and filter; Loose the nut dismantel the back over.



2. Install the flannel plate and filter at the backside; Install the cover to the downside.



3. Air return backward.



2) Hanging & Installation of Indoor Unit

Adjust the nut position while the gap between gasket(downside) and ceiling should be confirmed acc ording to actual situations.



B elow thec eiling

Hang the nut inside the U slot of the installation panel.To confirm level degree with gradienter . (Leaning downside toward non-draining side is prohibited)

3) How to Mount Outlet Pipe

Generally, we have two types of outlet pipe available, i.e. rectangular or round ones. Rectangular air conduit can be directly connected to air outlet of indoor unit by rivets. Foroutlet dimensions, see outline drawing of the unit.

Round air conduit should be connected to a piece of transitional air conduit before it is connected to air outlet of indoor unit, the other end of it can be separately connected to air conduit window or connected to air conduit window after air flow diversion, and the total length should not be over 6m. As shown in figure below, air speeds at all air outlets should be set to basically consistent so as to meet the room air-conditioning requirements.



4) Installation Method for Return Air Pipe

In case sidewise air intake is adopted, return air pipe should be fabricated and rivet-connected to return air orifice, and the other end of it should be connected to return air window.

In case of underside air intake, purchase or fabricate a section of pleated canvas air conduit serving as transition joint for return air orifice and return air window. in this way, it can be freely adjusted according to height of indoor ceiling board; in addition, during operation of the unit, canvas air conduit may avoid vibration of ceiling board, as shown in figure below.



Installation mode for underside air intake

Installation mode for sidewise air intake

5) Tips for Installation of Return Air Pipe and Outlet Pipe

To minimize energy loss occurring in transmission process and condensed water during heating operation, return air pipe and outlet pipe shall be equipped with heat-insulating layer as shown in the figure.:



Return air pipe and outlet pipe shall be fixed to floor precast slabs by iron stand; in addition, all ports of the air conduit should be tightly sealed by gasket cement, and it is advisable that the edge clearance of return air pipe shall be 150mm at least.

Drain pipe for condensed water shall be installed with minimum gradient of 1 %, and the drain pipe shall be insulated with heat-preserving pipe casing as well.



Precautions for Installation of Air Conduit:

1) The holes shall be reserved for the air conduits and parts to pass through the wall, slabor roofing, and the hole size and position shall comply with the design requirements;

- 2) The configuration of air conduit joint on the site may not reduce its effective cross section;
- 3) The support and hanger of air conduit cannot be set up at air port, valve, manhole and automatic control mechanism; the boom/suspender shall not be directly fixed on the flange;
- 4) The configuration of air conduit joint on the site may not reduce its effective cross section;
- 5) Deviation standard for hoisting operation of air conduit

	Horizontal Installation	Vertical Installation	
Open-type Installation	δ≤3mm/m ∆≤20mm	δ≤2mm/m ∆≤20mm	
Concealed Installation	Correct position, free from any obvious deviation		

 δ – Deviation per meter; – total deviation

- 6) The support and hanger of heat-preservation air conduit shall be located outside of the insulation layer, and may not damage the insulation layer;
- 7) The spacing of support and hanger shall comply the following provisions unless otherwise required in the design:

	Diameter(long side) size<400mm	Diameter(long side)≥ 400mm	
Horizontal spacing	≤4mm	≤3mm	
Vertical spacing	≤4mm, each riser shall be equipped with less than 2 fixed parts		

6) Installation of Drain Pipes

Warning:

Must install drainpipes according to the following figure, avoiding generating condensed water and leakage water.

a. Assemble the main body according to the Figure.

b. The opening of drainpipes can be installed on the leftside or the right side . Could remove the drain stopper and put it on the leftside or the right side.

c. For the best effect, should keep pipes as short as possible. Tilt the pipes to ensure the flow of fluid.

d. Make sure the drainpipes have admirable heat insulation.

e. It is necessary to install a trap near the opening of the drainpipe, so that when the machine is working, the pressure in the inside of the machine is lower than atmospheric pressure. If there isn't an elbow, the water will splash and the pipe will produce a bad smell.

f. keep straightness of drainpipes so as to remove dirt.

g. Seal the drainpipe on the other side of the machine, then wrap up the drainpipe in the heat-barrier materials.

h. Put water into the drain pan to test whether the water can be discharged swimmingly.

i. In humid conditions, please must use a add-on drain pan(commercially available) to cover the whole area of the indoor unit.



Unit: mm

Drainage Experiment

◆ Before the test, it is necessary to ensure the unblocking state of drain pipes, and check the sealing performance of various joints;

- The new room shall be subject to a drainage test before laying the ceiling;
- Inject a certain amount of water from the air outlet to check the drainage condition.

Precautions: the insulated cotton is used for the heat preservation of drain pipe after making sure the unblocked drainage and no water leakage; otherwise, it may result in the generation of condensed water.
3 Ceiling& Floor Type

3.1 Specifications

Model			TCA-18ZHRA/DV	TCA-24ZHRA/DV3	
	Capacity	Btu/h(W)	18000(5274)	24000(7034	
Cooling	Input	W	1635	2180	
capacity	Current	А	7.2	9.9	
	EER	w/w	3.32	3.22	
	Capacity	Btu/h(W)	19800(5800)	26000(7620)	
Heating	Input	W	1810	2350	
capacity	Current	А	8.1	10.6	
	СОР	w/w	3.43	3.34	
Indoor noise	High	dB(A)	43	45	
level at cooling(sound	Med.	dB(A)	41	43	
pressure level)	Low	dB(A)	38	40	
Defrigerent	Туре		R410A	R410A	
Refrigerant type/Quantity	Charged volume(20m)	kg	Refer to outdoor unit	Refer to outdoor unit	
Design pressure		MPa	4.2/1.5	4.2/1.5	
Electrical Data					
Power supply			220-240V~/50Hz	220-240V~/50Hz	
Voltage Range		V	220~240	220~240	
	Model		YSK36-4P	Y6S443B5136	
Indoor fan	Qty		1	1	
motor	Input	W	86/82/74/64	136/122/112/90	
	Capacitor	uF	2.5	2.5	
	Speed (Hi/Mid/Lo)	r/min	985/940/850/740	1230/1150/1045/860	
	Number of rows		3	3	
Indoor coil	Fin spacing	mm	1.5	1.5	
	Finitypo		Hydrophilic	Hydrophilic	
			aluminium	aluminium	
	Tube outside	mm	Φ7,inner grooved	Φ7,inner grooved	
	diameter .and type		tube	tube	

	Coil length×height×width	mm	810×294×25.4	810×294×25.4		
	Number of circuits		5	6		
Fan System						
Indoor air circulat	tion(Cooling/Heating)	L/S				
	tion(cooling/neating)	m3/h	1000/950/850	1300/1200/1100		
Indoor fan type			Centrifugal	Centrifugal		
Connections						
Connecting	Liquid	mm	6.35	9.52		
Pipe	Gas	mm	12.7	15.88		
Max. height drop	(high head)	m	15	30		
Max. length of co	nnecting pipe	m	30	50		
Refrigerant charge with long pipe		g/m	22	50		
Drainage Pipe mi		mm	0.D32	O.D 32		
Others						
Net dimensions (W x H x D) r		mm	1055x675x235	1055x675x235		
Net weight		kg	24	25		
Packing dimensio	ns (W x H x D)	mm	1130x748x305	1130x748x305		
Gross weight		kg	29	30		
Loading Capacity						
Note						
Specifications are based on the following conditions:						
Cooling: Indoor	temperature 27 °C DB,	/19℃WB, ar	nd outdoor temperature	e 35℃ DB/24℃ WB		
Heating: Indoor	temperature 20°C DB	/15℃WB,a	nd outdoor temperatur	e 7℃ DB/6℃ WB.		
Voltage:220V.						
Sound Level: Indoor unit sound pressure level, measured at a point 1.5m downward from the unit center.						
Outdoor unit so	ound pressure level,me	asured at \overline{a}	point 1.0m in front of t	he unit.		
Optional simple wired controller; Universal remote controller; auto-restart(optional); Timer:only one circle.						

Due to ongoing product development, specifications are subject to change without notice.

Model			TCA-36ZHRA/DVI	TCA-48ZHRA/DV3I	TCA-60ZHRA/DV3I
	Capacity	Btu/h(W)	36000(10550)	48000(14000)	60000(17500)
Cooling	Input	W	3090	4140	5500
capacity	Current	А	15.0	8.2	9.5
	EER	W/W	3.41	3.38	3.18
	Capacity	Btu/h(W)	40000(11700)	53000(15530)	63000(18400)
Heating	Input	W	3270	4438	5420
capacity	Current	А	15.5	9.1	10.1
	СОР	W/W	3.58	3.5	3.39
Indoor noise	High	dB(A)	46	52	54
level at cooling(sound	Med.	dB(A)	44	49	51
pressure level)	Low	dB(A)	42	46	48
Pofrigorant	Туре		R410A	R410A	R410A
type/Quantity	Charged volume(20m)	kg	2.70	3.80	4.1
Design pressure		MPa	4.2/1.5	4.2/1.5	4.2/1.5
Electrical Data					
Power supply			220-240V~/50Hz	380-415V~3N /50Hz	380-415V~3N /50Hz
Voltage Range	Voltage Range		220~240	380~415	380~415
Refrigerating Sys	stem				
	Model		Y6S443C0100	Y6S443B5137	Y6S443B8108
Indoor for	Qty		1	2	2
motor	Input	W	158/140/124	117/101/95x2	126/124/122x2
motor	Capacitor	uF	4.5	3.5	6
	Speed (Hi/Mid/Lo)	r/min	1235/1115/960	1185/980/890	1250/1165/1000
	Number of rows		3	3	4
	Fin spacing	mm	1.5	1.5	1.5
Indoor coil	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside diameter .and type	mm	Φ7,inner grooved tube	Φ7,inner grooved tube	Φ7,inner grooved tube
	Coil length×height×width	mm	982×294×38.1	1328×294×38.1	1328×294×50.8
Number of circuits			10	10	11
Fan System					
Indoor air aireula	tion/Cooling/Hosting)	L/S	416/347/280	500/436/347	555/491/402
Indoor air circulation(Cooling/Heating)		m3/h	1500/1250/1050	1800/1550/1250	2000/1770/1450

					DC Inverter Air
Indoor fan type	e		Centrifugal	Centrifugal	Centrifugal
Connections					
Connecting	Liquid	mm	9.52	9.52	9.52
Pipe	Gas	mm	ф 19.05	ф 19.05	ф 19.05
Max. height dr	op (high head)	m	30	30	30
Max. length of	connecting pipe	m	50	50	50
Refrigerant cha	arge with long pipe	g/m	50	50	50
Drainage Pipe		mm	O.D25	O.D25	O.D25
Others					
Net dimension	s (W x H x D)	mm	1275x675x235	1635x675x235	1635x675x235
Net weight		kg	29	38	41
Packing dimen	sions (W x H x D)	mm	1350x748x305	1710x748x305	1710x748x305
Gross weight		kg	35	46	48
Loading Capac	ity				
Note					
Specifications	s are based on the follo	owing conditio	ns:		
Cooling: Indo	or temperature 27 $^\circ\!{ m C}$ (DB/19℃WB,ar	nd outdoor temperature	e 35℃ DB/24℃ WB	
Heating: Indo	oor temperature 20 $^\circ\!\!\!{ m C}$	DB/15℃WB,a	nd outdoor temperatur	e 7℃ DB/6℃ WB.	
Voltage:230V	/.				
Sound Level:	Indoor unit sound pres	ssure level,me	asured at a point 1.5m	downward from the un	it center.
Outdoor unit	sound pressure level,	measured at a	point 1.0m in front of t	he unit.	

Optional simple wired controller; Universal remote controller; auto-restart(optional); Timer:only one circle.

Due to ongoing product development, specifications are subject to change without notice.

Т

3.2 Wirin g Diagra ms





A irflow velo city

Temperature



Discharge angle 60°(FLOOR)

Airflow velocity



Temperature



3.4Sound Levels







Model	Noise level dB(A)				
	Н	М	L		
TCA-18ZHRA/DVI	41	41	38		
TCA-24ZHRA/DVI	45	43	40		
TCA-36ZHRA/DVI	46	44	42		
TCA-48ZHRA/DVI	52	49	46		
TCA-60ZHRA/DVI	54	51	48		

3.5 Accessories (Options

	Name	Shape	Quantity
Installation fittings	1.Hook		2
	2.Hanging arm	A R C R	2
	3. Remote controller		1
Remote contro ller & Its holder	4. Remote controller holder		1
	5. Mounting screw (ST2.9 ×10-C-H)	9	2
	6. Alkaline dry batteries (AM4)	œ	2

DC Inverter Air

Others	7. Owner's manual	1
	8. Installation manual	1
	9. Remote controller manual	1

3.6 The S pecification of Pow er

MOD EL		TCA-18ZHR A/DV	TCA-24ZHRA/D V3	
INDOOR	PHASE	1-PHASE	1-PHASE	
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	220-240V 50Hz	
POWER	POWER WIRING (M M ²)	3*2.5	3*2.5	
	CIRC UIT BREAKER (A)	15	15	
OUTDOOR	PHASE	1-PHASE	3- PHASE	
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	380V 50Hz	
POWER	POWER WIRING (M M ²)	3*4.0	4*4.0	
	CIRC UIT BREAKER (A)	30	30	
INDO	OR/OUTDOO R CONNECTION	2*0 75	2*0.75	
WIRING(WEAK ELECT RIC SIGNAL((MM ²)		5-0.75	5-0.75	
INDO OR/OUTDOO R CONNECTION		2*2 5	2*2 E	
WIRING(STRANG ELECTRIC SIGNAL (MM ²)	5 2.5	5 2.5	

	MOD EL	TCA-36ZHR A/DV	TCA-48ZHRA/D V3	TCA-60ZHRA/DV3
INDOOR	PHASE	1-PHASE	1-PHASE	1 -PHASE
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	220-240V 50Hz	220-240V 50Hz
POWER	POWER WIRING (M M ²)	3*2.5	3*2.5	3*2.5
	CIRC UIT BREAKER (A)	15	15	15
OUTDOOR	PHASE	1-PHASE	3- PHASE	3- PHASE
UNIT	FREQ UENCY AND V OLT	220-240V 0Hz	380V 50Hz	38 0V 50Hz
POWER	POWER WIRING (M M ²)	3*4.0	4*4.0	4*4.0
	CIRC UIT BREAKER (A)	30	30	30
INDO OR/OUTDOO R CONNECTION WIRING(WEAK ELECT RIC SIGNAL((MM ²)		3*0.75	3*0.75	3*0.75
INDO OR/OUTDOO R CONNECTION WIRING(STRANG ELECTRIC SIGNAL (MM ²)		3*2.5	3*2.5	3*2.5

3.7 Installation Requirements of Indoor Unit

1) Installation Space

Floor console



Under ceilin g



Installation procedure

Please remove the grille and the side board.



