Installation, Operation, and Maintenance

Water-Source Comfort System
Axiom™ Rooftop

Models "E" and later Design Sequence
60HZ GER -036, -048, -060, -072, -090, -120, -150, -180, -240,-300

⚠SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

August 2013 **WSHP-SVX12B-EN**

Warnings, Cautions and Notices

Warnings, Cautions and Notices. Note that warnings, cautions and notices appear at appropriate intervals throughout this manual. Warnings are provide to alert installing contractors to potential hazards that could result in death or personal injury. Cautions are designed to alert personnel to hazardous situations that could result in personal injury, while notices indicate a situation that could result in equipment or property-damage-only accidents.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

Read this manual thoroughly before operating or servicing this unit.

ATTENTION: Warnings, Cautions, and Notices appear at appropriate sections throughout this literature. Read these carefully:

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

⚠CAUTION Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

NOTICE: Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns!

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants-including industry replacements for CFCs such as HCFCs and HFCs.

Responsible Refrigerant Practices!

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified. The Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠WARNING

Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow code could result in death or serious injury.

⚠WARNING

Personal Protective Equipment (PPE) Required!

Installing/servicing this unit could result in exposure to electrical, mechanical and chemical hazards.

- **Before installing/servicing this unit, technicians MUST put on all Personal Protective Equipment (PPE) recommended for the work being undertaken. ALWAYS refer to appropriate MSDS sheets and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate MSDS sheets and OSHA guidelines for information on allowable personal exposure levels, proper respiratory protection and handling recommendations.**
- **If there is a risk of arc or flash, technicians MUST put on all Personal Protective Equipment (PPE) in accordance with NFPA 70E or other country-specific requirements for arc flash protection, PRIOR to servicing the unit.**

Failure to follow recommendations could result in death or serious injury.

⚠WARNING

Contains Refrigerant!

System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. See unit nameplate for refrigerant type. Do not use non-approved refrigerants, refrigerant substitutes, or refrigerant additives.

Failure to follow proper procedures or the use of non-approved refrigerants, refrigerant substitutes, or refrigerant additives could result in death or serious injury or equipment damage.

⚠WARNING

Hazardous Voltage w/Capacitors!

Disconnect all electric power, including remote disconnects and discharge all motor start/run capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and discharge capacitors before servicing could result in death or serious injury.

⚠WARNING

Fiberglass Wool!

Product contains fiberglass wool. Disturbing the insulation in this product during installation, maintenance or repair will expose you to airborne particles of glass wool fibers and ceramic fibers known to the state of California to cause cancer through inhalation. Glass wool fibers may also cause respiratory, skin or eye irritation.

NOTICE:

Equipment Damage From Ultraviolet (UV) Lights!

The manufacturer does not recommend field installation of ultraviolet lights in its equipment for the intended purpose of improving indoor air quality. High intensity C-band ultraviolet light is known to severely damage polymer (plastic) materials and poses a personal safety risk to anyone exposed to the light without proper personal protective equipment. Polymer materials commonly found in HVAC equipment that may be susceptible include insulation on electrical wiring, fan belts, thermal insulation, various fasteners and bushings. Degradation of these materials can result in serious damage to the equipment.

The manufacturer accepts no responsibility for the performance or operation of our equipment in which ultraviolet devices were installed outside of the manufacturer's factory or its approved suppliers.

Introduction

Revision Summary.

WSHP-SVX12B-EN

Corrected dimensions and added center of gravity information.

Trademarks

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Model Number Descriptions

G	E	R	E	060	1	1	A	0	1	1	0	D	0	T	0	A	6	0	0	1	1 0 A	0	B	0	0 0 0 0 000
1	2	3	4	5,6,7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24 25 26	27	28	29	30-36

Digits 1-3 — Unit Configuration

GER= High Efficiency Rooftop

Digit 4 — Development Sequence

E

Digits 5-7 — Nominal Size (MBH)

036 = 3 Ton
048 = 4 Ton
060 = 5 Ton
072 = 6 Ton
090 = 7 1/2 Ton
120 = 10 Ton
150 = 12 1/2 Ton
180 = 15 Ton
240 = 20 Ton
300 = 25 Ton

Digit 8 — Voltage (Volts/Hz/Phase)

1 = 208/60/1
2 = 230/60/1
3 = 208/60/3
4 = 460/60/3
5 = 575/60/3
8 = 230/60/3

Digit 9 — Heat Exchanger

1 = Copper Water Coil
2 = Cupro-nickel Water Coil

Digit 10 — Design Sequence

Most Up-to-Date Design

Digit 11 — Refrigeration Circuit

0 = Heating and Cooling Circuit
A = Cooling ONLY Circuit

Digit 12 — Blower Configuration

1 = Standard Blower
2 = Oversized Blower Motor

Digit 13 — Freeze Protection

A = 20 Degree Freezestat B/T
B = 30 Degree Freezestat B/T

Digit 14 — Open Digit

0 = Standard Design
S = Design Special

Digit 15 — Supply-Air Arrangement

D = Down-Flow Supply-Air Arrangement (convertible for 3 - 10 Ton)
H = Horizontal Supply-Air Arrangement (12 1/2 - 25 Ton option)

DIGIT 16 — Return-Air Arrangement

0 = Standard Return-Air Arrangement

Digit 17 — Control Types

R = ReliaTel™ Standalone Controls
T = Tracer™ Communication Interface
L = LonTalk™ Communication Interface

Digit 18 — T'stat/Sensor Location

0 = Wall Mounted Location
A = Wall Mounted Sensor with Unit Mounted Return-Air Smoke Detector
B = Wall Mounted Sensor with Unit Mounted Supply-Air Smoke Detector
C = Wall Mounted Sensor with Unit Mounted Return-Air/Supply-Air Smoke Detectors

Digit 19 — Fault Sensors

0 = No Fault Sensor
A = Clogged Filter Switch
B = Fan Failure Switch
C = Discharge Air Sensing Tube
D = Clogged Filter Switch and Fan Fail Switch
E = Clogged Filter Switch and Discharge Air Sensing Tube
F = Fan Fail Switch and Discharge Air Sensing Tube
G = Clogged Filter Switch, Fan Fail Switch and DA Sensing Tube

Digit 20 — Temperature Sensor

7 = High Pressure Control/Frostat/Crankcase Heater

Digit 21 — Night Setback

0 = No Night Setback Relay
N = Night Setback Relay

Note: *Option N is used for the Micro Standalone Controller ONLY.*

Digit 22 — Electric Heat Option

0 = No Electric Heat
A = 5 kW (1-Phase)
B = 6 kW (3-Phase)
C = 9 kW (3-Phase)
D = 10 kW (1-Phase)
E = 12 kW (3-Phase)
F = 14 kW (1-Phase)
G = 18 kW (1 and 3-Phase)
J = 23 kW (3-Phase)
K = 27 kW (3-Phase)
N = 36 kW (3-Phase)
P = 54 kW (3-Phase)

Digit 23 — Unit Mounted Disconnect

0 = No Unit Mounted Disconnect
1 = Non-Fused Disconnect
2 = Circuit Breaker

Digit 24 — Filter Type

2 = 2" Throwaway Filter
4 = 2" MERV 8 Filter
5 = 2" MERV 13 Filter

Digit 25 — Acoustic Arrangement

0 = Sound Attenuation Package

Digit 26 — Factory Configuration

0 = Standard Factory Configuration
A = Hinged Access Panels

Digit 27 — Paint Color

0 = No Paint Selection Available

Digit 28 — Outside Air Option

0 = No Outside Air
A = Manual Outside Air Damper 0-25%
B = Motorized Outside Air Damper 0-50%
C = Economizer, Dry Bulb 0-100% without Barometric Relief
D = Economizer, Dry Bulb 0-100% with Barometric Relief
E = Economizer, Reference Enthalpy 0-100% without Barometric Relief
F = Economizer, Reference Enthalpy 0-100% with Barometric Relief
G = Economizer, Comparative Enthalpy 0-100% without Barometric Relief
H = Economizer, Comparative Enthalpy 0-100% with Barometric Relief

Digit 29 — Piping Arrangement

0 = Standard Piping Configuration

Digits 30-36 — Does Not Apply To The Rooftop Product

0000000= Digit 30-36 Does NOT Apply to the Rooftop Products

Note: *Through-the-base electric is a standard feature on the water-source rooftop unit.*

General Information

Jobsite Inspection

Always perform the following checks before accepting a unit:

- Verify that the nameplate data matches the data on the sales order and bill of lading (including electrical data).
- Verify that the power supply complies with the unit nameplate specifications.
- Visually inspect the exterior of the unit, for signs of shipping damage. Do not sign the bill of lading accepting the unit(s) until inspection has been completed. Check for damage promptly after the unit(s) are unloaded. Once the bill of lading is signed at the jobsite, the unit(s) are now the property of the SOLDTO party and future freight claims MAY NOT be accepted by the freight company.
- After assuring that charge has been retained, reinstall the schrader caps to assure that refrigerant leakage does not occur.
- After assuring that charge has been retained, reinstall the schrader caps to assure that refrigerant leakage does not occur.
- Verify that the refrigerant charge has been retained during shipment by use of gauges. Schrader taps are located internal to the cabinet.
- After assuring that charge has been retained, reinstall the schrader caps to assure that refrigerant leakage does not occur.

Jobsite Storage

Take precautions to prevent condensate from forming inside the unit's electrical compartments and motors if:

- If the unit is stored before it is installed.
- The unit is set on the roof curb, and temporary heat is provided in the building. Isolate all side panel service entrances and base pan openings (e.g. conduit holes, supply air/return air openings, and flue openings) from the ambient air until the unit is ready for start-up.

The manufacturer will not assume any responsibility for equipment damage resulting form condensate accumulation on the unit's electrical and/or mechanical components.

Unit Description

Before shipment, each unit is leak tested, dehydrated, charged with refrigerant and compressor oil, and run tested for proper control operation.

Unit Nameplate

The unit nameplate is located on the units's corner support just above the main power entrance access into the control panel. It includes the unit model number, serial number, electrical characteristics, refrigerant charge, and other pertinent unit data.

Compressor Nameplate

The nameplate for the compressors are located on the compressor terminal box.

Air-to-Refrigerant Coil

The air-to-refrigerant coil is aluminum fin, mechanically bonded to the copper tubing.

Water-to-Refrigerant Coil

The water-to-refrigerant coil is a copper or cupro-nickel (option) and steel tube (tube-within-a-tube) design, leak tested to assure there is no cross leakage between the water tube (copper/cupro-nickel) and refrigerant gas (steel tube).

The control system offered to control the unit is a ReliaTel™ Control Module. It may be installed as a standalone unit control module, or tied to a full building automation system.

The ReliaTel™ Control Module is a microelectronic control module that is referred to as a Refrigeration Module (RTRM). The acronym RTRM is used extensively throughout this document when referring to the control system network.

These modules through Proportional/Integral control algorithms perform specific unit functions that govern unit operation in response to zone temperature, supply air temperature and/or humidity conditions depending on the application. The stages of capacity control for these units is achieved by starting and stopping the compressors.

The RTRM is mounted in the control panel and is factory wired to the respective internal components. RTRM receives and interprets information from other unit modules, sensors, remote panels and customer binary contacts to satisfy the applicable request for cooling.

System Input Devices and Functions

The RTRM must have a mode input in order to operate the rooftop unit. The flexibility of having several mode capabilities depends upon the type of sensor and/or remote panel selected to interface with the RTRM. The possibilities are; Fan selection ON or AUTO, System selection HEAT, COOL, AUTO, and OFF.

The descriptions of the following basic input devices used with the RTRM network are to acquaint the operator with their function as they interface with the various modules. Refer to the unit's electrical schematic for the specific module connections.

Compressor Disable (CPR1/2)

This input incorporates the low (LPC) of each refrigeration circuit and can be activated by opening a field supplied contact installed in series with the LPC.

If this circuit is open before the compressor is started, the compressor will not be allowed to operate. Anytime this circuit is opened for 5-continuous seconds during compressor operation, the compressor for that circuit is immediately turned OFF. The compressor will not be allowed to restart for a minimum of 3-minutes should the LPC close.

If four consecutive open conditions occur during the first 3-minutes of operation, the compressor for that circuit will be locked out, a diagnostic communicated to the remote panel (if installed) and a manual reset will be required to restart the compressor.

