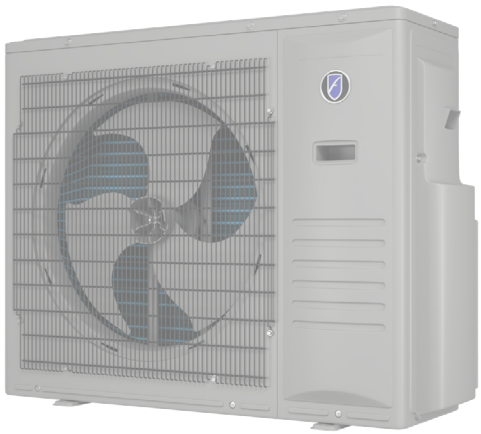
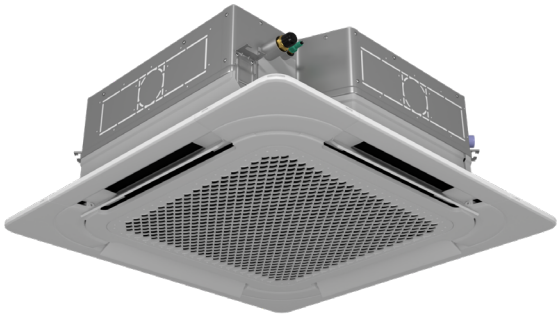
Service Manual

FRIEDRICH

Ductless
Floating Air® Pro X
Single Zone 9-36k BTU
R-454B Refrigerant





Outdoor Unit	**230-Volt:**	FPHFR09A3D, FPHFR12A3D, FPHFR18A3D, FPHFR24A3D, FPHFR36A3D
Wall Mounted Unit	**230-Volt:**	FAHFW09A3D, FAHFW12A3D, FAHFW18A3D, FAHFW24A3D
Cassette	**230-Volt:**	FPHFC09A3D, FPHFC12A3D, FPHFC18A3D, FPHFC24A3D, FPHFC36A3D
Ducted	**230-Volt:**	FPHFD09A3D, FPHFD12A3D, FPHFD18A3D, , FPHFD24A3D, FPHFD36A3D

THE EXPERTS IN ROOM AIR CONDITIONING

96161400_01

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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.

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.

Maintenance is the responsibility of the owner. Failure to properly maintain or repair equipment may result in personal injury and/or various types of property damage (fire, flood, etc.).

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

This service manual is designed to be used in conjunction with the installation and operation manuals provided with each air conditioning system.
This service manual was written to assist the professional service technician to quickly and accurately diagnose and repair malfunctions.

Installation procedures are not given in this manual. They are given in the Installation/Operation manual which can be acquired on the Friedrich website. Click the Link or scan the QR code to be directed to the Professional page where you can locate our technical literature.

SAFETY IS 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 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.

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.

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

This symbol indicates that this appliance uses a flammable refrigerant. If the refrigerant is leaked and is exposed to an external ignition source, there is a risk of fire.

This symbol indicates that the Operation Manual should be read carefully.

This symbol indicates that service personnel should be handling this equipment with reference to the installation manual.

This symbol indicates that information is available such as the Installation and Operation manual, or the Service Manual.

INTRODUCTION

Personal Injury Or Death Hazards

	⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
SAFETY FIRST	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:

- Unplug 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.
- 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 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.
- Never operate the unit on an extension cord.
- Follow all safety precautions and use proper and adequate protective safety aids such as: gloves, goggles, clothing, properly insulated tools, and testing equipment etc.
- Failure to follow proper safety procedures and/or these warnings can result in serious injury or 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.
- Ensure that the units drain has 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

Personal Injury Or Death Hazards

⚠WARNING: The manufacturer's warranty does not cover any damage or defect to the air conditioner caused by the attachment or use of any components, accessories or devices (other than those authorized by the manufacturer) into, onto or in conjunction with the air conditioner. You should be aware that the use of unauthorized components, accessories or devices may adversely affect the operation of the air conditioner and may also endanger life and property. The manufacturer disclaims any responsibility for such loss or injury resulting from the use of such unauthorized components, accessories or devices.

⚠WARNING: This appliance is not intended for use by persons (Including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

⚠WARNING: The maximum altitude for this appliance is 2,000 meters(6,562 feet).

Do not use above 2,000 meters(6,562 feet).

⚠WARNING: Electrical Shock Hazard

Disconnect all power to the unit before starting maintenance. All electrical connections and wiring MUST be installed by a qualified electrician and conform to the National Code and all local codes which have jurisdiction. Failure to do so can result in property damage, severe electrical shock or death.

⚠WARNING: Read Installation Manual

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 70-2023 national electric code or current edition, International Mechanic code 2021 or current edition, and any other local or national codes.

⚠WARNING: Safety First

Do not remove, disable, or bypass this unit's safety devices. Doing so may cause fire, injuries, or death.

⚠WARNING: This Product uses R-32 Refrigerant

Refrigerant Safety Group A2L

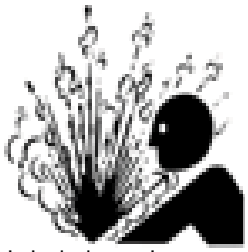
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

⚠WARNING: Refrigeration System under High pressure



Do not puncture, heat, expose to flame or incinerate. Only certified refrigeration technicians should service this equipment. R32 systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used.

⚠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: Keep all air circulation and ventilation openings free from obstruction.

⚠WARNING: The unit should not be in contact with any equipment that will transmit vibration to the unit. Any excessive vibration or pulsation to the unit could result in damage to the refrigerant tubing.

INTRODUCTION

Model And Serial Number Location

Indoor Unit
On side of Unit

Figure 101 (Indoor Unit Model Nameplate location)

Outdoor Unit
On side of Unit

Figure 102 (Outdoor Unit Model Nameplate location)

INTRODUCTION

Model Identification Guide

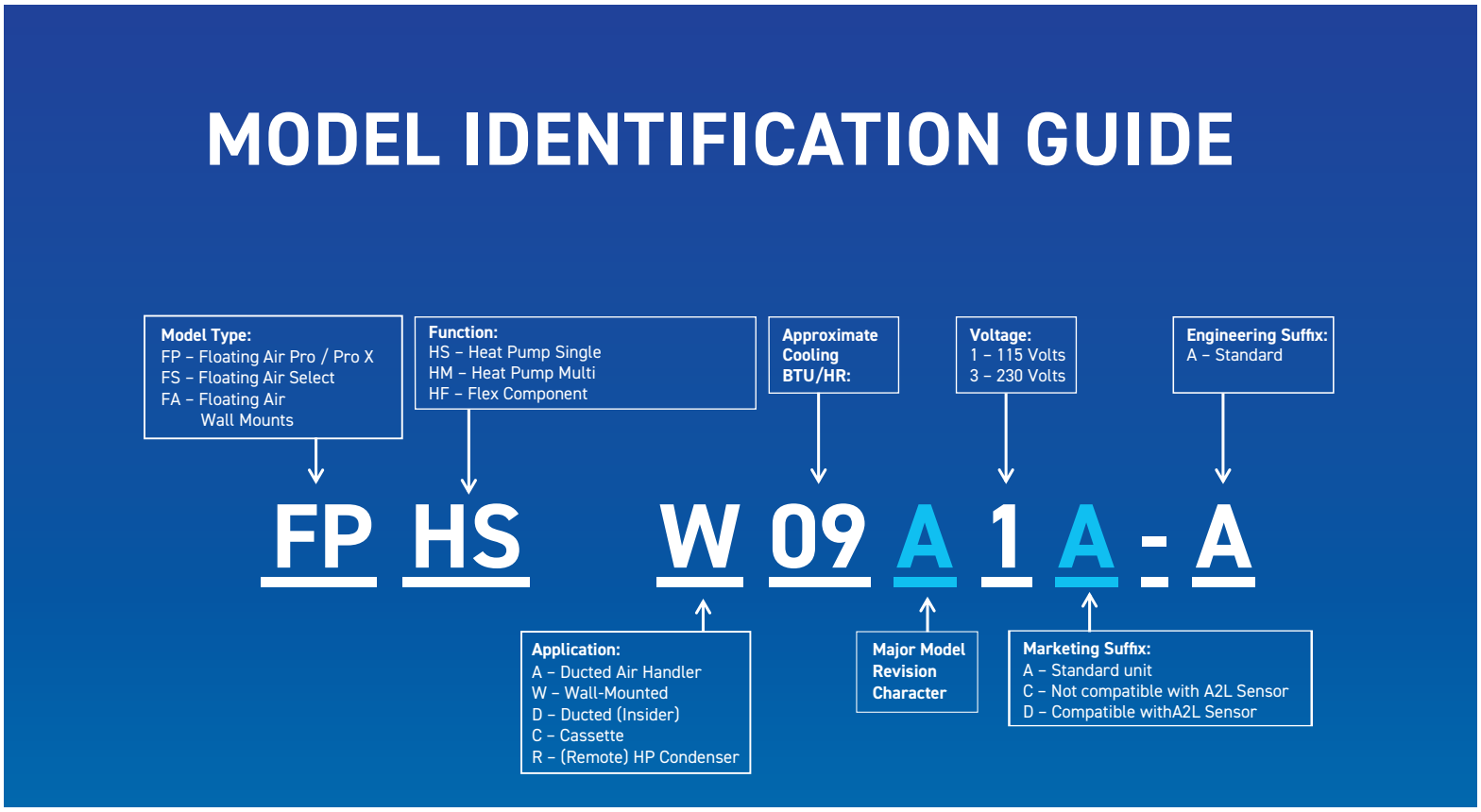


Figure 103 (Model Number Reference Guide)

Serial Number Reference Guide

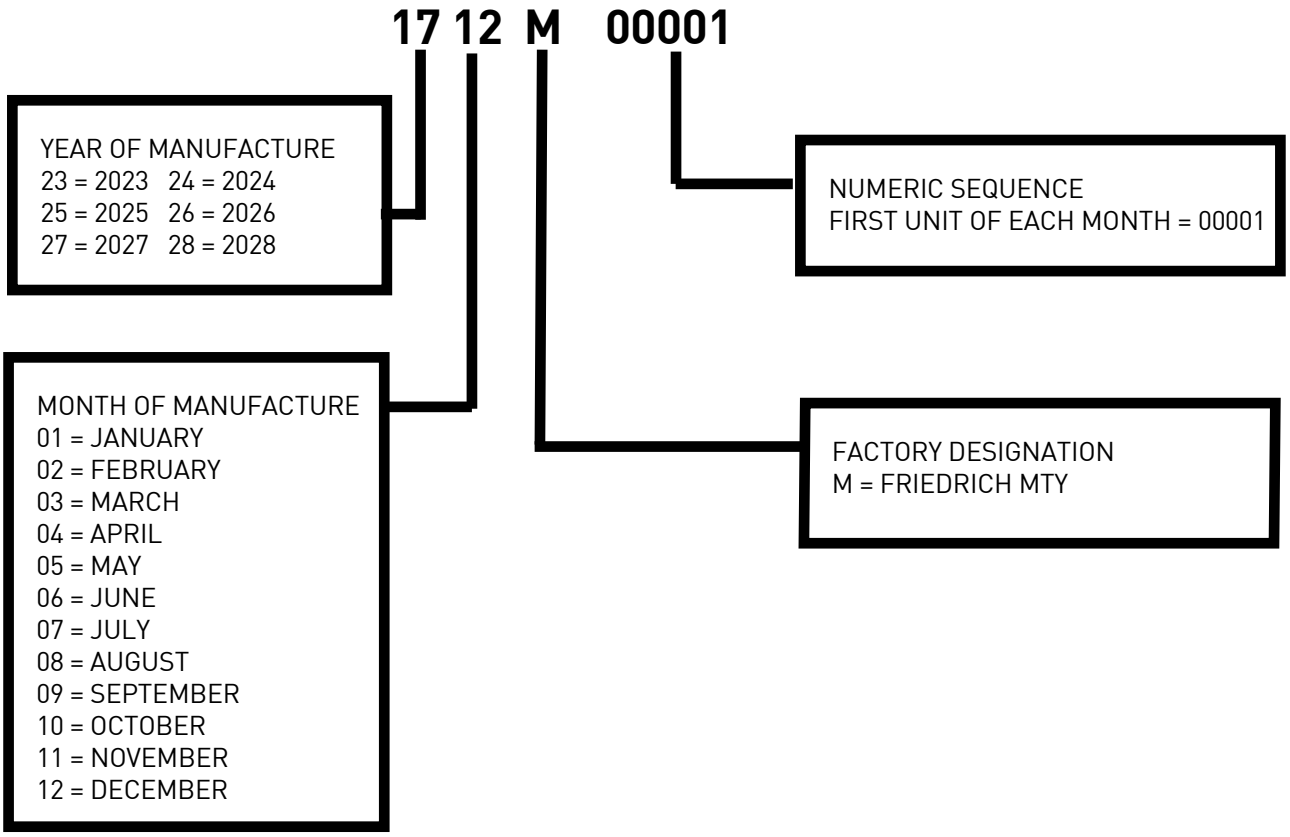


Figure 104 (Serial Number Reference Guide)

SPECIFICATION

Wall Mount 9-24k BTU

	FAC Model Set	Unit	FXHW093D	FXHW123D	FXHW183D	FXHW243D
	FAC Indoor Model		FAHFW09A3D	FAHFW12A3D	FAHFW18A3D	FAHFW24A3D
	FAC Outdoor Model		FPHFR09A3D	FPHFR12A3D	FPHFR18A3D	FPHFR24A3D
Model	Power Supply	V/ph/Hz	208~230/1/60	208~230/1/60	208~230/1/60	208~230/1/60
	Energy Star Standard	Y/N	Y	Y	Y	Y
	Energy Star -Cold Climate	Y/N	Y	Y	Y	Y
Performance						
Cooling	Rated Capacity @ 95°F	Btu/h	9000	12000	18000	24000
	Cooling Capacity Range(MIN-MAX)	Btu/h	4600~12700	4600~12700	7800~22000	10000~28000
	Capacity at 115°F	Btu/h	7200	9600	14400	19200
	Power Input	W	750	1000	1500	2000
	Current	A	3.88	4.5	6.65	8.87
	EER2 @ 95°F	Btu/h/W	12.0	12.0	12.0	12.0
	SEER2	Btu/h/W	22.0	22.0	21.0	21.0
	Cooling Operating Range	°F	5°F–125°F	5°F–125°F	5°F–125°F	5°F–125°F
Heating	Rated Capacity @ 47°F	Btu/h	9,000	12,000	18,000	24,000
	Heating Capacity Range (MIN-MAX)	Btu/h	5,500-16,000	5,500-16,000	7,800-23,000	6,700-30,000
	Power Input	W	750	1000	1440	2069
	Current	A	3.88	4.5	6.38	8.5
	COP @ 47°F	W/W	TBD	TBD	3.66	3.52
	COP @ 5°F	W/W	1.80	1.80	1.80	1.80
	HSPF2	Btu/h/W	10.50	10.50	10.00	10.00
	Rated Capacity Heating @ 17°F (-8.3°C)	Btu/h	6,500	8,700	14,100	19,100
	Maximum Heating Capacity @17F -8.3	Btu/h	12000	12000	18000	19700
	Maximum Heating Capacity @ 5F (-15°C)	Btu/h	12,000	12,000	18,000	24,000
	Maximum Heating Capacity @-5F (-20.5°C)	Btu/h	9600	9600	14400	19200
	Maximum Heating Capacity @ -13F (-25°C)	Btu/h	8,400	8,400	12,600	16,200
	Maximum Heating Capacity @-22F (-30°C)	Btu/h	4100	4100	6000	8400
	Heating Operating Range	°F	-22°F–75°F	-22°F–75°F	-22°F–75°F	-22°F–75°F
Indoor AirFlow	Air Circulation(Max)	ft3 CFM	382	394	647	706
	Air Circulation(high)	ft3 CFM	341	365	588	647
	Air Circulation(medium)	ft3 CFM	294	312	482	559
	Air Circulation(low)	ft3 CFM	247	253	382	441
	Sound Rating - Indoor (Max/H/M/L/Quiet)	dB (A)	42/39/37/35/32	42/39/37/35/32	48/45/41/39/36	50/48/43/41/39
Indoor Fan Motor	Model		KD09060033	KD09060033	ZWK465A00410	K1B310497
	Output	W	25	25	35	35
	Speed(Hi/Med/Lo)	r/min	1101/938/800	1154/992/800	1100/960/800	1200/1040/880
Outdoor Airflow	Air Circulation(high) for Outdoor	CFM	1354	1354	1853	2235
	Sound Rating - Outdoor	dB (A)	64	64	68	71
Outdoor Fan Motor	Model		ZKFN-40-8-33	ZKFN-40-8-33	ZWB2710L01AL	ZWB278L46A
	Output	W	37	37	62	106
	Speed (Hi)	r/min	880	880	880	870

Figure 201

SPECIFICATIONS

Wall Mount 9-24k BTU

	FAC Model Set	Unit	FXHW093D	FXHW123D	FXHW183D	FXHW243D
	FAC Indoor Model		FAHFW09A3D	FAHFW12A3D	FAHFW18A3D	FAHFW24A3D
	FAC Outdoor Model		FPHFR09A3D	FPHFR12A3D	FPHFR18A3D	FPHFR24A3D
Electrical	Rated Current	Cooling (A)	3.88	4.50	6.65	8.87
		Cooling (W)	750	1,000	1,500	2,000
		Heating (A)	3.88	4.50	6.38	8.50
		Heating (W)	750	1,000	1,440	2,069
	MOP (Maximum Over current Protection)	A	20	20	25	30
	MCA(Minimum Circuit Ampacity)	A	12	12	16	22
	communication wire size and type		4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire
Refrigeration	Moisture Removal	pints/hr	2.4	3.7	4.2	6.3
	Refrigerant		R454B	R454B	R454B	R454B
	Refrigerant charge volume	oz	38.1	38.1	56.4	74.1
	Compressor type		Twin ROTARY	Twin ROTARY	Twin ROTARY	Twin ROTARY
	Compressor MFG		CRSS	CRSS	CRSS	CRSS
	Compressor model #		C-6RZ146H1DJ	C-6RZ146H1DJ	C-6RZ210H1EBF	C-7RZ280H1AAF
	Expansion Device		EEV	EEV	EEV	EEV
	Evaporator material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Condenser material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Liquid Pipe	inch	1/4	1/4	1/4	3/8
	Gas Pipe	inch	3/8	3/8	1/2	5/8
	Max. Pipe Length (Total Equivalent)	ft	130	130	150	165
	Max. Elevation (indoor units higher than outdoor unit)	ft	50	50	80	100
	Pre-charge Pipe Length	ft	25	25	25	25
	additional refrigerant charge per foot after 25 ft	ounces/foot	0.16	0.16	0.16	0.38
DIMENSIONS & WEIGHT						
Indoor Unit	Dimension (WxHxD)	inches	33 7/8 ×11 1/4 ×8 1/2	33 7/8 ×11 1/4 ×8 1/2	45 1/4 ×13 1/4 ×10 1/8	45 1/4 ×13 1/4 ×10 1/8
		mm	860×285×216	860×285×216	1148×336×256	1148×336×256
	Packing(LxHxW)	inches	36 5/8 ×15 ×11 1/4	36 5/8 ×15 ×11 1/4	47 7/8 ×16 1/8 ×13	47 7/8 ×16 1/8 ×13
		mm	930×380×285	930×380×285	1215×410×330	1215×410×330
	Net Weight	lbs	22.1	22.1	34.2	34.2
		kg	10.0	10.0	15.5	15.5
	Shipping Weight	lbs	26.5	26.5	39.7	39.7
		kg	12.0	12.0	18.0	18.0

Figure 201

SPECIFICATIONS

Wall Mount 9-24k BTU

	FAC Model Set	Unit	FXHW093D	FXHW123D	FXHW183D	FXHW243D
	FAC Indoor Model		**FAHFW09A3D**	**FAHFW12A3D**	**FAHFW18A3D**	**FAHFW24A3D**
	FAC Outdoor Model		**FPHFR09A3D**	**FPHFR12A3D**	**FPHFR18A3D**	**FPHFR24A3D**
Outdoor Unit	Dimension (WxHxD)	inches 1/8ths	31-7/8×22-7/8×11	31-7/8×22-7/8×11	33-7/8 ×26-3/8 ×12-1/4	35-3/8×29-1/2×13-3/8
		mm	810×580×280	810×580×280	860×670×310	900×750×340
	Packing(LxHxW)	inches 1/8ths	37×16-1/2×25-1/4	37×16-1/2×25-1/4	39×28-3/4 ×17-3/4	41×32-5/8×18-1/8
		mm	940×420×640	940×420×640	990×730×450	1040×830×460
	Net Weight	lbs	79.4	79.4	103.6	123.4
		kg	36	36	47	56
	Shipping Weight	lbs	86	86	111.3	132.3
		kg	39	39	50.5	60
Stack height (Stack Limit) Indoor Unit/Outdoor Unit			Outdoor Unit :4 Indoor Unit :8	Outdoor Unit :4 Indoor Unit :8	Outdoor Unit :3 Indoor Unit :8	Outdoor Unit :3 Indoor Unit : 8
A2L Sensor Capable		Y/N	Y	Y	Y	Y
A2L Sensor Installed		Y/N	N	N	N	N

Figure 201

SPECIFICATIONS

Cassette (9-18k BTU)

FAC Model Set		Unit	FPHC093D	FPHC123D	FPHC183D
FAC Indoor Model			FPHFC09A3D	FPHFC12A3D	FPHFC18A3D
FAC Outdoor Model			FPHFR09A3D	FPHFR12A3D	FPHFR18A3D
Power Supply		V/ph/Hz	208~230/1/60	208~230/1/60	208~230/1/60
Energy Star Standard		Y/N	Y	Y	Y
Energy Star -Cold Climate		Y/N	Y	Y	Y
Performance					
Cooling	Rated Capacity @ 95°F	Btu/h	9,000	12,000	18,000
	Cooling Capacity Range (MIN-MAX)	Btu/h	4,300-14,500	4,300-14,500	7,800-24,000
	Capacity at @ 115°F	Btu/h	7200	9600	14400
	Power Input	W	750	1000	1500
	Current	A	3	4.3	6.3
	EER2 @ 95°F	Btu/h/W	12.00	12.00	12.00
	SEER2	Btu/h/W	20.00	20.00	20.00
	Cooling Operating Range	°F	5°F–125°F	5°F–125°F	5°F–125°F
Heating	Rated Capacity @ 47°F	Btu/h	9,000	12,000	18,000
	Heating Capacity Range (MIN-MAX)	Btu/h	5,500-18,000	5,500-18,000	8,500-24,000
	Power Input	W	750	1000	1560
	Current	A	3	4.25	6.78
	COP @ 47°F	W/W	3.52	3.52	3.38
	COP @ 5°F	W/W	1.80	1.80	2.00
	HSPF2	Btu/h/W	9.50	9.50	10.00
	Rated Capacity Heating @ 17°F (-8.3°C)	Btu/h	8,900	8,900	14,100
	Maximum Heating Capacity @ 5°F (-15°C)	Btu/h	12,000	12,000	18,000
	Maximum Heating Capacity @-5°F (-20.5°C)	Btu/h	9600	9600	14400
	Maximum Heating Capacity @ -13F (-25°C)	Btu/h	8,400	8,400	12,600
	Maximum Heating Capacity @-22F (-30°C)	Btu/h	4100	4100	6000
	Heating Operating Range	°F	-22°F–75°F	-22°F–75°F	-22°F–75°F
Indoor AirFlow	Air Circulation (Max/H/M/L)	ft3 CFM	341/341/294/235	341/341/294/235	643/643/554/465
	Sound Rating - Indoor (High)	dB (A)	52	52	50
Indoor Fan Motor	Model		ZW465B500021	ZW465B500021	ZW511B500061
	Output	W	57	57	75
	Speed(Hi/Med/Lo)	r/min	700/600/500	700/600/500	420/381/320
Outdoor Airflow	Air Circulation (Hi) for Outdoor	ft3 CFM	1,354	1,354	1,853
	Sound Rating - Outdoor (Hi)	dB (A)	64	64	68
Outdoor Fan Motor	Model		ZKFN-40-8-33	ZKFN-40-8-33	ZWB2710L01AL
	Output	W	40	40	60
	Speed (Hi)	r/min	880	880	880

Figure 202

SPECIFICATIONS

Cassettes (9-18k BTU)

FAC Model Set		Unit	FPHC093D	FPHC123D	FPHC183D
FAC Indoor Model			FPHFC09A3D	FPHFC12A3D	FPHFC18A3D
FAC Outdoor Model			FPHFR09A3D	FPHFR12A3D	FPHFR18A3D
Electrical	Rated Current	Cooling (A)	3.00	4.30	6.30
		Cooling (W)	750	1,000	1,500
		Heating (A)	3.00	4.25	6.78
		Heating (W)	750	1,000	1,560
	MOP (Maximum Over current Protection)	A	20	20	25
	MCA (Minimum Circuit Ampacity)	A	12	12	16
	Communication wire size and type		4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire
Refrigeration	Moisture Removal	pints/hr	1.96	3.14	4.22
	Refrigerant		R454B	R454B	R454B
	Refrigerant charge volume	oz	38.1	38.1	56.4
	Compressor type		Twin ROTARY	Twin ROTARY	Twin ROTARY
	Compressor MFG		CRSS	CRSS	CRSS
	Compressor model #		C-6RZ146H1DJ	C-6RZ146H1DJ	C-6RZ210H1EBF
	Expansion Device		EEV	EEV	EEV
	Evaporator material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Condenser material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Liquid Pipe	in	1/4	1/4	1/4
	Gas Pipe	in	3/8	3/8	1/2
	Max. Pipe Length ((Total Equivalent)	ft	130	130	150
	Max. Elevation (indoor units higher than outdoor unit)	ft	50	50	80
	Pre-charge Pipe Length	ft	25	25	25
	Additional refrigerant charge per foot after pre-charge length	oz/ft	0.16	0.16	0.16
DIMENSIONS & WEIGHT					
Indoor Unit	Dimension (WxHxD)	in	22-1/2 × 8-1/2 × 22-1/2	22-1/2 × 8-1/2 × 22-1/2	33-1/8 × 9-1/4 × 33-1/8
		mm	570×215×570	570×215×570	840×236×840
	Packing(LxWxH)	in	28-3/4 ×26-1/4×11-1/2	28-3/4 ×26-1/4×11-1/2	37-3/8 ×12-5/8 ×37-3/8
		mm	730×668×292	730×668×292	950×950×320
	Net Weight	lbs	34.2	34.2	52.9
		kg	15.5	15.5	24.0
	Shipping Weight	lbs	40.8	40.8	63.9
		kg	18.5	18.5	29.0
Outdoor Unit	Dimension (WxHxD)	in	31-7/8×22-7/8×11	31-7/8×22-7/8×11	33-7/8 ×26-3/8 ×12-1/4
		mm	810×580×280	810×580×280	860×670×310
	Packing (LxWxH)	in	37×16-1/2×25-1/4	37×16-1/2×25-1/4	39×17-3/4×28-3/4
		mm	940×420×640	940×420×640	990×450×730
	Net Weight	lbs	79.4	79.4	103.6
		kg	36.0	36.0	47.0
	Shipping Weight	lbs	86.0	86.0	111.3
		kg	39.0	39.0	50.5

Figure 202

SPECIFICATIONS

Cassettes (9-18k BTU)

FAC Model Set		Unit	FPHC093D	FPHC123D	FPHC183D
FAC Indoor Model			FPHFC09A3D	FPHFC12A3D	FPHFC18A3D
FAC Outdoor Model			FPHFR09A3D	FPHFR12A3D	FPHFR18A3D
Panel (Grille)	Dimension (WxHxD)	in	24-3/8×1-5/8×24-3/8	24-3/8×1-5/8×24-3/8	37-3/8×2×37-3/8
		mm	620×40×620	620×40×620	950×50×950
	Packing (LxWxH)	in	27-1/8×26-3/4 ×4-1/2	27-1/8×26-3/4 ×4-1/2	40-1/8×39-3/8×4-1/8
		mm	690×680×115	690×680×115	1,020×1,000×105
	Net Weight	lbs	5.7	5.7	14.3
		kg	3	3	7
	Shipping Weight	lbs	9.9	9.9	19.8
		kg	5	5	9
Loading	Stack height (Stack Limit)		Outdoor Unit :4 Indoor Unit : 7	Outdoor Unit :4 Indoor Unit : 7	Outdoor Unit :3 Indoor Unit : 9
A2L Sensor Installed		Y/N	Y	Y	Y
Max Condensate pump lift		ft, in.	2', 5"	2', 5"	2', 5"

Figure 202

SPECIFICATIONS

Cassettes (24-36k BTU)

FAC Model Set		Unit	FPHC243D	FPHC363D
FAC Indoor Model			FPHFC24A3D	FPHSC36A3D
FAC Outdoor Model			FPHFR24A3D	FPHFR36A3D
Power Supply		V/ph/Hz	208~230/1/60	208~230/1/60
Energy Star Standard		Y/N	Y	Y
Energy Star -Cold Climate		Y/N	Y	Y
Performance				
Cooling	Rated Capacity @ 95°F	Btu/h	24,000	36,000
	Cooling Capacity Range (MIN-MAX)	Btu/h	9,000-30,000	12,000-45,000
	Capacity at @ 115°F	Btu/h	19200	28800
	Power Input	W	2000	3000
	Current	A	8.5	14.2
	EER2 @ 95°F	Btu/h/W	12.00	12.00
	SEER2	Btu/h/W	20.00	19.50
	Cooling Operating Range	°F	5°F–125°F	5°F–125°F
Heating	Rated Capacity @ 47°F	Btu/h	24,000	36,000
	Heating Capacity Range (MIN-MAX)	Btu/h	7,500-34,000	11,000-45,000
	Power Input	W	2000	2850
	Current	A	8.5	13.5
	COP @ 47°F	W/W	3.52	3.70
	COP @ 5°F	W/W	2.00	2.00
	HSPF2	Btu/h/W	10.50	9.50
	Rated Capacity Heating @ 17°F (-8.3°C)	Btu/h	19,100	25,500
	Maximum Heating Capacity @17°F (-8.3°C)	Btu/h	24,000	36000
	Maximum Heating Capacity @ 5°F (-15°C)	Btu/h	24,000	36,000
	Maximum Heating Capacity @-5°F (-20.5°C)	Btu/h	19200	28800
	Maximum Heating Capacity @ -13°F (-25°C)	Btu/h	16,200	25,200
	Maximum Heating Capacity @-22°F - (30°C)	Btu/h	8400	13000
	Heating Operating Range	°F	-22°F–75°F	-22°F–75°F
Indoor AirFlow	Air Circulation (Max/H/M/L)	ft3 CFM	706/706/588/494	1,030/1,030/883/736
	Sound Rating - Indoor (High)	dB (A)	53	60
Indoor Fan Motor	Model		ZW511B500061	ZW511B500062
	Output	W	75	106
	Speed (Hi/Med/Lo)	r/min	470/400/340	660/560/480
Outdoor Airflow	Air Circulation (Hi) for Outdoor	ft3 CFM	2,235	3,350
	Sound Rating - Outdoor (Hi)	dB (A)	71	74
Outdoor Fan Motor	Model		ZWB278L46A	ZWB4710L17A
	Output	W	110	250
	Speed (Hi)	r/min	870	850

Figure 203

SPECIFICATIONS

Cassettes (24-36k BTU)

FAC Model Set			Unit	FPHC243D	FPHC363D
FAC Indoor Model				FPHFC24A3D	FPHSC36A3D
FAC Outdoor Model				FPHFR24A3D	FPHFR36A3D
Electrical	Rated Current	Cooling (A)		8.50	14.20
		Cooling (W)		2,000	3,000
		Heating (A)		8.50	13.50
		Heating (W)		2,000	2,850
	MOP (Maximum Over current Protection)	A		30	50
	MCA(Minimum Circuit Ampacity)	A		22	30
	communication wire size and type			4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire
Refrigeration	Moisture Removal	pints/hr		6.26	9.55
	Refrigerant			R454B	R454B
	Refrigerant charge volume	oz		74.1	112.8
	Compressor type			Twin ROTARY	Twin ROTARY
	Compressor MFG			CRSS	CRSS
	Compressor model #			C-7RZ280H1AAF	C-7RZ420H1CAF
	Expansion Device			EEV	EEV
	Evaporator material			Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Condenser material			Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Liquid Pipe	inch		3/8	3/8
	Gas Pipe	inch		5/8	5/8
	Max. Pipe Length (Total Equivalent)	ft		165	164
	Max. Elevation (indoor units higher than outdoor unit)	ft		100	98
	Pre-charge Pipe Length	ft		25	25
	additional refrigerant charge per foot after 25 ft	ounces/foot		0.38	0.38
DIMENSIONS & WEIGHT					
Indoor Unit	Dimension (WxHxD)	in		33-1/8 × 9-1/4 × 33-1/8	33-1/8 × 10-3/4 × 33-1/8
		mm		840×236×840	840×272×840
	Packing (LxWxH)	in		37-3/8 ×12-5/8 ×37-3/8	37-3/8 ×14-1/8×37-3/8
		mm		950×950×320	950×360×950
	Net Weight	lbs		52.9	57.3
		kg		24.0	26.0
	Shipping Weight	lbs		63.9	70.6
		kg		29.0	32.0

Figure 203

SPECIFICATIONS

Cassettes (24-36k BTU)

FAC Model Set		Unit	FPHC243D	FPHC363D
FAC Indoor Model			FPHFC24A3D	FPHSC36A3D
FAC Outdoor Model			FPHFR24A3D	FPHFR36A3D
Outdoor Unit	Dimension (WxHxD)	in	35-3/8×29-1/2×13-3/8	43-1/4×34-1/2×17-3/4
		mm	900×750×340	1100×875×450
	Packing (LxWxH)	in	41×32-5/8×18-1/8	45-7/8×39-1/2×21-1/4
		mm	1,040×830×460	1,165×1,005×540
	Net Weight	lbs	123.4	185.2
		kg	56.0	84.0
	Shipping Weight	lbs	132.3	209.4
		kg	60.0	95.0
Panel (Grille)	Dimension (WxHxD)	in	37-3/8×2×37-3/8	37-3/8×2×37-3/8
		mm	950×50×950	950×50×950
	Packing (LxWxH)	in	40-1/8×39-3/8×4-1/8	40-1/8×4-1/8×39-3/8
		mm	1,020×1,000×105	1,020×105×1,000
	Net Weight	lbs	14.3	14.3
		kg	7	7
	Shipping Weight	lbs	19.8	19.8
		kg	9	9
Loading	Stack Limitation (Stack Limit)		Outdoor Unit :3 Indoor Unit : 9	Outdoor Unit :2 Indoor Unit : 9
A2L Sensor Installed		Y/N	Y	Y
Max Condensate pump lift		ft, in.	2' 5"	2' 5"

Figure 203

SPECIFICATIONS

Ducted (9-18k BTU)

FAC Model Set		Unit	FPHD093D	FPHD123D	FPHD183D
FAC Indoor Model			FPHFD09A3D	FPHFD12A3D	FPHFD18A3D
FAC Outdoor Model			FPHFR09A3D	FPHFR12A3D	FPHFR18A3D
Power Supply		V/ph/Hz	208~230/1/60	208~230/1/60	208~230/1/60
Energy Star Standard		Y/N	Y	Y	Y
Energy Star -Cold Climate		Y/N	Y	Y	Y
Performance					
Cooling	Rated Capacity @ 95°F	Btu/h	9,000	12,000	18,000
	Cooling Capacity Range (MIN-MAX)	Btu/h	4,300-14,500	4,300-14,500	6,500-25,000
	Capacity at @ 115°F	Btu/h	7200	9600	18000
	Power Input	W	769	1025	1538
	Current	A	3.1	4.5	6.6
	EER2 @ 95°F	Btu/h/W	11.70	11.71	11.69
	SEER2	Btu/h/W	19.50	19.50	19.00
	Cooling Operating Range	°F	5°F–125°F	5°F–125°F	5°F–125°F
Heating	Rated Capacity @ 47°F	Btu/h	9,000	12,000	18,000
	Heating Capacity Range (MIN-MAX)	Btu/h	5,300-18,000	5,300-18,000	5,700-30,000
	Power Input	W	750	1000	1540
	Current	A	2.86	4.3	6.78
	COP @ 47°F	W/W	3.52	3.52	3.43
	COP @ 5°F	W/W	1.80	1.80	2.00
	HSPF2	Btu/h/W	9.50	9.50	9.00
	Rated Capacity Heating @ 17°F (-8.3°C)	Btu/h	8,700	8,700	13,200
	Maximum Heating Capacity @17F (-8.3°C)	Btu/h	8700	8700	13200
	Maximum Heating Capacity @ 5F (-15°C)	Btu/h	12,000	12,000	18,000
	Maximum Heating Capacity @-5F - (-20.5°C)	Btu/h	12000	12000	18000
	Maximum Heating Capacity @ -13F (-25°C)	Btu/h	8,400	8,400	12,600
	Maximum Heating Capacity @-22F (-30°C)	Btu/h	8400	8400	12600
	Working Temperature Range		-22°F–75°F	-22°F–75°F	6000
Indoor AirFlow	Air Circulation (Max/H/M/L)	ft3 CFM	324/324/294/235	324/324/294/235	530/530/471/412
	Sound Rating - Indoor (High)	dB (A)	52	52	50
	Air Circulation(medium)	ft3 CFM	294	294	471
	ESP (in-H2O)	Rated with filter	0.18	0.18	0.18
		Range with filter	0-0.12	0-0.12	0-0.56
Indoor Fan Motor	Model		TWZ65-S01	TWZ65-S01	ZWF-100H
	Output	W	57	57	75
	Speed (Hi/Med/Lo)	r/min	1,110/1,000/800	1,110/1,000/800	920/820/720
Outdoor Airflow	Air Circulation (Hi) for Outdoor	ft3 CFM	1,354	1,354	1,853
	Sound Rating - Outdoor (Hi)	dB (A)	64.0	64.0	68.0

Figure 204

SPECIFICATIONS

Ducted (9-18k BTU)

FAC Model Set		Unit	FPHD093D	FPHD123D	FPHD183D
FAC Indoor Model			FPHFD09A3D	FPHFD12A3D	FPHFD18A3D
FAC Outdoor Model			FPHFR09A3D	FPHFR12A3D	FPHFR18A3D
Outdoor Fan Motor	Model		ZKFN-40-8-33	ZKFN-40-8-33	ZWB2710L01AL
	Output	W	40	40	60
	Speed (Hi)	r/min	880	880	880
Electrical	Rated Current	Cooling (A)	3.10	4.50	6.70
		Cooling (W)	769	1,025	1,540
		Heating (A)	2.86	4.30	6.78
		Heating (W)	750	1,000	1,540
	MOP (Maximum Over current Protection)	A	20	20	25
	MCA (Minimum Circuit Ampacity)	A	12	12	16
	communication wire size and type	No.x AWG	4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire
Refrigeration	Moisture Removal	pints/hr	2.35	3.66	4.26
	Refrigerant		R454B	R454B	R454B
	Refrigerant charge volume	oz	38.1	38.1	56.4
	Compressor type		Twin ROTARY	Twin ROTARY	Twin ROTARY
	Compressor MFG		CRSS	CRSS	CRSS
	Compressor model #		C-6RZ146H1DJ	C-6RZ146H1DJ	C-6RZ210H1EBF
	Expansion Device		EEV	EEV	EEV
	Evaporator material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Condenser material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Liquid Pipe	in	1/4	1/4	1/4
	Gas Pipe	in	3/8	3/8	1/2
	Max. Pipe Length (Total Equivalent)	ft	130	130	150
	Max. Elevation (indoor units higher than outdoor unit)	ft	50	50	80
	Pre-charge Pipe Length	ft	25	25	25
	Additional refrigerant charge per foot after pre-charge length	oz/ft	0.16	0.16	0.16
DIMENSIONS & WEIGHT					
Indoor Unit	Dimension (W×H×D)	in	35-7/8 ×7-1/2×17-5/8	35-7/8 ×7-1/2×17-5/8	31-1/2×9-5/8×27-1/2
		mm	910×190×447	910×190×447	800×245×700
	Packing (L×W×H)	in	42-1/2×22-1/4 ×11-1/4	42-1/2×22-1/4 ×11-1/4	38-5/8×12-3/8×31-7/8
		mm	1080×565×285	1080×565×285	980×315×810
	Net Weight	lbs	44.1	44.1	58.4
		kg	20.0	20.0	26.5
	Shipping Weight	lbs	51.8	51.8	58.4
		kg	23.5	23.5	31.0

Figure 204

SPECIFICATIONS

Ducted (9-18k BTU)

FAC Model Set		Unit	FPHD093D	FPHD123D	FPHD183D
FAC Indoor Model			FPHFD09A3D	FPHFD12A3D	FPHFD18A3D
FAC Outdoor Model			FPHFR09A3D	FPHFR12A3D	FPHFR18A3D
Outdoor Unit	Dimension (W×H×D)	in	31-7/8×22-7/8×11	31-7/8×22-7/8×11	33-7/8 ×26-3/8 ×12-1/4
		mm	810×580×280	810×580×280	860×670×310
	Packing (L×W×H)	in	37×16-1/2×25-1/4	37×16-1/2×25-1/4	39×28-3/4 ×17-3/4
		mm	940×420×640	940×420×640	990×730×450
	Net Weight	lbs	79.4	79.4	103.6
		kg	36.0	36.0	47.0
	Shipping Weight	lbs	86.0	86.0	111.3
		kg	39.0	39.0	50.5
Loading	Stack height (Stack Limit)		Outdoor Unit :4 Indoor Unit : 8	Outdoor Unit :4 Indoor Unit : 8	Outdoor Unit :3 Indoor Unit : 8
A2L Sensor Installed		Y/N	Y	Y	Y
Max Condensate pump lift		ft, in	2', 3"	2', 3"	2', 3"

Figure 204

SPECIFICATIONS

Ducted (24k-36k BTU)

FAC Model Set		Unit	FPHD243D	FPHD363D
FAC Indoor Model			FPHFD24A3D	FPHSD36A3D
FAC Outdoor Model			FPHFR24A3D	FPHFR36A3D
Type			Ducted	Ducted
Performance				
Power Supply		V/ph/Hz	208~230/1/60	208~230/1/60
Energy Star Standard		Y/N	Y	Y
Energy Star -Cold Climate		Y/N	Y	Y
Cooling	Rated Capacity @ 95°F	Btu/h	24,000	33,000
	Cooling Capacity Range (MIN-MAX)	Btu/h	9,000-31,500	12,000-45,000
	Capacity at @ 115°F	Btu/h	19200	28800
	Power Input	W	2050	2820
	Current	A	9.4	13.4
	EER2 @ 95°F	Btu/h/W	11.71	11.70
	SEER2	Btu/h/W	19.00	18.50
	Cooling Operating Range	°F	5°F–125°F	5°F–125°F
Heating	Rated Capacity @ 47°F	Btu/h	24,000	36,000
	Heating Capacity Range (MIN-MAX)	Btu/h	7,600-37,500	11,000-45,000
	Power Input	W	2050	2900
	Current	A	9.2	13.8
	COP @ 47°F	W/W	3.52	3.64
	COP @ 5°F	W/W	2.00	2.00
	HSPF2	Btu/h/W	9.50	9.00
	Rated Capacity Heating @ 17°F (-8.3°C)	Btu/h	15,800	25,500
	Maximum Heating Capacity @17°F (-8.3°C)	Btu/h	20700	36000
	Maximum Heating Capacity @ 5F (-15°C)	Btu/h	24,000	36,000
	Maximum Heating Capacity @-5F-(20.5)	Btu/h	19200	28800
	Maximum Heating Capacity @ -13F (-25°C)	Btu/h	16,000	25,200
	Maximum Heating Capacity @-22F (-30°C)	Btu/h	8400	13000
	Heating Operating Range	°F	-22°F–75°F	-22°F–75°F
Indoor AirFlow	Air Circulation (Max/H/M/L)	ft3 CFM	735/735/647/559	1,118/1,118/1,000/883
	Sound Rating - Indoor (High)	dB (A)	53	60
	Indoor Sound Power(High)	dB (A)	68	69
	ESP in-H	Rated **with** filter	0.6	0.6
		Range **with** filter	0-0.66	0-0.8
Indoor Fan Motor	Model		ZWF-210H	ZWK702B500021
	Output	W	75	106
	Speed (Hi/Med/Lo)	r/min	1,400/1,250/1,100	1,260/1,150/1,020
Outdoor Airflow	Air Circulation (Hi) for Outdoor	ft3 CFM	2,235	3,350
	Sound Rating - Outdoor (Hi)	dB (A)	71.0	74.0

Figure 205

SPECIFICATIONS

Ducted (24k-36k BTU)

FAC Model Set		Unit	FPHD243D	FPHD363D
FAC Indoor Model			FPHFD24A3D	FPHSD36A3D
FAC Outdoor Model			FPHFR24A3D	FPHFR36A3D
Outdoor Fan Motor	Model		ZWB278L46A	ZWB4710L17A
	Output	W	102	250
	Speed (Hi)	r/min	870	850
Electrical	Rated Current	Cooling (A)	9.40	13.40
		Cooling (W)	2,050	2,820
		Heating (A)	9.20	13.80
		Heating (W)	2,050	2,900
	MOP (Maximum Over current Protection)	A	30	50
	MCA (Minimum Circuit Ampacity)	A	22	30
	communication wire size and type	No.x AWG	4 x 14AWG 600v stranded wire	4 x 14AWG 600v stranded wire
Refrigeration	Moisture Removal	pints/hr	4.31	9.55
	Refrigerant		R454B	R454B
	Refrigerant charge volume	oz	74.1	112.8
	Compressor type		Twin ROTARY	Twin ROTARY
	Compressor MFG		CRSS	CRSS
	Compressor model #		C-7RZ280H1AAF	C-7RZ420H1CAF
	Expansion Device		EEV	EEV
	Evaporator material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Condenser material		Hydrophilic aluminium fin & Copper tube	Hydrophilic aluminium fin & Copper tube
	Liquid Pipe	in	3/8	3/8
	Gas Pipe	in	5/8	5/8
	Max. Pipe Length (Total Equivalent)	ft	165	164
	Max. Elevation (indoor units higher than outdoor unit)	ft	100	98
	Pre-charge Pipe Length	ft	25	25
	Additional refrigerant charge per foot after pre-charge length	oz/ft	0.38	0.38
DIMENSIONS & WEIGHT				
Indoor Unit	Dimension (W×H×D)	in	43-1/4×9-5/8×27-1/2	55-1/8 × 11-3/4 × 31-1/2
		mm	1100×245×700	1400×300×800
	Packing (L×W×H)	in	50-3/8×12-3/8×31-7/8	62-1/4×15×36-1/4
		mm	1280×315×810	1580×380×920
	Net Weight	lbs	73.9	112.4
		kg	33.5	51.0
	Shipping Weight	lbs	73.9	125.7
		kg	38.5	57.0

Figure 205

SPECIFICATIONS

Ducted (24k-36k BTU)

FAC Model Set		Unit	FPHD243D	FPHD363D
FAC Indoor Model			FPHFD24A3D	FPHSD36A3D
FAC Outdoor Model			FPHFR24A3D	FPHFR36A3D
Outdoor Unit	Dimension (W×H×D)	in	35-3/8×29-1/2×13-3/8	43-1/4×34-1/2×17-3/4
		mm	900×750×340	1100×875×450
	Packing (L×W×H)	in	41×32-5/8×18-1/8	45-7/8×39-1/2×21-1/4
		mm	1,040×830×460	1,165×1,005×540
	Net Weight	lbs	123.4	185.2
		kg	56.0	84.0
	Shipping Weight	lbs	132.3	209.4
		kg	60.0	95.0
Loading	Stack Limitation (Stack Limit)		Outdoor Unit :3 Indoor Unit : 8	Outdoor Unit :2 Indoor Unit : 7
A2L Sensor Installed		Y/N	Y	Y
Max Condensate pump lift		ft, in	2', 3"	2', 3"
Figure 205				

SPECIFICATIONS

Indoor Unit Clearances

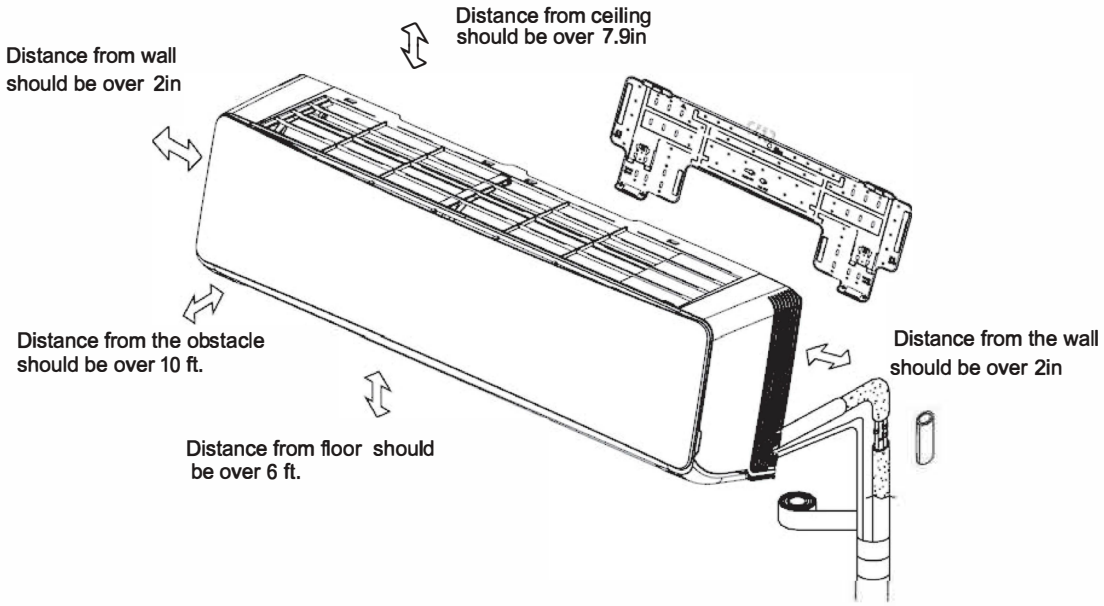


Figure 211 (Indoor Unit Clearances)

Outdoor Unit Clearances

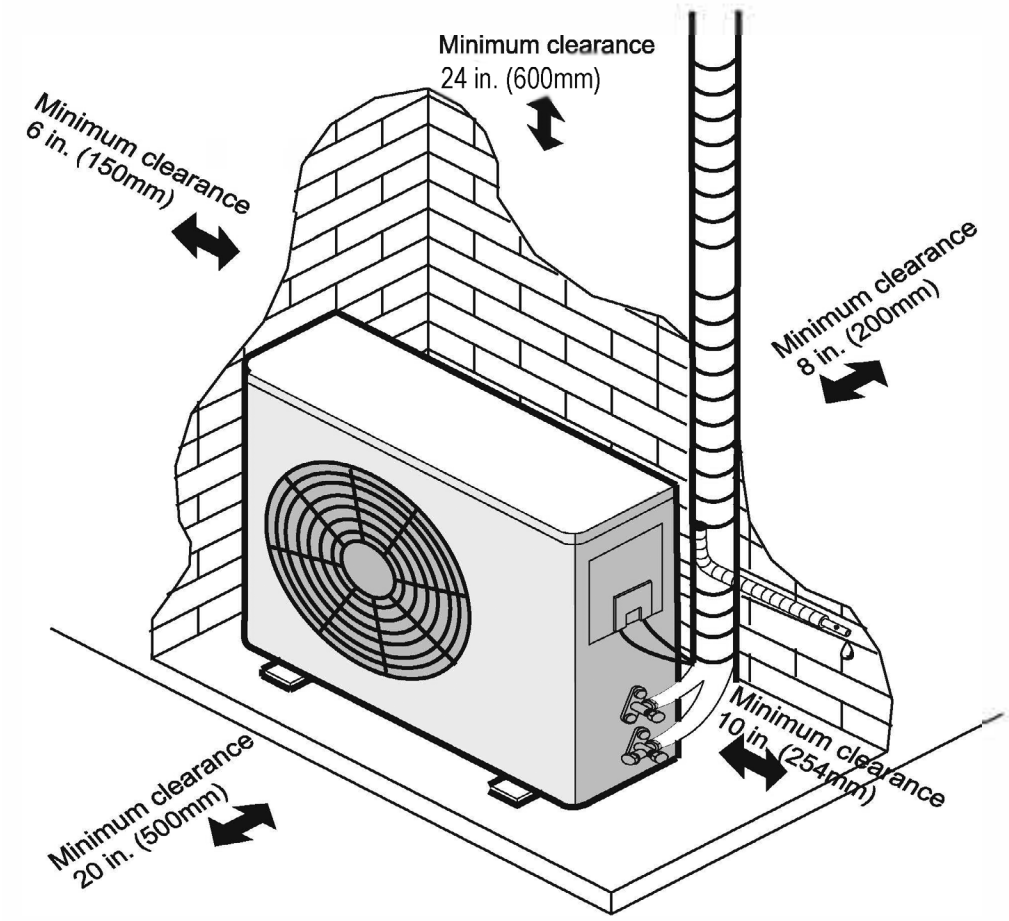


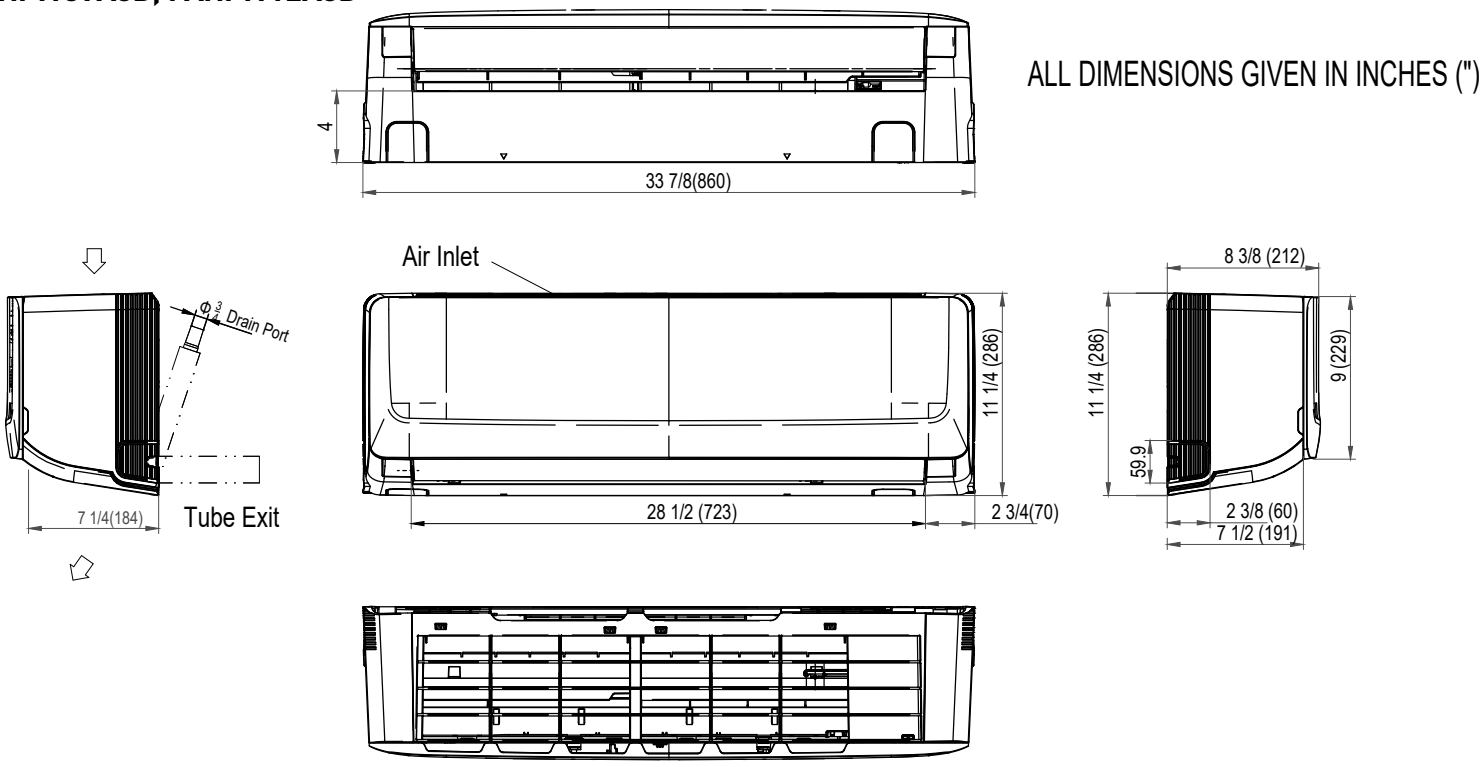
Figure 211 (Outdoor Unit Clearances)

SPECIFICATIONS

Dimensions Indoor Unit

FAHFW09A3D, FAHFW12A3D

ALL DIMENSIONS GIVEN IN INCHES (")



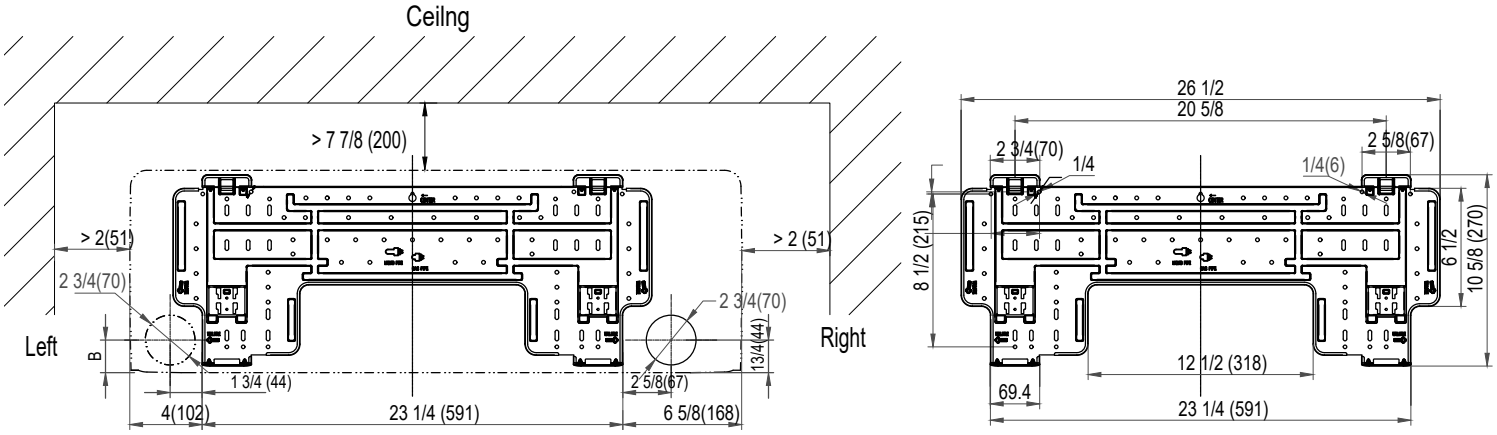
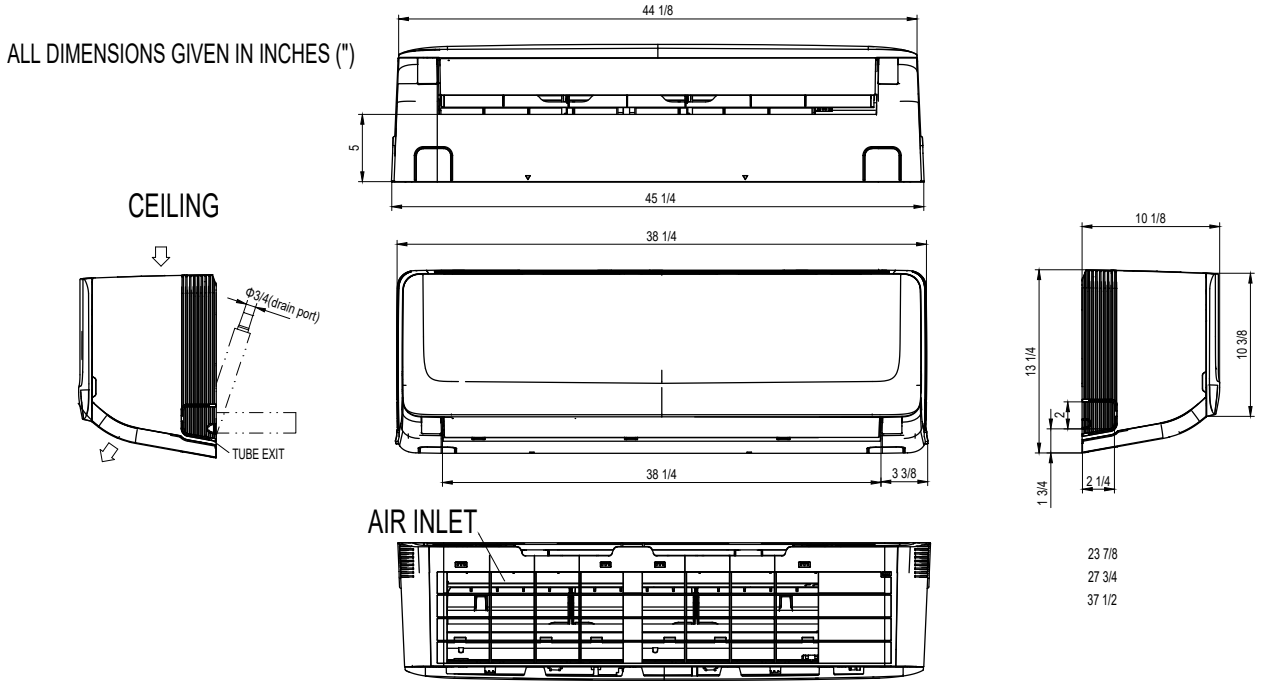


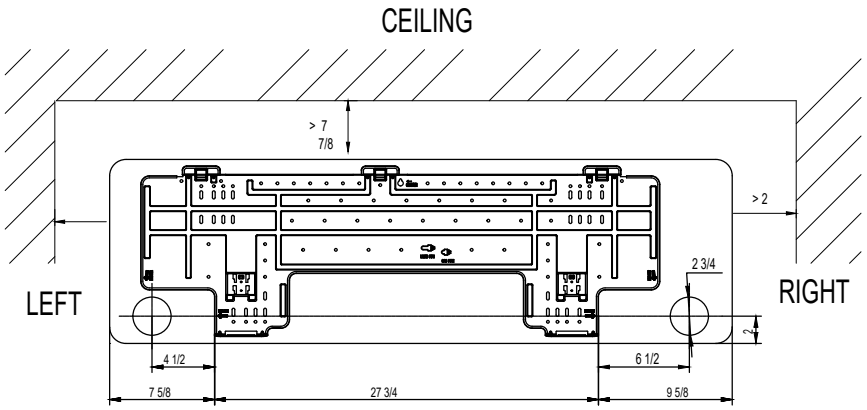
Figure 212

SPECIFICATIONS

Dimensions Indoor Unit

FAHFW18A3D, FAHFW24A3D





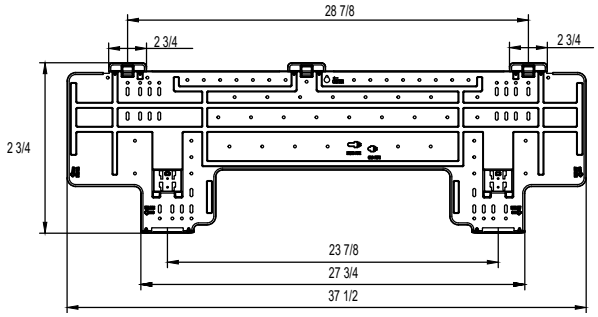


Figure 213

SPECIFICATIONS

Dimensions Outdoor Unit

FPHFR09A3D, FPHFR12A3D

Unit: in.(mm)

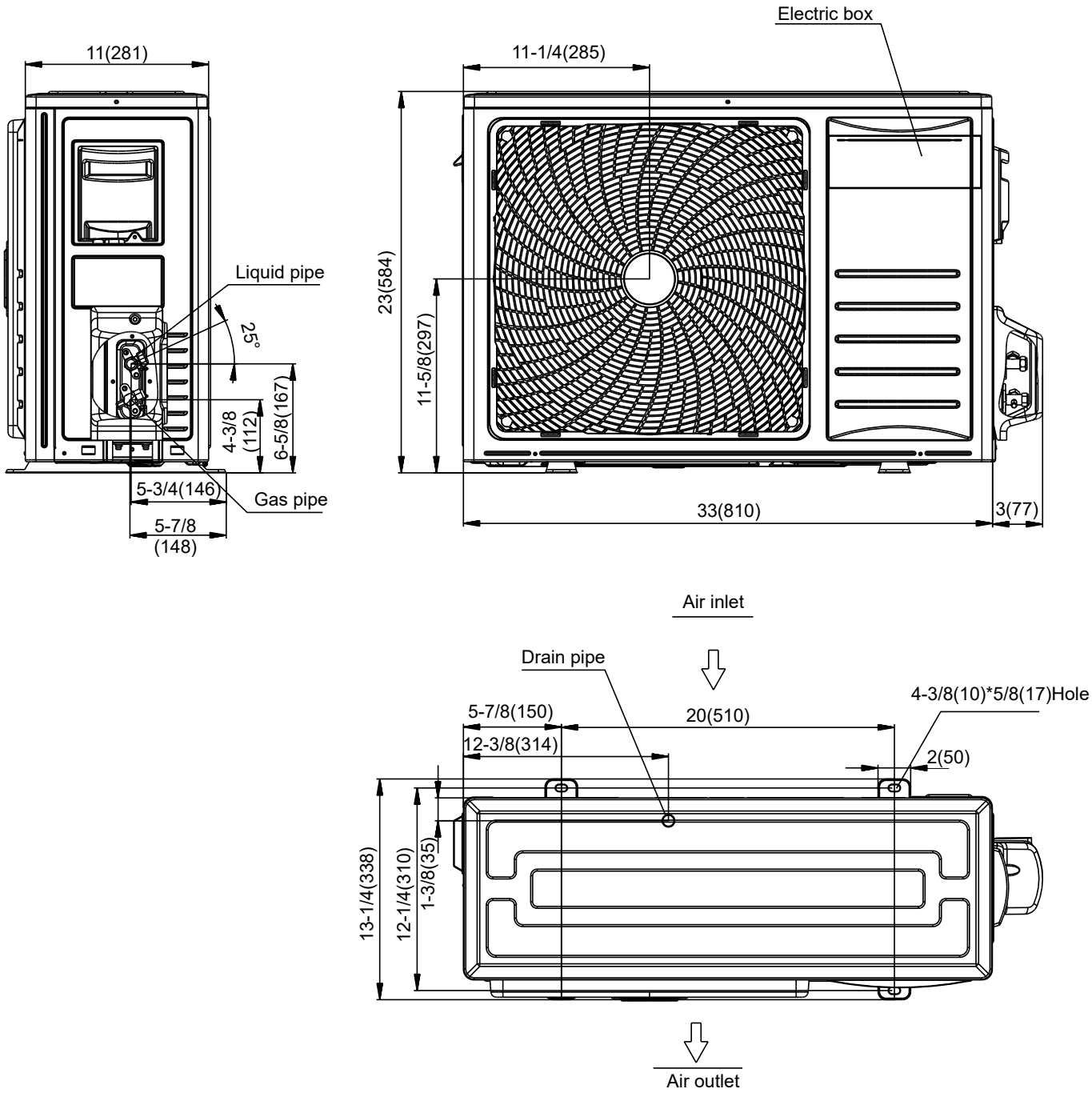


Figure 214

SPECIFICATIONS

Dimensions Outdoor Unit

FPHFR18A3D

Unit : in.(mm)

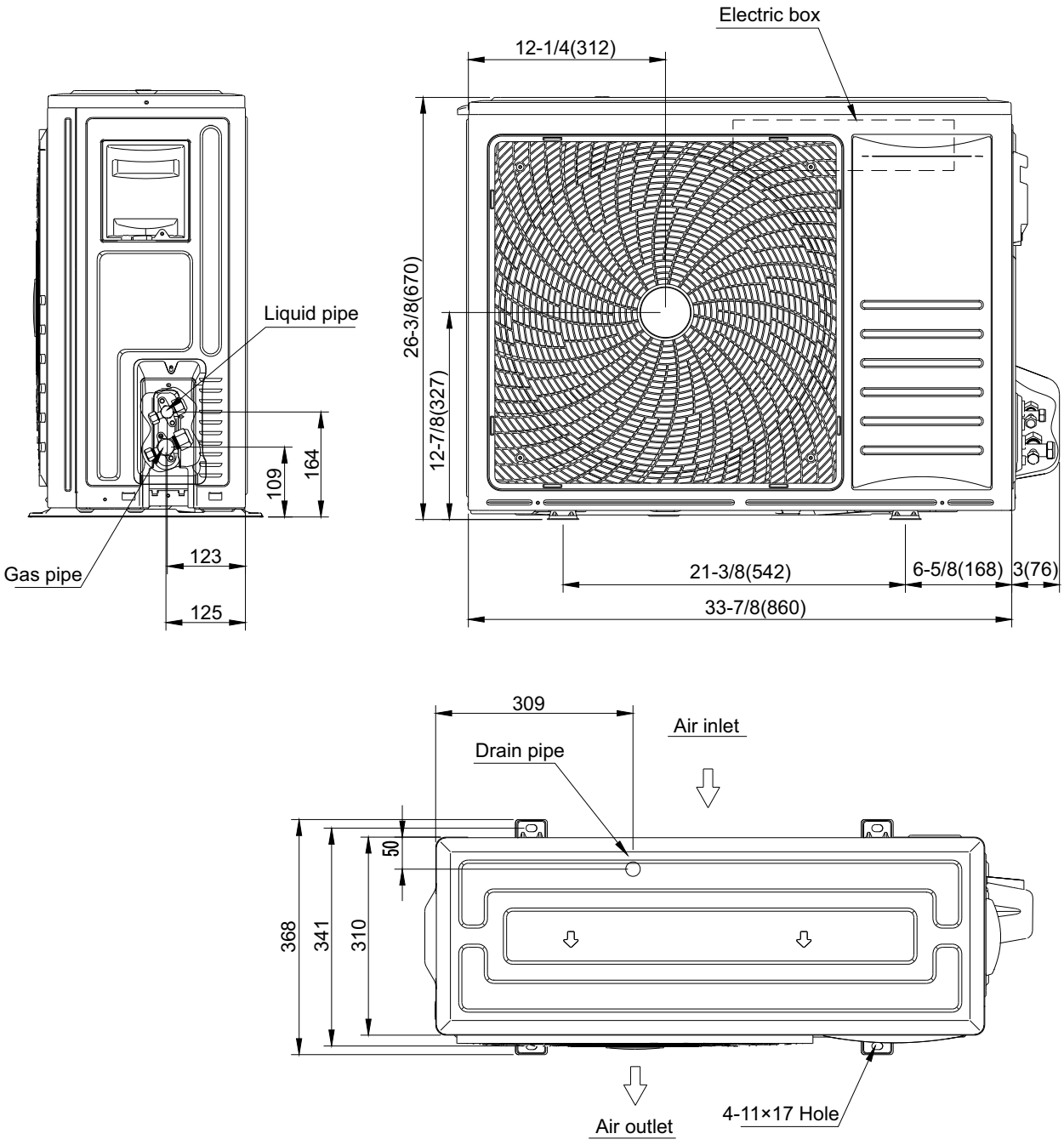


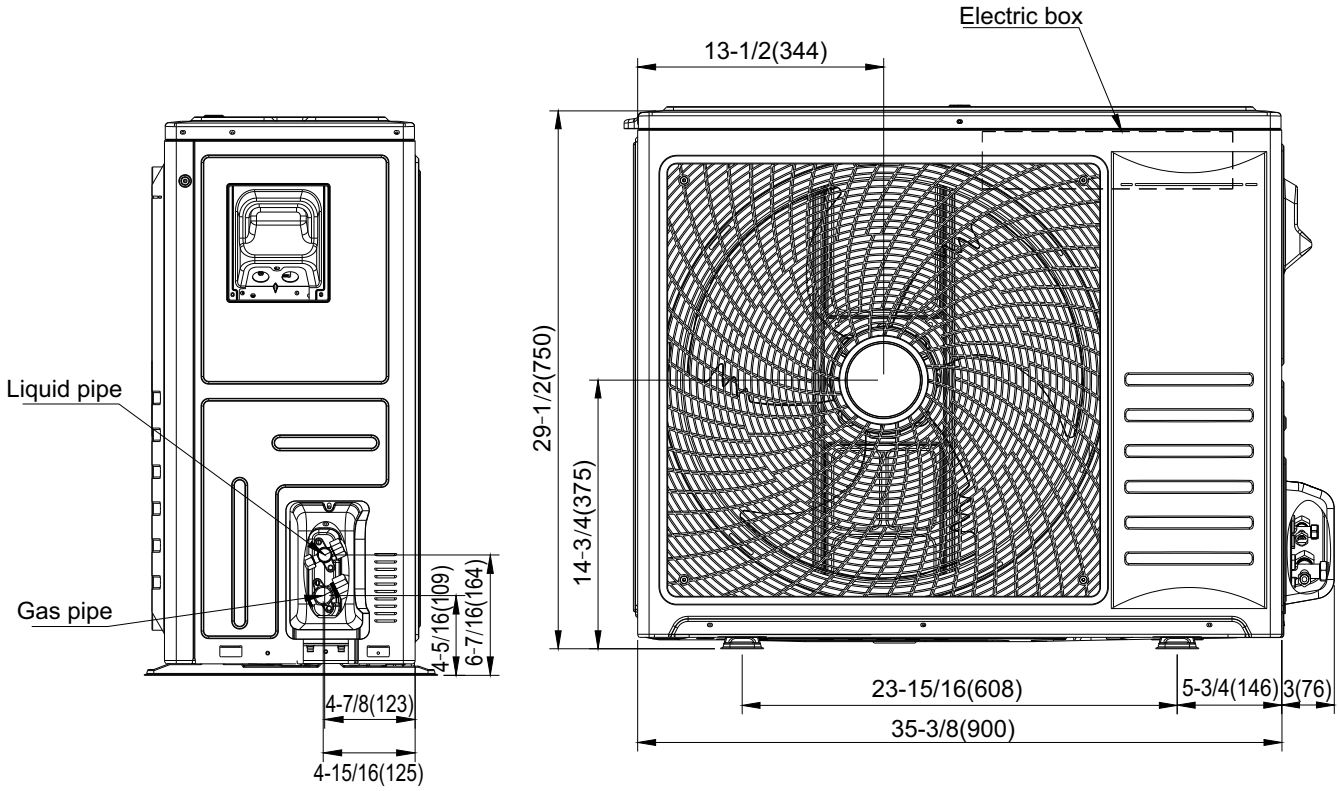
Figure 215

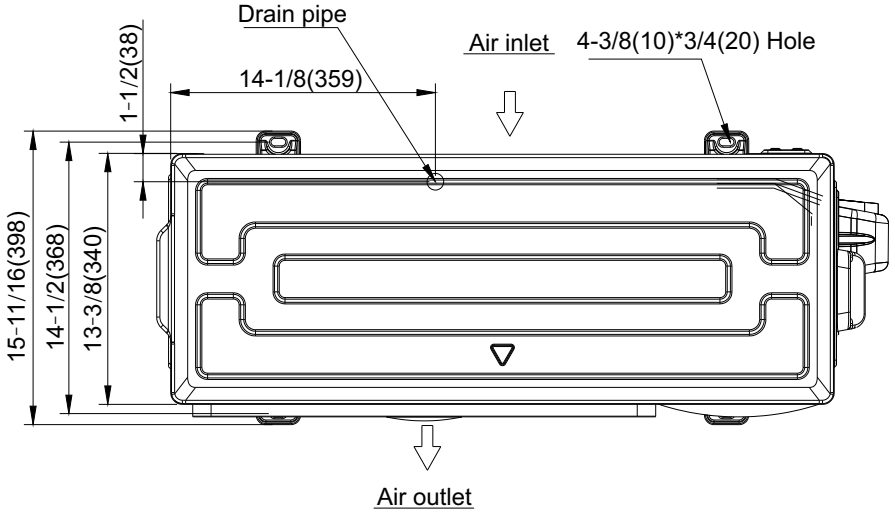
SPECIFICATIONS

Dimensions Outdoor Unit

FPHFR24A3D

Unit : in.(mm)



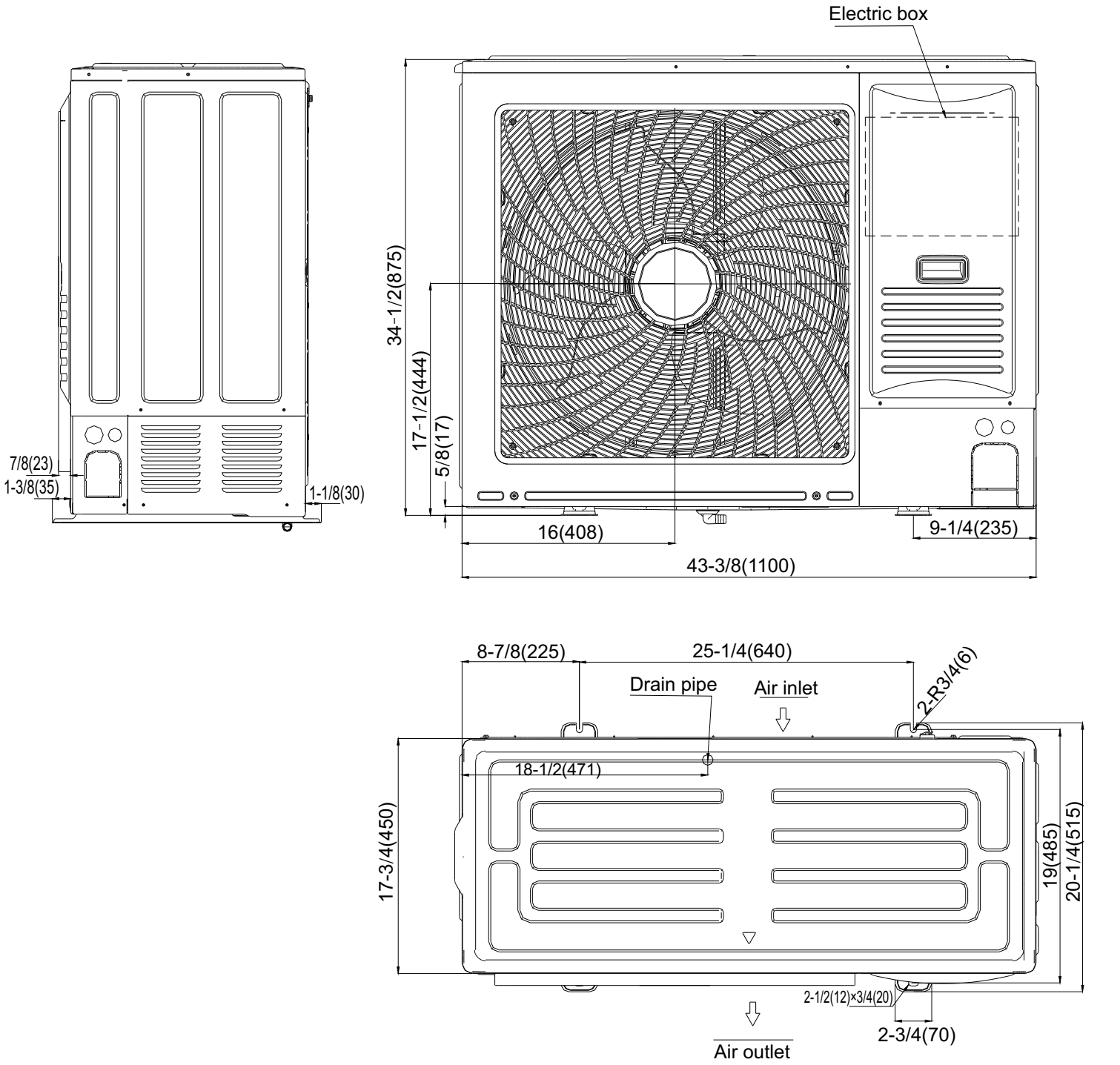


SPECIFICATIONS

Dimensions Outdoor Unit

FPHFR36A3D

Unit: in.(mm)



SPECIFICATIONS

Dimensions Cassette (9 and 12k BTU)

Cassette type

9K/12K

Unit: in.(mm)

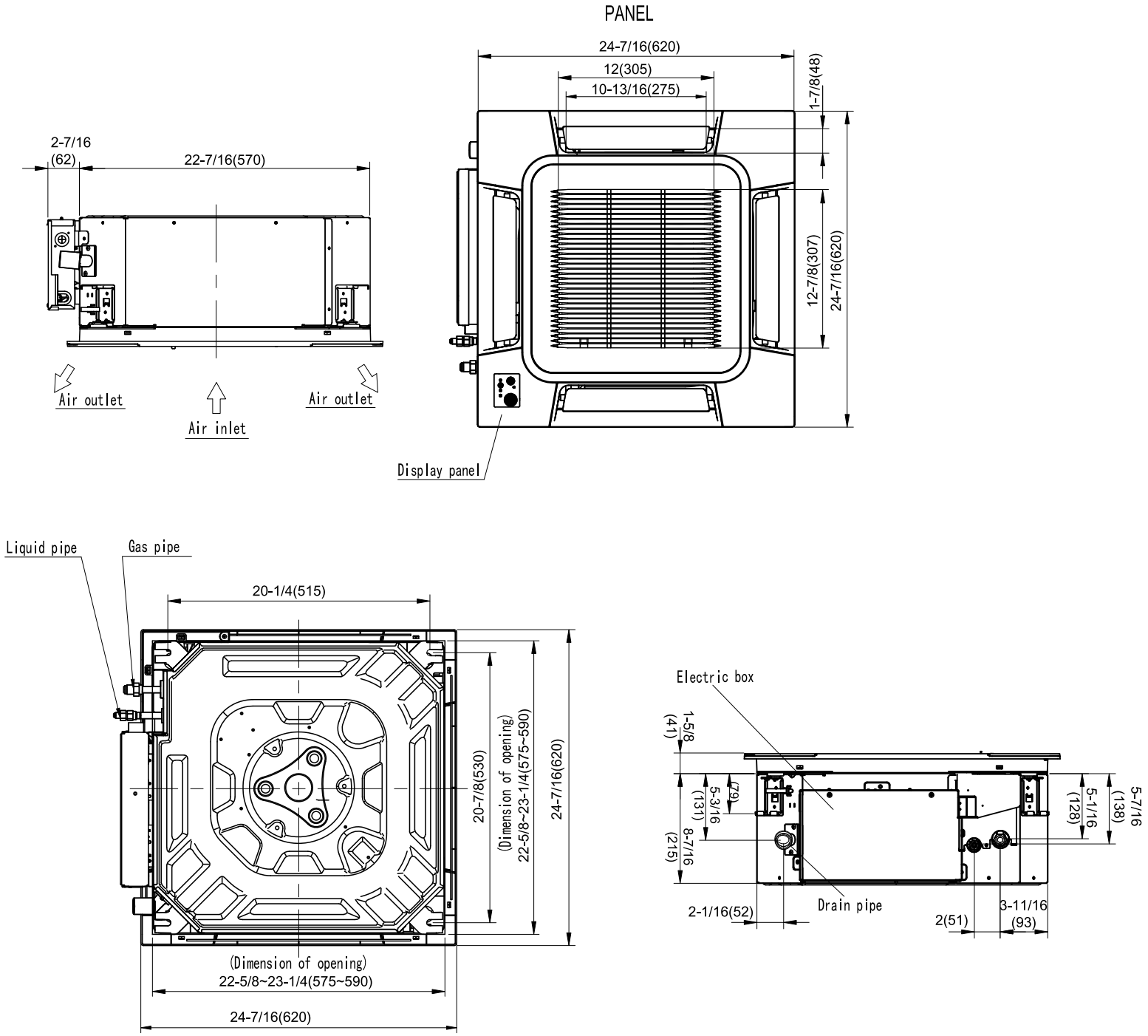
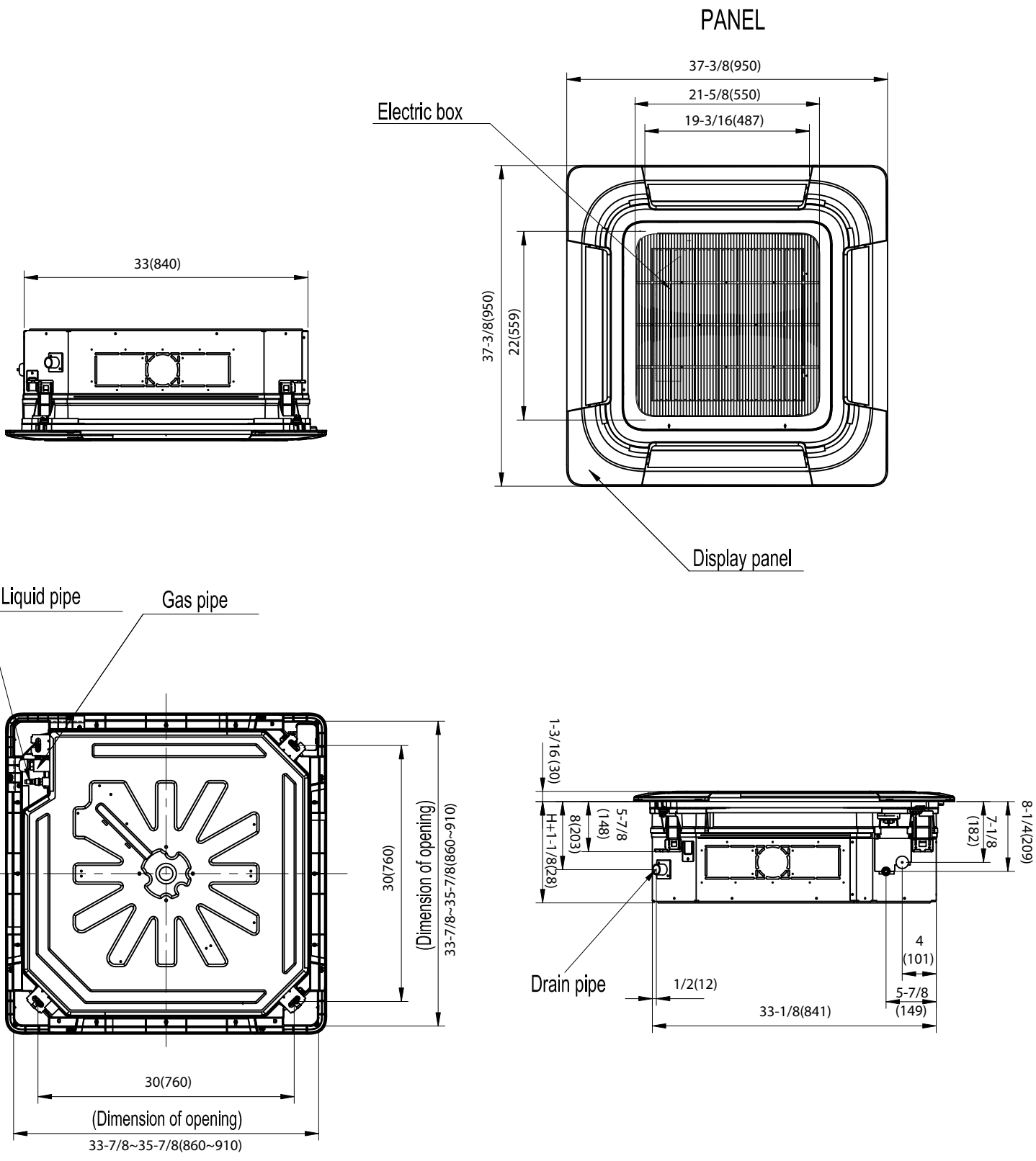


Figure 216

SPECIFICATIONS

Dimensions Cassette (18K, 24K, AND 36K BTU)

