FRIEDRICH

Floating Air® Pro-Premier® Series Ductless Split R-410A Refrigerant

Service Manual

Model	Indoor Unit	Outdoor Unit	Voltage	BTU	
FPHW091	FPHSW09A1A	FPHSR09A1A	115	9k	
FPHW091A	FPHSW09A1B	FPHSR09A1A	115	9k	WiFi
FPHW093	FPHFW09A3A	FPHSR09A3A	208/230	9k	
FPHW093A	FPHFW09A3B	FPHSR09A3A	208/230	9k	WiFi
FRHW093	FRHSW09A3A	FRHSR09A3A	208/230	9k	
FRHW093A	FRHSW09A3B	FRHSR09A3A	208/230	9k	WiFi
FPHW121	FPHSW12A1A	FPHSR12A1A	115	12k	
FPHW121A	FPHSW12A1B	FPHSR12A1A	115	12k	WiFi
FPHW123	FPHFW12A3A	FPHSR12A3A	208/230	12k	
FPHW123A	FPHFW12A3B	FPHSR12A3A	208/230	12k	WiFi
FRHW123	FRHSW12A3A	FRHSR12A3A	208/230	12k	
FRHW123A	FRHSW12A3B	FRHSR12A3A	208/230	12k	WiFi
FPHW183	FPHFW18A3A	FPHSR18A3A	208/230	18k	
FPHW183A	FPHFW18A3B	FPHSR18A3A	208/230	18k	WiFi
FPHW243	FPHFW24A3A	FPHSR24A3A	208/230	24k	
FPHW243A	FPHFW24A3B	FPHSR24A3A	208/230	24k	WiFi
FPHW363	FPHSW36A3A	FPHSR36A3A	208/230	36k	
FPHW363A	FPHSW36A3B	FPHSR36A3A	208/230	36k	WiFi
FPHW363B	FPHSW36A3C	FPHSR36A3B	208/230	36k	WiFi

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INTRODUCTION

Important Safety Information

The information in this manual is intended for use by a qualified technician who is familiar with the safety procedures required for installation and repair, and who is equipped with the proper tools and test instruments required to service this product.

Due to continuing research in new energy-saving technology, all information in this manual is subject to change without notice.

Installation or repairs made by unqualified persons can result in subjecting the unqualified person making such repairs as well as the persons being served by the equipment to hazards resulting in injury or electrical shock which can be serious or even fatal.

Safety warnings have been placed throughout this manual to alert you to potential hazards that may be encountered. If you install or perform service on equipment, it is your responsibility to read and obey these warnings to guard against any bodily injury or property damage which may result to you or others.

Your safety and the safety of others is very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.

This is a safety Alert symbol.
This symbol alerts you to potential hazards that can kill or hurt you and others.

All safety messages will follow the safety alert symbol with the word "WARNING" or "CAUTION". These words mean:

⚠WARNING Indicates a hazard which, if not avoided, can result in severe personal injury or death and damage to product or other property.

CAUTION Indicates a hazard which, if not avoided, can result in personal injury and damage to product or other property.

All safety messages will tell you what the potential hazard is, tell you how to reduce the chance of injury, and tell you what will happen if the instructions are not followed.

NOTICE Indicates property damage can occur if instructions are not followed.

⚠ WARNING

Refrigeration system under high pressure

Do not puncture, heat, expose to flame or incinerate.

Only certified refrigeration technicians should service this equipment.

R410A systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used.

Only use gauge sets designed for use with R410A.
Do not use standard R22 gauge sets.

INTRODUCTION

Important Safety Information

CAUTION

DO NOT OPERATE EQUIPMENT DURING ACTIVE STAGES OF CONSTRUCTION

To ensure proper operation, Friedrich requires that all equipment is not operated during active construction phases. This includes active stages of completing framing, drywalling, spackling, sanding, painting, flooring, and moulding in the equipment's designated conditioning space. The use of this equipment during construction could result in premature failure of the components and/or system and is in violation of our standard warranty guidelines. The operation of newly installed equipment during construction will accelerate the commencement and/or termination of the warranty period.

⚠ WARNING

Please read this manual thoroughly prior to equipment installation or operation. It is the installer's responsibility to properly apply and install the equipment. Installation must be in conformance with the NFPA 70-2008 National Electric Code or current edition, International Mechanic code 2009 or current edition and any other applicable local
or national codes.

⚠ WARNING

Refrigeration system under high pressure. Do not puncture, heat, expose to flame or incinerate. Only certified refrigeration technicians should service this equipment. R410A systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used. Only use gauge sets designed for use with R410A. Do not use R22 gauge sets. Failure to do so can result in property damage, personal injury, or death.

⚠ WARNING

Electrical shock hazard.

Turn OFF electric power before service or installation.

Unit must be properly grounded.

Unit must have correct fuse or circuit breaker protection. Unit's supply circuit must have the correct wire conductor size. All electrical connections and wiring must be installed by a qualified electrician and conform to the National Electrical Code and all local codes which have jurisdiction. Failure to do so can result in property damage, personal injury and/or death.

Your safety and the safety of others are very important.

We have provided many important safety messages in this manual and on your appliance. Always read and obey all safety messages.

This is the safety Alert symbol.
This symbol alerts you to potential hazards that can kill or hurt you and others.
All safety messages will follow the safety alert symbol with the word "WARNING" or "CAUTION".
These words mean:

Indicates a hazard which, if not avoided, can result in severe personal injury or death and damage to product or other property.

⚠ WARNING

Indicates a hazard which, if not avoided, can result in personal injury and damage to product or other property. All safety messages will tell you how to reduce the chance of injury, and tell you what will happen if the instructions are not followed.

CAUTION

Indicates property damage can occur if instructions are not followed.

NOTICE

Indicates property damage can occur if instructions are not followed.

INTRODUCTION

Personal Injury Or Death Hazards

SAFETY FIRST	⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
	Do not remove, disable or bypass this unit's safety devices. Doing so may cause fire, Doing so may cause fire, injuries, or death.	Ne pas supprime, désactiver ou contourner cette l´unité des dispositifs de sécurité, faire vous risqueriez de provoquer le feu, les blessures ou la mort.	No eliminar, desactivar o pasar por alto los dispositivos de seguridad de la unidad. Si lo hace podría producirse fuego, lesiones o muerte.

⚠ WARNING

ALWAYS USE INDUSTRY STANDARD PERSONAL PROTECTIVE EQUIPMENT (PPE)

ELECTRICAL HAZARDS:

- Shutdown and/or disconnect all electrical power to the unit before performing inspections, maintenance, or service.
- Make sure to follow proper lockout/tag out procedures.
- Always work in the company of a qualified assistant if possible.
- Capacitors, even when disconnected from the electrical power source, retain an electrical charge potential capable of causing electric shock or electrocution. Wait a few minutes after shutdown to allow the capacitors to discharge the stored energy.
- Handle, discharge, and test capacitors according to safe, established, standards, and approved procedures.
- Extreme care, proper judgment, and safety procedures must be exercised if it becomes necessary to test or troubleshoot equipment with the power turned on to the unit.
- Do not spray water on the air conditioning unit while the power is on.
- Electrical component malfunction caused by water could result in electric shock or other electrically unsafe conditions when the power is restored and the unit is turned on, even after the exterior is dry.
- Use air conditioner on a single dedicated circuit within the specified amperage rating.
- Ensure that the unit is properly grounded.
- Follow all safety precautions and use approved protective safety equipment such as: gloves, goggles, and clothing. Ensure that properly insulated tools, and testing equipment are are used as well to protect against equipment damage and reduce the risk of injury.
- Failure to follow proper safety procedures and these warnings can result in serious injury or possibly death.

INTRODUCTION

Personal Injury Or Death Hazards

- **REFRIGERATION SYSTEM REPAIR HAZARDS:**
- Use approved standard refrigerant recovering procedures and equipment to relieve high pressure before opening system for repair. Reference EPA regulations (40 CFR Part 82, Subpart F) Section 608.
- Do not allow liquid refrigerant to contact skin. Direct contact with liquid refrigerant can result in minor to moderate injury.
- Be extremely careful when using an oxy-acetylene torch. Direct contact with the torch's flame or hot surfaces can cause serious burns.
- Make certain to protect personal and surrounding property with fire proof materials and have a fire extinguisher at hand while using a torch.
- Provide adequate ventilation to vent off toxic fumes, and work with a qualified assistant whenever possible.
- Always use a pressure regulator when using dry nitrogen to test the sealed refrigeration system for leaks, flushing etc.
- **MECHANICAL HAZARDS:**
- Extreme care, proper judgment and all safety procedures must be followed when testing, troubleshooting, handling, or working around unit with moving and/or rotating parts.
- Be careful when, handling and working around exposed edges and corners of the sleeve, chassis, and other unit components especially the sharp fins of the indoor and outdoor coils.
- Use proper and adequate protective aids such as: gloves, clothing, safety glasses etc.
- Failure to follow proper safety procedures and/or these warnings can result in serious injury or death.

• PROPERTY DAMAGE HAZARDS

- **FIRE DAMAGE HAZARDS:**
- Read the Installation/Operation Manual for the air conditioning unit prior to operating.
- Use air conditioner on a single dedicated circuit within the specified amperage rating.
- Be extremely careful when using acetylene torch and protect surrounding property.
- Failure to follow these instructions can result in fire and minor to serious property damage.
- **WATER DAMAGE HAZARDS:**
- Improper installation, maintenance or servicing of the air conditioner unit can result in water damage to personal items or property.
- Insure that the unit has a sufficient pitch to the outside to allow water to drain from the unit.
- Do not drill holes in the bottom of the drain pan or the underside of the unit.
- Failure to follow these instructions can result in damage to the unit and/or minor to serious property damage.

INTRODUCTION

Model Identification Guide

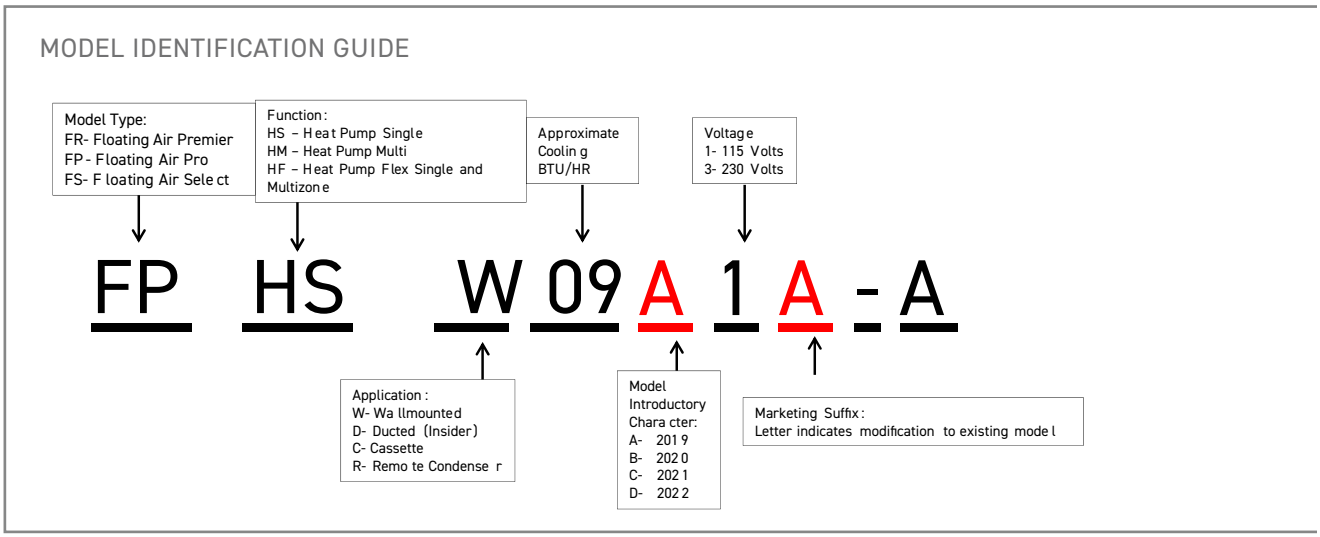


Figure 101

SPECIFICATIONS

Product Specifications 9k and 12k

Model No.	Units	FPHW091/A	FPHW121/A	FPHW093/A	FRHW093/A	FPHW123/A	FRHW123/A
INDOOR MODEL		FPHSW09A1A, FPHSW09A1B/B	FPHSW12A1A, FPHSW12A1B/B	FPHFW09A3A, FPHFW09A3B/B	FRHSW09A3A, FRHSW09A3B/B	FPHFW12A3A, FPHFW12A3B/B	FRHSW12A3A, FRHSW12A3B/B
OUTDOOR MODEL		FPHSR09A1A	FPHSR12A1A	FPHSR09A3A	FRHSR09A3A	FPHSR12A3A	FRHSR12A3A
SPECIFICATIONS							
CAPACITY COOLING (RATED)	Btu	9000	12000	9000	9000	12000	12000
CAPACITY COOLING MIN - MAX	Btu	3600-10000	4000-13500	3600-10000	3600-10000	4000-13500	4000-13500
COOLING AMPS		6.3	8.3	2.9	10500	4.3	13000
HEATING AMPS		7.0	9.7	3.1	6500	5.0	8000
SENSIBLE HEAT RATIO		76%	77%	76%	3600-10500	77%	4000-14000
CAPACITY HEATING (RATED) @ 47°F	Btu	9500	13000	9500	2.3	13000	4.6
CAPACITY HEATING MIN - MAX	Btu	3600-10500	4000-14000	3600-10500	3.4	4000-14000	4.8
CAPACITY HEATING (RATED) @ 17°F	Btu	5000	7500	5000	76%	7500	77%
COP		3.56	3.46	3.88	28	3.42	25
HSPF		10.00	10.50	10.70	16.1	10.50	15.4
SEER		19.5	22.0	22.5	12.5	22.0	12
EER		12.8	13.0	13.7	Yes	13.0	Yes
MOISTURE REMOVAL	Pts/h	1.9	2.5	1.9	1.9	2.5	2.5
AIRFLOW (HIGH/MED/LOW/QUIET)	CFM	424/382/323/247	424/382/323/247	424/382/323/247	416/384/355/279	424/382/323/247	598/536/446/345
SOUND RATING - INDOOR (HIGH/MED/LOW/QUIET)	dB-A	39/32/29/26	39/32/29/26	39/32/29/26	39/34/31	39/32/29/26	45/41/39
SOUND RATING - OUTDOOR	dB-A	53	53	53	55	53	55
OPERATING RANGE (HEATING)	°F	(-4° – 75°)	(-4° – 75°)	(-4° – 75°)	-13°-75°	(-4° – 75°)	-13°-75°
OPERATING RANGE (COOLING)	°F	(5° – 115°)	(5° – 115°)	(5° – 115°)	0°-115°	(5° – 115°)	0°-115°
ELECTRICAL DATA							
POWER SOURCE	V/Hz/Phase	115V~,60Hz,1P	115V~,60Hz,1P	230V~,208V~, 60Hz,1P	230V~,208V~, 60Hz,1P	230V~,208V~, 60Hz,1P	230V~,208V~, 60Hz,1P
MIN. AMPACITY	A	13.5	16.5	10	10A	10	12A
COOLING WATTS	W	700	950	655	559	960	779
HEATING WATTS	W	780	1100	720	905	1110	856
MAX. TD FUSE/ BREAKER	A	20	25	15	15A	15	15A
POWER AND COMMUNICATION CABLE	Type	4 x 14AWG 600V THHN	4 x 14AWG 600V THHN	4 x 14AWG 600V THHN	4 x 14AWG 600V THHN	4 x 14AWG 600V THHN	4 x 14AWG 600V THHN
REFRIGERATION SYSTEM							
REFRIGERANT		R410a	R410a	R410a	R410a	R410a	R410a
COMPRESSOR TYPE		Rotary	Rotary	Rotary	Rotary	Rotary	Rotary
CONNECTIONS		Flare	Flare	Flare	Flare	Flare	Flare
LIQUID LINE O.D.	in	1/4	1/4	1/4	1/4	1/4	1/4
SUCTION LINE O.D.	in	3/8	3/8	3/8	3/8	3/8	3/8
REFRIGERANT CHARGE	oz	33.5	40.9	33.5	25	40.9	25
FACTORY PRECHARGE	ft.	25	25	25	38.8	25	45.9
MIN. / MAX. LINE LENGTH	ft	10-50	10-50	10-50	10-50	10-50	10-50
MAX. HEIGHT DIFFERENCE	ft	33	33	33	33	33	33
DIMENSIONS & WEIGHT							
INDOOR UNIT							
W x H x D	in	33 7/8 x 11 3/16 x 8 1/2	33 7/8 x 11 3/16 x 8 1/2	33 7/8 x 11 3/16 x 8 1/2	33 7/8 x 11 3/16 x 8 1/2	33 7/8 x 11 3/16 x 8 1/2	38 1/8 X 13 1/8 X 9 15/16
NET WEIGHT	lbs	20	20	20	22	20	28.5
OUTDOOR UNIT							
W x H x D	in	28 1/8 x 19 x 9 7/16	31 7/8 x 23 x 11	28 1/8 x19 x 9 7/16	31 7/8 x 23 x 11	31 7/8 x 23 x 11	31 7/8 x 23 x 11
NET WEIGHT	lbs	65	78	59.5	75	72.5	84

Figure 201

SPECIFICATIONS

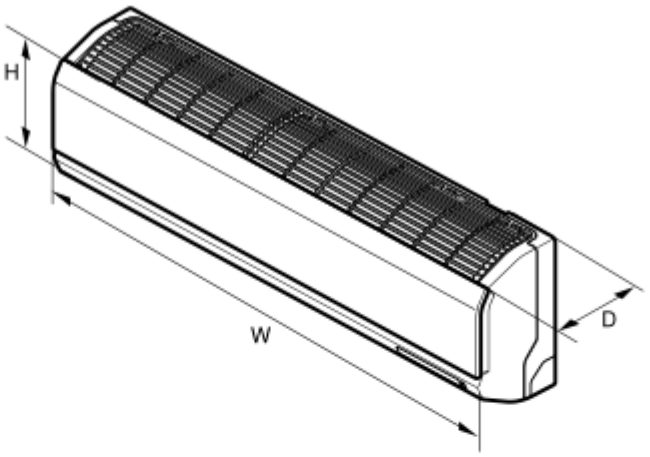
Product Specifications 18k, 24k and 36k

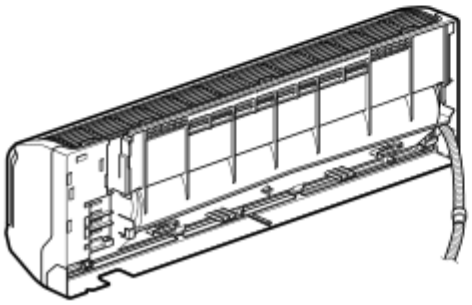
Model No.	Unit	FPHW183/A	FPHW243/A	FPHW363A	FPHW363B
INDOOR MODEL		**FPHFW18A3A,/ B**	**FPHFW24A3A/B**	**FPHSW36A3A/B**	**FPHSW36A3C**
OUTDOOR MODEL		**FPHSR18A3A**	**FPHSR24A3A**	**FPHSR36A3A**	**FPHSR36A3B**
CAPACITY COOLING (RATED)	Btu	18000	23500	36000	35000
CAPACITY COOLING MIN - MAX	Btu	6500-19500	8000-26500	12000--38000	12000--38000
COOLING AMPS		6.3	8.3	18.5	18.5
HEATING AMPS		7.2	11.1	16	16
SENSIBLE HEAT RATIO		80%	76%	79%	79%
CAPACITY HEATING (RATED) @ 47°F	Btu	19000	26000	36000	35000
CAPACITY HEATING MIN - MAX	Btu	6500-20000	8000-26500	12000--38000	12000--38000
CAPACITY HEATING (RATED) @ 17°F	Btu	11600	14500	18700	18700
COP		3.40	3.05	3.05	2.93
HSPF		11.6	10.5	8.8	8.8
SEER		23.3	21	16.4	16.4
EER		13	12.5	8.6	8.33
MOISTURE REMOVAL	Pts/h	3.2	5.1	6.8	6.8
AIRFLOW (HIGH/MED/LOW/QUIET)	CFM	618/565/482/382	735/665/559/441	1030/824/706/588	1030/824/706/588
SOUND RATING - INDOOR (HIGH/MED/LOW/QUIET)	dB-A	45/41/37/34	47/42/36/33	50/45/40/38	50/45/40/38
SOUND RATING - OUTDOOR	dB-A	55	58	60	60
OPERATING RANGE (HEATING)	°F	-4° – 75°	-4° – 75°	-4° – 75°	-4° – 75°
OPERATING RANGE (COOLING)	°F	5° – 115°	5° – 115°	5° – 115°	5° – 115°
ELECTRICAL DATA					
POWER SOURCE	V/Hz/Phase	230V~,208V~,60Hz,1P	230V~,208V~,60Hz,1P	230V~,208V~,60Hz,1P	230V~,208V~,60Hz,1P
MIN. AMPACITY	A	15	20	30	30
COOLING WATTS	W	1385	1880	4186	4186
HEATING WATTS	W	1638	2500	3459	3459
MAX. TD FUSE/ BREAKER	A	20	30	35	35
POWER AND COMMUNICATION CABLE	Type	4 x 14AWG, 600V THHN	4 x 14AWG, 600V THHN	4 x 14AWG, 600V THHN	4 x 14AWG, 600V THHN
REFRIGERATION SYSTEM					
REFRIGERANT		R410a	R410a	R410a	R410a
COMPRESSOR TYPE		Rotary	Rotary	Rotary	Rotary
CONNECTIONS		Flare	Flare	Flare	Flare
LIQUID LINE O.D.	in	1/4	3/8	3/8	3/8
SUCTION LINE O.D.	in	1/2	5/8	5/8	3/4
REFRIGERANT CHARGE .	oz	54.7	66.3	81.2	81.2
FACTORY PRECHARGE	ft.	25	25	25	25
MIN. / MAX. LINE LENGTH	ft	10-66	10-66	10-66	10-66
MAX. HEIGHT DIFFERENCE	ft	33	33	33	33
DIMENSIONS & WEIGHT					
INDOOR UNIT					
W x H x D	in	45 3/16 x 13 1/8 x 9 15/16		50 5/8 X 13 5/8 X 10 5/16	50 5/8 X 13 5/8 X 10 5/16
NET WEIGHT	lbs	33	33	40	40
SHIPPING WEIGHT	lbs	38.5	38.5	48	48
OUTDOOR UNIT					
W x H x D	in	33 7/8 x 25 9/16 x 12 3/16	34 7/8 x 31 5/16 x 14 3/8	34 7/8 x 31 5/16 x 14 3/8	34 7/8 x 31 5/16 x 14 3/8
NET WEIGHT	lbs	99	123.5	141	

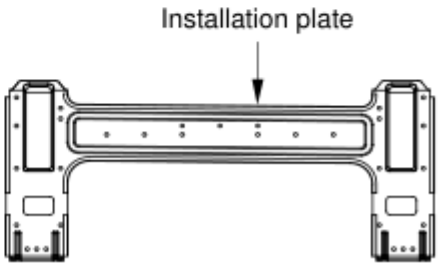
Figure 202

SPECIFICATIONS

Product Dimensions: Indoor Units







Model	Width	Height	Depth
FPHSW09A1A, FPHSW09A1B/B	33 7/8 “(Inches)	11 3/16 “(Inches)	8 1/2 “(Inches)
FPHFW09A3A, FPHFW09A3B/B	33 7/8 “(Inches)	11 3/16 “(Inches)	8 1/2 “(Inches)
FPHSW12A1A, FPHSW12A1B/B	33 7/8 “(Inches)	11 3/16 “(Inches)	8 1/2 “(Inches)
FPHFW12A3A, FPHFW12A3B/B	33 7/8 “(Inches)	11 3/16 “(Inches)	8 1/2 “(Inches)
FPHFW18A3A, FPHFW18A3B/B	45 3/16 “(Inches)	13 1/8 “(Inches)	9 15/16 “(Inches)
FPHFW24A3A, FPHFW24A3B/B	45 3/16 “(Inches)	13 1/8 “(Inches)	9 15/16 “(Inches)
FPHSW36A3A, FPHSW36A3B, FPHSW36A3C/B/C	50 5/8 “(Inches)	13 5/8 “(Inches)	10 5/16 “(Inches)

Figure 203

SPECIFICATIONS

Capacities and Selection Data

Capacity characteristic charts

The following charts show the characteristics of outdoor unit capacity, which corresponds with the operating ambient temperature of outdoor unit. This data is obtained with Free-Spin of the Condenser and not in a testing mode Conditions:

1- Pipe length / height difference : 25 ft. (7.6m) / 0 ft. (0m)
2- Compressor at rated inverter frequenc y
3- Indoor fan speed at high fan speed
4- Capacity loss due to frost accumulation and defrost operation is not included.

SPECIFICATIONS

Capacities and Selection Data

Floating Air Pro / Premier Cooling Extended Capacity (By System Model)				
System Model	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB		
		80 /67		
		Cooling BTUs	Heating BTUs	Power
		kBtu/h		kW
FPHW091/A	32	9.56	6.69	0.26
	41	10.09	7.06	0.36
	50	10.35	7.24	0.47
	59	10.96	7.67	0.50
	67	11.18	7.83	0.59
	77	11.57	8.10	0.70
	82	11.90	8.33	0.81
	87	11.78	8.25	1.00
	95	11.63	8.14	1.02
	104	11.08	7.76	1.02
	115	9.94	6.96	1.00
FPHW121/A	32	10.76	7.53	0.27
	41	11.29	7.90	0.36
	50	11.93	8.35	0.42
	59	12.17	8.52	0.59
	67	12.44	8.71	0.78
	77	12.68	8.88	1.01
	82	13.25	9.28	1.07
	87	12.98	9.08	1.16
	95	12.55	8.79	1.25
	104	11.90	8.33	1.24
	115	10.53	7.37	1.18
FPHW093/A	32	8.54	5.97	0.26
	41	8.72	6.10	0.36
	50	9.15	6.41	0.47
	59	9.53	6.67	0.60
	67	9.89	6.92	0.69
	77	10.21	7.14	0.80
	82	10.37	7.25	0.90
	87	10.28	7.19	0.91
	95	10.11	7.08	0.92
	104	9.85	6.89	0.89
	115	9.26	6.48	0.88

SPECIFICATIONS

Capacities and Selection Data

Floating Air Pro / Premier Cooling Extended Capacity (By System Model)				
System Model	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB		
		80 /67		
		Cooling BTUs	Heating BTUs	Power
		kBtu/h		kW
FPHW123/A	32	10.66	7.46	0.35
	41	11.39	7.97	0.54
	50	12.09	8.46	0.65
	59	12.73	8.91	0.76
	67	13.13	9.19	0.86
	77	13.62	9.54	0.95
	82	14.07	9.85	1.09
	87	13.85	9.69	1.15
	95	13.25	9.27	1.22
	104	12.15	8.50	1.19
	115	9.81	6.87	1.10
FPHW183/A	32	16.78	11.75	0.97
	41	17.75	12.43	1.09
	50	18.40	12.88	1.22
	59	18.62	13.03	1.30
	67	19.03	13.32	1.35
	77	19.31	13.52	1.41
	82	19.55	13.69	1.60
	87	19.26	13.48	1.91
	95	18.57	13.00	1.91
	104	17.27	12.09	2.11
	115	15.80	11.06	2.11
FPHW243/A	32	22.14	15.50	1.09
	41	25.05	17.54	1.47
	50	26.49	18.55	1.72
	59	27.28	19.10	1.93
	67	27.51	19.26	2.13
	77	27.72	19.40	2.35
	82	28.08	19.66	2.52
	87	27.35	19.15	2.72
	95	26.47	18.53	3.02
	104	22.76	15.93	2.89
	115	18.34	12.84	2.60

SPECIFICATIONS

Capacities and Selection Data

Floating Air Pro / Premier Cooling Extended Capacity (By System Model)				
System Model	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB		
		80 /67		
		Cooling BTUs	Heating BTUs	Power
		kBtu/h		kW
FPHW363/A/B	32	29.25	20.48	1.09
	41	32.72	22.90	1.45
	50	33.50	23.45	2.20
	59	33.88	23.72	2.46
	67	35.27	24.69	2.63
	77	36.36	25.45	3.52
	82	37.89	26.52	3.59
	87	37.20	26.04	3.69
	95	32.91	23.04	3.90
	104	29.64	20.75	3.65
	115	23.63	16.54	3.13
FRHW093/A	32	7.60	5.32	0.21
	41	8.41	5.89	0.28
	50	9.73	6.81	0.40
	59	11.23	7.86	0.50
	67	12.94	9.06	0.69
	77	14.12	9.89	0.89
	82	14.48	10.13	1.04
	87	14.27	9.99	1.07
	95	13.56	9.49	1.16
	104	12.67	8.87	1.25
	115	11.62	8.13	1.40
FPHW123/A	32	13.76	9.63	0.33
	41	14.12	9.88	0.47
	50	14.60	10.22	0.50
	59	14.92	10.44	0.70
	67	15.38	10.77	0.84
	77	15.50	10.85	1.09
	82	15.89	11.12	1.15
	87	15.73	11.01	1.17
	95	15.19	10.64	1.27
	104	14.44	10.11	1.38
	115	13.31	9.32	1.32

SPECIFICATIONS

Capacities and Selection Data

Floating Air Pro / Premier Cooling Extended Capacity (By System Model)				
System Model	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB		
		80 /67		
		Cooling BTUs	Heating BTUs	Power
		kBtu/h		kW
FPHW091/A	-5	-7	4.95	1.14
	5	3	5.45	1.07
	14	12	7.08	1.17
	17	15	8.93	1.30
	23	19	9.67	1.30
	32	28	9.65	1.19
	35	33	9.89	1.03
	47	43	10.54	0.94
	59	50	9.86	0.82
FPHW121/A	-5	-7	6.40	1.22
	5	3	8.12	1.30
	14	12	9.76	1.49
	17	15	12.13	1.63
	23	19	12.95	1.68
	32	28	13.07	1.48
	35	33	14.00	1.43
	47	43	15.50	1.45
	59	50	12.73	0.91
FPHW093/A	-5	-7	4.95	1.14
	5	3	6.20	1.20
	14	12	7.29	1.27
	17	15	8.59	1.34
	23	19	9.33	1.38
	32	28	9.85	1.34
	35	33	10.23	1.19
	47	43	11.65	1.11
	59	50	10.78	0.80
FPHW123/A	-5	-7	8.67	1.29
	5	3	10.18	1.34
	14	12	11.40	1.44
	17	15	12.10	1.48
	23	19	12.72	1.54
	32	28	13.46	1.56
	35	33	13.94	1.51
	47	43	14.19	1.31
	59	50	14.01	1.10

SPECIFICATIONS

Capacities and Selection Data

Floating Air Pro / Premier Cooling Extended Capacity (By System Model)				
System Model	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB		
		80 /67		
		Cooling BTUs	Heating BTUs	Power
		kBtu/h		kW
FPHW183/A	-5	-7	8.57	1.17
	5	3	10.90	1.27
	14	12	13.90	1.28
	17	15	15.43	1.49
	23	19	16.74	1.60
	32	28	18.24	1.65
	35	33	20.92	1.80
	47	43	21.27	1.81
	59	50	20.73	1.77
FPHW243/A	-5	-7	11.57	2.35
	5	3	15.61	2.62
	14	12	17.08	2.61
	17	15	19.55	2.79
	23	19	19.31	2.76
	32	28	20.88	2.57
	35	33	21.64	2.54
	47	43	26.78	2.52
	59	50	26.68	2.50
FPHW363/A	-5	-7	15.93	3.02
	5	3	19.21	3.12
	14	12	21.01	3.07
	17	15	21.32	3.15
	23	19	25.92	3.45
	32	28	27.41	3.61
	35	33	33.11	3.80
	47	43	38.07	3.90
	59	50	34.61	2.74
FRHW093/A	-5	-7	5.25	1.08
	5	3	7.76	1.22
	14	12	9.82	1.41
	17	15	11.08	1.45
	23	19	11.77	1.45
	32	28	11.87	1.21
	35	33	11.92	1.12
	47	43	12.05	1.06
	59	50	11.81	0.86

SPECIFICATIONS

Capacities and Selection Data

Floating Air Pro / Premier Cooling Extended Capacity (By System Model)				
System Model	Outdoor Air Temp. (°F DB)	Indoor Air Temp. °F DB / °F WB		
		80 /67		
		Cooling BTUs	Heating BTUs	Power
		kBtu/h		kW
FRHW123/A	-5	-7	8.56	1.46
	5	3	10.78	1.60
	14	12	11.96	1.80
	17	15	11.90	1.56
	23	19	13.03	1.48
	32	28	15.07	1.61
	35	33	15.22	1.66
	47	43	17.21	1.51
	59	50	16.45	1.17

OPERATION

Remote Control

The remote controller transmits signals to the system.