Low Pressure Control

With the ReliaTel module, the low pressure will be activated when a field supplied contact is opened. Anytime this circuit is opened for 5-continuous seconds, the compressor for that circuit is turned off immediately. The compressor will not be allowed to restart for a minimum of 3-minutes.

If four consecutive open conditions occur during the first 3-minutes of operation, the compressor will be locked out, a diagnostic communicated to ICSTM if applicable, and a manual reset will be required to restart the compressor.

High Pressure Control

The high pressure controls are wired in series between the compressor outputs on the RTRM and the compressor contactor coils. If the high pressure control switch opens, the RTRM senses a lack of current while calling for cooling and locks the compressor out.

On dual circuit units, if the high pressure control opens, the compressor on the affected circuit is locked out. A manual reset for the affected circuit is required.

Economizer Control Actuator ECA (option)

The ECA monitors the mixed-air temperature, return air temperature, minimum position setpoint (local or remote), power exhaust setpoint, CO2 setpoint, CO2 and ambient dry bulb/enthalpy sensor or comparative humidity (return air humidity against ambient humidity) sensors, if selected, to control dampers to an accuracy of

± 5% of stroke. The actuator is spring returned to the closed position any time power is lost to the unit. It is capable of delivering up to 25-inch pounds of torque and is powered by 24 VAC.

RTCI-ReliaTel Trane Communication Interface (option)

This module is used when the application calls for an ICS building management type control system. It allows the control and monitoring of the system through an ICS panel. The module can be ordered from the factory or ordered as a kit to be field installed. Follow the installation instruction that ships with each kit when field installation is necessary.

RTLI-ReliaTel LonTalk Communication Interface (option)

This module is used when the application calls for either an ICS building management type control system that is LonTalk. It allows the control and monitoring of the system through an ICS panel. The module can be ordered from the factory or ordered as a kit to be field installed. Follow the installation instruction that ships with each kit when field installation is necessary.

RTOM-ReliaTel Options Module (option)

The RTOM monitors the supply fan proving, clogged filter, supply air temperature, exhaust fan setpoint, supply air tempering, FrostatTM and smoke detector. Refer to system input devices and functions for operation.

Supply Fan Failure Input (option)

The fan failure switch can be factory or field installed to sense indoor fan operation. With the FFS-Fan Failure Switch, if air flow through the unit is not proven by the differential pressure switch (factory set point 0.07-inch w.c.) within 40-seconds nominally, the RTRM will shut off all mechanical operations, lock the system out, send a diagnostic to ICS, and the service LED will flash. The system will remain locked out until a reset is initiated either manually or through ICS.

Clogged Filter Switch (option)

The unit mounted clogged filter switch monitors the pressure differential across the return air filters. It is mounted in the filter section and is connected to the RTOM. A diagnostic service signal is sent to the remote panel if the pressure differential across the filters is at least 0.5-inch w.c. The contacts will automatically open when the pressure differential across the filters decreases to approximately 0.4-inch w.c. The clogged filter output is energized when the supply fan is operating and the clogged filter switch has been closed for at least 2-minutes. The system will continue to operate regardless of the status of the filter switch.

Power Exhaust Control (option)

The power exhaust fan is started whenever the position of the economizer dampers meets or exceed the power exhaust setpoint when the indoor fan is on. The setpoint panel is located in the return air section, and is factory set to 25%.

Evaporator Frost Control (option)

This input incorporates the Frostat control (FOS) of each refrigeration circuit and can be activated by closing a field supplied contact installed in parallel with the FOS.

If this circuit is open before the compressor is started, the compressor will not be allowed to operate. Anytime this circuit is opened for 5-continuous seconds during compressor operation, the compressor for that circuit is immediately turned OFF. The compressor will not be

allowed to restart for a minimum of 3-minutes should the FOS close.

Smoke Detector Sensor (option)

This sensor provides high limit shutdown of the unit and requires a manual reset. The sensor is used to detect smoke due to fire in the air conditioning or ventilation ducts.

In order for the supply air smoke detector or return air smoke detector to properly sense smoke in the supply/return air stream, the air velocity entering the smoke detector unit must be between 500 and 4000-feet per minute.

Discharge Line Thermostat

A bi-metal element discharge line thermostats installed as a standard option on the discharge line of each system. This standard option provides extra protection to the compressors against high discharge temperatures in case of loss of charge, extremely high ambient and other conditions which could drive the discharge temperature higher.

Field installed ONLY Accessories

High Temperature Sensor (BAYFRST002A)

This sensor connects the RTRM Emergency Stop Input LTB1-5 and LTB1-6 and provides high limit shutdown of the unit and requires a manual reset. The sensor is used to detect high temperatures due to fire in the air conditioning or ventilation ducts. The sensor is designed to mount directly to the sheet metal duct. Each kit contains two sensors. The return air duct sensor (X13100040010) is set to open at 135-degrees F. The supply air duct sensor (X13100040020) is set to open at 240-degrees F. The control can be reset after the temperature has been lowered approximately 25-degrees F below the cutout setpoint.

Electronic Timeclock (BAYCLCK001A)

This electronic timeclock is designed to control the occupied/unoccupied switching of up to four rooftop units. Once the unit(s) has entered an unoccupied status, night setback temperatures can be controlled by utilizing a standard zone sensor wired to the RTRM. The timeclock contains four binary outputs (RE1, RE2, RE3, RE4), a liquid crystal display (LCD), and four programming keys (Time/Day Key, Occupied/Unoccupied Program Key, Run Key, and an Advance/Override Key). An 18 to 30-VAC power source is required either from one of the units being controlled or from a separate class-2 power source.

Zone Panel (BAYSENS106A)

This electronic sensor features three system switch settings (EM HEAT, HEAT, COOL, and OFF) and two fan settings (ON and AUTO). It is a manual changeover control with single setpoint capability.

Zone Panel (BAYSENS108A)

This electronic sensor features four system switch settings (HEAT, COOL, AUTO, OFF) and two fan settings (ON and AUTO). It is a manual or auto changeover control with dual setpoint capability. It can be used with a remote zone temperature sensor BAYSENS017B.

Remote Panel w/o NSB (BAYSENS110A)

This electronic sensor features four system switch settings (HEAT, COOL, AUTO, and OFF) and two fan settings (ON and

AUTO) with four system status LED's. It is a manual or auto changeover control with dual setpoint capability. It can be used with a remote zone temperature sensor BAYSENS017B.

Programmable Zone Sensor (BAYSENS019B)

This 7-day programmable sensor features 2, 3, and 4-periods for Occupied/Unoccupied programming per day. If the power is interrupted, the program is retained in permanent memory. If power is off longer than 2-hours, only the clock and day may have to be reset.

The zone sensor allows selection of 2, 3, and 4 system modes (HEAT, COOL, AUTO, and OFF), two fan modes (ON and AUTO) It has dual temperature selection with programmable start time capability.

The occupied cooling setpoint ranges between 45 and 98-degrees F. The heating setpoint ranges between 43 and 96-degrees F.

A liquid crystal display (LCD) displays zone temperature, temperature set points, day of the week, time, and operational mode symbols.

The option menu is used to enable or disable applicable functions, (i.e. morning warm-up, economizer minimum position override during unoccupied status, fahrenheit or centigrade, supply air tempering, remote zone temperature sensor, 12/24-hour time display, smart fan, and computed recovery.

During an occupied period, an auxiliary relay rated for 1.25-amps at 30-volts AC with one set of single pole, double throw contacts is activated.

Remote Zone Sensor (BAYSENS013C)

This electronic sensor features remote zone sensing and timed override with override cancellation. It is used with a Trane Integrated ComfortTM building management system.

Remote Zone Sensor (BAYSENS014C)

This electronic sensor features single setpoint capability and timed override with override cancellation. It is used with a Trane Integrated ComfortTM building management system.

Remote Zone Sensor (BAYSENS016A)

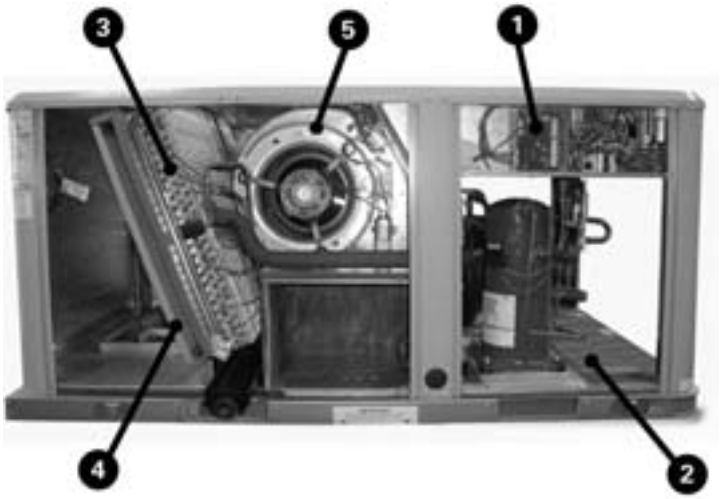
This bullet type temperature sensor can be used for outside-air ambient sensing, return air temperature sensing, supply air temperature sensing, remote temperature sensing (uncovered). Wiring procedures vary according to the particular application and equipment involved. Refer to the unit's wiring diagrams for proper connections.

Remote Zone Sensor (BAYSENS017B)

This electronic sensor can be used with BAYSENS106A, 108A, 110A, 019A, 020A, or 021A remote panels. When this sensor is wired to a BAYSENS019A or BAYSENS020A remote panel, wiring must be 18 AWG shielded twisted pair (Belden 8760 or equivalent). Refer to the specific remote panel for wiring details.

Component Location

1. Controls
2. Compressor/water-to-refrigerant section
3. Air-to-refrigerant coil
4. Filter location
5. Blower and motor location

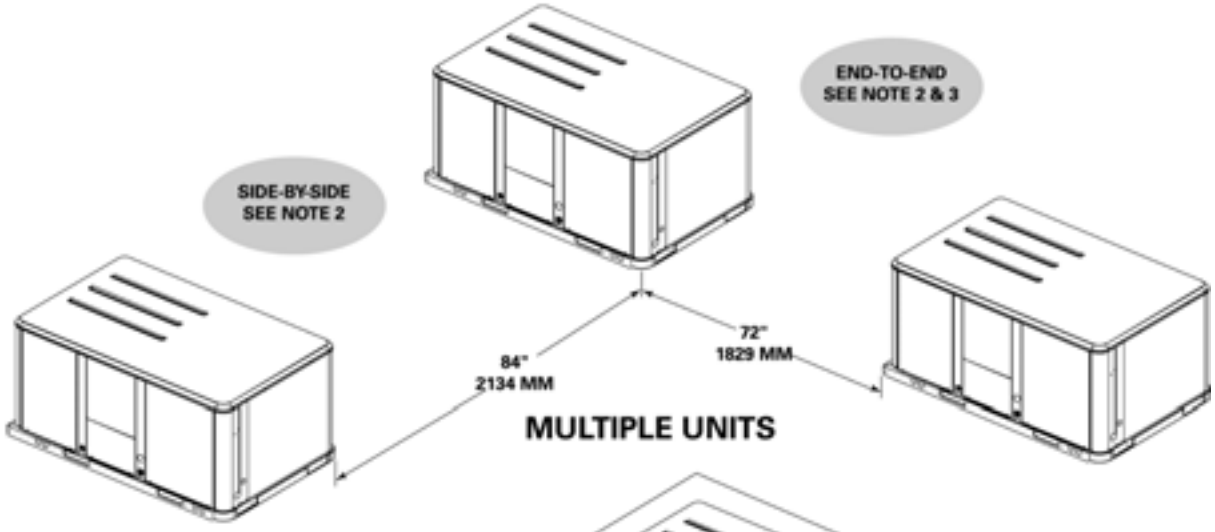


Dimensions

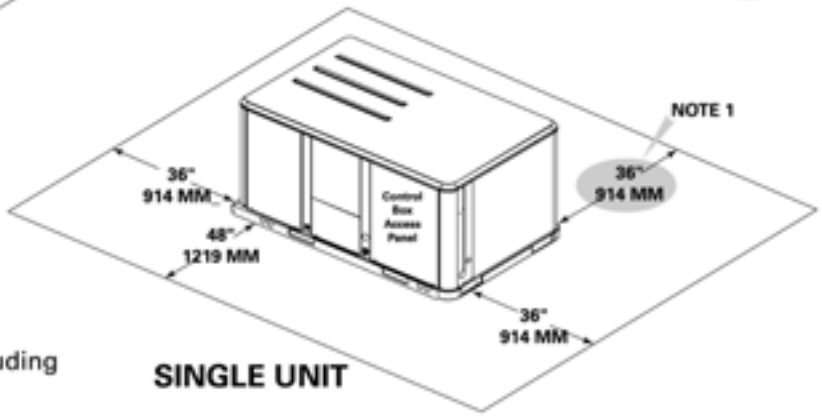
Unit Clearances

CLEARANCES FOR SINGLE AND MULTIPLE APPLICATIONS
The illustration below reflects the minimum operating and service clearances for either a single or multiple unit installation. These clearances are the minimum distances necessary to assure adequate serviceability, cataloged unit capacity, and peak operating efficiency.