Unit: Inches(mm)



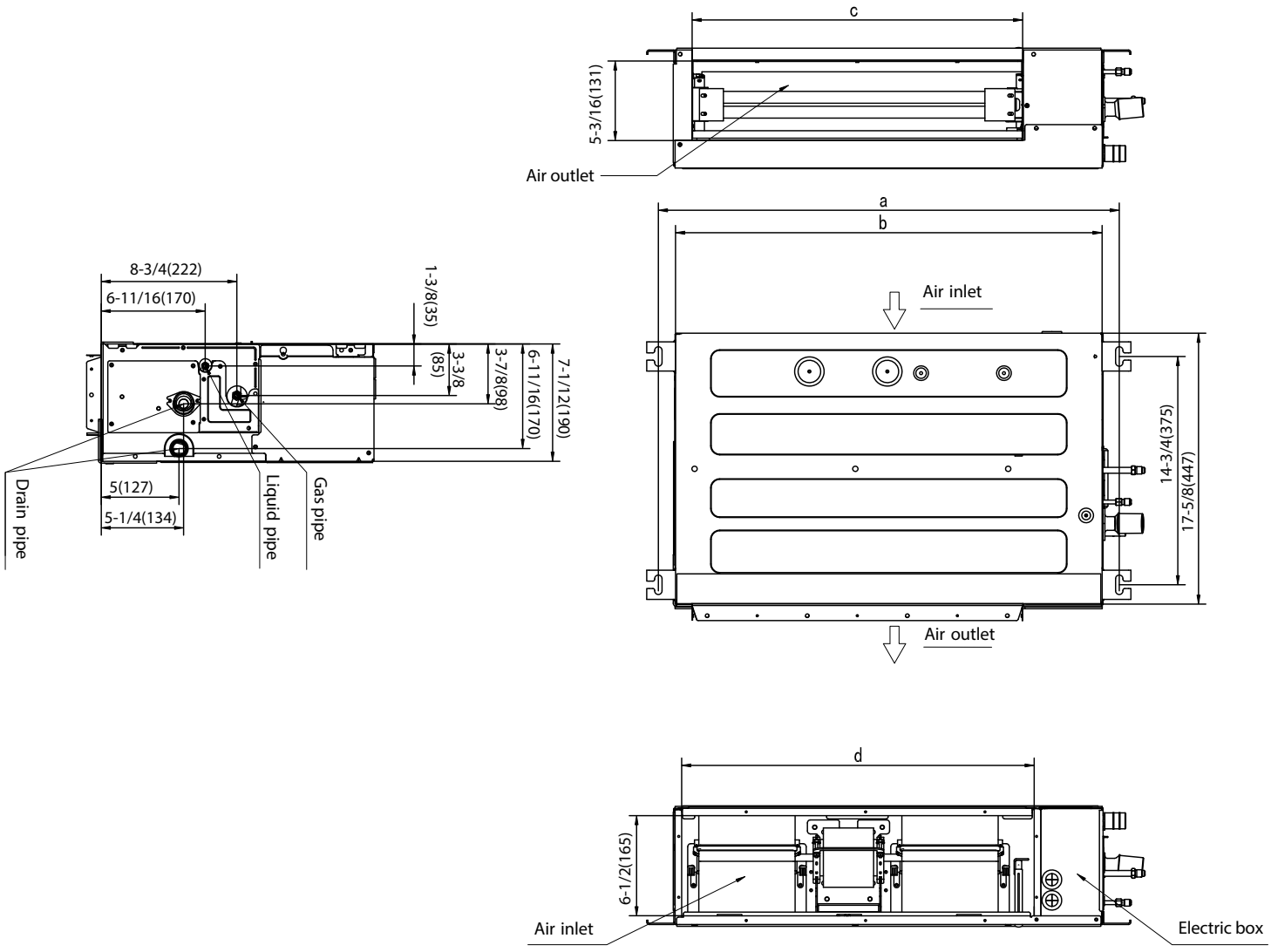
Model	**H**
18K/24K	9 1/4 (236)
36K	10 3/4 (272)

Figure 217

SPECIFICATIONS

Dimensions Ducted (9K and 12k BTU)

Unit : in.(mm)



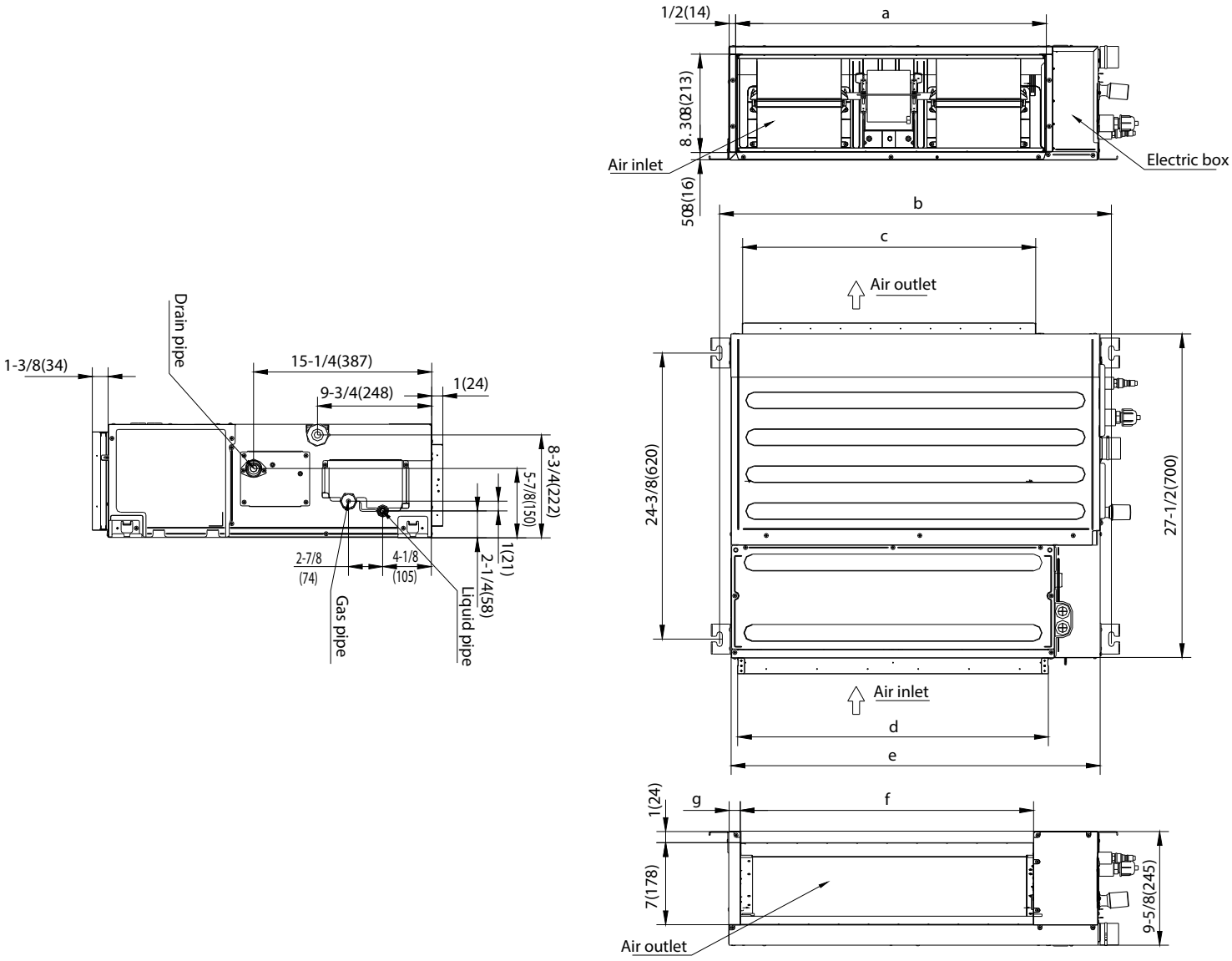
Model (Btu/h)	a	b	c	d
9K/12K	37-13/16 (961)	35-13/16 (910)	29-1/2 (749)	30 (786)

Figure 218

SPECIFICATIONS

Dimensions Ducted (18k BTU AND 24K BTU)

Unit : in.(mm)



Model(Btu/h)	a	b	c	d	e	f	g
18K	26-1/2 (674)	33-1/2 (850)	25 (636)	26-1/2 (673)	31-1/2 (800)	25 (636)	1 (24)
24K	38-3/8 (974)	45-1/4 (1150)	35-7/8 (912)	38-1/4 (973)	43-1/4 (1100)	35-7/8 (912)	1-7/8 (49)

Figure 219

SPECIFICATIONS

Dimensions Ducted (36K BTU)

Unit: in. (mm)

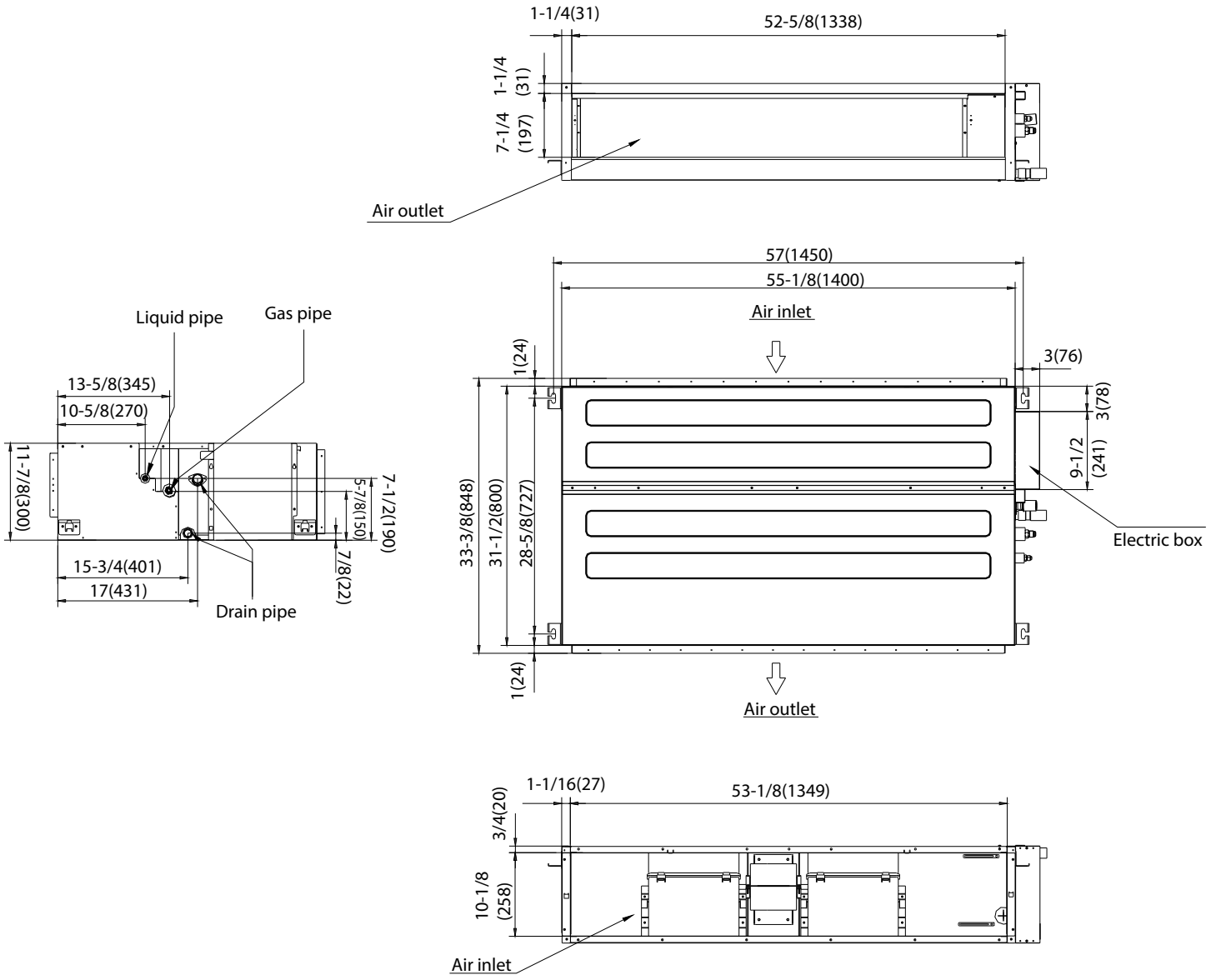


Figure 220

SPECIFICATIONS

Sound Power Data - Indoor Units (Ducted)

Model	9K
Test condition	4.6ft.(1.4m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

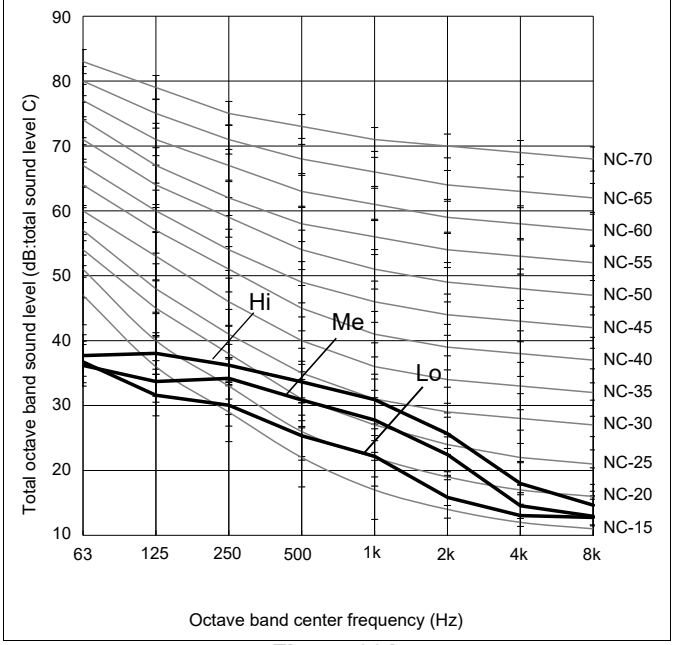


Figure 221

Model	12K
Test condition	4.6ft.(1.4m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

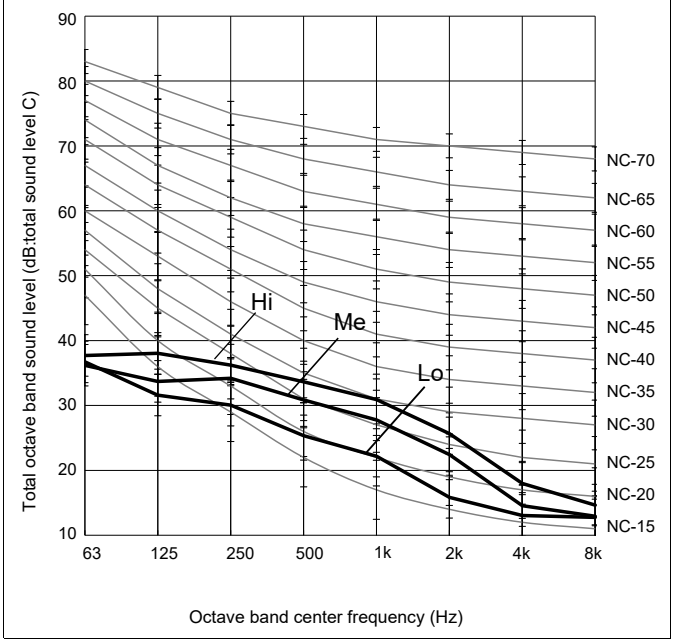


Figure 222

Model	18K
Test condition	4.6ft.(1.4m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

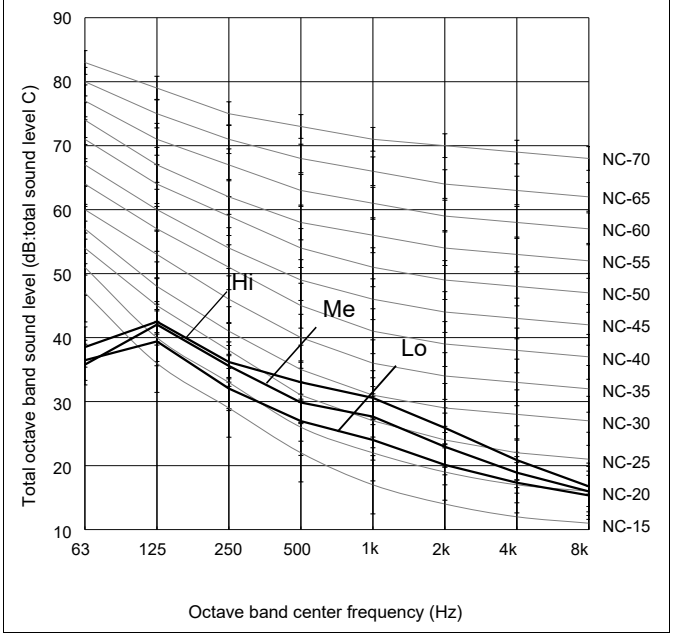


Figure 223

Model	24K
Test condition	4.6ft.(1.4m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

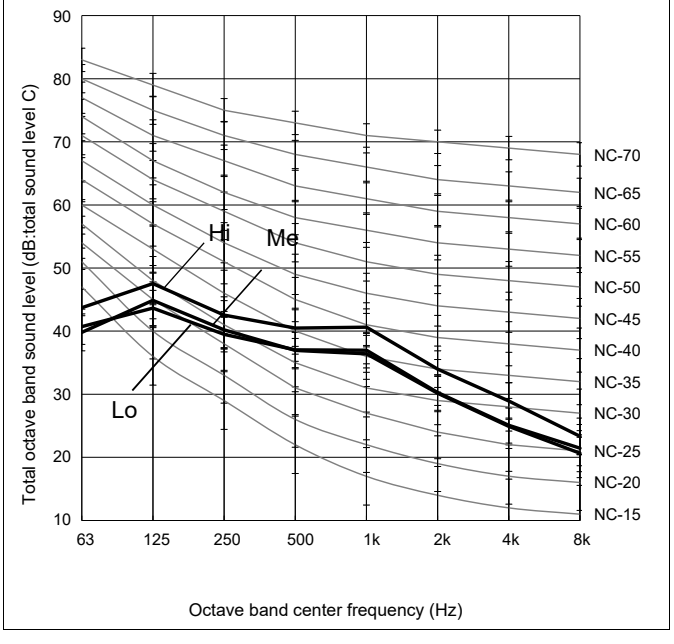


Figure 224

SPECIFICATIONS

Sound Power Data - Indoor Units (Ducted)

Model	36K
Test condition	4.6ft.(1.4m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

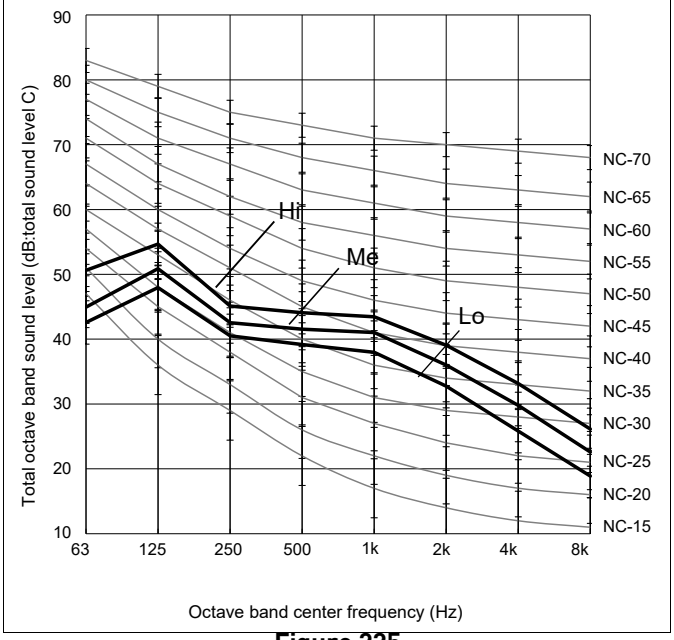


Figure 225

Test condition Duct:

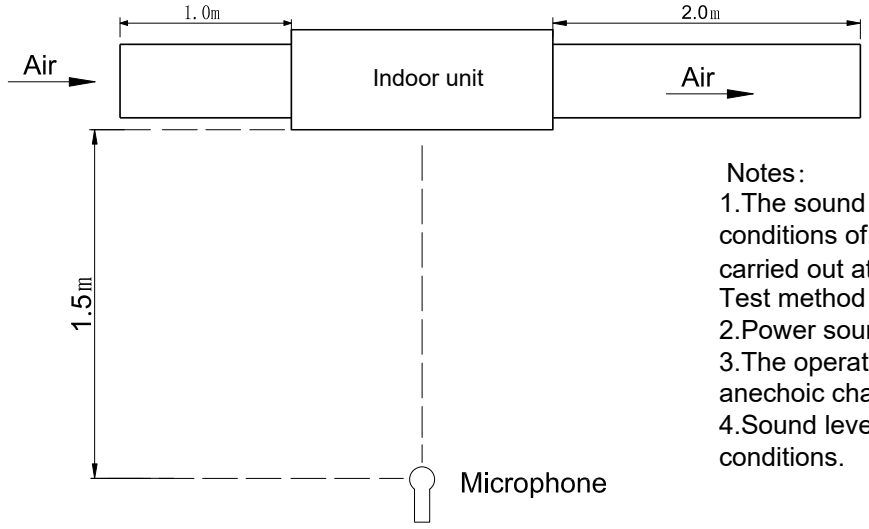


Figure 226

Notes:
1.The sound power level is dependent on the operating conditions of the unit. Sound measurements shall be carried out at the standard rating conditions。
Test method reference standard EN 12102-1.
2.Power source 230V, 50Hz.
3.The operation values were obtained in an semi-anechoic chamber (conversion values).
4.Sound levels vary with operating and environmental conditions.

SPECIFICATIONS

Sound Power Data - Indoor Units (Cassettes)

Model	9K
Test condition	4.92ft.(1.5m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

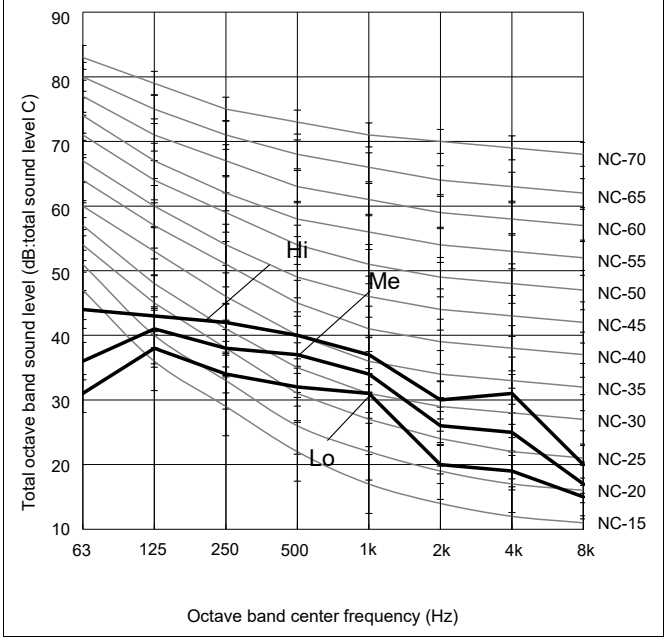


Figure 227

Model	12K
Test condition	4.92ft.(1.5m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

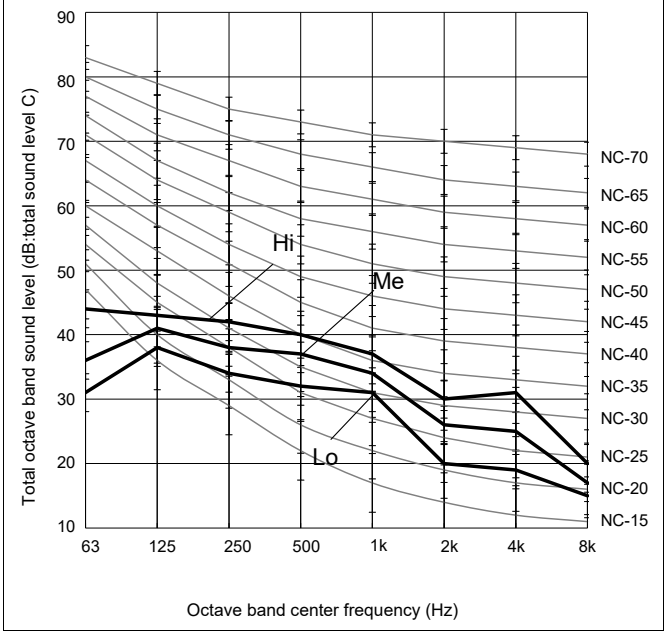


Figure 228

Model	18K
Test condition	4.92ft.(1.5m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

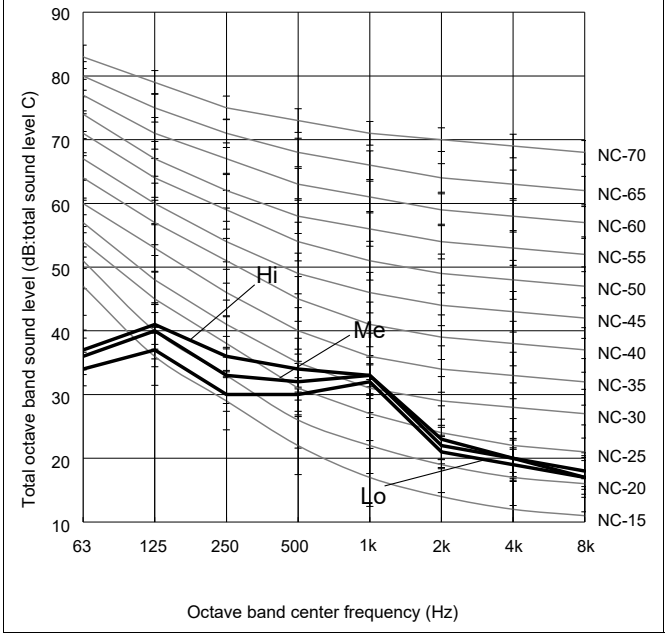


Figure 229

Model	24K
Test condition	4.92ft.(1.5m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

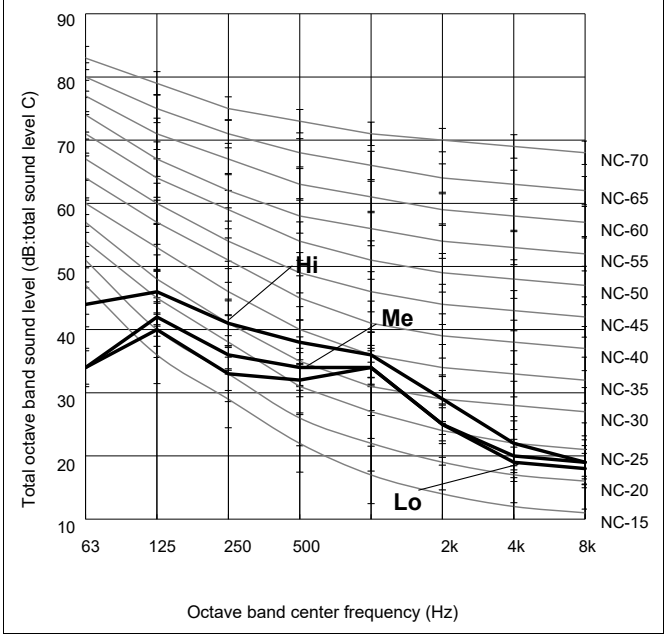


Figure 230

SPECIFICATIONS

Sound Pressure Data - Indoor Units (Cassettes)

Model	36K
Test condition	4.92ft.(1.5m) under the unit; 3.28ft.(1.0m) high from the ground. NC= Noise Criterion

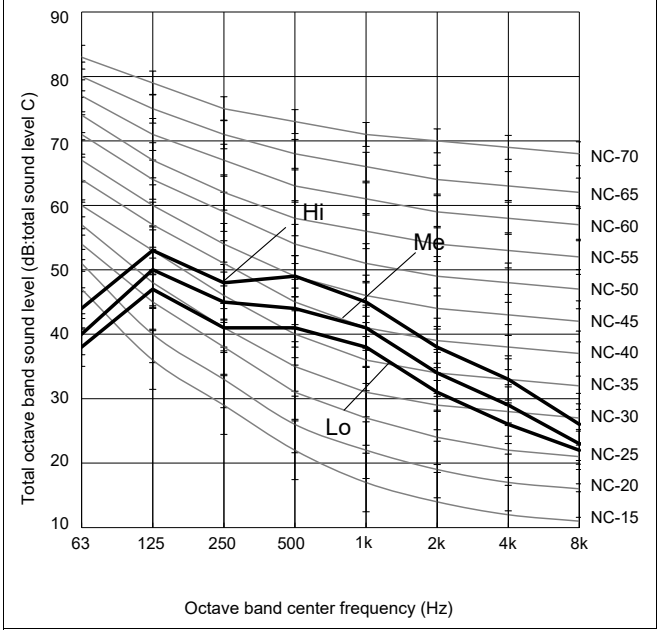


Figure 231

Test condition Cassette:

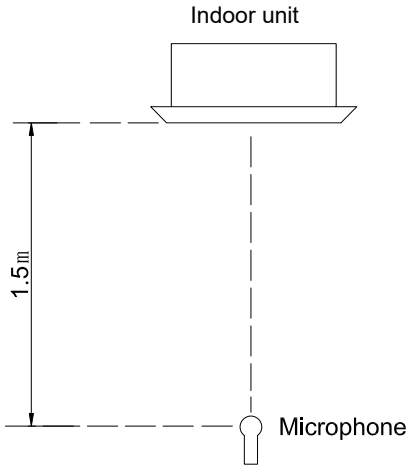


Figure 232

Notes:

1.The sound power level is dependent on the operating conditions of the unit. Sound measurements shall be carried out at the standard rating conditions。
Test method reference standard EN 12102-1.

2.Power source 230V, 50Hz.

3.The operation values were obtained in an semi-anechoic chamber (conversion values).

4.Sound levels vary with operating and environmental conditions.

SPECIFICATIONS

Sound Power Data - Outdoor Units

Model	9K
Test condition	3.28ft.(1.0m) ahead of the unit; 4.92ft.(1.5m) high from the bottom of the unit.

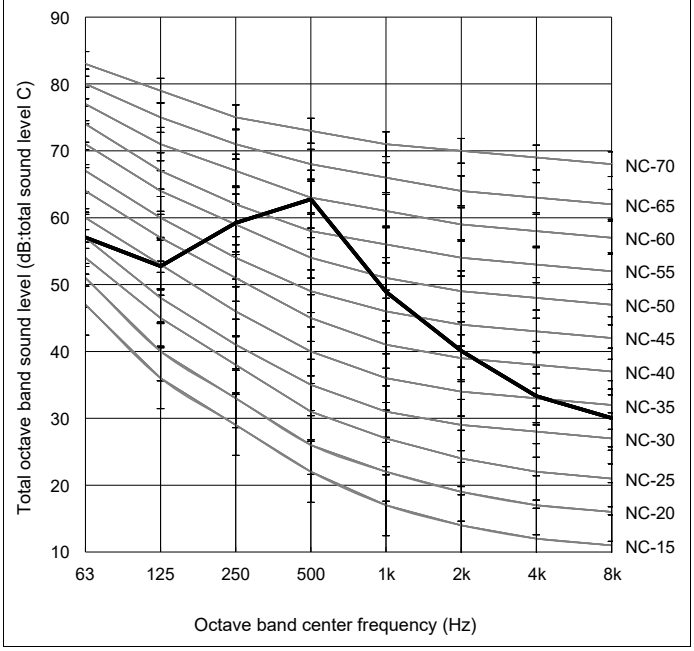


Figure 233

Model	12K
Test condition	3.28ft.(1.0m) ahead of the unit; 4.92ft.(1.5m) high from the bottom of the unit.

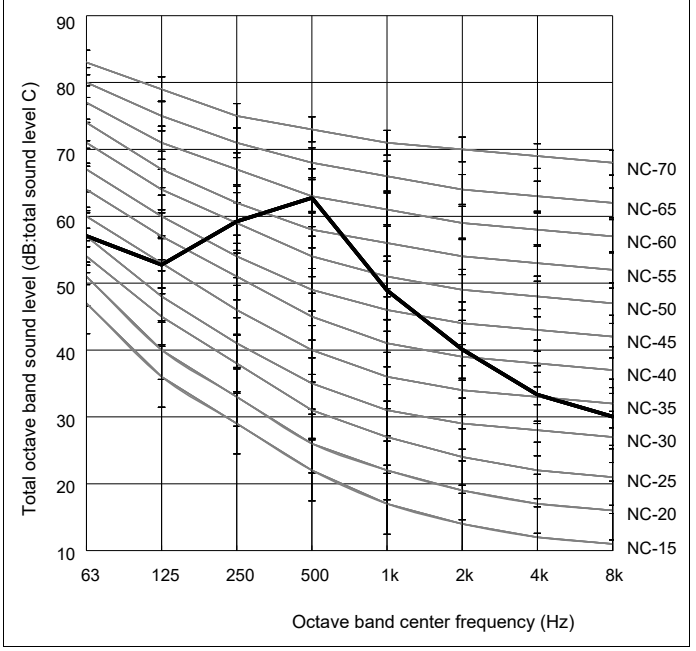


Figure 234

Model	18K
Test condition	3.28ft.(1.0m) ahead of the unit; 4.92ft.(1.5m) high from the bottom of the unit.

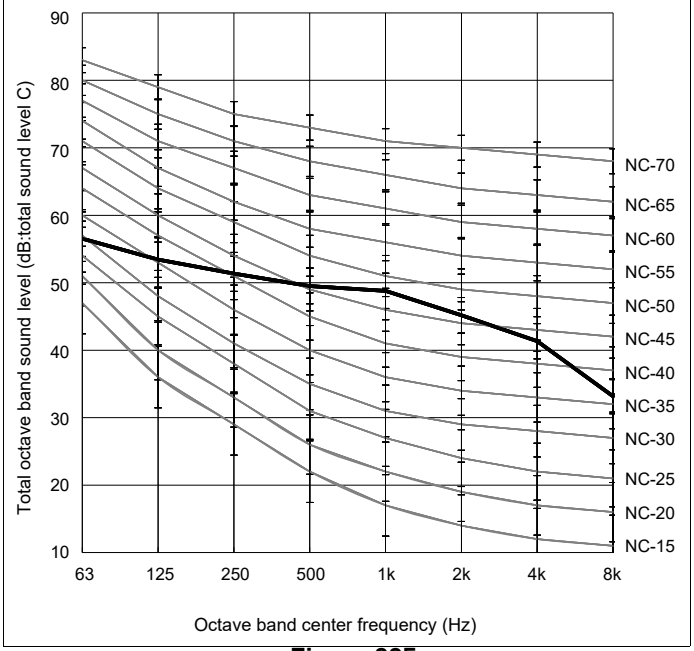


Figure 235

Model	24K
Test condition	3.28ft.(1.0m) ahead of the unit; 3.28ft.(1.0m) high from the bottom of the unit.

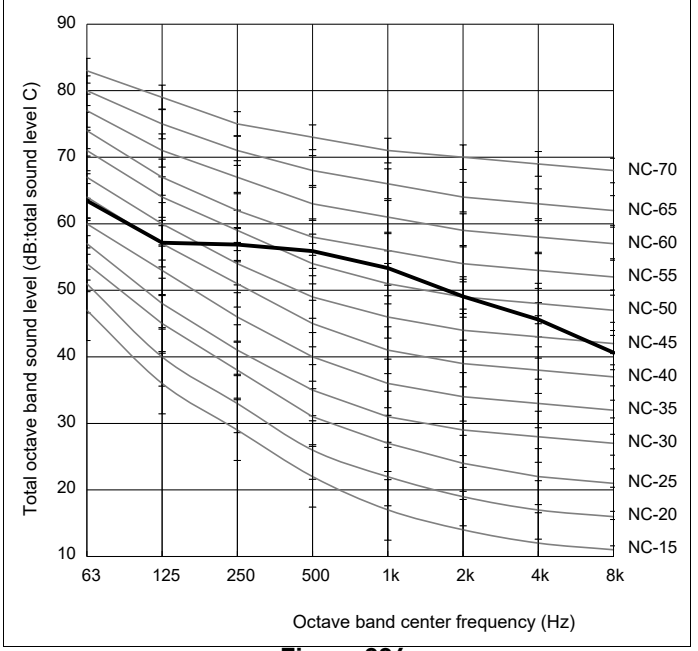


Figure 236

SPECIFICATIONS

Sound Power Data - Outdoor Units

Model	36K
Test condition	3.28ft.(1.0m) ahead of the unit; 4.92ft.(1.5m) high from the bottom of the unit.

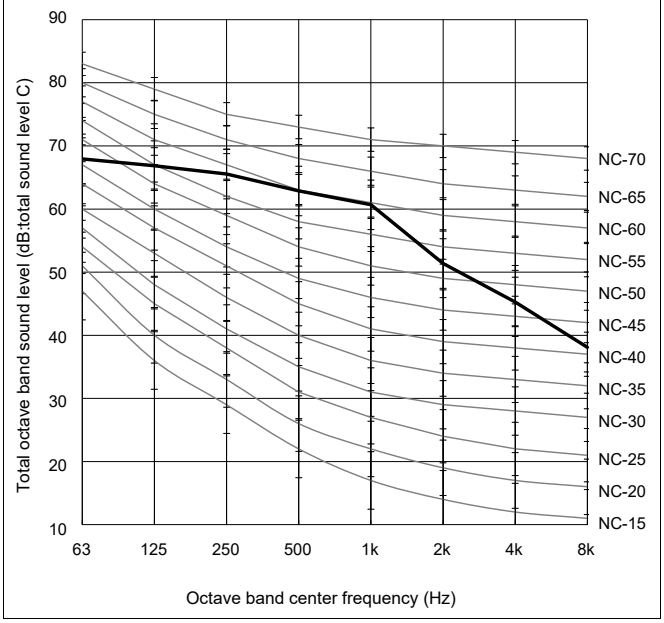


Figure 237

Test condition Outdoor:

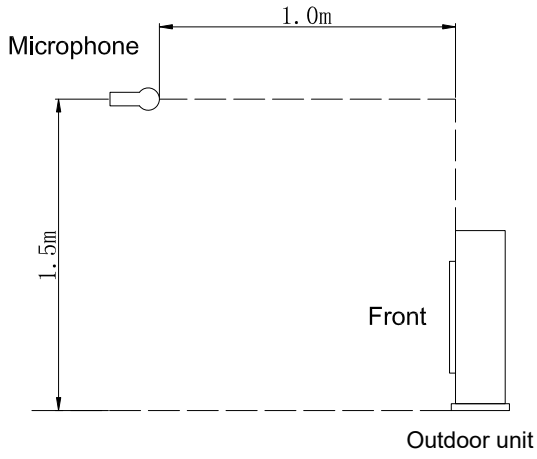


Figure 238

Notes:

1.The sound power level is dependent on the operating conditions of the unit. Sound measurements shall be carried out at the standard rating conditions。
Test method reference standard EN 12102-1.

2.Power source 230V, 50Hz.

3.The operation values were obtained in an semi-anechoic chamber (conversion values).

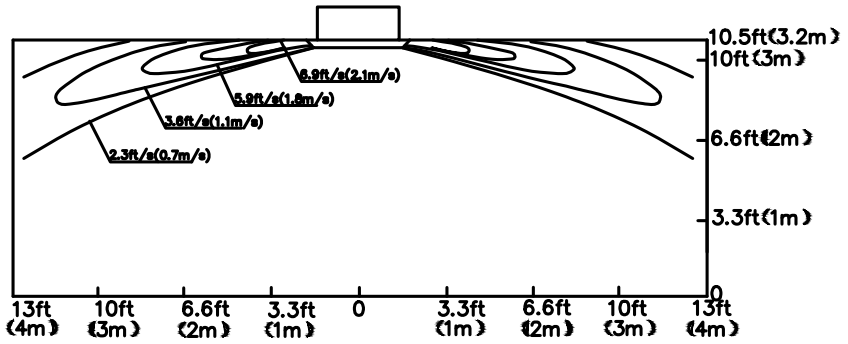
4.Sound levels vary with operating and environmental

SPECIFICATIONS

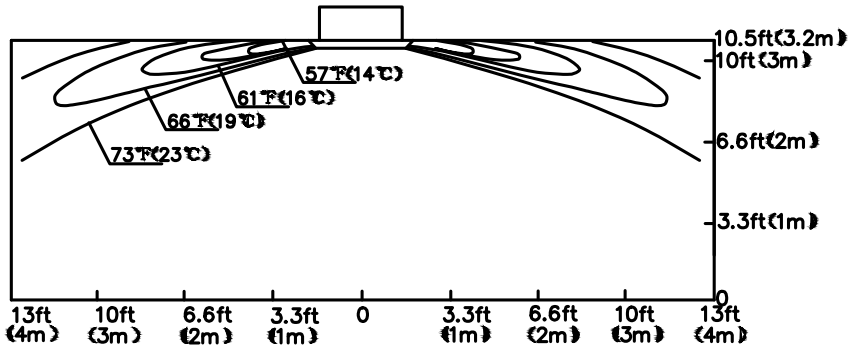
Airflow Distribution (9k Cassette)

9K

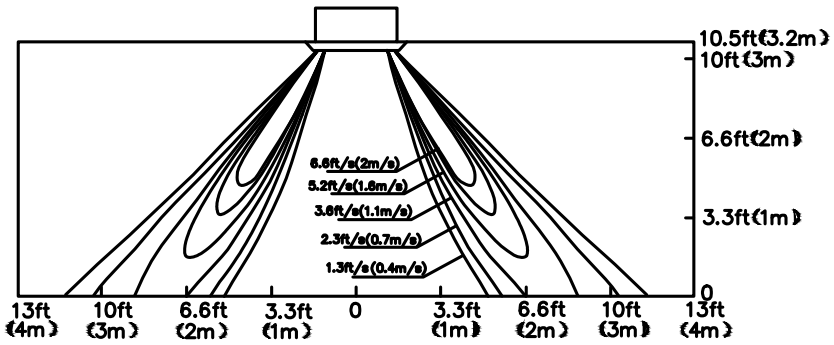
1)Cooling/Air Velocity Distribution



2)Cooling/Air Temperature Distribution



3)Heating/Air Velocity Distribution



4)Heating/Air Temperature Distribution

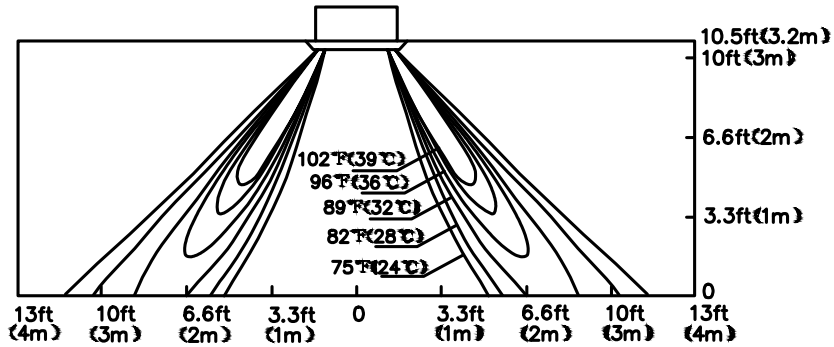


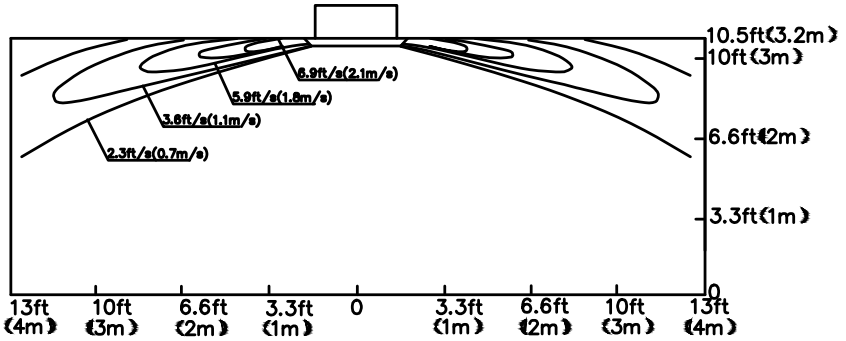
Figure 239

SPECIFICATIONS

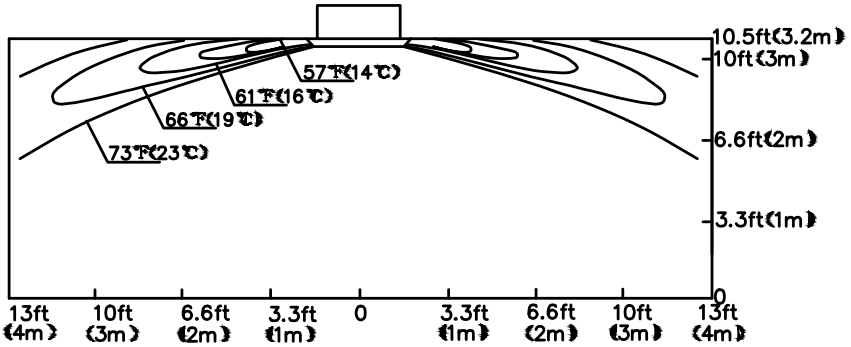
Airflow Distribution (12k Cassette)

12K

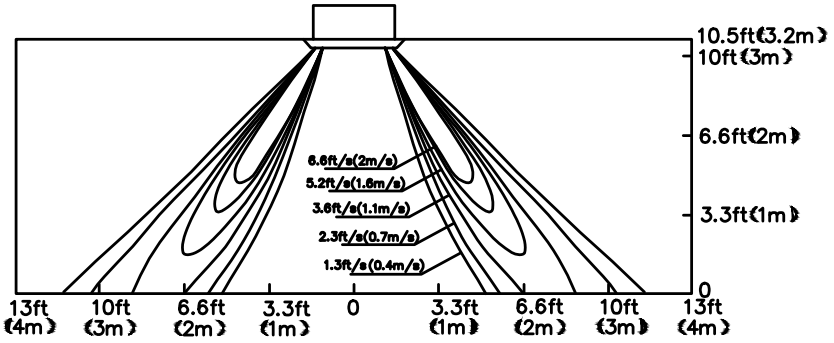
1)Cooling/Air Velocity Distribution



2)Cooling/Air Temperature Distribution



3)Heating/Air Velocity Distribution



4)Heating/Air Temperature Distribution

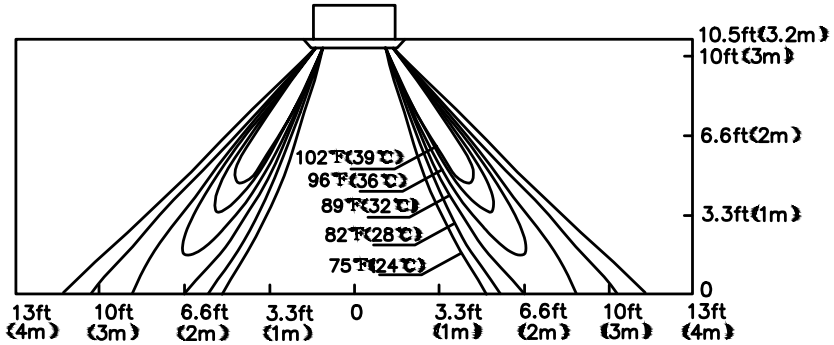


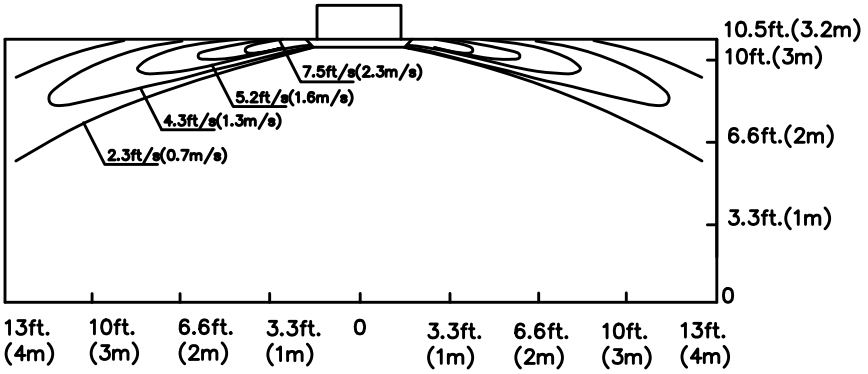
Figure 240

SPECIFICATIONS

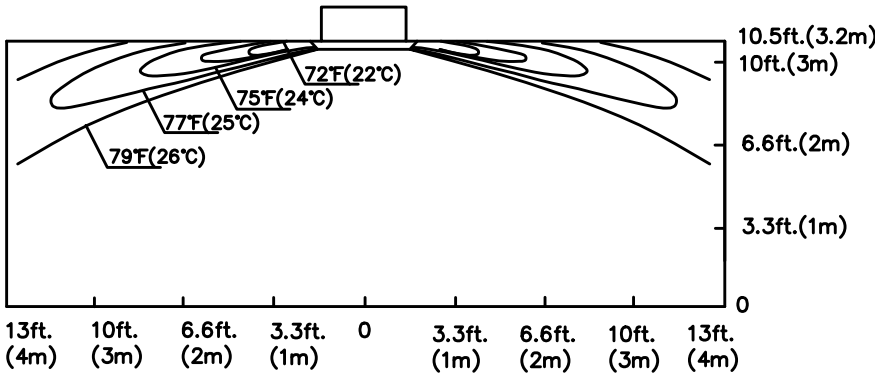
Airflow Distribution (18k Cassette)

18K

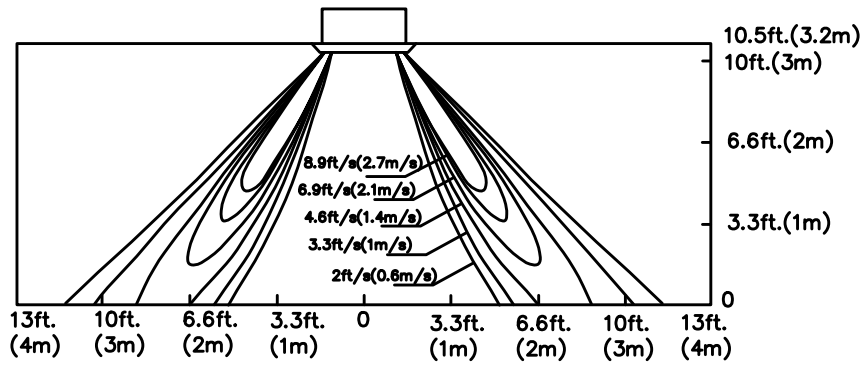
1)Cooling/Air Velocity Distribution



2)Cooling/Air Temperature Distribution



3)Heating/Air Velocity Distribution



4)Heating/Air Temperature Distribution

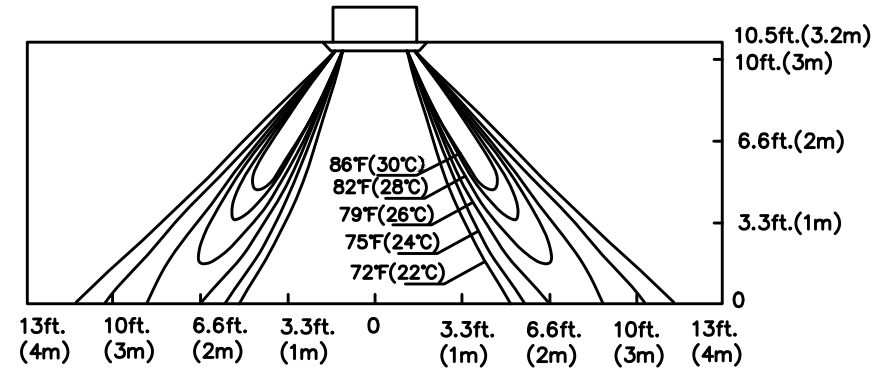
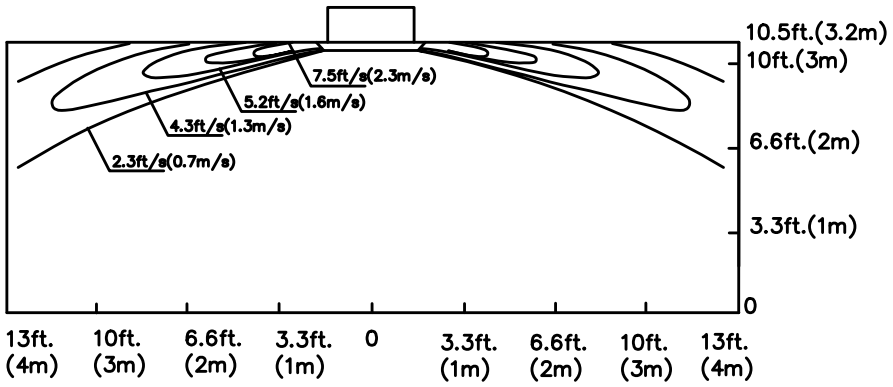


Figure 241

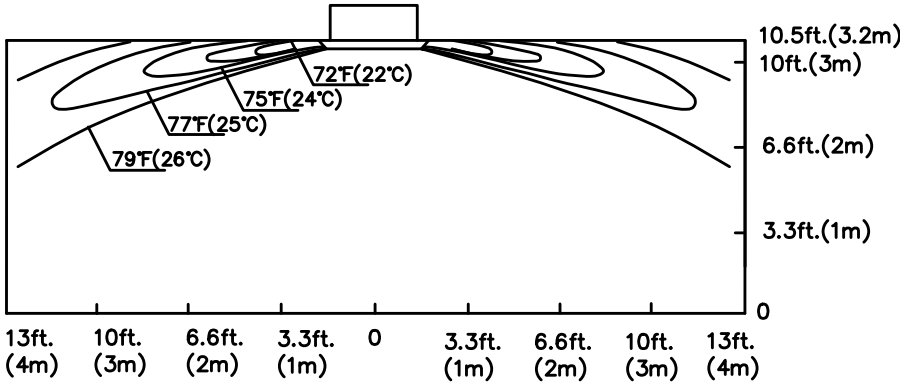
SPECIFICATIONS

Airflow Distribution (24k Cassette)

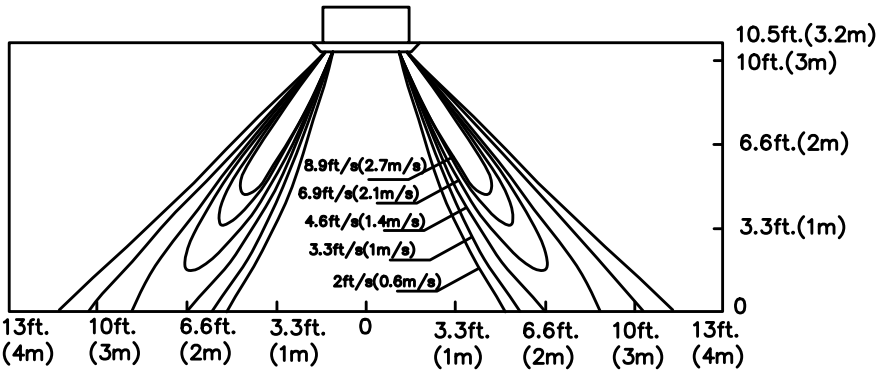
1)Cooling/Air Velocity Distribution



2)Cooling/Air Temperature Distribution



3)Heating/Air Velocity Distribution



4)Heating/Air Temperature Distribution

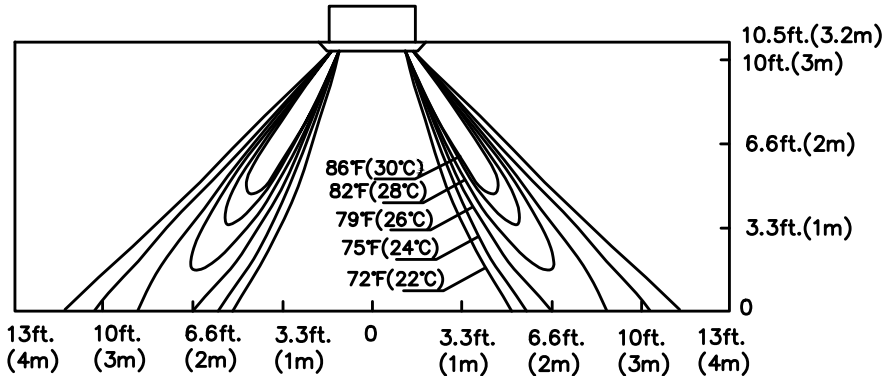
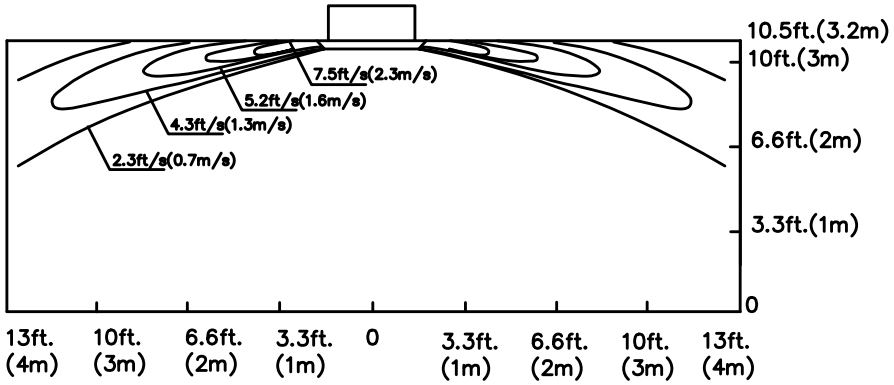


Figure 242

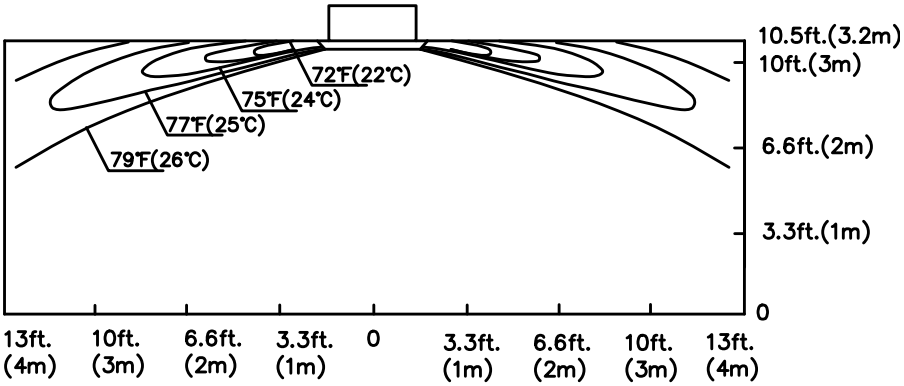
SPECIFICATIONS

Airflow Distribution (36k Cassette)

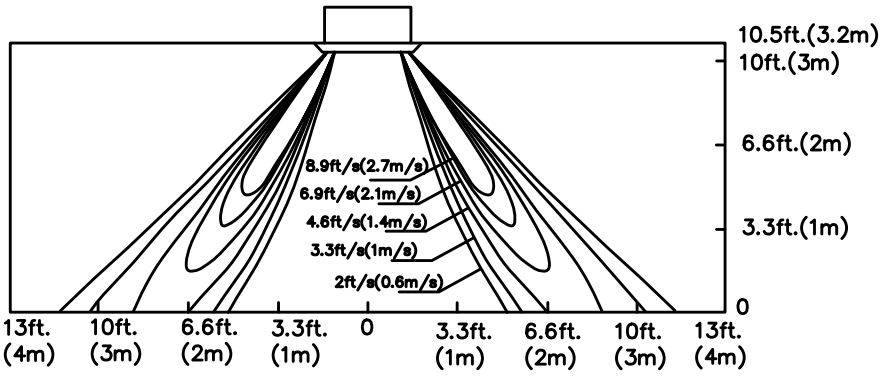
1)Cooling/Air Velocity Distribution



2)Cooling/Air Temperature Distribution



3)Heating/Air Velocity Distribution



4)Heating/Air Temperature Distribution

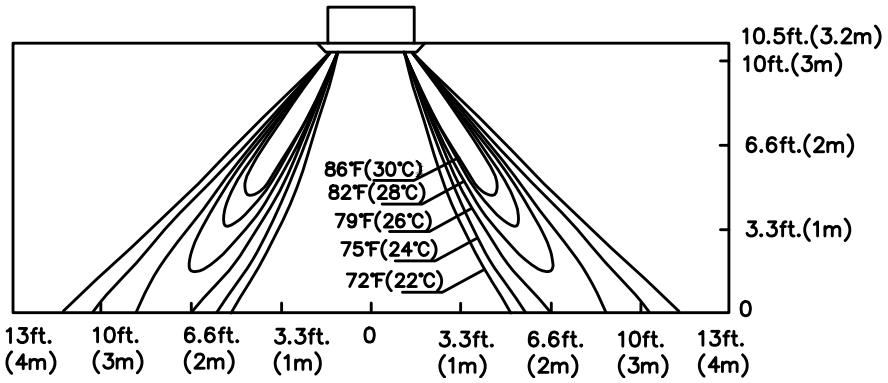
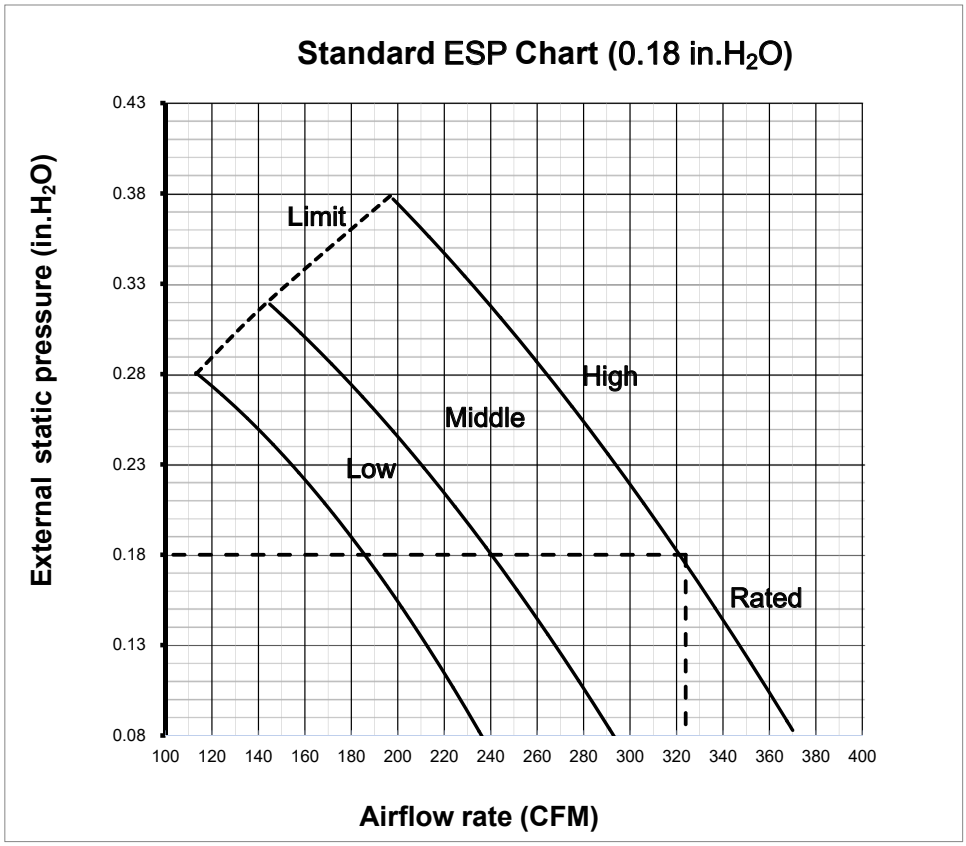


Figure 243

SPECIFICATIONS

ESP (External Static Pressure) Chart (9-12k Ducted Units)



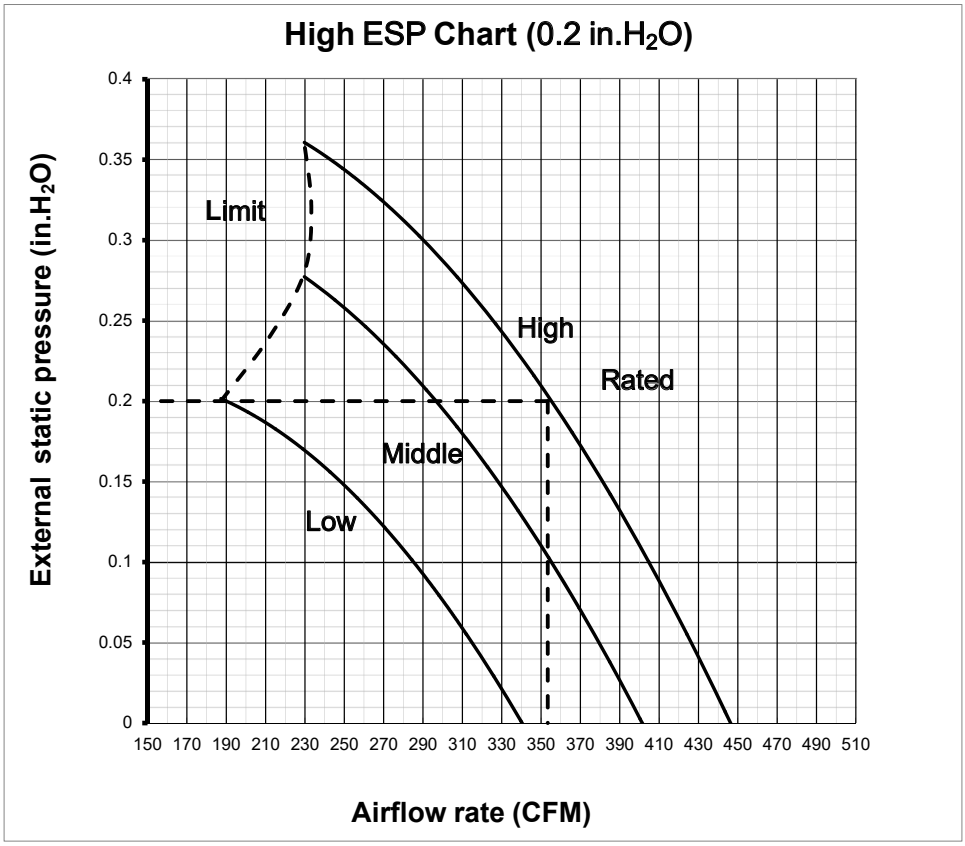
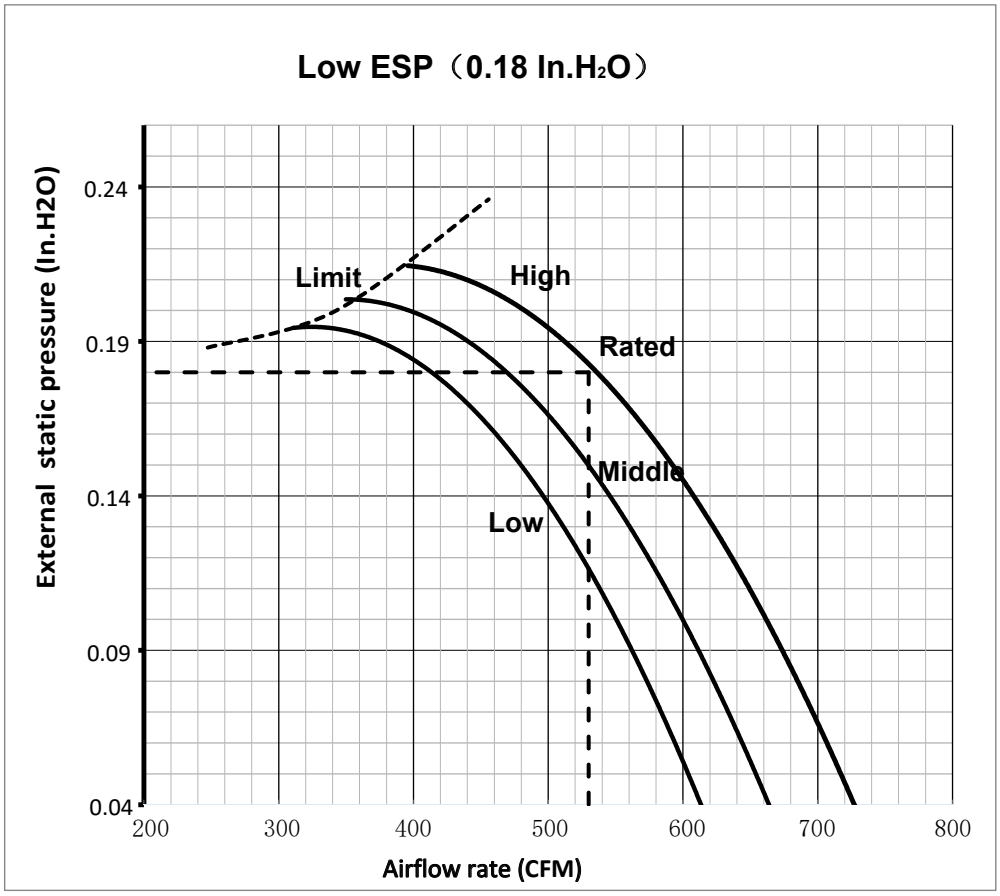


Figure 244

SPECIFICATIONS

ESP (External Static Pressure) Chart (18k Ducted Units)



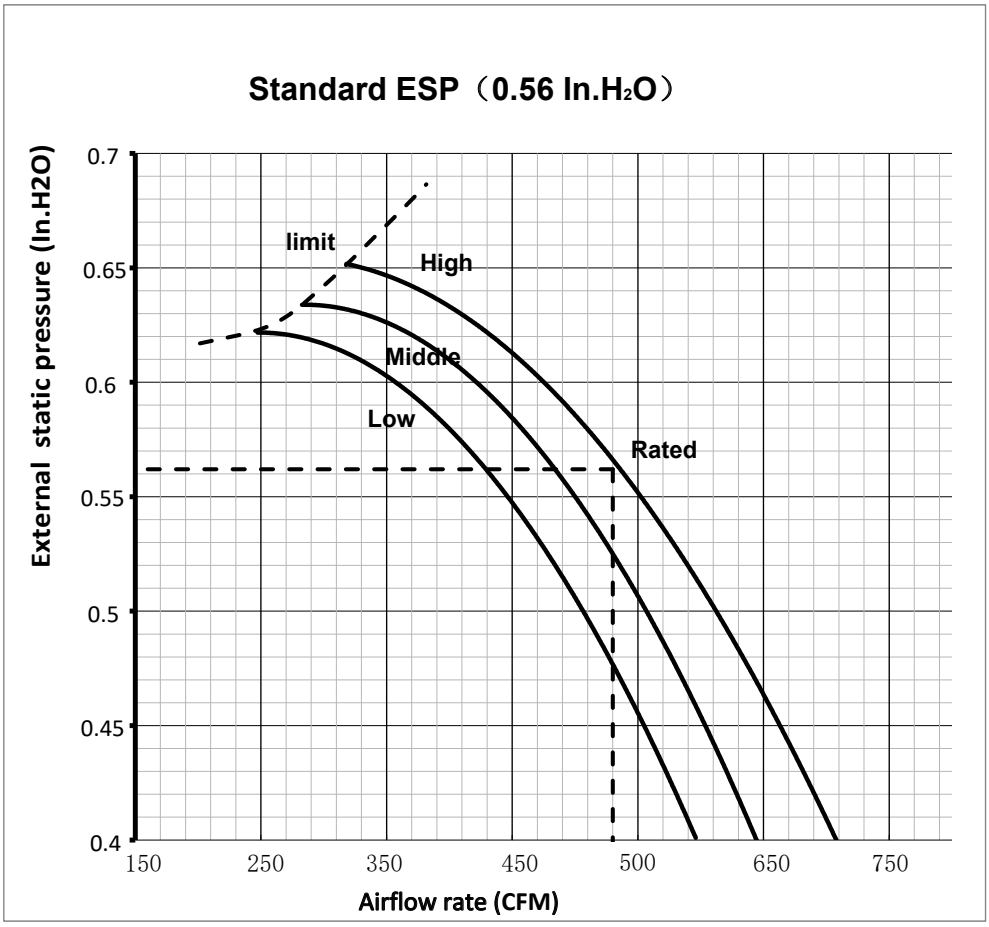
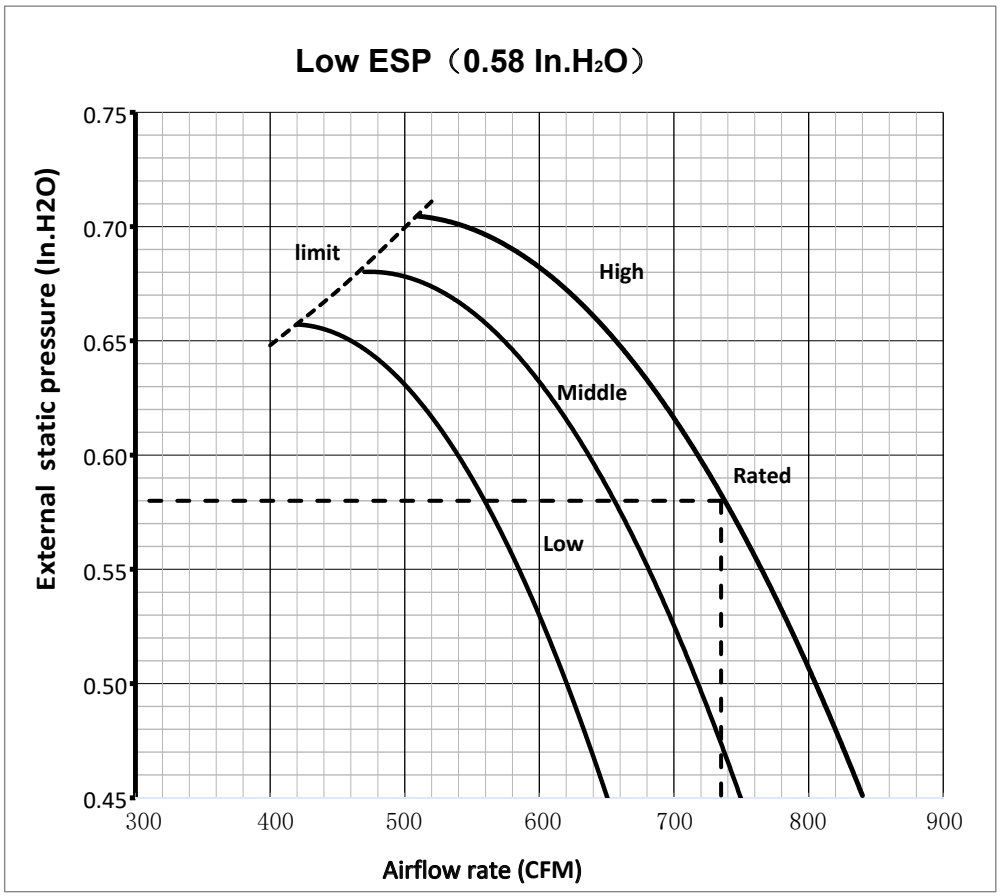


Figure 245

SPECIFICATIONS

ESP (External Static Pressure) Chart (24k Ducted Units)



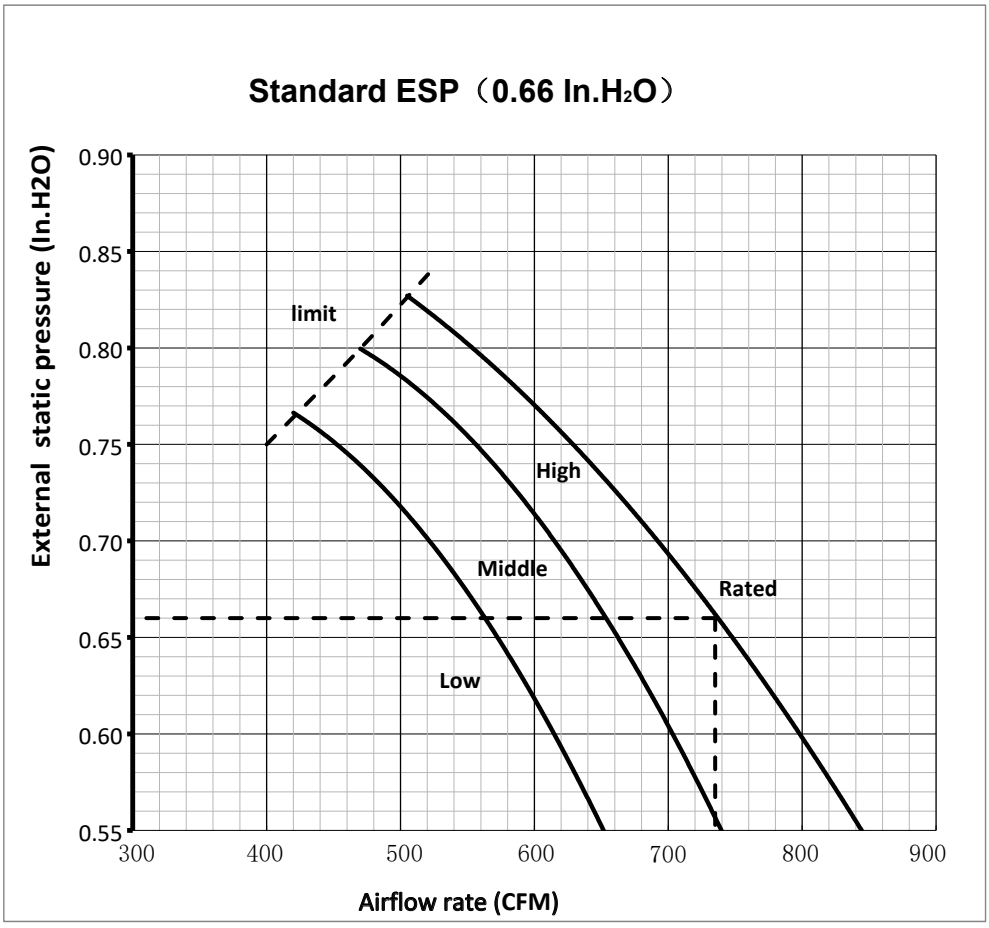
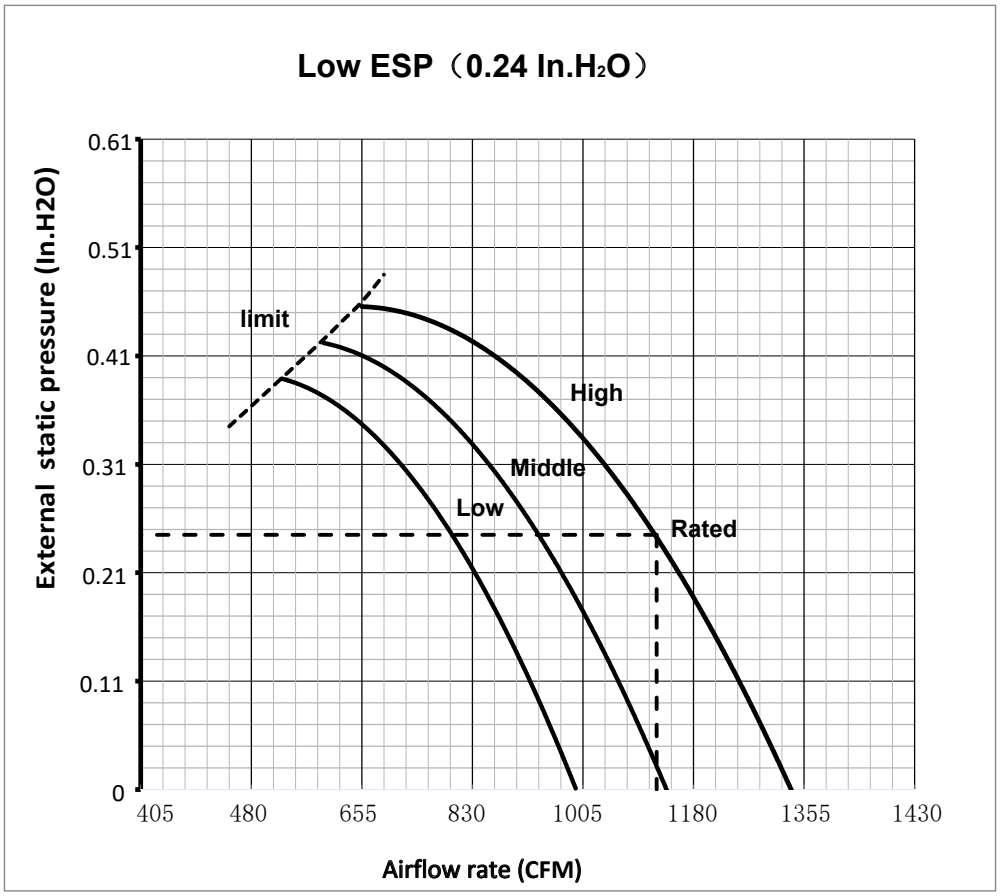


Figure 246

SPECIFICATIONS

ESP (External Static Pressure) Chart (36k Ducted Units)



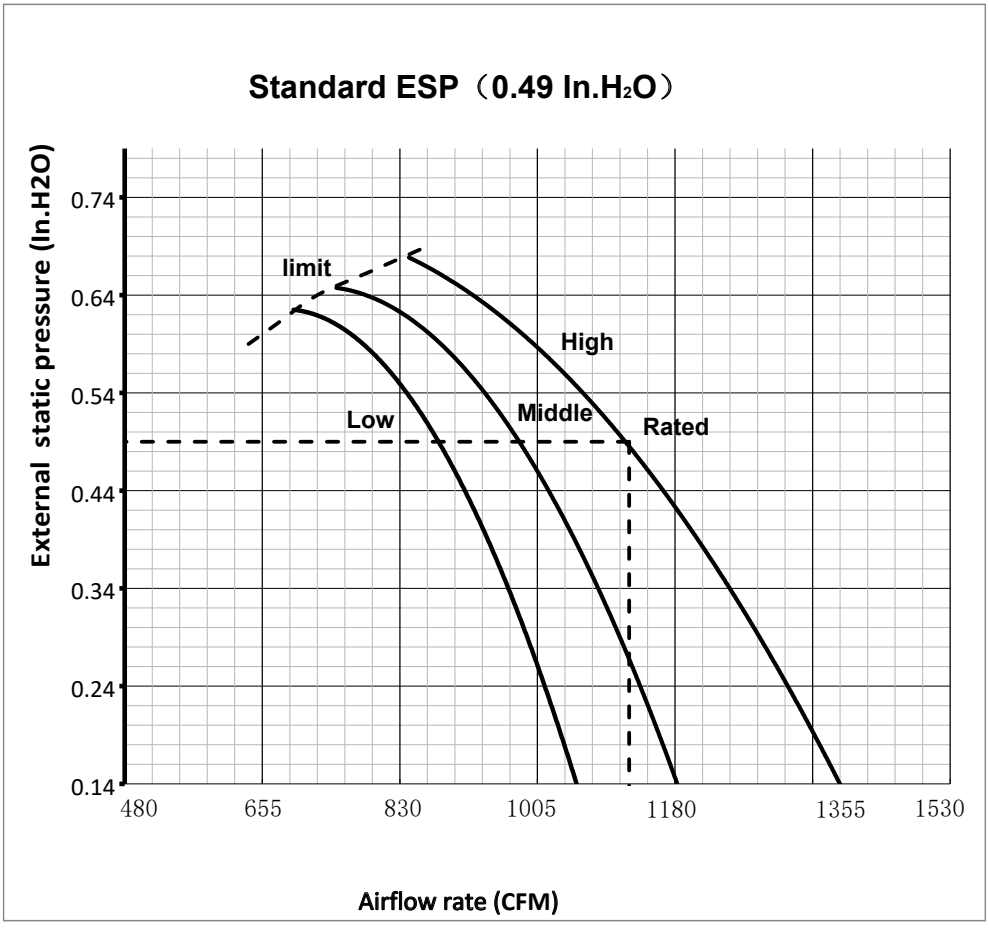


Figure 247

INSTALLATION

General

1. **This air conditioner uses new refrigerant HFO (R454B). R454B refrigerant is flammable.**
2. **Since the max. working pressure is less than 602psig (4.15MPa), some of the piping and installation and service tools are special.**
3. **This air conditioner uses power supply：208/230V ~, 60Hz.(Single Phase)**

Please read these SAFETY PRECAUTIONS carefully to ensure correct installation.

- Be sure to use a dedicated power circuit, and do not put other loads on the power supply.
- Be sure to read these SAFETY PRECAUTIONS carefully before installation.
- Be sure to comply with SAFETY PRECAUTIONS of installation manual, because it contains important safety issues. Definitions for identifying hazard levels are provide below with their respective safety symbols.

  ⚠ WARNING: Hazards or unsafe practices which COULD result in severe personal injury or death.
  ⚠ CAUTION: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.
- Please carefully file indoor and outdoor unit manual away for future reference.

⚠WARNING

- Installation should be performed by qualified personnel.
  Improper installation may cause water leakage, electrical shock or fire.
- Install the air conditioner on a solid base that can support the unit weight.
  An inadequate base or incomplete installation may cause injury if the unit falls off the base.
- Use the specified type of wire for electrical connections safely between the indoor and outdoor units.
  And firmly clamp the interconnecting wires so their terminals receive no external stresses.
- For wiring, use a cable long enough to cover the entire distance with no connection.
  And do not connect multiple devices to the same AC power supply.
  Otherwise, it may be due to bad contact, poor insulation, exceed the allowable current and cause a fire or electric shock.
- After all installation is completed, check to make sure that no refrigerant is leaking out.
  If the refrigerant gas leakage to the interior, and the heater, stove flame touching it, will generate harmful substances, possible ignition of refrigerant.
- Perform the installation securely referring to the installation manual.
  Incomplete installation could cause a personal injury due to fire, electric shock, the unit falling or leakage of water.
- In accordance with the installation instructions for electrical work, please be sure to use a dedicated circuit.
- If the power supply circuit capacity or electrical work is not in place, may cause a fire or electric shock.
- Attach the electrical cover to the indoor unit and the service panel to the outdoor unit securely.
- If the electrical covers on the indoor unit or the service panel of the outdoor unit are not attached securely, it could result in a fire or an electric shock due to dust water, etc.
- Please be sure to cut off the main power supply before the installation of indoor electronic PCB or wiring. Otherwise, it will cause electric shock. Circuits may stay energized as much as 5 mins after removing the power. Check that LEDs have gone out on PCBs
- All wiring shall be in accordance with local and national codes.
- The outdoor unit installation location should pay attention to the protection, avoid people or other small animals contact with electrical components, please keep the outdoor unit of the surrounding environment clean and clear from obstructions.
- When installing or relocating the unit, make sure that no substance other than the specified refrigerant (R454B) enters the refrigerant circuit. Adding any other refrigerant will void the warranty.
  Any presence of foreign substance such as air can cause abnormal pressure rise or an explosion.
- Assure that PARTIAL UNITS shall only be connected to an unit suitable for the same refrigerant.

INSTALLATION

General

Safety precautions

⚠ CAUTION

• Equipment Grounding,
Do not connect ground wires to household piping such as water gas or electrical. If ground is not present a new grounding rod must be installed.
• Do not install the unit in a place where an flammable gas leaks.
If gas leaks and accumulates in the area surrounding the unit, it could cause an explosion.
• Fasten a flare nut with a torque wrench as specified in this manual.
When fastened too tight, a flare nut may break after a long period and cause a leakage of refrigerant.
• Install an earth leakage breaker depending on the installation place(where it is humid).
If an earth leakage breaker is not installed, it could cause an electric shock.
• Perform the drainage/piping work securely according to the installation manual.
• If there is a defect in the drainage/piping work, water could drop from the unit and household goods could be wet and damaged.
• These units are PARTIAL UNIT AIR CONDITIONERs, complying with PARTIAL UNIT requirements of this standard, and must only be connected to other units that have been confirmed as complying to corresponding PARTIAL UNIT requirements of this standard, UL 60335-2-40/CSA C22.2 No. 60335-2-40, or UL 1995/CSA C22.2 No 236.
• Assure the maximum operating pressure is considered when connecting to any indoor units.
• According to ASHRAE 15, these units can stop compressor working in 10s when receiving the signal from the Refrigerant detection systems in indoor units.
Please verify and assure the validity during installation.