SMART(invalid for multi system)
Used to enter fuzzy logic operation directly, regardless of the unit is on or off.

POWER
The appliance will be started when it is energized or will be stopped when it is in operation, if you press this button.

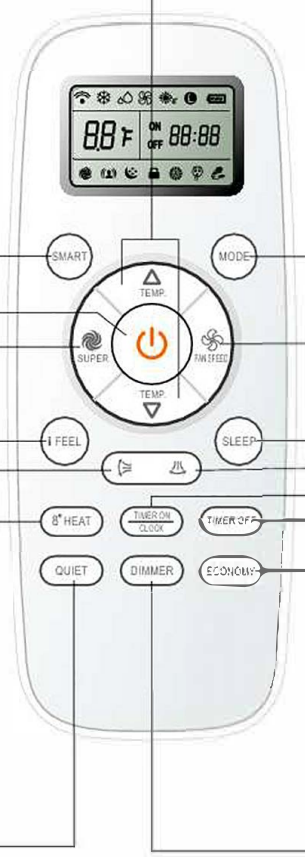
SUPER
Used to start or stop the fast cooling/heating. (Fast cooling operates at high fan speed with 61°F (16°C) set temp automatically; Fast heating operates at auto fan speed with 30°C (86°F) set temp automatically)

IFEEL
Used to set IFEEL mode operation. Press it once, the IFEEL function will be started. Press it again, the IFEEL function will be shut off.

SWING
Used to stop or start vertical adjustment louver swinging and set the desired up/ down airflow direction.

8 HEAT(optional)
Used to set 8 HEAT Mode.

QUIET
Used to set or cancel Quiet Mode operation.



TEMP + -
Used to adjust the room temperature and the timer, also real time.

MODE
Press this button to select the operation mode.

FAN
Used to select fan speed in sequence auto, higher, high, medium, low and lower.

SLEEP
Used to set or cancel Sleep Mode operation.

SWING
Used to stop or start Horizontal adjustment louver swinging and set the desired left/right airflow direction.

TIMER ON/CLOCK
Used to set or cancel the timer operation and used to set the current time.

TIMER OFF
Used to set or cancel the timer operation.

ECONOMY
Used to set or cancel Economy Mode operation.

DIMMER
When you press this button, all the display of indoor unit will be closed. Press any button to resume display.

Indication symbols on LCD:

Cooling indicator	Dry indicator	Fan only indicator	8° Heating indicator	Heating indicator
Auto fan speed	Higher fan speed	High fan speed	Medium fan speed	Low fan speed
Lower fan speed	Sleep 1 indicator	Sleep 2 indicator	Sleep 3 indicator	Sleep 4 indicator
Smart indicator	Quiet indicator	Economy indicator	Super indicator	ON OFF 88:88 Display set timer / Display current time
Signal transmit	Ifeel	Lock indicator	88 °F Display temperature	Battery power indicator

Note: Each mode and relevant function will be further specified in following pages.

Figure 301
Remote Control Operation and Function

OPERATION

Remote Technical Parameters

Remote receiver distance (front of the air conditioner): 26ft.
Remote receiver angle: Less than 60 degrees.
Temperature control accuracy: ±2.4°F.
Time Response: Less than 1 second.

Display Functions

Remote
Current control functions on the remote controller (See unit's "Installation and Operating Manual")
Display of the indoor unit displays set temperature or indoor temperature.

Indoor unit

Running LED lit during operation, flashing when in defrost.
Timer LED lit when the timer mode is active.
Sleep LED lit when the sleep mode is activated and turns off after 10 seconds.
Compressor LED lit when compressor is running.
Remote control receiver receives signals from the remote control.
Displays error codes if present. An error code is displayed according to the signal from the indoor CPU. The error code will flash for 5 seconds while displayed.

Indoor Unit Operation

Manual Operation "ON/OFF" Button:
When pressing the manual operation "ON/OFF" button after system is idle or in stand-by mode, the previous settings will be restored from last operation: Mode, Temperature, and Fan Speed. The air flow directional setting does not restore. When first powered, pressing the manual operation "ON/OFF" button will force the system would operate in "auto" mode and will enter stand-by mode by pressing the button again. Pressing and holding the manual operation "ON/OFF" button for 5 seconds will engage Test Mode and will beep 1 time. It will operate in cooling mode with the indoor fan speed set to high-speed and will ignore indoor temperature for 5 minutes. If the manual operation "ON/OFF" button is pressed again or a signal is received from the remote control, test mode will exit. If exited from the remote control the system will operate with the corresponding mode selected on the remote control.

I-Feel Function

The I-Feel function is set by the remote control. The room temperature value interpreted by the system will use the temperature on the remote control instead of the temperature reported by the ambient air sensor in the indoor unit. The remote control will automatically transmit a temperature signal every 10 minutes. The remote control will transmit a signal every 2 minutes if the temperature setpoint selected exceeds 2°F. If the indoor unit does not receive a signal from the remote in 30 minutes, the selected temperature setpoint will depend on the ambient air sensor of the indoor unit.

Timer Function

Max Timer range is 24 hours.
Timer ON/OFF can be cycled anytime.
Timer accuracy is ±1 minute.

The Timer can be adjusted by 1 min increments.
Timer On-OFF operational times can overlap.

Sleep Function

Sleep mode can only be used in Cooling, Heating and Dry mode.
If Sleep mode is selected in Cooling mode, the room temperature setting will increase 2.5°F every hour for 8 hours. Room temperature will not rise more than 2.5°F per hour. Temperature rise will cease at 79°F. Room temperature will not rise above 79°F.
If Sleep mode is selected in Heating mode, room temperature will be decreased by 2.5°F per hour for 3 hours but will not decrease more than 2.5°F per hour or 8°F for the duration of the mode.
In either mode, the indoor fan run in the LOW speed. Last user settings (air direction and temperature) can be used, or adjusted by user. The Running indicator will flash, then the unit will turn off all the light indicators except the Sleep. After 5 minutes, the Sleep indicator will turn off. All indicators will be standby unless the temperature or Time setting is adjusted. After setting these, the indicators will turn off after 10 seconds.

OPERATION

Sleep mode will cease after 8 hours of operation.

Using Sleep during Off-Timer Function

When using Sleep mode, if the next OFF-Timer setting less than 8 hours, Sleep mode will remain active until the OFF-Timer setting. If the next OFF-Timer setting more than 8 hours, it will override the OFF-Timer setting and will turn the system off 8 hours after engaging Sleep mode.

Auto Mode (SMART)

In Auto Mode (SMART) the system will automatically switch to Cooling, Heating, Dry or Fan Only modes based on the current room temperature. Air flow direction can be adjusted in any mode.
The auto set point is determined by the user.
When the room temperature is 79°F or above, Cooling mode will activate.
When the room temperature is between 73°F and 79°F, Dry mode will activate. Fan Speed will drop to LOW after 3 minutes.
When the room temperature is between 70°F and 73°F, Fan only mode will activate. Fan Speed is automatically set to LOW, but can be adjusted when between these room temperatures.
When the room temperature is below 70°F, Heating mode will activate. The room temperature is set to 72°F.
Auto Mode ceases when another specific operation mode is selected. If changing between Cooling and Heating modes, the compressor ceased for operation for 5 minutes.
Cooling only appliance
a. When the room temperature exceeds 79°F, it will be ran in Cool mode, and the temperature is set to 79°F.
b. When the room temperature exceeds 73°F, but not more than 79°F, it will be operated in the Dry mode.
c. When the room temperature is not more than 73°F, it will be operated in the Fan only, the air volume is set to LOW and the fan speed can be adjusted

Cooling Mode

Outdoor Fan

The outdoor fan's speeds (except in single speed-selection motors) is changed automatically according to outdoor ambient temperatures demands. When operating at a fixed frequency, the outdoor fan is forced to operate at the highest speed.

Indoor Fan

While in Cooling or Heating modes, the indoor fan speed is controlled by the remote control: High, Medium, Low and Automatic setting. When in Automatic speed in the Cool mode for the first time, the fan speed will run at Low setting. After that, temperature and fan speed selection are in Automatic is shown in Fig.302
When the temperature difference is lower than 5F, Low fan speed will engage. When the difference between the setpoint temperature and the room temperature is between 5F to 10F, the indoor fan speed will keep in Medium Speed. When the temperature difference is above 10F, High fan speed will engage.

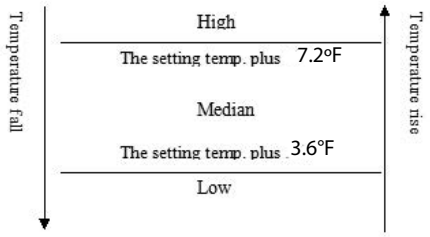


Figure 302

OPERATION

Air flow direction (Louvers) control

The louver is operated by a stepper motor and operates the horizontal swing of the louver automatically. Press the SWING button to start or stop the louver swing.
During the louver swing in normal operation, the current position will be stored. When the appliance turns off and the louvers swing automatically to the default position, it will position at the close position plus 5º.

4-way valve

State: It is disengaged in cooling.
Switchover: When initially powered on for cooling, the 4-way valve is disengaged immediately.
When the heating is changed to the cooling, it needs an interval of 50 seconds for the 4-way valve to change over from being engaged to being disengaged.
Cooling = No power to valve
Heating = Power to valve

Heating-run mode

Temperature compensation
The temperature compensation is 5º in heating mode. For example, if the set temperature is 77ºF(25°C) by the remote control, when the room temperature is detected with 88ºF(31°C), the compressor will turn off. The main reason is that the hot air is condensed at the top of the house.
Note: The compensation is available only if the room temperature sensor of indoor unit is used and it is not available when it is subject to the sensor on the remote control.

Indoor fan motor operation
Anti-cold air system:
When the appliance run in Heat mode condition, the indoor fan motor operation is shown in Figure 303 to prevent the cooling air come out during the appliance operation.

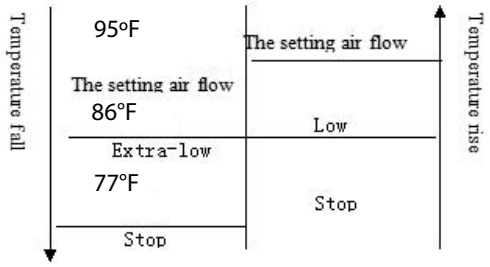


Figure 303

When the difference between the setting temperature and the room temperature equal to 2º or 4º, the indoor fan speed will keep in current speed.
Air flow direction control
The horizontal louver is controlled by a step motor, press the SWING button to swing or stop the louver.
During the louver run in normal operation, the current position will be stored. When the appliance turn off and louver swing automatically to the default position, it will position at the default position plus 5º.
Outdoor fan
The outdoor fan speeds except single speed motor can be changed according to outdoor ambient temperatures.
4-way valve
State: It is electrified in heating.
Switchover: When initially powered on for heating, the 4-way valve is activated immediately.
In the change from cooling to heating, it needs an interval of 50 seconds for the 4-way valve to change over from being interrupted to being activated.
The super function (option)
In cooling mode, when you press the SUPER button by remote control, the unit will operate for 15 minutes with the following setting:

a. The set temperature is 16º(61°F);
b. The fan speed with highest speed;
c. The compressor runs with high frequency.

OPERATION

Dehumidifying mode

The dehumidifying mode is illustrated as follows:

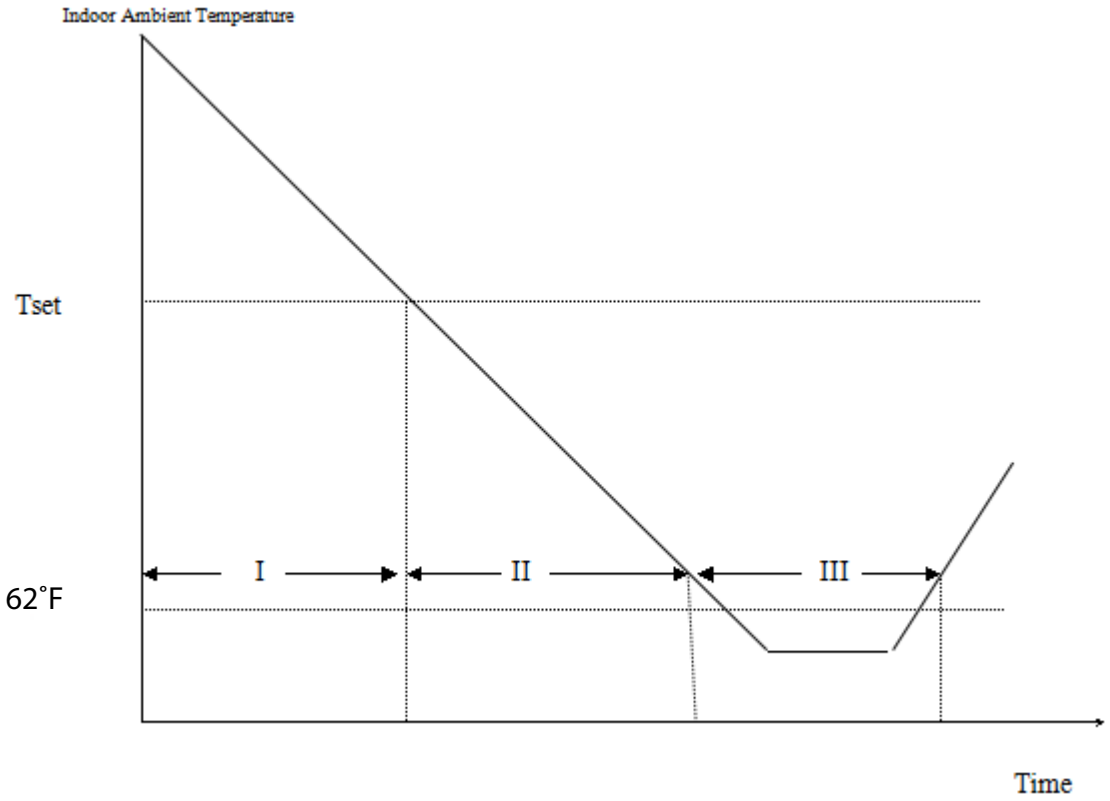


Figure 304

Dehumidifying area I: Operation at the frequency in the range (30–60Hz) according to Dt (Tindoor ambient-Tset).
Dehumidifying area II: The compressor stops for 5 minutes and operators for 5 minutes at the lowest frequency.
Dehumidifying area III: The compressor stops.

Dt(°F)	f(Hz)
32	30
33	30
34	40
35	50
36	60

Figure 305

OPERATION

Fan Only Mode Operation

During the appliance run in this mode; the compressor and outdoor fan stop and the indoor fan operates under the pre-setting of air volume. The louver swing and the indoor fan speed is the same as the Heating Mode.

Defrost

Conditions for Defrost Activation:

The following three conditions must be met to activate Defrost.
- Condition 1: Outdoor ambient sensor is below 28.4F
- Condition 2: When the heating compressor consecutively runs for 40 minutes .
- Condition 3: The difference between the condenser coil pipe sensor outdoor ambient temperature sensor ≥10F.

Defrosting actions:

- The compressor stops, and the outdoor fan stops after delay of 30 seconds; in 50 seconds the four-way valve is powered off; and in 10 seconds the compressor starts and runs at "defrosting frequency".

Conditions for ending defrosting:

Defrosting is over if either of the conditions below are met.
- Condition 1: The accumulated time of defrosting is longer than 12 minutes (EEPROM setting value in the current operating mode).
- Condition 2: If the temperature of coiled pipe is equal to or higher than 57°F (EEPROM setting value in the current operating mode).

Actions of exiting the defrosting state:

- The compressor stops. 50 seconds later the four-way valve opens, and another 10 seconds later the compressor and outdoor fan restart and begin normal operation.

Conditions of anti-freezing prohibition of frequency rising:

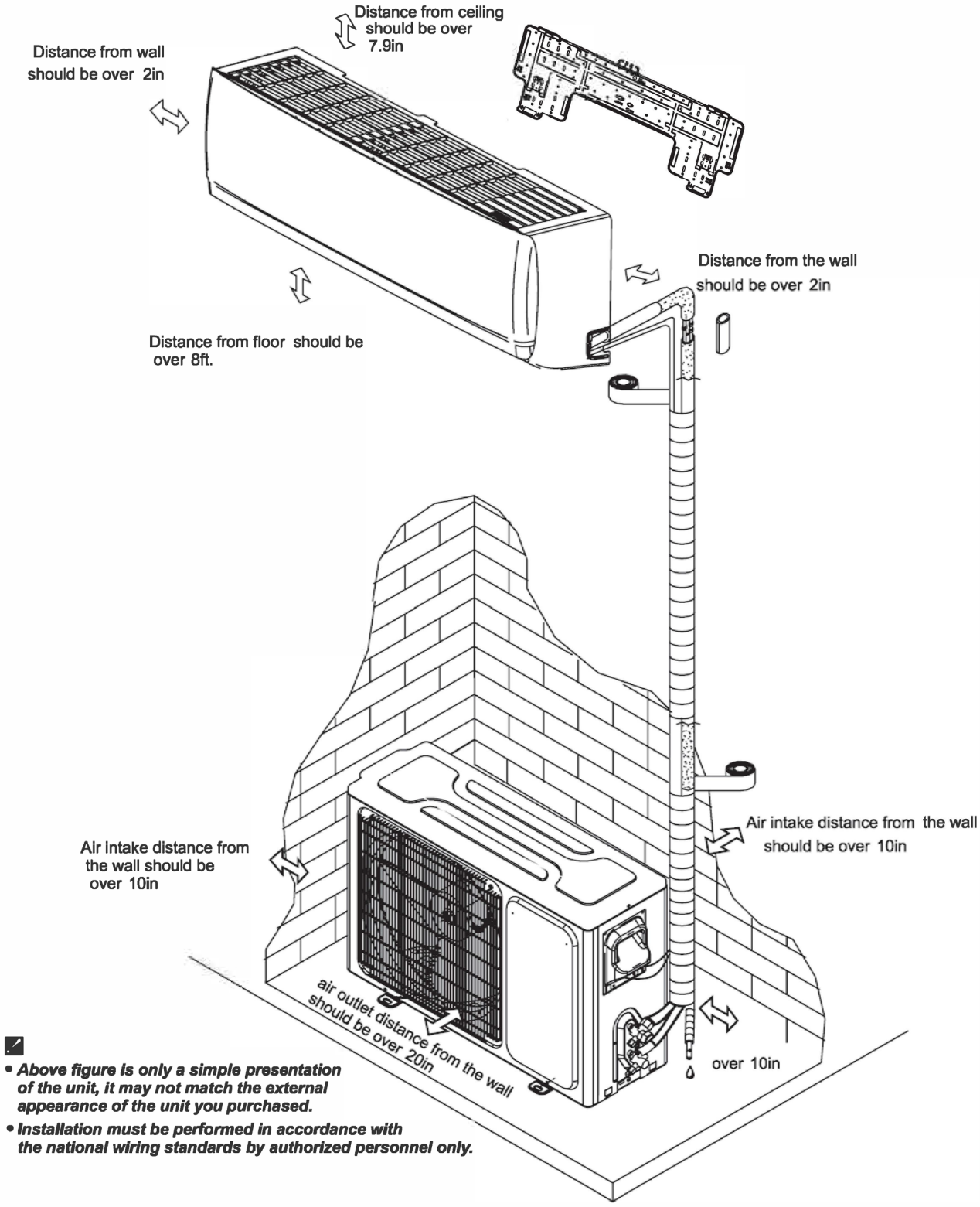
- Condition 1: in the case of anti-freezing frequency decreasing, the temperature of indoor heat exchanger rises to "anti-freezing frequency decreasing temperature".
- Condition 2: in normal operation, the temperature of indoor heat exchanger reaches "anti-freezing prohibition of frequency rising temperature".
- If either of the above two conditions is met, the product will enter anti-freezing prohibition of frequency rising state.
- Anti-freezing prohibition of frequency rising operation: the compressor is kept at the current frequency, which may decrease according to situations while cannot rise. The outdoor fan runs.

Condition for the end of anti-freezing prohibition of frequency rising state:

- When the temperature of indoor heat exchanger rises to "anti-freezing releasing temperature", the state of anti-freezing prohibition of frequency rising is released.

INSTALLATION

Installation Dimension Diagram



- ***Above figure is only a simple presentation of the unit, it may not match the external appearance of the unit you purchased.***
- ***Installation must be performed in accordance with the national wiring standards by authorized personnel only.***

Figure 401

INSTALLATION

Main Tools For Installation and Maintenance

Electroprobe

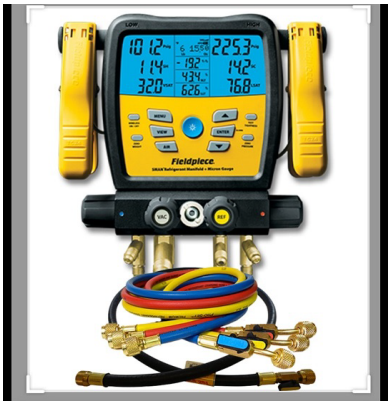
5. Universal meter

6. Torque wrench, open-end wrench, in hexagon spanner

Electronic leakage detector

8. Vacuum pump

9. Pressure meter



). Pipe pliers, pipe cutter

11. Pipe expander, pipe bender

12. Soldering appliance, refrigerant containe

Figure 402

INSTALLATION

Site Instructions

Site for Installing Indoor Unit

- Ensure that unit is mounted where air flow will not be restricted.
- Keep the required space from the unit to the ceiling and wall according to the installation diagram on previous page.
- Where the air filter can be easily removed.
- Keep the obstacles between the indoor unit and remote controller 3ft away from any source of radio frequency or electromagnet interference
- keep as far as possible from fluorescent lamps.
- Do not put anything near the air inlet to obstruct airflow.
- Install on a wall that is strong enough to bear the weight of the unit.
- Install in a place that will not increase operation noise and vibration.
- Keep away from direct sunlight and heating sources. Do not place flammable materials or combustion apparatuses on top of the unit.

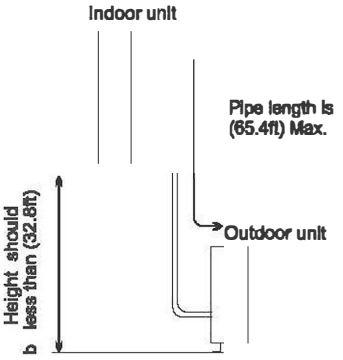


Figure 4.03

Site for Installing Outdoor Unit

- Clear open space with good unrestricted airflow.
- Avoid installing it where flammable gas could leak.
- Keep the required distance apart from the wall.
- Keep the outdoor unit away from greasy dirt.
- A fixed base where it is not subject to increased operation noise.
- Where there is not any blockage of the air outlet.
- Avoid installing under direct sunlight, in an aisle or sideway, or near heat sources and ventilation fans. Keep away from flammable materials, thick oil fog, and wet or uneven places.
- In case the pipe length is more than (24.5 ft), the refrigerant should be charged additionally, according to below table.

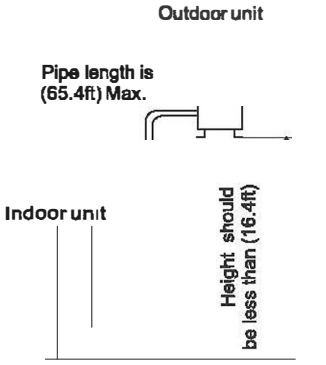


Figure 4.04

Capacity (Btu/h)	Pipe Size		Standard Length (ft)	Max. Elevation B (ft)	Max. Length A (ft)	Additional Refrigerant (oz/ft)
	LIQUID	GAS				
9k-12	1/4"(Ø6.35)	3/8"(Ø9.52)	25	33	50	.22
18k	1/4"(Ø6.35)	1/2"(Ø12.7)	25	33	66	.22
24k-36k	3/8"(Ø9.52)	5/8"(Ø15.88)	25	33	66	.32

INSTALLATION

Install Indoor Unit

1. ***Installing*** the Mounting Plate

1) Decide an installing location for the mounting plate according to the indoor unit location and piping direction.
2) Find the center of the mounting plate according to the mark on it. Then Install a screw to fix it preliminary.
3) Keep the mounting plate horizontally with a horizontal ruler or dropping line.
4) Drill holes of 1 1/4" (inches) in depth on the wall for fixing the plate.
5) Fix the mounting plate with as least 7 self-tapping screws. For some mounting plates with a holder in the middle , at least 8 screws are required. (Fig. 405)
6) Inspect if the mounting plate is well fixed. Then drill a hole for piping.

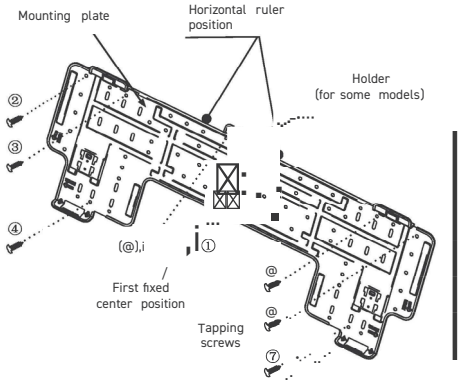


Fig. 405

Note: It ***is recommended*** to ***install screw anchors*** for sheet ***rock,*** concrete block, brick and such ***type*** of ***wall.***

Note: The left of the mounting bracket may be not the center of the indoor unit.