Providing less than the recommended clearances may result in return-air starvation, short-circuiting of exhaust and economizer airflows, or recirculation of hot air.



MULTIPLE UNITS



SINGLE UNIT

NOTES:

1. For horizontal discharge unit, this measurement is reduced to 18" [457 MM] to minimize duct extensions.

2. When equipped with economizer or barometric relief damper, clearance distance is to be measured from protruding hood instead of base.

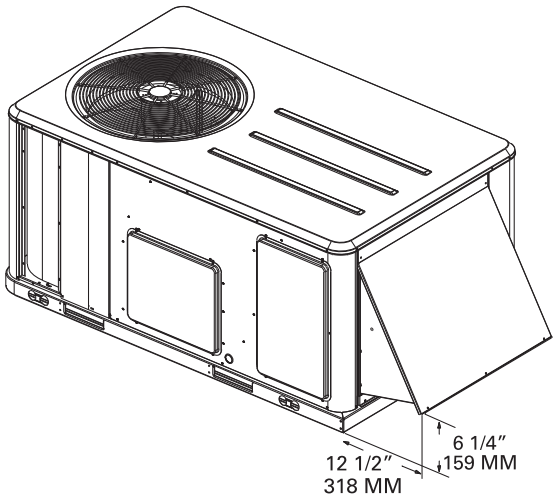
3. Clearance is the same if any unit is rotated 180-degrees.

4. Additional clearance required when barometric damper or economizer is installed.

Figure 1. 036 to 048 Clearances

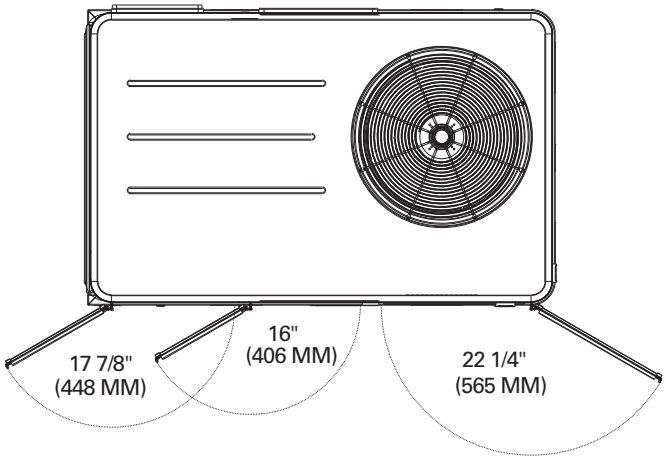
3-4 tons economizer, manual or motorized fresh air damper

Note: All dimensions are in inches/millimeters.



3-4 tons - swing diameter for hinged door(s) option

Note: All dimensions are in inches/millimeters.



3-4 tons - economizer & barometric relief damper hood

Note: All dimensions are in inches/millimeters.

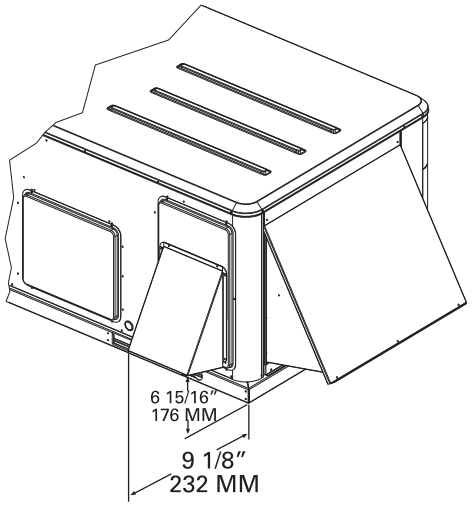
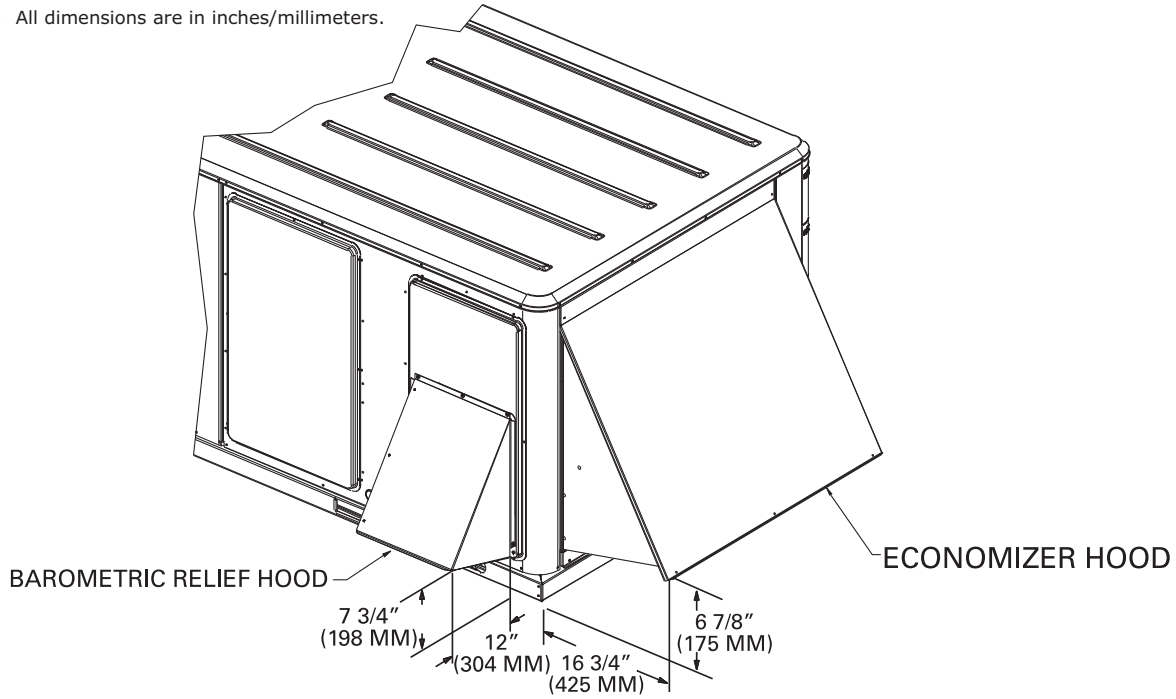


Figure 2. 060 to 072 Clearances

5-6 tons - economizer, manual or motorized fresh air damper

Note: All dimensions are in inches/millimeters.



5-6 tons - swing diameter for hinged door(s) option

Note: All dimensions are in inches/millimeters.

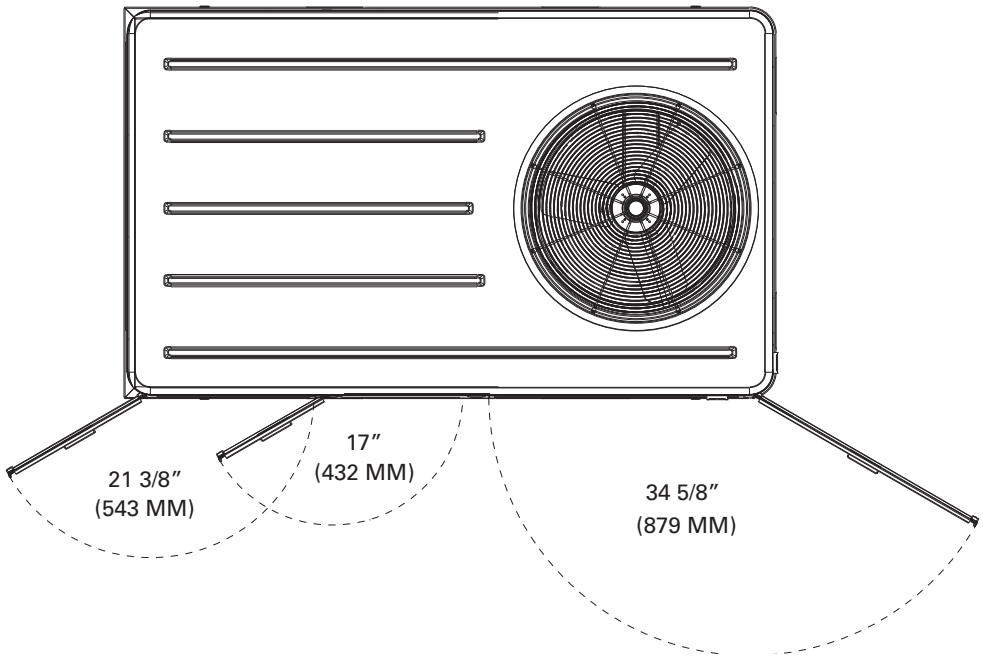
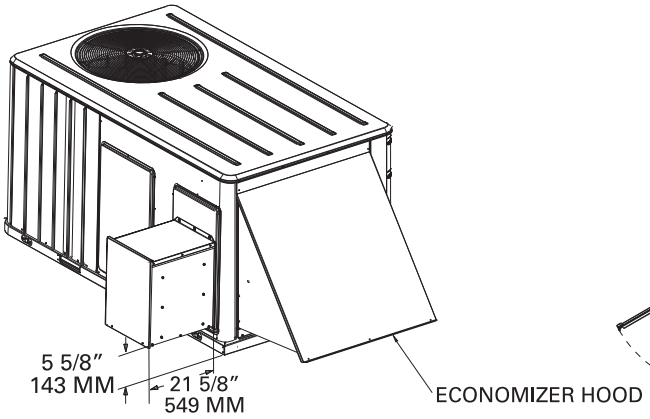


Figure 3. 090 Clearances

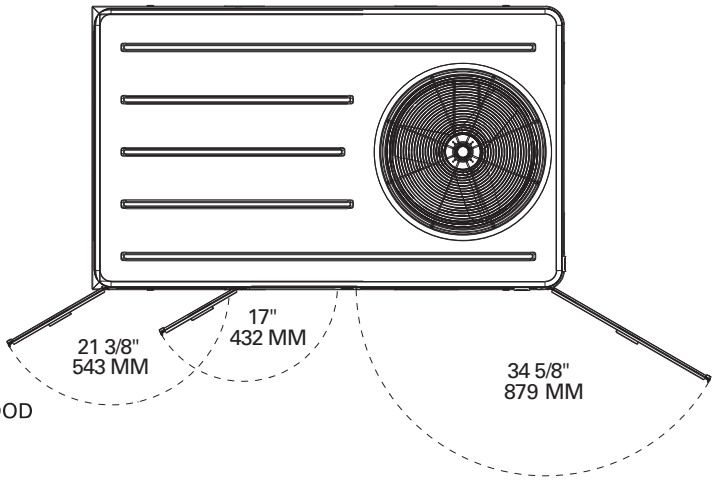
7½ tons power exhaust

Note: All dimensions are in inches/millimeters.



7½ tons swing diameter for hinged door(s) option

Note: All dimensions are in inches/millimeters.



7½ tons manual or motorized fresh air damper

Note: All dimensions are in inches/millimeters.

