

# Solar HVAC - Model "Z" Residential Mini-Splits and Mounting Kits I/O/M manual

PD 07/25/2023 - v 1.00 PN IOM-0052

# Air Conditioning and Heating

# Split System Heat Pump and Air Conditioner | 3 Tons | R410A





### Part I Technical Information

### 1. Important Notice

This service manual is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair the appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

The information, specifications and parameter are subject to change due to technical modification or improvement without any prior notice. The accurate specifications are presented on the nameplate label.

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Important- This document contains a wiring diagram and service information. This is customer property and is to remain with this unit. Please return to service information pack upon completion of work.



#### CAUTION

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.



#### WARNING

#### HAZARDOUS VO LTAGE!

Failure to follow this warning could result in property damage, severe personal injury, or death.

Disconnect all electric power, Including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.



#### REFRIGERANT OIL!

Any attempt to repair a central air conditioning product may result in property damage, severe personal injury, or death.

WARNING

These units use R-410 A refrigerant which operates at 50 to 70% higher pressures than R-22. Use only R-410A approved service equipment. Refrigerant cylinders are painted a "Rose" color to indicate the type of refrigerant and may contain a "dip" tube to allow for charging of liquid refrigerant into the system. All R-410A systems with variable speed compressors use a PVE oil that readily absorbs moisture from the atmosphere To limit this "hygroscopic" action. the system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.



#### CAUTION

#### HOT SUR FACE!

May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury. Do not touch top of compressor.

#### CAUTION

#### CONTAINS REFRIGERANT!

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage.

System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.

#### CAUTION

#### GROUNDING REQUIRED!

Failure to inspect or use proper service tools may result in equipment damage or personal injury.

Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. if grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

#### 

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### WARNING

#### SERVICE VALVES!

Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/or property damage. Extreme caution should be exercised when opening the Liquid Line Service valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge. No torque is required.

### 

#### WARNING

#### BRAZING REQUIRED!

Failure to inspect lines or use proper service tools may result in equipment damage or personal injury. if using existing refrigerant lines make certain that all joints are brazed, not soldered.

#### WARNING

#### HIGH LEAKAGE CURRENT!

Failure to follow this warning could result in property damage, severe personal injury, or death.

Earth connection essential before connecting electrical supply.

## Model "Z" Mini-Split Part Number Scheme

# SHMSPZ-234-5

# Туре

P - Heat Pump

	1		0	14	-,0	)
)9	-	9,0	00	ΒT	Us	
2	-	12,	000	) B	TUs	;
8	-	18,	000	) B	TUs	;
24	-	24,	000	) B	TUs	;
36	-	36,	000	) B	TUs	;

200

RTII's (23)

### Options (4)

- 0 No Options
- D Condenser Coil (UG)
- E Mounting Kit
- Y Start Up
- 7 Phase Monitor

### Model "Z" Mini-Split Description



ALCR CERTIFIED® www.ahridirectory.org

A Solar HVAC mini-split is more than twice as efficient as a standard mini-split.

A solar box equipped with chambers lined with specialty

reflective film is mounted to the top of the condensing unit. Through a patented process, ambient light is converted to

thermal energy which reduces the energy demand on the compressor.

Units come with a 1-year parts warranty.

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# SHMSPZ-09 | Solar HVAC Model "Z" Mini-Split Dimensions

Model	Indoor Unit				Outdoor Unit						
in (mm)	Α	В	С	D	E	F	G	Н	I	J	K
SHMSPZ-09	31.93 (811)	11.5 (292)	8.07 (205)	28.15 (715)	11.42 (290)	19.61 (498)	21.11 (536)	13.73 (349)	12.62 (321)	1.97 (50)	2.48 (63)

### Intdoor Unit:







#### **Outdoor Unit:**



iAIRE, LLC

# SHMSPZ-09 | Solar HVAC Model "Z" Mini-Split Dimensions (cont'd)





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# SHMSPZ-09 | Solar HVAC Model "Z" Mini-Split Specifications

### **Electrical - Mechanical Specifications**

		Control type			remote	
		Power supply			208/230V~/60Hz/1P	
"Rated Cooling	Rated coo	bling capacity (95F/35C)	Btu	/h	9000	
(95F/35C)"	E	ER2 (95F/35C)	Btu/W.h		10	
		SEER2	Btu/W.h		19	
	ca	Rated Heating pacity(47F/8.3C)	Btu	/h	10000	
	HSPF:	2 Rating (Region IV)	Btu/\	N.h	8.5	
Detection	HSPF	2 Rating (Region V)	Btu/\	N.h	7	
Rated Heating	C	OP2 (47F/8.3C)	W/Y	N	3.41	
	Max. Hea	ting capcacity (5F/-15C)	W/Y	N	7000	
					0.7	
	C	OP2 (5F/-15F)	W/Y	N	1.75	
Suit	table area		sq.	ft	Up to 400	
Operation temperature			F		60.8~87.8	
Ambinet temperature	Indo	or(cooling/ heating)	F		>=62/<=86	
Ambinet temperature	Outdo	oor(cooling/heating)			5~122/-4~86	
		Motor Type			AC	
Indoor Motor		Output	w		23	
		Speed	rpm	1	1200/980/850	
Indoor air	circulatio	n/Hi	CFN	Λ	353/265/206	
	***	Outdoor Unit ***				
		Motor Type			DC	
Outdoor Motor		Output	W		33	
		Cooling		٨	27	
Rated Current				A	3.1	
Indoor noise level at co		Turbo/High/Med.//	ow/Mute		J.4 ///30/37//20/27	
	Outdoor-p			dB(A)	50	
Connecting Wiring						
					4^10AVVG	
Connecting Pipe		Gas		inches	3/8"	
Connecting-ripe		Liquid	quid inches		1/4"	
	Maximum I	Line Length		(m/ft)	15 / 50	
Maximum Height	Maximum Height Difference Between Indoor and Outdoor (m/ft)					

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SHVAC Residential Mini-Split and Mounting Kit I/O/M

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# SHMSPZ-09 | Solar HVAC Model "Z" Mini-Split Specifications (cont'd)

### Weight and Packing Dimensions

	Indoor	mm	811x292x205
	indoor	inch	31.92x11.49x8.07
Net dimensions (W/ x D x H)	Outdoor	mm	715x290x498
	Outdoor	inch	28.14x11.42x19.61
	Solar Poy	mm	603.76x324.36x225.3
		inch	23.77x12.77x8.87
	Indoor	kg	9
	indoor	lbs	19.8
Not woight	Outdoor	kg	22
Net weight	Outdoor	lbs	48.5
	Solar Poy	kg	11.36363636
	SUIdI DUX	lbs	25
Indoor Pooking dimons	None (M/ x D x H)	mm	885x366x278
		inch	34.84x14.40x10.94
	Outdoor	mm	818x325x538
"Outdoor Packing dimensions	Outdoor	inch	32.20x12.80x21.18
(WXDXD) (without pipe)"	Solar Poy	mm	664.13x356.79x247.83
	SUIdI DUX	inch	26.15x14.05x9.76
	Indoor	kg	12
	indoor	lbs	26.5
*Cross weight (without pips)	Outdoor	kg	24
Gross weight (without pipe)		lbs	52.9
	Solar Poy	kg	12.5
		lbs	27.5

Note:

Unit should be UL 1995 listed Unit should be OG-100 Certified to the Solar Certification on ICC901/SRCC100 Face Solar Panels south for optimal performance \*Gross = Net Weight + Shipping Box

# SHMSPZ-12 | Solar HVAC Model "Z" Mini-Split Dimensions

Model	Indoor Unit				Outdoor Unit						
in (mm)	Α	В	С	D	E	F	G	Н	I	J	K
SHMSPZ-12	31.93 (811)	11.5 (292)	8.07 (205)	28.15 (715)	11.42 (290)	19.61 (498)	21.11 (536)	13.73 (349)	12.62 (321)	1.97 (50)	2.48 (63)

### Intdoor Unit:







#### **Outdoor Unit:**



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# SHMSPZ-12 | Solar HVAC Model "Z" Mini-Split Dimensions (cont'd)





# SHMSPZ-12 | Solar HVAC Model "Z" Mini-Split Specifications

### **Electrical - Mechanical Specifications**

	Control type			remote
	Power supply			208/230V~/60Hz/1P
"Rated Cooling	Rated cooling capacity (95F/35C	) Btu	/h	12000
(95F/35C)"	EER2 (95F/35C)	Btu/\	<i>N</i> .h	10
	SEER2	Btu/\	<i>N</i> .h	19
	Rated Heating capacity(47F/8.3C)	Btu	/h	12200
	HSPF2 Rating (Region IV)	Btu/\	N.h	8.5
	HSPF2 Rating (Region V)	Btu/\	N.h	7.2
Rated Heating	COP2 (47F/8.3C)	W/Y	W	3.21
	Max. Heating capcacity (5F/-15F	) W/	W	8600
				70%
	COP2 (5F/-15F)	W/W		1.75
Si	Up to 550			
Operat	ion temperature	F		60.8~87.8
Archinet terminerature	Indoor(cooling/ heating)	F		>=62/<=86
Ambinet temperature	Outdoor(cooling/heating)	or(cooling/heating) F		5~122/-4~86
	*** Indoor Unit ***			
	Motor Type			AC
Indoor Motor	Output	W		23
	Speed	rpm	<u>າ</u>	1200/1030/880
Indoor a	ir circulation/Hi	CFN	Λ	383/318/253
	*** Outdoor Unit ***			
	Motor Type			DC
Outdoor Motor	Output	W		33
Rated Current	Coolin	g	А	5.2
	Heatin	HeatingA		
Indoor noise level at c	ooling Turbo/High/Med	./Low/Mute		41/39/34/29/27
	51			

Connecting Pipe	Gas	inches	3/8"
	Liquid	inches	1/4"
Maximum L	(m/ft)	15 / 50	
Maximum Height Difference E	(m/ft)	10 / 33	

Size x Core number

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**Connecting Wiring** 

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4×16AWG

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### SHMSPZ-12 | Solar HVAC Model "Z" Mini-Split Specifications (cont'd)

### Weight and Packing Dimensions

	Indoor	mm	811x292x205
	indoor	inch	31.92x11.49x8.07
Net dimensions (W/ x D x H)	Outdoor	mm	715x290x498
	Outdoor	inch	28.14x11.42x19.61
	Solar Boy	mm	603.76x324.36x225.3
		inch	23.77x12.77x8.87
	Indoor	kg	9
	Indoor	lbs	19.8
Notwoight	Outdoor	kg	25
Net weight	Cultoon	lbs	55.1
	Solar Boy	kg	11.36363636
	Solar Box	lbs	25
Indoor Pooking dimons		mm	885x366x278
		inch	34.84x14.40x10.94
	Outdoor	mm	818x325x538
"Outdoor Packing dimensions	Outdoor	inch	32.20x12.80x21.18
(wxDxn) (without pipe)"	Solar Boy	mm	664.13x356.79x247.83
		inch	26.15x14.05x9.76
	Indoor	kg	12
	Indoor	lbs	26.5
*Groco weight (without pipe)	Outdoor	kg	28
Gross weight (without pipe)		lbs	61.7
	Solar Pox	kg	12.5
		lbs	27.5

Note:

Unit should be UL 1995 listed Unit should be OG-100 Certified to the Solar Certification on ICC901/SRCC100 Face Solar Panels south for optimal performance \*Gross = Net Weight + Shipping Box