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

2. Drill a Hole for Piping

1) Decide the position of hole for piping according to the location of mounting plate.
2) Drill a hole on the wall. The hole should tilt a little downward toward outside.
3) Install a sleeve through the wall hole to keep the wall tidy and clean. (Fig. 406)

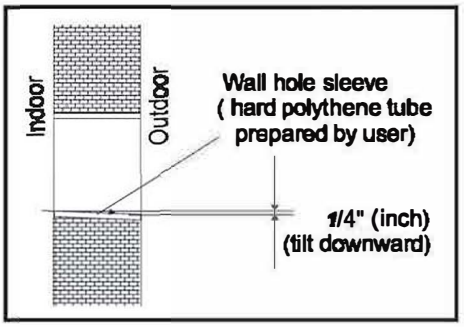


Fig.406

3. Piping Provision

1) Put the piping (liquid and gas pipe) and cables through the wall hole from outside or put them through from inside after indoor piping and cables connection is complete to connect to the outdoor unit.
2) Decide whether to cut the unloading piece off in accordance with the piping direction. (Fig. 407)

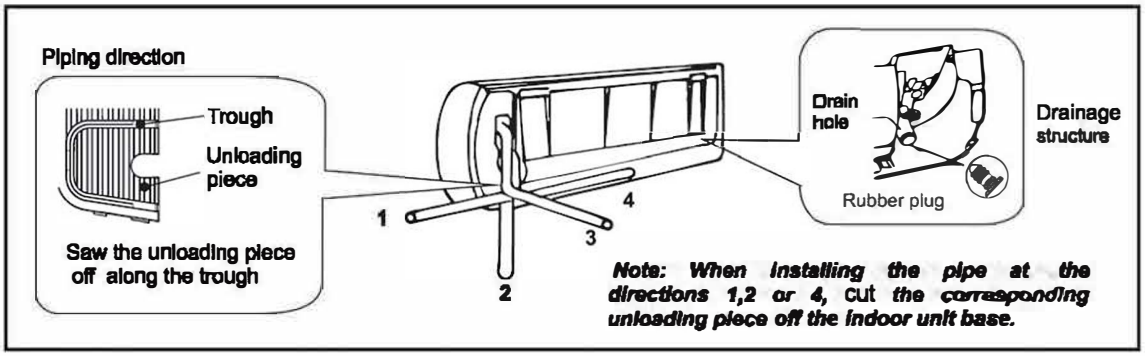


Fig. 407

INSTALLATION

Install Indoor Unit

Note: Both sides drainage structure is standard. For both sides drainage structure, it can be chosen for right, left or both sides drainage connection. If choosing both sides drainage connection, another proper drain hose is needed as there is only one drain hose offered by factory. If choosing one side drainage connection, make sure the drain hole on the other side is well plugged.

- Put the piping (liquid and gas pipe) and cables through the wall hole from outside.
  1) Cut the liquid pipe and gas pipe to the right length according to the position mark on the wall mounting plate (Fig. 40 8). Ensure that the cut is flat (Fig. 409).

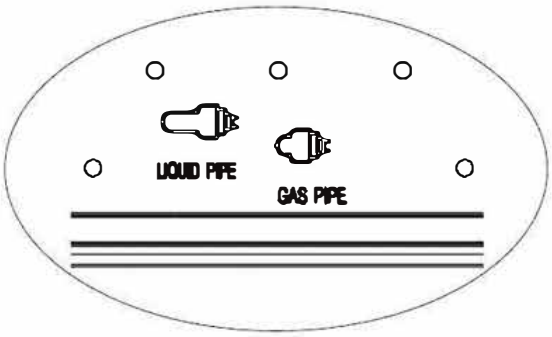


Fig. 40 8

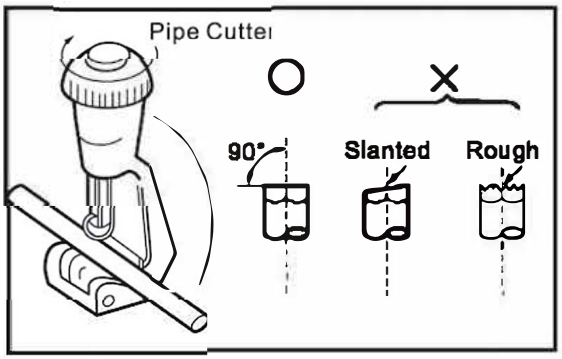


Fig. 409

  2) Remove burrs on the cutting edges. Keep the pipe outlet down to avoid the metal powder into the pipe(Fig. 410).
  3) Flare the pipes. Insert the pipe outlet into the copper nut before flaring the pipe. Ensure that the hole is flat with sound surface and even thickness. (Fig. 411)

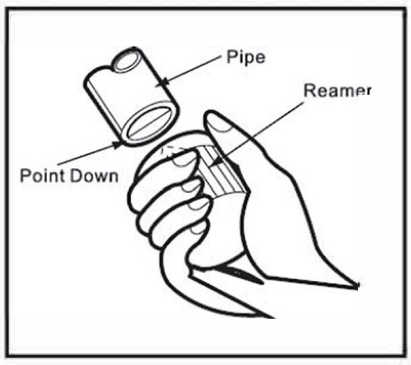


Fig. 410

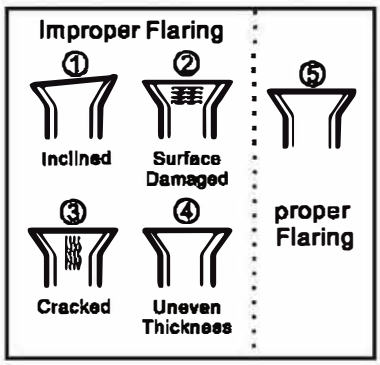


Fig. 411

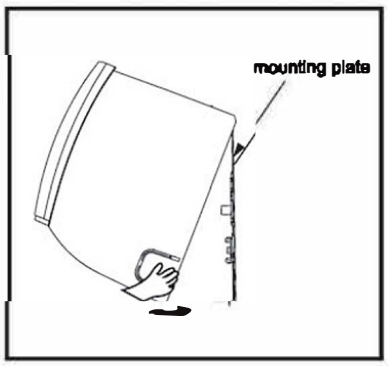


Fig. 412

INSTALLATION

Install Indoor Unit

4. Indoor Unit Piping Installation

1) Hang the unit onto mounting plate (Fig. 412).

2) In the A position, open the front panel as shown in Fig. 413.
3) In the B position, open the screw covers as shown in Fig. 414 and remove the screws. (Note: For some models, you need to remove 3 screws.)
4) In the C position, open the front shell as shown in Fig. 415 . Then in the D position, push the baffles to prevent the front shell from falling as shown in Fig. 416 .

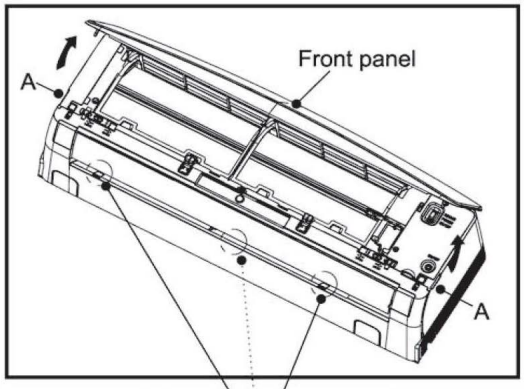


Fig. 413

Fig. 415

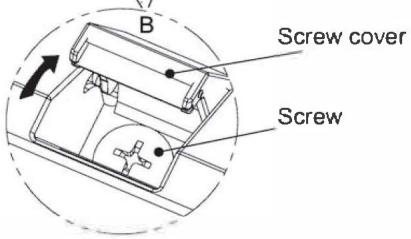


Fig. 414

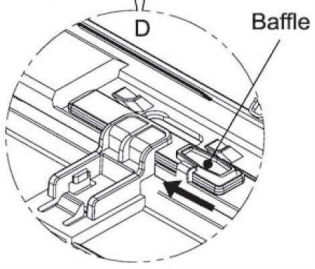


Fig. 416

5) Use the support plate to move the unit step by step to reach the best location. (Fig. 417 and Fig. 418).

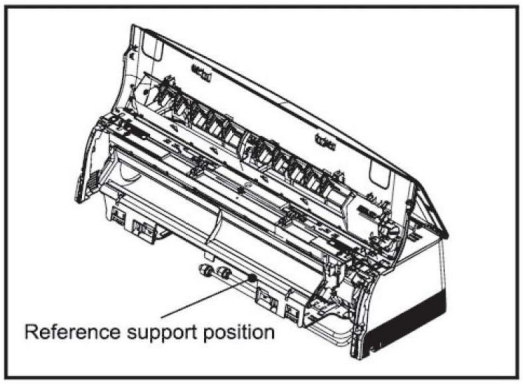


Fig. 417

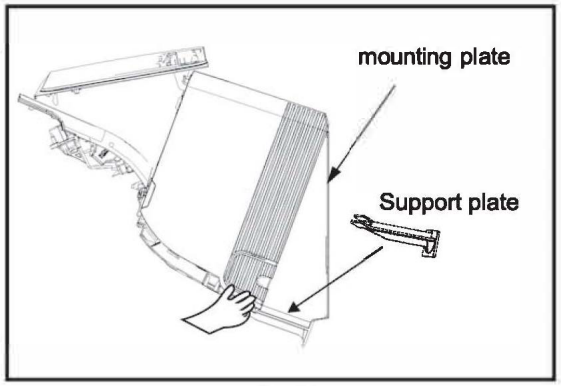


Fig. 418

Note: The figures in this manual may differ from that of the air conditioner you have selected.

INSTALLATION

Install Indoor Unit

6) Connect the piping .

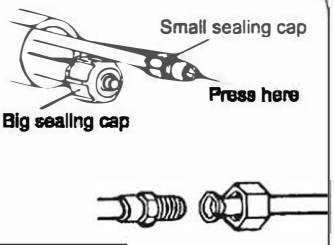
Piping Connection:

a.Before unscrewing the big and the small sealing caps, press the small sealing cap with the finger until the exhaust noise stops, and then loosen the finger.

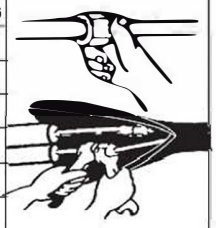
b. Connect indoor unit pipes with two wrenches. Pay special attention to the allowed torque as shown below to prevent the pipes, connectors and flare nuts from being deformed and damaged.

c. Pre-tighten them with fingers at first, then use the wrenches.

■ If you don't hear the exhaust noise, please contact with the merchant.



Model	Pipe size	Torque	Nut width	Min.thickness
9K-18K	Liquid Side (Φ6 or 1/4)	15~20N·m or 11~15ft-lbs	17 or 5/8	0.5 or 0.02
24K-36K	Liquid Side (Φ9.53 or 3/8)	30~35N·m or 22~26ft-lbs	22 or 7/8	0.6 or 0.024
9K-12K	Gas Side (Φ 9.53 or 3/8)	30~35N·m or 22~26ft-lbs	22 or 7/8	0.6 or 0.024
18K	Gas Side (Φ 12 or 1/2)	50~55N·m or 37~41ft-lbs	24 or 0.94	0.6 or 0.024
24K-36K	Gas Side (Φ 16 or 5/8)	60~65N·m or 44~48ft-lbs	27 or 1.1	0.6 or 0.024
36K	Gas Side (Φ 19 or 3/4)	70~75N·m or 52~55ft-lbs	32 or 1.26	1.0 or 0.039



NOTE: Dimensions are in "mm or inch" unless otherwise stated in the table.

7) After connecting piping as required, install the drain hose. Then connect the power cords. After connecting, wrap the piping, cords and drain hose together with thermal insulation materials(Fig. 419 ~ Fig.421).

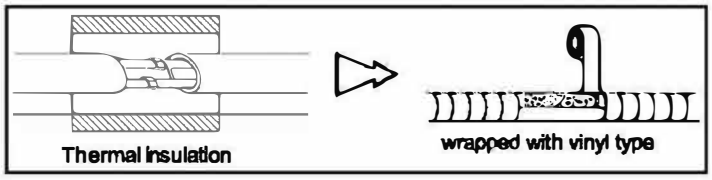


Fig. 419

Note: Wrap the piping joints with thermal insulation materials and then wrap with a vinyl tape.

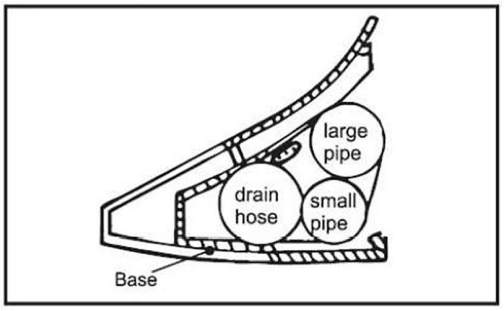


Fig. 420

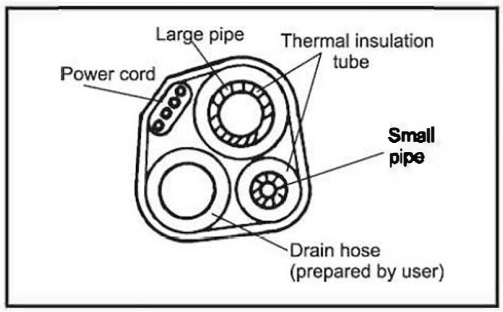


Fig. 421

Note: Place the drain hose under the pipes.
Note: Insulation material uses polythene foam over 6 mm in thickness.
Note: Drain hose is prepared by user.
Note: The figures in this manual may differ from that of the air conditioner you have selected.

INSTALLATION

Install Indoor Unit

8) Connect the power connecting cord (Fig.422).

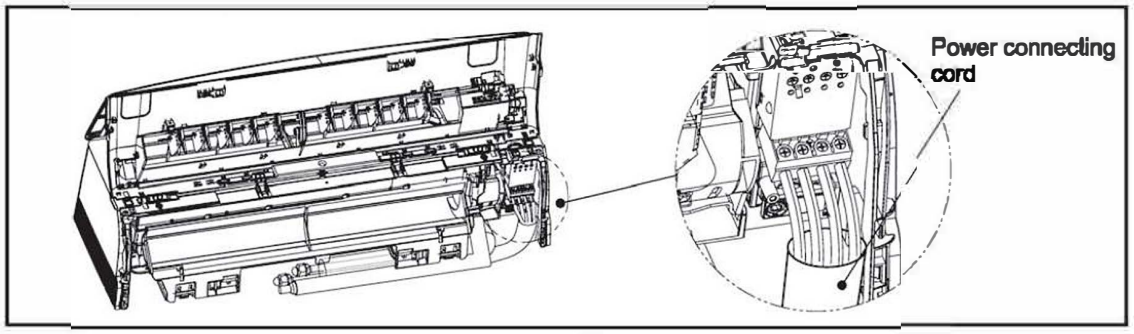


Fig. 422

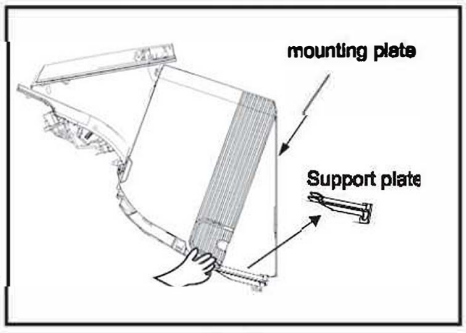


Fig.423

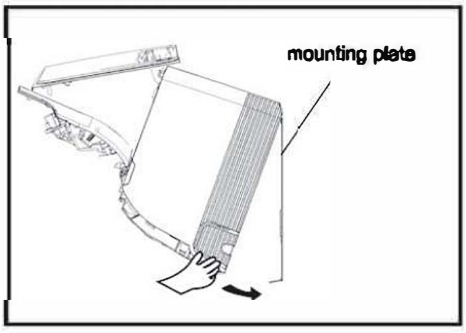


Fig424

9) Remove the support plate as shown in Fig. 423. Then move the unit step by step to reach the best installation, then press the 2 buckles of the air duct into 2 down slots of the mounting plate. (Fig.424 and Fig.425)

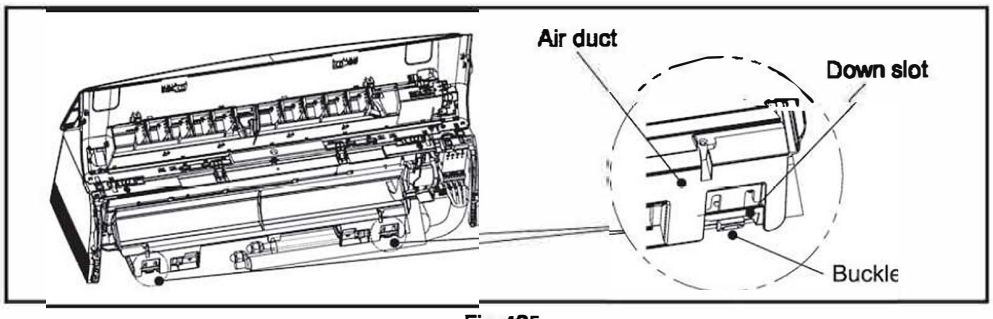


Fig. 425

Note: The figures in this manual may differ from that of the air conditioner you have selected.

INSTALLATION

Install Indoor Unit

10) Pull the baffles as shown in Fig. 426. Close the front shell as shown in Fig. 427. Then press the E position to fasten the front shell as shown in Fig. 428.

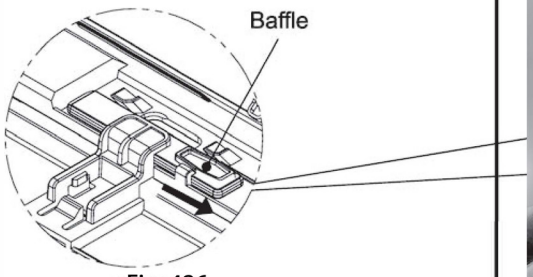


Fig. 426

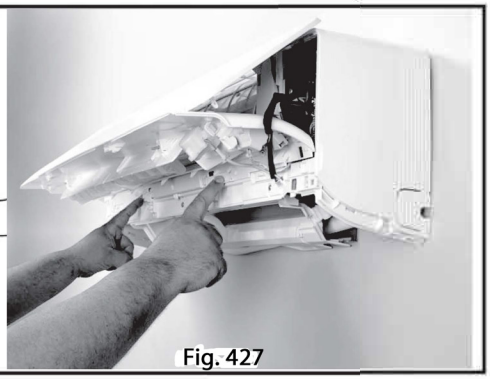
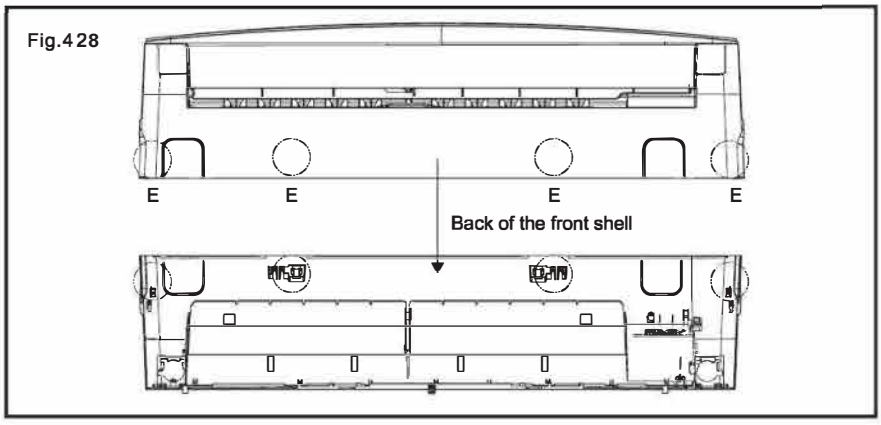


Fig. 427



11) Install the screws and close the screw covers as shown in Fig. 429. (Note: For some models, you need to install 3 screws.)

12) Close the front panel as shown in Fig. 430.

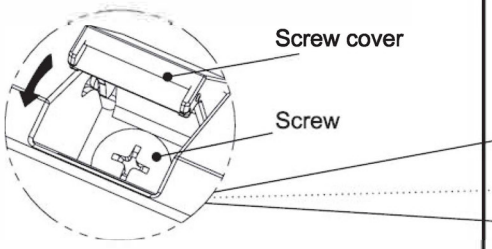


Fig. 429

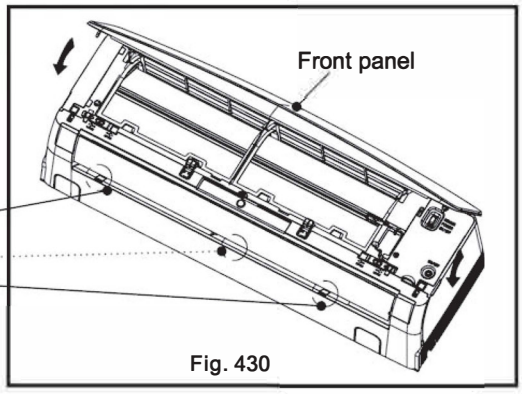


Fig. 430

Note: The figures in this manual may differ from that of the air conditioner you have selected.

INSTALLATION

Install Outdoor Unit

1. Install Condensate Drain for Outdoor Unit

The condensate drains from the outdoor unit when the unit operates in heating mode. install a drain port and a drain hose to direct the condensate water. Just install the drain port and rubber washer to the chassis of the outdoor unit, then connect a drain hose to the port as the right figure demonstrates.

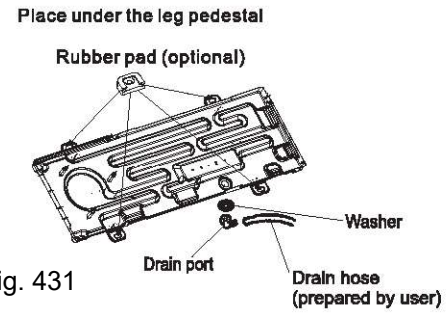


Fig. 431

2. Install Ground Pad or Wall Hangers

1.Determine proper location for outdoor unit.
2.Follow all instructions provided by manufacturer for installing wall hangers rubber pad.
3.Verify the wall hangers or rubber pad can safely support the weight of the outdoor unit.
4.Verify the wall hangers or rubber pad is level and meets all outdoor dimensional clearance.
5.Fix with bolts and nuts tightly on a flat and strong floor.
If installed on the wall or roof, make sure to fix the support well to prevent it from shaking due to serious vibration or strong wind.

⚠ *WARNING*

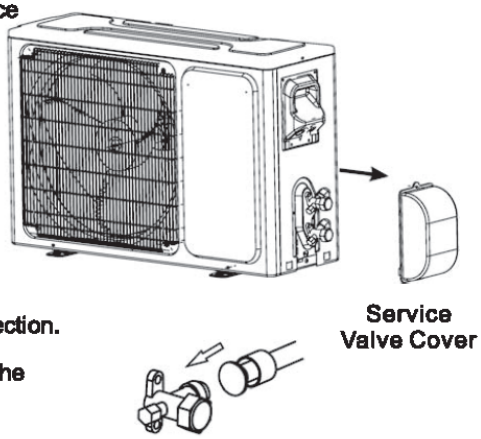
Florida wind load requirements state that outdoor unit must be anchored to concrete pad using four 3/8-in diameter power wedge bolt plus(or equivalent) with 1-in diameter fender washers. Anchor bolts must be embedded into 3000 PSI minimum concrete at a distance of 4 1/2- in from any concrete edge. The concrete thickness must exceed 1.5 times the anchor depth.

INSTALLATION

Outdoor Units

3. Piping Connections to Outdoor Unit

- Remove service valve cover(if provided) to access the service valves and refrigerant ports.
- Carefully bend and adjust length of refrigerant pipes to meet outdoor unit service valves connection with proper tools to avoid kinks.
- Apply a small amount of refrigerant oil to the flare connection on the refrigerant pipe.
- Properly align piping and tighten flare nut using a standard wrench and a torque wrench as shown in the indoor piping section.
- Carefully tighten flare nuts to correct torque level referring to the following Torque Table:



Torque Table

Pipe diameter /inch	Nut Size /inch	Tightening Torque	
		ft-lbs	N-m
1/4	1/4	11 to 15	15 to 20
3/8	3/8	22 to 26	30 to 35
1/2	1/2	37 to 41	50 to 55
5/8	5/8	44 to 48	60 to 65
3/4	3/4	52 to 55	70 to 75

Note: Over tightening may damage flare connections and cause leaks.

INSTALLATION

Power and Wiring

Connecting of the Cable

- Indoor Unit

Connect the power cord to the indoor unit by connecting the wires to the terminals on the control board individually in accordance with the outdoor unit connection.

Note: For some models, it is necessary to remove the cabinet to connect to the indoor unit terminal.

- Outdoor Unit

1) Remove the cable cross board from the unit by loosening the screw. Connect the wires to the terminals on the control board individually per circuit diagram posted on inside of access door.

2) Secure the power cord onto the control board with cable clamp.

3) Reinstall the cable cross board to the original position with the screw.

4) Use a recognized circuit breaker between the power source and the unit. A disconnecting device to adequately disconnect all supply lines must be fitted.

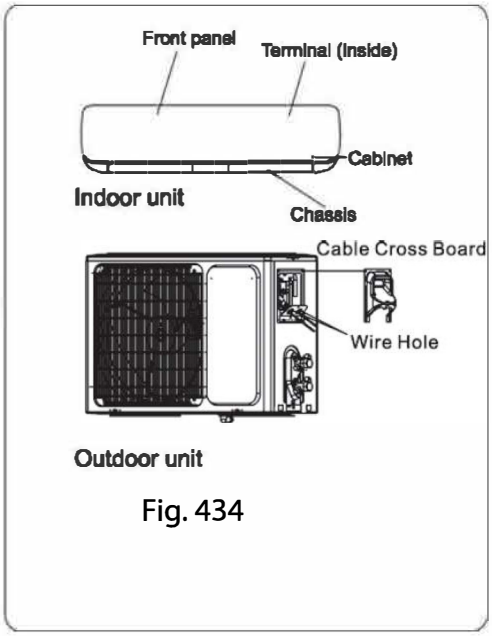


Fig. 434

Caution:

1. Never fail to have an individual power circuit specifically for the air conditioner.
2. Always refer to the circuit diagram posted on the inside of the access door for wiring.
3. Confirm that the cable thickness is as specified in the power source specification.
4. Check the wires and make sure that they are all tightly fastened after cable connection.
5. Be sure to install an earth leakage circuit breaker in wet or moist areas.

Cable Specifications

Capacity size	Wire Diameter(AWG) Condenser / Interconnecting Wire	Circuit Breaker Capacity Rating
9k-12k	12 AWG 600V / 14-4 AWG 600V THHN	15A
18k	12 AWG 600V / 14-4 AWG 600V THHN	20A
24-36K	10 AWG 600V / 14-4 AWG 600V THHN	30A

Fig. 435

INSTALLATION

Leak Check, Evacuation, and Charging (Triple Evacuation)

Friedrich requires all installations are Leak Checked and Evacuated in accordance to the "triple evacuation" process. This process promotes a dry tight refrigeration system before opening the service valves. It recommended that a single port refrigeration manifold and hoses rated over 31.5psi be used. Refrigeration hose valves, along with a vacuum pump and micron gauge, must be used to ensure the system can be vacuumed and held under 500 microns. Check all equipment and hoses for proper usage and leaks before beginning.

1. 1st Nitrogen Pressure Test:
Ensure all refrigeration connections are properly flared, secured, and torqued to their respective settings. Pressurize the system with nitrogen to 550psi. Soap all connections with an approved refrigerant leak detection solution.
The pressure in the system must hold for one hour respective to the environmental conditions and should not vary less than 540psi. If pressure can not be adequate held, check integrity of flares and torque specifications. Once pressure is held adequately, purge the nitrogen charge to system pressure of 5-10psi. DO NOT RETURN TO ATMOSPHERIC PRESSURE.

2. 1st Vacuum Micron Test:
Connect hoses and vacuum pump to the outdoor unit as shown in Fig. 436. Start the vacuum pump and vacuum to 1000 microns. Close the valve to the vacuum pump and check for micron rise for 15 minutes. If microns rise to near atmospheric pressure, there is a potential leak; repeat step 1. If microns rise over 5000, the system is very wet and will require further nitrogen purges.

3. 2nd Nitrogen Break:
Once the system holds below 5000 microns, reconnect the nitrogen tank break the system vacuum with 30-50psi of nitrogen. Wait 5 minutes, then purge to 5-10psi. DO NOT RETURN TO ATMOSPHERIC PRESSURE.

4. 2nd Vacuum Micron Test:
Reconnect vacuum pump and gauge and begin evacuation. Vacuum system to 500 microns. Close vacuum valve and check for micron rise. Vacuum should hold under 1000 microns. Repeat steps 3 and 4 until achieved.

5. 3rd Nitrogen Break:
Once the system holds below 1000 microns, reconnect the nitrogen tank break the system vacuum with 30-50psi of nitrogen. Wait 5 minutes, then purge to 5-10psi. DO NOT RETURN TO ATMOSPHERIC PRESSURE.

6. 3rd Final Vacuum Micron Test:
Reconnect vacuum pump and gauge and begin evacuation. Vacuum system to 300 microns. Close vacuum valve and check for micron rise. Vacuum should hold under 500 microns. Repeat steps 3 and 4 until achieved. Once held under 500 microns, the system is considered dry and tight.

7. Charging the system:
Unscrew Service Valve Caps to expose the inner hexagon head. Use an allen-head spanner or service wrench with appropriate adapter to release the refrigerant into the system. If the calculated line set length is over 24.5 ft, weight in the additional charge with an approved refrigerant scale as needed. Refer to fig. 437.

