HP-IOM-2R

# Commercial Heat Pump

## Inverter Air-to-Water

## HP Series 0275

## Installation and Instruction Manual

SGS
C US

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## Read Before Proceeding

- In order to provide the customers with high quality, strong reliability and good versatility in a product, this heat pump is produced by strict design and manufacturing standards. This manual includes all the necessary information about installation, troubleshooting, and maintenance.

  Please read this manual carefully before you open or maintain the unit. The manufacturer of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, troubleshooting, unnecessary maintenance which is not described in this manual.

  The unit must be installed by a licensed, qualified installer.
- It is vital that the below instructions are adhered to at all times to uphold the warranty.
  - The unit can only be opened or repaired by qualified installer or an authorized dealer.
  - Maintenance and operation must be carried out according to the recommended time and frequency, as stated in this manual.
  - Use genuine standard replacement parts only.

  Failure to comply with these recommendations will void the warranty.
- Inverter air-to-water heat pump is high efficient, energy saving and environment friendly, which is mainly used for space heating/cooling and some DHW applications where needed.

## Hazard Definitions

The following terms are used throughout this manual to bring attention to the presence of potential hazards or to important information concerning the product.

| | |
|---|---|
| **⚠ DANGER** | Indicates an imminently hazardous situation, which if not avoided, WILL result in death, serious injury or substantial property damage. |
| **⚠ WARNING** | Indicates an imminently hazardous situation, which if not avoided, COULD result in death, serious injury or substantial property damage. |
| **⚠ CAUTION** | Indicates an imminently hazardous situation, which if not avoided, MAY result in minor injury or property damage. |
| ***NOTICE*** | Used to notify of special instructions on installation, operation or maintenance, which are important to equipment, but not related to personal injury hazards. |

## HP General Information

The HP Series air-to-water heat pump provides building owners with an all electric, environmentally friendly alternative to boilers for their low temp heating applications while also being able to reverse cycle and provide hydronic cooling.

The HP Series utilizes advanced EVI (Enhaced Vapor Injection) technology, an intelligent controls system and R410a refrigerant to produce water temperatures up to 140°F in ambient temperatures as low as -20°F. This allows for complete flexibility in most climates while maintaining efficiencies that benefit the end user. The inverter compressor technology provides a precise control of capacities allowing for load matching throughout the range of the product and eliminating wasteful usage of energy in a typical on/off compressor unit.

### *Low Ambient Temperature Cooling Operation*

If cooling operation is desired in a year-round application, or any time outdoor temperatures are expected to be consistently below 55˚F, the fan operation should be modified in order to ensure proper operating conditions within the refrigeration system.

# Specifications

## *Choose the Correct Size Heat Pump*

Perform appropriate load calculation to determine required heating or cooling load for the project. Refer to specifications in this manual to determine proper size heat pump.

**Table 1** Specification Data

**HP0275**

| | | | |
|---|---|---|---|
| **Heating*** | Capacity Range | Btu/hr | 101,941-288,226 |
| | Power Input Range | kW | 13-28 |
| | Efficiency | COP | Up to 3.04 |
| **Heating**** | Capacity Range | Btu/hr | 66,345-188,981 |
| | Power Input Range | kW | 12.85-25.92 |
| | Efficiency | COP | Up to 2.14 |
| **Cooling***** | Capacity Range | Btu/hr | 129,661-203,681 |
| | Power Input Range | kW | 8.7-23 |
| | Efficiency | EER | 2.5 |
| | IPLV**** | EER | 17.18 |
| **Refrigerant** | Type | | R410a |
| | Amount (Qty) | lbs | 20 (2) |
| | Pressure (low) | PSI | 305 |
| | Pressure (high) | PSI | 638 |
| **Dimensions** | Shipping (LxWxH) | in | 89 x 50 x 89 |
| | Unit (LxWxH) | in | 86 x 45 x 84 |
| | Weight | lbs | 1615 |
| **Electrical** | Volts/Ph/hz | | 460/3/60 |
| | MCA | Amps | 60 |
| | MOPD | Amps | 70 |
| **Hydronic** | Pressure Drop (@75GPM) | PSI (ft/hd) | 10 (23) |
| | Connection | In | 4 |
| | Min Flow | G.P.M. | 44 |
| | Max Flow | G.P.M. | 75 |
| | Max System Pressure | PSI | 145 |
| | Water Connection | In | 4 |
| | Sound @ 3 meters | dB(A) | 67 |
| | Operating temps | °F | -20-120 |

* Heating (DB)@ 47°F, Delivered Water 120°F per AHRI 550-590 (75 GPM) EWT 110°F

** Heating (DB)@ 17°F, Delivered Water 120°F per AHRI 550-590 (75 GPM) EWT 110°F

***Cooling (DB/WB)@ 95°F/86°F, Delivered Water 44°F per AHRI 550/590 (60GPM) EWT 54°F

****IPLV is the recognized measurement of efficiency for Integrated Part Load Values in accordance with AHRI 550/590.
Ambient temp = 95°F. Delivered Water = 44°F (44GPM)

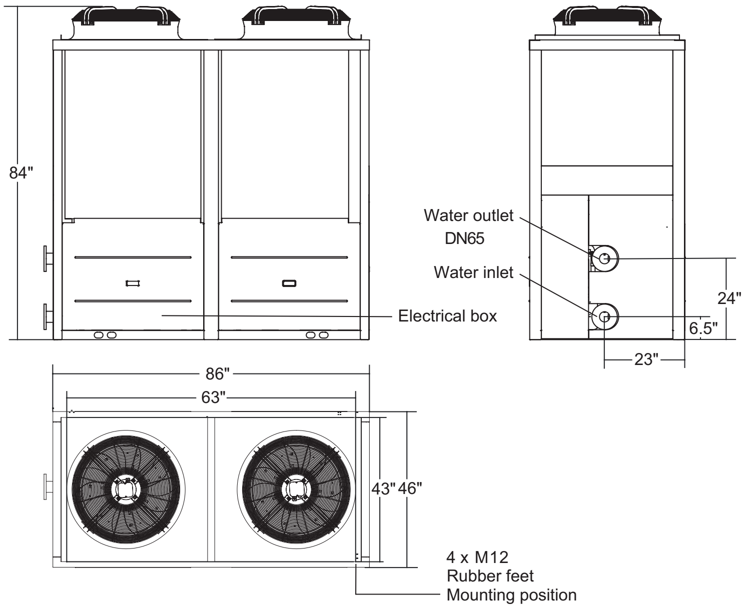
**Table 2**

**Heating**

| Hz | Water T (°F) | Ambient (°F) | Capacity (btu/hr) | Power (kW) | COP |
|---|---|---|---|---|---|
| 90 | 100 | -20 | 145,242 | 21.13 | 2.01 |
| | | -4 | 173,960 | 21.31 | 2.39 |
| | | 17 | 211,215 | 21.73 | 2.85 |
| | | 47 | 322,135 | 23.28 | 4.05 |
| | 120 | -20 | 129,954 | 25.21 | 1.51 |
| | | -4 | 155,648 | 25.42 | 1.79 |
| | | 17 | 188,981 | 25.92 | 2.14 |
| | | 47 | 288,226 | 27.77 | 3.04 |
| | 140 | -20 | | | |
| | | -4 | 137,337 | 28.79 | 1.4 |
| | | 17 | 166,748 | 29.36 | 1.66 |
| | | 47 | 254,317 | 31.46 | 2.37 |
| 60 | 100 | -20 | 98,888 | 21.13 | 1.67 |
| | | -4 | 118,441 | 21.31 | 1.98 |
| | | 17 | 143,806 | 21.73 | 2.42 |
| | | 47 | 213,626 | 23.28 | 3.65 |
| | 120 | -20 | 88,479 | 25.21 | 1.25 |
| | | -4 | 105,973 | 25.42 | 1.48 |
| | | 17 | 128,668 | 25.92 | 1.82 |
| | | 47 | 191,139 | 27.77 | 2.74 |
| | 140 | -20 | | | |
| | | -4 | 93,506 | 28.79 | 1.16 |
| | | 17 | 113,531 | 29.36 | 1.41 |
| | | 47 | 168,652 | 31.46 | 2.13 |
| 30 | 100 | -20 | 47,899 | 10.57 | 1.33 |
| | | -4 | 57,370 | 10.75 | 1.56 |
| | | 17 | 74,150 | 10.64 | 2.04 |
| | | 47 | 113,934 | 10.59 | 3.15 |
| | 120 | -20 | 42,857 | 12.61 | 1 |
| | | -4 | 51,331 | 12.82 | 1.56 |
| | | 17 | 66,345 | 12.85 | 2.04 |
| | | 47 | 101,941 | 12.99 | 3.15 |
| | 140 | -20 | | | |
| | | -4 | 45,292 | 14.52 | 0.91 |
| | | 17 | 58,539 | 14.38 | 1.19 |
| | | 47 | 89,948 | 14.31 | 1.84 |

# Specifications

**Figure 1** Dimensions



Foot mounting dimensions: 63" x 43"

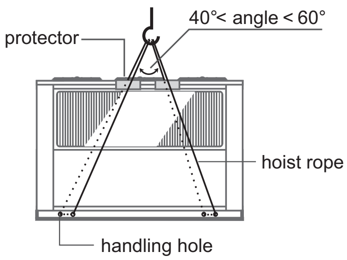
# Installation

## Transporting

During transportation, be sure that the unit is always standing up. The unit shall not be laid on its side. Failure to keep upright can damage components and void the product warranty.

If the unit needs to be lifted by crane, please use cable appropriate for the weight of the unit and lifting points located at the bottom of the unit. Ensure the heat pump is protected using protective material between the cables and the unit. This will prevent any damage to the coil, fans and cabinet. (see figure for example)

**Figure 2**



**⚠WARNING** Heat exchanger fins are sharp and can cut a finger if handled improperly. Please handle with gloves or protective wear.

## Installation Location

- Units can be installed outdoors as long as the location determined can handle the weight (see specifications) for each unit.
- The location is free from heat radiation and other possible fire hazards.
- There must be enough space around the unit for maintenance see "Required Clearances". The base of the unit must be located a minimum of 10 inches off the ground or above the highest anticipated snow level to allow proper condensate drainage. The condensate shall be provided a path to drain before re-freezing in an area that could create an obstruction or hazardous conditions such as on a walkway.

# Installation

**Figure 3** Required Clearances (in)

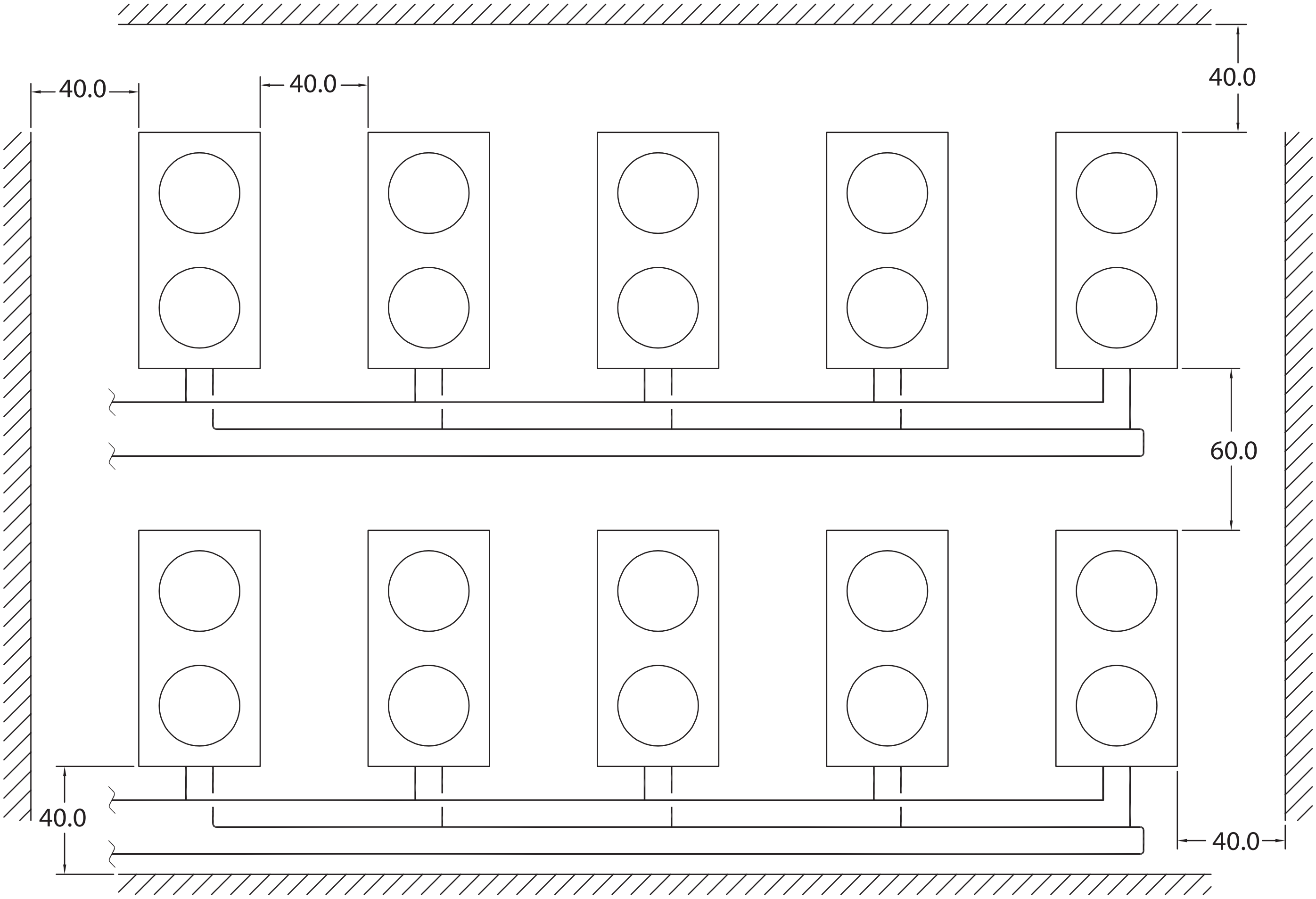
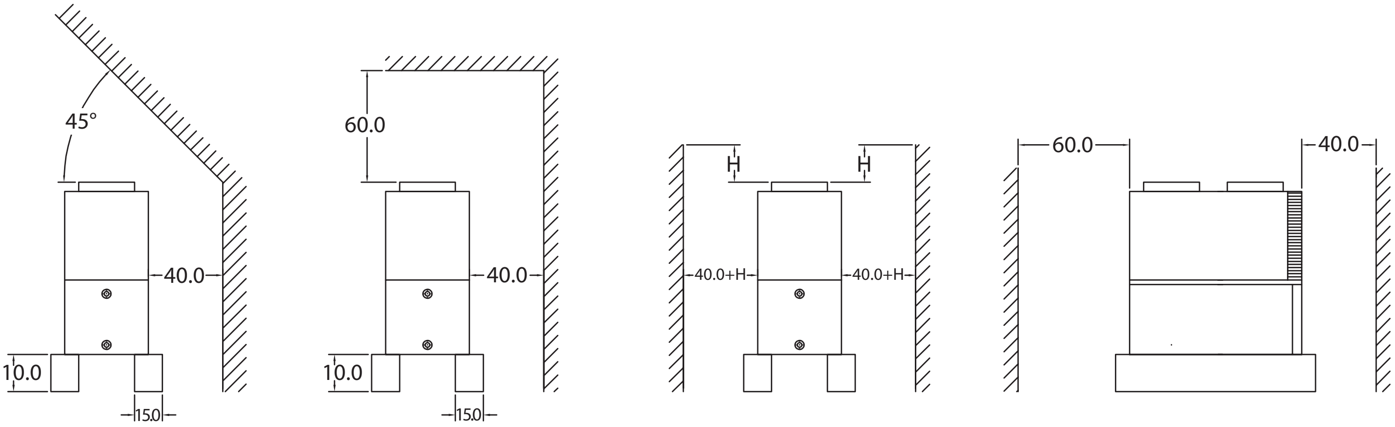

40.0
40.0
40.0
60.0
40.0
40.0

**Figure 4**


45°
40.0
10.0
15.0
60.0
40.0
10.0
15.0
H
H
40.0+H
40.0+H
60.0
40.0

# Installation

### *Prior to Initial Startup*

**⚠WARNING** Before proceeding read and fully understand the instructions contained in this manual. Do not attempt to operate this heat pump if it has not been installed in accordance with the guidelines set forth in this manual. Failure to comply with this warning can result in extensive property damage, severe personal injury or death! Failure to comply can also void product warranty.

Inspection before turning unit on;

- Check and make sure that the pipe connections are secured, leak free and the appropriate valves are open.
- Check the water loop to ensure there is sufficient water inside the expansion tank, the water loop is full of water/glycol mix* and without any air. Also make sure there is good insulation for the piping.
- Check all electrical wiring. Make sure that the power voltage is normal, the wiring is completed per the diagram, and the ground is connected.
- Ensure air-to-water heat pumps are free of any debris and that all loose screws or parts have been secured. Once power is turned on, check controller display for any immediate faults. A licensed and qualified installer can also verify refrigerant pressures by using the refrigerant ports located within the unit.
- The flow switch is installed inside of the heat pump. Check to ensure that the wiring and action of the switch is normal and controlled by the controller. Flow switch will open at 27 G.P.M.

# Glycol/Water System

**Table 3** Glycol Concentrations (10% Minimum, 50% Maximum)

| Propylene Glycol % | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| Min. Ambient Temp for Operation | 26°F/-3°C | 18°F/-8°C | 8°F/-13°C | -7°F/-22°C | -29°F/-34°C |
| Capacity Multiplier | 0.99 | 0.98 | 0.96 | 0.93 | 0.88 |
| Pressure Drop Multiplier (Cooling) | 1.10 | 1.20 | 1.34 | 1.5 | 1.65 |
| Pressure Drop Multiplier (Heating) | 1.10 | 1.20 | 1.34 | 1.46 | 1.5 |
| Minimum Expansion Volume / System Volume | | | | | |
| Heating and Cooling | 1 gallon expansion per 15 gallons system volume | | | | |
| Heating only, HP only | 1 gallon expansion per 20 gallons system volume | | | | |
| Heating only, with Boiler | 1 gallon expansion per 15 gallons system volume | | | | |

# Glycol / Water Mixture

**⚠WARNING** The water system must contain a mixture of inhibited glycol and water with thermal protection sufficient for the coldest expected temperature for the installation. The inhibitor level can degrade over time, and may need to be adjusted periodically. The inhibitor is essential to prevent the glycol from accelerating corrosion of metal components in the system. The glycol and inhibitor levels must be checked regularly (no less than once annually).

**⚠CAUTION** The minimum allowable concentration of glycol is 10% by volume in all installations.

**⚠CAUTION** Automotive glycol is not suitable for use in the system. Over time it may leave deposits which will degrade the performance and damage pumps or other devices in the system. Use only propylene glycol mixtures specifically labeled for boiler or HVAC use.

Obtain all components required for installation (piping, pumping etc...) and make sure all components and piping comply with applicable local codes. System fluid expansion must be calculated per established engineering methods.

**DO NOT** use galvanized pipe anywhere in the system. Galvanizing will react with the glycol and can cause glycol degradation and sludge in the system.

### *Insulate The Piping*

1. After testing and draining the system, apply pipe insulation. Fill system with glycol/water mixture. Calculate the system volume.
2. See Table 3, for required glycol concentration for the minimum expected outside temperature.
3. Obtain the required volume inhibited glycol/water solution premixed or mix in a clean container. (The glycol must contain an inhibitor to prevent metal corrosion.)
4. Pump the glycol/water solution into the system, allowing air to escape through the purge valve(s).
5. After filling the system, sample the system fluid and verify glycol and inhibitor percentages, following instructions provided with the glycol.

## General Piping Requirements

**CAUTION** Improper piping of this heat pump will void the manufacturer's warranty and can cause system failure resulting in flooding and extensive property damage!

**NOTICE** Shut off valves and unions should be installed at the inlet and outlet connections of the heat pump to provide for isolation of the unit should servicing be necessary.

### *Freeze Protection*

Installations in areas where the danger of freezing exists are not recommended unless proper freeze protection is provided. The following precautions MUST be observed:

1. A continuous flow of water through the unit MUST be maintained! The pump responsible for flow through the heat pump must run continuously!
2. A polypropylene glycol/water mixture suitable for the minimum temperature that the unit will be exposed to must be used. The pump must be capable of producing a minimum of 15% more flow and overcoming a 20% increase in head loss. Please refer to glycol/water system of this manual for performance correction factors and suggested glycol percentages for the heat pump system.
3. If the unit must be shut off for any reason the electric and water supplies MUST be shut off and the unit and its pump completely drained.

## System Piping

### *General Piping Requirements*

All system piping must be installed by a qualified technician in accordance with the latest revision of the ANSI/ASME Boiler and Pressure Vessel Code, Section IV.