# SHMSPZ-18 | Solar HVAC Model "Z" Mini-Split Dimensions

Model	Indoor Unit				Outdoor Unit						
in (mm)	Α	В	С	D	E	F	G	Н	I	J	K
SHMSPZ-18	39.76 (1010)	12.4 (315)	8.66 (220)	30.71 (780)	13.74 (349)	23.82 (605)	23.03 (585)	16.53 (420)	15.19 (386)	1.97 (50)	2.48 (63)

### Intdoor Unit:







#### **Outdoor Unit:**



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SHVAC Residential Mini-Split and Mounting Kit I/O/M

# SHMSPZ-18 | Solar HVAC Model "Z" Mini-Split Dimensions (cont'd)



# SHMSPZ-18 | Solar HVAC Model "Z" Mini-Split Specifications

### **Electrical - Mechanical Specifications**

	remote							
		Power supply			208/230V~/60Hz/1P			
"Rated Cooling	Rated coo	bling capacity (95F/35C)	Btu	/h	18000			
(95F/35C)"	E	ER2 (95F/35C)	Btu/\	N.h	9.4			
		SEER2	Btu/\	W.h	19			
	ca	Rated Heating pacity(47F/8.3C)	Btu	/h	19600			
	HSPF:	2 Rating (Region IV)	Btu/\	N.h	8.5			
	HSPF	2 Rating (Region V)	Btu/\	N.h	7			
Rated Heating	C	OP2 (47F/8.3C)	W/Y	N	3.21			
	Max. Hea	ting capcacity (5F/-15F)	W/Y	N	12000			
					61%			
	C	COP2 (5F/-15F)	W/Y	N	1.75			
Sı	iitable area		sq.	ft	Up to 1000			
Operat	Operation temperature				60.8~87.8			
Archinet terminerature	Indo	or(cooling/ heating)	F		>=62/<=86			
Outdoor(cooling/hea		oor(cooling/heating)	F		5~122/-4~86			
	فغغ المحام من المناف فغن							
		Motor Type						
Indoor Motor			10/		45			
		Output			40			
Indeere	ir oiroulatio		СЕМ		606/465/420			
		1/11	CFN	Δ	000/403/429			
	***	Outdoor Unit ***						
		Motor Type			DC			
		Output	W		33			
		Qaalian	1	Δ	0.0			
Rated Current		Cooling		A	8.2			
	Heating			A	1.1			
Indoor noise level at c	Indoor noise level at cooling Turbo/High/Med./Lo				50/48/43/38/32			
Outdoor noise level				dB(A)	54			
	9	Size X			4×10AVVG			
		Gas		inches	3/8"			
Connecting Pipe	•	Liquid		inches	1/4"			
	Maximum I	Line Length		(m/ft)	20 / 65			
Maximum Height Difference Between Indoor and Outdoor (m/ft)					15 / 49			

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# SHMSPZ-18 | Solar HVAC Model "Z" Mini-Split Specifications (cont'd)

### Weight and Packing Dimensions

	Indoor	mm	1010×315×220
	indoor	inch	39.76x12.40x8.66
Not dimensions $(W \times D \times H)$	Outdoor	mm	780×349×605
		inch	30.70x13.74x23.81
	Color Pox	mm	603.76x324.36x225.3
	Solar Box	inch	23.77x12.77x8.87
	Indoor	kg	13
		lbs	28.7
Notwoight	Outdoor	kg	32
Net weight	Outdoor	lbs	70.6
	Solar Pay	kg	11.36363636
	Solar Box	lbs	25
Indoor Dooking dimons		mm	1096×390×300
		inch	43.15x15.35x11.81
	Quitdoor	mm	890×385×640
"Outdoor Packing dimensions	Outdoor	inch	35.03x15.15x25.2
(W X D X R) (without pipe)"	Color Pox	mm	664.13x356.79x247.83
(	Solar Box	inch	26.15x14.05x9.76
	Indoor	kg	16
		lbs	35.3
*Cross weight (without pips)	Outdoor	kg	36
Gross weight (without pipe)		lbs	79.4
	Solar Box	kg	12.5
		lbs	27.5

Note:

Unit should be UL 1995 listed Unit should be OG-100 Certified to the Solar Certification on ICC901/SRCC100 Face Solar Panels south for optimal performance \*Gross = Net Weight + Shipping Box

# SHMSPZ-24 | Solar HVAC Model "Z" Mini-Split Dimensions

Model	Model Indoor Unit				Outdoor Unit						
in (mm)	Α	В	С	D	E	F	G	Н	I	J	K
SHMSPZ-24	46.93 (1192)	14.17 (360)	10.24 (260)	33.27 (845)	14.96 (380)	27.52 (699)	24.95 (634)	17.99 (457)	16.54 (420)	1.97 (50)	2.48 (63)

### Intdoor Unit:







#### **Outdoor Unit:**



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# SHMSPZ-24 | Solar HVAC Model "Z" Mini-Split Dimensions (cont'd)



# SHMSPZ-24 | Solar HVAC Model "Z" Mini-Split Specifications

### **Electrical - Mechanical Specifications**

	Control type					
		Power supply			208/230V~/60Hz/1P	
"Rated Cooling	Rated coo	oling capacity (95F/35C)	Btu	/h	24000	
(95F/35C)"	E	ER2 (95F/35C)	Btu/\	N.h	10	
		SEER2	Btu/\	N.h	20	
	ca	Rated Heating pacity(47F/8.3C)	Btu/h		24400	
	HSPF:	2 Rating (Region IV)	Btu/W.h		8.5	
	HSPF	2 Rating (Region V)	Btu/W.h		7	
Rated Heating	С	OP2 (47F/8.3C)	W/Y	W	3.21	
	Max. Hea	ting capcacity (5F/-15F)	W/Y	W	15100	
					62%	
	C	COP2 (5F/-15F)	W/Y	W	1.75	
Su	uitable area		sq.	ft	Up to 1500	
Operat	ion temperat	ure	F		60.8~87.8	
	Indo	or(cooling/ heating)	F		>=62/<=86	
Ampinet temperature	Outdo	oor(cooling/heating)	F		5~122/-4~86	
	***	indoor Unit ***				
					D0	
ludeen Meter					DC	
Indoor Motor		Output	vv		45	
	• • • • • • • • • • • • • • • •	Speed	rpm	1	1150/950/800	
Indoor a	Indoor air circulation/Hi CFM					
	***	Outdoor Unit ***				
		Motor Type			DC	
Outdoor Motor		Output	W		85	
	·	, 1				
Rated Current		Cooling		A	11	
	Heating A		10.5			
Indoor noise level at c	t cooling Turbo/High/Med./Low/Mute 51/48/43/3		51/48/43/38/35			
	Outdoor n	oise level		dB(A)	58	
Connecting Wirir	Ig	Size x	Core number		4×16AWG	
			4/0"			
Connecting Pip	e	Gas		inches	1/2	
	Maxim				1/4	
			(m/ft)		20 / 65	
Maximum Height Difference Between Indoor and Outdoor (m/ft)					15 / 49	

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SHVAC Residential Mini-Split and Mounting Kit I/O/M

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# SHMSPZ-24 | Solar HVAC Model "Z" Mini-Split Specifications (cont'd)

### Weight and Packing Dimensions

	Indoor	mm	1192×360×260	
	indoor	inch	46.93x14.17x10.23	
Net dimensions (W/ x D x H)	Outdoor	mm	845×380×699	
		inch	33.26x14.96x27.51	
	Solar Poy	mm	1003.81x324.36x225.3	
		inch	39.52x12.77x8.87	
	Indoor	kg	16.5	
	indoor	lbs	36.4	
Notwoight	Outdoor	kg	41	
Net weight	Culdoor	lbs	90.4	
	Solar Boy	kg	22.72727273	
	Solar Box	lbs	50	
Indoor Pooking dimons	mm	1265×435×337		
		inch	49.80x17.13x13.27	
	Outdoor	mm	950×420×750	
"Outdoor Packing dimensions	Outdoor	inch	37.40x16.53x29.53	
(W X D X R) (without pipe)"	Solar Boy	mm	1104.19x356.79x247.83	
(		inch	43.47x14.05x9.76	
	Indoor	kg	20.5	
	indoor	lbs	45.2	
*Groop weight (without pipe)	Outdoor	kg	45.5	
Gross weight (without pipe)		lbs	100.3	
	Solar Pox	kg	25	
		lbs	55	

Note:

Unit should be UL 1995 listed Unit should be OG-100 Certified to the Solar Certification on ICC901/SRCC100 Face Solar Panels south for optimal performance \*Gross = Net Weight + Shipping Box

# SHMSPZ-36 | Solar HVAC Model "Z" Mini-Split Dimensions

Model	Model Indoor Unit				Outdoor Unit						
in (mm)	Α	В	С	D	E	F	G	Н	I	J	K
SHMSPZ-36	46.93 (1192)	14.17 (360)	10.24 (260)	35.83 (910)	14.17 (360)	31.5 (800)	26.87 (683)	17.05 (433)	15.67 (398)	1.97 (50)	2.48 (63)

### Intdoor Unit:







### **Outdoor Unit:**



iAIRE, LLC

SHMSPZ-36 | Solar HVAC Model "Z" Mini-Split Dimensions (cont'd)



# SHMSPZ-36 | Solar HVAC Model "Z" Mini-Split Specifications

### **Electrical - Mechanical Specifications**

	remote					
		Power supply			208/230V~/60Hz/1P	
"Rated Cooling	Rated coo	bling capacity (95F/35C)	Btu	/h	36000	
(95F/35C)"	E	ER2 (95F/35C)	Btu/W.h		9	
		SEER2	Btu/\	<i>N</i> .h	20	
	ca	Rated Heating pacity(47F/8.3C)	Btu/h		36000	
	HSPF:	2 Rating (Region IV)	Btu/W.h		8.5	
	HSPF	2 Rating (Region V)	Btu/\	<i>N</i> .h	7	
Rated Heating	С	OP2 (47F/8.3C)	W/	W	3.01	
	Max. Hea	ting capcacity (5F/-15F)	W/	W	21100	
					59%	
	C	OP2 (5F/-15F)	W/	W	1.75	
Su	itable area		sq.	.ft	Up to 2500	
Operati	ion temperat	ure	F		60.8~87.8	
Anabiant toward water	Indo	or(cooling/ heating)	F		>=62/<=86	
Ampinet temperature	Outdo	tdoor(cooling/heating) F		5~122/-4~86		
	***	Indoor Unit ***				
		Motor Typo				
Indoor Motor			۱۸/		45	
		Spood		<u></u>	40	
Indoor a	r circulatio	Speed	СЕМ		847/700/588	
		1/111		<i>n</i>	0477700/300	
	***	Outdoor Unit ***				
Outdoor Motor		Motor Type			DC	
		Output	w		85	
		Occilian		٨	40.5	
Rated Current		Cooling		A	16.5	
			· · · · /B /I · · f ·	A	15.2	
Indoor noise level at c		Turbo/Hign/Med./I	_ow/iviute		52/49/43/38/36	
	Outdoor noise level			aB(A)	63	
Connecting wirin	4×16AWG					
		Gas		inches	5/8"	
Connecting Pipe	<b>;</b>	Liquid		inches	1/4"	
	Maximum I	_ine Length	gth (m/ft)		30 / 98	
Maximum Heigh	Maximum Height Difference Between Indoor and Outdoor					