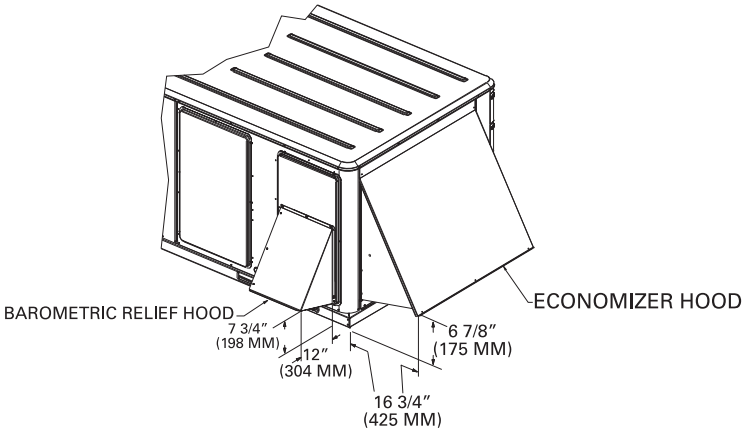
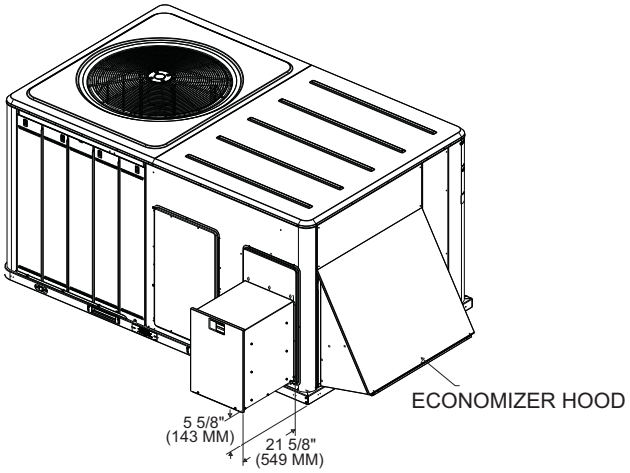


Figure 4. 120 Clearances

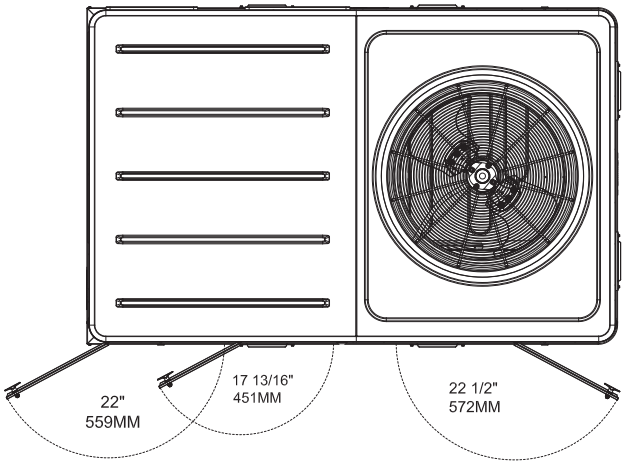
10 tons exhaust

Note: All dimensions are in inches/millimeters.



10 tons swing diameter for hinged door(s) option

Note: All dimensions are in inches/millimeters.



10 tons economizer, manual or motorized fresh air damper

Note: All dimensions are in inches/millimeters.

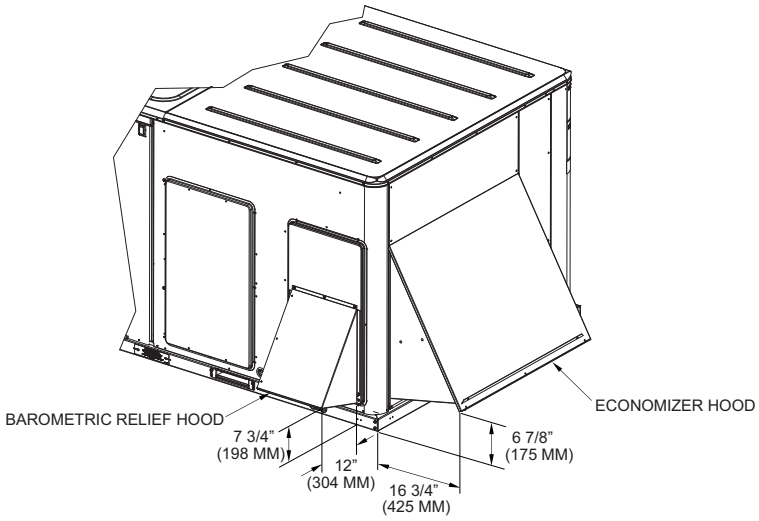
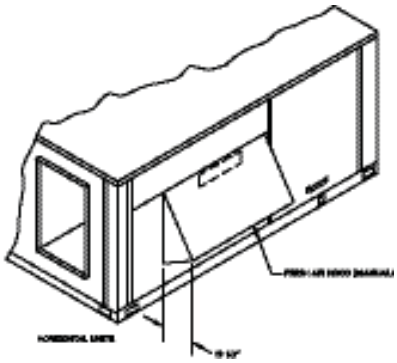
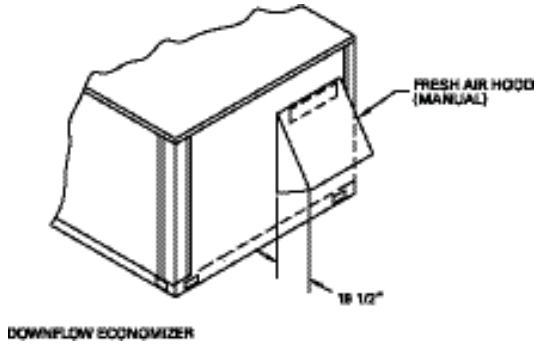


Figure 5. 150 - 300 Clearances

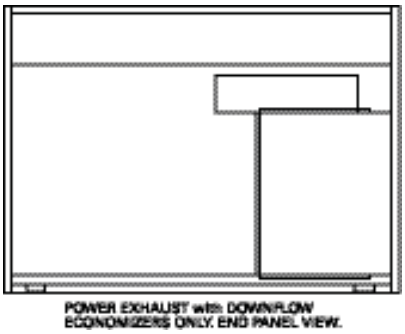
Fresh Air Hood (Horizontal Units)



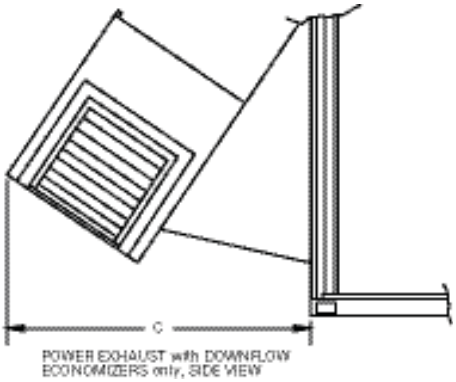
Fresh Air Hood (Downflow Units)



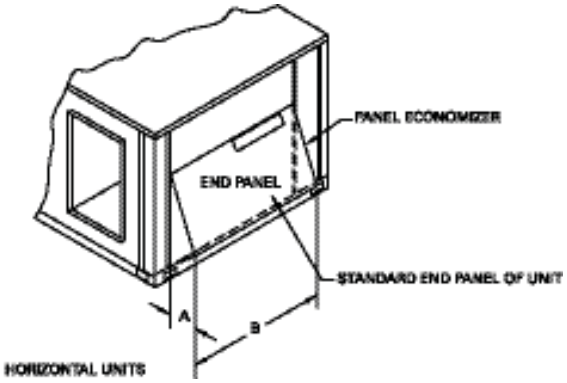
Power Exhaust - Downflow Economizers



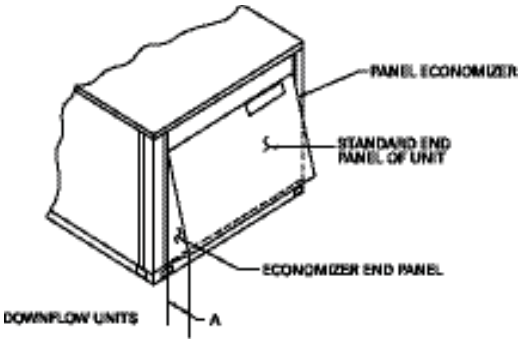
Power Exhaust - Downflow Economizers - Side View



Economizer - Horizontal Units



Economizer - Downflow Units



When applying economizer to horizontal units, connected ductwork must be run full size to allow proper operation of economizer damper.