All applicable local codes and ordinances must also be followed. A minimum clearance of **1in**, *25 mm* must be maintained between system pipes and all combustible construction. All system piping must be supported by suitable hangers, not the heat pump The thermal expansion of the system must be considered when supporting the system. A minimum system pressure of **20 psig**, *138 kPa* must be maintained at heat pump operating conditions. For glycol systems, a minimum system pressure of **30 psig**, *207 kPa* must be maintained at system operating conditions.

**CAUTION** **System Cleaning & Flushing:** Prior to commissioning the heat pump, the piping/system must be cleaned and flushed to prevent contaminants from settling back into the heat pump and fouling the heat exchanger.

Isolate the heat pump from the system prior to the cleaning process. Fill the system with water, add the cleaning solution and follow the solution manufacturer's instructions. Once clean, refill the system with clean water as specified in the Water Treatment section.

## Water Treatment

This heat pump was designed to operate in a closed loop heating system. System fill water must not contain more than 500 ppm of total dissolved solids, less than 150 ppm chloride concentration and no greater than 300 ppm hardness. Suspended solids such as Magnetite, Iron Oxides must be flushed from the system prior to commissioning the heat pump(s). The PH level must be within the 6.5-10 range. Where required, the system must be protected by the addition of a corrosion inhibitor per the chemical supplier's instructions.

For systems requiring glycol for freeze protection use a glycol/ water mix that prevents foaming. Air entrapped within foam significantly decreases heat transfer and can result in damage to the heat exchanger. Products such as DOWFROST, DOWTHERM, UCARTHERM or an equivalent product must be used to ensure proper protection to the heat pump.

The water used for dilution of concentrated heat transfer fluids must be distilled, de-ionized, or equivalently clean as stated above. De-ionized water by itself can be aggressive torwards many metals, but is perfectly safe when used for dilution of DOWFROST, DOWTHERM or UCARTHERM as specified by the manufacturer.

**FAILURE TO ENSURE PROPER WATER QUALITY CAN RESULT IN DAMAGE TO THE HEAT PUMP(S) VOIDING THE WARRANTY.**

## Water Meter

Make-up water introduced into a closed system due to system leaks can negatively affect the long term reliability of the heating sytem resulting in abnormal heat pump water quality. It is recommended that a water meter be installed in the system make-up line. If make-up is recorded, the leaks must be found and repaired.

## Pump Requirements

This heat pump requires a continuous minimum water flow for proper operation. The system pump must be sized to overcome the head loss of the heat pump and the system in order to achieve the required temperature rise. If the system contains hydronic antifreeze this must be considered when sizing the pump.

## Expansion Tank & Air Separator

An expansion tank or other means to control thermal expansion must be installed in the system. An expansion tank must be installed close to the heat pump on the suction side of the pump. An air scoop and automatic air vent must also be installed to eliminate air trapped in the system.

## Reverse Return Piping (RECOMMENDED)

Systems using multiple heat pumps can also be installed using a reverse return system, see piping schematics in this manual.

## Primary/Secondary Piping

Although acceptable, the system is not as cost effective as reverse return piping. Piping schematics in this manual shows a typical primary/secondary piping system. A dedicated pump is used to maintain a constant water flow through the heat pump. Flow must be properly accounted for in the design of primary/ secondary systems. In order to prevent heat pump(s) short cycling the system flow must be equal to or higher than the heat pump(s) local flow. Systems using multiple heat pumps can be installed using a primary/secondary manifold system, see piping schematics in this manual.

**Figure 5** Single Heat Pump Piping

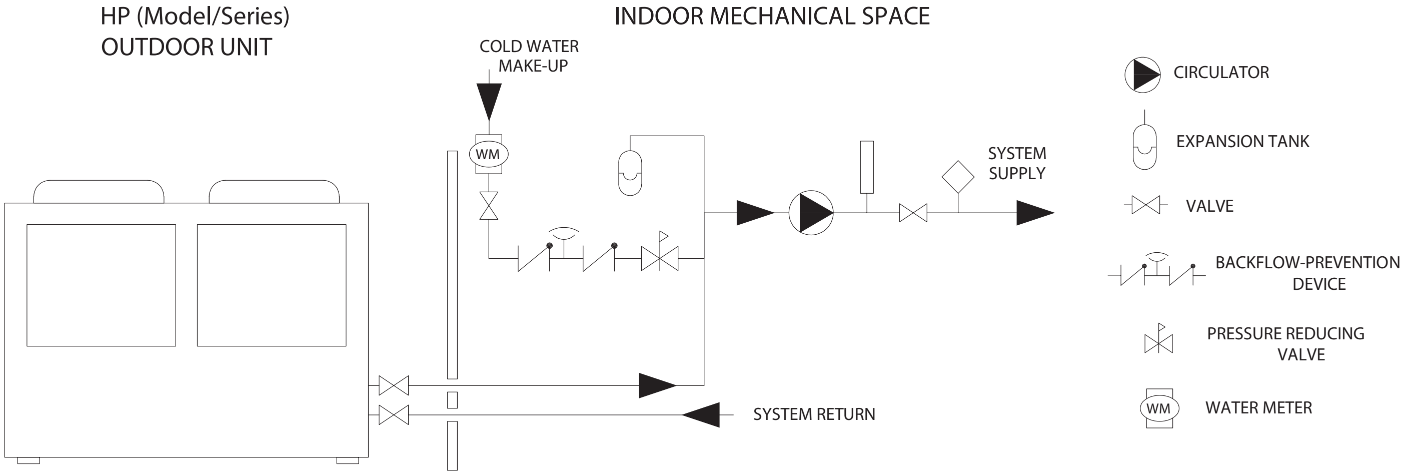
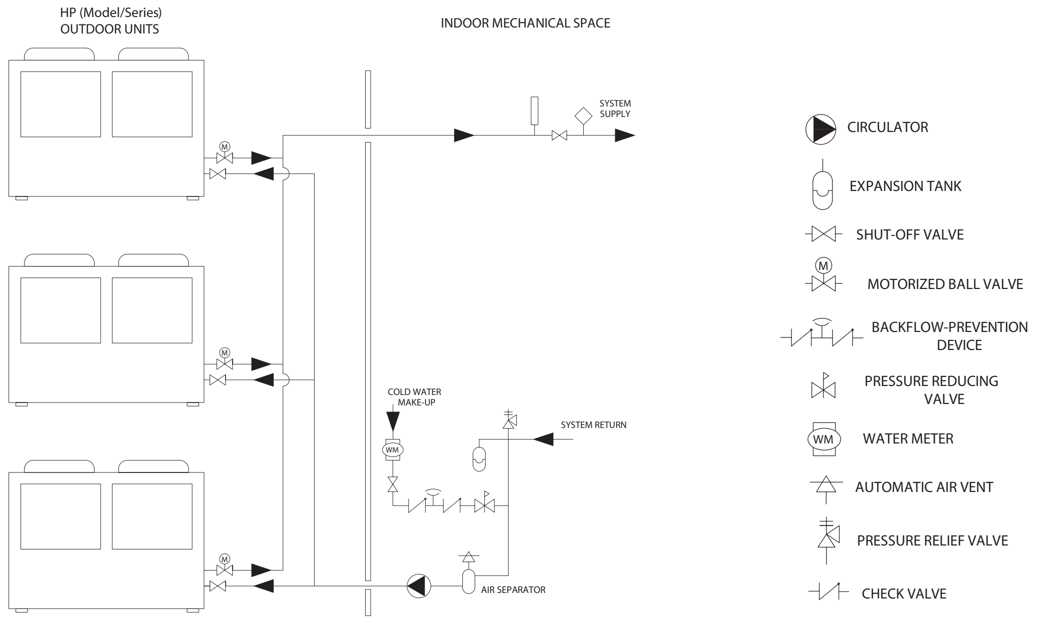
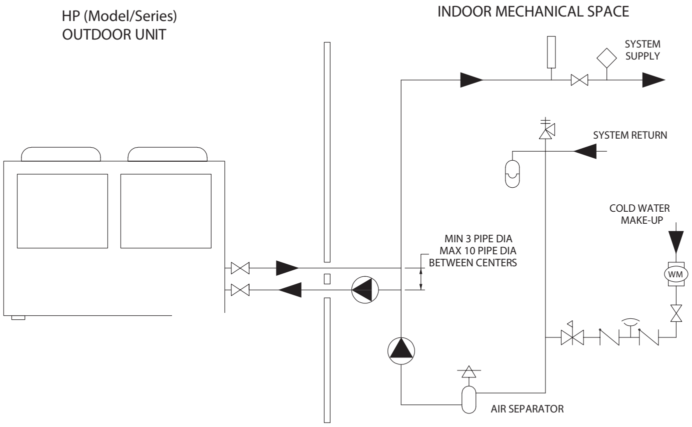


**Figure 6** Typical Multiple Heat Pump Reverse Return Piping (RECOMMENDED)


HP (Model/Series)
OUTDOOR UNITS
INDOOR MECHANICAL SPACE
SYSTEM SUPPLY
M
COLD WATER MAKE-UP
SYSTEM RETURN
WM
AIR SEPARATOR
CIRCULATOR
EXPANSION TANK
SHUT-OFF VALVE
M
MOTORIZED BALL VALVE
BACKFLOW-PREVENTION DEVICE
PRESSURE REDUCING VALVE
WM
WATER METER
AUTOMATIC AIR VENT
PRESSURE RELIEF VALVE
CHECK VALVE

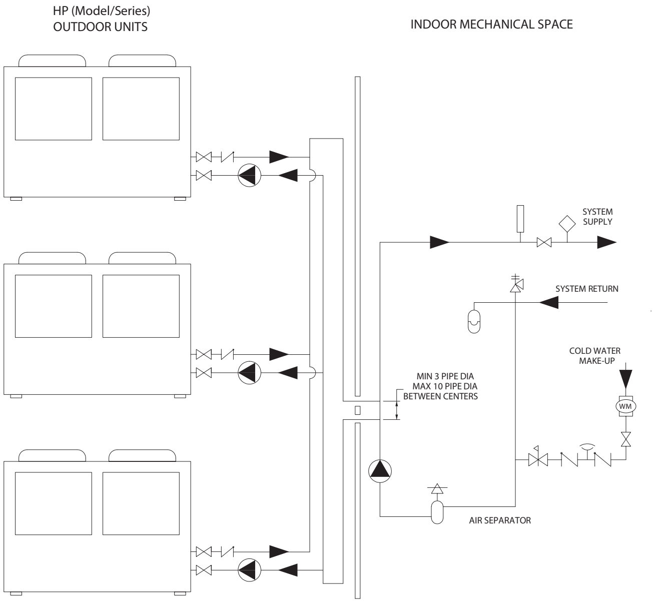
NOTE: Not all system valves may be shown. Consult local codes for additional system components which may be necessary.

**Figure 7** Typical Single Heat Pump Primary/Secondary Piping


HP (Model/Series)
OUTDOOR UNIT
INDOOR MECHANICAL SPACE
SYSTEM SUPPLY
SYSTEM RETURN
COLD WATER MAKE-UP
MIN 3 PIPE DIA
MAX 10 PIPE DIA
BETWEEN CENTERS
WM
AIR SEPARATOR

NOTE: Not all system valves may be shown. Consult local codes for additional system components which may be necessary.

**Figure 8** Typical Multiple Heat Pump Primary/Secondary Piping


HP (Model/Series)
OUTDOOR UNITS
INDOOR MECHANICAL SPACE
SYSTEM SUPPLY
SYSTEM RETURN
COLD WATER MAKE-UP
MIN 3 PIPE DIA
MAX 10 PIPE DIA
BETWEEN CENTERS
WM
AIR SEPARATOR

NOTE: Not all system valves may be shown. Consult local codes for additional system components which may be necessary.

# Electrical Wiring and Controls

## *Electrical Connections*

- The power supply must go through the wire access and be connected to the power supply terminals in the control box. Then connect the 3-signal wire plugs of the wire controller and main controller.
- External pump can be powered through main power terminals accessed through main power access on side of the units.
- If an additional auxiliary heater is need to be controlled by the heat pump controller, the relay (or power) of the aux-heater must be connected to the relevant output of the controller.
- Power supply for the unit should follow unit electrical specifications and adhere to local and national electrical codes.

## *Electrical Power Connections*

**CAUTION** Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation! Verify proper operation after servicing.

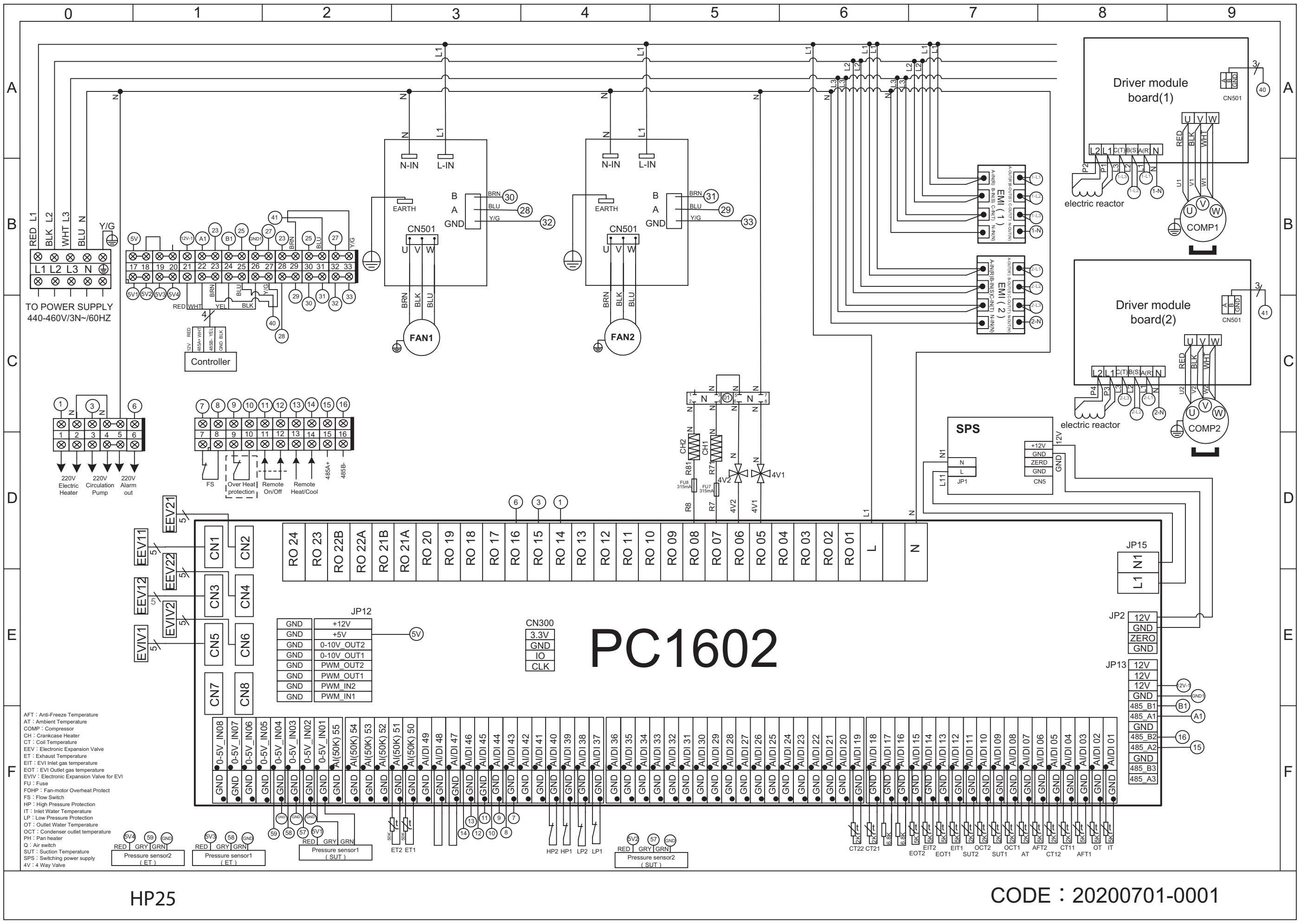
The electrical connections to this heat pump must be made in accordance with all applicable local codes and the latest revision of the National Electrical Code, ANSI /NFPA-70. Installation should also conform with CSA C22.1 Canadian Electrical Code Part I if installed in Canada. A separate circuit breaker must be installed for the heat pump - (if required, the optional local pump FLA must be incorporated and sized accordingly). A properly rated shut-off switch should be located at the heat pump. The heat pump must be grounded in accordance with the authority having jurisdiction, or if none, the latest revision of the National Electrical Code, ANSI/NFPA-70.

The electrical loads given in the Specification Table, allow for a pump load of no more than 5 amps at 110 VAC (2.5 amps at 230 VAC). If the pump load exceeds this, provide a separate power source to the pump.

Line voltage field wiring of any controls or other devices must use copper conductors with a minimum size of #14 awg.

Refer to point of connection diagram in this manual and the wiring diagram supplied with the heat pump for proper wiring connections.

**Figure 9** Wiring Diagram


PC1602
Driver module board(1)
Driver module board(2)
COMP1
COMP2
FAN1
FAN2
EMI ( 1 )
EMI ( 2 )
SPS
electric reactor
Controller
TO POWER SUPPLY 440-460V/3N~/60HZ
220V Electric Heater
220V Circulation Pump
220V Alarm out
FS
Over Heat protection
Remote On/Off
Remote Heat/Cool
Pressure sensor2 ( ET )
Pressure sensor1 ( ET )
Pressure sensor1 ( SUT )
Pressure sensor2 ( SUT )
AFT：Anti-Freeze Temperature
AT：Ambient Temperature
COMP：Compressor
CH：Crankcase Heater
CT：Coil Temperature
EEV：Electronic Expansion Valve
ET：Exhaust Temperature
EIT：EVI Inlet gas temperature
EOT：EVI Outlet gas temperature
EVIV：Electronic Expansion Valve for EVI
FU：Fuse
FOHP：Fan-motor Overheat Protect
FS：Flow Switch
HP：High Pressure Protection
IT：Inlet Water Temperature
LP：Low Pressure Protection
OT：Outlet Water Temperature
OCT：Condenser outlet temperature
PH：Pan heater
Q：Air switch
SUT：Suction Temperature
SPS：Switching power supply
4V：4 Way Valve
HP25
CODE：20200701-0001