PD 02/03/23 V01.00

SHVAC Residential Mini-Split and Mounting Kit I/O/M

iAIRE, LLC

# SHMSPZ-36 | Solar HVAC Model "Z" Mini-Split Specifications (cont'd)

### Weight and Packing Dimensions

	Indoor	mm	1192×360×260	
	indoor	inch	46.93x14.17x10.23	
Net dimensions (W/ x D x H)	Outdoor	mm	910x360x800	
	Outdoor	inch	35.83x14.17x31.50	
	Solar Poy	mm	1034.03x479.55x278.64	
	SUIdi DUX	inch	40.71x18.88x10.97	
	Indoor	kg	18	
	Indoor	lbs	39.7	
Notwoight	Outdoor	kg	52	
Net weight	Outdoor	lbs	114.6	
	Solar Poy	kg	34.09090909	
	Solar Box	lbs	75	
Indoor Dooking dimons		mm	1265×435×337	
		inch	49.80x17.13x13.27	
	Outdoor	mm	1028×480×860	
"Outdoor Packing dimensions	Outdoor	inch	40.47x18.70x33.86	
(W X D X D) (without pipe)"	Solar Bay	mm	1137.44x527.51x306.5	
(	Solar Box	inch	kg 52   lbs 114.6   kg 34.09090909   lbs 75   mm 1265×435×337   inch 49.80×17.13×13.27   mm 1028×480×860   inch 40.47×18.70×33.86   mm 1137.44×527.51×306.5   inch 44.78×20.77×12.07   kg 22   lbs 48.5   kg 57.5	
	Indoor	kg	22	
	indoor	lbs	48.5	
*Groop weight (without pipe)	Outdoor	kg	57.5	
Gross weight (without pipe)		lbs	126.8	
	Solar Pay	kg	37.5	
	Solar Box	lbs	82.5	

Note:

Unit should be UL 1995 listed Unit should be OG-100 Certified to the Solar Certification on ICC901/SRCC100 Face Solar Panels south for optimal performance \*Gross = Net Weight + Shipping Box

# SHMSPZ-xx | Solar HVAC Model "Z" Mini-Split Clearances





## **Mini-Split Mounting Kit Part Numbers**

Solar Box

SLR-MNT-02C15.75-2610 - 1.25-Ton
SLR-MNT-02C31.50-4018 - 2.50-Ton
SLR-MNT-03C31.50-4018 - 3.75-Ton

### Description

A Solar HVAC Solar Mounting Kit allows mounting of a Solar Box, in a sunny location, away from the condensing unit to which it is plumbed.

The Solar Mounting Kit allows for wall, floor, or roof mounting and is sized per tonnage of the Solar Box. A single solar box can be mounted per kit at an angle of 30 degrees to 60 degrees.

Strut mounting frame and hardware only. All parts ship loose and are to be assembled in the field. Solar Boxes are ordered separately. Customer must provide their own lagging and plumbing hardware.





SUB-0029-Z5DH

PD 02/18/23 V02.06

# SLR-MNT-02C15.75-2610 1.25-Ton Dimensions



SUB-0030-SLR-MNT-1.25

PD 06/29/23 V01.00

## SLR-MNT-02C31.50-4018 - 2.50-Ton Dimensions



D-0050-5LK-101N 1-2.50

PD 06/29/23 V01.00

SHVAC Residential Mini-Split and Mounting Kit I/O/M

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# SLR-MNT-03C31.50-4018 - 3.75-Ton Dimensions

Strut mounting frame and hardware only. All parts ship loose to be assemblied in the field. Lag mounting and plumbing hardware NOT included. Solar box ordered/shipped separate. 18.875in [479.4mm] /7 20" [508mm] 40.000in [1016mm] 1222 18.000in [457.2mm] 5 9/16" [141.7mm] Piping stubs (to go to condensing unit) 45 9/16" 00000 40 13/16" [1157.7mm] [1037.4mm] Cross braces adjustable 41 11/16" to any position along back strut channel to 30 1/8" [1058.4mm] [765.6mm] 3 7/16" mount to any wall. [87.6mm]

Approximate "Minimum" Angle

Approximate "Maximum" Angle

SUB-0030-SLR-MNT-3.75

PD 06/29/23 V01.00

SHVAC Residential Mini-Split and Mounting Kit I/O/M

iAIRE, LLC

# **Wiring Diagrams**

# MODEL: 9K, 12K, 18K, 24K \_ Power Supply from Indoor INDOOR UNIT:



#### OUTDOOR UNIT



# MODEL: 9K, 12K, 18K, 24K \_Power Supply from Outdoor INDOOR UNIT:



#### OUTDOOR UNIT:



#### INDOOR UNIT:



#### OUTDOOR UNIT:



#### INDOOR UNIT:



#### OUTDOOR UNIT:



#### INDOOR UNIT:

MODEL: 36000BTU(230V/60Hz)



OUTDOOR UNIT:

MODEL:36000BTU(230V/60Hz)



## **PCB** Layouts

Note: the PCB type is printed on the PCB, please inquire the PCB layout via the PCB type information.

#### Indoor PCB

Model 9K, 12K, 18K, 24K \_ AC fan motor



1	ODU AC power output
2	Fuse
3	Transformer out
4	IDU AC power input
5	AC motor driver
6	IDU/ODU wiring connection- N connector
7	Power supply-N connector
8	Anion connector
9	IDU/ODU communication wiring
10	Up-Down swing connector
11	Left-Right swing connector
12	Display
13	Emergency button
14	AC Motor feedback
15	Temperature sensor connector
16	WIFI connector

#### PCB type: A010283



1	ODU AC power output
2	Fuse
3	ODU AC power input
4	DC fan motor connection
5	IDU/ODU wiring connectionN connector
6	Power supplyN connector
7	Anion connector
8	IDU/ODU communication wiring
9	Left-Right swing connector
10	Up-Down swing connector
11	Display
12	Emergency button
13	Temperature sensor connection
14	WIFI connection


Model 9K, 12K, 18K, 24K \_ DC fan motor

PCB type: A010270



PCB type: A010403



1	ODU AC power output
2	Fuse
3	ODU AC power input
4	DC fan motor connection
5	IDU/ODU wiring connectionN connector
6	Power supplyN connector
7	Anion connector
8	IDU/ODU communication wiring
9	Left-Right swing connector
10	Up-Down swing connector
11	Display
12	Emergency button
13	Temperature sensor connection
14	WIFI connection

9K, 12K PCB type: A010313



1	ODU PCB Mainly relay
2	Fuse
3	L, N & 1 (communication) wiring
4	4-way valve
5	Heater
6	DC fan motor connector
7	Electronic expansion valve
8	Discharge sensor connector
9	OAT/OPT sensor connector
10	LED5

#### PCB type: A010386



18,24K PCB type: A010286



1	DRED(OPTION)			
2	OAT/OPT connector			
3	Discharge sensor connector			
4	Electronic expansion valve			
5	AC/DC fan motor connector			
6	Heater			
7	4-way valve			
8	LED5			
9	Communication wiring			
10	Fuse			
11	L , N line			
12	ODU PCB Mainly relay			
13	LED1-LED4			

Note: OAT: Outdoor Ambient Temperature OPT: Outdoor pipe temperature

# **Remote Control**

## Outdoor unit



Note: OAT: Outdoor Ambient Temperature OPT: Outdoor pipe temperature

# Remote Control (cont'd)

### **Remote control DISPLAY**

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No.	Symbols	Meaning
1		Battery indicator
2	Q	Auto Mode
3	*	Cooling Mode
4	٥٥	Dry Mode
5	*	Fan only Mode
6	×	Heating Mode
7	ECO	ECO Mode
8	Ю	Timer
9	8.8°	Temperature indicator
10	* ****	Fan speed: Auto/ low/ low-mid/ mid/ mid-high/ high
11	1	Mute function
12	<b>\</b>	TURBO function
13	ľ.	Up-down auto swing
14		Left-right auto swing
15	৩	SLEEP function
16	¥	Health function
17	₽Ő	I FEEL function
18	8H	8°C heating function
19	((i·	Signal indicator
20		Gentle wind
21	a	Child-Lock
22	Ϋ́	Display ON/OFF



 $\triangle$  The display and some functions of the remote control may vary according to the model.

# Remote Control (cont'd)

No.	Button	Function
1	$\bigcirc$	To turn on/off the air conditioner .
2	^	To decrease temperature, or Timer setting hours.
3	~	To increase temperature, or Timer setting hours.
4	MODE	To select the mode of operation (AUTO, COOL, DRY, FAN, HEAT).
_	500	To activate/deactivate the ECO function.
5	ECO	Long press to activate/deactivate the 8°C heating function (depending on models).
6	TURBO	To activate/deactivate the TURBO function.
7	FAN	To select the fan speed of auto/low/mid/high.
8	TIMER	To set the time for timer on/off.
9	SLEEP	To switch-on/off the function SLEEP.
10	DISPLAY	To switch-on/off the LED display.
11	SWING 🗘	To stop or start horizontal louver movement or set the desired up/down air flow direction.
12	SWING <>	To stop or start horizontal louver movement or set the desired left/rightair flow direction.
13	I FEEL	To switch-on/off the I FEEL function.
14	NALITE	To switch-on/off the MUTE function.
14	MOTE	Long press to activate/deactivate the GEN function (depending on models).
15	MODE + TIMER	To activate/deactivate the CHILD-LOCK function.
16	SWING 🗘	To activate/deactivate the SELF-CLEAN function (depending on models).
	SWING<>	
17	FAN + MUTE	IO activate/deactivate the GENTLE WIND function (depending on models).
18	SLEEP + DISPLAY	To activate/deactivate the HEALTH function (depending on models).
19	I SET	To memory the setting temperature, setting mode and setting fan speed as you need.

A The display and some functions of the remote control may vary according to the model.

- ⚠ The shape and position of buttons and indicators may vary according to the model, but their function is the same.
- $\triangle$  The unit confirms the correct reception of each button with the beep.

# **Electronic Controller Information**

RT-----Room Temperature.

IPT-----Indoor Pipe (Coil) Temperature. ST-----Indoor Setting Temperature. OPT---Outdoor Pipe Temperature. OAT---Outdoor Ambient Temperature. ODT---Outdoor Discharge Temperature. CRT---Compensated Room Temperature. IDU--- Indoor unit ODU---Outdoor unit.

**Note:** When AC finishing installation, because of the air ventilation and the distance of temperature test sensor to different location of the house, the temperature for IDU PCB control need compensation.

#### 1) . Cooling mode. CRT=RT;

2) . Heating mode. CRT=RT-3°C(5.4°F)-----Split AC.

#### 5.2.1 Auto mode

5.2.1.1. The set temperature can be adjusted from 16-31°C(60.8-87.8°F) on auto mode, the operation of fan speed and vane position according to preset.

#### 5.2.1.2. Operation

When unit set to auto mode, it will work on cooling, heating or fan mode totally according to  $\Delta t$  --the temperature difference between RT and ST shown as table:

Mode	Δt=RT-ST
COOLING	Δt >1℃(1.8℉)
FAN	-1℃(-1.8℉)≤Δt≤ 1℃(1.8℉)
HEATING	Δt <-1℃(-1.8℃)

#### 5.2.2 Cooling mode

5.2.2.1. Temperature control :16-31°C(60.8-87.8°F), and the operation of fan speed and vane position according to preset.

