

41/48/55**Split Air-to-Water Heat Pump**

IDU - Indoor Unit Product Manual

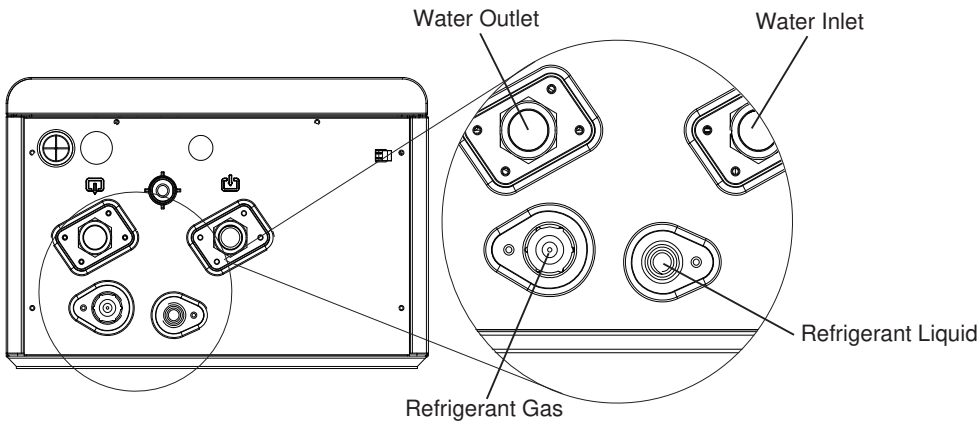
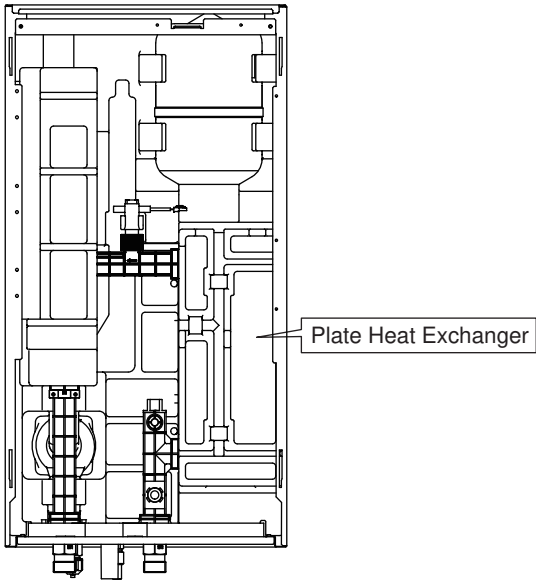
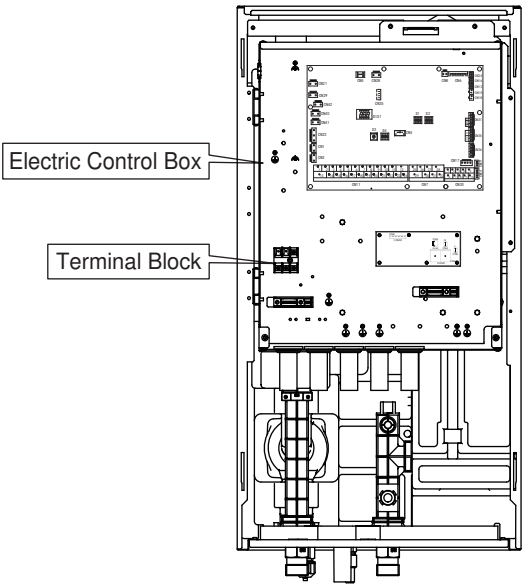
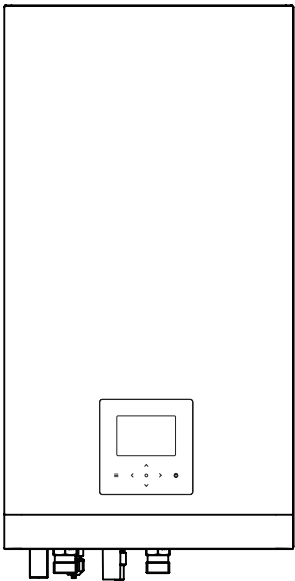
- Installation
- Startup

**⚠ WARNING**

This manual must only be used by a qualified heating installer/service technician. Read all instructions, including this manual and all other information shipped with the unit, before installing. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.

Contents

Section 1 - Safety Precautions	6	ANNEX A: Refrigerant Cycle	58
Section 2 - Before Installation	18	ANNEX B: Menu structure (wired controller)	59
Section 3 - Installation Site	18	ANNEX C: Modbus mapping table	60
Section 4 - Installation Precautions	19		
Dimensions	19		
Installation requirements	20		
Recommended servicing space	21		
Mounting the indoor unit	21		
Refrigerant piping connection	22		
Section 5 - General Introduction	23		
Section 6 - Accessories	24		
Section 7 - Overview Of The Unit	24		
Disassembling the unit	24		
Main components	25		
Electronic control box	26		
Refrigerant pipework	28		
Water piping	28		
Filling water	32		
Field wiring	33		
Section 8 - Start-up And Configuration ...	41		
Initial start-up at low outdoor ambient temperature ...	41		
Pre-operation checks	41		
Water pressure drop	42		
Field settings	43		
Operation Settings	46		
Section 9 - Commissioning	48		
Test Run for the Actuator	48		
Air Purge	49		
Test Run	49		
Check of the Minimum Flow Rate	50		
Section 10 - Hand-over	50		
Energy Saving Tips	50		
Additional Operation Reference	50		
Section 11 - Trouble Shooting	53		
General guidelines	53		
General symptoms	53		
Error codes	55		
Section 12 - Disposal	57		





Specifications

Outdoor unit			41	48	55
Power supply			208/230 V~ 60 Hz		
Heating: Outside air temperature: 44.6 °F Outlet water temperature: 95 °F	Capacity	Btu/h	41,283	49,471	54,589
	Rated input	kW	2.44	3.09	3.56
	COP	W/W	4.95	4.70	4.50
Heating: Outside air temperature: 44.6 °F Outlet water temperature: 113 °F	Capacity	Btu/h	41,965	48,448	54,589
	Rated input	kW	3.24	3.89	4.44
	COP	W/W	3.80	3.65	3.60
Heating: Outside air temperature: 44.6 °F Outlet water temperature: 131 °F	Capacity	Btu/h	40,942	47,083	54,589
	Rated input	kW	3.87	4.6	5.52
	COP	W/W	3.10	3.00	2.90
Heating: Outside air temperature: 35.6 °F Outlet water temperature: 95 °F	Capacity	Btu/h	31,730	38,895	44,353
	Rated input	kW	2.35	3.12	3.71
	COP	W/W	3.95	3.65	3.50
Heating: Outside air temperature: 35.6 °F Outlet water temperature: 113 °F	Capacity	Btu/h	36,506	39,918	43,671
	Rated input	kW	3.57	4.09	4.49
	COP	W/W	3.00	2.86	2.85
Heating: Outside air temperature: 35.6 °F Outlet water temperature: 131 °F	Capacity	Btu/h	38,895	42,306	45,718
	Rated input	kW	4.47	5.06	5.58
	COP	W/W	2.55	2.45	2.40
Heating: Outside air temperature: 19.4 °F Outlet water temperature: 95 °F	Capacity	Btu/h	34,118	40,942	45,377
	Rated input	kW	3.33	4.29	4.93
	COP	W/W	3.00	2.80	2.70
Heating: Outside air temperature: 19.4 °F Outlet water temperature: 113 °F	Capacity	Btu/h	34,800	40,259	44,012
	Rated input	kW	4.25	5.02	5.78
	COP	W/W	2.40	2.35	2.23
Heating: Outside air temperature: 19.4 °F Outlet water temperature: 131 °F	Capacity	Btu/h	34,118	37,530	42,648
	Rated input	kW	4.88	5.37	6.19
	COP	W/W	2.05	2.05	2.02
Cooling: Outside air temperature: 95 °F Outlet water temperature: 64.4 °F	Capacity	Btu/h	40,942	46,059	48,448
	Rated input	kW	3	3.74	3.93
	COP	W/W	4.00	3.61	3.61
Cooling: Outside air temperature: 95 °F Outlet water temperature: 44.6 °F	Capacity	Btu/h	39,577	43,330	47,765
	Rated input	kW	4.22	4.98	5.71
	COP	W/W	2.75	2.55	2.45

NOTICE

The test flow rate for the above working conditions is determined based on a temperature difference of 9 °F between the inlet and outlet water.

Outdoor Unit		41/48/55	
Rated water flow		gpm	12.11
Compressor	Type		Twin rotary DC inverter
Outdoor fan	Motor type		Brushless DC motor
	Number of fans		1
Air side heat exchanger	Type		Finned tube
Refrigerant(R32)	Factory charge	lb	4.04
Throttle type			Electronic expansion valve
Piping connections	Type		Flare
	Liquid Dia.(Outside diameter)	in	3/8
	Gas Dia.(Outside diameter)	in	5/8
	Min. pipe length	ft	6.5
	Max. pipe length	ft	98
Installation height difference	Outdoor unit above	ft	65.5
	Outdoor unit below	ft	65.5
Sound pressure level(at a distance of 39.37") ¹		dB(A)	57
Outdoor unit Net dimensions (WxHxD)		in	44 x 34 x 20-5/8
Outdoor unit Net weight		lb	214
Operating temperature range	Cooling	° F	23 to 110
	Heating	° F	-13 to 95
	DHW	° F	-13 to 110

Indoor Unit		41-55	
Function		Cooling , Heating and DHW	
Setting water temperature range	Cooling	° F	41~77
	Heating	° F	77~149
	DHW ²	° F	See Notice 2
Power supply			110-120 V~ 60 Hz
Sound pressure level(39.37 in) ¹		dB(A)	31
Dimension (WxHxD)		in	16-1/2 x 31-1/8 x 10-5/8
Net weight		lb	68.34
Water circuit	Piping connections	in	1" NPT
	Drain pipe connection	in	1
	Water side exchanger		Plate type
	Internal water volume	gallon	0.41
Refrigerant circuit	Liquid Dia. (Outside diameter)	in	3/8
	Gas Dia. (Outside diameter)	in	5/8

NOTICE

1. Sound pressure level is the maximum value tested under the two conditions of Heating: Outside air temperature: 45 °F & outlet water temperature: 95 °F and Cooling: Outside air temperature: 95 °F & outlet water temperature: 65 °F. 39.37 inches represents the distance from the heat pump for which the sound pressure level of noise was recorded.
2. The heat pump DHW operates with a outlet temperature range of 77-149°F, the tank set temperature depends on the tank thermostat setting.
3. Some specifications may change, for reference only.

1 SAFETY PRECAUTIONS

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully. Read these instructions carefully before installation. Keep this manual in a secure location for future reference.

Hazard Definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels or to important information concerning the life of the product.

DANGER

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

WARNING

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

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

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

SAFETY INSTRUCTIONS

Safety instruction(or equivalent) signs indicate specific safety-related instructions or procedures.

DANGER

- Before touching electric terminal parts, turn off power switch.
- When service panels are removed, live parts can be easily touched by accident.
- Never leave the unit unattended during installation or servicing when the service panel is removed.
- Do not touch water pipes during and immediately after operation as the pipes may be hot and could burn your hands. To avoid injury, give the piping time to return to normal temperature or be sure to wear protective gloves.
- Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.
- Before touching electrical parts, turn off all applicable power to the unit.

WARNING

- Tear apart and throw away plastic packaging bags so that children will not play with them. Children playing with plastic bags face danger of death by suffocation.
- Safely dispose of packing materials such as nails and other metal or wood parts that could cause injuries.
- Ask your dealer or qualified personnel to perform installation work in accordance with this manual. Do not install the unit yourself. Improper installation could result in water leakage, electric shocks or fire
- Be sure to use only specified accessories and parts for installation work. Failure to use specified parts may result in water leakage, electric shocks, fire, or the unit falling from its mount.
- Install the unit on a foundation that can withstand its weight. Insufficient physical strength may cause the equipment to fall and possibly cause injury.
- Perform specified installation work with full consideration of strong wind, hurricanes, or earthquakes. Improper installation work may result in accidents due to equipment falling.
- Make certain that all electrical work is carried out by qualified personnel according to the local laws and regulations and this manual using a separate circuit. Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.

- Be sure to install a ground fault circuit interrupter according to local laws and regulations. Failure to install a ground fault circuit interrupter may cause electric shocks and fire.
- Make sure all wiring is secure. Use the specified wires and ensure that terminal connections or wires are protected from water and other adverse external forces. Incomplete connection or affixing may cause a fire.
- When wiring the power supply, form the wires so that the front panel can be securely fastened. If the front panel is not in place there could be overheating of the terminals, electric shocks or fire.
- After completing the installation work, check to make sure that there is no refrigerant leakage.
- Never directly touch any leaking refrigerant as it could cause severe frostbite. Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Burns or frostbite are possible if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation. Touching the internal parts can cause burns. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Every working procedure that affects safety means shall only be carried out by competent persons.
- Examples for such working procedures are: breaking into the refrigerating circuit; Opening of sealed components; Opening of ventilated enclosures.

WARNING

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

Do not pierce or burn the unit.

Be aware that refrigerants may not contain an odor.

WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the 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.

Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment credential.

Servicing shall only be performed as recommended by the equipment manufacturer.

Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of a person competent in the use of flammable refrigerants.

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.

WARNING

The following precautions should be complied with when installation, service, maintenance and repair, and decommissioning of appliances using flammable refrigerant.

General

This appliance contains A2L flammable refrigerant R32.

Installation

WARNING

Every working procedure that affects safety means shall only be carried out by competent personnel.

Examples for such working procedures are:

- breaking into the refrigerating circuit;
- opening of sealed components;
- opening of ventilated enclosures.

General

WARNING

- **Pipe-work shall be in compliance with national and local codes and standards.**
- The 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;
- 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 of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

-field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 0.012 lbs per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected;

-taking into consideration the length and diameter of the connecting refrigerant piping, add refrigerant to complete the installation according to the information provided on the label for determining the required additional refrigerant charge, as well as the instructions in this manual on how to complete the refrigerant charge.

The minimum INSTALLED HEIGHT shall comply with the corresponding requirements in this manual.

Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects, for example the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris;

Provision shall be made for expansion and contraction of long runs of piping;

WARNING

This appliance contains **FLAMMABLE REFRIGERANTS**, the minimum floor area of the room shall comply with the requirements in the " Required Minimum Room Area" table within this manual;

The detailed information on the following topics is included in the manual:

- function, operation and required servicing measures;
- specified end-of-life and replacement instructions;
- other information about REFRIGERANT DETECTION SYSTEMS.

Unventilated areas

WARNING

The appliance contains more than m1 (6 times LOWER FLAMMABILITY LIMIT) for any refrigerating circuit, an unventilated area where the appliance using **FLAMMABLE REFRIGERANTS** is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

The appliance shall be stored in an area where the room size corresponds to the room area as specified for operation;

The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) or other **POTENTIAL IGNITION SOURCES** (for example an operating electric heater, hot surfaces);

The appliance shall be stored so as to prevent mechanical damage from occurring.

Information on servicing

General



Servicing shall **Be Performed Only By Trained and Certified Service Personnel.**

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, Clause "Work procedure" to Clause "No ignition sources" shall be completed prior to conducting work on the system.

Work procedure

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

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.

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 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.

Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating 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.

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 can 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. "No Smoking" signs shall be displayed.

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.

Checks to the refrigerating 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.

The following checks shall be applied to installations using flammable refrigerants:

- the **refrigerant charge** is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which can 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.

Checks 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 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:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

Repairs to sealed components and intrinsically safe components



Sealed electrical components shall be replaced if it fails or is damaged.

Repair to intrinsically safe components



Intrinsically safe components must be replaced if it fails or is damaged.

Wiring

Check that wiring 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.

Detection of flammable refrigerants

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.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of **flammable refrigerants**, the sensitivity can be inadequate, or can 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 (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

NOTE Examples of leak detection methods are

- bubble method,
- fluorescent agent method.

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 "Refrigerant removal and circuit evacuation"

Refrigerant removal and circuit evacuation

CAUTION

Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

When breaking 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 remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas;
- continuously flush with inert gas when using flame to open circuit;
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

CAUTION

An inert gas, specifically, is dry oxygen free nitrogen(OFN).

The system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times.

CAUTION

This operation is absolutely vital if brazing operations on the pipework are to take place.

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 in an appropriate position according to the instructions.
- Ensure that the refrigerating system is grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already labelled).
- Extreme care shall be taken not to overfill the refrigerating system.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. 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.

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 good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- Become familiar with the equipment and its operation.
- Isolate system electrically.
- 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 the cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with instructions.
- h) Do not overfill cylinders (no more than 80 % volume liquid charge).
- 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.
- k) Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Labeling

Equipment shall be labeled stating that it has been de-commissioned and emptied 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 refrigerant.

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is required to follow good practice so that all refrigerants are 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, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the **flammable refrigerant**. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that **flammable refrigerant** does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

CAUTION

Be sure the heat pump is grounded. In order to avoid electric shock, make sure that the unit is grounded and that the ground wire is not connected to a gas or water pipe, lightning conductor or telephone ground wire.

Do not operate the heat pump with a wet hand. An electric shock may happen.

Do not operate the heat pump when using a room fumigation-type insecticide. Failure to observe this precaution could cause the chemicals to become deposited in the unit, which could endanger the health of those who are hypersensitive to chemicals. It may also cause the refrigerant sensor to alarm.

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the heat pump.

Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause wetting of the building, furniture, etc.

Never touch the internal parts of the controller. Do not remove the front panel. Some parts inside are dangerous to touch, and machine troubles may occur.

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.

Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.

Storage package protection should be constructed in such a way 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.

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.

The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.

Do not place appliances (for example an operating gas appliance) which produce open flame in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion, deformation of the unit due to the heat or even an explosion.

Do not install the heat pump in a location where flammable gas may leak out. If the gas leaks out and stays around the heat pump, a fire may break out.

⚠ WARNING

The appliance uses R32 refrigerant.



⚠ WARNING

These instructions are exclusively intended for qualified contractors and authorized installers.

Work on the refrigerant circuit with mild flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.

Work on electrical equipment may only be carried out by a qualified electrician.

Before initial commissioning, all safety – related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

Special requirements for R32

⚠ WARNING

Installation and operation of a heat pump with an A2L refrigerant has special requirements. The ECO HP unit uses the refrigerant R32, which is heavier than air and is considered to be flammable. Because of this special considerations have to be made in regards to the installation and other appliances that may share the same space / room. Please refer to the following sections for specific requirements for your installation.

⚠ WARNING

- Do NOT have refrigerant leakage and open flame.
- Be aware that the R32 refrigerant does NOT contain an odor.

⚠ WARNING

- Do NOT re-use joints which have been used already.
- Joints made in installation between parts of refrigerant system shall be accessible for maintenance purposes.

⚠ WARNING

Make sure installation, servicing, maintenance and repair comply with instructions and with applicable legislation (for example national gas regulation) and are executed only by authorized persons.

WARNING

Installations of an A2L refrigerant (R32) Heat Pump like the ECO HP with other Combustion appliances in the same room / space are not allowed without specific preventative measures. Weil-McLain boilers that utilize a sealed Cabinet and are vented per their Installation and Service Manuals Direct Vent instructions are permitted, because any leaked refrigerant will not be able to enter the combustion air as well as reach any component that could be considered a potential ignition source. Consult your WM Sales Representative for a detailed list of WM boilers meeting this requirement. As for other combustion appliances, consult the manufacturer of those devices before the installation and operation of the ECO HP product.