# Electrical Wiring and Controls

**Figure 10** Controller Interface Diagram and Definition

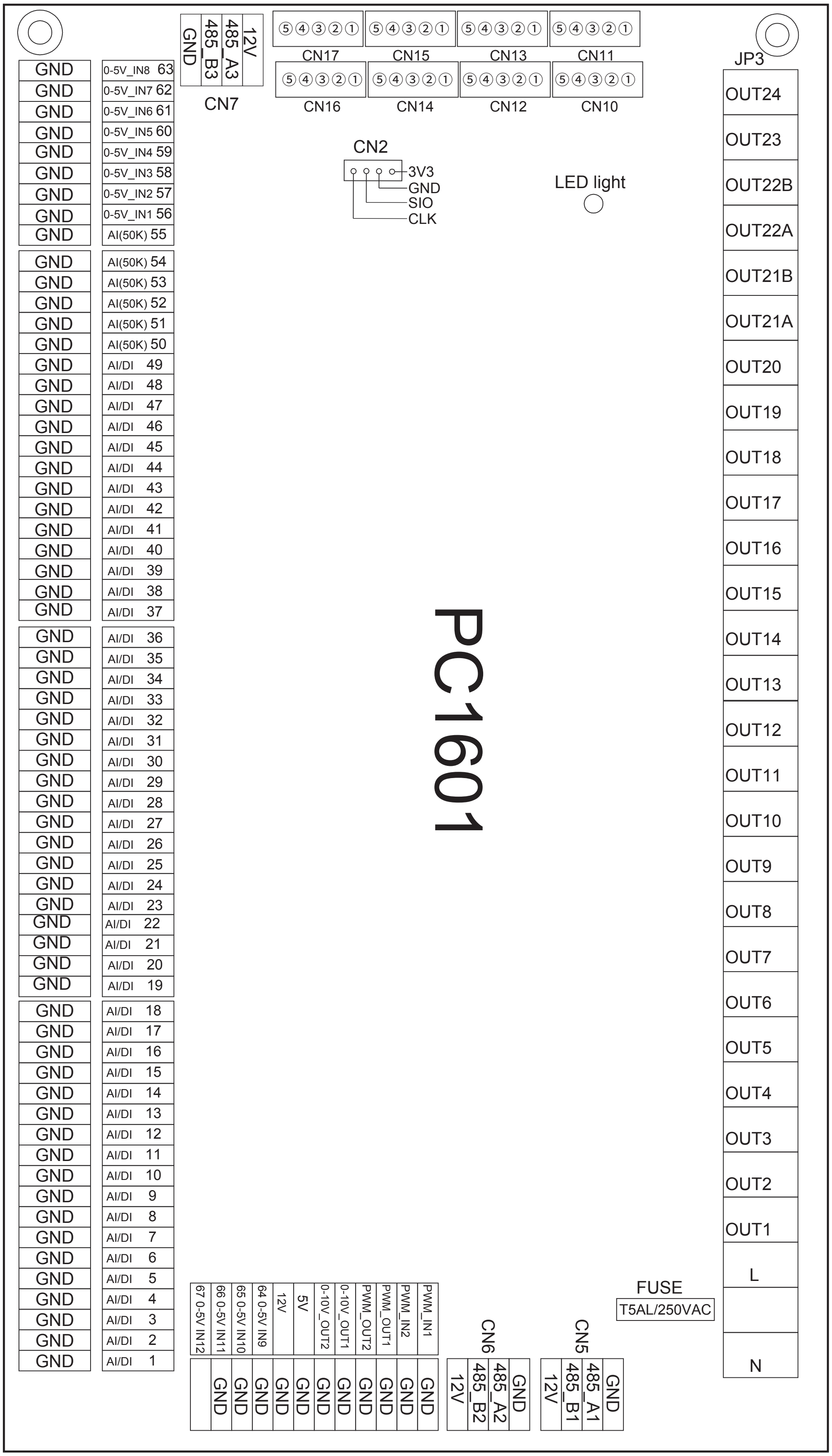

PC1601
CN7
12V
485_A3
485_B3
GND
⑤④③②① CN17
⑤④③②① CN15
⑤④③②① CN13
⑤④③②① CN11
⑤④③②① CN16
⑤④③②① CN14
⑤④③②① CN12
⑤④③②① CN10
CN2
3V3
GND
SIO
CLK
LED light
JP3
OUT24
OUT23
OUT22B
OUT22A
OUT21B
OUT21A
OUT20
OUT19
OUT18
OUT17
OUT16
OUT15
OUT14
OUT13
OUT12
OUT11
OUT10
OUT9
OUT8
OUT7
OUT6
OUT5
OUT4
OUT3
OUT2
OUT1
L
N
FUSE
T5AL/250VAC
GND 0-5V_IN8 63
GND 0-5V_IN7 62
GND 0-5V_IN6 61
GND 0-5V_IN5 60
GND 0-5V_IN4 59
GND 0-5V_IN3 58
GND 0-5V_IN2 57
GND 0-5V_IN1 56
GND AI(50K) 55
GND AI(50K) 54
GND AI(50K) 53
GND AI(50K) 52
GND AI(50K) 51
GND AI(50K) 50
GND AI/DI 49
GND AI/DI 48
GND AI/DI 47
GND AI/DI 46
GND AI/DI 45
GND AI/DI 44
GND AI/DI 43
GND AI/DI 42
GND AI/DI 41
GND AI/DI 40
GND AI/DI 39
GND AI/DI 38
GND AI/DI 37
GND AI/DI 36
GND AI/DI 35
GND AI/DI 34
GND AI/DI 33
GND AI/DI 32
GND AI/DI 31
GND AI/DI 30
GND AI/DI 29
GND AI/DI 28
GND AI/DI 27
GND AI/DI 26
GND AI/DI 25
GND AI/DI 24
GND AI/DI 23
GND AI/DI 22
GND AI/DI 21
GND AI/DI 20
GND AI/DI 19
GND AI/DI 18
GND AI/DI 17
GND AI/DI 16
GND AI/DI 15
GND AI/DI 14
GND AI/DI 13
GND AI/DI 12
GND AI/DI 11
GND AI/DI 10
GND AI/DI 9
GND AI/DI 8
GND AI/DI 7
GND AI/DI 6
GND AI/DI 5
GND AI/DI 4
GND AI/DI 3
GND AI/DI 2
GND AI/DI 1
67 0-5V IN12 GND
66 0-5V IN11 GND
65 0-5V IN10 GND
64 0-5V IN9 GND
12V GND
5V GND
0-10V_OUT2 GND
0-10V_OUT1 GND
PWM_OUT2 GND
PWM_OUT1 GND
PWM_IN2 GND
PWM_IN1 GND
CN6
12V
485_B2
485_A2
GND
CN5
12V
485_B1
485_A1
GND

**Table 4** The Input and Output Interface Instructions

| No. | Sign | Meaning | No. | Sign | Meaning |
|---|---|---|---|---|---|
| 1 | AI/DI1 | Water inlet temperature | 29 | AI/DI29 | No use |
| 2 | AI/DI2 | Water outlet temperature | 30 | AI/DI30 | No use |
| 3 | AI/DI3 | System 1 antifreeze temperature | 31 | AI/DI31 | No use |
| 4 | AI/DI4 | System 1 coil temperature 1 | 32 | AI/DI31 | No use |
| 5 | AI/DI5 | System 1 coil temperature 2 | 33 | AI/DI33 | No use |
| 6 | AI/DI6 | System 2 antifreeze temperature | 34 | AI/DI34 | No use |
| 7 | AI/DI7 | Ambient temperature | 35 | AI/DI35 | No use |
| 8 | AI/DI8 | System 1 coil outlet temperature | 36 | AI/DI36 | No use |
| 9 | AI/DI9 | System 1 return air temperature | 37 | AI/DI37 | System 1 low pressure switch |
| 10 | AI/DI10 | System 2 coil outlet temperature | 38 | AI/DI38 | System 2 low pressure switch |
| 11 | AI/DI11 | System 2 return air temperature | 39 | AI/DI39 | System 1 high pressure switch |
| 12 | AI/DI12 | System 1 EVI inlet temperature | 40 | AI/DI40 | System 2 high pressure switch |
| 13 | AI/DI13 | System 1 EVI outlet temperature | 41 | AI/DI41 | No use |
| 14 | AI/DI14 | System 2 EVI inlet temperature | 42 | AI/DI42 | No use |
| 15 | AI/DI15 | System 2 EVI outlet temperature | 43 | AI/DI43 | Water flow switch |
| 16 | AI/DI16 | Water tank temperature | 44 | AI/DI44 | Electric heating overload protection switch |
| 17 | AI/DI17 | End return water temperature | 45 | AI/DI45 | Emergency switch |
| 18 | AI/DI18 | System 2 coil temperature 1 | 46 | AI/DI46 | Mode switch |
| 19 | AI/DI19 | System 2 coil temperature 2 | 47 | AI/DI47 | Fan 1 overload protection switch |
| 20 | AI/DI20 | No use | 48 | AI/DI48 | Fan 2 overload protection switch |
| 21 | AI/DI21 | No use | 49 | AI/DI49 | Reserved |
| 22 | AI/DI22 | No use | 50 | AI 50(50K) | System 1 exhaust temperature |
| 23 | AI/DI23 | No use | 51 | AI 51(50K) | System 2 exhaust temperature |
| 24 | AI/DI24 | No use | 52 | AI 52(50K) | No use |
| 25 | AI/DI25 | No use | 53 | AI 53(50K) | No use |
| 26 | AI/DI26 | No use | 54 | AI 54(50K) | No use |
| 27 | AI/DI27 | No use | 55 | AI 55(50K) | No use |
| 28 | AI/DI28 | No use | 56 | 0-5V_IN1 | System 1 low pressure sensor |

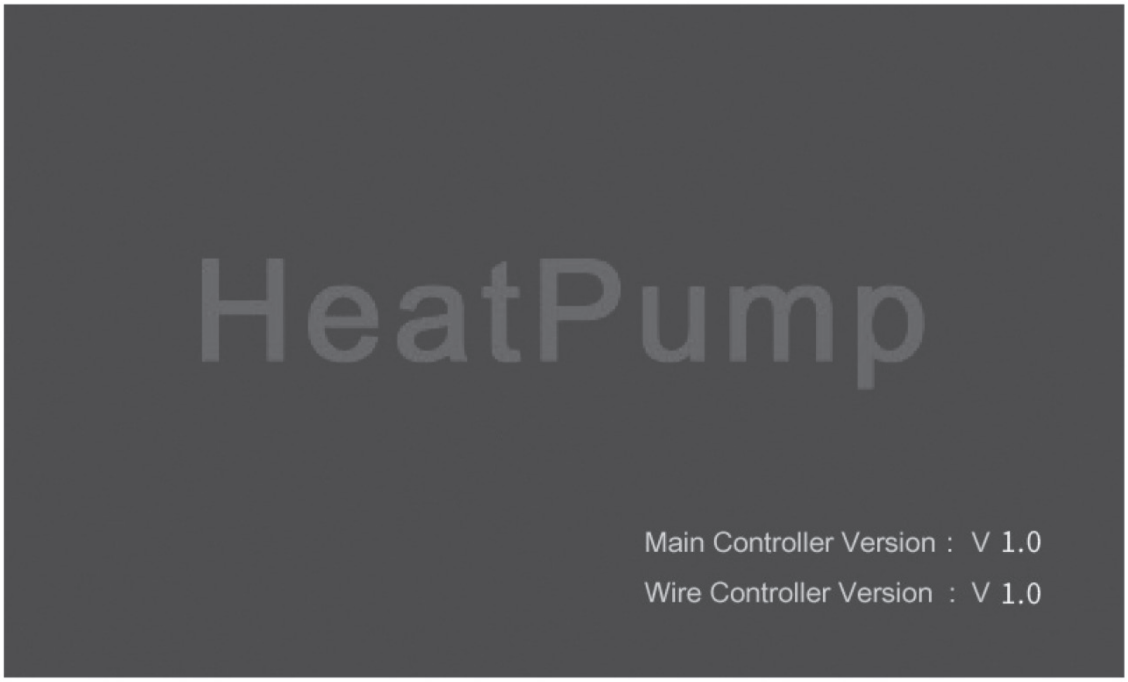
**Table 4** The Input and Output Interface Instructions

| No. | Sign | Meaning | No. | Sign | Meaning |
|---|---|---|---|---|---|
| 57 | AI/0-5V_IN2 | System 2 low pressure sensor | 86 | CN17 | No use |
| 58 | 0-5V_IN3 | System 1 high pressure sensor | 87 | OUT1 | System 1 fan output (low speed) |
| 59 | 0-5V_IN4 | System 2 high pressure sensor | 88 | OUT2 | System 1 fan output (high speed) |
| 60 | 0-5V_IN5 | No use | 89 | OUT3 | System 2 fan output (low speed) |
| 61 | 0-5V_IN6 | No use | 90 | OUT4 | System 2 fan output (high speed) |
| 62 | 0-5V_IN7 | No use | 91 | OUT5 | System 1 four-way valve output |
| 63 | 0-5V_IN8 | No use | 92 | OUT6 | System 2 four-way valve output |
| 64 | 0-5V_IN9 | No use | 93 | OUT7 | System 1 crankshaft heating belt output |
| 65 | 0-5V_IN10 | No use | 94 | OUT8 | System 2 crankshaft heating belt output |
| 66 | 0-5V_IN11 | No use | 95 | OUT9 | System 1 spray valve output (No use) |
| 67 | 0-5V_IN12 | No use | 96 | OUT10 | System 2 spray valve output (No use) |
| 68 | PWM_IN1 | Flow meter | 97 | OUT11 | Water replenishing valve (reserved) |
| 69 | PWM_IN2 | No use | 98 | OUT12 | Backwater valve (reserved) |
| 70 | PWM_OUT1 | No use | 99 | OUT13 | Water supply pump (reserved) |
| 71 | PWM_OUT2 | No use | 100 | OUT14 | Electric heating |
| 72 | 0-10V_OUT1 | No use | 101 | OUT15 | Circulating water pump output |
| 73 | 0-10V_OUT2 | No use | 102 | OUT16 | Alarm output |
| 74 | +5V | No use | 103 | OUT17 | System 1 fan output (high speed) |
| 75 | +12V | 12V output | 104 | OUT18 | System 2 fan output (high speed) |
| 76 | CN5 | Wire controlled color display | 105 | OUT19 | No use |
| 77 | CN6 | Centrally controlled color display | 106 | OUT20 | No use |
| 78 | CN7 | DTU module | 107 | OUT21A | No use |
| 79 | CN10 | System 1 electronic expansion valve (big) | 108 | OUT21B | No use |
| 80 | CN11 | System 2 electronic expansion valve (big) | 109 | OUT22A | No use |
| 81 | CN12 | System 1 electronic expansion valve (small) | 110 | OUT22B | No use |
| 82 | CN13 | System 2 electronic expansion valve (small) | 111 | OUT23 | No use |
| 83 | CN14 | System 1 EVI electronic expansion valve | 112 | OUT24 | No use |
| 84 | CN15 | System 2 EVI electronic expansion valve | | | |
| 85 | CN16 | No use | | | |

## Controls and Operation

Every heat pump is shipped with a wired touch screen controller. The controller should be mounted in an area safe from debris or potential for damage and mounted securely.

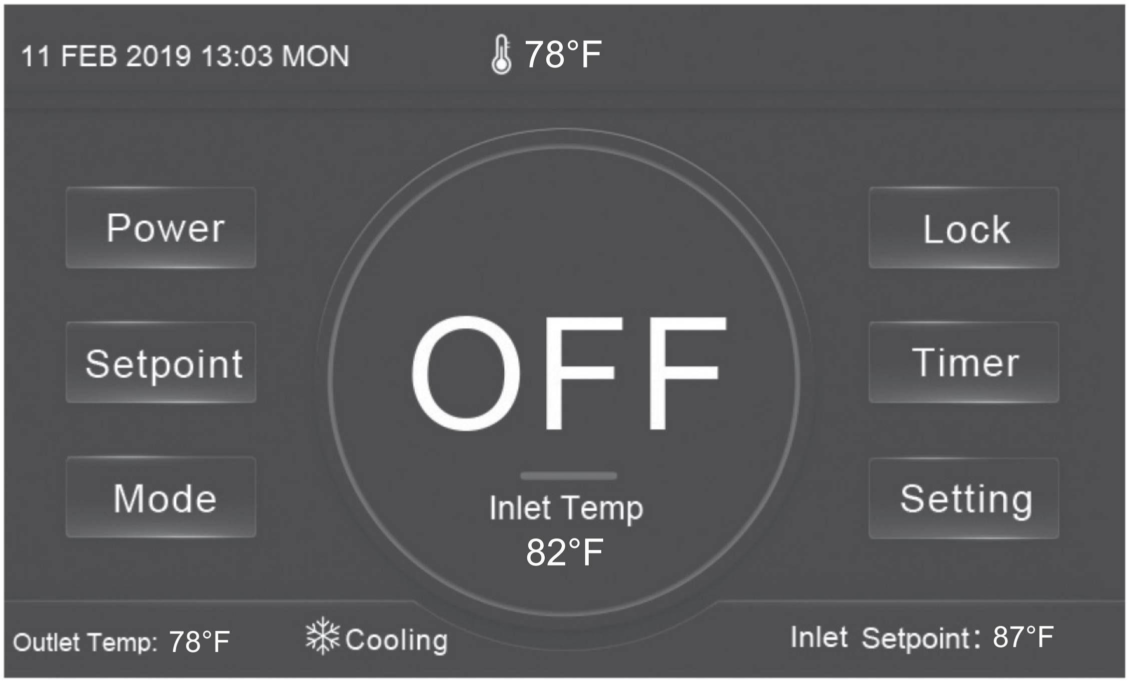
### *Startup Screen*



Main Controller Version : V 1.0

Wire Controller Version : V 1.0

### *Home Screen in "Off" Mode*



11 FEB 2019 13:03 MON

78°F

Power
Setpoint
Mode
Lock
Timer
Setting

OFF

Inlet Temp 82°F

Outlet Temp: 78°F

Cooling

Inlet Setpoint: 87°F

# Controls and Operation

## *Home Screen in "On" Mode*

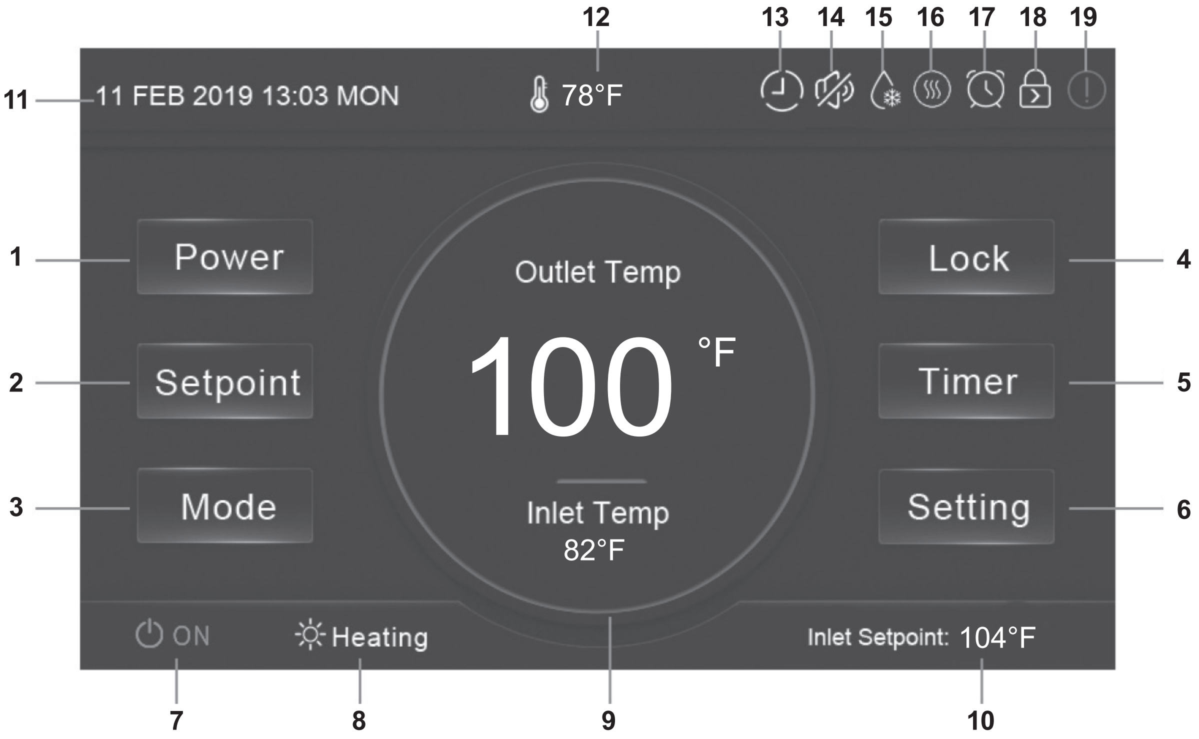

12
13
14
15
16
17
18
19
11
11 FEB 2019 13:03 MON
78°F
1
Power
2
Setpoint
3
Mode
Outlet Temp
100 °F
Inlet Temp
82°F
Lock
4
Timer
5
Setting
6
ON
Heating
Inlet Setpoint: 104°F
7
8
9
10

**Table 5** Button Function

| No. | Name | Description |
|---|---|---|
| **1** | Power | Press to switch ON or OFF |
| **2** | Setpoint | Press to set the target temperature |
| **3** | Mode | Press to select cooling or heating mode |
| **4** | Lock | Press to lock or unlock screen password is “22” to unlock |
| **5** | Timer | Press to enter timer setting interface (Temp Timer, Power Timer, Mute Timer) |
| **6** | Setting | Press to enter function setting interface (Status, Parameter, Failure, Time) |

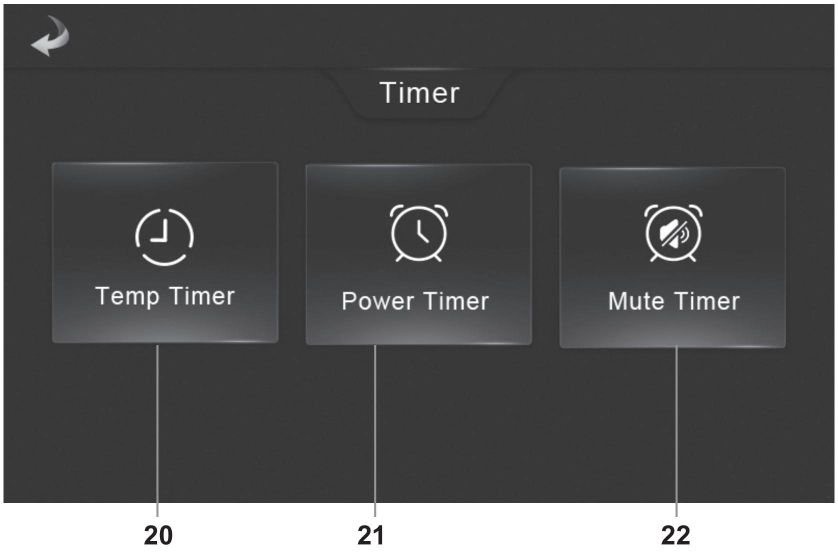
## Controls and Operation

**Table 6** Running Status Icons Description

| No. | Icon | Description |
|---|---|---|
| **7** | ⏻ ON | Indicating that the unit is power-on |
| **8** | ☼ Heating<br>❄ Cooling | Indicating the operating mode: Heating or Cooling |
| **9** | Display circle | Indicating the operating status:<br>blue--cooling mode; red-heating mode; grey-power-off mode. |
| **10** | Inlet Setpoint: | Indicating the target temperature of inlet water |
| **11** | 11 FEB 2019 13:03 MON | Indicating the date and time |
| **12** | 🌡 25.5°C | Indicating the ambient temperature |
| **13** | 🕒 | Indicating the Temp Timer function is activated |
| **14** | 🔇 | Indicating that the mute mode is activated |
| **15** | 💧 | Indicating that the defrost mode is activated |
| **16** | ♨ | Indicating that the electric auxiliary heating mode is activated |
| **17** | ⏰ | Indicating that the power timer mode is activated |
| **18** | 🔒 | Indicating the lock screen status |
| **19** | ⓘ | Fault icon indicating a fault has occurred. Fault icon will blink during a fault and be removed when the fault is cleared. |