- 5.2.2.2. Compressor and process control
- 1). When RT-ST≥0.5°C (0.9°F), the compressor starts up working, AC operates as customer preset;
- 2). When
  - a. RT-ST≤-3°C (-5.4°F) and compressor keeps 2 min continuously; or
  - b. RT-ST $\leq -2^{\circ}$ C (-3.6°F) and compressor works in lowest frequency for 5 min continuously; or

c. RT-ST $\leq$ -1°C (-1.8°F) and compressor works in lowest frequency for 10 min continuously, The compressor stops operation.

- 3). The compressor frequency control: Based on relation of RT & ST, and the changing speed of RT.
- 4). The compressor will also stop working while unit:
  - a. switched off.
  - b. under protection.
  - c. changed to fan mode.
- 5). Under normal operation, the compressor can be stopped by program only working after 7 min once it starts up.
- 6). In the process of unit operation, once the compressor ceased, it should be 3 min delay for the next procedure.

#### 5.2.2.3. ODU Fan motor control:

- 1). While unit:
  - a. switched off.
  - b. under protection.
  - c. to the set temperature.

After compressor ceased, the fan motor stops working according to the temperature of OPT and OAT, the max

delay for the motor should be less than 160s.

2). When switch on unit on cooling mode, ODU fan motor will delay 5s after compressor starts up.

5.2.2.4. When ODU failure or stops for protection, IDU works as preset.

5.2.2.5. Anti-frosting protection

Control the unit operation frequency and the frequency changing rate to achieve anti-frosting protection.

#### 1). Frequency Slowly Increasing(FSI):

a. If 6°C(42.8°F)≤IPT < 7°C(44.6°F), the frequency increasing rate is 1Hz/60s, slowly increasing operation speed. b. When IPT≥7°C(44.6°F), unit quit from protection.

2). Frequency Limitation:

If 5°C(41°F)≤IPT<6°C(42.8°F), the compressor frequency forbidden to increase

- 3). Normal Frequency Decreasing (NFD):
- If 3°C(37.4)≤IPT<4°C(39.2°F), the frequency decreasing rate is 8Hz/90s, until to the lower frequency limit.
- 4). Fast Frequency Decreasing (FFD):
- If 2°C(35.6°F)≤IPT<3°C(37.4°F), the frequency decreasing rate is 16Hz/90s, until to the lower frequency limit. 5). Unit stop:
  - a. When IPT < 1°C(33.8°F) for 3min continuously, unit stops working for anti-defrosting protection.

b. While IPT>6°C(42.8°F), and the unit stopped for 3 min already, can the unit recover to operation.



#### 5.2.3 Dry mode

- 5.2.3.1. Temperature control: 16~31°C(60.8-87.8°F).
  - Fan speed: low

Vane blade position: as customer preset

- 5.2.3.2. When ODU failure or stops for protection, IDU works as preset.
- 5.2.3.3. Failure protection: as cooling mode.
- 5.2.3.4. Energy saving and sleep mode: Invalid.
- 5.2.3.5. ODU Fan motor stops working.

#### 5.2.4 Heating mode

5.2.4.1. Temperature control: 16-31°C(60.8-87.8°F).

5.2.4.2. Compressor and process control.

When ST-CRT≥0.5°C(0.9°F), the compressor starts up working, AC operates as customer preset;
 When

a. ST-CRT≤−3°C(-5.4°F) and compressor keeps 2 min continuously; or

b. ST-CRT≤-2°C(-3.6°F) and compressor works in lowest frequency for 5 min continuously; or

c. RT-CRT $\leq$ -1°C(-1.8°F) and compressor works in lowest frequency for 10 min continuously, The compressor stops operation.

3). The compressor frequency control: Based on relation of RT & ST, and the changing speed of RT.

- 4). The compressor will also stop working while unit:
  - a. switched off.
  - b. under protection.
  - c. changed to fan mode.
- 5). Under normal operation, the compressor can be stopped by program only working after 7 min once it starts up.
- 6). In the process of unit operation, once the compressor ceased, it should be 3 min delay for the next procedure.

5.2.4.3. IDU time delay: When compressor stops or unit switches off while in heating mode, IDU fan motor will work for a few seconds more to prevent overheat.

5.2.4.4. ODU Fan motor control:

1). While unit:

a. To be switched off

b. Under protection.

c. To the set temperature

After compressor ceased, the fan motor stops working according to the temperature of OPT and OAT, the max delay for the motor should be less than 160s.

- 2). When switch on unit on heating mode, ODU fan motor will delay 5s after compressor starts up
- 3). in the process of defrosting, the fan motor will stop operation 48s delay after compressor stopped.

4). defrosting finish, the compressor stops operation, the fan motor will start working simultaneously.

5.2.4.5. 4-way valve control

1). On Cooling/Dry/Fan mode,4-way valve: OFF, when unit switched on heating mode,4-way valve: ON.

2). When heating mode switched off, or changed from heating to other modes, the 4-way valve will be **OFF** 2 min delay after the compressor stops working.

3). Unit stops working caused by any kind of protection, the 4-way valve will be OFF 4 min delay.

- 4). In the process of defrosting, 4-way valve will be OFF 43s delay after compressor stopped.
- 5). When defrosting finish, the compressor stops operation, 4-way valve will be ON after 43s delay.



#### 5.2.4.6. Defrost

Note: t1: compressor continuous works time.

t2: AC unit operation first time going to defrost circle.

t3: compressor accumulated working time (when  $OPT \le 3 \ ^{\circ}C(5.4 \ ^{\circ}F)$  unit starts to count the time for t3). When AC unit working to:

a. t1≥t2, or

b. t3≤t1<t2.

and also the temperature (related to OAT & OPT) tested 3 min continuously meets for defrosting.

- 1) <u>Defrosting start up</u>: Compressor stops working, and re-starts to working after 50s delay;
- 2) Conditions for quitting defrosting
  - a. After defrosting 60s, and OAT≥12°C(53.6°F); or
  - b. OAT < -5°C(-41°F), and OPT  $\ge$  8°C(46.4°F) for 80s continuously; or

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c. The defrosting for 10 min.

When AC meet any of condition a, b or c, defrosting finish.

COMPRESSOR	50S	50S
4-way VALVE	43S	43s
OUTDOOR FAN	48S Defrosting	max time
	ON	OFF

3) **Defrosting end off**: Compressor stops working, and re-starts to working after 50s delay;

#### 5.2.4.7. Cold air prevention:

This function intends to prevent cold air from being discharged when the heating operation starts up

- 1). IDU fan motor cold air prevention
- (1) .When RT<24°C(75.2°F):

a. If ITP>31°C(87.8°F) while compressor works for 5 min, fan motor will work according to preset fan speed. b. If IPT≤31°C(87.8°F), fan motor stops working while compressor operation within 2min, if IPT≥27°C(89.6°F), fan motor works in low speed 2 min, then change to preset speed.

② When RT≥24°C(75.2°F):

a. Within 2 min after compressor start up working, once IPT>27°C(89.6°F), fan motor will change to preset speed. b. After compressor starts working 2 min, fan motor change to preset speed directly.

- 2). Vane blade operation for cold air prevention.
- a. If the vane works on status of **<u>non-swing</u>**: While IPT increase to a special degree, the vane blade will change the position to:
  - ① Default angle; or
  - 2 Previous position; or
  - ③ Customer preset.

The above operation can work one time only, when compressor stops working, the unit will once again inspect the function.

b. If the vane works on **swing**: When IDU quits from cold air prevention, vane operate as preset.

6.2.4.8. "8°C(46.4°F)" Heating

When function effective, it will make sure the room temperature not lower than 8°C(46.4°F), unit works on heating mode.

#### 5.2.5 Fan mode

5.2.5.1. The temperature setting: 16~31°C(60.8-87.8°F),

Fan speed and vane position: as preset. The function for remote controller 58E only.

- 5.2.5.2. For above function, when unit preset to be auto fan mode, the fan motor will change its operation speed based on the temperature difference of ambient and preset temperature.
- 5.2.5.3. ODU always OFF.



#### 5.2.6 Timer

The unit has times control, when the unit meet the timer preset, it will be switched on or off automatically.

#### 5.2.6.1 TIMER ON

- 1). TIMER ON can be set only when the air conditioner is OFF.
- 2). Press TIMER on the remote control ONCE to enter time setting.
- 3). Press "▲" or "▼" to set the time for unit to start working.
- 4). Set other function as MODE, FAN SPEED, SWING etc.
- 5). Press TIMER ONCE AGAIN to confirm the TIME ON setting

#### 5.2.6.2 TIMER OFF

- 1). TIMER OFF can be set only when the air conditioner is ON.
- 2). Press TIMER on the remote control ONCE to enter time setting.
- 3). Press " $\blacktriangle$ " or " $\blacktriangledown$ " to set the time for unit to stop working.
- 4). Press TIMER ONCE AGAIN to confirm the TIME OFF setting

Note: In case of no selection for the time setting within 10s, the timer function will be OFF automatically.

#### 5.2.7 Sleeping mode

While AC works in sleeping mode, the light of POWER SUPPLY and SLEEP always ON, and the temperature display will be OFF after 15s.

In this mode, the AC unit works according to the SLEEP CURVE as designed.

Sleeping mode the unit can work 10 hours continuously, after that it will quit from this mode and work as previous presetting.

#### 5.2.8 Emergency switch

When the EMERGENCY switch is pressed one time, COOLING mode is selected and if it pressed again within 3s, HEATING mode selected, while press once again, the unit will be switched off.

When the remote controller out of function, batteries lost power, for example, the EMERGENCY button in the front of indoor unit can be used for function test.

NOTE: Do not press the EMERGEMCY switch during normal operation.

#### 5.2.9 Auto-restart function

While air conditioner is operating in one mode, all of its operation data, such as working mode, preset temperature etc. would be memorized into IC by main PCB. If power supply cut off due to reasons and recover again, the AUTO-RESTART function will set synchronously and the air conditioner would work at the same mode as before.

#### Note: The function setting:

Within 3 min while power on unit, set the unit on cooling mode, set temperature 30°C(86°F), and mid fan speed, press the ECO button 10 times within 8s, the AUTO-RESTART will be activated.

#### 5.2.10 Protection

#### 5.2.10.1 Overload protection

5.2.10.1.1. Overload protection for Cooling or Dry mode

1). if:

- a. OPT≥62°C(143.6°F), unit stops working for overload protection.
- b. OPT < 55°C(131°F), after compressor stopped for 3 min, can the unit be started to operate.
- 2). When OPT≥55°C(131°F), the compressor will be frequency limited/reduced for over load protection.

3). If unit have 6 times of over load stop-working protection continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of over load stop-working protection will be reset to zero and start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, on fan mode or changed to be heating mode from others.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

5.2.10.1.2. Overload protection for Heating mode 1). If:

a. IPT≥62°C(143.6°F), unit stops working for overload protection.

b. IPT<55°C(131°F), after compressor stopped for 3 min, can the unit be started to operate.

2). When IPT≥55°C(131°F), the compressor will be frequency limited/reduced for over load protection.

3). If unit have 6 times of over load stop-working protection continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of over load stop-working protection will be reset to zero and start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, on fan mode or changed to be heating mode from others.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed. **5.2.10.2 The compressor discharge temperature protection** 

5.2.10.2.1. If ODT≥115°C(239°F), unit stops working for over temperature protection;

While ODT  $< 100^{\circ}$  C(212°F), & after compressor stopped for 3 min, the unit can be started to operate.