Power Exhaust Dimensions

Unit Model #	A	B	C
GERE150-240	19½	64¾	39

Figure 6. 3 to 4-Ton Unit

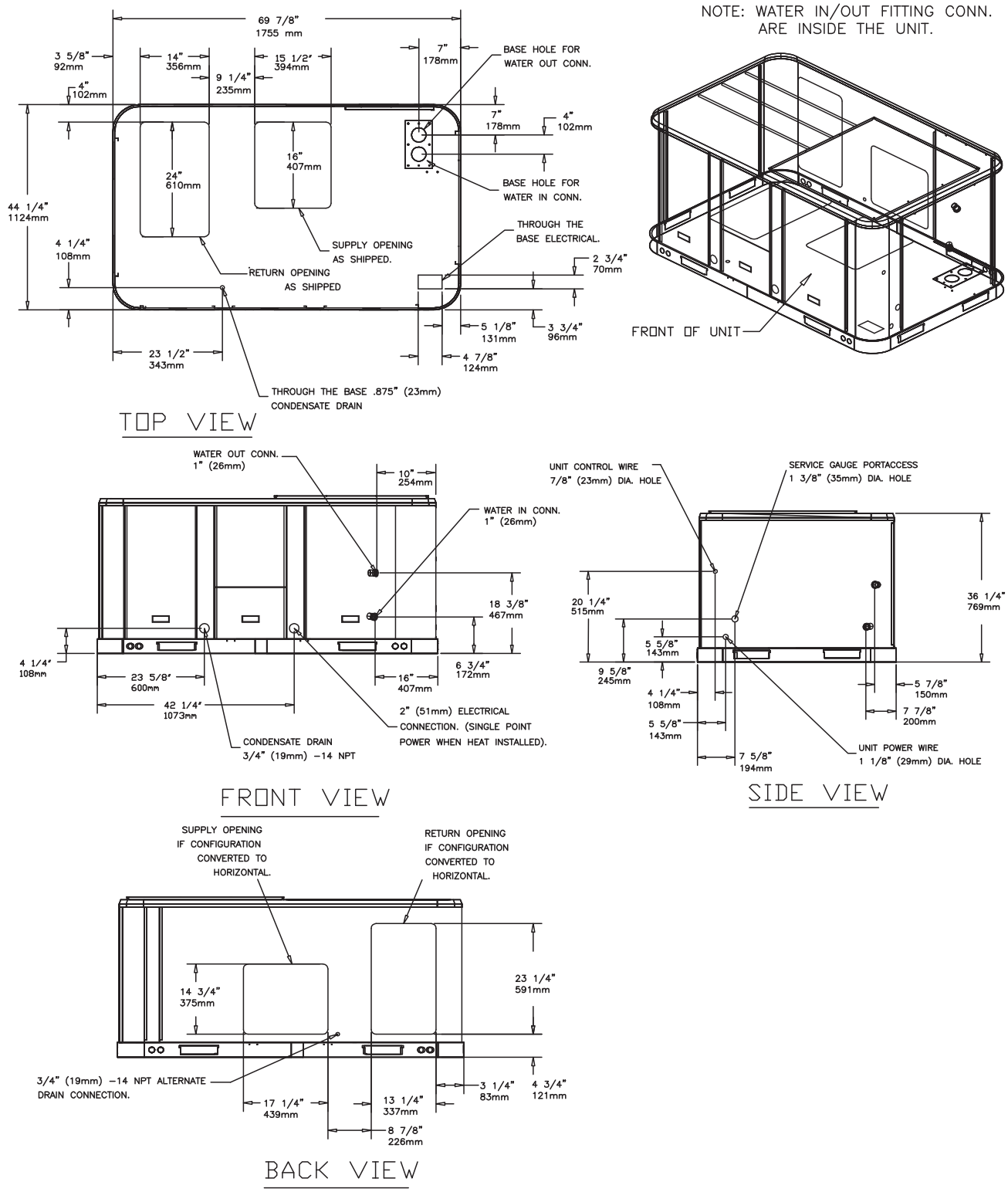


Figure 7. 5 -Ton Unit

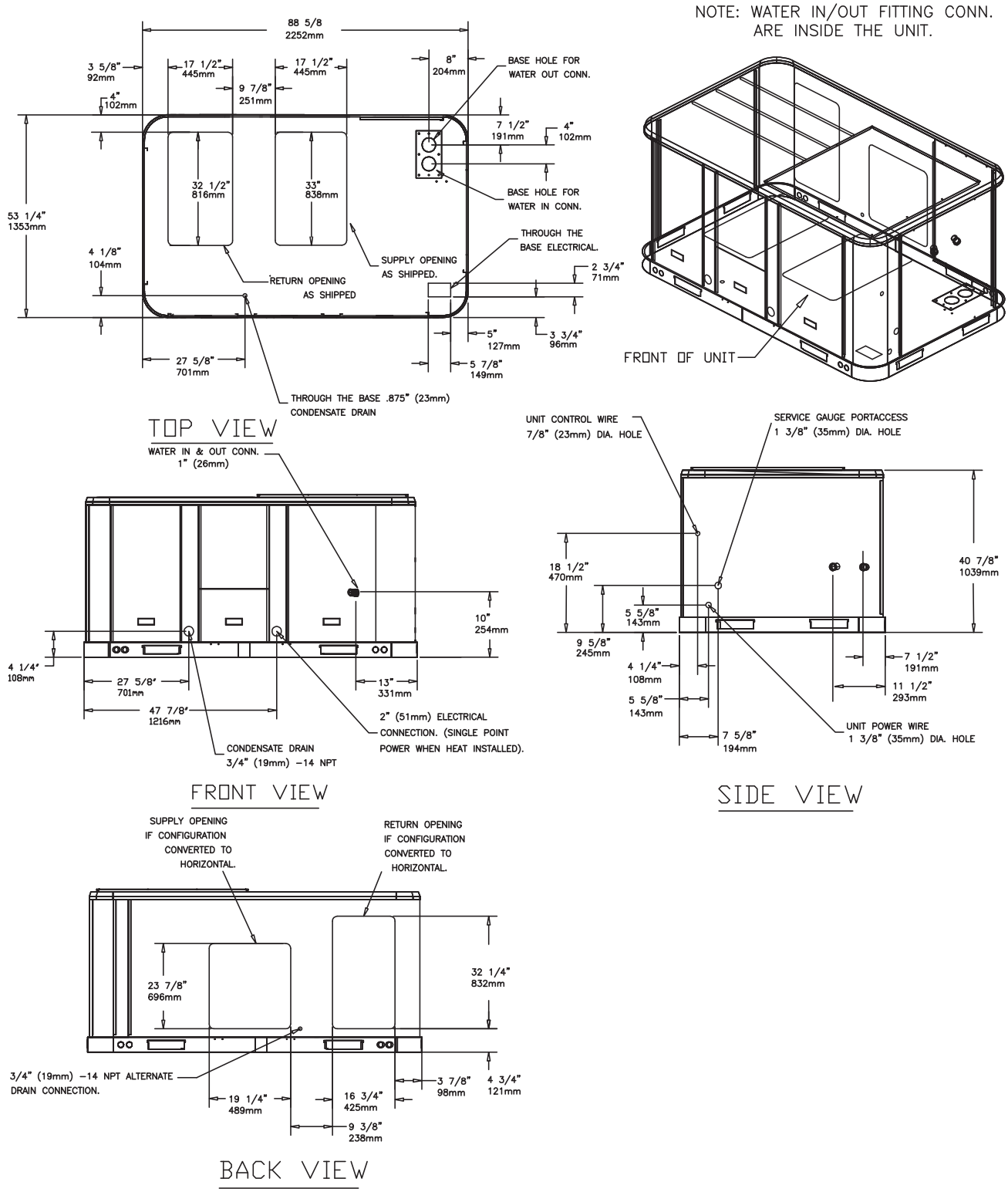


Figure 8. 6 -Ton Unit

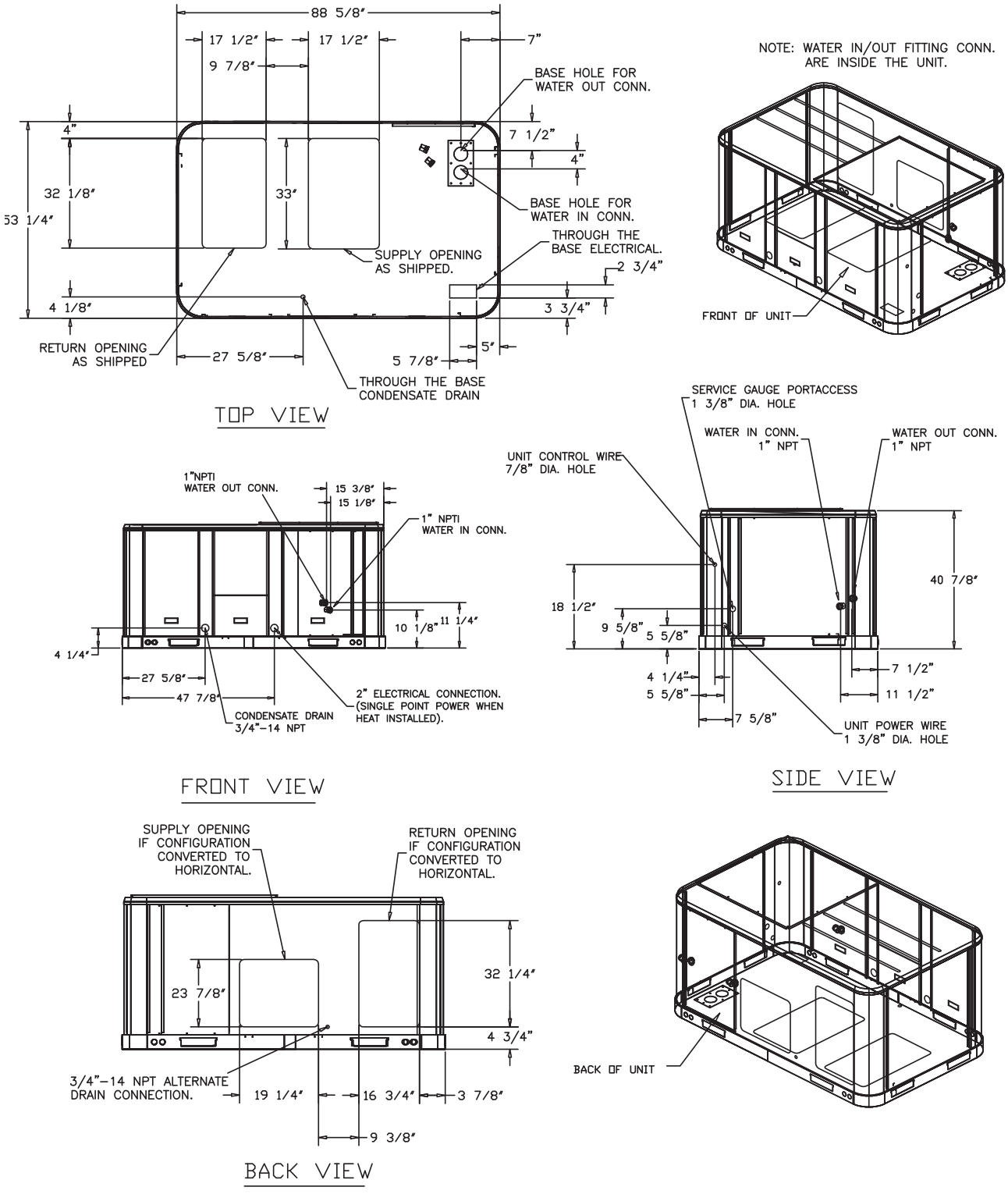


Figure 9. 7 1/2-Ton Unit

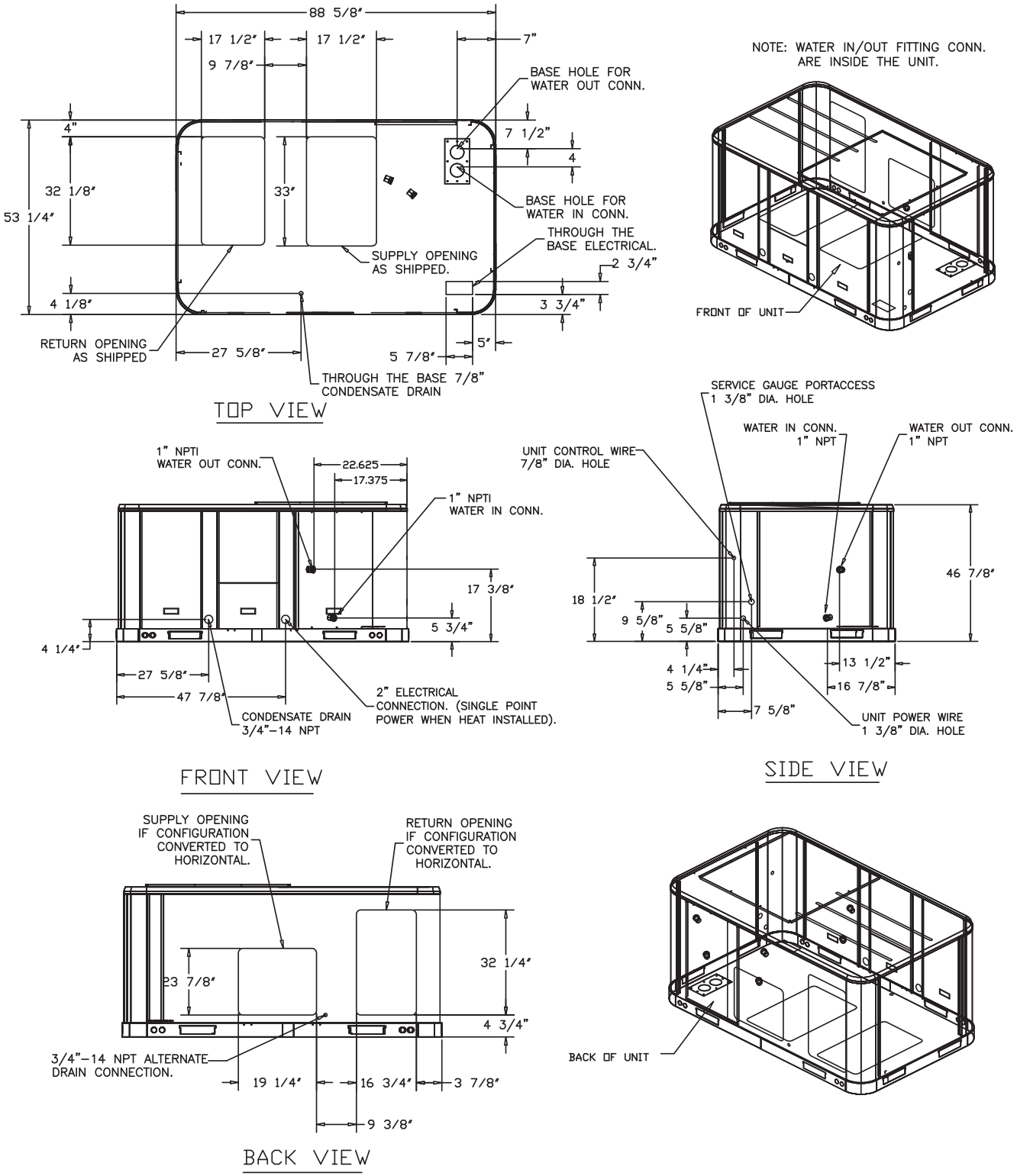


Figure 10. 10 -Ton Unit

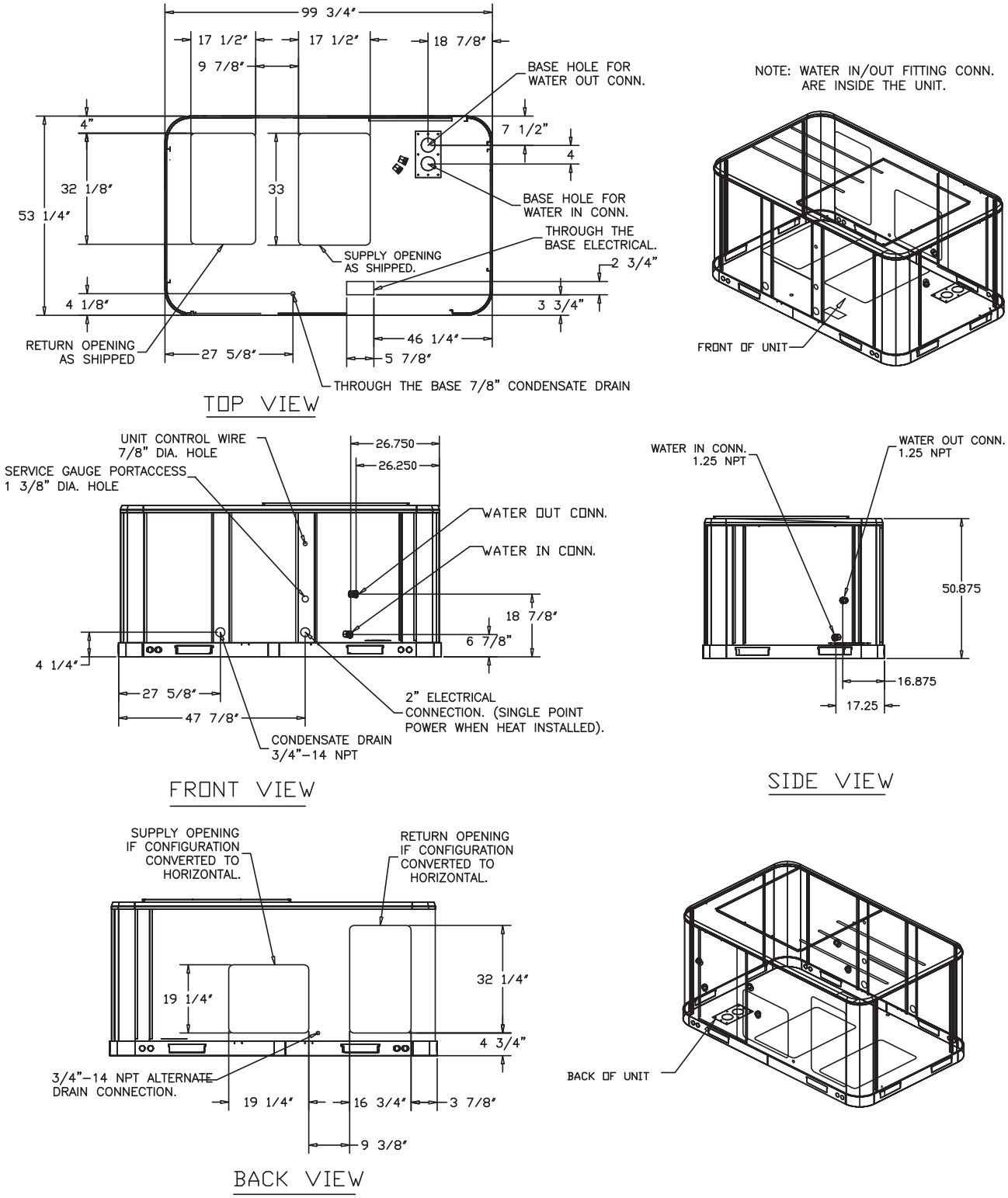


Figure 11. 12 1/2 and 15-Ton Unit

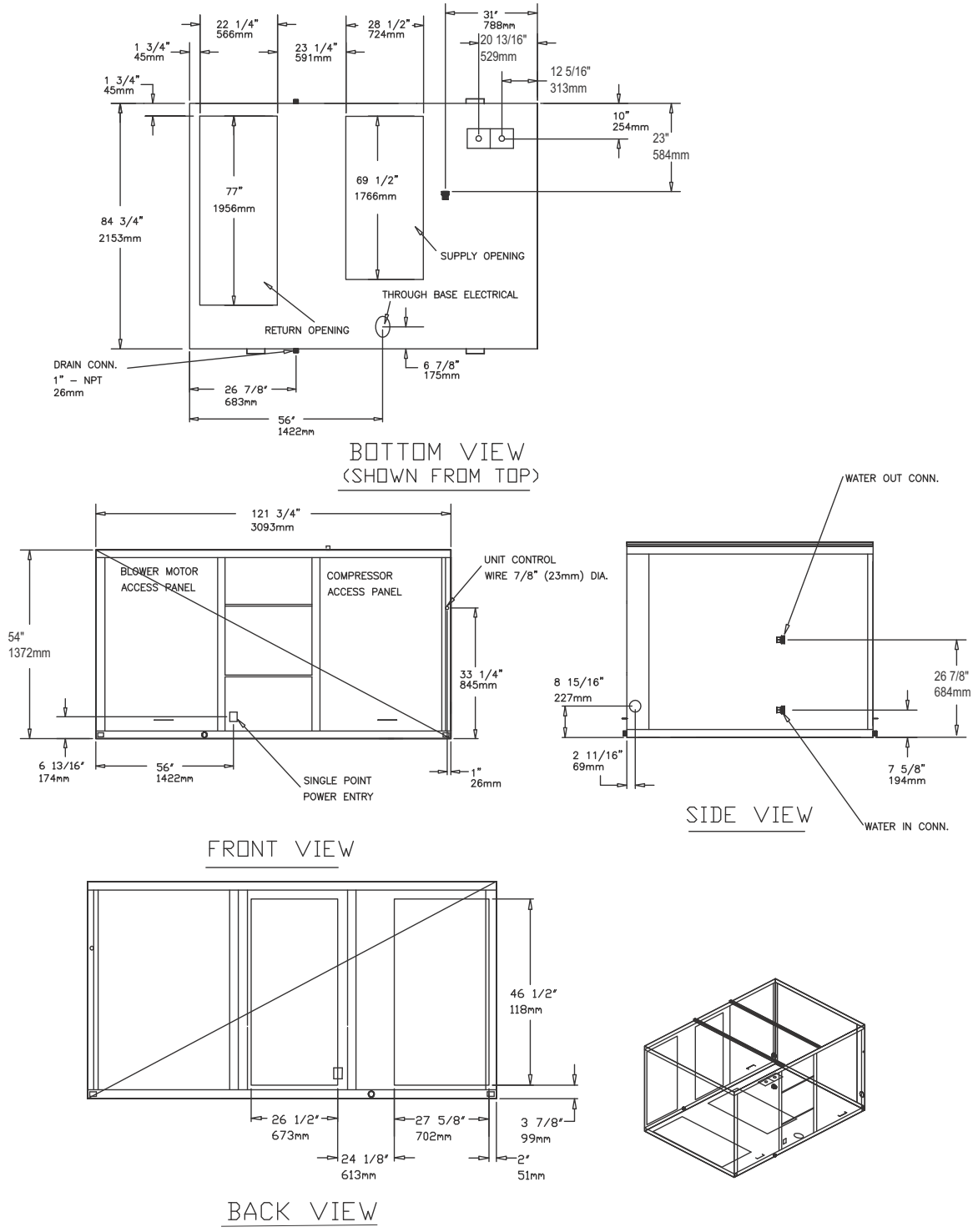


Figure 12. 20-Ton Unit

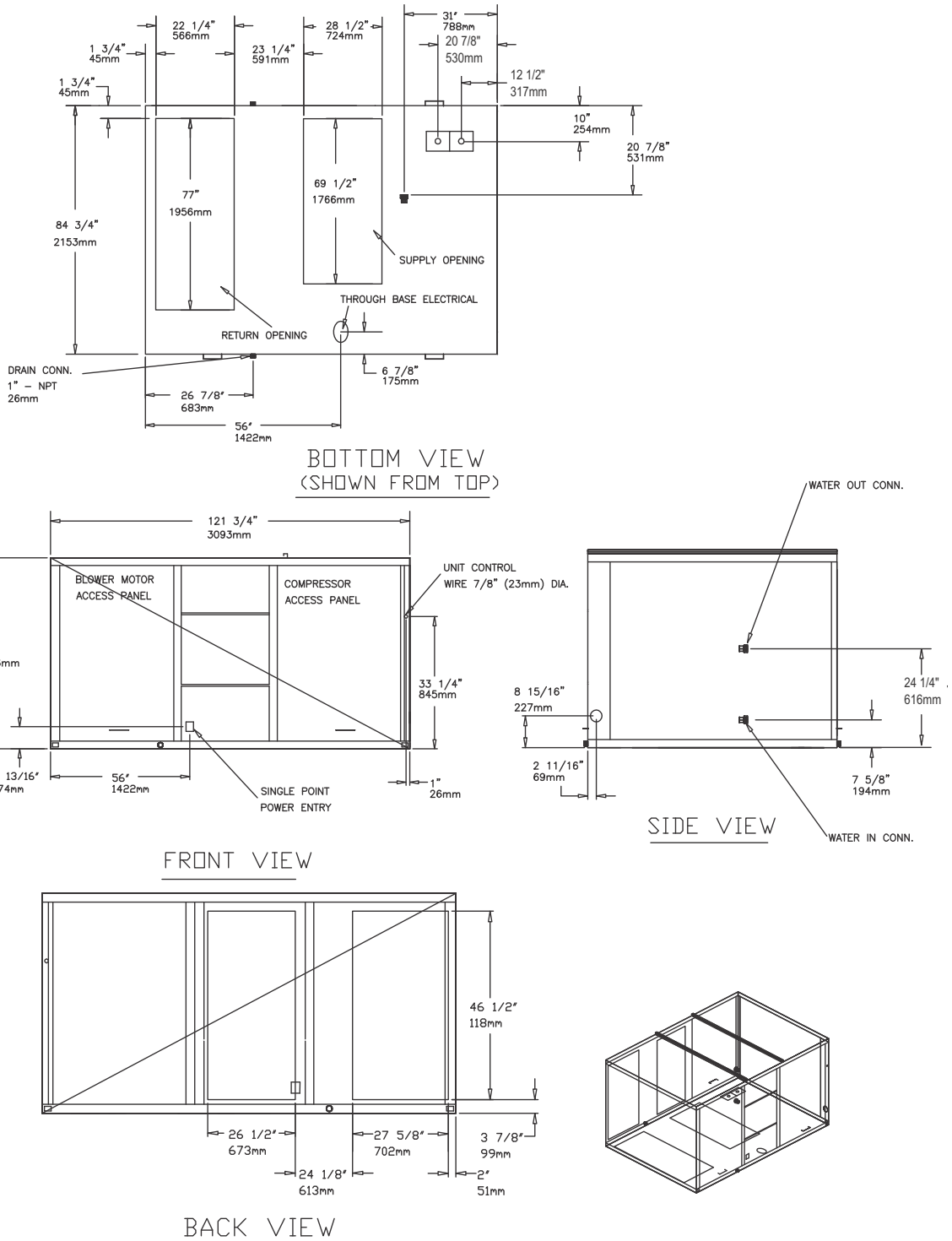


Figure 13. 25-Ton Unit

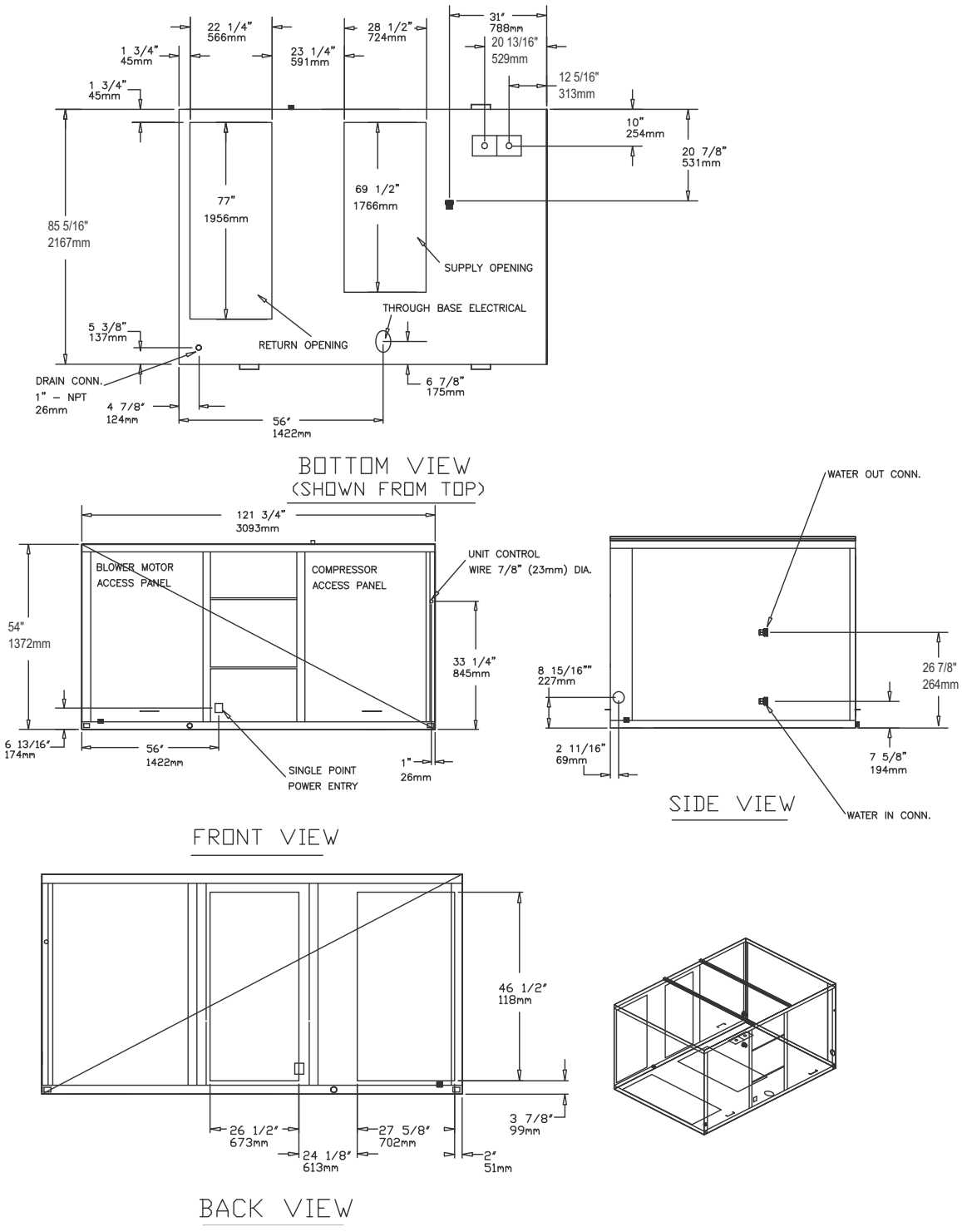


Figure 14. 3 to 4-Ton Roofcurb

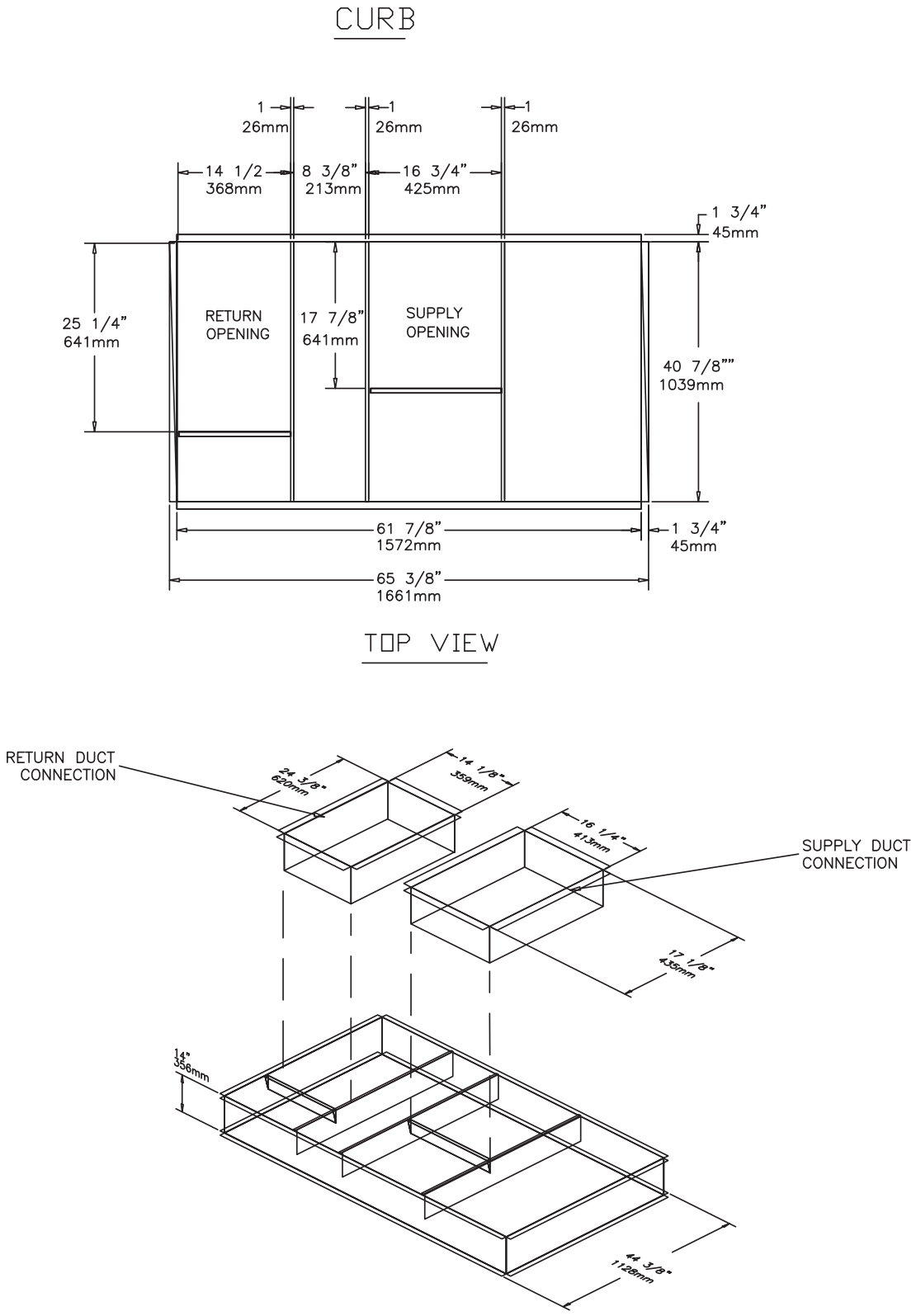


Figure 15. 5, 6 and 7 1/2 -ton roofcurb

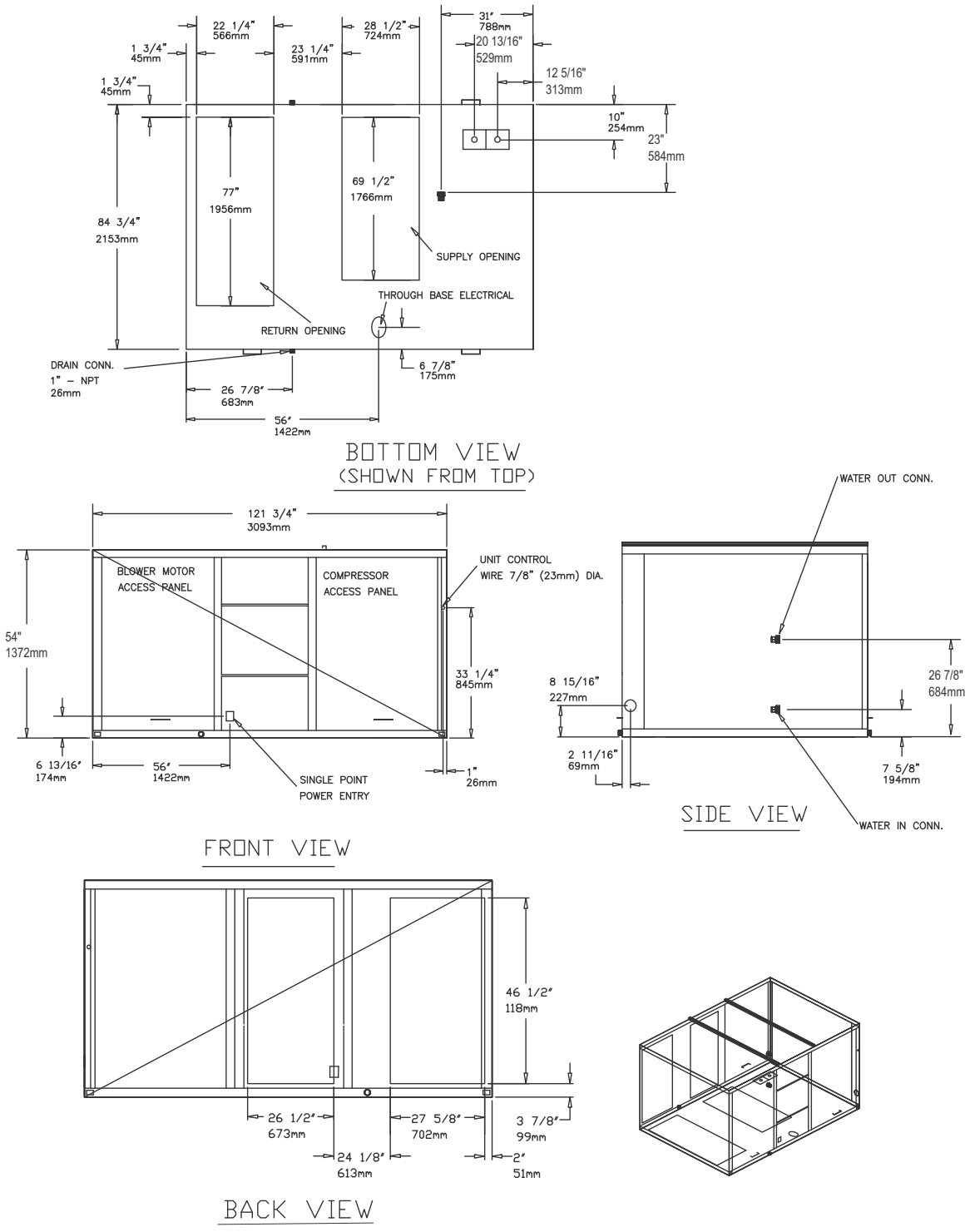


Figure 16. 10 -Ton Roofcurb

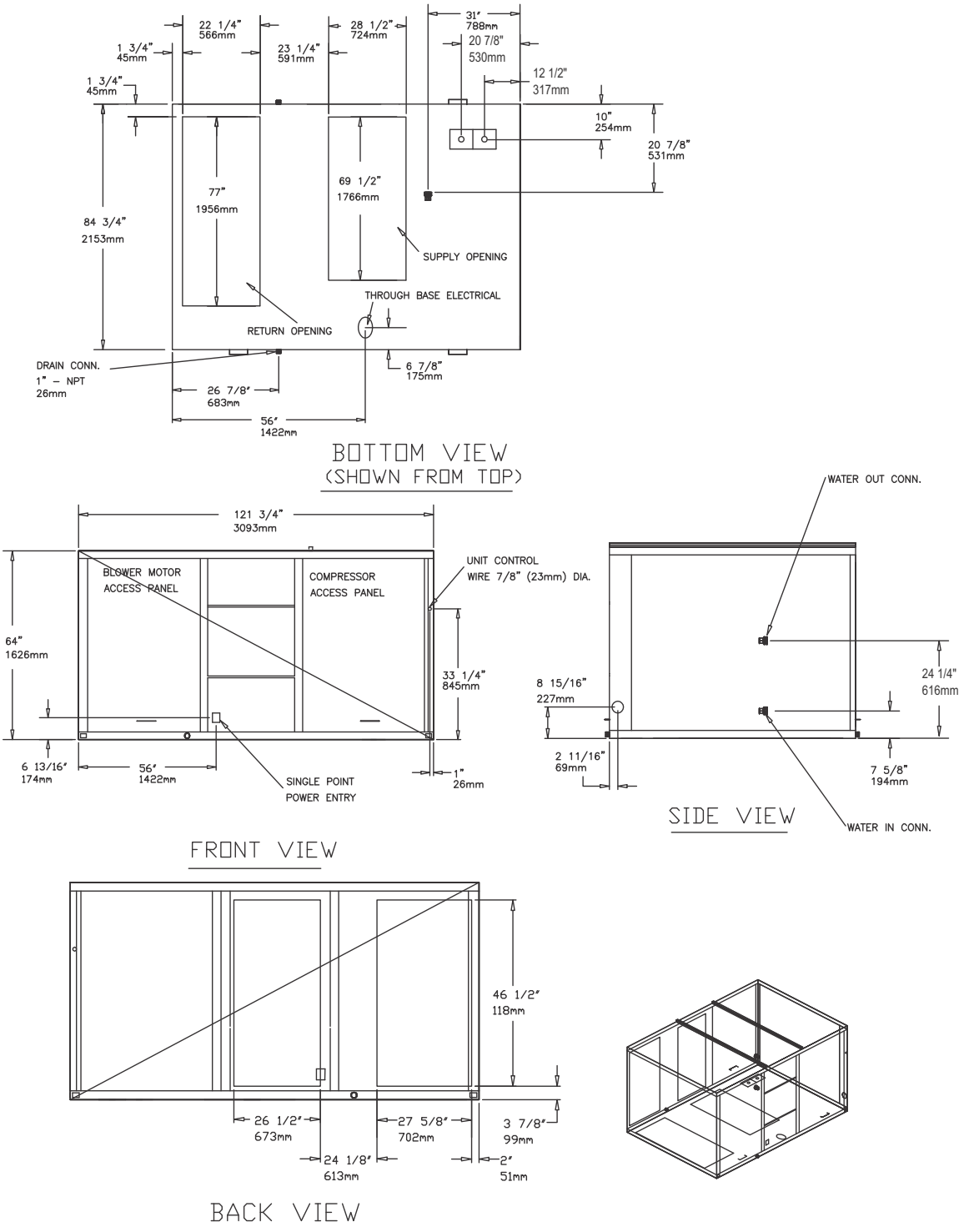
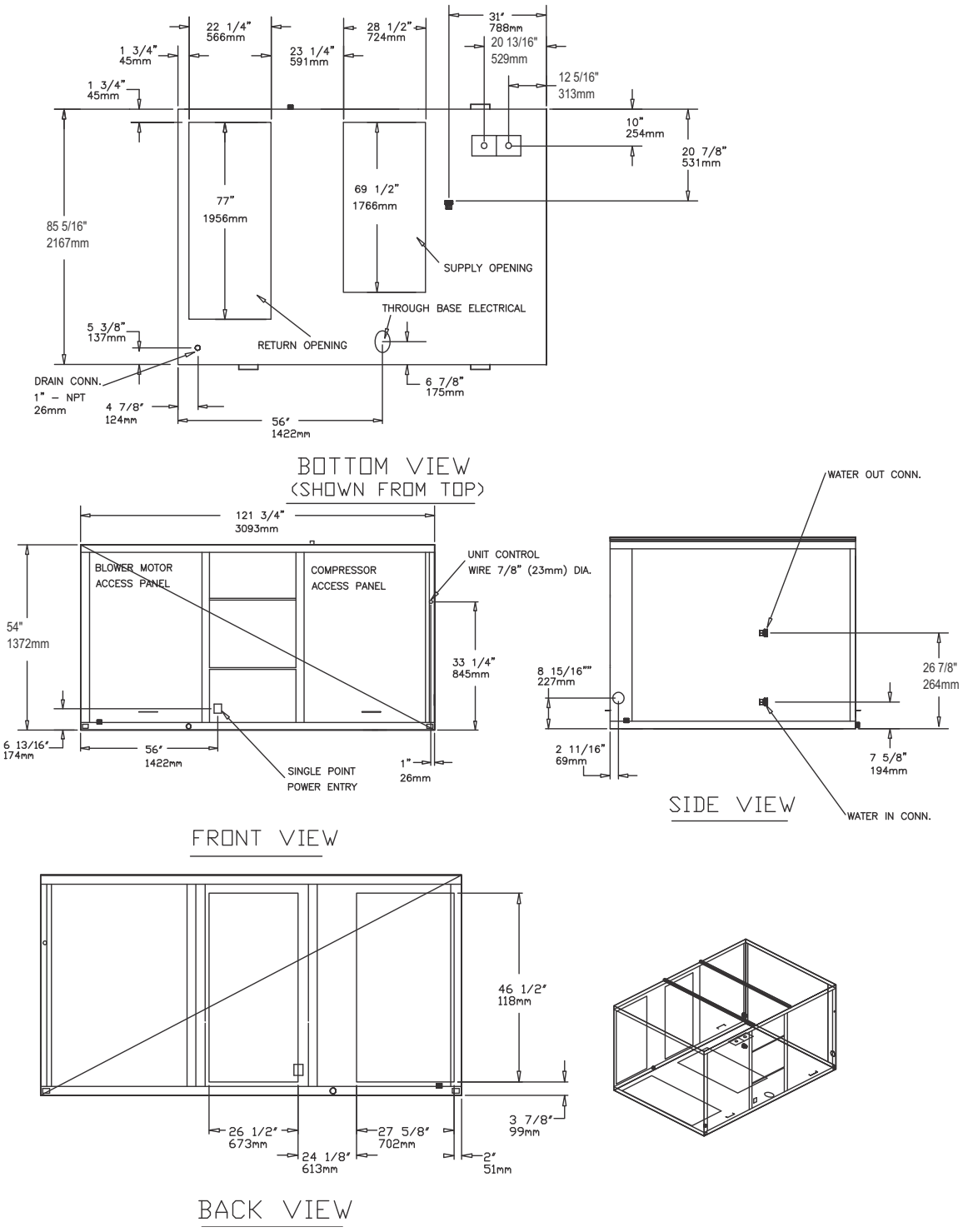


Figure 17. 12 1/2 to 25-Ton Roofcurb



⚠WARNING

Heavy Objects!

Do not use cables (chains or slings) except as shown. Each of the cables (chains or slings) used to lift the unit must be capable of supporting the entire weight of the unit. Lifting cables (chains or slings) may not be of the same length. Adjust as necessary for even unit lift. Other lifting arrangements may cause equipment or property-only damage. Failure to properly lift unit could result in death or serious injury. See details below.

Figure 18. Corner weight locations and center of gravity

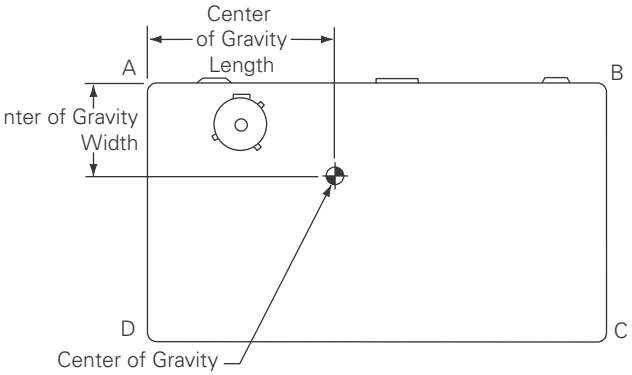


Figure 19. Rigging

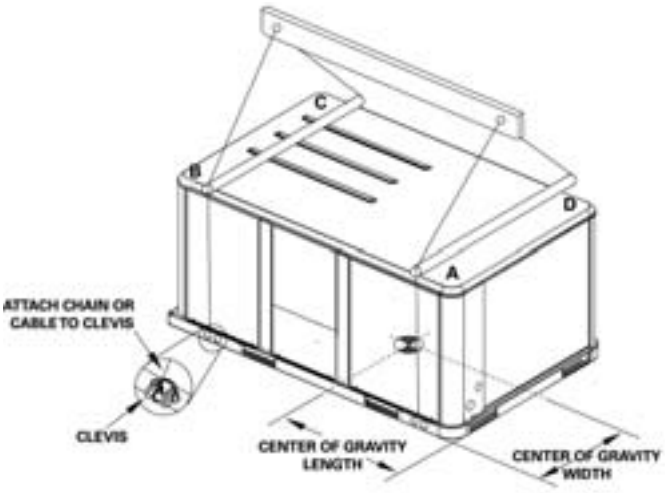


Table 1. Typical unit weights and point loading data

Model	Net Weight	Corner Weights				Center of Gravity	
		A	B	C	D	Length	Width
036	487	132	121	112	121	33.0	19.0
048	538	146	134	124	134	33.0	19.0
060	678	188	164	154	173	40.5	23.0
072	700	194	169	159	179	40.5	23.0
090	794	218	194	182	201	41.0	23.0
120	941	235	251	234	221	52.0	28.0
150	1800	491	481	410	418	60.0	32.0
180	1848	505	493	421	429	60.0	32.0
240	2008	548	536	458	466	60.0	32.0
300	1906	520	509	435	442	30.0	32.0