Safety instructions

• Do not let air enter the refrigeration system or discharge refrigerant when moving the air conditioner.
• This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
• Children should be supervised to ensure that they do not play with the appliance.
• If the appliance is fixed wiring, the appliance must be fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under over voltage category III conditions, and these means must be incorporated in the fixed wiring in accordance with the wiring NEC codes and regulation.

• The appliance shall be installed in accordance with national wiring regulations.
• Servicing shall only be performed as recommended by the equipment manufacturer.
• The method of connection of the appliance to the electrical supply and interconnection of separate components is detailed in below part. The wiring diagram with a clear indication of the connections and wiring to external control devices and supply cord is detailed in below part.
• In order to avoid a hazard due to inadvertent resetting of the thermal cut-out, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.
• It is necessary to allow disconnection of the appliance from the supply after installation. The disconnection may be achieved by incorporating a switch in the fixed wiring in accordance with the wiring rules. During service and when replacing parts, be sure to disconnect the appliance from its power source. If the disconnection is not foreseen, a disconnection with a locking system in the isolated position shall be provided.
• The information of dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures is detailed in below part.
• This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
• Instructions on addition charging of refrigerants are detailed in below part.

INSTALLATION

General

Precautions for using R454B refrigerant

The basic installation work procedures are the same as the conventional refrigerant (R22 or R410A). However, pay attention to the following points:

⚠ WARNING

1.Transport of equipment containing flammable refrigerants.

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment, permitted to be transported together will be determined by the applicable transport regulations.

2. Marking of equipment using signs

Signs for similar appliances (containing flammable refrigerants) used in a work area generally are addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location. All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs. The effectiveness of signs should not be diminished by too many signs being placed together. Any pictograms used should be as simple as possible and contain only essential details.

3.Disposal of equipment using flammable refrigerants

Compliance with national regulations

4.Storage of equipment/appliances

The storage of equipment should be in accordance with the manufacturer's instructions.

5.Storage of packed (unsold) equipment

- Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.
- The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
- The storage temperature should not exceed 60℃, as the refrigerant leakage may occur above 60℃, which can cause danger.

6.Information on servicing

6-1 Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following precautions should be complied with prior to conducting work on the system.

6-2 Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of flammable gas or vapour being present while the work is being performed.

6-3 General work area

- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

6-4 Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

6-5 Presence of fire extinguisher

- If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
- Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

6-6 No ignition sources

- No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.
- All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.
- Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

6-7 Ventilated area

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.
- A degree of ventilation shall continue during the period that the work is carried out.
- The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

6-8 Checks to the refrigeration equipment

- Where electrical components are being changed, they shall be fit for the purpose and to the correct specification.
- At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

INSTALLATION

General

Safety Precautions

⚠ WARNING

- The following checks shall be applied to installations using flammable refrigerants:
  – The charge amount is in accordance with the room size within which the refrigerant containing parts are installed; Refer to a chart.
  – The ventilation machinery and outlets are operating adequately and are not obstructed;
  – If an indirect refrigerating circuit is used, the secondary circuit shall be checked for the leak of refrigerant;
  – Marking of the equipment should be visible and legible. Illegal markings and signs hall be corrected;
  – Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
- 9 **Checks of electrical devices**
- Repair and maintenance of electrical components shall include initial safety checks and component inspection procedures.
- If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
- If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.
- This shall be reported to the owner of the equipment so all parties are advised.
- Initial safety checks shall include:
- Capacitors should have adequate time to discharge before touching electrical parts . NO MANUAL DISCHARGING. Check that LEDs on PCBs have gone out.
- That there no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

7. **Repairs of sealed components**
Sealed electrical components shall be replaced with OEM approved parts.

8. **Repairs of intrinsically safe components**
Intrinsically safe components must be replaced with OEM approved parts.

9. **Cabling**
- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.
- The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

10. **Detection of flammable refrigerants**
- Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.
- A halide torch (or any other detector using a naked flame) shall not be used.

11. **Leak detection methods**
The following leak detection methods are deemed acceptable for systems containing flammable refrigerants:
- Leak detector must be A2L compatible.
- Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (maximum 25%) is confirmed.
- Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- If a leak is suspected, all naked flames shall be removed/ extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- Removal of refrigerant shall be according to EPA Sec. 608.

INSTALLATION

General

Safety Precautions

⚠ WARNING

12. **Removal and evacuation**
- When opening a refrigerant circuit into the refrigerant circuit to make repairs – or for any other purpose –conventional procedures shall be used.
- However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.
- The following procedure shall be adhered to:
  - Safely recover the refrigerant. following local and national regulations;
  - Purge first then evacuate.
  - Purge the circuit with inert gas (optional for A2L);
  - Evacuate (optional for A2L);
  - Suggest cutting out the components and unbrazing when removed from the system.
  - Open the circuit.
- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The system shall be "flushed" with dry nitrogen to render the unit safe.
- This process may need to be repeated for several times.
- Compressed air or oxygen shall not be used for this task.
- Flushing shall be achieved by breaking the vacuum in the system with Dry nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- Flushing shall be achieved by purging the Dry nitrogen through the refrigeration system from an entrance point to an exit point that will replace refrigerant, and oxygen trapped in the system. 3-5 minutes of purging is normal. Once repairs have been made a pressure test to 550 psi must be performed and must hold for 30 mins. Once pressure test is complete, release the nitrogen and evacuate the system to a 500 miron or below and should hold for 30 mins without raising. (triple evacuation will help with this process). Link to Porcess.

13. **Charging procedures**
- In addition to conventional charging procedures, the following requirements shall be followed:
  - Ensure that contamination of different refrigerants does not occur when using charging equipment.
  - Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
  - Cylinders shall be kept inverted.
  - Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
  - Label the system when charging is complete (Indicate any added refrigerant and total charge and subsequent line set length).
  - Extreme care shall be taken not to overfill the refrigeration system.
  - Prior to recharging the system pressure shall be tested with Dry nitrogen.
- The system shall be leak tested on completion of charging but prior to commissioning.
- A follow up leak test shall be carried out prior to leaving the site.

14. **Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail.

It is recommended that all refrigerants are recovered safely.

Prior to the task, an oil and refrigerant sample shall be taken in case that an analysis is required prior to the re-use of recovered refrigerant. It is essential that electrical power is available before the task.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure ensure that:
- Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- All personal protective equipment is available and being used correctly;
- The recovery process is supervised at all times by a competent person;
- Recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery.

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80 % volume liquid charge).

Safety Precautions

⚠ WARNING

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

15. **Labelling**
Equipment shall be labelled stating that it has been de-commissioned and empty of refrigerant.
The label shall be dated and signed.
For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANTS.

16. **Recovery**
- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerant is removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.
- Ensure that the correct number of cylinders for holding the total system charge is available.
- All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).
- Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.
- Empty recovery cylinders are evacuated and,cooled during the recovery process.

17. **Competence of service personnel**
Information and training
The training should include the substance of the following:
Information about the explosion potential of flammable refrigerants to show that flammables may be dangerous when handled without care.
Information about potential ignition sources, especially those that are not obvious, such as lighters, light switches, vacuum cleaners, electric heaters.
Information about the concept of sealed components and sealed enclosures according to UL 60335.
Information about the correct working procedures:

a) Commissioning
- Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
- Connect the pipes and carry out a leak test before charging with refrigerant.
- Check safety equipment before putting into service.

b) Maintenance
- Portable equipment shall be repaired outside on in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Check that all LED lights are out on all PCBs to ensure that power has been drained from the unit.
- Reassemble sealed enclosures accurately If seals are worn, replace them.
- Check safety equipment before putting into service.

c) Repair
- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- When brazing is required the following procedures shall be carried out in the right order.
  - Remove the refrigerant.

INSTALLATION

General

Safety Precautions

⚠ WARNING

- Evacuate the refrigerant circuit.
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again.
- Remove parts to be replaced by cutting, not by flame.
- Purge the braze point with nitrogen during the brazing procedure.
- Carry out a leak test before charging with refrigerant.

● Reassemble sealed enclosures accurately. If seals are worn, replace them.
● Check safety equipment before putting into service.

d) Decommissioning
di) If the safety is affected when the equipment is putted out of service. the refrigerant charge shall be removed before decommissioning.
dii) Ensure sufficient ventilation at the equipment location.
diii) Be aware that malfunction of the equipment may be caused by refrigerant loss and a leak is possible.
div) Check that all LED lights are out on all PCBs to ensure that power has been drained from the unit.
dv) Remove refrigerant.

e) Disposal
f) Ensure sufficient ventilation at the working place.
g) Remove the refrigerant.
h) Evacuate the refrigerant circuit
i) Purge the refrigerant circuit with nitrogen for 5 min.
j) Evacuate again.
k) Cut out the compressor and drain the oil.

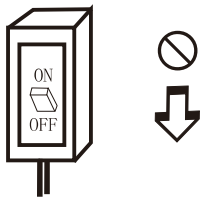
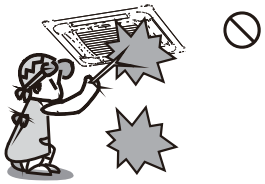
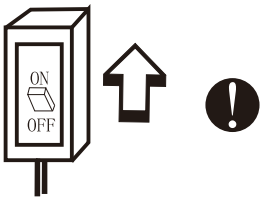
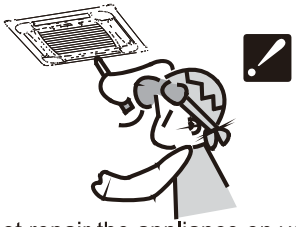
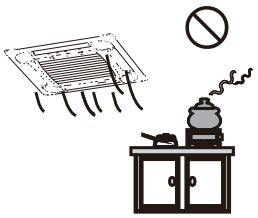
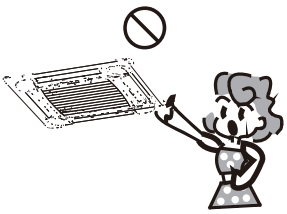
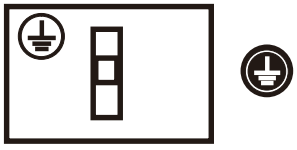
l) The pipe-work shall be compliance with national gas regulations.
m) The maximum refrigerant charge amount is X kg (X see below).
n) Where addition of charge is required to complete installation, according to the content in "Refrigerant piping" . After charged, finish the label (in accessory bag) and paste it near the nameplate.
o) When moving or relocating the air conditioner, consult experienced service technicians for disconnection and reinstallation of the unit.
p) Do not place any other electrical products or household belongings under indoor unit or outdoor unit.
q) Condensation dripping from the unit might get them wet, and may cause damage or malfunction of your property.
r) Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
s) The appliance shall be stored in a room without continuously operating ignition sources（for example: open flames, an operating gas appliance or an operating electric heater).
t) Do not pierce or burn.
u) Be aware that refrigerants may not contain an odour.
v) To keep ventilation openings clear of obstruction.
w) The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
x) The appliance shall be stored in a room without continuously operating open flames (for example an operating as appliance) and ignition sources (for example an operating electric heater).
y) Any person who is involved with working on or accessing a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
z) Servicing shall only be performed as recommended by the equipment manufacturer.
aa) Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
ab) The appliance shall be installed and stored so as to prevent mechanical damage from occurring.
ac) Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated.
ad) The installation of pipe-work shall be kept to a minimum.
ae) Mechanical connections shall be accessible for maintenance purposes.

INSTALLATION

Cassette

Symbols in this User's Manual are interpreted as shown below:

- Be sure not to do.
- The feature of the appliance, instead of a fault.
- Pay attention to such a situation.
- Be sure to follow the instruction.
- Grounding is necessary.
- Warning: Incorrect handling could cause a serious hazard, such as death, serious injury,etc.

 Do not use the power supply circuit breaker or pull off the plug to turn it off during operation. This may cause a fire due to spark, etc.	 Avoid dirt accumulation on power supply circuit breaker. Otherwise it may lead to electric shock or a fire break out due to insufficient contact.	Provide accurate power supply in accordance with the rating plate requirement. Otherwise, serious faults may occur or a fire may be break out.
 Do not apply excess pressure, pull or press the power supply cord, otherwise, the power supply cord can break leading to electric shock or fire.	 Never insert a stick or similar objec to the unit. Since the fan is rotating at high speed, this may cause an injury.	
 Turn off the appliance first and then cut off power supply when appliance malfunctions.	 Do not repair the appliance on your own, this may lead to electric shock and so on.	 Prevent the air flow from reaching the gas burners and stove.
 Do not operate the unit with wet hands.		 It is the installers responsibilty to ground the appliance per local and national codes or ordinances by a licensed person.

Operating condition

The protective device may trip and stop if it is operated outside the allowed temperature range.

If the air conditioner runs in "COOLING" or "DRY" mode with door or window open for a long time when relative humidity is above 85%, dew may drip down from the air outlet.

Noise pollution

- Install the air conditioner at a place that will not cause vibration to ensure quiet operation.

Features of protector

The protective device will work at following cases:

- Turning off the appliance and restarting it at once or changing mode during operation, you need to wait at least 3 minutes.

Inspection

After operating for a long time, the air conditioner should be inspected on the following items:

- Abnormal operating sound or vibration.
- Water leakage from indoor unit.
- Electrification of metal cabinet.

Stop the air conditioner if above trouble occurs. It is advisable to have a detailed inspection after using the appliance for 5 years even if none of the above condition occurs.

Features of HEATING mode

Preheating

At the beginning of HEATING operation, the airflow from indoor unit is discharged 2-5 minutes later.

Defrosting

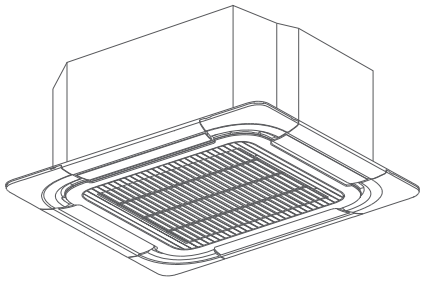
During HEATING operation the appliance will defrost automatically to improve efficiency. This procedure usually lasts for 2-10 minutes. During defrosting, fans stop operation. After defrosting completes, it returns to "HEATING" mode automatically.

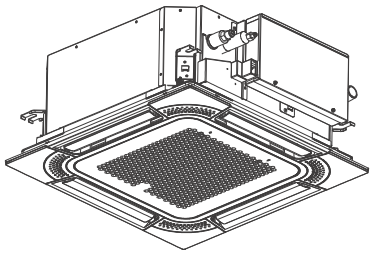
It is hard to increase the room temperature when outdoor temperature is very low. It might take a longer time if the working temperature range not closer to the operation limits.

INSTALLATION

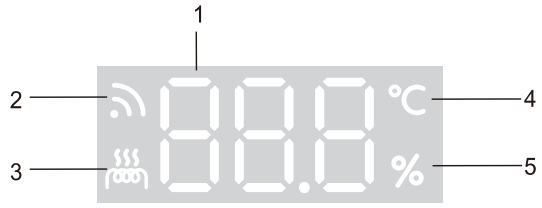
Cassette

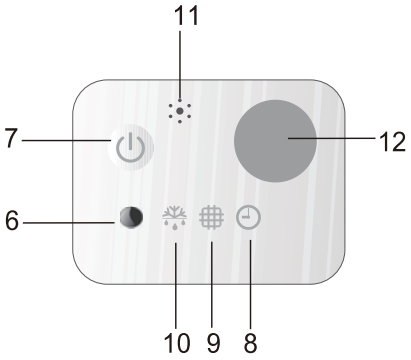
Indoor unit





Display panel





1 Temperature/humidity indicator
Display indoor set temperature or indoor temperature; Display indoor humidity (models without a humidity sensor display "--.--").

2 Wi-Fi receiver
It lights up when Wi-Fi is connected. It stops lighting when Wi-Fi is disconnected.

3 Electric heater indicator (It is only valid for the air conditioner with electric heater function.)
It lights up during heating mode when electric heater is on. It stops lighting when heater is completed.

4 Temperature Unit (℃) indicator
It lights up when the air conditioner displays with Celsius temperature, and stops lighting when it is displays with Fahrenheit temperature.

5 Humidity indicator
It lights up when display humidity.

NOTE: **The figures in this manual are based on the external view of a standard model. Consequently, the shape may differ from the air conditioner model you have selected.**

Identification of Parts

6 Run indicator (Red)
It lights on during operation. It lights off during SLEEP mode.
7 Emergency switch
The filter clean indicator is reset when the switch is pressed. The unit will be started or stopped when the switch is pressed. The unit will be operated in forced cooling mode if press the switch continuously for more than 5s when the unit is off.
8 Timer indicator (Green)
It lights on when timer is in use. It lights off when timer completes.
9 Filter clean (Yellow)
It lights on when the filter should be cleaned.
10 Defrost indicator (Green)
It lights on during defrosting and it lights off when defrosting is complete.
11 Buzzer
It rings when the signal from remote controller is received.
12 Infrared receiver
Receives signal from the remote controller.

Operation Manual

1. Special Remarks

- **3-minute protection after the compressor stops**
  To protect compressor, the system implements a 3 minute compressor lockout once operation is stopped.
- **5 minute-protection**
  Compressor must run for at least 5 minutes once operation starts. During the 5 minutes, compressor will not stop even after set point is reached. The system will shut off if manually turned off using the remote controller.
- **Cooling operation**
  The fan of the indoor unit will never stop running in cooling operation. It continues to operate even if the compressor stops working.
- **Heating operation**
  Heating capacity depends on external factors like outdoor unit temperature. Heating capacity might decrease if outdoor ambient temperature is too low.
- **Anti-freezing function during cooling**
  When the air temperature from the indoor outlet is too low, the unit will run for some time under the fan mode, to avoid frost or ice forming on the indoor heat exchanger.
- **Anti cold air function**
  When heating, in order to prevent the indoor unit from blowing cold air, the fan speed is controlled at low speed air or stopped in heating mode, and the fan speed is set according to the indoor coil temperature.
- **Defrosting**
  When the outdoor temperature is too low, ice may form on the outdoor heat exchanger, reducing heating performance. When this happens, the defrost cycle of the system will start. During the defrost cycle, the indoor unit fan stops (or runs at a very low speed in some cases), to prevent cold draft.
  Once the defrost cycle is complete, heating operation and the fan speed resume.
- **Discharging the residual heating air**
  When stopping the air conditioner in normal operation, the fan motor will run with low speed for a while to blow out the residual hot air.
- **Auto restart from power outage**
  When the power supply is recovered after power outage, all presets still be in effect and the system will run according to the previous settings.

Operation Manual

2.Filter Cleaning

⚠CAUTION

Do not operate the system without air filter to protect the indoor unit heat exchanger against being clogged.

Turn off the main power switch before changing or cleaning filter. (The previous operation mode may appear.)

Installation or maintenance work of air filter must be performed by qualified professional personnel.

2.1 Filter Cleaning Indication

(1) For Display indicators

When letters “FC” displays, it indicates it’s time to clean the filter.

(2) For light indicators

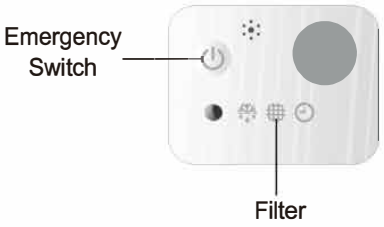
Step 1

It is time to clean the filter, when the filter icon is turned on.

Step 2

Cancel the setting

Press Emergency switch to return to the standard state.



2.2 Take Out the Filter

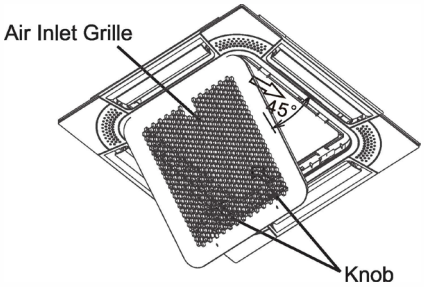
Take out the air filter according to the following steps.

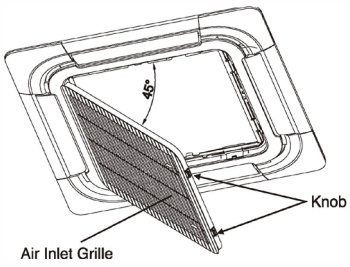
Step 1

Open the air inlet grille after pushing the two knobs as the arrow mark.

Step 2

Take out the air filter from the air inlet grille by supporting the air grille and lifting the air filter after detaching the filter from the hinges.





2.3 Clean the Filter

Clean the air filter according to the following steps.

Step 1

Use a vacuum cleaner or rinse the air filter to remove the dirt.

⚠ CAUTION

Do not use hot water with temperature higher than 104°F (40°C).

Step 2

Dry the air filter in the shade to remove excess moisture.

2.4 Resetting of Filter

Press key “TURBO” on the remote controller for 5 seconds, then release the button to restore.

For the operation of wired controller, please refer to manual of the wired controller for related information.

Operation Manual

3.Trouble Shooting

⚠ CAUTION

When condensate drain overflows from the indoor unit, stop the operation and contact a qualified, licensed service professional.
When you smell or see smoke coming out of the unit, turn OFF the main power supply and contact a qualified, licensed service professional.

3.1 If Trouble issue persists

If the issue continues after checking the following, contact your contractor and inform them of the following items.

(1) Model number and serial number
(2) Details of the issue

3.2 No Operation

Check whether the SET TEMP is set at the correct temperature.

3.3 Not Cooling or Heating Properly

- Check for obstruction of air flow of outdoor or indoor units.
- Check if there are too many heating sources in the room.
- Check if the air filter is clogged.
- Check if the doors or windows are open.
- Check if the temperature condition is within the operation range.

3.4 This is Not Abnormal

- **Odour from Indoor Unit**
  Unpleasant odour diffuses from indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.
- **Dew on Air Panel**
  When the cooling operation continues for a long period of time under high humidity conditions, dew can form on the air panel.
- **Refrigerant Flow Sound**
  While the system is being started or stopped, the refrigerant flow sound may be heard.

Installation and Maintenance

1. Safety Notice

⚠ WARNING

·Installation should be performed by a qualified personnel. (Improper installation may cause water leakage and damage, shock, or fire.)
·Install the unit according to the instructions given in this manual. (Incomplete installation may cause water leakage and damage, electrical shock, or fire).
·Be sure to use the supplied or specified installation parts. (Use of other parts may result in a poor installation, water leakage, shock, or fire).
·Install the air conditioner on a solid structure that can support the unit weight. (Inadequate support or incomplete installation may cause injury).
·Electrical work should be carried out in accordance with the installation manual and national and local codes.(Insufficient capacity or incomplete electrical work may cause electrical shock, or fire).
·Be sure to use a dedicated power circuit. (Never use a power supply shared by another appliance).

INSTALLATION

Cassette

·For wiring, use a cable long enough to cover the entire distance. Do not use an extension cord.
·Use the specified types of wires for electrical connections between the indoor and outdoor units. (Tightly connect the wires so their terminals with no external stresses).
·Poor or loose connections may cause terminal overheating or fire.
·After connecting all the wiring be sure to secure the cables so that they do not put pressure on the electrical covers or panels. (Install covers over the wires. Incomplete cover installation may cause terminal overheating, electrical shock, or fire).
·When installing or relocating the system, be sure to keep the refrigerant circuit free from air (Air in the refrigerant circuit may cause an abnormal pressure rise or rupture, resulting in injury).
·If any refrigerant has leaks out during the installation work, ventilate the room.
·After all installation is completed, check to make sure that no refrigerant is leaking out. (Refrigerant produces a toxic gas if exposed to flames).
·When making piping connection, do not let any debris or contaminants other than the specified refrigerant get into refrigeration cycle. (Doing so will cause reduced performance, abnormal high pressure in the refrigeration cycle, explosion and injury).
·Make sure that the equipment is properly grounded. Do not ground the unit to a utility pipe, lightning arrester, or telephone grounding. Incomplete grounding may cause electrical shock. (A high surge current from lightning or other sources may cause damage to the equipment).
·An earth leakage circuit breaker may be required depending on the site condition to prevent electrical shock.
·Disconnect the power supply before wiring, piping, or checking the unit.
·When moving the units, do not tilt the unit incline more than 45 degree. Pay attention to the sharp edges of the air conditioner to avoid any injury.
·During wired controller installation, ensure that the length of the wire between the indoor unit and remote controller is within 131 ft. (40 m).

⚠ CAUTION

- Do not install the equipment in a location where there is danger of exposure to flammable gas leakage. (A high concentration of flammable gas near the unit may result in fire)
- Install condensate drain piping according to the instructions in this manual. (Inadequate piping may cause flooding).
- Tighten the flare nut according to the specifications with a torque wrench. (Tightening the flare nut beyond specified torque may damage the flare nut).

2. Tools and Instruments for Installation

Number	Tool	Number	Tool
1	Standard screwdriver	8	Knife or wire stripper
2	Refrigerant vacuum pump	9	Level
3	Charge hose	10	Hammer
4	Pipe bender	11	Drill
5	Adjustable wrench	12	Flaring kit
6	Pipe cutter	13	Inner hexagon spanner and torque wrench
7	Cross head screwdriver	14	Measuring Tape

3. Installation of the Indoor Unit

⚠ DANGER

Do not install the indoor unit in a flammable environment to avoid fire or an explosion.

INSTALLATION

Cassette

Installation and Maintenance

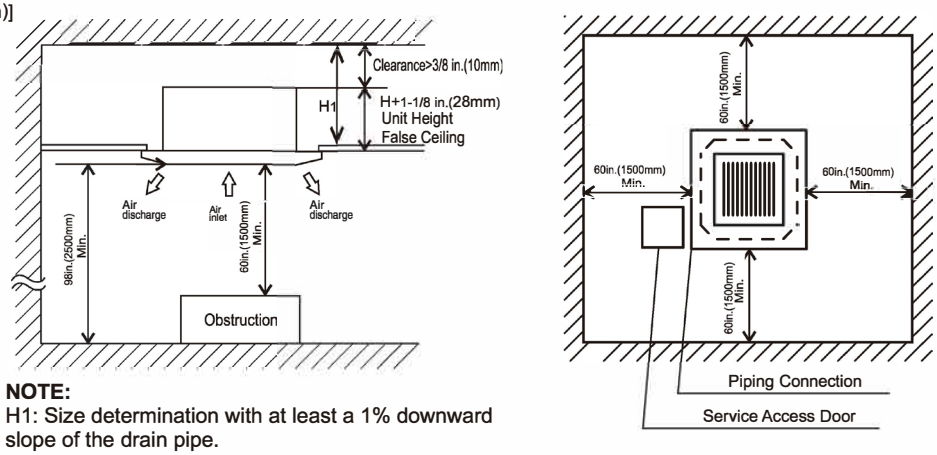
⚠ WARNING

- **Check to ensure that the overhead structure can support the weight of the equipment. Otherwise the indoor unit may topple, and fall down causing injury.**
- **Do not install the indoor unit outdoors. If done, an electric hazard or electric leakage will occur.**

3.1 Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance space, as shown in Fig.3.1.
- Provide a service access door near the unit piping connection area on the ceiling.
- Ensure that the ceiling has a sufficient strength to hang the indoor unit.
- Check that the ceiling surface is flat for the air panel installation work.

[Unit : in.(mm)]



NOTE:
H1: Size determination with at least a 1% downward slope of the drain pipe.

[Unit : in.(mm)]

Capacity (Btu/h)	H
9K/12K	8-7/16 (215)
18K/24K	9-1/4 (236)
36K/48K	10-3/4 (272)

Fig. 3.1 Space around Indoor Unit

- Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air distribution can be achieved in the room. It is recommended that the indoor unit is installed 8 ft. (2.5m) to 10 ft. (3m) from the floor level.
- Do not install flammable items in the service space for the indoor unit.
- Avoid obstacles which may obstruct the air intake or the air discharge flow.
- Do not install the indoor unit in a machine shop or kitchen where oil vapor or mist flows through the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and in severe cases, damaging the indoor unit.
- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities with electromagnetic waves from medical equipment:
  (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
  (B) Install the indoor unit and components at least 10 ft. (3m) from the electromagnetic wave source.

Installation and Maintenance

(C) Install the remote controller within a field provided and installed steel box. Prepare a steel case and install the remote control switch in it. Install remote controller wire with a steel electric conduit. Connect a ground wire to both the box and the tube.

(D) Install a noise filter when the power supply emits harmful noises.

- To avoid any corrosive chemical reaction at the heat exchanger, do not install the indoor unit in an acid or alkaline environment. If the indoor unit has to be installed in such environments, use corrosion-proof type unit.

3.2 Installation

3.2.1 Opening of False Ceiling and Suspension Bolts

(1) Determine the final location and orientation of installation of the indoor unit. Allow adequate space for piping, wiring, and maintenance.
Indoor unit installation template is printed on the packaging. Cut out the template for opening the false ceiling and installing the suspension bolts.

(2) Cut out the area for the indoor unit in the false ceiling and install suspension bolts, as shown in Fig. 3.2.

Unit: in. (mm)

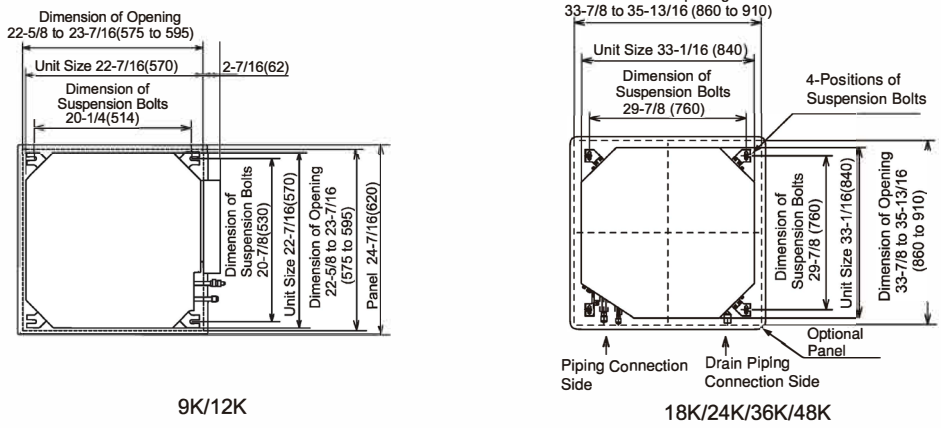


Fig. 3.2 Opening of False Ceiling and Suspension Bolts

(3) Check to ensure that the ceiling is horizontally level, otherwise the condensate may not drain properly, issues can occur.

(4) Strengthen the opening parts of the false ceiling.

(5) Mount suspension bolts, as shown in Fig. 3.3.

Unit: in. (mm)

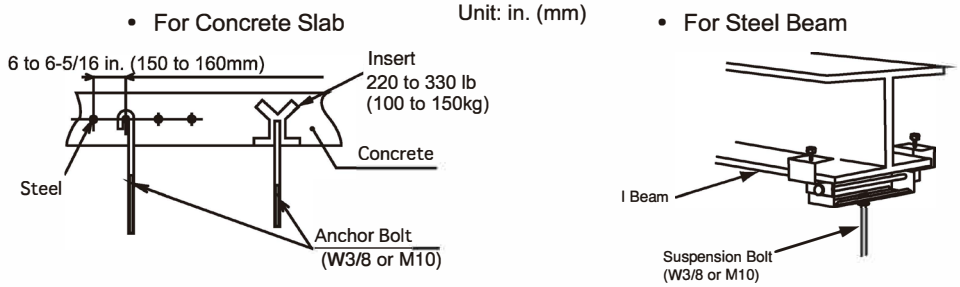
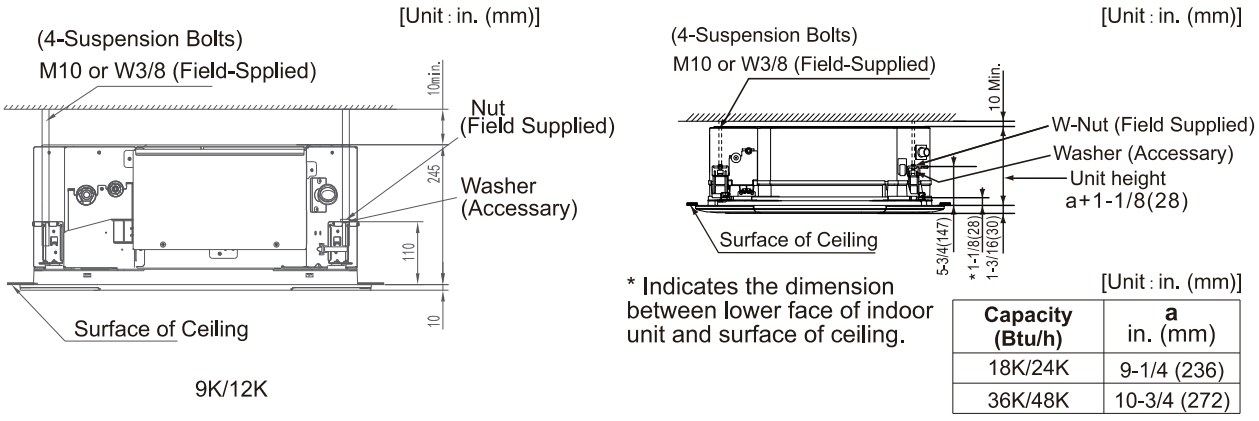


Fig. 3.3 Mounting Suspension Bolts

INSTALLATION

Cassette

3.2.2 Mounting Position of the Indoor Unit



[Unit : in. (mm)]

Capacity (Btu/h)	a in. (mm)
18K/24K	9-1/4 (236)
36K/48K	10-3/4 (272)

Fig. 3.4 Mounting Position [Unit : in. (mm)]

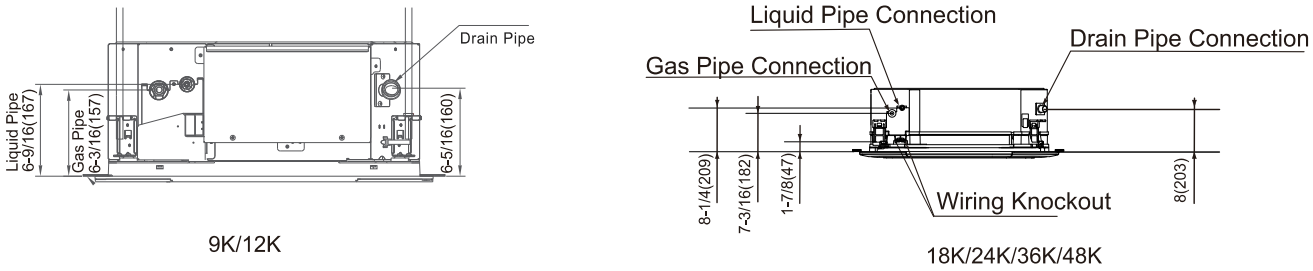
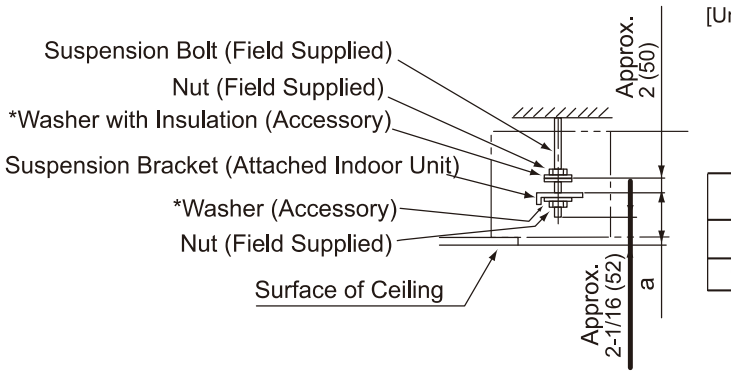


Fig. 3.5 Indoor Unit and Air Panel [Unit : in. (mm)]

3.2.3 Installing the Indoor Unit

(1) Mount the nuts and washers into the suspension bolts, as shown in Fig. 3.6.



Capacity (Btu/h)	a in. (mm)
9K/12K	4-3/8(110)
18K/24K/36K/48K	5-3/4(147)

*Place the washer so that the surface with insulation faces downwards.

Fig. 3.6 Mounting Nuts and washer

INSTALLATION

Cassette

(2) Lift the indoor unit by hoist, and do not apply any force on the drain pan.

(3) Secure the indoor unit using the nuts and washer, as shown in Fig. 3.7.

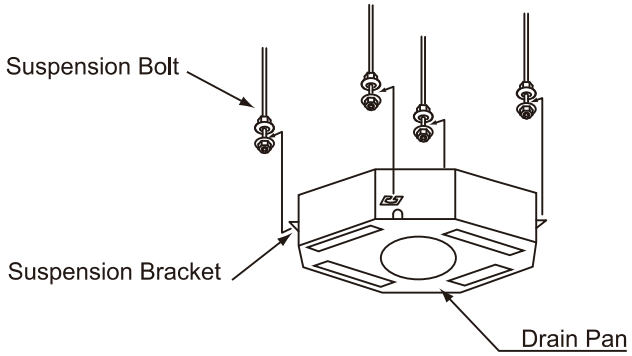


Fig. 3.7 Mounting the Indoor Unit

NOTE: If a false ceiling is already constructed, complete all piping and wiring work inside the ceiling before securing the indoor unit.

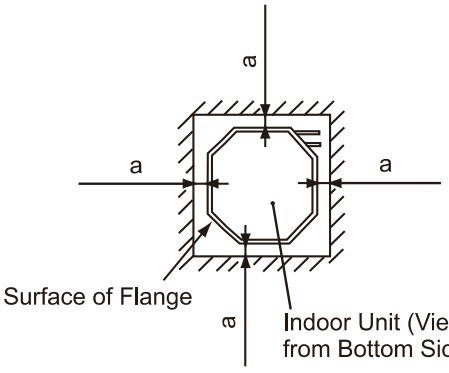
3.2.4 Adjusting the Space between Indoor Unit and False Ceiling Opening

⚠ CAUTION

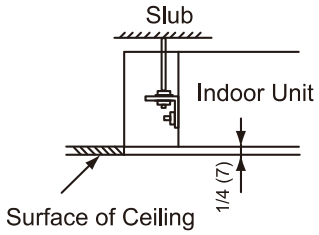
- **Check the level of the drain pan using a leveler to avoid incorrect operation of the drain discharge mechanism in the indoor unit. The drain piping side of the indoor unit must be approximately 5mm lower than the other side.**
- **Tighten the nuts of the suspension brackets after the adjustment is completed. Apply LOCK-TIGHT paint* to the bolts and nuts to prevent them from loosening, otherwise, abnormal noises or sounds may occur and the indoor unit may fall down.**

LOCK-TIGHT paint*: Paint the lock bolts and nuts. Adjust the indoor unit to the correct position while checking with the scale (factory-supplied).

(1) Installation template is attached with the packing.
(2) Adjust the position of indoor unit, according to the dimensions.



[Unit : in. (mm)]



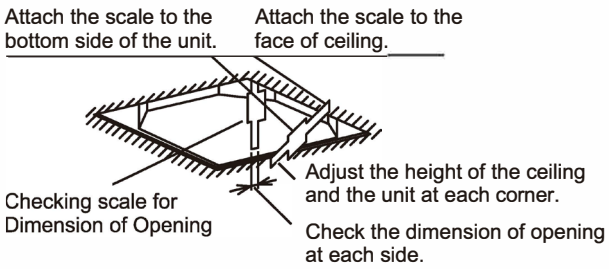
Capacity(Btu/h)	a in. (mm)
9K/12K	3/16 to 3/8 (5-10)
18K/24K/36K/48K	3/8 to 1-3/8 (10-35)

INSTALLATION

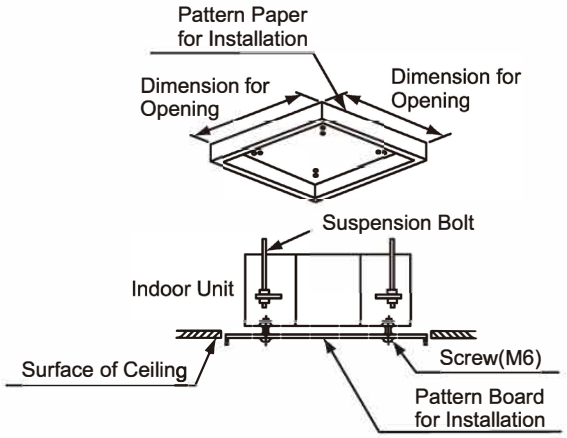
Cassette

Installation and Maintenance

a. For Ceiling already Completed with Panels



b . Ceiling not Completed with Panels yet



3.3 Installation Details for Air Panels

- Installation work for air panel should be done according to the Installation Manual for Air Panel.
- Ensure that the connector between indoor unit and the air panel is properly connected.

4. Refrigerant Pipe

⚠ DANGER

Use refrigerant R454B in the refrigerant cycle (refer to outdoor nameplate). Do not add oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-pressure test. These type of gases are extremely dangerous, which may cause an explosion. It is recommended to use nitrogen to perform these tests.

4.1 Pipe Material

(1) Prepare locally-supplied ACR copper pipes.
(2) Select the piping size from the following table.

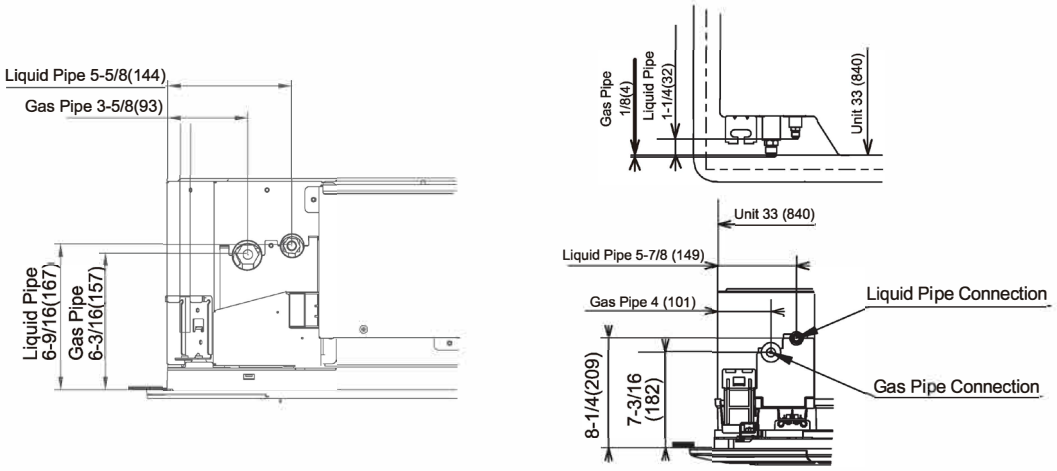
Model	Gas pipe [in. (mm)]	Liquid pipe [in. (mm)]
9K/12K	ø 3/8 (9.52)	ø1/4 (6.35)
18K	ø 1/2 (12.7)	ø 1/4 (6.35)
24K/36K	ø 5/8 (15.88)	ø 3/8 (9.52)
48K	ø 3/4 (19.05)	ø 3/8 (9.52)

(3) Select clean copper (ACR) pipes. Make sure that there is no dust and moisture inside. Blow the pipes with nitrogen or dry air to remove dust and foreign materials before connecting pipes.

Installation and Maintenance

4.2 Pipe Connection

(1) Position of piping connection is shown in Fig. 4.1.(Indoor Unit)



9K/12K

18K/24K/36K/48K

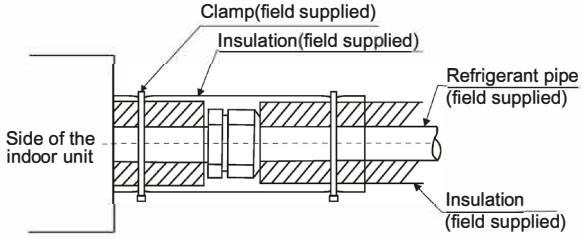
Fig. 4.1 Position of Piping Connection [Unit : in. (mm)]

(2) When tightening the flare nut, use torque wrench and adjustable as shown in Fig.4.2.

Tube size [in. (mm)]	Torque [lbf·ft. (N·m)]
ø 1/4 (6.35)	14.8 (20)
ø 3/8 (9.52)	29.5 (40)
ø 1/2 (12.7)	44.3 (60)
ø 5/8 (15.88)	59.0 (80)
ø 3/4 (19.05)	73.8 (100)

Fig. 4.2 Tightening Work of Flare Nut

(3) After refrigerant piping work is complete, piping should be fully insulated.



INSTALLATION

Cassette

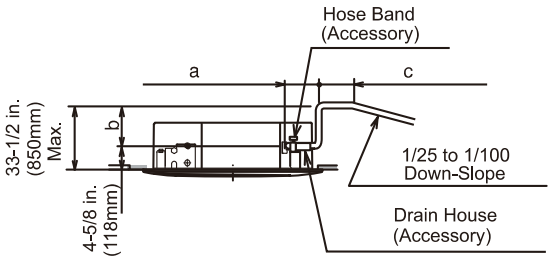
5.Drain Piping

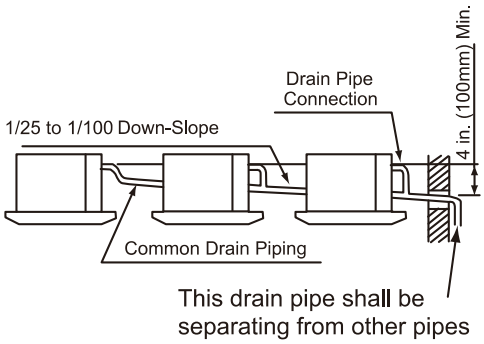
⚠ CAUTION

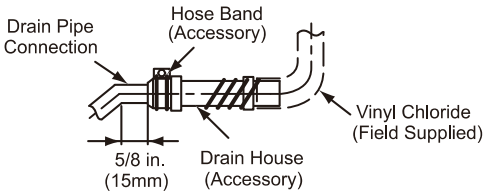
- Do not create an upper-slope or rise for the drain piping, since drain water can flow back to the indoor unit causing leakage into the room when the system operation is stopped.
- Do not connect the drain pipe with sanitary, sewage piping, or any other drainage piping.
- When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the common drain pipe, also the pipe must be sized properly based on system capacity.

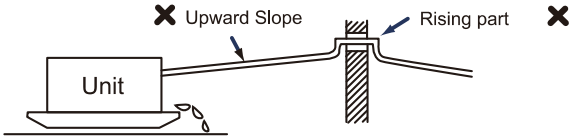
5.1 Conduct Drain Piping Work

(1) Prepare a polyvinyl chloride pipe with a 1-1/4 in. (32mm) outer diameter.
(2) Fasten the tubing to drain hose with the adhesive agent and factory-supplied clamp.
The drain piping must be performed with a down-slope pitch of 1/25 to 1/100.



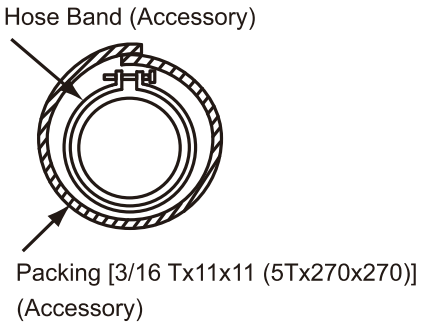






∗ The total length of a+b+c :
a≤12 in. (300mm), b≤33-1/2 in. (850mm), c≤2 in. (50mm), a+b+c≤43-5/16 in. (1100mm)
∗ In case of lifting the drain pipe at outlet part, perform the drain piping work as shown in the above figure.

(3) Insulate the drain pipe after connecting the drain hose.



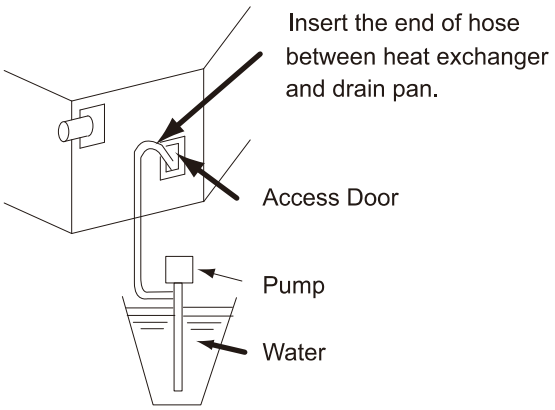
Unit: in. (mm)

Cassette

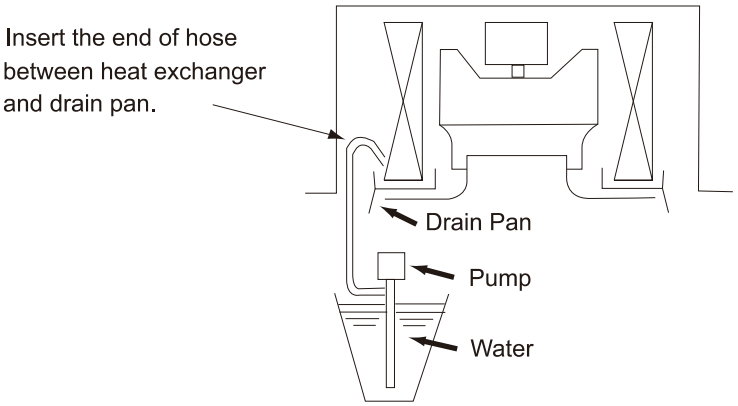
5.2 Check Draining of the Piping

- After performing drain piping work and electrical wiring, check to ensure that water drains properly per the following procedure.
- Checking with the Float Switch:
  (A) Switch ON the power supply.
  (B) Start cooling operation.
  (C) Gradually pour 64~80.6 oz(2~2.5 liters) of water into the drain pan through the access door or the air outlet.
  (D) Check to ensure that the water flows out at the end of drain piping and no water leakage occurs. When water cannot be found at the end of drain piping, pour another 64 oz(2 liters) of water into the drain pan.

- If pouring water through the access door.



- To add water through the air outlet use the diagram below for guidance.



Installation and Maintenance

6. Electrical Wiring

⚠ WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Check the item below before turning ON the main switch.
- Tighten screws according to the following torque.
  M3.5: 0.9 lbf·ft. (1.2 N·m)

  M5: 1.5 to 1.8 lbf·ft. (2.0 to 2.4 N·m)

⚠ CAUTION

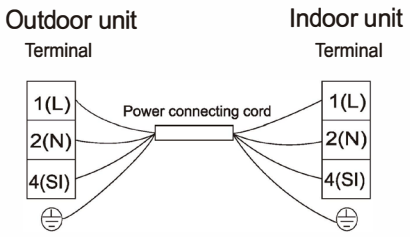
- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.
- Tightly secure the wires with the cord clamp inside the indoor unit.
- Secure the cable of the remote control switch using the cord clamp inside the electrical box.

6.1 General Check

(1) Make sure that the field-selected electrical components(main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in "7.Electrical Installation". Make sure that the components comply with National Electrical Code(NEC).
(2) Check to ensure that the power supply voltage is within ±10% of the rated voltage.
(3) Check the capacity of the electrical wires. If the power source capacity is too low, the system cannot be started due to the voltage drop.
(4) Check to ensure that the ground wire is connected.
(5) Power Source Main Switch Install a multi-pole main switch with a space of 1/8 in. (3.5mm) or more between each phase.

6.2 Electrical Wiring Connection

The intermediate connection between the indoor unit and the air panel should be referred to in the "Installation Manual for Air Panel".
(1) Connect the power supply and earth wires to the terminals in the electrical box.
(2) Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.

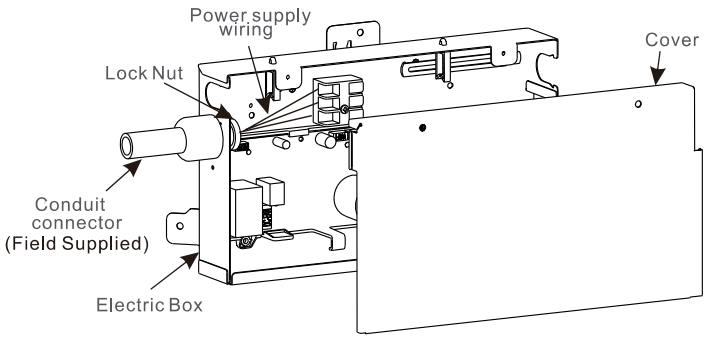


6.3 Wire connects step

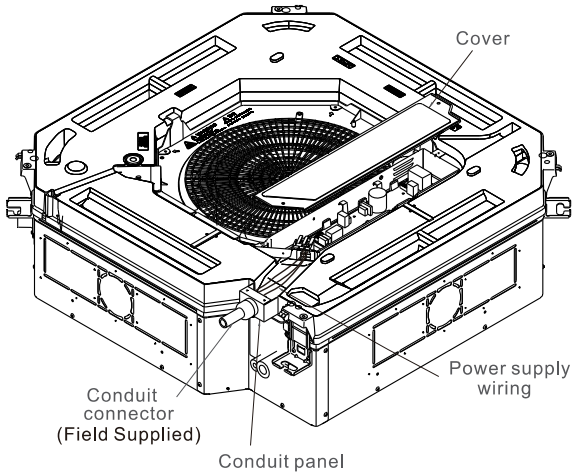
(1) Remove the screws and the cover.
(2) Pass power supply wiring through the hole on the conduit panel or electric box .
(3) Fasten the conduit connection to the conduit panel using the lock nut.
(4) Connect the power supply wiring to the terminal.
(5) Tie the power supply wiring with the clamp tightly.
(6) After completing the wiring, seal the wiring hole with the sealing material.
(7) Put the cover after completion of the work.

INSTALLATION

Cassette



9K/12K



18K/24K/36K/48K

7. Electrical Installation

⚠WARNING

- This product must be installed on a single dedicated electrical circuit. Circuit breaker protection must be installed in accordance with this manual. In moist and humid locations, an ELB type circuit breaker must be used.
- Do not operate the system until all the check points have been cleared.
  (A) Check to ensure that the insulation resistance is more than 2MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.
  (B) Check to ensure that the stop valves of the outdoor unit are fully opened and then start the system.

Model Capacity(Btu/h)	Transmitting Cable Size
9K~48K	4×14AWG

Note:

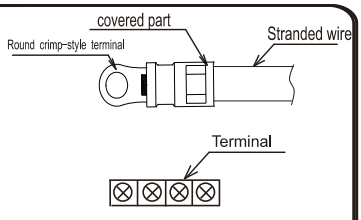
(1) Follow local and national codes and regulations when select field wires ,and all the above are the minimum wire size.

(2) Use copper supply wires.

(3) Install main switch and ELB for each system separately. When used, select the high response type ELB that is acted within 0.1second.
Recommended capacity to see outdoor machine switch capacity.

< Attention: When connecting the Power Supply Wiring >

1. When connecting the terminal block using stranded wire, make sure to use the round crimp-style terminal for connection to the power supply terminal block. Place the round crimp-style terminals on the wires up to the covered part and secure in place.



8. Trial Run

Please perform trial run according to outdoor unit installation manual.

INSTALLATION

Cassette-Fresh Air Duct

⚠ DANGER DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injuries.

⚠ WARNING WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injuries.

⚠ CAUTION CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injuries.

NOTICE NOTICE is used to address practices not related to personal injury.

NOTE NOTE is useful information for operation and/or maintenance.

INSTALLATION

Cassette-Fresh Air Duct

NOTICE

- If the air conditioning system is installed in a location where difference between the indoor temperature and outdoor supply air temperature is 15 degrees or more, a heat recovery ventilator is required. Otherwise, air conditioning is not available. In addition, when the said difference is 10 degrees or more, the Thermo-ON/OFF behavior of the operation may get slow. However, it does not affect the operation of the air conditioner.

- The installation of fresh air intake duct may be prohibited for safety reasons. Consult the local and national building and safety codes and regulations.

- Air filters must be installed in the duct. Fresh air does not pass through the air filter of air panel.

- A duct adapter can take in fresh air approximately 17.6 cfm through duct fan, and a heat recovery ventilator must be installed for further fresh air intake. The amount of fresh air intake must be kept below 35.3 cfm. When the heat recovery ventilator and duct fan are in service, the operation noise may rise. Interlock the duct fan, heat recovery ventilator and indoor unit, and they must be controlled to run only at the time of air-conditioner driving.

INSTALLATION

Cassette-Fresh Air Duct

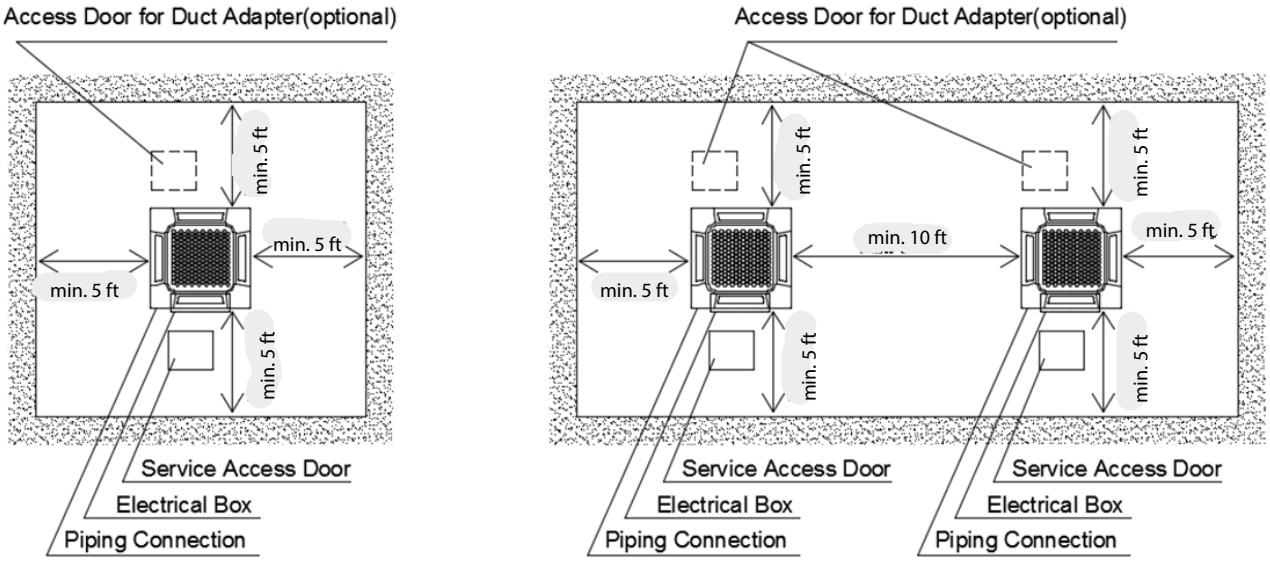
- Thermally insulate duct and duct connector using nonflammable insulation materials. Otherwise, air leakage and condensation may arise.

- Install the indoor unit and then attach a duct adapter. Otherwise, the indoor unit can't be installed for grid ceiling. For the normal ceiling, arrange a service access door near the indoor unit.

Clearance

Distance from Wall Side

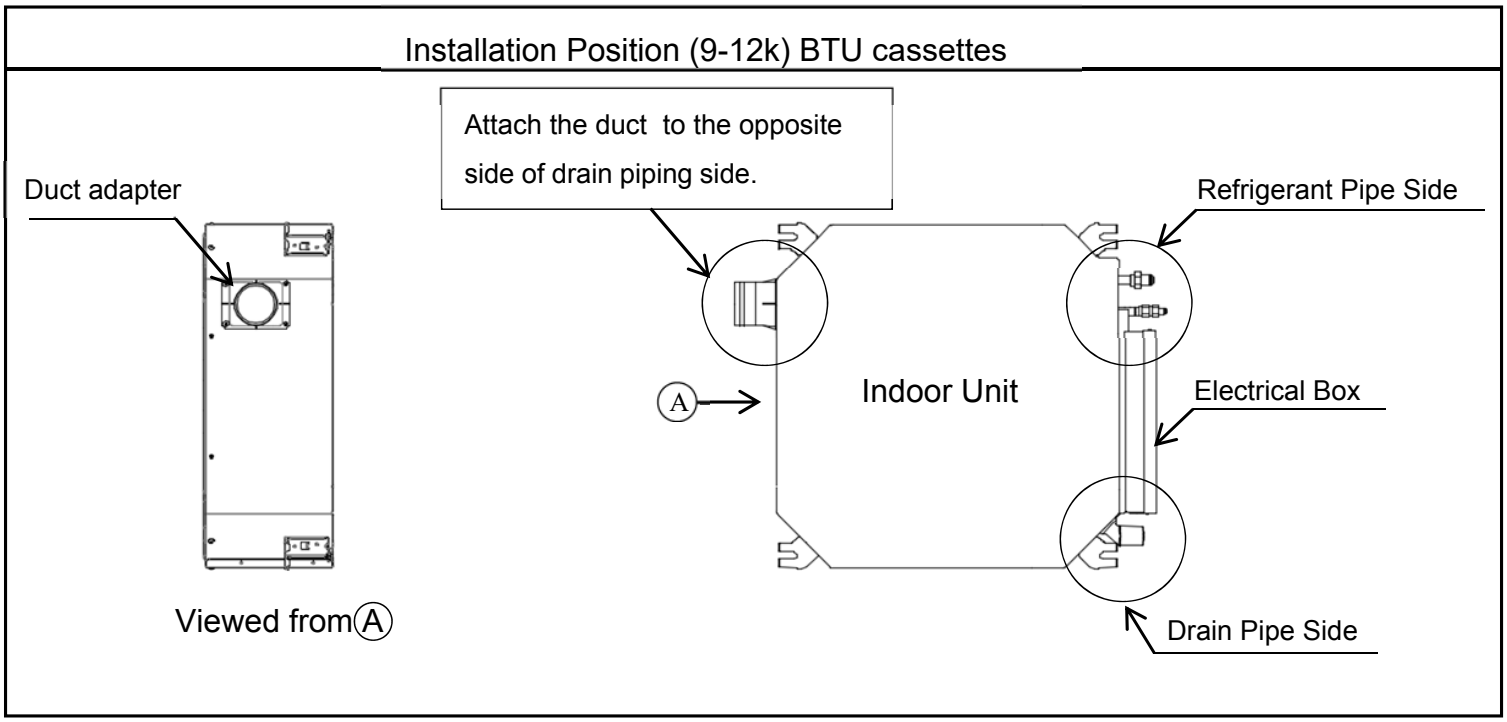
Dimensions given in feet



Cassette-Fresh Air Duct

2. Installation

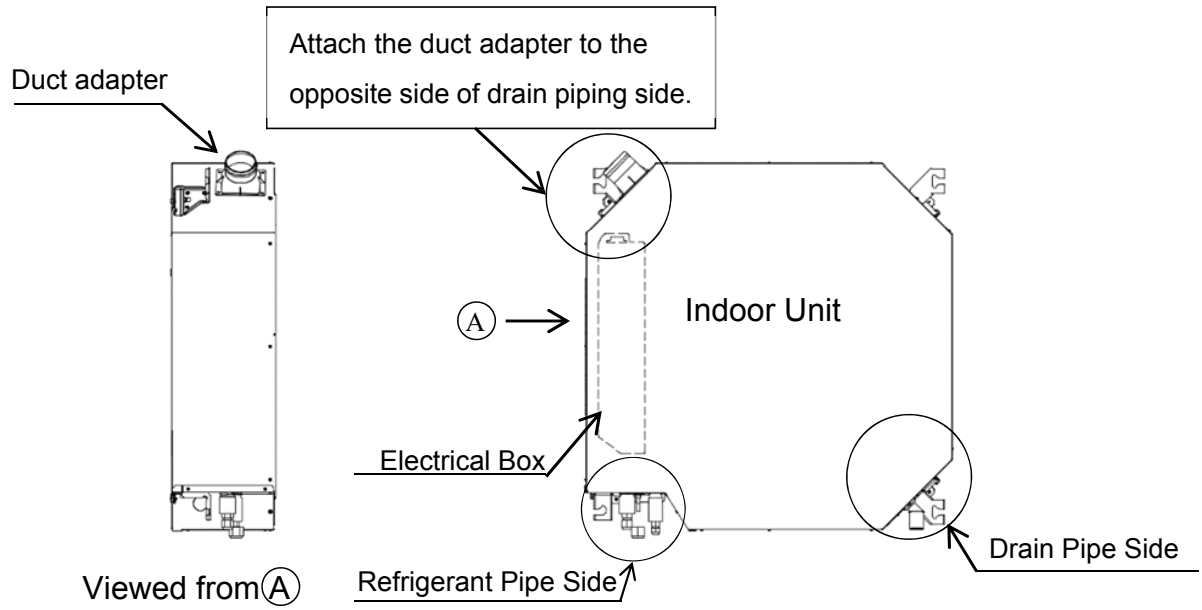
Use a duct adapter (locally procured) as the connection flange to attach the fresh air intake duct.



INSTALLATION

Cassette-Fresh Air Duct Adapter

Installation Position for cassette



(1) Attach a duct adapter to the indoor unit in the following procedure.

INSTALLATION

Cassette-Fresh Air Duct Adapter

Procedure

1. Punch the knockout hole in the side plate where the duct adapter is attached with scissors, etc.
2. Cut of the insulation (Polystyrene) along notched part of the side plate using a cutter, etc.
3. File the notched part slightly to remove burr after punching. (Be sure to prevent debris getting into the indoor unit.)
4. Remove debris after cutting off the insulation (Polystyrene).
   Otherwise, debris may get scattered during the indoor unit operation.

⚠ CAUTION

5. DO NOT put the edge of a cutter more than 1 1/8" into the notched part when cutting off the insulation.

- DO NOT use any tool which produces a lot of debris such as a saw for the opening operation . The drainage may become clogged and cause water leakage.
- A hot knife is suggested for a clean cutout

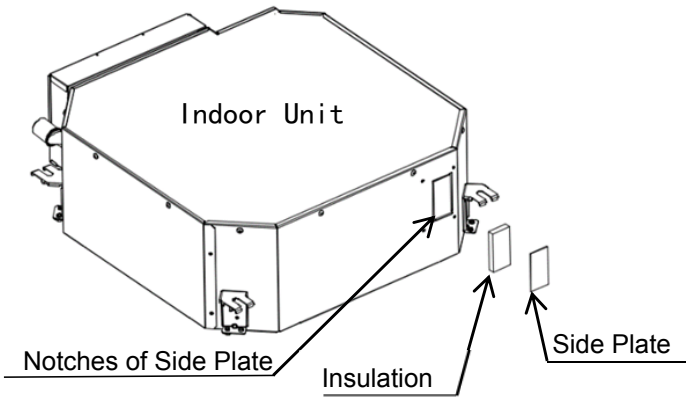


Fig.1

INSTALLATION

Cassette-Fresh Air Duct Adapter

(2) Fix the duct adapter with screws (4 pieces) This is an example of a duct adapter. Use locally available adapter for installation.

(3) Tighten the band for fixing the flexible duct.

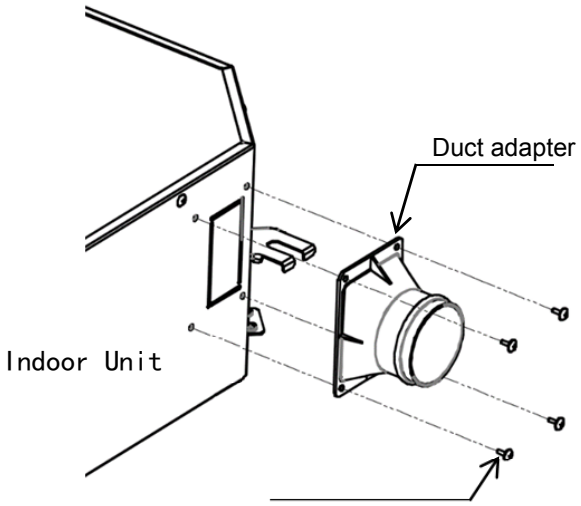


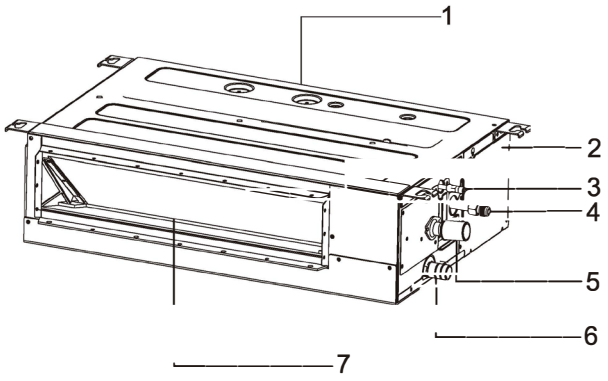
Fig.2

INSTALLATION

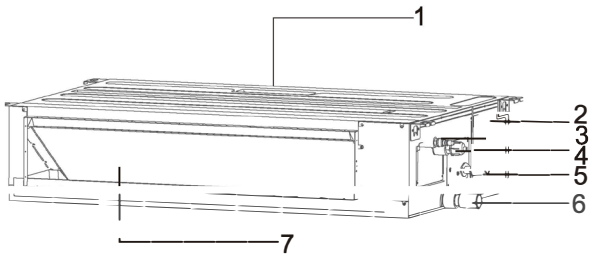
Ducted

Indoor unit

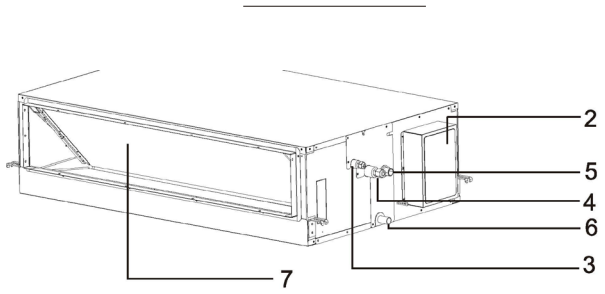
9K/12K



18K/24K



36K



1. Air inlet
2. Electric box
3. Refrigerant pipe (Liquid)
4. Refrigerant pipe (Gas)
5. Drain pipe (Connect with pump)
6. Drain pipe
7. Air outlet

Special Remarks

- **3-minute protection after the compressor stops**
  To protect compressor, the system implements a 3 minute delay once operation is stopped.
- **5 minute-protection**
  Compressor must run for at least 5 minutes once operation starts. During the 5 minutes, compressor will not stop even after set point is reached. The system will shut off if manually turned off using the remote controller.
- **Cooling operation**
  The fan of the indoor unit will never stop running in cooling operation. It continues to operate even if the compressor stops working.
- **Heating operation**
  Heating capacity depends on external factors like outdoor unit temperature. Heating capacity might decrease if outdoor ambient temperature is too low.
- **Anti-freezing function during cooling**
  When the air temperature from the indoor outlet is too low, the unit will run for some time under the fan mode, to avoid frost or ice forming on the indoor heat exchanger.
- **Anti cold air function**
  During heating mode, in order to prevent cold air blowing from indoor unit, indoor unit fan speed will run with low speed or stop, which is set according to the indoor coil temperature.
- **Defrosting**
  When the outdoor temperature is too low, ice may form on the outdoor heat exchanger, reducing heating performance. When this happens, the defrost cycle of the system will start. During the defrost cycle, the indoor unit fan stops (or runs at a very low speed in some cases), to prevent cold draft.
  Once the defrost cycle is complete, heating operation and the fan speed resume.
- **Discharging the residual heating air**
  When stopping the air conditioner in normal operation, the fan motor will run with low speed for a while to blow out the residual hot air.
- **Auto restart from power outage**
  When the power supply is recovered after power outage, all presets still be in effect and the system will run according to the previous settings.
- **Self-cleaning function**
  To enter this function in heating mode, you must first shut down the unit, use the remote control to set Cooling or Dry mode, press the CLEAN button to enter, and after that, set the controller to continue running in heating mode.

Trouble Shooting

⚠ CAUTION

If drain water overflows from the indoor unit, stop the operation and contact your dealer. If you smell or see white smoke coming out of the unit, turn OFF the main power supply and contact your dealer.

1. If Trouble still Exists

If the trouble still exists even after checking the following, contact your dealer and inform them of the following items.

(1) Unit Model Name

(2) Content of Trouble

2. No Operation

Check whether the SET TEMP is set at the correct temperature.

3. Not Cooling or Heating Properly

- Check for obstruction of air flow of outdoor or indoor units.
- Check if there are too many heating sources in the room.
- Check if the air filter is clogged with dust.
- Check if the doors or windows are open.
- Check if the temperature condition is within the operation range.

4. This is Not Abnormal

- **Odour from Indoor Unit**
  Unpleasant odor diffuses from indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.
- **Steam from Outdoor Heat Exchanger**
  During defrosting operation, ice on the outdoor heat exchanger melts resulting in steam.
- **Dew on Air Panel**
  When the cooling operation continues for a long period of time under high humidity conditions, dew can form on the air panel.
- **Refrigerant Flow Sound**
  While the system is being started or stopped, the refrigerant flow sound may be heard.

Air Filter

Filter Cleaning

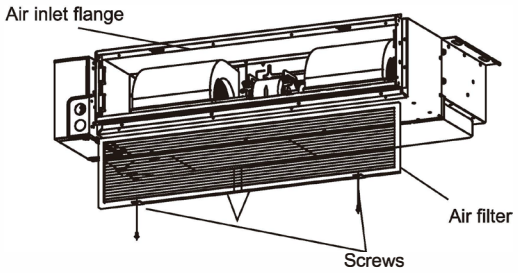
⚠ CAUTION

Turn OFF the main power switch before taking filter.

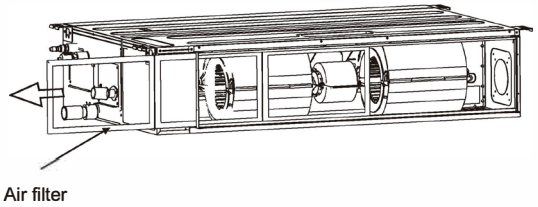
1. Take Out the Filter

Remove the fixed screws of the filter and pull the filter down along the rail of the flange as the figure below.

9K/12K/36K



18K/24K



2. Clean the Filter

⚠ CAUTION

Do not use hot water with temperature more than 104°F (40℃).
Do not use light oil essence, diluent, powder or other similar solvents for cleaning.
Air filter can remove dust or other particles in the air, if blocked, the performance of air conditioner will be greatly reduced. Therefore, in long-term use, you must always clean the air filter.
If the indoor machine is installed in the place with more air dust, the frequency of cleaning the air filter should be increased.

3. Reinstall the Filter

Reinstall the air filter in the reverse order of the filter take out described above.

INSTALLATION

Ducted

1. Safety Notice

⚠ WARNING

·Installation should be performed by a qualified personnel. (Improper installation may cause water leakage, electrical shock or fire.)

·Install the unit according to the instructions given in this manual. (Incomplete installation may cause water leakage, electrical shock or fire).

·Be sure to use the supplied or specified installation parts. (Use of other parts may cause the unit to get loosened, water leakage, electrical shock or fire).

·Install the air conditioner on a solid base that can support the unit weight. (An inadequate base or incomplete installation may cause injury if the unit falls off the base).

·Electrical work should be carried out in accordance with the installation manual and the local and national electrical wiring rules or code of practice. (Insufficient capacity or incomplete electrical work may cause electrical shock or fire).

·Be sure to use a dedicated power circuit. (Never use a power supply shared by another appliance).

·For wiring, use a cable long enough to cover the entire distance. Do not use an extension cord.

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

·Incomplete connections or clamping may cause terminal overheating or fire.

·After connecting all the wires be sure to fix the cables so that they do not put undue force on the electrical covers or panels. (Install covers over the wires, incomplete cover installation may cause terminal overheating, electrical shock or fire).

·When installing or relocating the system, be sure to keep the refrigerant circuit free from air (Air in the refrigerant circuit may causes an abnormal pressure rise or rupture, resulting in injury).

·If any refrigerant has leaked out during the installation work, ventilate the room.

·After all installation is completed, check to make sure that no refrigerant is leaking out. (The refrigerant produces a toxic gas if exposed to flames).

·When carrying out piping connection, take care not to let air substances other than the specified refrigerant get into refrigeration cycle. (Otherwise, it will cause lower performance, abnormal high pressure in the refrigeration cycle, explosion and injury).

·Make sure that the installation is properly grounded. Do not ground the unit to a utility pipe, lightning arrester, or telephone grounding. Incomplete grounding may cause electrical shock. (A high surge current from lightning or other sources may cause damage to the air conditioner).

·An earth leakage circuit breaker may be required depending on the site condition to prevent electrical shock.

·Disconnect the power supply before wiring, piping, or checking the unit.

·When moving the indoor unit and outdoor unit, please be careful, do not make the outdoor unit incline over 45 degree. Pay attention to the sharp edges of the air conditioner to avoid any injury.

·During wired controller installation, ensure that the length of the wire between the indoor unit and wired controller is within 131 ft. (40m).

⚠ CAUTION

- Do not install the air conditioner in a place where there is danger of exposure to inflammable gas leakage. (If the gas leaks and builds up around the unit, it may catch fire).
- Establish drain piping according to the instructions in this manual. (Inadequate piping may cause flooding).
- Tighten the flare nut according to the specifications with a torque wrench. (If the flare nut is tightened beyond specified torque, the flare nut may crack after a long time and cause refrigerant leakage).

2. Tools and Instruments for Installation

Number	Tool	Number	Tool	Number	Tool
1	Standard screwdriver	6	Pipe cutter	11	Churn drill
2	Vacuum pump	7	Cross head screw-driver	12	Pipe expander
3	Charge hose	8	Knife or wire stripper	13	Inner hexagon spanner
4	Pipe bender	9	Leveler	14	Measuring tape
5	Adjustable wrench	10	Hammer		

3. Installation of the Indoor Unit

⚠ CAUTION

During installation, do not damage the insulation material on the surface of the indoor unit.

3.1 Initial Check

⚠ CAUTION

- When moving the unit after unpacking, make sure to lift it by holding its lifting lugs. Do not exert any pressure on other parts, especially the refrigerant piping, drain piping and flange parts.
- Wear protective gears when installing the unit.

3.1.1 Selecting

(1) Select an installation site where the following conditions are fulfilled and that meets with your customer's.

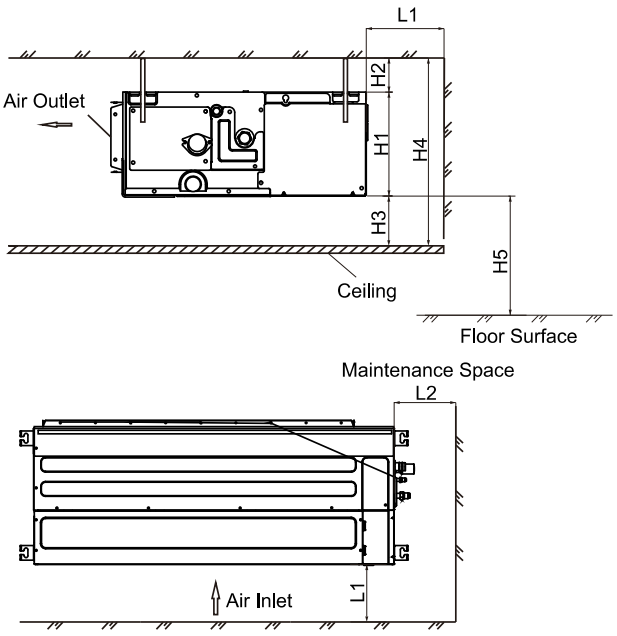
- Optimum air distribution is ensured.
- The air passage is not blocked.
- Condensate can drain properly.
- The ceiling is strong enough to bear the weight of the indoor unit.
- A false ceiling does not seem to be at an incline.
- Sufficient clearance for maintenance and servicing is ensured.(See Fig.3.1.1)
- Piping between the indoor and outdoor units is within the allowable limits.(refer to the installation of the outdoor unit)
- The indoor unit, outdoor unit, power supply wiring and transmission wiring must be kept at least 1m away from televisions and radio, this prevents image interference and noise in electrical appliances.
  (Noise may be generated depending on the conditions under which the electric wave is generated, even if a one-meter allowance is maintained.)
- Do not install the indoor unit in a machinery shop or kitchen where vapor from oil or its mist flows to the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the performance of the indoor unit, and may deform and in the worst case, break the plastic parts of the indoor unit.
- Use suspension bolts to install the unit, check whether or not the ceiling is strong enough to support the weight of the unit. If there is a risk that the ceiling is not strong enough, reinforce the ceiling before installing the unit.

INSTALLATION

Ducted

(2) Minimum space required for installation.

[unit: in. (mm)]



H1: product height
H2≥ 0.39(10)
H3≥ 2(50)
L1≥ 5.9(150)
L2≥ 18(450)
H5≥ 98(2500)
H4: Size determination with at least a 1% downward slope of the drain pipe.

Fig. 3.1.1

NOTE:

1. Reserve necessary maintenance port when the ceiling is not detachable.
2. The location of the maintenance port should ensures remove electric box cover and internal components are all easy to perform.

3.1.2 Inspection of ceiling openings

(1) Reserve necessary maintenance port when the ceiling is not detachable.

(2) The location of the maintenance port should ensures remove electric box cover and internal components are all easy to perform.

When the height (H) from the ceiling to the bottom plate of the unit is ≥12 in.(300 mm), two access holes are required, as shown in Fig. 3.1.2.

Example 1: [unit: in. (mm)]

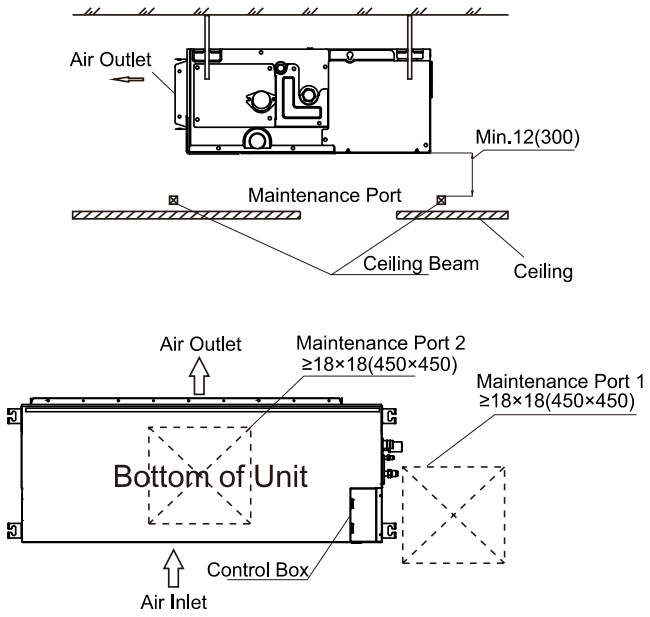
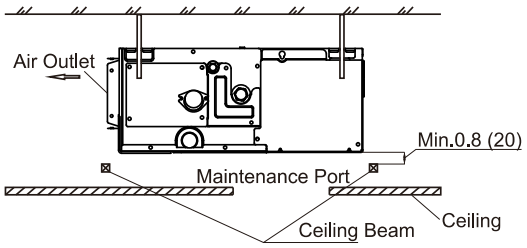


Fig. 3.1.2

When the height (H) from the ceiling to the bottom plate of the unit is <12 in.(300 mm), access holes are required, as shown in Fig. 3.1.3, Fig. 3.1.4.



Example 2: Installation of two access holes

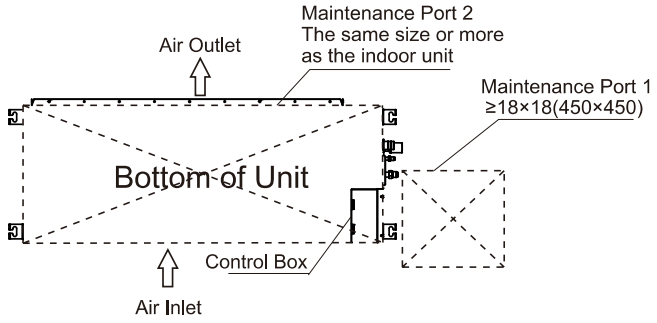


Fig. 3.1.3

Installation and Maintenance

Example 3: Installation of one access hole

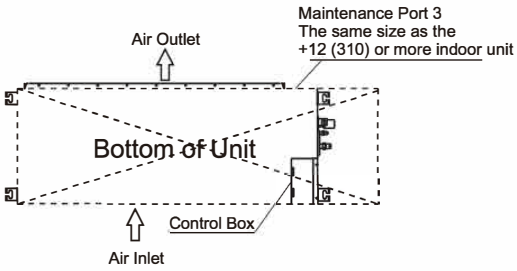


Fig. 3.1.4

3.1.3 For the bottom intake

For bottom intake, replace the chamber lid in the procedure listed in fig. 3.1.5

(1) Remove the chamber lid.

(2) Reattach the removed filter in the orientation shown in Fig. 3.1.5.

Reattach the removed chamber lid in the orientation shown in Fig. 3.1.6, refer to Fig. 3.1.6 for the direction of filter.

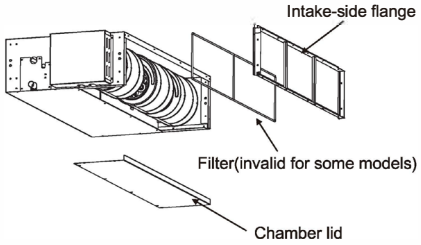


Fig. 3.1.5

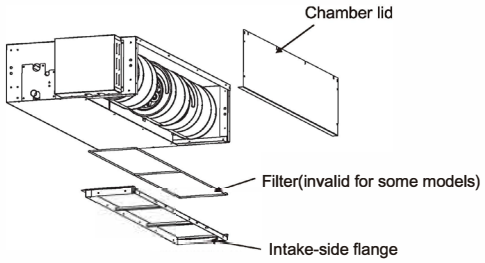


Fig. 3.1.6

3.2 Installation

3.2.1 Suspension bolts

(1) Consider the pipe direction, wiring and maintenance carefully, and choose the proper direction and location for installation.

(2) Install the suspension bolts as shown in Fig. 3.2.1 below.

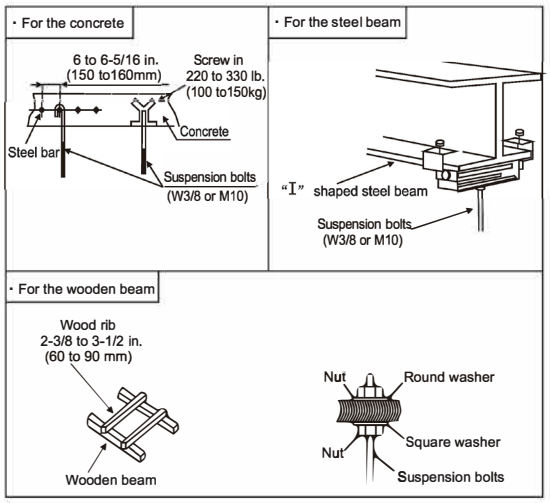
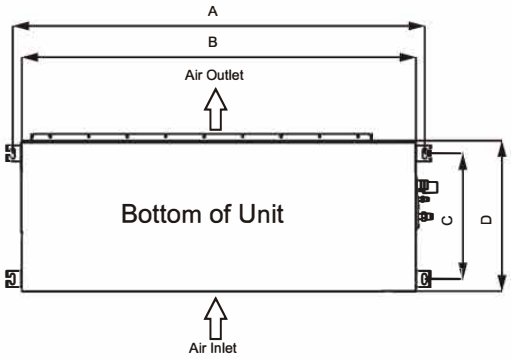


Fig. 3.2.1 Fixing the suspension bolts

3.2.2 The position of the suspension bolts and the pipes

(1) Mark the positions of the suspension bolts, the positions of the refrigerant pipes and the drain pipes.

(2) The dimension are shown below.