CAUTION

- Pipework should be protected from physical damage.
- Installation of pipework shall be kept to a minimum length.

PRECAUTIONS ON REFRIGERANT LEAKAGE

In UL/CSA 60335-2-40, R32 refrigerant is classified as class A2L, which is mildly flammable. Therefore, R32 refrigerant is suitable for systems needing additional refrigerant charge and which will limit the area of the rooms being served by the system.

The total amount of refrigerant in the system shall be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

If the total refrigerant charge in the system is < 4.04 lb, there are no additional installation room minimum floor area requirements. Use the first column of Table 1 to determine minimum floor area requirement of the installation room.

If the total refrigerant charge in the system is ≥ 4.04 lb, you need to comply with additional minimum floor area requirements as described in the following diagrams, tables and flow chart. The diagrams show an example installation room and, if required, a secondary natural ventilation room. The flow chart steps through the process of determining the minimum floor area requirement per the refrigerant charge and IDU installation height. The tables provide the values needed to step through the flow chart.

Table 1-Minimum floor area per refrigerant charge & IDU installation height: indoor unit.

Table 2-Minimum venting opening area to secondary room for natural ventilation: indoor unit.

CAUTION

The space considered shall be any space which contains refrigerant-containing parts or into which refrigerant could be released.

For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate to create a fire or explosion hazard.

INSTALLATIONS IN AN UNVENTILATED ROOM

UL 60335-2-40 specifies an Unventilated Room as a room that does not have a means of venting away any potential leaked refrigerant.

*installation height (h0) is measured from the floor to the bottom of the indoor unit.

The room area (A) of the smallest, enclosed, occupied space shall be used in the determination of the refrigerant quantity limits.

For determination of room area (A) when used to calculate the refrigerant charge limit, the following shall apply. The room area (A) shall be defined as the room area enclosed by the projection to the base of the walls, partitions and doors of the space in which the appliance is installed.

Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space. Units mounted higher than 70-7/8 in and spaces divided by partition walls that are no higher than 62-7/8 in shall be considered a single space.

Rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliance to Amin, if the passageway complies with all the following.

- 1) It is a permanent opening.
- 2) It extends to the floor.
- 3) It is intended for people to walk through.

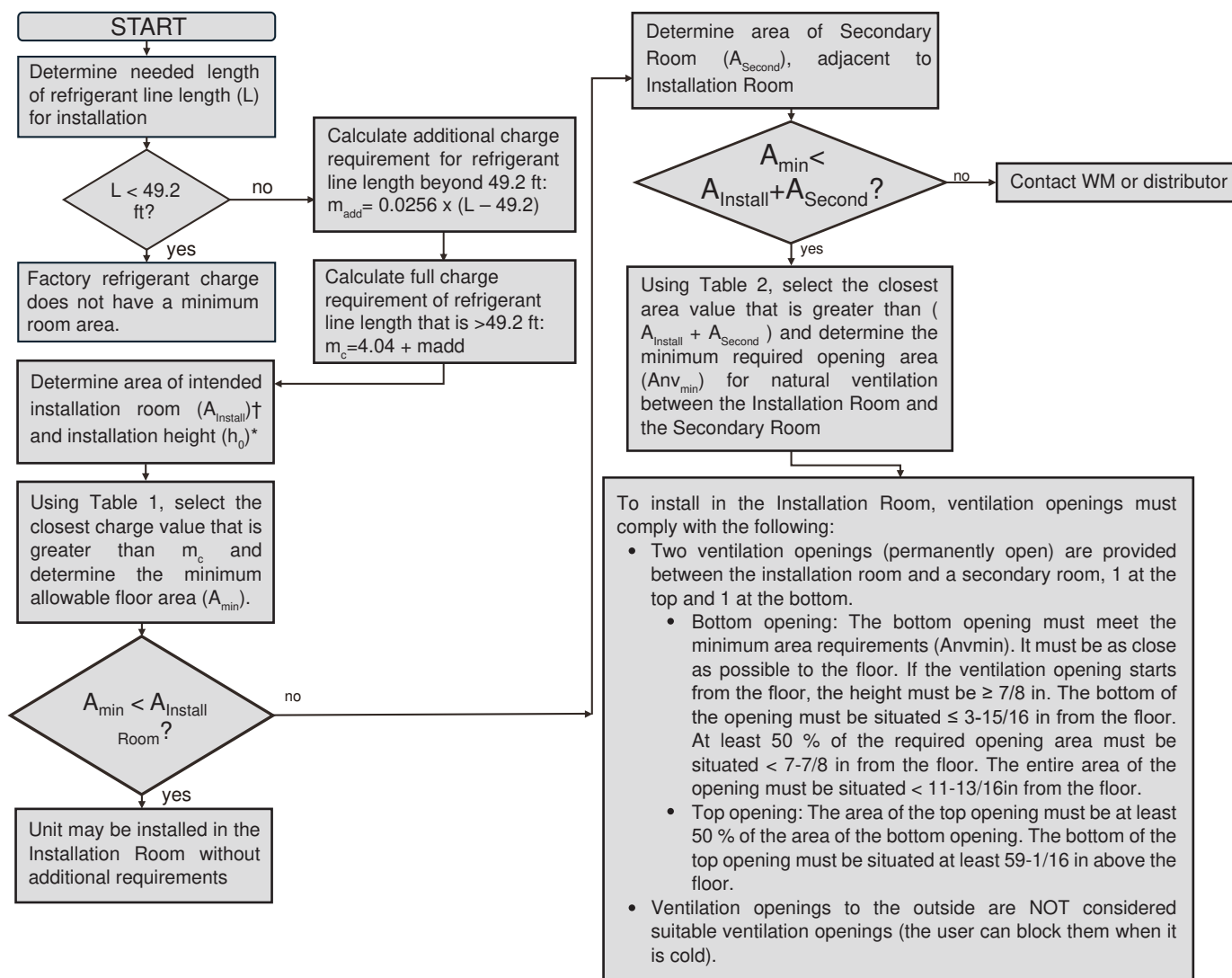
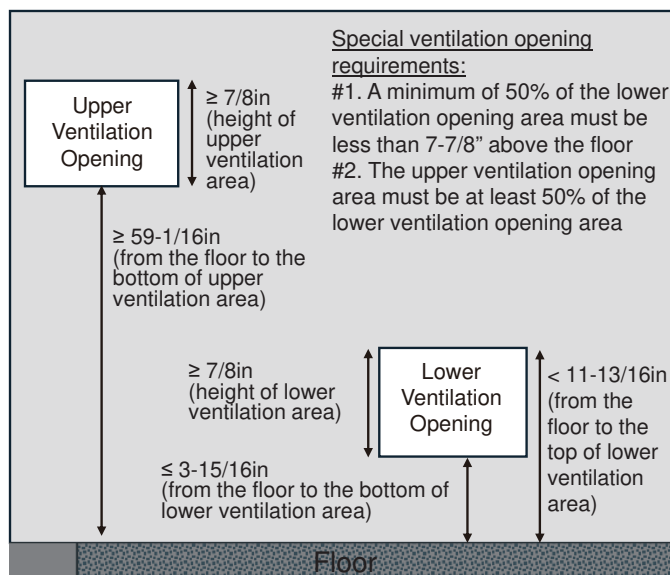
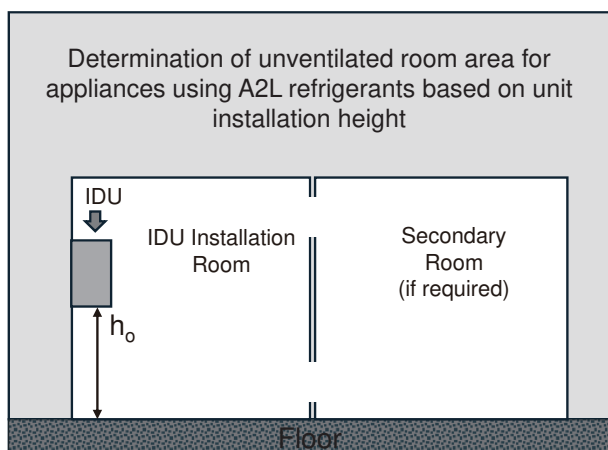




Table 1 - Minimum required Room Area

Refrigerant line length (ft)	System Charge, m _{max} (lbs)	Install height-h0 (in)										
		63	60	56	52	48	44	40	36	32	28	24
		Minimum room area, Amin (ft ²)										
≤49.2	4.04	No limit	No limit	No limit	No limit	No limit	No limit	No limit	No limit	No limit	No limit	No limit
55.8	4.21	83.9	88.1	94.4	101.7	110.2	120.2	132.2	146.9	183.4	239.6	326.1
62.3	4.38	87.3	91.6	98.2	105.7	114.5	125	137.4	156.7	198.3	259	352.5
68.9	4.54	90.6	95.1	101.9	109.8	118.9	129.7	142.7	168.9	213.8	279.2	380.1
75.4	4.71	94	98.6	105.7	113.8	123.3	134.5	148	181.6	229.8	300.2	408.6
82	4.88	97.3	102.2	109.5	117.9	127.7	139.3	157.7	194.7	246.5	321.9	438.2
88.6	5.05	100.6	105.7	113.2	121.9	132.1	144.1	168.8	208.4	263.7	344.4	468.8
95.1	5.21	104	109.2	117	126	136.5	148.9	180.2	222.4	281.5	367.7	500.4
98.4	5.3	105.6	110.9	118.9	128	138.7	153.7	186	229.6	290.6	379.6	516.7

Table 2 - Minimum required Ventilation Opening

Room area (ft ²)	Install height-h0 (in)										
	63	60	56	52	48	44	40	36	32	28	24
	Minimum Ventilation Opening, Anvmin (in ²)										
515	---	---	---	---	---	---	---	---	---	---	0.1
450	---	---	---	---	---	---	---	---	---	---	15.9
400	---	---	---	---	---	---	---	---	---	---	28
350	---	---	---	---	---	---	---	---	---	8.1	40
250	---	---	---	---	---	---	---	---	12.9	36.3	63.5
200	---	---	---	---	---	---	---	10.6	29	50.1	74.6
150	---	---	---	---	---	1.5	14.4	28.7	44.8	63.2	84.8
95	---	---	---	7.8	16.4	25.8	36.2	47.8	60.8	75.9	93.8
75	---	4.5	11.1	18.3	26	34.4	43.7	54.1	65.9	79.6	95.8
40	22	25.4	30.3	35.6	41.4	47.8	54.9	62.9	72	82.7	95.5

2 BEFORE INSTALLATION

• Before installation

Be sure to confirm the model name and the serial number of the unit.

3 INSTALLATION SITE

WARNING

- There is flammable refrigerant in the unit and it should be installed in a well-ventilated site.
Be sure to adopt adequate measures to prevent the unit from being used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunction, smoke or fire. Please instruct the customer to keep the area around the unit clean.
- The equipment is not intended for use in a potentially explosive atmosphere.

- Select an installation site where the following conditions are satisfied and one that meets with your customer's approval.
 - Places that are well-ventilated.
 - Safe places which can bear the unit's weight and vibration and where the unit can be installed at an even level.
 - Places where there is no possibility of flammable gas or product leak.
 - The equipment is not intended for use in a potentially explosive atmosphere.
 - Places where servicing space can be ensured.
 - Places where the units' piping and wiring lengths come within the allowable ranges.
 - Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
 - Do not install the unit in places often used as a work space. In case of construction work (e.g. grinding etc.) where a lot of dust is created, the unit must be covered.
 - Do not place any object or equipment on top of the unit (top plate)
 - Do not climb, sit or stand on top of the unit.
 - Be sure that sufficient precautions are taken in case of refrigerant leakage according to relevant local laws and regulations.

CAUTION

The indoor unit should be installed in an indoor water proof place, or the safety of the unit and the operator cannot be ensured.

The indoor unit is to be wall mounted in an indoor location that meets the following requirements:

- The installation location is frost-free.
- The space around the unit is adequate for servicing, see figure 4-3.
- The space around the unit allows for sufficient air circulation.
- There is a provision for condensate drain and pressure relief valve blow-off.

CAUTION

When the unit is running in the cooling mode, condensate may drop from the water inlet and water outlet pipes. Please make sure the dropping condensate will not result in damage of your furniture and other devices.

- The installation surface is a flat and vertical non-combustible wall, capable of supporting the operation weight of the unit.
- All piping lengths and distance have been taken into consideration.

4 INSTALLATION PRECAUTIONS

4.1 Dimensions

Dimensions of the wall bracket:

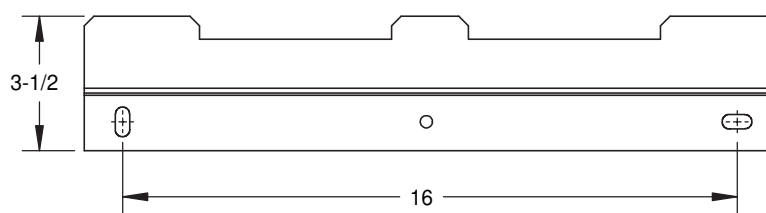


Fig.4-1

unit:in

Dimensions of the unit:

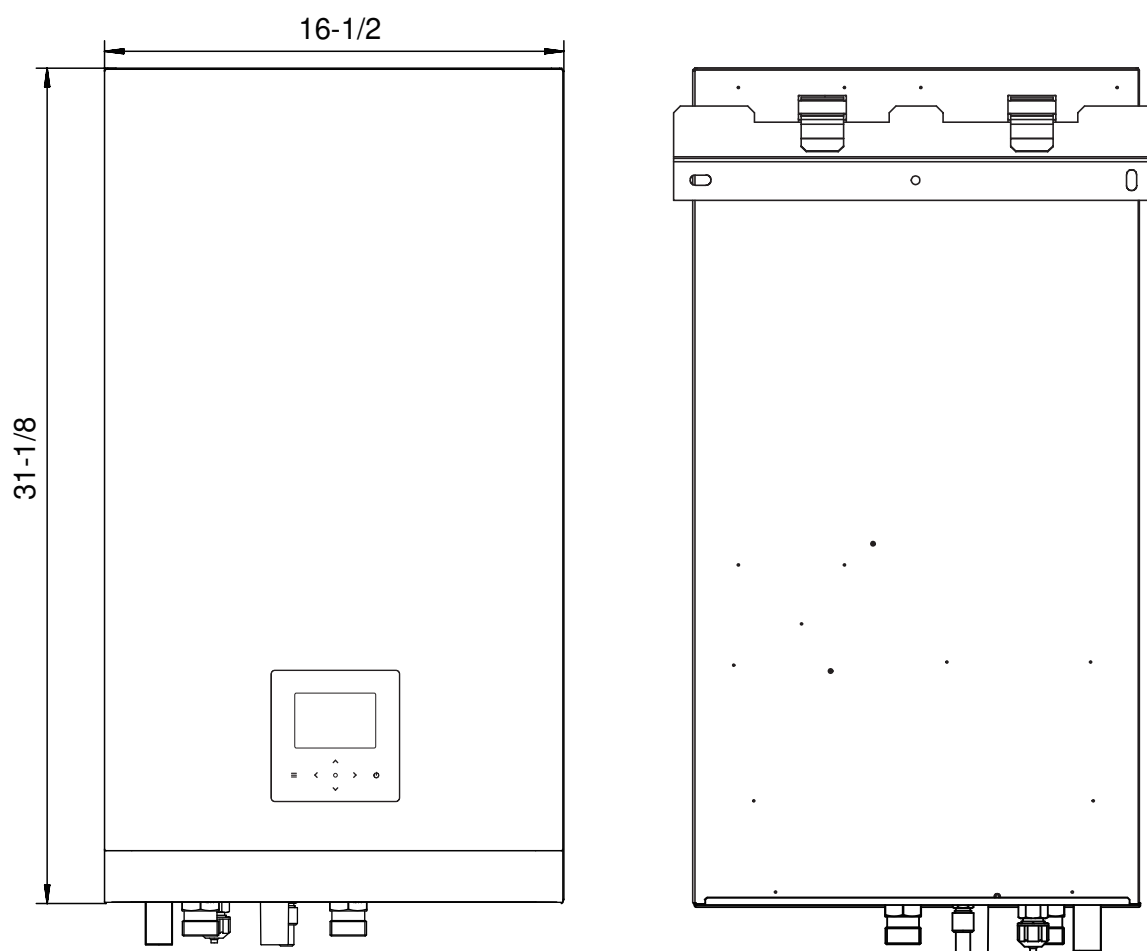
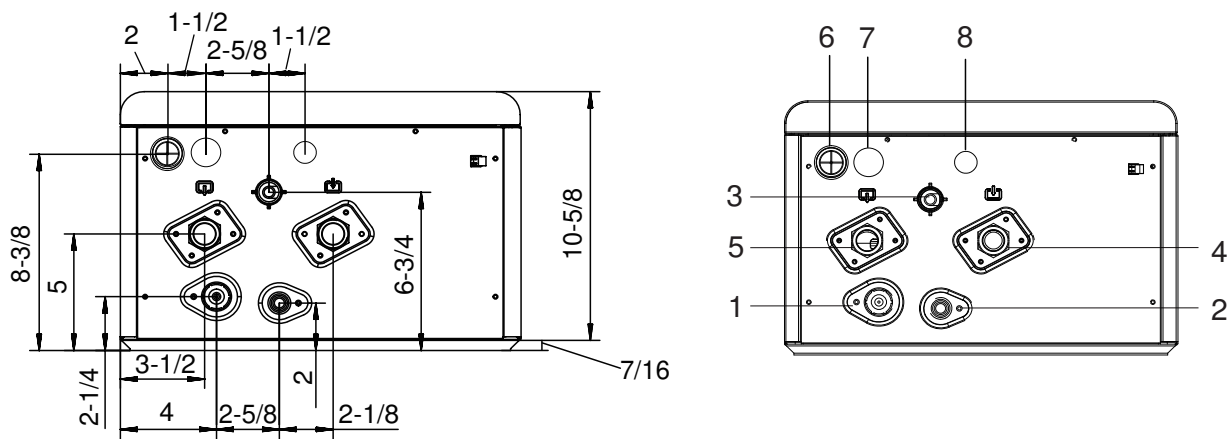


Fig.4-2



unit:in

NO.	
1	Refrigerant gas pipe size 5/8", connection size 7/8"-14UNF
2	Refrigerant liquid pipe size 3/8", connection size 5/8"- 18UNF
3	Drain Ø 1"
4	Water Inlet 1" NPT
5	Water Outlet 1" NPT
6	Wiring hole Ø for 3/4" conduit
7	Wiring hole Ø for 3/4" conduit
8	Wiring hole Ø for 1/2" conduit

4.2 Installation requirements

- The indoor unit is packed in a box.
- At delivery, the unit must be checked and any damage must be reported immediately to the carrier claims agent.
- Check if all indoor unit accessories are enclosed.(See section 6 for accessories list)
- Bring the unit as close as possible to the final installation position in its original package in order to prevent damage during transport.
- The indoor unit weight is approximately 68 lbs and should be lifted by two persons.

WARNING

Do not grasp the control box or pipe to lift the unit!