5.2.10.2.2. If ODT>100°C(212°F), the compressor will be frequency limited/reduced for over temperature protection. 5.2.10.2.3. If unit have 6 times of <u>discharge over temperature stop working protection</u> continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of discharge over temperature stop working protection will be reset to zero and start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, or changed to fan mode.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

#### 5.2.10.3 The current protection

5.2.10.3.1. If the unit A/C working current more than **Limited current** ( $I_{LC}$ ), the compressor will be frequency limited / reduced for over current protection.

5.2.10.3.2. When unit A/C working current more than **Stopped current (I**sc), AC unit stops working. Only when the compressor stops for 3 min can the unit be recovered operation.

5.2.10.3.3. If unit have 6 times of <u>over current stop-working protection</u> continuously, this protection can't be recovered unless press ON/OFF button.

In the process of unit operation, once the compressor runs continuously more than 6 min, the counter of stopworking protection will be reset to zero and re-start a new counting process.

Note: For different models,  $I_{LC}$  and  $I_{SC}$  have different programmed value.

#### 5.2.10.4 IPM overheating protection

5.2.10.4.1. When IPM temperature T<sub>IPM</sub>≥87°C(188.6°F), the compressor will be frequency limited / reduced for IPM over temperature protection.

5.2.10.4.2. When TIPM≥95°C(203°F), the AC unit stops working for AC system protection.

If  $T_{IPM} \leq 87^{\circ}C(188.6^{\circ}F)$ , and after compressor stopped for 3 min, can the unit be started to operate.

5.2.10.4.3. If unit have 6 times of **IPM over temperature stop working protection** continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of over load stop working protection will be reset to zero and re-start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, or changed to fan

mode.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

### 5.2.11 Complementary

5.2.11.1 Energy saving (ECO)

Function effective on Cooling and Heating mode only.

On cooling mode, the set temperature range from 26°C(78.8°F) to 31°C(87.8°F),on heating mode, from 16°C (60.8°F) to 25°C(77°F).

#### 5.2.11.2 TURBO

Function effective on Cooling, Heating, Fan and Auto modes, and fan speed operates on highest.

#### 5.2.11.3 The communication control

If ODU PCB can't get signal feedback from IDU for 2 min continuously, AC unit stops working and shows E0 error code as IDU/ODU communication failure.

Once the IDU & ODU communication recovery, and also the compressor stopped for 3 min already, can the unit be recovered to operate.

5.2.12 Calibration Test Mode:

Within 3 min while indoor unit switch on, and set the unit as:

- 1) Cooling mode.
- 2) set temperature to 30°C.
- 3) Mid-fan speed.

by press ECO button 7 times within 8s, the unit will change to calibration test mode, and the buzzer sounds 3 times.

## 9k - 24k Installation and Maintenance

## PART II Installation and Maintenance

1. Notes for installation and maintenance Safety Precautions

## Important!

Please read the safety of precautions carefully before installation and maintenance. The following contents are very important for installation and maintenance. Please follow the instructions bellow.

- The installation or maintenance must accord with the instructions.
- Comply with all national electrical codes and local electrical codes.
- Pay attention to the warnings and cautions in this manual.
- All installation and maintenance shall be performed by distributor or qualified person.
- All electric work must be performed by licensed technician according to local regulations and instructions given in this manual.
- Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.

## Warnings

#### **Electrical safety Precautions.**

- 1) Cut off the power supply of air conditioner before checking and maintenance.
- 2) The air conditioner must apply specialized circuit and prohibit share the same circuit with other appliances.
- 3) The air conditioner should be installed in suitable location and ensure the power plug is touchable.
- 4) Make sure each wiring terminal is connected firmly during installation and maintenance.
- 5) Have the unit adequately grounded. The grounding wire can't be used for other purposes.
- 6) Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
- 7) The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
- 8) The power cord and power connection wires can't be pressed by hard objects.
- 9) If power cord or connection wire is broken, it must be replaced by qualified person.
- 10) If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.
- 11) For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more then 3mm.
- 12) Make sure all wires and pipes are connected properly and the valves are opened before energizing.
- 13) Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.
- 14) Replace the fuse with a new one of the same specification if it is burnt down, don't replace it with a cooper wire or conducting wire.
- 15) If the unit is to be installed in a humid place, the circuit breaker must be installed.

### **Installation Safety Precaution**

- 1) Select the installation location according to the requirement of this manual. (See the requirements in installation part).
- 2) Handle unit transportation with care, the unit should not be carried by only one person if it is more than 20kg.
- 3) When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed, make sure the installation supporter is firm.
- 4) Ware safety belt if the height of working is above 2m.
- 5) Use equipped components or appointed components during installation.

6) Make sure no foreign objects are left in the unit after finishing installation.

#### Improper installation may lead to fire hazard, explosion, electric shock or injury.

Safety precautions for Installing and Relocating the unit.

To ensure safety, please be mindful of the following precautions.

## 🗥 Warnings

When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.

Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.

When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.

Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.

When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode. Then, fully close the valve at high pressure side (two-way valve). About 30-40 seconds later, fully close the valve at low pressure side (3-way valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recover should not exceed 1 minute.

If refrigerant recovery takes too much time, may be cause compressor overheat, resulting in injury.

During refrigerant recovery, make sure that two-way valve and 3-way valve are fully closed and power is disconnected before detaching the connecting pipe.

If compressor starts running when the valves is open and connecting pipe is not yet connected, air will be sucked in and cause pressure rise and then compressor overheat or gas leak, resulting in injury.

When installing the unit, make sure that connecting pipe is securely connected before the compressor starts running.

If compressor starts running when the valves is open and connecting pipe is not yet connected, air will be sucked in and cause pressure rise and then compressor overheat or gas leak, resulting in injury.

Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.

If there leaked gas around the unit, it may cause explosion and other accidents.

Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.

Poor connection may lead to electric shock or fire.

Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.

Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

#### Introduction R32, R290 air conditioner installation Introduction to Refrigerants R32 & R290

The refrigerants used for air conditioners are environmentally friendly hydrocarbons R32 and R290. The two kinds of refrigerants are combustible and odorless. Moreover, they can burn and explode under certain condition. However, there will be no risk of burning and explosion if you comply with the following table to install your air conditioner in a room with an appropriate area and use it correctly.

Compared with ordinary refrigerants, Refrigerants R32 & R290 are environmentally friendly and do not destroy the ozone sphere and that their values of greenhouse effect are also very low.

#### R32/R290 air conditioner installation area requirement

m1=(4m<sup>3</sup>)×LFL, m2=(26m<sup>3</sup>) ×LFL, m3=(130m<sup>3</sup>) ×LFL

Where LFL is the lower flammable limit in kg/m<sup>3</sup>, R290 LFL is 0.038kg/m<sup>3</sup>, R32 LFL is 0.306kg/m<sup>3</sup>.

#### For the appliances with a charge amount m1<M<m2:

The maximum charge in a room shall be in accordance with the flowing: Mmax=2.5×(LFL)<sup>(5/4)</sup> ×h<sub>0</sub>×A<sup>1/2</sup>

The required minimum floor area  $A_{min}$  to install an appliance with refrigerant charge M(kg) shall be in accordance with following:  $A_{min}$ = (M/ (2.5 x (LFL)<sup>(5/4)</sup> x h<sup>0</sup>)) 2

Where:

M<sub>max</sub> is the allowable maximum charge in a room, in kg;

M is the refrigerant charge amount in appliance, in kg;

Amin is the required minimum room area, in m2;

A is the room area, in m2;

LFL is the lower flammable limit, in kg/m3;

h0 is the installation height of the appliance, in meters for calculating M<sub>max</sub> or A<sub>min</sub>, 1.8 m for wall mounted; **Table GG.1 - Maximum charge (kg)** 

Category	LFL (kg/m3)	h0	Floor area (m²) Maximum charge (kg)						
outogory		(m)	4	7	10	15	20	30	50
		0.6	0.05	0.07	0.08	0.1	0.11	0.14	0.18
Dooo	0.038	1	0.08	0.11	0.03	0.06	0.09	0.2	0.3
R290		1.8	0.15	0.2	0.24	0.29	0.34	0.41	0.53
		2.2	0.18	0.24	0.29	0.36	0.41	0.51	0.65
	R32 0.306	0.6	0.68	0.9	1.08	1.32	1.53	1.87	2.41
R32		1	1.14	1.51	1.8	2.2	2.54	3.12	4.02
		1.8	2.05	2.71	3.24	3.97	4.58	5.61	7.254
		2.2	2.5	3.31	3.96	4.85	5.6	6.86	8.85

#### Table GG.2 - Minimum room area (m2)

Category	LFL (kg/m3)	h0 (m)	Charge amount (M) (kg) <b>Minimum room area (m2)</b>						
			0.152kg	0.228kg	0.304kg	0.456kg	0.608kg	0.76kg	0.988kg
		0.6	/	82	146	328	584	912	1514
R290	0.038	1	/	30	53	118	210	328	555
		1.8	/	9	16	36	65	101	171
		2.2	/	6	11	24	43	68	115
			1.224kg	1.836kg	2.448kg	3.672kg	4.896kg	6.12kg	7.956kg
R32	0.306	0.6	/	29	51	116	206	321	543
		1	/	10	19	42	74	116	196
		1.8	/	3	6	13	23	36	60
		2.2	/	2	4	9	15	24	40

#### Caution:

- Please contact the nearest after-sale service center when maintenance is necessary. At the time of maintenance, the maintenance personnel must strictly comply with the Operation Manual provided by the corresponding manufacturer and any non-professional is prohibited to maintain the air conditioner.
- It is necessary to comply with the provisions of gas-related national laws and regulations.
- It is necessary to clear away the refrigerant in the system when maintaining or scrapping an air conditioner.
- When filling the combustible refrigerant, any of your rude operations may cause serious injury or injuries to human body or bodies and object or objects.
- A leak test must be done after the installation is completed.
- It is a must to do the safety inspection before maintaining or repairing an air conditioner using combustible refrigerant in order to ensure that the fire risk is reduced to minimum.

### 1) Installation Safety

#### **Installation Safety Principles**

Site Safety





**Open Flames Prohibited** 



Ventilation Necessary SHVAC Residential Mini-Split and Mounting Kit I/O/M

#### **Operation Safety**

**Open Flames Prohibited** 









Mind Static Electricity Must wear protective clothing and anti-static gloves Don't use mobile phone **Installation Safety** 

- Refrigerant Leak Detector
- Appropriate Installation

Installation I he lef

The left picture is the schematic diagram of a refrigerant leak detector.

### Caution:

Location

- The installation should be in a well-ventilated condition location.
- When you installing or maintaining an air conditioner using Refrigerant R32/R290, the location should be free fire from open or any other goods temperature higher than 370°C for R290/548°C for R32 which easily produces open fire include welding, smoking, drying oven.
- When installing an air conditioner of R32/R290, it is necessary to take appropriate anti-static measures such as wear anti-static clothing and gloves.
- It is necessary to choose the location for installation or maintenance where in the air inlets and outlets of the indoor and outdoor units should be not surrounded by obstacles or close to any heat source or combustible and/or explosive environment.
- If the indoor unit suffers refrigerant leak during the installation, it is necessary to immediately turn off the valve of the outdoor unit and all the personnel should go out till the refrigerant leaks completely for 15 minutes. If the product is damaged, it is a must to carry such damaged product back to the maintenance station and it is prohibited to weld the refrigerant pipe or conduct other operations on the user's site.
- It is necessary to choose the place where the inlet and outlet air of the indoor unit is even.
- It is necessary to avoid the places where there are other electrical products, power switch plugs and sockets, kitchen cabinet, bed, sofa and other valuables right under the lines on two sides of the indoor unit.