[unit: in. (mm)]

Capacity (Btu/h)	A	B	C	D
9K/12K	37-7/8 (961)	35-7/8 (910)	14-3/4 (375)	17-5/8 (447)
18K	33-1/2 (850)	31-1/2 (800)	24-3/8 (620)	27-1/2 (700)
24K	45-1/4 (1150)	43-1/4 (1100)	24-3/8 (620)	27-1/2 (700)
36K/48K	57-1/8 (1450)	55-1/8 (1400)	28-5/8 (727)	31-1/2 (800)

Fig. 3.2. 2 Suspension bolts

Installation and Maintenance

3.2.3 Install the indoor unit

The installation of the indoor unit is shown in Fig. 3.2.3.

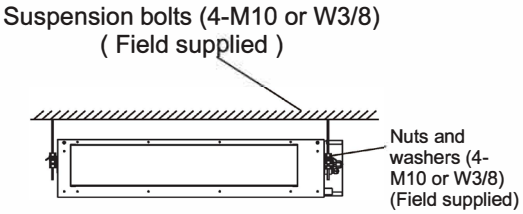


Fig. 3.2.3 The installation of the indoor unit

(1) How to fix the suspension bolts and the nuts
As shown in the figures 3.2.4, the nuts are fixed four bolts.

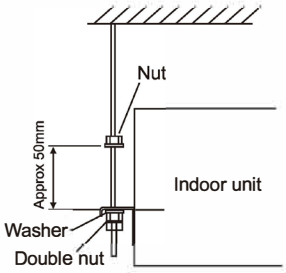


Fig. 3.2.4 Suspension bolts and nuts

(2) Install the indoor unit

·As shown in the following figure, place the left hanger bracket on the nuts and washers of the suspension bolts.

·Make sure that the left hanger bracket has been fixed on the nuts and washers securely, install the right hanger bracket suspension hook on the nuts and washers.
(When installing the indoor unit, you can slightly remove the suspension bolts.)

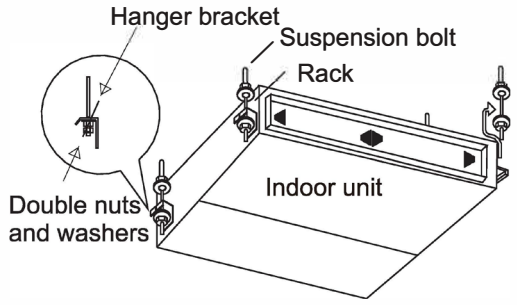


Fig. 3.2.5

3.2.4 Adjusting of the unit level

(1) Check to ensure that the foundation is flat, taking into account the maximum foundation gradient.

(2) The unit should be installed that the drainage side is slightly 0~0.2 in. (0~5 mm) lower than other sides for adequate drainage.

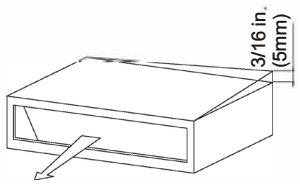


Fig. 3.2.6

(3) After the adjustment, tighten the nuts and smear the thread locker on the suspension to prevent the nuts from loosening.

⚠ CAUTION

(1) During the installation, please cover the unit with the plastic cloth to keep it clean.

(2) Make sure that the unit is installed level by using a level or a plastic pipe filled with water in instead of a level, adjust the top surface of the unit to the surface of the water at both ends of the plastic pipe and adjust the unit horizontally.(one thing to watch out for in particular is if it is installed so that the slope is not in the direction of the drain piping, as this might cause leaking.)

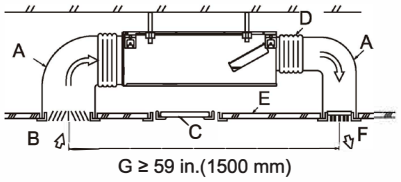
3.2.5 Installing the duct

⚠ CAUTION

- Make sure the external static pressure of the unit is within the range.
- Connect the duct and intake-side flange.
- Connect the duct and outlet-side flange.
- The connection of indoor unit and air duct must be well sealed and kept warm with insulation material.

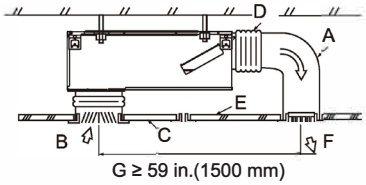
<Example> (For LSP/MSP Type)

A. In case of rear inlet

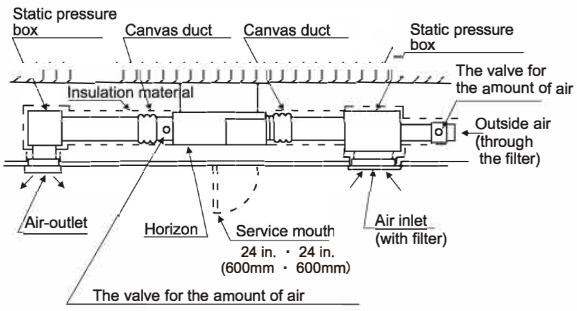


A Duct
B Air inlet
C Access door
D Canvas duct
E Ceiling surface
F Air outlet
G Leave distance enough to prevent short cycle

B. In case of bottom inlet



<Example> (For MSP/HSP Type)



4. Refrigerant Pipe

⚠ DANGER

Use the refrigerant according to outdoor nameplate. When carrying on the leakage check and test, do not mix in oxygen, acetylene or other flammable and virulent gas, for these gases are quite dangerous, and may possibly cause explosion. Always use dry nitrogen for leakage tests.

4.1 Pipe Material

(1) Prepare the copper pipe on the spot.
(2) Choose dustless, non-humid, clean copper pipe. Before installing the pipe, use nitrogen or dry air to blow away the pipe dust and impurity.
(3) Choose the copper pipe (ACR) according to Fig. 4.1.

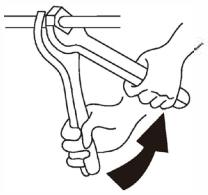
4.2 Pipe Connection

(1) The pipe diameter are shown in Fig. 4.1.

Capacity (Btu/h)	Gas Pipe [in. (mm)]	Liquid Pipe [in. (mm)]
9K/12K	Φ 3/8 (9.52)	Φ 1/4 (6.35)
18K	Φ 1/2 (12.7)	Φ 1/4 (6.35)
24K/36K	Φ 5/8 (15.88)	Φ 3/8 (9.52)

Fig. 4.1 Pipe diameter

(2) As shown in Fig. 4.2, screw up the nuts with 2 spanners.



Pipe size [in. (mm)]	Torque [lbf·ft. (N·m)]
ø 1/4 (6.35)	14.8 (20)
ø 3/8 (9.52)	29.5 (40)
ø 1/2 (12.7)	44.3 (60)
ø 5/8 (15.88)	59.0 (80)
ø 3/4 (19.05)	73.8 (100)

Fig. 4.2 Tightening torque for the nut

(3) After refrigerant piping work is complete, piping should be fully insulated.

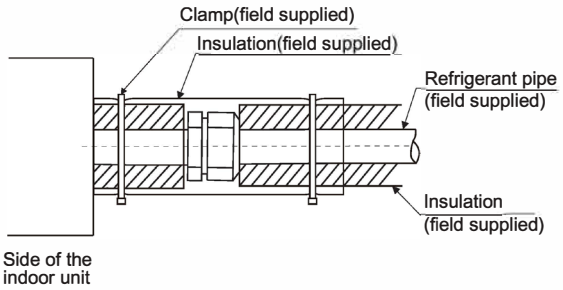
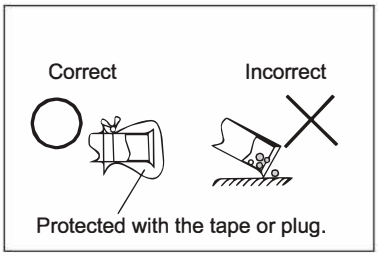


Fig. 4.3 Piping insulation procedure

- The pipe goes through the hole with the seal.
- Do not place the pipes on the floor directly.



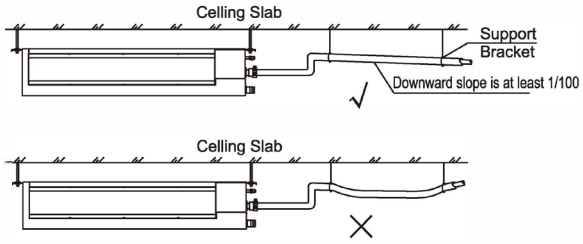
Installation and Maintenance

5. Drain Piping

5.1 Conduct Drain Piping Work

5.1.1 Draining piping connections

- Prepare polyvinyl chloride pipe with a 1-1/4 in. (32mm) outer diameter.
- The diameter of drain pipe connection hole should be same as that of the drain pipe.
- Keep the drain pipe short and sloping down wards at a gradient of at least 1/100 to prevent air pockets from forming.
- Attach a support bracket at 3.3~4.9 ft. (1~1.5m) intervals for the prevention of piping deflection.
- The highest point of the main drain pipe should be provided with a vent hole, and at least every 16.4 ft.(5m) on the main drain pipe should be provided with a vent hole.

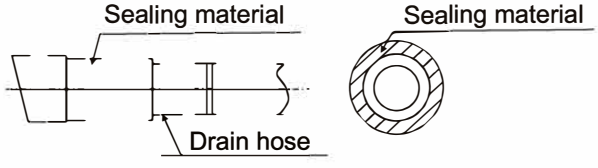


⚠ CAUTION

Water accumulating in the drain piping can cause the drain to clog.

⚠ CAUTION

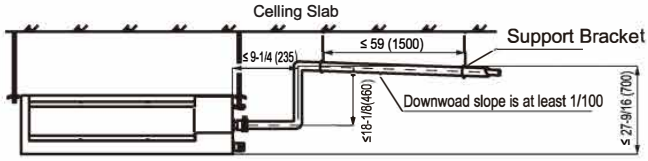
- Use the drain hose and the clamp. Insert the drain hose fully into the drain socket and firmly tighten the drain hose and warm-keeping material with the clamp.
- The two areas below should be insulated because condensation may happen there causing water leakage. Drain piping passing indoors and Drain sockets.
- Referring the figure below, insulate the drain socket and drain hose using the included large sealing pad.



5.1.2 Connection mode of the drain pipe with a drain drain pump unit

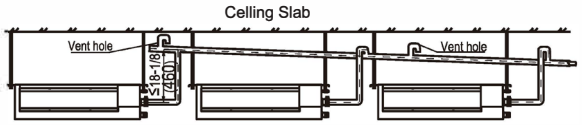
(1) The drain pipe for a single indoor unit

[unit: in. (mm)]



(2) The drain pipe for multiple indoor units through the main drain pipe

[unit: in. (mm)]



NOTE:

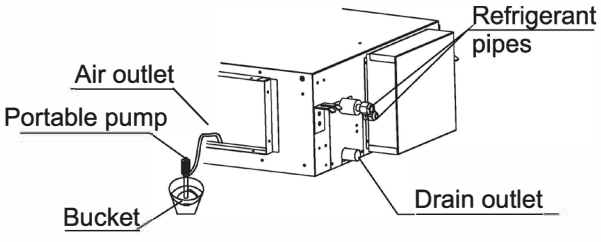
Select the diameter of the concentrated drain piping to suit the capacity of equipment connecting to the concentrated drain piping (see the equipment design sheet).

⚠ CAUTION

- Do not connect the drain pipes directly to sewage pipes to avoid ammonia odour. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger.
- Do not twist or bend the drain hose, doing so applies excessive force it and may also cause leakage.

5.2 Check Draining of the Piping

- After piping work is finished, check if drainage flows smoothly.
- Gradually pour approximately 1000 cc of water from the outlet hole into the drain pan to check drainage flow.
- Check the drainage as shown below:



Installation and Maintenance

6. Electrical Wiring

6.1 General Check

⚠ CAUTION

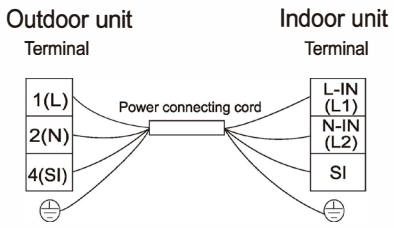
- Before proceeding with electrical connections, make certain that power supply are as specified on the unit rating plate. See unit wiring label for proper field high and low-voltage wiring. Make all electrical connections in accordance with the NEC and any local codes or ordinances that may apply. Refer to the NEC(USA) or CSA (Canada) for wire sizing. Use copper wire only.
- Every installation must include an NEC(USA) or CSA (Canada) approved over-current protection device.

⚠ WARNING

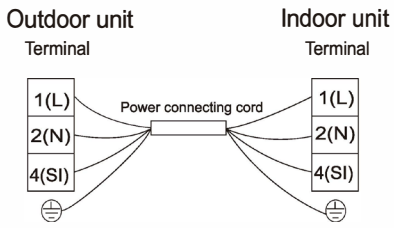
Disconnect all power before servicing or installing this unit.
To avoid the electrical shock, please ensure the air conditioner is properly grounded.
All routing of electrical wiring must be made through provided electrical knockouts.
Do not cut, puncture or alter the cabinet for electrical wiring.
Knockouts are provided on the indoor unit top panel and sides of the cabinet to allow for the entry of the supply voltage conductors. If the knockouts on the cabinet sides are used for electrical conduit, an adapter ring must be used in order to meet UL 60335 safety requirements. An MEC or CEC approved strain relief is to be used at this entry point. Some codes/municipalities require the supply wire to be enclosed in conduit. Consult your local codes.

Electrical Wiring Diagram

9K/12K



18K/24K/36K/48K



Note:
Since there may be differences in some model's terminal blocks, wiring connection should be done according to letters on the terminal block. Please disregard numbers in this case.

Ducted

6.2 Change of Static Pressure

The static pressure can be freely adjusted by using specific wired controller. (For more information, please refer to other technical files or contact local technical service center of our company.)

Capacity (Btu/h)	The Range of Static Pressure	Function Code Set
9K/12K	0-0.20 in. H_2O (0-50Pa)	0-50 function code value equals static pressure value, more than 45 is 0.18 in. H_2O (45Pa). [default: 0.18 in. H_2O (45Pa)]
18K	0-0.56 in. H_2O (0-140Pa)	0-140 function code value equals static pressure value, more than 45 is 0.18 in. H_2O (45Pa). [default: 0.18 in. H_2O (45Pa)]
24K	0-0.66 in. H_2O (0-165Pa)	0-165 function code value equals static pressure value, more than 145 is 0.58 in. H_2O (145Pa). [default: 0.58 in. H_2O (145Pa)]
36K	0-0.80 in. H_2O (0-200Pa)	0-200 function code value equals static pressure value, more than 145 is 0.58 in. H_2O (145Pa). [default: 0.58 in. H_2O (145Pa)]

Note: The pressure loss of filter is included in the data above.

6.3 Electrical Installation

⚠WARNING

- This product must be installed on a single dedicated electrical circuit. Circuit breaker protection must be installed in accordance with this manual. In moist and humid locations, an ELB type circuit breaker must be used.
- Do not operate the system until all the check points have been cleared.

(A) Check to ensure that the insulation resistance is more than 2MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.

(B) Check to ensure that the stop valves of the outdoor unit are fully opened and then start the system.

- Pay attention to the following items while the system is running.

Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 194℉ (90℃).

Capacity (Btu/h)	Transmitting Cable Size
9K~ 36K	4×14AWG

Note：

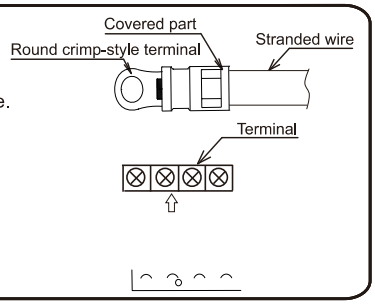
(1) Follow local and national codes codes and regulations when select field wires, and all the above are the minimum wire size.

(2) Use copper supply wires.

(3) Install main switch and ELB for each system separately. When using an ELB, select the high response type ELB that is acted within 0.1second.

< Attention: When Connecting the Power Supply Wiring >

1. When connecting the terminal block using stranded wire, make sure to use the round crimp-style terminal for connection to the power supply terminal block. Place the round crimp-style terminals on the wires up to the covered part and secure in place.



INSTALLATION

Wall Mount

C.2 Clearances

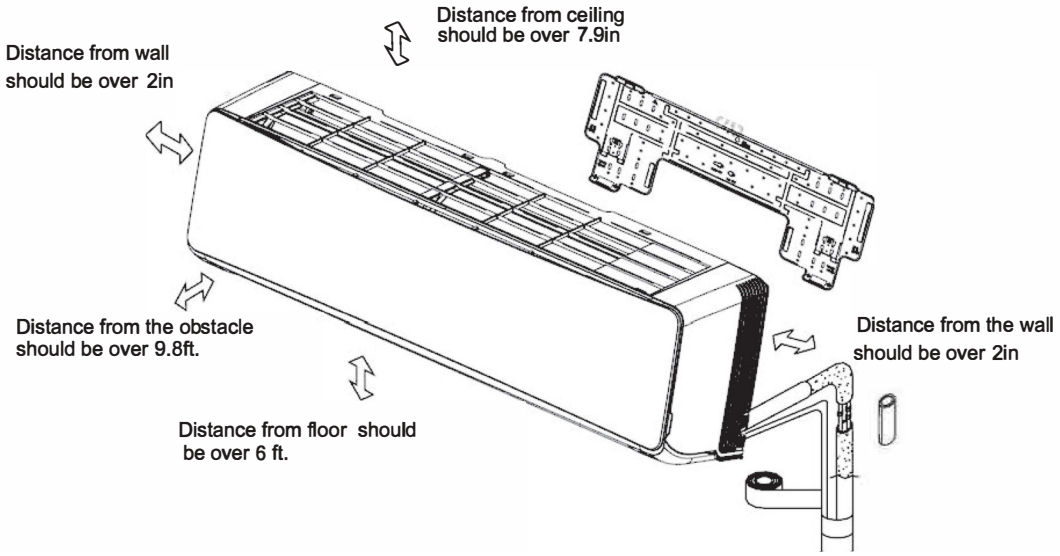


Figure C.2

INSTALLATION

Wall Mount

C.3 Pre-Installation Checkpoints

1. Ensure there are no obstacles near the air outlet and air can be easily blown to every corner.
2. Where piping and wall hole can be easily arranged.
3. Keep the required space from the unit to the ceiling and wall according to the installation diagram on previous page.
4. Where the air filter can be easily removed.
5. Keep the unit and remote controller 3 ft or more apart from television, radio etc.
6. Keep as far as possible from fluorescent lamps.
7. Do not put anything near the air inlet to obstruct it from air absorption.
8. Install on a wall that is strong enough to bear the weight of the unit.
9. Install in a place that will not increase operation noise and vibration.

11. Refer to the Outdoor Unit Installation and operation manual for piping requirements, refrigerant charging, and operational checks.

⚠WARNING

Fire Hazard

A2L refrigerant is classified as mildly flammable. Temperatures on surfaces that may be exposed to leakage of FLAMMABLE REFRIGERANTS shall not exceed 1292°F

⚠WARNING

Refigeration System Under High Pressure

Do not puncture, heat, expose to flame or incinerate.
Only certified refrigeration technicians should service this equipment.
R-32 and R-454B 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 R32 and R-454B.
Do not use standard R22 gauge sets..

INSTALLATION

Wall Mount

C.4 Install Mounting Plate

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" 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. C.4.1).
6) Inspect if the mounting plate is well fixed. Then drill a hole for piping.

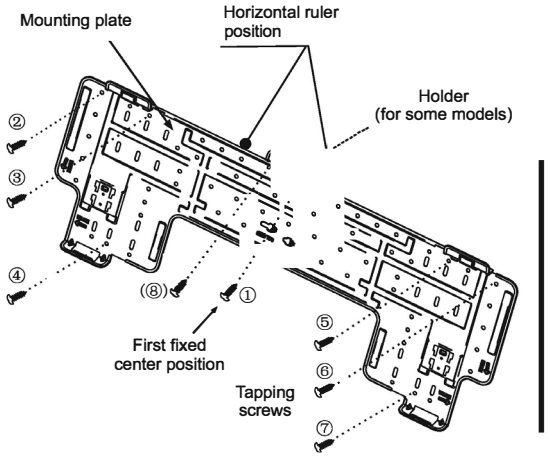


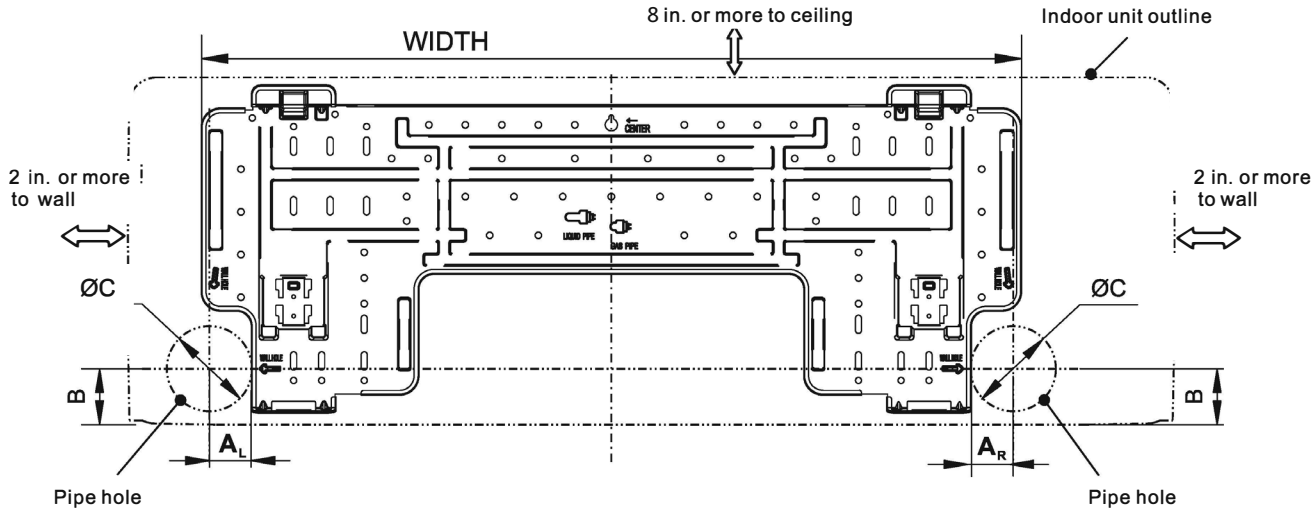
Fig. C.4.1

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

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

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

- ***THE MOUNTING PLATE DIAGRAMS AND DIMENSIONS (Recommended)***



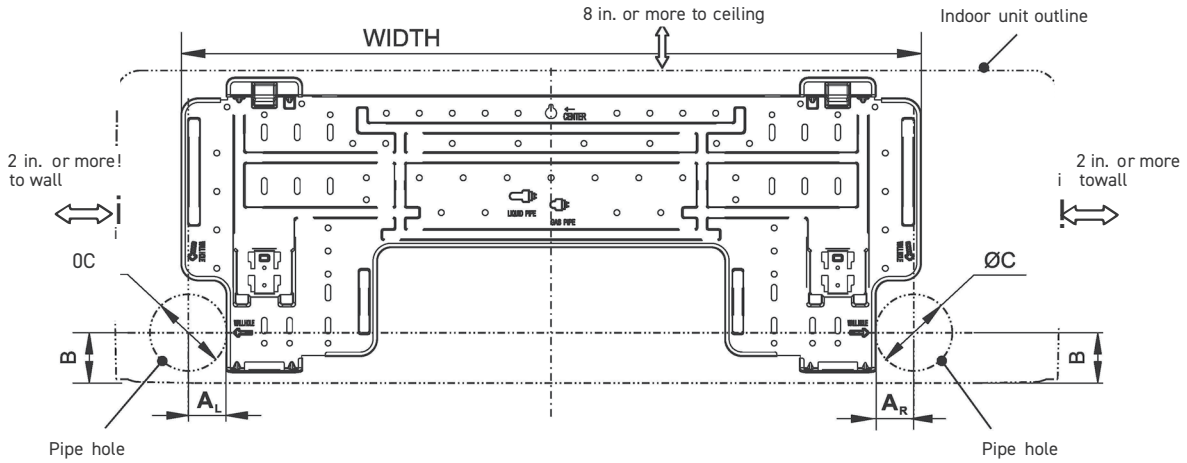
For 9K/12K Series Models, WIDTH: 26 5/8 in.

C.4.2

INSTALLATION

Wall Mount

C.4 Install Mounting Plate



For 18K/ 24K Series Models, WIDTH: 37 1/2 in.

C. 4.3

INSTALLATION

Wall Mount

C.5 Drill Hole for Piping

Table of Wall Hole Mounting size per Unit Size

Unit Model	Size A_L	Size A_R	Size B	Size C
	in	in	in	in
7K/9K/12K Series	1 3/8 in	1 3/8 in	1 3/4 in	2 3/4 in
18K/24K Series	4 7/8 in	6 1/2 in	2 in	2 3/4 in

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. C.5)

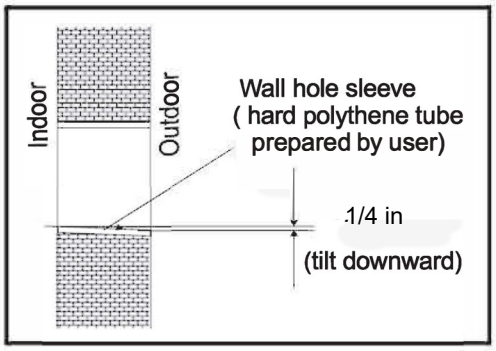


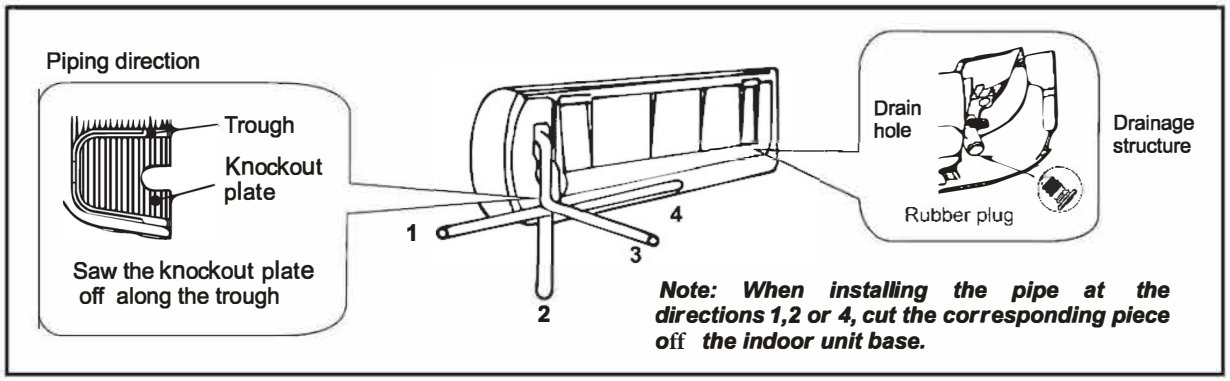
Fig. C.5

INSTALLATION

Wall Mount

C.6 Piping Provisions

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 knockout plate in accordance with the piping direction. (Fig. C.6.1)



Note:Drain hose can be installed on either side of the unit. If choosing both sides drainage connection, another proper drain hose is needed as there is only one drain hose attached to the unit. 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. C.6.2). Ensure that the cut is flat (Fig. C.6.3).

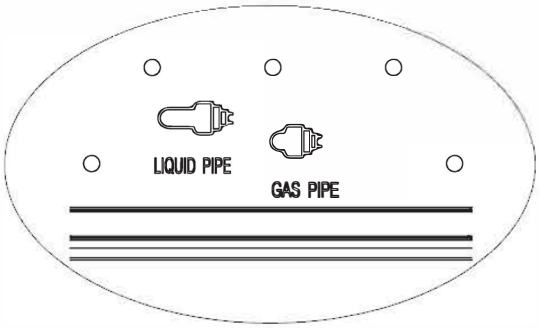


Fig.C.6.2

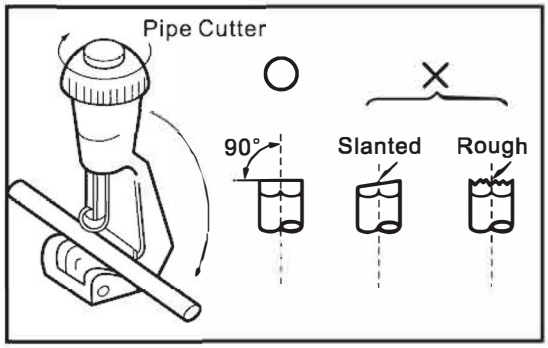


Fig.C.6.3

2 Remove burrs on the cutting edges. Keep the pipe outlet down to avoid getting the metal burrs into the pipe(Fig. C.6. 4).

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. C.6.5)

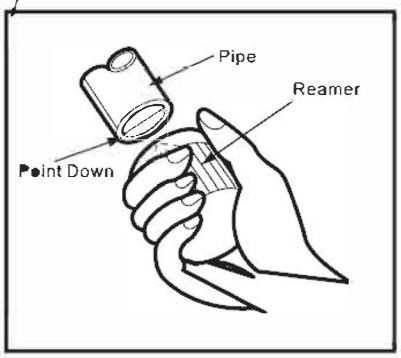


Fig. C.6. 4

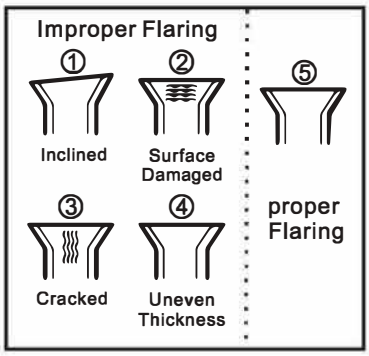


Fig. C.6.5

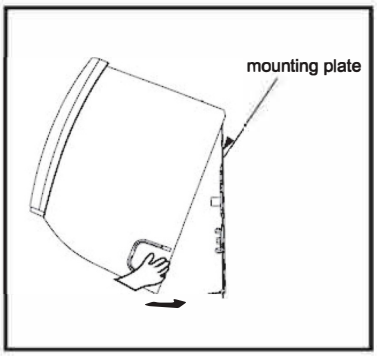


Fig. C.7.1

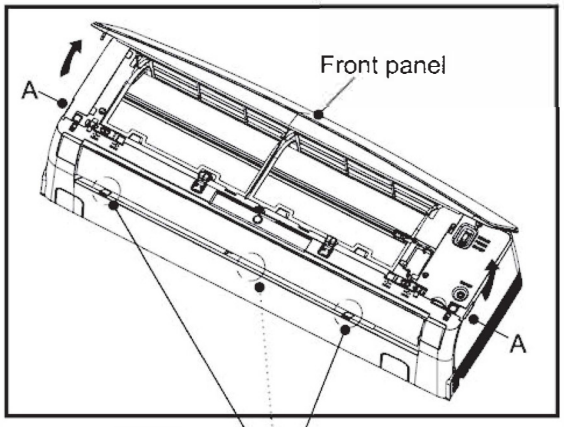
INSTALLATION

Wall Mount

C.7 Indoor Unit Installation

1 Hang the unit onto mounting plate (Fig. C.7.1).

2) In the A position, open the front panel as shown in Fig. C. 7.2.
3) In the B position, open the screw covers as shown in Fig. C.7.3 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. C. 7.4 . Then in the D position, push the baffles to prevent the front shell from falling as shown in Fig. C. 7.5.



C.7.2

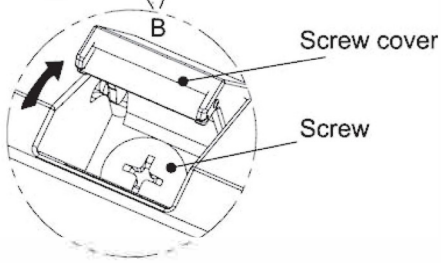


Fig.C.7.3

C.7.4

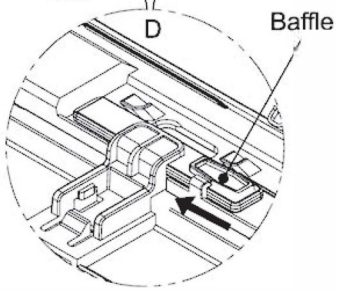


Fig.C.7.5

5) Use the support plate to move the unit step by step to reach the best location. (Fig. C. 7.6 and Fig. C. 7.7).

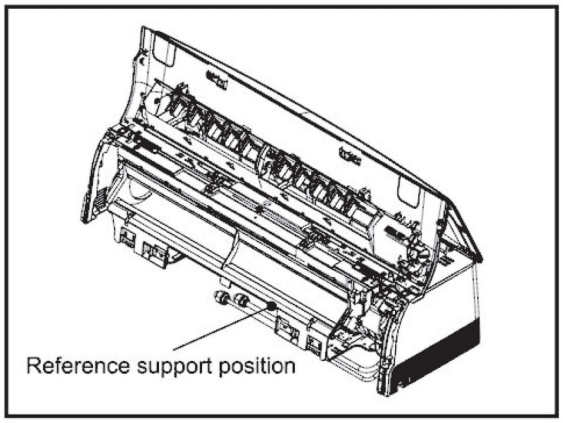


Fig. C. 7.6

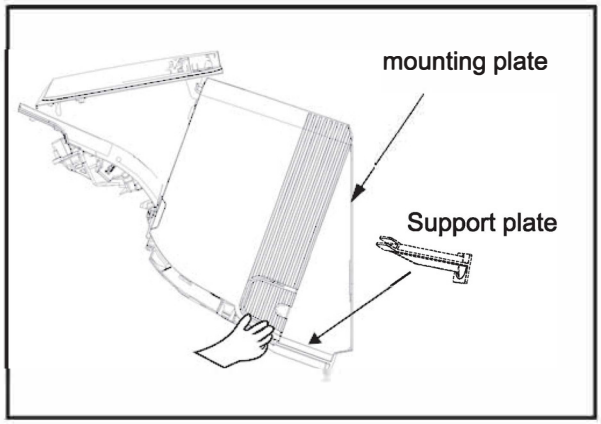


Fig. C. 7.7

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

INSTALLATION

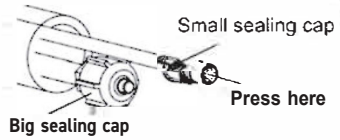
Wall Mount

C.7 Indoor Unit Installation

6) Connect the piping.

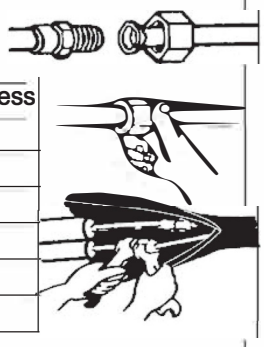
Piping Connection:

a.Before unscrewing the big and the small sealing caps, press the small sealing cap with suitable tool until pressure is relieved.
If you don't hear the exhaust noise, please contact customer service.



b. Hand thread and tighten nuts.

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.



Model	Pipe size (inches)	Torque (ft lbs	Nut width	Min.thickness
7K-18K	LiquidSide (1/4)	11-15ft-lbs	5/8"	0.02 "
24K-36K	Liquid Side (3/8)	22-26ft-lbs	7/8"	0.024"
7K-12K	GasSide(cl> 9.53 or 3/8)	22-26ft-lbs	7/8"	0.024"
18K	GasSide(cl>12 or1/2)	37-41ft-lbs	15/16"	0.024"
24K	GasSide(cl>16or 5/8)	44-48ft-lbs	1 1/8"	0.024"

Table C.7.8

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. C.7.9-C.7.11).

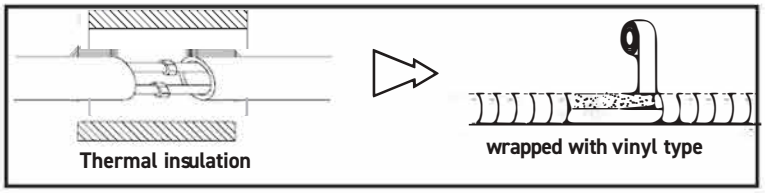


Fig. C.5.9

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

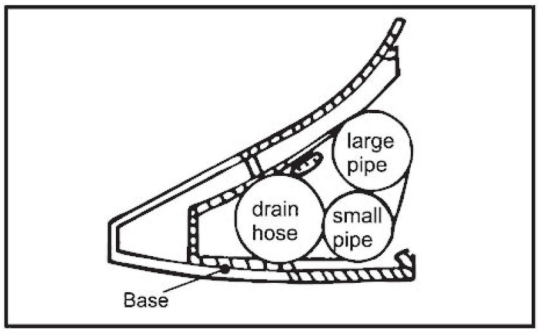


Fig. C.5.10

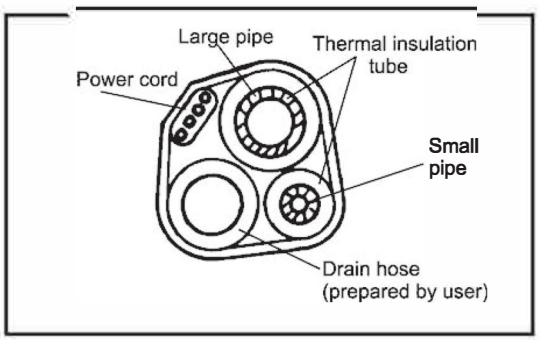


Fig. C.5.11

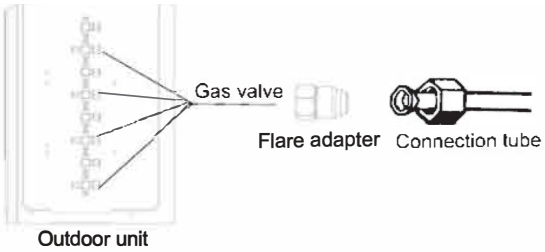
Note: Place the drain hose under the pipes.
Note: Insulation material uses polythene foam over 1/4" (6) mm in thickness.
Note: Drain hose Is prepared by the installer.
Note: Note: The appearance of the model in this manual may differ from that of the air conditioner you have selected.

INSTALLATION

Wall Mount

C.7 Indoor Unit Installation

The 18K/24K indoor unit include the adapter which can switch 3/8" gas connection tube into 1/2" or 5/8" connection tube.
It is installed outdoor unit.



8) Connect the power connecting cord (Fig. C.5.12).

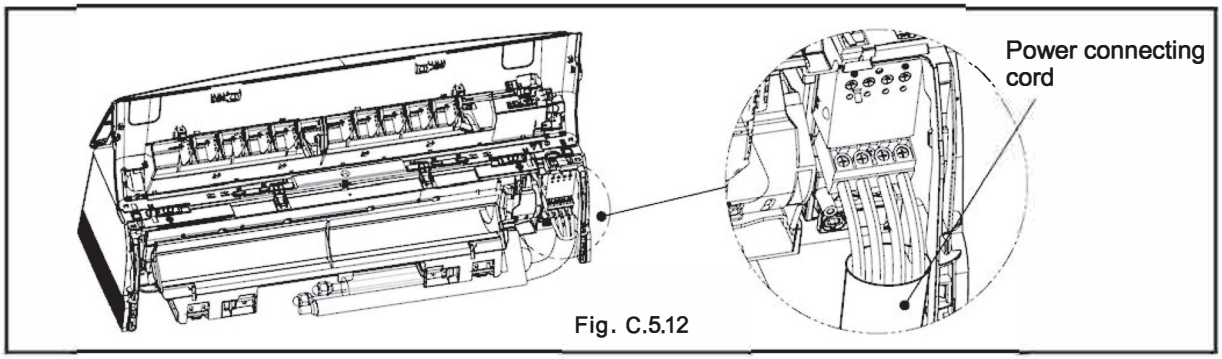


Fig. C.5.12

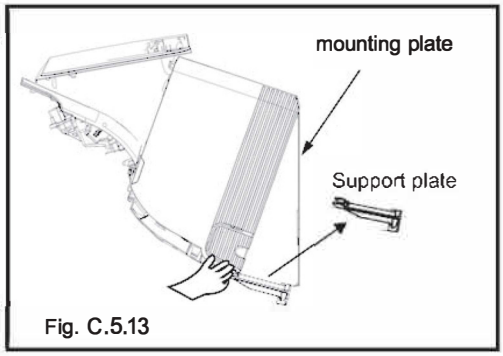


Fig. C.5.13

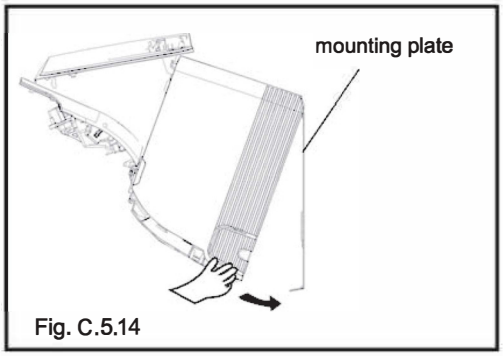
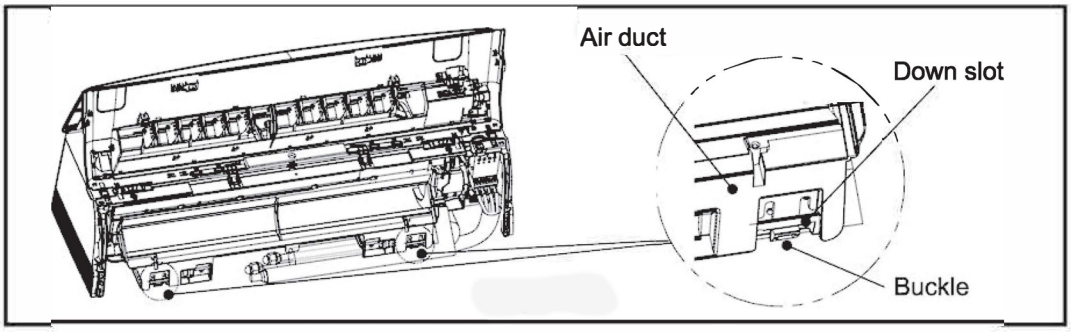


Fig. C.5.14

9) Remove the support plate as shown in Fig. C.5.13 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. C.5.14 and Fig.C.5.15)



C.5.15

INSTALLATION

Wall Mount

C.7 Indoor Unit Installation

10) Pull the baffles as shown in Fig. C.5.20 Close the front shell as shown in Fig. C.5.21 . Then press the E position to fasten the front shell as shown in Fig. C.5.22

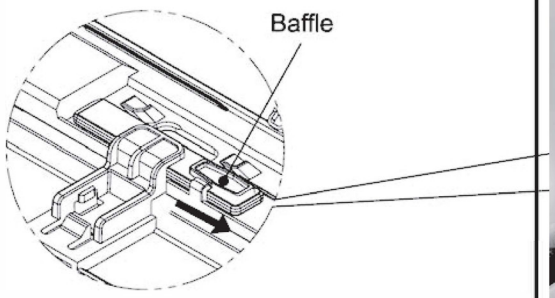


Fig. C.5.20

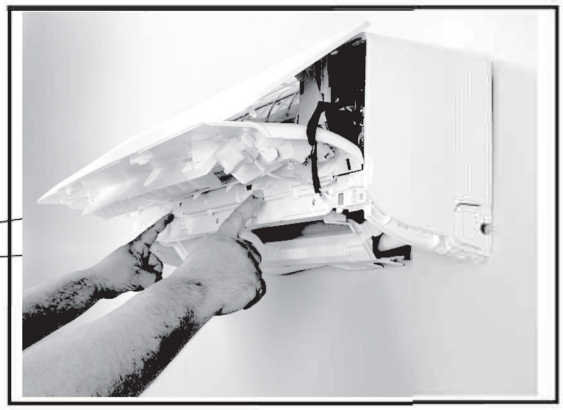
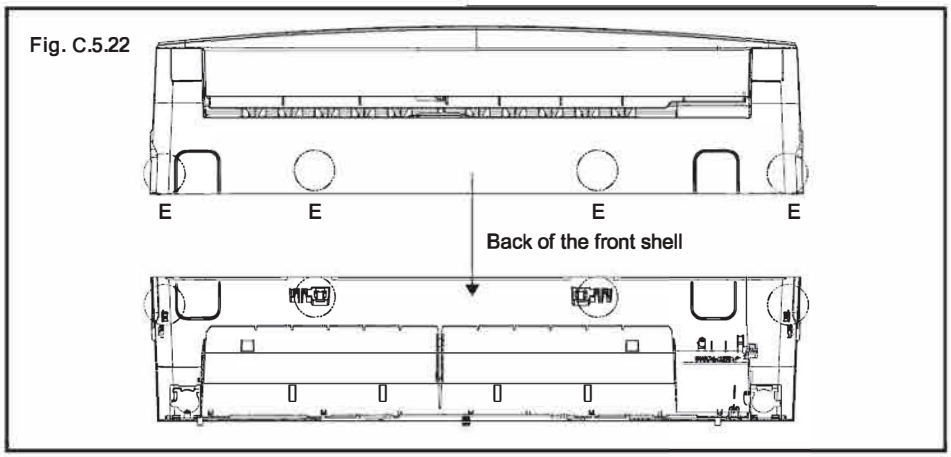


Fig.C.5.21



11) Install the screws and close the screw covers as shown in Fig. C.5.23 (Note: For some models, you need to install 3 screws.)

12) Close the front panel as shown in Fig. C.5.24

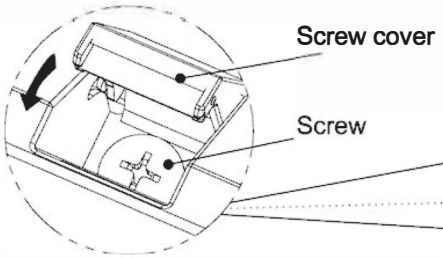


Fig.C.5. 23

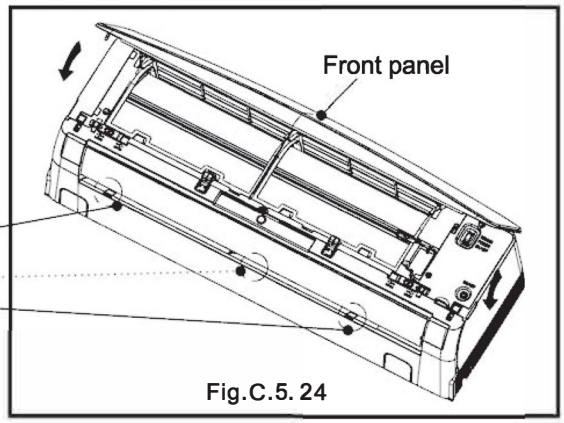


Fig.C.5. 24

INSTALLATION

Wall Mount

⚠WARNING	
	**Electrical Shock Hazard** Always ensure power is disconnected before attempting to connect wires.

GROUNDING	Unit MUST be grounded from branch circuit to unit, or through separate ground wire. Be sure that branch circuit or general purpose outlet is grounded. Do NOT use an extension cord.
ELECTRICAL DISCONNECT	If national or local electrical codes require an electrical disconnect for the indoor unit, use a 3 pole disconnect.

Model	Wire Diameter(AWG) Interconnecting Wire
9k	14-4 AWG 600V THHN
12k	14-4 AWG 600V THHN
18k	14-4 AWG 600V THHN
24k	14-4 AWG 600V THHN
Table E.1	

NOTE: All communication wire must be stranded wire

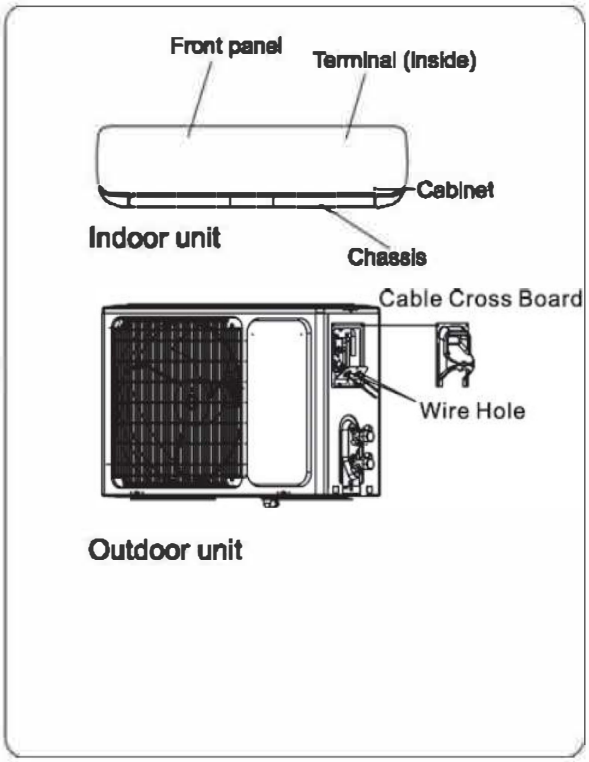


Figure E.2

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 block.

·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. Refer to Figure E.2.
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.

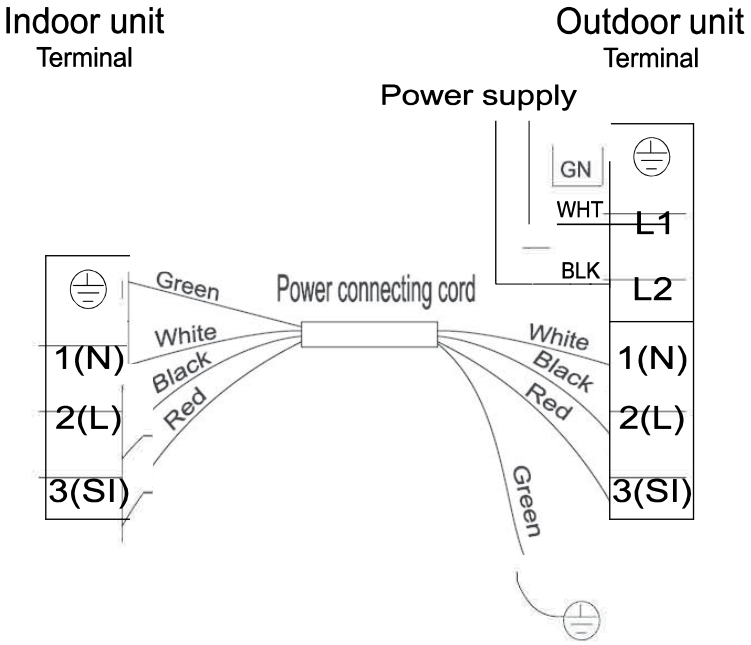
INSTALLATION

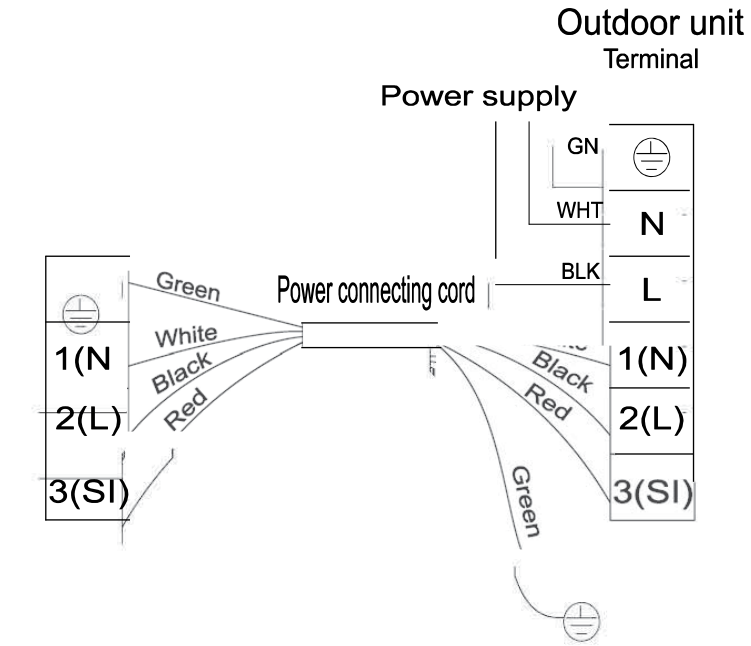
Wall Mount

E.1 Indoor Unit Wiring Connection Diagram

Make sure that the color of the wires in the outdoor unit and terminal No. are the same as those of the indoor unit.

1) 208/230V





☑ **Diagram is reference only, actual product terminals should be followed.**

INSTALLATION

Outdoor Unit 9-18K

Safety Precautions

⚠ WARNING

- That pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed;
- That after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements;
  The minimum test pressure for the low side: 1.65MPa
  The minimum test pressure for the high side: 4.14MPa
- Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected. The joints must be welded or brazed.

Label in accessory bag

Contains Flammable Refrigerants
Contient des réfrigérants inflammables

Refrigerant:
Fluide frigorigène: R454B

Additional Charge:
Charge supplémentaire: ____ oz

Total Charge (Installer Reference):
Charge totale (Référence du Programme d'installation): ____ oz

Max. Refrigerant Charge Amount X[oz.(g)]

Capacity (Btu/h)	9K/12K	18K
Max. Refrigerant charge [oz.(g)]	55.24(1566)	76.65(2173)

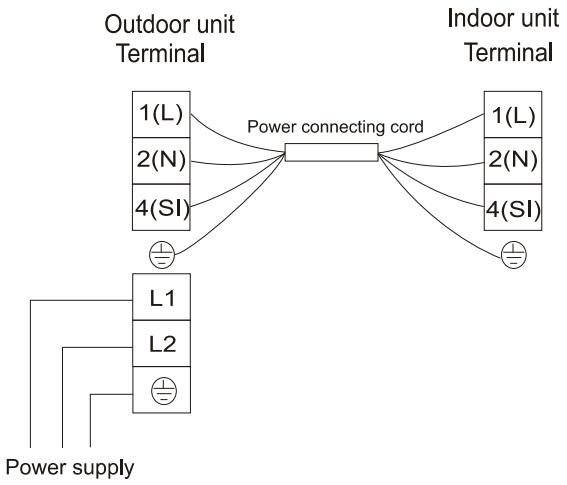
Explanation of symbols displayed on the indoor unit or outdoor unit.

 Refrigerant safety group A2L	**WARNING**	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows that the operation manual should be read carefully.
	**CAUTION**	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	**CAUTION**	This symbol shows that information is available such as the operating manual or installation manual.

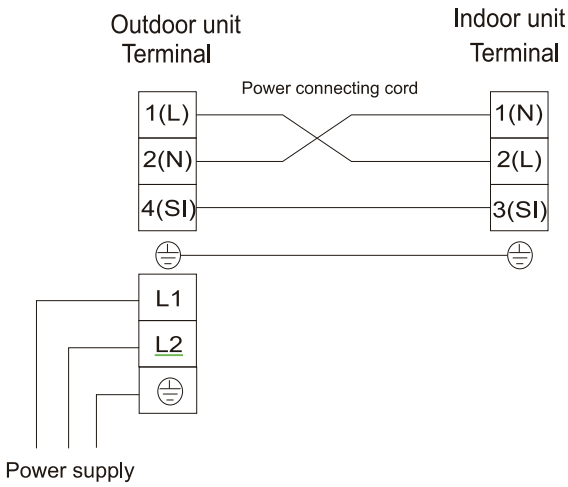
Electrical Wiring Diagram

Electrical Wiring Diagram

Outdoor unit connected to a duct /cassette indoor unit



Outdoor unit connected to a wall-mounted indoor unit



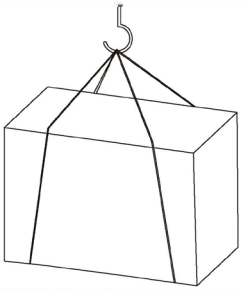
INSTALLATION

Outdoor Unit 9-18K

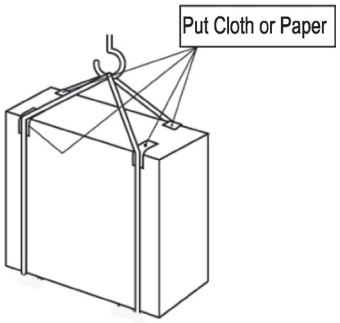
Transportation and Handling before Installation

Transport the product as close to the installation location as practical before unpacking.

• Handling Method
When handling the unit, ensure a balance of the unit, check safety and lift it up smoothly.
(1) Do not remove any packing materials.
(2) Hang the unit under packing condition with two ropes, as shown in Fig. blow.



• Handling
If have no package to move, please protect with cloth or paper.

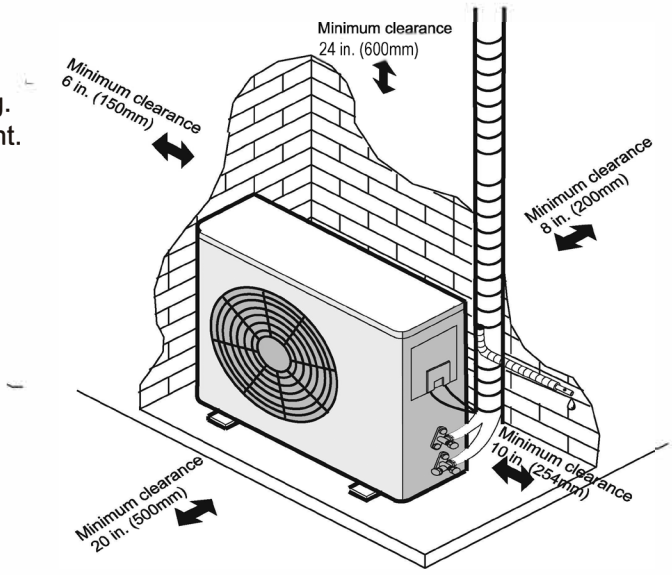


Installation Locations Selection

Before choosing the installation site, obtain user's approval.

• Where it is not exposed to strong wind.
• Where airflow is good and clean.
• Where rigid wall or support is available to prevent the increase of operation sound or vibration.
• Where there is no risk of combustible gas leakage.
• Where it is at least 3m away from the antenna of TV set or radio. An amplifier may be required for the affected device.
• Install the unit horizontally.
• Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or some baffle boards.

⚠ CAUTION:
Avoid the following places for installation where air conditioner trouble is liable to occur.
• Where there is draining machine oil.
• Where sulfide gas is generated such as a hot spring.
• Where there is high-frequency or wireless equipment.



NOTE:
When operating the air conditioner in low outside temperature, be sure to follow the instruction described below.
• Never install the outdoor unit in a place where its air inlet/outlet side may be exposed directly to wind.
• To prevent exposure to wind, install the outdoor unit with its air inlet side facing the wall.
• To prevent exposure to wind, it is recommended to install a baffle board on the air outlet side of the outdoor unit.

INSTALLATION

Outdoor Unit 9-18K

Installation Instructions

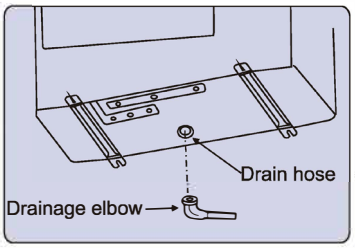
Drainage Elbow and Drain Hose Installation

Install Drainage Elbow and Drain Hose

• The condensate water may drain from the outdoor unit when the unit operates in heating mode. In order to avoid disturbing neighbors and to protect the environment, it is necessary to install a drainage elbow and a condensate drain hose to drain out the condensate water.

• Perform drainage work before the indoor unit and outdoor unit are connected. Otherwise, it will be difficult to install drainage elbow after the machine becomes immovable.)

• Connect the drain hose [field-supplied, inside diameter: 5/8 in. (15mm)] as shown in the figure for drainage.



Note:

• Do not use the drainage elbow in the cold region. Drain may freeze.

Outdoor Unit Installation

(1) Use the washers to fasten the machine at the foundation bolts.

(2) When fastening the outdoor unit with the foundation bolts, the fasten holes position as the Fig.1.

(3) Fasten the outdoor unit as shown in Fig.2.

(4) Make sure to fasten the outdoor unit tight and level to prevent noise from occurring.

(5) Do not drain off water to the public places to hazardous slips/falls.

(6) The strong base (made of concrete, etc.) should be made. The appliance should be placed not less than 4in. (10cm) high to avoid being wet or corroded. Otherwise, it may cause damage to the appliance or reduce its life time. (Fig.3)

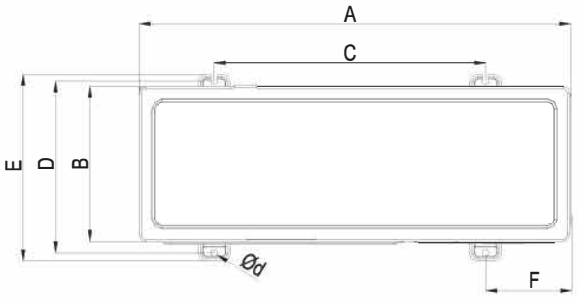


Fig.1

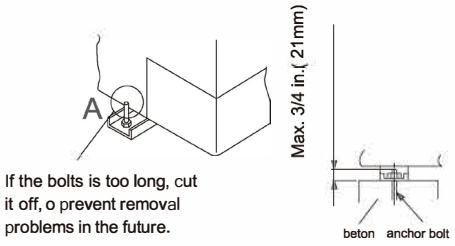


Fig.2

[unit: in. (mm)]

Capacity (Btu/h)	A	B	C	D	E	F	d
9K/12K	31-7/8 (810)	11 (280)	20-1/16 (510)	12-3/16 (310)	13-5/16 (338)	5-15/16 (150)	3/8*5/8 (10*17)
18K	33-7/8 (860)	12-3/16 (310)	21-3/8 (542)	13-7/16 (341)	14-1/2 (368)	6-5/8 (168)	7/16*5/8 (11*17)

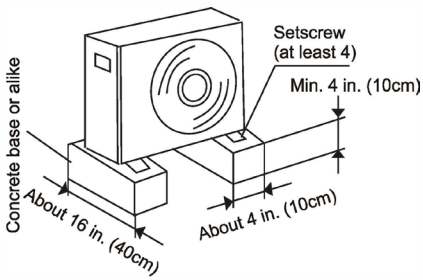


Fig.3

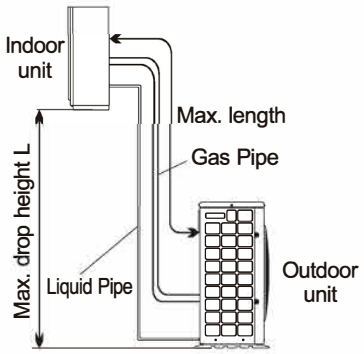
Installation Instructions

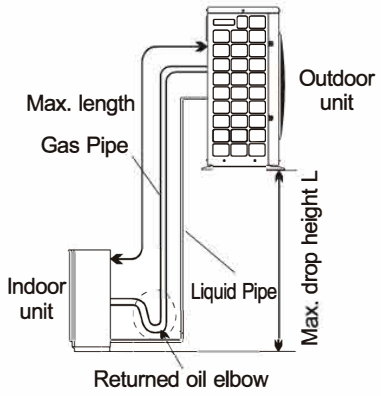
Refrigerant Piping

1. Piping Requirement

Capacity(Btu/h)	Outer Diameter of Pipe	
	Gas [in.(mm)]	Liquid [in.(mm)]
9K/12K	Φ 3/8 (9.52)	Φ 1/4 (6.35)
18K	Φ 1/2 (12.7)	Φ 1/4 (6.35)

The shorter the refrigerant piping length is, the better. So the connecting pipe should be as short as possible. When the indoor unit is lower than outdoor unit and height is larger than 16 ft, install an oil trap at every 16 ft of drop.





Capacity (Btu/h)	Min. Pipe length (L)	Max. Pipe length (L)	Max. Height difference (H)
9K/12K	10ft. (3m)	130ft. (40m)	50ft. (15m)
18K	10ft. (3m)	150ft. (45m)	80ft. (24m)

Refrigerant additional charge

The unit has been filled with refrigerant, but if piping exceeds 25 ft. (7.5m), additional refrigerant (R454B) charge is required. Heat pump series:
9K/12K/18K: Additional refrigerant charge= (L-25) ft.×0.16 oz/ft. [15(g/m)]

2. Piping Material

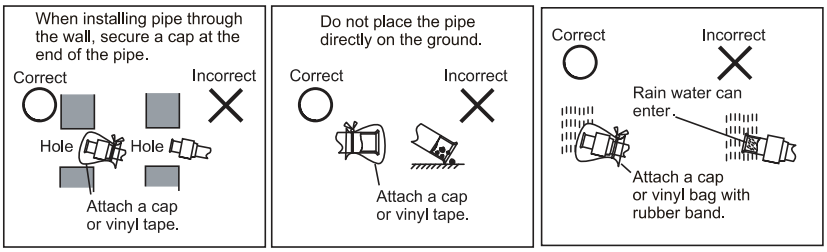
(1) Prepare locally-supplied copper pipes.
(2) Select clean copper pipes. Make sure there is no dust and moisture inside the pipes. Blow the inside of the pipes with nitrogen or dry air, to remove any dust or foreign materials before connecting pipes.
(3) Piping thickness and material are shown as below.

Diameter [in. (mm)]	ø 1/4 (6.35)	ø 3/8 (9.52)	ø 1/2 (12.70)
Thickness [in. (mm)]	1/32 (0.8)	1/32 (0.8)	1/32 (0.8)

INSTALLATION

Outdoor Unit 9-18K

CAUTION



3. Refrigerant piping work

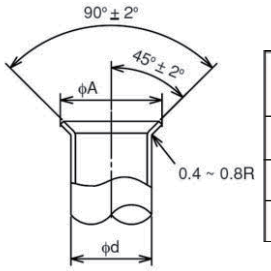
(1) Pipe cutting
Cut the copper pipe correctly with a pipe cutter.

(2) Burrs removal
Completely remove all burrs from the cross section of the pipe.
Orient the end of the copper pipe downward to prevent burrs from dropping in the pipe.

(3) Putting nut on
Remove flare nuts attached to indoor and outdoor units, then put them on the pipe, burrs of which have been removed.
(Not possible to put them on after flaring work).
Flare nut for pipe depends on the diameter of pipe.

(4) Flaring work
Perform flaring work with a flaring tool as shown below.

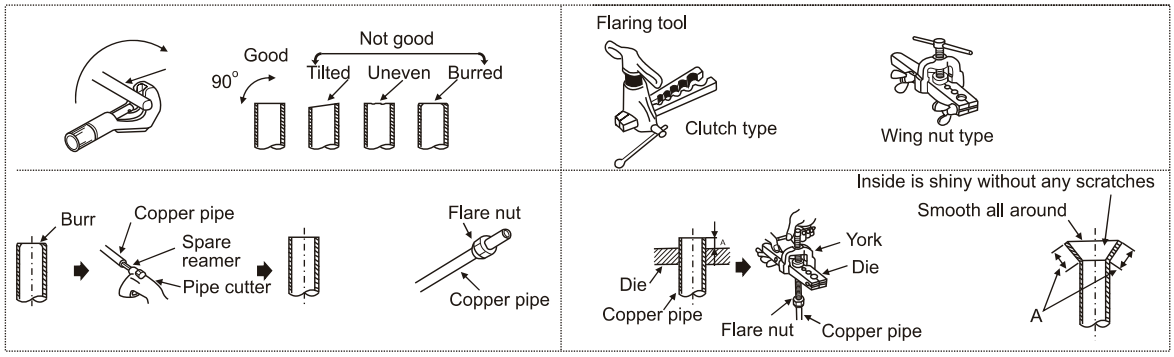
(5) Check
Compare the flared work with the figure below.
If flare is noted to be defective, cut off the flared section and perform flaring work again.



[Unit: in. (mm)]

Diameter ød	$A^{+0}_{-1/64}$ $(^{+0}_{-0.4})$
1/4 (6.35)	11/32 (9.1)
3/8 (9.52)	1/2 (13.2)
1/2 (12.7)	10/16 (16.6)

*: Perform the flaring work with type O material.



4. Piping connection (when outdoor unit connected to a duct /cassette /wall-mount indoor unit)

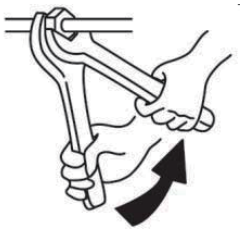
(1) Confirm that the valve is closed.

(2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant piping. Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching the weak part of the building such as wall, ceiling, etc.
(If touched, abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length.)

(3) Tighten the flare nut with two spanners (one being a torque wrench) as shown in the right figure.

(4) Apply the refrigerant oil (field-supplied) thinly at the seat surface of the flare nut and pipe before connecting and tightening.
And when tightening the flare nut, use two spanners.

(5) Outdoor refrigerant piping should connect with stop valve.



Double Spanner work

Pipe size [in. (mm)]	Torque [lbf·ft. (N·m)]
ø 1/4 (6.35)	14.8 (20)
ø 3/8 (9.52)	29.5 (40)
ø 1/2 (12.7)	44.3 (60)

Tightening Torque for Flare Nut

INSTALLATION

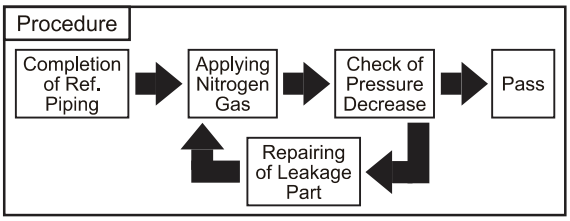
Outdoor Unit 9-18K

6. Air tight test

-Use Nitrogen only

Connect the gauge manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.
Perform the air-tight test.
Don't open the gas line stop valves.
Apply nitrogen gas pressure of 550 psig (3.79 MPa).
Check for any gas leakage at the flare nut connections, or brazed parts by gas leak detector or foaming agent.
Gas pressure doesn’t decrease is OK.
After the air tight test, release nitrogen gas.

Piping insulation procedure

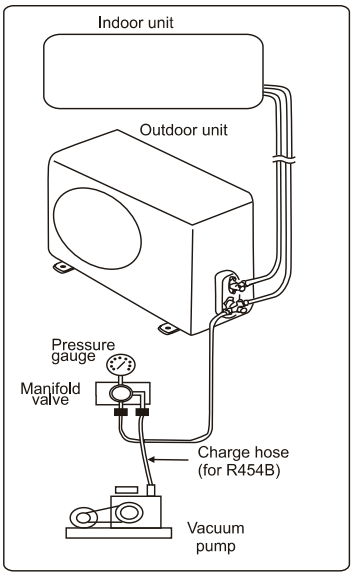


Air tight procedure

INSTALLATION

Outdoor Unit 9-18K

7. Vacuum Pumping leaks Refrigerant Charge



• Vacuum pumping

(1) Remove the service port cap of the stop valve on the gas pipe side of the outdoor unit.
(2) Connect the manifold gauge and vacuum pump to the service port of the stop valve on the gas pipe side of the outdoor unit.
(3) Run the vacuum pump. (Work for more than 15 minutes.)
(4) Check the vacuum with the gauge manifold valve, then close the gauge manifold valve and stop the vacuum pump.
(5) Leave it as is for one or two minutes. Make sure that the pointer of the manifold gauge remains in the same position. Confirm that the pressure gauge shows -14.7psig (-0.101MPa or -760mmHg).
(6) Remove the manifold gauge quickly from the service port of the stop valve.
(7) After refrigerant pipes are connected and evacuated, fully open all stop valves on both sides of gas pipe and liquid pipe.
(8) Open adjusted valve to add refrigerant (the refrigerant is liquid).
(9) Tighten the cap to the service port .
(10) Retighten the cap.
(11) Leak test foam with halogen leak detector to check the flare nut and brazing for leaks. Use foam that does not generate ammonia (NH3) in the reaction.

⚠ WARNING

- An excess or a shortage of refrigerant is the main cause of trouble to the unit. Charge the correct refrigerant quantity according to the description of label at the inside of the manual.
- Check for refrigerant leakage in detail. If a large refrigerant leakage occurs, it will cause danger or even explosion if a fire was being used in the room.

⚠CAUTION

This system is only applicable to R454B refrigerant, and the pressure gauge and charging hose must be special for R454B. If the pressure gauge pointer does not move to -14.5psi [-0.1 MPa (-756 mmHg)], please make sure to check for leaks at the valve connection between the indoor and outdoor units, and then proceed to the next step after repairing the leak.

Methods for opening and closing the stop valve

- The following figure shows the names of each component required to process the stop valve(Fig.1). The stop valve is closed before installation.
- Opening and closing the stop valve: Prepare hexagon wrenches.
  (1) Open the stop valve: Insert the hexagon wrench into the valve stem, rotate the valve stem counterclockwise, and stop rotating when the valve stem can no longer rotate. At this point, the valve has already opened.
  (2) Close the stop valve: Insert the hexagon wrench into the valve stem, rotate the valve stem clockwise, and stop rotating when the valve stem can no longer rotate. At this point, the valve has already closed.

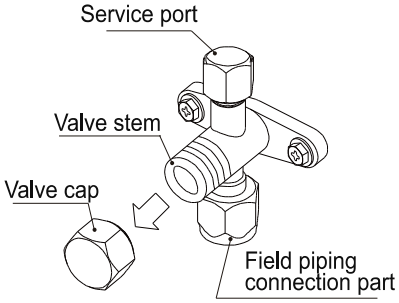


Fig.1

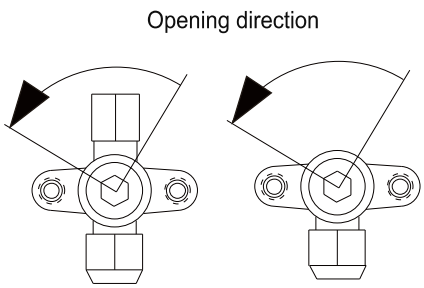


Fig.2 Liquid pipe

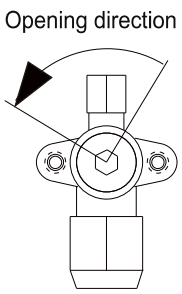


Fig.3 Gas pipe

INSTALLATION

Outdoor Unit 9-18K

This operation must be completed with an electronic scale for weighing. The refrigerant is charged to the air conditioning unit through the service port of the stop valve at low-pressure side.

(1) Connect the manifold pressure gauge to the refrigerant cylinder first, remove the air from the charging hose, and then connect it to the charging port of the stop valve at the low-pressure side of the outdoor unit.
(2) Start the air conditioning unit for refrigeration.
(3) Open the refrigerant cylinder and pressure gauge valve.
(4) After the required amount of refrigeration is charged into the unit, quickly close the valves at the low-pressure side and of the refrigerant cylinder.
(5) Disconnect the charging hose from the service port of the stop valve and tighten the service port cap.

⚠ CAUTION

- Excessive or insufficient refrigerant is the main cause of unit faults. The outdoor unit is pre-charged with refrigerant when it leaves the factory, please charge the correct amount of refrigerant according to the instructions.
- After charging, please close the valve and record the refrigerant charging amount.

Amount of refrigerant additionally charged
If the pipe length is less than 25ft.(7.5 m), there is no need for additional charging after vacuumizing. When the length of the pipe is greater than 5.0m, calculate according to the following table.

Capacity (Btu/h)	**Amount of refrigerant pre-charged before leaving the factory/W_0[oz(g)]**	**Amount of refrigerant additionally charged X [oz(g)]**	
		pipe length(L)≤ 25ft.(7.5m)	pipe length(L)≥ 25ft.(7.5m)
9K/12K	38.1(1080)	0	X=0.16(oz/ft) [15(g/m)]× [L-25ft.(7.5m)]
18K	56.4(1600)	0	X=0.16(oz/ft) [15(g/m)]× [L-25ft.(7.5m)]

INSTALLATION

Outdoor Unit 9-18K

Installation instructions

Wiring

⚠ WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit and wait for more than 3 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Keep the wiring away from the refrigerant pipes, plate edges and electrical parts inside the unit. If not, the wires will be damaged and a fire may occur.
- In moist or humid locations, an ELB (Electronic Leakage Breaker) must be installed at the power source. Failure to install may result in electrical shock , or a fire that could result in serious injury, or even death.
- This unit uses an inverter, which means that it if an earth leakage breaker is installed, it must be capable handling harmonics in order to prevent malfunctioning of the earth leak detector itself.
- Do not use intermediate connection wires, stranded wires(see **<Attentions when Connect the power supply wiring>**), extension cables or control line connection,to pwer the outdoor unit. Use of these wires may cause high temperatures, electric shock or fire.
- The tightening torque of each screw shall be as follows.
  M4: 0.7 to 1.0 lbf·ft. (1.0 to 1.3 N·m)
  M5: 1.5 to 1.8 lbf·ft. (2.0 to 2.5 N·m)
  M6: 3.0 to 3.7 lbf·ft. (4.0 to 5.0 N·m)
  M8: 6.6 to 8.1 lbf·ft. (9.0 to 11.0 N·m)
  M10: 13.3 to 217 lbf·ft. (18.0 to 23.0 N·m)

⚠ CAUTION

- Wrap the wire with tape material, and seal wiring holes to prevent damage from insects and condensate.
- Tightly secure the power source wiring using the cord clamp inside the unit.

Note: Attach the rubber bushings with adhesive when conduit tubes to the outdoor unit are not used.

General check

(1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data.
Make sure that the components comply with National Electrical Code (NEC).

(2) Check to ensure that the voltage of power supply is within +10% of nominal voltage and earth phase is contained in the power supply wires. If not, electrical parts will be damaged.

(3) Check to ensure that the capacity of power supply is sufficient.
Insufficient power supply power supply will cause the voltage to drop of on compressor startup, and may prevent proper operation.

(4) Check to ensure that the earth wire is connected.

(5) Install a main switch, multi-pole main switch with a space of 0.14 in. (3.5mm) or more, single phase main switch with a space of 0.12 in. (3.0mm) or more between each phase.

(6) Check to ensure that the electrical resistance is more than 2 MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.

INSTALLATION

Outdoor Unit 9-18K

Electrical Data

Capacity (Btu/h)	Power Supply	ELB		MCA(A)	Transmitting Cable Size	Circuit Breaker (A)
		Rated Current (A)	Nominal Sensitive Current (mA)			
9K/12K/18K	208/230V ~/60Hz	20	30	12/12/16	4×14AWG	20/20/25

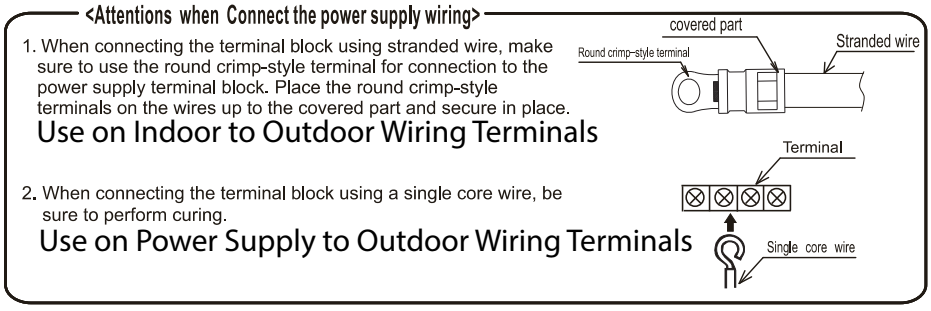
Max. Running Current (A): REFER TO NAMEPLATE

Note:

(1) Follow local and national codes and regulations when select field wires, and all the above are the minimum wire size.

(2) Install main switch and ELB or CB for each system separately. Where required by local and national codes, select a the high response type ELB that is acted within 0.1second. Recommended capacity to see outdoor machine switch capacity. capacity.

(3) All communication wire must be 4*14 AWG THHN stranded. Solid wire can cause communication error.



Trial Run

In cold weather conditions, make sure to turn electric power 6 hours before operating unit. This will allow the compressor to warm up and prevent damage to the compressor.

Trial run should be performed after refrigerant piping, condensate drain, wiring, etc. have been finished.

Do not operate the system until all the check points have been cleared.

(A) Check to ensure that the stop valves of the outdoor unit are fully opened.

(B) Check to ensure the electric wires has been fully connected.

(C) Check to ensure that the electrical resistance is more than 2MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.

Trial run function identification

Operate remote controller turn ON, then proceed trial run.

Pay attention to the following items while the system is running.

Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 194°F(90°C).

- Turn off the power after trial run is finished.

Installation of the appliance is generally finished after the above operations are done. If you still have any trouble, please contact local technical service center of our company for further information.

INSTALLATION

Outdoor Unit 24-36K

Safety Precautions

⚠ WARNING

- That pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed;
- That after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements;

  The minimum test pressure for the low side: 415psig(2.86MPa)
  The minimum test pressure for the high side: 600psig(4.14MPa)
- Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected. The joints must be welded or brazed.

Label in accessory bag

Contains Flammable Refrigerants
Contient des réfrigérants inflammables

Refrigerant:
Fluide frigorigène: R454B

Additional Charge:
Charge supplémentaire: ____ oz

Total Charge (Installer Reference):
Charge totale (Référence du Programme d'installation): ____ oz

Max. Refrigerant Charge Amount X[oz.(g)]

Capacity (Btu/h)	18K/ 24K	36K	
Max. Refrigerant charge [oz.(g)]	126.53(3587)	165.22(4684)	

Explanation of symbols displayed on the indoor unit or outdoor unit.

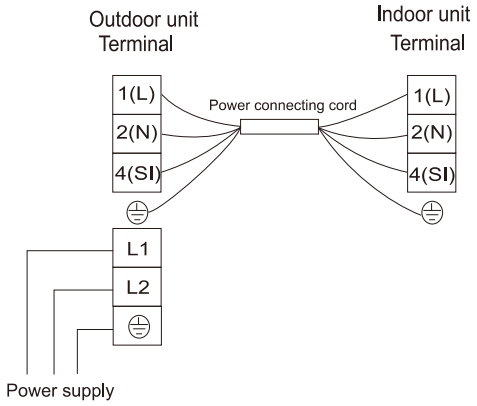
	**WARNING**	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	**CAUTION**	This symbol shows that the operation manual should be read carefully.
	**CAUTION**	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	**CAUTION**	This symbol shows that information is available such as the operating manual or installation manual.

INSTALLATION

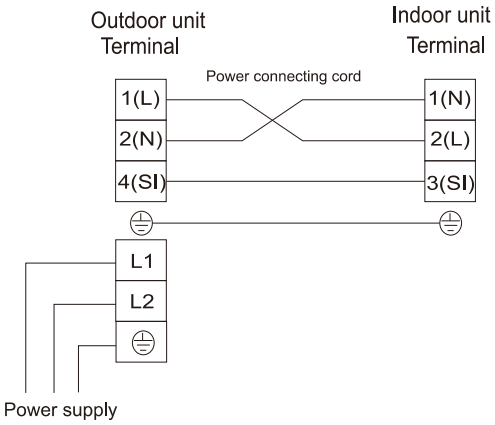
Outdoor Unit 24-36K

Electrical Wiring Diagram

Outdoor unit connected to a Duct /Cassette



Outdoor unit connected to a Wall-mounted indoor unit



INSTALLATION

Outdoor Unit 24-36K

Transportation and Handling before Installation

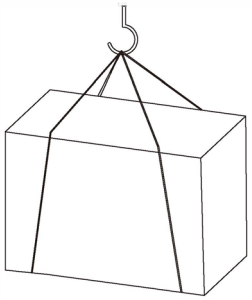
Transport the product as close to the installation location as practical before unpacking.

• Handling Method

When handling the unit, ensure a balance of the unit, check safety and lift it up smoothly.

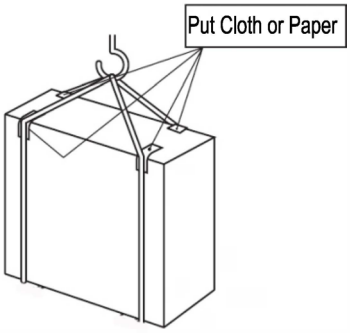
(1) Do not remove any packing materials.

(2) Hang the unit under packing condition with two ropes, as shown in Fig. blow.



• Handling

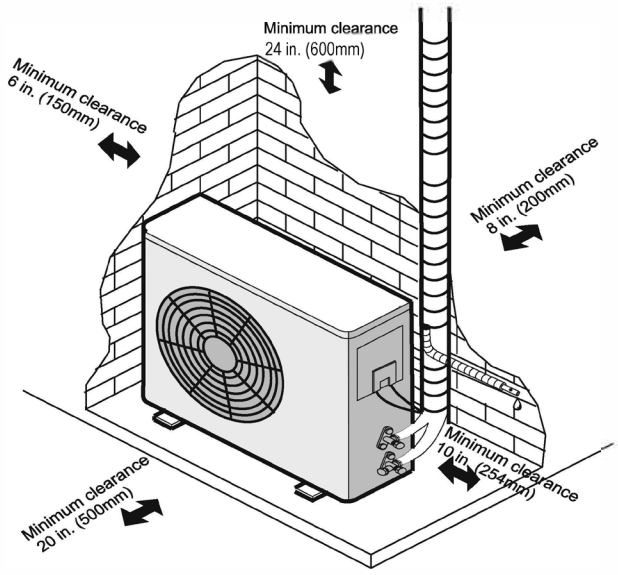
If have no package to move, please protect with cloth or paper.



Installation Locations Selection

Selection of installation locationDuring installation, it is essential to fully consider the space required for maintenance and to avoid placing any obstacles at the ventilation outlets that could block air circulation.
The following installation locations should be avoided:

- Places with flammable and explosive hazards, such as coal dust, metal dust, cotton lint, petroleum, natural gas, etc.. and places like mines, gas stations, or production workshops in industries such as coal dust, garment manufacturing, woodworking, cement, and cotton quilt factories;
- Special places with strong heat sources, steam, constant temperature, and humidity, such as fruit preservation warehouses, bath centers, etc.;
- Environments with corrosive or sulfurous, volatile gases, such as sulfur, acid, salt, papermaking sites, sulfur springs, chemical plants, etc.;
- Places with high frequency electromagnetic interference facilities, such as welding machines, frequency converters, radio transmission equipment, medical equipment, etc.;
- Places filled with mineral oil fumes or spray or steam, for example, the kitchen.
  If the oil is attached to the heat exchanger, it will degrade the performance of the indoor unit and may damage its plastic parts.



INSTALLATION

Outdoor Unit 24-36K

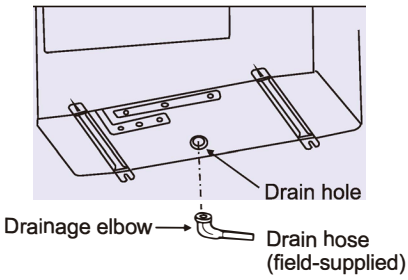
Drainage Elbow and Drain Hose Installation

Install Drainage Elbow and Drain Hose

• The condensate water may drain from the outdoor unit when the unit operates in heating mode. In order to avoid disturbing neighbors and to protect the environment, it is necessary to install a drainage elbow and a condensate drain hose to drain out the condensate water.

• Perform drainage work before the indoor unit and outdoor unit are connected. Otherwise, it will be difficult to install drainage elbow after the machine becomes immovable.)

• Connect the drain hose [field-supplied, inside diameter: 5/8 in. (15mm)] as shown in the figure for drainage.



Note:

• Do not use the drainage elbow in the cold region. Drain may freeze.

Outdoor Unit Installation

(1) Use the washers to fasten the machine at the foundation bolts.

(2) When fastening the outdoor unit with the foundation bolts, the fasten holes position as the Fig.1.

(3) Fasten the outdoor unit as shown in Fig.2.

(4) Make sure to fasten the outdoor unit tight and level to prevent noise from occurring.

(5) Do not drain off water to the public places to hazardous slips/falls.