Table 2. Net weights for electric heat are as follows

Unit Size	23-36 kW	54 kW	72 kW
GER 150, 180, 240, 300	33/27	40/32	43/34

Table 3. Option and accessory weights

Option/Accessory Description	Net Weight 036-060	Net Weight 072-120	Net Weight 150-180, 300	Net Weight 240
Electric Heat	15	15	-	-
Economizer H/D	26	36	65/80	65/80
Motorized Damper	20	30	60/75	60/75
Manual Damper	16	26	32	32
Barometric Relief	7	10	-	-
Power Exhaust	N/A	80	95	95
Oversized Motor	5	8	5	5
Belt Drive Motor (3-phase only)	31	Standard	10	10
Hinged Access	10	12	27	27
Hail Guard	12	20	-	-
Through the base electrical	8	13	23	23
Unit Disconnect Switch	5	5	10	10
Unit Circuit Breaker	5	5	10	10
TCI, LCI	1	1	1	1
Frostat	1	1	1	1
Crankcase Heater	1	1	1	1
Smoke Detector, Return	7	7	-	-
Smoke Detector, Supply	5	5	5	5
Clogged Filter Switch	1	1	1	1
Fan Fail Switch	1	1	1	1
Discharge Air Tube	3	3	3	3
Roof curb	70	115	235	235
Zone Sensors	1	1	1	1

Installation

General Installation Checks

The checklist below is a summary of the steps required to successfully install a commercial unit. This checklist is intended to acquaint the installing personnel with what is required in the installation process. It does not replace the detailed instructions called out in the applicable sections of this manual.

- Check the unit for shipping damage and material shortage; file a freight claim and notify appropriate sales representation.
- Verify the correct model, options and voltage from the unit nameplate.
- Verify the installation location of the unit will provide the required clearance for proper operation.
- Assemble and install the roof curb (if applicable). Refer to the latest edition of the curb installers guide that ships with each curb kit.
- Fabricate and install duct work; secure duct work to the curb.

Factory Installed Economizer

- Ensure the economizer has been pulled out into the operating position. Refer to the economizer installers guide for proper position and setup.
- Install all access panels.

Filter Installation