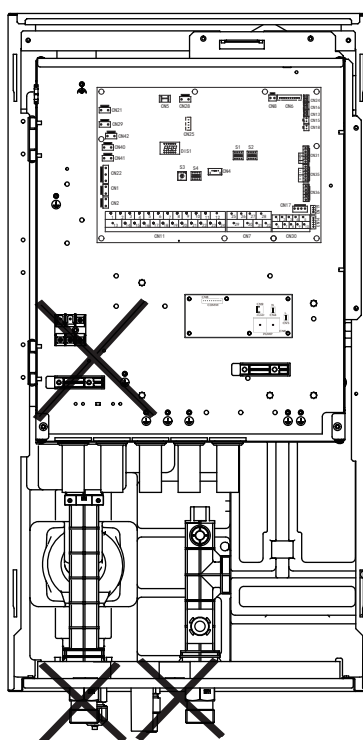


Fig.4-3

4.3 Recommended servicing space

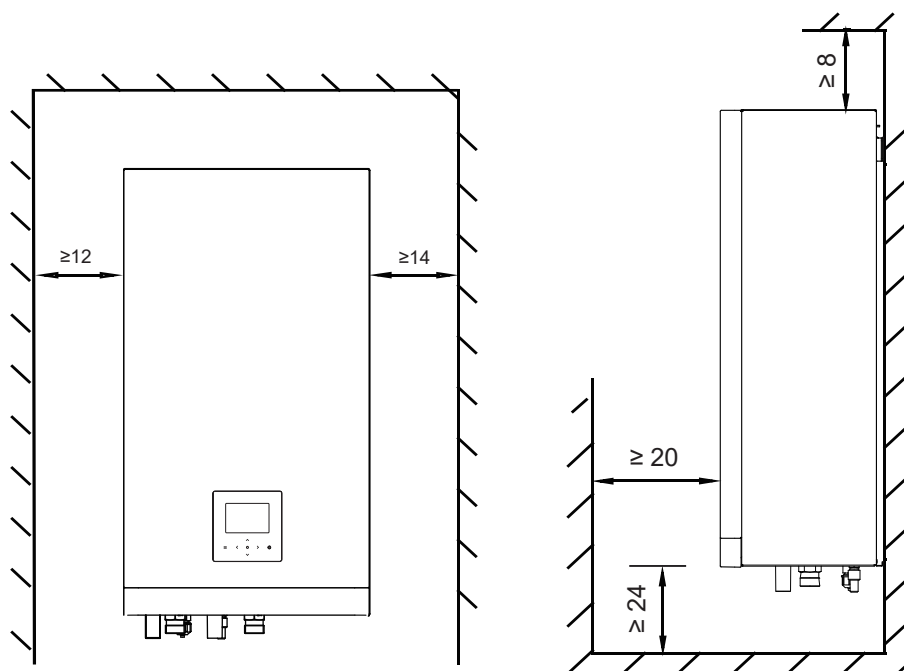


Fig.4-4

unit:in

4.4 Mounting the indoor unit

- Fix the wall mounting bracket to the wall using appropriate screws and/or nuts and bolts.
- Make sure the wall mounting bracket is horizontal level.
- Pay special attention to prevent overflow of the drain pan.
- Hang the indoor unit on the wall mounting bracket.

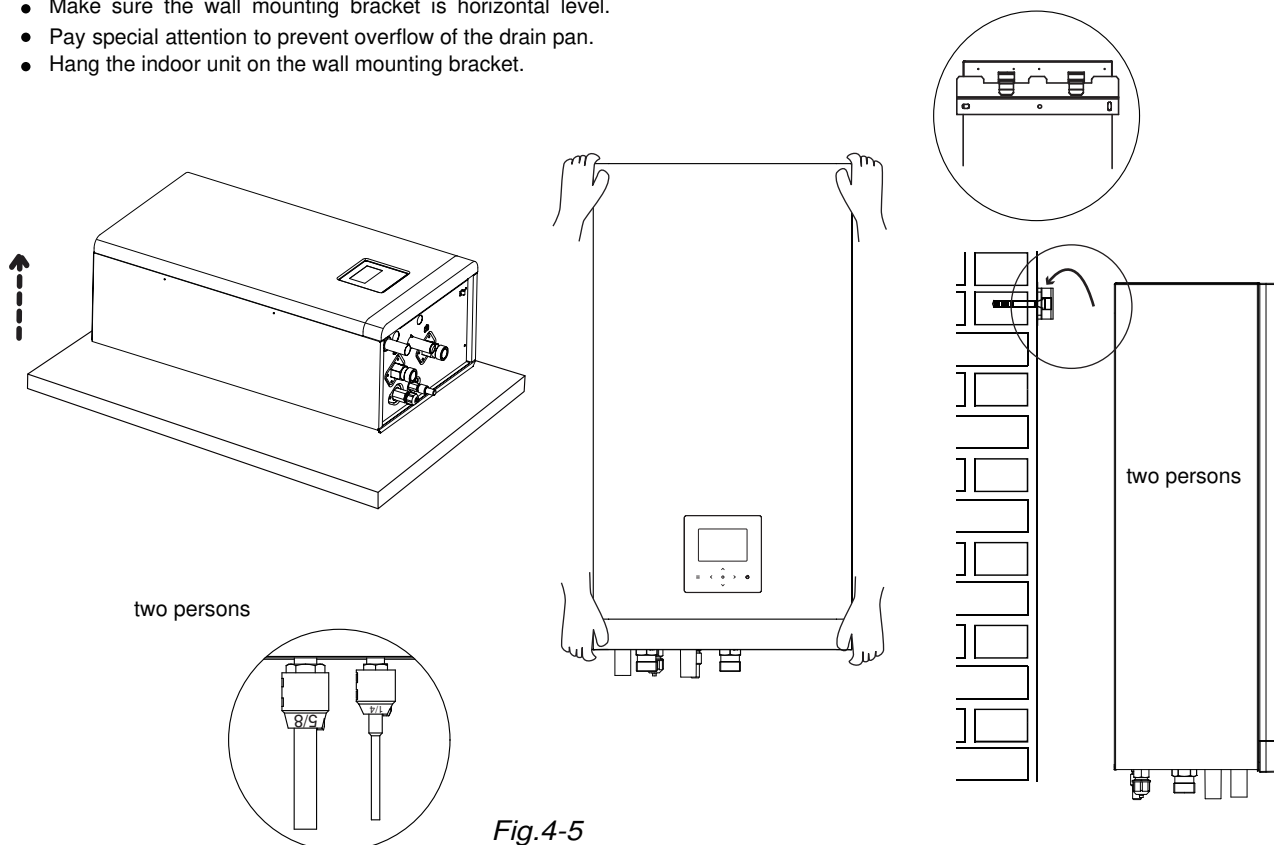


Fig.4-5

4.5 Refrigerant piping connection

⚠ WARNING

The 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 ASHRAE15, 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.

The installation of pipe-work shall be kept to a minimum.

All joints made in the installation between parts of the refrigerating system, with at least one part charged, shall be made in accordance with the following:

- A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe or any uncharged refrigerating system part.
- Mechanical connectors used indoors shall comply with ISO 14903 or UL 207 (U.S. only). When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
- Refrigerant tubing shall be protected or enclosed to avoid damage.
- Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operation shall be protected against mechanical damage.

Compliance is checked according to the installation instructions and a trial installation, if necessary.

Field-made refrigerant joints indoors shall be leak tested. The test method shall have a sensitivity of 0.012 lbs per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

For installations with field applied joints that are exposed in the occupied space, these joints shall be at least one of the following:

- Mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only).
- Welded or brazed joints.
- Joints in enclosures that vent to the unit or to the outside.

Compliance is checked by inspection and tests.

⚠ WARNING

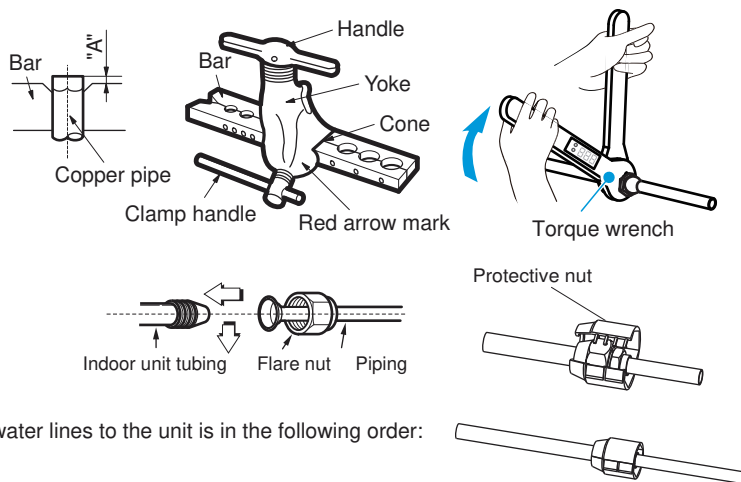
After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.

The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

Field-made refrigerant joints indoors shall be leak tested. The test method shall have a sensitivity of 0.012 lbs per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

- Align the center of the pipes.
- Sufficiently tighten the flare nut with fingers, and then tighten it with a spanner and torque wrench.
- The protective nut is a one-time part, it can not be reused. In case it is removed, it should be replaced with a new one. (Protective nuts included with accessories)

Outer diam.	Tightening torque(lb-ft)	Max tightening torque(lb-ft)
φ 3/8	18.5	19.2
φ 5/8	33.2	34.7



- The most convenient assembly of refrigerant and water lines to the unit is in the following order:
 1. Refrigerant liquid line
 2. Refrigerant gas line
 3. Water pipes

⚠ CAUTION

- The installation of pipe-work shall be kept to a minimum.
- Excessive torque can break nut on installation conditions.
- When flared joints are reused indoors, the flare part should be re-fabricated.

5 GENERAL INTRODUCTION

These units are used for both heating and cooling applications and domestic hot water tanks. They can be combined with fan coil units, floor heating applications, low temperature high efficiency radiators, domestic hot water tanks (field supply) and solar kits (field supply). A wired controller is supplied with the unit.

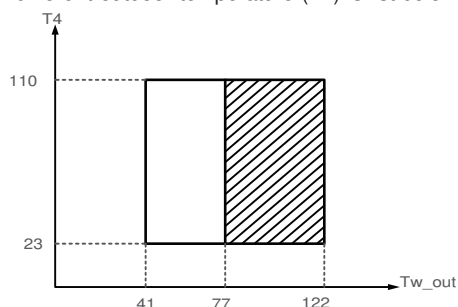
NOTICE

- Maximum length of communication wiring between the indoor unit and the controller is 164 ft.
- Power cords and communication wiring must be laid out separately, they can not be placed in the same conduit. Otherwise, it may lead to electromagnetic interference. Power cords and communication wirings should not come in contact with the refrigerant pipe so as to prevent the high temperature pipe from damaging wirings.
- Communication wiring must use shielded wire. Including indoor unit to outdoor unit PQE line, indoor unit to controller ABXYE line.

Operation range

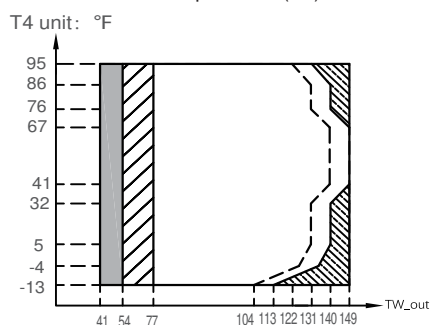
Operating range of indoor unit	
Outlet water (Heating mode)	54 °F ~ 149 °F
Outlet water (Cooling mode)	41 °F ~ 77 °F
Ambient temperature	41 °F ~ 95 °F
Water pressure	14.50 psi ~ 43.51 psi
Water flow	3.08 gpm ~ 13.21 gpm

In cooling mode, the water flowing temperature (TW_out) range in different outdoor temperature (T4) is list below:



▨ Operation range by heat pump with possible limitation and protection.

In heating mode, the water flowing temperature (TW_out) range in different outdoor temperature (T4) is listed below:

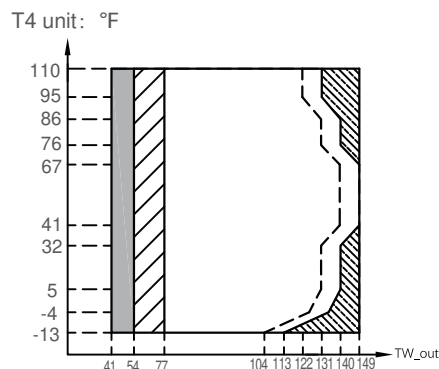


- ▨ If AHS setting is valid, only IBH/AHS turns on;
- ▨ If AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.
- ▨ Operation range by heat pump with possible limitation and protection.
- ▨ Heat pump turns off, only IBH/AHS turns on.
- Maximum inlet water temperature line for heat pump operation.

NOTICE

DHW will target the Max Outlet Water Temperature for the current Outdoor Temperature

In DHW mode, the water flowing temperature (TW_out) range in different outdoor temperature (T4) is listed below:



- ▨ If AHS setting is valid, only IBH/AHS turns on;
- ▨ If AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.
- ▨ Operation range by heat pump with possible limitation and protection.
- ▨ Heat pump turns off, only IBH/AHS turns on.
- Maximum inlet water temperature line for heat pump operation.

NOTICE

AHS: Additional Heat Source;
IBH: Internal Back-Up Heater.

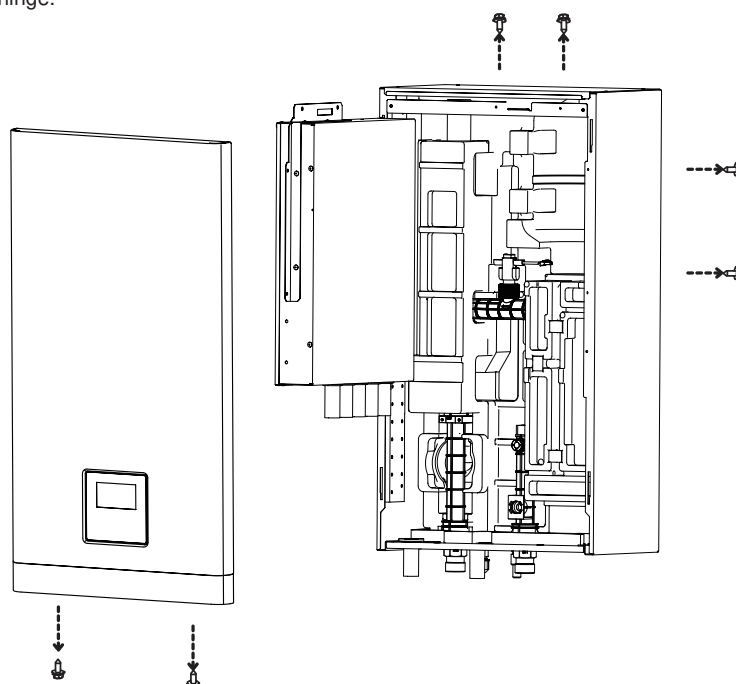
6 ACCESSORIES

Installation Fittings		
Name	Shape	Quantity
Indoor Unit Product Manual		1
M16 Copper Nut Tamper Cap		1
M9 Copper Nut Tamper Cap		1
M16 Copper nut		1
M9 Copper nut		1
Tie Wrap		2

7 OVERVIEW OF THE UNIT

7.1 Disassembling the unit

The indoor unit cover can be removed by removing the 2 screws, remove the 4 screws securing the hinged electrical box and open up the electrical box on its hinge.



CAUTION

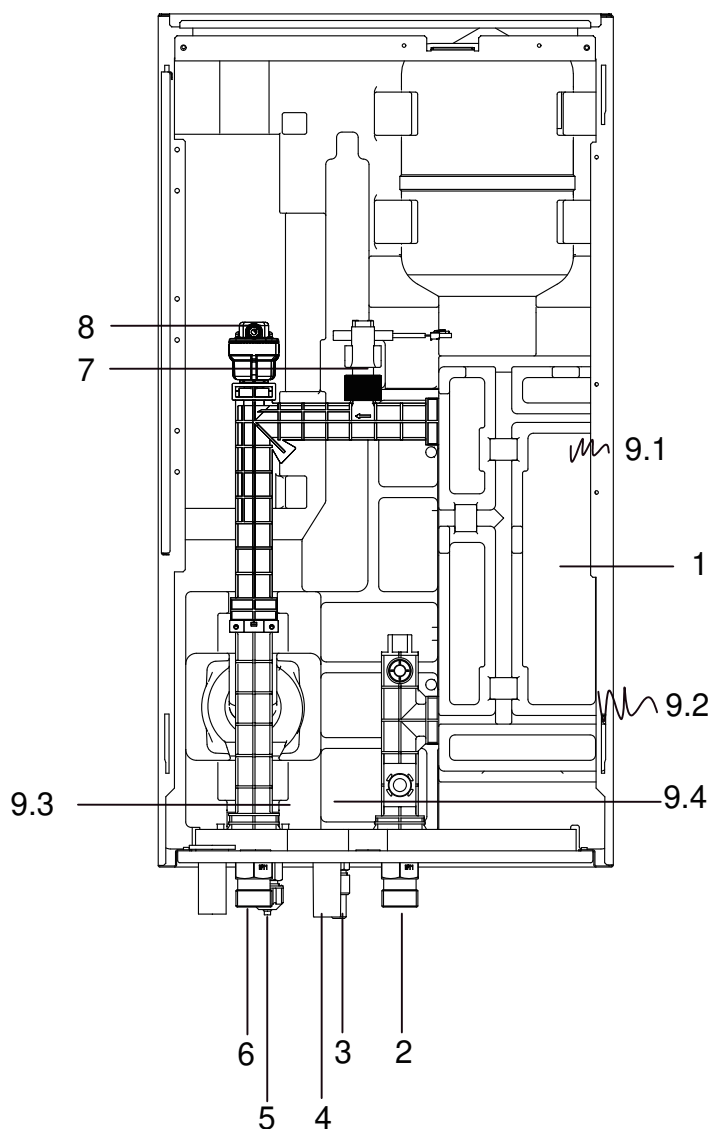
Make sure to fix the cover with the screws and nylon washers when installing the cover (screws are delivered as accessory). Parts inside the unit can be hot.

- To gain access to the control box components – e.g. to connect the field wiring – the control box service panel can be removed. Loosen the front screws and unhinge the control box service panel.

CAUTION

Switch off all power supply – i.e. outdoor unit power supply, indoor unit power supply, electric heater and additional heater power supply before removing the control box service panel.