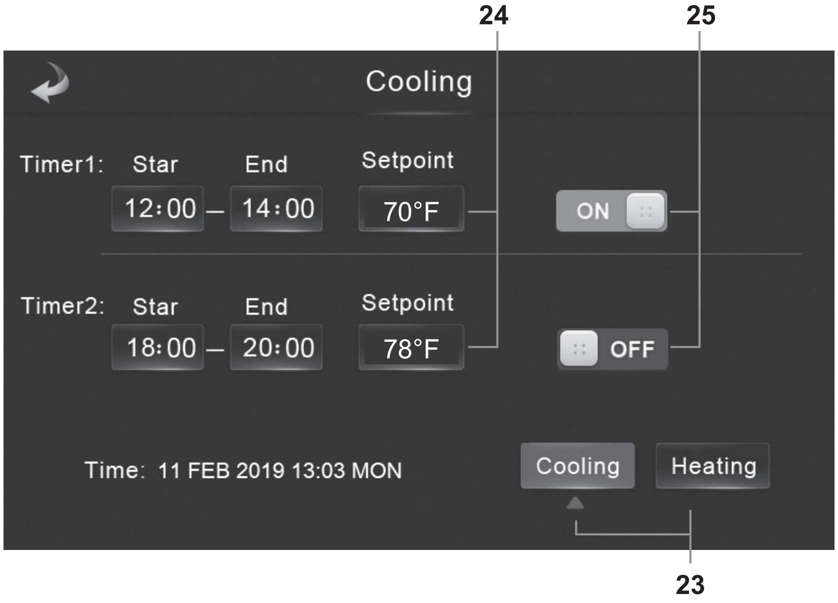
## Controls and Operation

### *Timer Functions*


Timer
Temp Timer
Power Timer
Mute Timer
20
21
22

### *Button Function*

| No. | Name | Function |
|---|---|---|
| **20** | Temp Timer | Press to enter temp timer settings. Here you can set the schedule and timer based on specific building requirements. |
| **21** | Power Timer | Press to enter power timer screen. Here you can set timers to shut the unit down or turn the unit on with timers |
| **22** | Mute Timer | Press to enter the mute timer screen. This allows the unit to set a schedule of when the unit can be run in "mute" mode. |


24
25
Cooling
ON
OFF
Cooling
Heating
23

Timer1: Star 12:00 – End 14:00 Setpoint 70°F

Timer2: Star 18:00 – End 20:00 Setpoint 78°F

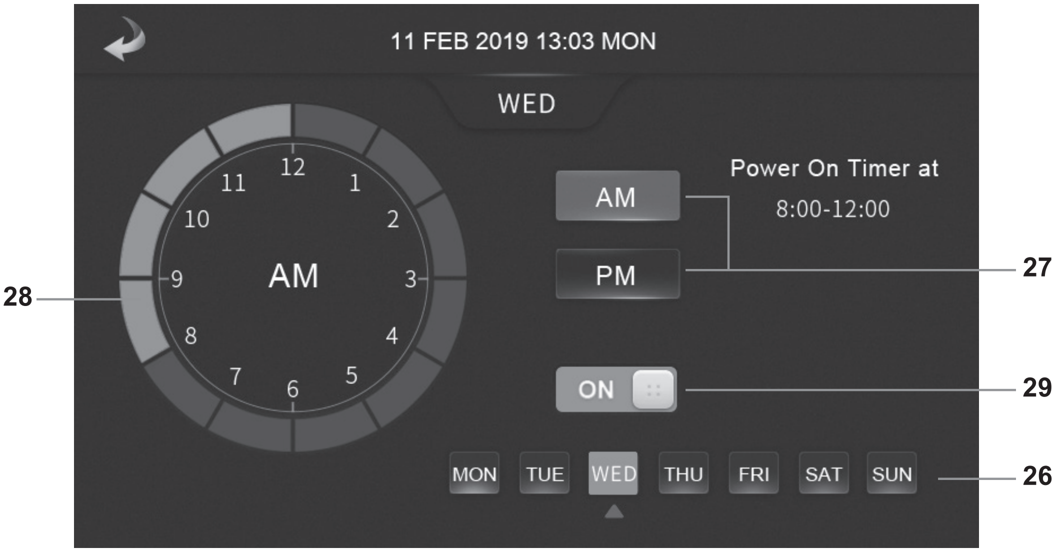
Time: 11 FEB 2019 13:03 MON

## Controls and Operation

The temp timer function allows timers to be set for on or off peak based on each application. First access the temp timer menu (20). Press the cooling or heating (23) to set the mode required, then enter the start/end and setpoints (24). Last press on or off (25) to enable or disable these timers.

Note: green: enable; grey: not enabled.

### *Power Timer*


11 FEB 2019 13:03 MON
WED
12
1
2
3
4
5
6
7
8
9
10
11
AM
AM
PM
Power On Timer at
8:00-12:00
ON
MON
TUE
WED
THU
FRI
SAT
SUN
27
28
29
26

The power timer feature allows the user to set daily time parameters for the unit. To navigate to the power timer screen press power timer (20). Select the specific day of the week (26), time (28) and AM or PM (27). Once finalized turn on or off (29) to enable or disable.

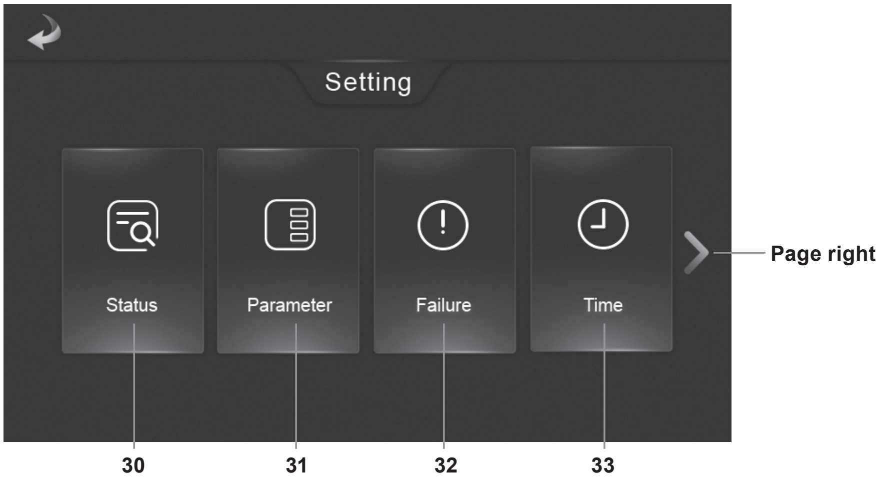
Note: green: enable; grey: not enable.

# Controls and Operation

## *Mute Timer*

The mute timer function allows the user to schedule a time/date for the unit to operate in "mute mode". See "fast mute" section for details on mute mode.

## *Settings*


Setting
Status
Parameter
Failure
Time
Page right
30
31
32
33

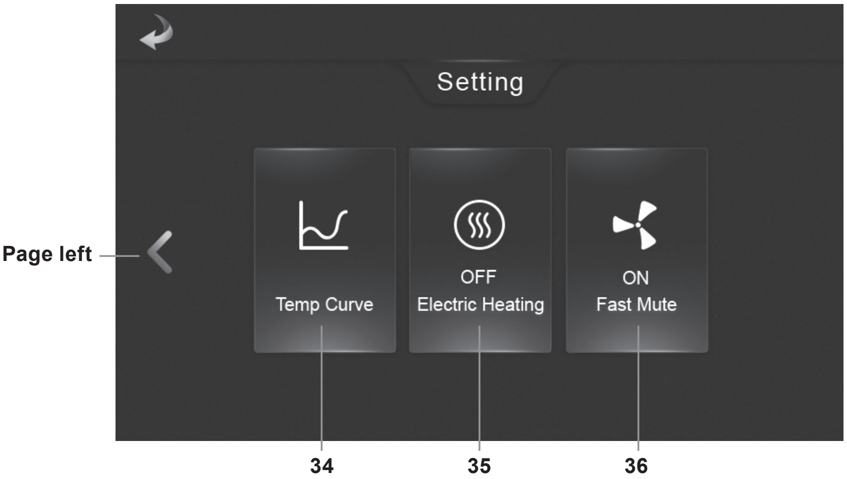
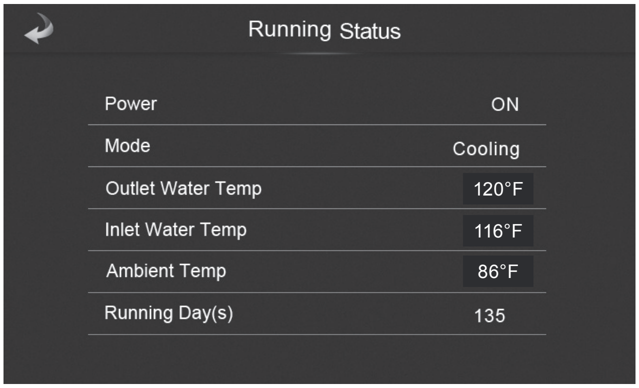

Setting
Page left
Temp Curve
OFF
Electric Heating
ON
Fast Mute
34
35
36

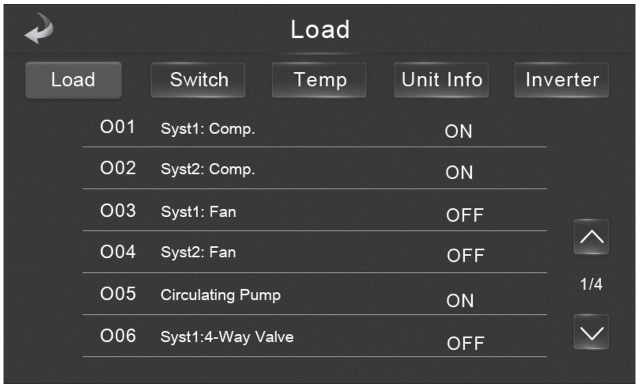
**Table 7** Button Description (see below for details on each)

| No. | Name | Function |
|---|---|---|
| **30** | Status | Press to enter status menu. |
| **31** | Parameter | Press and enter "22" to view/change installer accessible parameters |
| **32** | Fault | Press to see current faults or history of faults |
| **33** | Time | Press to set time and date of unit. |
| **34** | Temp Curve | Press to see recent water temps and curves |
| **35** | Electric Heating | Enable or disable ability to power electric heater |
| **36** | Fast Mute | Enable or disable fast mute |

# Controls and Operation



| | |
|---|---|
| Power | ON |
| Mode | Cooling |
| Outlet Water Temp | 120°F |
| Inlet Water Temp | 116°F |
| Ambient Temp | 86°F |
| Running Day(s) | 135 |



| | | |
|---|---|---|
| O01 | Syst1: Comp. | ON |
| O02 | Syst2: Comp. | ON |
| O03 | Syst1: Fan | OFF |
| O04 | Syst2: Fan | OFF |
| O05 | Circulating Pump | ON |
| O06 | Syst1:4-Way Valve | OFF |

## *Status Button*

By pressing the "status" button the installer will be able to view the current running status of the unit and the status of many of the units components and functions.

Running Status button shows current power mode (on/off) of the unit, outlet and inlet water temperature and ambient temperature.

The unit status button allows access to specific menus involved with the status of the unit. The installer password is '22'. The top/sub menus are "Load" "Switch" "Temp" "Unit Info" "Inverter".

Load

This menu allows access to the current status of compressors, fans, circ pump, 4-way valves electric heater, crankshaft heaters, spray valves, fault alarms, chassis heater, EEV valve steps, and capacity demands.

Switch

This menu allows access to the the current status of the high and low pressure switches (each system), water flow switch, emergency input switch, if the mode switch is open or closed, electric heater overload switch, and each fan protection overload switches.

Temp

This menu allows access to the current status of the following temperature readings:

Inlet Water

Outlet Water

Sys1 & 2 Antifreeze

Ambient Temp

Sys1 & 2 coil outlet temp

Sys 1 & 2 Suction temp

Sys 1 & 2 coil temps (1 & 2 temperatures)

Sys 1& 2 evap temp

Sys 1 & 2 superheat

Sys 1& 2 EVI (in temp)

Sys 1 & 2 EVI (out temp)

Sys 1 & 2 Exhaust temp

Sys 1 & 2 condensate temp

Sys 1 & 2 high and low pressure temp

Current running water flow (m3/hr)

Unit Info

This menu allows access to the specific details to that units software code, and software version for the main board, wired controller, and each inverter boards.

Inverter

This menu allows access to the current status of the following items related to the compressor and fan inverter boards.

Sys 1 & 2 Compressor set frequency

Sys 1 & 2 Compressor running frequency

System 1 & 2 Inverter phase current

Sys 1 & 2 Inverter board temp

Sys 1 & 2 Inverter bus voltage

Sys 1 & 2 If one or two inverter boards are running.

Sys 1 & 2 If there is a fault on either inverter board

Sys 1 & 2 Fan set speed

Sys 1 & 2 Fan running speed

Sys 1 & 2 Fan phase current

Sys 1 & 2 Fan IPM temp

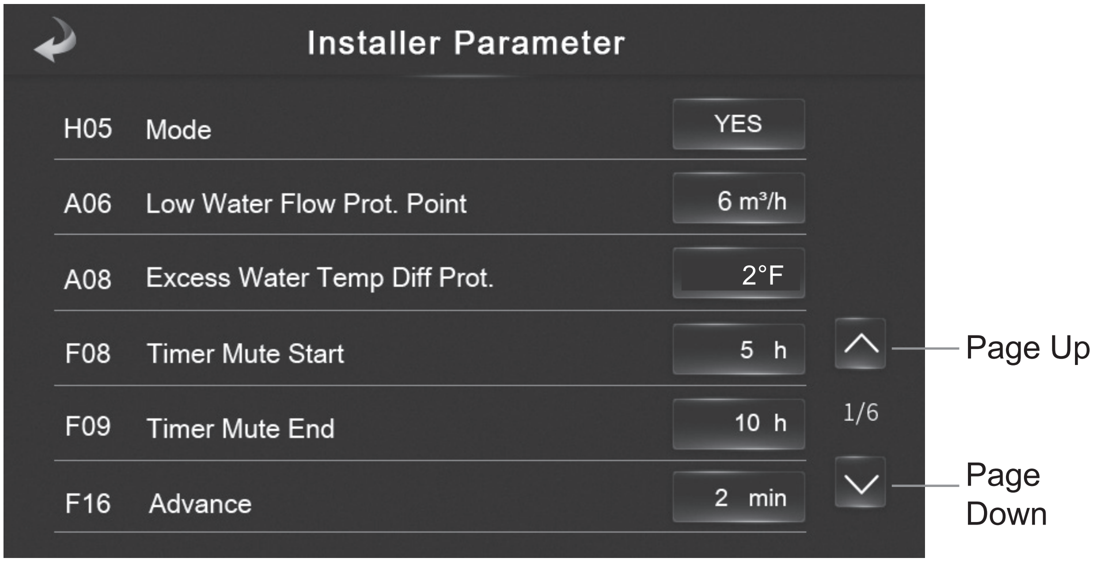
Sys 1 & 2 Fan bus voltage

Sys 1 & 2 Fan faults

# Controls and Operation

## *Parameter Button*

Pressing the “Parameter” button allows installers to access/adjust certain parameters. Refer to the parameter chart for all accessible parameters and limitations.



Installer Parameter

H05 Mode YES

A06 Low Water Flow Prot. Point 6 m³/h

A08 Excess Water Temp Diff Prot. 2°F

F08 Timer Mute Start 5 h

F09 Timer Mute End 10 h

F16 Advance 2 min

**Table 8** Parameter List

| Code | Parameter | Range |
|---|---|---|
| **H** | **System** | |
| H01 | Power Down Memory | 0-[No]/1-[Yes] |
| H02 | Syst. Qty | 1-[1 Syst.]/2-[2 Syst.] |
| H03 | 4-Way Valve Polarity | 0-[On-heating]/1-[Off-heating] |
| H05 | Mode | 0-[Cool]/1-[Heat&Cool]/2-[Heat] |
| H06 | Model | 1-[Polaris]/4-[Module] |
| H07 | Offline Control | 0-[Wire] /1-[ Mechanical] |
| H09 | Mute | 0-[No]/1-[Yes] |
| H10 | Unit Address | 1~32 |
| H25 | 4-Way Valve Delay Comp. Switching Time | 0~60s |
| H27 | Comp. Model | 1~10 |
| H28 | Water Temp Control (Inlet/Outlet) | 0-[Inlet]/1-[Outlet] |
| H29 | Comp. Slient Max Running Frequency | 0~150Hz |
| H30 | Temperature Unit | 0-[°C]/1-[°F] |
| | | |
| **A** | **Protection** | |
| A01 | Comp. Stop Working Min AT | -38.0~10.0°C (-36.4-50°F) |
| A02 | Water(Out) Antifreezing Prot. Point | -15.0~10.0°C (5-50°F) |
| A03 | Exhaust Air Temp Prot. Point | 60.0~130.0°C (140-266°F) |
| A04 | Refrigerant | 0-[R410A]/1-[R22]/2-[R134a]/3-[R407C] |
| A05 | Pressure Sensor | 0-[No]/1-[Yes] |
| A06 | Low Water Flow Prot. Point | 0~50m³/h |
| A07 | Water(Out) High Temp Prot. Point | 40~65°C (104-149°F) |
| A08 | Excess Water Temp Diff Prot. | 0~25°C (32-77°F) |
| A09 | Refrigerant Leakage Pressure Setpoint | 0~5bar |
| | | |

# Controls and Operation

Parameter List

| Code | Parameter | Range |
|---|---|---|
| **F** | **Fan motor** | |
| F01 | Speed | 0-[1 Speed]/1-[2 Speed]/2-[AC]/3-[DC] |
| F02 | Cooling High Speed Pressure | 0~50bar |
| | Cooling High Speed Coil Temp | -15.0~60.0°C (5-140°F) |
| F03 | Cooling Low Speed Pressure | 0~50bar |
| | Cooling Low Speed Coil Temp | -15.0~60.0°C (5-140°F) |
| F04 | Cooling Motor Off Pressure | 0~50bar |
| | Stop Cool Coil Temp | -15.0~60.0°C (5-140°F) |
| F05 | Heating: High Speed Pressure | 0~30bar |
| | Heating: High Speed Coil Temp | -15.0~60.0°C (5-140°F) |
| F06 | Heating: Low Speed Pressure | 0~30bar |
| | Heating: Low Speed Coil Temp | -15.0~60.0°C (5-140°F) |
| F07 | Heating: Motor Off Pressure | 0~30bar |
| | Stop Heat Coil Temp | -15.0~60.0°C (5-140°F) |
| F08 | Timer Mute Start | 0~23h |
| F09 | Timer Mute End | 0~23h |
| F10 | Quantity | 0-[1 Fan]/1-[2 Fans] |
| F11 | Speed Control | 0-[Coil]/1-[Pressure] |
| F15 | Unloading Coil Pressure | 0~15bar |
| | Unloading Coil AT | 20~80°C (68-176°F) |
| F16 | Advance | 0~120min |
| F17 | DC Fan Motor Max Speed | 300~1300r |
| | AC Fan Maxi Speed Running Duty Cycle | 0~100% |
| F18 | Cooling: Fan Min Speed | 300~1300r |
| | Cooling: Fan Min Speed Duty Cycle | 0~100% |
| F19 | Heating: Fan Min Speed | 300~1300r |
| | Heating: Fan Min Speed Duty Cycle | 0~100% |
| F20 | Mute Mode Speed | 300~1300r |
| | Mute Running Duty Cycle | 0~100% |
| F21 | Timer Mute | 0-[No]/1-[Yes] |
| F22 | Manual Fan Speed | 0-[No]/1-[Yes] |
| F23 | DC Fan Rated Speed | 300~1300r |
| | AC Fan Rated Duty Cycle | 0~100% |
| F24 | DC Fan Speed | 0-[1 Fan]/ 1-[2 Fans] |
| | | |
| **D** | **Defrosting** | |
| D01 | Defrosting | 0-[Normal]/1-[Smart II] |
| D02 | Judge Defrosting AT | -37~45°C (-34.6-113°F) |
| D03 | Defrosting Heating Cumulative Time | 0~120min |
| D04 | Defrosting Cycle | 30~90min |
| D05 | Adjust Defrosting Cycle Exhaust Temp | 0~150°C (32-302°F) |
| D06 | Judge Defrosting Low Pressure 1 | 0~45bar |
| D06 | Judge Defrosting Low Pressure 2 | 0~45bar |
| D07 | Defrost Interval Adjust Time | 0~120min |
| D08 | Sliding Defrost Star Temp | -37~45°C (-34.6-113°F) |
| D09 | Sliding Defrost Star Suction Temp | -37~45°C (-34.6-113°F) |
| D10 | Sliding Defrost Stop Temp | -37~45°C (-34.6-113°F) |
| D11 | Sliding Defrost Stop Suction Temp | -37~45°C (-34.6-113°F) |
| D12 | Sliding Defrost Adjust Exhaust Temp | 0~150°C (32-302°F) |
| D13 | Sliding Curve Small Valve Steps | 0~500N |
| D14 | Star Defrosting Water(In) Temp | 4~65°C (39.2-149°F) |
| D15 | Forced Defrosting Low Pressure | 0~45bar |
| D16 | Forced Defrosting Running Time | 0~120min |
| D17 | End Defrosting Coil(Out) Temp | -37~45°C (-34.6-113°F) |
| D18 | End Defrosting Coil Temp | -37~45°C (-34.6-113°F) |
| D19 | Max Defrosting Time | 0~20min |
| D20 | Defrosting Frequency | 0~200Hz |
| | | |