INSTALLATION

Leak Check, Evacuation, and Charging (Triple Evacuation)

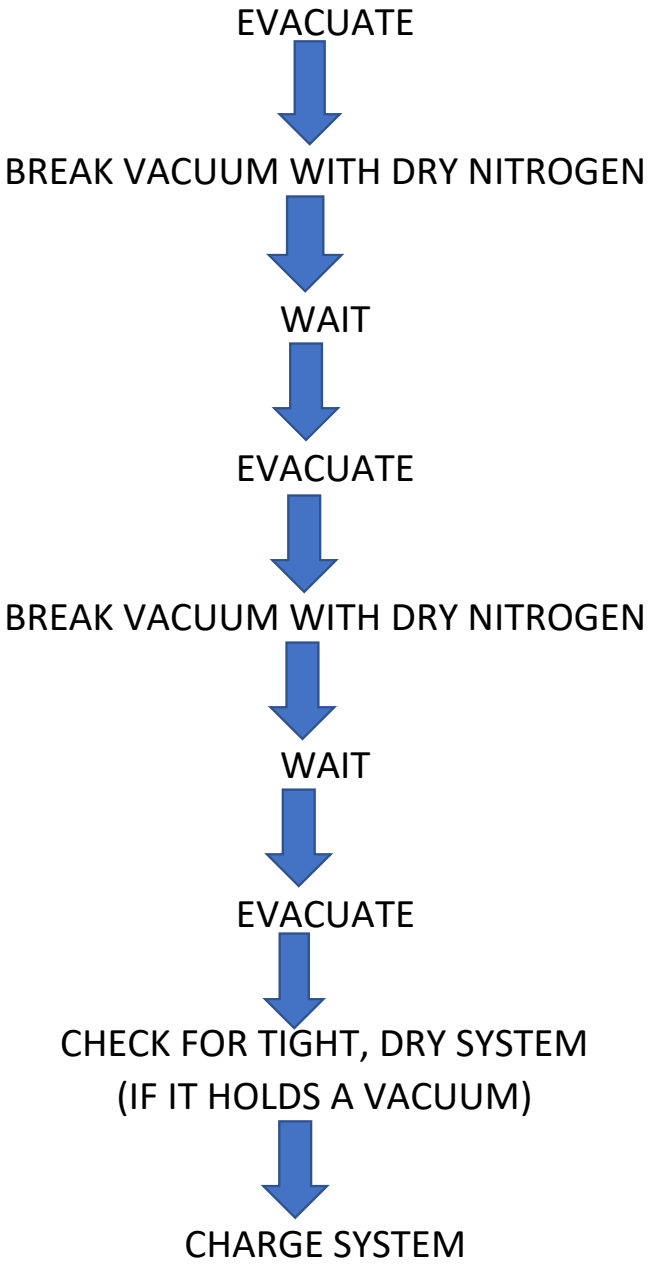


Fig. 436

Capacity (Btu/h)	Pipe Size		Standard Length (ft)	Max. Elevation B (ft)	Max. Length A (ft)	Additional Refrigerant (oz/ft)
	LIQUID	GAS				
9k-12	1/4"(Ø6.35)	3/8"(Ø9.52)	25	33	50	.22
18k	1/4"(Ø6.35)	1/2"(Ø12.7)	25	33	66	.22
24k-36k	3/8"(Ø9.52)	5/8"(Ø15.88)	25	33	66	.32

Fig. 437

INSTALLATION

Checklist and Operation Test

Check Unit following Installation

No.	Items to be checked	Possible malfunction
1	Has the unit been installed firmly?	The unit may drop, shake or emit noise.
2	Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating) capacity.
3	Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
4	Is water drained well?	It may cause condensation and water dripping.
5	Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damage the parts.
6	Is electric wiring and pipeline installed correctly?	It may cause malfunction or damage the parts.
7	Is the unit grounded securely?	It may cause electric leakage.
8	Does the power cord follow the specification?	It may cause malfunction or damage the parts.
9	Is there any obstruction in air inlet and air outlet?	It may cause insufficient cooling (heating).
10	The dust and sundries caused during installation are removed?	It may cause malfunction or damaging the parts.
11	The gas valve and liquid valve of connection pipe are open completely?	It may cause insufficient cooling (heating) capacity.

Fig. 438

Test Operation

System Checks

1. Conceal refrigerant pipes where possible.
2. Make sure drain hose slopes downward along entire length at a slope of 1/4"(inch) per '(foot).
3. Ensure all refrigerant pipes and connections are properly insulated.
4. Fasten pipes to outside wall, when possible.
5. Seal and weatherproof wall hole which the interconnecting wires and refrigerant pipes pass through.

Perform test operation after completing gas leak and electrical safety check.

1. Turn on electrical disconnect to outdoor unit.
2. Push the "ON/OFF" button on Remote Controller to begin testing or press and hold Emergency ON/OFF button for 5 seconds to force test mode.
3. Push MODE button, select COOLING, HEATING, FAN mode to confirm all functions.

Indoor Unit

1. Do all Remote controller's buttons function properly?
2. Do the display panel lights work properly?
3. Does the swing louver function properly?
4. Does the drain work?

Outdoor Unit

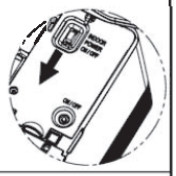
1. Push the mode button to COOL and adjust the room setting to 61 °F(16°C) deg. wait up to 3 minutes from compressor time guard. Does compressor and outdoor fan turn on in cooling mode?
2. Push the mode button to HEAT and adjust the room setting to 85 °F(30°C) deg. wait up to 3 minutes for compressor time guard. Does compressor and outdoor fan turn on in heat mode?

MAINTENANCE

Front panel and shell maintenance

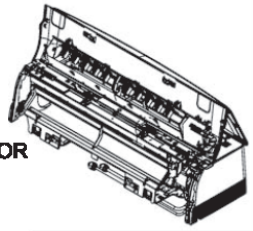
1 **Cut off the power supply by moving the power switch in the direction of the arrow.**

Note: Turn off the appliance first before cutting off the power supply.



2

Open the front panel and the front shell refer to Fig.9~Fig.12 of INDOOR UNIT INSTALLATION.



3 **Wipe with a soft and dry cloth.**

Use soft moisture cloth to clean if the front panel is very dirty.

4 **Never use volatile substance such as gasoline or polishing powder to clean the appliance.**

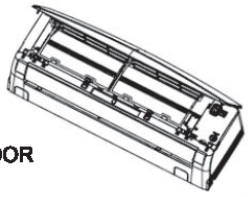
⚠

5 **Never sprinkle water onto the indoor unit**

⚠

6

Close the front panel and the front shell refer to Fig.22~Fig.26 of INDOOR UNIT INSTALLATION.



Air filter maintenance

It is necessary to clean the air filter after using it for about 200 hours.

Clean it as follows:

1 **Stop the appliance and remove the air filter.**

1.Open the front panel.
2.Press the handle of the filter gently from the front.
3. Grasp the handle and slide out the filter.

2 **Clean and reinstall the air filter.**

If the dirt is conspicuous, wash it with a solution of detergent in lukewarm water. After cleaning, dry well in shade.

3 **Close the front panel again.**

■ ***Clean the air filter every two weeks if the air conditioner operates in an extremely dusty environment.***

Fig. 501

MAINTENANCE

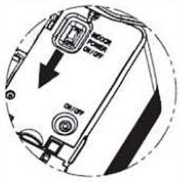
⚠ **The following is a deep cleaning and must be completed by a professional.**

⚠ **Users are strictly forbidden to operate privately, otherwise they will be at their own risk.**

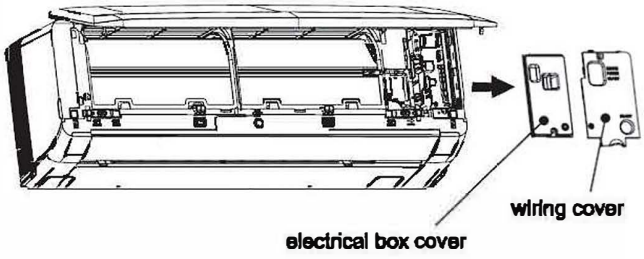
Front shell, air duct and fan maintenance

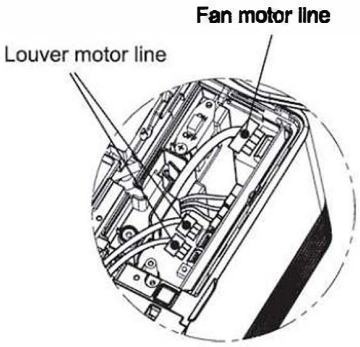
1 **Cut off the power supply by moving the power switch in the direction of the arrow.**

Note: Turn off the appliance first before cutting off the power supply.



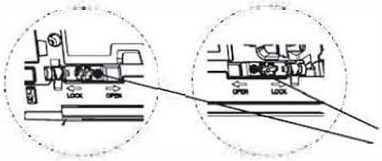
2 **1. Remove the wiring cover and the electrical box cover.**
2. Disconnect the fan motor line and the louver motor line.

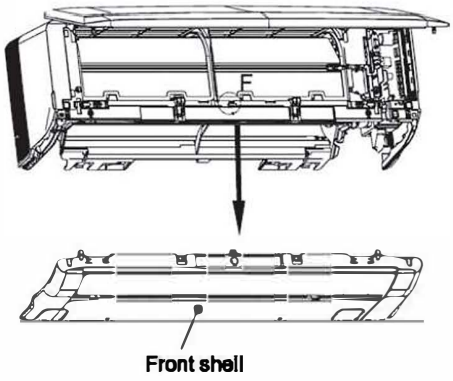




3 **1. Open the screw covers and remove the screws refer to Fig.414 of INDOOR UNIT INSTALLATION.**
2. Open the limit axes.
3. Remove the front shell for cleaning.

Note: Pay attention to the limit of F position, some models have two places.
Note: when you want to clean the front shell with clean water, you must first remove all the motors on the front shell.





4 **Remove the screws of the air duct.**
(G position and H position)

Note: Some models do not have H position screws.

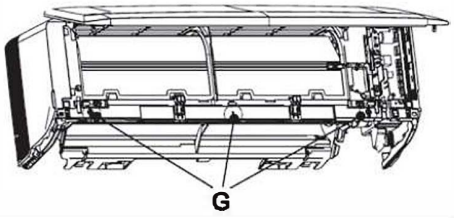


Fig. 502

MAINTENANCE

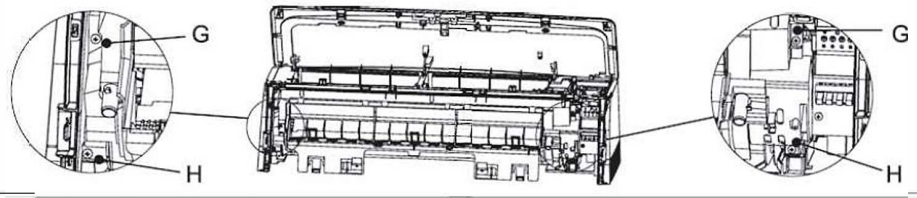
⚠ **The following is a deep cleaning and must be completed by a professional.**

⚠ **Users are strictly forbidden to operate privately, otherwise they will be at their own risk.**

Front shell, air duct and fan maintenance

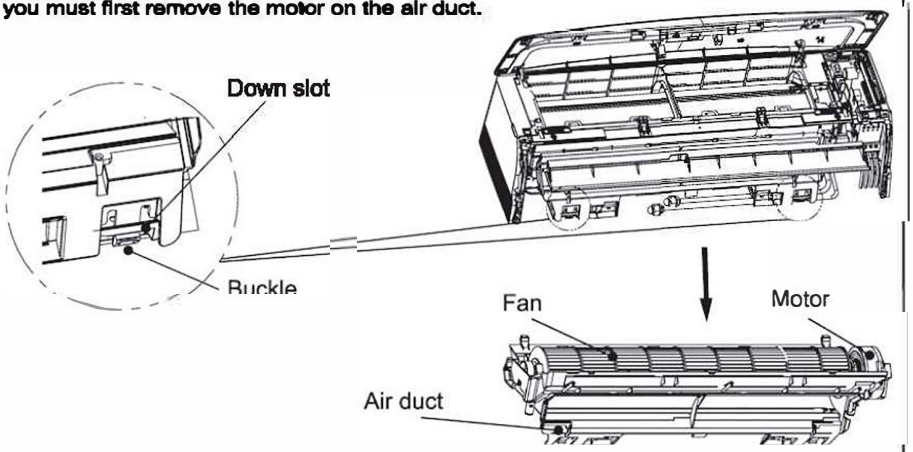
Remove the screws of the air duct. (G position and H position)

Note: Some models do not have H position screws.



5 **1. Press the 2 buckles of the air duct to disengage it from 2 down slots of the mounting plate.**
2. Remove the air duct.

Note: when you want to clean the air duct and the fan with clean water, you must first remove the motor on the air duct.



6 **After cleaning, install the machine against the disassemble sequence.**

Note: If the front shell, the air duct and the fan are washed with water, they must be thoroughly dried before they can be installed.

Fig. 503

TROUBLESHOOTING

Diagnostic Codes

Outdoor Unit

When the unit has the following trouble and the compressor stops running, The LED of outdoor control board will show the error sequence automatically:

Diag Code	Outdoor Failure Description	LED1	LED2	LED3	the root cause my be one of the following
Mark description: the lights flash every second for the following faults					
	Outdoor coil temperature sensor faulted	ON	OFF	ON	a.the outdoor coil sensor connector loose. b.the outdoor coil temperature sensor failed. c.the outdoor control board failed.
	Compressor exhaust temperature sensor faulted	ON	OFF	OFF	a.the compressor exhaust temperature sensor connector loose. b.the compressor exhaust temperature sensor failed. c.the outdoor control board failed.
	Communication failure between the indoor unit and outdoor unit	OFF	OFF	BLINKS	a.the communication cable connector loose. b.the communication cable failed. c.the connectorion between the filter board and the outdoor control board is incorrect or loose. d.the connectorion between the filter board and the terminal is incorrect or loose. e.the indoor control board failed. f.the PFC board failed. g.the power board failed. h.the outdoor control board failed.
	Current overload protection	ON	BLINKS	OFF	a.the fan motor run abnormally. b.the condensor and evaporator is dirty. c.the air inlet and outlet is abnormall.
	Maximum current protection	ON	BLINKS	ON	a.the outdoor control board is short circuited. b.the drive board is short circuited. c.the other components are short circuited.
	Communication trouble between outdoor unit and driver	OFF	ON	ON	a. the connection wires are loose. b.the outdoor board or drive board failed.
	Outdoor EEPROM faulted	ON	ON	ON	a.the EEPROM chip is loose. b.the EEPROM chip inserted in wrong direction. c. The EEPROM chip failed.
	Compressor exhaust temperature too high protection	OFF	BLINKS	ON	a.the compressor exhaust temperature sensor failed. b.the refrigerant of the unit is low.
	Outdoor ambient temperature sensor faulted	ON	ON	OFF	a.the outdoor ambient temperature sensor connecter loose. b.the outdoor ambient temperature sensor failed. c.the outdoor control board failed.
	Compressor shell temperature too high protection	OFF	ON	BLINKS	a.the compressor exhaust temperature sensor connector loose. b.the refrigerant of the unit is low.
	Anti-freeze protection with cooling or overload protection with heating in indoor unit	OFF	BLINKS	BLINKS	a.the indoor coil temperature sensor connector loose. b.the indoor coil temperature sensor failed. c.the indoor control board failed. d. the refrigerant system is abnormal.

TROUBLESHOOTING

Diagnostic Codes

Outdoor Unit

Diag Code	Outdoor Failure Description	LED1	LED2	LED3	the root cause my be one of the following
	Compressor drive faulted	BLINKS	OFF	BLINKS	a.the outdoor drive board failed. b.the compressor failed. c. the outdoor control board failed.
	Outdoor fan motor locked rotor protection	BLINKS	BLINKS	ON	a.the connection of the outdoor fan motor is loose. b.there is something blocking the outdoor fan. c.the fan motor failed. d.the outdoor control board failed.
	Outdoor coil anti-overload protection with cooling	OFF	ON	OFF	a.There is too much refrigerant. b.the outdoor fan motor failed. c.the outdoor fan is broken. d.the condensor is dirty. e.the air inlet and air outlet of the indoor unit and the outdoor unit is not normal.
	IPM module protection	OFF	BLINKS	OFF	a.The IPM board failed. b.The outdoor fan is broken. c.The outdoor fan motor failed. d.The outdoor fan has been blocked. e.The condenser is dirty. f.The outdoor unit has been installed without standard.
	PFC protection	BLINKS	OFF	OFF	a.the PFC failed. b.the outdoor drive board failed.
	Compressor pre heating process	BLINKS	ON	BLINKS	it is normal mode in cold weather
	Chip in outdoor board faulted	ON	OFF	BLINKS	a. Using the wrong drive board. b. Using the wrong compressor.
	AC voltage higher or lower protection	ON	ON	BLINKS	a.the supply voltage is higher or lower than normal. b.the inner supply voltage of the unit is higher or lower than normal.
	DC compressor start failure	BLINKS	BLINKS	OFF	a.the outdoor drive board failed. b.the compressor failed.
	Outdoor ambient temperature too low protection	BLINKS	OFF	OFF	a. Outdoor ambient temperature too low.
Mark description: the lights flash every two seconds for the following faults					
	Protection against overheated outdoor radiator	BLINKS	OFF	OFF	a. Radiator sensors failed. b. Detection circuit of the sensor on the control panel fails
	Protection of the system against too high pressure	BLINKS	BLINKS	OFF	a. The pressure switch fails b. The pressure detection switch on the control panel failed. c. The measured value of the system pressure exceeds the limit.

TROUBLESHOOTING

Diagnostic Codes

Outdoor Unit When The Compressor Is In Operation

THE FLASH IS 1 SECOND				
No.	LED1	LED2	LED3	Reasons for the current operating frequency of the compressor is limited
1	BLINK	BLINK	BLINK	Normal frequency rising and decreasing, no limitation
2	OFF	OFF	ON	Frequency decreasing or prohibition of frequency rising caused by over-current
3	OFF	ON	ON	Frequency decreasing or prohibition of frequency rising caused by anti-freezing of refrigeration or anti-overload in heating
4	ON	OFF	ON	Frequency decreasing or prohibition of frequency rising caused by too high compressor discharge temperature
5				Limit to the max operating frequency caused by too low power voltage
6	ON	ON	ON	Operation at fixed frequency (in the case of capability measuring or compulsory operation at fixed frequency)
7	BLINK	OFF	OFF	Protective frequency decreasing against outdoor overload (overpower, over frequency conversion rate, over torque, detection of DC under-voltage)
8	ON	OFF	OFF	Frequency decreasing caused by indoor and outdoor communication fault
9	OFF	ON	BLINK	Frequency decreasing or prohibition of frequency rising protection against overload of outdoor coiled pipe
10	OFF	ON	OFF	Frequency decreasing or prohibition of frequency rising for power-saving when it is being used simultaneously with other appliances

TROUBLESHOOTING

Diagnostic Codes

Indoor Unit

The the indoor display board will show the error code automatically when the unit has the following trouble:

Error	Power	Timer	Running	Sleep		
Code	1	2	3	4	Content	The root cause is may be one of the following
EA					the error code will display when the communication between display board and control board is interrupted	a. The connection between the display board and control board is loose. b. The indoor control board failed. c.The wiring of the display board failed

When the unit has the following trouble and the compressor stops running, press the sleep button on the remote controller for 10 times in ten seconds and the 7-segment tube of the display board will show the error code as the following, if two malfunctions happened at the same time, the sleep button needs to be pressed 10 times again, the LED will show the other error code.
Refer to the remote controller which the sleep key can set into 4 different combination ways , when using to check the error codes only takes effect for pressing the sleep key 10 times in ten seconds instead of 4 times.
NOTE: If the troubleshooting inquiry display by 7-segment tube, then the error code will be displayed, otherwise only the LED of the display board can show.

Error	Power	Timer	Running	Sleep		
Code	1	2	3	4	Content	The root cause is may be one of the following
0					Normal	
1	OFF	BLINK	OFF	OFF	The failure for temperature sensor of outdoor coil	a. The outdoor temperature sensor loose. b. The outdoor temperature sensor failed. c. The indoor control board failed.
2	OFF	BLINK	ON	OFF	Compressor exhaust temperature sensor in trouble	a. the compressor exhaust temperature sensor connector loose. b.the compressor exhaust temperature sensor failed. c.the outdoor control board failed.
5	ON	BLINK	OFF	OFF	IPM module protection	a.The IPM board failed. b.The outdoor fan is broken. c.The outdoor fan motor failed. d.The outdoor fan has been blocked. e.The condenser is dirty.
6	ON	BLINK	OFF	ON	AC voltage higher or lower protection	a. the supply voltage is higher or lower than normal. b.the inner supply voltage of the unit is higher or lower than normal.
7	ON	BLINK	ON	OFF	Communication failure between the indoor unit and outdoor unit	a.the communication cable is diconnected or loose. b. the connection between the filter board and the terminal is incorrect or loose c.the communication cable failed. d.the connection between the filter board and the outdoor control board is incorrect or loose. e.the indoor control board failed. f.the PFC board failed. g.the power board failed. h.the outdoor control board failed.
8	ON	BLINK	ON	ON	Current overload protection	a.the fan motor runs abnormally. b.the condensor and evaporator is dirty. c.the air inlet and outlet are abnormal.

TROUBLESHOOTING

Diagnostic Codes

Indoor Unit

Error Code	Power 1	Timer 2	Running 3	Sleep 4	Content	The root cause is may be one of the following
9	OFF	OFF	BLINK	OFF	Maximum current protection	a.the outdoor control board is short circuited. b.the drive board is short circuited. c. other components are short circuited.
10	OFF	OFF	BLINK	ON	Communication trouble between outdoor unit and driver	a. the connection wires loose. b.the outdoor board or drive board failed.
11	OFF	ON	BLINK	OFF	Outdoor EEPROM in trouble	a.the EEPROM chip is loose. b.the EEPROM chip inserted incorrectly. c.the EEPROM chip failed.
12	OFF	ON	BLINK	ON	Outdoor ambient temperature too low protection	Outdoor ambient temperature too low.
13	ON	OFF	BLINK	OFF	Compressor exhaust temperature too high protection	a.the compressor exhaust temperature sensor failed. b.the unit refrigerant charge is low
14	ON	OFF	BLINK	ON	Outdoor ambient temperature sensor failure.	a.the outdoor ambient temperature sensor connector loose b.the outdoor ambient temperature sensor failed.; c.the outdoor control board failed.
15	ON	ON	BLINK	OFF	Compressor shell temperature too high protection	a.the compressor exhaust temperature sensor connector loose. b.the unit refrigerant charge is low.
16					Anti-freeze protection with cooling or overload protection with heating in	a.the indoor coil temperature sensor connector loose; b.the indoor coil temperature sensor failed.. c.the indoor control board failed.. d. the refrigerant system is abnormal
17					PFC protection	a.the PFC failed.; b.the outdoor drive board failed.
18					DC compressor start failure	a.the outdoor drive board failed.; b.the compressor failed.
19	OFF	OFF	OFF	BLINK	Compressor drive failure.	a.the outdoor drive board failed.; b.the compressor failed. c. the outdoor control board failed.
20	ON	OFF	OFF	BLINK	Outdoor fan motor locked rotor protection.	a.the connection of the outdoor fan motor is loose. b.there is something blocking the outdoor fan. c.the fan motor failed. d.the outdoor control board failed.
21					Outdoor coil anti-overload protection with cooling.	a.the unit refrigerant charge is exccessive. b.the outdoor fan motor failed. c.the outdoor fan is broken. d.the condensor is dirty. e.the air inlet and air outlet of the indoor unit and the outdoor unit is not normal.
22					Compressor pre heating process	it is normal mode in cold weather.

TROUBLESHOOTING

Diagnostic Codes

Indoor Unit

Error	Power	Timer	Running	Sleep		
Code	1	2	3	4	Content	The root cause is may be one of the following
23					1. The wiring of the sensor for the expansion valve A (thin tube) connect loose; 2. The sensor for the expansion A(thin tube) has failure; 3. The sampling circuit is abnormal.	
24					Outdoor board chip failure.	a.Using the wrong drive board; b.Using the wrong compressor
26					Overheated outdoor radiator	a. Radiator sensor fails. b. Detection circuit of the sensor on the control panel fails.
27					Protection against too high system pressure	a. The pressure switch fails. b. The pressure detection switch on the control panel fails. c. The measured value of system pressure exceeds the limit.
33	BLINK	OFF	OFF	ON	The failure for temperature sensor of indoor room	a. The indoor room temperature sensor loose. b. The indoor room temperature sensor failed. c. The indoor control board failed.
34	BLINK	OFF	ON	OFF	The failure for temperature sensor of indoor coil temperature	a. The indoor coil temperature sensor loose. b. The indoor coil temperature sensor failed. c. The indoor control board failed.
36	BLINK	ON	OFF	ON	Communication failure between the indoor unit and outdoor unit	a. the communication cable connector loose. b. the connection between the filter board and the terminal is incorrect or loose. c. the communication cable failed. d. the connection between the filter board and the outdoor control board is incorrect or loose. e. the indoor control board failed. f. the PFC board failed. g. the power board failed. h. the outdoor control board failed.
38	BLINK	ON	ON	ON	Indoor EEPROM failure	a. The EEPROM chip loose; b. The indoor control board failed.
39	BLINK	OFF	ON	ON	Indoor fan motor runs abnormally.	a. Something blocking the indoor fan motor. b. The fan motor cord is disconnected or loose. c. The fan motor failed. d. The indoor control board failed.
41	ON	ON	BLINK	ON	The failure for Indoor grounding protection.	The indoor control board failed.
77	ON				WiFi Connection Enabled	Cycle Power on/off

TROUBLESHOOTING

Diagnostic Codes

Led Display

Error Code	Power 1	Timer 2	Running 3	Content	The root cause is may be one of the following
0				Normal	
1	BLINK	ON	ON	The failure for temperature sensor of outdoor coil	a. The outdoor temperature sensor loose. b. The outdoor temperature sensor failed. c. The indoor control board failed
2	BLINK	ON	OFF	Compressor exhaust temperature sensor in trouble	a. the compressor exhaust temperature sensor connect loose. b. the compressor exhaust temperature sensor failed. c. the outdoor control board failed.
5	ON	BLINK	OFF	IPM module protection	a.The IPM board failed. b.The outdoor fan is broken. c.The outdoor fan motor failed d.The outdoor fan has been blocked. e.The condenser is dirty. f.The outdoor unit has been installed below standards.
6	OFF	BLINK	OFF	AC voltage higher or lower protection	a. the supply voltage is higher or lower than normal. b. the inner supply voltage of the unit is higher or lower than normal.
7	ON	ON	OFF	Communication failure between the indoor unit and outdoor unit	a.the communication cable connect loose. b.the communication cable failed. c.the connection between the filter board and the outdoor control board is incorrect or loose. d.the connection between the filter board and the terminal is incorrect or loose. e.the indoor control board failed. f.the PFC board failed. g.the power board failed. h.the outdoor control board failed.
8				Current overload protection	a.the fan motor runs abnormally. b.the condensor and evaporator are dirty. c.the air inlet and outlet is abnormal or obstructed.
9				Maximum current protection	a.the outdoor control board is short circuited. b.the drive board is short circuited. c.ther components are short circuited.
10	ON	OFF	OFF	Communication trouble between outdoor unit and driver	a. the connection wires connector loose. b.the outdoor board or drive board failed.
11	BLINK	OFF	OFF	Outdoor EEPROM in trouble	a.the EEPROM chip is loose; b.the EEPROM chip inserted in the opposite direction. c.the EEPROM chip failed.
12				Outdoor ambient temperature too low protection	Outdoor ambient temperature too low.
13	BLINK	OFF	ON	Compressor exhaust temperature too high protection	a.the compressor exhaust temperature sensor failed b.the refrigerant chage is low.
14	ON	ON	BLINK	Outdoor ambient temperature sensor in trouble	a.the outdoor ambient temperature sensor connector is loose. b.the outdoor ambient temperature sensor failed. c.the outdoor control board failed.
15	OFF	BLINK	ON	Compressor shell temperature too high protection	a.the compressor exhaust temperature sensor connector loose. b.the refrigerant charge is low.

TROUBLESHOOTING

Diagnostic Codes

LED Display

Error	Power	Timer	Running		
Code	**1**	**2**	**3**	**Content**	**The root cause is may be one of the following**
16	ON	OFF	ON	Anti-freeze protection with cooling or overload protection with heating in	a.the indoor coil temperature sensor connector loose. b.the indoor coil temperature sensor failed. c.the indoor control board failed. d. the refrigerant system is abnormal.
17	OFF	ON	OFF	PFC protection	a.the PFC failed. b.the outdoor drive board failed.
18	OFF	ON	ON	DC compressor start failure	a.the outdoor drive board failed. b.the compressor failed.
19	OFF	ON	BLINK	Compressor drive in trouble	a.the outdoor drive board failed. b.the compressor failed. c. the outdoor control board failed.
20	ON	OFF	BLINK	Outdoor fan motor locked rotor protection	a.the connection of the outdoor fan motor is loose. b.there are something blocking the outdoor fan. c.the fan motor failed. d.the outdoor control board failed.
21	OFF	OFF	BLINK	Outdoor coil anti-overload protection with cooling	a.the refrigerant charge is exxcessive. b.the outdoor fan motor failed. c.the outdoor fan is broken. d.the condensor is dirty. e.the air inlet and air outlet of the indoor unit and the outdoor unit are abnormal.
22				Compressor pre heating process	it is normal mode in cold weather
23				Expansion valve A tube (thin) sensor fault	1. The wiring of the sensor for the expansion valve A (thin tube) connect loose; 2. The sensor for the expansion A(thin tube) has failure; 3. The sampling circuit is abnormal.
24				Outdoor board chip failure.	a.Using the wrong drive board; b.Using the wrong compressor.
26				Overheated outdoor radiator	a. Radiator sensor fails. b. Detection circuit of the sensor on the control panel fails.
27				Protection against too high system pressure	a. The pressure switch fails. b. The pressure detection switch on the control panel fails. c. The measured value of system pressure exceeds the limit.
33	ON	BLINK	BLINK	Indoor room temperature sensor failure.	a. The indoor room temperature sensor loose; b. The indoor room temperature sensor is failure; c. The indoor control board is failure.
34	OFF	BLINK	BLINK	Indoor coil temperature sensor failure.	d. The indoor coil temperature sensor loose. e. The indoor coil temperature sensor failed. f. The indoor control board failed.
36	BLINK	ON	BLINK	Communication failure between the indoor unit and outdoor unit	a.the communication cable connector loose. b.the communication cable failed. c.the connection between the filter board and the outdoor control board is incorrect or loose. d.the connection between the filter board and the terminal is incorrect or loose. e.the indoor control board failed. f.the PFC board failed. g.the power board failed. h.the outdoor control board failed.