- Each unit ships with 1-inch filters. The quantity of filters is determined by unit size. Access to the filters is obtained by removing the fan access panel. To modify the unit's filter rack to accept 2-inch filters, remove the L-shaped angle attachment screws and rotate the angles 90-degrees.
- Reinstall the screws and insert new filters. Refer to the unit Service Facts (shipped with each unit) for filter requirements.

Note: *Do not operate the unit without filters.*

Main Electrical Power Requirements

⚠WARNING

Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow code could result in death or serious injury.

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

- Verify the power supply complies with the unit nameplate specifications.
- Inspect all control panel components; tighten any loose connections.
- Connect properly sized and protected power supply wiring to a field-supplied/installed disconnect switch and to the main power terminal block (HTB1) in the unit control panel.
- Install proper grounding wires to an earth ground.

Note: *All field-installed wiring must comply with NEC and applicable local codes.*

Electric Heat Requirements

- Verify that the power supply complies with the electric heater specifications on the unit and heater nameplate.
- Inspect the heater junction box and control panel; tighten any loose connections.
- Check electric heat circuits for continuity.

Low Voltage Wiring (AC & DC) Requirements

- Install the zone thermostat, with or without switching subbase.
- Connect properly sized control wiring to the proper termination points between the zone thermostat and the unit control panel.

Foundation for Rooftop Units

If the unit is installed at ground level (horizontal design), elevate it above the snow line. Provide concrete footings at each support location with a full perimeter support structure or a slab foundation for support. Refer to Table 1, p. 28 for the unit's operating and point loading weights when constructing a footing foundation.

If anchoring is required, anchor the unit to the slab using hold down bolts or isolators. Isolators should be installed to minimize the transmission of vibrations into the building.