2) FLOOR CONSOLE TYPE

1. Select the piping and drainage directions.

The piping and drain can be made in two directions as shown below(fig.1).

When the direction is selected, please drill a 100mm(4") diameter hole on the wall, and the hole must be tilted downward towards the outdoor for smooth water flow. When the pipe is led out from the rear, make a hole in figure, at the position shown (fig. 2).



Insert the anchor bolts in to the drilled holes, and drive the pins completely into the anchor bolts with a hammer.

2. Drilling holes for anch or bolts and installing the anchor blots(m10)

According to the position of the hole, install two expansible anchor bolts(A and B) at the position shown in the figure.



NOTE:

Co olling Ca pacity Dim ension	1 8 000 B tu /hr	2 4 000 B tu /hr	36 00 0 Btu / hr	48 000 Btu /hr	60 000 Btu / hr
L	98 0mm	9 80mm	12 00mm	1560mm	1560mm

With a concrete drill, drill two 10mm diameter holes at the position(A and B) on the w all.



Insert the a nchor bolts in to the drilled holes, and drive the pins completely into the anchor bolts wit h a hammer.



Install the unit to them with nuts, washers and sp ring washer

s NOTE: The installation angle should not exceed 15 degrees.



CAUTION

Be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port of the indoor unit.



Arrange the drain hose lower than this portion.





3) UNDER CEILING TYPE

1.Select piping and drain directions.

CAUTION: Install the drainage hose at the rear, it should not be installed on the top. When the directions are selected, drill 80 mm (3-1 /8") and 50 mm (2") or 150 mm (6") d ia. hole on the wall so that the hole is tilted do wnward toward the outdo or for smoot h water flow.



2. Drilling holes for anch or bolts and installing the anchor blots(m10).

Please drill four holes for anchor bolts at the position A,B,C and D.



NOTE:

Co olling Ca pacity Dim en sion	18 000 Btu /hr	24 000 Btu /hr	36 0 00 Btu /hr	4 8 000 Btu /hr
L	980mm	980mm	12 00mm	1560mm

4) Installing indoor unit

Now, securely tighten nuts to each bolt with washers and spring washers.

NOTE: The installation angle should not exceed 10 degrees.



5) DRAINAGE PIPE CONNECTION

1.Installing the drain hose

Insert the drain hose into the drain pan, then secure the drain hose with a ylon fastener (we have connected the drain hose to the drain pan in the factory, you just need connect the drain pipe.). Wrap the insulation (dra in hose) around the drain hose connection.

Be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port of the indoor unit.

Remove the hole cover.



2.Drainage test

A.Check wh ether the drain pipe is unhindered and each joint is airproof.

B.Inject 2000ml water into the drain pan to test whether the water flows smoothly.

Part 3 Outdoor Units

1.Specification

Model			TCA-36HRA/DVO	TCA-48HRA/DV3O	TCA-60HRA/DV3O
Control type					
	Capacity	Btu/h(W)	36000(10550)	48000(14000)	60000(17500)
Cooling	Input	W	3050	4180	5420
capacity	Current	А	15.0	8.2	9.5
	EER	W/W	3.46	3.35	3.23
	Capacity	Btu/h(W)	40000(11700)	53000(15530)	63000(18400)
Heating	Input	W	3224	4440	5460
capacity	Current	А	15.5	9.1	10.1
	СОР	W/W	3.63	3.5	3.37
Outdoor noise lev	vel(sound power levle)	dB(A)	59	60	60
Refrigerant	Туре		R410A	R410A	R410A
type/Quantity	Charged volume(20m)	kg	2.70	3.80	4.1
Design pressure		MPa	4.2/1.5	4.2/1.5	4.2/1.5
Electrical Data					
Power supply			220-240V~/50Hz	380-415V~3N /50Hz	380-415V~3N /50Hz
Voltage Range		V	220~240	380~415	380~415
Max. Power		W	5000	7200	7600
Max. Current		А	24.3	14.5	16
Refrigerating System					
	Model		TNB220FFEMC-L	MNB36FABMC	LNB42FSAMC
	Туре		Rotary	Rotary	Rotary
	Brand		Mitsubishi	Mitsubishi	Mitsubishi
	Capacity	Btu/h(W)	23679(6940)	40602(11900)	47700(13980)
	Input	W	2150	3640	4270
Compressor	Rated current(RLA)	А	9	9.7	12
	Locked rotor Amp(LRA)	А	/	/	/
	Thermal protector position		/	/	/
	Capacitor	μF	/	/	/
	Refrigerant oil	ml	720	1100	1400
	Model		YDK56-6-6	YDK56-6-6	YDK56-6-6
	Qty		1	2	2
Outdoor fan	Input	W	270	300	300
motor	Capacitor	μF	4	4X2	4X2
	Speed(Hi/Med/Lo)	r/min	860	740	740
Outdoor coil	Number of rows		2	2	3

	DC Inverter Air				
	Fin spacing	mm	1.6	1.6	1.6
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside dia.and type	mm	Φ7,inner grooved tube	Φ7,inner grooved tube	Φ7,inner grooved tube
	Coil length * height * width	mm	927.8×822×36.4	910×1218×25.4	910×1218×38.1
	Number of circuits		7	6	16
Fan System					
Outlet size of inde	oor airflow	mm	/	/	/
Outdoor fan type			Propeller	Propeller	Propeller
Connections					
Connecting	Liquid	mm	9.52	9.52	9.52
Pipe	Gas	mm	19.05	19.05	19.05
Max. height drop	(high head)	m	30	30	30
Max. length of co	nnecting pipe	m	50	50	50
Refrigerant charg	e with long pipe	g/m	50	50	50
Drainage Pipe		mm	O.D 32	0.D32	O.D32
Others					
Net dimensions (W x H x D)	Outdoor	mm	940×885×340	940×1250×340	940×1250×340
Net dimensions (W x H x D) Net weight	Outdoor Outdoor	mm kg	940×885×340 75	940×1250×340 93	940×1250×340 95
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D)	Outdoor Outdoor Outdoor	mm kg mm	940×885×340 75 1030×950×430	940×1250×340 93 1030×1272×430	940×1250×340 95 1030×1272×430
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight	Outdoor Outdoor Outdoor Outdoor	mm kg mm kg	940×885×340 75 1030×950×430 80	940×1250×340 93 1030×1272×430 103	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading	Outdoor Outdoor Outdoor Outdoor	mm kg mm kg	940×885×340 75 1030×950×430 80	940×1250×340 93 1030×1272×430 103	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity	Outdoor Outdoor Outdoor Outdoor	mm kg mm kg	940×885×340 75 1030×950×430 80	940×1250×340 93 1030×1272×430 103	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note	Outdoor Outdoor Outdoor Outdoor	mm kg mm kg	940×885×340 75 1030×950×430 80	940×1250×340 93 1030×1272×430 103	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications at	Outdoor Outdoor Outdoor Outdoor re based on the followin	mm kg mm kg	940×885×340 75 1030×950×430 80 S:	940×1250×340 93 1030×1272×430 103	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications at Cooling: Indoor	Outdoor Outdoor Outdoor Outdoor Outdoor re based on the followir temperature 27 °C DB/2	mm kg mm kg ng condition	940×885×340 75 1030×950×430 80 s: d outdoor temperature	940×1250×340 93 1030×1272×430 103 35 °C DB/24 °C WB.	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications a Cooling: Indoor Heating: Indoor	Outdoor Outdoor Outdoor Outdoor Outdoor re based on the followin temperature 27 °C DB/2 temperature 20 °C DB/2	mm kg mm kg ng condition 19 °C WB, and	940×885×340 75 1030×950×430 80 s: d outdoor temperature d outdoor temperature 7	940×1250×340 93 1030×1272×430 103 35℃ DB/24℃ WB. ℃ DB/6℃ WB.	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications at Cooling: Indoor Heating: Indoor Voltage:22V.	Outdoor Outdoor Outdoor Outdoor Outdoor re based on the followin temperature 27 °C DB/2 temperature 20 °C DB/	mm kg mm kg 19 °C WB,and 15 °C WB,and	940×885×340 75 1030×950×430 80 s: d outdoor temperature d outdoor temperature 7	940×1250×340 93 1030×1272×430 103 35 ℃ DB/24 ℃ WB. ℃ DB/6 ℃ WB.	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications at Cooling: Indoor Heating: Indoor Voltage:22V.	Outdoor Outdoor Outdoor Outdoor Outdoor Outdoor temperature 27 °C DB/: temperature 20 °C DB/: door unit sound pressur	mm kg mm kg kg 19 °C WB,and 15 °C WB,and 15 °C WB,and 15 °C WB,and	940×885×340 75 1030×950×430 80 s: d outdoor temperature d outdoor temperature 7 sured at a point 1.5m dow	940×1250×340 93 1030×1272×430 103 35℃ DB/24℃ WB. ℃ DB/6℃ WB.	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications at Cooling: Indoor Heating: Indoor Voltage:22V. Sound Level: Inc Outdoor unit so	Outdoor Outdoor Outdoor Outdoor Outdoor Outdoor temperature 27 °C DB/2 temperature 20 °C DB/2 door unit sound pressur und pressure level,mea	mm kg mm kg kg ng condition 19℃WB,and 15℃WB,and 15℃WB,and sured at a p	940×885×340 75 1030×950×430 80 s: d outdoor temperature d outdoor temperature 7 sured at a point 1.5m dow oint 1.0m in front of the	940×1250×340 93 1030×1272×430 103 35℃ DB/24℃ WB. ℃ DB/6℃ WB. wnward from the unit ce unit.	940×1250×340 95 1030×1272×430 108
Net dimensions (W x H x D) Net weight Packing dimensions (W x H x D) Gross weight Loading Capacity Note Specifications at Cooling: Indoor Heating: Indoor Voltage:22V. Sound Level: Inc Outdoor unit so Optional simple	Outdoor Outdoor Outdoor Outdoor Outdoor Outdoor temperature 27 °C DB/2 temperature 20 °C DB/2 door unit sound pressur und pressure level,mea wired controller; Unive	mm kg mm kg kg kg ng condition 19°C WB,and 15°C WB,and 15°C WB,and 15°C WB,and sured at a p	940×885×340 75 1030×950×430 80 s: d outdoor temperature d outdoor temperature 7 sured at a point 1.5m dow oint 1.0m in front of the controller; auto-restart(d	940×1250×340 93 1030×1272×430 103 35 °C DB/24 °C WB. °C DB/6 °C WB. wnward from the unit ce unit. optional); Timer:only one	940×1250×340 95 1030×1272×430 108

Due to ongoing product development, specifications are subject to change without notice.