TROUBLESHOOTING

Diagnostic Codes

LED Display

Error	Power	Timer	Running		
Code	**1**	**2**	**3**	**Content**	**The root cause is may be one of the following**
38	BLINK	BLINK	OFF	Indoor EEPROM failure	a. The EEPROM chip loose; b. The indoor control board failed.
39	BLINK	BLINK	ON	Indoor fan motor run abnormally	a. There is something blocking the indoor fan motor. b. The fan motor cord connector loose. c. The fan motor has failed. d. The indoor control board failed.
41	OFF	OFF	ON	The failure for Indoor grounding protective	The indoor control board failed.

The failure is detected when the room temperature sensor broken or shorted over 5 sec.
The failure is detected when the temperature sensor of heater exchange broken or shorted over 5 sec.
The failure is detected when each setting data is not match after the EEPPOM self-check two times.
The failure is occur when the grounding signal is not detected after the appliance power ON.

TROUBLESHOOTING

Test the jumper terminals
Outdoor Unit Verification of Operation and Testing:

When powered on, if there is a probability that the outdoor unit is malfunctioning, or to rule out field wiring, the terminals below can be jumped to engage the outdoor unit in normal cooling operation.

Application: Jump these terminals to engage cooling for the outdoor unit. This is to determine that the field wiring is correct.

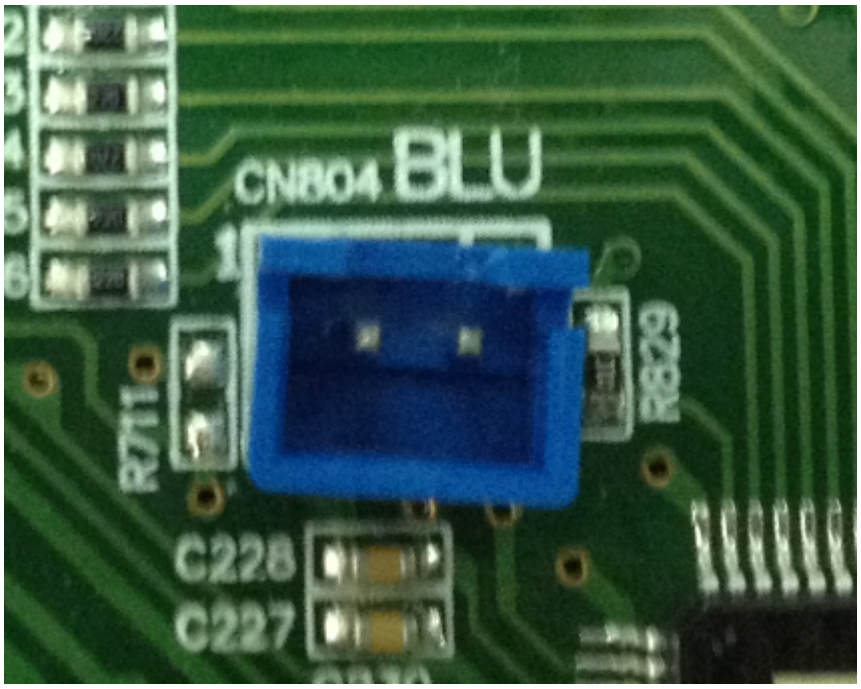


Fig. 701

TROUBLESHOOTING

Protection Circuit Fault Isolation

Protection diagnosis of the complete machine (all types of protection during operation, i.e. under-voltage, over-voltage and overcurrent protection)

Note:List all types of protection that may occur to the complete machine and describe the conditions and signs of the start, course and end of such protection.

Voltage protection

Protection against AC input over-voltage/under-voltage

1. Conditions for protection against AC input over-voltage/under-voltage:
If the input AC voltage is greater than "protective over-voltage value" or less than "protective under-voltage value" for five seconds, over-voltage/under-voltage protection starts. (E6)
2. Protection actions against AC input over-voltage/under-voltage
The system stops operation.
3. Conditions for ending AC input over-voltage/under-voltage:
If the input AC voltage is lower than "the protective over-voltage value" -10V, or higher than "the protective under-voltage value" +10V, the over-voltage/under-voltage protection will be released.

Current protection:

1. Protection against over-current
Conditions for over-current protection: if the current is equal to or greater than "current value for starting the refrigeration current protection (E2 value)" for six seconds, over-current protection starts.
Protection actions against over-current: indoor display screen and outdoor indicator give indications, the compressor and outdoor fan stop, but indoor fan runs normally.
Condition for ending over-current protection: when the current drops below "current value for releasing the refrigeration current protection (E2 value)", over-current protection will be released.
2. Frequency decreasing for over-current
Conditions for over-current frequency decreasing: if the current is equal to or greater than "current value for starting the refrigeration current protective frequency decreasing (E2 value)", over-current frequency decreasing starts.
Over-current frequency decreasing actions: the compressor will decrease frequency at rate of (E2 value)Hz/S. The indoor and outdoor fans run.
Conditions for ending over-current frequency decreasing: when the current drops below "current value for starting the refrigeration current protective prohibition of frequency rising (E2 value)", over-current under-clocking will be released.

Is the limit auto-reset
3. Prohibition of frequency increasing of compressor exhausting

Conditions for prohibition of frequency rising of compressor discharge

Condition 1: in the case of frequency decreasing of compressor discharge, the discharge temperature of the compressor drops below 39.2F
Condition 2: in normal operation, the discharge temperature of compressor reaches 41F.
Either of the above two conditions is met, prohibition of frequency rising of compressor discharge begins.
Actions relates to prohibition of frequency rising of compressor discharge: the frequency of compressor maintains at the current level, which may decrease as the case requires while cannot rise. The indoor and outdoor fans run.
Condition for ending prohibition of frequency rising of compressor discharge: if the temperature of compressor discharge rises above 42.8F, prohibition of frequency rising of compressor discharge will be released.

4. Prohibition of frequency for anti-overload of outdoor coiled pipe (cooling condenser temperature high) – To prevent compressor overload from tripping.

Condition for anti-overload prohibition of frequency of outdoor coil pipe: in the case of anti-overload frequency decreasing of outdoor coiled pipe, anti-overload prohibition of frequency of the unit begins when the temperature of outdoor coiled pipe drops below "the anti-overload frequency decreasing temperature of outdoor coiled pipe".
Actions relates to anti-overload prohibition of frequency of outdoor coiled pipe: the frequency of compressor maintains at the current level, which may decrease as the case requires while cannot rise. The indoor and outdoor fans run.
Condition for ending anti-overload prohibition of frequency of outdoor coiled pipe: if the temperature of outdoor coiled pipe drops below "temperature to release the anti-overload state of outdoor coiled pipe", anti-overload prohibition of frequency of outdoor coiled pipe will be released.

TROUBLESHOOTING

Compressor Fault Isolation

Judging the connecting terminals of inverter compressor:

It is impossible to identify terminals U, V and W of inverter compressor with multi-meter. Just connect the terminals in the same way as the original unit when replacing the compressor. A wrong connection will lead to reverse and loud noise of the compressor.

Resistance of compressor coil:

Measure the resistance between any two terminals, which are about a few Ohms, three phases having the same resistance

Electric Filter Board Fault Isolation

Visual examination: as the circuit is simple, the connection may be checked visually to see whether any loose or poor connection.

Voltage test: the voltage at the input end shall be the same as the voltage at the output end.

Electrical Communication Fault ISOLATION

Step one: to determine whether the connecting cables and tether cables of indoor/outdoor units are correctly wired. If not, change wiring order and test connection.

Step two: to determine whether there is loose connection.

Fasten the connection in the case of loose connection and then conduct verification.

Step three: measure the voltage between SI and N with multi-meter and see whether the voltage fluctuates between 0VDC and 24VDC. Please directly replace indoor and outdoor control boards if there are no voltage fluctuations.

TROUBLESHOOTING

Unit does not run

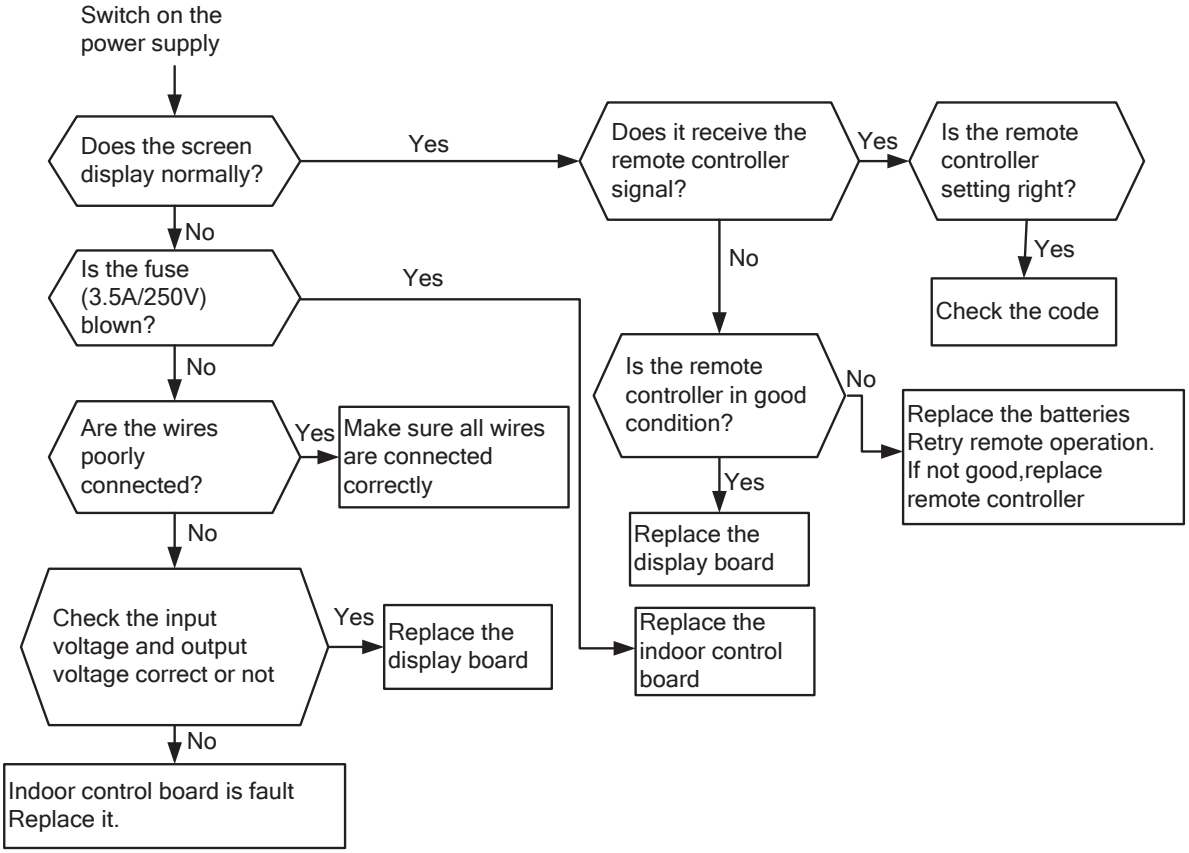


Fig. 702

TROUBLESHOOTING

Error Code 39-DC FAN

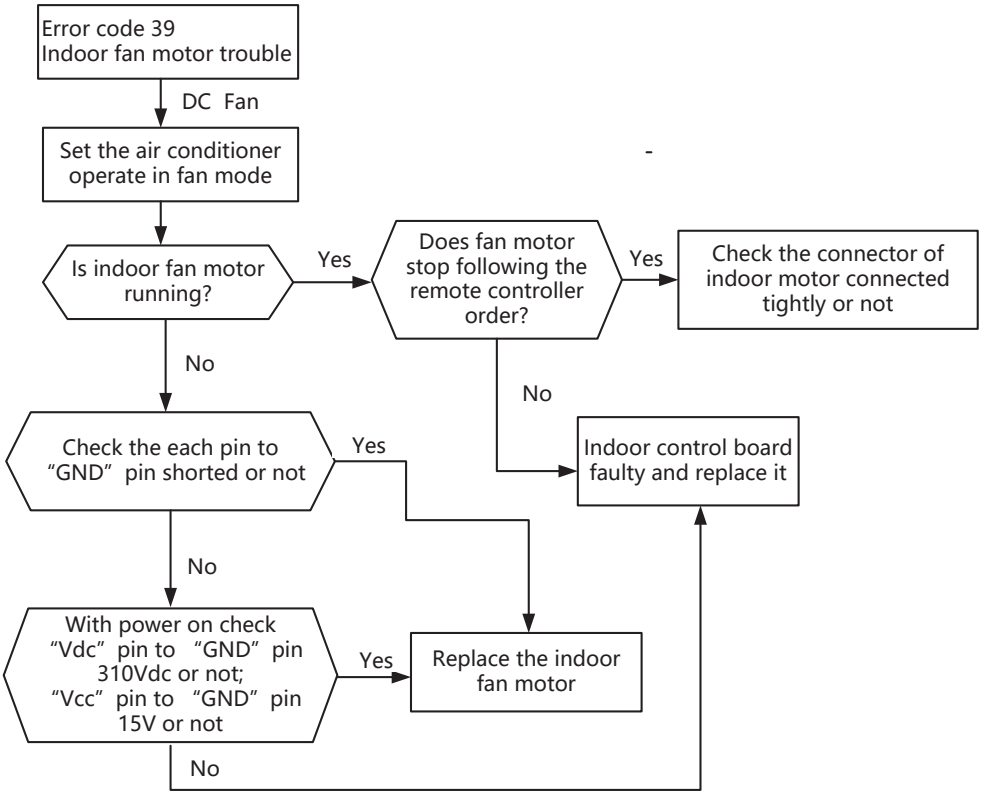


Fig. 703

DC Fan Test Points
Fig. 704

TROUBLESHOOTING

Error Code 39-PG Fan

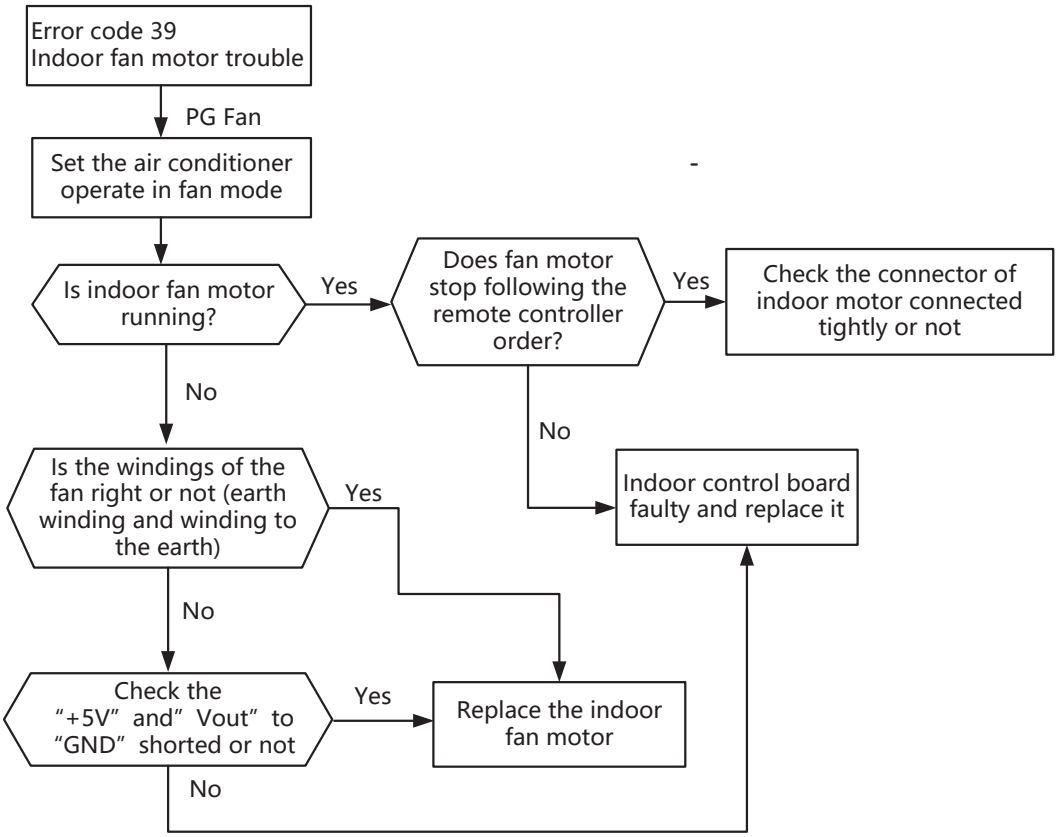


Fig. 705

PG Fan Test Points
Fig. 706

TROUBLESHOOTING

Error Code 9

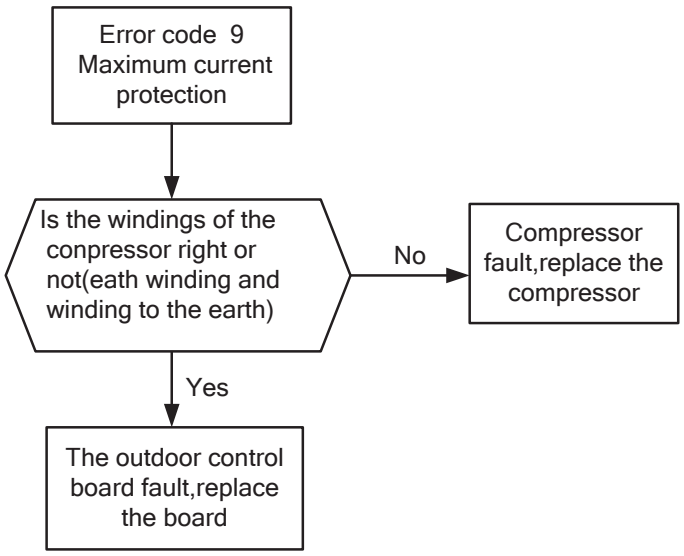
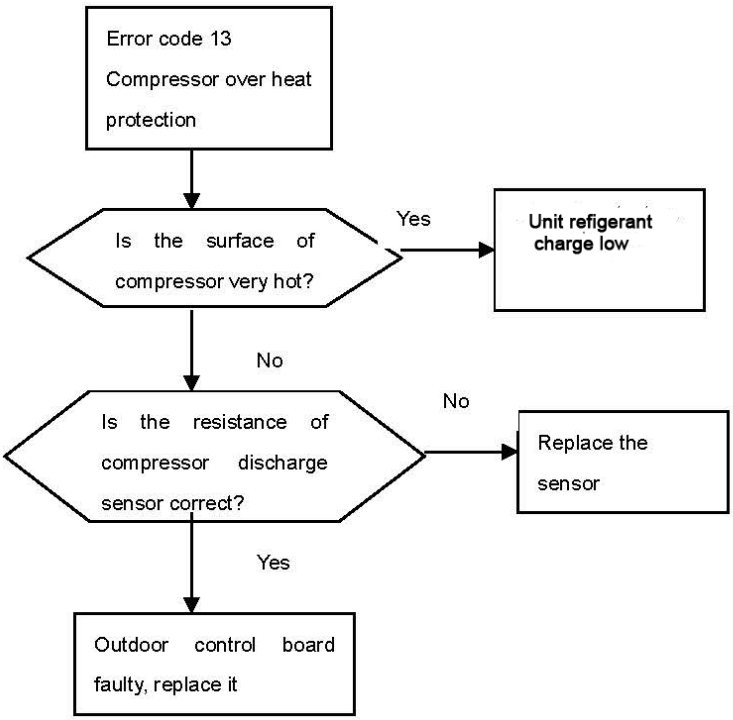


Fig. 707

TROUBLESHOOTING

Error Code 13



Error Code 8

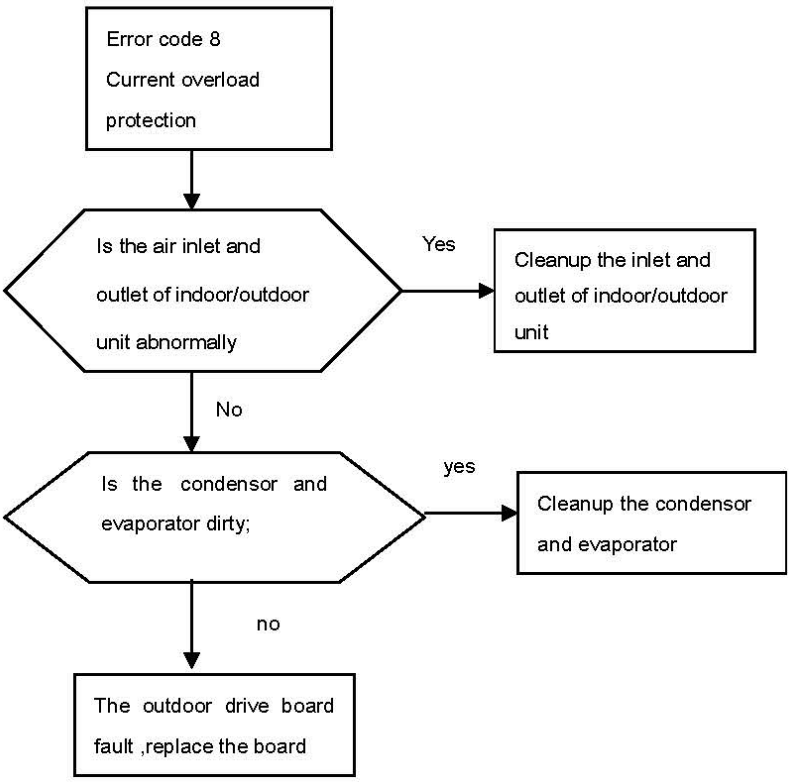
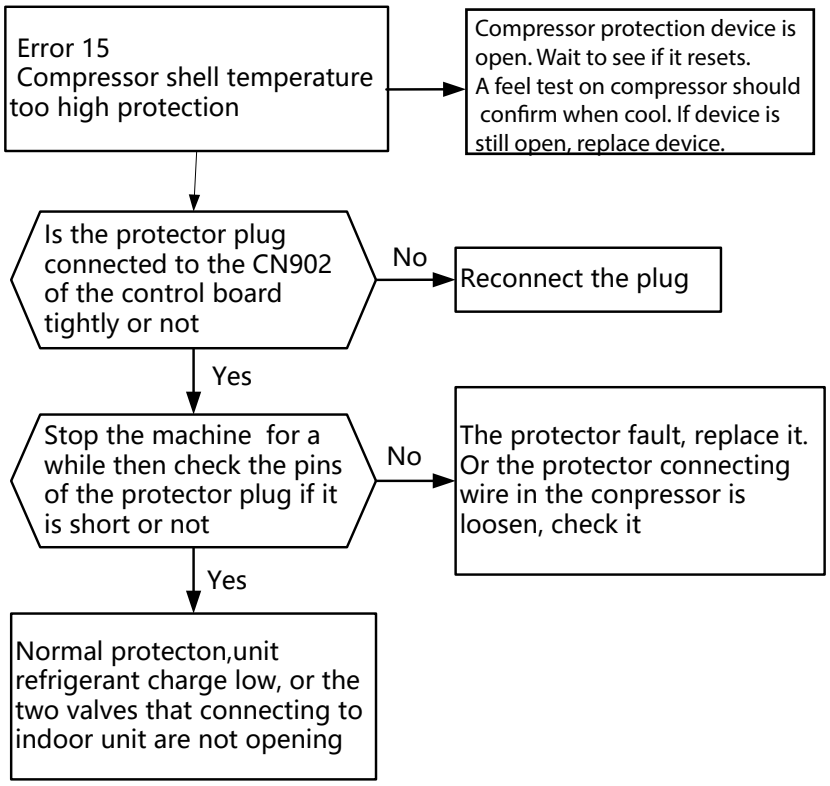


Fig. 708

TROUBLESHOOTING

Error Code 15



Shell protection test point:

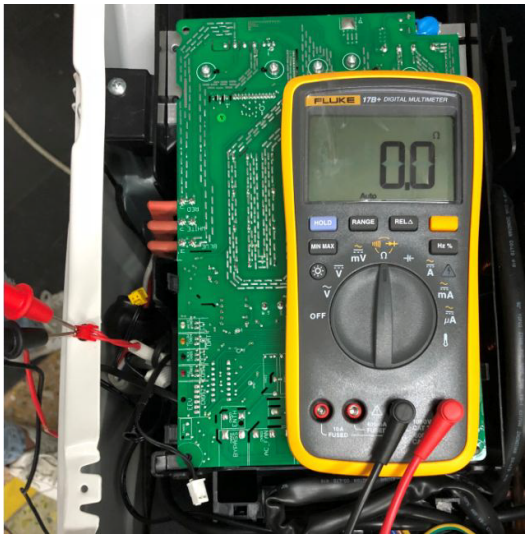
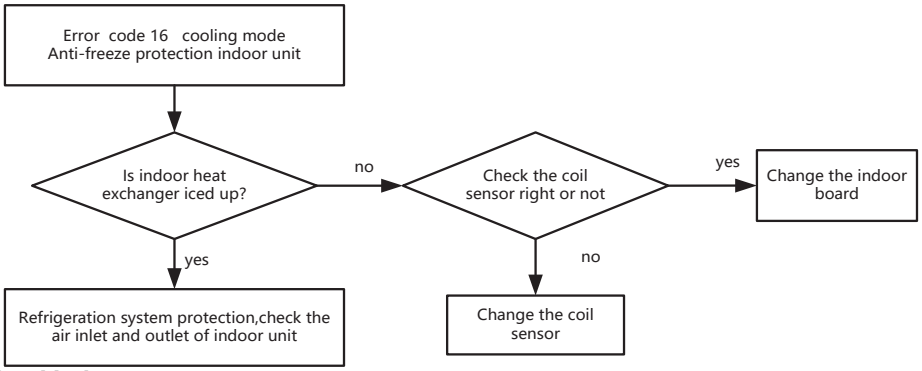