# Controls and Operation

Parameter List

| Code | Parameter | Range |
|---|---|---|
| **E** | **EEV** | |
| E01 | EEV Adjust Mode | 0-[Manual]/ 1-[Auto] |
| E08 | Defrost Steps | 0~500N |
| E13 | Cooling Section AT Setpoint | -30~80°C (-22-176°F) |
| E14 | Cooling Section 1 Steps | 0~500N |
| E15 | Cooling Section 2 Steps | 0~500N |
| E16 | Heating Section AT Setpoint 1 | -30~80°C (-22-176°F) |
| E17 | Heating Section AT Setpoint 2 | -30~80°C (-22-176°F) |
| E18 | Heating Section 1 Superheat | -20.0~20.0°C (-4-68°F) |
| E19 | Heating Section 2 Superheat | -20.0~20.0°C (-4-68°F) |
| E20 | Heating Section 3 Superheat | -20.0~20.0°C (-4-68°F) |
| E21 | EVI EEV Adjust Mode | 1-[Manual]/2-[Auto] |
| E22 | EVI Superheat | -20.0~20.0°C (-4-68°F) |
| E23 | EVI EEV Init. Steps | 0~500N |
| E24 | EVI EEV Min Steps | 0~500N |
| E26 | Exhaust-Control Temp | 60~120°C (140-248°F) |
| E27 | End Exhaust-Control Temp | 60~120°C (140-248°F) |
| E28 | Cooling EEV Ajust Mode | 0-[Fixed]/1-[Superheat] |
| E29 | Cooling Section AT Setpoint 1 | -30~80°C (-22-176°F) |
| E30 | Cooling Section AT Setpoint 2 | -30~80°C (-22-176°F) |
| E31 | Cooling Section 1 Superheat | -20.0~20.0°C (-4-68°F) |
| E32 | Cooling Section 2 Superheat | -20.0~20.0°C (-4-68°F) |
| E33 | Cooling Section 3 Superheat | -20.0~20.0°C (-4-68°F) |
| E34 | Heating Main Circuit Big Valve Init. Steps | 0~500N |
| E35 | Heating Main Circuit Small Valve Init. Steps | 0~500N |
| E36 | Main Circuit Big Valve Min Steps | 0~500N |
| E37 | Main Circuit Small Valve Min Steps | 0~500N |
| E38 | Main Circuit EEV Adjust Coefficient | 2/4/20 |
| E39 | Big&Small Valve Mode To Switch AT | -30~80°C (-22-176°F) |
| E40 | Valves Switch Superheat Return Diff | 0~5°C |
| E41 | Heating Small Valve 2nd Init. Steps AT | -37~0°C (-34.6-32°F) |
| E42 | Heating Small Valve 2nd Init. Steps | 0~500N |
| E43 | Heating Small Valve Steps Limit AT 1 | -37~0°C (-34.6-32°F) |
| E44 | Heating Small Valve Limit Section 1 Steps | 0~500N |
| E45 | Heating Small Valve Steps Limit AT 2 | -37~0°C (-34.6-32°F) |
| E46 | Heating Small Valve Limit Section 2 Steps | 0~500N |
| E47 | Heating Small Valve Steps Limit AT 3 | -37~0°C (-34.6-32°F) |
| E48 | Heating Small Valve Limit Section 3 Steps | 0~500N |
| | | |
| **R** | **Temperature** | |
| R01 | Heating: Inlet Water Set Temp | R21~R22 |
| R02 | Heating: Startup Return Diff | 0~10°C (0-50°F) |
| R03 | Heating: KP Coefficient | 0~50 |
| R04 | Heating: Energy Demand Range Refresh | 10~1800s |
| R05 | Heating: Energy Demand Cumulative Refresh | 20~1800s |
| R06 | 1 Syst. To 2 Syst. Energy Demand | 0~200 |
| R07 | 2 Syst. To 1 Syst. Energy Demand | 0~200 |
| R08 | Heating: Max Energy Demand | 0~200 |
| R09 | Cooling: Inlet Water Set Temp | R19~R20 |
| R10 | Cooling: Startup Return Diff | 0~10°C (32-50°F) |
| R11 | Cooling: KP Coefficient | 0~50 |
| R12 | Cooling: Energy Demand Range Refresh | 10~1800s |
| R13 | Cooling: Energy Demand Cumulative Refresh | 20~1800s |
| R14 | Cooling: Max Energy Demand | 0~200 |
| R15 | Electric Heater | 0-[NO]/1-[Waterway]/2-[Tank] |
| R16 | Electric Heating No Delay Start AT | -30.0~20.0°C (-22-68°F) |
| R17 | Electric Heating Star Return Diff | 0~10°C (0-50°F) |
| R18 | Electric Heating Stop Return Diff | 0~10°C (0-50°F) |

# Controls and Operation

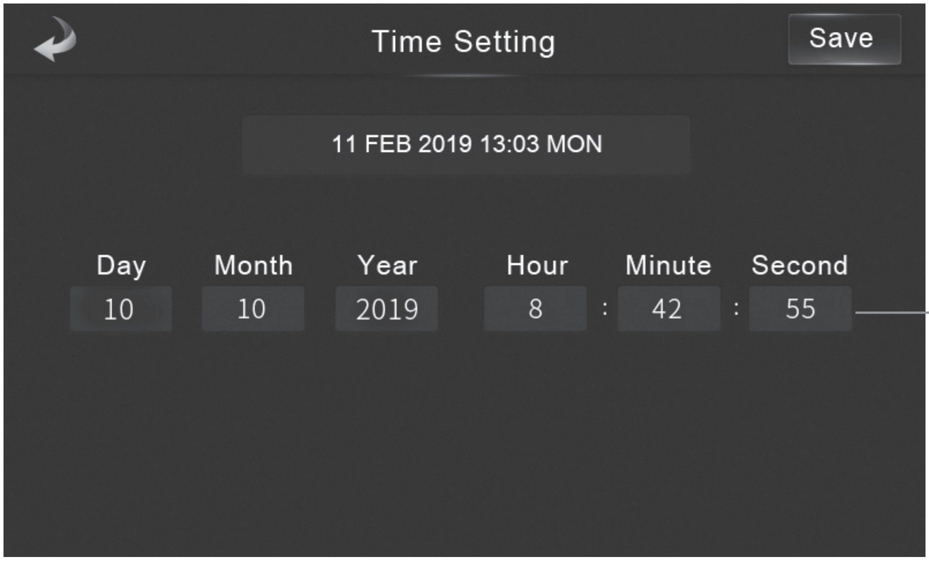
Parameter List

| Code | Parameter | Range |
|---|---|---|
| R19 | Min Cooling Setpoint | -30.0~80.0°C (-22-176°F) |
| R20 | Max Cooling Setpoint | -30.0~80.0°C (-22-176°F) |
| R21 | Min Heating Setpoint | -30.0~99°C (-22-210°F) |
| R22 | Max Heating Setpoint | -30.0~99°C (-22-210°F) |
| R23 | Heating: Low AT For Compensate Start | -35~0°C (-35-32°F) |
| R24 | Heating: Low AT For Compensate Stop | -38~0°C (-36.4-32°F) |
| R25 | Heating: Max Target Temp For Low AT Compensate | 20~60°C (68-140°F) |
| R26 | Heating: High AT For Compensate Start | 10~80.0°C (50-176°F) |
| R27 | Heating: High AT For Compensate Stop | 10~80.0°C (50-176°F) |
| R28 | Heating: Max Target Temp For High AT Compensate | 20~60°C (68-140°F) |
| | | |
| **P** | **Water Pump** | |
| P01 | Mode | 0-[Normal]/1-[Special]/2-[Interval] |
| P02 | Interval | 1~120min |
| P03 | Duration | 1~30min |
| P04 | Advance | 0~30min |
| | | |
| **U** | **Flowmeter** | |
| U01 | Flowmeter | 0-[No]/1-[Yes] |
| U02 | Flowmeter 1L Water Pulse | |
| U03 | Flowmeter Syst. (Divisor)A | -100.00~100.00 |
| U04 | Flowmeter Syst. (Subtraction)B | -100.00~100.00 |

If the unit has faulted, the fault icon will display on the main screen. Press the icon to bring you to the fault records screen. Refer to the fault table for troubleshooting. Once faults have been cleared/repaired, you can clear the fault history by pressing "clear".

### *Time Setting Button*

Pressing the "time setting" button alows the installer to set the current date and time. The correct time is important for fault records and setting timers.



11 FEB 2019 13:03 MON

| Day | Month | Year | Hour | Minute | Second |
|---|---|---|---|---|---|
| 10 | 10 | 2019 | 8 : | 42 : | 55 |

Input field

# Controls and Operation

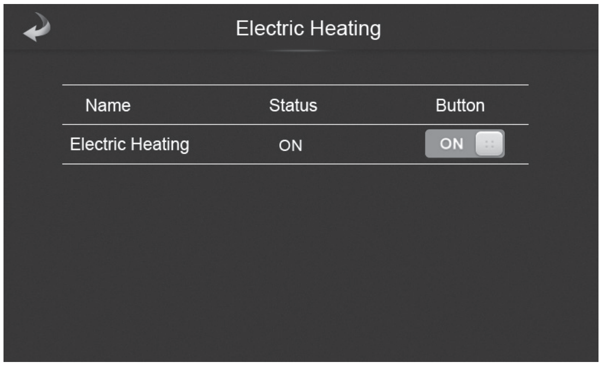
## *Temp Curve Button*

The temp curve button records the water inlet and water outlet temperature on the unit.

Temperature data is collected every 5 minutes and the 12 sets of temperature data are saved every hour. If the power is disrupted during the hour prior to being saved, the data recorded for that hour will not be saved. A new set of data will start from the last saved time.

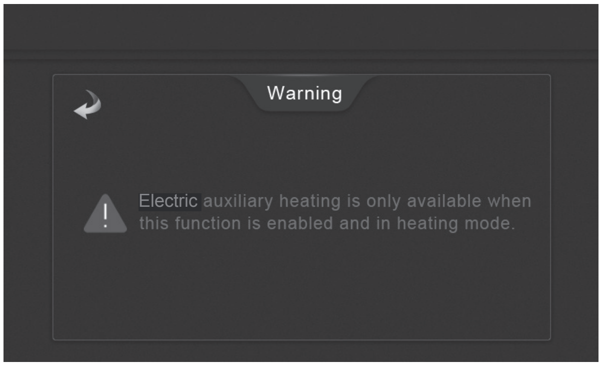
## *Electric Heat*

To control an auxiliary electric heater, press the electric heat button and change selection to "On".



Electric Heating

| Name | Status | Button |
|---|---|---|
| Electric Heating | ON | ON |



Warning

Electric auxiliary heating is only available when this function is enabled and in heating mode.

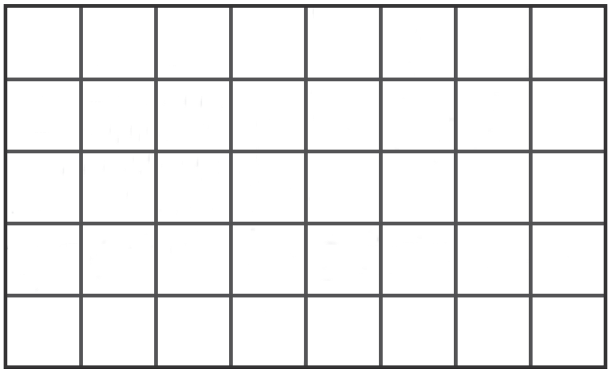
Note: Electric heat is only allowed when heating, or heating and cooling mode has been selected for unit operation, and in heating demand only.

## *Fast Mute Button*

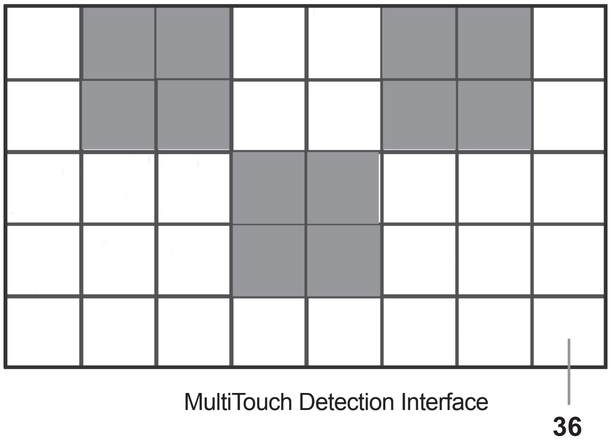
To enable the "Fast Mute" function, press the "Fast Mute" button (# 36 from button description table). This will slow the fans down to provide a quieter operation. However, the fast mute will also decrease capacity. Use only when quiet operation is required. To turn off, press "Fast Mute" again.

## *Calibrate Touch-Screen Controller*

If main controller touch screen becomes dirty or damaged, perform the following to verify screen functionality. On the main home screen, press setting button, status, unit status and enter "2" for the password. Press the bottom left of the screen 10 times in 4 seconds and you should enter the display calibration screen. Press the blank squares to check if the screen has bad spots or is not functioning properly (green is normal). Click the bottom right corner of the screen to exit when completed.



Display Calibration Interface



MultiTouch Detection Interface

## Controls and Operation

The integrated HP control can be controlled using Modbus to perform a variety of demands. A connection to the Modbus port on the control board is required. Utilize the chart below to determine the appropriate addresses and functionality that is required for the project.

Note: If display is changed to fahrenheit or celsius, all temperature read/write will be visible in the selected temperature scale.

**Table 9**

| | |
|---|---|
| TEMP1 | signed byte, 0.1°C resolution, formula: T*10, temperature range -30~97°C (when displaying 25 degrees, the data on the communication according to the previous formula is 250; when displaying -25 degrees, the data on the communication according to the previous formula is -250. A 1 on bit 15 represents a negative number and a 0 on bit 15 represents a positive number. A value of 32767 represents a fault on the corresponding sensor. |
| DIGI1 | unsigned byte, multiplier 1, when displaying 123, data on the communication is 123. |
| DIGI2 | unsigned byte, multiplier 10, when displaying 1230, data on the communication is 123. |
| DIGI3 | unsigned byte, multiplier 100, when displaying 12300, data on the communication is 123. |
| DIGI4 | unsigned byte, multiplier 5, when displaying 10, data on the communication is 2. |
| DIGI5 | unsigned byte, multiplier 0.1, when displaying 12.3, data on the communication is 123. |
| DIGI7 | unsigned byte, multiplier 0.01, when displaying 1.23, data on the communication is 123. |
| DIGI6 | unsigned byte, multiplier 0.001, when displaying 0.123, data on the communication is 123. |

**Table 10**

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 1011 | 03/16 | | power control | double-byte | read/write | default 0 (0-shutdown/1-on) | DIGI1 |
| 1012 | 03/16 | | mode | double-byte | read/write | default 1 (0-cooling/1-heating) | DIGI1 |
| 1013 | 03/16 | | current temperature setpoint (reserved) | double-byte | read/write | | TEMP1 |
| 1014 | 03/16 | | power status (reserved) | double-byte | read/write | | DIGI1 |
| 1015 | 03/16 | | operation mode (reserved) | double-byte | read/write | | DIGI1 |
| 1016 | 03/16 | | current temperature (reserved) | double-byte | read/write | | TEMP1 |
| 1017 | 03/16 | | manual load control | double-byte | read/write | 0-disabled/1-enabled | DIGI1 |
| | 03/16 | | fan 1 | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | fan 2 | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | circulation pump | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | crankshaft heating element 1 | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | crankshaft heating element 2 | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | crankcase heating element | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | mister valve 1 | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | mister valve 2 | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | water make-up valve (reserved) | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | water return valve (reserved) | double-byte | read/write | 0-off/1-on | |
| | 03/16 | | water supply pump (reserved) | double-byte | read/write | 0-off/1-on | |
| 1018 | 03/16 | H01 | power-loss data retention feature presence | double-byte | read/write | default 1 (0-not present/1-present) | DIGI1 |
| 1019 | 03/16 | H02 | number of systems within unit (1 compressor or 2) | double-byte | read/write | default 2 (1-single system/2-dual system) | DIGI1 |
| 1020 | 03/16 | H03 | reversing valve polarity | double-byte | read/write | default 1 (0-heating powered/1-heating unpowered) | DIGI1 |
| 1021 | 03/16 | H05 | mode selection | double-byte | read/write | default 1 (0-cooling only/1-cooling and heating/2-heating) | DIGI1 |
| 1022 | 03/16 | H06 | model selection | double-byte | read/write | default 1 (0-circulating domestic hot water heater/1-North Star/4-Modular Machine) | DIGI1 |
| 1023 | 03/16 | H07 | master subordinate configuration | double-byte | read/write | default 0 (0-master/1-subordinate) | DIGI1 |
| 1024 | 03/16 | H10 | unit address | double-byte | read/write | default 1 (range 1~32) | DIGI1 |
| 1027 | 03/16 | | manual electric heating configuration | double-byte | read/write | default 0 | DIGI1 |
| 1028 | 03/16 | | operation time configuration | double-byte | read/write | default 0 | DIGI1 |
| 1030 | 03/16 | H09 | quiet mode configuration | double-byte | read/write | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1035 | 03/16 | H25 | compressor activation delay due to reversing valve actuation | double-byte | read/write | default 60s (range 0~60s) | DIGI1 |
| 1036 | 03/16 | H27 | compressor model selection | double-byte | read/write | default 2 (range 1~10) | DIGI1 |
| 1037 | 03/16 | A01 | compressor low ambient shutdown temperature | double-byte | read/write | default -37°C (range -37.0~10.0°C) | TEMP1 |
| 1038 | 03/16 | A02 | water supply freeze protection setpoint | double-byte | read/write | default 4°C (range -15.0~10.0°C) | TEMP1 |
| 1040 | 03/16 | A03 | vapor supply temperature protection setpoint | double-byte | read/write | default 115°C (range 60.0~130.0°C) | TEMP1 |
| 1041 | 03/16 | A04 | refrigrant type | double-byte | read/write | default 0 (0-R410A/1-R22/2-R134a/3-R407C) | DIGI1 |
| 1042 | 03/16 | A05 | pressure sensor configuration | double-byte | read/write | default 1 (0-disabled/1-enabled) | DIGI1 |
| 1054 | 03/16 | A07 | water supply overtemperature protection setpoint | double-byte | read/write | default 65°C (range 40~65°C) | TEMP1 |
| 1055 | 03/16 | A08 | water delta temperature protection setpoint | double-byte | read/write | default 13°C (range 0~25°C) | TEMP1 |
| 1056 | 03/16 | A09 | refrigerant leakage pressure setpoint | double-byte | read/write | default 0bar (range 0~5bar) | DIGI5 |
| 1057 | 03/16 | A06 | low water flow protection setpoint | double-byte | read/write | default 3$m^3$/h (range 0~50$m^3$/h) | DIGI1 |
| 1058 | 03/16 | H29 | quiet mode compressor maximum frequency | double-byte | read/write | default 80Hz (range 0~150Hz) | DIGI1 |
| 1059 | 03/16 | F01 | fan configuration | double-byte | read/write | default 1 (0-single speed/1-dual speed/2-AC/3-DC (variable speed)) | DIGI1 |
| 1060 | 03/16 | F02 | cooling mode coil temperature for high speed fan operation | double-byte | read/write | default 40°C (range -15.0~60.0°C) | TEMP1 |
| 1061 | 03/16 | F02 | cooling mode high-side pressure for high speed fan operation | double-byte | read/write | default 23bar (range 0~50bar) | DIGI5 |
| 1062 | 03/16 | F03 | cooling mode coil temperature for low speed fan operation | double-byte | read/write | default 30°C (range -15.0~60.0°C) | TEMP1 |
| 1063 | 03/16 | F03 | cooling mode high-side pressure for low speed fan operation | double-byte | read/write | default 15bar (range 0~50bar) | DIGI5 |
| 1064 | 03/16 | F04 | cooling mode coil temperature for fan shutdown | double-byte | read/write | default 10°C (range -15.0~60.0°C) | TEMP1 |
| 1065 | 03/16 | F04 | cooling mode high-side pressure for fan shutdown | double-byte | read/write | default 2bar (range 0~50bar) | DIGI5 |
| 1066 | 03/16 | F05 | heating mode coil temperature for high speed fan operation | double-byte | read/write | default 10°C (range -15.0~60.0°C) | TEMP1 |
| 1067 | 03/16 | F05 | heating mode low-side pressure for high speed fan operation | double-byte | read/write | default 10bar (range 0~30bar) | DIGI5 |
| 1068 | 03/16 | F06 | heating mode coil temperature for low speed fan operation | double-byte | read/write | default 20°C (range -15.0~60.0°C) | TEMP1 |
| 1069 | 03/16 | F06 | heating mode low-side pressure for low speed fan operation | double-byte | read/write | default 12bar (range 0~30bar) | DIGI5 |
| 1070 | 03/16 | F07 | heating mode coil temperature for fan shutdown | double-byte | read/write | default 30°C (range -15.0~60.0°C) | TEMP1 |
| 1071 | 03/16 | F07 | heating mode low-side pressure for fan shutdown | double-byte | read/write | default 17bar (range 0~30bar) | DIGI5 |
| 1072 | 03/16 | F08 | quiet mode start time | double-byte | read/write | default 0h (range 0~23h) | DIGI1 |
| 1073 | 03/16 | F09 | quiet mode end time | double-byte | read/write | default 6h (range 0~23h) | DIGI1 |
| 1074 | 03/16 | F10 | number of fans | double-byte | read/write | default 1 (0-single fan/1-dual fan) | DIGI1 |
| 1075 | 03/16 | F11 | fan speed control configuration | double-byte | read/write | default 0 (0-coil/1-pressure) | DIGI1 |
| 1076 | 03/16 | F15 | high ambient fan shutdown ambient temperature | double-byte | read/write | default 35°C (range 20~80°C) | TEMP1 |
| 1077 | 03/16 | F16 | fan (heat source pump) activation advancement preceding compressor activation | double-byte | read/write | default 1min (range 0~120min) | DIGI1 |
| 1078 | 03/16 | F17 | AC fan duty cycle at maximum speed | double-byte | read/write | default 100% (range the larger of F18/F19~100%) | DIGI1 |
| 1079 | 03/16 | F17 | DC fan maximum speed | double-byte | read/write | default 1060r (range the larger of F18/F19~1300r) | DIGI1 |