Model			TCA-18HRA/DV	TCA-24HRA/DV	
Control type					- -
	Capacity	Btu/h(W)	18000(5274)	24000(7034)	
Cooling	Input	W	1635	2180	
capacity	Current	А	7.2	9.9	
	EER	W/W	3.32	3.22	
	Capacity	Btu/h(W)	19800(5800)	26000(7620)	
Heating	Input	W	1810	2350	
capacity	Current	А	8.1	10.6	
	СОР	W/W	3.43	3.34	
Outdoor noise lev	vel(sound power levle)	dB(A)	55	58	
Refrigerant	Туре		R410A	R410A	
type/Quantity	Charged volume(20m)	kg	1.5	2.05	
Design pressure		MPa	4.2/1.5	4.2/1.5	
Electrical Data					
Power supply			220-240V~/50Hz	220-240V~/50Hz	
Voltage Range		V	220~240	220~240	
Max. Power		W	3100	4100	
Max. Current		А	14	19	
Refrigerating Sys	tem				
	Model		ATN150D42UFZ	ATF235D22UMT	
	Туре		Rotary	Rotary	
	Brand		GMCC	GMCC	
	Capacity	Btu/h(W)	14000(4480)	24000(7135)	
	Input	W	1120	1955	
Compressor	Rated current(RLA)	А	4.9	6.9	
	Locked rotor Amp(LRA)	А	/	/	
	Thermal protector position		/	/	
	Capacitor	μF	/	/	
	Refrigerant oil	ml	450	670	
	Model		SIC-67FV-F140-9	GZSDJ-31(DC)	
Outdoor fan	Qty		1	1	
motor	Input	W	53	85	
motor	Capacitor	μF	/	/	
	Speed(Hi/Med/Lo)	r/min	1000	860	
	Number of rows		2	2	
Outdoor coil	Fin spacing	mm	1.6	1.6	
	Fin type		Hydrophilic aluminium	Hydrophilic aluminium	
	Tube outside dia.and type	mm	Φ7,inner grooved tube	Φ7,inner grooved tube	

	Coil length * height * width	mm	776×570.5×36.4	896×611×36.4			
	Number of circuits		3	5			
Fan System							
Outlet size of inde	Outlet size of indoor airflow		/	/			
Outdoor fan type			Propeller	Propeller			
Connections							
Connecting	Liquid	mm	6.35	9.52			
Pipe	Gas	mm	12.7	15.88			
Max. height drop	(high head)	m	15	20			
Max. length of co	nnecting pipe	m	30	35			
Refrigerant charg	e with long pipe	g/m	22	50			
Drainage Pipe		mm					
Others							
Net dimensions (W x H x D)	Outdoor	mm	780×605×290	900×650×310			
Net weight	Outdoor	kg	33	52			
Packing dimensions (W x H x D)	Outdoor	mm	883×653×412	1015×720×425			
Gross weight	Outdoor	kg	36	57			
Loading							
Capacity							
Note							
Specifications a	re based on the followin	g conditions	5:				
Cooling: Indoor	temperature 27°C DB/1	.9℃WB,and	outdoor temperature	35℃ DB/24℃ WB.			
Heating: Indoor	temperature 20°C DB/1	L5℃WB,and	l outdoor temperature 7	℃ DB/6℃ WB.			
Voltage:22V.							
Sound Level: Indoor unit sound pressure level, measured at a point 1.5m downward from the unit center.							
Outdoor unit sound pressure level, measured at a point 1.0m in front of the unit.							
Optional simple	Optional simple wired controller; Universal remote controller; auto-restart(optional); Timer:only one circle.						
Due to ongoing	Due to ongoing product development, specifications are subject to change without notice.						

2 Sound Levels



3 Correction Curve of Capacity performance

1. Correction of Cooling Capacity

Valid Cooling Capacity = Rated Cooling Capacity × Correction Coefficient $[(1)\times(2)\times(3)\times(4)]$ Notes: (1)×(2)×(3)×(4) refers to the correction coefficients for the following four figures.

(1) Correction Coefficient of Indoor W et-bulb Temperature



Indoor Air Wet-bulb Temperature (°C)-

(2) Correction Coefficient of Outdoor Dry-bulb Te mperature



(3) Correction Coefficient of Piping Length

Piping Length of Outdoor Unit (5m-50m)



Precautions:

A. It is equally applicable whether or not the outdoor unit is above or below the indoor unit;

B. Refrigerant piping cannot exceed the calibrated range of the machine, oth erwise do not follow the capacity attenuation curve in the said figure.

(4) Correction Coefficient of Air Volue Change Rate of Indoor Unit



2. Correction of Heating Capacity

Valid Heating Capacity = Rated He ating Capacity × Correction Coefficient $[(1)\times(2)\times(3)\times(4)]$

Notes: $(1)\times(2)\times(3)\times(4)$ refers to the correction coefficient of the followin g four figures.

(1) Correction Coefficient of Indoor Dry-Bulb Temp erature



(2) Correction Coefficient of Outdoor Wet-Bulb Temperature



(3) Correction Coefficient of Piping Length Pipin



Precautions:

A. It is equally applicable whether or not the outdoor unit is above or below the indoor unit;

B. Refrigerant piping cannot exceed the calibrated range of the machine, otherwise do not follow the capacity attenuation curve in the said figure.

(4) Correction Coefficient of Air Volue Change Rate of Outdoor Unit





5. Installation Dimension Drawing of Outdoor Unit

Split type outdoor unit





M ODE	А	В	С	D	Е	F	Н	R EMA RK
18	7 80	521	29 0	3 28	2 90	2 88	6 05	Fig .1
24	9 00	753	34 9	3 99	3 15	3 04	6 50	Fig .1
36	9 40	600	37 5	4 00	3 40	33 8	8 85	Fig .1
48/60	9 40	600	37 5	4 00	3 40	3 38	1 2 50	Fig. 2

6. Installation Requirements of Outdoor Unit

1. Hoisting and Transportation of Outdoor Unit

- \mathfrak{H} Please use four wire ropes of at least Φ 6mm to hoist the outdoor unit and pay attention to the gravity center position to avoid the slide and turnover of the outdoor unit, and forklift can also be used for the handling;
- Hease add the guard plate at the contacting surface between wire rope and air conditioner to avoid the surface scratches and deformation of the outdoor unit;
- ℜ Please remove the backing plate for transportation after completing the hoisting operations, as shown in the following figures:



2. Installation Site of Outdoor Unit

Do not install the outdoor unit in the following places:

where is easily subject to combustible gas leakage;
where there are a lot of oil (including engine oil);
where there is a higher salt content (coastal region);
Where there is a lot of sulfide gas;
Where the hot air of the outdoor unit may affect the windows of the neighbors;
Where the noise of outdoor unit may affect the normal life of the local people;
Where is unable to bear the weight of the outdoor unit;
Where is not leveled;
Where is poorly ventil ated;
Where there are private power supplies and high-frequency devices.
Installation Position Space of the Outdoor Unit
The power supply devices shall be mounted at the side of outdoor unit;

3) Installation Requirements of Side Air Outlet Outdoor Unit

Installation Space Requirements



2) Minimum Distance between Side Faces



3) Minimum Distance between Upper Side and Lower Side



4) Minimum Distance for Relative Arrangement of Front Face in the Same Plane (Air Outlet Side):



5) Minimum Distance for Relative Arrangement of Back Face in the Same Plane (Air Return Side):



6) Front/Rear Arrangement of Outdoor Units in the Same Plane (Air outlet in same direction, namely, the air outlet of the rear outdoor unit faces towards the air inlet of the front unit):

It is necessary to put an end to this installation mode! Because the return air of the front unit may seriously affect the exhaust air of the rear unit!



7. Electrical Design

7.1. Specification of Power Supply

MODEL		18K	24K	
INDOOR	INDOOR PHASE		1-PHASE	
UNIT	FREQUENCY AND VOLT	220-240V 50Hz	220-240V 50Hz	
POWER	POWER WIRING (MM ²)	3*2.5	3*2.5	
	CIRCUIT BREAKER (A)	15	15	
OUTDOOR	PHASE	1-PHASE	1- PHASE	
UNIT	FREQUENCY AND VOLT	220-240V 50Hz	220-240V 50Hz	
POWER	POWER WIRING (MM ²)	3*4.0	4*4.0	
	CIRCUIT BREAKER (A)	30	30	
INDOOR/OUTDOOR CONNECTION		2*0.75	2*0.75	
WIRING(WEAK ELECTRIC SIGNAL((MM ²)		5 0.75	5 0.75	
INDC	OOR/OUTDOOR CONNECTION	2*2 5	2*2 5	
WIRING(STRANG ELECTRIC SIGNAL((MM ²)	5-2.5	5-2.5	

DC Inverter Air

MODEL		36K	48K	60K
INDOOR PHASE		1-PHASE	3-PHASE	3-PHASE
UNIT	FREQUENCY AND VOLT	220-240V 50Hz	220-240V 50Hz	220-240V 50Hz
POWER	POWER WIRING (MM ²)	3*2.5	3*2.5	3*2.5
	CIRCUIT BREAKER (A)	15	15	15
OUTDOOR	PHASE	1-PHASE	3- PHASE	3- PHASE
UNIT	FREQUENCY AND VOLT	220-240V 50Hz	380V 50Hz	380V 50Hz
POWER	POWER WIRING (MM ²)	3*4.0	4*4.0	4*4.0
	CIRCUIT BREAKER (A)	30	30	30
INDOOR/OUTDOOR CONNECTION WIRING(WEAK ELECTRIC SIGNAL((MM ²)		3*0.75	3*0.75	3*0.75
INDOOR/OUTDOOR CONNECTION WIRING(STRANG ELECTRIC SIGNAL((MM ²)		3*2.5	3*2.5	3*2.5

Notes:

1) The diameter of power capacity cables and power cables shall be selected according to the requirements, and the diameter of air-condition power cord shall be greater than that of common power cord;

2) In order to prevent the misuse of the air conditioner, it is necessary to make sure of no staggering and winding of power cord with the connection line of the indoor unit;

3) After the airtight test and the vacuum pumping operation, it shall be energized;

4) The signal cables of the control system and the power cords shall not be placed in the same conduit and there shall be a proper spacing between two conduits;

5) The connection signal lines between indoor units and between indoor unit and outdoor unit must be subject to a uniform system installation with the refrigerant piping;

6) There shall be no intermediate transition joint for the shielded cables.

7.2. Electrical Wiring Diagram

2.1 TCA-36HRA/DV





2.2TCA-18HRA/DVO, TC A-24HRA/DVO



8. Design and Installation of Connecting Pipes

8.1. Pipe length and drop height shall comply with the scope required below.

Mode	18K	24K	
Max pipe length	30m	35m	
Max drop height l	15m	20m	
Max bending No.	5	5	
The refrigerant shall be			
increased while the	22 <i>a/m</i>	6E a lm	
mounted pipe is more	228/111	osg/iii	
than the standard piping			

Mode	36K	48K	60k
Max pipe length	50m	50m	50m
Max drop height l	30m	30m	30m
Max bending No.	5	5	5
The refrigerant shall be increased while the mounted pipe is more than the standard piping	50g/m	50g/m	50g/m

Note: A return oil elbow must be equipped for each drop of 10m in the vertical height of refrigerant pipe!

Connection Mode

	Gas Side	Liquid Side
Outdoor Unit	Flare nut	Flare nut
Indoor Unit	Flare nut	Flare nut

8.2. Material and Size of the Pipes

Outdoor pipe dimension and installation modes (in sequence of cooling capacity)

Pipe material		Copper Pipe For Air Conditioner				
Model		1822K	2328K	3048K	4960k	
Sizo(mm)	Liquid side	Φ6.35(1/8inch)	Φ9.52(3/8inch)	Φ9.52(3/8inch)	Φ9.52(3/8inch)	
5120(11111)	Gas side	Φ12.7(1/2inch)	Φ15.88(5/8inch)	Φ19.05(3/4inch)	Φ19.05(3/4inch)	

8.3. Precautions for Installation:

3.1 Installation

Confirm the model, name and specification to avoid the faulty installation.

3.2 Refrigerant Piping

A. The refrigerant piping must adopt the pipe diameter specified; B.

The refrigerant piping must be subject to insulation treatment;

- C. It is necessary to inject the nitrogen of certain pressure into the refrigerant pipes before welding the pipes;
- D. The indoor unit cannot be energized before the airtight test and vacuum pumping operation after completing the installation of refrigerant piping. If it has been energized, the airtight test and vacuum pumping operation must be carried out to the pipes at gas side and liquid side.

3.3. Airtight Test

The refrigerant piping must be subject to the air-tight test and the test pressure of R410A system is 40.0kgf/cm^2 .

3.4. Vacuum Pumping Operation/Evacuation

The evacuation of refrigerant piping must use the vacuum pump and it shall be simultaneously carried out from both gas side and liquid side.

3.5. Adding of Refrigerant

A. The adding amount of refrigerant for each outdoor unit for excessive standard piping length shall be determined according to the piping size and specification.

B. The data of refrigerant adding amount, piping length and height difference of indoor/outdoor units shall be recorded and properly stored for backup.

3.6 Electrical Wiring

- A. The diameter of power capacitor cables and power cables shall be selected according to the design manual, and the diameter of air-condition power cord shall be greater than the power cord of the common motor;
- B. In order to prevent the misuse of the air conditioner, it is necessary to make sure of no staggering and winding of power cord with the connection line of the indoor unit (low-voltage line);
- C. The indoor unit shall be energized after the airtight test and the vacuum pumping operation (Evacuation).

3.7 Trial Run

The trial run cannot be performed unless the outdoor unit has been energized for over 12 hours.

8.4. Installation of Refrigerant Pipes

- 1. Selection of Refrigerant Copper Tubes
 - 1) The refrigerant pipes must use the specified diameter;
 - 2) The refrigerant pipes must be subject to the insulation treatment and the copper tube for R410A system must be subject to the oil-removing treatment;
 - 3) The withstand pressure copper tube: R410A: \geq 46kgf/cm²;
 - 4) The R410A system requires that the impurities in copper tube shall be < 30mg/10m.
- 2. Material Protection of Refrigerant Pipes
 - The end of each pipe must be wrapped and capped. The "tightening" is the most effective method. However, "binding" is the simple alternative method used for certain working area.
 - A. Tightening Method

Clamp and flatten the en d of copper tube and then weld it.



B. B inding Method

Wrap the copper tube with PVC tapes



- C. Special attention shall be p aid to the following operations:
 - Hole (the dirt may easily enter the pipe)



- When t he copper t ube gets into the outdo or area (th rain may easily enter the pipe, in p articular, special attention shall be paid when the pipe is in a vertical state)
- 2) Preca utions for Material Protection of Refrigerant Pipe
 - A. N o waste or w ater vapor shall be entered into the pipes
 - **#** Before c ompleting the connection of pipes, th e opening of the pipes shall be capped tightly;
 - He opening of pipes shall be latera I or be down ward;



B. The opening of the pipe must be block ed and capped while it passes through the wall.



C. The pipe shall not be placed on the ground or rubbed against the ground.



D. T he pipe opening shall be upside down while removing the burr after cutting the pipe.

E. Remember that the pipe opening must be plugged while cond ucting the piping operations in rainy



3. Welding Operations

days.

1) The welding operation shall be carried out in a downward or lateral state and the overhead welding operation shall be avoided.