(6) The strong base (made of concrete, etc.) should be made. The appliance should be placed not less than 4in. (10cm) high to avoid being wet or corroded. Otherwise, it may cause damage to the appliance or reduce its life time. (Fig.3)

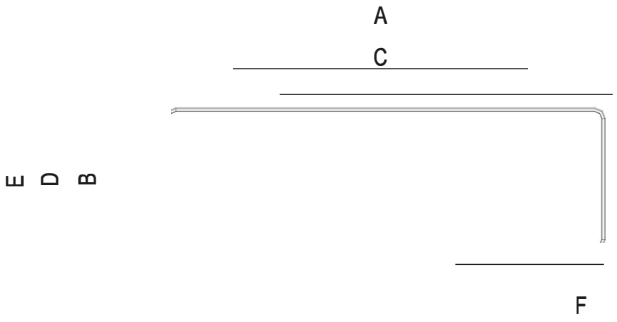
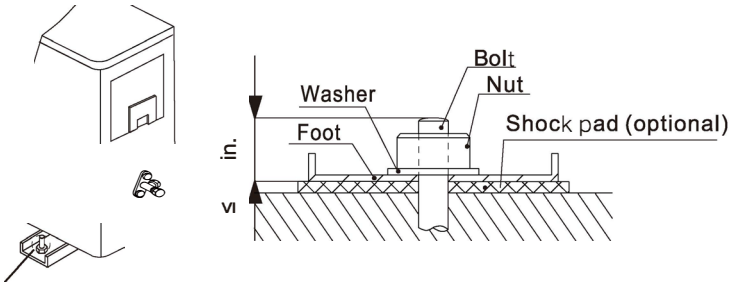


Fig.1

[unit: in. (mm)]

Capacity (Btu/h)	A	B	C	D	E	F	d
18K/24K	35-3/8 (900)	13-3/8 (340)	23-7/8 (608)	14-1/2 (368)	15-5/8 (398)	5-3/4 (146)	3/8*3/4 (10*20)
36K	43-1/4 (1100)	17-3/4 (450)	25-1/4 (640)	19-1/8 (485)	20-1/4 (515)	9-1/4 (235)	1/2*3/4 (12*20)



The anchor bolts should be protruded ≤ 3/4 in. (20mm) (Refer to figure), otherwise, it is not conducive to removing the service plate.

Fig.2

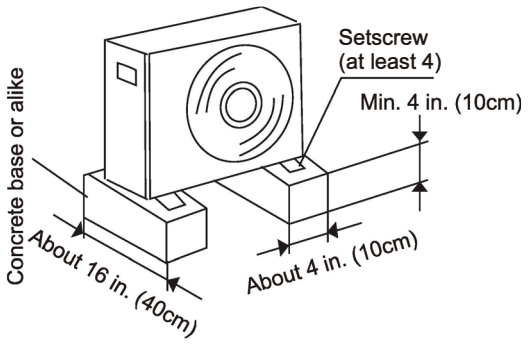


Fig.3

INSTALLATION

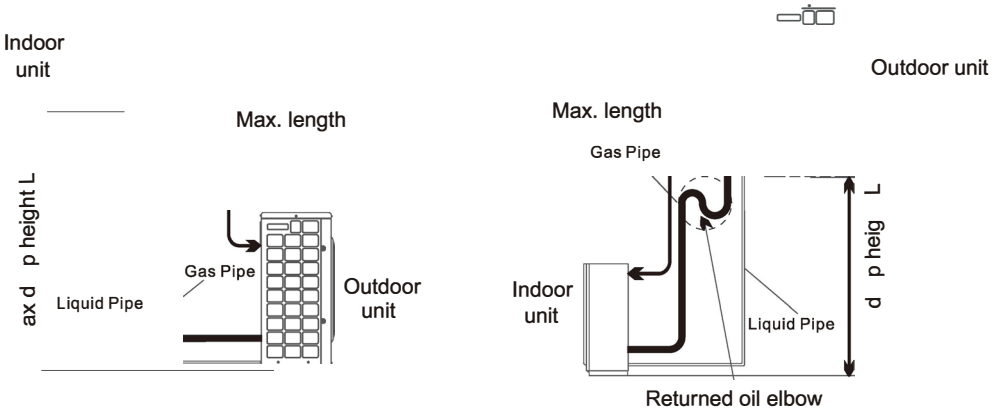
Outdoor Unit 24-36K

Refrigerant Piping

1. Piping Diameter

Capacity(Btu/h)	Outer Diameter of Pipe	
	Gas [in.(mm)]	Liquid [in.(mm)]
18K/24K/36K	Φ 5/8 (15.88)	Φ 3/8 (9.52)

2. Pipe length



Capacity (Btu/h)	Min. Pipe length (L)	Max. Pipe length (L)	Max. Height difference (H)
18K/24K/36K	10ft. (3m)	165ft. (50m)	100ft. (30m)

⚠ CAUTION

It is better with the shorter refrigerant piping length to maintain the capacity. So the connecting pipe should be as short as possible.
When the indoor unit is lower than outdoor unit and the height difference is larger than 32.8 ft.(10m), a returned oil elbow should be installed on the vertical gas pipe for every 20 ft.(6m).

3. Piping Material

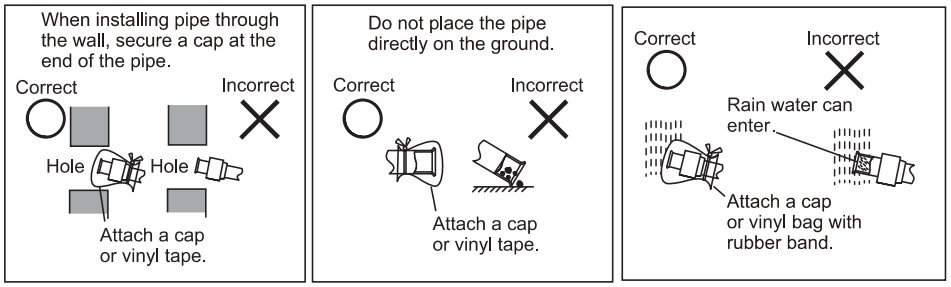
(1) Prepare locally-supplied copper pipes.(ACR Copper)
(2) Select clean copper pipes. Make sure there is no dust and moisture inside the pipes. Blow the inside of the pipes with nitrogen, to remove any dust or foreign materials before connecting pipes.
(3) Piping thickness and material are shown as below.

Diameter [in. (mm)]	ø 1/4 (6.35)	ø 3/8 (9.52)	ø 1/2 (12.70)	ø 5/8 (15.88)	ø 3/4 (19.05)	ø 7/8 (22.22)
Thickness [in. (mm)]	1/32 (0.8)	1/32 (0.8)	1/32 (0.8)	1/32 (1.0)	1/32 (1.0)	1/32 (1.0)
Material	C1220T-O, Type O, TP2M					

INSTALLATION

Outdoor Unit 24-36K

CAUTION



4. Refrigerant piping work

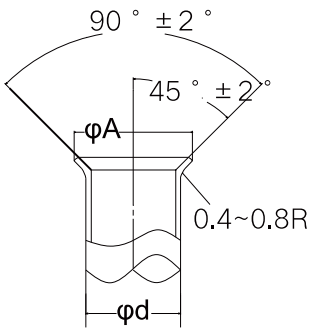
(1) Pipe cutting
Cut the copper pipe correctly with a pipe cutter.

(2) Burrs removal
Completely remove all burrs from the cross section of the pipe.
Orient the end of the copper pipe downward to prevent burrs from dropping in the pipe.

(3) Putting nut on
Remove flare nuts attached to indoor and outdoor units, then put them on the pipe, burrs of which have been removed.
(Not possible to put them on after flaring work).
Flare nut for pipe depends on the diameter of pipe.

(4) Flaring work
Perform flaring work with a flaring tool as shown below.

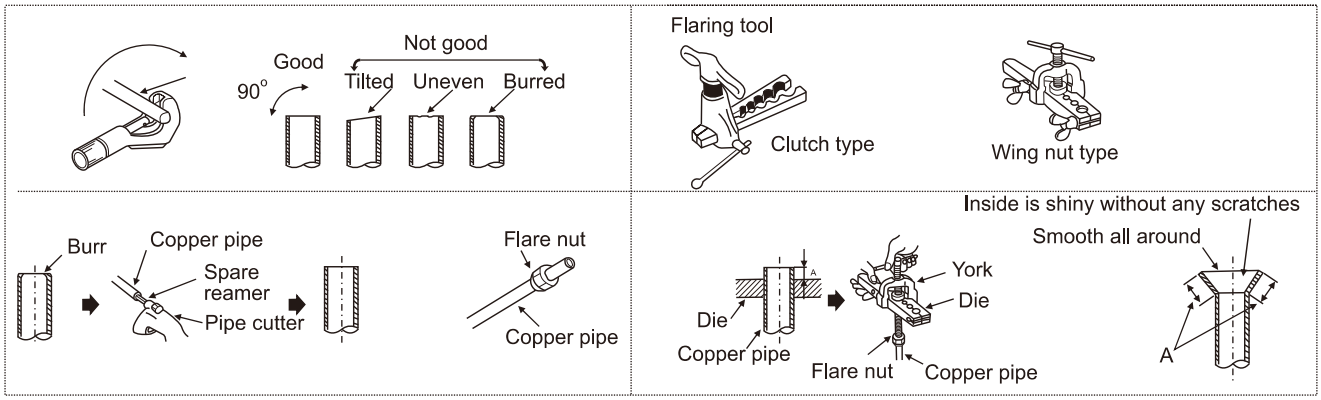
(5) Check
Compare the flared work with the figure below.
If flare is noted to be defective, cut off the flared section and perform flaring work again.



[Unit: in. (mm)]

Diameter ød	$A^{+0}_{-1/64}$ $(^{+0}_{-0.4})$
1/4 (6.35)	11/32 (9.1)
3/8 (9.52)	1/2 (13.2)
1/2 (12.7)	10/16 (16.6)
5/8 (15.88)	3/4 (19.7)
3/4 (19.05)*	15/16 (24.0)

*: Perform the flaring work with type O material.



Installation Instructions

5. Piping connection (when outdoor unit connected to a duct /cassette /wall-mount indoor unit)

(1) Confirm that the valve is closed.

(2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant piping. Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching the weak part of the building such as wall, ceiling, etc. (If touched, abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length.)

(3) Tighten the flare nut with two spanners (one being a torque wrench) as shown in the right figure.

(4) Apply the refrigerant oil (field-supplied) thinly at the seat surface of the flare nut and pipe before connecting and tightening.(optional)
And when tightening the flare nut, use two spanners.

(5) Outdoor refrigerant piping should connect with stop valve.

Double Spanner Work

Pipe size [in. (mm)]	Torque [lbf·ft. (N·m)]
ø 1/4 (6.35)	14.8 (20)
ø 3/8 (9.52)	29.5 (40)
ø 1/2 (12.7)	44.3 (60)
ø 5/8 (15.88)	59.0 (80)
ø 3/4 (19.05)	73.8 (100)

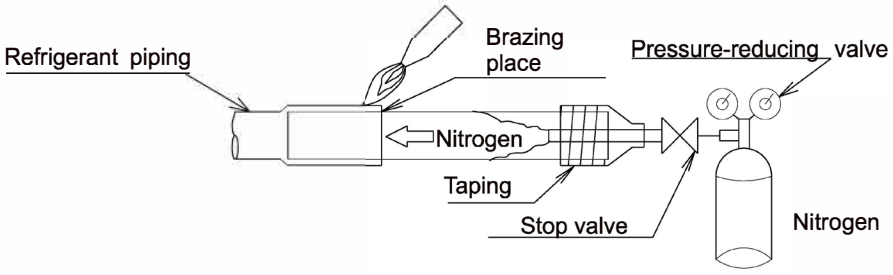
Tightening Torque for Flare Nut

⚠ CAUTION

Precautions when brazing the refrigerant pipings

When brazing the refrigerant piping, carry out brazing work(CAUTION2) after substituting nitrogen for air [flow nitrogen into the piping and substitute nitrogen for air(CAUTION1)(see the drawing below)].

1. The proper pressure for having nitrogen flow through the piping is approximately 2.9 psig(0.02 MPa), a pressure that makes one feel like breeze and be obtained through a pressure reducing valve.
2. Do not use flux when brazing refrigerant piping. Use phosphor copper brazing filler metal (BCuP-2; JIS Z 3264/ B-Cu93P-710/795: ISO 3677) that does not require flux. (If chlorinated flux is used, the piping will be corroded and, in addition if fluorine is contained, the refrigerant oil will be deteriorated and the refrigerant circuit will be affected badly.)



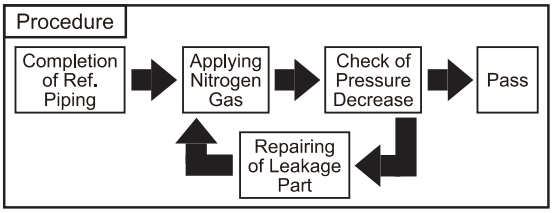
⚠ CAUTION

Do not use anti-oxidants when brazing the piping joints(Residue can clog pipes and break equipment).
Do not reuse joint which have been used once already.

7. Line pressure tightness test

-Use Nitrogen only. Do not used compressed air.

Connect the gauge manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.
Perform the line pressure tightness test.
Don't open the gas line stop valves.
Apply nitrogen gas pressure of 550 psig (3.79 MPa).
Check for any gas leakage at the flare nut connections, or brazed parts by gas leak detector or foaming agent.
Gas pressure doesn’t decrease is OK.
After the air tight test, release nitrogen gas.



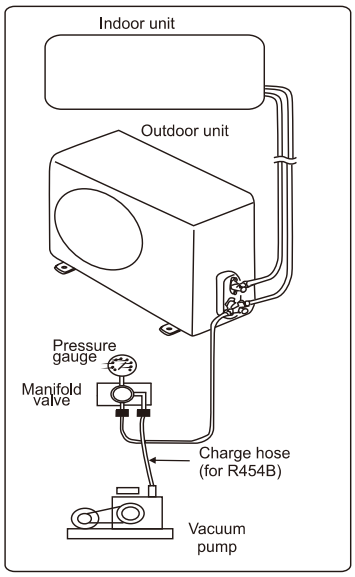
Air tight procedure

INSTALLATION

Outdoor Unit 24-36K

8. Vacuum Pumping

(1) Remove the service port cap of the stop valve on the gas pipe side of the outdoor unit.
(2) Connect the manifold gauge and vacuum pump to the service port of the stop valve on the gas pipe side of the outdoor unit.
(3) Run the vacuum pump. (Work for more than 15 minutes.)
(4) Check the vacuum with the gauge manifold valve, then close the gauge manifold valve and stop the vacuum pump.
(5) Leave it as is for one or two minutes. Make sure that the pointer of the manifold gauge remains in the same position. Confirm that the pressure gauge shows -14.7psig (-0.101MPa or -760mmHg).
(6) Remove the manifold gauge quickly from the service port of the stop valve.
(7) After refrigerant pipes are connected and evacuated, fully open all stop valves on both sides of gas pipe and liquid pipe.
(8) Open adjusted valve to add refrigerant (the refrigerant is liquid).
(9) Tighten the cap to the service port .
(10) Retighten the cap.
(11) Leak test foam with halogen leak detector to check the flare nut and brazing for leaks. Use foam that does not generate ammonia (NH3) in the reaction.



⚠ CAUTION

This system is only applicable to R454B refrigerant, and the pressure gauge and charging hose must be special for R454B. If the pressure gauge pointer does not move to -14.5psig [-0.1 MPa (-756 mmHg)], please make sure to check for leaks at the valve connection between the indoor and outdoor units, and then proceed to the next step after repairing the leak.

Methods for opening and closing the stop valve

- The following figure shows the names of each component required to process the stop valve(Fig.1). The stop valve is closed before installation.
- Opening and closing the stop valve: Prepare hexagon wrenches.
  (1) Open the stop valve: Insert the hexagon wrench into the valve stem, rotate the valve stem counterclockwise, and stop rotating when the valve stem can no longer rotate. At this point, the valve has already opened.
  (2) Close the stop valve: Insert the hexagon wrench into the valve stem, rotate the valve stem clockwise, and stop rotating when the valve stem can no longer rotate. At this point, the valve has already closed.

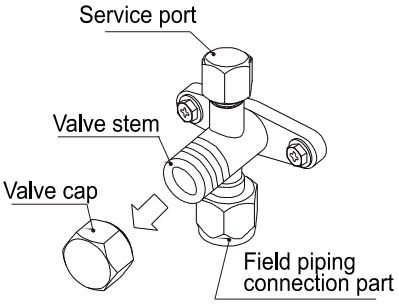


Fig.1

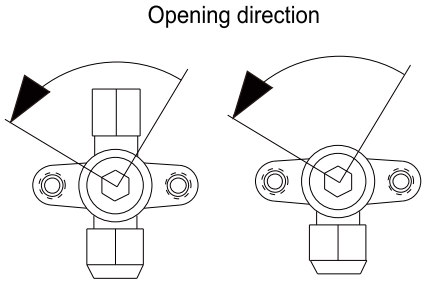


Fig.2 Liquid pipe

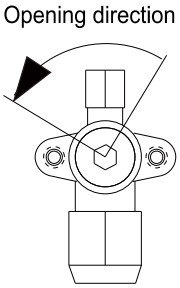


Fig.3 Gas pipe

Outdoor Unit 24-36K

9. Additional Refrigerant Charge

This operation must be completed with an electronic scale for weighing. The refrigerant is charged to the air conditioning unit through the service port of the stop valve at low-pressure side.

(1) Connect the manifold pressure gauge to the refrigerant cylinder first, remove the air from the charging hose, and then connect it to the charging port of the stop valve at the low-pressure side of the outdoor unit.
(2) Start the air conditioning unit for refrigeration.
(3) Open the refrigerant cylinder and pressure gauge valve.
(4) After the required amount of refrigeration is charged into the unit, quickly close the valves at the low-pressure side and of the refrigerant cylinder.
(5) Disconnect the charging hose from the service port of the stop valve and tighten the service port cap.

⚠ CAUTION

- Excessive or insufficient refrigerant is the main cause of unit faults. The outdoor unit is pre-charged with refrigerant when it leaves the factory, please charge the correct amount of refrigerant according to the instructions.
- After charging, please close the valve and record the refrigerant charging amount.

Amount of refrigerant additionally charged

If the pipe length is less than 25ft.(7.5 m), there is no need for additional charging after triple evacuation. When the length of the pipe is greater than 25ft.(7.5 m), calculate according to the following table.

Capacity (Btu/h)	Amount of refrigerant pre-charged before leaving the factory/W_o[oz(g)]	Amount of refrigerant additionally charged X [oz(g)]	
		pipe length(L)≤ 25ft.(7.5m)	pipe length(L)≥ 25ft.(7.5m)
18K/24K*	74.1(2100)	0	X=0.38(oz/ft) [35(g/m)]× [L-25ft.(7.5m)]
36K	112.8(3200)	0	X=0.38(oz/ft) [35(g/m)]×

INSTALLATION

Outdoor Unit 24-36K

Wiring

⚠ WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit and wait for more than 3 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Avoid the wirings from touching the refrigerant pipes, plate edges and electrical parts inside the unit. If not do, the wires will be damaged and at the worst, a fire will occur.
- An ELB type circuit breaker may be required for this unit depending on local and national electrical codes. An ELB type breaker is recommended in moist and/ or humid locations.
- This unit uses an inverter, which means that it must be used an earth leak detector capable handing harmonics in order to prevent malfunctioning of the earth leak detector itself.
- Do not use intermediate connection wires, stranded wires(s) **when connecting main power supply**), extension cables or control line connection, because the use of these wires may cause high temperature, electric shock or fire.
- The tightening torque of each screw shall be as follows.
  M4: 0.7 to 1.0 lbf·ft. (1.0 to 1.3 N·m)
  M5: 1.5 to 1.8 lbf·ft. (2.0 to 2.5 N·m)
  M6: 3.0 to 3.7 lbf·ft. (4.0 to 5.0 N·m)
  M8: 6.6 to 8.1 lbf·ft. (9.0 to 11.0 N·m)
  M10: 13.3 to 217 lbf·ft. (18.0 to 23.0 N·m)
  Keep the above tightening torque when wiring work.

⚠ CAUTION

- With tape material along the wire wrapped, sealed wiring holes, prevent the condensed water and insects.
- Tightly secure the power source wiring using the cord clamp inside the unit.
  Note: Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.

General check

(1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data.
Make sure that the components comply with National Electrical Code (NEC).

(2) Check to ensure that the voltage of power supply is within +10% of nominal voltage and earth phase is contained in the power supply wires. If not, electrical parts will be damaged.

(3) Check to ensure that the capacity of power supply is enough.
If not, the compressor will be not able to operate cause of voltage drop abnormally at starting.

(4) Check to ensure that the earth wire is connected.

(5) Install a main switch, multi-pole main switch with a space of 0.14 in. (3.5mm) or more, single phase main switch with a space of 0.12 in. (3.0mm) or more between each phase.

(6) Check to ensure that the electrical resistance is more than 2 MΩ, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.

INSTALLATION

Outdoor Unit 24-36K

Electrical Data

Capacity (Btu/h)	Power Supply	ELB		MCA (A)	Transmitting Cable Size	Circuit Breaker (A)
		Rated Current (A)	Nominal Sensitive Current (mA)			
18K/24K	208/230V ~/60Hz	30	30	22	4×14AWG	30
36K	208/230V ~/60Hz	50	30	30/37	4×14AWG	50

Max. Running Current (A): REFER TO NAMEPLATE

Note:

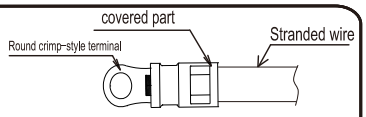
(1) Follow local codes and regulations when select field wires, and all the above are the minimum wire size.

(2) 18AWG. color-coded low voltage wire should be used for lengths less than 100ft(30m). For wire lengths than 100ft.(30m), 16AWG. wire should be used. When transmitting cable length is longer than 262ft. (80m), a larger wire size should be selected.

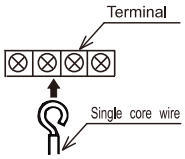
(3) Install main switch and ELB for each system separately. Select the high response type ELB that is acted within 0.1second. Recommended capacity to see outdoor machine switch capacity.

Attention when connecting transmitting cable to indoor unit

1. When connecting the terminal block using stranded wire, make sure to use the round crimp-style terminal for connection to the power supply terminal block. Place the round crimp-style terminals on the wires up to the covered part and secure in place.



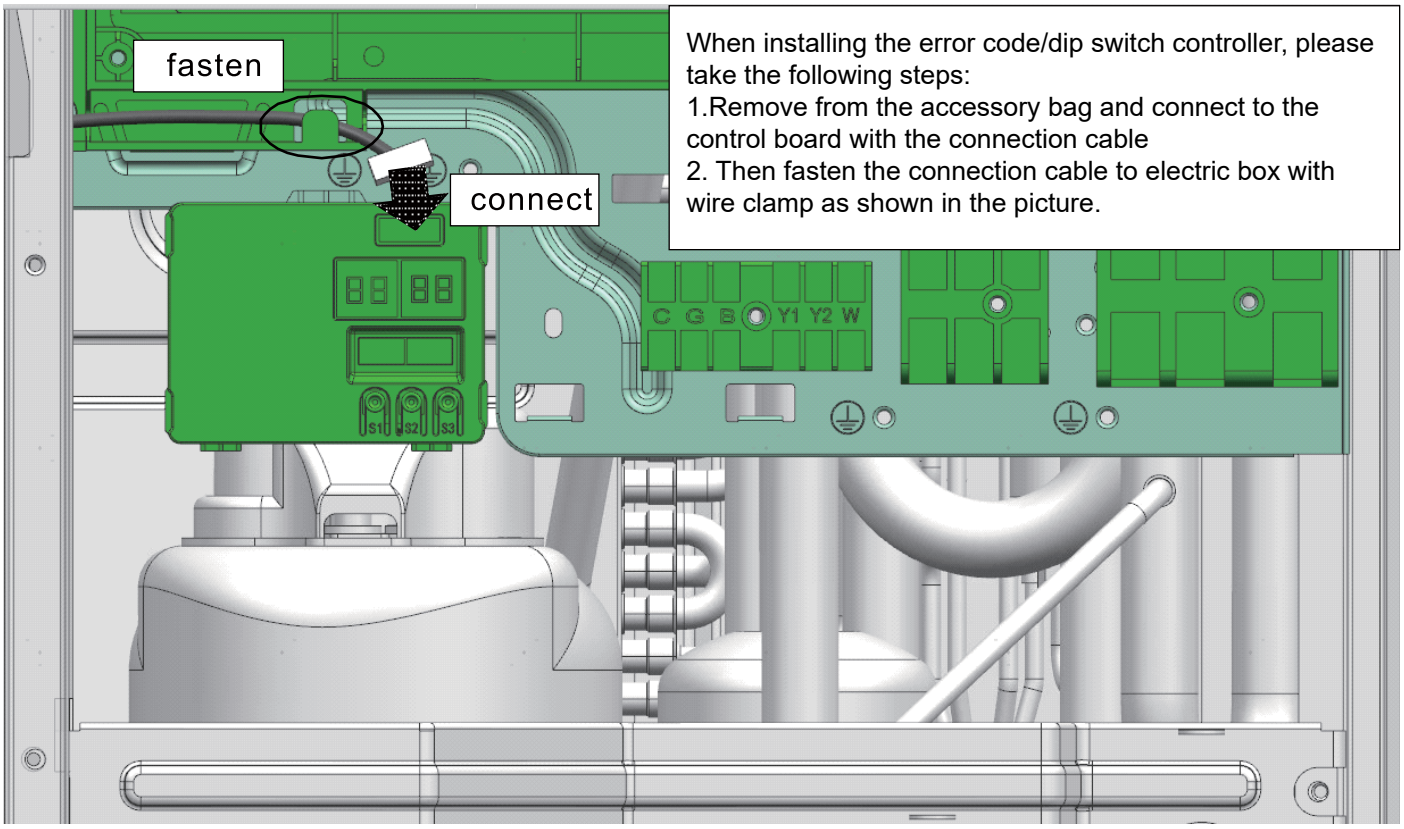
2. When connecting the terminal block using a single core wire, be sure to perform curing.



When connecting Power Supply to Outdoor Unit

Checker Box (Only for 36K)

For 36K, during installation, please connect the Checker box supplied in the accessories to the electrical box as shown in the figure below.



INSTALLATION

Outdoor Unit 24-36K

Test Run

1. Preparation before test run and precautions

Please turn off all power supplies and confirm with a testing instrument whether all power supplies have been turned off.

Before running, please proceed the following steps to inspect the installation status:

(1) Structural damage inspection
Confirm whether there is no damage on the surface and interior of the equipment.

(2) Outdoor fan inspection
Confirm whether the impeller of the fan is located in the middle of the air outlet. Do not touch the air outlet.

(3) Fastening screw inspection
Check whether the screw parts become loose due to vibration during transportation, In addition, confirm whether the screws are tightened during installation.
Especially, be sure to inspect the screws of electrical wiring more carefully.

(4) Refrigerant leakage inspection
Vibration during transportation may cause loosening of the fastening (flaring part) position of the pipe. Check for refrigerant leakage.
Be sure to carry out this inspection carefully.

(5) Dial switch setting inspection
Confirm whether the dial switch is in the set position at the time of delivery (see: Dial setting of the outdoor unit).

(6) Insulation resistance inspection
Measure whether the resistance between the electrical component terminals and the ground reaches 2 MΩ or above with a 500 V megameter. When the resistance is below 2 MΩ, it indicates poor insulation at the electrical connection position, and the equipment cannot be operated at this time.
In addition, do not apply power to the communication line terminal block (otherwise it will cause damage to the printed circuit board).

(7) Full opening of stop valve
Before conducting a test run, please check whether the stop valve of the outdoor unit is fully open.

(8) Power supply phase inspection
Do not operate when the phase sequence is incorrect or missing.

(9) Power-on of crankcase heating belt
After completing the inspection of item (1) to (8), connect the outdoor unit power supply. After powering on the crankcase heating belt, the compressor can be preheated. If the compressor is not preheated and started directly, the compressor will fail. The unit can only be started after 6 hours of power-on.

(10) Confirmation of indoor and outdoor ambient temperature
The indoor ambient temperature during refrigeration operation shall not be lower than 80.6℉(27°C), and the outdoor ambient temperature during heating operation shall not exceed 66.2℉(19°C).

⚠ WARNING

The machine can be started only after all checkpoints are checked without problems.

(1) Check to ensure that the ground resistance of the wiring terminals exceeds 2 MΩ, Otherwise, find out and repair the leaking part before starting the system.

(2) Check and ensure that all stop valves of the outdoor unit are turned on before starting the system.

(3) It is recommended to power on for at least 6 hours to ensure sufficient lubrication of the compressor and extend its service life.

2. Identification of test run functions

Turn on the remote control and perform a test run.

Test whether the function and display of the air conditioning unit are normal and whether the temperature control is in good state during the test run.

When the system is operating, the following conditions shall be noticed.

(1) Do not touch any parts at the exhaust end to avoid scald. This is because the temperature of the compressor and pipes at the exhaust end is heated to above 194℉(90°C).

(2) After the test run is completed, turn off the power. Do not touch any electrical components within 10 mins after switching off the main power supply.
After completing the above operations, the installation of the equipment is usually completed. If you still have any questions, please contact our local technical service center for more information.

OPERATION

Operation Range (Cooling and Heating)

Temperature		Cooling operation	Heating operation
Indoor temperature	Max	90˚F	81˚F
	Min	70˚F	45˚F
outdoor temperature	Max	125˚F	75˚F
	Min	5˚F	-13˚F

Figure 301

*Optimum performance will be achieved within these operating temperature. If air conditioner is used outside of the above conditions, the protective device may trip and stop the appliance.
*The temperature of some products is allowed beyond the range. In specific situation, please consult the merchant. When relative humidity is above 80%, if the air conditioner runs in COOLING or DRY mode with door or window opened for a long time, dew may drip down from the outlet.

OPERATION

Remote Control

The remote controller transmits signals to the system.

SMART
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.

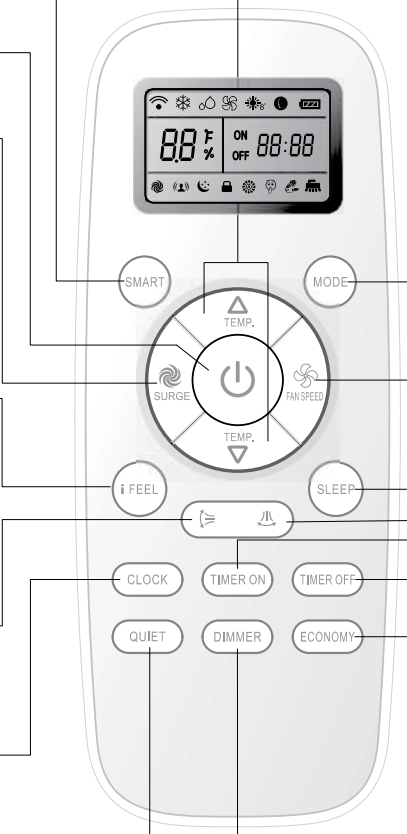
SURGE
Used to start or stop the fast cooling/heating. (Fast cooling operates at high fan speed with 61°F set temp automatically ; Fast heating operates at auto fan speed with 86°F set temp automatically)

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.

CLOCK
Used to set the current time.

QUIET
Used to set or cancel Quiet Mode operation. When the air conditioner is in standby, and the mode of remote controller is in Cooling or Dry (except Super mode), press this button for about 5 seconds once to start Clean mode , then the indicator " " will display on LCD.



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 or 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
Used to set or cancel the timer operation.

TIMER OFF
Used to set or cancel the timer operation.

ECONOMY
Used to set or cancel Economy Mode operation.
When in Cooling mode (except Super mode), press this button for about 5 seconds once to start Power control mode , press this button for about 5 seconds once again to stop it

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

TIMER ON + TIMER OFF LOCK
Used to start or stop LOCK mode.

TEMP. + 46°HEAT
Used to start or stop 46°HEAT mode.

Indication symbols on LCD:

Cooling indicator	Auto fan speed	Sleep 1 indicator	Quiet indicator	Signal transmit
Dry indicator	Higher fan speed	Sleep 2 indicator	Smart indicator	Battery power indicator
Fan only indicator	High fan speed	Sleep 3 indicator	Economy indicator	ON OFF 88:88	Display set timer / Display current time
Heating indicator	Medium fan speed	Sleep 4 indicator	Surge indicator	
46°Heat indicator	Low fan speed	Lock indicator	Ifeel	88 °F	Display temperature
Lower fan speed			Clean indicator	%	Power control indicator

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

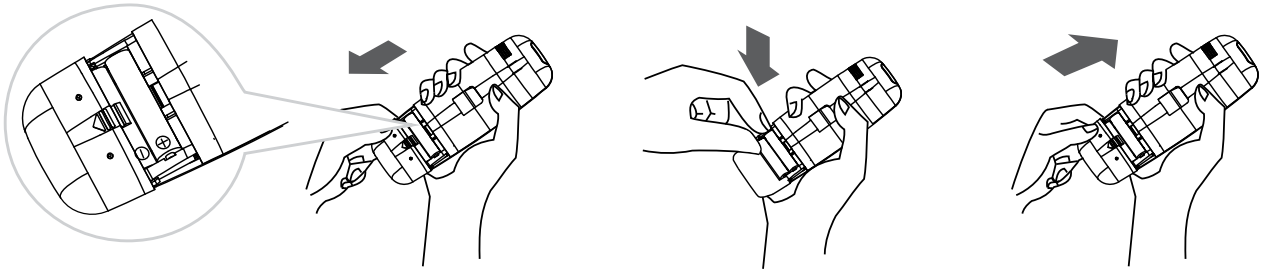
Figure 302

OPERATION

Remote Control

◆ *How to Insert the Batteries*

1. Remove the battery cover according to the arrow direction.
2. Insert new batteries making sure that the (+) and (-) of battery are matched correctly.
3. Reattach the cover by sliding it back into position.



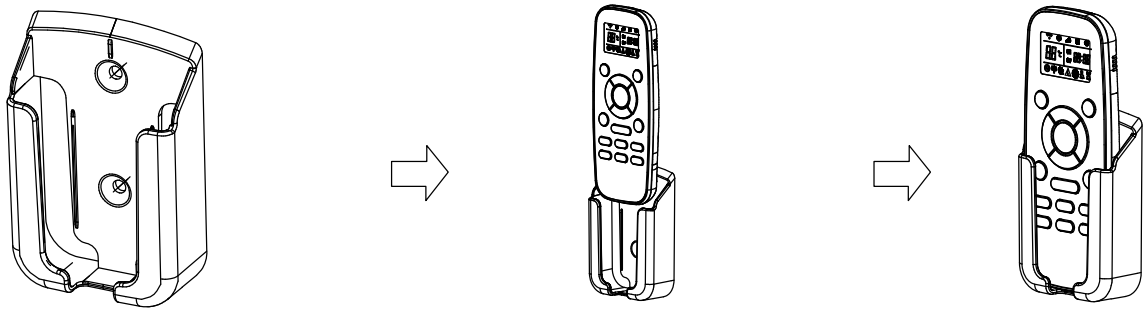
Note:

- ***Use 2 LR03 AAA(1.5volt) batteries. Do not use rechargeable batteries. Replace batteries with new ones of the same type when the display becomes dim.***

◆ *Storage and Tips for Using the Remote Controller*

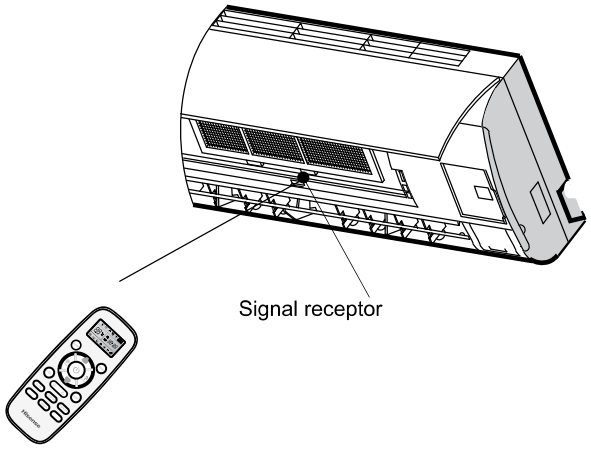
The remote controller may be stored mounted on a wall with a holder.

Note: The remote controller holder is an optional part.



◆ *How to Use*

To operate system, point remote directly at unit (audible beep should sound when buttons are pressed). The remote can operate system up to 23ft away without interference.



⚠ *CAUTIONS*

For appropriate signal transmission between remote controller and indoor unit, keep the signal receiver away from the following items:

- Direct sunlight or other strong lights or heat
- Flat panel television screen or other electrical appliances that react to the remote controller

Additionally, the air conditioner will not operate if curtains, doors or other materials block the signals from the remote controller to the indoor unit. If the signal may not be transmitted properly, either move these materials or consult your local dealer.

OPERATION

Remote Control

Operation modes

◆ Selecting mode

Press MODE button

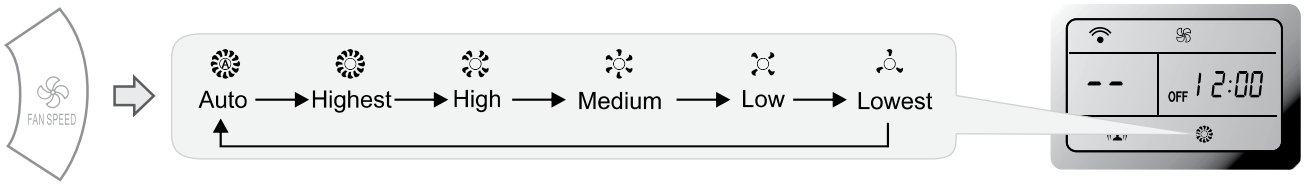
Result : The operation modes changed in sequence:

Heating mode is NOT available for cooling only air conditioner.

◆ FAN mode

Press FAN SPEED button

Result : The fan speed is changed in sequence:



At "FAN ONLY" mode, the "AUTO" is not available.
At "DRY" mode, Fan speed is set at "AUTO" automatically, "FAN" button is ineffective in this case.

◆ Setting temperature

Press TEMP △ button once

Result : Raise temperature setting by 1°F

Press TEMP ▽ button once

Result : Lower temperature setting by 1°F

Range of available set temperature	
*HEATING, COOLING	61°F~86°F
DRY	19°F~45°F
FAN ONLY	unable to set

***Note: Heating mode is NOT available for cooling only models.**
***Note: At "Dry" mode, a decrease or rise of up to 45°F can be set with Remote controller if you still feel uncomfortable.**

◆ Turning on

Press ⏻ button.

Result : The RUN indicator of the indoor unit lights up.

SWING, SMART, TIMER ON, TIMER OFF, CLOCK, 46° HEAT,SLEEP and SURGE operation modes will be specified in the following pages.

- ***Changing modes during operation, sometimes the unit does not response at once. Wait 3 minutes.***
- ***During heating operation, air flow is not discharged at the beginning. After 2—5 minutes, the air flow will be discharged until temperature of indoor heat exchanger rises.***
- ***Wait 3 minutes before restarting the appliance.***

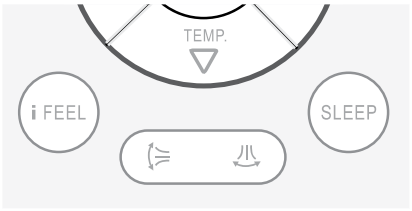
OPERATION

Remote Control

Airflow direction control

Vertical airflow(Horizontal airflow) Blade angle will adjust based on remote setting.

Operation mode	Direction of airflow
COOLING, DRY	horizontal
*HEATING, FAN ONLY	downward



The direction of airflow can be also adjusted by pressing the " " button of the remote controller.

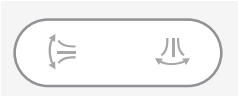
Heating mode is only available for heat pump models.

◆ Vertical airflow control (with the remote controller)

Use remote to adjust blade/louver angles.

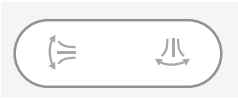
Press " " button once.

Result : The vertical adjustment louver will swing up and down automatically.



Press " " button again .

Result : The louvers swing to a suitable angle as desired.

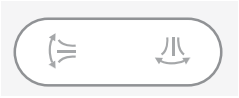


◆ Horizontal airflow control (with the remote controller)

Use remote to adjust blade/louver angles.

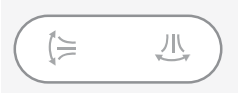
Press " " button once.

Result : The horizontal adjustment louver will swing left and right automatically.



Press " " button again .

Result : The louvers swing to a suitable angle as desired.



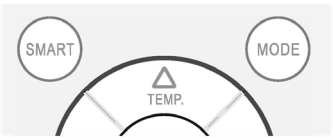
Operation instructions

SMART mode(Multizone system not capable of auto change over function)

◆ How to set SMART mode?

Press the SMART button.

Result : Enters **SMART** mode(auto change over operation) regardless of the units ON/OFF status. Temperature and fan speed are automatically set based on actual room temperature.



Heat pump models

Indoor temperature	Operation mode	Target temperature
70°F or below	HEATING	72°F
70°F-73°F	FAN ONLY	
73°F-79°F	DRY	Room temperature decrease 2°F after operate for 3 minutes
Over 79°F	COOLING	79°F

☑ ***SMART mode will not work when system is set to SURGE Mode.***

☑ ***Pressing MODE will cancel SMART mode. Note: Temperature, airflow and direction are controlled automatically in SMART mode. However, you can choose an offset of -7 to 7 if SMART mode preset is not comfortable.***

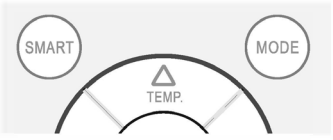
◆ What you can do in SMART mode?

Issue	Button	Adjust
Not enough air flow in SMART mode.		Indoor fan speed alternates among Highest, High, Medium, low and Lowest each time when this button is pressed.
Airflow is not directed properly.		Pressing SWING button once will change blade/louver position, pressing SWING again will stop swing function.

◆ How to cancel the SMART mode?

Press the MODE button.

Result : The SMART mode will be cancelled.



OPERATION

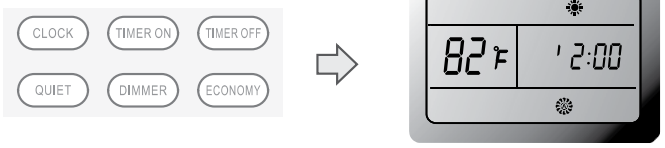
Remote Control

CLOCK button

◆ ***How to adjust the real time?***

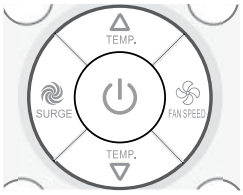
1. Press CLOCK button.

   Result : The time flashes on the LCD.



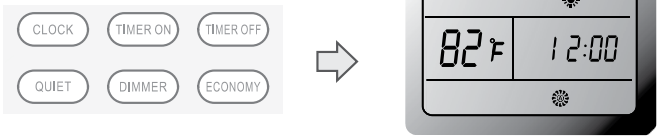
2. Press TEMP. and TEMP. buttons.

   Result : Once to increase or decrease the time setting by 1 minute.
   One and a half seconds to increase or decrease the time setting by 10 minute.
   For a longer time to increase or decrease the time by 1 hour.



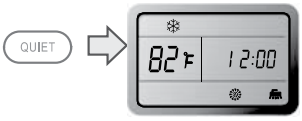
3. Press CLOCK button again.

   Result : The real time is set.



CLEAN mode

When the unit is in standby, and the mode of remote controller is in Cooling or Dry , press QUIET button for 5 seconds once to start Clean mode , then the indicator " " will display on LCD.



- ***Clean mode is ineffective in SUPER mode.***
- ***Press ON/OFF or SMART or MODE button can exit the Clean mode, then the indicator " " will disappear.***
- ***After the clean process finish, the air conditioner will return to Cooling or Dry as preset, while the indicator" " on remote controller will display for about 30 mins.***

OPERATION

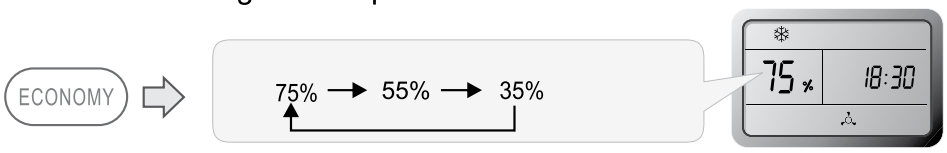
Remote Control

◆ Power control mode

When in Cooling mode, press (ECONOMY) button for about 5 seconds once to start Power control mode (at low fan speed), press this button for about 5 seconds once again to stop it.

When the appliance in the Power control mode, press (ECONOMY) button once by once

Result : The operation modes changed in sequence:



- ***Power control mode is ineffective in SURGE or ECONOMY mode.***
- ***Except for the button of Swing, Dimmer, Ifeel, Clock, Time on, Time off, Fan, press the other buttons can exit the Powercontrol mode, and the indicator " % " will disappear.***
- ***When start the Power control mode, the fan will automatically enter low wind speed, but you can change the wind speed by press the Fan button.***

SURGE mode

SURGE mode is used to start or stop fast cooling or heating.

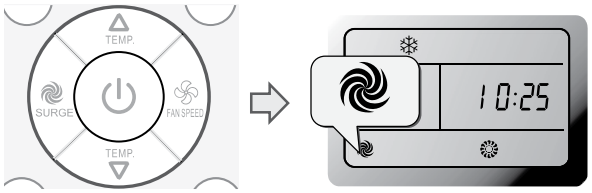
SURGE mode can be set when the appliance is in operation or in standby.

In SURGE mode, you can set airflow direction or timer.

◆ *How to set SURGE mode?*

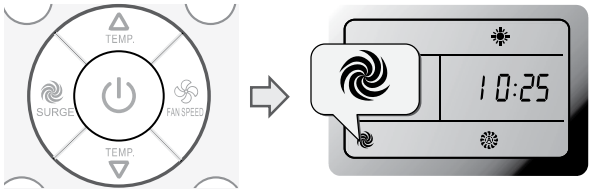
Press (SURGE) button in cool mode.

Result : At higher fan speed ,the set temperature automatically to 61°F



Press (SURGE) button in heat mode.

Result : At auto fan speed ,the set temperature automatically to 86°F



◆ *How to cancel SURGE mode?*

Press SURGE , MODE, FAN, ON/OFF,SLEEP or TEMPERATURE SETTING button.

Result : Display will return to previous mode

Exit from SURGE mode.

Note:

SMART button is not available in SURGE mode.

Surge mode will operate for 15 minutes unless user cancels the function.

OPERATION

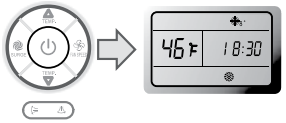
Remote Control

46°HEAT mode

46°HEAT mode is used to set 46° heating mode.
In **46°HEAT** mode, the fan speed is set at "AUTO" automatically.

◆ ***How to set 46°HEAT mode?***

Press TEMP. and buttons together for about 2 seconds at the heating mode.



Result : The 46° heat mode will be started.

◆ ***How to cancel 46°HEAT mode?***

Press any button except for TIMER ON CLOCK , TIMER OFF and .

Result : The display will disappear and the 46°HEAT mode will be cancelled.

Note:

In 46°HEAT mode, the default temperature is set 46°F.

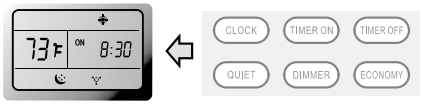
46°HEAT mode can be set only when the air conditioner works in the heating mode.

TIMER mode

It is convenient to set the timer on with **TIMER ON** buttons when you go out in the morning to achieve a comfortable room temperature at the time you get home. You can also set timer off at night to enjoy a good sleep.

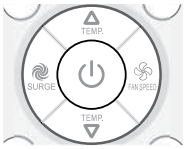
◆ ***How to set TIMER ON?***

1. Press TIMER ON button.



Result : "ON 12:00" flashes on the LCD.

2. Press the TEMP. or TEMP. button.



Result : Once to increase or decrease the time setting by 1 minute.
One and a half seconds to increase or decrease the time setting by 10 minute.
For a longer time to increase or decrease the time by 1 hour.

3. When your desired time displayed on LCD, press the TIMER ON button and confirm it.

Result : A "beep" can be heard.
"ON" stops flashing.
The TIMER indicator on the indoor unit lights up.(invalid for some models)

4. Timer will be displayed on the remote for 5 seconds and set time will reappear

◆ ***How to cancel TIMER ON?***

Press the TIMER ON button again.

Result : A "beep" can be heard and the indicator disappears, the time on mode has been canceled.

Note: It is similar to set TIMER OFF, you can make the appliance switch off automatically at your desired time.

QUIET mode

In this mode, the air conditioner unit work with low noise performance.

Note: Press MODE.FAN.SMART. SURGE button cancel QUIET mode.

OPERATION

Remote Control

ECONOMY mode

In this mode, the air conditioner will bring you energy saving performance by lower running current.

Note:
ECONOMY button is ineffective in SMART, SURGE and Power control mode.
Press ON/OFF , MODE ,TEMP △ ,TEMP △ , FAN , SLEEP , QUIET or ECONOMY button cancel ECONOMY mode.
Press and hold " QUIET " button and " ECONOMY " button together for 3 seconds will alternate the mode between the cooling only and the cooling and heating.

IFEEL mode

The built temperature sensor will sense the surrounding temperature, and transmit this back to the unit. This temperature will be your set point until you make another adjustment to the set point.

◆ *How to set IFEEL mode ?*

Press the (i FEEL) button.

Result : The transmit signal in the display will appear, and the IFEEL function will be started.

Note:
Place remote in a location where the signal will be well received by unit.
IFEEL should be used to adjust room temperature for momentary comfort.
To get the best efficiency from your system allow the unit to operate at a set point.
This will allow the system to fluctuate with the changing room loads.

◆ *How to cancel IFEEL mode?*

Press the (i FEEL) button once again.

Result : The transmit signal in the display will disappear, and the IFEEL function will be shut off.

Note:
If IFEEL function fails to cancel, try holding button for 5 seconds.

Dimmer button

◆ *How to set the DIMMER ?*

Press the (DIMMER) button to turn off the light and the display in the unit.

Note:
If light is set to off a request from the remote to change a function will turn it on again. User will need to turn it off if that is the desired condition.

LOCK mode

◆ *How to set LOCK ?*

Press (TIMER ON) and (TIMER OFF) buttons together for 2 seconds to start LOCK mode.
The lock indicator appears on the display

Press together for 2 seconds

◆ *How to cancel LOCK ?*

Press (TIMER ON) and (TIMER OFF) buttons together for 2 seconds to stop LOCK mode.
The lock indicator disappears .

Press together for 2 seconds

OPERATION

Remote Control

SLEEP mode

SLEEP mode can be set in **COOLING ,HEATING** or **DRYING** mode.

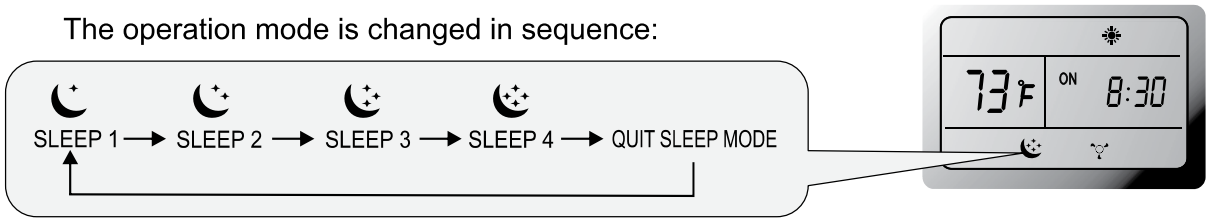
This function gives you a more comfortable environment for sleep.

- The appliance will stop operation automatically after operating for 8 hours.
- Fan speed is automatically set at low speed.

◆ *How to set SLEEP mode ?*

Each time SLEEP button is pressed.

Result : The operation mode is changed in sequence:



SLEEP mode 1:

- Set temperature will rise by 2°F at most if the appliance operates in cooling mode for 2 hours constantly, then keeps steady.
- Set temperature will decrease by 2°F at most if the appliance operates in heating mode for 2 hours constantly, then keeps steady.

SLEEP mode 2:

- Set temperature will rise by 2°F if the appliance operates in cooling mode for 2 hours constantly, decrease by 1°F after 6 hours, then decrease by 1°F after 7 hours.
- Set temperature will decrease by 2°F if the appliance operates in heating mode for 2 hours constantly, rise by 1°F after 6 hours, then rise by 1°F after 7 hours.

SLEEP mode 3:

- Set temperature will rise by 1°F if the appliance operates in cooling mode for 1 hour , rise by 2°F after 2 hours, then decrease by 2°F after 6 hours,
  decrease by 1°F after 7 hours.
- Set temperature will decrease by 2°F if the appliance operates in heating mode for 1 hour , decrease by 2°F after 2 hours, then rise by 2°F after 6 hours, rise by 2°F after 7 hours.

SLEEP mode 4:

- Set point will remain steady.

Note: Press SURGE ,SMART, MODE or FAN button cancel SLEEP mode.
Note: By pressing "Sleeping mode" four times, or selecting other modes like SURGE, SMART, OR FAN, you could cancel the sleeping function of those units without four sleeping curves.
Note: Heating is NOT available for cooling only air conditioner.

OPERATION

Unit Function (Cassette and Ducted)

1.1.1 Indoor unit mode control

1. Main general technical parameters

(1) Remote receiver distance: 26ft.(8m).

(2) Remote receiver angle: Less than 80 degrees.

(3) Temperature control accuracy: ±1˚F.

(4) Time error: Less than 1%.

2. Functions of the control function

2.1 Emergency switch

Pressing the emergency button can start or stop the machine. Starting is according to the automatic mode of operation.

Press this button to turn ON the unit, the machine will run in auto mode, and press it again to turn it off.

When the machine is OFF, press and hold the emergency switch for 5 seconds, with 3 beeps, the indoor unit would turn to emergency running. In such situation, machine would be forced to turn to cooling operation with high speed, the flaps sweep and the machine's operation is irrelevant with room temperatures.

If a remote signal has been received during the emergency run, the machine will operate upon the command of such a remote signal.

2.2 Operator-machine communication

Air conditioning and remote control is provided with a temperature sensor. The remote control on the temperature sensor detects the default settings of room temperature at room temperature. If the indoor control unit has not received remote control signal for a long time, it will automatically switch to the air conditioner body temperature sensor.

2.3 Timer function

(1) Timer ON

When set to start in a time by the remote controller, the air conditioner starts in the Timer ON condition. When the set time is up, the air conditioner will turn on and operates in the preset conditions after receiving a signal from the remote controller. If the air conditioner has not received a signal from the remote controller when the set time is up, it will automatically start and operate in the preset conditions.

(2) Timer OFF

When set to stop in a set time by the remote control, the air conditioner will start in the Timer OFF condition. When the set time is up, the air conditioner will turn off after receiving a signal from the remote controller. If the air conditioner has not received a signal from the remote control when the set time is up, it will turn off automatically.

(3) Neither the turning on nor turning off operation will cancel the timer function.

Unit Function (Cassette and Ducted)

2.4 Sleep

(1) In the heating, cooling or dehumidifying mode, press the "Sleep" button on the remote controller to start or cancel the sleep function in turn, and at the same time the sleep icon on the display screen will be on or off accordingly.

(2) In the heating mode, the set temperature will decrease automatically after the sleep function is started.

(3) In the cooling mode, the set temperature will rise automatically after the sleep function is started.

(4) By default, the setting is to cancel the sleep function. Turning off the unit will also cancel the sleep function.

2.6 Anti-Cold prevention mode

In the heating mode, to prevent the indoor fan from blowing cold air, the indoor fan will stop or run slowly until the coil is warm.

2.7 Residual energy consumption

In the heating mode, when the air conditioner is turned off, the indoor heat exchanger temperature is still higher, so the air conditioner will continue to run and utilize remaining heat

In cooling and dehumidification mode, after the compressor stops, indoor unit fan will continue to run for a period of time to utilize remaining cool.

2.8 Dehumidifying method:

If remote control setting is in dehumidifying mode, indoor unit is forced to run at low speed , and the outdoor unit runs according to the refrigeration mode operation.

2.9 Auto re-start from power break

When the power supply has recovered after a failure, all presets are still effective and the air conditioner can run according to the previous setting.

How to set/cancel:

It can be set /cancelled with the wired remote controller.

For details, see internal control parameter adjustment.

OPERATION

Unit Function (Cassette and Ducted)

2.10 Fault code

The fault code can be shown by LED lamps or will display on the wired controller.

2.11 Filter cleaning

FC will light up when air filter is clogged with dust.

How to set/cancel: It can be set /cancelled with the wired remote controller.

For details, see internal control parameter adjustment.

2.12 Self cleaning

When the indoor and outdoor ambient temperature meets the conditions of 32-95℉, operate the controller to make the machine enter the indoor unit self cleaning mode.

How to set/cancel: It can be set /cancelled with the wire controller or wired remote controller. For details, see internal control parameter adjustment. Self-cleaning effect is related to room humidity。

2.13 46℉(8℃) heating function

In the heating mode, operate the remote controller with 46℉(8℃) heating function to enter the 46℉(8℃) heating function, then the indoor unit temperature is set to 46℉(8℃) and the cold air prevention is cancel.

2.14 How to clear the fault lock after the refrigerant leakage fault occurs. (Cassette and Ducted)

If the wired controller displays fault code 56, this indicates that the unit has detected a refrigerant leak. In this case, inspect and confirm the entire unit for refrigerant leakage points. After completing the inspection and replenishing the refrigerant, power on the unit. Use the remote control to press the Sleep button six consecutive times, or use the wired controller (wall controller) to adjust the values in 17-32 (see Field settings, parameter 2.1.3 Indoor unit parameter revision 2. Changing system parameter) and set the values to 0. Now, the fault code 56 is cleared, and the unit can be run normally.

2.15 How to clear the fault lock after the refrigerant leakage fault occurs. (Wall Mounted)

1. When refrigerant leakage is detected, fault code 56 is displayed actively. The indoor fan is forced to run at the highest speed, and the outdoor unit stops. Other controls do not respond except for the exit the 56 fault operations:–

2. How to exit the fault

After the fault repair is completed, the whole machine will still alarm and prompt, must be through the special operation of the remote controller to clear the fault prompt, the steps are as follows:

Step 1: Press one time mode button, and the buzzer ring 1 sounds;

Step 2: Press three times up and down swing button, and the buzzer ring 3 sounds;;

Step 3: Press one time mode button again, and the buzzer ring 1 sounds;

After the preceding steps, the buzzer rings four times, indicating that the 56 fault is rectified.

If you do not perform the preceding steps,the buzzer does not ring four times, and the 56 fault cannot be cleared, need to repeat steps 1 to 3 above.

After the refrigerant leakage fault is removed, the indoor fan runs at the maximum speed for 5 minutes, and then the machine will runs in the mode currently set.

OPERATION

Unit Function (Outdoor Unit)

1.1 Cooling anti-freeze protection

The indoor coil sensor functions as real time temperature detector of evaporator. It prevents the indoor unit evaporator temperature becoming too low. If the indoor coil temperature is too low, the compressor will automatically start the protection mode.

1.2 Overload protection

To prevent system overload caused by excessive pressure, the unit will implement real-time detection when outdoor coil temperature is too high during cooling mode or indoor coil temperature is too high during heating mode.

1.3 Operation mode

Air conditioning mode is the operation mode set by users through remote controller, four modes are available: cooling, heating, dehumidification, as well as fan mode.

1.4 Start-up protection

To prevent the compressor from restarting frequently when the system pressure has not been completely balanced, and it can't be restarted within 3 minutes.

1.5 Exhaust temperature protection

To prevent deterioration due to high exhaust temperature of compressor, the machine will realize the real-time detection of the exhaust gas temperature. If the temperature is too high, then auto protection will shut down the compressor.

1.6 Oil-return control

When the compressor runs at low frequencies for a long time, the control system will start the oil-return function. The oil in the system returns to the compressor.

1.7 Pressure protection（Some models do not have this feature）

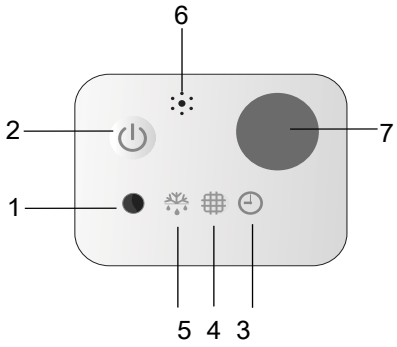
When the pressure increases to a preset value, the pressure switch will automatically protect the unit. The compressor will stop and report the fault code protection.

OPERATION

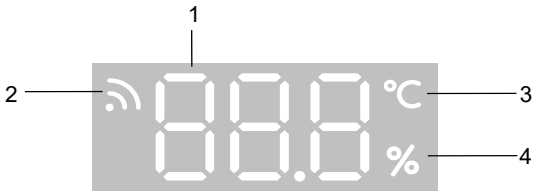
Unit Function

1.2 Indoor Unit Display Panel

Cassette type



9K/12K



18K-36k

Description

9K/12K

1 Run indicator (Red)
It lights on during operation. It lights off during SLEEP mode.
2 Emergency switch
The filter clean indicator is reset when the switch is pressed. The unit will be started or stopped when the switch is pressed. The unit will be operated in forced cooling mode if press the switch continuously for more than 5s when the unit is off.
3 Timer indicator (Green)
It lights on when timer is in use. It lights off when timer completes.
4 Filter clean (Yellow)
It lights on when the filter should be cleaned.
5 Defrost indicator (Green)
It lights on during defrosting and it lights off when defrosting is complete.
6 Buzzer
It rings when the signal from remote controller is received.
7 Infrared receiver
Receives signal from the remote controller.

18K-36k

1 Temperature/humidity indicator
Display indoor set temperature or indoor temperature; Display indoor humidity (models without a humidity sensor display "--").
2 Wi-Fi receiver
It lights up when Wi-Fi is connected. It stops lighting when Wi-Fi is disconnected.
3 Temperature Unit [℉(℃)] indicator
It lights up when the air conditioner displays with Celsius temperature, and stops lighting when it is displays with Fahrenheit temperature.
4 Humidity indicator
It lights up when display humidity.

OPERATION

Unit Function

1.3 Control Logic Description

1.3.1 Sensors in HVAC Systems

(1) Discharge temperature sensor
(2) Outdoor coil temperature sensor
(3) Outdoor ambient temperature sensor
(4) Indoor coil temperature sensor
(5) Indoor ambient temperature sensor

1.3.2 Compressor Frequency Control

(1) Compressor frequency calculation
(2) Compressor frequency range determination
(3) Compressor frequency protection limit
(4) Compressor frequency output

1.3.3 Electronic Expansion Valve Control

(1) Opening control during powering on
(2) Opening control at the start-up phase
(3) Opening control at stable operation phase
(4) Opening control during powering off

1.3.4 Indoor/Outdoor Fan Speed Control

(1) Speed control in cooling mode
(2) Speed control in heating mode

1.3.5 Defrost Control

(1) Defrost entry conditions
(2) Defrost cycle
(3) Defrost exit conditions

1.3.6 System Protection

(1) High temperature protection
(2) Low temperature protection
(3) Cold air prevention in heating

1.3.7 Others

(1) Auto mode
(2) ECO mode
(3) Sleep mode
(4) Indoor self-cleaning mode
(5) 46°F heating mode

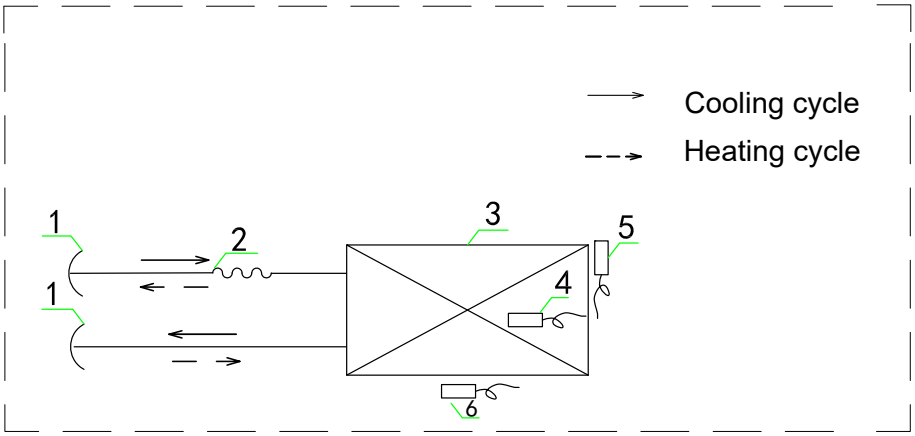
OPERATION

Unit Function

1.3.1 Sensors in HVAC Systems

INDOOR UNIT

Duct / Cassette type



List of component

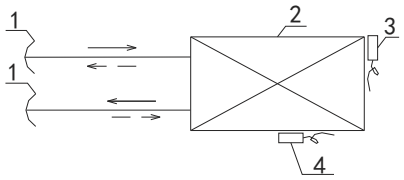
No.	Apellation
1	Hexagon nut
2	Split capillary
3	Indoor heat exchanger
4	Coil temperature sensor
5	Ambient temperature sensor
6	Refrigerant leakage sensor

OPERATION

Unit Function

1.3.1 Sensors in HVAC Systems

Indoor unit

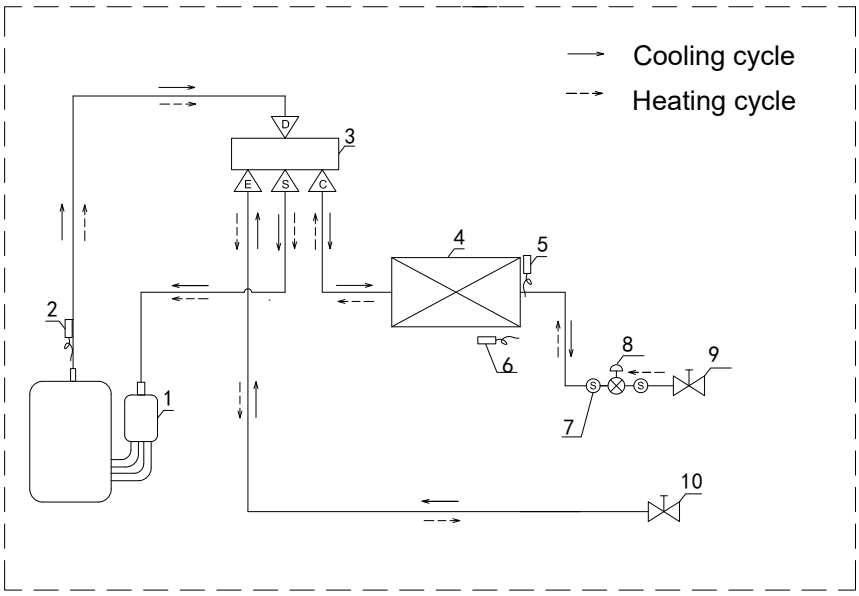


List of component

No.	Apellation
1	Hexagon nut
2	Indoor heat exchanger
3	Ambient temperature sensor
4	Coil temperature sensor

Outdoor unit

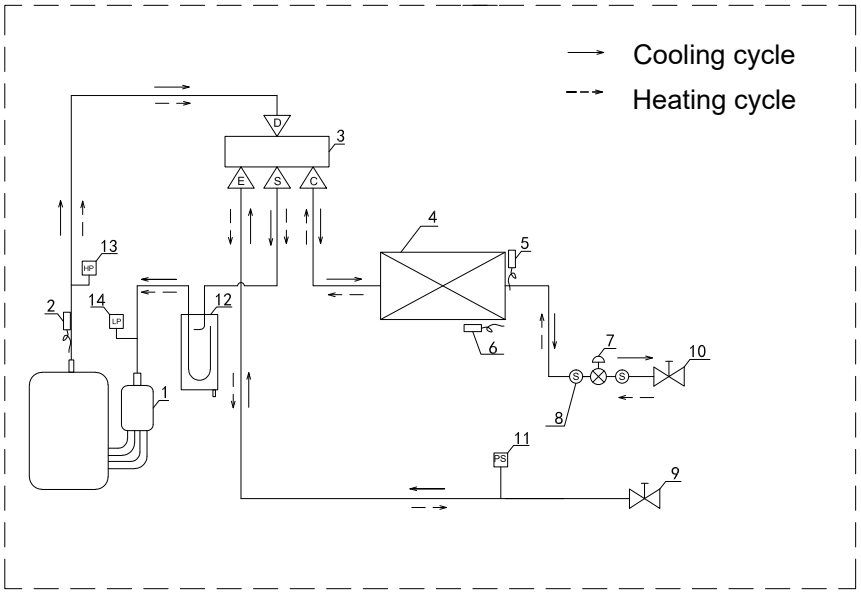
9K/12K/18K/24K



List of component

No.	Apellation
1	Compressor
2	Discharge temperature sensor
3	4-Way valve
4	Outdoor heat exchanger
5	Coil temperature sensor
6	Ambient temperature sensor
7	Strainer
8	Electronic expansion value
9	Stop valve(Liquid)
10	Stop valve(Gas)

36K



List of component

No.	Apellation
1	Compressor
2	Discharge temperature sensor
3	4-Way valve
4	Outdoor heat exchanger
5	Ambient temperature sensor
6	Coil temperature sensor
7	Electronic expansion value
8	Strainer
9	Stop valve(Gas)
10	Stop valve(Liquid)
11	Pressure sensor
12	Gas-Liquid separator
13	High pressure switch
14	Low pressure switch

OPERATION

Unit Function

(1) Discharge temperature sensor

It is designed to detect and control the temperature at the compressor discharge port. When the discharge temperature is too high [>212℉(100°C)], the compressor will run at low frequency or shut down.

(2) Outdoor coil temperature sensor

It is designed to detect the temperature in the middle of the outdoor heat exchanger. In cooling mode. When the temperature is too high [>149℉(65°C)], the compressor will run at low frequency or shut down. Additionally, it is used to:

1) In cooling mode, detect the coil temperature and control the opening of the electronic expansion valve.
2) In cooling mode, execute the system overload control.
3) In heating mode, activate the system defrost control.

(3) Outdoor ambient temperature sensor

It is designed to detect the outdoor ambient temperature for compressor frequency control and outdoor fan speed control.

(4) Indoor coil temperature sensor

It is designed to detect the temperature in the middle of the indoor heat exchanger. In heating mode, When the temperature is too high [>149℉(65°C)], the compressor will run at low frequency or shut down. Additionally, it is used to:

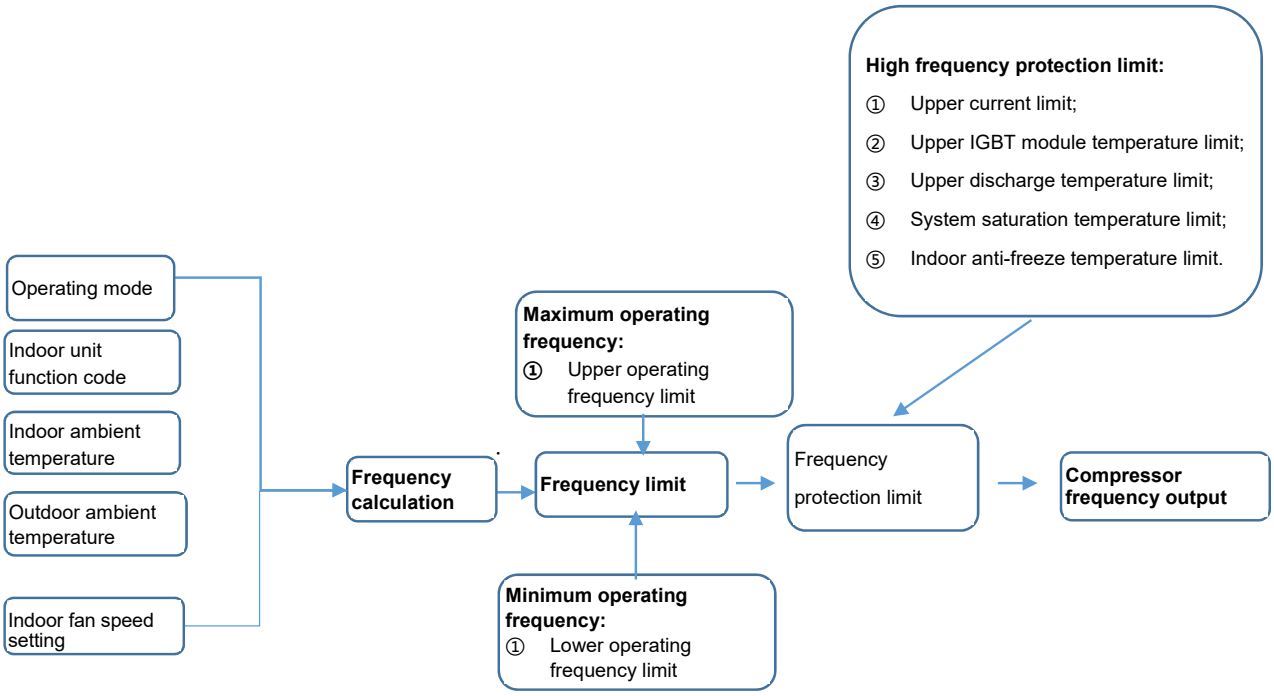
1) In heating mode, detect the coil temperature and control the opening of the electronic expansion valve.
2) In heating mode, execute the system overload control.
3) In heating mode, perform the indoor cold air prevention control.
4) In cooling mode, activate the system low temperature protection.

(5) Indoor ambient temperature sensor

It is designed to detect the indoor ambient temperature for compressor frequency control.

Unit Function

1.3.2 Compressor Frequency Control



The final frequency output of the compressor is calculated as follows.

(1) Compressor frequency calculation

The compressor frequency is calculated based on the following parameters.

1) HVAC operating mode coefficient K1
   Each operating mode such as cooling, heating, dehumidification, Auto, ECO, mute, or sleep has a specific frequency demand coefficient.
2) Indoor unit capacity code K2
   Indoor units with different function codes have different capacity codes, which are generally the same as the nominal cooling capacity/100 on the nameplate.
3) Indoor ambient temperature coefficient K3
   It refers to the temperature detected by the indoor ambient temperature sensor.
4) Outdoor ambient temperature coefficient K4
   It refers to the temperature detected by the outdoor ambient temperature sensor.
5) Indoor setting speed coefficient K5
   Each indoor setting speed has a specific frequency calculation coefficient.

Indoor setting speed	Super	High	Medium	Low	Mute
Compressor frequency control coefficient	1.05	1.0	0.9	0.8	0.6

Compressor frequency = K1×K2×K3×K4×K5

Unit Function

(2) Compressor frequency range determination

1) Maximum operating frequency
   The maximum operating frequency of the compressor is set to protect the reliability of HVACs while providing a strong cooling/heating performance, keeping the operating pressure, temperature, current of electrical devices, and heating of electrical devices within a proper range, and ensuring a longer service life of HVACs.
2) Minimum operating frequency
   The minimum operating frequency of the compressor is set based on the requirements of four-way valve switching, cold air prevention in heating, and anti-freeze in cooling while providing energy-saving performance.

(3) Compressor frequency protection limit

The frequency protection conditions for compressors are mainly limited by the following 5 factors:

1) Upper current limit
   Excessive current will lead to the temperature rise of electrical devices in the outdoor control board and reduce the service life of electrical devices, so it is necessary to set a reasonable current value. When this value is reached, the operating frequency of the compressor will be reduced to protect the HVAC.
2) Upper IGBT module temperature limit
   Excessive temperature of the IGBT module poses a risk of damage to the control board chip, so it is necessary to set a reasonable temperature value. When this value is reached, the operating frequency of the compressor will be reduced to protect the HVAC.
3) Upper discharge temperature limit
   The discharge temperature represents the internal temperature of the compressor, and the excessive temperature[>248℉(120°C)] poses a risk of melting internal insulated components, causing damage to the compressor. Therefore, it is necessary to set a reasonable temperature value [generally 208℉(98°C)]. When the discharge temperature exceeds this value, the operating frequency of the compressor will be reduced.
4) System saturation temperature limit
   The HVAC system has a maximum design pressure, and the saturation temperature at the corresponding pressure is detected for small HVACs, which is generally the temperature of the coil on the condensing side. Generally, the maximum design pressure of the R32 system is 4.3 MPa [saturation temperature is 149℉(65°C)], and the system overpressure limit is set to 3.8 MPa [saturation temperature is 140℉(60°C)]. When this value is reached, the operating frequency of the compressor will be reduced.
5) Indoor anti-freeze temperature limit
   When the indoor coil temperature is lower than 32℉(0°C), the indoor unit heat exchanger has the risk of freezing, resulting in abnormal operation of HVACs, so it is necessary to set a reasonable temperature value. Generally, it is set to 36℉(2°C), and when the indoor coil temperature in cooling mode is lower than this value, the operating frequency of the compressor will be reduced.

(4) Compressor frequency output

After the above correction, the control module outputs a compressor frequency, which is the actual operating frequency of the compressor.

OPERATION

Unit Function

Basepan Heat -

1. The base pan heat tubing element is energized according to the outdoor ambient temperature which is Tout.
The entry and exit temperature conditions are the same for all models.
When Tout is lower than 35.6°F (2°C) , the base pan heat is turned on, and when the Tout is higher than 37.4°F (3°C), the base pan heat is turned off.

Compressor crankcase heaters

2. The compressor crankcase heater is energized according to the outdoor ambient temperature which is Tout.
    2.1 When the compressor is running, the control rules for the compressor electric heating belt are as follows:
        (1) If the Tout ≤ 14°F (-10°C), turn on the compressor crankcase heaters;
        (2) If the Tout >- 41°F (5°C), turn off the compressor crankcase heaters;
        (3) If the 14°F (-10°C) < Tout ≤ 41°F (5°C), keep the previous operating state;
        (4) After each compressor starts to run for 5 minutes, turn off the compressor crankcase heaters.
    2.2 When the compressor is stopped, the control rules for the compressor crankcase heaters are as follows:
        (1) If the Tout≤ 14°F (-10°C), turn on the compressor crankcase heaters;
        (2) If the Tout > 41°F (5°C), turn off the compressor crankcase heaters;
        (3) If the 14°F (-10°C) < Tout ≤- 41°F (5°C), keep the previous operating state.

Unit Function

1.3.3.3 Electronic Expansion Valve Control

(1) Opening control during powering on

When the HVAC is powered on, the electronic expansion valve is at an initial opening, which is usually 200 steps. This opening helps to balance the pressure of the indoor and outdoor units before the HVAC is started.

(2) Opening control at the start-up phase

The first 5 minutes during compressor start-up is generally called the start-up phase, and the opening of the electronic expansion valve in this phase only depends on the compressor frequency. Typical initial openings are as follows:

Compressor frequency (Hz)		20	30	40	50	60	70	80	90
Initial opening (step)	Cooling	112	138	164	190	216	242	268	294
	Heating	84	106	128	150	172	194	216	238

(3) Opening control at stable operation phase

After 5 minutes of the compressor start-up, the HVAC is controlled by the discharge superheat (DSH).
DSH= discharge temperature − condenser coil temperature (20<DSH<50).

Note:
In cooling mode, the condenser coil temperature is the outdoor unit coil temperature.
In heating mode, the condenser coil temperature is the indoor unit coil temperature.

The control module calculates a target DSH according to the compressor frequency and outdoor ambient temperature, detects the actual DSH every 60s, and outputs the opening adjustment command of the electronic expansion valve every 60s according to the setting parameters.

δDSH = target DSH - actual DSH

$\delta DSH_{dv} = DSH_n - DSH_{n-1}$

In which, DSH_n is the DSH value of HVAC systems detected in the current cycle, DSH_{n-1} is the DSH value of HVAC systems detected in the previous cycle, and δDSH_{dv} is the difference between the DSH values of two adjacent cycles, which is available for determining the change trend of the DSH value.

1) When the target DSH is <actual DSH, the electronic expansion valve is opened.
2) When the target DSH is ≥actual DSH, the electronic expansion valve is closed.

Please refer to the following table for specific adjustments.

δDSH \ δDSH_{dv}	-5	-3	-1	0	1	3	5
10	-20	-15	-10	-7	-5	-3	0
7	-15	-10	-7	-5	-3	0	3
4	-10	-7	-5	-3	0	3	5
1	3	-1	0	0	0	1	3
0	-3	-1	0	0	0	1	3
-1	-3	-1	0	0	0	1	3
-4	5	-3	0	3	5	7	10
-7	-3	0	3	5	7	10	15
-10	0	3	5	7	10	15	20

(4) Opening control during powering off

After the HVAC receives the power-off command, the electronic expansion valve opening is maintained at 200 steps after the compressor shuts down. This opening helps to balance the pressure of the indoor and outdoor units before the HVAC is started.

1.3.3.4 Indoor/Outdoor Fan Speed Control

(1) Speed control in cooling mode

Indoor fan running rules:

In cooling mode, indoor fan runs all the time and the speed can be selected as high,(medium), low and auto.

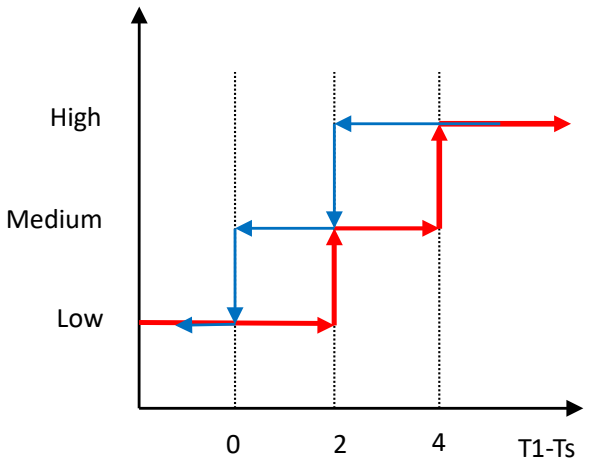
The auto fan:

T1 is indoor room temperature. Ts is setting temperature。

When the indoor ambient temperature minus the setting temperature is <36℉(2°C), the cooling mode runs at low speed.

With the setting temperature unchanged, when the indoor ambient temperature minus the setting temperature is ≥36℉(2°C) and <39℉(4°C), the cooling mode runs at medium speed.

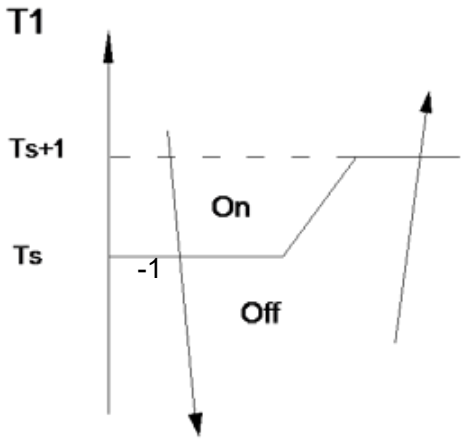
With the setting temperature unchanged, when the indoor ambient temperature minus the setting temperature is ≥39℉(4°C), the cooling mode runs at high speed.



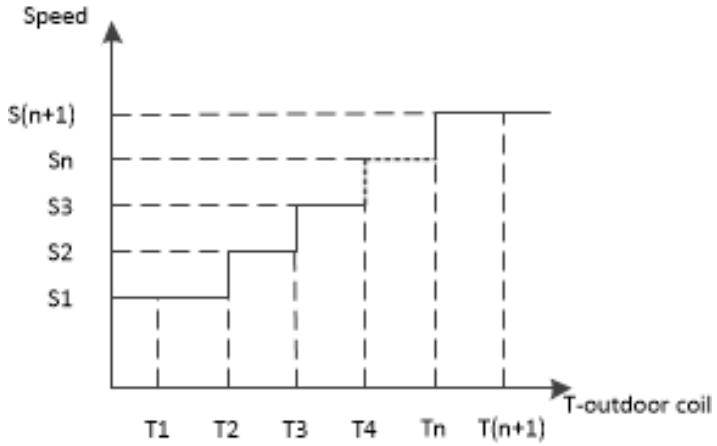
OPERATION

Unit Function

outdoor fan running rules:
Once the compressor starts up, it will follow the below rules: When indoor room temp.T1 is lower than Ts, the compressor and outdoor fan will shut off. When T1 is higher than Ts+1, the compressor and outdoor fan will start up.



Outdoor fan running rules:
Once the outdoor fan start up, it will follow the below rules:
Single outdoor fan: First, it will run in an invariable speed for a short time; Then it will regulate the speed by the outdoor-coil temperature.
Double outdoor fan: If it has two outdoor fans, the upper fan regulates the speed by the rules, and the downer fan speed lower than the upper fan speed for 30rpm~60rpm.

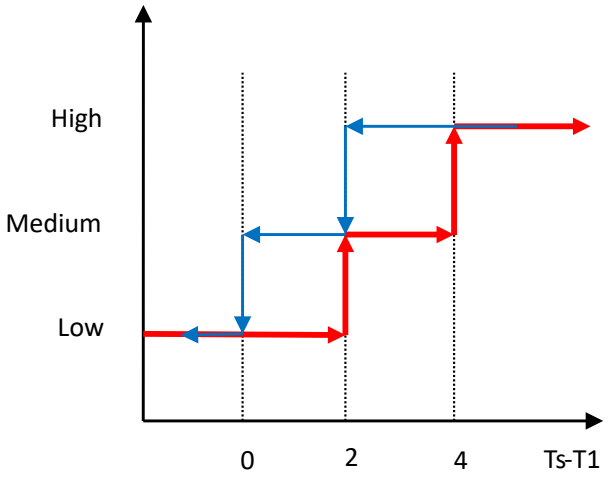


Unit Function

(2) Speed control in heating mode

After several minutes, the speed will change to high, (medium), low and auto which we selected.

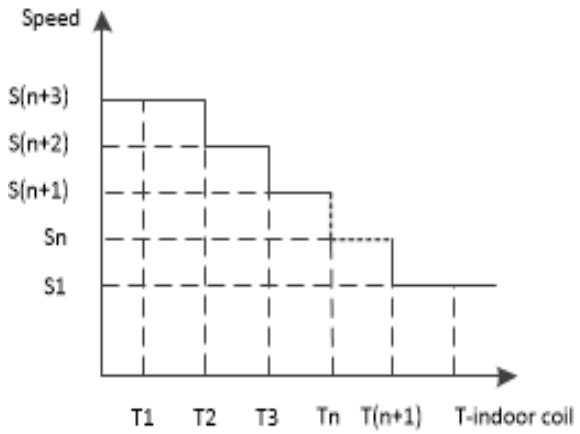
The auto fan: T1 is indoor room temperature. Ts is setting temperature.



Speed control in heating mode for Air Handler unit

In heating mode, indoor fan runs all the time and the speed can be selected as high and medium.

DC-Inverter outdoor unit:
Outdoor fan running rules:
Once the outdoor fan start up, it will follow the below rules:
Single outdoor fan: First, it will run in an invariable speed for a short time; Then it will regulate the speed by the indoor-coil temperature.
Double outdoor fan: If it has two outdoor fans, the upper fan regulates the speed by the rules, and the downer fan speed lower than the upper fan speed for 30rpm~60rpm.



OPERATION

Unit Function

1.3.3.5 Defrost Control

(1) Defrost entry conditions

1) After the compressor runs for about 40 min, the outdoor ambient temperature and the outdoor coil temperature are detected.
2) The target defrost temperature is the outdoor ambient temperature × 0.8 - 43℉(6°C), IF the outdoor coil temperature arrived at the target defrosting temperature,which is kept for 2 min, and then defrosting is enabled.

Target defrost temperature [℉ (°C)]				
Outdoor ambient temperature	41(5)	32(0)	23(-5)	14(-10)
Target defrost temperature	28(-2)	21(-6)	14(-10)	7(-14)

(2) Defrost cycle

1) No -stop defrost for 9K/12K: The compressor is reduced to 40 Hz, the internal slider of the four-way valve is changed from the heating position to the cooling position, and then the compressor rises to the defrost frequency and starts defrosting. For above 36K, the compressor stops for 1 min and then starts, rises to the defrost frequency, and starts defrosting.
2) The defrost cycle ranges from 3 min (minimum) to 10 min (maximum). Additionally, the indoor fan/outdoor fan stops during defrosting.