Tool Name	Requirement(s) for Use
Mini Vacuum Pump	It should be an explosion-proof vacuum pump; can ensure certain precision and its vacuum degree should be lower than 10Pa.
Filling Device	It should be a special explosion-proof filling device; have certain precision and its filling deviation should be less than 5g.
Leak Detector	It should be calibrated regularly; and its annual leak rate should not exceed 10g.
Concentration Detector	<ul> <li>A) The maintenance site should be equipped with a fixed-type combustible refrigerant concentration detector and connected to a safeguard alarm system; its error must be not more than 5%.</li> <li>B) The installation site should be equipped with a portable combustible refrigerant concentration detector which can realize two-level audible and visual alarm; its error must be not more than 10%.</li> <li>C) The concentration detectors should be calibrated regularly.</li> <li>D) It is necessary to check and confirm the functions before using the concentration detectors.</li> </ul>

### Special tools:

Pressure Gauge	<ul> <li>A) The pressure gauges should be calibrated regularly.</li> <li>B) The pressure gauge used for Refrigerant 22 can be used for Refrigerants R290 and R161; the pressure gauge used for R410A can be used for Refrigerant 32.</li> </ul>
Fire Extinguisher	It is necessary to carry fire extinguisher(s) when installing and maintaining an air conditioner. On the maintenance site, there should be two or more kinds of dry powder, carbon dioxide and foam fire extinguishers and that such fire extinguishers should be placed at stipulated positions, with eye-catching labels and in handy places.

#### Maintenance

#### 1). Inspections before maintenance.

#### (1) Inspection of maintenance environment

- There should be no leaked refrigerant in the room before operation.
- It is only allowed to operate in a room which meets the area requirement on the nameplate.
- It is necessary to make the room keep a continuous ventilation state at the time of maintenance.
- The room in the maintenance should be free from fire or welding, smoking, drying oven or any other goods temperature higher than 370°C (R290)/548°C (R32) which easily produces fire.
- During the maintenance, it is necessary to ensure that any person's any mobile phone or any electronic product with radiation in the room is powered off.
- The maintenance area should be equipped with a drying powder or carbon dioxide fire extinguisher and that such fire extinguisher can work.

#### (2) Inspection of maintenance equipment

- Check the maintenance equipment is applicable to the refrigerant or not and it is only allowed to use the professional equipment recommended by the air conditioner manufacturer.
- Check the refrigerant leak detector whether has been calibrated. The set maximum alarm concentration of the refrigerant leak detector should not exceed 25% of the lower explosion limit (LEL), the refrigerant leak detector must be working during maintenance.

#### 2) Inspection of air conditioner

- It is necessary to ensure that the air conditioner is in reliable ground connection before maintenance.
- Make sure powered supply to air conditioner is off. Before maintenance, it is necessary to cut off the
  power and discharge the capacitor power which used in the air conditioner. If it is a must to need the
  power supply during the maintenance, it is necessary to do ongoing leak detection at the most dangerous
  position/point in order to avoid potential danger.
- Check the warning labels on the air conditioner whether are in good condition. It is necessary to replace the damaged or smeared warning labels.

#### 3). Leak inspection before maintenance

Before maintenance, use the leak detector or concentration detector (pump-type) recommended by the corresponding air conditioner manufacturer to check the air conditioner leak or not.

#### Warning

If leak may exist, it is necessary to move all the fire out from the site or extinguish fire and then immediately shut off the air conditioner. Meanwhile, it is necessary to make sure well-ventilated.

#### 4). Safety principles during the maintenance

- At the time of maintenance, it is necessary to ensure well-ventilation on the site.
- It is prohibited to use fire including welding, smoking or other purposes. It is prohibited to use mobile phones.

- At the time of maintenance, if the relative humidity is lower than 40%, it is necessary to wear antistatic clothing and gloves.
- If the combustible refrigerant is found leaking during the maintenance, it is a must to immediately take forced ventilation and plug up the leak source.
- If the product is damaged to the extent that it is a must to open the refrigerating system for maintenance, it is a must to carry the product back to the maintenance station for maintenance. (It is prohibited to weld the refrigerant pipe and do other operations on the user's site.)
- It is necessary to return the air conditioner to its initial state if it is necessary to provide visiting service again due to lacking spare part during the maintenance. Moreover, it is a must to ensure that the refrigerating system is in secure ground connection.
- If it is necessary to provide visiting service with a refrigerant cylinder, the volume of refrigerant filled in such refrigerant cylinder should not exceed the stipulated value. When such cylinder is stored in a vehicle or placed on the installation or maintenance site, it is necessary to place it vertically and securely and keep it away from any place where there is any heat source, combustion source, radiation source or electrical equipment.

#### 5). Requirements for the site of maintenance-station

- The maintenance location should be well-ventilated, with leveled ground and not in a basement.
- The maintenance should be divided into welding and non-welding areas both of which should be labeled clearly. There should be a certain safety distance between the two areas. The maintenance location should be equipped with ventilating and air-exhausting equipment to prevent the refrigerant gas from aggregating.
- It is necessary to provide some relevant instruments such as combustible refrigerant leak detector and have a leak detecting instrument management system. It is necessary to confirm that the leak detector can work normally before maintenance.
- The main power switch should be set outside the maintenance location and equipped with protective (explosion-proof) devices.
- It is necessary to provide firefighting devices such as dry powder or carbon dioxide fire extinguisher appropriate for extinguishing the electrical fire and keep such firefighting devices in a usable condition.
- Temporary wires and sockets are prohibited on the maintenance location.

#### 6). Requirements for fill the refrigerants

- It is necessary to use nitrogen to clear the cyclic system before operating the refrigerating system and vacuumize the outdoor unit for 30 minutes at least.
- It is necessary to ensure that there is no cross contamination among different refrigerants when the refrigerant filling device is used. The total length including the refrigerant pipeline should be as short as possible in order to reduce the residual refrigerant inside such pipeline.
- It is necessary to vertically place the refrigerant storage tanks.
- It is necessary to ensure that the refrigerating system is in ground connection before the refrigerant is filled.
- When filling the refrigerant, it is necessary to fill corresponding type and volume of refrigerant as per the requirements on the product nameplate and overfilling is prohibited.
- It is necessary to seal the system in a safe sealing way after maintaining the refrigerating system.
- It is necessary to ensure that the maintenance will not damage or reduce the safety protection grade of the original system.

#### 7). In-maintenance welding

- It is necessary to ensure that the maintenance location is well-ventilated.
- Before welding the outdoor unit, it is a must to confirm that the refrigerating system has been drained

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and the system has been cleaned and ensure that there has been no refrigerant in the outdoor unit.

• It is necessary to close the stop valve of the outdoor unit when using a welding gun to do the maintenance work such as cutting and welding.

### 8). Maintenance of electrical components

- It is necessary to use a special leak detector to check whether the maintained electrical parts location have the leak refrigerant.
- It is not allowed to refit, remove or cancel any component with the safety protection function after finishing the maintenance process.
- When maintaining the sealed parts, it is necessary to turn off the power of air conditioner before opening the sealing cover. When power supply is needed, it is necessary to do the ongoing leak detection at the most dangerous position in order to prevent potential danger.
- It is necessary to specially note that the maintenance of electrical components will not affect the replacement of protective cover.
- In order to ensure that the sealing function is not damaged after maintenance or the sealing material will not lose the effect of preventing the combustible gas leak due to ageing. So the substitute components should meet the requirements recommended by the air conditioner manufacturer.

## Warning

Before doing the trial operation after finishing the maintenance, it is a must to use a practical leak detector to inspect the leakage and reliability of ground connection in order to ensure that no refrigerant leakage and reliable ground connection.

The refrigerant storage tanks should be separately placed in a well-ventilated place at the temperature ranging from  $-10^{\circ}$ C to  $50^{\circ}$ C and label them with warning labels.

### 9). Emergency Accident Handling

A maintenance station should establish emergency handling plans. It is necessary to take appropriate precautionary measures in work. For example, it is prohibited to enter the location with any kindling material and it is prohibited to wear clothing or shoes which easily produce static.

Handling suggestions when a large amount of combustible refrigerant leaks:

- It is necessary to immediately operate the ventilating equipment while cutting off other power supply and evacuating the affected personnel urgently from the location.
- It is necessary to inform near residents of evacuating for over 20 meters from the location, make an alarm call, set the emergency area and prohibit irrelevant personnel and vehicles from approaching.
- The professional firefighters should wear anti-static clothing to handle the emergency on the site and cut off the source of leak.
- It is necessary to use nitrogen for blowing the site, especially the low-lying positions, clear away the residual combustible refrigerant gas from any area nearby and surrounding the leak point and use a handheld detector for detection and not clear the alarm until the concentration of refrigerant is zero.

# **Tools and Accessories**

## 2.2 Accessory

Remote controller	Remote controller supporter	Batteries	Vinyl tape
Drain hose	Hole cover	Screw	Insulation material
	$\bigcirc$	Communities	6

## 2.3 Tools

Tool name	Picture	Tool name	Picture	Tool name	Picture
Standard Wrench	2	Pipe Cutter		Vacuum Pump	6
Adjustable/ Crescent Wrench		Screw drivers (Phillips & Flat blade)		Safety Glasses	
Torque Wrench	•	Manifold and Gauges		Work Gloves	
Hex Keys or Allen Wrenches	L	Level	REED	Refrigerant Scale	
Drill & Drill Bits	P	Flaring tool	S. S	Micron Gauge	
Hole Saw	<b>E</b> A	Clamp on Amp Meter	BILLER		

## 36k Installation and Maintenance

# 2.3 Position Indoor unit

- Install the indoor unit level on a strong wall that is not subject to vibrations
- The inlet and outlet ports should not be obstructed: the air should be able to blow all over the room.
- Do not install the unit near a source of heat, steam or flammable gas.
- Do not install the unit in too windy or dusty places.
- Do not install the unit where people often pass. Select a place where the air discharge and operating sound level will not disturb the neighbors.
- Install the unit where connection between indoor and outdoor unit is as easy as possible.
- Install the unit where it is easy to drain the condensed water.
- Check the machine operation regularly and leave the necessary spaces as shown in the picture.
- Install the indoor unit where the filter can be easily accessible.

#### OUTDOOR UNIT

- Do not install the outdoor unit near sources of heat, steam or flammable gas.
- Do not install the unit in too windy or dusty places.
- Do not install the unit where people often pass. Select a place where the air discharge and operating sound level will not disturb the neighbors.
- Avoid installing the unit where it will be exposed to direct sunlight (other wise use a protection, if necessary, that should not interfere with the air flow).
- Leave the spaces as shown in the picture for
- The air to circulate freely.
- Install the outdoor unit in a safe and solid place.
- If the outdoor unit is subject to vibration, place rubber gaskets onto the feet of the unit.
- Install the indoor unit in the room to be air conditioning, avoiding to installation in corridors or communal areas.
- Install the indoor unit at a height of at least 2.5m
- from the ground.
   Minimum space to be left (mm) showing in the

picture.