# Controls and Operation

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 1080 | 03/16 | F18 | cooling duty cycle at minimum fan speed | double-byte | read/write | default 50% (range 0~F17%) | DIGI1 |
| 1081 | 03/16 | F18 | cooling minimum fan speed | double-byte | read/write | default 600r (range 300~F17r) | DIGI1 |
| 1082 | 03/16 | F19 | heating duty cycle at minimum fan speed | double-byte | read/write | default 50% (range 0~F17%) | DIGI1 |
| 1083 | 03/16 | F19 | heating minimum fan speed | double-byte | read/write | default 600r (range 300~F17r) | DIGI1 |
| 1084 | 03/16 | F20 | quiet mode duty cycle | double-byte | read/write | default 50% (range 0~100%) | DIGI1 |
| 1085 | 03/16 | F20 | quiet mode speed | double-byte | read/write | default 600r (range 300~1300r) | DIGI1 |
| 1086 | 03/16 | F21 | quiet mode timer configuration | double-byte | read/write | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1087 | 03/16 | F22 | manual fan speed/manual low-speed configuration | double-byte | read/write | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1088 | 03/16 | F23 | AC fan rated duty cycle | double-byte | read/write | default 50% (range 0~100%) | DIGI1 |
| 1089 | 03/16 | F23 | DC fan rated speed | double-byte | read/write | default 600r (range 300~1300r) | DIGI1 |
| 1090 | 03/16 |  | one-key quiet mode configuration | double-byte | read/write | default 0 | DIGI1 |
| 1101 | 03/16 | F15 | high ambient fan shutdown pressure | double-byte | read-only | default 4bar (range 0~15bar) | DIGI5 |
| 1102 | 03/16 | F24 | number of DC fan speed control boards | double-byte | read-only | default 0 (0-single module/1-dual module) | DIGI1 |
| 1103 | 03/16 | H28 | water temperature control mode | double-byte | read-only | default 0 (0-water return/1-water supply) | DIGI1 |
| 1131 | 03/16 | E01 | heating mode electronic expansion valve control mode | double-byte | read-only | default 1 (0-manual/1-automatic) | DIGI1 |
| 1134 | 03/16 | E08 | defrost position | double-byte | read-only | default 480N (range 0~500N) | DIGI1 |
| 1136 | 03/16 | E13 | cooling band ambient temeprature setpoint | double-byte | read-only | default 0°C (range -30~80°C) | TEMP1 |
| 1137 | 03/16 | E14 | cooling band 1 initial position | double-byte | read-only | default 350N (range 0~500N) | DIGI1 |
| 1138 | 03/16 | E15 | cooling band 2 initial position | double-byte | read-only | default 350N (range 0~500N) | DIGI1 |
| 1139 | 03/16 | E16 | heating band ambient temeprature setpoint 1 | double-byte | read-only | default -15°C (range -30~E17°C) | TEMP1 |
| 1140 | 03/16 | E17 | heating band ambient temeprature setpoint 2 | double-byte | read-only | default -5°C (range E16~80°C) | TEMP1 |
| 1141 | 03/16 | E18 | heating band 1 overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1142 | 03/16 | E19 | heating band 2 overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1143 | 03/16 | E20 | heating band 3 overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1144 | 03/16 | E21 | EVI electronic expansion valve control mode | double-byte | read-only | default 1 (1-manual/2-automatic) | DIGI1 |
| 1145 | 03/16 | E22 | EVI overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1146 | 03/16 | E23 | EVI electronic expansion valve initial position | double-byte | read-only | default 200N (range 0~500N) | DIGI1 |
| 1147 | 03/16 | E24 | EVI electronic expansion valve minimum position | double-byte | read-only | default 100N (range 0~500N) | DIGI1 |
| 1149 | 03/16 | E26 | EVI electronic expansion valve high discharge control activation temperature | double-byte | read-only | default 105°C (range 60~120°C) | TEMP1 |
| 1150 | 03/16 | E27 | EVI electronic expansion valve high discharge control deactivation temperature | double-byte | read-only | default 95°C (range 60~120°C) | TEMP1 |
| 1151 | 03/16 | E28 | cooling mode electronic expansion valve control mode | double-byte | read-only | default 1 (0-fixed/1-overtemperature control) | DIGI1 |
| 1152 | 03/16 | E29 | cooling band ambient temeprature setpoint 1 | double-byte | read-only | default 21°C (range -30~E30°C) | TEMP1 |
| 1153 | 03/16 | E30 | cooling band ambient temeprature setpoint 2 | double-byte | read-only | default 35°C (range E29~80°C) | TEMP1 |
| 1154 | 03/16 | E31 | cooling band 1 overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1155 | 03/16 | E32 | cooling band 2 overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1156 | 03/16 | E33 | cooling band 3 overtemperature | double-byte | read-only | default 3°C (range -20.0~20.0°C) | TEMP1 |
| 1158 | 03/16 | R09 | cooling mode return temperature setpoint | double-byte | read-only | default 25°C (range R19~R20°C) | TEMP1 |
| 1159 | 03/16 | R01 | heating mode return temperature setpoint | double-byte | read-only | default 50°C (range R21~R22°C) | TEMP1 |
| 1160 | 03/16 | R02 | heating mode activation temperature hysteresis | double-byte | read-only | default 2°C (range 0~10°C) | TEMP1 |
| 1162 | 03/16 | R19 | cooling mode setpoint minimum | double-byte | read-only | default 8°C (range -30.0~R20°C) | TEMP1 |
| 1163 | 03/16 | R20 | cooling mode setpoint maximum | double-byte | read-only | default 35°C (range R19~80.0°C) | TEMP1 |
| 1164 | 03/16 | R21 | heating mode setpoint minimum | double-byte | read-only | default 5°C (range -30.0~R22°C) | TEMP1 |
| 1165 | 03/16 | R22 | heating mode setpoint maximum | double-byte | read-only | default 55°C (range R21~99°C) | TEMP1 |
| 1166 | 03/16 | R16 | ambient temperature for immediate electric heating activation | double-byte | read-only | default -15°C (range -30.0~20.0°C) | TEMP1 |
| 1167 | 03/16 | R23 | low ambient heating compensation starting ambient temperature | double-byte | read-only | default -20°C (range R24~0°C) |  |
| 1168 | 03/16 | R24 | low ambient heating compensation ending ambient temperature | double-byte | read-only | default -37°C (range -35~R23°C) |  |
| 1169 | 03/16 | R25 | low ambient heating compensation highest target temperature | double-byte | read-only | default 40°C (range 20~60°C) |  |
| 1170 | 03/16 | R26 | high temperature heating compensation starting ambient temperature | double-byte | read-only | default 55°C (range 10~R27°C) |  |
| 1171 | 03/16 | R27 | high temperature heating compensation ending ambient temperature | double-byte | read-only | default 55°C (range R26~80.0°C) |  |
| 1172 | 03/16 | R28 | high temperature heating compensation highest target temperature | double-byte | read-only | default 62°C (range 20~60°C) |  |
| 1173 | 03/16 | R15 | electric heating configuration | double-byte | read-only | default 0 (0-disabled/1-space heating/2-domestic hot water) | DIGI1 |
| 1174 | 03/16 | R10 | cooling mode activation temperature hysteresis | double-byte | read-only | default 2°C (range 0~10°C) | TEMP1 |
| 1191 | 03/16 | L14 | (cooling) second stage timed temperature control start time | double-byte | read-only | default 0h (range 0~23h) | DIGI1 |
| 1192 | 03/16 | L15 | (cooling) second stage timed temperature control end time | double-byte | read-only | default 0h (range 0~23h) | DIGI1 |
| 1193 | 03/16 | U01 | flow meter configuration | double-byte | read-only | default 1 (0-disabled/1-enabled) | DIGI1 |
| 1194 | 03/16 | U02 | flow meter number of pulses per liter | double-byte | read-only | (reserved feature) | DIGI1 |
| 1195 | 03/16 | U03 | flow meter parameter (divisor) a | double-byte | read-only | default 16.500 (-32.000~32.000) | DIGI7 |
| 1196 | 03/16 | U04 | flow meter parameter (subtractor) b | double-byte | read-only | default 1.950 (-32.000~32.000) | DIGI7 |
| 1197 | 03/16 | P01 | circulation pump mode of operation | double-byte | read-only | default 2 (0-normal/1-special/2-interval) | DIGI1 |
| 1198 | 03/16 | P02 | circulation pump operation interval | double-byte | read-only | default 30min (range 1~120min) | DIGI1 |
| 1199 | 03/16 | P03 | circulation pump operation duration | double-byte | read-only | default 3min (range 1~30min) | DIGI1 |
| 1200 | 03/16 | P04 | circulation pump activation advancement preceding compressor activation | double-byte | read-only | default 1min (range 0~30min) | DIGI1 |
| 1201 | 03/16 | L09 | (cooling) first stage timed temperature control enable | double-byte | read-only | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1202 | 03/16 | L10 | (cooling) first stage timed temperature control start time | double-byte | read-only | default 0h (range 0~23h) | DIGI1 |
| 1203 | 03/16 | L11 | (cooling) first stage timed temperature control end time | double-byte | read-only | default 0h (range 0~23h) | DIGI1 |
| 1204 | 03/16 | L12 | (cooling) first stage timed temperature control setpoint | double-byte | read-only | default 21°C (range R19~R20°C) | TEMP1 |
| 1205 | 03/16 | L13 | (cooling) second stage timed temperature control enable | double-byte | read-only | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1210 | 03/16 | D14 | defrost water return temperature | double-byte | read-only | default 15°C (range 4~65°C) | TEMP1 |
| 1211 | 03/16 | D15 | forced defrost low-side starting pressure | double-byte | read-only | default 2bar (range 0~45bar) | DIGI5 |
| 1212 | 03/16 | D16 | forced defrost operation time | double-byte | read-only | default 120min (range 0~120min) | DIGI1 |
| 1213 | 03/16 | D17 | coil outlet defrost ending temperature | double-byte | read-only | default 33°C (range -37~45°C) | TEMP1 |
| 1214 | 03/16 | D18 | coil defrost ending temperature | double-byte | read-only | default 30°C (range -37~45°C) | TEMP1 |
| 1215 | 03/16 | D19 | maximum defrost time | double-byte | read-only | default 8min (range 0~20min) | DIGI1 |
| 1216 | 03/16 | D13 | ambient-temperature-based defrost curve correction small valve position | double-byte | read-only | default 165N (range 0~500N) | DIGI1 |
| 1217 | 03/16 | D20 | defrost frequency | double-byte | read-only | default 80Hz (range 0~200Hz) | DIGI1 |
| 1218 | 03/16 | L16 | (cooling) second stage timed temperature control setpoint | double-byte | read-only | default 21°C (range R19~R20°C) | TEMP1 |
| 1219 | 03/16 | L01 | (heating) first stage timed temperature control enable | double-byte | read-only | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1220 | 03/16 | L02 | (heating) first stage timed temperature control start time | double-byte | read-only | default 21h (range 0~23h) | DIGI1 |
| 1221 | 03/16 | L03 | (heating) first stage timed temperature control end time | double-byte | read-only | default 7h (range 0~23h) | DIGI1 |
| 1222 | 03/16 | L04 | (heating) first stage timed temperature control setpoint | double-byte | read-only | default 55°C (range R21~R22°C) | TEMP1 |
| 1223 | 03/16 | L05 | (heating) second stage timed temperature control enable | double-byte | read-only | default 0 (0-disabled/1-enabled) | DIGI1 |
| 1224 | 03/16 | L06 | (heating) second stage timed temperature control start time | double-byte | read-only | default 7h (range 0~23h) | DIGI1 |

# Controls and Operation

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 1225 | 03/16 | L07 | (heating) second stage timed temperature control end time | double-byte | read-only | default 21h (range 0~23h) | DIGI1 |
| 1226 | 03/16 | L08 | (heating) second stage timed temperature control setpoint | double-byte | read-only | default 45°C (range R21~R22°C) | TEMP1 |
| 1227 | 03/16 | E35 | heating mode main circuit small valve initial position | double-byte | read-only | default 350N (range 0~500N) | DIGI1 |
| 1228 | 03/16 | E36 | main circuit large valve minimum position | double-byte | read-only | default 60N (range 0~500N) | DIGI1 |
| 1229 | 03/16 | E37 | main circuit small valve minimum position | double-byte | read-only | default 100N (range 0~500N) | DIGI1 |
| 1230 | 03/16 | E38 | main circuit electronic expansion valve adjustment coefficient | double-byte | read-only | default 2 (range 2-4) | DIGI1 |
| 1231 | 03/16 | E39 | large small valve mode exchange ambient temperature (heating) | double-byte | read-only | default 0°C (range -30~80°C) | TEMP1 |
| 1232 | 03/16 | E40 | large small valve mode exchange overtemperature hysteresis | double-byte | read-only | default 1°C (range 0~5°C) | TEMP1 |
| 1233 | 03/16 | E41 | heating mode small valve second initial position ambient temperature | double-byte | read-only | default -20°C (range -37~0°C) | TEMP1 |
| 1234 | 03/16 | E42 | heating mode small valve second initial position | double-byte | read-only | default 200N (range 0~500N) | DIGI1 |
| 1235 | 03/16 | E43 | heating mode small valve position limit 1 ambient temperature | double-byte | read-only | default -30°C (range -37~0°C) | TEMP1 |
| 1236 | 03/16 | E44 | heating mode small valve position limit 1 | double-byte | read-only | default 120N (range 0~500N) | DIGI1 |
| 1237 | 03/16 | E45 | heating mode small valve position limit 2 ambient temperature | double-byte | read-only | default -25°C (range -37~0°C) | TEMP1 |
| 1238 | 03/16 | E46 | heating mode small valve position limit 2 | double-byte | read-only | default 250N (range 0~500N) | DIGI1 |
| 1239 | 03/16 | E47 | heating mode small valve position limit 3 ambient temperature | double-byte | read-only | default -15°C (range -37~0°C) | TEMP1 |
| 1240 | 03/16 | E48 | heating mode small valve position limit 3 | double-byte | read-only | default 350N (range 0~500N) | DIGI1 |
| 1241 | 03/16 | R03 | heating mode Kp gain | double-byte | read-only | default 10 (range 0~50) | DIGI1 |
| 1242 | 03/16 | R04 | heating mode demand band refresh interval | double-byte | read-only | default 10s (range 10~1800s) | DIGI1 |
| 1243 | 03/16 | R05 | heating mode demand accumulation refresh interval | double-byte | read-only | default 40s (range 20~1800s) | DIGI1 |
| 1244 | 03/16 | R06 | single->dual demand | double-byte | read-only | default 26 (range 0~200) | DIGI1 |
| 1245 | 03/16 | R07 | dual->single demand | double-byte | read-only | default 21 (range 0~200) | DIGI1 |
| 1246 | 03/16 | R08 | heating mode maximum demand | double-byte | read-only | default 106 (range 0~200) | DIGI1 |
| 1247 | 03/16 | R11 | cooling mode Kp gain | double-byte | read-only | default 10 (range 0~50) | DIGI1 |
| 1248 | 03/16 | R12 | cooling mode demand band refresh interval | double-byte | read-only | default 10s (range 10~1800s) | DIGI1 |
| 1249 | 03/16 | R13 | cooling mode demand accumulation refresh interval | double-byte | read-only | default 40s (range 20~1800s) | DIGI1 |
| 1250 | 03/16 | E34 | heating mode main circuit large valve initial position | double-byte | read-only | default 200N (range 0~500N) | |
| 1252 | 03/16 | R14 | cooling mode maximum demand | double-byte | read-only | default 87 (range 0~200) | DIGI1 |
| 1253 | 03/16 | R17 | electric heating activation hysteresis | double-byte | read-only | default 5°C (range 0~10°C) | TEMP1 |
| 1254 | 03/16 | R18 | electric heating deactivation hysteresis | double-byte | read-only | default 5°C (range 0~10°C) | TEMP1 |
| 1258 | 03/16 | D01 | defrost type | double-byte | read-only | default 1 (0-normal defrost/1-intelligent defrost II ) | DIGI1 |
| 1259 | 03/16 | D02 | defrost decision ambient temperature | double-byte | read-only | default 12.5°C (range -37~45°C) | TEMP1 |
| 1260 | 03/16 | D03 | accumulated defrost heating time | double-byte | read-only | default 26min (range 0~120min) | DIGI1 |
| 1261 | 03/16 | D04 | defrost interval | double-byte | read-only | default 45min (range 30~90min) | DIGI1 |
| 1262 | 03/16 | D05 | defrost interval vapor supply temperature correction | double-byte | read-only | default 110°C (range 0~150°C) | DIGI5 |
| 1263 | 03/16 | D06 | defrost decision low-side pressure 1 | double-byte | read-only | default 2.6bar (range 0~45bar) | DIGI5 |
| 1264 | 03/16 | D06 | defrost decision low-side pressure 2 | double-byte | read-only | default 1.7bar (range 0~45bar) | TEMP1 |
| 1265 | 03/16 | D07 | defrost interval correction time | double-byte | read-only | default 15min (range 0~120min) | DIGI1 |
| 1266 | 03/16 | D08 | ambient-temperature-based defrost starting temperature | double-byte | read-only | default 6.1°C (range -37~45°C) | TEMP1 |
| 1267 | 03/16 | D09 | ambient-temperature-based defrost starting vapor return temperature | double-byte | read-only | default -4.1°C (range -37~45°C) | TEMP1 |
| 1268 | 03/16 | D10 | ambient-temperature-based defrost ending temperature | double-byte | read-only | default -26.1°C (range -37~45°C) | TEMP1 |
| 1269 | 03/16 | D11 | ambient-temperature-based defrost ending vapor return temperature | double-byte | read-only | default -28.1°C (range -37~45°C) | TEMP1 |
| 1270 | 03/16 | D12 | ambient-temperature-based defrost curve correction vapor supply temperature | double-byte | read-only | default 100°C (range 0~150°C) | TEMP1 |
| 2011 | 16 | | power status | double-byte | read-only | 0-shutdown/1-on | DIGI1 |
| 2012 | 16 | | operation mode | double-byte | read-only | 0-cooling/1-heating/250-defrost | DIGI1 |
| 2013 | 16 | | current temperature | double-byte | read-only | | TEMP1 |
| 2014 | 16 | | up time in days | double-byte | read-only | | DIGI1 |
| 2015 | 16 | | main program version number | double-byte | read-only | data on the communication being 11 | DIGI5 |
| 2016 | 16 | | build number | double-byte | read-only | data on the communication being 117, represents build number 82400117 | DIGI1 |
| 2017 | 16 | | VFD board 1 program version number | double-byte | read-only | data on the communication being 001, represents version number V1 | DIGI1 |
| 2018 | 16 | | VFD board 2 program version number | double-byte | read-only | data on the communication being 001, represents version number V1 | DIGI1 |
| 2019 | 16 | | timed peak-shaving temperature control status | double-byte | read-only | | DIGI1 |
| 2020 | 16 | | quiet mode status (0-inactive/1-active) | double-byte | read-only | | DIGI1 |
| 2023 | 16 | T01 | water return temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2024 | 16 | T02 | water supply temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2026 | 16 | T05 | ambient temeprature | double-byte | read-only | -50~60°C | TEMP1 |
| 2027 | 16 | T08 | system 1 coil temperature 1 | double-byte | read-only | -50~60°C | TEMP1 |
| 2028 | 16 | T09 | system 1 coil temperature 2 | double-byte | read-only | -50~60°C | TEMP1 |
| 2031 | 16 | T20 | system 2 coil temperature 1 | double-byte | read-only | -50~60°C | TEMP1 |
| 2032 | 16 | T21 | system 2 coil temperature 2 | double-byte | read-only | -50~60°C | TEMP1 |
| 2043 | 16 | T07 | system 1 vapor return temperature | double-byte | read-only | -50~60°C | TEMP1 |
| 2044 | 16 | T19 | system 2 vapor return temperature | double-byte | read-only | -50~60°C | TEMP1 |
| 2047 | 16 | T14 | system 1 vapor supply temperature | double-byte | read-only | | TEMP1 |
| 2048 | 16 | T26 | system 2 vapor supply temperature | double-byte | read-only | | TEMP1 |
| 2051 | 16 | T12 | system 1 EVI inlet temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2052 | 16 | T24 | system 2 EVI inlet temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2055 | 16 | T13 | system 1 EVI outlet temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2056 | 16 | T25 | system 2 EVI outlet temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2059 | 16 | T03 | system 1 freeze protection temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2063 | 16 | T04 | system 2 freeze protection temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2075 | 16 | O15 | system 1 electronic expansion valve large valve position | double-byte | read-only | 0~500N | DIGI1 |
| 2076 | 16 | O18 | system 2 electronic expansion valve large valve position | double-byte | read-only | 0~500N | DIGI1 |
| 2079 | 16 | O17 | system 1 EVI electronic expansion valve position | double-byte | read-only | 0~500N | DIGI1 |
| 2080 | 16 | O20 | system 2 EVI electronic expansion valve position | double-byte | read-only | 0~500N | DIGI1 |
| 2087 | 16 | T17 | system 1 low-side pressure | double-byte | read-only | 0~60bar | DIGI5 |
| 2088 | 16 | T29 | system 2 low-side pressure | double-byte | read-only | 0~60bar | DIGI5 |
| 2101 | 16 | O16 | system 1 electronic expansion valve small valve position | double-byte | read-only | 0~500N | DIGI1 |
| 2102 | 16 | O19 | system 2 electronic expansion valve small valve position | double-byte | read-only | 0~500N | DIGI1 |
| 2103 | 16 | T06 | system 1 coil supply temperature | double-byte | read-only | -50~60°C | TEMP1 |
| 2104 | 16 | T18 | system 2 coil supply temperature | double-byte | read-only | -50~60°C | TEMP1 |
| 2105 | 16 | O21 | power demand | double-byte | read-only | 0~200 | DIGI1 |
| 2109 | 16 | T16 | system 1 high-side pressure | double-byte | read-only | 0~60bar | DIGI5 |
| 2110 | 16 | T28 | system 2 high-side pressure | double-byte | read-only | 0~60bar | DIGI5 |
| 2111 | 16 | T10 | system 1 evaporator temperature | double-byte | read-only | -45~34°C | TEMP1 |
| 2112 | 16 | T11 | system 1 overtemperature | double-byte | read-only | -30~97°C | TEMP1 |