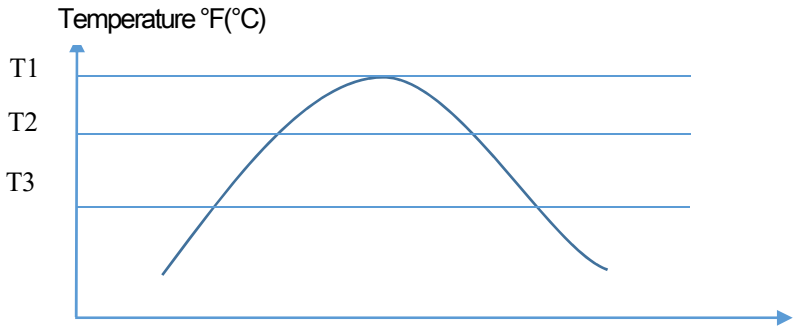
(3) Defrost exit conditions

1) When the defrost time reaches the maximum, the defrost mode automatically exits.
2) When the outdoor coil temperature reaches the defrost exit temperature [50℉(10°C)], the defrost mode keeps for 8s and then exits.

1.3.3.6 System Protection

(1) High temperature protection

There are three types of high temperature protection, namely high discharge temperature protection,cooling overload protection, and heating overload protection, and the control logic of the three is the same, as shown in the following diagram.



T1: Temperature for compressor shutdown
T2: Temperature for compressor frequency reduction
T3: Temperature for preventing the compressor from frequency increase When the temperature is too high, the control module outputs a signal as below:

OPERATION

Unit Function

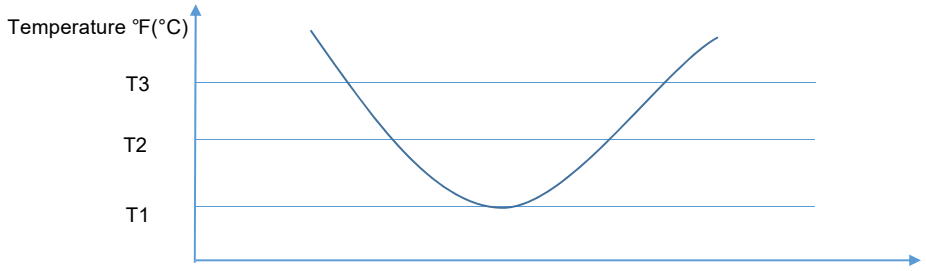
1) **When T≥T1, the compressor shuts down, and the HVAC stops.**
2) **When T1>T≥T2, the compressor frequency is reduced.**
3) **When T2>T≥T3, the compressor is prohibited from increasing the frequency.**
4) **When T<T3, the HVAC operates properly.**

Please refer to the following table for the three types of high temperature protection.

High temperature protection [℉ (℃)]			
Name	Shutdown	Frequency reduction	Frequency increase prohibited
High discharge temperature protection (discharge temperature sensor)	221(105)	208(98)	201(94)
Cooling overload protection (outdoor coil temperature sensor)	149(65)	144(62)	138(59)
Heating overload protection (indoor coil temperature sensor)	149(65)	144(62)	138(59)

(2) Low temperature protection

1) **The low temperature protection mainly refers to the anti-freeze protection of the indoor unit for correcting the operating frequency of the compressor as follows:**



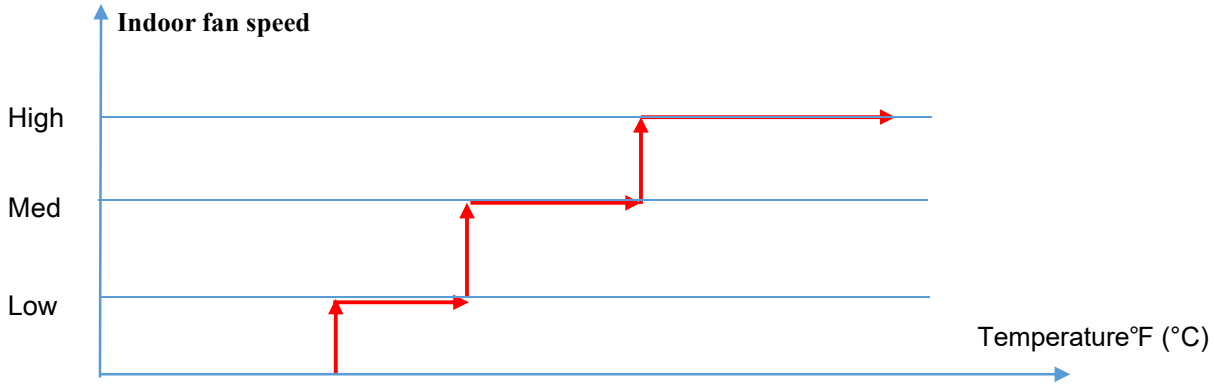
When the indoor coil temperature is too low, the control module outputs a signal as below:

1) **When T≥T3, the HVAC operates properly.**
2) **When T3>T≥T2, the compressor frequency is reduced.**
3) **When T2>T≥T1, the compressor is prohibited from increasing the frequency.**
4) **When T<T1, the compressor shuts down, and the HVAC stops.**
   Please refer to the following table for low temperature protection.

Low temperature protection [℉ (℃)]			
Name	Shutdown	Frequency reduction	Frequency increase prohibited
Anti-freeze in cooling (discharge temperature sensor)	28(-2)	36(2)	39(4)

Unit Function

(3) Cold air prevention in heating



When the indoor coil temperature is too low in heating mode, the control module outputs a signal as below:

When T<T1, the indoor fan does not start.

2) When T2>T≥T1, the indoor fan runs at low speed.
3) When T3>T≥T2, the indoor fan runs at medium speed.
4) When T≥T3, the indoor fan runs at setting speed.

Please refer to the following table for the temperature for cold air prevention in heating.

Temperature for cold air prevention in heating [℉ (°C)]			
Name	T1	T2	T3
Cold air prevention in heating (indoor coil temperature sensor)	68(20)	90(32)	100(38)

Unit Function

1.3.3.7 Others

(1) Auto Mode

This mode can be chosen with remote control and the set temperature can be changed between 61~86℉(16~30℃).
In auto mode, the unit will choose cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

ΔT=T1-Ts	Running mode
ΔT > 37℉(3℃)	Cooling
26℉(-3℃)≤ ΔT ≤37 ℉(3℃)	Fan-only
ΔT ＜26℉(-3℃)	Heating

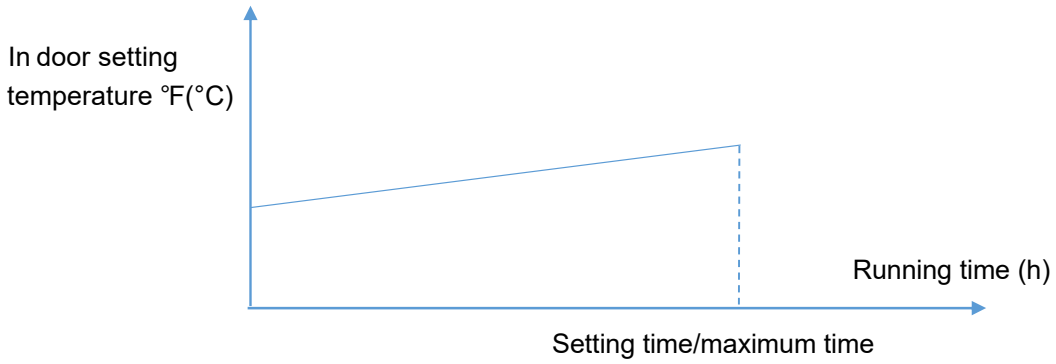
Indoor fan will run at auto fan of the relevant mode. The louver operates the same as in relevant mode. If the compressor keeps stopping for 10 minutes or the set temperature is modified, the machine will choose mode according to ΔT again.

(2) ECO mode

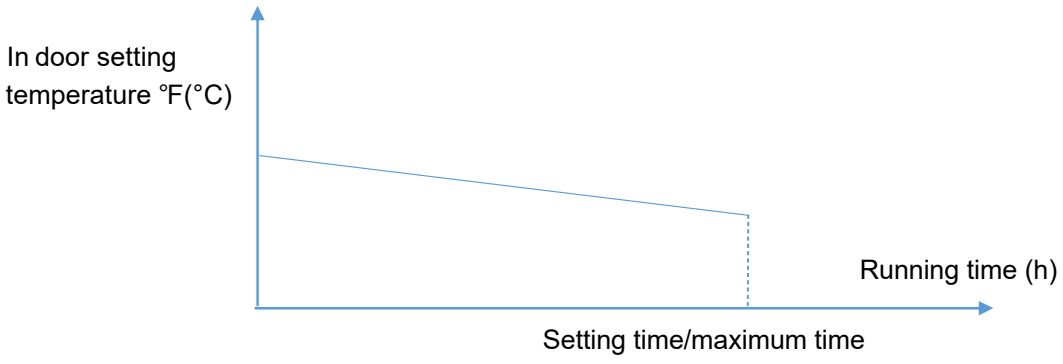
ECO mode coefficient K6
The indoor ambient temperature, outdoor ambient temperature, and indoor setting temperature are detected for recalculating the compressor frequency and improving the energy efficiency of the HVAC. Compressor frequency = K1×K2×K3×K4×K5×K6

(3) Sleep mode

After receiving the sleep command in cooling mode, the indoor unit automatically adjusts the indoor setting temperature and exits the cooling mode after the setting time is reached (forced exit after 8h).



After receiving the sleep command in heating mode, the indoor unit automatically adjusts the indoor setting temperature and exits the heating mode after the setting time is reached (forced exit after 8h).

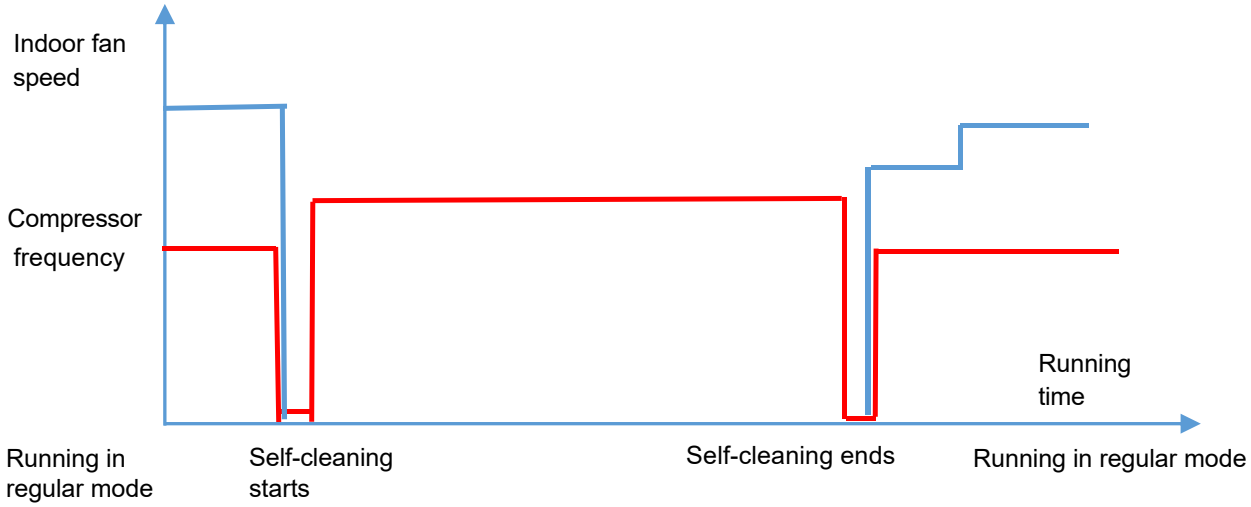


Unit Function

(4) Indoor self-cleaning mode

After receiving the self-cleaning signal, the indoor unit enters the self-cleaning mode.
The indoor fan and compressor shut down first.
After 1 min, the compressor starts and runs with the cooling mode, but the indoor fan does not run.
After the self-cleaning mode is over, the compressor shuts down, and then after 1 min, the HVAC returns to the mode before the self-cleaning starts.

After the new mode is activated, the indoor fan runs at low speed first (to prevent the water from being blown out of the evaporator) and then the setting speed.



Note:
The self-cleaning mode is available only when both the indoor and outdoor ambient temperatures are 0 to 35°C. The self-cleaning mode runs with an interval of about 1h, so the repeat running is avoided.

(5) 46°F(8°C) heating mode

According to the remote control setting, the 46°F(8°C)heating mode is turned on, and the HVAC system responds as follows:
The indoor unit is automatically set to heating mode with an indoor setting temperature of 46°F(8°C).
The indoor unit cancels the cold air prevention.
The compressor frequency is multiplied by the 46°F(8°C) heating mode coefficient K7 as follows:
Compressor frequency = K1×K2×K3×K4×K5×K7

Note:
The parameters of the control logic part are not necessarily real data, for reference only.

Field Settings

2.1 Field setting

2.1.1 Outdoor unit DIP switch

DIP Switch Setting of Outdoor Unit (Optional setting)

1. Turn on all power sources before setting. Without turning on, the switches settings are not refreshed and might be invalid.
2. Mark of "■" indicates the position of DIP switches.

S5 DIP switch setting		S4 DIP switch setting	
Factory Setting		Factory Setting	
Energy management		Pump Down Switch	
Cooling Only		Forced Defrost	

Forced defrost mode

Operation:

Dial the switch from OFF to ON before turning on the appliance, and set it in heating mode, then it will run with manual defrosting mode at once.

Cooling only set

Operation:

Heating mode will be invalid after the DIP has been dialed.

Energy management

Actions:

The air conditioner will run more energy-saving and reduce the noise outdoor unit .

Pump down mode

Actions:

The compressor runs with the target frequency, and without any protection when frequency rises; The EEV runs with setting opening; Outdoor unit fan will run with the set fan speed.

Operation procedures:

The thermostat is turned off during the whole process.

Please power off before operation.

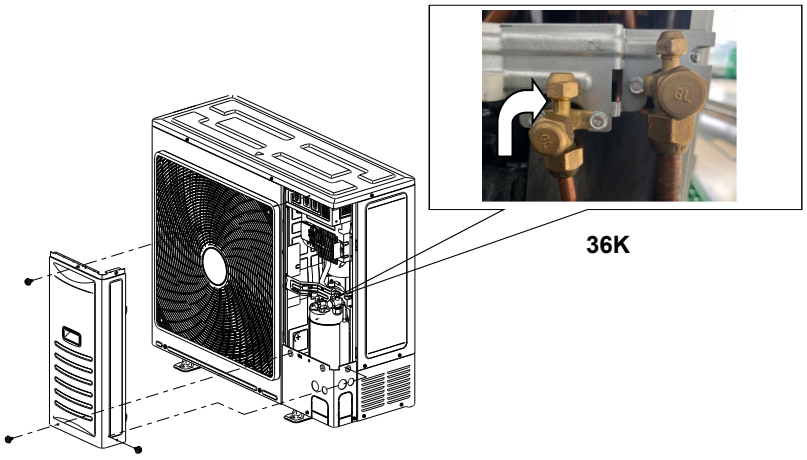
Step 1:

Open the wiring cover on the right side of the machine.

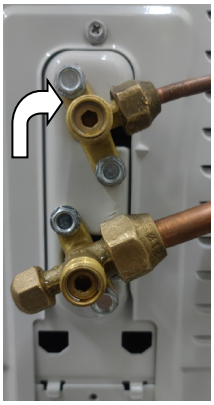
Step 2:

Close the stop valve of the liquid piping with an Allen wrench in a clockwise direction.

(Liquid stop valve spool type: 9K~36K: S4)



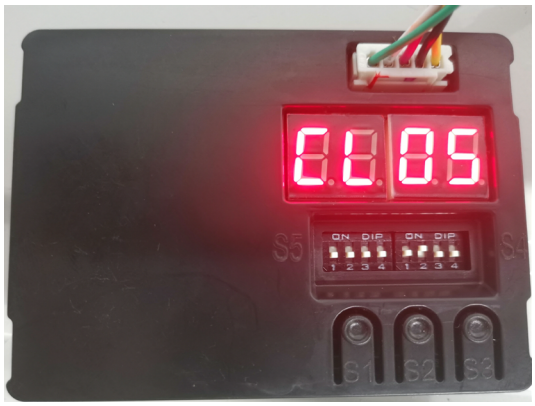
36K



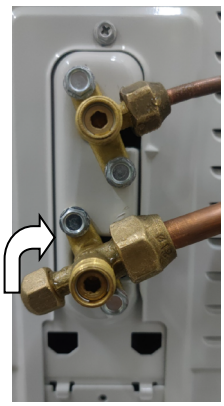
9K~24K

Field Settings

Step 3:
Switch on the machine power.
Step 4:
Switch S4-2 to ON position on the checker board, the outdoor unit starts, and the current frequency value is displayed on the LED digital tube of the checker board.
Step 5:
The frequency value will keep changing until "CLOS" is displayed on the LED digital tube of the checker board, then please check whether the liquid stop valve is closed.



Step 6:
When "GOOD" is displayed on the LED digital tube of the checker board, please close the stop valve of the gas piping with an Allen wrench in a clockwise direction within 10s.
(Gas stop valve spool type: 9K/12K: S4; 18K~36K: S5)



9K~24K

36K

Step 7:
Cut off machine power and the procedure for recovering refrigerant is finished.

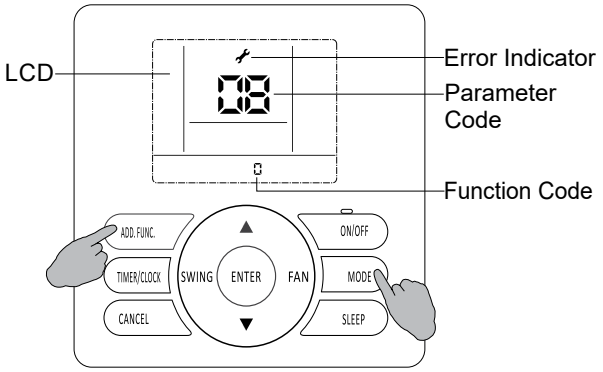
Field Settings

2.1.2 ESP setting (Ducted type)

During the installation, choose proper static pressure according to the actual conditions within the range below to meet the user's requirements.
The static pressure can be freely adjusted by using specific wired remote controller.

Capacity (Btu/h)	The Range of Static Pressure	Function Code Set
9K/12K	0-0.20 in. H_2O (0-50Pa)	0-50 function code value equals static pressure value, more than 45 is 0.18 in. H_2O (45Pa). [default: 0.18 in. H_2O (45Pa)]
18K	0-0.56 in. H_2O (0-140Pa)	0-140 function code value equals static pressure value, more than 45 is 0.18 in. H_2O (45Pa). [default: 0.18 in. H_2O (45Pa)]
24K	0-0.66 in. H_2O (0-165Pa)	0-165 function code value equals static pressure value, more than 145 is 0.58 in. H_2O (145Pa). [default: 0.58 in. H_2O (145Pa)]
36K (Duct)	0-0.80 in. H_2O (0-200Pa)	0-200 function code value equals static pressure value, more than 145 is 0.58 in. H_2O (145Pa). [default: 0.58 in. H_2O (145Pa)]

Note: The pressure loss of filter is included in the data above.



wired controller

ESP setting (wired controller):

1. Press and hold “MODE” button and “ADD.FUNC.” button for 3 seconds, symbol and parameter code starts blinking at the same time.
2. Press“▲/▼”button to adjust parameter number until “17” is displayed, and press “ENTER” button to enter system parameter adaption state, symbol stops blinking.
3. Select desired parameter code 10 by pressing “▲/▼” button, and press "ENTER" button to confirm.
4. Select desired function code to rewrite the parameter values by pressing “▲/▼ ”button, and press "ENTER" button to confirm.
5. Press “ON/OFF” button or “CANCEL”button to quit.

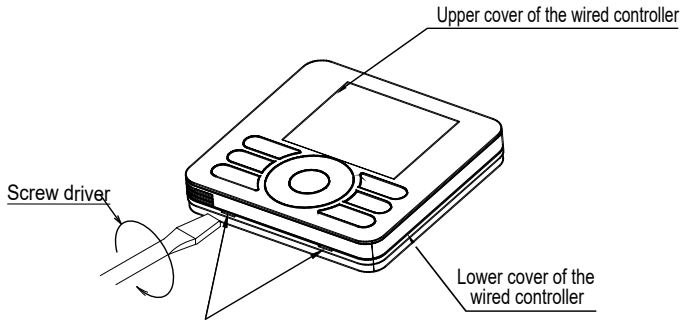
OPERATION

Field Settings

2.1.3 Indoor unit parameter revision

1) Connecting wired controller with the indoor unit

Step 1: Remove the upper cover of the wired controller

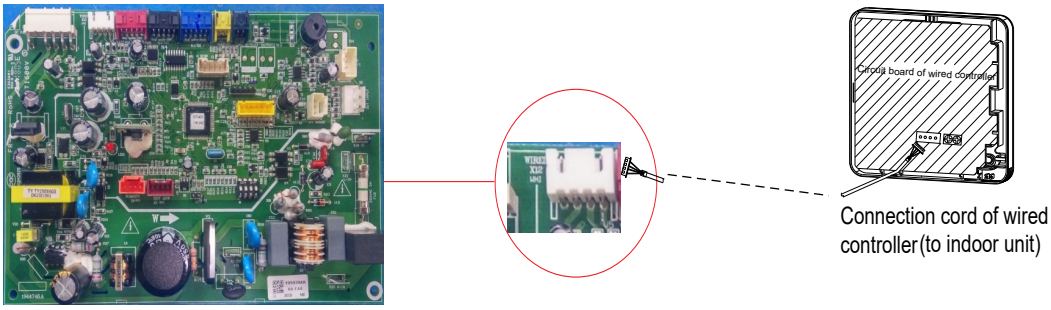


Insert a normal screw driver into the position, and gently rotate it. In this way, the upper cover can be easily removed.

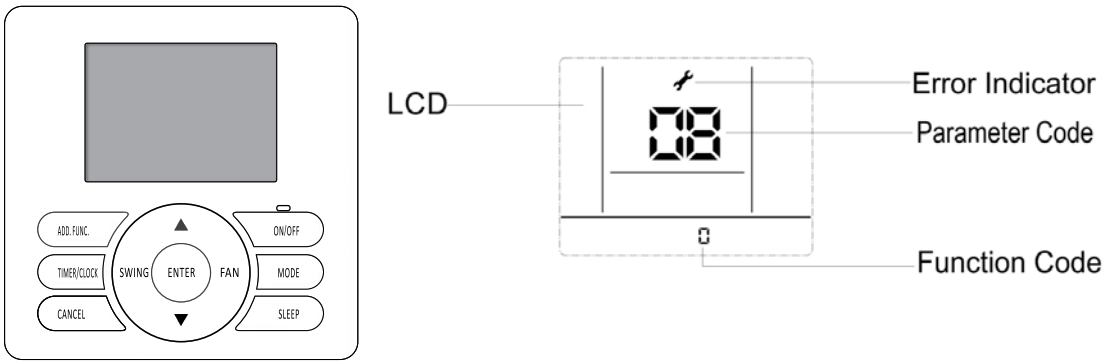
NOTE:

Control board of the remote controller is placed on upper cover. Please protect it from being scratched during removal and installation!

Step 2: Connect the wired controller with the indoor unit



2) Changing system parameter



OPERATION:

① Hold down both "MODE" button and "ADD.FUNC." button for 3 seconds, symbol and parameter number blink at the same time.

② Press "▲" "▼ "button to adjust parameter number until "17" is displayed. And press "ENTER" button to enter system parameter adaption state, and symbol stops blinking, parameter number blinks.

③ Select desired parameter code by pressing "▲" / "▼"button following the table below, and press "ENTER" button to confirm.

④ Select desired function code by pressing "▲"/ "▼" button, and press "ENTER" button to confirm.

OPERATION

Field Settings

PARAMETER CODE	PARAMETER DESCRIPTION	PARAMETER VALUE&REPRESENTATION		NOTE
		DATA TYPE	REPRESENTATION (FUNCTION CODE)	
1	Self Recovery of Power Break	Integer	0：Cancel Self Recovery of Power Break function； 1：Self Recovery of Power Break； others：invalid	
2	Temperature Type	Integer	0：Centigrade Temperature； 1：Fahrenheit Temperature； others：invalid	
4	Ratio of ambient temperature sensed by indoor temperature sensor(cooling mode)	Integer	0~10valid，more than 10 default is10 0：0%；1：10%；…；10：100%	0-entirely use temperature sensed by wired remote controller; 10-entirely use temperature sensed by indoor unit
5	Filter Clean Indication	Integer	0：Cancel Filter Clean prompt function； 1：Set Filter Clean prompt function； others：invalid	
6	Filter Clean Time Set	Integer	0~32，more than 32 default is 32*1000h	
7	Installation Height Compensation	Integer	0~10m，more than 10m default is 10. =0,1,2 : no fan speed compensation; =3: increase fan speed; =4~10: increase more fan speed.	
8	Cooling Temperature Compensation （indoor unit temperature sensor）	Integer	0 : 0℃ ; 1 : -0.5℃ ; 2 : -1℃ ; 3 : -1.5℃ ; 4 : -2℃ ; 5 : -2.5℃ ; 6 : -3℃ ; 7 : -3.5℃ ; 8 : -4℃ ; 9 : -4.5℃ ; 10 : -5℃.(the wired controller displays integer with the symbol)	
9	Heating Temperature Compensation （indoor unit temperature sensor）	Integer	0 : 0℃ ; 1 : -0.5℃ ; 2 : -1℃ ; 3 : -1.5℃ ; 4 : -2℃ ; 5 : -2.5℃ ; 6 : -3℃ ; 7 : -3.5℃ ; 8 : -4℃ ; 9 : -4.5℃ ; 10 : -5℃. (the wired controller displays integer with the symbol)	
10	Static Pressure Set	Integer	1~240，function code=static pressure more than the limit static pressure default the limit static pressure，Default is 0 (default static pressure, related to models)	Duct type (DC motor)
12	Ratio of temperature sensed by indoor temperature sensor((Heating mode)	Integer	0~10valid，more than 10 default is10 0：0%；1：10%；…；10：100%	0-entirely use temperature sensed by wired remote controller; 10-entirely use temperature sensed by indoor unit
13	Temperature Adjustment-Cooling	Character	-10~10℃（Single Character with symbol）	Temperature displayed on wired controller
14	Temperature Adjustment-Heating	Character	-10~10℃（Single Character with symbol）	Temperature displayed on wired controller
25	Access control, fire protection, ON/OFF function set	Integer	=0，Access control, fire protection functions are all invalid； =1，Access control function is valid； =2，fire protection function is valid； =3，Access control, fire protection are all valid； =4，ON/OFF function is valid.	
32	Refrigerant leakage fault	Integer	0:No refrigerant leakage fault 1:The unit has a refrigerant leak fault and is locked.	

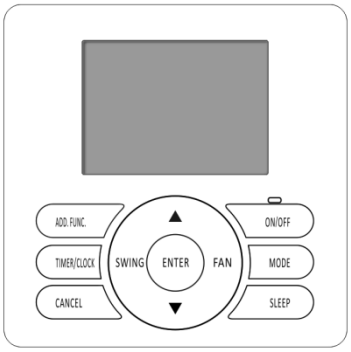
Field Settings

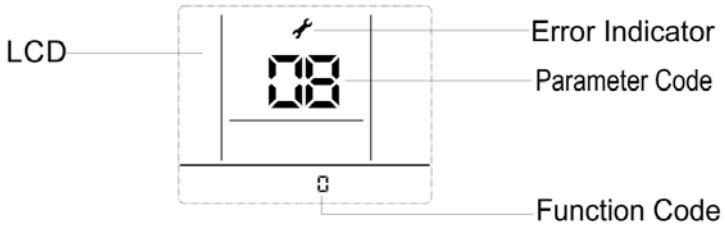
2.1.4 Running Parameter Query

Running parameter can be referred to by 7 segment display or specified wired remote controller.

Query by wired remote controller

Operation:





OPERATION:

(1) Hold down both "MODE" button and "ADD.FUNC." button for 3 seconds, symbol and parameter number blinks at the same time.

(2) Press "▲" "▼" button to select parameter number as you need, parameter value will be displayed on the LCD.

Parameter Code	Parameter Description
06	Indoor unit air inlet temperature
07	Indoor unit coil sensor temperature
08	Outdoor unit ambient sensor temperature
09	Discharge temperature
10	Suction temperature
11	Outdoor coil temperature
12	Discharge pressure
13	Suction pressure
14	Outdoor EEV opening
15	AC current input
16	AC voltage
24	Error code
25	Drive error code
26	Indoor unit air outlet temperature
28	Compressor current
29	Indoor unit room temperature
30	Indoor unit coil inlet temperature
31	Indoor unit coil outlet temperature
32	Outdoor unit condenser inlet temperature
33	Outdoor unit condenser outlet temperature
43	Outdoor unit defrost temperature
57	Outdoor fan 1 speed
58	Outdoor fan 2 speed
60	Indoor fan speed

Field Settings

2.1.5 Instructions for ON/OFF Input Control and Output Control Functions and Settings

(1) Function Introduction

● **ON/OFF Input Control**

ON/OFF-1 Input Control (**Saving Access Control Mode.**)

It is a kind of control mode to control the machine startup & shutdown based on the on & off input signal. It is an Access Control usually for Room Card control or Window control.

ON/OFF-2 Input Control (**Common Access Control Mode, or Dry Contact Mode**)

It is a kind of control mode to control the machine startup & shutdown based on the on & off input signal. It is an Access Control usually for Room Card control or Window control.

ON/OFF-3 Input Control (**Comfort Access Control Mode**)

It is a kind of control mode to control the machine startup & shutdown based on the on & off input signal. It is an Access Control usually for Room Card control or Window control.

ON/OFF-4 Input Control (**Fire Protection Mode**)

It is a kind of control mode to control the machine startup & shutdown based on the on & off input signal. It is an special control usually for fire protection.

ON/OFF-5 Input Control (**ALL On/All Off Mode A for strict local control**)

It is a kind of control mode to control the machine startup & shutdown based on the on & off input signal. It is a strict local control for all on/all off control.

ON/OFF-6 Input Control (**ALL On/All Off Mode B for flexible local control**)

It is a kind of control mode to control the machine startup & shutdown based on the on & off input signal. It is a flexible local control for all on/all off control.

● **Output Control**

There is 12V DC signal output when AC Error occurs.

From the 12V DC output, the error can be identified by alarm lights, alarm bells, etc.in the distance.

(2) Function Setting

In case of using or cancelling ON/OFF Input Control functions, use the wired controller to modify the parameters of indoor unit.

The Output Control function is ready for the indoor unit. The installer do not need to modify the parameters of indoor unit with the wired controller. Just connect the output adapter in Fig 1 to output 12V DC signal.

Pins of the OUT INPUT shown in the electrical wiring diagram in Fig.2 are in short circuit state before shipment (an external short circuit adapter of ON/OFF input is shown as Fig.3).

Fig.1 12V DC output adapter

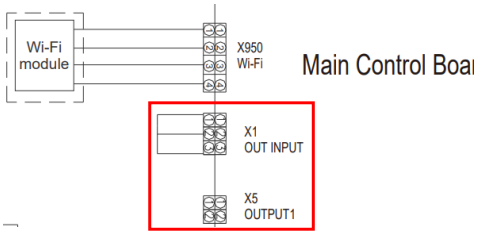


Fig.2 Example of wiring diagram

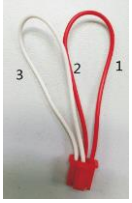


Fig.3 ON/OFF input adapter

Field Settings

Table 1 Field setting of indoor unit by the wired controller

Field setting	ON/OFF Input Control						Output Control
	Red Line			White Line			12V DC Output
Wired Controller	ON OFF-1	ON OFF-2	ON OFF-3	ON OFF-4	ON OFF-5	ON OFF-6	
0							YES
1	YES						YES
2				YES			YES
3	YES			YES			YES
4					YES		YES
5						YES	YES
6		YES		YES			YES
7			YES	YES			YES

Installer need to do the field setting of indoor unit by the wired controller according to the table1.

(3) Detailed Description

ON/OFF-1, ON/OFF-2, ON/OFF-3 Input Control is very similar. And they are usually used for the same kind of demand (for example room card) for different detailed requirement.

Tabel 2 Control logic of Input Control Modes

ON/OFF	ON Input			OFF Input		
	AC	Wired Controller	Controller control	AC	Wired Controller	Controller control
ON OFF-1	Standby	Standby	YES	Standby after 30s	Standby	NO
ON OFF-2	back to last setting	back to last setting	YES	Standby after 30s	Standby	NO
ON OFF-3	back to last setting	back to last setting	YES	Low Energy Saving	ON	Yes（Temperature and Fan Speed blocked）
ON OFF-4	Standby	Standby	YES	Standby after 3s	Standby	NO
ON OFF-5	ON（OFF blocked ）	ON（OFF blocked ）	YES（OFF blocked ）	Standby after 0s	Standby	NO（ON blocked ）
ON OFF-6	ON	ON	YES	Standby after 0s	Standby	YES

OPERATION

Field Settings

- Some project requirement of ON/OFF modes

(1) Project requirement for ON/OFF-1

For some hotel projects, the air conditioner will turn off when people pull out the room card, then check out and leave the hotel. And the air conditioner will not turn on automatically when another people come in and inset the room card in the hourly room situation because the end user is always changing and the usage habit is different. Installer should choose ON/OFF-1 for this kind of projects.

(2) Project requirement for ON/OFF-2

For some hotel projects and apartment and house projects, the air conditioner will turn off when people pull out the room card and leave the hotel. And the air conditioner will turn on automatically when people come back and inset the room card. The end user is the same one and it is good to remember the user's usage habit.

Installer should choose ON/OFF-2 for this kind of projects.

And for some window contact requirement, installer can connect the window contact sensor to the input control port and choose ON/OFF 2.

(3) Project requirement for ON/OFF-3

In some hot area and countries, when people come back to hotel and inset the room card, the air conditioner will turn on. But people have to wait for 5~10 minutes until the room is cooled down. So people do not want the air conditioner off when the room card is pulled out and they want the air conditioner still on but in low energy consumption modes. Installer should choose ON/OFF-3 for this kind of projects.

For Smart Grid of air conditioner for BAFA in 2023, installer can choose ON/OFF-3.

(4) Project requirement for ON/OFF-4

In some special projects, the tender documents require that the air conditioner should be linked to the fire signal and stops when there is a fire.

Installer should choose ON/OFF-4 for this kind of projects.

(5) Project requirement for ON/OFF-5

In some close control system, we need the backup function. Usually there is two air conditioners and if one breaks down, another one will turn on automatically.

Installer should choose ON/OFF-5 for this kind of projects. Installer needs to connect a 12V DC Relay to Output Control port of Air Conditioner A and Input Control port of Air Conditioner B. And if the air conditioner A error happens, 12V DC signal will control the relay to be ON, then the ON Input signal will control air conditioner B ON automatically.

(6) Project requirement for ON/OFF-6

The front desk staff presses a switch and all the air conditioners in the building can be turn on by the users when people comes into office. And when people leave the office, the front desk staff will press the switch to be off and all the air conditioners in the buildings will be off. If some people need to work overtime in the office, they can turn on the air conditioner locally by the remote controller or wired controller.

Installer should choose ON/OFF-6 for this kind of projects.

It is not friendly to choose ON/OFF-5 for this kind of projects because the people working overtime in the office can not turn on the air conditioner locally after the front desk switch is off.

2.2 Test Run

2.2.1 Preparation before test run and precautions

Please turn off all power supplies and confirm with a testing instrument whether all power supplies have been turned off.

Before running, please proceed the following steps to inspect the installation status:

(1) Structural damage inspect

Confirm that there is no damage on the surface and interior of the equipment.

(2) Outdoor fan inspection

Confirm whether the impeller of the fan is located in the middle of the air outlet. Do not touch the air outlet.

(3) Fastening screw inspection

Check whether the screws have become loose due to vibration during transportation. In addition, confirm whether the screws are tightened during installation.

Especially, be sure to inspect the screws of electrical wiring more carefully.

(4) Refrigerant leakage inspect

Vibration during transportation may cause loosening of the fastening (flaring part) position of the pipe. Check for refrigerant leakage.

Be sure to carry out this inspection carefully.

(5) Insulation resistance inspect

Measure whether the resistance between the electrical component terminals and the ground reaches 2 MΩ or above with a 500 V megameter. When the resistance is below 2 MΩ, it indicates poor insulation at the electrical connection position, and the equipment cannot be operated at this time.

In addition, do not apply power to the communication line terminal block (otherwise it will cause damage to the printed circuit board).

(6) Full opening of stop valve

Before conducting a test run, please check whether the stop valve of the outdoor unit is fully open.

(7) Power supply phase inspect

Do not operate when the phase sequence is incorrect or missing.

(8) Power-on of crankcase heating belt

After completing the inspection of items (1) to (8), connect the outdoor unit power supply. After powering on the crankcase heating belt, the compressor can be preheated. If the compressor is not preheated and started directly, the compressor will fail. The unit can only be started after 6 hours of power-on.

(9) Confirmation of indoor and outdoor ambient temperature

The indoor ambient temperature during refrigeration operation shall not be lower than 81℉(27°C), and the outdoor ambient temperature during heating operation shall not exceed 66℉(19°C).

Field Settings

⚠ WARNING

The machine can be started only after all checkpoints are checked without problems.

(a) Check to ensure that the ground resistance of the wiring terminals exceeds 2 MΩ. Otherwise, find out and replace the leaking part before starting the system.
(b) Check and ensure that all stop valves of the outdoor unit are turned on before starting the system.
(c) It is recommended to power on for at least 6 hours to ensure sufficient lubrication of the compressor and extend service life.

7.2 Identification of test run functions

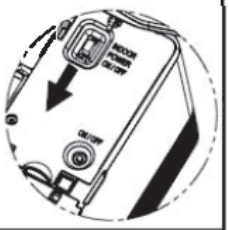
Turn on the remote control and perform a test run.
Test whether the function and display of the air conditioning unit are normal and whether the temperature control is in good state during the test run.
When the system is operating, the following conditions shall be noticed.

(a) Do not touch any parts at the exhaust end to avoid scald. This is because the temperature of the compressor and pipes at the exhaust end is heated to above 194℉(90°C).
(b) Do not press the AC contactor button, otherwise a serious accident may occur.
After the test run is completed, turn off the power. Do not touch any electrical components within 10 min after switching off the main power supply.
After completing the above operations, the installation of the equipment is usually completed. If you still have any questions, please contact our local technical service center for more information.

MAINTENANCE

Front panel and shell maintenance

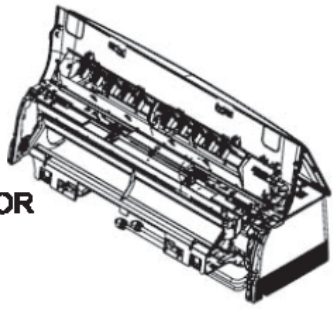
1 **Cut off the power supply by moving the power switch in the direction of the arrow.**



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.**

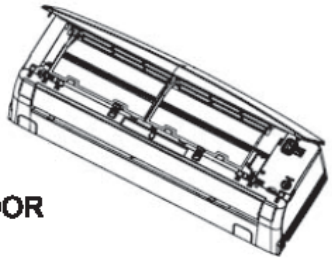
Use soft moisture cloth to clean if the front panel is very dirty.

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.***

MAINTENANCE

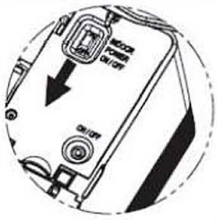
⚠ **The following is a deep cleaning and must be completed by a professional.**

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

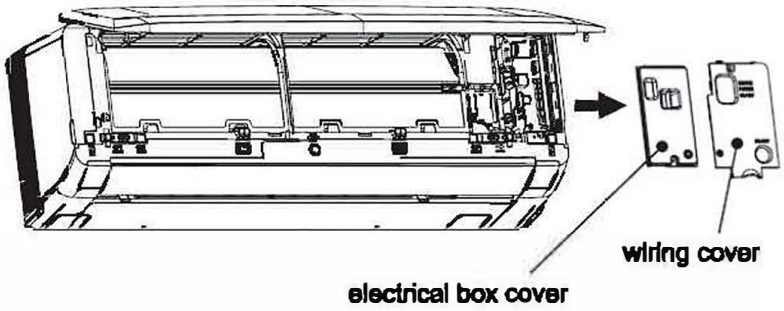
Front shell, air duct and fan maintenance

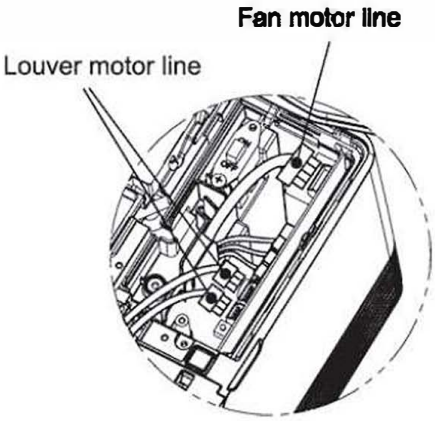
1 **Cut off the power supply by moving the power switch in the direction of the arrow.**

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



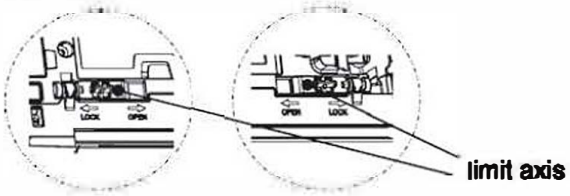
2 **1. Remove the wiring cover and the electrical box cover.**
2. Disconnect the fan motor line and the louver motor line.

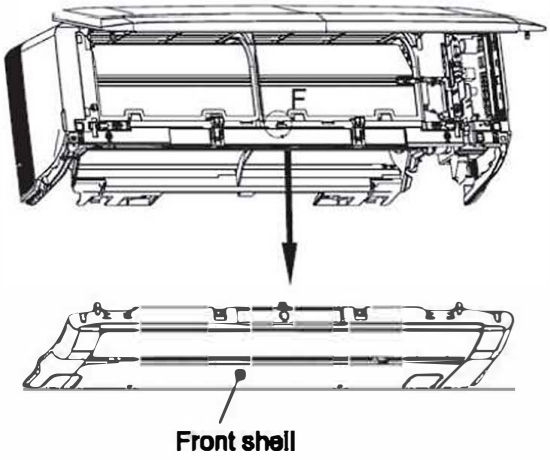




3 **1. Open the screw covers and remove the screws refer to Fig.414 of INDOOR UNIT INSTALLATION.**
2. Open the limit axes.
3. Remove the front shell for cleaning.

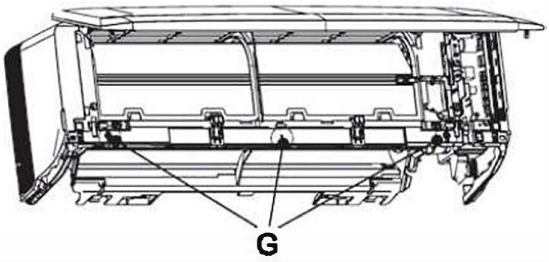
Note: Pay attention to the limit of F position, some models have two places.
Note: when you want to clean the front shell with clean water, you must first remove all the motors on the front shell.





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

Note: Some models do not have H position screws.



MAINTENANCE

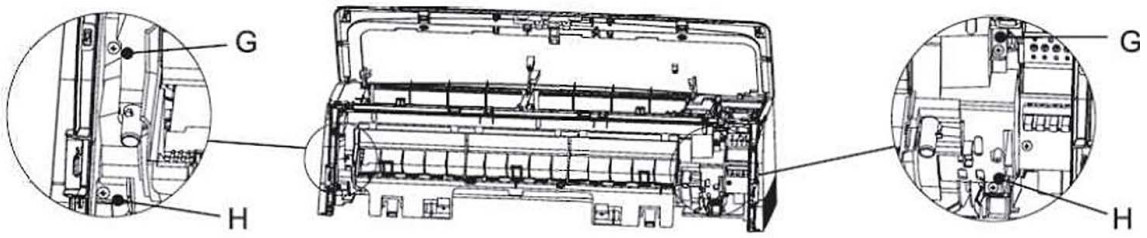
⚠ **The following is a deep cleaning and must be completed by a professional.**

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

Front shell, air duct and fan maintenance

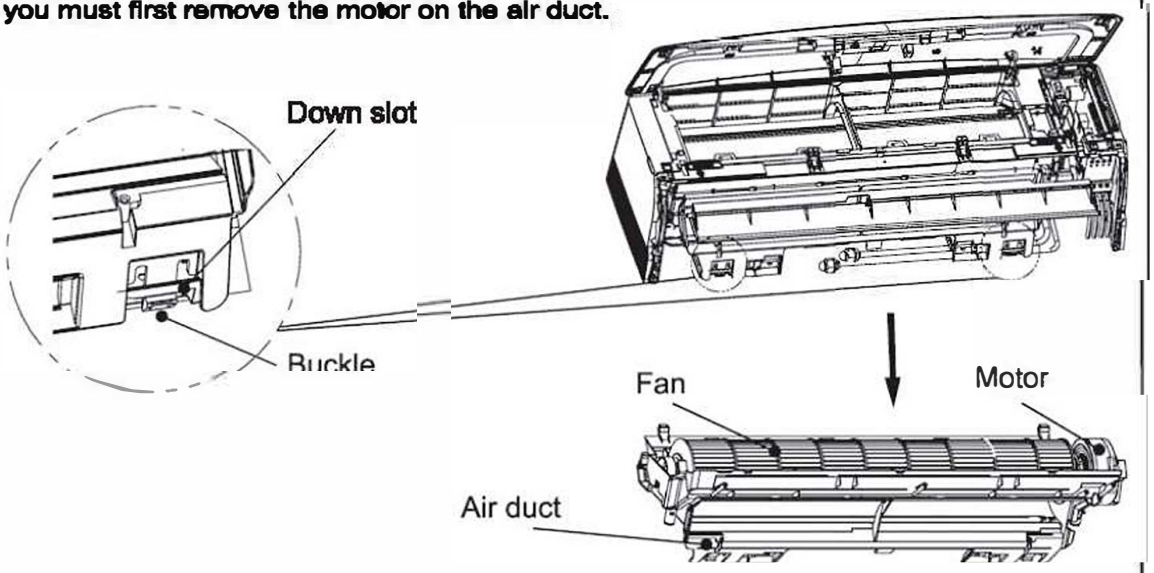
Remove the screws of the air duct. (G position and H position)

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.

TROUBLESHOOTING

Outdoor Unit

Basic Troubleshooting

Troubleshooting	Possible Reason of Abnormality	How to Deal With
Air conditioner does not start up	1. Power supply failure; 2. Trip of breaker or blown fuse 3. Power voltage is too low; 4. Improper setting of remote control ; 5. Remote control is short of power.	1. Check power supply circuit; 2. Measure insulation resistance to ground to see if there is any leakage; 3. Check if there is a defective contact or leak current in the power supply circuit; 4. Check and set remote control again; 5. Change batteries.
The compressor starts or stops frequently	The air inlet and outlet has been blocked.	Remove blocking obstacles.
Poor cooling/heating	1. The outdoor heat exchanger is dirty, such as condenser; 2. There are heating devices indoors 3. The air tightness is not enough. People come in and out too frequently. 4. Block of outdoor heat exchanger; 5. Improper setting of temperature.	1. Clean the heat exchanger of the outdoor unit, such as condenser ; 2. Remove heating devices; 3. Keep certain air tightness indoors; 4. Remove blocking obstacles; 5. Check and try to set temperature again.
Sound from deforming parts	During system starting or stopping, a sound might be heard. However, this is due to thermal deformation of plastic parts.	It is not abnormal, and the sound will disappear soon.
Water leakage	1. Drainage pipe blocked or broken; 2. Wrap of refrigerant pipe joint is not closed completely.	1. Change drainage pipe. 2. Re-wrap and make it tight.

Table 501

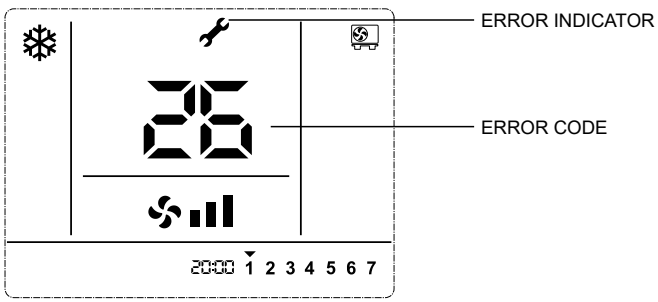
Troubleshooting according to fault codes

When the air conditioner failure occurs, the fault code will display on control board, wired controller or display panel.

How to check fault codes

Indoor unit

(1)Error codes indicated by wire remote controller (see figure below)



When the air conditioner malfunctions, will be displayed on the LCD, and error codes will appear and blink.

Fault code displays on wired controller

TROUBLESHOOTING

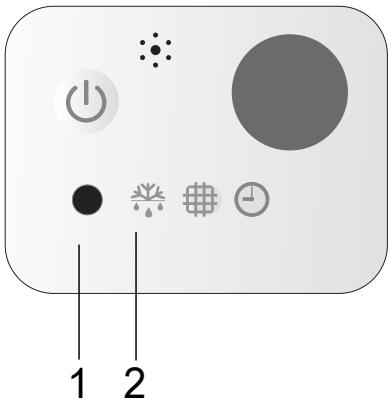
Outdoor Unit

Diagnostic Codes _ Intro

(3) Fault codes indicated by LED lamps on display panel (9K/12K/18K)

Lamp RUN (LED2, Red) and Lamp DEFROST（LED5, Green）flash. Lamp RUN displays fault code represented by 2- digit number, and lamp DEFROST displays fault code represented by single digit number (as shown fig. below). For example, fault code 36: LED RUN & defrost flash 3 times at the same time, and LED DEFROST continues flashing 3 times, it reports No. 36 fault.

Display panel



1 Run indicator (Red)
Indicates the fault code with 2- digit number.
2 Defrost indicator (Green)
Indicates the fault code with single digit number.

LED FALSH CONTROL：flash 300mS (T1)，off 300mS (T2)，after 2000mS (T3) fault code repeat displays. (as shown below)

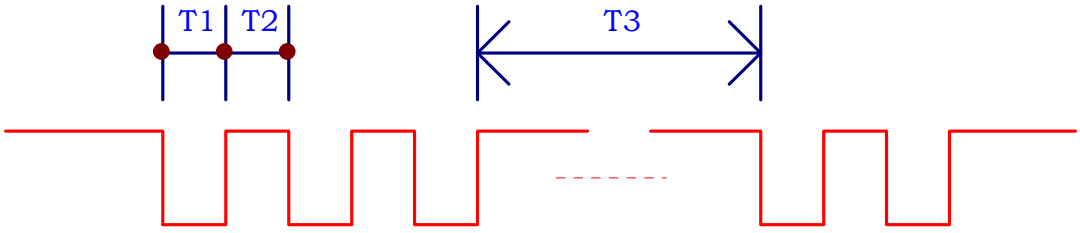


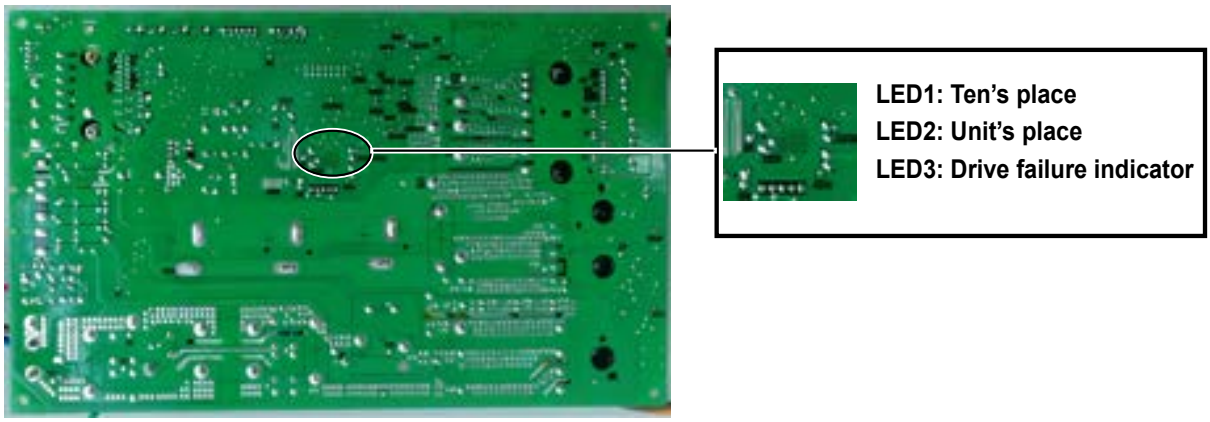
FIG.2 LED flash control

TROUBLESHOOTING

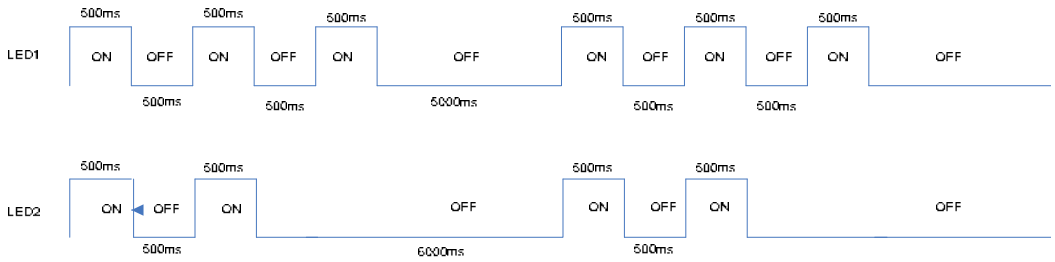
Outdoor Unit
Diagnostic Codes _ Intro

Outdoor unit（Fault code displayed by LED lamps on outdoor main control board.）

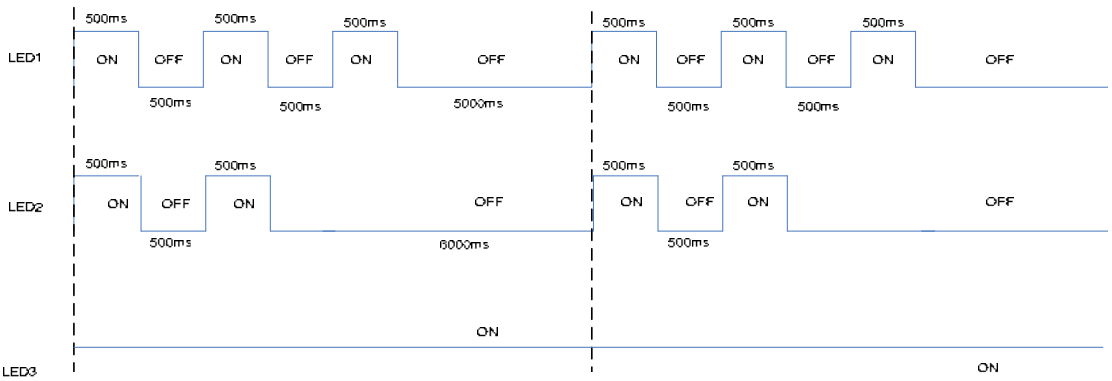
DC-Inverter unitary （Main control board upside-down)
Fault code displayed by LED lamps on outdoor main control board.
There are 3 LED lamps on control board, LED1, LED2 and LED3.
LED1 indicates fault code represented by 2-digit number, LED2 indicates fault code represented by single digit number and LED3 indicates outdoor drive control fault. When LED3 is off, LED1 and LED 2 indicate main control fault code.
Note: For 3 digit fault codes LED 1 will blink more than nine times, followed by LED 2.
For example for fault code 125; LED 1 will blink 12 times followed by LED 2 blinking 5 times.
When LED3 is on, LED1 and LED 2 indicate drive control fault code.
When LED3 is flickering and LED1, LED 2 are all off, indicate compressor is preheating. Failures display with 5s interval. It means LED will be off for 5s to report next fault code. System protection codes display method is the same with main control fault code. LED lamps will be off when there is no failure, protection or preheating.



For example, outdoor main control fault 32:



For example, outdoor drive fault 32:

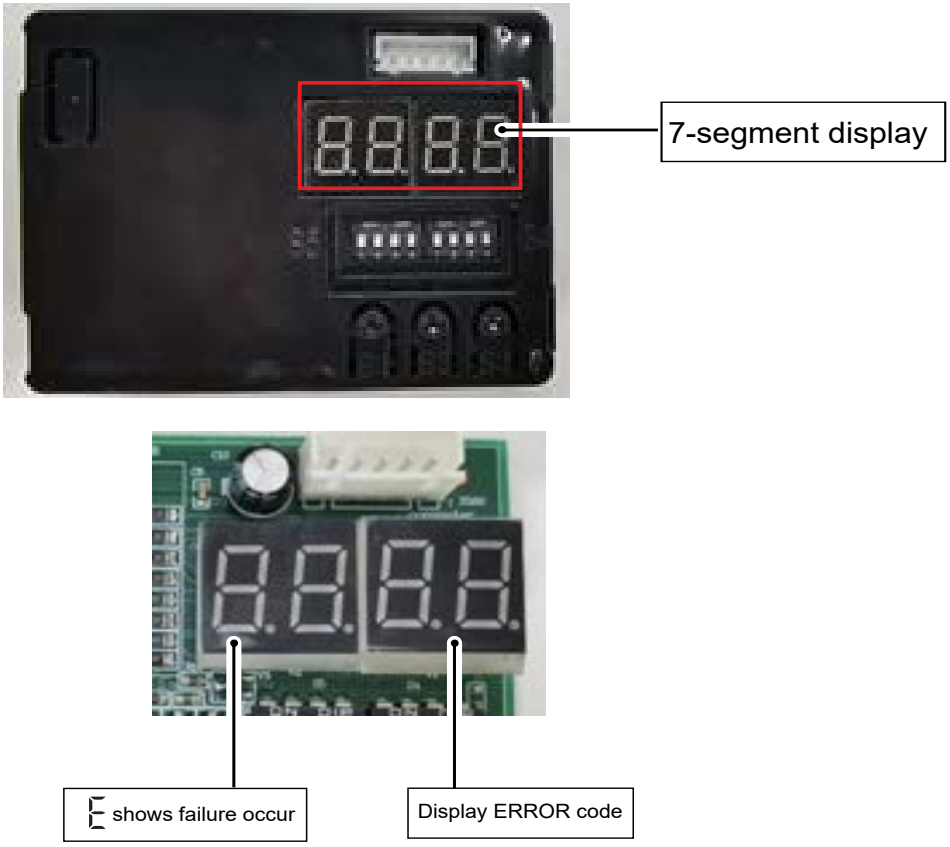


TROUBLESHOOTING

Outdoor unit

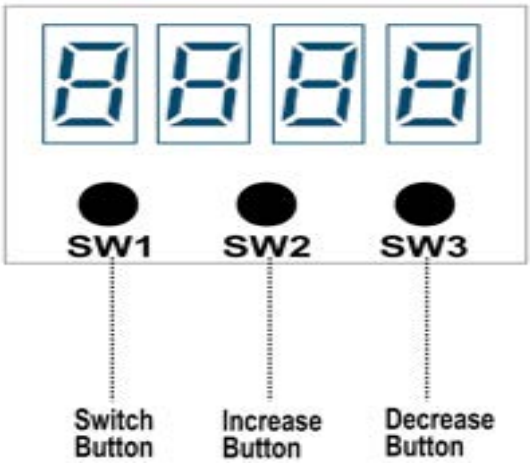
Fault code displayed on checker board

Fault code/drive fault code will be displayed on checker board.



Digital Display Switch Introduction

It can be used to check outdoor running parameters.



TROUBLESHOOTING

Outdoor Unit
Diagnostic Codes _ Intro

There are 3 buttons on the digital display board：

1) SWITCH button：Indoor parameters and outdoor parameters can be selected in turn by pressing it.
"P."-outdoor unit parameter ,"A."-indoor unit parameter；

2) INCREASE button：Each time it is pressed, the number rises by 1,hold it down, the number will rapidly increase;

3) DECREASE button：Each time it is pressed, the number lowers by 1,hold it down, the number will rapidly decrease.

4) The parameters will be displayed after 3s when the checking numbers are selected.

Parameters can be checked as following table below.

Parameter Code	Descriptions	Parameter Code	Descriptions
P.0	Fault codes	P.27	Outdoor DC Motor 2 target speed
P.1	Compressor actual frequency	P.29	The current opening of the outdoor expansion valve
P.2	Compressor driving frequency	A.1	Unit A fault codes
P.4	Compressor target frequency	A.2	Unit A valve actual opening
P.5	Compressor exhaust temperature	A.4	Unit A liquid pipe temperature
P.6	Outdoor suction Temperature	A.5	Unit A gas pipe temperature
P.7	Outdoor ambient temperature	A.6	Unit A coil temperature
P.8	Outdoor coil temperature	A.7	Unit A ambient temperature
P.9	Outdoor defrosting temperature	A.8	Unit A set temperature
P.10	IPM module temperature	A.9	Unit A capacity
P.11	Outdoor capacity requirement	A.10	Unit A set fan speed
P.12	IPM fault codes	A.11	Unit A actual suction overheating (cooling)
P.13	Outdoor DC Motor 1 target speed		
P.14	AC input current		
P.15	AC input voltage		
P.16	DC bus voltage		
P.17	Compressor phase current		
P.18	Frequency limit code		
P.20	Target suction overheating		
P.21	Target exhaust overheaingt		
P.22	Actual suction overheating (heating)		
P.23	Actual exhaust overheating (heating)		

NOTES:
P11 is expressed as a coeffficient and is only used for developmental purposes or R&D. This code is not for trouble-shooting.
P12 is the Driver Fault. Code will first dhow up as 45 fault code. Then when you call up the P12, it will show the sub fault code.

TROUBLESHOOTING

Outdoor Unit

Diagnostic Codes _Main PCB

Fault code	Fault description	Possible reasons for abnormality	How to deal with
1	Outdoor ambient temperature sensor fault	1. The outdoor ambient temperature sensor is connected loosely. 2. The outdoor ambient temperature sensor fails to work. 3. The Main PCB sampling circuit fails.	1. Reconnect the outdoor ambient temperature sensor. 2. Replace the outdoor ambient temperature sensor components. 3. Replace the Main PCB.
2	Outdoor coil temperature sensor fault	1. The outdoor ambient temperature sensor is connected loosely;. 2. The outdoor ambient temperature sensor fails to work;. 3. The Main PCB sampling circuit fails.	1. Reconnect the outdoor ambient temperature sensor. 2. Replace the outdoor ambient temperature sensor components. 3. Replace the Main PCB.
3	The unit over-current shut down fault	1. Main PCB current sampling circuit fails; 2. The current is exceeding maximum limits high because the supply voltage is too low. 3. The compressor is blocked. 4. Overload in cooling mode; 5. Overload in heating mode."	1. Replace the Main PCB. 2. Normal protection, Check supply power. 3. Replace the compressor. 4. Please see Table 702 5. Please see Table 703.
4	EEprom Data error	1. EE components fails; 2. EE components control circuit fails; 3. EE components are inserted incorrectly."	1. Replace the Main PCB.
5	Cooling freezing protection (the indoor coil temperature is too low) or heating overload (indoor coil temperature is too high)	1. The indoor unit airflow abnormal. 2. The room temperature is too low in cooling mode or the room temperature is too high in heating. 3. The filter is dirty. 4. The duct resistance is too high to result in low air flow. 5. The fan speed setting is too low. 6. The indoor unit is not installed in accordance with the installation standards, and the air inlet is too close to the air outlet .	1. Check whether the indoor fan, indoor fan motor and evaporator work normally. 2. Normal protection. 3. Clean the filter. 4. Check the volume control valve, duct length etc. 5. Set the fan speed to high. 6. Reinstall the indoor unit referring to the user manual to change the distance between the indoor unit and the wall or ceiling.
7	The communication fault between the indoor unit and outdoor unit	1. The communication cable is connected improperly between the indoor unit and outdoor unit. 2. The communication cable is connected loosely. 3. The communication cable fails. 4. The indoor control board fails. 5. The outdoor control board fails;. 6. Communication circuit fuse open. 7. The specification of communication cable is incorrect.	1. Reconnect the communication cable referring to the wiring diagram. 2. Reconnect the communication cable. 3. Replace the communication cable. 4. Replace the indoor control board;. 5. Replace the outdoor control board. 6. Check the communication circuit, adjust the DIP switch and the short-circuit fuse. 7. Ensure communication cable is 4 X 14 AWG 600v Stranded wire.
13	Compressor overheat protector device	1. The wiring of the overload protector is connected loosely. 2. The overload protector fails . 3. The refrigerant is low. 4. The installation pipe is much longer than the normal one, but extra refrigerant is not added ; 5. The expansion valve fails; 6. The outdoor Main PCB has failed.	1. Reconnect the wiring of the overload protector;. 2. Replace the overload protector. 3. Using an A2L approved leak detector, Check the braze points of the unit to confirm there are no leaks, then recharge the refrigerant;. 4. Add the refrigerant, refer to refrigerant Charging methods. 5. Replace expansion valve. 6. Replace the outdoor Main PCB.
14	The high pressure switch operation or the unit is turned off for high pressure protection	1. The wiring of the high pressure protector is connected loosely. 2. The high pressure protector fails; 3. The outdoor Main PCB has malfunctioned. 4. Overload in cooling; 5. Overload in heating."	1. Reconnect the wiring of the high pressure protector. 2. Replace the high pressure protector. 3. Replace the Main PCB. 4. Please refer to NOTE 3. 5. Please refer to NOTE 4.
15	The low pressure switch protection or the unit is turned off for low pressure protection	1. The wiring of the low pressure switch is connected loosely. 2. The low pressure switch fails. 3. The refrigerant is not enough. 4. The expansion valve fails in heating mode. 5. The Outdoor Unit Main PCB has malfunctioned.	1. Reconnect the wiring of the low pressure switch. 2. Replace the low pressure switch. 3. Check the welding point to confirm whether the unit leaks, and then add some refrigerant. 4. Replace the expansion valve. 5. Replace the outdoor control board.

Table 502

TROUBLESHOOTING

Outdoor Unit
Diagnostic Codes _Main PCB

Fault code	Fault description	Possible reasons for abnormality	How to deal with
16	Overload protection in cooling mode	1. The refrigerant is excessive. 2. The outdoor ambient temperature is too high. 3. Short-circuit occurs in the air outlet and air inlet of the outdoor unit. 4. The condenser coil is dirty. 5. The speed of the outdoor fan motor is too low. 6. The outdoor fan is broken or the outdoor fan is blocked. 7. The air inlet and outlet have been blocked. 8. The expansion valve fails.	1. Discharge the refrigerant, and recharge the refrigerant referring to the rating label. 2. Please use it within allowable temperature range. 3. Adjust the installation of the outdoor unit referring to the user manual. 4. Clean the condenser. 5. Check the outdoor fan motor and fan capacitor. 6. Check the outdoor fan. 7. Remove the obstacles. 8. Replace the expansion valve.
17	Discharge temperature sensor fault	1. The wiring of the discharge temperature sensor is connected loosely. 2. The discharge temperature sensor fails; 3. The Main PCB sampling circuit is abnormal.	1. Reconnect the wiring of the discharge temperature sensor. 2. Replace the discharge temperature sensor. 3. Replace the outdoor Main PCB.
18	AC voltage is abnormal	1. The AC voltage>275V or <160V; 2. The AC voltage of sampling circuit on the driver board is abnormal.	1. Normal protection, please check the supply power; 2. Replace the Main PCB.
22	The defrosting sensor fault	1. The wiring of the suction temperature sensor is connected loosely. 2. The suction temperature sensor fails. 3. The Main PCB sampling circuit is abnormal.	1. Reconnect the wiring of the suction temperature sensor;. 2. Replace the suction temperature sensor; 3. Replace the outdoor Main PCB.
43	High pressure sensor fault	1. The wiring of the high-pressure pressure sensor connect is loose; 2. The high-pressure pressure sensor fails 3. The sampling circuit of the high pressure pressure sensor fails.	1. Reconnect the wiring of the high-pressure pressure sensor; 2. Replace the high-pressure pressure sensor; 3. Replace the outdoor Main PCB.
45	IPM fault	There are many reasons for this failure. You can check the driver board fault LED to further analyze the fault code of the drive board and to learn about what leads to the fault and how to operate it. Specific information can be seen in table 503.	See table 504
46	IPM and control board communication fault	There are many reasons for this failure. You can check the driver board fault LED to further analyze the fault code of the drive board and to learn about what leads to the fault and how to operate it. Specific information can be seen in table 503 and 504.	See table 504
47	Discharge temperature is too high	1. The refrigerant of the unit is low. 3. EEV has malfunctioned. 4. The outdoor ambient temperature is too high.	1. Check for refrigerant leak. 2. Repair leak - See Refrigerant evacuation and charging. 3. Replace EEV. 4. Normal protection.
48	The outdoor DC fan motor fault (upper fan motor)	1. Fan motor connections loose. 2. Fan motor wiring damaged. 3. The upper DC fan motor fails; 4. The drive circuit of the upper DC fan motor fails; 5. The outdoor fan has been blocked."	1. Reconnect the wiring of the up DC fan motor; 2. Repair or replace wiring. 3. Replace the upper DC fan motor; 4. Replace the Main PCB. 5. Check the outdoor fan and ensure the outdoor fan can run normally."
91	The unit turns off due the IPM board over heating fault	1. The outdoor ambient temp. is too high; 2. The speed of the out fan motor is too low if the fan motor is AC fan motor; 3. The outdoor unit is not installed in accordance with the standard; 4. The supply power is too low.	1. Normal protection; 2. Check the fan capacitor, and replace the fan capacitor if it is failure; 3. Reinstall the outdoor unit. Refer to the installation section of this manual; 4. Normal protection.
96	Refrigerant low	Refrigerant low	Discharge the refrigerant and charge the refrigerant referring to the Nameplate of the unit. See installation section of this manual.

Table 502

TROUBLESHOOTING

Outdoor Unit

Diagnostic Codes _Main PCB

Fault code	Fault description	Possible reasons for abnormality	How to deal with
97	4-way valve commutation failure fault	1. The connecting wiring of the 4- way valve coil is loose; 2. The 4-way valve coil fails; 3. The 4-way valve fails; 4. The driver board of the 4-way valve fails.	1. Reconnect the wiring of the 4-way valve; 2. Replace the 4-way valve coil; 3. Replace the 4-way valve; 4. Replace the main pcb.
NOTE 1: If the indoor unit can not start or the indoor unit stops itself after 30s, at the same time the unit do not display the fault code, please check the pin and the socket of the control board.			
NOTE 2: If the indoor unit displays the 75,76,77,78 fault code after you turn on the unit, please check the TEST seat of the indoor control board or the TEST detection circuit to see whether short circuit occurs.			
NOTE 3: Overload in cooling mode			
		THE ROOT CAUSE	**CORRECTIVE MEASURE**
1		The refrigerant is excessive.	Discharge the refrigerant, and recharge the refrigerant referring to the nameplate and the installation section of this manual.
2		The outdoor ambient temperature is too high.	Please use within allowable temperature range
3		Short-circuit occurs in the air outlet and air inlet of the outdoor unit.	Adjust the installation of the outdoor unit referring to the installation section of this manual.
4		The outdoor heat exchanger is dirty, such as condenser.	Clean the heat exchanger of the outdoor unit, such as condenser
5		The speed of the outdoor fan motor is too low.	Check the outdoor fan motor,
6		The outdoor fan is broken or the outdoor fan is blocked.	Check the outdoor fan.
7		The air inlet and outlet has been blocked.	Remove the blocked objects.
8		The expansion valve fails.	Replace the expansion valve.
NOTE 4: Over load in heating mode			
1		The refrigerant is excessive.	Discharge the refrigerant, and recharge the refrigerant referring to the nameplate and the installation section of this manual.
2		The outdoor ambient temperature is too high.	Please use within allowable temperature range
3		The indoor ambient temperature is too high.	Please use within allowable temperature range.
4		Short-circuit occurs in the air outlet and air inlet of the outdoor unit.	Adjust the installation of the outdoor unit referring to the installation section of this manual.
5		The indoor filter is dirty.	Clean the indoor filter.
6		The speed of the indoor fan motor is too low.	Check the indoor fan motor and fan capacitor.
7		The indoor fan is broken or the outdoor fan is blocked.	Check the indoor fan.
8		The air inlet and outlet has been blocked.	Remove the blocked objects.
9		The expansion valve fails.	Replace the expansion valve.

Table 502

TROUBLESHOOTING

Outdoor Unit

Diagnostic Codes _Driver Faults

Fault code	Fault description	Possible reasons for abnormality	How to deal with
1	Inverter DC voltage overload fault	1. Power supply input is too high or too low; 2. Control board fault.	1. Check the power supply; 2. Change the control board.
2	Inverter DC low voltage fault		
3	Inverter AC current overload fault		
4	Out-of-step detection	1. Compressor phase lost; 2. Bad control board components; 3. The compressor insulation fault.	1. Check the compressor wire connection 2. Change the main PCB. 3. Change the compressor.
5	Loss phase detection fault (speed pulsation)		
6	Loss phase detection fault (current imbalance)		
7	Inverter IPM fault (edge)	1. System overload or current overload; 2. Control board fault; 3. Compressor oil shortage, serious wear of crankshaft ; 4. The compressor insulation fault.	1. Check the system; 2. Change the control board; 3. Change the compressor; 4. Change the compressor.
8	Inverter IPM fault (level)		
9	PFC fault (edge)		
10	PFC fault (level)		
11	PFC power detection of failure	1. The power supply is not stable; 2. Instantaneous power failure; 3. Control board failure.	1. Check the power supply; 2. No need to deal with; 3. Change the main PCB.
12	PFC overload current detection of failure.	1. System overloads, and the current is too high. 2. Control board fails; 3. PFC fails.	1. Check the system; 2. Change the control board; 3. Change the Main PCB
13	DC voltage detected abnormal .	1. Input voltage is too high or too low; 2. control board fails.	1. Check the power supply; 2. Change the Main PCB.
14	PFC LOW voltage detected failure.		
15	AD offset abnormal detected failure.	Control board fails.	Change the Main PCB.
16	Inverter PWM logic set fault.		
17	Inverter PWM initialization failure		
18	PFC_PWM logic set fault.		
19	PFC_PWM initialization fault.		
20	Temperature abnormal.		
21	Shunt resistance unbalance adjustment fault		
22	Communication failure.	1. Communication wire connection is not proper; 2. Control board fails;	1. Check the wiring; 2. Change the Main PCB.
23	Motor parameters setting of failure	Initialization is abnormal.	Reset the power supply.
26	DC voltage mutation error	1. Power input changes suddenly; 2. control board fails.	1. Check the power supply, to provide stable power supply; 2. Change the Main PCB.
27	Compressor drive D axis current control error	1. System overload, phase current is too high; 2. Control board fails.	1. Check if the system is normal; 2. Check if the stop valve is open; 3. Change the control board.
28	Compressor drive Q axis current control error	1. System overload, phase current is too high; 2. Control board fails.	1. Check if the system is normal; 2. Check if the stop valve is open; 3. Change the Main PCB.

Table 504

TROUBLESHOOTING

Outdoor Unit
Diagnostic Codes _Driver Faults

Fault code	Fault description	Possible reasons for abnormality	How to deal with
29	Saturation error of D axis current control integral	1. System overloads suddenly; 2. Compressor parameter is not suitable; 3. Control board fails.	1. Check if the system is normal; 2. Check if the stop valve is open; 3. Change the Main PCB.
30	Saturation error of Q axis current control integral	1. System overloads suddenly; 2. Compressor parameter is not suitable; 3. Control board fails.	1. Check if the system is normal; 2. Check if the stop valve is open; 3. Change the Main PCB.
33	EE data abnormal	Control board EEPROM is abnormal.	1. Change EEPROM; 2. Change the Main PCB.
50	DC voltage detected abnormal	1. The fan motor system overloads. 2. Control board fails; 3. The fan motor is not insulated well;	1. Change the fan motor; 2. Change the Main PCB. 3. Change the fan motor.
51	Out-of-step detection	1. The wire is not connected well; 2. Bad control board components; 3. The fan motor starting overloads; 4. The fan motor is demagnetized; 5. The fan motor is not insulated well.	1. Check the fan motor wire connection; 2. Change the control board; 3. Change the fan motor; 4. Change the fan motor; 5. Change the fan motor;
52	Abnormal speed control	1. Bad control board components; 2. The fan motor shaft clamping; 3. The fan motor insulation fails.	1. Change the Main PCB. 2. Change the fan motor; 3. Change the fan motor;
53	Out of phase detection fault	1. Phase loss of the fan motor; 2. Bad control board components.	1. Change the Main PCB. 2. Change the fan motor; 3. Change the fan motor
54	IPM-FO hardware over-current (edge)	1. The fan motor overloads or over- current; 2. The control board fails; 3. The fan motor insulation fails.	1. Change the fan motor; 2. Change the Main PCB. 3. Change the fan motor
55	IPM-FO hardware over-current (level)	1. The fan motor overloads or over- current; 2. The control board fails; 3. The fan motor insulation fails.	1. Change the fan motor; 2. Change the Main PCB. 3. Change the fan motor
56	The fan motor -AD Offset abnormal detection fault	The control board circuit fails.	Change the Main PCB.
57	The fan motor speed control integral saturation	1. The fan motor overload mutation; 2. Parameters are inappropriate; 3. The control board fault.	1. Change the fan motor system; 2. Change the fan motor; 3. Change the Main PCB.
58	The fan motor D,Q axis current control error	1. The fan motor overloads, the phase current is large; 2. The control board fault.	1. Check the fan motor system; 2. Change the Main PCB.
59	The fan motor D,Q axis current control integral saturation	1. The fan motor overload mutation; 2. Parameters are inappropriate; 3. The control board fault.	1. Change the fan motor system; 2. Change the fan motor; 3. Change the Main PCB.
60	The fan motor reverse	1. Bad control board components; 2. Wiring problems	1. Change the Main PCB. 2. Check the wiring.
61	IPM-PWM initialization fault	1. EE logics error; 2. The control board fails.	1. Change the Main PCB. 2. Change the Main PCB.
70	Effective value protection of compressor phase current	1. Low power supply voltage; 2. control board fault.	1. Check the power supply voltage; 2. Replace the main PCB.
71	Start failure	1. System overload; 2. control board fault; 3. Compressor fault	1. Check if the system operates properly and if the shut-off valve is turned on; 2. Replace the main PCB. 3. Replace the compressor.

Table 504

TROUBLESHOOTING

Outdoor Unit
Diagnostic Codes _Driver Faults

Fault code	Fault description	Possible reasons for abnormality	How to deal with
72	IPM over- temperature fault	1. High outdoor ambient temperature; 2. Improper installation of outdoor units; 3. Low power supply voltage.	1. Protect properly; 2. Reinstall the outdoor unit according to the installation specifications. 3. Protect properly.
73	MCU error	control board fault	Replace the control board
74	Compressor speed estimation error	1. System overload; 2. control board fault; 3. Compressor fault	1. Check if the system operates properly and if the shut-off valve is turned on; 2. Replace the main PCB. 3. Replace the compressor.
75	Over-power	1. System overload; 2. control board fault; 3. Compressor fault	1. Check if the system operates properly and if the shut-off valve is turned on; 2. Replace the main PCB. 3. Replace the compressor.
76	High compressor speed	1. control board fault	1. Replace the control board. 2. Replace the compressor.
Codes 101-132 appear in the operation process and indicate some kind of normal operation state, instead of faults, so they do not need to be dealt with. DSH: Discharge Super Heat			
101	When overcurrent occurs, stop the frequency from increasing.	Current control	
102	When overcurrent occurs, reduce the frequency.	Current control	
103	When the temperature of IPM module is too high, stop the frequency from increasing.	Frequency control to keep appropriate temperature of IPM module.	
104	When the temperature of IPM module is too high, reduce the frequency.	Frequency control to keep appropriate temperature of IPM module.	
105	When the discharge temperature is too high, stop the frequency from increasing.	Frequency control to keep appropriate discharge temperature.	
106	When the discharge temperature is too high, reduce the frequency.	Frequency control to keep appropriate discharge temperature.	
107	In cooling mode, when the temperature of the outdoor unit coil is too high, stop the frequency from increasing.	Frequency control to keep appropriate temperature of the outdoor unit coil in cooling mode.	
108	In cooling mode, when the temperature of the outdoor unit coil is too high, reduce the frequency.	Frequency control to keep appropriate temperature of the outdoor unit coil in cooling mode.	
113	To prevent the indoor unit from being frozen or high temperature, stop the frequency from increasing.	Frequency control to keep appropriate temperature of the indoor unit coil.	
114	To prevent the indoor unit from being frozen or high temperature, reduce the frequency.	Frequency control to keep appropriate temperature of the indoor unit coil.	
119	When DSH exceeds the target value, the valve opening gets wider to adjust the flow.	Control on expansion valve based on DSH.	
120	When DSH exceeds the target value, the valve opening gets narrower to adjust the flow.	Control on expansion valve based on DSH.	
121	When DSH exceeds the target value, stop the valve opening from getting narrower.	Control on expansion valve based on DSH.	
122	When DSH exceeds the target value, stop the valve opening from getting wider.	Control on expansion valve based on DSH.	
131	When the temperature of IPM module is too high, stop the frequency from increasing.	Frequency control to keep appropriate temperature of IPM module.	
132	When the temperature of IPM module is too high, reduce the frequency.	Frequency control to keep appropriate temperature of IPM module.	

Table 504

Outdoor Unit

Diagnostic Codes _Driver Faults

Fault code	Fault description	Possible reasons for abnormality	How to deal with
134	When the discharge temperature is too high, stop the valve opening getting narrower.	Control on discharge temperature expansion valve.	
140	The compressor overloads.	Control on the compressor output.	
141	The compressor current overloads.	Control on the output torque of the compressor.	
NOTE: DSH: Discharge Super Heat These codes appearing in the operation process indicate some kind of normal operation state, instead of faults, so they do not need to be dealt with.			

Table 504

TROUBLESHOOTING

Indoor Unit - Wall Mount

Diagnostic Codes

The indoor display board will show the error code automatically when the unit has the following trouble:
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.
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 EPROM self-check two times.
The failure occurs when the grounding signal is not detected after the appliance power ON

Error Code	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
6	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	Communication failure between the indoor unit and outdoor unit	a. The communication cable is disconnected 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.
23	There is a leak in the product	a. There is a leak in the indoor b. There is a leak in the outdoor c. There is a leak in the connecting pipe
For code 23, there are two situations where this fault code will be displayed. Situtation 1 a. The compressor runs continuously for at least 15 minutes. b. The room temperature cannot be lowered (ΔT ⩾ 3.6°F, where ΔT represents the difference between the indoor ambient temperature and the set temperature). c. The compressor frequency is relatively high (⩾ 50Hz). d. The indoor unit is "not too cold" (0 ⩽ ΔTin ⩽ 3.6°F, where ΔTin represents the difference between the indoor ambient temperature and the indoor coil temperature). e. The above state lasts for 5 minutes. f. Then, the air conditioner will enter a "fixed mode" and operate for 5 minutes. g. During these 5 minutes, if any of the following conditions is met for 2 minutes, it is judged as a "serious refrigerant deficiency" and the machine is stopped: Condition 1: The outdoor unit exhibits "poor heat dissipation" (0 ⩽ ΔTout ⩽ 2.7°, where ΔTout represents the temperature difference between the outdoor coil and the outdoor environment) and the expansion valve has a large opening. Condition 2: The exhaust pipe is "overheated" , which means DSH, equal to the difference between the Exhaust temperature and Outdoor condenser coil temperature(DSH ⩾ 140°F). Situtation 2: a. The compressor runs continuously for at least 10 minutes. b. The room temperature cannot be lowered (ΔT ⩾ 3.6°F, where E represents the indoor ambient temperature minus the set temperature). c. The air conditioner has previously experienced frequency reduction or shutdown due to excessively high exhaust pipe temperature. d. Within 5 seconds, the indoor unit indicates "not too cold" (0 ⩽ ΔTin ⩽ 3.6°F, where ΔTin represents the difference between the indoor ambient temperature and the indoor coil temperature). e. If any of the following conditions is met, it shall be immediately judged as "severe refrigerant deficiency" and the machine shall be shut down: Condition 1: The outdoor unit has "poor heat dissipation" (0 ⩽ ΔTout ⩽ 2.7°F, where ΔTout represents the temperature difference between the outdoor coil and the outdoor environment) and the expansion valve has a large opening (⩾ 250 steps). Condition 2: The exhaust pipe is "overheated" , which means DSH is equal to the difference between the Exhaust temperature and Outdoor condenser coil temperature (DSH ⩾ 140°F). Condition 3: The exhaust pipe is "relatively hot" (DSH ⩾ 136°F) and the expansion valve has been opened to its maximum (= EEVmax).		
33	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.