#### 2.4 Electricity and wiring

#### Safety precaution

- 1) Must follow the electric safety regulations when installing the unit.
- 2) According to the local safety regulations, use qualified power supply circuit and air switch.
- 3) Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock, fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.

The power cord should be selected according to the following specifications sheet.

Appliance Amps(A)	Wire Size (mm²/in²)
5	0.75/0.0012
10	1.0/0.0016
13	1. 5/0.0023
18	1.6/0.0025
25	2.0/0.0031
30	2.5/0.0039

#### 2.5 IDU Installation

To install, proceed as follows:

#### 2.5.1 Installation of the mounting plate.

- By using a level, put the mounting plate in a perfect square position vertically and horizontally.
- 2) Drill 32mm deep holes in the wall to fix the plate.
- 3) Insert the plastic anchors into the hole.
- 4) Fix the mounting plate by using the provided tapping screws.
- 5) Check that the mounting plate is correctly fixed.



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Note: The shape of the mounting plate may be different from the one above, but installation method is similar.

#### 2.5.2 Drilling a hole in the wall for the piping

- Decide where to drill the hole in the wall for the piping (if necessary) according to the position of the mounting plate
- 2) Install a flexible flange through the hole in the wall to keep the latter intact and clean.





The hole must slope downwards towards the exterior.

Note: Keep the drain pipe down towards the direction of the wall hole, otherwise leakage may occur.

#### 2.5.3 Electrical connections---Indoor unit

1).Lift the front panel.

- 2).Take off the cover as indicated in the picture (by removing a screw or by breaking the hooks).
- For the electrical connections, see the circuit diagram on the right part of the unit under the front panel.
- 4).Connect the cable wires to the screw terminals by following the numbering, Use wire size suitable to the electric power input (see name plate on the unit) and according to all current national safety code requirements.
- 5).The cable connecting the outdoor and indoor units must be suitable for outdoor use.

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- The plug must be accessible also after the appliance has been installed so that it can be pulled out if necessary.
- 7).An efficient earth connection must be ensured.
- 8). If the power cable is damaged, it must be





#### ★ Refrigerant piping connection

The piping can be run in the 3 directions indicated by numbers in the picture. When the piping is run in direction 1 or 3, cut a notch along the groove on the side of the indoor unit with a cutter.

Run the piping in the direction of the wall hole and bind the copper pipes, the drain pipe and the power cables together with the tape with the drain pipe at the bottom, so that water can flow freely.



Shape the connection pipe

#### 2.5.4 Connecting the pipes.

- Do not remove the cap from the pipe until connecting it, to avoid dampness or dirt from entering.
- If the pipe is bent or pulled too often, it will become stiff. Do not bend the pipe more than three times at one point.
- When extending the rolled pipe, straighten the pipe by unwinding it gently as shown in the picture.



Extending the rolled pipe

#### 2.5.5 Connections to the indoor unit

- 1).Remove the indoor unit pipe cap (check that there is no debris inside).
- 2).Insert the fare nut and create a flange at the extreme end of the connection pipe.



3).Tighten the connections by using two wrenches working in opposite directions.When extending the drain hose at the indoor unit, install the drain pipe.

# Wrap the insulation material around the connecting portion.

 Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there is no gap.



Wrap the area which accommodates the rear piping housing section with vinyl tape.



 Bundle the piping and drain hose together by wrapping them with vinyl tape over the range within which they fit into the rear piping housing section.



#### **2.5.6 Indoor unit condensed water drainage** The indoor unit condensed water drainage is

fundamental for the success of the installation.

- 1).Place the drain hose below the piping, taking care not to create siphons.
- 2). The drain hose must slant downwards to aid drainage.
- 3).Do not bend the drain hose or leave it protruding or twisted and do not put the end of it in water. If an extension is connected to the drain hose, ensure that it is lagged when it passes into the indoor unit.
- 4).If the piping is installed to the right, the pipes, power cable and drain hose must be lagged and secured onto the rear of the unit with a pipe connection.



• Insert the pipe connection into the relative slot.

Capacity	Pipe Size (Torque)				
(Btu/h)	Gas	Liquid			
7/9/12K	3/8"	1/4"			
	(4.2kg.m/30.3	(1.8kg.m/13.02			
	8ibf.ft)	ibf.ft)			
18K	1/2"	1/4"			
	(5.5kg.m/39.7	(1.8kg.m/13.02			
	8ibf.ft)	ibf.ft)			
24K	5/8"	3/8"			
	(6.6kg.m/47.74	(4.2kg.m/30.38			
	ibf.ft)	ibf.ft)			

Press to join the pipe connection to the base.



#### 2.6 ODU Installation

- The outdoor unit should be installed on a solid wall and fastened securely.
- The following procedure must be observed before connecting the pipes and connecting cables : decide which is the best position on the wall and leave enough space to be able to carry out maintenance easily.
- Fasten the support to the wall using screw anchors which are particularly suited to the type of wall;
- Use a larger quantity of screw anchors than normally required for the weight they have to bear to avoid vibration during operation and remain fastened in the same position for years without the screws becoming loose.
- The unit must be installed following the national regulations.

# Outdoor unit condensed water drainage (only for heat pump models)

The condensed water and the ice formed in the outdoor unit during heating operation can be drained away through the drain pipe.

- Fasten the drain port in the 25mm hole placed in the part of the unit as shown in the picture.
- 2) Connect the drain port and the drain pipe.

Pay attention that water is drained in a suitable place.



#### **Electronic connections**

- 1. Take the cover away.
- 2. Connect the cable wires to the terminal board using the same numbering as in the indoor unit.
- 3. For the electrical connections, see the wiring diagram on the back of the cover
- 4. Fasten the cables with a cable-clamp.
- 5. An efficient earth connection must be ensured.
- 6. Replace the covers.

Wiring diagram on the back of the cover Screw Remove the upper cover Outdoor unit

### Connecting the pipe

Screw the flare nuts to the outdoor unit coupling with the same tightening procedures described for the indoor unit.

Note: If the tightening torque is not sufficient, there will probably be some leakage. With excessive tightening torque there will also be some leakage, as the flange could be damaged.



## **General Assembly Instructions**

## **Generic Assembly Instructions**

- 1. Assemble frame componets together without solar box.
  - 1. See Exploded views for hardware.
  - 2. Mount Top Cross Brace at least low enough along the Vertical Support to allow the Any Angle Bracket to rotate.
  - Mount Bottom Cross Brace either well above or well below the Horizontal Support. Positioning is determined by angle of Solar Box.
  - 4. Note: Larger (10- and 15-Ton) frames have an additional Cross Brace.
  - 5. Note: Larger (15-Ton) frames have an additional Horizontal Support.
- 2. Measure desired angle for Solar Box and fix Horizontal Supports in approximate position. This can be adjusted after Solar Box mounting to ensure desired angle.
- Mount frame to wall with lag bolts (not included) through the Cross Braces. For floor or roof mounting see next section.
- Mount Solar Box (pipe pop-outs on top) with edge of strut channels touching to form a solid triangle. Tighten strut channel nuts once desired position is obtained.
- 5. Brace and secure piping to unistrut to plumb into the condensing unit. Be sure to follow line length requirements for determining how far away the Solar Box can be mounted.
- 6. Insulate any exposed copper piping.



## **Floor and Roof Assembly Instructions**

To mount Solar Box to a floor or roof, lay the frame with the cross braces on the bottom facing downward. Assembly of components are exactly the same as the wall mounting configuration; see previous page for detailed instructions.

- 1. Assemble frame components together without solar box. See Exploded views for hardware.
  - a. Mount Top Cross Brace at least low enough along the Vertical Support to allow the Any Angle Bracket to rotate.
  - b. Mount Bottom Cross Brace either well above or well below the Horizontal Support. Positioning is determined by angle of Solar Box.
  - c. Note: Larger (10- and 15-Ton) frames have an additional Cross Brace.
  - d. Note: Larger (15-Ton) frames have an additional Horizontal Support.

2.Measure desired angle for Solar Box and fix Horizontal Supports in approximate position. This can be adjusted after Solar Box mounting to ensure desired angle.

3. Mount frame to wall with lag bolts (not included) through the Cross Braces. For floor or roof mounting see next page.

- 4. Mount Solar Box (pipe pop-outs on top) with edge of strut channels touching to form a solid triangle. Tighten strut channel nuts once desired position is obtained.
- 5. Brace and secure piping to unistrut to plumb into the condensing unit. Be sure to follow line length requirements for determining how far away the Solar Box can be mounted.
- 6. Insulate any exposed copper piping.

To mount Solar Box to a floor or roof, lay the frame with the cross braces on the bottom facing downward. Assembly of components are exactly the same as the wall mounting configuration; see previous page for detailed instructions.



## Vacuum and Leakage Testing

#### 2.7 Vacuum and gas leakage test

#### 1. Use vacuum Pump

1) Air and humidity left inside the refrigerant circuit can cause compressor malfunction. After having connected the indoor and outdoor units, bleed the air and humidity from the refrigerant circuit by using a vacuum pump.

2) Open the piezometer and operation for 10-15minutes to check if the pressure of piezometer remains in -0.1Mpa.

3) Close the vacuum pump and maintain this status for 1-2min to check if the pressure of piezometer remains in -0.1Mpa. If the pressure decrease, there may be leakage.

4) Remove the piezometer, open the valve core

- of liquid valve and gas valve completely.
- 5) Tighten the screw caps of valve and refrigerant charging vent.



#### 2. Leakage Detection

1).With leakage detection.

Check if there is leakage with leakage detection. 2).With soap water. If leakage detection is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there a leakage.

#### 2.8 Final test

#### 1 Preparation of test operation.

- The client approves the air conditioner installation.
- Specify the important notes for air conditioner to the client.

#### 2 Method of test operation

- Put through the power, press ON/OFF button on the remote controller to start operation.
- Press MODE button the select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not. If ambient temperature is lower than 16°C(60.8°F), the air conditioner can't start cooling.



# Solar HVAC Mini-Split Plumbing Diagram

## Appendix 1 & 2

### Appendix 1 The comparison table of Celsius-Fahrenheit temperature

Fahrenheit diplay temperature (°F)	Fahrenheit( ℉)	Celsius (℃)	Fahrenheit diplay temperature (°F)	Fahrenheit (℉)	Celsius (℃)	Fahrenheit diplay temperature (°F)	Fahrenheit( ℉)	Celsius (℃)
61	60.8	16	69/70	69.8	21	78/79	78.8	26
62/63	62.6	17	71/72	71.6	22	80/81	80.6	27
64/65	64.4	18	73/74	73.4	23	82/83	82.4	28
66/67	66.2	19	75/76	75.2	24	84/85	84.2	29
68	68	20	77	77	25	86	86	30

### Appendix 2 The Pipe length and Gas charging

Connecting pipes size and length for installation

Madal	Pipe size(Inch)					
Woder	Liquid	Gas				
9000BTU	1/4	3/8				
12000BTU	1/4	3/8				
18000BTU	1/4	1/2				
24000BTU	1/4	1/2				
36000BTU	1/4	5/8				



Model	Standard length (m/inch)	Refrigerant piping Max. length (m/inch) A	Additional refrigerant charging: Xg= B * (A-5m/196inch) B
9000BTU	3.0/118.2	15/591	20g/m(0.018oz/inch)
12000BTU	3.5/137.9	15/591	20g/m(0.018oz/inch)
18000BTU	5.0/197	15/591	30g/m(0.026oz/inch)
24000BTU	5.0/197	15/591	30g/m(0.026oz/inch)
36000BTU	5.0/197	15/591	30g/m(0.026oz/inch)

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## **Appendix 3**

#### **Appendix 3 Pipes Flaring**

Main cause for gas leakage is due to defect in flaring work. Carry out correct flaring work in the following procedure.