2) The attention shall be paid to the assembly direction and angle of the liquid pipe and gas pipe openings to avoid the oil backflow or accumulation;

3) The alternative method for nitrogen injection is the standard operation method during the welding operation.

- A. Preparation for fire prevention (to avoid the fire, conduct in clean area, prepare the fire-fighting equipment and water for emergency purpose);
- B. Pay attention to the avoidance of scalds;
- C. Pay attention to the gap between pipe and nipples (avoid the leakage);
- D. Confirm the support strength for pipes.
 - ℜ The spacing criteria for supports of horizont al pipes (cop er tube) are as follows:

Cr iteria(mm)	Below 20	25-40	50	
Max. spacing(m)	1.0	1.5	2.9	
			10	

XMinimum embedding depth and gap of copp er tube nipples/fittingsUnit mm

Туре	Outer diame ter D	Minimum embedding depth B	Gap A-D
. B .	5 <d<8< td=""><td>6</td><td>0.05.0.21</td></d<8<>	6	0.05.0.21
	8 <d<12< td=""><td>7</td><td>0.05-0.21</td></d<12<>	7	0.05-0.21
	11 <d<16< td=""><td>8</td><td>0.05.0.27</td></d<16<>	8	0.05.0.27
Side direction	16 <d<25< td=""><td>10</td><td>0.05-0.27</td></d<25<>	10	0.05-0.27
Brazing	25 <d<35< td=""><td>12</td><td>0.05.0.25</td></d<35<>	12	0.05.0.25
	35 <d<45< td=""><td>14</td><td>0.05-0.55</td></d<45<>	14	0.05-0.55

4. Flare Connection

1) The auxiliary connecting pipe must be annealed before the flaring operation;

2) The pipe shall be cut by pipe cutter (the large diameter pipe shall use the large cutter; when the diameter is

so large that it cannot be cut by the pipe cutter, the metal saw shall be used, but attention

shall be paid to that the saw dust cannot enter the pipeline);

3) The flaring tool shall be used and the size of flare opening shall remain as follows:

Do not forget to consider the pipe nut in the situation specified for processing of flare opening. Shape and Size of Flare Opening:



Dimension table (unit: mm)

Nominal size	Outer diameter D ₀	А
F1/4	6.35	8.6-9.0
F3/8	9.52	12.6-13.0
F1/2	12.7	15.8-16.2
F5/8	15.88	19.0-19.4
F3/4	19.05	22-22.4

Attention shall be paid to that the bore diameter of pipe nut shall be increased by 1mm based on the dimension A; otherwise there is a possibility that the pipe nut cannot be assembled.

Pipe diameter "d" (mm)	6.4	9.5	12.7	15.9	19.1
R22 flare size "A" (mm)	8.8	12.8	16.2	19.4	23.7
R410A flare size "A" (mm)	9.1	13.2	16.6	19.7	24.0

Notes: A. The flared side of R410A is deeper than that of R22;

B. The eccentricity between horn center and pipe center is set for 0.1mm or above;

C. There shall be no scar, crack and asperity at the horn position.

4) Apply the air-conditioning oil on the inner and outer surface of the flare (for facilitating the smooth pass

of flare nut to prevent the distortion of the pipeline)

A. Carefully remove the burrs;

B. Use two wrenches to grab the pipe;

C. The flare nut shall be mounted onto the pipe before the pipe expansion operation;

D. The torque force shall be appropriate when using it to tighten the nut (standard torque $\pm 10\%$)

Size	Torque		
	(kgf ⋅m)	(N·cm)	
1/4"(Ф6.4)	144-176	1440-1720	
3/8"(Ф9.5)	133-407	3270-3990	
1/2"(Ф12.7)	504-616	4950-6030	
5/8"(Ф15.9)	630-770	6180-7540	
3/4"(Ф19.0)	990-1210	9270-11860	
5. Laying of Refrigerant Pipes

1) Laying of Refrigerant Pipes

The system shall be clear and a system sign shall be marked at some distance to avoid the improper connection.

2) Protection of Outdoor Refrigerant Pipes

In addition to the insulation layer, some outdoor refrigerant pipes shall be subject to the treatment against the expected damage. If the length of exposed outdoor refrigerant pipe is over one meter, the exposed pipe must be equipped with a pinch plate for protection.

3) Laying Principle of Refrigerant Pipes

A. It shall adopt the centralized arrangement, arrangement along the wall and the arrangement using the corridor.

- B. After completing the laying, it shall be wrapped with the white wrapping tapes. All pipes shall be wrapped together according to the thickness of main pipeline on the basis of independent wrapping for individual pipes, and no sense of relaxation shall prevail for their wrapping tightness.
- C. The connecting pipes and electric wires of indoor/outdoor units (power cords, control lines) shall be in principle arranged along the walls, turned reasonably, be smoothly vertical and horizontal, parallel to each other and bound together to try the best to avoid the overhead cross and blockage;

D. The installation of connecting pipes and electric wires of indoor/outdoor units (power cords, control lines) shall in principle try the best to reduce the length of the pipeline;

E. It is necessary to try the best to wrap all pipes and the joints cannot be exposed;

4) Precautions for Laying of Refrigerant Pipes

A. Pipe Inserting: add the system number on the pipe to avoid the wrong connection of pipes;

B. Confirm the support strength for pipes.

Note: A return oil elbow must be equipped for each drop of 10m in the vertical height of refrigerant pipe!

6. Adding of Refrigerant

Calculate required refrigerant according to length of liquid pipe Add refrigerant

1) Charging Step of Refrigerant

A. The completion condition of vacuum drying can be determined based on evacuation or vacuumpumping operation;

B. Calculate the weight of added refrigerant. When the piping length is longer than the actual standard length for delivery:

(1) Valid length of pipe = pipe length + (elbow number× elbow equivalent length)

(2) Conversion of elbow equivalent length

Gas piping size	Ф12.7	Φ15.9	Ф19.0	Ф25.4	Ф28.6
90 ⁰ elbow equivalent length	0.10	0.10	0.15	0.15	0.20

Calculation of Adding Amount of Refrigerant

Recharging Amount: R (Kg) = (L1-L2)×A/m)

Where, L1— actual length of liquid pipe (m);

L2— actual standard length for delivery (m) (see the Recharging label of the outdoor unit)

|--|

Pipe specification	ф6.4	ф9.5	φ12.7	φ15.9	φ19.1	φ22.2
Add R410A for an increase						
of one meter	22	65	110	170	250	350
(g/m)						

C. Correctly measure the refrigerant using the scale and filler tank;

D. Connect the filler tank, instrument manifolds and maintenance valve of liquid pipe of outdoor unit (at high-pressure side) and charge the refrigerant in its liquid state. The air in the hose and manifold must be removed by the refrigerant before the recharging operation.

E. After completing the recharging operation, check whether there is refrigerant leakage at the flare positions of indoor/outdoor units;

F. Record the adding amount of refrigerant onto the refrigerant indicator nameplate of outdoor unit; G. The recharged amount shall be measured by the electronic scale.

9. Heat Insulation Works

9.1. Insulation Materials and Thickness

1) Insulation Materials

The insulation materials shall use the materials that can withstand the temperature of pipes: the withstand pressure at high-pressure side shall not be less than 70 $^{\circ}$ C and at low-pressure side shall not be less than 120 $^{\circ}$ C.(no such a requirement at the low-pressure side for single-cold unit) For example: heat-pump type – heat-resisting polyethylene foam (over 120 $^{\circ}$ C)

Single-cold type – foaming polyethylene (over 100° C).

	Pipe diameter (mm)	Thickness of Insulation Materials		
Refrigerant Pipe	Ф6.4-Ф25.4	10mm		
	Ф28.6-Ф38.1	15mm		
Drain Pipe Inner diameter Ф20-Ф32		10mm		

2)Thickness selection of insulation materials:

9.2. Heat Insulation of Refrigerant Pipes

1) Operation Sequence

A. The non-welded or non-connected positions shall be subject to the heat-insulation treatment prior to the laying of pipes;

B. The welding area, flared area or flan ge area shall be subject to the heat-insulation treatment after completing the leakage d etection.

2) He at Insulation of Non-weld ed or Non-c onnected Po sitions

In order to facilitate the construction, please use t he heat insulation materials to deal with the pipes b efore their laying, and meanwhile, a certain length at two ends of the pipe shall be res erved not for the insulation treatment for purpose of welding an d leakage de tection after completing the laying of the pipe.



3) Heat Insulation of Welding Area, Flare A rea or Flange Area

A. The heat in sulation of welding area, flare area or flange area shall be carried out after completing the leakage detection of pipes.

B. There shall be no gap between the junction position of attached insulation materials and the locally prepared insulation materials.



4) Wrapping Trea tment

The wrapping tapes shall be used for the wrapping treatment after completing the insulation treatment and no sense of relaxation shall prevail.

9.3. Heat Insulation of Drain Pipes

The heat insulation treatment of drain pipes shall be extended to the juncture (position), or it may cause the condensation at the position without heat insulation treatment.

9.4. Precautions

1)The welding area, flare area or flange area shall all be subject to the heat insulation treatment after they are qualified upon the airtight test;

2) The gas pipe and liquid pipe shall be subject to the heat insulation treatment and the juncture shall also be subject to the separate heat insulation treatment;

3) The piping juncture of indoor unit (pipe fitting, flare nut) shall be subject to the heat insulation treatment through the attached insulation materials.

Part 4 Maintenance

1. Troubleshooti ng of Inv erter Sys tem

1.1. 8-wa y cassette; 4-way c assette



1.2. Ceiling & Floor



Display function declaration :

LED light the state of running light

When powered-on the first time, the running light twinkles, while the double-8 does not lit. When started-up normally, the running light lights on, while the double-8 shows the designed temperature. When operated normally, the running light lights on, while the double-8 shows the designed temperature. When closed down, both LED and double-8 are gone out.

LED light the state of Timing light

When timing set, the timing light lights on, and the double-8 flash shows the time setting within 5 seconds, then shows the designed temperature.

When without time setting, the timing light gone out, while the double-8 back to the original state.

LED light the state of defrosting/preheat light

When in the state of defrost, oil return, cold-wind proof, the defrosting/preheat light lights on, while the double-8 shows the designed temperature. (One-driven-one does not show the oil return state).

When out of the state of defrost, oil return, cold-wind proof, the defrosting/preheat light gone out, while the double-8 shows the designed temperature. (One-drive-one does not show the oil return state).

LED light the state of warning light

When double-8 shows E* or P*, the running lights gone out, while the warning light lights on.

1.3. Duct

1) Display the faults through the remote-control receiver indicator light of indoor unit. The faults of indoor unit are displayed as follows:



When powered-on the first time, the running light twinkles, while the double-8 does not lit. When started-up normally, the running light lights on, while the double-8 shows the designed temperature. When operated normally, the running light lights on, while the double-8 shows the designed temperature. When closed down, both LED and double-8 are gone out.

LED light the state of Timing light

When timing set, the timing light lights on, and the double-8 flash shows the time setting within 5 seconds, then shows the designed temperature.

When without time setting, the timing light gone out, while the double-8 back to the original state.

LED light the state of defrosting/preheat light

When in the state of defrost, oil return, cold-wind proof, the defrosting/preheat light lights on, while the double-8 shows the designed temperature. (One-driven-one does not show the oil return state).

When out of the state of defrost, oil return, cold-wind proof, the defrosting/preheat light gone out, while the double-8 shows the designed temperature. (One-drive-one does not show the oil return state).

LED light the state of warning light

When double-8 shows E* or P*, the running lights gone out, while the warning light lights on.

2) Display the faults through the digital tube of outdoor unit. The fault contents refer to the fault indication table of corresponding outdoor unit. (See the digital tube display information code during the fault protection)

2. Fault Identification: Determine the fault type according to the symptom

The faults of AC system are generally classified into four categories:

1) AC system cannot be started;

2) AC system has a poor cooling effect;

3) The system can be started but it is usually subject to abnormal protective shutdown during the running;

4) Water leakage and noise problem of the indoor unit

Common Troubleshooting:

1) AC system cannot be started

(1) Check the wiring condition of power cables of indoor/outdoor units, and whether the communication cables of indoor/outdoor units are connected as required;

(2) check the indicator light of remote receiver panel of indoor unit, digital tube display of outdoor unit, and check whether there is fault indication of indoor/outdoor units.

2) AC system has a poor cooling effect

(1)Whether the air volume of indoor unit is normal or not? If the air volume is significantly smaller or there is no wind from the indoor unit, it usually belongs to the following problems:

A. Return air mesh is too dirty;

B. Motor of the indoor unit failed (motor failed, capacitor capacity attenuated)

C. Electric control panel failed, causing no fan output.

(2) Whether the difference between outlet wind temperature of indoor unit and the return wind temperature of indoor unit is normal or not. The outlet wind temperature difference is 10-15° under normal cooling condition, and it is 18-25° under the normal heating condition.

If there is no problem for the said, it indicates there is no problem for the air conditioner. The reasons resulted in the poor cooling effect include:

(1) The design load for the air-conditioner is not enough;

(2) Improper installation results in no wind from the air conditioner;

(3) The return air design of air conditioner is unreasonable, resulting in an unreasonable air flow in the room and uneven room temperature;

If the AC cooling effect is indeed poor after the inspection, there may be the following reasons:

A. The running frequency of inverter compressor is wrong and its frequency is lower than the target frequency. The factors restricting the running frequency of inverter compressor include:

The exhaust temperature of outdoor unit is too high, the voltage is too high or too low, the current is too big, and outdoor ambient temperature;

B. The refrigerant amount of the outdoor unit is too little or too much

Inspection and Treatment: it can be judged by testing the system temperature and pressure.