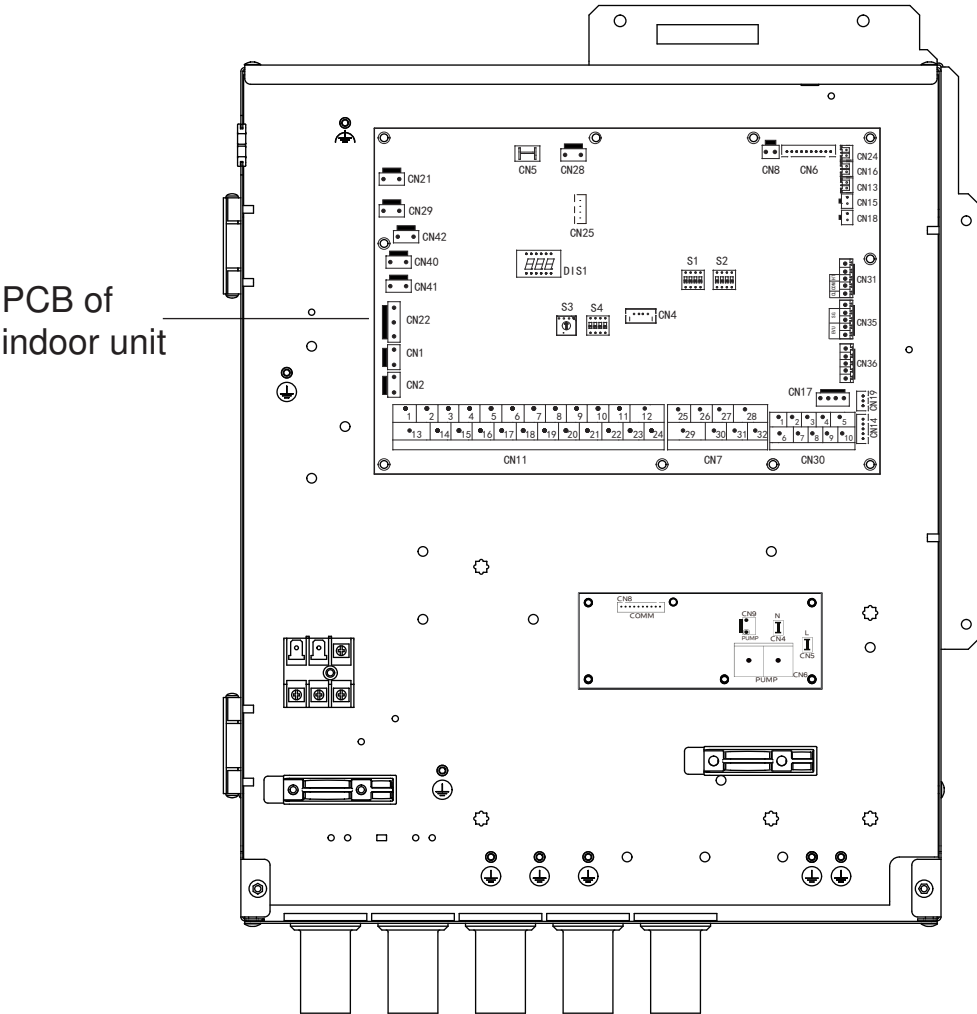
7.2 Main components



Code	Description	Explanation
1	Plate heat exchanger	Transfers energy from refrigerant to water.
2	1" NPT - Water Inlet	Water inlet.
3	Refrigerant liquid pipe	/
4	Drainage port	/
5	Refrigerant gas pipe	/
6	1" NPT - Water Outlet	Water outlet.
7	Flow switch	When the water flow is less than 3.08 GPM, the flow switch will be OFF(open its contact).
8	Automatic air purge vent	Remaining air in the water circuit will be automatically removed via the automatic air purge vent.
9	Temperature sensors	Four temperature sensors determine the water and refrigerant temperature at various points, Tw_in , Tw_out are for water and Tb, T2b are for refrigerant. 9.1-Tw_out ;9.2-Tw_in ;9.3-T2B ;9.4-T2

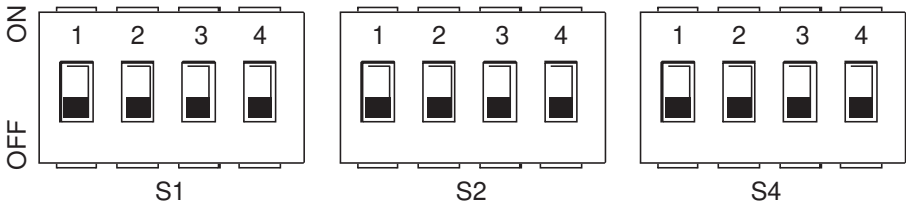


7.3 Electronic control box



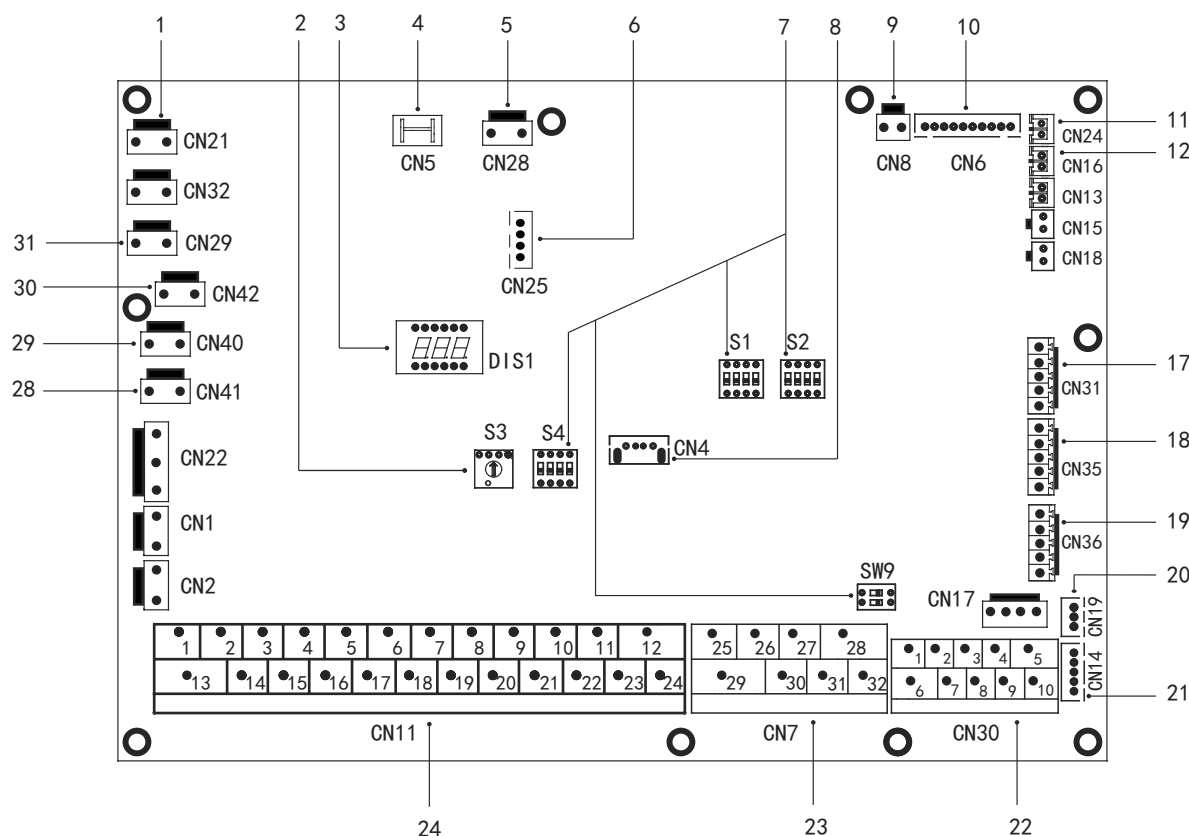
NOTICE

The picture is only for reference, please refer to the actual product.
DIP switch S1、 S2 and S4 is located on the indoor unit main control board, the dip switch settings are as follows (Refer to electrically controlled wiring diagram for details).



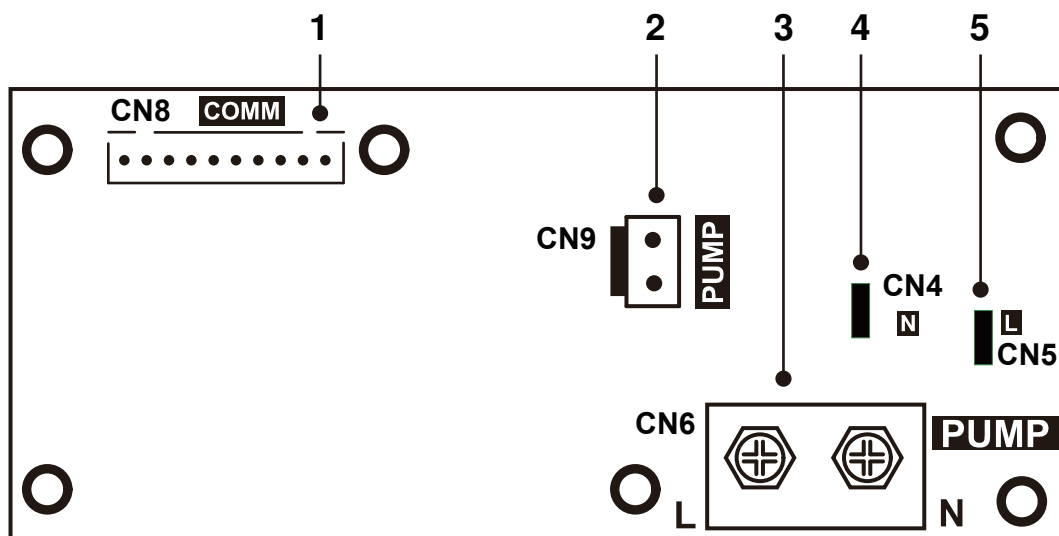
DIP switch		ON= 1	OFF=0	Factory defaluts	DIP switch		ON=1	OFF=0	Factory defaluts	DIP switch		ON=1	OFF=0	Factory defaluts
S1	1/2	Reserved		Refer to electrically controlled wiring diagram	S2	1	Reserved		Refer to electrically controlled wiring diagram	S4	1	Reserved	Reserved	Refer to electrically controlled wiring diagram
			2			Reserved		2			Refrigerant detection valid	Refrigerant detection invalid		
	3/4	Reserved				3/4	0/0=Reserved 0/1=Fixed speed pump 1/0=Reserved 1/1=Variable speed pump	3			Reserved	Reserved		
						4	Imperial unit (standard)	Metric unit						

7.3.1 Main control board of indoor unit



Order	Port	Code	Assembly unit	Order	Port	Code	Assembly unit
1	CN21	POWER	Port for power supply	19	CN36	M1 M2	Port for leak detection sensor
2	S3	/	Rotary dip switch	20	CN19	P Q	Communicate port between indoor unit and outdoor unit
3	DIS1	/	Digital display	21	CN14	A B X Y E	Port for communication with the wired controller
4	CN5	GND	Port for earth			1 2 3 4 5	Port for communication with the wired controller
5	CN28	PUMP	Port for variable speed pump power input	22	CN30	6 7	Communication port between indoor unit and outdoor unit
6	CN25	DEBUG	Port for IC programming			9 10	Port for Internal machine Parallel
7	S1,S2,S4,SW9	/	Dip switch			26 30/31 32	Compressor run/Operating status
8	CN4	USB	Port for USB programming	23	CN7	/	/
9	CN8	FS	Port for flow switch			27 28	Port for additional heat source
10	CN6	T2	Port for temperature sensor of refrigerant liquid side temperature of indoor unit			3 4 15	Port for room thermostat
		T2B	Port for temperature sensor of refrigerant gas side temperature of indoor unit			5 6 16	Port for SV1(3-way valve)
		TW_in	Port for temperature sensor of inlet water temperature of plate heat exchanger			7 8 17	Port for SV2(3-way valve)
		TW_out	Port for temperature sensor of outlet water temperature of plate heat exchanger			9 21	Port for zone 2 pump
11	CN24	Tbt1	Port for balance tank temperature sensor	24	CN11	10 22	Port for outside circulation pump
12	CN16	/	/			11 23	Port for solar energy pump
		HT	Control port for room thermostat (heating mode)			12 24	Port for DHW pipe pump
17	CN31	COM	Power port for room thermostat			18 19 20	Port for SV3(3-way valve)
		CL	Control port for room thermostat (cooling mode)	28	CN41	HEAT8	Port for anti-freeze electric heating tape(internal)
18	CN35	EVU	Port for DHW thermostat	29	CN40	HEAT7	Port for anti-freeze electric heating tape(internal)
				30	CN42	HEAT6	Port for anti-freeze electric heating tape(internal)
				31	CN29	HEAT5	Port for anti-freeze electric heating tape(internal)

7.3.2 Pump Control Board



Order	Port	Code	Assembly unit	Voltage
1	CN8	COMM	Port for PUMP control board controlled by the main control board of indoor unit	12 V DC
2	CN9	PUMP	Power for Indoor Unit Pump, VH socket (Reserved)	110-120 V AC
3	CN6	PUMP	Power for Indoor Unit Pump	110-120 V AC
4	CN4	N	Power input N	110-120 V AC
5	CN5	L	Power input L	

7.4 Refrigerant pipework

CAUTION

When connecting the refrigerant pipes, always use two wrenches/spanners for tightening or loosening connections. Failure to do so can result in damaged piping connections and leaks.

NOTICE

- The appliance contains fluorinated greenhouse gases. Chemical name of the gas: R32.
- Fluorinated greenhouse gases are contained in hermetically sealed equipment.

7.5 Water piping

All piping lengths and distances have been taken into consideration.

NOTICE

If no glycol is in the system, in case of a power supply failure or pump operating failure, drain all the water system if the water temperature could fall below 32 °F.

CAUTION

1. If a potable water source is used for the equipment's water supply, the source water supply shall be protected against back siphonage by the equipment.
2. The appliance is intended to be permanently connected to the water pipe, and it is not recommended to use a hose connection.
3. Install the system piping. Do not install the heat pump into the system until you have cleaned the pipes.
4. In order to prevent sediment and other impurities from entering the interior of the machine and causing clogging of the heat exchanger, be sure to install a filter at the water inlet of the indoor unit, with a filter mesh of 80 mesh or more recommended.

7.5.1 Water Quality Requirement

Clean system to remove sediment

1. The system must be thoroughly flushed (without heat pump connected) to remove sediment. The heat exchanger can be damaged by buildup or corrosion due to sediment.
2. For zoned systems, flush each zone separately through a purge valve. (If purge valves and isolation valves are not already installed, install them to properly clean the system.)
3. Flush system until water runs clean and piping is free of sediment.

WARNING

- Do not use petroleum-based cleaning or sealing compounds in hydronic heating system. Damage to elastomer seals and gaskets in system could occur, resulting in substantial property damage.
- Before filling the heat pump and system with water, verify the following. DO NOT fill with softened water. Corrosion can occur.
- Failure to comply could result in heat pump failure or unreliable operation.

Water chemistry

Water pH between 7.0 and 8.5

1. Maintain heat pump water pH between 7.0 and 8.5. Check with litmus paper or have chemically analyzed by water treatment company.
2. If pH differs from above, consult local water treatment company for treatment needed.

Hardness less than 7 grains

1. Consult local water treatment companies for unusually hard water areas (above 7 grains hardness).

Chloride concentration must be LESS THAN 100 ppm

1. Filling with chlorinated fresh water should be acceptable since drinking water chloride levels are typically less than 5 ppm.
2. Do not use the heat pump to directly heat swimming pool or spa water.
3. Do not fill heat pump or operate with water containing chloride in excess of 100 ppm.

WARNING

Verify that the water chemistry meets the limitations and requirements of all other equipment in the system.

WM Required Chemicals:

Contact a WM technologies representative:

- Corrosion inhibitor, Sentinel X100
- Sentinel X100 Quick Test Kit

Antifreeze and Correct Dosage Amount

Use only antifreeze listed by WM Technologies as suitable for use with ECO HP Split Air-to-Water Heat Pump. Contact a WM Technologies representative for information to obtain antifreeze through a WM Technologies distributor.

1. Determine the freezing temperature needed (to protect against lowest likely temperature the system water will encounter).
2. Find the antifreeze concentration by volume needed for this temperature from the antifreeze manufacturer's data on the antifreeze container.
3. Add up the volume (gallons) of all system piping and components, including the expansion tank and heat pump.
 - a. Heat pump water content is 0.41 gallons.
 - b. Remember to include expansion tank water content.
4. Multiply this volume by the (percent) antifreeze needed to find the number of gallons of antifreeze to add.

Fill and test water system

1. Fill system only after ensuring the water meets the requirements of this manual.
2. Close manual and automatic air vents and heat pump drain valve.
3. Fill to correct system pressure. Correct pressure will vary with each application.
 - a. Typical cold water fill pressure for a residential system is 12 psi.
 - b. Pressure will rise when heat pump is turned on and system water temperature increases. Operating pressure must never exceed 24 PSIG.
4. At initial fill and during heat pump startup and testing, check system thoroughly for any leaks. Repair all leaks before proceeding further.

WARNING

Eliminate all system leaks. Continual fresh make-up water will reduce heat pump life. Minerals can build up in the heat exchanger, reducing heat transfer, overheating heat exchanger, and causing heat exchanger failure.

Purge air from water system

1. Connect a hose to the system purge valve. Route hose to an area where water can drain and be seen.
2. Close the heat pump or system isolation valve between the purge valve and fill connection to the system.
3. Close zone isolation valves.
4. Open quick-fill valve on cold water make-up line.
5. Open purge valve.

Freeze protection (if used)

WARNING

- Follow these guidelines to prevent possibility of severe personal injury, death or substantial property damage:
- Use only the products listed by WM Technologies for use with this boiler. See WM Required Chemicals section on previous page for information.
- Thoroughly flush any system that has used glycol before installing the heat pump.
- Review the material safety data sheets (MSDS) are available online. The MSDS contains information on potential hazards and first aid procedures for exposure or ingestion.
- Check antifreeze inhibitor level at least annually. Glycol concentration and inhibitor levels may change over time. Add antifreeze to increase concentration if necessary. Add inhibitor as needed to bring to acceptable level, using inhibitor test kit to verify.
- In addition to antifreeze and inhibitor, use and maintain minimum level of Sentinel X100 inhibitor as directed on this page.
- If using freeze protection fluid with automatic fill, install a water meter to monitor water make-up. Freeze protection fluid may leak before the water begins to leak, causing concentration to drop, reducing the freeze protection level.
- DO NOT exceed 50% antifreeze by volume. Antifreeze moves more sluggishly than water and can interfere with heat transfer. At antifreeze concentrations higher than 50%, sludge can develop in heat pump, potentially causing damage to the heat exchanger.
- Clean the system before filling. Always drain and flush the system thoroughly before filling with antifreeze. Sludge, iron oxide deposits and other sediment in the system inhibit flow and can cause rapid breakdown of inhibitors.
- Use only antifreeze recommended by WM Technologies.

NOTICE

WM Technologies provides information for application of the antifreeze products listed in this document only for use in Weil-McLain heat pump. Do not apply these products or instructions for other applications. Local codes may require a back flow preventer or actual disconnection from city water supply.

6. One zone at a time, open the isolation valves. Allow water to run through the zone, pushing out the air. Run until no noticeable air flow is present. Close the zone isolation valves and proceed with the next zone. Follow this procedure until all zones are purged. Follow the same procedure to purge air from the heat pump and its internal piping.
7. Close the quick-fill water valve and purge valve and remove the hose. Open all isolation valves. Watch that system pressure rises to correct cold-fill pressure.
8. After the system has operated for a while, eliminate any residual air by using the manual air vents located throughout the system.
9. If purge valves are not installed in system, open manual air vents in system one at a time, beginning with lowest floor. Close vent when water squirts out. Repeat with remaining vents.
10. Open automatic air vent (diaphragm-type or bladder-type expansion tank systems only) one turn.
11. Starting on the lowest floor, open air vents one at a time until water squirts out.
12. Repeat with remaining vents.
13. Refill to correct pressure.

X100 inhibitor is required

WARNING

- It is required that the ECO HP Split Air-to-Water Heat Pump have Sentinel X100 added to the system to prevent damage to its heat exchanger. See WM Required Chemicals section on previous page for ordering information.
- After filling the system as directed in these instructions, fill with the X100 aerosol, following the instructions on the container.
- After adding the inhibitor to the system, allow time for the water to circulate and mix. Then check the inhibitor level. Add additional inhibitor if necessary.
- See separate instructions or weil-mclain.com for suggested guidelines to determine how much inhibitor to use.

Check/verify water chemistry

1. The system may have residual substances that could affect water chemistry.
2. After the system has been filled and leak tested, verify water pH and chloride concentrations are acceptable.
3. Test the pH of a sample of system water at least annually. The pH of the water mixture must be between 7.0 and 8.5. (Or use the Sentinel inhibitor test kit to check concentration.)
4. If pH is outside this range (or inhibitor test kit indicates low level), the inhibitor level may not be sufficient to prevent corrosion.

⚠ WARNING

Test antifreeze concentration at least annually. If concentration is low, add antifreeze or drain system and refill with correct mixture.