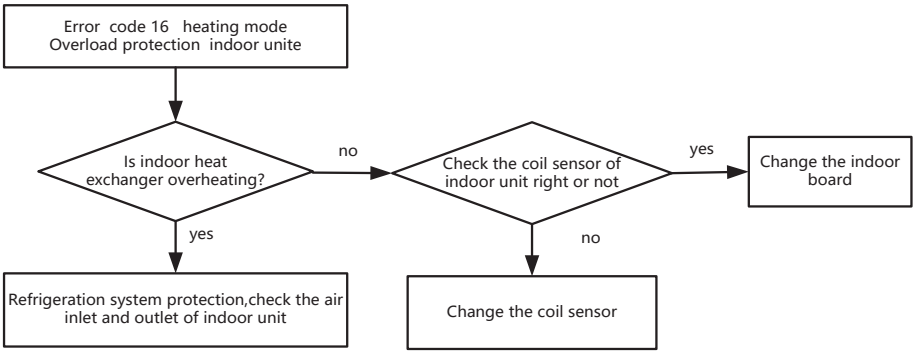
Fig. 709

TROUBLESHOOTING

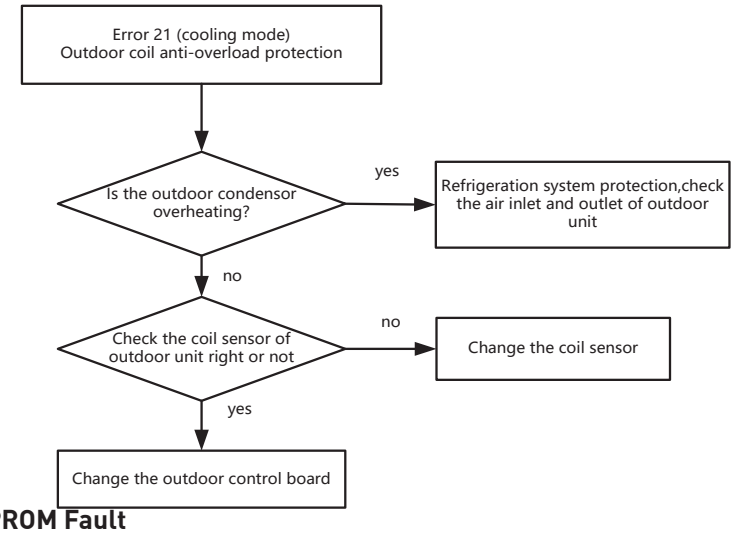
Error Code 16 Cooling Mode



Error Code 16 Heating Mode



Error Code 21 Cooling Mode



Error Code 11 EEPROM Fault

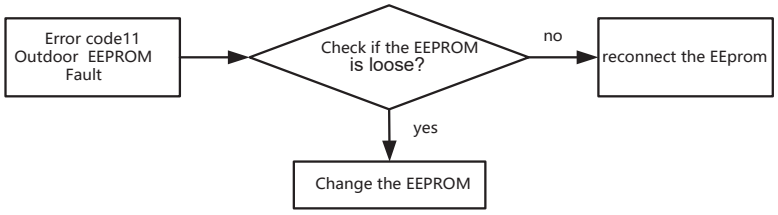
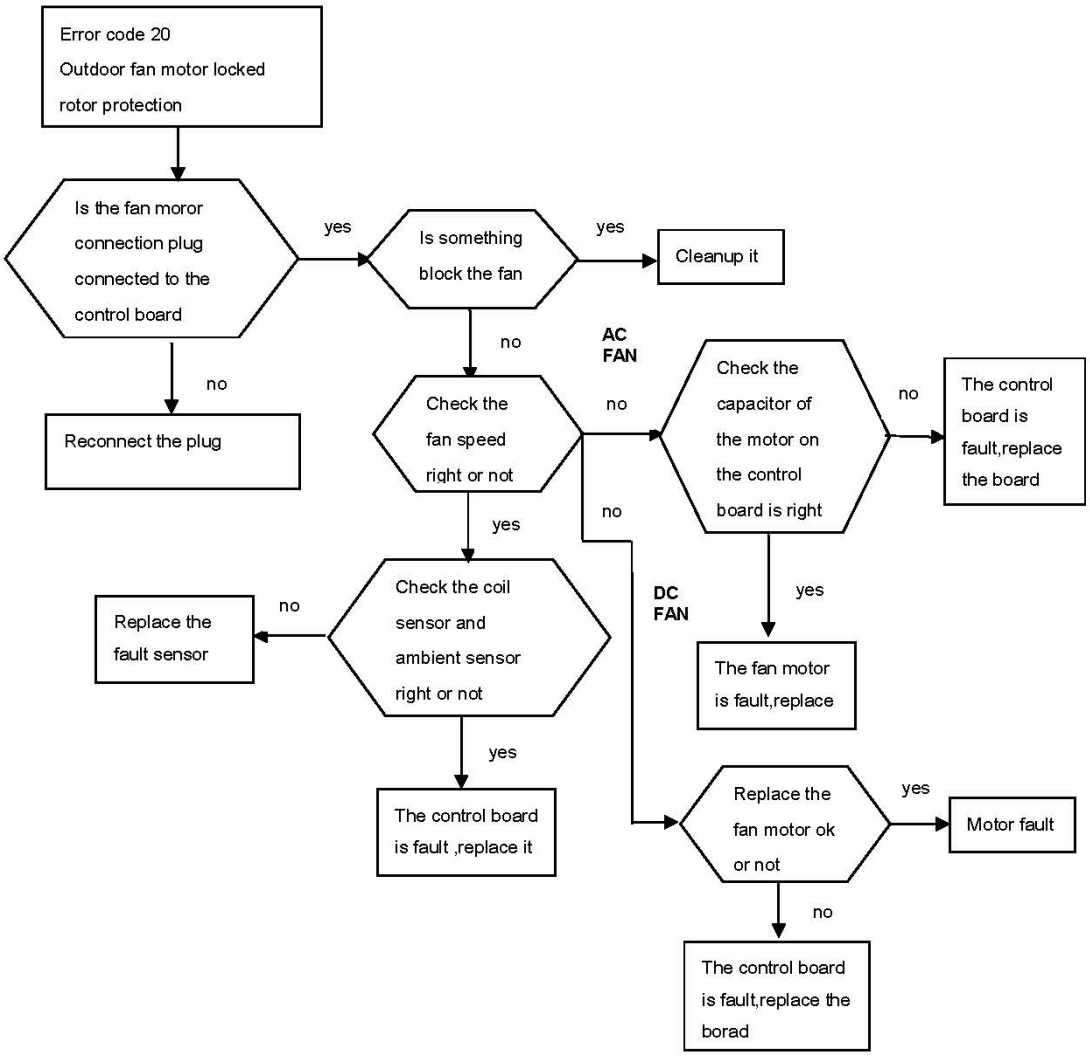


Fig. 710

TROUBLESHOOTING

Error Code 20



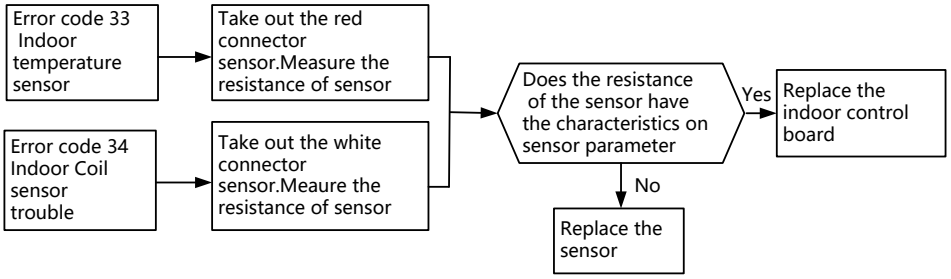
DC fan motor test point:

Fig. 711

TROUBLESHOOTING

Error Code 33

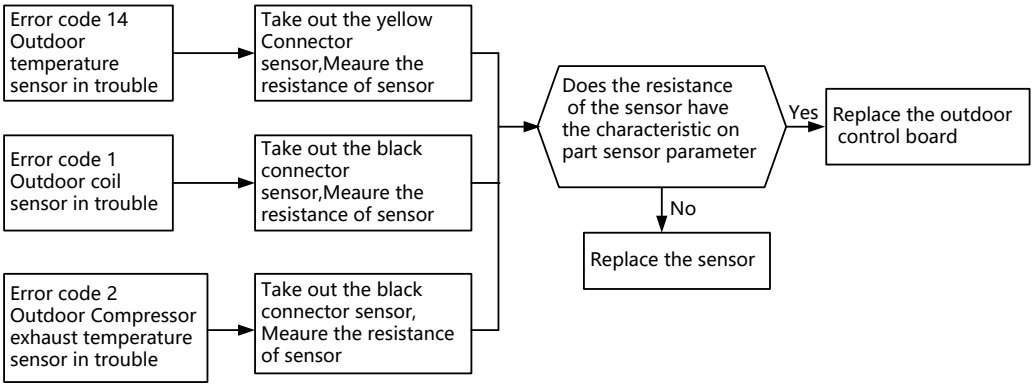
Error Code 34



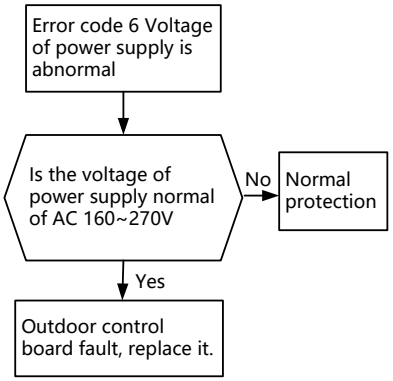
Error Code 14

Error Code 1

Error Code 2



Error Code 6



The Voltage protection values is different according to the model

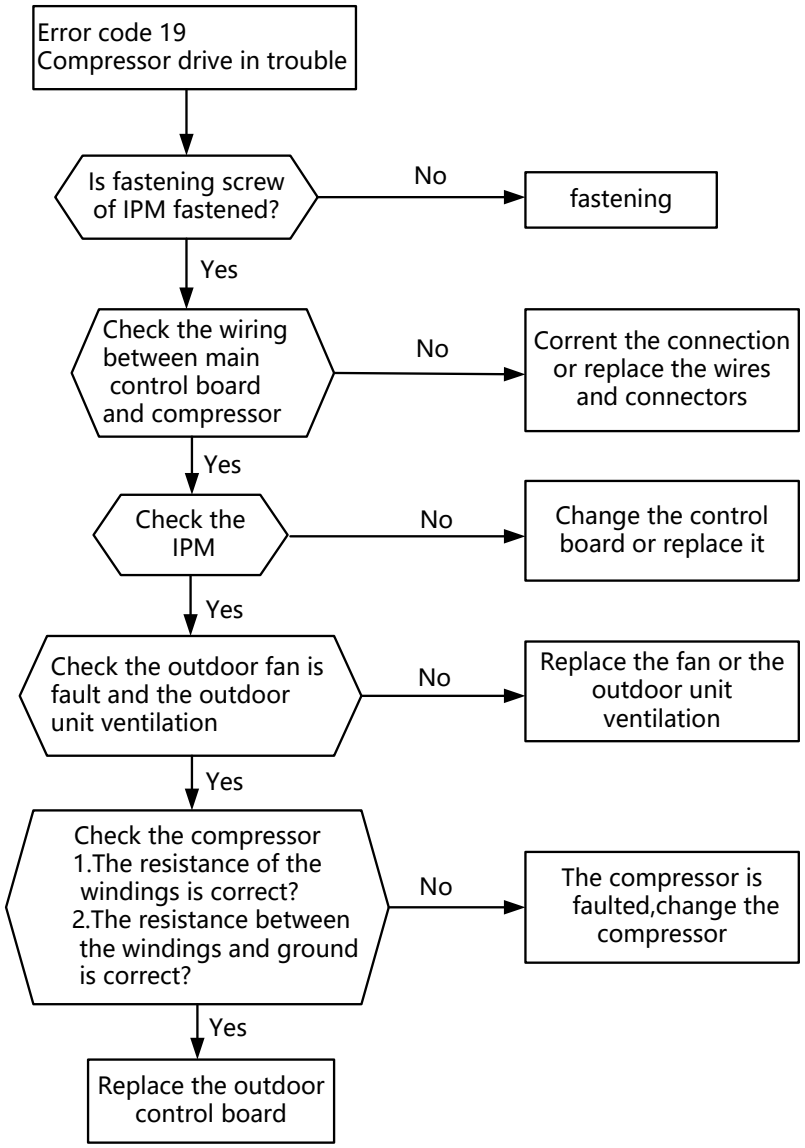
AC voltage test point:

Sensor test point:

Fig. 712

TROUBLESHOOTING

Error Code 19



test point:

Check the screw of IPM fastening

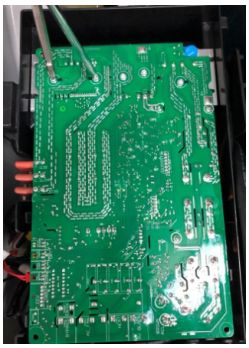


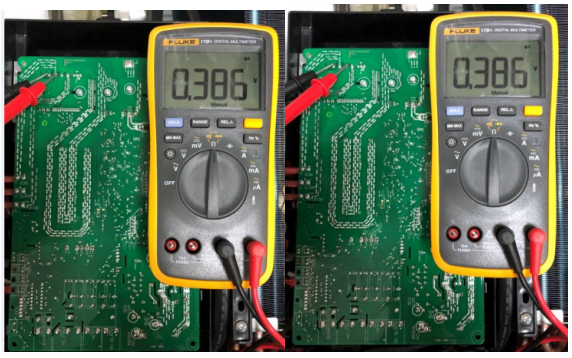
Fig. 713

TROUBLESHOOTING

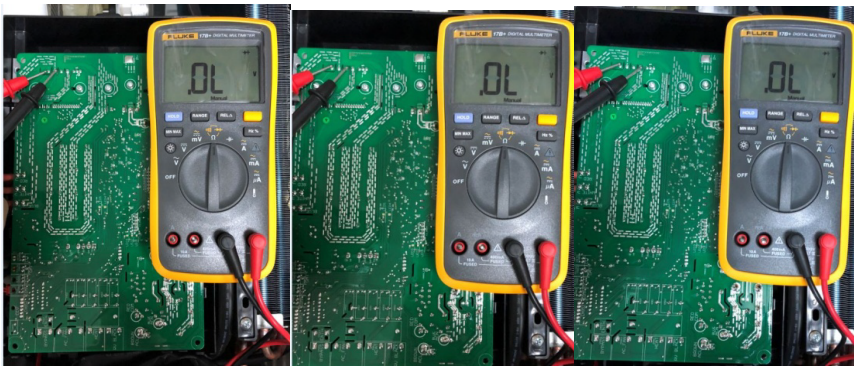
Error Code 19

test point:

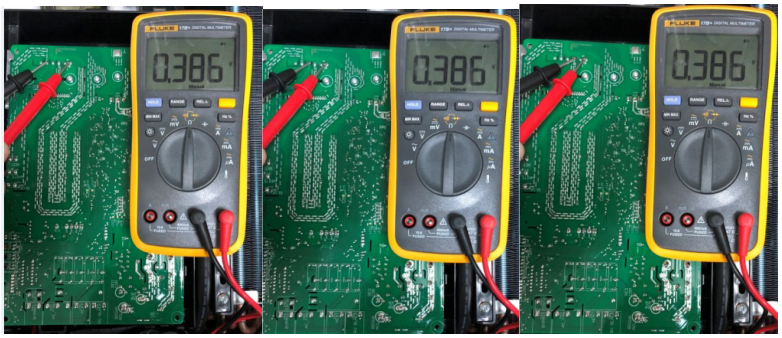
Forward of IPM P-U/P-V/P-W test :



Reverse of IPM P-U/P-V/P-W test:



Forward of IPM N-U/N-V/N-W test :



Reverse of IPM N-U/N-V/N-W test :

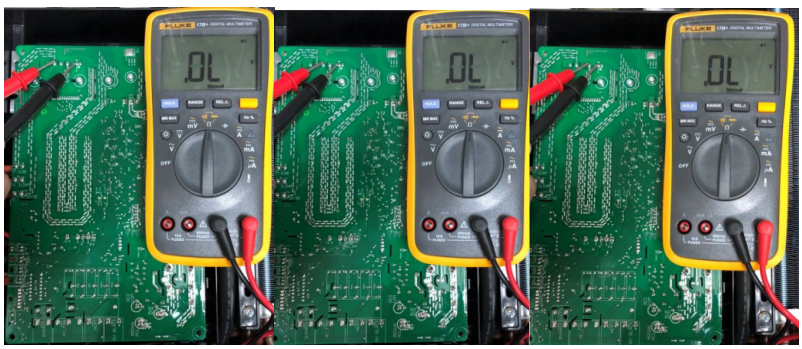


Fig. 714

TROUBLESHOOTING

Error Code 19

test point:

The resistance of the compressor U-W\V-W

Values should be +/- 0.1 (Ohms) between phases.

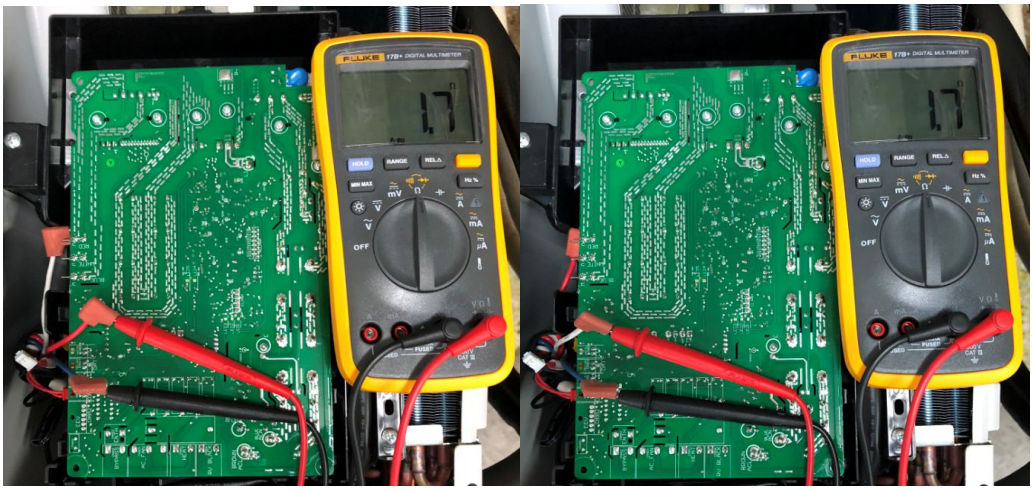
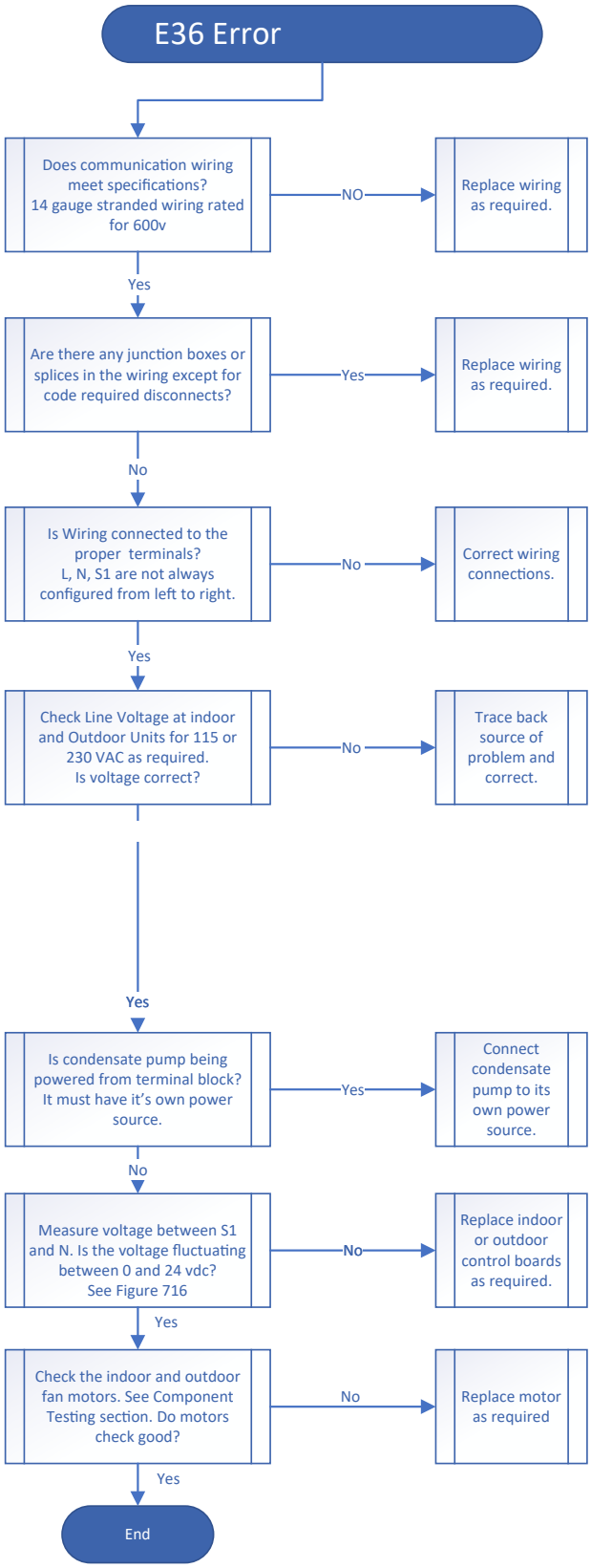


Fig. 715

TROUBLESHOOTING

Error Code 36

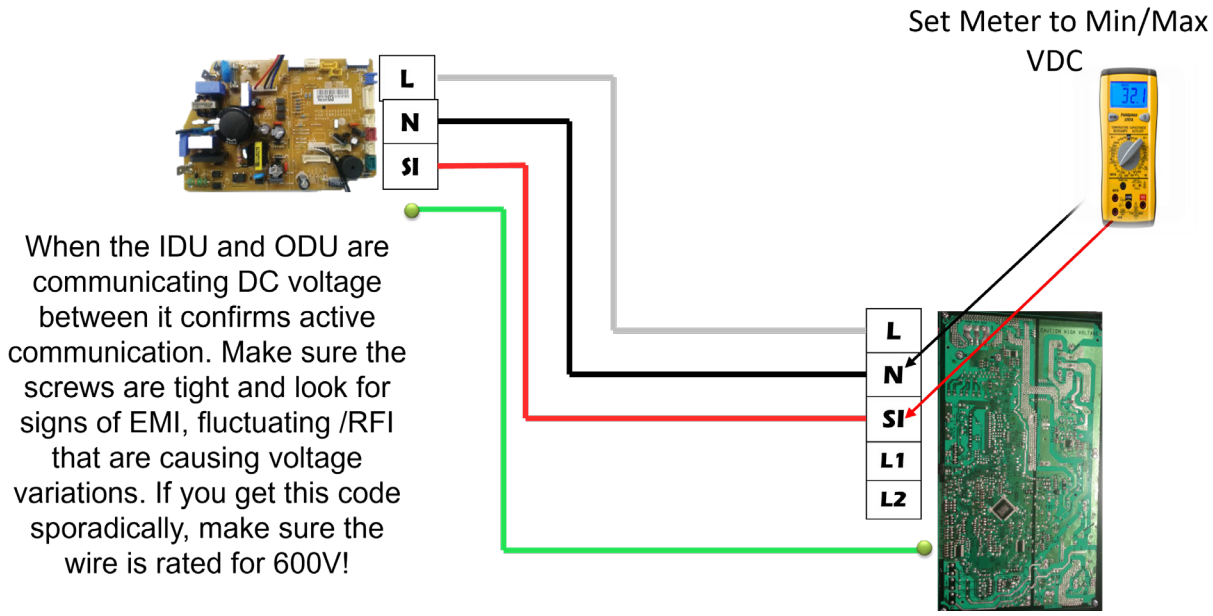


See Figure 716

TROUBLESHOOTING

Error Code 36

Check from SI to Neutral on the outdoor unit or indoor unit



When the IDU and ODU are communicating DC voltage between it confirms active communication. Make sure the screws are tight and look for signs of EMI, fluctuating /RFI that are causing voltage variations. If you get this code sporadically, make sure the wire is rated for 600V!

Fig. 716

TROUBLESHOOTING

Blank Display/Indoor Unit Door Micro Switch

If the Display is blank, check to see if the door is properly closed.

If the door is properly closed, confirm that you have proper line voltage to the indoor unit.

If the indoor unit door is not properly closed, or if the door micro switch has malfunctioned the display may be blank. See Figure 717 When the micro-switch is not engaged, and the power button is depressed, there will be no display and the system will not operate or respond in any way.See Figure 718.

When the Timer On/Clock button is pressed you will see a temperature on the display, but still no system operation. After a few seconds, the display will drop the temperature leaving just the Wi-Fi and Timer icons. Still no indoor unit operation. See Figure 719.

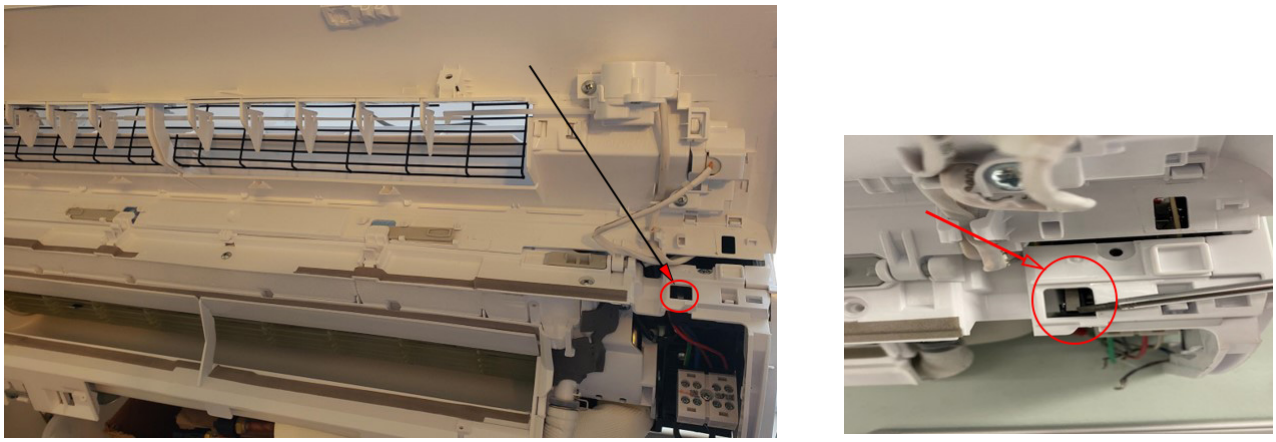


Fig. 717 (Door Micro Switch)

Fig. 718 (Blank Display)

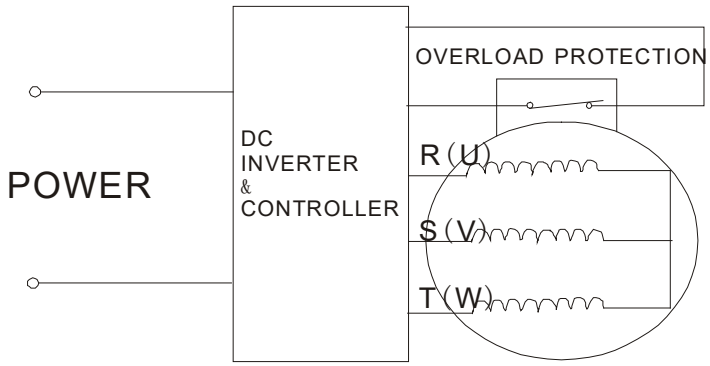
TROUBLESHOOTING

Blank Display/Indoor Unit Door Micro Switch
When the Timer On/Clock button is pressed you will see a temperature on the display, but still no system operation. After a few seconds, the display will drop the temperature leaving just the Wi-Fi and Timer icons. Still no indoor unit operation. See Figure 719.

Fig. 719 (Momentary Temp. Display)

COMPONENTS TESTING

Compressor



Resistance Test.

The compressor is at fault if the resistance of winding is 0(short circuit)or∞ open circuit.
Common signs compressor is faulty:

- Compressor motor lock.
- Discharge pressure value approaches static pressure value .
- Compressor motor winding abnormality.

Note:

- Don't put a compressor on its side or turn over.
- Assemble the compressor quickly after removing the plugs. Prolonged exposure will damage the internal components of the compressor
- Ensure wiring is correct before operating. Reverse operation will permanently damage the compressor.

- **Electric Reactor**

Common Problems:

- Sound abnormality
- Runs in a sporadic rhythm.

COMPONENTS TESTING

EEV Stepper Coil

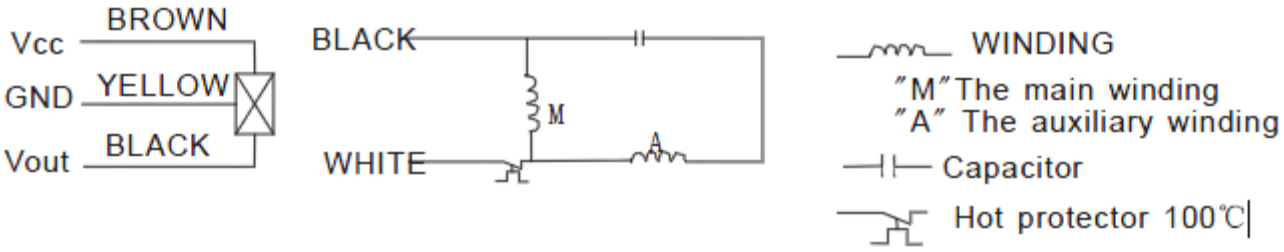
Discharge pipe temperature is too high. This means the compressor is over heating and will shut down and lock itself out. The cause for this issue is lack of refrigerant coming back to the compressor to cool the compressor. The main causes of this would be low charge, restriction or issue with the electronic expansion valve (EEV).

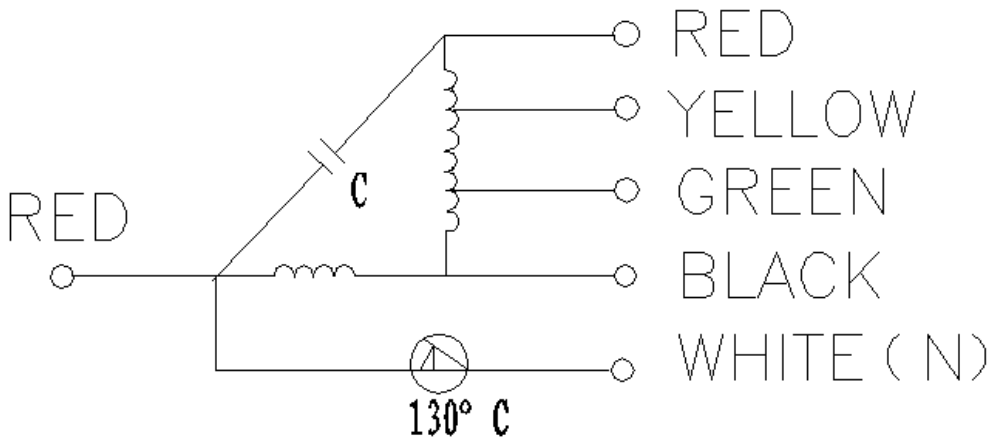
Check Resistence of EEV stepper coil.
Using an ohmmeter check all wires against each other.
5 wire EEV
Red to all colors is 45 +/- 10%
All other colors to each other are 95 +/- 10%

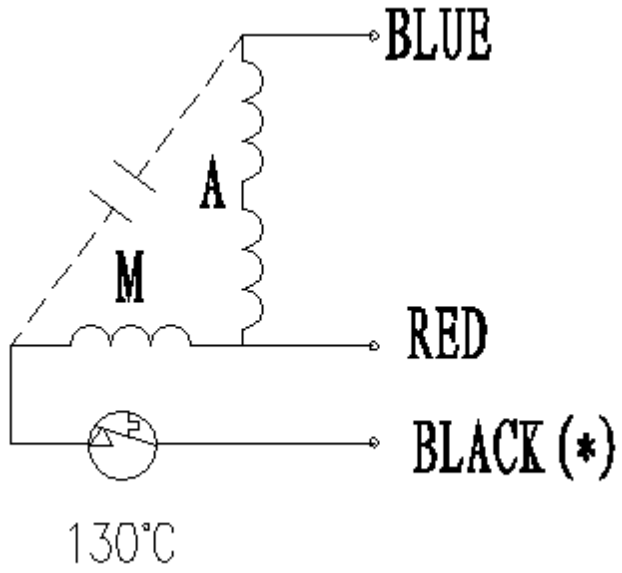
Remove the head off the EEV (pulls right off) & check for any rust build up. If there is any rust inside the EEV head, replace the EEV head. If there is rust on the EEV body you can clean it up with some emery cloth.