Table 505

TROUBLESHOOTING

Diagnostic Codes
Indoor Unit

Error Code	Content	The root cause is may be one of the following
34	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	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	Indoor EEPROM failure	a. The EEPROM chip loose; b. The indoor control board failed.
39	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	The failure for Indoor grounding protection.	The indoor control board failed.
56	There is a leak in the product. . When the refrigerant leakage fails, the fault code 56 is displayed actively. The indoor fan is forced to run at the highest speed, and the outdoor unit stops. Other controls do not respond.	a. There is a leak in the indoor b. There is a leak in the connecting pipe
57	the error code will display when the communication between refrigerant Sensor and indoor control board have in trouble	a. The connection between the refrigerant Sensor and control board is loose;. b. The indoor control board is failure. c. The wiring of the refrigerant Sensor is failure.
77	Wi-Fi Connection Enabled	Cycle Power on/off

Table 505

TROUBLESHOOTING

Indoor Wall Mount

Unit Does Not Run

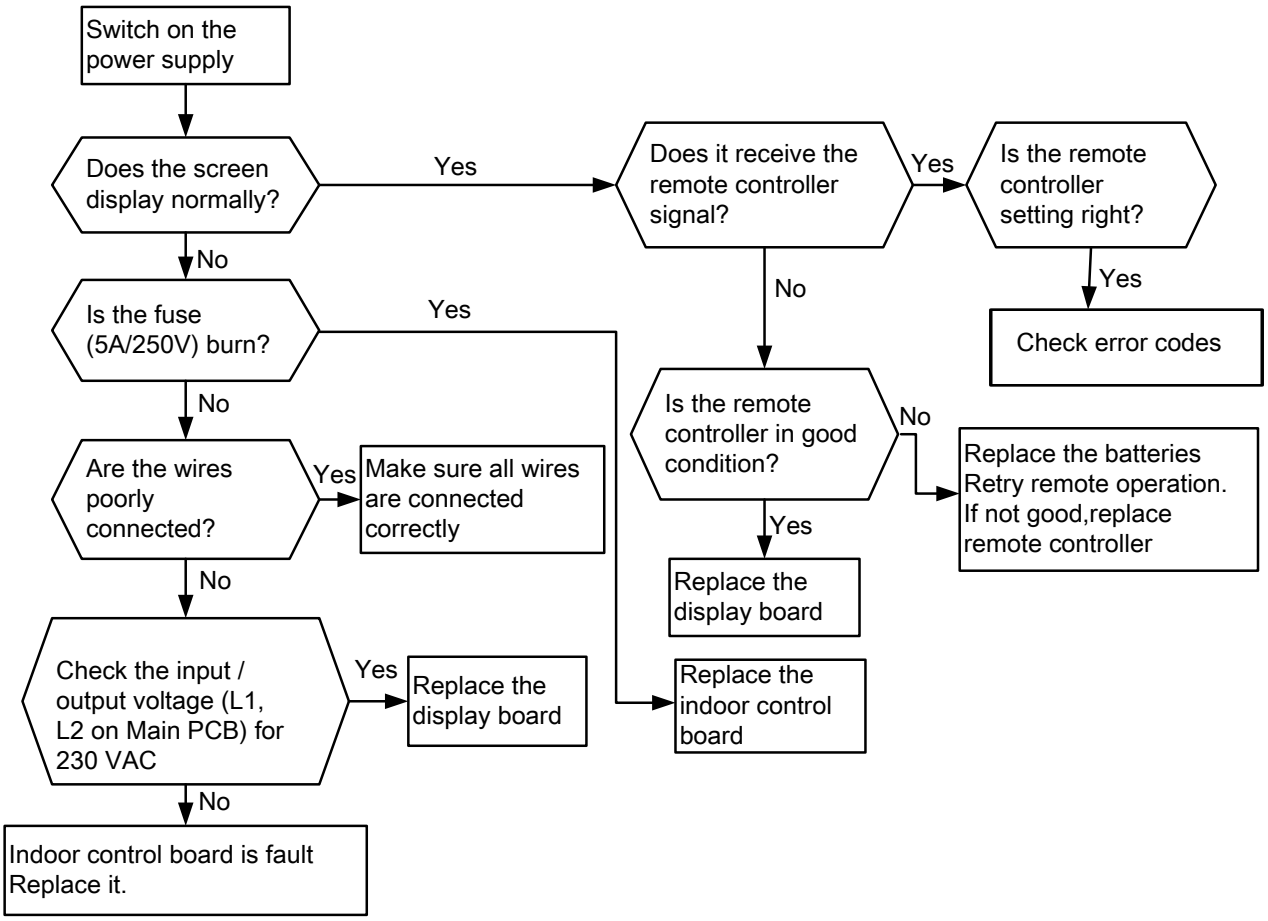


Figure 506

TROUBLESHOOTING

Indoor Wall Mount

Error Code 39-DC Fan

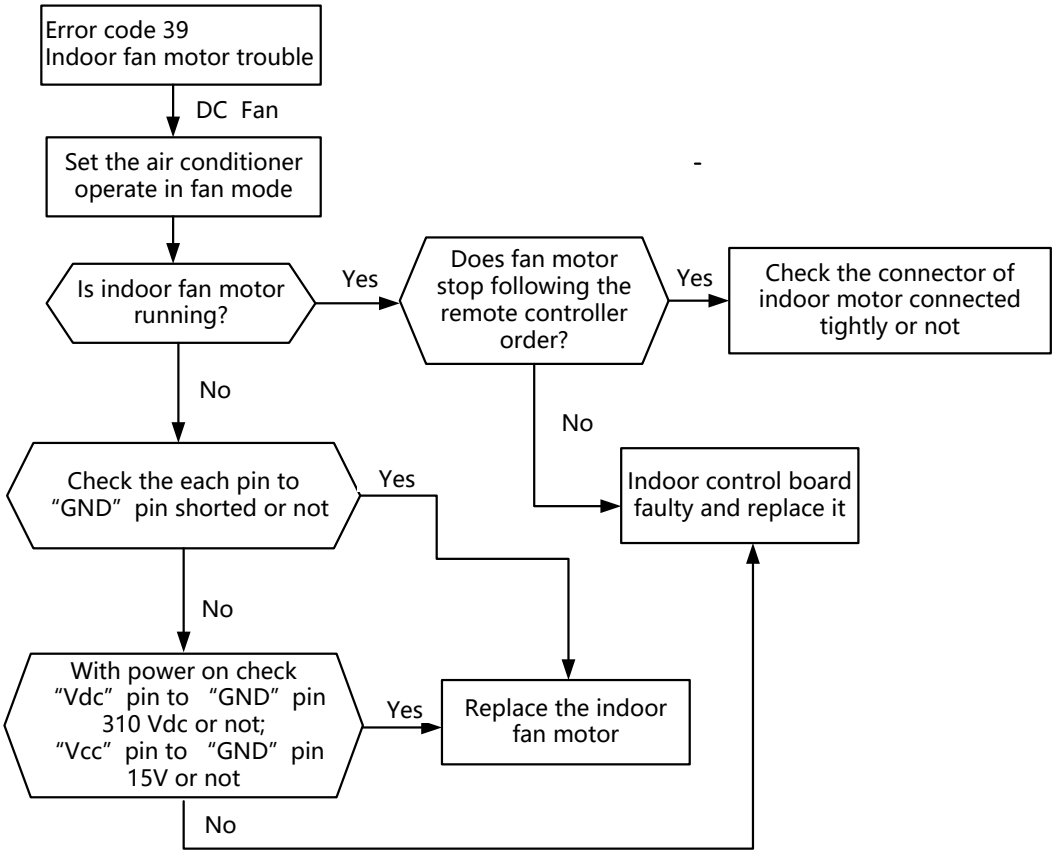
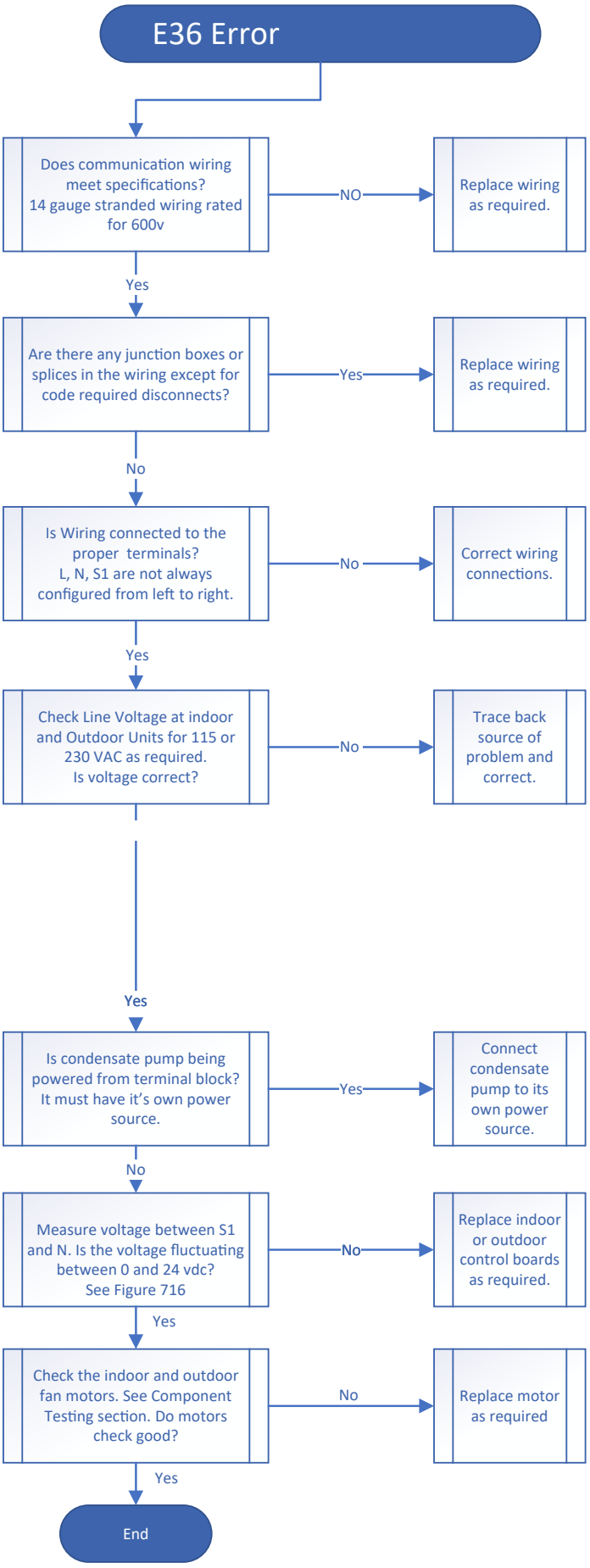


Figure 507

TROUBLESHOOTING

Indoor Wallmount

Error Code 36



See Figure 509

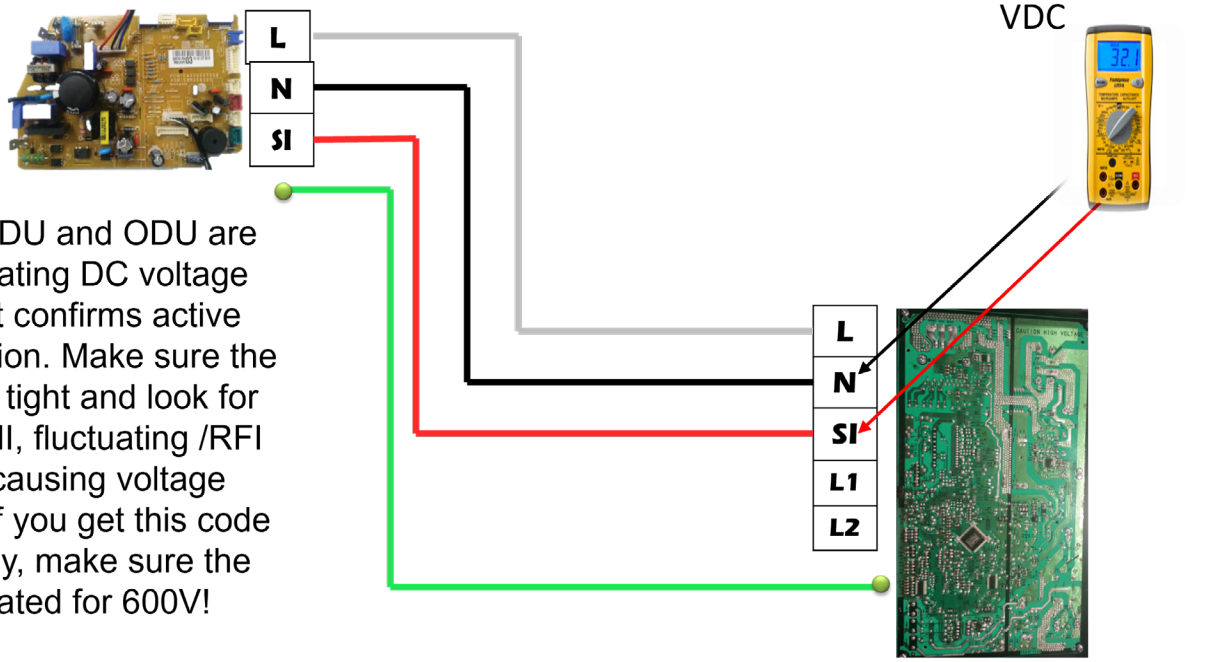
Figure 508

TROUBLESHOOTING

Indoor Wallmount

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!

Note: The voltage should fluctuate is ina consistent manner
For example: 4, 12, 24, and then back down

Figure 509

TROUBLESHOOTING

Indoor Wallmount

Blank Display/ Indoor 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.

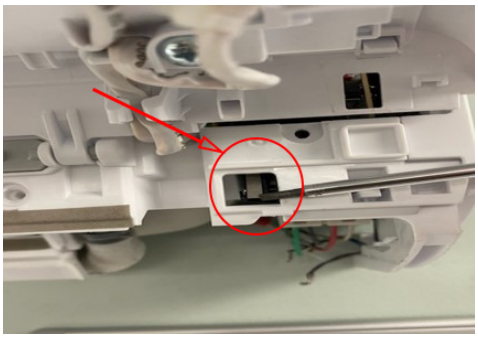


Fig. 510 (Door Micro Switch)

Fig. 511 (Blank Display)

TROUBLESHOOTING

Indoor Wallmount

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. 512 (Momentary Temp. Display)

TROUBLESHOOTING

Indoor Unit Cassette and Ducted

Diagnostic Codes

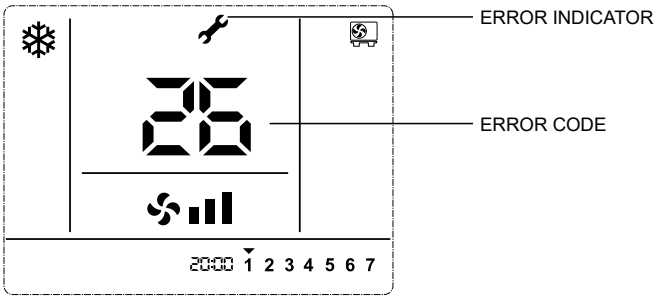
Troubleshooting according to fault codes

When the air conditioner failure occurs, the fault code will display on control board, wired controller or display panel.

How to check fault codes

Indoor unit

(1)Error codes indicated by wired controller (see figure below)



When the air conditioner malfunctions, will be displayed on the LCD, and error codes will appear and blink.

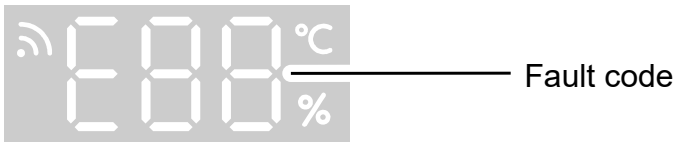
Fault code displays on wired controller

TROUBLESHOOTING

Indoor Unit Cassette and Ducted Diagnostic Codes

(2) Fault codes indicated by display panel(18K-36K)

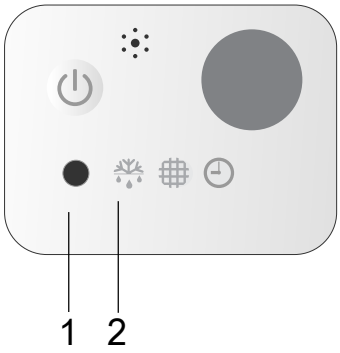
Display panel



(3) Fault codes indicated by LED lamps on display panel (9K/12K)

Lamp RUN (LED2, Red) and Lamp DEFROST（LED5, Green）flash. Lamp RUN displays fault code represented by 2- digit number, and lamp DEFROST displays fault code represented by single digit number (as shown fig. below). For example, fault code 36: LED RUN & defrost flash 3 times at the same time, and LED DEFROST continues flashing 3 times, it reports No. 36 fault.

Display panel



1 Run indicator (Red)
Indicates the fault code with 2- digit number.
2 Defrost indicator (Green)
Indicates the fault code with single digit number.

LED FALSH CONTROL：flash 300mS (T1)，off 300mS (T2)，after 2000mS (T3) fault code repeat displays. (as shown below)

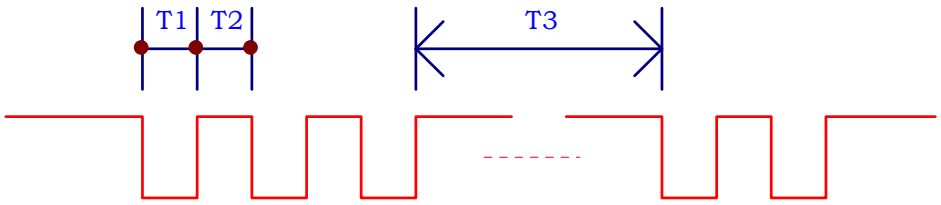


FIG.2 LED flash control

TROUBLESHOOTING

Indoor Unit Cassette and Ducted Diagnostic Codes

Fault code	Fault description	Possible reasons for abnormality	How to deal with
37	Humidity sensor failure	1. The cable of the humidity sensor connect loose. 2. The humidity sensor is failure. 3. The indoor control board is failure.	1. Reconnect the cable of the humidity sensor. 2. Replace the humidity sensor. 3. Replace the indoor control board.
51	Drainage protection	1. Defective drain pump. 2. Improper drain piping work. 3. Drain piping clogging. 4. Defective float switch. 5. Defective indoor unit PCB. 6. Defective short circuit connector on PCB.	1. Replace the drain pump. 2. Replace the drain piping. 3. Dredge the drain piping. 4. Replace the float switch. 5. Replace the indoor unit PCB. 6. Replace the short circuit connector.
55	Mode conflict fault	The user sets the conflicting mode for more than two indoor units.	Reset the operation mode for the indoor unit, for with one outdoor unit, the user should avoid setting the conflicting operation mode with the indoor units.
56	Refrigerant leakage	1. The refrigerant sensor detects that the concentration of refrigerant in the air exceeds the threshold.	Check and repair problematic pipes and add refrigerant.
57	Refrigerant sensor communication fault or refrigerant sensor fault	1. The refrigerant sensor fails to communicate with the indoor unit for a long time. 2. The refrigerant sensor reports the fault message such as life loss.	1. Replace the refrigerant sensor. 2. Reconnect the connection cable between the refrigerant sensor and the indoor unit board.
64	Communication between Indoor & Outdoor unit Fault	1. The indoor unit and the outdoor unit are not connected properly. 2. The communication cable is connected loosely. 3. The communication cable between the indoor unit and the outdoor unit fails or the cable between the indoor control board to terminal fails or the cable between the outdoor control board to the terminal fails. 4. The indoor control board fails. 5. The outdoor control board fails.	1. Reconnect the connection cable referring to the indoor and outdoor wiring diagram. 2. Reconnect the communication cable referring to the indoor and outdoor wiring diagram. 3. Replace the communication cable referring to the indoor and outdoor wiring diagram. 4. Replace the indoor control board; 5. Replace the outdoor control board.
72	Indoor fan motor fault	1. The cable of the indoor fan motor is connected loosely. 2. The cable of the indoor fan motor fails; 3. The indoor fan motor fails; 4. The indoor control board fails; 5. The outdoor fan has been blocked.	1. Reconnect the cable of the fan motor. 2. Replace the cable of the fan motor. 3. Replace the fan motor. 4. Replace the indoor control board. 5. Check the indoor fan and ensure the indoor fan can run normally.
73	Indoor EEPROM Data fault	1. Indoor EE components fail. 2. The control circuit of the EE components fails. 3. The EE components has been inserted in opposite direction.	1. Replace the EE components. 2. Replace the indoor control board. 3. Reassemble the EE components of the indoor control board.
81	Indoor ambient Temperature Sensor Fault	1. Disconnection or contact failure of connectors on the outdoor controller circuit board 2. Defective thermistor. 3. Defective outdoor controller circuit board.	1. Check connection of connector on the indoor controller circuit board. 2. Check resistance value of thermistor or replace the outdoor temperature sensor. 3. Replace outdoor controller circuit board.
83	Evaporator Middle Temperature Sensor Fault	1. The cable of the coil temperature sensor of the evaporator fails; 2. The coil temperature sensor of the evaporator fails; 3. The sampling circuit is abnormal.	1. Reconnect the cable of the coil temperature sensor of the evaporator; 2. Replace the coil temperature sensor of the evaporator; 3. Replace the indoor control board.
FE	Communication between main control board & Wired controller Fault (display on wired controller)	1. The wired controller and the indoor control board are connected loosely. 2. The sequence of the wiring between the wired controller to the indoor control board is wrong. 3. The wiring between the wired controller to the indoor control board fails. 4. The wired controller fails. 5. The indoor control board is abnormal.	1. Reconnect the wiring between the wired controller to the indoor control board. 2. Replace the wiring between the wired controller to the indoor control board. 3. Replace the wiring between the wired controller to the indoor control board. 4. Replace the wired controller. 5. Replace the indoor control board.

Figure 513

TROUBLESHOOTING

Indoor Unit Cassette and Ducted Diagnostic Codes

ER	Communication between main control board & display board Fault (displays on display board)	1. The wiring between the display board to the indoor control board is connected loosely. 2. The sequence of the wiring between the display board to the indoor control board is wrong. 3. The wiring between the display board to the indoor control board fails. 4. The display board fails. 5. The indoor control board fails.	1. Reconnect the wiring between the display board to the indoor control board. 2. Replace the wiring between the display board to the indoor control board. 3. Replace the wiring between the display board to the indoor control board. 4. Replace the display board. 5. Replace the indoor control board.
NOTE 1: If the indoor unit can not start or the indoor unit stops itself after 30s, at the same time the unit do not display the fault code, please check the pin and the socket of the control board.			
NOTE 2: If the indoor unit displays the 75,76,77,78 fault code after you turn on the unit, please check the TEST seat of the indoor control board or the TEST detection circuit to see whether short circuit occurs.			
NOTE 3: Overload in cooling mode			
		THE ROOT CAUSE	**CORRECTIVE MEASURE**
1		The refrigerant is excessive.	Discharge the refrigerant, and recharge the refrigerant referring to the nameplate and the installation section of this manual.
2		The outdoor ambient temperature is too high.	Please use within allowable temperature range
3		Short-circuit occurs in the air outlet and air inlet of the outdoor unit.	Adjust the installation of the outdoor unit referring to the installation section of this manual.
4		The outdoor heat exchanger is dirty, such as condenser.	Clean the heat exchanger of the outdoor unit, such as condenser
5		The speed of the outdoor fan motor is too low.	Check the outdoor fan motor,
6		The outdoor fan is broken or the outdoor fan is blocked.	Check the outdoor fan.
7		The air inlet and outlet has been blocked.	Remove the blocked objects.
8		The expansion valve fails.	Replace the expansion valve.
NOTE 4: Over load in heating mode			
1		The refrigerant is excessive.	Discharge the refrigerant, and recharge the refrigerant referring to the nameplate and the installation section of this manual.
2		The outdoor ambient temperature is too high.	Please use within allowable temperature range
3		The indoor ambient temperature is too high.	Please use within allowable temperature range.
4		Short-circuit occurs in the air outlet and air inlet of the outdoor unit.	Adjust the installation of the outdoor unit referring to the installation section of this manual.
5		The indoor filter is dirty.	Clean the indoor filter.
6		The speed of the indoor fan motor is too low.	Check the indoor fan motor and fan capacitor.
7		The indoor fan is broken or the outdoor fan is blocked.	Check the indoor fan.
8		The air inlet and outlet has been blocked.	Remove the blocked objects.
9		The expansion valve fails.	Replace the expansion valve.
Fault Clearance Procedures Fault Code 56: Clearance Condition: After repairing the leak, power-cycle the unit. The fault will reset if the system continuously detects refrigerant concentration below the alarm threshold or confirms no leakage via sensor data. Post-Clearance Action: The unit will enforce a 5-minute high-speed fan operation to stabilize the system. Fault Code 57: Clearance Condition: The fault auto-clears when communication with the refrigerant sensor is re-established or the sensor ceases to report intrinsic faults. No manual intervention required post-recovery			

Figure 513

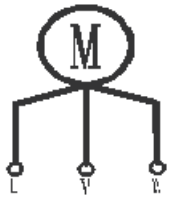
COMPONENTS TESTING

1. DC Motor (Indoor unit)

a. External drive

Use the multimeter to test resistance between two terminals at 77°F(25°C).

Model	Duct type		Cassette type		Air Handler type	
	Normal test results	Deviation range	Normal test results	Deviation range	Normal test results	Deviation range
9K/12K	U-V: 75Ω U-W: 75Ω V-W: 75Ω	±10%	U-V: 50Ω U-W: 50Ω V-W: 50Ω	±10%	/	/
18K	U-V: 39Ω U-W: 39Ω V-W: 39Ω	±7%	U-V: 32Ω U-W: 32Ω V-W: 32Ω	±10%	U-V: 6.4Ω U-W: 6.4Ω V-W: 6.4Ω	±7%
24K	U-V: 16.5Ω U-W: 16.5Ω V-W: 16.5Ω	±7%	U-V: 32Ω U-W: 32Ω V-W: 32Ω	±10%	U-V: 6.4Ω U-W: 6.4Ω V-W: 6.4Ω	±7%
36K	U-V: 3.65Ω U-W: 3.65Ω V-W: 3.65Ω	±7%	U-V: 34.5Ω U-W: 34.5Ω V-W: 34.5Ω	±10%	U-V: 2.9Ω U-W: 2.9Ω V-W: 2.9Ω	

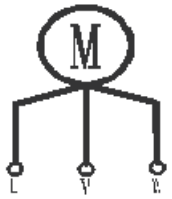


2. DC Motor (Outdoor unit)

External drive

Use the multimeter to test resistance between two terminals at 77°F(25°C).

Model	Test condition (Ambient temperature)	Normal test results	Deviation range
9K/12K	77°F(25°C)	U-V: 52Ω U-W: 52Ω V-W: 52Ω	±10%
18K	68°F(20°C)	U-V: 44Ω U-W: 44Ω V-W: 44Ω	±7%
24K	68°F(20°C)	U-V: 38.75Ω U-W: 38.75Ω V-W: 38.75Ω	±7%
36K	68°F(20°C)	U-V: 7.1Ω U-W: 7.1Ω V-W: 7.1Ω	±7%



3. Compressor

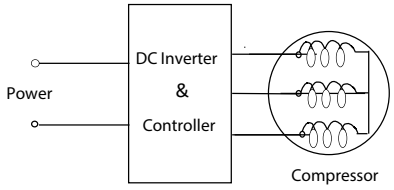
Test in resistance.

TOOL: Multi-meter.

Test the resistance of the winding. The compressor fails if the resistance of winding is 0 (short circuit)or∞(open circuit).

Familiar error:

1) Compressor motor lock.
2) Discharge pressure value approaches static pressure value.
3) Compressor motor winding abnormality.



COMPONENTS TESTING

Notes：

1) Don't put a compressor on its side or turn over.
2) Please assemble the compressor in your air conditioner rapidly after removing the plugs. Don't place the comp. in air for a long time.
3) Avoid compressor running in reverse caused by connecting electrical wire incorrectly.
4) Warning! In case AC voltage is impressed to compressor, the compressor performance will decrease because of its rotor magnetic force decreasing.

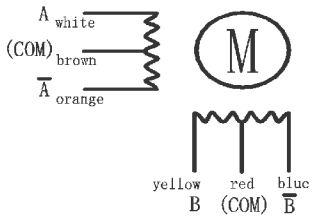
Use the multimeter to test resistance between two terminals at 68℉(20℃)
Test results:

Model	Part Number	Normal test results	Deviation range
9K/12K	2410469	U-V: 1.419Ω U-W: 1.419Ω V-W: 1.419Ω	±5%
18K	2410440	U-V: 0.986Ω U-W: 0.986Ω V-W: 0.986Ω	±5%
24K	2410447	U-V: 0.560Ω U-W: 0.560Ω V-W: 0.560Ω	±5%
36K	2410482	U-V: 0.426Ω U-W: 0.426Ω V-W: 0.426Ω	±5%

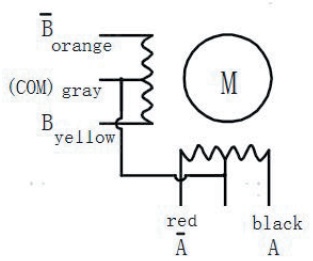
4. EEV coil

Use the multimeter to test resistance between two terminals at 68 ℉(20℃).
Test results:

Model	Normal test results	
9K~24K	Brown （com）-White Brown （com）-Orange Red （com）-Yellow Red （com）-Blue	46Ω±3.7Ω
36K	Grey(COM)-Black: 46Ω Grey(COM)-Red: 46Ω Grey(COM)-Orange: 46Ω Grey(COM)-Yellow: 46Ω	



9K~24K



36K

5. 4-Way valve coil

Use the multimeter to test resistance between two terminals at 68℉(20℃).

Test results:

Model	Normal test res ults
9K~36K	2085Ω±208Ω

COMPONENTS TESTING

6. Water pump

Use the multimeter to test resistance between two terminals at 77°F(25℃).

Test results:

Duct type		Cassette type	
Model	Normal test results	Model	Normal test results
9K~24K	333Ω±10%	9K~12K	333Ω±10%
36K	333Ω±10%	18K~36K	435Ω±8%

7. Water switch level

Test the resistance between two harness.

Testing condition：

1.at the on-position condition

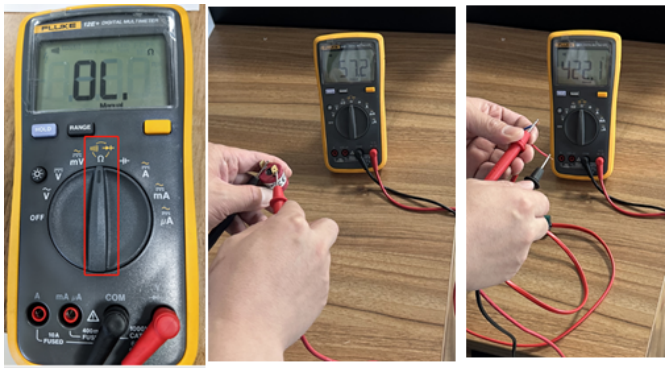
2.at 77°F(25℃)

Test results:

Model	Normal test results
9K/12K	≤0.3Ω
18K~36K	≤0.4Ω

8. Pressure switch

The pressure switch is divided into normally closed and normally open types (under atmospheric pressure), the high pressure switch is normally closed, and the low pressure switch is normally open.

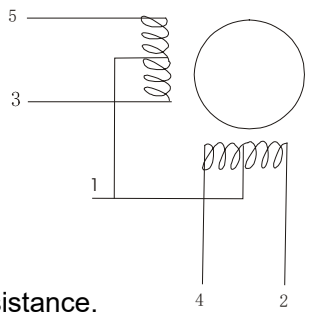


Normally closed switch detection:
With no pressure in the pipeline, you can turn a multimeter to the ohm range and connect the red and black probes with a pin (lead) respectively to detect whether the switch is in the "ON" state.

Normally open switch detection:
With the pressure in the pipeline higher than the switching-on pressure, you can turn a multimeter to the ohm range and connect the red and black probes with a pin (lead) respectively to detect whether the switch is in the "ON" state

COMPONENTS TESTING

9. **Step motor**



Test results:

Model	Normal test results
9K~36K	300Ω±7%

Test in resistance.
Tool: Multimeter.

Test the resistance of winding. The stepper motor fails if the resistance of winding is 0 (short circuit) or ∞ (open circuit).

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).

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

230v Indoor Unit Main PCB Terminal ID (No A2L Sensor Capability)

FAHFW18A3D (Serial Numbers prior to 2505F05243)

FAHFW24A3D (Serial Numbers prior to 2505F06609),

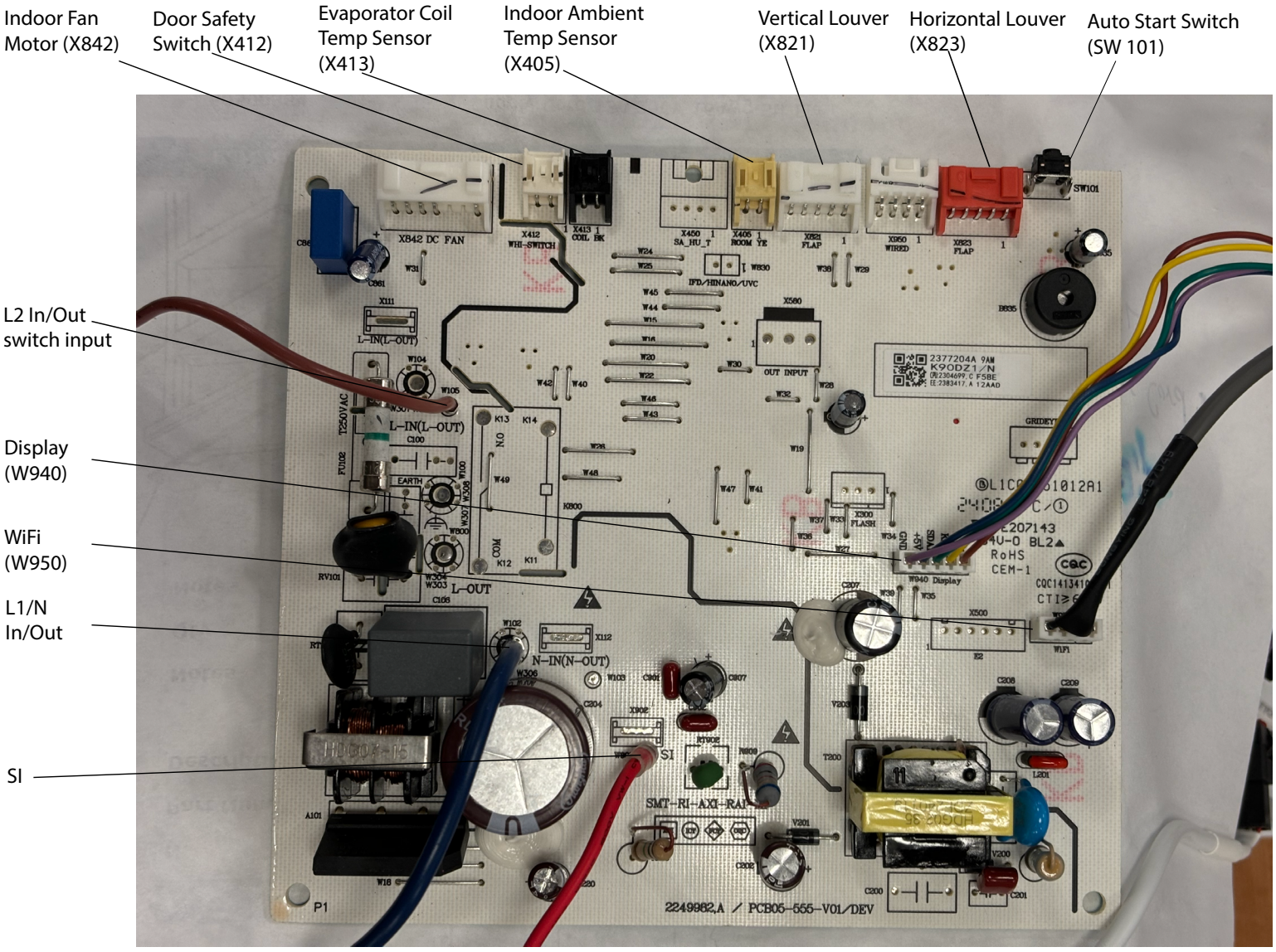


Figure 601

COMPONENTS TESTING

230v Indoor Unit Main PCB Terminal ID (With A2L Sensor Capability)

FAHFW09A3D, FAHFW12A3D

FAHFW18A3D (Serial Numbers 2505F05243 and after)

FAHFW24A3D (Serial Numbers 2505F06609 and after),

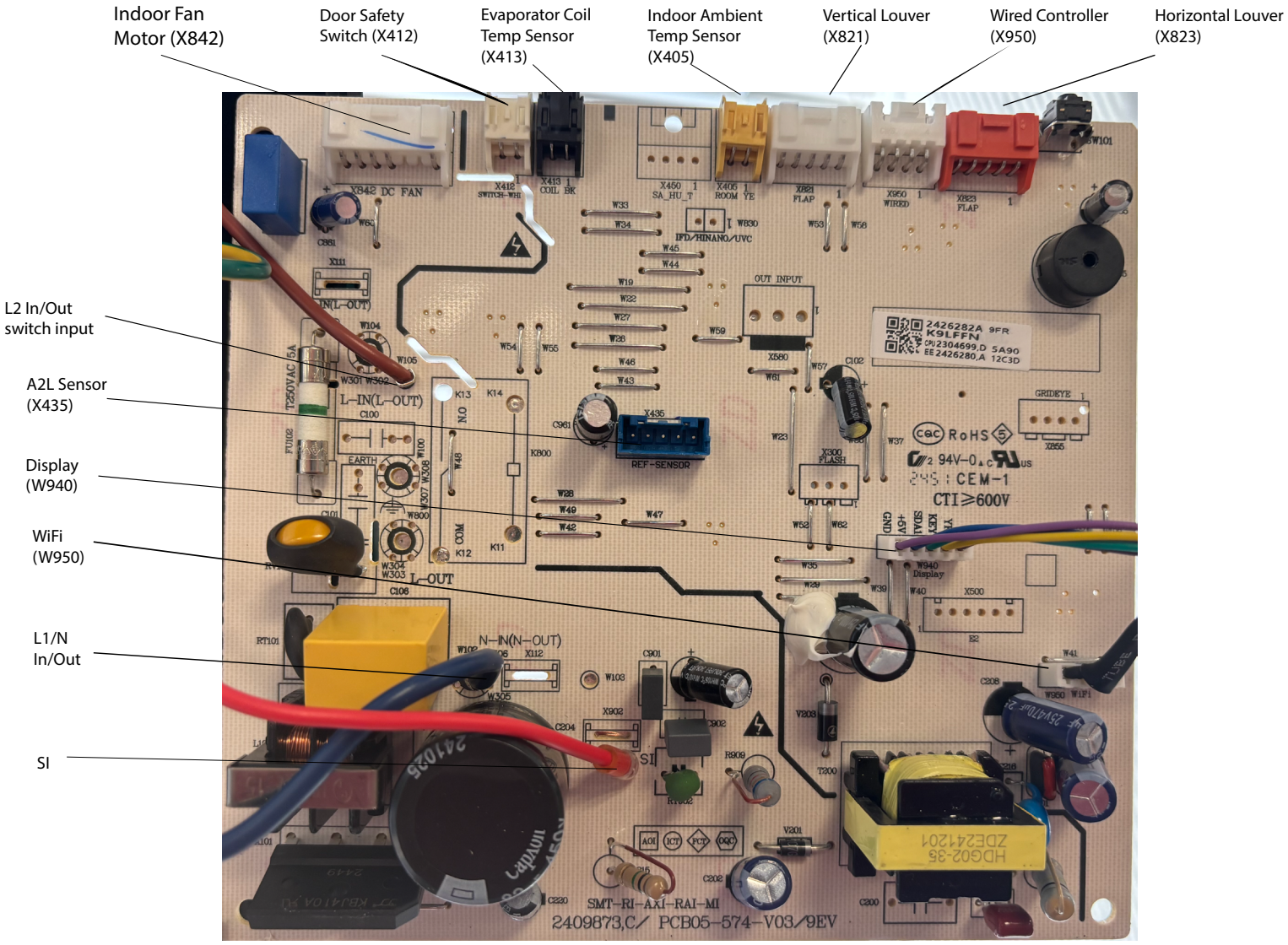


Figure 602

COMPONENTS TESTING

Indoor Fan Motor

Power Check:

1. Turn unit on.
2. Check indoor fan connector on main PCB.

There are 5 wires:
Voltage for Power (Red) to Ground (Black) = 310 VDC
Motor Return Voltage (White) to Ground (Black) = 15 VDC
PWM (Yellow) to Ground (Black) = 0-6.5 VDC

3. 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.

⚠ WARNING

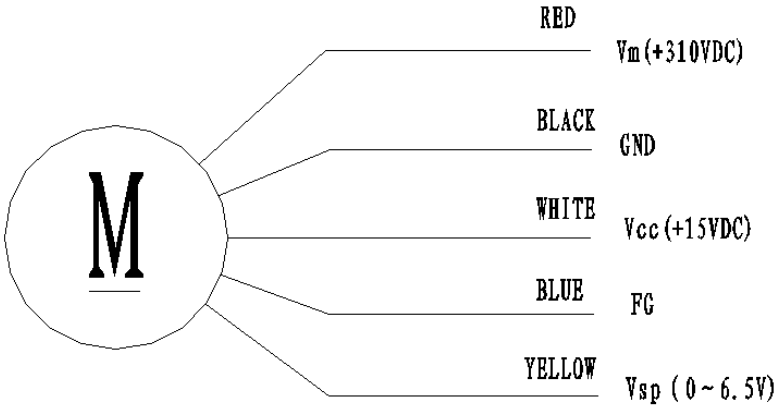
ELECTRIC SHOCK HAZARD

Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

Figure 603

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)

COMPONENT TESTING

Reversing Valve

A reversing valve is a component of a heat pump that changes the direction of refrigerant flow, allowing the system to function in both heating and cooling modes.

It consists of a pressure-operated, main valve and a pilot valve actuated by a solenoid plunger. The solenoid is energized by 24 vac during the heating cycle only.

The single tube on one side of the main valve body is the high-pressure inlet to the valve from the compressor. The center tube on the opposite side is connected to the low pressure (suction) side of the system. The other two are connected to the indoor and outdoor coils. Small capillary tubes connect each end of the main valve cylinder to the "A" and "B" ports of the pilot valve. A third capillary is a common return line from these ports to the suction tube on the main valve body. Four-way reversing valves also have a capillary tube from the compressor discharge tube to the pilot valve.

The plunger assembly in the main valve can only be shifted by the pressure differential between the high and low sides of the system. The pilot section of the valve opens and closes ports for the small capillary tubes to the main valve to cause it to shift.

⚠ WARNING

ELECTRIC SHOCK HAZARD

Disconnect power to the unit before servicing. Failure to follow this warning could result in serious injury or death.

⚠ WARNING

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

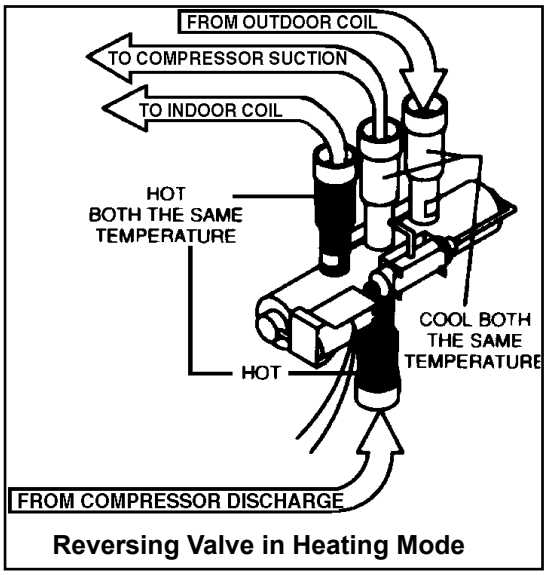
Proper safety procedures must be followed, and PPE must be utilized when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

Checking the Reversing Valve

NOTE: System operating pressures must be near normal before valve can shift. NOTE: You must have normal operating pressures before the reversing valve can shift.

Run the unit in the heating mode then disconnect connector X 800 from the ODU main PCB and the valve should shift to cooling mode. If valve does not shift - replace the valve(verify the unit is properly charged before replacing valve.) For a stuck valve diagnosis run in the cooling mode and check the temp difference between the suction line from the evaporator and the common suction line at the compressor, if there is more than a 3 °F difference then change the valve.

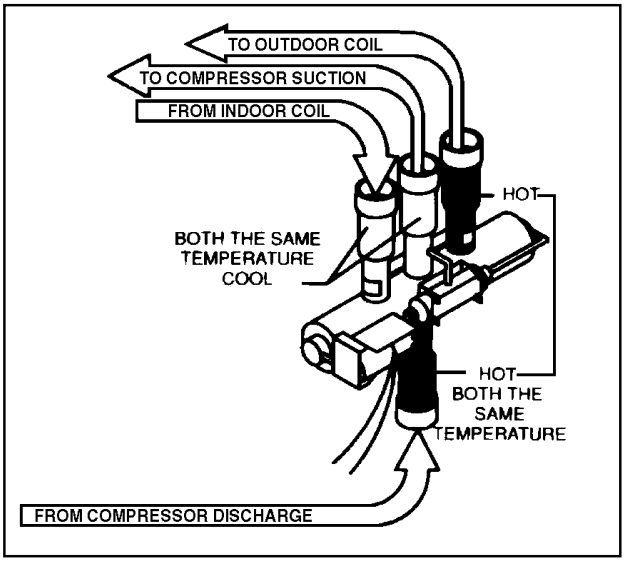


Reversing Valve in Heating Mode

Checking The Reversing Valve Solenoid

The solenoid coil is an electromagnetic type coil mounted on the reversing valve and is energized during the operation of the compressor in the heating cycle.

1. Turn off high voltage electrical power to unit.
2. Unplug line voltage lead from reversing valve coil.
3. Check for electrical resistance through the coil. If the coil is open replace the coil.
4. Check from each lead of coil to the copper liquid line as it leaves the unit or the ground lug. There should be no continuity between either of the coil leads and ground; if there is, coil is grounded and must be replaced.
5. If coil tests okay, reconnect the electrical leads.
6. Make sure coil has been assembled correctly.

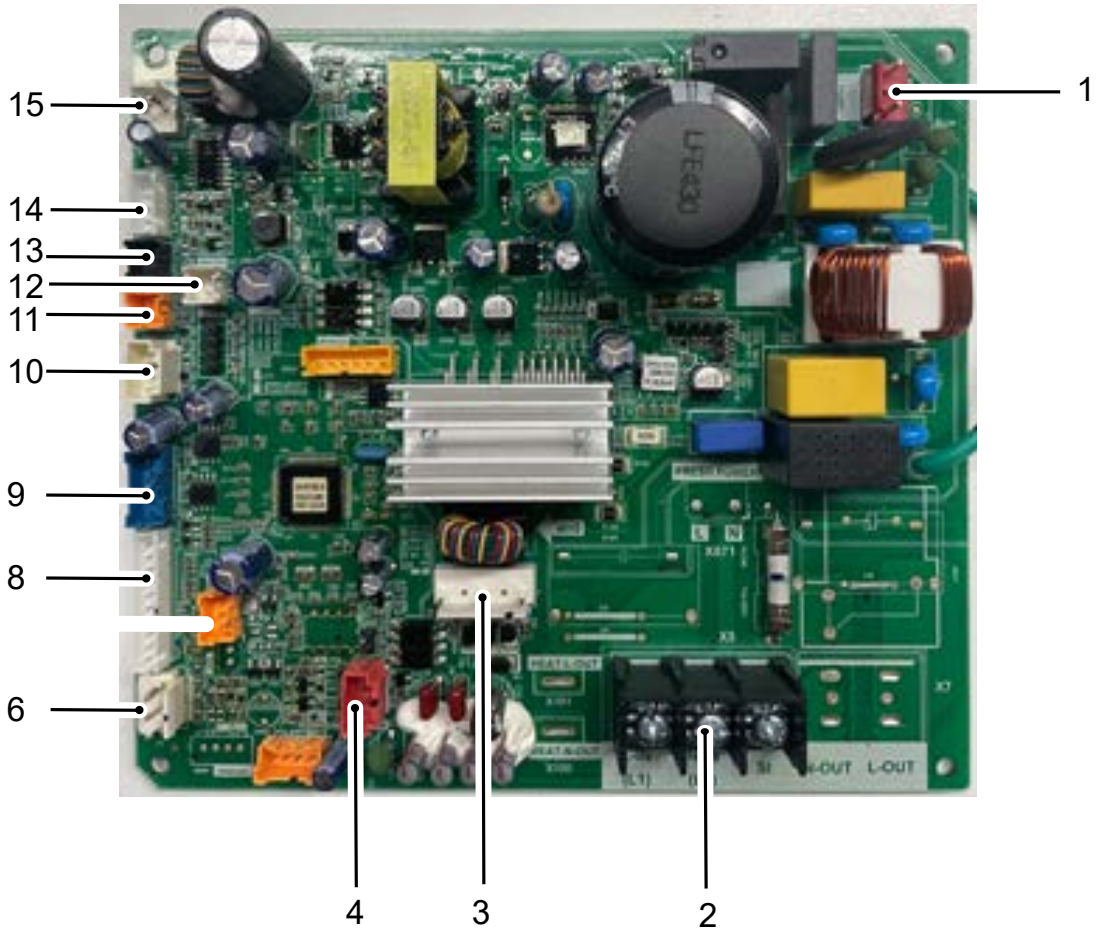


NOTE: Do not start unit with solenoid coil removed from valve, or do not remove coil after unit is in operation. This will cause the coil to burn out.

7. With the unit in heat mode, verify that unit has 24 vac on the solenoid terminals of the Outdoor Unit Main PCB.

COMPONENTS TESTING

Ducted Unit 9-12k BTU - Main PCB ID

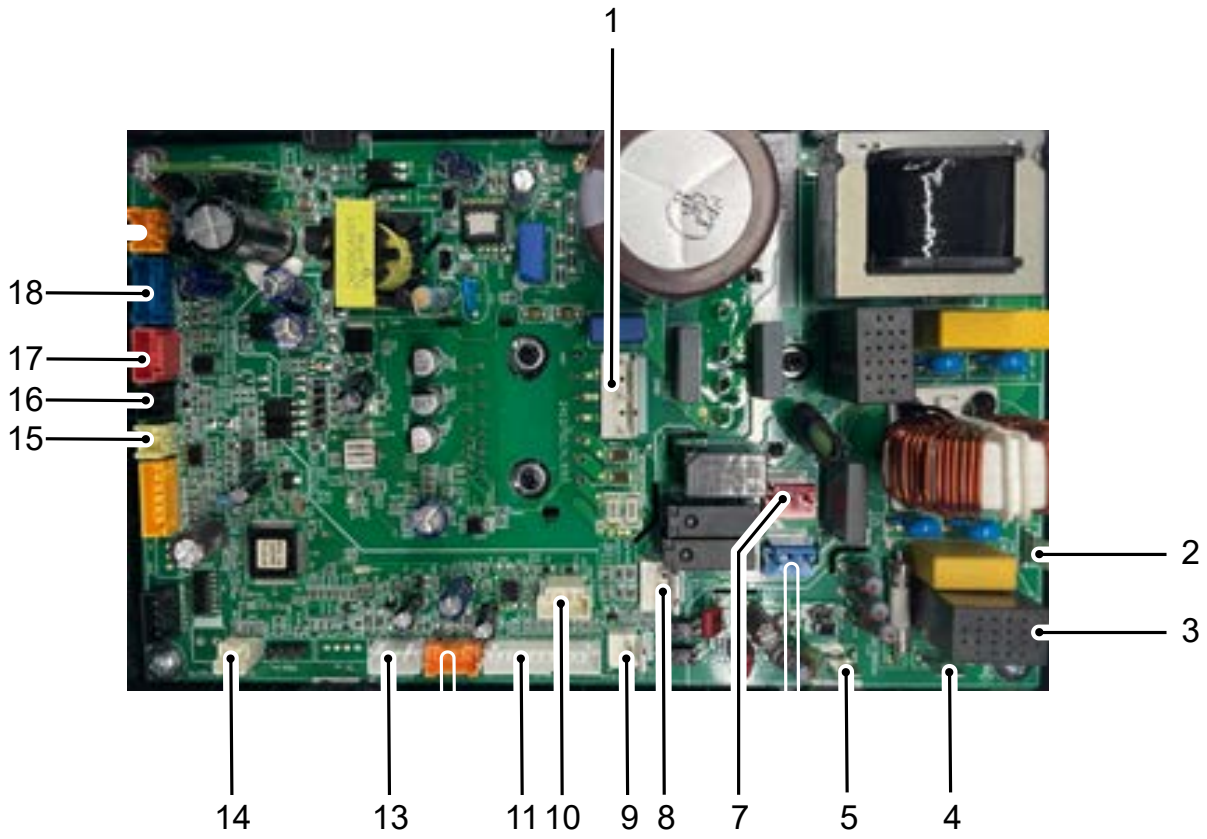


NO.	Description	NO.	Description
1	Pump Motor	9	Refrigerant Interface
2	Terminal Block	10	WIFI Interface
3	DC-Fan Motor	11	Ambient Temperature Sensor
4	Humidity Sensor	12	Water Switch
		13	Coil Temperature Sensor
6	Door ON/OFF Input or Fire Input	14	Wired Controller
		15	12V-Output
8	Display Interface		

Figure 604

COMPONENTS TESTING

Ducted Unit 18k-36k BTU - Main PCB ID

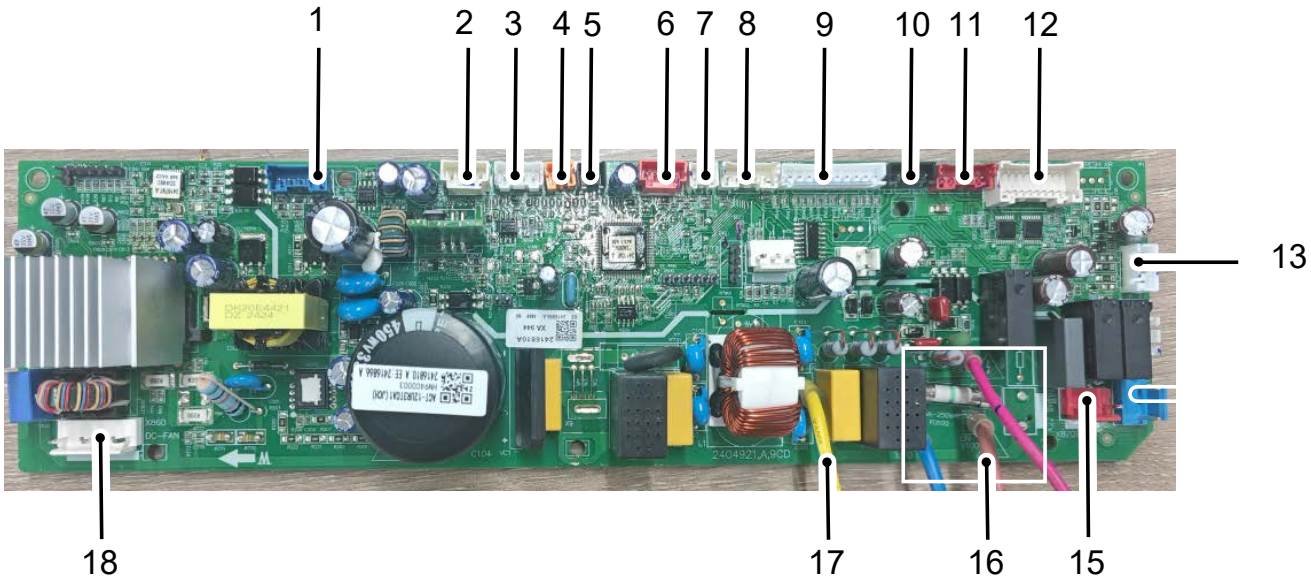


NO.	Description	NO.	Description
1	DC Fan Motor	11	Display Interface
2	Ground line		
3	N-In Line	13	Wired Controller
4	L-In Line	14	Water Switch
5	Si Line	15	Ambient Temperature Sensor
		16	Coil Temperature Sensor
7	Pump Motor	17	Humidity Sensor
8	Door ON/OFF Input or Fire Input	18	Refrigerant Interface
9	12V-Output		
10	WIFI Interface		

Figure 605

COMPONENTS TESTING

Cassette Unit - Main PCB ID

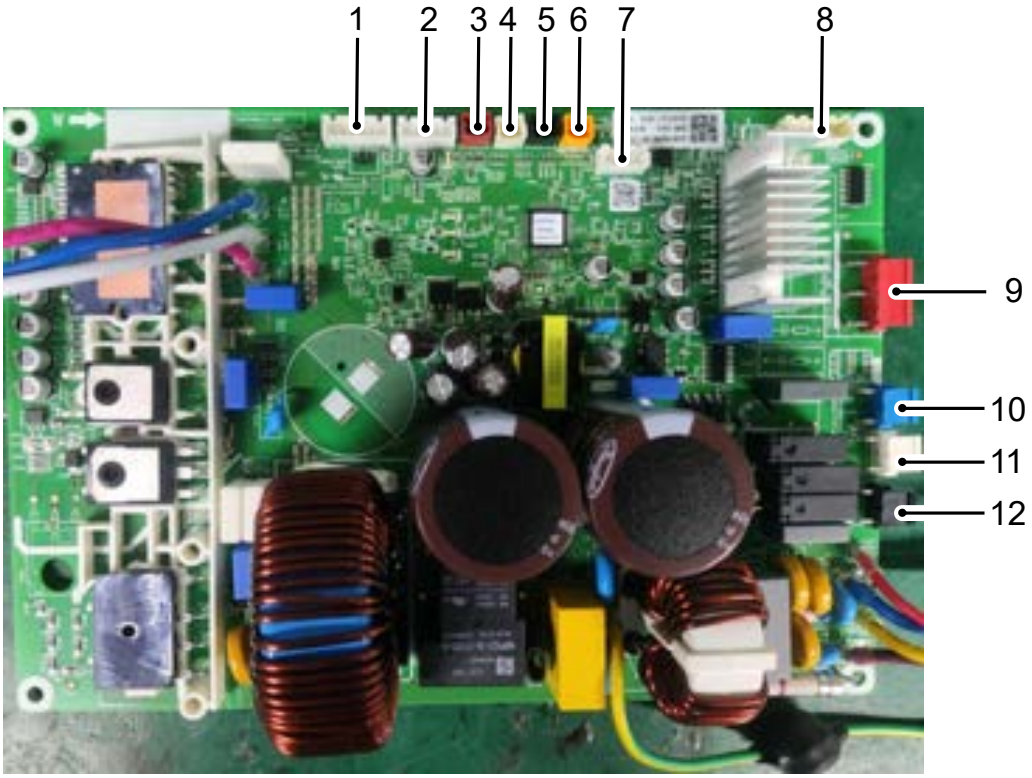


NO.	Description	NO.	Description
1	Refrigerant Interface	10	Heater
2	WIFI Interface	11	STEP Motor
3	IR SENSOR	12	STEP Motor
4	Ambient Temperature Sensor	13	Wired Controller
5	Coil Temperature Sensor		
6	Humidity Sensor	15	Pump
7	Water Level	16	L-in/ N-in /Si Line
8	Display Interface	17	Ground
9	Display Interface	18	DC Fan Motor

Figure 606

COMPONENTS TESTING

Outdoor Unit -9-12k BTU Main PCB ID

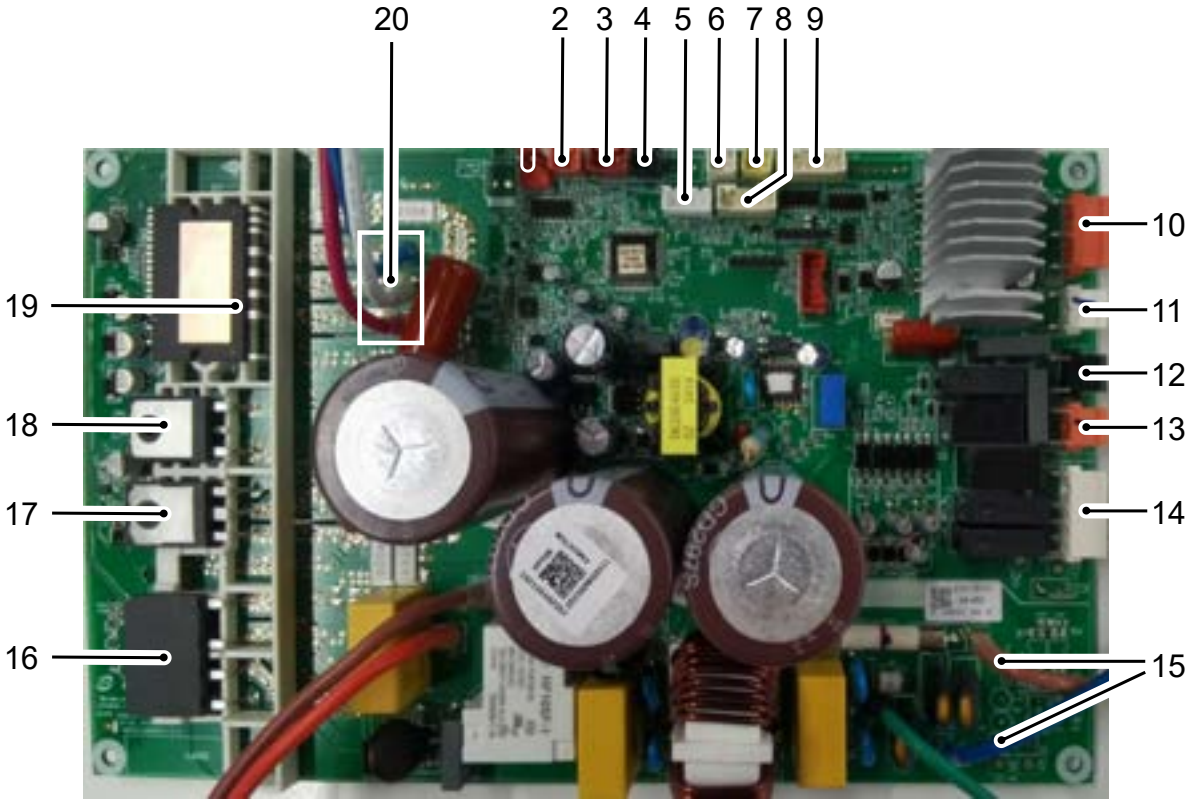


NO.	Description	NO.	Description
1	EE-PRG	7	Flash
2	Checker	8	Electronic Expansion Valve
3	Overheat Protector	9	DC Fan Motor
4	Discharge Temperature Sensor	10	Base Heater Interface
5	Coil Temperature Sensor	11	Heating Belt Interface
6	Ambient Temperature Sensor	12	4-Way Valve Circuit and Interface

Figure 607

COMPONENTS TESTING

Outdoor Unit - 18k-24k BTU Main PCB ID

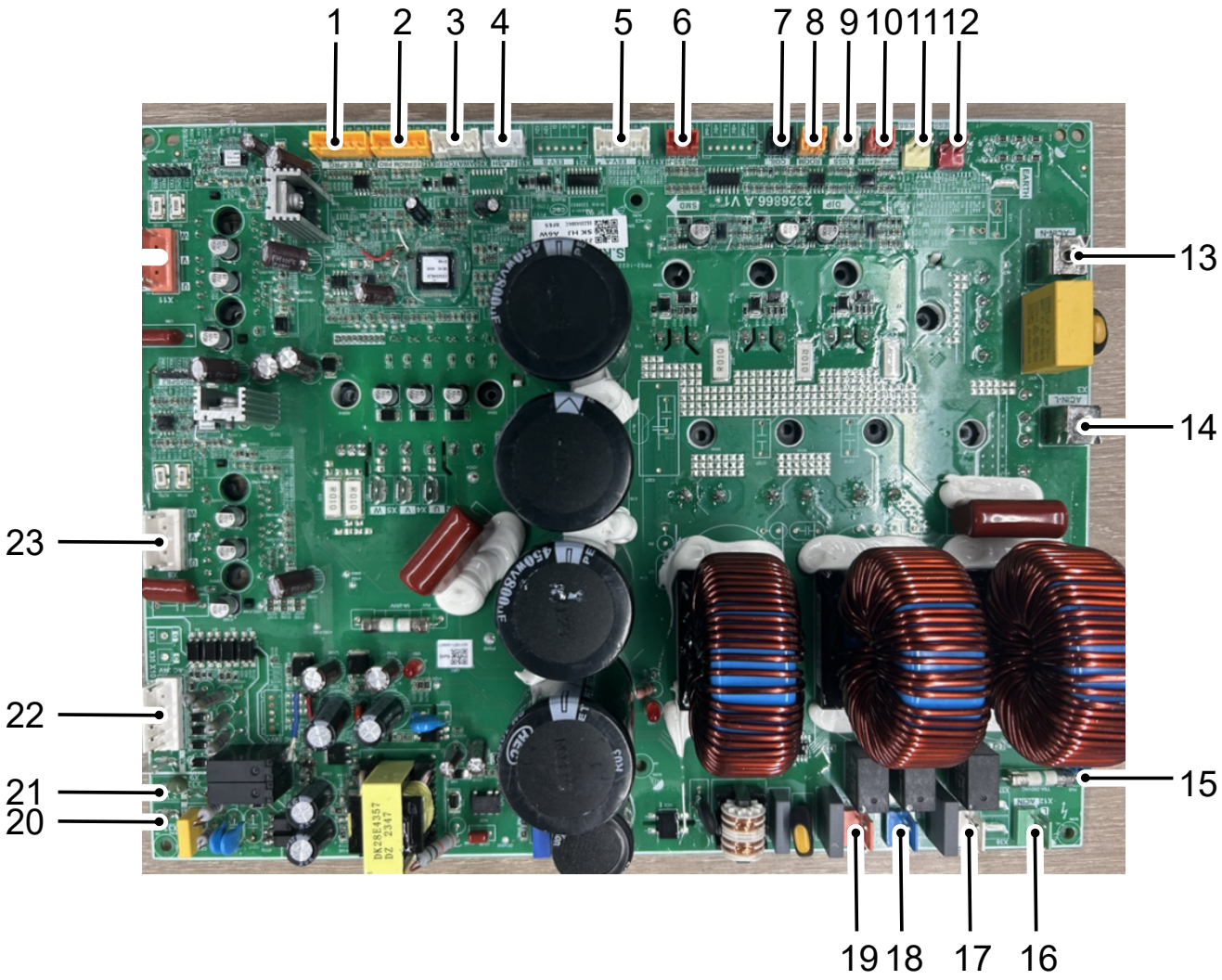


NO.	Description	NO.	Description
		11	Crankcase Heater
2	Overheat Protector	12	4-way Valve
3	Press Sensor	13	Base Heater
4	Coil Temperature Sensor	14	Communication Signal between IDU&ODU
5	EEPROM	15	AC Power Lin / AC Power Nin
6	Discharge Temperature Sensor	16	Rectification Module
7	Ambient Temperature Sensor	17	IGBT
8	Computer/Checker	18	Freewheel Diode
9	Electronic Expansion Valve	19	IPM Module
10	DC Fan Motor	20	Compressor

Figure 608

COMPONENTS TESTING

Outdoor Unit - 36k BTU Main PCB ID



NO.	Description	NO.	Description
1	EE-PRG	13	N Power input
2	EEPROM PRO	14	L Power input
3	Watcher	15	PTC signal
4	EEPROM Flashing	16	L/N Power input
5	Electronic Expansion Valve	17	Heating Belt Interface
6	Pressure Sensor	18	Base Heater Interface
7	Coil Temperature Sensor	19	4-Way Valve Circuit and Interface
8	Ambient Temperature Sensor	20	TO PAC Indoor
9	Discharge Temperature Sensor	21	24V Communication signal-W
10	Compressor Overheat Protector	22	24V Communication signal-C/G/B/Y1/Y2
11	Low Voltage Switch	23	DC Fan Motor1
12	high voltage switch		

Figure 609

COMPONENTS TESTING

Outdoor Unit - Segment Display Board (Checker Board)

NO.	Description	NO.	Description
1	Computer/Checker to Outdoor Control Board	4	S1-Select Button
2	7-Segment Display	5	S2-Increase Button
3	DIP Switch	6	S3-Decrease Button

Checker Box (Only for 36K)

For 36K, during installation, please connect the Checker box supplied in the accessories to the electrical box as shown in the figure below.

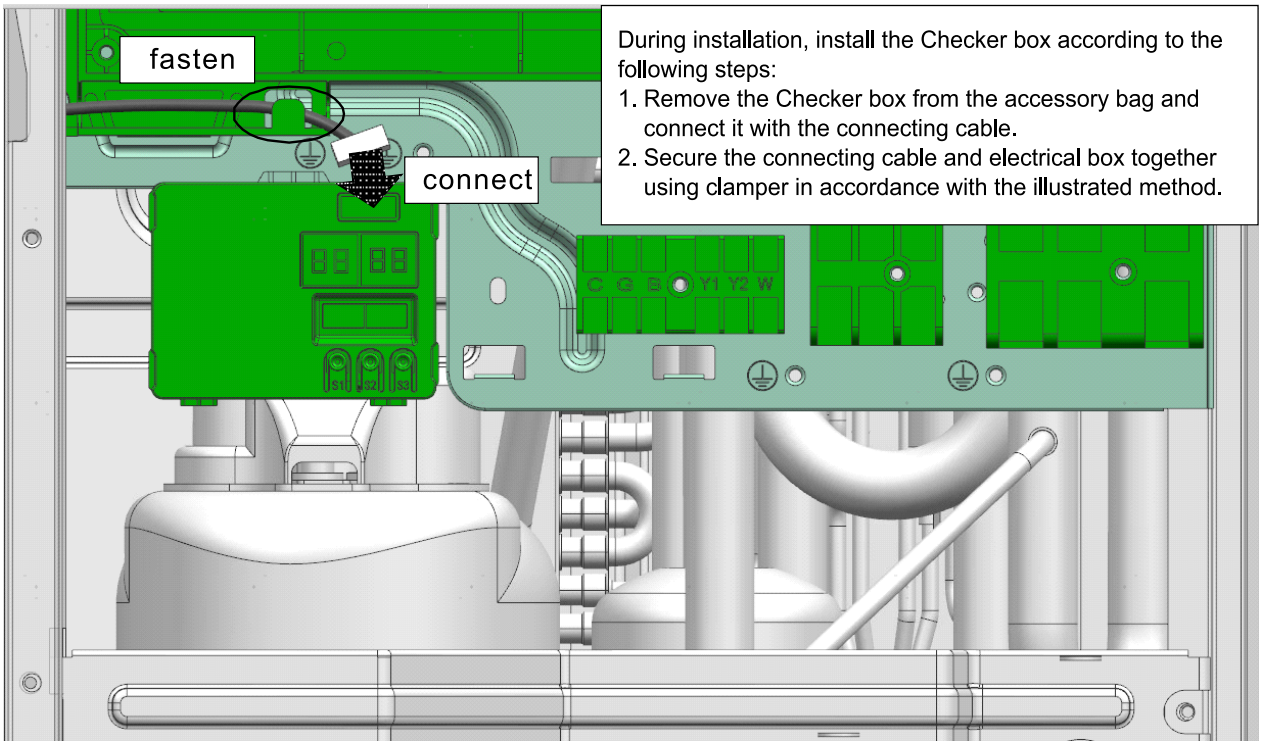
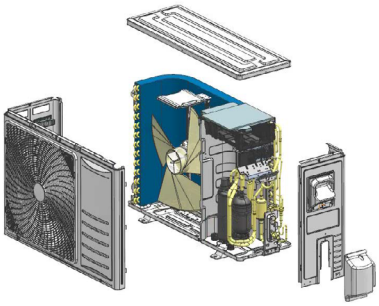
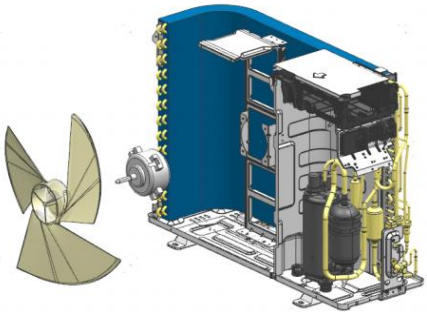
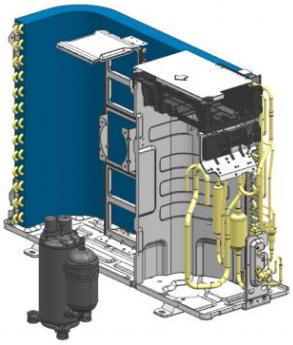
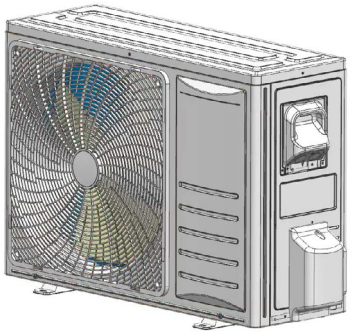


Figure 6

DISASSEMBLY

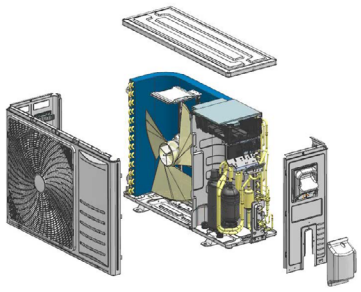
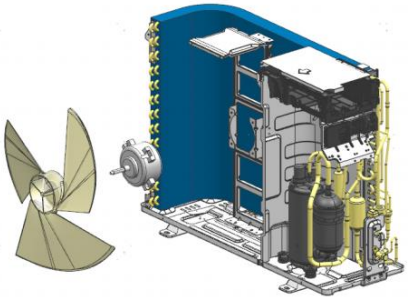
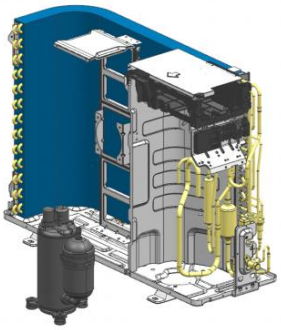
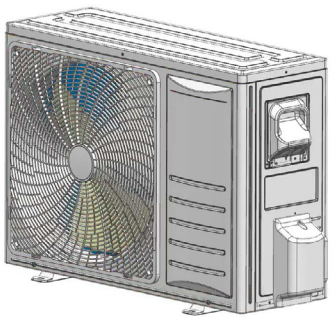
Outdoor Unit (9k-18k)

Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.		
Step	Illustration	Handling Instruction
1.Remove external casing		1.Remove the top cover and handle; 2.Remove the outer case and valve mounting plate.
2.Remove motor		1.Remove the blade nut and then remove the blade; 2.Remove the motor from motor supporter;
3.Remove compressor		1. Remove all refrigerant from system. Refer to Sealed System Repairs. 2. Cut out the 4-way valve piping assy from compressor; 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.
4.Assemble unit		Assemble the unit in the reverse order of disassembly.

DISASSEMBLY

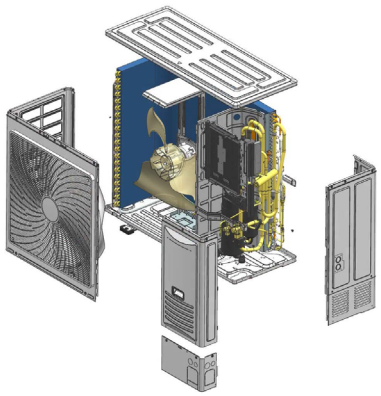
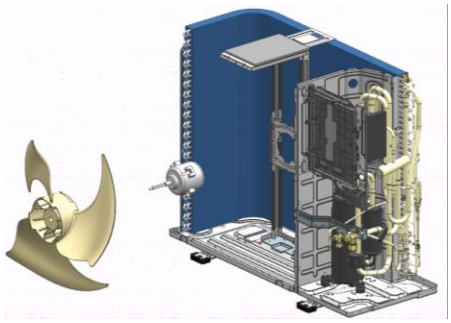
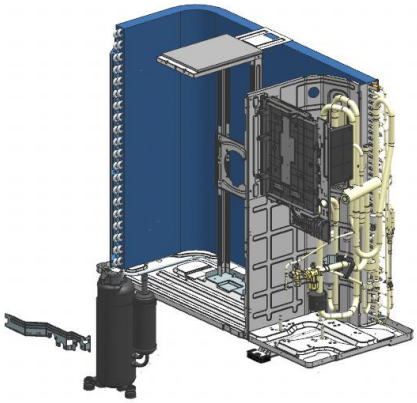
Outdoor Unit (24k)

Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

Step	Illustration	Handling Instruction
1.Remove external casing		1.Remove the top cover and handle; 2.Remove the outer case and valve mounting plate.
2.Remove motor		1.Remove the blade nut and then remove the blade; 2.Remove the motor from motor supporter;
3.Remove compressor		1. Remove all refrigerant from system. Refer to Sealed System Repairs. 2. Cut out the 4-way valve piping assy from compressor 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.
4.Assemble unit		Assemble the unit in the reverse order of disassembly.

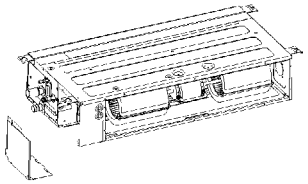
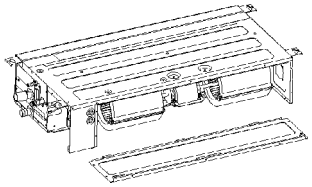
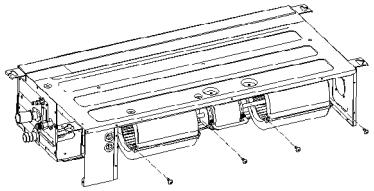
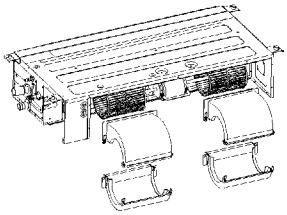
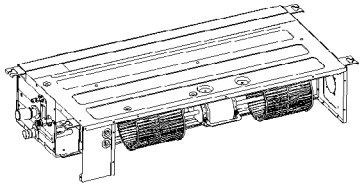
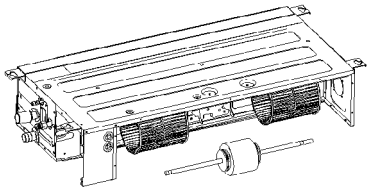
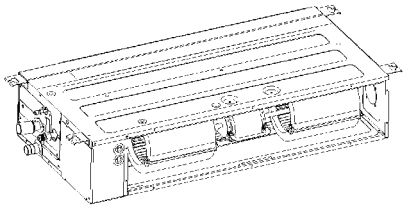
DISASSEMBLY

Outdoor Unit (36k)

Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.		
Step	Illustration	Handling Instruction
1.Remove external casing		1.Remove the top cover and handle; 2.Remove the outer case and valve mounting plate.
2.Remove motor		1.Remove the blade nut and then remove the blade; 2.Remove the motor from motor supporter;
3.Remove compressor		1. Remove all refrigerant from system. Refer to Sealed System Repairs. 2. Cut out the 4-way valve piping assy from compressor 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.
4.Assemble unit		Assemble the unit in the reverse order of disassembly.

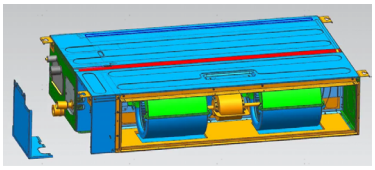
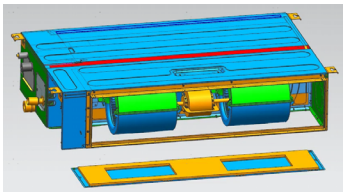
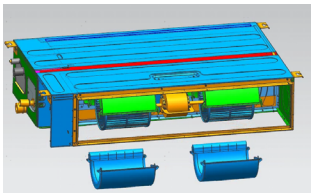
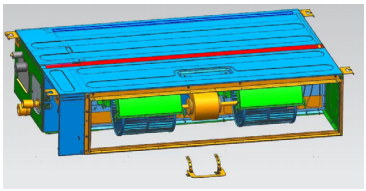
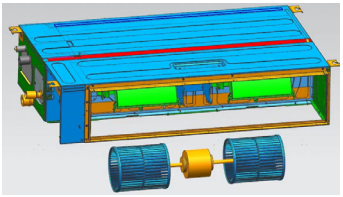
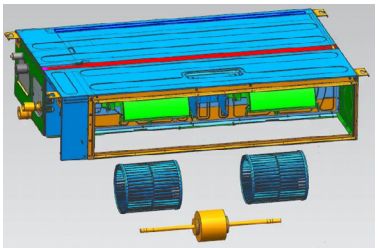
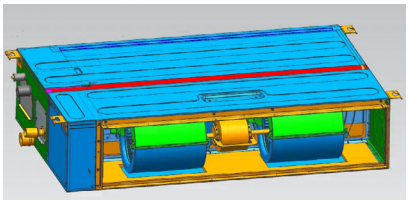
DISASSEMBLY

Indoor Unit (Ducted 9k/12k)

Removal and Assembly of Fan Motor		
Important: Before removing the fan, make sure power to the system is disconnected.		
Step	Illustration	Handling Instruction
1. Unplug the motor cables		Use screwdriver to remove the electric box cover and unplug the motor cables in the electric box.
2. Remove the base board		Loosen and take out the screws fixing the base board, then remove the base board.
3. Remove the screws on fan sub-assembly.		Remove the screws on fan sub-assembly.
4. Remove the fan cage enclosure		Rotate the fan cage housing toward supply opening and remove it.
5. Loosen the fan and motor.		Use a hex wrench to loosen the screws holding the fan cage to the motor shaft. Remove outer housing holding motor in place.
6. Replace the motor		Remove the motor from the support bracket. Then remove the fan cages from the motor shafts. Remove the motor from the air inlet and replace it with new motor. Be sure to tighten the cages onto the motor shafts.
7. Reassembly of the unit		Reassemble the unit in the reverse order of disassembly and test the operation.

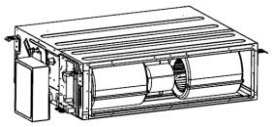
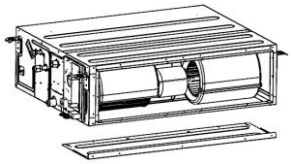
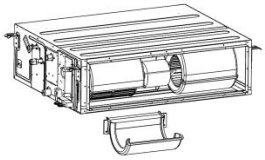
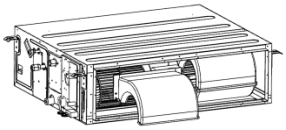
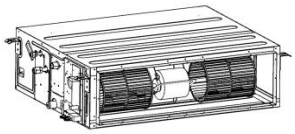
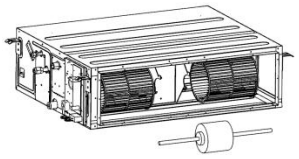
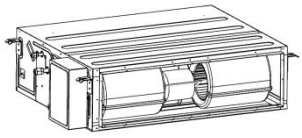
DISASSEMBLY

Indoor Unit (Ducted 18k-24k)

Removal and Assembly of Fan Motor		
Important: Before removing the fan, make sure power to the system is disconnected.		
Step	Illustration	Handling Instruction
1. Unplug the motor cables		Use screwdriver to remove the electric box cover and unplug the motor cables in electric box.
2. Remove the base board		Loosen and take out the screws fixing the base board, then remove the base board.
3. Remove the screws on fan sub-assembly.		Remove the screws on fan sub-assembly.
4. Remove the clamp sub-assembly.		Screw the bolts on the clamp sub-assembly, and take the clamp out of the motor bracket.
5. Remove the fan and motor sub-assembly.		Remove the fan and motor sub-assembly from the motor bracket.
6. Remove the fan.		Remove the fan cages from the motor shafts.
7. Reassembly of the unit		Reassemble the unit in the reverse order of disassembly and test operation.

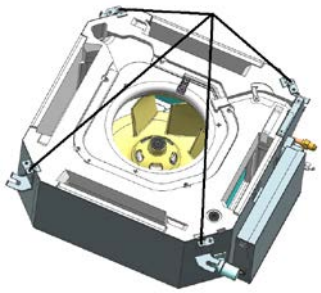
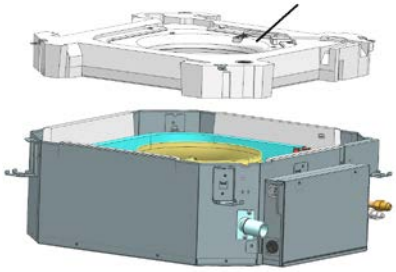
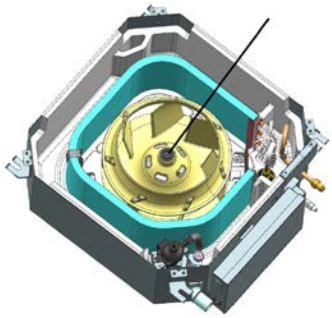
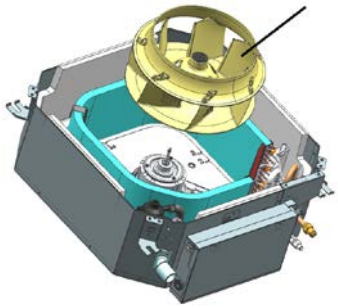
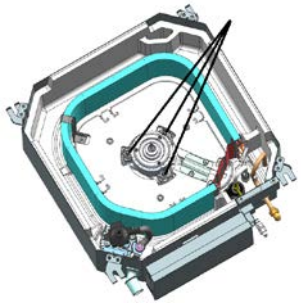
DISASSEMBLY

Indoor Unit (Ducted 36k)

Removal and Assembly of Fan Motor		
Important: Before removing the fan, make sure power to the system is disconnected.		
Step	Illustration	Handling Instruction
1. Unplug the motor cables		Use screwdriver to remove the electric box cover and unplug the motor cables in electric box.
2. Remove the base board		Loose and take out the screws fixing the base board, then remove the base board.
3. Remove the screws on fan sub-assembly.		Remove the screws on fan sub-assembly.
4. Removing the fan cage enclosure		Rotate the fan cage housing toward supply opening and remove.
5. Loosen the fan and motor.		Use a hex wrench to loosen the screws holding the fan cage to the motor shaft. Remove outer housing holding motor in place.
6. Replace the motor		Remove the motor from the support bracket. Then remove the fan cages from the motor shafts. Remove the motor from the air inlet and replace with new motor. Be sure to tighten the cages onto the motor shafts.
7. Reassembly of the unit		Reassemble the unit in the reverse order of disassembly and test operation.

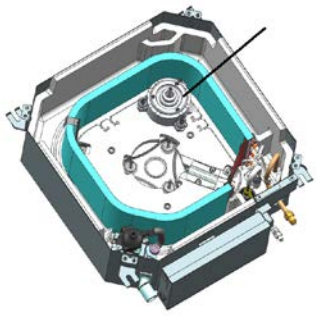
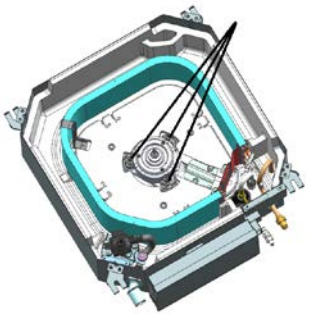
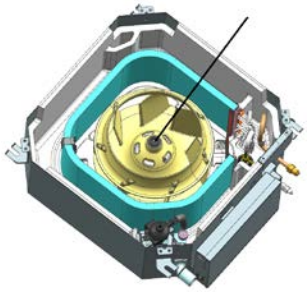
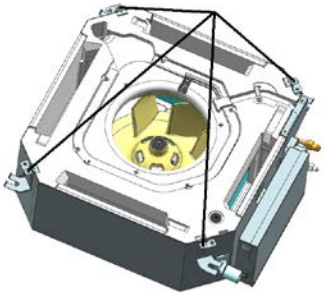
DISASSEMBLY

Indoor Unit (Cassette 9k-12k)

Replacement of Fan Motor		
Step	Illustration	Handling Instruction
1. Loosen the screws holding condensate pan.		Use screwdriver to loosen the screws holding the drain pan in place.
2. Remove the condensate pan		Carefully remove the condensate pan.
3. Loosen the bolt holding the fan blade in place		Use a wrench or socket to carefully remove the fan blade bolt.
4. Remove the fan blade		The fan blade can now be removed.
5. Loosen the bolts holding the motor in place		Use a wrench or socket to carefully remove the motor bolts.

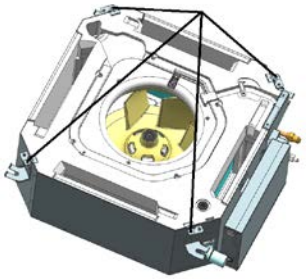
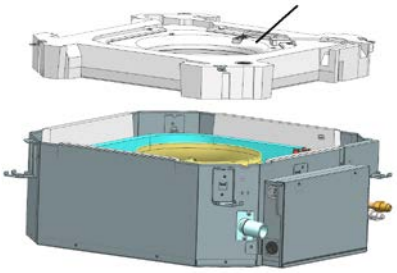
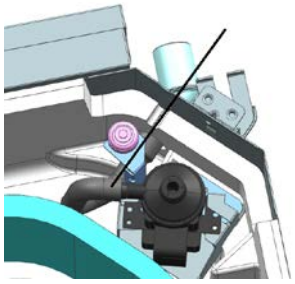
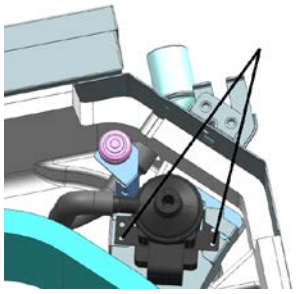
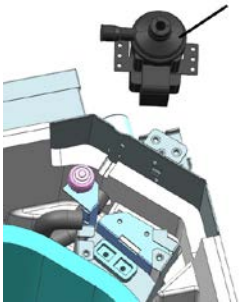
DISASSEMBLY

Indoor Unit (Cassette 9k-12k)

Replacement of Fan Motor		
Step	Illustration	Handling Instruction
6. Remove the motor and replace it		Remove the motor and replace it.
7. Tighten the bolts holding the motor		Use a wrench or socket to carefully tighten the motor bolts.
8. Mount the fan blade and tighten the bolt		Mount the fan blade and use a wrench or socket to carefully tighten the bolt holding the fan blade in place. Do not overtighten as damage may occur.
9. Reinstall the condensate pan and tighten the screws		Use a screwdriver to carefully tighten the screws holding the condensate pan in place. Take care to overtighten as damage to pan will occur.

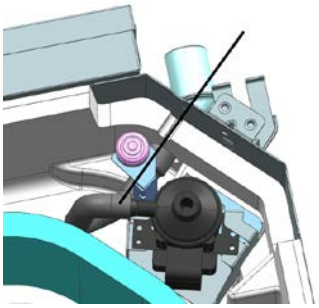
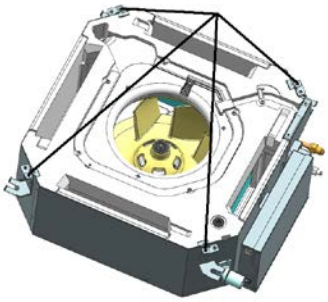
DISASSEMBLY

Indoor Unit (Cassette 9k-12k)

Removal and Installation of Condensate Pump		
Step	Illustration	Handling Instruction
1. Loosen the screws holding condensate pan		Use screwdriver to loosen the screws holding the drain pan in place.
2. Remove the condensate pan		Carefully remove the condensate pan.
3. Pull out the water outlet pipe		Pull out the water outlet Pipe.
4. Loosen the screws holding the condensate pump.		Loosen the screws holding the condensate pump.
5. Take out the pump and replace it		Take out the pump and replace it.