6. Follow instructions on antifreeze container to determine the amount of antifreeze needed. DO NOT exceed 50% by volume concentration of antifreeze.
7. Follow the instructions on the Sentinel test kit to sample the system water and verify inhibitor concentration.
8. Check inhibitor level after adjustments are made. Check concentration annually.

7.5.2 Installation functional checks

When water is at a standstill inside the system, freezing is very likely to happen and damage the system in the process. The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.

Before continuing installation of the unit, check the following:

- The maximum water pressure ≤ 43.5 psi.
- Always use materials that are compatible with the water used in the system and with the materials used in the unit.
- Ensure that components installed in the field piping can withstand the water pressure and temperature.
- Drain taps must be provided at all low points of the system to permit complete drain of the circuit during maintenance.
- Air vents must be provided at all high points of the system. The vents should be located at points that are easily accessible for service. An automatic air vent is provided inside the unit. Check that this air vent is not tightened so that automatic release of air in the water circuit is possible.
- Ensure that the water volume in the plumbing system is 10.56 gal or more. This minimum volume of water helps to prevent frequent start-stop operation and cold water temperatures during the defrosting operation.

7.5.3 Water volume and sizing expansion vessels

1. The unit does not include an integrated expansion tank, ensure that expansion tanks are installed on the external piping system.
2. Evaluate the size of the expansion tank according to the water capacity of the indoor unit and additional piping to see if it meets the requirements; if not, the water capacity needs to be reduced or replaced with a larger expansion tank.

7.5.4 Water circuit connection

Water connections must be made correctly in accordance with labels on the indoor unit, with respect to the water inlet and water outlet.

⚠ CAUTION

Be careful not to deform the unit's piping by using excessive torque when connecting the piping. Deforming the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall to prevent dust and dirt entering.
- Use a good thread sealant for sealing the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-copper metallic piping, be sure to insulate two different materials from each other to prevent galvanic corrosion.
- As copper is a soft material, use appropriate tools for connecting the water circuit. Inappropriate tools will cause damage to the pipes.

NOTICE

The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping:

- Never use Zn-coated parts in the water circuit. Due to the use of copper tubing in some locations in the unit, excessive corrosion may occur in these parts.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between the domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit. The recommended maximum changeover time of the valve should be less than 60 seconds.

7.5.5 Water circuit anti-freeze protection

All internal hydronic parts are insulated to reduce heat loss. Insulation must also be added to the field piping.

The software contains special functions using the heat pump to protect the entire system against freezing.

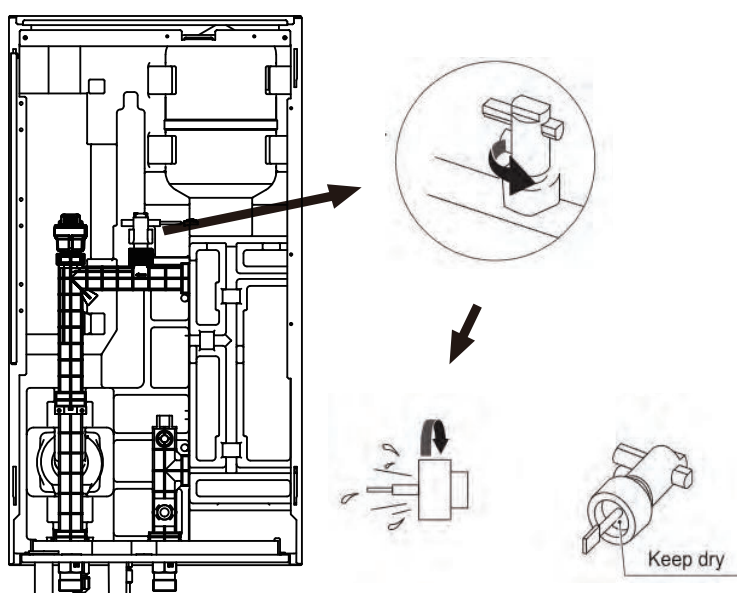
When the temperature of the water flow in the system drops to a certain value, the unit will heat the water, either using the heat pump and/or the electric heating tape. The freeze protection function will turn off only when the temperature increases to a certain value.

In event of a power failure, the above features would not protect the unit from freezing.

CAUTION

When the unit is not running for a long time, make sure the unit is powered on all the time, if you want to cut off the power, the water in the system pipe needs to be drained clean in order to avoid the pump and pipeline system being damaged from freezing water. Also, the power of the unit needs to be cut off after water in the system is completely drained.

Water may enter into the flow switch and cannot be drained out and may freeze when the temperature is low enough. The flow switch should be removed and dried, then can be reinstalled in the unit.



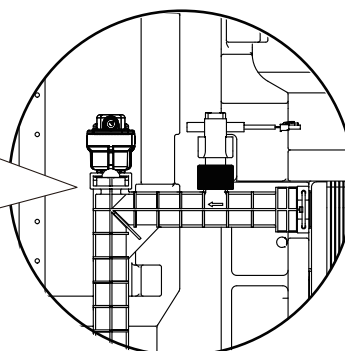
NOTICE

1. Counterclockwise rotation, remove the flow switch.
2. Dry the flow switch completely.
3. The flow switch is keyed to ensure proper orientation when installed. Take special care to ensure proper alignment.

7.6 Filling water

- Connect the water supply to the filling valves and open the valve.
- Make sure all the automatic air purge valves are open (at least 2 turns).
- Fill with water until the pressure and temperature gage indicates a pressure of approximately 15 psi. Remove air in the circuit as much as possible using the automatic air vent.

Do not fasten the black plastic cover on the vent valve at the topside of the unit when the system is running. Open air purge valve, turn counterclockwise at least 2 full turns to release air from the system.



NOTICE

During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic bleed valve during the first operating hours of the system. Topping off the water afterwards might be required.

- The water pressure indicated on the pressure and temperature gage will vary depending on the water temperature (higher pressure at higher water temperature). However, at all times water pressure should remain above 12-15 psi to avoid air entering the circuit.
- The unit might drain-off too much water through the pressure relief valve.

7.7 Field wiring

WARNING

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC)

A main switch or other means of disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations. Switch off the power supply before making any connections. Use only copper wires. Never squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections. All field wiring and components must be installed by a licensed electrician and must comply with relevant local laws and regulations.

The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.

Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.

Be sure to establish a ground. Do not ground the unit to a utility pipe, surge protector, or telephone ground. Incomplete grounding may cause electrical shock.

Be sure to install a ground fault circuit interrupter (30 mA). Failure to do so may cause electrical shock.

Be sure to install the required fuses or circuit breakers.

7.7.1 Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on the high pressure side).
- Secure the electrical wiring with cable ties so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the ground fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the ground fault circuit interrupter.

NOTICE

The ground fault circuit interrupter must be a high- speed type breaker of 30 mA (< 0.1 s).

- This unit is equipped with an inverter. Installing a phase advancing capacitor not only will reduce the power factor improvement effect, but also may cause abnormal heating of the capacitor due to high-frequency waves. Never install a phase advancing capacitor as it could lead to an accident.

NOTICE

Use wires in accordance with local code, all the wires are connected to high voltage except for thermistor wire and wire for user interface.

- Equipment must be grounded.
- All high-voltage external load, if it is metal or a grounded port, must be grounded.
- All external load current must be less than 0.2 A, if the single load current is greater than 0.2 A, the load must be controlled through AC contactor.
- "AHS1" "AHS2", "A1" "A2", "R1" "R2" and "DFT1" "DFT2" wiring terminal ports provide only the switch signal. Please refer to image of 7.7.5 to get the ports position in the unit.

7.7.2 Field wiring guidelines

- Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the switch box service panel.

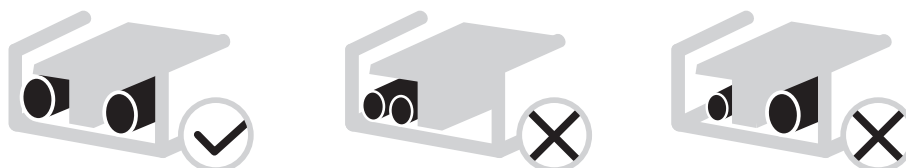
⚠ WARNING

Switch off all power including the unit power supply before removing the switch box service panel.

- Fix all wiring using wire ties.
- Lay out the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely.
- Follow the electric wiring diagram for electrical wiring work (the electric wiring diagrams are located on the rear side of the switch box service panel).
- Install the wires and fix the cover firmly so that the cover may be fit in properly.

7.7.3 Precautions on wiring of power supply

- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.
 - Do not connect different gauge wires to the same power supply terminal. (Loose connections may cause overheating.)
 - When connecting wires of the same gauge, connect them according to the figure below.



- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- Attach a ground fault circuit interrupter and fuse to the power supply line.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside force cannot affect the terminals.

7.7.4 Safety device requirements

- Select the wire diameters (minimum value) individually for each unit based on the table below.
- Select circuit breaker having a contact separation in all poles not less than 0.118 inch providing full disconnection, where MFA is used to select the current circuit breakers and residual current operation breakers:

System	Power Current						IWPM	
	Hz	Voltage (V)	Min. (V)	Max. (V)	MCA (A)	MFA (A)	kW	FLA (A)
IDU 41-55	60	110-120 V	99	132	1.5	15	0.07	1.2

NOTICE

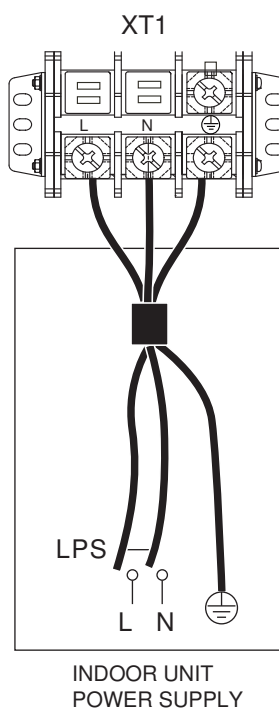
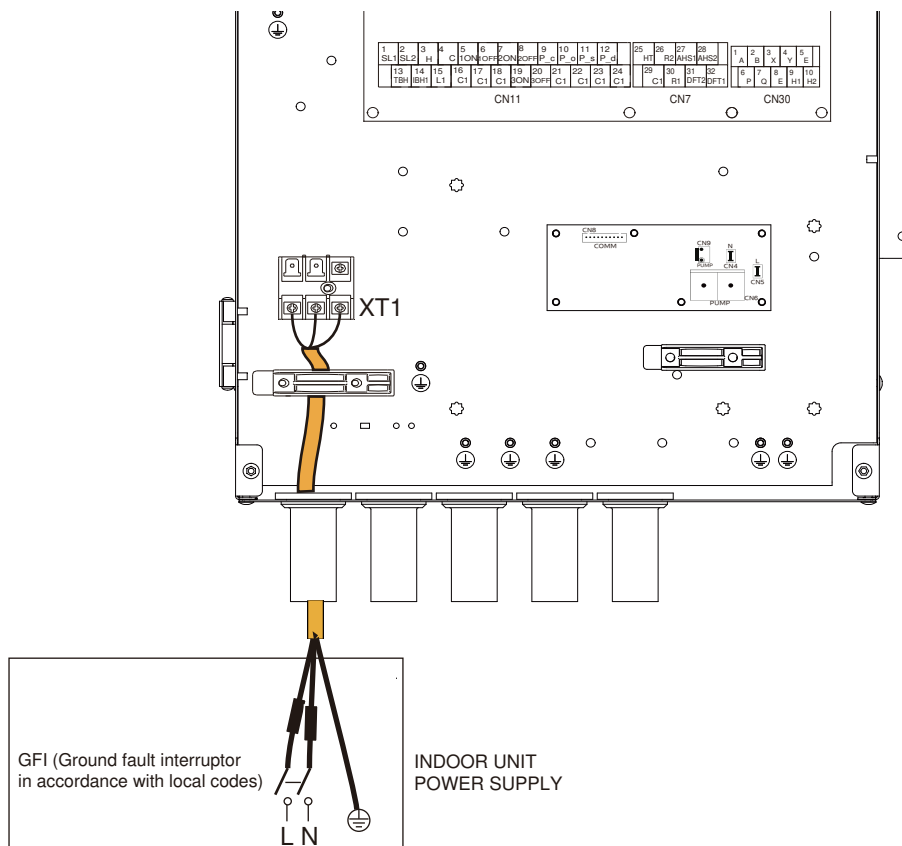
MCA : Min. Circuit Amps. (A)
 MFA : Max. Fuse Amps. (A)
 IWPM: Indoor Water Pump Motor
 FLA : Full Load Amps. (A)

7.7.5 Specifications of standard wiring components

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.

Equipment main Power Supply Wiring

- Minimum wire gauge AWG14.



CAUTION

When connecting to the power supply terminal, use the circular wiring terminal with the insulation casing (see Figure 8.1). Use power cord that conforms to the specifications and connect the power cord firmly. To prevent the cord from being pulled out by external force, make sure it is fixed securely.

WARNING

Fire hazard
Do not connect aluminum wire between disconnect switch and unit.
Use only copper wire.

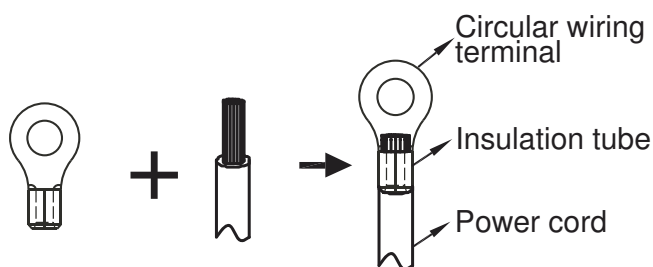


Figure 8.1

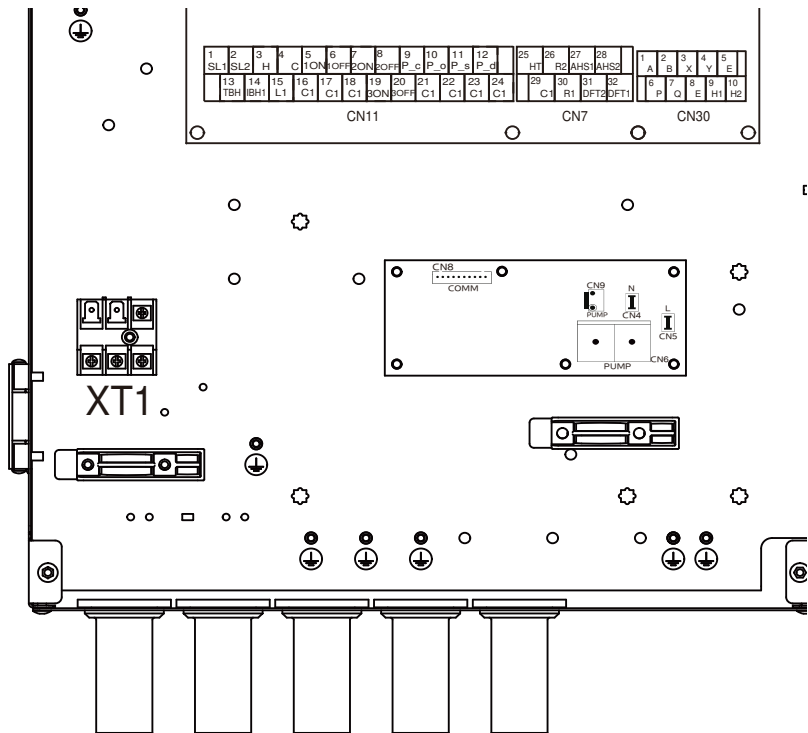
NOTICE

The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (< 0.1 s). Flexible cord must meet national Electrical Code ANSI/NFPA 70-latest edition and any other national, state, provincial or local codes or regulations. In Canada, CSA C22.1 Canadian Electrical Code Part 1, and any local codes.



7.7.6 Connection for other components

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.



CN30	Print		Connect to
	1	A	Wired controller
	2	B	
	3	X	
	4	Y	
	5	E	
	6	P	Outdoor unit
	7	Q	
	9	H1	Internal machine Parallel
10	H2		

CN7	Print		Connect to
	31	DFT2	Heat pump operation status signal
	32	DFT1	
	27	AHS1	Additional heat source
	28	AHS2	

XT1	L	Indoor unit power supplier
	N	
	PE	

Port provides two control signals for the load. The types and current loads stated below refer to section 3, section 4 and section 5, which can be found on the following page.

Type 1: Dry connector without voltage.

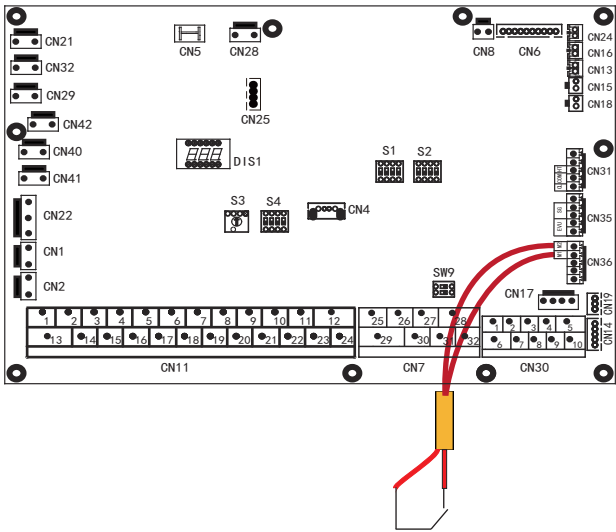
Type 2: Port provides the signal with 110-120 V voltage.

If the current load is ≤ 0.2 A, load can connect to the port directly.

If the current load is > 0.2 A, the AC contactor is required to be connected for the load.

1) Optional Manual Override:

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.



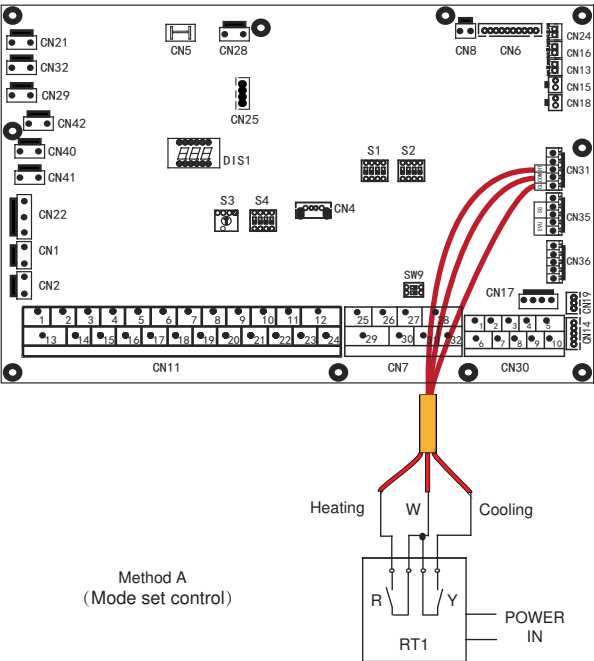
When dip switch is set to refrigerant sensor is valid, M1M2 receives closed circuit signal and heat pump runs normally; M1M2 receives open circuit signal and heat pump is forced to stop.

When dip switch is set to refrigerant sensor is invalid, Optional Manual Override is defined by M1M2 under the Input definition option in the For serviceman on the wire controller.

(1) The default is Remote ON/OFF, when the M1M2 port is closed, the heat pump stops all operation immediately, and the heat pump resumes normal control when the M1M2 port is disconnected;

(2) If M1M2 on the wire controller is set to AHS ON/OFF, when M1M2 port is closed, AHS is forced to run, and M1M2 port is disconnected, the AHS is controlled to ON/OFF based on normal operating.