COMPONENTS TESTING

Fan Motor







COMPONENTS TESTING

Fan Motor

Resistance Test.

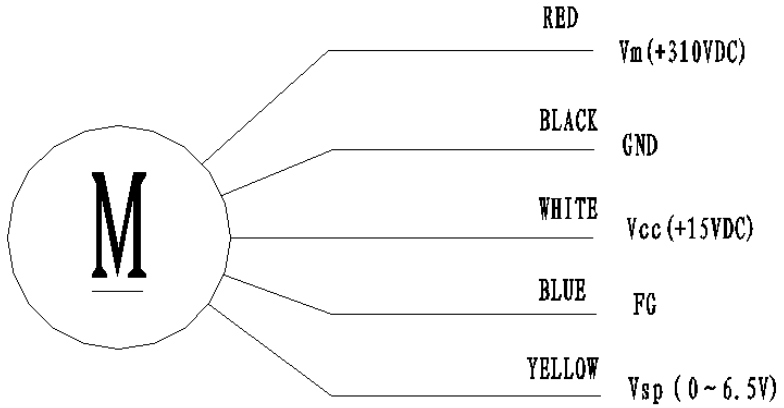
Test the resistance of the main winding. The indoor fan motor is faulted if the resistance of main winding 0 (short circuit)or ∞ open circuit.
DC Voltage test

Manually rotate indoor fan motor slowly for several revolutions, and measure voltage "YELLOW" and "GND" on motor. The voltage repeats 0V DC and 5V DC.

Notes:

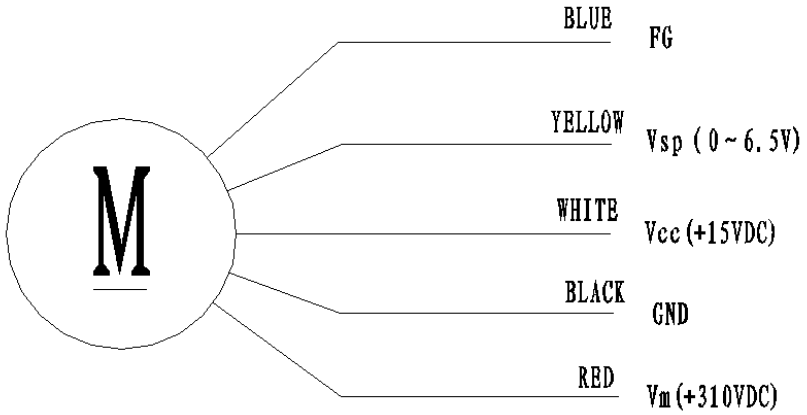
- Do not hold motor by lead wires.
- Do not connect or disconnect the molex connecter while power ON.
- Do not drop motor against hard material. Malfunction may not be observed at early stage after such shock. But it may be found later, this type of mishandling voids our warranty.

Indoor DC Fan Motor



1	RED	Vm(+310VDC)
2	--	--------
3	--	--------
4	BLACK	GND
5	WHITE	Vcc(+15VDC)
6	BLUE	FG
7	YELLOW	Vsp (0~6.5V)

Outdoor DC Fan Motor



1	BLUE	FG
2	YELLOW	Vsp (0~6.5V)
3	WHITE	Vcc(+15VDC)
4	BLACK	GND
5	--	--------
6	RED	Vm(+310VDC)

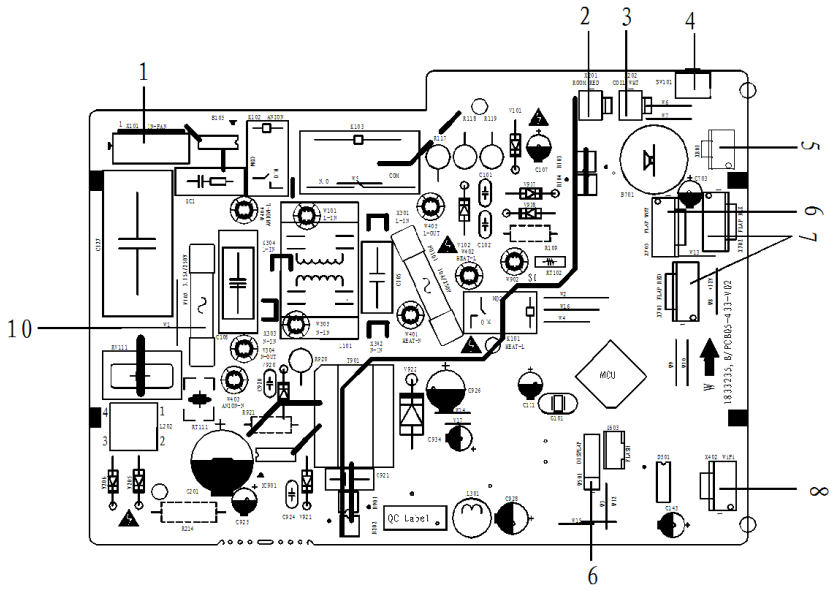
COMPONENTS TESTING

Printed Circuit Board Diagram Lookup Chart

Model Number	Indoor Unit	Indoor Unit Printed Circuit Board	Outdoor Unit	Outdoor Unit Printed Circuit Board	Voltage	BTU
FPHW091	FPHSW09A1A, FPHSW09A1B	1833235	FPHSR09A1A	OU-PCB-SYD/SVE	115	9k
FPHW093	FPHFW09A3A, FPHFW09A3B	1833235 1898224	FPHSR09A3A	OU-PCB-SYD/SVE 1878005	208/230	9k
FRHW093	FRHSW09A3A, FRHSW09A3B	1833235 1898224	FRHSR09A3A	OU-PCB-SYD/SVE 1878005	208/230	9k
FPHW121	FPHSW12A1A, FPHSW12A1B	1833235	FPHSR12A1A	OU-PCB-SYD/SVE	115	12k
FPHW123	FPHFW12A3A, FPHFW12A3B	1833235 1898224	FPHSR12A3A	OU-PCB-SYD/SVE 1878005 1841765	208/230	12k
FRHW123	FRHSW12A3A, FRHSW12A3B	1833235 1898224	FRHSR12A3A	OU-PCB-SYD/SVE 1878005 1841765	208/230	12k
FPHW183	FPHFW18A3A, FPHFW18A3B	1833235 1841766	FPHSR18A3A	1841765	208/230	18k
FPHW243	FPHFW24A3A, FPHFW24A3B	1841766	FPHSR24A3A	1841765 1846941	208/230	24k
FPHW363	FPHSW36A3A, FPHSW36A3B, FPHSW36A3C	1836919	FPHSR36A3A, FPHSR36A3B	1846941	208/230	36k
Fig. 608						

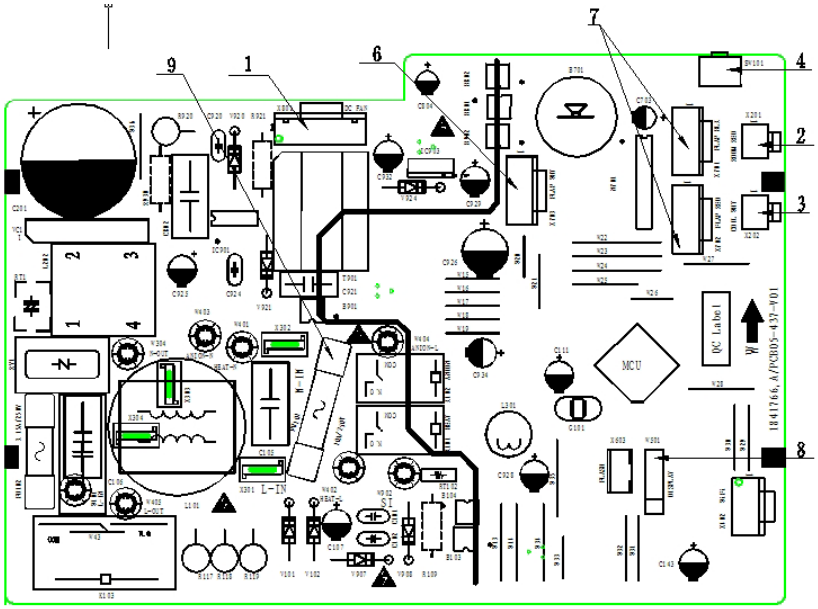
COMPONENTS TESTING

Printed Circuit Board (Indoor)



1	Interface of PG motor
2	Room temperature sensor
3	Pipe temperature sensor
4	Switch button
5	Feedback from PG motor
6	Up□down swing
7	Left□right swing
8	Wiring control or wifi interface
9	Display interface
10	Protective tube

Figure 609 (9-18k units)
1833235 Indoor Unit Printed Circuit Board Identification

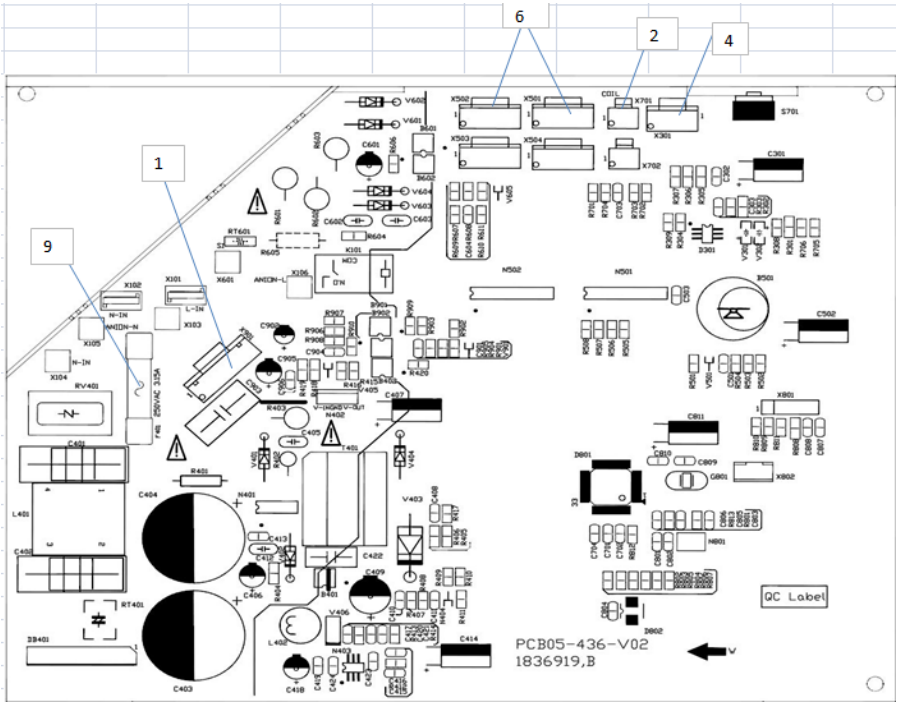


1	Interface of PG motor
2	Room temperature sensor
3	Pipe temperature sensor
4	Switch button
6	Up□down swing
7	Left□right swing
8	Display interface
9	Protective tube

Figure 610 (12-24k units)
1841766/1898224 Indoor Unit Printed Circuit Board Identification

COMPONENTS TESTING

Printed Circuit Board (Indoor)

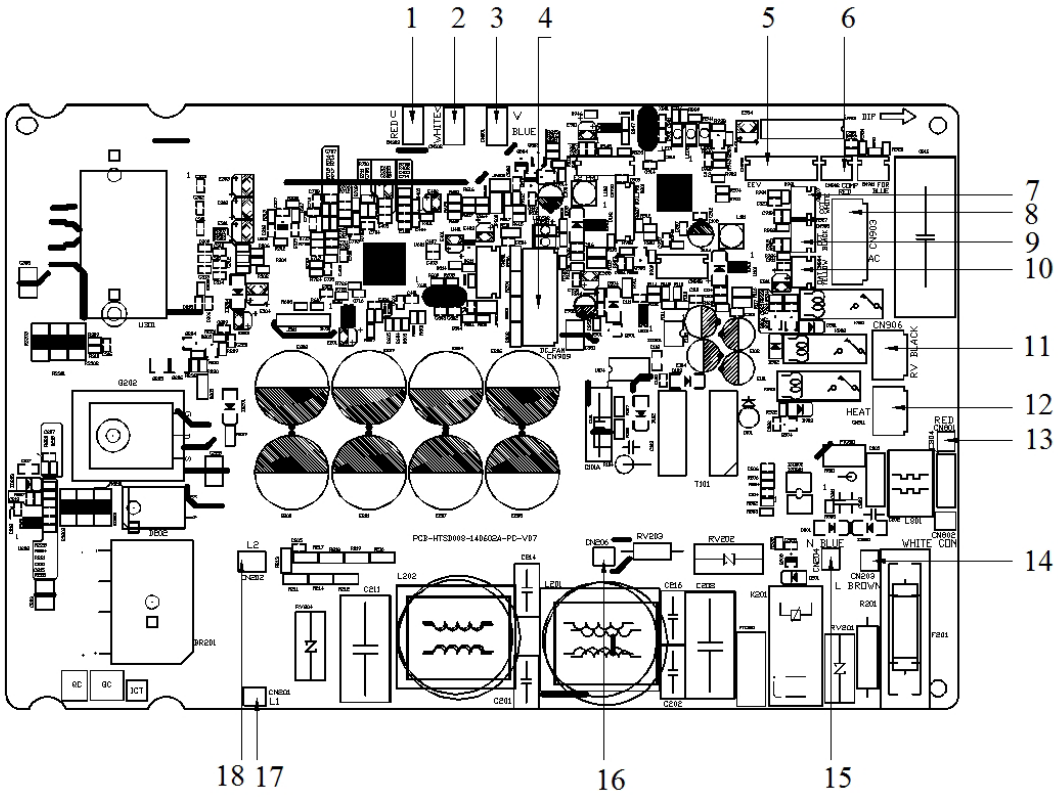


1	Interface of ID motor
2	Room/and Pipe temperature sensor
4	Switch button
6	Vane Steppers
9	Fuse

Figure 611 (36k units)
1836919 Indoor Unit Printed Circuit Board Identification

COMPONENTS TESTING

Printed Circuit Board (Outdoor)

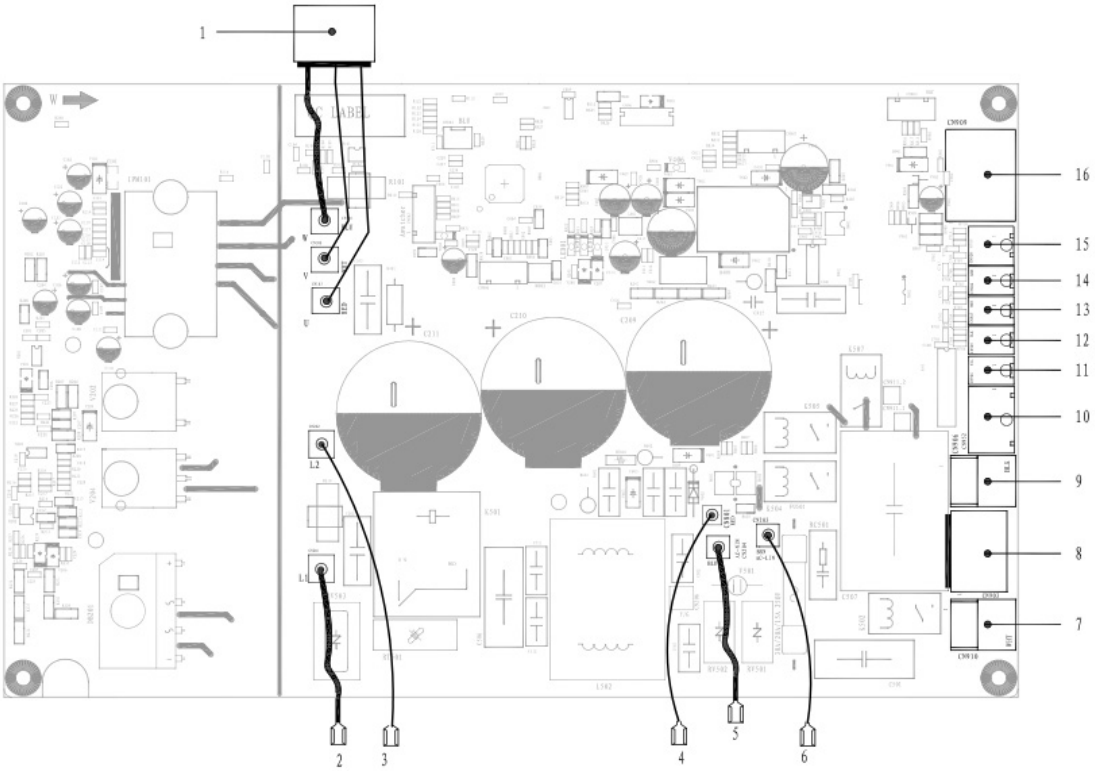


1	Terminal of compressor U phase	10	Outdoor ambient temperature sensor
2	Terminal of compressor V phase	11	Terminal of 4-way valve
3	Terminal of compressor W phase	12	Terminal of heater
4	Terminal of DC fan	13	communication wire to terminal block
5	Terminal of electronic expansion valve	14	Terminal of nuetral wire to terminal block
6	Terminal of compressor overload protector	15	Terminal of live wire to terminal block
7	Compressor discharge temperature sensor	16	Terminal of ground wire
8	Terminal of AC fan	17	Terminal of reactor
9	Outdoor pipe temperature sensor	18	Terminal of reactor

Figure 612 (9-12k units)
OU-PCB-SYD/SVE Outdoor Unit Printed Circuit Board Identification

COMPONENTS TESTING

Printed Circuit Board (Outdoor)

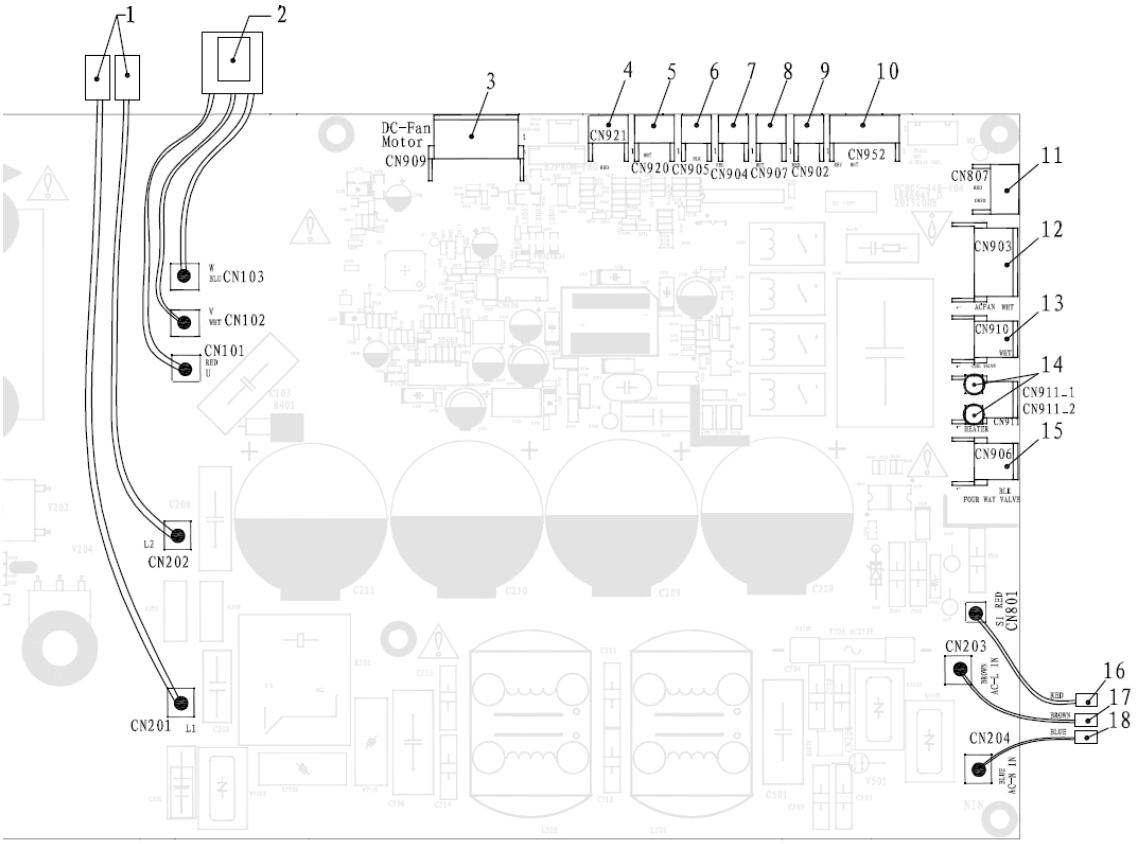


1	Terminal of compressor U/V/W phase	9	4-way valve terminal
2	Terminal of reactor	10	Terminal of electronic expansion valve
3	Terminal of reactor	11	Outdoor ambient temperature sensor
4	Terminal of signal wire,connect to the terminal panel "3(SI)"	12	Outdoor pipe temperature sensor
5	Terminal of neutral wire,connect to the terminal panel "1(N)"	13	Compressor discharge temperature sensor
6	Terminal of live wire,connect to the terminal panel "2(L)"	14	Terminal of compressor overload protector
7	cool valve terminal	15	Over pressure sensor
8	Terminal of AC fan	16	Terminal of DC fan

Figure 613 (12-24k units)
1841765 Outdoor Unit Printed Circuit Board Identification

COMPONENTS TESTING

Printed Circuit Board (Outdoor)



1	Terminal of reactor	10	Terminal of electronic expansion valve
2	Terminal of compressor	11	DRED Function
3	Terminal of DC fan	12	Terminal of AC fan
4	Heat Sink temperature sensor	13	Cool Valve terminal
5	PressureProtector	14	Heater terminal
6	Compressor discharge temperature sensor	15	4-way valve terminal
7	Outdoor ambient temperature sensor	16	Terminal of communication wire
8	Outdoor pipe temperature sensor	17	Terminal of live wire
9	Terminal of compressor overload protector	18	Terminal of neutral

Figure 614 (24-36k units)
1846941 Outdoor Unit Printed Circuit Board Identification

R-410A SEALED SYSTEM REPAIR

Service Valves Appearance

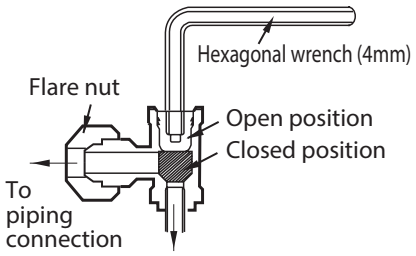
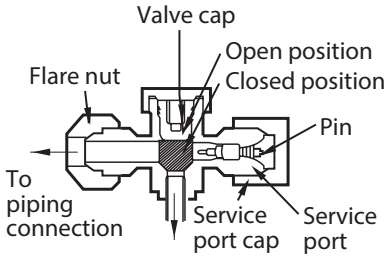
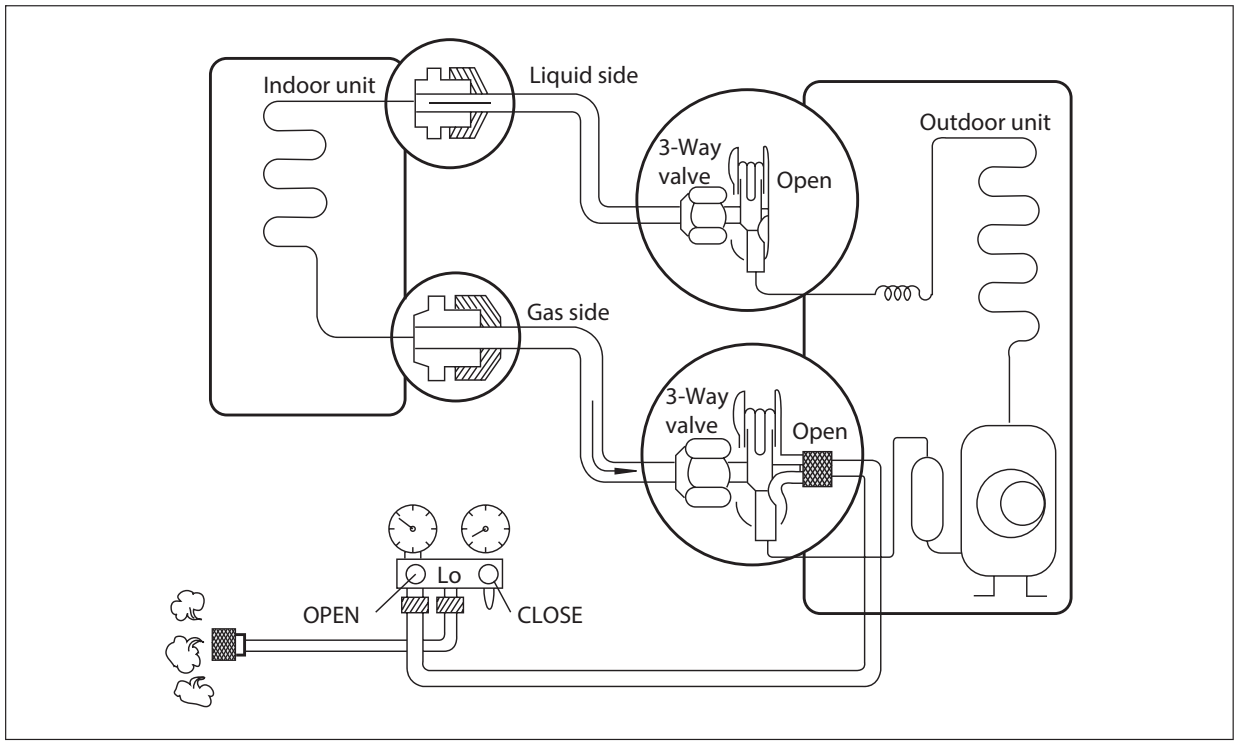
		2-way Valve (Liquid Side)	3-way Valve (Gas Side)	
		 To outdoor unit	 To outdoor unit	
	Works	Shaft position	Shaft position	Service port
	Shipping	Closed (with valve cap)	Closed (with valve cap)	Closed (with cap)
1.	Air purging (Installation)	Closed (clockwise)	Closed (clockwise)	Open (with vacumm pump)
	Operation	Open (with valve cap)	Open (with valve cap)	Closed (with cap)
2.	Pumping down (Transfering)	Closed (clockwise)	Open (counter-clockwise)	Open (connected manifold gauge)
3.	Evacuation (Servicing)	Open	Open	Open (with charging cylinder)
4.	Gas charging (Servicing)	Open	Open	Open (with charging cylinder)
5.	Pressure check (Servicing)	Open	Open	Open (with charging cylinder)
6.	Gas releasing (Servicing)	Open	Open	Open (with charging cylinder)

Fig. 504

R-410A SEALED SYSTEM REPAIR

Gas Charging (After Repair)



• Procedure

(1) Connect the charge hose to the charging cylinder.

– Connect the charge hose which you dis-connected from the vacuum pump to the valve at the bottom of the cylinder.
– If you are using a gas cylinder, also use a scale and reverse the cylinder so that the system can be charged with liquid.

(2) Purge the air from the charge hose.

– Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air. (Be careful of the liquid refrigerant).

(3) Open the valve (Lo side on the charge set and charge the system with liquid refrigerant.

- Weigh in the refrigerant amount listed on the rating plate, adding additional refrigerant as needed for long line set length.
- If the temperature does not allow full liquid charge, run the system in air conditioning and throttle refrigerant in at 0.2 oz/min. Allow the system pressure to stabilize each time.

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with larger amounts of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valves service port.

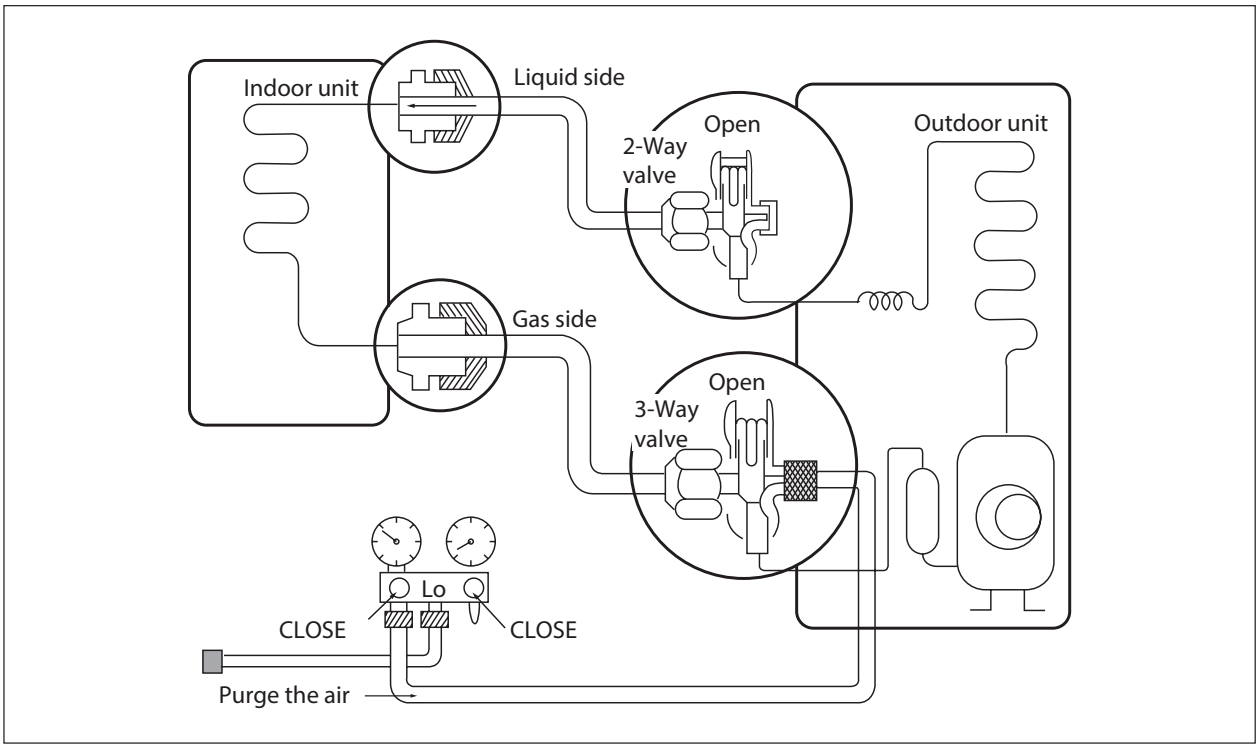
– Stopping partway will allow the gas to be discharged.
– If the system has been charged with liquid refrigerant while operating the air conditioner turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem nuts and the service port nut.