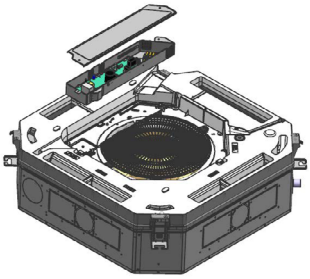
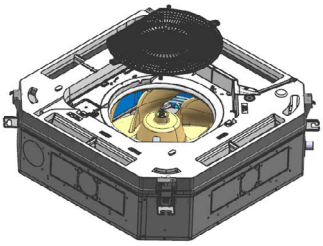
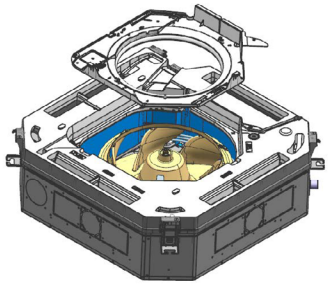
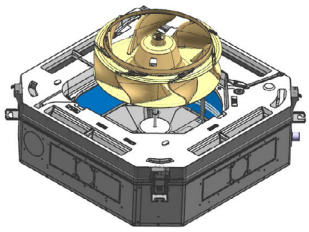
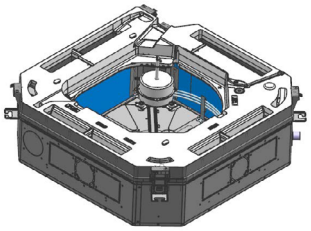
DISASSEMBLY

Indoor Unit (Cassette 9k-12k)

Removal and Installation of Condensate Pump		
Step	Illustration	Handling Instruction
6. Tighten the screws holding the condensate pump		Use a screwdriver to tighten the screws holding the condensate pump in place.
7. Connect the condensate pipe		Connect the condensate pipe
8. Mount the condensate pan and tighten the screws		Use a screwdriver to carefully tighten the screws holding the condensate pan in place. Damage may occur if over tightened.

DISASSEMBLY

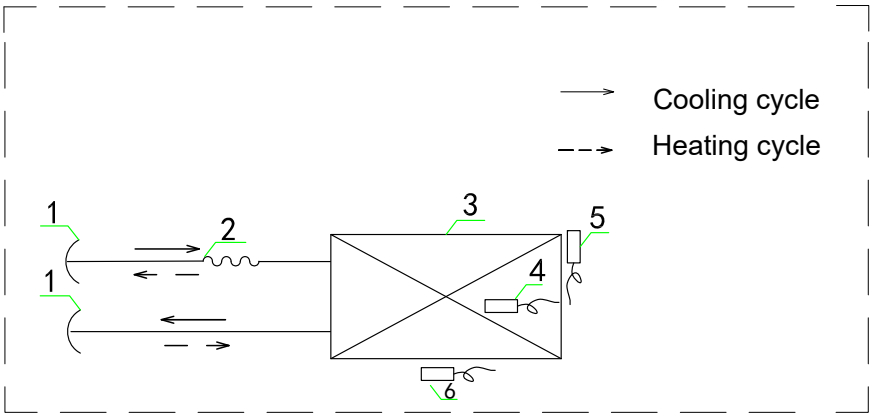
Indoor Unit (Cassette 18k-36k)

Step	Illustration	Handling Instruction
1. Loosen the screws holding the electric box cover and electric box.		Use screwdriver to loosen the electric box.
2. Loosen the screws holding the guard filter and remove the the guard filter.		Use screwdriver to loosen the screws holding the air guiding in place.
3. Loosen the screws holding the air guiding plate and remove the air guiding plate.		Use screwdriver to loosen the screws holding the air guiding in place.
4. Loosen the bolts holding the fan blades in place and remove the fan blade.		Use a wrench or socket to carefully remove the fan blade bolts.
5. Loosen the screws holding the motor in place and remove the motor and replace it.		Use screwdriver to loosen the screws holding the motor.

R-454B SEALED SYSTEM REPAIR

Refrigerant Cycle

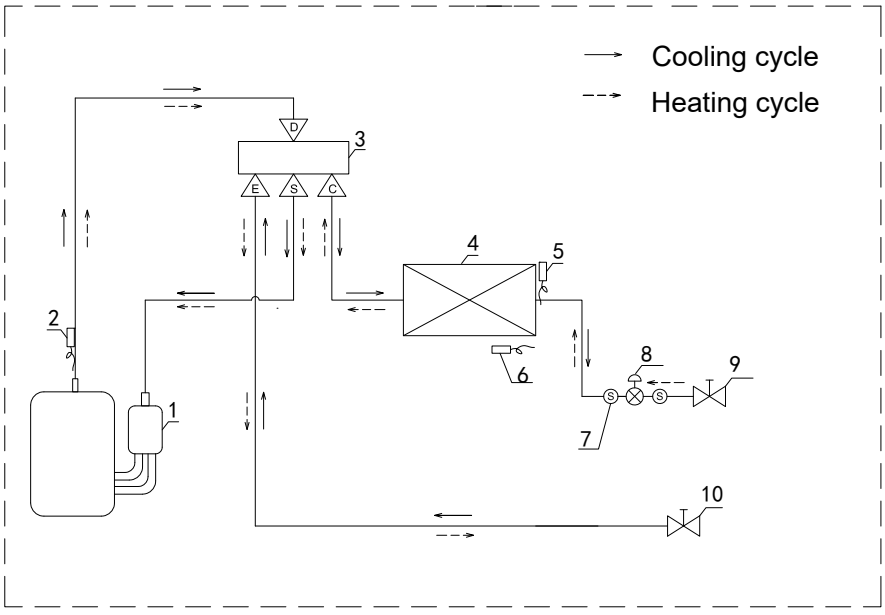
INDOOR UNIT



List of component

No.	Apellation
1	Hexagon nut
2	Split capillary
3	Indoor heat exchanger
4	Coil temperature sensor
5	Ambient temperature sensor
6	Refrigerant leakage sensor

OUTDOOR UNIT



List of component

No.	Apellation
1	Compressor
2	Discharge temperature sensor
3	4-Way valve
4	Outdoor heat exchanger
5	Coil temperature sensor
6	Ambient temperature sensor
7	Strainer
8	Electronic expansion value
9	Stop valve(Liquid)
10	Stop valve(Gas)

Figure 701

R-454B SEALED SYSTEM REPAIR

General Information

⚠WARNING: Electrical Shock Hazard

Disconnect all power to the unit before starting maintenance. All electrical connections and wiring MUST be installed by a qualified electrician and conform to all codes which have jurisdiction. Failure to do so can result in property damage, severe electrical shock or death.

⚠WARNING: This Product uses R-454B Refrigerant

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

When not installed, the appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.

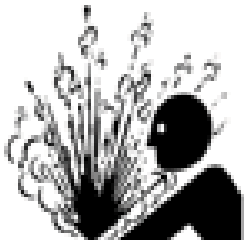
Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

Refrigerant Safety Group A2L

⚠WARNING: Refrigeration System under High pressure

Do not puncture, heat, expose to flame or incinerate. Only certified refrigeration technicians should service this equipment. R-454B systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used.



⚠ **Warning:** Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized.

NOTICE: Individuals working on these units must be EPA 608 Certified along with A2L Refrigerant Training.

⚠ **Warning:** Refrigerant 32 cannot be used as a retrofit for R-410A refrigerant. The mixing of refrigerant across classes is prohibited. R-454B Is not a drop in replacement for R-410A.

General Work Area: All maintenance staff and others working in the installation area shall be instructed on the nature of work being carried out. Work in confined spaces as defined by the Occupational Safety And Health Administration shall be avoided.

⚠ **Warning:** Job site should be examined for safety hazards such as flammable vapors, ignition sources, ventilation and confined spaces. Create a safe perimeter with barriers and signs designating a flammable area.

⚠ **Warning:** Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapor being present while the work is being performed.

Check for presence of refrigerant:

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres.
- Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.
- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
- The following leak detection methods are deemed acceptable for all refrigerant systems:

  1. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. 2. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

  If a leak is suspected, all flame sources shall be removed/extinguished.

  If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system per EPA guidelines.

Presence of fire extinguisher: If any hot work is to be conducted on the refrigerating equipment or any associated parts, a class ABC Rated fire extinguishing equipment shall be available to hand. Have a class ABC Rated fire extinguisher adjacent to the charging area.

R-454B SEALED SYSTEM REPAIR

General Information

⚠ Warning:

No ignition sources: No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.

Ventilated Area: Ensure that the area is in the open or that it is adequately ventilated before accessing the refrigerant in the system or conducting any hot work. A mechanical ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant away from the work area or external to building envelope.

During Repairs To Sealed Components: All power must be removed from the equipment being worked on prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a constant leak detector shall be located at the most critical point to warn of a potentially hazardous situation.

Checks And Repairs To Electrical Devices:

- Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected remove power supply to unit. **DO NOT OPERATE.**
- Initial safety checks shall include:
  - ·Ensure that power has completed dissipated from the unit by checking that all LEDs have gone out on all PCBs.
  - ·That no live electrical components and wiring are exposed while charging, recovering or purging the system;
  - ·Verify unit is properly grounded.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
- Ensure that the apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.
-

The following is a list of important considerations when working with R-454B equipment:

- R-454B pressure is similar to R-410A and approximately 60% higher than R-22 pressure.
- R-454B cylinders must not be allowed to exceed 125˚F, they may leak or rupture.
- R-454B must never be pressurized with a mixture of compressed air, it may become MORE flammable.
- Servicing equipment and components must be specifically designed for use with R-454B and dedicated to prevent contamination.
- Manifold sets must be equipped with gauges capable of reading 750 psig (high side) and 200 psig (low side), with a 500-psig low-side retard.
- Gauge hoses must have a minimum 750-psig service pressure rating.
- Recovery cylinders must have a minimum service pressure rating of 400 psig, (DOT 4BA400 and DOT BW400 approved cylinders).
- POE (Polyol-Ester) lubricants must be used with R-454B equipment.
- To prevent moisture absorption and lubricant contamination, do not leave the refrigeration system open to the atmosphere for extended periods of time.
- If unit refrigerant is low, recover the refrigerant, evacuate, and recharge unit to nameplate amount.
- Always charge by liquid inverted.

Verify with tool manufacturers that all tools used during this repair are non-sparking and can be used with A2L Refrigerants.
No halide torches for leak testing.
Refrigerant monitors or detectors must be used to detect refrigerant in the work area.

- R-454B A2L Refrigerant Recovery System.
- Vacuum Pump rated for A2L refrigerant (capable of 300 microns or less vacuum.)
- Nitrogen bottle with purging and pressurizing capabilities up to 550 psi.
- Oxy/ Acetylene torch or similar equipment utilized for brazing.
- Non-Sparking (Not Halide)Electronic Leak Detector rated for detecting A2L refrigerant.
- Digital refrigerant scale
- Refrigeration Gauges rated for A2L Refrigerants with temp scales for R-454B refrigerant.
- Gauge Manifold (Right handed threads).
- A2L compatible Vacuum Gauge capable of 300 microns or less.
- Nitrogen regulator for purging and testing, rated to 800 psi. (Capable of low psi flow)
- Pipe tubing cutter.
- Refrigerant recovery cylinder. (Flammable A2L label)
- Ventilation fan.
- Class ABC fire extinguisher.
- Recovery access tool.
- Purge hose fittings

R-454B SEALED SYSTEM REPAIR

Required Equipment

- Pinch off and opening tools

ABC Fire Extinguisher

Recovery Machine

Vaccum Pump

Nitrogen

Guage Manifold

Nitrogen Regulator

Vaccum Guage

R-454B SEALED SYSTEM REPAIR

Refrigerant Removal, Recovery, and Evacuation

NOTE: When accessing the refrigerant in the system to make repairs or for any other purpose, conventional procedures shall be used. However, for FLAMMABLE REFRIGERANTS (R-454B is classified in the A2L group for mildly flammable refrigerants) it is important that best practice is followed since flammability is a consideration. Follow all EPA 608 regulations and procedures along with AHRI 15 Best Practices for A2L refrigerants.

⚠ **Warning:** Ensure sufficient ventilation at the repair place.

⚠ **Warning:** Ensure there are no open flame sources or hot surfaces that exceed 1200˚F in the work area.

⚠ **Warning: DO NOT** Discharge capacitors. The standard procedure to short circuit the capacitor terminals usually creates sparks.

NOTICE: Ensure that the following precautions are taken prior to opening the sealed system.

- Verify Recovery machine is rated for A2L refrigerants.
- Mark the Job site inspection area as flammable work zone using appropriate signs.
- Utilize a Refrigerant leak detector or refrigerant monitor to sense the area for the presence of refrigerants.
- Disconnect all power supply to unit.
- Properly ground all equipment and hoses along with tank to prevent a static build up .
- Ensure adequate ventilation is provided for the job site.
- Do not mix A2L refrigerant Gages and hoses with other refrigerants.
- Keep exposure of refrigerant to Air to as minimum as possible (creates a dangerous condition).
- Under no circumstances is the mixing of refrigerants in the recovery cylinders allowed and should be strictly avoided at all times. Do not introduce oxygen into any recovery cylinders.
- Verify power is removed from the unit by checking that LEDs on PCBs have gone out.

1. Recover refrigerant to EPA sec. 608 standards. If a low charge is suspected weigh recovered refrigerant and compare to unit nameplate. Refer to Figure G.3

NOTE: DO NOT RECOVER TO A VACUUM PRIOR TO FLUSHING WITH NITROGEN. STOP RECOVERY AT 0-5 PSI.

3. Purge system with dry nitrogen.(3-5 minutes).

4. Perform an evacuation to 500 microns and break vacuum with Dry Nitrogen.
5. Re-purge the unit for 3-5 minutes or until the nitrogen flows out both process tubes.
6. Re-evacuate unit to 500 microns and break vacuum with Dry Nitrogen.
8. Open the refrigerant circuit by cutting out components.

Transportation

Be aware that local, state, and national codes exist that regulate the transportation of flammable gases. Be sure to become informed of the regulations and always stay compliant.

R-454B SEALED SYSTEM REPAIR

Component Replacement/Brazing

Warning: Ensure sufficient ventilation at the repair place.

Warning: Presence of fire extinguisher. If any hot work is to be conducted on the refrigerating equipment or any associated parts, have a ABC class fire extinguisher available to hand.

Warning: No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks.

Warning: Ensure there are no open flame sources or hot surfaces that exceed 1200˚F in the work area.

NOTE: When brazing is required, the following procedures shall be carried out in the right order:

1. Remove and recover refrigerant, and evacuate the system. Refer to the refrigerant removal, recovery, and evacuation section of this manual.

Warning: Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
2. Perform a check of the work area for the presence of flammable refrigerant prior to brazing or performing any hot work. Use a non-Sparking (Not Halide) A2L certified Electronic Leak Detector rated for detecting R-454B refrigerant.
3. Re-pipe all repairs and install all components to sealed system.

4. Purge nitrogen through the unit. at approximately 3-5 CF/H psi through the duration of the brazing process. (Nitrogen must be purging through the unit while any brazing is being performed.)
5. Pressure test unit to 550 psi minimum and hold pressure for 30 minutes minimum. Inspect for any leaks with a leak detection fluid and repair as required. Repeat as required until system passes leak test.
6. Triple evacuate the unit to achieve a 500 micron level.
7. Reassemble sealed enclosures accurately. If seals are worn, replace them.
8. Charge the system with the amount of refrigerant specified on the model nameplate. Refer to the refrigerant charging section of this manual for charging procedures.

R-454B SEALED SYSTEM REPAIRS

Refrigerant Charging

⚠WARNING: Electrical Shock Hazard

Disconnect all power to the unit before starting maintenance. All electrical connections and wiring MUST be installed by a qualified electrician and conform to all codes which have jurisdiction. Failure to do so can result in property damage, severe electrical shock or death.

⚠WARNING: This Product uses R-454B Refrigerant

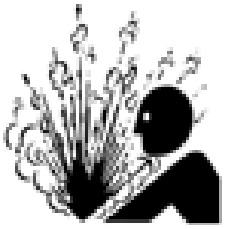
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

When not installed, the appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

⚠WARNING: Refrigeration System under High pressure



Do not puncture, heat, expose to flame or incinerate. Only certified refrigeration technicians should service this equipment. R-454B systems operate at higher pressures than R22 equipment. Appropriate safe service and handling practices must be used.

⚠WARNING: Freeze Hazard

Proper safety procedures must be followed, and all PPE must be utilized when working with liquid refrigerant. Failure to comply could result in minor to moderate injury.

NOTE: Always weigh in refrigerant based on the model nameplate.

⚠Warning:

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Charge unit with refrigerant cylinder in the inverted position to obtain liquid refrigerant.
- Charge the unit according to the amount on the name plate matching the unit.
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.
- Prior to recharging a system, it shall be pressure-tested with the dry nitrogen.

The acceptable method for charging the sealed system is the Weighed in Charge Method. The weighed in charge method is applicable to all units. It is the preferred method to use, as it is the most accurate.

The weighed in method should always be used whenever a charge is removed from a unit such as for a leak repair, compressor replacement, or when there is no refrigerant charge left in the unit. To charge by this method, requires the following steps:

- ⚠**Warning:** Ensure sufficient ventilation at the repair place.

⚠**Warning:** Ensure there are no open flame sources or hot surfaces that exceed 1200˚F in the work area.

1. Recover Refrigerant in accordance with EPA regulations. (Refer to Refrigerant Removal, Recovery, and Evacuation Section).

NOTE: If a low charge is suspected weigh recovered refrigerant and compare to unit nameplate.
NOTE: Service ports are located on the side of the unit. See figure G.3.

2. Weigh in the refrigerant charge with the proper quantity of R-454B refrigerant per model nameplate.

3. Perform triple evacuation.
NOTE: EPA Section 608 regulations require that if a system is charged with flammable refrigerant it must have red markings on the service ports.

R-454B SEALED SYSTEM REPAIRS

Refrigerant 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 31.5 psi 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 550 psi. 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 drop more than 10 psi. If pressure can not be adequately held, check integrity of flares and torque specifications. Once pressure is held adequately, purge the nitrogen charge to system pressure of 5-10 psi. 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 30-50 psi of nitrogen. Wait 5 minutes, then purge to 5-10 psi. 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 30-50 psi of nitrogen. Wait 5 minutes, then purge to 5-10 psi. 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 25 ft, weight in the additional charge with an approved refrigerant scale as needed. Refer to installation section of this manual.

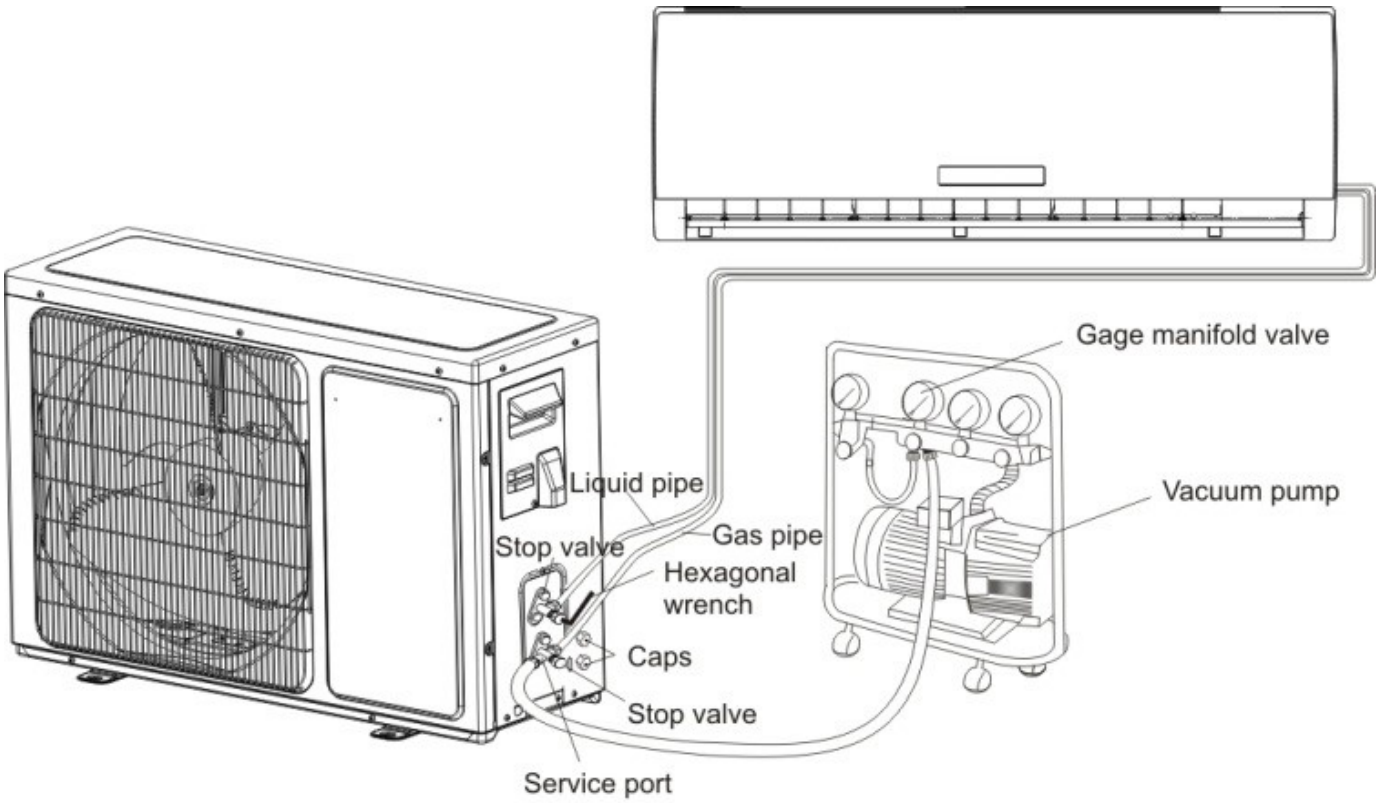


Figure 705

R-454B SEALED SYSTEM REPAIRS

Compressor Replacement

⚠ WARNING

ELECTRIC SHOCK HAZARD
Turn off electric power before service or installation. Extreme care must be used, if it becomes necessary to work on equipment with power applied.

Failure to do so could result in serious injury or death.

⚠ WARNING

HIGH PRESSURE HAZARD
Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and PPE must be utilized
when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

⚠ WARNING

EXPLOSION HAZARD
The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.

Failure to follow proper safety procedures could result in serious injury or death.

⚠ CAUTION

FREEZE HAZARD
Proper safety procedures must be followed, and proper protective clothing must be worn when working with liquid refrigerant.

Failure to follow these procedures could result in minor to moderate injury.

⚠ WARNING

NEVER, under any circumstances, liquid charge a rotary-compressor through the LOW side. Doing so would cause permanent damage to the new compressor. Use a charging adapter.

1. Be certain to perform all necessary electrical and refrigeration tests to be sure the compressor is actually defective before replacing.

2. Recover all refrigerant from the system though the service valves. Refer to Refrigerant Removal, Recovery, and Evacuation Section of this manual).

PROPER HANDLING OF RECOVERED REFRIGERANT ACCORDING TO EPA REGULATIONS IS REQUIRED.

3. After all refrigerant has been recovered, cut and remove compressor. Be certain to have both suction and discharge process tubes open to atmosphere.

4. Install the replacement compressor.

CAUTION: Seal all openings on the defective compressor immediately. Compressor manufacturers will void warranties on units received not properly sealed. Do not distort the manufacturers tube connections.

5. Braze all connections. Refer to the Component Replacement/Brazing section of this manual.

6. Charge system with proper amount of refrigerant per the model nameplate. Refer to the Refrigerant charging section of this manual.

R-454B SEALED SYSTEM REPAIR

Replace The Reversing Valve

⚠ WARNING

HIGH PRESSURE HAZARD

Sealed Refrigeration System contains refrigerant and oil under high pressure.

Proper safety procedures must be followed, and PPE must be utilized when working with refrigerants.

Failure to follow these procedures could result in serious injury or death.

⚠ WARNING

EXPLOSION HAZARD

The use of nitrogen requires a pressure regulator. Follow all safety procedures and wear protective safety clothing etc.

Failure to follow proper safety procedures could result in serious injury or death.

NOTICE

FIRE HAZARD

The use of a torch requires extreme care and proper judgment. Follow all safety recommended precautions and protect surrounding areas with fire proof materials. Have a fire extinguisher readily available. Failure to follow this notice could result in moderate to serious property damage.

1. Recover all refrigerant from the system though the service valves. Refer to Refrigerant Removal, Recovery, and Evacuation Section of this manual).

PROPER HANDLING OF RECOVERED REFRIGERANT ACCORDING TO EPA REGULATIONS IS REQUIRED.

2. Remove solenoid coil from reversing valve. If coil is to be reused, protect from heat while changing valve.

NOTE: When brazing a reversing valve into the system, it is of extreme importance that the temperature of the valve does not exceed 250°F at any time.

Wrap the reversing valve with a large rag saturated with water. "Re-wet" the rag and thoroughly cool the valve after each brazing operation of the four joints involved.

The wet rag around the reversing valve will eliminate conduction of heat to the valve body when brazing the line connection.

3. Cut all lines from reversing valve. Refer to the Brazing section of this manual.

4. Clean all excess braze from all tubing so that they will slip into fittings on new valve.

5. Remove solenoid coil from new valve.

6. Protect new valve body from heat while brazing with plastic heat sink (Thermo Trap) or wrap valve body with wet rag.

7. Fit all lines into new valve and braze lines into new valve.

8. Braze all connections. Refer to the Brazing section of this manual.

9. Pressurize with nitrogen to 550 psi and leak test all connections with a leak detection fluid. Repair any leaks found.

10. Once the sealed system is leak free, install solenoid coil on new valve.

11. Charge system with proper amount of refrigerant per the model nameplate. Refer to the refrigerant charging section of this manual.

WIRING DIAGRAMS

Indoor Unit,

Wall Mount (No A2L sensor connection)

FAHFW18A3D (Serial Numbers prior to 2505F05243)

FAHFW24A3D (Serial Numbers prior to 2505F06609)

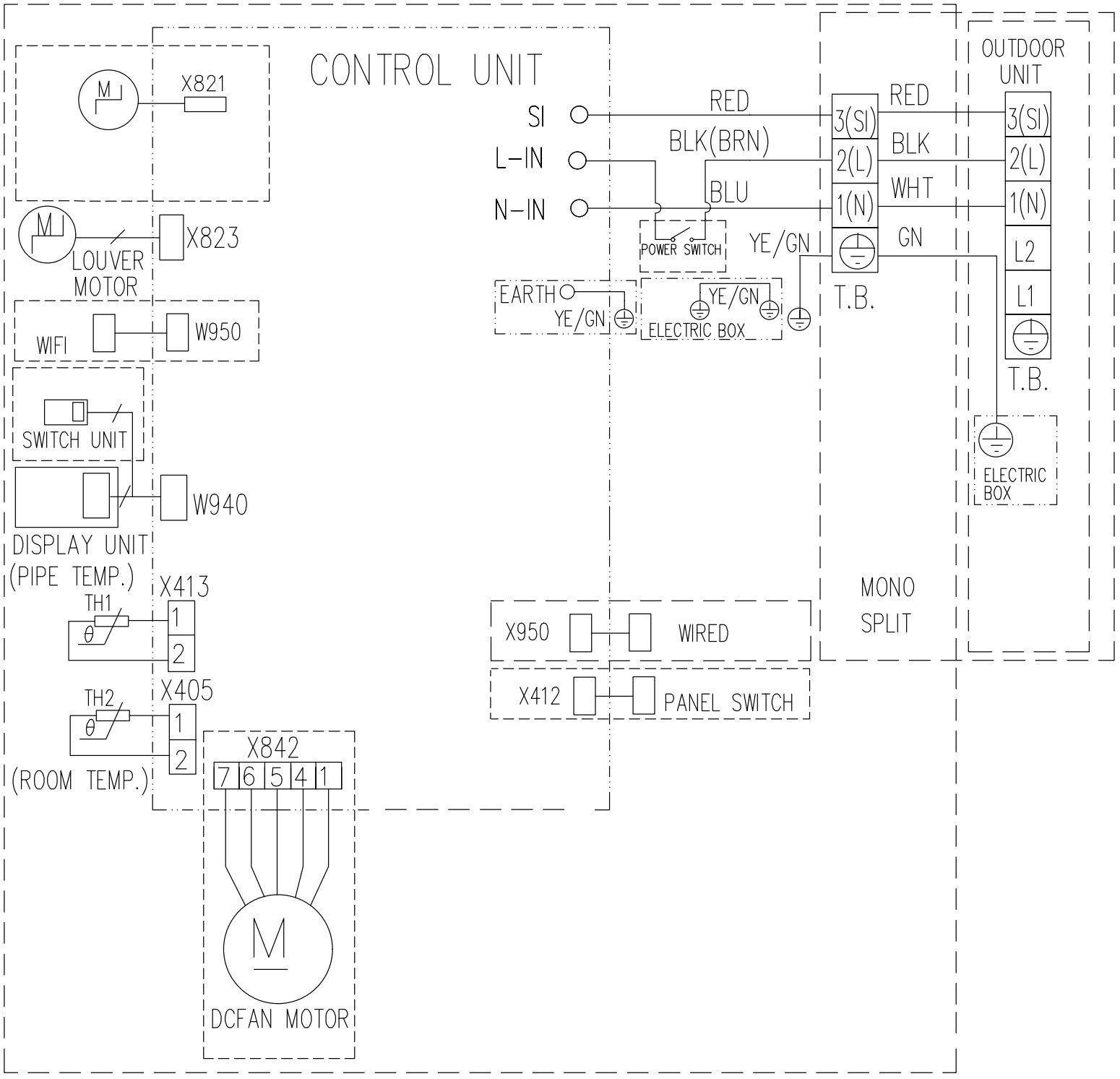


Figure 801

WIRING DIAGRAMS

Indoor Unit

Wall Mount (With A2L sensor connection)

FAHFW09A3D, FAHFW12A3D

FAHFW18A3D (Serial Numbers 2505F05243 and after)

FAHFW24A3D (Serial Numbers 2505F06609 and after)

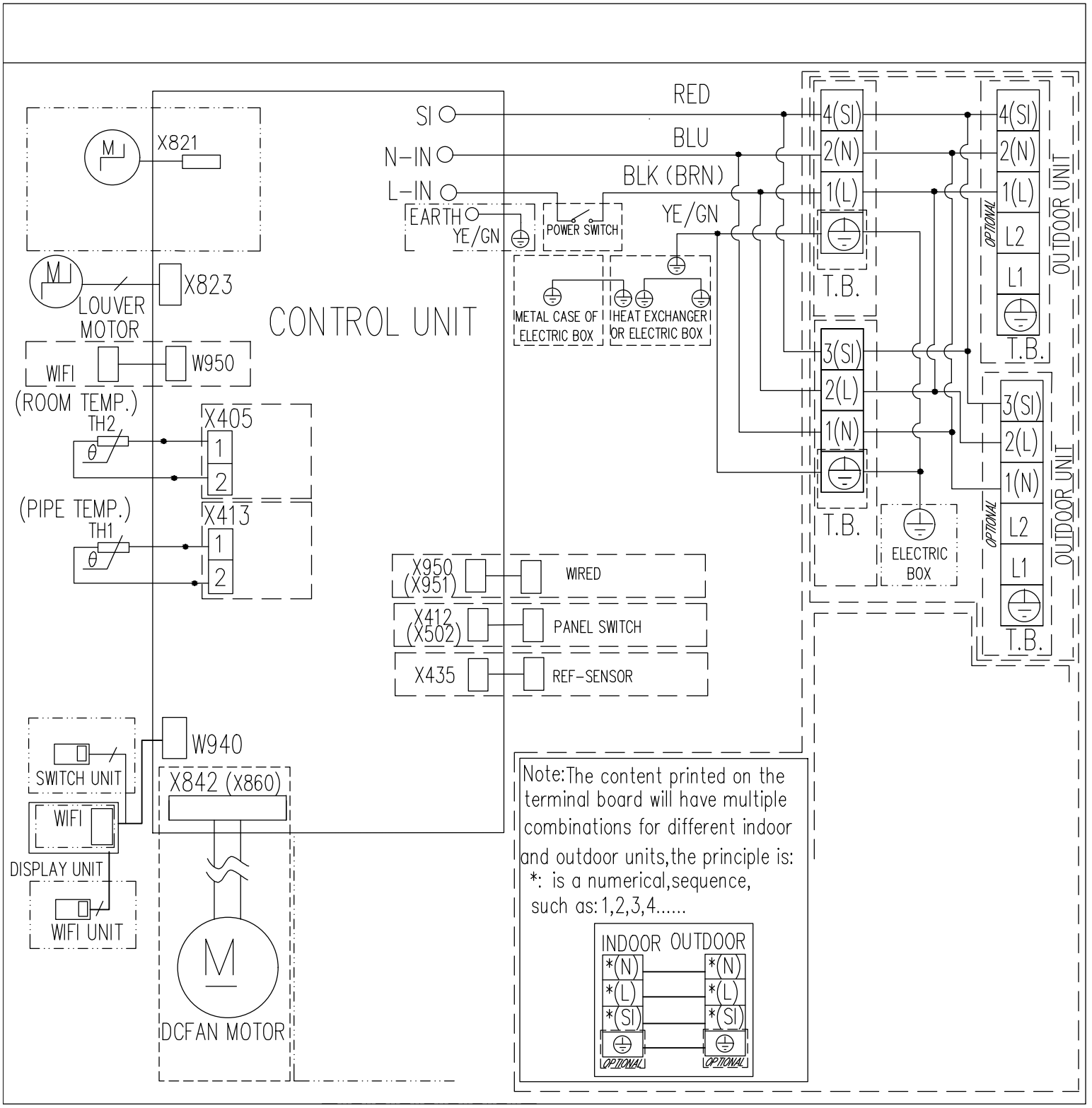


Figure 802

WIRING DIAGRAMS

Indoor Unit

Ducted 9k &12k

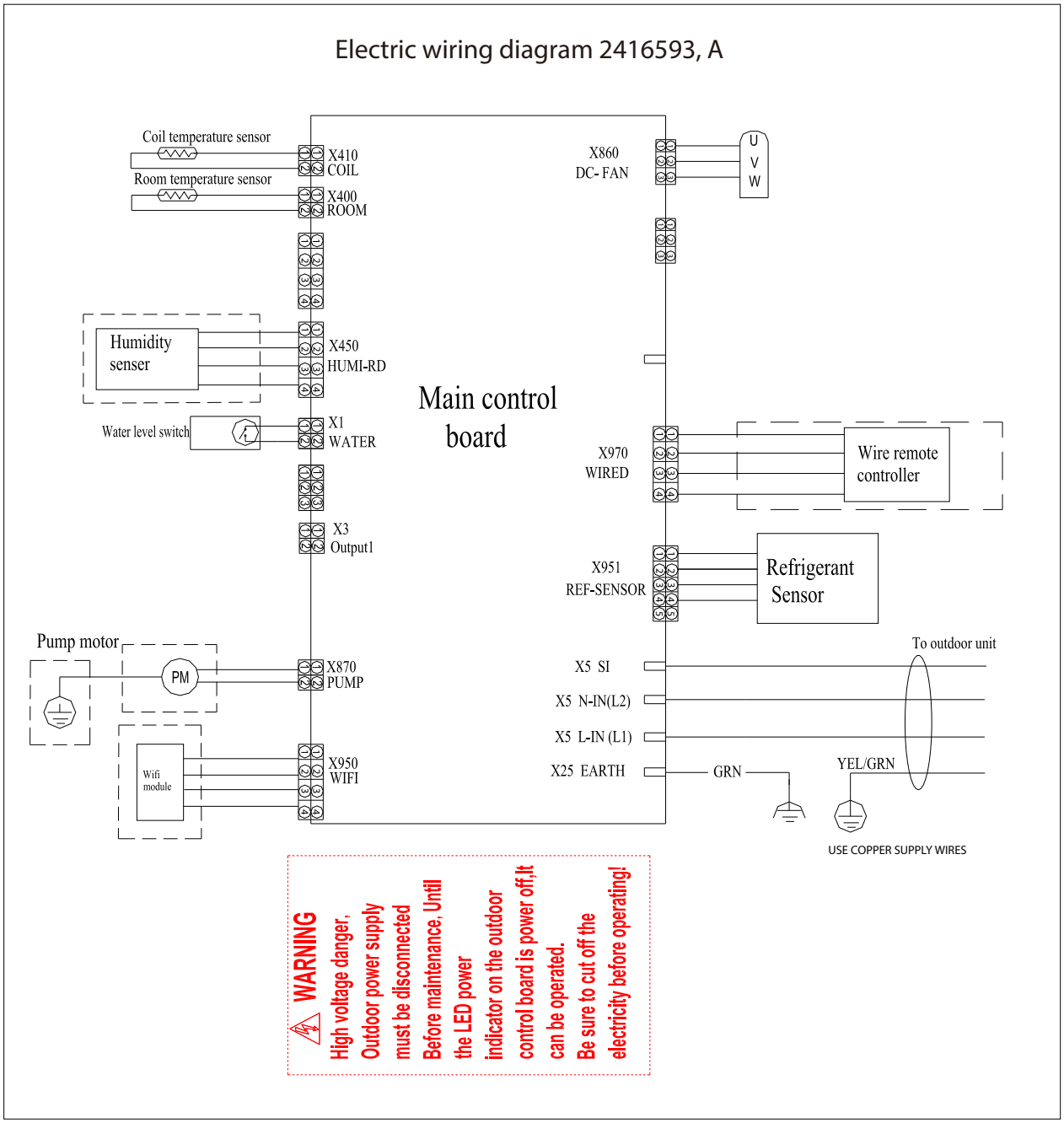
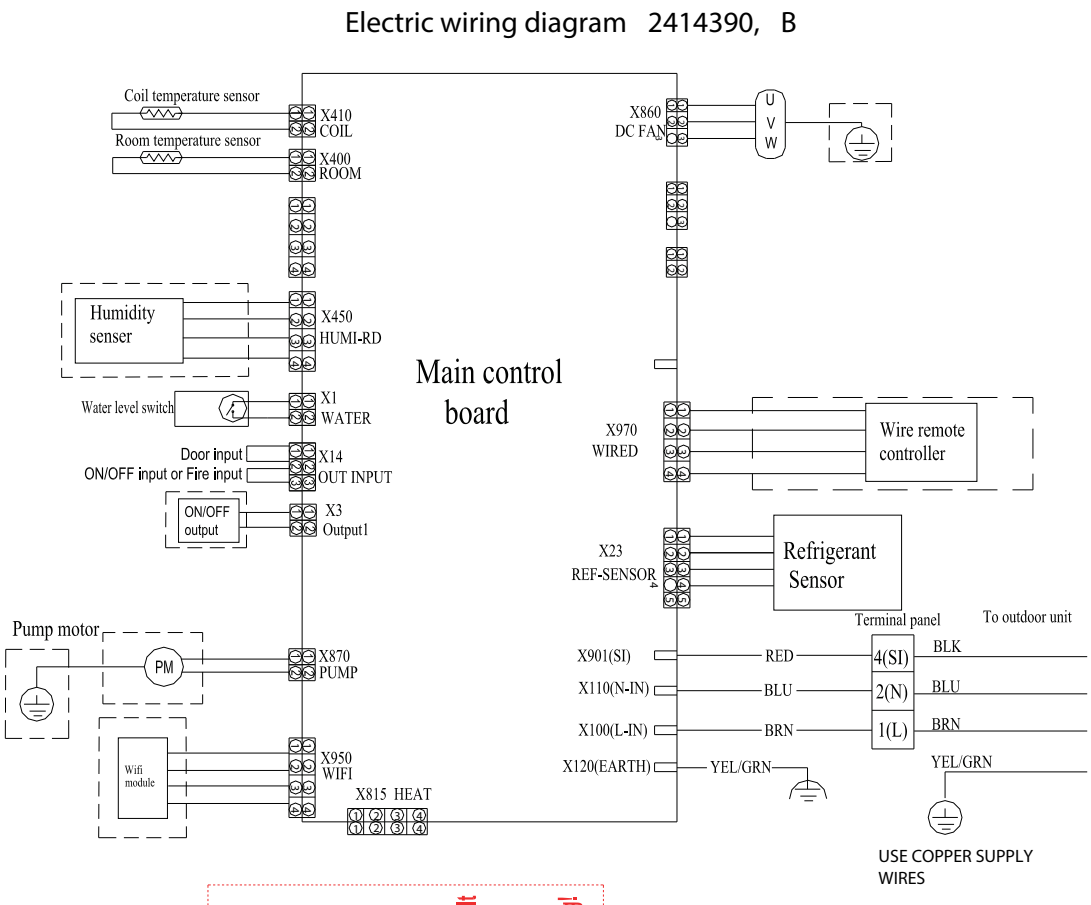


Figure 803

WIRING DIAGRAMS

Indoor Unit

Ducted 18k-36k



Remark:
Dashed parts are not available in some models.
Details see the table below.

Fresh module	UVC	ON/OFF output	Pump motor	Humidity module	Wifi module	Nanoe module	Wired remote controller	Display board	Hi-NANO

● --available part

Figure 804

WIRING DIAGRAMS

Indoor Unit

Cassette 9k -12k

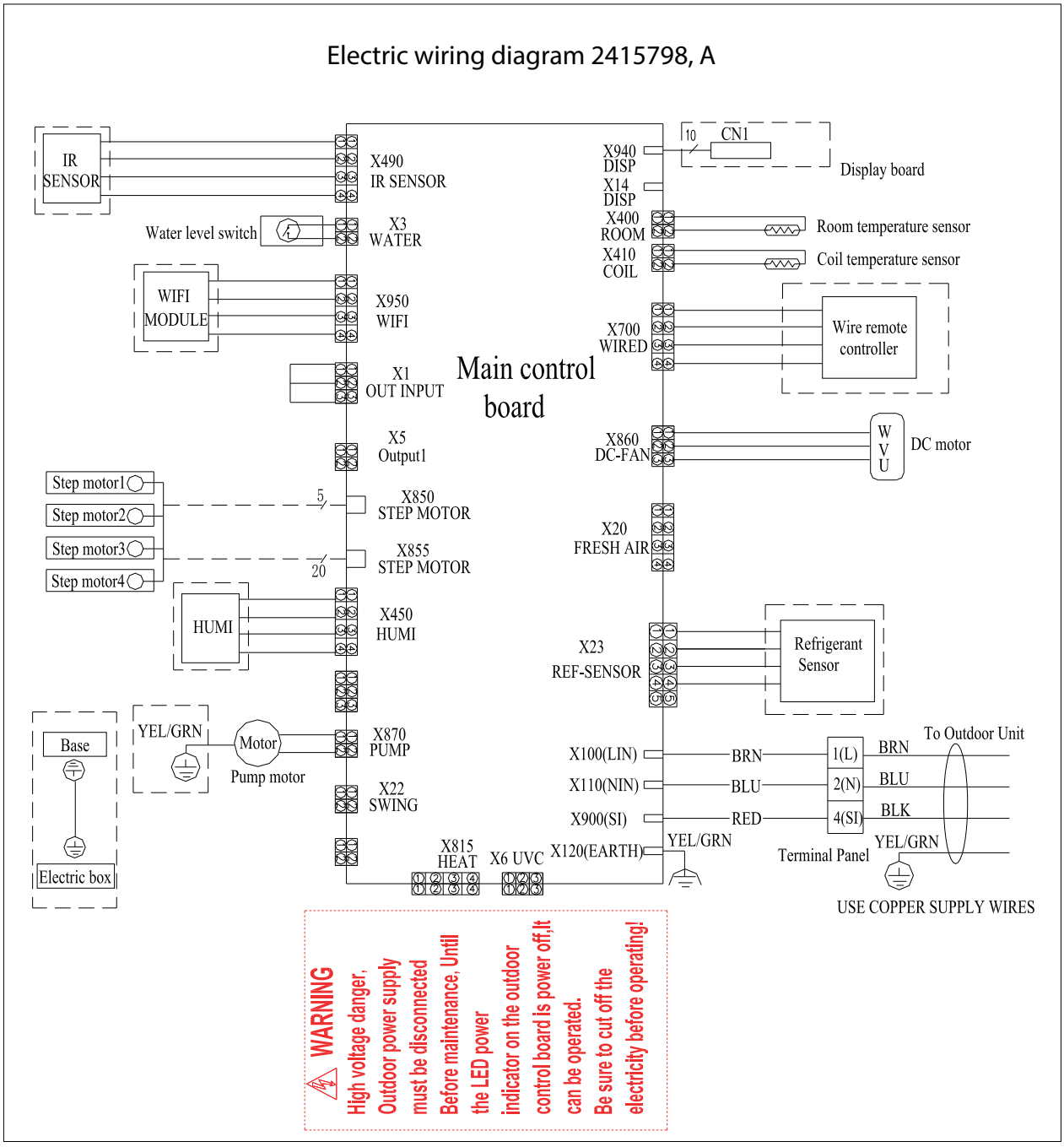
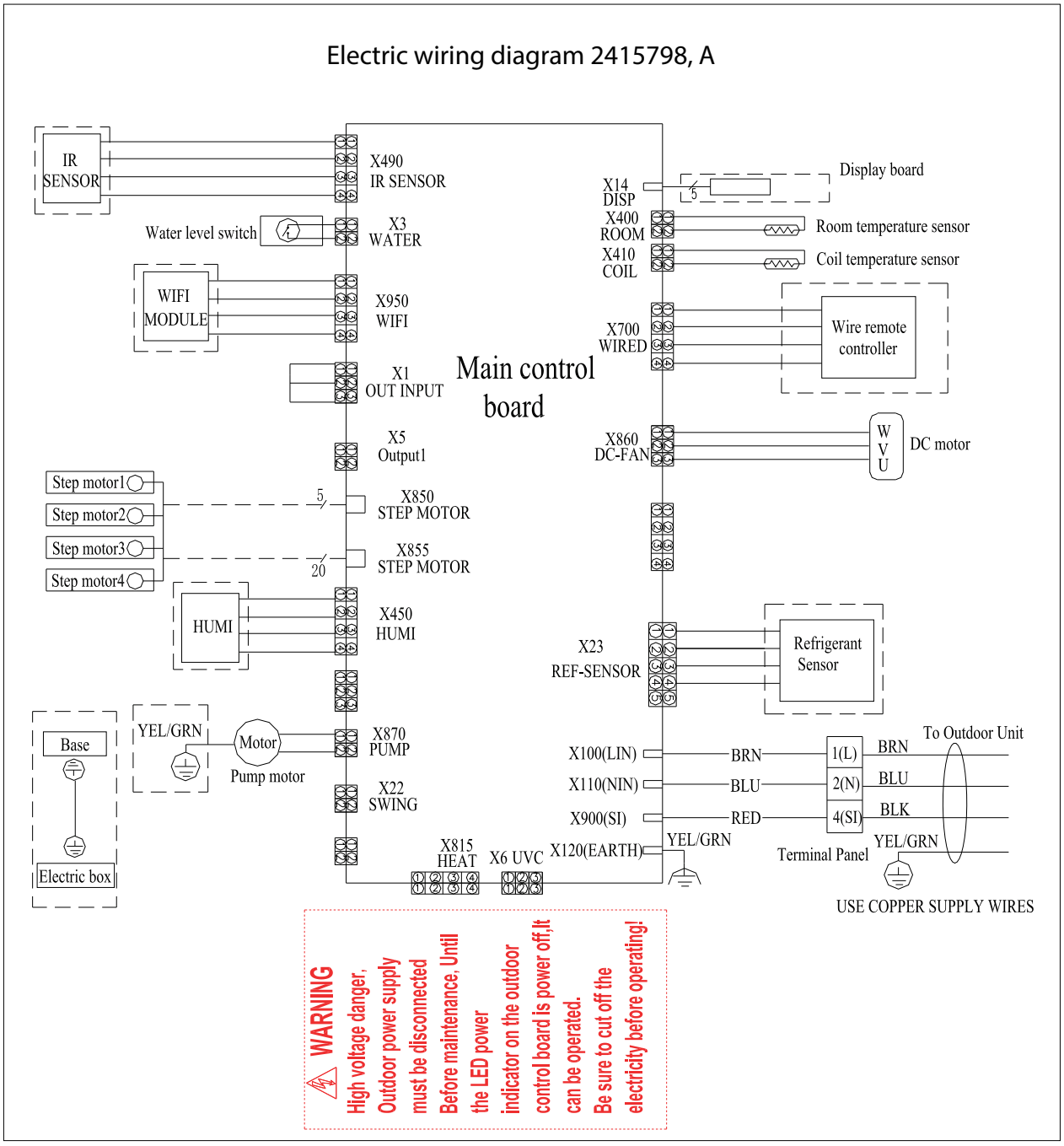


Figure 805

WIRING DIAGRAMS

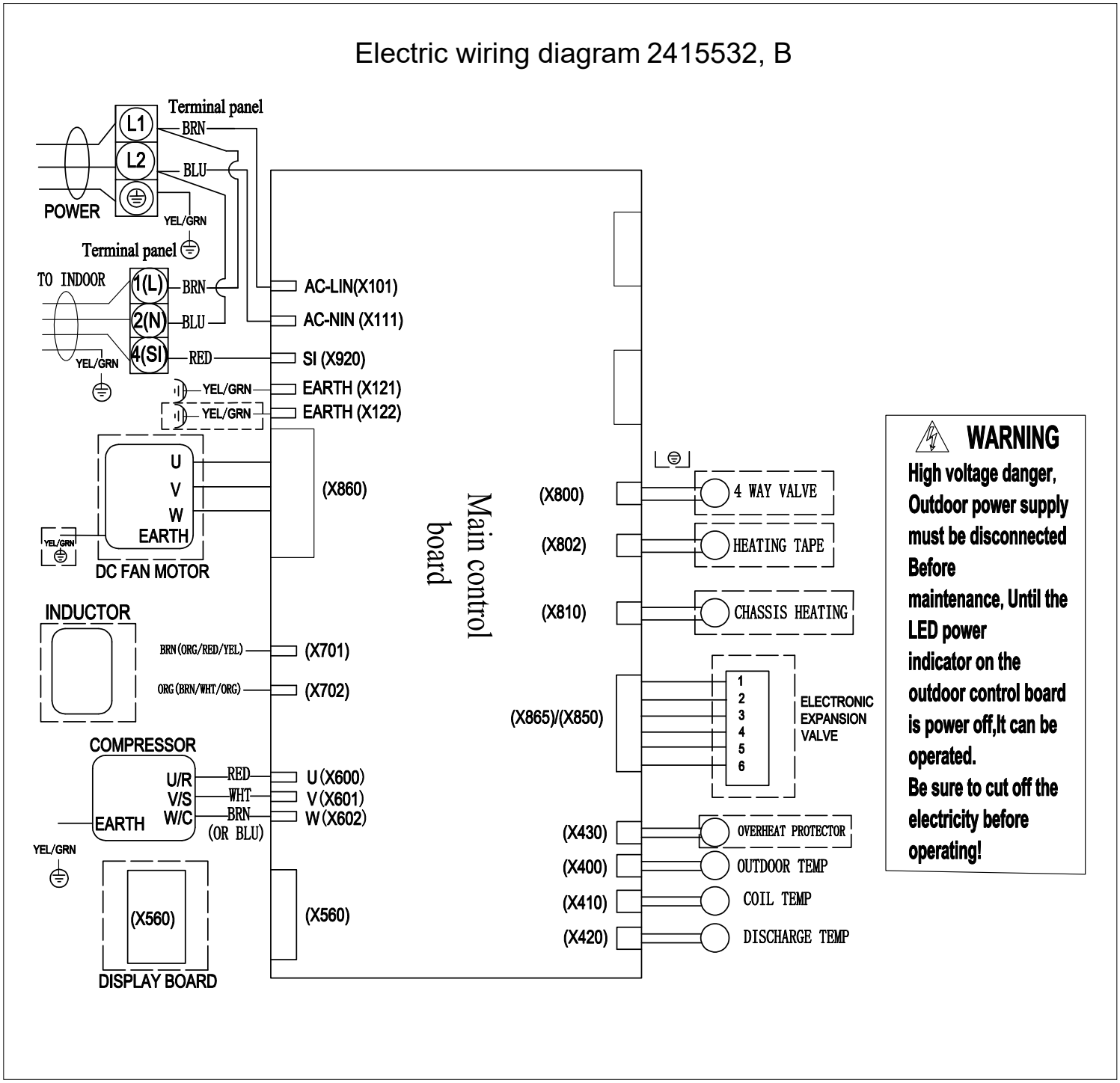
Indoor Unit

Cassette 18k-36k



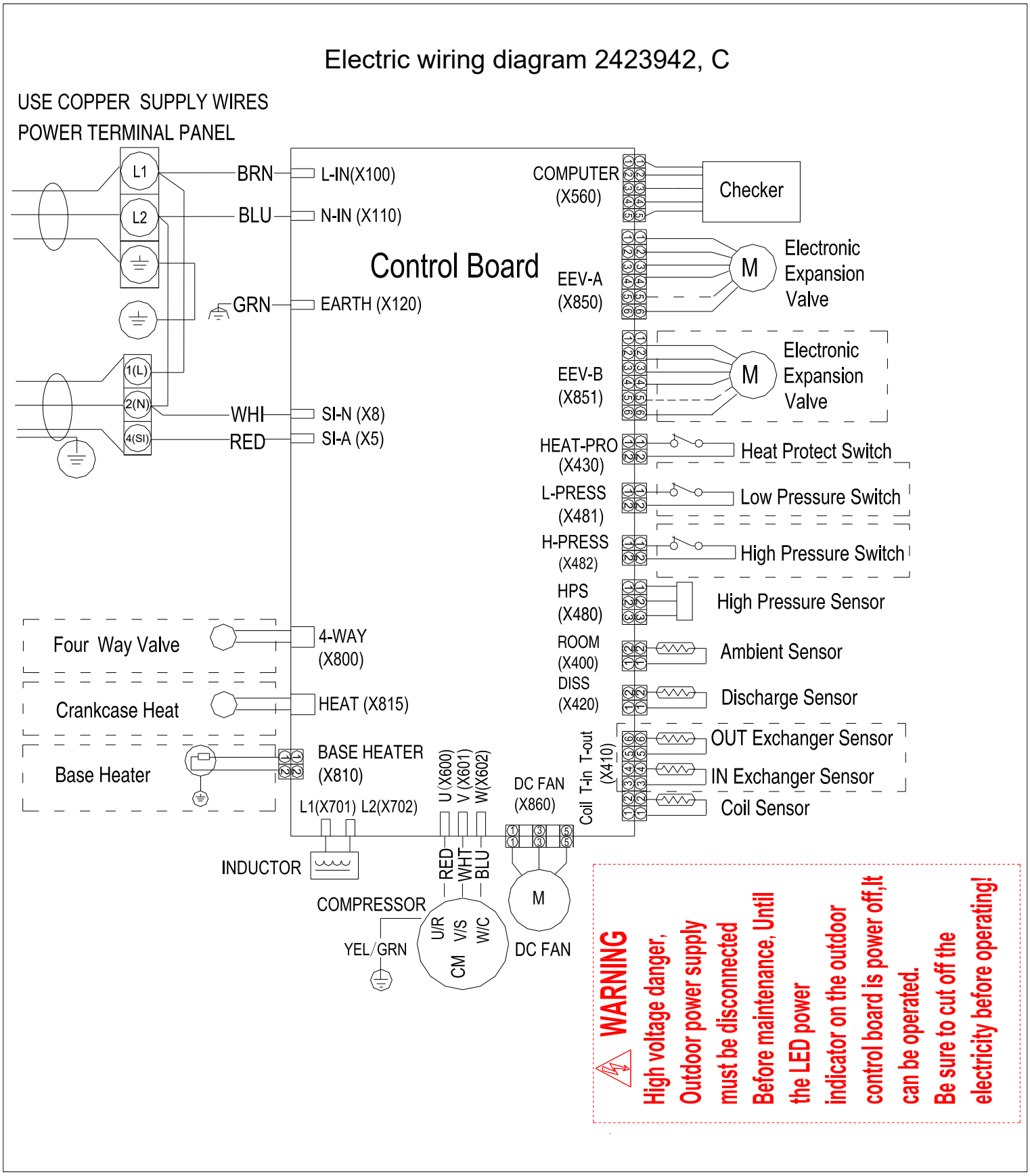
WIRING DIAGRAMS

Outdoor Unit 9-12k BTU



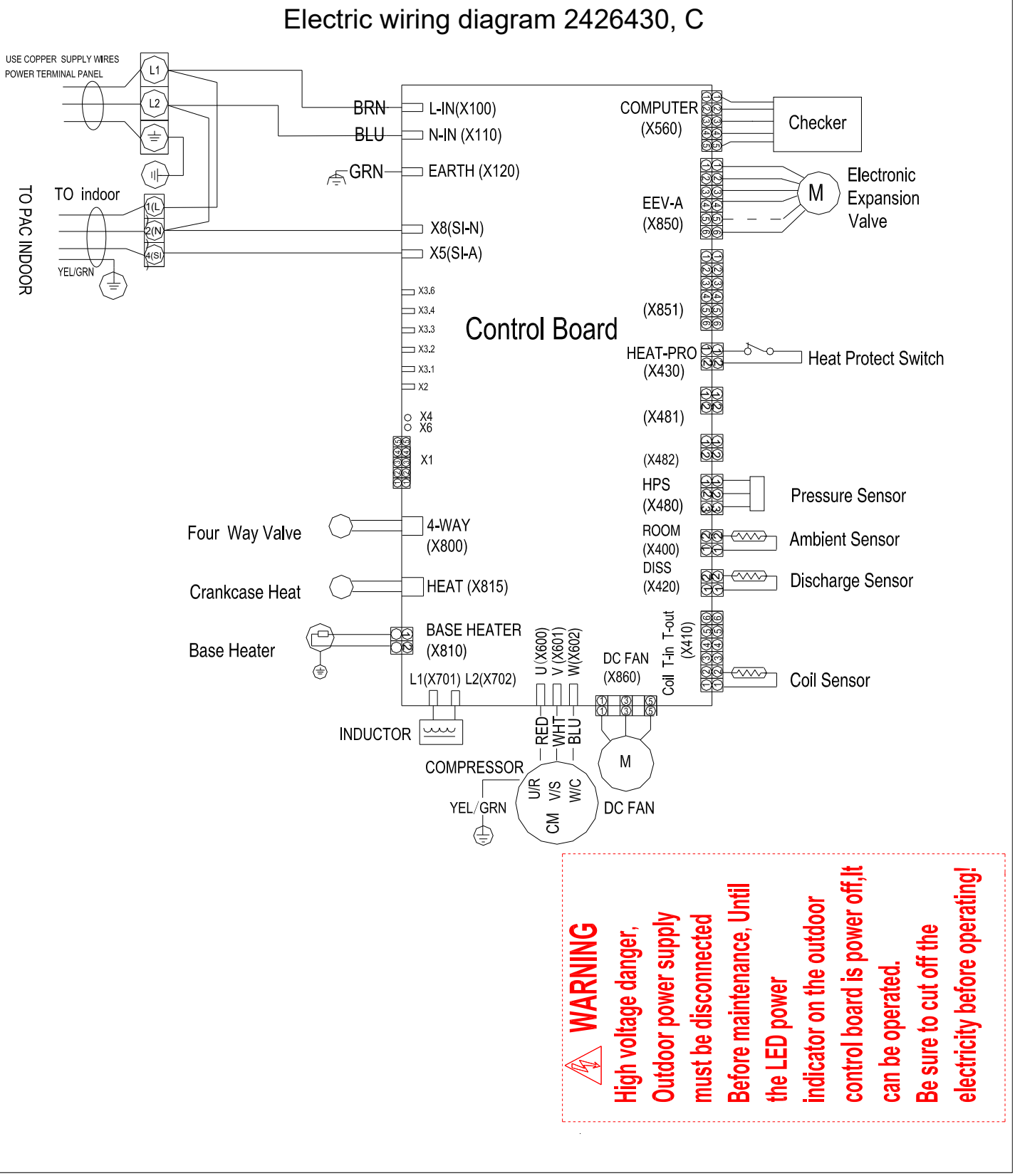
WIRING DIAGRAMS

Outdoor Unit 18k BTU



WIRING DIAGRAMS

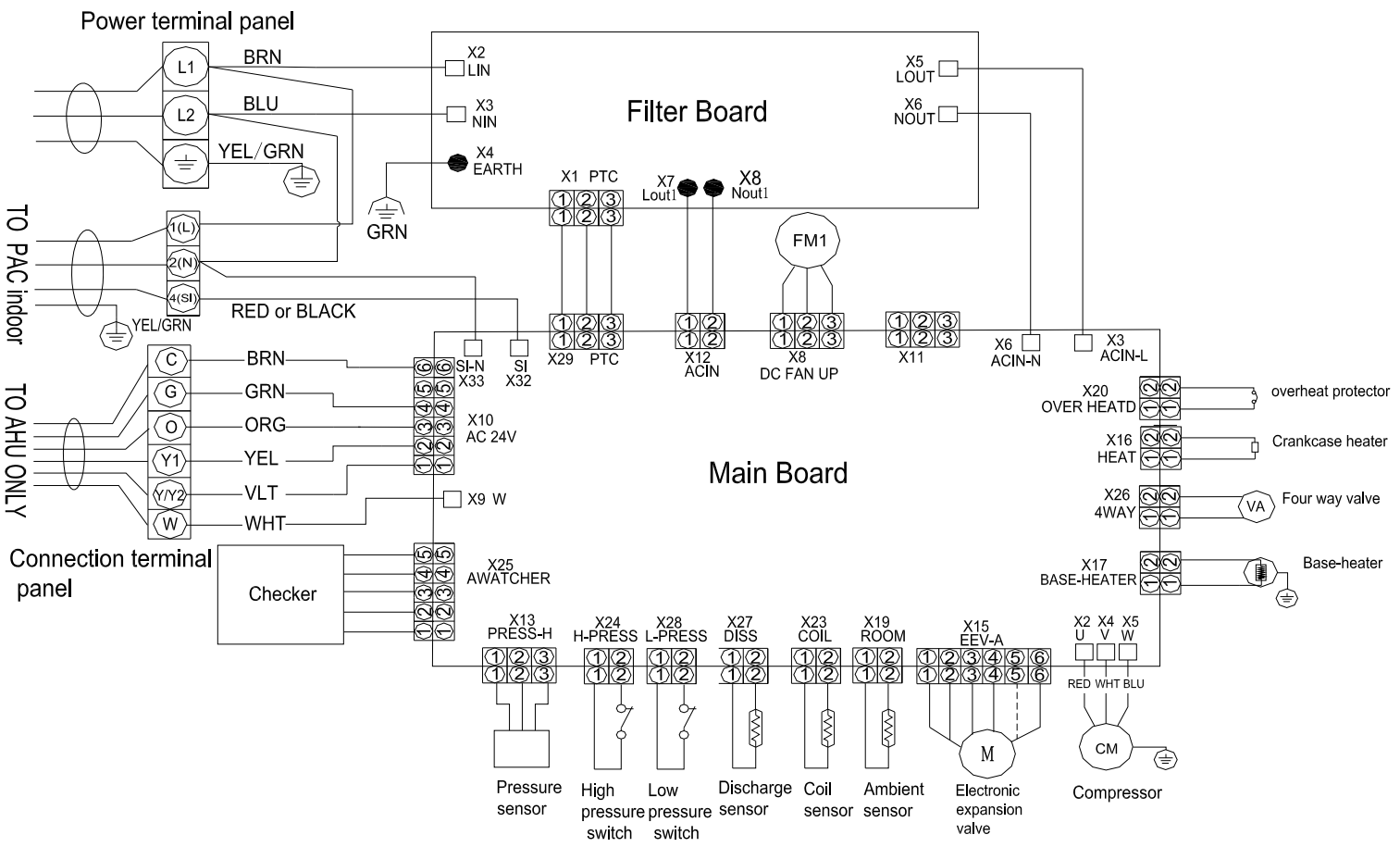
Outdoor Unit 24k BTU



WIRING DIAGRAMS

Outdoor Unit 36k BTU

Electric wiring diagram 2414330.E



WARNING

High voltage danger,
Outdoor power supply must be disconnected Before maintenance, Until the LED power indicator on the outdoor control board is power off,It can be operated.
Be sure to cut off the electricity before operating!

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

Compressor Discharge Temp Sensor Resistance Values

4.3 Sensor Parameter

1. THE PARAMETER OF OUTDOOR COMPRESSOR DISCHARGE TEMPERATURE SENSOR:

R_0=187.25K±6.3% R_{100}=3.77K±2.5K B0/100=3979K±1%

T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
-30	-22	908.2603	985.5274	1065.121	-7.84	7.47
-29	-20.2	855.3955	927.6043	1001.915	-7.78	7.42
-28	-18.4	805.9244	873.4324	924.8368	-7.73	5.56
-27	-16.6	759.6097	822.7471	887.5944	-7.67	7.31
-26	-14.8	716.232	775.3041	835.9165	-7.62	7.25
-25	-13	675.5881	730.8775	787.5529	-7.56	7.2
-24	-11.2	637.4902	689.2583	742.272	-7.51	7.14
-23	-9.4	601.7645	650.2533	699.8601	-7.46	7.09
-22	-7.6	568.2499	613.6835	660.1191	-7.4	7.03
-21	-5.8	536.797	579.3832	622.8658	-7.35	6.98
-20	-4	507.2676	547.1989	587.9307	-7.3	6.93
-19	-2.2	497.5332	516.9882	555.1565	-3.76	6.88
-18	-0.4	453.4748	488.6192	524.3977	-7.19	6.82
-17	1.4	428.9819	461.9693	495.5191	-7.14	6.77
-16	3.2	405.9517	436.9251	486.3954	-7.09	10.17
-15	5	384.2888	413.3808	442.9105	-7.04	6.67
-14	6.8	363.9047	391.2386	418.9563	-6.99	6.62
-13	8.6	344.7169	370.4072	396.4325	-6.94	6.56
-12	10.4	326.6497	350.8019	375.2461	-6.88	6.51
-11	12.2	309.6286	332.3441	355.3104	-6.83	6.46
-10	14	293.5903	314.962	336.5448	-6.79	6.41
-9	15.8	278.4719	298.5822	318.3744	-6.74	6.22
-8	17.6	264.2156	283.1464	302.2294	-6.69	6.31
-7	19.4	250.7678	268.5936	286.5448	-6.64	6.26
-6	21.2	238.0783	254.8686	271.7603	-6.59	6.22
-5	23	226.1003	241.92	257.8193	-6.54	6.17
-4	24.8	214.7903	229.6997	244.6593	-6.49	6.11
-3	26.6	204.1073	218.163	232.2612	-6.44	6.07
-2	28.4	194.0135	207.2681	220.5495	-6.39	6.02
-1	30.2	184.4732	196.9759	209.4913	-6.35	5.97
0	32	175.4533	187.25	199.0468	-6.3	5.93
1	33.8	166.8952	178.0255	189.1529	-6.25	5.88
2	35.6	158.8023	169.3067	179.8058	-6.2	5.84
3	37.4	151.1467	161.0633	170.9724	-6.16	5.8
4	39.2	143.9026	153.2667	162.6216	-6.11	5.75
5	41	137.0455	145.8905	154.7246	-6.06	5.71
6	42.8	130.5528	138.9097	147.2544	-6.02	5.67
7	44.6	124.4033	132.3011	140.1856	-5.97	5.62
8	46.4	118.5769	126.0429	133.4946	-5.92	5.58
9	48.2	113.055	120.1146	127.1591	-5.88	5.54
10	50	107.8202	114.4973	121.1586	-5.83	5.5
11	51.8	102.856	109.1728	115.4734	-5.79	5.46
12	53.6	98.147	104.1246	110.0855	-5.74	5.41
13	55.4	93.6787	99.3367	104.9778	-5.7	5.37
14	57.2	89.4378	94.7946	100.1342	-5.65	5.33
15	59	85.4114	90.4842	95.5398	-5.61	5.29

APPENDIX

Compressor Discharge Temp Sensor Resistance Values

4.3 Sensor Parameter

1. THE PARAMETER OF OUTDOOR COMPRESSOR DISCHARGE TEMPERATURE SENSOR:

R_0=187.25K±6.3% R_{100}=3.77K±2.5K B0/100=3979K±1%

T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
16	60.8	81.5875	86.3926	91.1805	-5.56	5.25
17	62.6	77.9551	82.5076	87.043	-5.52	5.21
18	64.4	74.5034	78.8177	83.115	-5.47	5.17
19	66.2	71.2227	75.3122	79.3848	-5.43	5.13
20	68	68.1036	71.9808	75.8414	-5.39	5.09
21	69.8	65.1373	68.8141	72.4746	-5.34	5.05
22	71.6	62.3155	65.8032	69.2746	-5.3	5.01
23	73.4	59.6306	62.9395	66.2324	-5.26	4.97
24	75.2	57.0752	60.2152	63.3395	-5.21	4.93
25	77	54.6424	57.6227	60.5877	-5.17	4.89
26	78.8	52.3258	55.1551	57.9695	-5.13	4.85
27	80.6	50.1192	52.8058	55.4778	-5.09	4.82
28	82.4	48.0168	50.5684	53.1058	-5.05	4.78
29	84.2	46.0133	48.4371	50.8472	-5	4.74
30	86	44.1034	46.4046	48.696	-4.96	4.71
31	87.8	42.2825	44.4711	46.6466	-4.92	4.66
32	89.6	40.5458	42.6261	44.6937	-4.88	4.63
33	91.4	38.8891	40.8668	42.8323	-4.84	4.59
34	93.2	37.3084	39.189	41.0576	-4.8	4.55
35	95	35.7998	37.5883	39.3653	-4.76	4.51
36	96.8	34.3596	36.0609	37.7511	-4.72	4.48
37	98.6	32.9844	34.603	36.2109	-4.68	4.44
38	100.4	31.671	33.2113	34.7412	-4.64	4.4
39	102.2	30.4164	31.8823	33.3383	-4.6	4.37
40	104	29.2176	30.613	31.9988	-4.56	4.33
41	105.8	28.0718	29.4004	30.7197	-4.52	4.29
42	107.6	26.9765	28.2417	29.4979	-4.48	4.26
43	109.4	25.9293	27.1342	28.3306	-4.44	4.22
44	111.2	24.9277	26.0755	27.215	-4.4	4.19
45	113	23.9697	25.0632	26.1488	-4.36	4.15
46	114.8	23.053	24.095	25.1293	-4.32	4.12
47	116.6	22.1757	23.1688	24.1545	-4.29	4.08
48	118.4	21.336	22.2826	23.2221	-4.25	4.05
49	120.2	20.5321	21.4345	22.3301	-4.21	4.01
50	122	19.7623	20.6226	21.4766	-4.17	3.98
51	123.8	19.0261	19.8468	20.6612	-4.14	3.94
52	125.6	18.3211	19.104	19.8808	-4.1	3.91
53	127.4	17.6458	18.3926	19.1338	-4.06	3.87
54	129.2	16.9986	17.7113	18.4185	-4.02	3.84
55	131	16.3784	17.0537	17.7335	-3.96	3.83
56	132.8	15.7839	16.4332	17.0774	-3.95	3.77
57	134.6	15.2139	15.8338	16.4488	-3.92	3.74
58	136.4	14.6673	15.2592	15.8464	-3.88	3.71
59	138.2	14.143	14.7083	15.269	-3.84	3.67
60	140	13.64	14.1799	14.7154	-3.81	3.64

APPENDIX

Compressor Discharge Temp Sensor Resistance Values

4.3 Sensor Parameter

1. THE PARAMETER OF OUTDOOR COMPRESSOR DISCHARGE TEMPERATURE SENSOR:

R_0=187.25K±6.3% R_{100}=3.77K±2.5K B0/100=3979K±1%

T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
61	141.8	13.1573	13.673	14.1846	-3.77	3.61
62	143.6	12.6941	13.1868	13.6756	-3.74	3.57
63	145.4	12.2494	12.7202	13.1872	-3.7	3.54
64	147.2	11.8224	12.2723	12.7186	-3.67	3.51
65	149	11.4124	11.8424	12.269	-3.63	3.48
66	150.8	11.0185	11.4295	11.8373	-3.6	3.45
67	152.6	10.6401	11.0331	11.423	-3.56	3.41
68	154.4	10.2765	10.6522	11.0251	-3.53	3.38
69	156.2	9.9271	10.2863	10.6429	-3.49	3.35
70	158	9.5912	9.9348	10.2756	-3.46	3.32
71	159.8	9.2682	9.5968	9.9231	-3.42	3.29
72	161.6	8.9576	9.272	9.5841	-3.39	3.26
73	163.4	8.6589	8.9597	9.2583	-3.36	3.23
74	165.2	8.3716	8.6594	8.9451	-3.32	3.19
75	167	8.1	8.4	8.6	-3.3	3.2
76	168.8	7.8	8.1	8.4	-3.3	3.1
77	170.6	7.6	7.8	8.1	-3.2	3.1
78	172.4	7.3	7.6	7.8	-3.2	3.1
79	174.2	7.1	7.3	7.5	-3.2	3.0
80	176	6.9	7.1	7.3	-3.1	3.0
81	177.8	6.6	6.9	7.1	-3.1	3.0
82	179.6	6.4	6.6	6.8	-3.1	3.0
83	181.4	6.2	6.4	6.6	-3.0	2.9
84	183.2	6.0	6.2	6.4	-3.0	2.9
85	185	5.8	6.0	6.2	-3.0	2.9
86	186.8	5.7	5.8	6.0	-2.9	2.8
87	188.6	5.5	5.6	5.8	-2.9	2.8
88	190.4	5.3	5.5	5.6	-2.9	2.8
89	192.2	5.1	5.3	5.4	-2.8	2.8
90	194	5.0	5.1	5.3	-2.8	2.7
91	195.8	4.8	5.0	5.1	-2.8	2.7
92	197.6	4.7	4.8	4.9	-2.7	2.7
93	199.4	4.5	4.7	4.8	-2.7	2.6
94	201.2	4.4	4.5	4.6	-2.7	2.6
95	203	4.3	4.4	4.5	-2.7	2.6
96	204.8	4.1	4.3	4.4	-2.6	2.6
97	206.6	4.0	4.1	4.2	-2.6	2.5
98	208.4	3.9	4.0	4.1	-2.6	2.5
99	210.2	3.8	3.9	4.0	-2.5	2.5
100	212	3.7	3.8	3.9	-2.5	2.4
101	213.8	3.6	3.7	3.8	-2.5	2.5
102	215.6	3.5	3.6	3.6	-2.6	2.5
103	217.4	3.4	3.4	3.5	-2.6	2.5
104	219.2	3.3	3.3	3.4	-2.6	2.6
105	221	3.2	3.2	3.3	-2.6	2.6
106	222.8	3.1	3.2	3.2	-2.7	2.6

APPENDIX

Compressor Discharge Temp Sensor Resistance Values

4.3 Sensor Parameter

1. THE PARAMETER OF OUTDOOR COMPRESSOR DISCHARGE TEMPERATURE SENSOR:

R_0=187.25K±6.3% R_{100}=3.77K±2.5K B0/100=3979K±1%

T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
107	224.6	3.0	3.1	3.1	-2.7	2.6
108	226.4	2.9	3.0	3.1	-2.7	2.7
109	228.2	2.8	2.9	3.0	-2.8	2.7
110	230	2.7	2.8	2.9	-2.8	2.7
111	231.8	2.7	2.7	2.8	-2.8	2.8
112	233.6	2.6	2.7	2.7	-2.8	2.8
113	235.4	2.5	2.6	2.7	-2.9	2.8
114	237.2	2.4	2.5	2.6	-2.9	2.8
115	239	2.4	2.4	2.5	-2.9	2.9
116	240.8	2.3	2.4	2.4	-3.0	2.9
117	242.6	2.2	2.3	2.4	-3.0	2.9
118	244.4	2.2	2.2	2.3	-3.0	3.0
119	246.2	2.1	2.2	2.2	-3.0	3.0
120	248	2.1	2.1	2.2	-3.1	3.0
121	249.8	2.0	2.1	2.1	-3.1	3.0
122	251.6	1.9	2.0	2.1	-3.1	3.1
123	253.4	1.9	2.0	2.0	-3.1	3.1
124	255.2	1.8	1.9	2.0	-3.2	3.1
125	257	1.8	1.9	1.9	-3.2	3.1
126	258.8	1.7	1.8	1.9	-3.2	3.2
127	260.6	1.7	1.8	1.8	-3.2	3.2
128	262.4	1.7	1.7	1.8	-3.3	3.2
129	264.2	1.6	1.7	1.7	-3.3	3.2
130	266	1.6	1.6	1.7	-3.3	3.3

APPENDIX

Coil and Ambient Temp Sensor Resistance Values

2. THE PARAMETER OF THE OTHER SENSOR (R0=15K±2% B0/100=3450K±2%)						
T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
-30	-22	60.8	64.8	69.0	-6.2	6.1
-29	-20.2	57.8	61.4	65.2	-5.9	5.8
-28	-18.4	54.9	58.2	61.6	-5.6	5.6
-27	-16.6	52.2	55.1	58.2	-5.4	5.3
-26	-14.8	49.6	52.3	55.1	-5.1	5.1
-25	-13	47.2	49.6	52.1	-4.9	4.8
-24	-11.2	44.9	47.1	49.4	-4.6	4.6
-23	-9.4	42.8	44.7	46.8	-4.4	4.4
-22	-7.6	40.7	42.5	44.3	-4.2	4.2
-21	-5.8	38.8	40.4	42.1	-4.0	4.0
-20	-4	36.9	38.4	39.9	-3.8	3.8
-19	-2.2	35.2	36.5	37.9	-3.6	3.6
-18	-0.4	33.5	34.7	36.0	-3.5	3.4
-17	1.4	32.0	33.1	34.2	-3.3	3.3
-16	3.2	30.5	31.5	32.5	-3.2	3.1
-15	5	29.1	30.0	30.9	-3.0	3.0
-14	6.8	27.7	28.6	29.4	-2.9	2.8
-13	8.6	26.5	27.2	28.0	-2.8	2.7
-12	10.4	25.3	26.0	26.6	-2.7	2.6
-11	12.2	24.1	24.8	25.4	-2.6	2.5
-10	14	23.0	23.6	24.2	-2.5	2.4
-9	15.8	22.0	22.5	23.1	-2.4	2.3
-8	17.6	21.0	21.5	22.0	-2.3	2.2
-7	19.4	20.1	20.5	21.0	-2.2	2.1
-6	21.2	19.2	19.6	20.0	-2.2	2.1
-5	23	18.4	18.7	19.1	-2.1	2.1
-4	24.8	17.6	17.9	18.3	-2.1	2.0
-3	26.6	16.8	17.1	17.5	-2.0	2.0
-2	28.4	16.1	16.4	16.7	-2.0	2.0
-1	30.2	15.4	15.7	16.0	-2.0	1.9
0	32	14.7	15.0	15.3	-2.0	1.9
1	33.8	14.1	14.4	14.6	-2.0	1.9
2	35.6	13.5	13.8	14.0	-2.0	1.9
3	37.4	12.9	13.2	13.4	-2.0	1.9
4	39.2	12.4	12.6	12.9	-2.1	1.9
5	41	11.9	12.1	12.3	-2.0	2.0
6	42.8	11.4	11.6	11.8	-2.1	2.0
7	44.6	10.9	11.1	11.4	-2.1	2.1
8	46.4	10.4	10.7	10.9	-2.2	2.1
9	48.2	10.0	10.2	10.5	-2.3	2.1
10	50	9.6	9.8	10.0	-2.3	2.2
11	51.8	9.2	9.4	9.6	-2.4	2.3
12	53.6	8.8	9.0	9.3	-2.4	2.4
13	55.4	8.5	8.7	8.9	-2.5	2.5
14	57.2	8.1	8.3	8.6	-2.6	2.6

APPENDIX

Coil and Ambient Temp Sensor Resistance Values

2. THE PARAMETER OF THE OTHER SENSOR (R0=15K±2% B0/100=3450K±2%)						
T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
15	59	7.8	8.0	8.2	-2.7	2.7
16	60.8	7.5	7.7	7.9	-2.8	2.8
17	62.6	7.2	7.4	7.6	-2.9	2.9
18	64.4	6.9	7.1	7.3	-3.0	3.0
19	66.2	6.6	6.9	7.1	-3.1	3.1
20	68	6.4	6.6	6.8	-3.2	3.2
21	69.8	6.1	6.3	6.6	-3.4	3.4
22	71.6	5.9	6.1	6.3	-3.5	3.5
23	73.4	5.7	5.9	6.1	-3.7	3.6
24	75.2	5.4	5.7	5.9	-3.8	3.8
25	77	5.2	5.5	5.7	-4.0	3.9
26	78.8	5.0	5.3	5.5	-4.0	4.0
27	80.6	4.9	5.1	5.3	-4.1	4.1
28	82.4	4.7	4.9	5.1	-4.2	4.1
29	84.2	4.5	4.7	4.9	-4.2	4.2
30	86	4.4	4.6	4.8	-4.3	4.3
31	87.8	4.2	4.4	4.6	-4.4	4.3
32	89.6	4.0	4.2	4.4	-4.4	4.4
33	91.4	3.9	4.1	4.3	-4.5	4.5
34	93.2	3.8	3.9	4.1	-4.6	4.6
35	95	3.7	3.8	4.0	-3.9	4.6
36	96.8	3.5	3.7	3.9	-4.7	4.7
37	98.6	3.4	3.6	3.7	-4.8	4.8
38	100.4	3.3	3.4	3.6	-4.8	4.8
39	102.2	3.2	3.3	3.5	-4.9	4.9
40	104	3.0	3.2	3.4	-5.0	4.9
41	105.8	2.9	3.1	3.3	-5.0	5.0
42	107.6	2.8	3.0	3.1	-5.1	5.1
43	109.4	2.7	2.9	3.0	-5.2	5.1
44	111.2	2.6	2.8	2.9	-5.2	5.2
45	113	2.6	2.7	2.9	-5.3	5.2
46	114.8	2.5	2.6	2.8	-5.3	5.3
47	116.6	2.4	2.5	2.7	-5.4	5.4
48	118.4	2.3	2.4	2.6	-5.5	5.4
49	120.2	2.2	2.4	2.5	-5.5	5.5
50	122	2.2	2.3	2.4	-5.6	5.6
51	123.8	2.1	2.2	2.3	-5.7	5.6
52	125.6	2.0	2.1	2.3	-5.7	5.7
53	127.4	2.0	2.1	2.2	-5.8	5.7
54	129.2	1.9	2.0	2.1	-5.8	5.8
55	131	1.8	1.9	2.1	-5.9	5.9
56	132.8	1.8	1.9	2.0	-6.0	5.9
57	134.6	1.7	1.8	1.9	-6.0	6.0
58	136.4	1.7	1.8	1.9	-6.1	6.0
59	138.2	1.6	1.7	1.8	-6.2	6.1

APPENDIX

Coil and Ambient Temp Sensor Resistance Values

2. THE PARAMETER OF THE OTHER SENSOR (R0=15K±2% B0/100=3450K±2%)						
T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
60	140	1.6	1.7	1.8	-6.2	6.1
61	141.8	1.5	1.6	1.7	-6.2	6.3
62	143.6	1.5	1.6	1.7	-6.5	6.3
63	145.4	1.4	1.5	1.6	-6.4	6.3
64	147.2	1.4	1.5	1.6	-6.5	6.4
65	149	1.3	1.4	1.5	-6.4	6.5
66	150.8	1.3	1.4	1.5	-6.6	6.6
67	152.6	1.2	1.3	1.4	-6.6	6.6
68	154.4	1.2	1.3	1.4	-6.7	6.6
69	156.2	1.2	1.2	1.3	-6.7	6.7
70	158	1.1	1.2	1.3	-6.8	6.8
71	159.8	1.1	1.2	1.3	-6.8	6.8
72	161.6	1.1	1.1	1.2	-6.9	6.9
73	163.4	1.0	1.1	1.2	-7.0	6.9
74	165.2	1.0	1.1	1.2	-7.0	6.9
75	167	1.0	1.0	1.1	-7.1	7.1
76	168.8	0.9	1.0	1.1	-7.2	7.1
77	170.6	0.9	1.0	1.1	-7.2	7.1
78	172.4	0.9	1.0	1.0	-7.3	7.2
79	174.2	0.9	0.9	1.0	-7.3	7.3
80	176	0.8	0.9	1.0	-7.4	7.3
81	177.8	0.8	0.9	0.9	-7.4	7.4
82	179.6	0.8	0.8	0.9	-7.5	7.4
83	181.4	0.8	0.8	0.9	-7.5	7.5
84	183.2	0.7	0.8	0.9	-7.6	7.6
85	185	0.7	0.8	0.8	-7.6	7.6
86	186.8	0.7	0.8	0.8	-7.7	7.7
87	188.6	0.7	0.7	0.8	-7.7	7.7
88	190.4	0.7	0.7	0.8	-7.8	7.8
89	192.2	0.6	0.7	0.7	-7.8	7.8
90	194	0.6	0.7	0.7	-7.9	7.9
91	195.8	0.6	0.7	0.7	-8.0	7.4
92	197.6	0.6	0.6	0.7	-8.0	8.0
93	199.4	0.6	0.6	0.7	-8.1	8.0
94	201.2	0.6	0.6	0.7	-8.1	8.1
95	203	0.5	0.6	0.6	-8.2	8.1
96	204.8	0.5	0.6	0.6	-8.2	8.2
97	206.6	0.5	0.6	0.6	-8.2	8.2
98	208.4	0.5	0.5	0.6	-8.3	8.3
99	210.2	0.5	0.5	0.6	-8.4	8.3
100	212	0.5	0.5	0.6	-8.4	8.4
101	213.8	0.5	0.5	0.5	-8.5	8.4
102	215.6	0.4	0.5	0.5	-8.5	8.5
103	217.4	0.4	0.5	0.5	-8.6	8.5
104	219.2	0.4	0.5	0.5	-8.6	8.6

APPENDIX

Coil and Ambient Temp Sensor Resistance Values

2. THE PARAMETER OF THE OTHER SENSOR (R0=15K±2% B0/100=3450K±2%)						
T [°C]	T [°F]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
105	221	0.4	0.4	0.5	-8.7	8.6
106	222.8	0.4	0.4	0.5	-8.7	8.7
107	224.6	0.4	0.4	0.5	-8.8	8.7
108	226.4	0.4	0.4	0.4	-8.8	8.8
109	228.2	0.4	0.4	0.4	-8.8	8.8
110	230	0.4	0.4	0.4	-8.9	8.8
111	231.8	0.3	0.4	0.4	-9.0	8.9
112	233.6	0.3	0.4	0.4	-9.0	9.0
113	235.4	0.3	0.4	0.4	-9.0	9.0
114	237.2	0.3	0.4	0.4	-9.1	9.1
115	239	0.3	0.3	0.4	-9.1	9.1
116	240.8	0.3	0.3	0.4	-9.2	9.1
117	242.6	0.3	0.3	0.4	-9.2	9.2
118	244.4	0.3	0.3	0.3	-9.3	8.8
119	246.2	0.3	0.3	0.3	-9.3	9.3
120	248	0.3	0.3	0.3	-9.3	9.3

APPENDIX

Friedrich Authorized Parts Depots

FRIEDRICH

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

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

TECHNICAL SUPPORT CONTACT INFORMATION

Friedrich Air Conditioning Co.
10001 Reunion Place, Suite 500 · San Antonio, Texas 78216
1-877-599-5665
www.friedrich.com