Measuring point	Normal	Normal	Max. cooling	Max. heating
	Cooling	heating		
Exhaust Temperature($^{\circ}\!\mathbb{C}$)	85-90	70-80	<115	<110
Return air Temperature($^\circ\!\mathbb{C}$)	8-12	-3-3		
Cooling Temperature ($^\circ\!\mathbb{C}$)	48-52	-1-1	<65	
Heating Temperature ($^{\circ}\!\!\mathbb{C}$)	7-9	42-50		<60
Super-cooling/superheating	5-10	5-10		
degree (° \mathbb{C})				
Exhaust pressure (Pa)	1.7-1.9	1.7-1.9	2.3-2.5	2.3-2.5
Return air pressure (Pa)	0.45-0.6	0.4-0.5	<0.7	<0.7

The normal temperature and pressure of the system are as follows:

When the refrigerant amount is too little, its symptom is as follows: exhaust air and return air temperature is higher, LV pressure and HV pressure is lower;

When the refrigerant amount of outdoor unit is too much, its symptom is as follows: exhaust air and return air temperature is lower, LV pressure and HV pressure is higher;

C. Air Channeling of Compressor or Four-way Valve

Common phenomena: poor cooling effect, higher LV pressure and lower HV pressure

Distinction: when there is an air channeling in four-way valve, the noise of four-way valve is bigger, and the temperature difference is very big while testing one position and four positions of four-way valve, and there are many tested temperatures far beyond the normal temperature (normal temperature difference is 3° or so);

D. Poor Heat Exchange of Outdoor Unit (Installation space of outdoor unit is smaller and the condenser is too dirt)

Phenomena: higher exhaust air and return air temperature; higher LV pressure and HV pressure.

E. System is Blocked

Phenomena: higher exhaust air and return air temperature; lower LV pressure and higher HV pressure.

G. Throttle Member failed

The electronic expansion valve of outdoor unit cannot be opened.

There may be the following reasons: the electronic expansion valve or the coil is damaged, the electronic expansion valve assembly of electric control panel drive is damaged;

3) The system can be started for running but it is usually subject to abnormal protective shutdown during the

running;

(1) Common Protection of AC System

General Protection: it is the protection function designed to protect the air conditioner (AC) from being damaged by the possible big current, high temperature and high voltage (delay protection three minutes after the start of compressor, phase sequence, phase-loss protection, low/high voltage protection, over-voltage and under-voltage protection of inverter compressor, exhaust air temperature protection, module protection, etc.); Cooling and dehumidifying mode protection: evaporator anti-freeze protection and condenser high temperature protection.

Heating mode protection: evaporator high-temperature protection, cold wind resistance function, blowing residual heat function.

(2) Confirmation of Protection Types

Confirm the protection type through the display of indoor unit remote receiver panel indicator light and outdoor unit digital tube.

Firstly, it is necessary to determine whether it is the electrical control problem (element, electrical control panel) or the cooling system problem.

For example, there may be the following reasons for system display of high-voltage protection: high-voltage switch damaged (element problem), system high voltage is actually not high, but there are problems for circuit board after the test of circuit (circuit board of outdoor unit is failed), and there are cooling system problems (poor heat radiation effect, excessive refrigerant, etc.).

(3) Water leakage and Noise Problem of

Indoor Unit Reasons for Water Leakage of Indoor

Unit:

(1) Condensation of indoor unit;

Possible reasons: system refrigerant is insufficient, system is blocked, and shunt capillary pipe of indoor unit is blocked.

(4) Drain pipe is not connected or not subject to a heat insulation treatment;

(5) Drainage pump in the ceiling does not work;

(6) Low-temperature protection of evaporator failed.

Reasons for Big Noise of Indoor Unit:

(1) Fan or motor of indoor unit is poorly assembled;

(2) Fan volute of indoor unit is deformed;

(3) The design and installation of air outlet pipe or return air duct is unreasonable during the on-site installation of air duct unit.

3. Control System

3.1. Overview of Control System

The control system of indoor/outdoor units uses the master-slave structure as follows:





In such a system, the control panel of indoor unit receives from the user the signals (e.g. set temperature, fan spe ed, etc.) sent through control ways of remote controller, line controller, central controller, intelligent network AC management system (PC control), etc., and environment information (e.g. indoor unit coil temperature, indoor ambient temperature, etc.), and organizes them together in tems of certain formats to control the actions of the relevant parts including electronic expansion valve, etc, and meanwh ile, transfers them to the control panel of outdoor unit through the communication way listed in the following figure. The control panel of the outdoor unit will deal with the information from all indoor units and calculate the optimal running mode and transmit the orders of outdo or unit to the indoor unit for execution. We can provide a variety of control modes to the user.

3.2. Electrical Control of Outdoor Unit and Troubleshooting



1) Main Control Board of Outdoor Unit(36K 48K 60K)

Description of Main Control Board of Outdoor Unit

- 1 Low-wind output of AC motor of outdoor unit,220-240V
- 2 Mid-wind output of AC motor of outdoor unit, 220-240V
- 3 High-wind output of AC motor of outdoor unit, 220-240V
- 4 N output of motherboard of outdoor unit
- 5 Main reserved output of outdoor unit, 220-240V
- 6 Heating belt of compressor, 220-240V
- 7 Motherboard reserved output of outdoor unit,220-240V
- 8 Communication interface between outdoor unit and indoor unit, RS-485 signal
- 9 OTC Interface
- 10- Monitoring interface of outdoor unit (RS-485 signal)
- 11— LWE2 Outdoor electronic expansion valve
- 12— LWE1 outdoor electronic expansion valve (reserved)
- 13- Communication terminal between outdoor unit motherboard and IPM module, RS-485 signals
- 14— Outdoor unit capacity (model) PID
- 15— TC, Condenser coil temperature sensor input,
 - TABM(T4), outdoor ambient temperature sensor input

16— TE(T3 OR OPT), condenser defrosting temperature sensor

input 17— TP, compressor exhaust temperature sensor input

18— TS(T5), compressor return air temperature sensor

input 19- Reserved interface for temperature sensor 20-

PID of piping length

- 21- Spot-inspection button
- 22— LPS, high pressure switch
- 23— DC motor B of outdoor unit
- 24— DC motor A of outdoor unit
- 25— LED display whole running state;
- 26— fuse
- 27— L, motherboard power supply input, 220-240V
- 28— HPS, high pressure switch
- 29— Australia Power Grid Detection DRAM
- 30- Current transducer interface, detect compressor input current
- 31— 4-WAY, 220-240V
- 32— SV2, reserved 220-240V
- 33— SV1, reserved 220-240V

2) Spot-inspection Description of Outdoor Unit

No.	Display Content	Remarks
	display rupping frequency during the	Normal frequency value, defrosting d+
0	rupping	frequency value, return oil C +
	lunning	frequency value
1	Target frequency	Actual value
2	Outdoor DMV oppning	display number ·8=PMV actual
2		opening
3	Fan status	S0,S1—S3 (wind gears)
4	Capacity need of indoor unit	Capacity need
F	Actual running capacity need after	Conscitu nood
5	correction	Capacity need
C	Evaporator middle temperature of	Actual value
D	indoor unit (T2 OR IPT)	
7	Indoor ambient temperature (T1 OR RT)	Actual value
0	Condenser defrosting temperature (T3	Astrophysics
8	OR OPT)	Actual value
9	Condenser central temperature (Tc)	Actual value
10	Outdoor ambient temperature (T4)	Actual value
11	Suction temperature (T5)	Actual value
12	Inverter exhaust temperature (Tp)	Actual value
13	Inverter compressor phase current	Actual value
14	Capacity of the Machine	30, 40, 50, 60, 80
15	Running mode	0, 1, 2, 3

16	Machine running fault 1	Display code, 0 for No Fault
17	Machine running fault 2	Display code, 0 for No Fault
18	Machine running fault 3	Display code, 0 for No Fault
19	Machine running fault 4	Display code, 0 for No Fault
20	Machine running fault 5	Display code, 0 for No Fault
21	Spot-Inspection End	""

Notes:

- 1. Fault refers to the recent five faults;
- 2. Running Mode: 0 shutdown, 1 Cooling, 2 Heating, 3 Defrosting
- 3. Capacity of the Machine.

3) Display of Fault Codes

Digital tube displays the number of currently connected and communicated indoor units during the standby process;

Digital tube displays the frequency value of inverter compressor during the running of the compressor; Digital tube displays the "d xx" for defrosting and the "Cxx" for oil return;

The digital tube will display the following information code during the fault protection

Display	Display		
code of	code of	Fault or Protection Definition	Troublochooting
indoor	outdoor		Troubleshooting
unit	unit		
EO	E01	Bus communication fault of	Stop system, shoot trouble, resume operation
		indoor/outdoor units	
EC	E03	Inverter module communication fault of	Stop system, shoot trouble, resume operation
		outdoor unit	
E4	E04	Phase-sequence protection fault	Stop system, shoot trouble, resume operation
		(motherboard)	
E7	E05	Outdoor ambient temperature sensor	Stop system, shoot trouble, resume operation
		fault (T4)	
E4	E06	Condenser central temperature sensor	Stop system, shoot trouble, resume operation
		fault (Tc)	
E3	E07	Defrosting ambient temperature sensor	Stop system, shoot trouble, resume operation
		fault (T3)	
EH	E12	Return air temperature sensor fault (TS)	Stop system, shoot trouble, resume operation
E8	E13	Compressor exhaust temperature	Stop system, shoot trouble, resume operation
		sensor fault (Td)	
E4	E21	Four-way valve commutation failure	Stop system, unable to run the heating
		(heating mode)	
EE	E23	EEPROM fault (Outdoor unit E2 fault)	Stop system, shoot trouble, resume operation
E4	E30	Outdoor unit DIP selection machine type	Stop system, shoot trouble, resume operation
		fault	
E1	E32	Room temperature sensor T1 (RT)	Stop system, shoot trouble, resume operation
E2	E33	Indoor coil temperature sensor T2(IPT)	Stop system, shoot trouble, resume operation
E4	E34	High pressure switch fault (open circuit	Stop system, shoot trouble, need to
		for frequency 0)	re-energize it to resume operation

DC Inverter Air

E4	E35	Low pressure switch fault (open circuit	Stop system, shoot trouble, need to
		for frequency 0)	re-energize it to resume operation
P1	P01	Over/under veltage protection	Stop system, release protection, resume
		over/under-voltage protection	operation
PO	P03	Invertor module protection	Stop system, release protection, resume
		Inverter module protection	operation
Р3	P04	High voltage switch protection	Stop system, release protection, resume
			operation
			Stop system, release protection, resume
D 4	D 00	Inverter compressor exhaust high	operation; after three protections within one
P4	P09	temperature protection (Td)	hour, it shall be re-energized to resume
			operation;
			Stop system, release protection, resume
DC	010	Condenser high temperature protection	operation; after three protections within one
PO	P12	(Тс)	hour, it shall be re-energized to resume
			operation;
50	010		Stop system, release protection, resume
P2	P15	inverter compressor current protection	operation
			Stop system, release protection, resume
02	D21	Low voltage switch protection	operation; after three protections within one
РЭ	P21	Low voltage switch protection	hour, it shall be re-energized to resume
			operation;
Р3	P26	IPM Module over-current protection	Stop system, release protection, resume
			operation
Р3	P27	IPM Module low voltage protection	Stop system, release protection, resume
			operation
Р3	P28	IPM Module high voltage protection	Stop system, release protection, resume
			operation
P5	P31	Indoor unit coil temperature protection	
		(T2 OR IPT)	
P8	P33	Outdoor over-temperature and	Stop system, release protection, resume
		under-temperature protection (T4)	operation
P3	P34	Drive radiator temperature protection	Stop system, release protection, resume
			operation

18K ,24K outdoor PCB



- 1--- Compressor drive output, UVW
- 2--- Monitor and test ou tput
- 3--- Electronic expansion valve interface
- 4--Exhaust temperature sensor interface
- 5 — Temperature sensor interface of outdoor temperature and condense tube
- 6--Outdoor DC fan output
- 7——Four way valve out put interface
- 8——Power input

4) Description of Address DIP

a.Capacity of Outdoor Unit (Model DIP) (14) SW410

	Model(HP)(BTU)(*100W)	SW410 (8-1)
1	TCA-36HRA/DV	0100 0000
2	TCA-48HRA/DV3	0011 0000
3	TCA-60HRA/DV3	0000 0000

Note: 1 –ON; 0 - OFF.

b.Piping Length DIP of Outdoor Unit (20) SW411:

		SW411 (4——1)	
1	Long	0000	
	piping	0000	
2	Short	0001	
	piping	1000	

Note: 1 –ON; 0 - OFF.

c.Capacity of Outdoor Unit (Model DIP) (14) SW1

	Model(HP)(BTU)(*100W)	SW 1 (4-1)
1	TCA-18HRA/DVO	1111
2	TCA-24HRA/DVO	0111

3.3 TCA-48/60HRA /DV3 Electric Control Box (ECB)

1) ECB Structure of Outdoor Unit



- 1— Compressor drive module of outdoor unit;
- 2— Main control panel of outdoor unit;
- 3— Power supply terminal block of outdoor unit;

Communication terminal block of indoor/outdoor units

- 4— Outdoor power supply filter board;
- 5— Fan capacitor;
- 6— Electrolytic capacitor
- 7— Reactor
- 2) Compressor Driver of Outdoor Unit, Fault and Protection



- 1— Communication between compressor driver and main control panel
- 2- LED indicator light (LED601(Red)), Flash(ON for 1s, OFF for1s): Driver runs normally,

Flash (ON for 0.5s, OFF for 0.5s, Flash for N times and OFF for 3.25s; this is a cycle): Module fault

- 3—DC+ OUT Externally connect the reactor
- 4-R/S/T 3-Phase power supply input
- 5-DC-OUT Externally connect the capacitor negative electrode
- 6—DC- IN Externally connect the capacitor negative electrode
- 7–U/V/W Compressor drive output
- 8—DC+ IN Externally connect the capacitor positive electrode

List of Shutdown Fault Indications

Fault Code	Fault Contents
1	IPM Over-current (Peak Value)
2	Compressor drive failure protection
3	Compressor over-current (Peak Value)
5	Compressor phase current sampling fault
6	PIM over-temperature shutdown
8	DC bus over-voltage
9	DC bus under-voltage
14	PIM temperature sensor fault
15	DSP and MCU Communication fault
16	Communication fault with main control panel

Note: the "number" in fault code refers to the flashing times of LEDD, etc.