– Tighten the service port nut.
– Be sure to check for gas leakage.

R-410A SEALED SYSTEM REPAIR

Pumping Down



• Procedure

(1) Confirm that both the 2-way and 3-way valves are set to the open position.

– Remove the valve stem caps and confirm that the valve stems are in the raised position.

– Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.

– Connect the charge hose with the push pin to the service port.

(4) Air purging of the charge hose.

– Open the low-pressure valve on the charge set slightly to air purge from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 14 PSI.

(7) Immediately set the 3-way valve to the closed position.

– Do this quickly so that the gauge ends up indicating 0-15 PSI.

(8) Disconnect the charge set, and mount the 2-way and 3-way valves stem nuts and the service port nut.

– Tighten the service port nut.

– Be sure to check for gas leakage.

WIRING DIAGRAMS

Wiring Diagram Lookup Table

Model Number	Indoor Unit	Indoor Unit Wiring Diagram	Outdoor Unit	Outdoor Unit Wiring Diagram	Voltage	BTU
FPHW091/A	FPHSW09A1A, FPHSW09A1B	1912241	FPHSR09A1A	1912204	115	9k
FPHW093/A	FPHFW09A3A, FPHFW09A3B	1854605 1912241 1907790	FPHSR09A3A	1854707	208/230	9k
FRHW093/A	FRHSW09A3A, FRHSW09A3B	1854605 1912241 1907790	FRHSR09A3A	1854707	208/230	9k
FPHW121/A	FPHSW12A1A, FPHSW12A1B	1912241	FPHSR12A1A	1912204	115	12k
FPHW123/A	FPHFW12A3A, FPHFW12A3B	1854605	FPHSR12A3A	1854707	208/230	12k
FRHW123/A	FRHSW12A3A, FRHSW12A3B	1854605	FRHSR12A3A	1854707	208/230	12k
FPHW183/A	FPHFW18A3A, FPHFW18A3B	1854605 1854698	FPHSR18A3A	1854707	208/230	18k
FPHW243/A	FPHFW24A3A, FPHFW24A3B	1854698	FPHSR24A3A	1854707	208/230	24k
FPHW363/A	FPHSW36A3A, FPHSW36A3B, FPHSW36A3C	1852066	FPHSR36A3A, FPHSR36A3B	1854707	208/230	36k

WIRING DIAGRAMS

Indoor Units

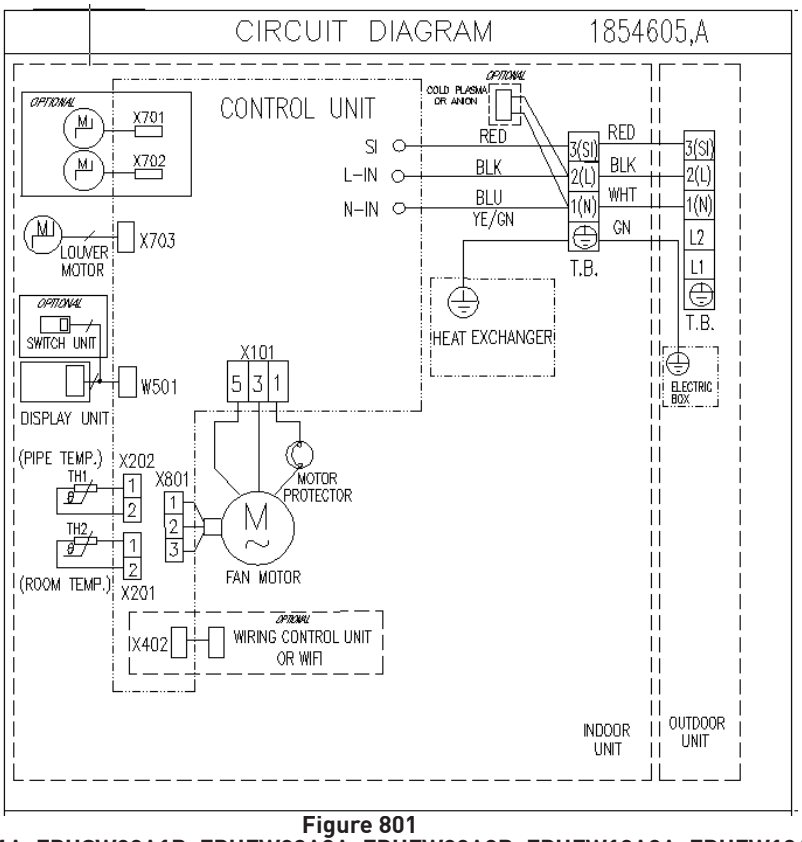


Figure 801
FPHSW09A1A, FPHSW09A1B, FPHFW09A3A, FPHFW09A3B, FPHFW12A3A, FPHFW12A3B, FRHSW12A3A, FRHSW12A3B, FPHFW18A3A, FPHFW18A3B

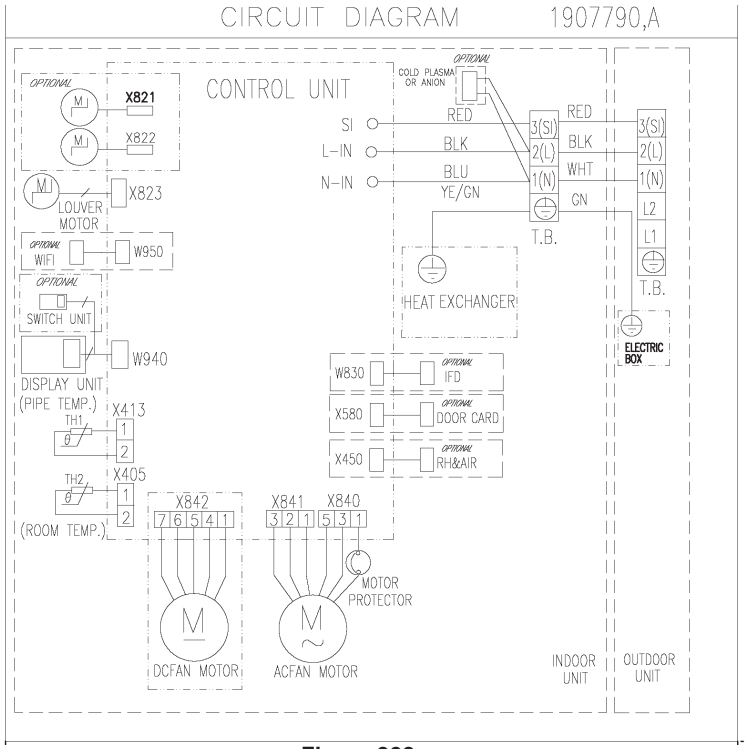


Figure 802
FPHFW09A3A, FPHFW09A3B

WIRING DIAGRAMS

Indoor Units

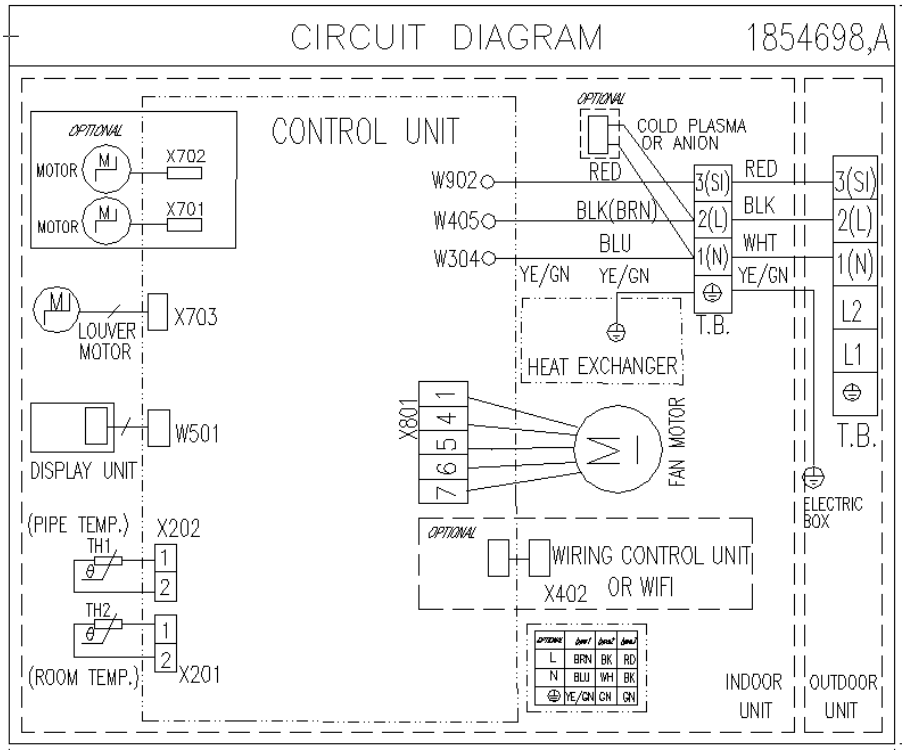


Figure 803

FPHFW18A3A, FPHFW18A3B, FPHFW24A3A, FPHFW24A3B

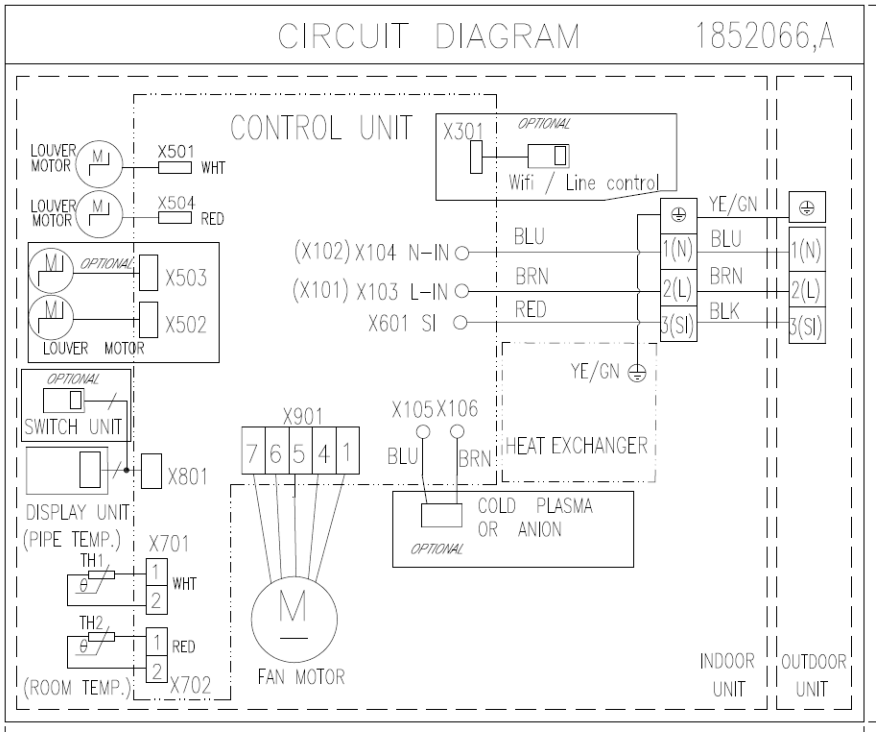


Figure 804
FPHSW36A3A, FPHSW36A3B, FPHSW36A3C

WIRING DIAGRAMS

Outdoor Units

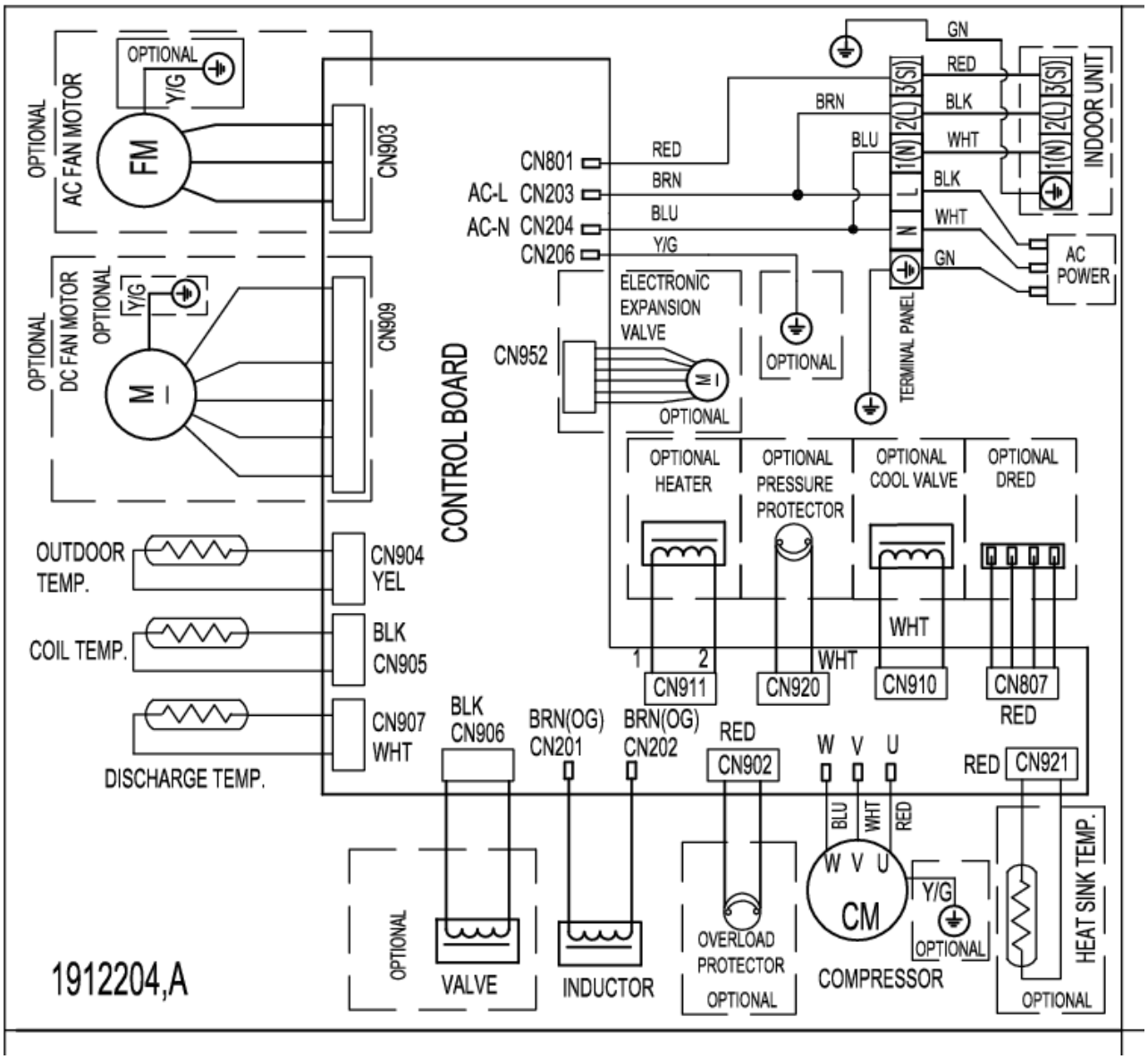


Figure 805
9-36K Outdoor Units

INTERACTIVE PARTS VIEWER

All Friedrich Service Parts can be found on our online interactive parts viewer.

Please click on the link below:

Interactive Parts Viewer

For Further Assistance contact Friedrich customer service at **(1-800-541-6645)**.

APPENDIX

Appendix 1: Reference Sheet of Celsius and Farenheit

Conversion formula for Fahrenheit degree and Celsius degree: Tf=Tcx1.8+32

Set temperature

Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	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

Ambient temperature

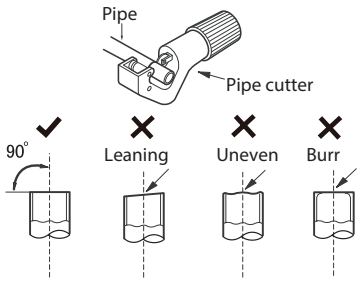
Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)		Fahrenheit display temperature (℉)	Fahrenheit (℉)	Celsius (℃)
32/33	32	0		55/56	55.4	13		79/80	78.8	26
34/35	33.8	1		57/58	57.2	14		81	80.6	27
36	35.6	2		59/60	59	15		82/83	82.4	28
37/38	37.4	3		61/62	60.8	16		84/85	84.2	29
39/40	39.2	4		63	62.6	17		86/87	86	30
41/42	41	5		64/65	64.4	18		88/89	87.8	31
43/44	42.8	6		66/67	66.2	19		90	89.6	32
45	44.6	7		68/69	68	20		91/92	91.4	33
46/47	46.4	8		70/71	69.8	21		93/94	93.2	34
48/49	48.2	9		72	71.6	22		95/96	95	35
50/51	50	10		73/74	73.4	23		97/98	96.8	36
52/53	51.8	11		75/76	75.2	24		99	98.6	37
54	53.6	12		77/78	77	25				

APPENDIX

Appendix 2: Pipe Expanding Method

⚠ **Note:**

Improper pipe expanding is the main cause of refrigerant leakage.Please expand the pipe according to the following steps:

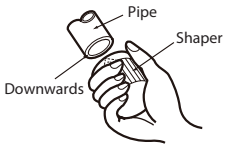


A:Cut the pip

Confirm the pipe length according to the distance of indoor unit and outdoor unit.
Cut the required pipe with pipe cutter.

B:Remove the burrs

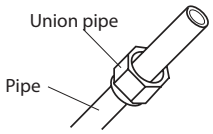
Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C:Put on suitable insulating pipe

D:Put on the union nut

Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



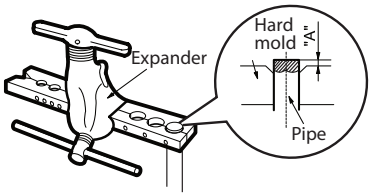
E:Expand the port

Expand the port with expander.

⚠ **Note:**

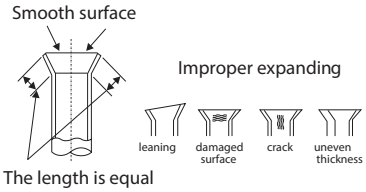
"A" is different according to the diameter, please refer to the sheet below:

Outer diameter(inch)	A(inch)	
	Max	Min
Φ1/4	2/39	1/36
Φ3/8	1/16	1/51
Φ1/2	1/14	1/51
Φ5/8	5/53	2/23



F:Inspection

Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



APPENDIX

Appendix 3 Resistance Table Of Indoor Coil And Indoor Room Sensor

The Resistence Table of Outdoor Coil and Outdoor Air Sensor
R(32F)=15k B(0/100)=3450

Temp. (°F)	Resistance (kΩ)	Voltage	Temp. (°F)	Resistance (kΩ)	Voltage	Temp. (°F)	Resistance (kΩ)	Voltage
-4	38.757	0.58143512	64.4	7.051	2.09859271	132.8	1.877	3.654865988
-2.2	36.844	0.60795346	66.2	6.778	2.14682606	134.6	1.818	3.686036427
-0.4	35.038	0.63530819	68	6.516	2.19524793	136.4	1.76	3.717201166
1.4	33.331	0.66352684	69.8	6.267	2.24333597	138.2	1.705	3.747244673
3.2	31.719	0.69257720	71.6	6.028	2.29151689	140	1.652	3.776658768
5	30.196	0.72246147	73.4	5.8	2.33944954	141.8	1.6	3.805970149
6.8	28.755	0.75321223	75.2	5.581	2.38741691	143.6	1.551	3.834009923
8.6	27.392	0.78480857	77	5.372	2.43506494	145.4	1.503	3.861880963
10.4	26.103	0.81722911	78.8	5.172	2.48247664	147.2	1.457	3.888973616
12.2	24.882	0.85051031	80.6	4.981	2.52951096	149	1.413	3.91524643
14	23.727	0.88458737	82.4	4.797	2.57653834	150.8	1.37	3.941267388
15.8	22.632	0.91951536	84.2	4.622	2.62291710	152.6	1.328	3.967019291
17.6	21.594	0.95527085	86	4.453	2.66931854	154.4	1.289	3.991234935
19.4	20.611	0.99179340	87.8	4.292	2.715076661	156.2	1.25	4.015748031
21.2	19.678	1.02913875	89.6	4.137	2.76063657	158	1.213	4.039284017
23	18.794	1.06721353	91.4	3.989	2.805589174	159.8	1.177	4.062450215
24.8	17.954	1.10609872	93.2	3.847	2.850117358	161.6	1.142	4.085229093
26.6	17.158	1.14565549	95	3.711	2.894109636	163.4	1.109	4.106941536
28.4	16.401	1.18599135	96.8	3.58	2.937788018	165.2	1.076	4.12888601
30.2	15.683	1.22696435	98.6	3.455	2.980713033	167	1.045	4.149715216
32	15	1.26865672	100.4	3.335	3.023117961	168.8	1.015	4.17007359
33.8	14.351	1.31098658	102.2	3.219	3.065272268	170.6	0.986	4.189944134
35.6	13.734	1.35393437	104	3.108	3.106725146	172.4	0.957	4.210004953
37.4	13.148	1.39741342	105.8	3.001	3.147759536	174.2	0.93	4.228855721
39.2	12.589	1.44157386	107.6	2.899	3.187898487	176	0.904	4.247168554
41	12.058	1.48618720	109.4	2.801	3.227439565	177.8	0.878	4.265640683
42.8	11.553	1.53125563	111.2	2.706	3.266717909			
44.6	11.071	1.57689691	113	2.615	3.305249514			
46.4	10.613	1.62286005	114.8	2.528	3.342947037			
48.2	10.176	1.66928515	116.6	2.444	3.380169671			
50	9.76	1.71601615	118.4	2.363	3.416856492			
51.8	9.363	1.76311968	120.2	2.286	3.45247766			
53.6	8.985	1.81043663	122	2.211	3.487894953			
55.4	8.624	1.85805887	123.8	2.139	3.522585993			
57.2	8.279	1.90597205	125.6	2.07	3.556485356			
59	7.951	1.95387327	127.4	2.003	3.590032381			
60.8	7.637	2.00204130	129.2	1.939	3.622673675			
62.6	7.337	2.05033368	131	1.877	3.654865988			
Note: the AD value in the table is calculated on the basis of the pull-down resistor is 5.1K								

APPENDIX

Resistance Table Of Outdoor Compressor Temperature Sensor
R (32F)=187.25k B(0100)=3979

Temp. (°F)	Resistance (kΩ)	Voltage	Temp. (°F)	Resistance (kΩ)	Voltage	Temp. (°F)	Resistance (kΩ)	Voltage
-4	542.867	0.06185563	64.4	78.854	0.39694585	132.8	6.624	2.532777116
-2.2	512.839	0.06543004	66.2	75.381	0.41372093	134.6	6.414	2.573028606
-0.4	484.672	0.06917993	68	72.082	0.43102355	136.4	6.212	2.612972641
1.4	458.239	0.07311215	69.8	68.948	0.44885674	138.2	6.017	2.652726847
3.2	433.423	0.07723358	71.6	65.968	0.46723835	140	5.829	2.692216328
5	410.115	0.08155140	73.4	63.136	0.48615877	141.8	5.648	2.731362468
6.8	388.213	0.08607312	75.2	60.443	0.50562884	143.6	5.474	2.770083102
8.6	367.625	0.09080590	77	57.88	0.52566481	145.4	5.306	2.808524698
10.4	348.264	0.09575738	78.8	55.367	0.54691396	147.2	5.144	2.846617549
12.2	330.048	0.10093573	80.6	52.978	0.56877112	149	4.988	2.884289108
14	312.904	0.10634837	82.4	50.707	0.59123237	150.8	4.837	2.921715219
15.8	296.761	0.11200385	84.2	48.547	0.61430611	152.6	4.692	2.958579882
17.6	281.556	0.11790981	86	46.492	0.63799445	154.4	4.552	2.995066949
19.4	267.227	0.12407536	87.8	44.537	0.66229036	156.2	4.417	3.031113488
21.2	253.72	0.13050821	89.6	42.676	0.68720188	158	4.286	3.066931265
23	240.982	0.13721739	91.4	40.904	0.71272849	159.8	4.161	3.10190676
24.8	228.965	0.14421140	93.2	39.217	0.73885738	161.6	4.039	3.13682074
26.6	217.624	0.15149895	95	37.609	0.76561057	163.4	3.922	3.171050177
28.4	206.917	0.15908889	96.8	36.077	0.79296593	165.2	3.776	3.214826021
30.2	196.805	0.16699001	98.6	34.616	0.82093877	167	3.703	3.237170332
32	187.25	0.17521257	100.4	33.224	0.84949031	168.8	3.602	3.268602192
33.8	177.957	0.18402550	102.2	31.895	0.87866649	170.6	3.501	3.300650422
35.6	169.186	0.19319719	104	30.628	0.90841082	172.4	3.409	3.33039475
37.4	160.903	0.20273937	105.8	29.419	0.93873381	174.2	3.317	3.360680043
39.2	153.179	0.21252789	107.6	28.264	0.96965549	176	3.228	3.390506582
41	145.685	0.22297275	109.4	27.162	1.00111890	177.8	3.141	3.420179056
42.8	138.696	0.23368340	111.2	26.109	1.03315203		3.058	3.448975451
44.6	132.086	0.24480509	113	25.103	1.06573050		2.977	3.477549351
46.4	125.833	0.25634646	114.8	24.142	1.09883007		2.899	3.505516033
48.2	119.916	0.26831655	116.6	23.223	1.13246511		2.823	3.533201704
50	114.315	0.28072493	118.4	22.345	1.16658089		2.749	3.56058226
51.8	109.01	0.29358432	120.2	21.505	1.20120120		2.678	3.587254695
53.6	103.984	0.30690352	122	20.701	1.23631868		2.609	3.613561484
55.4	99.222	0.32068816	123.8	7.8	2.328767123		2.542	3.639477628
57.2	94.708	0.33494897	125.6	7.546	2.369998606		2.477	3.664977902
59	90.427	0.34969710	127.4	7.301	2.411176512		2.414	3.6900369
60.8	86.366	0.36494000	129.2	7.065	2.452217815		2.353	3.714629083
62.6	82.512	0.38068793	131	6.843	2.492120501		2.294	3.738728832
Note: the AD value in the table is calculated on the basis of the pull-down resistor is 5.1K								

APPENDIX

Available Accessories

WALL CONTROLLERS

FPWC1

FPWC1 Optional wired wall controller for Floating Air Premier single zone and Floating Air® Pro, single and multizone models. Does not work with FPHSW36A3B at this time. Please check with your Friedrich representative for options. Cable length = 26 ft (8m)

APPENDIX

Interactive Parts Viewer

All Friedrich Service Parts can be found on our online interactive parts viewer.

Please click on the link below:

Interactive Parts Viewer

For Further Assistance contact Friedrich customer service at **(1-800-541-6645)**.

Limited Warranty

Current warranty information can be obtained by referring to https://www.friedrich.com/professional/support/product-resources

APPENDIX

Friedrich Authorized Parts Depots

NEUCO Inc.
515 W Crossroads Parkway
Bolingbrook, IL 60440
312.809.1418
borr@neuco.com

United Products Distributors Inc.
4030A Benson Ave
Halethorpe, MD 21227
888-907-9675
c.businsky@updinc.com

Shivani Refigeration & Air Conditioning Inc.
2259 Westchester Ave.
Bronx, NY 10462
sales@shivanionline.com

The Gabbert Company
6868 Ardmore
Houston, Texas 77054

713-747-4110
800-458-4110

Johnstone Supply of Woodside
27-01 Brooklyn Queens Expway
Woodside, New York 11377

718-545-5464
800-431-1143

Reeve Air Conditioning, Inc.
2501 South Park Road
Hallandale, Florida 33009

954-962-0252
800-962-3383

Total Home Supply
26 Chapin Rd Ste 1109
Pine Brook, NJ 07058
877-847-0050
support@totalhomesupply.com
https://www.totalhomesupply.com/brands/Friedrich.html

FRIEDRICH

TECHNICAL SUPPORT CONTACT INFORMATION

Friedrich Air Conditioning Co.
10001 Reunion Place, Suite 500 • San Antonio, Texas 78216
1-800-541-6645
www.friedrich.com