# Controls and Operation

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 2113 | 16 | T22 | system 2 evaporator temperature | double-byte | read-only | -45~34°C | TEMP1 |
| 2114 | 16 | T23 | system 2 overtemperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2117 | 16 | T30 | unit water flow | double-byte | read-only | 0~100m³/h | DIGI5 |
| 2118 | 16 | O124 | unit online status | double-byte | read-only | 0-offline/1-online | DIGI1 |
| 2122 | 16 | I18 | system 1 fan speed | double-byte | read-only | 0~1300r | DIGI1 |
| 2123 | 16 | I24 | system 2 fan speed | double-byte | read-only | 0~1300r | DIGI1 |
| 2126 | 16 | I01 | system 1 compressor frequency setpoint | double-byte | read-only | 0~200Hz | DIGI1 |
| 2127 | 16 | I02 | system 1 compressor operation frequency | double-byte | read-only | 0~200Hz | DIGI1 |
| 2128 | 16 | I03 | system 1 VFD board phase current | double-byte | read-only | 0~100A | DIGI5 |
| 2129 | 16 | I04 | system 1 VFD board IPM temperature | double-byte | read-only | 0~150°C | DIGI1 (Value: 0~255=-55~200°C) |
| 2130 | 16 | I05 | system 1 VFD board bus voltage | double-byte | read-only | 0~1000V | DIGI1 |
| 2131 | 16 | I06 | system 1 VFD board operation status | double-byte | read-only | 0~65536 | DIGI1 |
| 2132 | 16 | I07 | system 1 VFD board fault status 1 | double-byte | read-only | 0~65536 | DIGI1 |
| 2133 | 16 | I08 | system 1 VFD board fault status 2 | double-byte | read-only | 0~65536 | DIGI1 |
| 2134 | 16 | I09 | system 2 compressor frequency setpoint | double-byte | read-only | 0~200Hz | DIGI1 |
| 2135 | 16 | I10 | system 2 compressor operation frequency | double-byte | read-only | 0~200Hz | DIGI1 |
| 2136 | 16 | I11 | system 2 VFD board phase current | double-byte | read-only | 0~100A | DIGI5 |
| 2137 | 16 | I12 | system 2 VFD board IPM temperature | double-byte | read-only | 0~150°C | DIGI1 (Value: 0~255=-55~200°C) |
| 2138 | 16 | I13 | system 2 VFD board bus voltage | double-byte | read-only | 0~1000V | DIGI1 |
| 2139 | 16 | I14 | system 2 VFD board operation status | double-byte | read-only | 0~65536 | DIGI1 |
| 2140 | 16 | I15 | system 2 VFD board fault status 1 | double-byte | read-only | 0~65536 | DIGI1 |
| 2141 | 16 | I16 | system 2 VFD board fault status 2 | double-byte | read-only | 0~65536 | DIGI1 |
| 2142 | 16 | I17 | system 1 fan speed setpoint | double-byte | read-only | 0~1300r | DIGI1 |
| 2143 | 16 | I19 | system 1 fan phase current | double-byte | read-only | 0~50A | DIGI5 |
| 2144 | 16 | I20 | system 1 fan IPM temperature | double-byte | read-only | -20~150°C | TEMP1 |
| 2145 | 16 | I21 | system 1 fan bus voltage | double-byte | read-only | 0~1000V | DIGI1 |
| 2146 | 16 | I22 | system 1 fan fault status | double-byte | read-only | 0~65536 | DIGI1 |
| 2147 | 16 | I23 | system 2 fan speed setpoint | double-byte | read-only | 0~1300r | DIGI1 |
| 2148 | 16 | I25 | system 2 fan phase current | double-byte | read-only | 0~50A | DIGI5 |
| 2149 | 16 | I26 | system 2 fan IPM temperature | double-byte | read-only | -20~150°C | TEMP1 |
| 2150 | 16 | I27 | system 2 fan bus voltage | double-byte | read-only | 0~1000V | DIGI1 |
| 2151 | 16 | I28 | system 2 fan fault status | double-byte | read-only | 0~65536 | DIGI1 |
| 2156 | 16 | T31 | unit status | double-byte | read-only | 0~500kW | DIGI5 |
| 2157 | 16 | T15 | system 1 condensor temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2158 | 16 | T27 | system 2 condensor temperature | double-byte | read-only | -30~97°C | TEMP1 |
| 2159 | 16 | bit0 | F151 system 1 compressor communication fault | double-byte | read-only |  | DIGI1 |
|  | 16 | bit1 | F152 system 1 compressor failed to start | double-byte | read-only |  |  |
|  | 16 | bit2 | F153 system 1 starting IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit3 | F154 system 1 running IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit4 | F156 system 1 compressor overcurrent protection fault | double-byte | read-only |  |  |
|  | 16 | bit5 | F155 compressor 1 IPM overtemperature protection fault | double-byte | read-only |  |  |
|  | 16 | bit6 | F157 compressor 1 bus overvoltage protection fault | double-byte | read-only |  |  |
|  | 16 | bit7 | F158 compressor 1 bus undervoltage protection fault | double-byte | read-only |  |  |
|  | 16 | bit8 | F251 system 2 compressor communication fault | double-byte | read-only |  |  |
|  | 16 | bit9 | F252 system 2 compressor failed to start | double-byte | read-only |  |  |
|  | 16 | bit10 | F253 system 2 starting IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit11 | F254 system 2 running IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit12 | F256 system 2 compressor overcurrent protection fault | double-byte | read-only |  |  |
|  | 16 | bit13 | F255 compressor 2 IPM overtemperature protection fault | double-byte | read-only |  |  |
|  | 16 | bit14 | F257 compressor 2 bus overvoltage protection fault | double-byte | read-only |  |  |
|  | 16 | bit15 | F258 compressor 2 bus undervoltage protection fault | double-byte | read-only |  |  |
| 2160 | 16 | bit0 | F101 fan 1 output loss-of-phase-power protection fault | double-byte | read-only |  | DIGI1 |
|  | 16 | bit1 | F102 fan 1 output zero-speed protection fault | double-byte | read-only |  |  |
|  | 16 | bit2 | F103 fan 1 starting IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit3 | F104 fan 1 running IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit4 | F105 fan 1 overcurrent protection fault | double-byte | read-only |  |  |
|  | 16 | bit5 | F106 fan 1 overtemperature protection fault | double-byte | read-only |  |  |
|  | 16 | bit6 | F107 fan 1 bus overvoltage protection fault | double-byte | read-only |  |  |
|  | 16 | bit7 | F108 fan 1 bus undervoltage protection fault | double-byte | read-only |  |  |
|  | 16 | bit8 | F201 fan 2 output loss-of-phase-power protection fault | double-byte | read-only |  |  |
|  | 16 | bit9 | F202 fan 2 output zero-speed protection fault | double-byte | read-only |  |  |
|  | 16 | bit10 | F203 fan 2 starting IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit11 | F204 fan 2 running IPM protection fault | double-byte | read-only |  |  |
|  | 16 | bit12 | F205 fan 2 overcurrent protection fault | double-byte | read-only |  |  |
|  | 16 | bit13 | F206 fan 2 overtemperature protection fault | double-byte | read-only |  |  |
|  | 16 | bit14 | F207 fan 2 bus overvoltage protection fault | double-byte | read-only |  |  |
|  | 16 | bit15 | F208 fan 2 bus undervoltage protection fault | double-byte | read-only |  |  |
| 2161 | 16 | bit0 | E081 DC fan board 1 communication fault | double-byte | read-only |  | DIGI1 |
|  | 16 | bit1 | E082 DC fan board 2 communication fault | double-byte | read-only |  |  |
|  | 16 | bit2 | E121 system 1 reversing valve abnormal operation | double-byte | read-only |  |  |
|  | 16 | bit3 | E221 system 2 reversing valve abnormal operation | double-byte | read-only |  |  |
| 2162 | 16 | O03 | O03 system 1 fan | double-byte | read-only | 0-off/1-high speed/2-low speed | DIGI1 |
| 2163 | 16 | O04 | O04 system 2 fan | double-byte | read-only | 0-off/1-high speed/2-low speed | DIGI1 |
| 2164 | 16 | bit0 | O01 system 1 compressor (0-off/1-on) | double-byte | read-only |  | DIGI1 |
|  | 16 | bit1 | O02 system 2 compressor (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit8 | O05 circulation pump output (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit9 | O06 system 1 reversing valve (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit10 | O07 system 2 reversing valve (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit11 | O08 electric heating (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit5 | O13 alarm output (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit6 | O14 crankcase heating element output (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit7 | O09 system 1 crankshaft heating element output (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit8 | O10 system 2 crankshaft heating element output (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit9 | O11 system 1 mister valve output (0-off/1-on) | double-byte | read-only |  |  |
|  | 16 | bit10 | O12 system 2 mister valve output (0-off/1-on) | double-byte | read-only |  |  |

# Controls and Operation

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 2167 | 16 | bit0 | S01 system 1 overpressure switch (0-closed/1-open) | double-byte | read-only | | DIGI1 |
| | 16 | bit1 | S03 system 2 overpressure switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit4 | S02 system 1 underpressure switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit5 | S04 system 2 underpressure switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit9 | S05 water flow switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit10 | S07 mode switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit11 | S08 electric heating overload protection switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit12 | S06 emergency switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit13 | S09 system 1 fan overload protection switch (0-closed/1-open) | double-byte | read-only | | |
| | 16 | bit14 | S10 system 2 fan overload protection switch (0-closed/1-open) | double-byte | read-only | | |
| 2169 | 1 | bit0 | P01 water return temperature sensor fault | double-byte | read-only | | DIGI1 |
| | 2 | bit1 | P02 water supply temperature sensor fault | double-byte | read-only | | |
| | 3 | bit2 | P03 domestic hot water temperature sensor fault | double-byte | read-only | new in domestic hot water | |
| | 4 | bit3 | P04 ambient temeprature sensor fault | double-byte | read-only | | |
| | 5 | bit4 | P17 system 1 vapor return temperature sensor fault | double-byte | read-only | | |
| | 6 | bit5 | P27 system 2 vapor return temperature sensor fault | double-byte | read-only | | |
| | 9 | bit8 | P181 system 1 vapor supply temperature sensor fault | double-byte | read-only | | |
| | 10 | bit9 | P281 system 2 vapor supply temperature sensor fault | double-byte | read-only | | |
| | 13 | bit12 | P101 system 1 EVI inlet temperature sensor fault | double-byte | read-only | | |
| | 14 | bit13 | P201 system 2 EVI inlet temperature sensor fault | double-byte | read-only | | |
| 2170 | 17 | bit0 | P102 system 1 EVI outlet temperature sensor fault | double-byte | read-only | | DIGI1 |
| | 18 | bit1 | P202 system 2 EVI outlet temperature sensor fault | double-byte | read-only | | |
| | 21 | bit4 | P191 system 1 user-side freeze protection 1 temperature sensor fault | double-byte | read-only | | |
| | 25 | bit8 | P291 system 2 user-side freeze protection 1 temperature sensor fault | double-byte | read-only | | |
| | 37 | bit4 | P150 system 1 coil temperature sensor 1 fault | double-byte | read-only | | |
| | 38 | bit5 | P154 system 1 coil temperature sensor 2 fault | double-byte | read-only | | |
| | 41 | bit8 | P250 system 2 coil temperature sensor 1 fault | double-byte | read-only | | |
| | 42 | bit9 | P254 system 2 coil temperature sensor 2 fault | double-byte | read-only | | |
| | 53 | bit4 | PP11 system 1 low-side pressure sensor fault | double-byte | read-only | | |
| | 54 | bit5 | PP21 system 2 low-side pressure sensor fault | double-byte | read-only | | |
| | 57 | bit8 | P182 system 1 vapor supply overtemperature protection fault | double-byte | read-only | | |
| | 58 | bit9 | P282 system 2 vapor supply overtemperature protection fault | double-byte | read-only | | |
| | 61 | bit12 | E11 system 1 overpressure protection fault | double-byte | read-only | | |
| | 62 | bit13 | E21 system 2 overpressure protection fault | double-byte | read-only | | |
| 2173 | 65 | bit0 | E12 system 1 underpressure protection fault | double-byte | read-only | | DIGI1 |
| | 66 | bit1 | E22 system 2 underpressure protection fault | double-byte | read-only | | |
| | 69 | bit4 | E171 system 1 user-side freeze protection fault | double-byte | read-only | | |
| | 70 | bit5 | E271 system 2 user-side freeze protection fault | double-byte | read-only | | |
| 2174 | 81 | bit0 | E19 level 1 freeze protection fault | double-byte | read-only | | DIGI1 |
| | 82 | bit1 | E29 level 2 freeze protection fault | double-byte | read-only | | |
| | 83 | bit2 | E065 water supply overtemperature protection fault | double-byte | read-only | | |
| | 84 | bit3 | E071 water supply undertemperature protection fault | double-byte | read-only | | |
| | 85 | bit4 | TP low ambient temeprature protection fault | double-byte | read-only | | |
| | 86 | bit5 | E04 electric heating overload protection fault | double-byte | read-only | | |
| | 87 | bit6 | E032 water flow switch protection fault | double-byte | read-only | | |
| | 88 | bit7 | E06 water delta temperature protection fault | double-byte | read-only | | |
| | 89 | bit8 | E103 fan 1 overtemperature protection fault | double-byte | read-only | | |
| | 90 | bit9 | E203 fan 2 overtemperature protection fault | double-byte | read-only | | |
| | 91 | bit10 | EE1 abnormal loss of power (reserved) | double-byte | read-only | | |
| | 94 | bit13 | E081 DC fan board 1 communication fault | double-byte | read-only | | |
| | 95 | bit14 | E082 DC fan board 1 communication fault | double-byte | read-only | | |
| 2175 | 97 | bit0 | P182 system 1 vapor supply overtemperature protection fault more than or equal to 3 occurances | double-byte | read-only | | DIGI1 |
| | 98 | bit1 | P282 system 2 vapor supply overtemperature protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 101 | bit4 | E11 system 1 overpressure protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 102 | bit5 | E21 system 2 overpressure protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 105 | bit8 | E12 system 1 underpressure protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 106 | bit9 | E22 system 2 underpressure protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 109 | bit12 | E171 system 1 user-side freeze protection more than or equal to 3 occurances | double-byte | read-only | | |
| | 110 | bit13 | E271 system 2 user-side freeze protection more than or equal to 3 occurances | double-byte | read-only | | |
| | 121 | bit8 | E065 water supply overtemperature protection fault more than 3 occurances (0-not present/1-present) | double-byte | read-only | | |
| | 122 | bit9 | E071 water supply undertemperature protection fault more than 3 occurances (0-not present/1-present) | double-byte | read-only | | |
| | 123 | bit10 | E04 electric heating overload protection fault more than 3 occurances (0-not present/1-present) | double-byte | read-only | | |
| | 124 | bit11 | E032 water flow switch protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 125 | bit12 | E06 water delta temperature protection fault more than or equal to 3 occurances | double-byte | read-only | | |
| | 126 | bit13 | E036 water level sensor fault | double-byte | read-only | | |
| | 127 | bit14 | P152 system 1 coil outlet temperature sensor fault | double-byte | read-only | | |
| | 128 | bit15 | P252 system 2 coil outlet temperature sensor fault | double-byte | read-only | | |