3.4 TCA-36HRA/DV Electric Control Box (ECB)

1) ECB Structure of Outdoor Unit



- 1— Power supply terminal block of outdoor unit Indoor/outdoor communication terminal block
- 2— Main control panel of outdoor unit
- 3— Outdoor power filter board
- 4- Compressor driver module of outdoor unit
- 2) Compressor Driver, Fault and Protection



- 1- CN708: Communication between compressor driver and main control panel
- 2- U/V/W(CN5, CN6, CN7): Compressor driver output
- 3- AC-L/AC-N(CN1, CN2): Power supply input terminal
- 4- L1/L2(CN3, CN4): externally connect PFCDC reactor
- 5- LED Indicator Light

LED701 (Red) OFF: No fault

Flash: shutdown fault indication (see 5.2.1 – List of Shutdown Protection Faults) LED702 (Yellow) OFF: Not fault

Flash: alarm fault indication (see 5.2.2 – List of Alarm Protections)

LED703 (Green) Flash: Driver standby

Normally ON: Driver running

6- LED Indicator Light

LED704(red) Normally ON: Driver is ON

OFF: Driver is OFF

Fault Code	Fault Content				
1	IPM over current				
2	Compressor drive failure protection				
3	Compressor over-current (Peak Value)				
4	Reserve				
5	Compressor phase current sampling fault				
6	IGBT shell over-heat shutdown				
7	Reserve				
8	DC bus over-voltage				
9	DC bus under-voltage				
10	AC input under-voltage				
11	AC input over-current				
12	Input voltage sensor sampling fault				
13	PFC and DSP communication fault				
14	Radiator sensor fault				
15	Communication fault of DSP and communication board				
16	Communication fault with main control panel				

Note: the "number" in fault code refers to the flashing times of LEDD, etc.

List of Alarm Protections

Fault Code	Fault Content		
1	Compressor over-current alarm (peak value)		
2	Compressor weak magnetic protection alarm		
3	IGBT shell over-heat alarm		
4	Reserve		
5	AC input over-current alarm		
6	EEPROM Fault alarm		

Note: the "number" in fault code refers to the flashing times of LEDD, etc.

3.5 Troubleshooting and Repair

(1) Steps of Fault Repair

A. Collect fault phenomena

B. Judge whether it is a fault or reasonable protection function;

C. Fault identification: determine fault position according to fault display;

D. test the damage condition of failed peripheral elements (sensor, display screen, pressure switch, level switch, etc.);

E. Replace the damaged parts;

F. Main control panel is damaged or not;

G. Replace the main control panel.

(2) Troubleshooting and Protection based on Fault Codes

H**: refers to the number of indoor units connected with the outdoor unit, which is displayed when all indoor units are in standby state.

It displays "Dxx" when the outdoor unit is in the defrosting state;

It displays "Cxx" in the return oil state;

xx— Running frequency

E01: an incorrect communication line between indoor unit and outdoor unit.

Treatment Method:



Note: The communication line connection of indoor/outdoor units refers to the chapter 3 - Electrical Design.

E03: the communication fault between inverter module and main control panel of outdoor unit Treatment Method:

1. Whether the module communication lines are reliably connected with communication interface of main control panel (CN302);

- 2. Whether the module power supply is reliably connected with the filter boards L and N (220V);
- 3. Whether is there the large-size disturbance source existed in surrounding environment;
- 4. Replace the inverter module;
- 5. Replace the outdoor motherboard.

E04: faulty phase sequence detected for the first energization

Treatment Method:

- 1. Replace the phase sequence of power supply;
- 2. If it still displays E04 after the replacement, it may be the problem of main control panel. It is necessary to

replace the main control panel (MCP).

E05: open/short-circuit fault of outdoor ambient temperature sensor (TABM,T1)

Treatment Method:



Use the resistor gear of multi-meter to measure the resistance of sensor to check whether it is corresponding to that of temperature sensor in attached page

Use the resistor gear of multi-meter to measure the pull down resistance of circuit sensor interface, usually 8.1-10K. Use the DC voltage gear to measure the voltage of sensor sampling port of IC under the standby state, usually 3V or so

E06: open/short-circuit fault of outdoor condenser central temperature sensor (TC)

The treatment method is the same as E05.

E07: open/short-circuit fault of outdoor condenser defrosting temperature sensor (T3 OR OPT)

The treatment method is the same as E05.

E12: open/short-circuit fault of outdoor suction temperature sensor (TX or T5)

The treatment method is the same as E05.

E13: open/short-circuit fault of compressor exhaust temperature sensor (TD)

The treatment method is the same as E05.

E21: commutation failure of four-way valve (heating mode)

Treatment Method:

- 1. Under the heating mode, use the multi-meter to test the voltage of four-way valve output terminal of outdoor main control panel (31), usually within 165-270V;
- 2. If the voltage is normal, it indicates the commutation failure of four-way valve. It is necessary to check or replace the four-way valve;

3. If the voltage is not normal, please replace the motherboard of outdoor unit.

E23: EEPROM fault of outdoor unit

Treatment Method:

- 1. Change EEPROM of outdoor unit (upgrade the EEPROM data);
- 2. Replace the motherboard of outdoor unit;

E30: DIP Fault of model selection of indoor/outdoor unit

Treatment Method:

- 1. Check whether the model DIP of outdoor unit (14) is consistent with the specified model (DIP refers to the address DIP description of main control panel of outdoor unit);
- 2. Check whether the model DIP of indoor unit (14) is consistent with the specified model (DIP refers to the address DIP description of main control panel of indoor unit);
- 3. Replace the motherboard of outdoor unit;
- 4. Replace the motherboard of indoor unit;

E32: open/short-circuit fault of indoor ambient temperature sensor (T1 or RT)

The treatment method is the same as E05.

E33: open/short-circuit fault of indoor ambient temperature sensor (T2 or IPT)

The treatment method is the same as E05.

E34: High pressure switch fault

Such fault occurs in the standby state or prior to the startup.

Treatment Method:

- 1. Use multi-meter to check whether the high pressure switch is in open-circuit, and if YES, please replace the high pressure sensor;
- 2. Replace the motherboard of outdoor unit.

E35: Low pressure switch fault

Such fault occurs in the standby state or prior to the startup.

Treatment Method:

- 1. Use the pressure gauge to check whether the system pressure is normal, and if it is less than 0.2, please supplement the refrigerant.
- 2. Use multi-meter to check whether the low pressure switch is in open-circuit, and if YES, please replace the high pressure sensor;
- 3. Replace the motherboard of outdoor unit.

P01: Protection shutdown when voltage is higher than 275V or lower than 160V

Treatment Method: (voltage detection circuit in the inverter module board)

1. Use the multi-meter to test whether the power supply between Phases A, B and C and Neutral Line is among 180V-260V;

2. Whether the module communication line is reliably connected with the communication interface of main control panel;

- 3. Whether the power supply module is reliably connected with filter boards L and N;
- 4. Replace the inverter module board;
- 5. Replace the motherboard of outdoor unit.

P03: Inside Function Protection of Inverter Module (see Compressor Driver Fault and Protection Codes for details)

Treatment Method:

1. Whether the module communication line is reliably connected with the communication interface of main control panel;

- 2. Whether the module DC power supply is 310V or so for single phase (530V for three phases);
- 3. Whether it can be normally started after cutting off the input connecting line of the compressor. If it can be normally started, it indicates the compressor is damaged (the resistance of three terminal blocks of compressor is about 5 ohms) and if it cannot be normally started, it indicates the module is damaged.

P04: High Pressure Protection of the System

Treatment Method:

- 1. Test whether the system pressure is normal;
- 2. Disconnect the pressure switch and use multimeter to test whether the two terminals of pressure switch are short-circuit;
- 3. If the pressure switch and system pressure are both normal, please replace the main control panel;

If three high pressure protections occur within one hour, the protection will be changed into the fault code (E34) and then the system will automatically shut down and be locked, and it is required to switch off and reenergize to resume the operation.

P09: Inverter Compressor Exhaust High Temperature Protection (TD)

Treatment Method:

- 1. Test whether the compressor exhaust temperature is normal (below 115°);
- 2. If it is normal, please test whether the resistance of exhaust temperature sensor is consistent with that in attached page (Annex 4);

If three compressor exhaust high temperature protections occur within one hour, the protection will be changed into the fault code (E13) and then the system will automatically shut down and be locked, and it is required to switch off and re-energize to resume the operation.

P12: Condenser High Temperature Protection (TC)

Treatment Method:

- 1. Test whether the condenser temperature is normal (below 62°);
- 2. If it is normal, please test whether the resistance of exhaust temperature sensor is consistent with that in attached page (Annex 3);

If three condenser high temperature protections occur within one hour, the protection will be changed into the fault code (E06) and then the system will automatically shut down and be locked, and it is required to switch off and re-energize to resume the operation.

P13: Shutdown when inverter compressor current is greater than the protection current

Treatment Method:



P21: Low Pressure Protection of the System

Treatment Method:

- 1. Test whether the system pressure is normal;
- 2. Disconnect the pressure switch and use multi-meter to test whether the two terminals of pressure switch are short-circuit;
- 3. If the pressure switch and system pressure are both normal, please replace the main control panel;

If three low pressure protections occur within one hour, the protection will be changed into the fault code (E35) and then the system will automatically shut down and be locked, and it is required to switch off and reenergize to resume the operation.

P31: Coil Temperature (T2) Protection of Indoor Unit

Treatment Method:

1. Test whether the indoor evaporator temperature is normal;

2. If it is normal, please test whether the resistance of exhaust temperature sensor is consistent with that in attached page (Annex 3);

3. If it is normal, please replace the main control panel.

If three indoor coil (T2) protections (excluding evaporator low temperature protection) occur within one hour, the protection will be changed into the fault code (E33) and then the system will automatically shut down and be locked, and it is required to switch off and re-energize to resume the operation.

P33: Outdoor Ambient Over-temperature/under-temperature (T4 or TAMB)

Protection Treatment Method:

1. Test whether the ambient temperature of outdoor unit is in the running range: Cooling: $-15^{\circ}C \le T4 \le 48^{\circ}C$ Heating: $-15^{\circ}C \le T4 \le 27^{\circ}C$

- 2. If it is normal, please test whether the resistance of exhaust temperature sensor is consistent with that in attached page (Annex 3);
- 3. If it is normal, please replace the main control panel.

P34: Driver Radiator Temperature Protection of Outdoor

Unit Treatment Method:

- 1. Test whether the driver radiator temperature is normal (below 80°);
- 2. If it is normal, please test whether the resistance of driver radiator temperature is consistent with that in attached page (Annex 3);
- 3. If it is normal, please replace the main control panel.

18K , 24K Outdoor unit fault handling

Outdoor board running status indicator light

1. The main controller LED lamp is located in the center position of the outdoor PCB and set the running status indicator light (yellow luminous tube). When the air conditioner is no fault and the compressor doesn't running the indicator light flash at 1 second frequency. The outdoor light always lit when the compressor runs normally; If there is a fault, the indicator light will flash at 1 second frequency for n times and then destroy 3 seconds for a cycle to show the fault, as follows:

Protection and Fault	Indoor display	Outdoor flash	Reason	
Under voltage protection	P1	2	Input voltage lower than 160V±5V	
Overload of current protection	P2	3	Running current exceeds a limited value (no displayed)	
High temperature protection of exhaust	Р4	4	Exhaust temperature exceeds shutdown protection value	
Over cooling protection when cooling mode	Р5	32	The temperature of the indoor tube is lower than the set value when cooling mode.	
Over heating protection when cooling mode	P6	5	The temperature of the indoor tube is higher than the set value when cooling mode.	
Over heating protection when heating mode	P7	33	The temperature of the indoor tube is higher than the set value when heating mode.	
High/low temperature protection of outdoor unit	P8	31	Cooling when outdoor below 0 $^\circ\!\mathrm{C}$ or heating when outdoor higher than 32 $^\circ\!\mathrm{C}$	
Drive protection	Р9	6	Compressor driven is abnormal or can't be started	
Module protection	PO	1	Temperature and current of variable frequency module are overload	
Communication malfunction between indoor and outdoor	EO	7	Communication abnormal between outdoor PCB power board a outdoor module	
Communication malfunction for outdoor unit	EC	15	No Communication between indoor and outdoor or outdoor power is abnormal	
Indoor room temperature sensor	E1	25	The temperature of the indoor tube is lower than the set value when cooling mode.	