2) Room thermostat :



RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the indoor unit is connected with the external temperature controller, user interface FOR SERVICEMAN set ROOM THERMOSTAT to MODE SET :

1. When the unit detects a voltage of 12 V DC between Y and W, the unit operates in the cooling mode.
2. When the unit detects a voltage of 12 V DC between R and W, the unit operates in the heating mode.
3. When the unit detects a voltage of 0 V DC for both sides(Y-W, R-W) the unit does not operate.
4. When unit detect voltage is 12 V DC for both sides(Y-W, R-W) the unit operates according to the mode set priority by the wire controller.

NOTICE

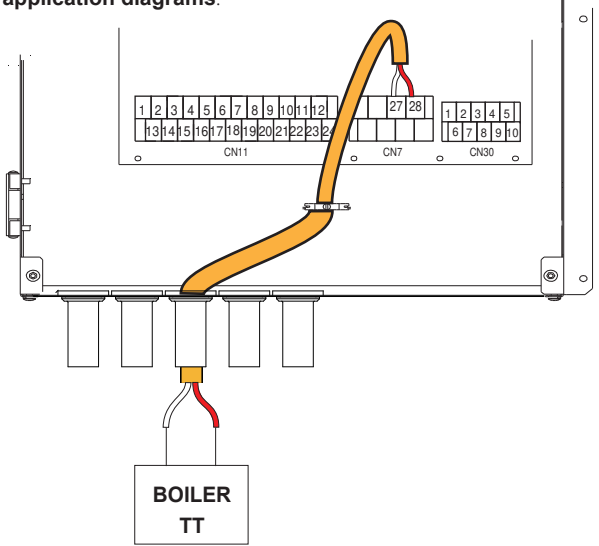
Room thermostat is set to Mode set by default, and does not respond to other settings.

a) Procedure

- Connect the wires to the appropriate terminals as shown in the picture.
- Fix the wires with wire ties to the wire tie mountings to ensure stress relief.

3) For additional heat source control

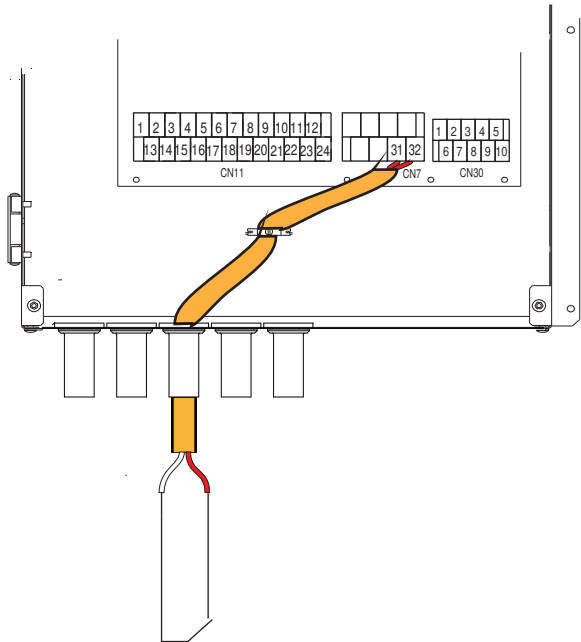
The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.



Voltage	24 V AC
Maximum running current(A)	0.2
Minimum wiring size(AWG)	18
Control port signal type	Type 1



4) For DFT1/DFT2 signal output:



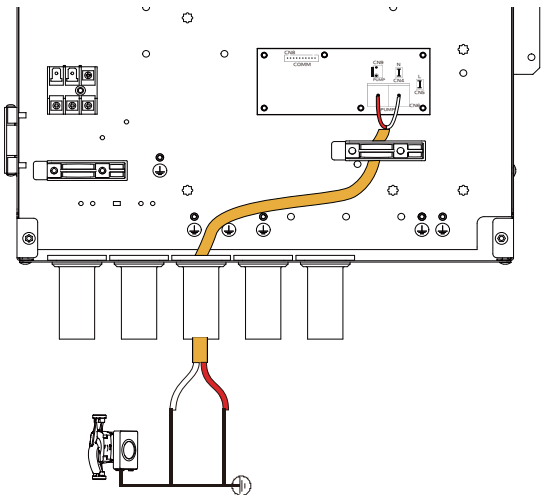
The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.

- 1. DFT1/DFT2 is used to transmit the operating status of the heat pump.
- 2. When the heat pump is in heating/DHW operation, heat pump failure, frost, anti-freezing and over the operating range can not be turned on (need boiler to turn on the operation), DFT1/DFT2 = ON;
- 3. When the heat pump is in normal state (other than the above state), DFT1/DFT2 = OFF

Voltage	24 V AC
Maximum running current(A)	0.2
Minimum wiring size(AWG)	18
Control port signal type	Type 1

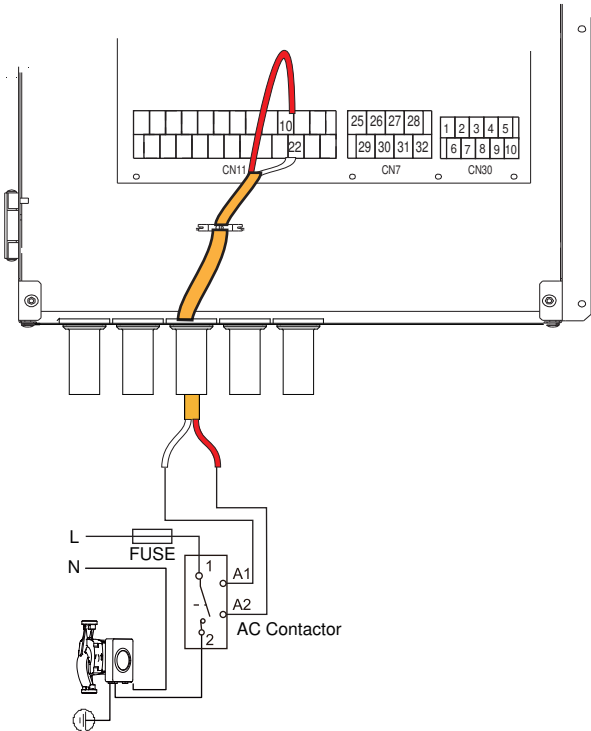
5) For outside circulation PUMP O and PUMP I

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.



outside circulation pump P_I

Voltage	110-120 V AC
Maximum running current(A)	1.2
Minimum wiring size(AWG)	18
Control port signal type	Type 2



outside circulation pump P_o

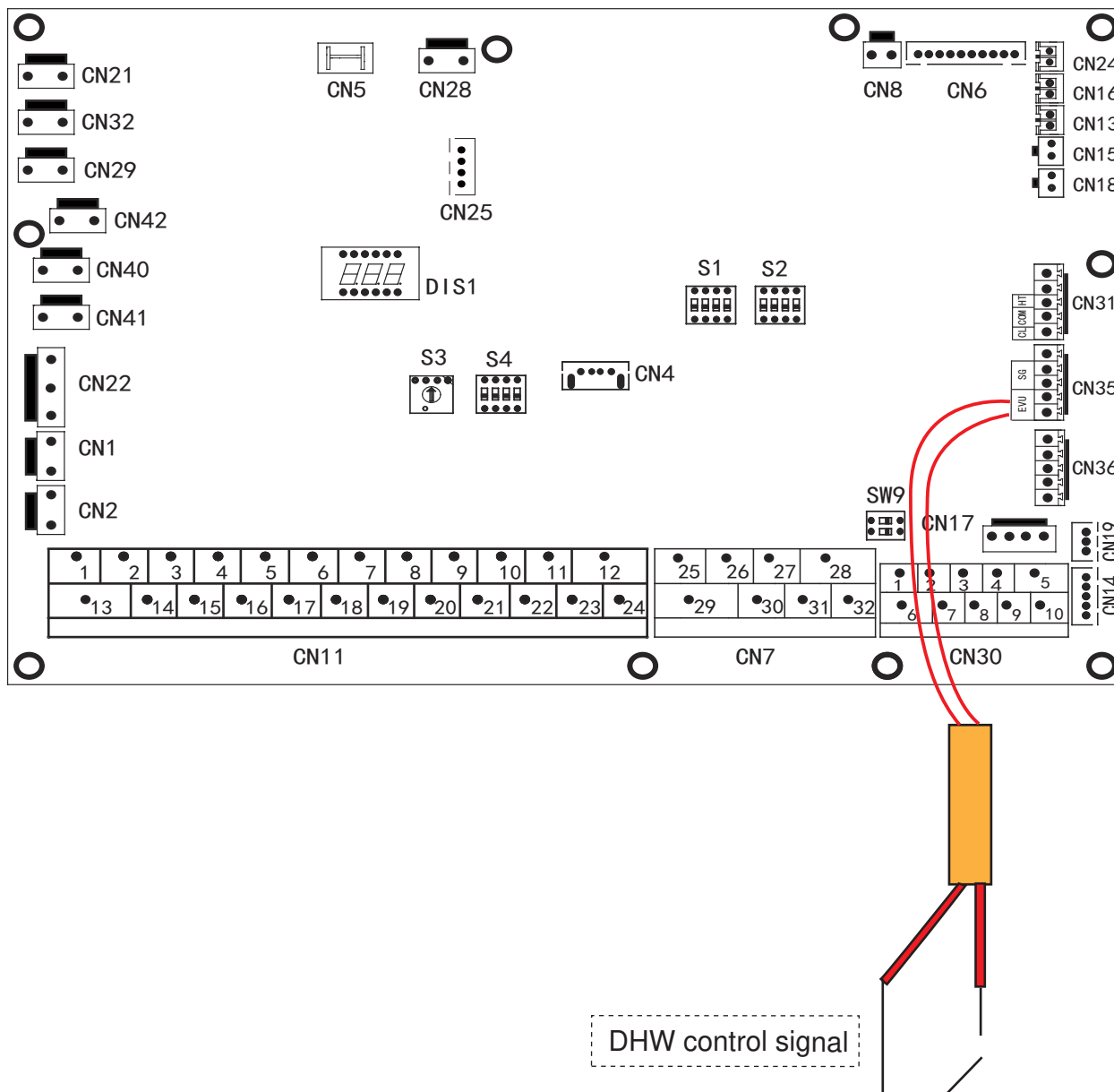
Voltage	110-120 V AC
Maximum running current(A)	0.2
Minimum wiring size(AWG)	18
Control port signal type	Type 2

a) Procedure

- Connect the wiring to the appropriate terminals as shown in the picture.
- Fix the wiring with wire ties to the wire mountings to ensure stress relief.

6) DHW control:

The on/off switching of the heat pump system for DHW mode is controlled through the EVU ports. When EVU=closed circuit is received, heat pump DHW mode is prioritized, when EVU=open circuit is received, heat pump exits DHW mode.



8 START-UP AND CONFIGURATION

The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

CAUTION

It is important that all information in this chapter is read sequentially by the installer and that the system is configured as applicable.

8.1 Initial start-up at low outdoor ambient temperature

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in concrete floors cracking due to rapid temperature change. Please contact the responsible cast concrete building contractor for further details.

To do so, the lowest water flow set temperature can be decreased to a value between 77°F and 95°F by adjusting the FOR SERVICEMAN.

8.2 Pre-operation checks

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for typical application diagrams.

Checks before initial start-up.

DANGER

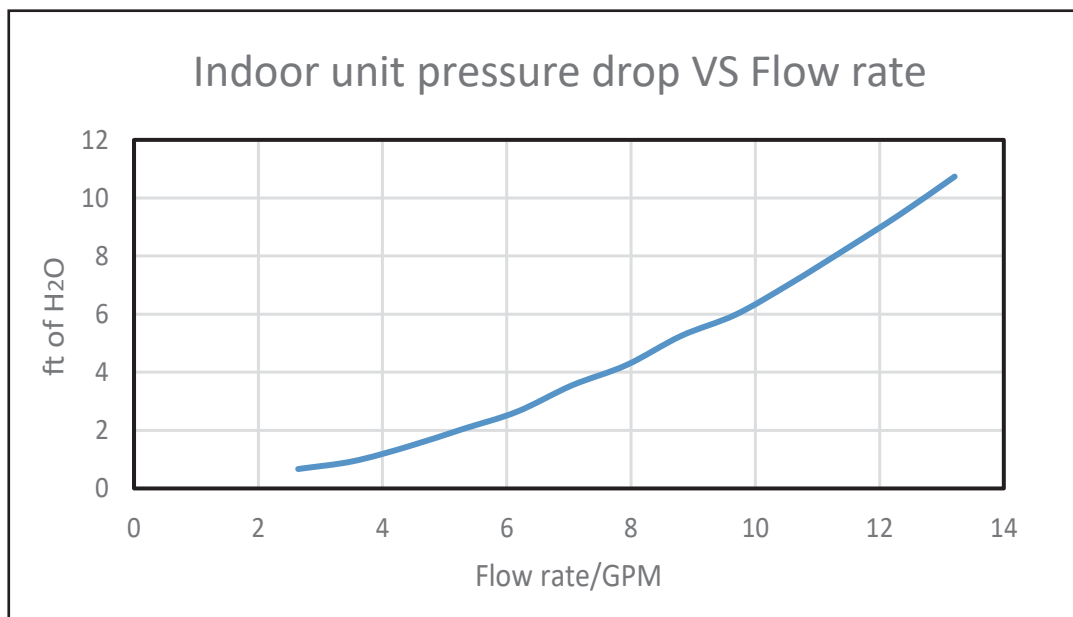
Switch off the power supply before making any connections.

After the installation of the unit, check the following before switching on the circuit breaker:

- Field wiring: Make sure that the field wiring between the local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), unit and domestic hot water tank, and unit and backup heater kit have been connected according to the instructions described in the chapter 7.7 "Field wiring", according to the wiring diagrams and to local laws and regulations.
- Fuses, circuit breakers, or protection devices Check that the fuses or the locally installed protection devices are of the size and type specified in 7.7.3 "Safety device requirements". Make sure that no fuses or protection devices have been bypassed.
- Ground wiring: Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
- Internal wiring: Visually check the switch box for loose connections or damaged electrical components.
- Mounting: Check that the unit is properly mounted, to avoid abnormal noises and vibrations when starting up the unit.
- Damaged equipment: Check the inside of the unit for damaged components or squeezed pipes.
- Refrigerant leak: Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Power supply voltage: Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- Air purge valve: Make sure the air purge valve is open (at least 2 turns).
- Shut-off valves: Make sure that the shut-off valves are fully open.

8.3 Water pressure drop

The water pressure drop in the indoor unit is shown below:



⚠ CAUTION

If the valves are at the incorrect position, the circulation pump will be damaged.

⚠ DANGER

If it's necessary to check the running status of the pump when the unit is powered on, please do not touch the internal electronic control box components to avoid electric shock.

Failure diagnosis at first installation

- If nothing is displayed on the user interface, it is necessary to check for any of the following abnormalities before diagnosing possible error codes.
 - Disconnection or wiring error (between power supply and unit and between unit and user interface).
 - The fuse on the PCB may be broken.
- If the user interface shows "E8" or "E0" as an error code, there is a possibility that there is air in the system, or the water level in the system is less than the required minimum.
- If the error code E2 is displayed on the user interface, check the wiring between the user interface and unit.

More error code and failure causes can be found in 11.3 "Error codes"



8.4 Field settings

The unit should be configured to match the installation environment (outdoor climate, installed options, etc.) and user demand. A number of field settings are available. These settings are accessible and programmable through “FOR SERVICEMAN” in user interface.

Section 8.5 is for reference of field settings.

Refer to Application Guide for specifics settings for the application being installed

Procedure

To change one or more field settings, proceed as follows.

NOTICE

Temperature values displayed on the wired controller (user interface) are in °F.

About FOR SERVICEMAN

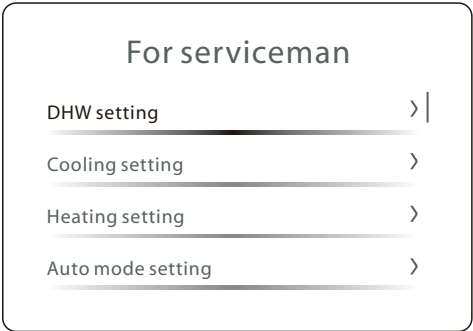
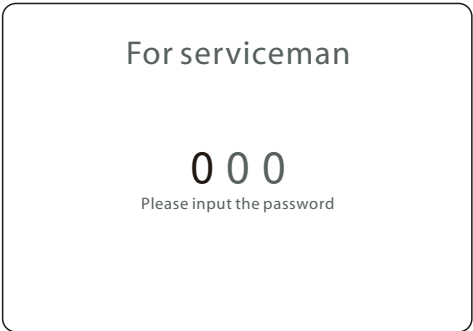
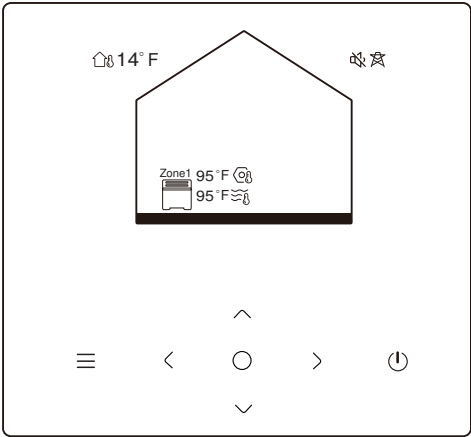
“FOR SERVICEMAN” is designed for the installer to set the parameters.

- Setting the composition of equipment.
- Setting the parameters.

How to go to FOR SERVICEMAN

How to enter FOR SERVICEMAN mode

On the home page, press and hold and simultaneously for 3 seconds to enter the authorization page. Enter password 234 and confirm it. Then, the system jumps into the page with a list of advanced settings.



NOTICE

“FOR SERVICEMAN” is only for installer or other specialist with sufficient knowledge and skills.

Save the settings and quit FOR SERVICEMAN mode

After all settings are adjusted, press , and the confirmation page pops out. Select Yes and confirm to quit FOR SERVICEMAN mode.

NOTICE

- The settings are saved automatically after you quit FOR SERVICEMAN mode.

8.4.1 DHW setting

Select the target item and enter the setting page. In order to hide some unavailable functions and parameters, DHW mode needs to be set to NO.

DHW setting

DHW mode	YES
----------	-----

8.4.2 Cooling setting

Cooling setting

Cool mode	YES
t_T4_FRESH_C	0.5 hours
T4CMAX	126 °F
T4CMIN	50 °F

8.4.3 Heating setting

Heating setting

Heating mode	YES
t_T4_FRESH_H	0.5 hours
T4HMAX	77 °F
T4HMIN	5 °F

Either cooling mode or heating mode must be enabled, and they cannot be both set to NO at the same time.

8.4.4 Auto mode setting

Auto mode setting

T4AUTOCMIN	77 °F
T4AUTOHMAX	63 °F

8.4.5 Temp. type setting

Temp. type setting

Water flow temp.	YES
Room temp.	NO
Double zone	YES

Temp. type setting function is not available, the wired controller setting is invalid

8.4.6 Room thermostat setting

Room thermostat setting

Room thermostat	YES
-----------------	-----

Room thermostat is set to Mode set by default, and does not respond to other settings. The wired controller cannot be used to turn on/off one Zone and all timers in Schedule are invalid. The unit can read the operating status of the unit, and set the operation mode (excluding Auto mode), and the temperature if the temperature curve is inactive.

8.4.7 Other heat source

AHS (additional heat source) function is always available, TBH (Tank booster heater) function, IBH (Internal backup heater) function and Solar function are not available.

8.4.8 Service call

Service call

Phone number	0000000000000000
Mobile number	0000000000000000

Up to two phone numbers can be saved, and the maximum length of the phone numbers is 15 characters. If the length is smaller than 15 character, use 0 in the front to indicate blank characters.