## Controls and Operation

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 2177 | 129 | bit0 | E035 low water flow protection fault | double-byte | read-only |  | DIGI1 |
|  | 130 | bit1 | PP12 system 1 high-side pressure sensor fault | double-byte | read-only |  |  |
|  | 131 | bit2 | PP22 system 2 high-side pressure sensor fault | double-byte | read-only |  |  |
|  | 132 | bit3 | E131 system 1 refrigerant leakage abnormality | double-byte | read-only |  |  |
|  | 133 | bit4 | E231 system 2 refrigerant leakage abnormality | double-byte | read-only |  |  |
|  | 134 | bit5 | E121 system 1 reversing valve abnormal operation | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 135 | bit6 | E221 system 2 reversing valve abnormal operation | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 136 | bit7 | E035 low water flow protection fault more than or equal to 3 occurances | double-byte | read-only |  |  |
|  | 137 | bit8 | E103 fan 1 overtemperature protection fault more than or equal to 3 occurances | double-byte | read-only |  |  |
|  | 138 | bit9 | E203 fan 2 overtemperature protection fault more than or equal to 3 occurances | double-byte | read-only |  |  |
|  | 139 | bit10 | E131 system 1 refrigerant leakage abnormality more than or equal to 3 occurances | double-byte | read-only |  |  |
|  | 140 | bit11 | E231 system 2 refrigerant leakage abnormality more than or equal to 3 occurances | double-byte | read-only |  |  |
|  | 141 | bit12 | E077 system 1 vapor return overtemperature protection fault | double-byte | read-only |  |  |
|  | 142 | bit13 | E078 system 2 vapor return overtemperature protection fault | double-byte | read-only |  |  |
|  | 143 | bit14 | E077 system 1 vapor return overtemperature protection fault more than or equal to 3 occurances | double-byte | read-only |  |  |
|  | 144 | bit15 | E078 system 2 vapor return overtemperature protection fault more than or equal to 3 occurances | double-byte | read-only |  |  |
| 2178 | 145 | bit0 | F151 system 1 compressor communication fault | double-byte | read-only |  | DIGI1 |
|  | 146 | bit1 | F152 system 1 compressor failed to start | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 147 | bit2 | F153 system 1 starting IPM protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 148 | bit3 | F154 system 1 running IPM protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 149 | bit4 | F156 system 1 compressor overcurrent protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 150 | bit5 | F155 compressor 1 IPM overtemperature protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 151 | bit6 | F157 compressor 1 bus overvoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 152 | bit7 | F158 compressor 1 bus undervoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 153 | bit8 | F251 system 2 compressor communication fault | double-byte | read-only |  |  |
|  | 154 | bit9 | F252 system 2 compressor failed to start | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 155 | bit10 | F253 system 2 starting IPM protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 156 | bit11 | F254 system 2 running IPM protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 157 | bit12 | F256 system 2 compressor overcurrent protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 158 | bit13 | F255 compressor 2 IPM overtemperature protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 159 | bit14 | F257 compressor 2 bus overvoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 160 | bit15 | F258 compressor 2 bus undervoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
| 2179 | 161 | bit0 | F101 fan 1 output loss-of-phase-power protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) | DIGI1 |
|  | 162 | bit1 | F102 fan 1 output zero-speed protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 163 | bit2 | F103 fan 1 starting IPM protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 164 | bit3 | F104 fan 1 running IPM protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 165 | bit4 | F105 fan 1 overcurrent protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 166 | bit5 | F106 fan 1 overtemperature protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 167 | bit6 | F107 fan 1 bus overvoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 168 | bit7 | F108 fan 1 bus undervoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 169 | bit8 | F201 fan 2 output loss-of-phase-power protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 170 | bit9 | F202 fan 2 output zero-speed protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 171 | bit10 | F203 fan 2 starting IPM protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 172 | bit11 | F204 fan 2 running IPM protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 173 | bit12 | F205 fan 2 overcurrent protection fault | double-byte | read-only | (color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 174 | bit13 | F206 fan 2 overtemperature protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 175 | bit14 | F207 fan 2 bus overvoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |
|  | 176 | bit15 | F208 fan 2 bus undervoltage protection fault | double-byte | read-only | (10 color display and integrated control 1 occurannce, DTU 3 occurances) |  |

# Controls and Operation

| Address | Function | Display Paramater | Name | Byte length | Read/write | Options | Data Type |
|---|---|---|---|---|---|---|---|
| 3011 | 03/16 | | color display line controller status flag | double-byte | read/write | bit0 : reserved<br>bit10 : changes occured in address 1001-1090 (0-false/1-true)<br>bit20 : changes occured in address 1091-1180 (0-false/1-true)<br>bit30 : changes occured in address 1181-1270 (0-false/1-true)<br>bit150 : color display is powered-on for the first time (0-false/1-true)/ongoing download or upload (0-false/1-true) | DIGI1 |
| 3017 | 03/16 | | current year | double-byte | read-only | data on the communication being 1, represents 2001; data on the communication being 15, represents 2015 | DIGI1 |
| 3018 | 03/16 | | current month | double-byte | read-only | data on the communication being 1, represents January; data on the communication being 10, represents October | DIGI1 |
| 3019 | 03/16 | | current day of month | double-byte | read-only | data on the communication being 1, represents the first day of the month; data on the communication being 10, represents the 10th day of the month | DIGI1 |
| 3020 | 03/16 | | current hour | double-byte | read-only | data on the communication being 1, represents 1, data on the communication being 10, represents 10 | DIGI1 |
| 3021 | 03/16 | | current minute | double-byte | read-only | data on the communication being 1, represents 1, data on the communication being 10, represents 10 | DIGI1 |

## Controls and Operation

**Table 11** Error Codes and Troubleshooting

| Protection/failure | Codes | Causes | Possible fixes |
|---|---|---|---|
| Communication Fault | E08 | Abnormal communication between wire controller and the main board | Inspect whether the wire controller, the main board and the connection thereof are reliable |
| The Wire Controller Does Not Match The Mainboard | E084 | | |
| DC Fan Board 1 Communication Fault | E081 | Communication of the speed regulation module 1 with main board is abnormal | "Check the speed regulation module 1 and the main board and if their connections are normal and reliable." |
| Syst1: High Pressure Prot. | E11 | The high-voltage switch of the system is disconnected | Inspect System 1 voltage switch and refrigerating circuit for any failure |
| Syst2: High Pressure Prot. | E21 | The high-voltage switch of the system is disconnected | Inspect System 2 voltage switch and refrigerating circuit for any failure |
| Syst1: Low Pressure Prot. | E12 | The low-voltage switch of the system is disconnected | Inspect System 1 voltage switch and refrigerating circuit for any failure |
| Syst2: Low Pressure Prot. | E22 | The low-voltage switch of the system is disconnected | Inspect System 2 voltage switch and refrigerating circuit for any failure |
| Water Flow Switch Prot. | E032 | The water system has no or only few water | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any damages |
| Electric Heater Overload Prot. | E04 | Electric heating overheat protection switch is disconnected | Inspect whether the electric heating is under operation condition of over 150℃ for a long time |
| Primary Antifreezing Prot. In Winter | E19 | Excessively low environment temperature | |
| Secondary Antifreezing Prot. in Winter | E29 | Excessively low environment temperature | |
| Syst1: User Side Antifreezing Prot. | E171 | The water flow of the system is insufficient | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any blockage |
| Syst2: User Side Antifreezing Prot. | E271 | The water flow of the system is insufficient | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any blockage |
| Water(Out) High Temp Prot. | E065 | Excessively high water outlet temperature | |
| Fan 1 Thermal Overload Prot. | E103 | Fan 1 thermal overload | Check if fan 1 is running normally |
| Fan 2 Thermal Overload Prot. | E203 | Fan 2 thermal overload | Check if fan 2 is running normally |
| Syst1: Exhaust Air High Temp Prot. | P182 | The system compressor is overloaded | Inspect whether the operation of System 1 compressor is normal |
| Syst2: Exhaust Air High Temp Prot. | P282 | The system compressor is overloaded | Inspect whether the operation of System 2 compressor is normal |
| Water In/Out Large Temp Diff Prot. | E06 | The water flow of the system is insufficient, the pressure difference of the water system is small | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any blockage |
| Water(Out) Low Temp Prot. | E071 | Excessively low water outlet temperature | |
| Low Water Flow Prot. | E035 | The system has no water or too low volume of water | Check if the water flow of water pipe meets the requirements and if the water pump is damaged. |
| Syst1:Refrigerant Leakage Abnormal | E131 | System 1 refrigerant leakage | Check if the refrigerant in the system leaks |
| Syst2: Refrigerant Leakage Abnormal | E231 | System 2 refrigerant leakage | Check if the refrigerant in the system leaks |
| Syst1: 4-Way Valve Abnormal Switch | E121 | SYS1 four-way valve switching failed | Check if the four-way valve commutation state is the desired state |
| Syst2: 4-Way Valve Abnormal Switch | E221 | SYS2 four-way valve switching failed | Check if the four-way valve commutation state is the desired state |
| Syst1: Low Pressure Prot. 3+ | E12 | The low-voltage switch of the system is disconnected | Inspect System 1 voltage switch and refrigerating circuit for any failure |
| Syst2: Low Pressure Prot. 3+ | E22 | The low-voltage switch of the system is disconnected | Inspect System 2 voltage switch and refrigerating circuit for any failure |

## Controls and Operation

**Table 11** Error Codes and Troubleshooting

| Protection/fault | Codes | Causes | Possible fixes |
|---|---|---|---|
| Water Flow Switch Prot. 3+ | E032 | The water system has no or only few water | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any damages |
| Electric Heater Overload Prot. 3+ | E04 | Electric heating overheat protection switch is disconnected | Inspect whether the electric heating is under operation condition of over 150℃ for a long time |
| Syst1: User Side Antifreezing Prot. 3+ | E171 | The water flow of the system is insufficient | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any blockage |
| Syst2: User Side Antifreezing Prot. 3+ | E271 | The water flow of the system is insufficient | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any blockage |
| Water(Out) High Temp Prot. 3+ | E065 | Excessively high water outlet temperature | |
| Low Water Flow Prot. 3+ | E035 | The system has no water or too low volume of water | Check if the water flow of water pipe meets the requirements and if the water pump is damaged. |
| Syst1: Exhaust Air High Temp Prot. 3+ | P182 | The system compressor is overloaded | Inspect whether the operation of System 1 compressor is normal |
| Syst2: Exhaust Air High Temp Prot. 3+ | P282 | The system compressor is overloaded | Inspect whether the operation of System 2 compressor is normal |
| Water In/Out Large Temp Diff Prot. 3+ | E06 | The water flow of the system is insufficient, the pressure difference of the water system is small | Inspect whether the water flow of the water pipe conforms to related requirements and check the water pump for any blockage |
| Water(Out) Low Temp Prot. 3+ | E071 | Excessively low water outlet temperature | |
| Water In Sensor Fault | P01 | The temperature sensor is open or short circuited | Check and replace inlet water temperature sensor |
| Water Out Sensor Fault | P02 | The temperature sensor is open or short circuited | Check and replace outlet water temperature sensor |
| Syst1: Coil Temp Sensor1 Fault | P150 | The temperature sensor is open or short circuited | Check and replace the system 1 coil 1 temperature sensor |
| AT Sensor Fault | P04 | The temperature sensor is open or short circuited | Check and replace the ambient temperature sensor |
| Syst1: Suction Temp Sensor Fault | P17 | The temperature sensor is open or short circuited | Check and replace the system 1 return air temperature sensor |
| Syst1: User Side Antifreezing 1 Sensor Fault | P191 | The temperature sensor is open or short circuited | Check and replace the system 1 use side antifreeze 1 temperature sensor |
| Syst2:Coil Temp Sensor1 Fault | P250 | The temperature sensor is open or short circuited | Check and replace the system 2 coil 1 temperature sensor |
| Syst1: Coil(Out) Temp Sensor Fault | P152 | The temperature sensor is open or short circuited | Check and replace the system 1 coil outlet temperature sensor |
| Syst2: Coil(Out) Temp Sensor Fault | P252 | The temperature sensor is open or short circuited | Check and replace the system 2 coil outlet temperature sensor |
| Syst1: EVI(In) Temp Sensor Fault | P101 | The temperature sensor is open or short circuited | Check and replace the system 1 EVI inlet temperature sensor |
| Syst1: EVI(Out) Temp Sensor Fault | P102 | The temperature sensor is open or short circuited | Check and replace the system 1 EVI outlet temperature sensor |
| Syst1: Exhaust Air Temp Sensor Fault | P181 | The temperature sensor is open or short circuited | Check and replace the system 1 exhaust temperature sensor |
| Water Level Sensor Fault | E036 | Open circuit or short circuit of the water level sensor | Inspect and replace water level sensor |
| Syst1: Low Pressure Sensor Fault | PP11 | The sensor is open or short circuited | Check and replace the system 1 low pressure sensor |
| Syst2: Suction Temp Sensor Fault | P27 | The temperature sensor is open or short circuited | Check and replace the system 2 return air temperature sensor |
| Syst2: User Side Antifreezing 1 Sensor Fault | P291 | Temperature sensor fault | Check if the temperature sensor is working properly |
| Syst1: High Pressure Sensor Fault | PP12 | The sensor is open or short circuited | Check and replace the system 1 high pressure sensor |
| Syst2: High Pressure Sensor Fault | PP22 | The sensor is open or short circuited | Check and replace the system 2 high pressure sensor |

## Controls and Operation

**Table 11** Error Codes and Troubleshooting

| Protection/fault | Codes | Causes | Possible fixes |
|---|---|---|---|
| Syst2: Exhaust Air Temp Sensor Fault | P281 | Open circuit or short circuit of the temperature sensor | Inspect and replace System 2 exhaust temperature sensor |
| Syst2: Low Pressure Sensor Fault | PP21 | Open circuit or short circuit of the sensor | Inspect and replace System 2 low-voltage sensor |
| Water Tank Temp Fault | P03 | Open circuit or short circuit of the temperature sensor | Inspect and replace water tank temperature sensor |
| Syst2: EVI(In) Temp Sensor Fault | P201 | Open circuit or short circuit of the temperature sensor | Inspect and replace System 2 enthalpy inlet temperature sensor |
| Syst2: EVI(Out) Temp Sensor Fault | P202 | Open circuit or short circuit of the temperature sensor | Inspect and replace System 2 enthalpy outlet temperature sensor |
| Low AT Power-Off Prot. | TP | Excessively low environment temperature | |
| Syst1: Coil Temp Sensor2 Fault | P154 | The temperature sensor is open or short circuited | Check and replace the system 1 coil 2 temperature sensor |
| DC Fan Board 2 Communication Fault | E082 | Communication of the speed regulation module 2 with main board is abnormal | Check the speed regulation module 2 and the main board and if their connections are normal and reliable. |
| Syst2: Coil Temp Sensor2 Fault | P254 | The temperature sensor is open or short circuited | Check and replace the system 2 coil 2 temperature sensor |
| Syst1: Comp. Communication Fault | F151 | Communication failure with system 1 compressor drive board | 1. Check if the communication line is normal;<br>2.Check if the system 1 compressor drive board is normal |
| Syst1: Comp. Start Fault | F152 | System 1 compressor failed to start | 1. Check if the compressor line is normal;<br>2. Check if the system 1 compressor is blocked |
| Syst1: Start IPM Prot. | F153 | System 1 compressor starting current is too large | 1. Check if the starting high pressure is excessive;<br>2. Check if the system 1 compressor is blocked |
| Syst1: Running IPM Prot. | F154 | System 1 compressor running current is too large | Check if the pressure ratio is too high |
| Syst1: Comp. Overcurrent Prot. | F156 | System 1 compressor running current is too large | Check if the pressure ratio is too high |
| Comp. 1 IPM Over-Temp. Prot. | F155 | System 1 compressor drive board has poor heat dissipation | Check if there is a gap in the installation of the fluorine-cooled heat sink |
| Press 1 Bus Over Voltage Prot. | F157 | Voltage is too high | Check if the input voltage is higher than 480V |
| Press 1 Bus Under Voltage Prot. | F158 | Voltage is too low | Check if the input voltage is lower than 250V |
| Syst2: Comp. Communication Fault | F251 | Communication failure with system 2 compressor drive board | 1. Check if the communication line is normal;<br>2. Check if the system 2 compressor drive board is normal |
| Syst2: Comp. Start Fault | F252 | System 2 compressor failed to start | 1. Check if the compressor line is normal;<br>2. Check if the system 2 compressor rotor is locked |
| Syst2: Start IPM Prot. | F253 | System 2 compressor starting current is too large | 1. Check if the starting high pressure is excessive;<br>2. Check if the system 1 compressor is blocked |
| Syst2: Running IPM Prot. | F254 | System 2 compressor running current is too large | Check if the pressure ratio is too high |
| Syst2: Comp. Overcurrent Prot. | F256 | System 2 compressor running current is too large | Check if the pressure ratio is too high |
| Press 2 IPM Over-Temp Prot. | F255 | System 2 compressor drive board has poor heat dissipation | Check if there is a gap in the installation of the fluorine-cooled heat sink |
| Press 2 Bus Over Voltage Prot. | F257 | Voltage is too high | Check if the input voltage is higher than 480V |
| Press 2 Bus Under Voltage Prot. | F258 | Voltage is too low | Check if the input voltage is lower than 250V |
| Fan 1 Phase Loss Prot. | F101 | System 1 fan failed to start | Check if the system 1 fan line is normal |
| Fan 1 Zero Speed Prot. | F102 | System 1 fan failed to start | Check if the system 1 fan rotor is locked |
| Fan 1 Start IPM Prot. | F103 | System 1 fan starting current is too large | Check if the system 1 fan rotor is locked |

## Controls and Operation

**Table 11** Error Codes and Troubleshooting

| Protection/fault | Codes | Causes | Possible fixes |
|---|---|---|---|
| Fan 1 Running IPM Prot. | F104 | System 1 fan running current is too large | Check if the system 1 fan rotor is locked |
| Fan 1 Overcurrent Prot. | F105 | System 1 fan running current is too large | Check if the system 1 fan rotor is locked |
| Fan 1 Over-Temp Prot. | F106 | System 1 fan drive board has poor heat dissipation | Check the heat dissipation condition |
| Fan 1 Bus Over Voltage Prot. | F107 | Voltage is too high | Check if the input voltage is higher than 480V |
| Fan 1 Bus Under Voltage Prot. | F108 | Voltage is too low | Check if the input voltage is lower than 250V |
| Fan 2 Output Phase Loss Prot. | F201 | System 2 fan failed to start | Check if the system 2 fan line is normal |
| Fan 2 Output Zero Speed Prot. | F202 | System 2 fan failed to start | Check if the system 2 fan rotor is locked |
| Fan 2 Start IPM Prot. | F203 | System 2 fan starting current is too large | Check if the system 2 fan rotor is locked |
| Fan 2 Running IPM Prot. | F204 | System 2 fan running current is too large | Check if the system 2 fan rotor is locked |
| Fan 2 Overcurrent Prot. | F205 | System 2 fan running current is too large | Check if the system 2 fan rotor is locked |
| Fan 2 Over-Temp Prot. | F206 | System 2 fan drive board has poor heat dissipation | Check the heat dissipation condition |
| Fan 2 Bus Over Voltage Prot. | F207 | Voltage is too high | Check if the input voltage is higher than 480V |
| Fan 2 Bus Under Voltage Prot. | F208 | Voltage is too low | Check if the input voltage is lower than 250V |
| Abnormal Power Fault | EE1 | | |
| Syst1: High Suction Temp Prot. | E077 | SYS1 return air temperature is too high | Check if the return air temperature sensor is normal |
| Syst2: High Suction Temp Prot. | E078 | SYS2 return air temperature is too high | Check if the return air temperature value is greater than the protection value |
| Syst1: High Suction Temp Prot. 3+ | E077 | SYS1 return air temperature is too high | Check if the return air temperature sensor is normal |
| Syst2: High Suction Temp Prot. 3+ | E078 | SYS2 return air temperature is too high | Check if the return air temperature value is greater than the protection value |

# HP Series Limited Warranty

The "Manufacturer" warrants to the original owner at the original installation site that the Compressors and Heat Exchanger of the Industrial, Commercial, and other Non-Residential Use Air-to-Water Heat Pump (the "Product") will be free from defects in material or workmanship for five (5) years from the date of installation. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective. All other Mestek supplied Air-to-Water Heat Pump parts are warranted against defects in material and workmanship for two (2) years from date of installation or 18 months from date of shipment from Mestek. This Air-to-Water Heat Pump is designed to operate in a closed loop heating system. System fill water must not contain more than 500 ppm Total Dissolved Solids and a minimum 80 ppm - maximum 200 ppm Water Hardness. Suspended solids such as Magnetite, Iron Oxides must be flushed from the system prior to commissioning the Air-to-Water Heat Pump(s). The PH level must be within the 6.5-8.5 range. Where required, the system must be protected by the addition of a corrosion inhibitor per the chemical supplier's instructions.

This limited warranty does not apply:

(a) If the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way.

These include but not limited to:

- Chemical corrosion, no corrosive chemical (dry cleaning chemicals, degreasing liquids, chlorine or any chemicals that produce hydrochloric acid) can be present around the Air-to-Water Heat Pump as it rapidly destroys the equipment and voids the warranty.

(b) to any expenses, including labor or material, incurred during removal or reinstallation of the Product or parts thereof.

(c) to damage as a result of settlement, distortion, collapse, or cracking of any foundation area, beams or pipes surrounding the Product.

- to any workmanship of any installer of the Product; or to Products installed outside the continental United States or Canada.

This limited warranty is conditional upon:

(a) shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid.

(b) determination in the reasonable opinion of the Manufacturer that there exists a defect in material or workmanship. Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.

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