Evaporator tube	F2	26	The temperature of the indoor tube is higher than the set value			
temperature sensor	LZ	20	when cooling mode.			
Condenser tube		10	The temperature of the indoor tube is higher than the set value			
temperature sensor	E3	10	when heating mode.			
System fault	E4	23	The tube temperature is abnormal in cooling or heating			
indoor fan fault	E6	21、28	Indoor fan stop or run abnormally			
Outdoor temperature	- 7					
sensor fault	E/	9	Open circuit of short circuit of outdoor room temperature sensor			
Exhaust temperature	F.0	11	Open circuit or short circuit of outdoor exhaust gas temperature			
sensor	Łδ	11	sensor			
Variable frequency drive	50					
module fault	E9	14、30	The driver module protect happen three times in 30 minutes.			
Outdoor fan fault	EF	16、20	Outdoor DC fan motor stop or run abnormally			
Current sensor fault	EA	13	System can't collect current data normally.			
Indoor EEPROM fault	EE	27	EEPROM data receive failed			
Outdoor EEPROM fault	EE	19	PCB can't collect EEPROM data normally.			
Compressor housing top			The temperature of compressor housing top is more high or			
switch fault	٤P	8	temperature switch fault			
Voltage sensor fault	EU	12	System can't collect current voltage data normally.			
Back gas temperature		10	Open circuit or short circuit of outdoor exhaust gas temperature			
sensor	ΕĦ	18	sensor			
power off Instantly		55	Instant power off			
compressor input voltage						
lost phase		34	Compressor input voltage lack of phase			
High pressure protect	P3	24	High pressure protect			
Model matching error		29	Capacity matching error			

P1: Protection shutdown when voltage is higher than 275V or lower than 160V

Treatment Method: (voltage detection circuit in the inverter module board)

1. Use the multi-meter to test whether the power supply between Phases A, B and C and Neutral Line is among 180V-260V;

2. Whether the module communication line is reliably connected with the communication interface of main control panel;

- 3. Whether the power supply module is reliably connected with filter boards L and N;
- 4. Replace the inverter module board;
- 5. Replace the motherboard of outdoor unit

P4: Inverter Compressor Exhaust High Temperature Protection

Treatment Method:

- 1. Test whether the compressor exhaust temperature is normal (below 115°);
- 2. If it is normal, please test whether the resistance of exhaust temperature sensor is consistent with that in attached page (Annex 4);

If three compressor exhaust high temperature protections occur within one hour, the protection will be changed into the fault code (E8) and then the system will automatically shut down and be locked, and it is required to switch off and re-energize to resume the operation.

P3: High Pressure Protection of the System

Treatment Method:

1. Test whether the system pressure is normal;

2. Disconnect the pressure switch and use multimeter to test whether the two terminals of pressure switch are short-circuit;

3. If the pressure switch and system pressure are both normal, please replace the main control panel;

If three high pressure protections occur within one hour, the protection will be changed into the fault code (E34) and then the system will automatically shut down and be locked, and it is required to switch off and reenergize to resume the operation.

E2: Coil Temperature (T2) Protection of Indoor Unit

Treatment Method:

1. Test whether the indoor evaporator temperature is normal;

2. If it is normal, please test whether the resistance of exhaust temperature sensor is

consistent with that in attached page (Annex 3);

3. If it is normal, please replace the main control panel.

If three indoor coil (T2) protections (excluding evaporator low temperature protection) occur within one hour, the protection will be changed into the fault code (E33) and then the system will automatically shut down and be locked, and it is required to switch off and re-energize to resume the operation.

E4: Outdoor Ambient Over-temperature/under-temperature (T4) Protection

Treatment Method:

1. Test whether the ambient temperature of outdoor unit is in the running range: Cooling: -15 $^{\circ}C \le T4 \le 48 ^{\circ}C$

Heating: -15 °C ≤**T4≤27 °C**

2. If it is normal, please test whether the resistance of exhaust temperature sensor is consistent with that in attached page (Annex 3);

3. If it is normal, please replace the main control panel.

E9: Driver Radiator Temperature Protection of Outdoor

Unit Treatment Method:

1. Test whether the driver radiator temperature is normal (below 80°);

2. If it is normal, please test whether the resistance of driver radiator temperature is consistent with that in attached page (Annex 3);

3. If it is normal, please replace the main control panel.

3.6 Electrical Control and Troubleshooting of Indoor Unit



1). Description of Motherboard of Indoor Unit (cassette)

1— Transformer Input socket, 220v high voltage

220V-240V is inputted to transformer 220V power supply of the power board is inputted to the socket and transmitted here via fuse and PTC protector.

2—Pump

3—Indoor Fan Output

220V-240V output, four relays and four wind gears on electric control panel: high wind, middle wind, low wind and breeze. However, the low-wind and breeze gear output is short-circuit, and the breeze gear of indoor fan has been eliminated, therefore, even though it belongs to the suction of breeze relay, the indoor fan will be operated as per the low wind gear, that is, there are only three wind speed gears for all indoor air duct units. It will be operated as per the low wind speed gear even if it is in the heating and anti-cold wind and oil-return period.

Power Dial Switch				
Capacity	KNOB1			
36K	3			
48K	4			
60K	5			

4-KNOB1 Indoor Unit Capacity (Model) DIP

5-VERTICAL VANE MOTOR

6—Evaporator Central Temperature Sensor (IPT)

Indoor Ambient Temperature Sensor (RT)

7-WATER SWITCH

8—Dashboard Socket (Display Panel)

The dashboard is only used to display the running status and fault information of the air conditioner, and receive the signals of the remote controller.

9—Communication Port

Indoor/outdoor units use the RS-485 communication style for communications, of which, 2 and 3 are used for communication, with a polarity, and 4 is the shielded layer and it is connected to the position +5V in electric control panel to enhance the anti-interference ability of the communication lines. When the indoor/outdoor units cannot be communicated for continuous 2 minutes, the communication fault will be displayed.

10-wire controller

11—SW2

12—SW1 Indoor Unit Type DIP

Function dial the code (SW1)						
Function	S₩1_1	SW1_2	S₩1_3	SW1_4	Explain	
Water level	ON	/			Use	
	OFF				Ban	
Do motor		ON			Use	
		OFF			Ban	
Fan gear selection			OFF	OFF	Don`t block 🔳	
			OFF	ON	Blocking high wind	
			ON	OFF	Blocking middle wind	
	/		ON	ON	Blooking low wind	

Remarks;

- 1. circuit breaker QF (with a leakage protection function provided by the user);
- c. drainage pump, the water level switch is optional;
 t. "■" for the dial contact location, the type and function to dial contact position
- in the table shall prevail;
- 4. 2# fan according to the product assembly:
- 5, SW1 Don't make.

13—Transformer Output

AC power supply is inputted into transformer, and the transformer will output 15V and then input to the electric control panel.

14—POWER SOUREC input interface

15—FUSE

2) Description of Motherboard of Indoor Unit (Duct/ Ceiling & floor)



1—Transformer Input socket, 220v high voltage

220V-240V is inputted to switch power board (transformer), 220V power supply of the power board is inputted to the socket and transmitted here via fuse and PTC protector.

2—Pu mp

3—Indoor Unit Capacity DIP

Power Dial Switch			
Capacity	KNOB1		

36K	3
48K	4
60K	5

4— Ind oor Fan Output

220V-240V output, four relays and four wind gears on electric control panel: high wind, middle wind, low wind and breeze. However, the low-wind and breeze gear output is short-circuit, and the breeze gear of indoor fan has been eliminated, therefore, even though it belongs to the suction of breeze relay, the indoor fan will be operated as per the low wind gear, that is, there are only three wind speed gears for all indoor air duct units. It will be operated as per the low wind speed gear even if it is in the heating and anti-cold wind and oil-return period.

5—Up and down vane motor

6-Left or right vane motor

7—Dashboard Socket (Display Panel)

The dashboard is only used to display the running status and fault information of the air conditioner, and receive the signals of the remote controller.

8—Evaporator Central Temperature Sensor (IPT)

9—Indoor Ambient Temperature Sensor (RT)

10—Communication Port

Indoor/outdoor units use the RS-485 communication style for communications, of which, 2 and 3 are used for communication, with a polarity, and 4 is the shielded layer and it is connected to the position +5V in electric control panel to enhance the anti-interference ability of the communication lines. When the indoor/outdoor units cannot be communicated for continuous 2 minutes, the communication fault will be displayed.

11—wire controller

12—SW2

Type Dial Switch (SW3)					
SW3_1 SW3_2 SW3_3 SW3_4 Explain					
ON	OFF	OFF	OFF	Ceiling Floor(ZD)	
OFF	ON	OFF	OFF	Mesp Duct (FG)	

13—SW1 Indoor Unit Type DIP

Function dial the code (SW2)						
Function SW2_1 SW2_2 SW2_3 SW2_4 Explain						
	ON				Use	
Water level	OFF				Ban	
D		ON			Use	
Dc motor		OFF			Ban	
			OFF	OFF	Don`t block	
Fan gear			OFF	ON	Blocking high wind	
selection			ON	OFF	Blocking middle wind	
			ON	ON	Blocking low wind	

Remarks:

- 1, circuit breaker QF (with a leakage protection function provided by the user);
- 2. drainage pump, the water level switch is optional;
- 3. To for the dial contact location, the type and function to dial contact position in the table shall prevail;
- 4, 2# fan according to the product assembly;
- 5, swl Don`t make.

14—transformer Output

AC power supply is inputted into transformer, and the transformer will output 15V and then input to the electric control panel.

15—FUSE

16—POWER SOUREC input interface

3) Troubleshooting Methods





B. Fault of Outdoor Unit

After the failure of outdoor unit, the indoor unit will display the fault of outdoor unit, see the Troubleshooting of Outdoor Unit for more details.

3.7 System Maintenance

1). Maintenance of Indoor Unit

1) Clean the Dust Filter Screen

(1) The dust filter screen can eliminate the dust or other particles from the air, and if it is blocked, the effect of air-conditioner system will be significantly reduced;

(2) If the indoor unit is mounted in heavy dusty place, the times of cleaning the dust filter screen shall be increased;

- (3) If the dirt is heavy and it is difficult to clean, please replace the dust filter screen;
- (4) Replacement Method of Dust Filter Screen:
- A. Take off the air intake grill according to the operation methods in the following table.

Model	Operation Sequence
Ducted Indoor Unit	 a. Slide the clip of air intake panel along the arrow direction and open downward the air intake grill;
	b. Take out the dust filter screen at the bottom of air conditioner.

B. Detach the filter screen: press down the hook of dust filter screen and pull down to take out the filter screen.

C. Clean the filter screen.

The filter screen can be cleaned by vacuum cleaner or clean water. If the dirt is heavier, please use the soft brush and neutral detergent to clean and then spin the water and put it in cool place.

Notes: do not dry up the filter screen in direct sunlight or by fire; the filter screen of the embedded air

conditioner shall be assembled before the installation and the fixation.

D. Re-mount the filter screen

E. Re-mount and close the air intake grill as per the reverse order of Step A and Step B.

2) Clean the air outlet and panel

(1) Wipe it with soft dry cloth;

(2) If it is difficult to remove the stain, please use the clean water or neutral detergent to clean it. Notes:

A. Do not clean it with gasoline, benzene, volatile agent, scouring powder and liquid pesticides; otherwise it will cause the discoloration or deformation;

B. Do not get the water into the indoor unit; otherwise, it may cause electric shock or fire;

C. Do not scrub it while cleaning the air deflector with water;

D. If the air conditioner is operated under the condition of no installation of filter screen, the dust accumulated in the air conditioner will cause the fault because the dust in the indoor air cannot be removed.

2). Maintenance of Outdoor Unit

1) Some edges of stamping parts and fins of condenser are sharp, any incorrect operation may lead to damage, and therefore, it must be careful while cleaning it.

2) The inside coils and other parts of outdoor unit shall be cleaned regularly. Please feel free to contact the commercial air conditioner dealers or local TCL commercial air-conditioner after-sale service center.

3) It is necessary to regularly check the air outlet of outdoor unit to see whether they are blocked by dirt or soot;

3). System Maintenance prior to Seasonal Shutdown

1) Make the air conditioner in a blowing running state and keep it for about half a day to fully dry its inside;

2) Turn off the air conditioner via the ON/OFF of the remote controller and then power it off. If the power supply is not switched off, the machine will consume the electricity of several kilowatts or tens of kilowatts. Therefore, if it is powered off, it can save the power.

3) After the air conditioner has been used for several seasons, there will be accumulated debris of different degrees in it according to the different working conditions. For this reason, except the said common cleaning operations, it is recommended to carry out other inspection and maintenance, for example, the trained service personnel can be invited to clean the air filter and its housing.

4). System Maintenance prior to Seasonal Startup

- 1) Check the following items:
- A. Ensure that the air inlet and outlet of indoor and outdoor units are not blocked;
- B. Ground wire is intact/ wiring is intact;
- 2) The trained service personnel can be invited to clean the air filter and its housing.
- The air filter must be mounted after the cleaning;
- 3) Power it on.

Annexes

Annex 1 Analysis of Common Faults of Compressors

1. Compressor Fault Detection

(1) Short-circuit fault of compressor coil: with the multimeter, the resistance between terminal blocks or between terminal blocks and the ground is measured as 0 ohm under the condition that the compressor is in a cold state;

Specific fault symptom: power air switch is subject to the leakage of electricity and tripping when the compressor is started.

Reasons:

a. The air and moisture entered in the cooling system will lead to a poor insulation effect of the coils and it may cause the short circuit of compressor coil when it is operated in high temperature and pressure for a long time; b. The system power supply quality is poor, leading to under-voltage or over-voltage, phase failure and partial phase and even the short circuit of compressor coil;

c. The debris entered into the system will block the filter and reduce the circulating amount of the refrigerant, leading to insufficient running pressure and overheat running of the compressor and even the short circuit of compressor coil;

(2) open-circuit fault of compressor coil: With the multimeter, the resistance among terminal blocks is measured as ∞ ohms under the condition that the compressor is in a cold state.