8.4.9 Restoration of factory settings

All the settings will come back to factory default. Do you want to restore factory settings?

NO
YES

Allow all operating parameters to be restored to the factory preset values.

Select YES and confirm to validate this function.

8.4.10 Trial run or Test run

Refer to 11. Commissioning for further information.

8.4.11 Auto restart

Auto restart

Auto restart cooling/heating mode	YES
Auto restart DHW mode	NO

8.4.12 Power input limitation

Power input limitation

Power input limitation	1
------------------------	---

8.4.13 Input definition

Input definition

M1 M2	Remote ON/OFF
Smart grid	NO
Tbt	NO
P_X port	Defrost

8.4.14 Modular system setting

Modular system setting

PER_START	10%
TIME_ADJUST	5minutes

8.4.15 HMI address setting

HMI address setting

HMI address for BMS	1
Stop BIT	1

Refer to 8.4.1 DHW setting for the operation method.

8.4.16 Common setting

Common setting

t_DELAY PUMP	2.0minutes
t_ANTILOCK PUMP	24hours
t2_ANTILOCK PUMP RUN	60seconds
t1-ANTILOCK SV	24hours

Refer to 8.4.1 DHW setting for the operation method.

8.4.17 Clear energy data

Clear all energy metering data.

All energy data will be cleaned. Do you want to clear energy data?

NO
YES

Refer to 8.4.1 DHW setting for the operation method.

8.5 Operation Settings

Title	Code	State	Default	Minimum	Maximum	Set interval	Unit
DHW setting	DHW mode ⁽¹⁾	Enable or disable DHW mode: 0=NO, 1=YES	1	0	1	1	/
Cooling setting	Cooling mode	Enable or disable the cooling mode: 0=NO, 1=YES	1	0	1	1	/
	t_T4_Fresh_C	The refresh time of climate-related curves in cooling mode	0.5	0.5	6	0.5	Hours
	T4CMAX	The highest ambient operating temperature in cooling mode	126	95	126	1	°F
	T4CMIN	The lowest ambient operating temperature in cooling mode	50	23	77	1	°F
	dT1SC	The temperature difference for starting the heat pump (T1)	9	4	18	1	°F
	dTSC	The temperature difference for starting the heat pump (Ta)	4	2	18	1	°F
	Zone 1 C-emission	The type of Zone 1 terminal for cooling mode: 0=FLH (floor heating), 1=FCU(fan coil unit), 2=RAD(radiator)	1	0	2	1	/
Heating setting	Heating mode	Enable or disable the heating mode: 0=NO, 1=YES	1	0	1	1	/
	t_T4_Fresh_H	The refresh time of climate-related curves in heating mode	0.5	0.5	6	0.5	Hours
	T4HMAX	The maximum ambient operating temperature in heating mode	77	68	95	1	°F
	T4HMIN	The minimum ambient operating temperature in heating mode	5	-13	86	1	°F
	dT1SH	The temperature difference for starting the unit (T1)	9	4	36	1	°F
	dTSH	The temperature difference for starting the unit (Ta)	4	2	18	1	°F
	Zone 1 H-emission	The type of Zone 1 terminal for heating mode: 0=FLH (floor heating), 1=FCU(fan coil unit), 2=RAD(radiator)	2	0	2	1	/
	Force defrost	Enable or disable the force defrost: 0=NO, 1=YES.	0	0	1	1	/
Auto mode setting	T4AUTOCMIN	The minimum operating ambient temperature for cooling in auto mode	77	68	85	1	°F
	T4AUTOHMAX	The maximum operating ambient temperature for heating in auto mode	63	50	63	1	°F
Temp. type setting	Water flow temp. ⁽²⁾	Enable or disable the Water flow temp.: 0=NO, 1=YES (Do not change)	1	0	1	1	/
	Room temp. ⁽²⁾	Enable or disable the Room temp.: 0=NO, 1=YES (Do not change)	0	0	1	1	/
	Double zone ⁽²⁾	Enable or disable the Double zone: 0=NO, 1=YES (Do not change)	0	0	1	1	/
Room thermostat setting	Room thermostat ⁽³⁾	The style of room thermostat: 0=NO, 1=Mode set, 2=One zone, 3=Double zone (Set to 2=One zone)	0	0	3	1	/

Notes (1)-(8) are found in NOTICE on page 48.

Title	Code	State	Default	Minimum	Maximum	Set interval	Unit
Other heat source	AHS function ⁽⁴⁾	Enable or disable the AHS (Auxiliary heating source) function: 0=NO, 1=Heating, 2=Heating and DHW	0	0	2	1	/
	AHS_Pump_I Control ⁽⁵⁾	Select the pump operating status when only AHS runs: 0=Run, 1=Not run	0	0	1	1	/
	dT1_AHS_ON	The temperature difference between T1S and T1 for starting the auxiliary heating source	9	4	36	1	°F
	t_AHS_Delay	The time for which the compressor has run before startup of the additional heating source	30	5	120	5	Minutes
	T4_AHS_ON	The ambient temperature for starting the additional heating source	23	5	86	1	°F
Special function ⁽⁷⁾	Preheating for floor	Enable or disable floor preheating: 0=NO, 1=YES	0	0	1	1	/
	T1S	The set outlet water temperature during first floor preheating	77	77	95	1	°F
	t_ARSTH	Running time for first floor preheating	72	48	96	12	Hours
	Floor drying up	Enable or disable floor drying: 0=NO, 1=YES	0	0	1	1	/
	t_Dryup	Temp-up days for floor drying	8	4	15	1	Days
	t_Highpeak	Days for floor drying	5	3	7	1	Days
	t_Drydown	Temp-down days for floor drying	5	4	15	1	Days
	t_Drypeak	Outlet water temperature for floor drying	113	86	131	1	°F
	Start time	The start time of floor drying	00:00	0:00	23:30	1/30	h:min
	Start date	The start date of floor drying	Current date+1	Current date+1	31/12/2099	1/1/1	dd/mm/yyyy
Auto restart	Auto restart cooling/heating mode	Enable or disable the auto restart of cooling/heating mode: 0=NO, 1=YES	1	0	1	1	/
	Auto restart DHW mode	Enable or disable the auto restart of DHW mode: 0=NO, 1=YES	1	0	1	1	/
Power input limitation ⁽⁷⁾	Power input limitation	The type of power input limitation	1	1	8	1	/
Input definition	M1 M2	Define the function of the M1M2 switch: 0=remote ON/OFF, 1=TBH ON/OFF, 2=AHS ON/OFF	0	0	2	1	/
	Smart grid ⁽²⁾	Enable or disable the smart grid: 0=NO, 1=YES	0	0	1	1	/
	T1T2	Control options of Port T1T2: 0=NO, 1=RT/Ta_PCB	0	0	1	1	/
	Tbt	Enable or disable the TBT: 0=NO, 1=YES	0	0	1	1	/
	P_X port	Select the function of P_X port: 0=Defrost, 1=Alarm	0	0	1	1	/

Notes (1)-(8) are found in NOTICE on page 48.

Title	Code	State	Default	Minimum	Maximum	Set interval	Unit
HMI address setting	HMI address for BMS	Set the HMI address code for BMS	1	1	255	1	/
	Stop BIT	Upper computer stop bit: 1=STOP BIT1, 2=STOP BIT2	1	1	2	1	/
Common setting	t_Delay pump	The time for which the compressor has run before startup of the pump	2.0	0.5	20.0	0.5	Minutes
	t1_Antilock pump	The pump anti-lock interval	24	5	48	1	Hours
	t2_Antilock pump run	The pump anti-lock running time	60	0	300	30	Seconds
	t1_Antilock SV	The valve anti-lock interval	24	5	48	1	Hours
	t2_Antilock SV run	The valve anti-lock running time	30	0	120	10	Seconds
	Ta-adj.	The corrected value of Ta inside the wired controller	0	-18	18	1	°F

NOTICE

- (1) In order to hide some unavailable functions and meaningless parameters, DHW mode needs to be set to NO. (Refer to application guide)
- (2) This function is not available, the wire controller setting is invalid.
- (3) Room thermostat is set to Mode set by default, and does not respond to other settings.
- (4) Default is Heating and DHW Mode AHS is enabled, the wire controller setting is invalid.
- (5) Default is Not run (when running AHS alone, PUMP I does not run) and the wire controller setting is invalid.
- (6) There are some items that are invisible if the function is disabled or unavailable.
- (7) Parameters in the Special function and Power input limitation should not be changed.

9 COMMISSIONING

Test run is used to confirm the functionality of the valves, air purge, circulation pump operation, cooling, heating and domestic water heating.

Test run

Point check > |

Air purge >

Circulated pump running >

Cooling running >

Test run

Heating running > |

Cooling running >

DHW running >

Checklist during commissioning

<input type="checkbox"/>	Test run for the actuator.
<input type="checkbox"/>	Air purge.
<input type="checkbox"/>	Test run for operation.
<input type="checkbox"/>	Check of the minimum flow rate .

9.1 Test Run for the Actuator

NOTICE

During the commissioning of the actuator, the protection function of the unit is disabled. Excessive use may damage components.


Why

Check whether each actuator is in good working conditions.

What - Actuator List

No.	Name		Note
1	SV2	Three-way valve 2	
2	SV3	Three-way valve 3	
3	PUMP_I	Integrated circulation pump	
4	PUMP_O	Additional circulation pump(for Zone 1)	
5	AHS	Additional heat source	
6	SV1	Three-way valve 1	Invisible if DHW is disabled

How

1	Go to "FOR SERVICEMAN" (Refer to 9.5).
2	Find "Test run" and enter the process.
3	Find "Point check" and enter the process.
4	Select the actuator, and press  to activate or deactivate the actuator. • The status ON means the actuator is activated, and OFF means the actuator is deactivated.

NOTICE




When you return from test screen, all actuators turn OFF automatically.

9.2 Air Purge

Why

To purge out the remaining air in the water loop.

How

1	Go to "FOR SERVICEMAN" (Refer to 9.5).
2	Find "Test run and enter the process.
3	Find "Air purge" and enter the process.
4	Select "Air purge" and press  to activate or deactivate the air purge function. •  means the air purge function is activated, and  means the air purge function is deactivated.

Besides

"Air vent pump_i output"	To set pump_i output. The higher the value is, the pump gives a higher output.
"Air vent running time"	To set the duration of air purge. When the set time is due, air purge is deactivated.
"Status check"	Additional operation parameters can be found.

9.3 Test Run

Why

Check whether the unit is in good working conditions.



What

Circulated pump operation

Cooling operation

Heating operation

How

1	Go to "FOR SERVICEMAN" (Refer to 9.5)
2	Find "Test run" and enter the page.
3	Find "Other" and enter the process.
4	Select "XXXX"* and press  to run the test. During test, press  , select OK and confirm to return to the upper layer. * - Four performance test options are shown in What .

NOTICE

In performance test, the target temperature is preset and cannot be changed.

If the outdoor temperature is outside the range of operating temperature, the unit may not operate or may not deliver the required capacity.

In circulated pump operation, If the flow rate is out of recommended flow rate range, please make proper change of the installation, and ensure that the flow rate in the installation is guaranteed in all conditions.

9.4 Check of the Minimum Flow Rate

1	Check the hydraulic configuration to find out the space heating loops that can be closed by mechanical, electronic, or other valves.
2	Close all space heating loops that can be closed.
3	Start and operate the circulation pump (See "11.3 Test Run").
4	Refer to the Hybrid Application Guide for information on reading flow rate.

(a) During pump trial run, the unit can operate below the minimum required flow rate.

10 HAND-OVER

Once the trial run is finished and the unit operates properly, please make sure the following is clear for the user:

- Fill the installer setting table (in the OPERATION MANUAL) with the actual settings.
- Empty the error history in the HMI before hand-over to the user.
- Make sure that the user has the printed documentation and ask him/her to keep it for future reference.
- Explain to the user how to properly operate the system and what to do in case of problems.
 - Basic operation guidelines can be found in the OPERATION MANUAL.
 - For additional information about operation, see 12.2 Additional Operation Reference.
- Show the user what to do for the maintenance of the unit.
- Explain to the user about energy saving tips as described below.

10.1 Energy Saving Tips

Tips about room temperature

- Make sure the desired room temperature is NEVER too high (in heating mode) or too low (in cooling mode), and ALWAYS set it according to your actual needs. A rise/drop of 2°F can save up to 6% of heating/cooling costs.
- Do NOT increase/decrease the desired room temperature to speed up space heating/cooling as such operation cannot accelerate the heating/cooling process.
- When your system layout contains slow heat emitters (such as underfloor heating), avoid large fluctuations of the desired room temperature and do NOT drop or rise the room temperature excessively. Otherwise, it will take more time and energy to heat up/cool down the room again.
- Use a weekly schedule to meet your normal space heating or cooling needs. If necessary, you can easily deviate from the schedule:
 - 1) For shorter periods: You can override the scheduled room temperature until the next scheduled action starts. For example, you can do this when you have a party, or when you are leaving for a couple of hours.
 - 2) For longer periods: You can use the holiday mode.

10.2 Additional Operation Reference

10.2.1 Mode

What

Set the unit operation mode for room comfort.

- Three modes in all – Space heating mode, space cooling mode, and auto mode.

AUTO mode	The unit will select the operation mode automatically based on the outdoor ambient temperature and some settings in "FOR SERVICEMEN". <ul style="list-style-type: none"> • This icon is invisible if either the heating function or cooling function is disabled.
Heating	The icon of heating is invisible if the heating function is disabled.
Cooling	The icon of cooling is invisible if the cooling function is disabled.

10.2.2 Schedule

What

Make unit operation plans.

- This function is based on the current time displayed on the HMI. Make sure the time is correct.

Conflicts and operation priority

- 1) A daily schedule and a weekly schedule can work simultaneously.
- 2) For all schedules, timers (if more than one) for the same zone or appliance must be different, and the operation mode of Zone 1 and Zone 2 in the same time setting must be the same. Otherwise, the most recent setting is invalid, and a notice window appears.

10.2.3 Weather temp. setting

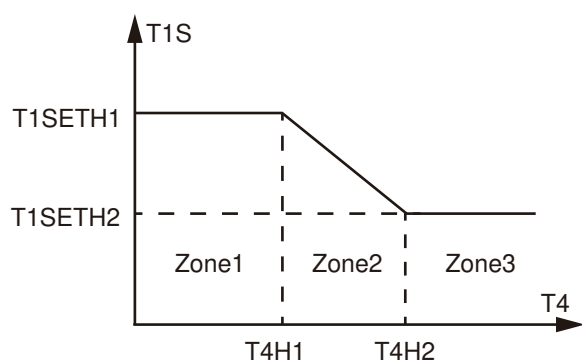
What

Allow the set water temperature to regulate depending on the outdoor ambient temperature.

- This function is only applicable to space heating and space cooling. When the function is active, the unit will apply the temperature curve if the current operation mode is set the same as that of the activated function.

- Three types of curves in all – Standard, ECO, Custom.

Illustration of temperature curve



T1S – set water temperature

T4 – outdoor ambient temperature

In Zone 1 and Zone 3, the set water temperature remains stable despite the change of the outdoor ambient temperature. In Zone 2, the set water temperature regulates depending on the outdoor ambient temperature.

NOTICE

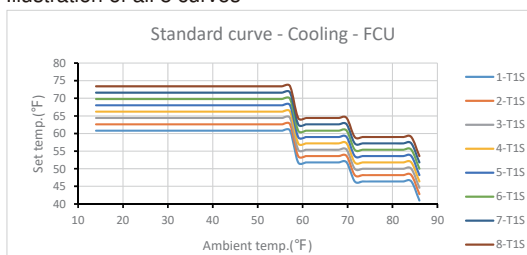
The temperature settings of the climate curve are limited by a certain range. The low-temperature curve for cooling is between 41 °F and 77 °F, while the high-temperature curve is between 65 °F and 77 °F.

All temperatures below are in °F.

For cooling (FCU – fan coil application):

T4	14≤T4<59	22≤T4<72	72≤T4<86	86≤T4
1-T1S	61	52	47	41
2-T1S	63	54	49	43
3-T1S	65	56	50	45
4-T1S	67	58	52	47
5-T1S	68	59	54	49
6-T1S	70	61	56	50
7-T1S	72	63	58	52
8-T1S	74	65	59	54

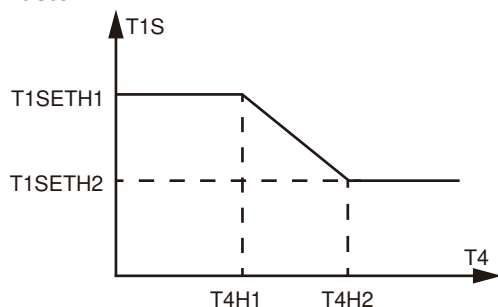
Illustration of all 8 curves



NOTICE

For heating a custom curve is required to match the curve from your boiler. See the Hybrid Application Guide for setup instructions.

Custom



T1S – Set water temperature

T4 – Outdoor ambient temperature

T1SETH1, T1SETH2, T4H1, and T4H2 can be adjusted.

NOTICE

The illustration on HMI is for reference only. If the set T1SETH1 is lower than T1SETH2 or T4H2 is lower than T4H1, the unit will reverse T1SETH1 and T1SETH2, T4H1 and T4H2 automatically.

10.2.4 Options

What

More general settings.

Silent mode

The start time and end time of the silent mode timer cannot be identical.

If two silent mode timers are activated simultaneously, the date of both the timers cannot be overlapped. Otherwise, the most recent setting is invalid, and a notice window appears.

WLAN setting

In case of any change of the WIFI name, the unit will lost WLAN connection and need to be reconnected.

Force defrost

Invisible if the unit is running in cooling mode.

10.2.5 Unit status

What

More information of the unit and its operation status.

Operating parameter

The run time is rounded down. For instance, if the unit is hour, and the actual run time is 0.5 h, the displayed value is 0.

10.2.6 Error info

What

Error history of the unit.

The first column shows the unit number, if slave units are available.

Press the Menu button for 5 seconds to clear all error records.

10.2.7 FAQ

What

Assistance for common questions.

11 TROUBLE SHOOTING

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit.

This troubleshooting and related corrective actions may only be carried out by your local technician.

11.1 General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

WARNING

When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances can safety devices be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local dealer.

11.2 General symptoms

Symptom 1: The unit is turned on but the unit is not heating or cooling as expected

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the parameters. T4HMAX, T4HMIN in heat mode. T4CMAX, T4CMIN in cool mode. T4DHWMAX, T4DHWMIN in DHW mode.
The water flow is too low.	<ul style="list-style-type: none"> • Check that all shut off valves of the water circuit are in the right position. • Check if the strainer is plugged. • Make sure there is no air in the water system. • Check on the pressure and temperature gage that there is sufficient water pressure. <p>The water pressure must be >14.5 PSI (water is cold).</p> <ul style="list-style-type: none"> • Make sure that the expansion vessel is not broken. • Check that the resistance in the water circuit is not too high for the pump.
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to "8.5.2 Water volume and sizing expansion vessels").

Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)

POSSIBLE CAUSES	CORRECTIVE ACTION
The unit maybe operate out of its operation range (the water temperature is too low).	<p>In case of low water temperature, the system utilizes the AHS to reach the minimum water temperature first (54 °F).</p> <ul style="list-style-type: none"> • Check that the backup heater power supply is correct. • Check that the backup heater thermal fuse is closed. • Check that the backup heater thermal protector is not activated. • Check that the backup heater contactors are not broken.