#### A. Cut the pipes and the cable.

- 1) Use the piping kit accessory or the pipes purchased locally.
- 2) Measure the distance between the indoor and the outdoor unit.
- 3) Cut the pipes a little longer than measured distance.
- 4) Cut the cable 1.5m(4.9ft) longer than the pipe length.



#### **B. Burrs removal**

- 1) Completely remove all burrs from the cut cross section of pipe/tube.
- Put the end of the copper tube/pipe in a down ward direction as you remove burrs in order to avoid dropping burrs into the tubing.



#### C. Flaring work

• Carry out flaring work using flaring tool as shown below.

Outside o	liameter	А
mm	inch	mm /inch
ø6.35	1/4	1.0~1.3(0.04~0.06)
ø9.52	3/8	0.8~1.0(0.03~0.04)
ø12.7	1/2	0.5~0.8(0.02~0.03)
ø15.88	5/8	0.5~0.8(0.02~0.03)

Firmly hold copper pipe in a die in the dimension shown in the table above.



#### D. Check

- 1) Compare the flared work with figure below.
- 2) If flare is noted to be defective, cut off the flared section and do flaring work again.



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# Appendix 4

## Appendix 4 THERMISTOR TEMPERATURE CHARACTERISTICS

## 1). Indoor unit and outdoor exchange temperature and outside air temperature sensor temperature

темр	Posistanco	Voltage of	темр	Posistanco	Voltage of	темр	Posistanco	Voltage of
TENIP.	(k Ohm)	voltage of	TENIF.	(k Ohm)	voltage of	i Eivip.	(k Ohm)	voltage of
	(K OIIII)	4 629	15(F0)			C(F)		1 115
-30(-80)	60 135	4.028	16(60.8)	7.149	2.900	61(141.8)	1.404	1.113
-29(-04.2)	56.056	4.580	17(62.6)	6 963	2.910	62(143.6)	1.410	1.061
-27(-89.6)	53 963	4.568	18(64.4)	6 591	2.800	63(145.40)	1.374	1.001
26(78.8)	51 144	4.508	10(66.2)	6.332	2.019	64(147.2)	1.331	1.000
25(77)	49.499	4.547	20(68)	6.084	2.709	65(140)	1.250	0.084
24(75.2)	45.985	4.501	21(60.8)	5.947	2.720	66(150.8)	1.230	0.904
-23(-73.4)	43.905	4.301	22(71.6)	5.621	2.071	67(152.6)	1.212	0.900
-23(-73.4)	43.027	4.477	22(71.0)	5.021	2.572	69(154.4)	1.175	0.930
21(60.8)	30.305	4.432	24(75.2)	5 109	2.572	60(156.2)	1.105	0.913
-20(-68)	37 326	4.300	25(77)	5,000	2.524	70(158)	1.103	0.868
-19(-66 2)	35.458	4.333	26(78.8)	4 811	2.473	71(159.8)	1.072	0.847
-18(-64.4)	33 695	4.343	27(89.6)	4.630	2 379	72(161.6)	1.040	0.825
-17(-62.6)	32.030	4 313	28(82.4)	4.050	2 332	73(163.4)	0.979	0.805
-16(-60.8)	30.458	4 283	29(84.2)	4 292	2 285	74(165.2)	0.950	0.785
-15(-59)	28 972	4 252	30(86)	4 133	2 238	75(167)	0.922	0.765
-14(-57.2)	27 567	4 219	31(87.8)	3 981	2 192	76(168.8)	0.895	0.746
-13(-55.4)	26.239	4 186	32(89.6)	3,836	2 146	77(170.6)	0.869	0.728
-12(-53.6)	24 984	4 152	33(91.4)	3 697	2 101	78(172.4)	0.843	0.710
-11(-51.8)	23 795	4 117	34(93.2)	3 563	2.057	79(174.2)	0.819	0.692
-10(-50)	22 671	4 082	35(95)	3 435	2.007	80(176)	0.795	0.675
-9(-48.2)	21.606	4.045	36(96.8)	3.313	1.969	81(177.8)	0.773	0.658
-8(-46.4)	20.598	4.008	37(98.6)	3.195	1.926	82(179.6)	0.751	0.641
-7(44.6)	19.644	3,969	38(100.4)	3.082	1.883	83(181.4)	0.729	0.625
-6(-42.8)	18.732	3.930	39(102.2)	2.974	1.842	84(183.2)	0.709	0.610
-5(-41)	17.881	3.890	40(104)	2.870	1.800	85(185)	0.689	0.595
-4(-39.2)	17.068	3.850	41(105.8)	2.770	1.760	86(186.8)	0.669	0.580
-3(37.4)	16.297	3.808	42(107.6)	2.674	1.720	87(188.6)	0.651	0.566
-2(-35.6)	15.565	3.766	43(109.4)	2.583	1.681	88(190.4)	0.633	0.552
-1(-33.8)	14.871	3.723	44(111.2)	2.494	1.642	89(192.2)	0.615	0.538
0(32)	14.212	3.680	45(113)	2.410	1.604	90(194)	0.598	0.525
1(33.8)	13.586	3.635	46(114.8)	2.328	1.567	91(195.8)	0.582	0.512
2(35.6)	12.991	3.590	47(116.6)	2.250	1.530	92(197.6)	0.566	0.499
3(37.4)	12.426	3.545	48(118.4)	2.174	1.495	93(199.4)	0.550	0.487
4(39.2)	11.889	3.499	49(120.2)	2.102	1.459	94(201.2)	0.535	0.475
5(41)	11.378	3.452	50(122)	2.032	1.425	95(203)	0.521	0.463
6(42.8)	10.893	3.406	51(123.8)	1.965	1.391	96(204.8)	0.507	0.452
7(44.6)	10.431	3.358	52(125.6)	1.901	1.357	97(206.6)	0.493	0.441

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# Appendix 4 (cont'd)

8(46.4)	9.991	3.310	53(127.4)	1.839	1.325	98(208.4)	0.480	0.430
9(48.2)	9.573	3.262	54(129.2)	1.779	1.293	99(210.2)	0.467	0.419
10(50)	9.174	3.214	55(131)	1.721	1.262	100(212)	0.455	0.409
11(51.8)	8.795	3.165	56(132.8)	1.666	1.231			
12(53.6)	8.433	3.116	57(134.6)	1.613	1.201			
13(55.4)	8.089	3.067	58(136.4)	1.561	1.172			
14(57.2)	7.760	3.017	59(138.2)	1.512	1.143			

#### Resistance at 25°C(77°F):5 kΩ.



TH1: indoor room temperature sensor and outside air temperature sensor

TH2: indoor exchange temperature sensor and outside exchange temperature

sensor

Before measuring resistance, disconnect connectors as shown

above.

1) Outdoor unit sensor temperature characteristics

TEMP. ℃( <b>下</b> )	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	темр. ℃(℉)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. ℃(℉)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)
-30(-86)	283.3	322.9	367.7	24(75.2)	19.36	20.89	22.52	78(172.4)	2.563	2.654	2.745
-29(-84.2)	267.4	304.4	346.3	25(77)	18.55	20	21.54	79(174.2)	2.481	2.567	2.654
-28(-82.4)	252.5	287.1	307.4	26(78.8)	17.77	19.14	20.6	80(176)	2.402	2.484	2.567
-27(-89.6)	238.5	270.9	307.4	27(89.6)	17.03	18.32	19.7	81(177.8)	2.327	2.404	2.483
-26(-78.8)	225.4	255.7	289.8	28(82.4)	16.32	17.55	18.85	82(179.6)	2.254	2.327	2.401
-25(-77)	213.1	241.4	273.3	29(84.2)	15.65	16.81	18.04	83(181.4)	2.183	2.253	2.323
-24(-75.2)	201.5	228	257.9	30(86)	15	16.1	17.27	84(183.2)	2.115	2.182	2.248
-23(-73.4)	190.6	215.5	243.4	31(87.8)	14.39	15.43	16.54	85(185)	2.05	2.113	2.176
-22(-71.6)	180.3	203.6	229.8	32(89.6)	13.81	14.79	15.34	86(186.8)	1.985	2.047	2.109
-21(-69.8)	170.7	192.5	217	33(91.4)	13.25	14.18	15.17	87(188.6)	1.922	1.983	2.045
-20(-68)	161.6	182.1	205	34(93.2)	12.72	13.6	14.54	88(190.4)	1.861	1.922	1.983
-19(-66.2)	153.1	172.3	193.7	35(95)	12.21	13.05	13.93	89(192.2)	1.802	1.862	1.923
-18(-64.4)	145	163.1	183.2	36(96.8)	11.72	12.52	13.36	90(194)	1.746	1.805	1.865
-17(-62.6)	137.5	154.4	173.2	37(98.6)	11.26	12.01	12.81	91(195.8)	1.692	1.75	1.809
-16(-60.8)	130.3	146.2	163.9	38(100.4)	10.82	11.53	12.29	92(197.6)	1.639	1.697	1.755
-15(-59)	123.6	138.5	155.1	39(102.2)	10.29	11.07	11.78	93(199.4)	1.589	1.646	1.703
-14(-57.2)	117.3	131.3	146.8	40(104)	9.986	10.63	11.31	94(201.2)	1.54	1.596	1.653
-13(-55.4)	111.3	124.4	139	41(105.8)	9.6	10.21	10.85	95(203)	1.493	1.549	1.604
-12(-53.6)	105.6	118	131.7	42(107.6)	9.231	9.813	10.42	96(204.8)	1.448	1.502	1.558
-11(-51.8)	100.3	111.9	124.7	43(109.4)	8.878	9.43	10	97(206.6)	1.404	1.458	1.512

#### SHVAC Residential Mini-Split and Mounting Kit I/O/M

# Appendix 4 (cont'd)

-10(-50)	95.24	106.2	118.2	44(111.2)	8.54	9.064	9.612	98(208.4)	1.362	1.415	1.469
-9(-48.2)	90.49	100.8	112.1	45(113)	8.217	8.714	9.233	99(210.2)	1.321	1.373	1.426
-8(-46.4)	85.99	95.68	106.3	46(114.8)	7.908	8.38	8.872	100(212)	1.284	1.335	1.387
-7(44.6)	81.75	90.86	100.8	47(116.6)	7.612	8.06	8.526	101(213.8)	1.245	1.296	1.348
-6(-42.8)	77.74	86.31	95.74	48(118.4)	7.328	7.754	8.196	102(215.6)	1.209	1.258	1.309
-5(-41)	73.94	82.01	90.88	49(120.2)	7.057	7.461	7.88	103(217.4)	1.173	1.222	1.272
-4(-39.2)	70.35	77.95	86.29	50(122)	6.797	7.18	7.578	104(219.2)	1.139	1.187	1.236
-3(37.4)	66.96	74.11	81.96	51(123.8)	6.548	6.912	7.289	105(221)	1.105	1.153	1.202

#### **R**—Resistance

Resistance at 25°C(77°F):20 kΩ



TH3: Outdoor unit discharge pipe sensor

Before measuring resistance, disconnect connectors as shown above.