Specific fault symptom:

a. The compressor is unable to start in case of any open circuit for either group of coils, and the current of other two groups of coils is big. After a long time, it will lead to the burning of compressor built-in protector or two groups of coils.

b. The compressor is unable to start in case of any open circuit of either two groups of coils, and the current of the residual group of coils is big, and after a long time, it will lead to the burning of compressor built-in protector or two groups of coils.

c. The compressor is unable to start in case of any open circuit of three groups of coils, and any group of coils has no current.

Reasons:

a. The air and moisture entered in the cooling system will lead to a poor insulation effect of the coils and it may cause the open circuit of compressor coil when it is operated in high temperature and pressure for a long time; b. The system power supply quality is poor, leading to under-voltage or over-voltage, phase failure and partial phase and even the open circuit of compressor coil;

c. The debris entered into the system will block the filter and reduce the circulating amount of the refrigerant, leading to insufficient running pressure and overheat running of the compressor and even the open circuit of compressor coil;

(3) Stuck Fault of Compressor Motor: when the compressor bearing is rotated under the condition of insufficient lubrication or lack of lubricant, it will cause the abrasion and stuck of compressor bearing.

Specific fault symptom: it will cause the current protection or compressor built-in protection shortly after the start of the compressor,

Reasons:

a. The refrigerant leakage and the lubricant leakage occur in the cooling system, which has resulted in the
reduction of the lubricant of the compressor;

b. The air and the moisture enter the system and they enable the lubricant and air-conditioning oil to begin to acidify and heat to finally become the gelatinous substance and cause the stuck of compressor after the compressor has been operated in high temperature and high pressure for a long time;

c. In order to remove the residual acidified air-conditioning oil in the AC system, the carbon tetrachloride (CTC) or other cleaning liquid is now used widely to clean the piping system of air conditioner. The CTC left on the pipe wall is sometimes diluted by the refrigerant and air-conditioning oil. The diluted CTC is operated together with the refrigerant and AC oil in the high temperature and pressure for a long time to cause the acidification and heating of AC oil to finally become the gelatinous substance and cause the stuck of compressor.

(4) Compressor Liquid Strike Fault: the excessive liquid refrigerant that is not evaporated is sucked into the compressor to cause the wreck of compressor liquid strike scroll.

Specific fault symptom:

a. The compressor is unable to start, which leads to the current protection or compressor built-in protection (insertion);

b. After the wreck of compressor liquid strike scroll, the scroll fragments will fall on the motor coils to damage the insulation layer of the coil and cause the burning of coil;

c. The compressor can run, but it has no high or low pressure and has a small current.

Specific fault symptom: it causes the current protection or compressor built-in protection (insertion) shortly after the compressor is started.

Reasons:

a. The compressor is subject to a liquid strike due to excessive adding or charging of refrigerants in the cooling system;

b. During the cooling process of the system, the fan of indoor unit does not work or the capacitor capacitance decreases, fan speed is low, air duct is clogged and the filter screen and heat exchanger are dirt, which all possibly cause the incomplete evaporation of the refrigerant and even the liquid strike of the compressor;

c. During the heating process of the system, the fan of outdoor unit does not work or the capacitor capacitance decreases, fan speed is low, air duct is clogged and the heat exchanger is dirt, which all possibly cause the incomplete evaporation of the refrigerant and even the liquid strike of the compressor;

d. During the cooling process, the electronic expansion valve of indoor unit in the VRF system does not work and it is still in the normally open state. At this moment, the refrigerant is not evaporated to absorb the heat, causing the liquid strike of compressor.

2. Notes to Replacement of Compressor

For any compressor fault, it is necessary to analyze the lubricant of damaged compressor oil during the replacement and repair.

(1) The oil is very dark and turbid (see the following figure), and the moving parts in the compressor have undergone the serious wear.

a. it is necessary to replace the compressor;

b. It is also necessary to replace the low-pressure storage tank in the system and at this moment, some deteriorated lubricants of the system have been stored in this storage tank;

c. the high-pressure nitrogen is used to blow the waste oil of the whole cooling system to ensure the waste oil is removed thoroughly from the whole cooling system.

(2) The oil shows the dark red and it is not turbid (see the following figure) and the moving parts in the compressor have undergone the light wear.

a. it is necessary to replace the oil in the compressor;

b. It is also necessary to replace the low-pressure storage tank in the system and at this moment, some

deteriorated lubricants of the system have been stored in this storage tank;

c. the high- pressure nitrogen is used to blow the waste oil of the whole cooling system to ensure the waste oil is removed th oroughly from the whole cooling system.

After c ompleting th e replacement of compressor, the strict evacuation and pressure holding operation shall be carried out to the cooling system and the refrigerant shall be filled as per the system requirements. After starting and operating the compressor for half an hour, it is necessary to test the performance parameters of system temperature, pressure, current, etc.



Annex 2 Faults Not Resulted from Air Conditioner

Due to the difference of installation, commissioning and actual operating environments, the air conditioner may present different running states. The following phenomena are not resulted from the abnormity of the compressor.

1. The system does not work

- 1) The system does not work immediately after pressing the ON/OFF button;
- If the indicator light is ON, it presents the normal running state of the air conditioner. The symptom that it does not work immediately is incurred from the action of safety device of the system to prevent the overload;
- 3) The compressor of the air conditioner will automatically start its running three minutes later;
- 4) If the running indicator light and defrosting/preheating indicator light is ON, it indicates that you have chosen the heating mode. Because the compressor is unable to run at the very beginning, the under-temperature of indoor unit will result in the "anti-cold wind" protection.

2. White mist in indoor unit

- 1) Conduct the cooling operation under the condition that the indoor relative humidity is too high (or oily and dusty place);
- 2) If there is heavy dirt in the indoor unit, the room temperature will be uneven, and under such a condition, it is necessary to clean the inside of the indoor unit, which must be performed by the professional repairman.
- 3) The air conditioner is switched from defrosting operation into the heating operation;
- 4) The water from defrosting operation becomes the steam to discharge.

3. Noise of Air Conditioner

- The air conditioner will give out the lower continuous "Hissing" sound when it is in its automatic operation, cooling, dehumidifying or heating operation. it is the flowing sound of refrigerants between indoor unit and outdoor unit;
- 2) In a short time after the running suspension or during the defrosting operation, the "hissing" sound can be heard. It is the sound given out by refrigerant when it stops or changes its flow;
- 3) When the air conditioner is in heating (including the heating in automation mode) or dehumidifying operations, the "rustle" sound can be heard, and it is the operating sound of the drainage pump.
- 4) When the air conditioner is running or stops running, the "creak" sound can be heard. It is the expanding or contracting sound of plastic parts due to the change of temperature;

4. Dust blown from Indoor Unit

The dust in the indoor unit will be blown out when the unit is operated for the first time after it is left unused for a long time.

5. Odor Emitted from Indoor Unit

The odor absorbed from room, furniture or soot through the air return circulation of indoor unit is emitted during the running process of the air conditioner.

6. Cooling Mode Converted into Heating Mode

- 1) In order to prevent the frosting of heat exchanger of indoor unit, it will automatically be converted into the Blowing Mode and soon restored to Cooling Mode.
- 2) When the room temperature has dropped to the set temperature, the air conditioner will automatically shut down the compressor and enter the Blowing state; after the room temperature rises, the compressor will be restarted. The action of compressor in the heating mode is exactly opposite;
- 3) In case of any conflict of operating modes in the same control system, the priority is given to the heating

mode, namely, the air conditioner system only performs the Blowing state under the cooling mode.

Annex 3 Parameter Table of Temperature Sensor

Celsius	Resistance	Fahrenh		Celsius	Resistance	Fahrenh	Celsius	Resistance	Fahrenh
-20	115.2660	-4.0		26	9.5507	78.8	72	1.5367	161.6
-19	108.1460	-2.2		27	9.1245	80.6	73	1.4848	163.4
-18	101.5170	-0.4		28	8.7198	82.4	74	1.4350	165.2
-17	96.3423	1.4		29	8.3357	84.2	75	1.3870	167.0
-16	89.5865	3.2		30	7.9708	86.0	76	1.3111	168.8
-15	84.2190	5.0		31	7.6241	87.8	77	1.2908	170.6
-14	79.3110	6.8		32	7.2946	89.6	78	1.2542	172.4
-13	74.5360	8.6		33	6.9814	91.4	79	1.2133	174.2
-12	70.1698	10.4		34	6.6836	93.2	80	1.1739	176.0
-11	66.0898	12.2		35	6.4002	95.0	81	1.1360	177.8
-10	62.2756	14.0		36	6.1306	96.8	82	1.0996	179.6
-9	58.7079	15.8		37	5.8736	98.6	83	1.0645	181.4
-8	56.3694	17.6		38	5.6296	100.4	84	1.0307	183.2
-7	52.2438	19.4		39	5.3969	102.2	85	0.9982	185.0
-6	49.3161	21.2		40	5.1752	104.0	86	0.9668	186.8
-5	46.5725	23.0		41	4.9639	105.8	87	0.9366	188.6
-4	44.0000	24.8		42	4.7625	107.6	88	0.9075	190.4
-3	41.5878	26.6		43	4.5705	109.4	89	0.8795	192.2
-2	39.8239	28.4		44	4.3874	111.2	90	0.8525	194.0
-1	37.1988	30.2		45	4.2126	113.0	91	0.8264	195.8
0	35.2024	32.0		46	4.0459	114.8	92	0.8013	197.6
1	33.3269	33.8		47	3.8867	116.6	93	0.7771	199.4
2	31.5635	35.6		48	3.7348	118.4	94	0.7537	201.2
3	29.9058	37.4		49	3.5896	120.2	95	0.7312	203.0
4	28.3459	39.2		50	3.4510	122.0	96	0.7094	204.8
5	26.8778	41.0		51	3.3185	123.8	97	0.6884	206.6
6	25.4954	42.8		52	3.1918	125.6	98	0.6818	208.4
7	24.1932	44.6		53	3.0707	127.4	99	0.6186	210.2
8	22.5662	46.4		54	2.9590	129.2	100	0.6297	212.0
9	21.8091	48.2		55	2.8442	131.0			
10	20.7184	50.0		56	2.7382	132.8			
11	19.6891	51.8		57	2.6368	134.6			
12	18.7177	53.6		58	2.5397	136.4			
13	17.8005	55.4		59	2.4168	138.2			
14	16.9341	57.2		60	2.3577	140.0			
15	16.1156	59.0		61	2.2725	141.8			ļ
16	15.3418	60.8	_	62	2.1907	143.6			ļ
17	14.6181	62.6		63	2.1124	145.4			
18	13.9180	64.4		64	2.0373	147.2			
19	13.2631	66.2		65	1.9653	149.0			
20	12.6431	68.0		66	1.8963	150.8			
21	12.0561	69.8		67	1.8300	152.6			

(temperatures of room temperature sensor and pipe temperature sensor are the same) (10K,25 $^\circ$ C)

DC Inverter Air

22	11.5000	71.6	68	1.7665	154.4		
23	10.9731	73.4	69	1.7055	156.2		
24	10.4736	75.2	70	1.6469	158.0		
25	10.0000	77.0	71	1.5907	159.8		

Annex 4 Parameter Table of Temperature Sens or

(Exhaust Air Temperature Sensor) (5K,90°C)

Unit: °C — KΩ

-20	542.7	20	68, 66	60	13 59	100	2 702
-19	511.9	21	65, 62	61	13.11	100	3.102
-18	483	22	62.73	62	12.65	101	3, 595
-17	455.9	23	59, 98	63	12.00	102	3. 492
-16	430.5	24	57.37	64	11 79	103	2 206
-15	406.7	25	54, 89	65	11.38	104	3.290
-14	384.3	26	52, 53	66	10.99	105	2 112
-13	363.3	27	50, 28	67	10.61	100	3.113
-12	343.6	28	48, 14	68	10.01	107	2 041
-11	325.1	29	46, 11	69	9 902	100	2. 341
-10	307.7	30	44.17	70	9,569	110	2.00
-9	291.3	31	42.33	71	9 248	111	2.701
-8	275.9	32	40.57	72	8 94	112	2.104
-7	261.4	33	38.89	73	8,643	112	2.03
-6	247.8	34	37.3	74	8, 358	113	2.009
-5	234.9	35	35.78	75	8, 084	115	2,109
-4	222.8	36	34.32	76	7.82	116	2. 122
-3	211.4	37	32.94	77	7, 566	117	2 204
-2	200.7	38	31.62	78	7.321	118	2 222
-1	190.5	39	30.36	79	7.086	119	2.200
0	180.9	40	29.15	80	6.859	120	2 117
1	171.9	41	28	81	6.641	121	2 061
2	163.3	42	26.9	82	6, 43	122	2.007
3	155.2	43	25.86	83	6.228	123	1 955
4	147.6	44	24.85	84	6.033	124	1 905
5	140.4	45	23.89	85	5.844	125	V 1.856
6	133.5	46	22.89	86	5.663	126	1.808
7	127.1	47	22.1	87	5.488	127	1. 762
8	121	48	21.26	88	5.32	128	1. 717
9	115.2	49	20.46	89	5.157	129	1.674
10	109.8	50	19.69	90 1	5	130	1.632
11	104.6	51	18.96	91	4.849		11 000
12	99.69	52	18.26	92	4.703		
13	95.05	53	17.58	93	4.562		
14	90.66	54	16.94	94	4.426		
15	86.49	55	16.32	95	4.294	B(25/5	0)=3950K+-3%
16	82.54	56	15.73	96	4.167		,
17	78.79	57	15.16	97	4.045	R(90°C)=5K Q +-3%
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		