Symptom 3: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	<ul style="list-style-type: none"> Check on the pressure and temperature gage that there is sufficient water pressure. The water pressure must be > 14.5 psi (water is cold). Check that the pressure and temperature gage is not broken. Check that the expansion vessel is not broken. Check that the setting of the pre- pressure of the expansion vessel is correct (refer to "8.5.2 Water volume and sizing expansion vessels").

Symptom 4: The water pressure relief valve opens

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken.	Replace the expansion vessel.
The filling water pressure in the installation is higher than 43.5 psi.	Make sure that the filling water pressure in the installation is about 12-15 psi (refer to "8.5.2 Water volume and sizing expansion vessels").

Symptom 5: The water pressure relief valve leaks

POSSIBLE CAUSES	CORRECTIVE ACTION
Dirt is blocking the water pressure relief valve outlet.	<p>Check for correct operation of the pressure relief valve by activating the lever</p> <ul style="list-style-type: none"> If you do not hear a clacking sound, contact your local dealer. In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.

Symptom 6: Space heating capacity shortage at low outdoor temperatures

POSSIBLE CAUSES	CORRECTIVE ACTION
AHS is not activated.	Look at Section 8.5.7 to ensure the AHS is on and configured to provide heat.

Symptom 7: Heat mode can't change to DHW mode immediately

POSSIBLE CAUSES	CORRECTIVE ACTION
The heat pump does not receive the control signal DHW=ON	According to "7.7.5 Connection for other components", check whether there is a problem with the DHW wiring and whether the DHW=ON signal can be sent correctly.

Symptom 8: DHW mode can't change to Heat mode immediately

POSSIBLE CAUSES	CORRECTIVE ACTION
The heat pump did not receive the DHW shutdown signal.	Check that the tank controller can correctly send the DHW shutdown signal.

11.3 Error codes

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for additional service information.

When a safety device is activated, an error code will be displayed on the user interface.

A list of all errors and corrective actions can be found in the table below.

Reset the safety by turning the unit OFF and back ON.

In case this procedure for resetting the safety is not successful, contact your local dealer.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
<i>E0</i>	Water flow fault (3 times E8)	<ol style="list-style-type: none"> 1.The wire circuit is short connected or open. Reconnect the wire correctly. 2.Water flow rate is too low. 3. Water flow switch is failed, switch is open or close continuously, change the water flow switch. 4. Verify power to circulator 5. Ensure circulator is operating
<i>E2</i>	Communication fault between wired controller and indoor unit	<ol style="list-style-type: none"> 1.Wire doesn't connect between wired controller and unit. connect the wire. 2.Communication wire sequence is not right. Reconnect the wire in the right sequence. 3.Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place.
<i>E8</i>	Water flow fault	<p>Check that all shut off valves of the water circuit are completely open.</p> <ol style="list-style-type: none"> 1. Check if the strainer needs cleaning. 2. Refer to "8.6 Filling water" 3. Make sure there is no air in the system(purge air). 4. Check on the pressure and temperature gage that there is sufficient water pressure. The water pressure must be > 12-15 psi. 5. Check the pump speed setting, speed may need to be increasd. 6. Make sure that the expansion vessel is not broken. 7. Check that the resistance in the water circuit is not too high for the pump (refer to "9.4 Setting the pump"). 8. Check that the pump fuse and PCB fuse are not blown.
<i>Ed</i>	Hydro-box plate heat exchanger water inlet temperature sensor (Tw_in) fault	<ol style="list-style-type: none"> 1.Check the resistance of the sensor 2. The Tw_in sensor connector is loosen. Re connect it. 3.The Tw_in sensor connector is wet or there is water in. remove the water, make the connector dry. Add waterproof adhesive 4. The Tw_in sensor failure, change a new sensor.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
<i>EE</i>	Hydro-box PCB EEPROM fault	<ol style="list-style-type: none"> 1. The EEPROM parameter is error, rewrite the EEPROM data. 2. EEPROM chip part is broken, change a new EEPROM chip part. 3. Main control board of indoor unit is broken, change a new PCB.
<i>H0</i>	Communication fault between hydro-box and outdoor unit	<ol style="list-style-type: none"> 1. Wire doesn't connect between outdoor unit and main control board of indoor unit. connect the wire. 2. Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place
<i>H2</i>	Plate heat exchanger outlet(heat) refrigerant temperature sensor(T2) fault.	<ol style="list-style-type: none"> 1. Check the resistance of the sensor 2. The T2 sensor connector is loosen. Reconnect it. 3. The T2 sensor connector is wet or there is water in it. Remove the water, make the connector dry. Add waterproof adhesive 4. The T2 sensor failure, change a new sensor.
<i>H3</i>	Plate heat exchanger inlet (heat) refrigerant temperature sensor(T2B) fault	<ol style="list-style-type: none"> 1. Check the resistance of the sensor 2. The T2B sensor connector is loosen. Reconnect it. 3. The T2B sensor connector is wet or there is water in it. Remove the water, make the connector dry. Add waterproof adhesive. 4. The T2B sensor failure, change a new sensor.
<i>H5</i>	Room temperature sensor (Ta) fault	<ol style="list-style-type: none"> 1. Check the resistance of the sensor 2. The Ta sensor is in the interface; 3. The Ta sensor failure, change a new sensor or change a new interface, or reset the Ta, connect a new Ta from the indoor unit PCB.
<i>H9</i>	Zone 2 water flow temperature sensor (Tw2) fault	<ol style="list-style-type: none"> 1. Check the resistance of the sensor 2. The Tw2 sensor connector is loosen. Reconnect it. 3. The Tw2 sensor connector is wet or there is water in it. Remove the water, make the connector dry. add waterproof adhesive 4. The Tw2 sensor failure, change a new sensor.
<i>HA</i>	Hydro-box plate heat exchanger water outlet temperature sensor (Tw_out) fault	<ol style="list-style-type: none"> 1. The TW_out sensor connector is loose. Reconnect it. 2. The TW_out sensor connector is wet or there is water in it. Remove the water, make the connector dry. Add waterproof adhesive 3. The TW_out sensor failure, change a new sensor.
<i>P5</i>	[Tw_out - Tw_in] value high protection	<ol style="list-style-type: none"> 1. Check that all shut off valves of the water circuit are completely open. 2. Check if the strainer needs cleaning. 3. Refer to "8.6 Filling water" 4. Make sure there is no air in the system (purge air). 5. Check on the pressure and temperature gage that there is sufficient water pressure. The water pressure must be 12-15 psi(water is cold). 6. Check the pump speed setting, the speed may need to be increased. 7. Make sure that the expansion vessel is not broken. 8. Check that the resistance in the water circuit is not too high for the pump. (refer to "9.4 Setting the pump").
<i>Pb</i>	Anti-freeze mode	Unit will return to the normal operation automatically.
<i>PP</i>	Tw_out-Tw_in unusual protection	<ol style="list-style-type: none"> 1. Check the resistance of the two sensor 2. Check the two sensors locations 3. The water inlet/outlet sensor wire connector is loosen. Reconnect it. 4. The water inlet/outlet (TW_in /TW_out) sensor is broken, Change a new sensor. 5. Four-way valve is blocked. Restart the unit again to let the valve change the direction. 6. Four-way valve is broken, change a new valve.

ERROR CODE	MALFUNCTION OR PROTECTION	FAILURE CAUSE AND CORRECTIVE ACTION
<i>Hb</i>	Three times 'PP' protection and Tw_out<44.6 °F	The same to "PP".
<i>E7</i>	Balance tank temperature sensor (Tbt) fault.	1.Check the resistance of the sensor. 2.The Tbt1 sensor connector is loosen, reconnect it. 3.The Tbt1 sensor connector is wet or there is water in it, remove the water, make the connector dry. Add waterproof adhesive. 4.The Tbt1 sensor failure, change a new sensor."
<i>Eb</i>	Solar panel temperature sensor (Tsolar) fault	1.Check the resistance of the sensor. 2.The Tsolar sensor connector is loosen, reconnect it. 3.The Tsolar sensor connector is wet or there is water in, remove the water in it, make the connector dry. Add waterproof adhesive. 4.The Tsolar sensor failure, change a new sensor.
<i>HE</i>	The communication fault between indoor unit and Ta/room thermostat transfer PCB	RT/Ta PCB is set to be valid on user interface but the thermostat transfer board is not connected or the communication between thermostat transfer board and main board is not effectively connected. If the thermostat transfer board is not needed, set the RT/Ta PCB to invalid. If the thermostat transfer board is needed, please connect it to the main board and make sure the communication wire is connected well and there is no strong electricity or strong magnetic interference.
<i>EL</i>	Water pump communication wire fault	The communication line of the water pump is not properly connected to the main control board of indoor unit. connect the wire.
<i>EL</i>	Communication fault between hydraulic module and MH-kit	1.Wire doesn't connect between main control board of indoor unit and MH-kit. connect the wire. 2.Communication wire sequence is not right. Reconnect the wire in the right sequence. 3. Whether there is a high magnetic field or high power interfere, such as lifts, large power transformers, etc.. To add a barrier to protect the unit or to move the unit to the other place.

CAUTION

- In winter, if the unit has E0 and Hb failure and the unit is not repaired in time, the water pump and pipeline system may be damaged by freezing, so E0 and Hb failure must be repaired in time.

12 DISPOSAL

Comply with national regulations.

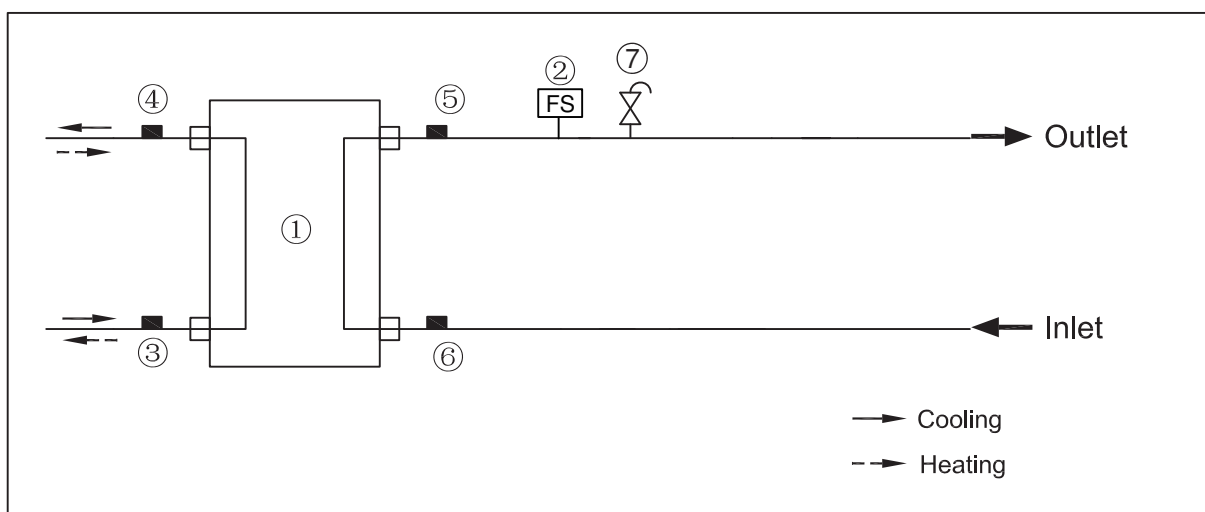
Components and accessories from the units are not part of ordinary domestic waste.

Complete units, compressors, motors etc. are only to be disposed of via qualified disposal specialists.

This unit uses flammable refrigerant R32. Please contact the dealer when you want to dispose of this unit. Law requires that the collection, transportation and disposal of refrigerants must conform with the regulations governing the collection and destruction of hydrofluorocarbons.

ANNEX

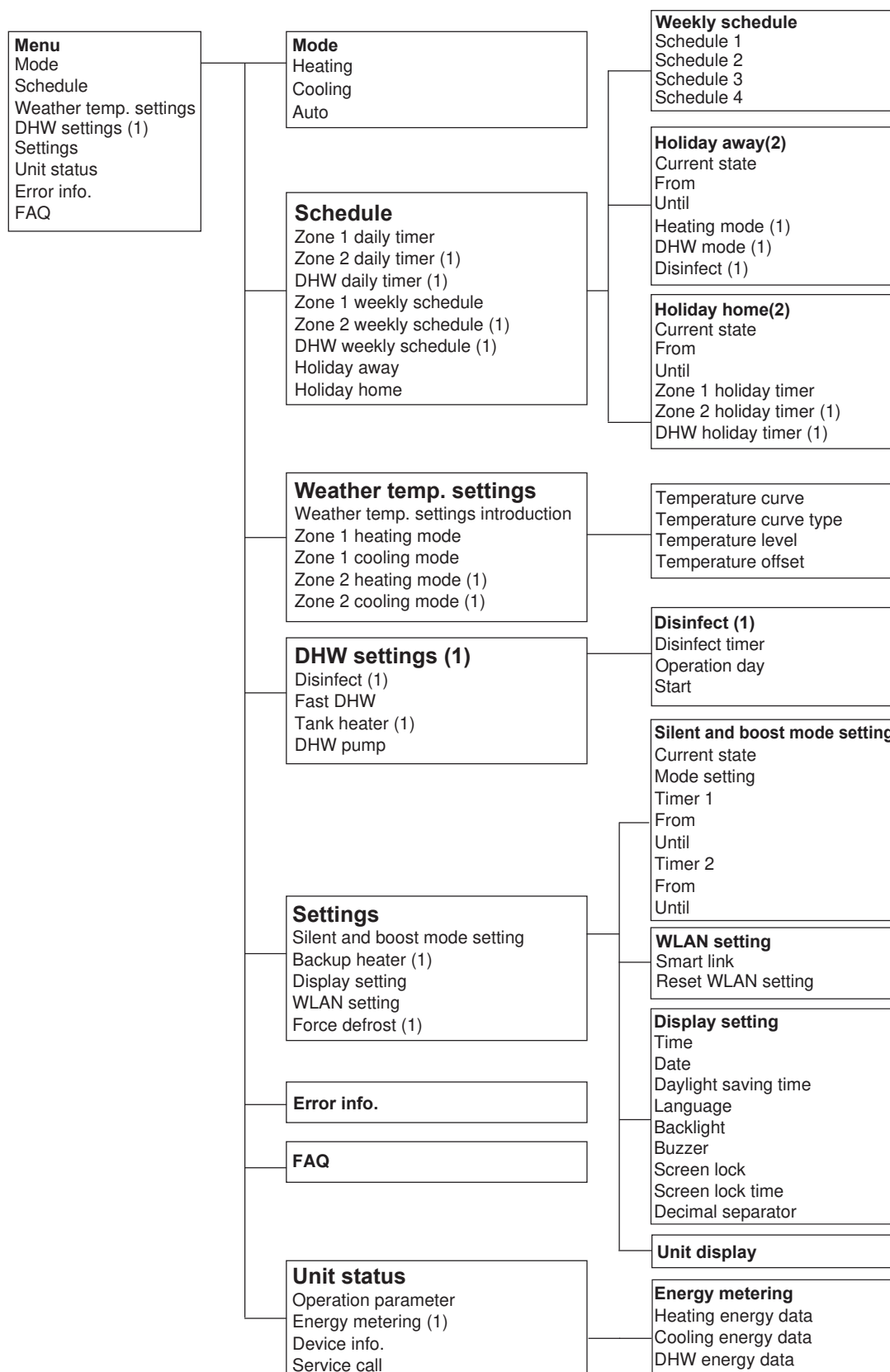
ANNEX A: Refrigerant cycle



Item	Description
1	Water Side Heat Exchanger (Plate Heat Exchanger)
2	Flow switch
3	Refrigerant liquid line temperature sensor
4	Refrigerant gas line temperature sensor
5	Water outlet temperature sensor
6	Water inlet temperature sensor
7	Automatic air purge valve

Annex B. Menu structure (wired controller)

The following is for reference, please refer to Weil-McLain Hybrid Heat Pump Application Guide for additional information



(1) Invisible if corresponding function is disabled.

(2) This function is disabled, if the wire controller activates this function, the heat pump will not respond to the command.

For serviceman

For serviceman

- 1 DHW setting
- 2 Cooling setting
- 3 Heating setting
- 4 Auto mode setting
- 5 Temp. type setting
- 6 Room thermostat setting
- 7 Other heating source
- 8 Service call
- 9 Restore factory setting
- 10 Test run
- 11 Special function
- 12 Auto restart
- 13 Power input limitation
- 14 Input define
- 15 Modular system setting
- 16 HMI address setting
- 17 Common setting
- 18 Clear energy data
- 19 C2 fault restore

1 DHW setting

- 1.1 DHW mode

2 Cooling setting

- 2.1 Cooling mode
- 2.2 t_T4_Fresh_C
- 2.3 T4CMAX
- 2.4 T4CMIN
- 2.5 dT1SC
- 2.6 dTSC
- 2.7 Zone 1 C-emission
- 2.8 Zone 2 C-emission

3 Heating setting

- 3.1 Heating mode
- 3.2 t_T4_Fresh_H
- 3.3 T4HMAX
- 3.4 T4HMIN
- 3.5 dT1SH
- 3.6 dTSH
- 3.7 Zone 1 H-emission
- 3.8 Zone 2 H-emission
- 3.9 Force defrost

4 Auto mode setting

- 4.1 T4AUTOCMIN
- 4.2 T4AUTOHMAX

5 Temp. type setting

- 5.1 Water flow temp.
- 5.2 Room temp.
- 5.3 Double zone

6 Room thermostat setting

- 6.1 Room thermostat
- 6.2 Mode set priority

16 HMI address setting

- 16.1 HMI address for BMS
- 16.2 Stop BIT

17 Common setting

- 17.1 t_Delay pump
- 17.2 t1_Antilock pump
- 17.3 t2_Antilock pump run
- 17.4 t1_Antilock SV
- 17.5 t2_Antilock SV run
- 17.6 Ta_adj.

7 Other heating source

- 7.1 AHS function
- 7.2 AHS_Pump_I Control
- 7.3 dT1_AHS_ON
- 7.4 t_AHS_Delay
- 7.5 T4_AHS_ON
- 7.6 EnSwitchPDC
- 7.7 GAS_COST
- 7.8 ELE_COST
- 7.9 MAX_SETHEATER
- 7.10 MIN_SETHEATER
- 7.11 MAX_SIGHEATER
- 7.12 MIN_SIGHEATER

8 Service call

- Phone number
- Mobile number

9 Restore factory settings

10 Test run

11 Special function

- 11.1 Preheating for floor
- 11.2 Floor drying up

12 Auto restart

- 12.1 Auto restart cooling/heating mode
- 12.2 Auto restart DHW mode

13 Power input limitation

- 13.1 Power input limitation

14 Input define

- 14.1 M1M2
- 14.2 Smart grid
- 14.3 T1T2
- 14.4 Tbt
- 14.5 P_X PORT

15 Modular system setting

- 15.1 PER_START
- 15.2 TIME_ADJUST

18 Clear energy data

19 C2 fault restore

There are some items that are invisible if the function is disabled or unavailable.

Annex C. Modbus mapping table

1) MODBUS PORT COMMUNICATION SPECIFICATIONS

Port: RS-485; H1 and H2 are the Modbus communication ports.

Communication address: Only one-to-one connection is available for the host computer and wired controller, and the wired controller is a slave unit. The communication address of the host computer and wired controller is consistent with the address of 17.2 HMI Address for BMS (In FOR SERVICEMAN mode).

Baud rate: 9600. Number of digits: 8 Verification: none. Stop bit: 1 bit

Communication protocol: Modbus RTU (Modbus ASCII not supported)



NOTE

Handwriting practice area with horizontal lines.



NOTE

Handwriting practice area with horizontal lines.



NOTE

Handwriting practice area consisting of 25 horizontal dotted lines for notes.