For rooftop applications, ensure the roof is strong enough to support the combined unit and support structural weight.

⚠ WARNING

Risk of Roof Collapsing!

Confirm with a structural engineer that the roof structure is strong enough to support the combined weight of the roofcurb and the unit. Refer to Table 1, p. 28 and Table 3, p. 29 for typical unit and curb weights. Failure to ensure proper structural roof support could cause the roof to collapse, which could result in death or serious injury and property damage.

If anchoring is required, anchor the unit to the roof with hold-down bolts or isolators.

Check with the contractor for proper waterproofing procedures.

Ductwork

When attaching the ductwork to the unit, provide a watertight flexible connector at the unit to prevent operating sounds from transmitting through the ductwork.

Elbows with turning vanes or splitters are recommended to minimize air noise due to turbulence and to reduce static pressure.

All outdoor ductwork between the unit and the structure should be weather proofed after installation is complete. See dimensional data on pages 13 through 16 for connection sizes.

Roof Curbs

The roof curbs for these units (down flow) consists of a full perimeter enclosure to support the unit. Before installing any roof curb:

- Verify that the correct roof curb is applied to the unit
- Verify that the roof curb includes the necessary gaskets and hardware.
- Verify that the proposed installation location provides the required clearance for proper unit operation.
- Insure that the curb is level and square.The top surface of the curb must be true to assure an adequate curb-to-unit seal.

Step-by-step curb assembly and installation instructions ship with each accessory roof curb kit. Follow the instructions carefully to assure proper fit-up when the unit is set into place.

To assure proper condensate flow during operation, the unit (and curb) must be level.

If the unit is elevated, a field constructed catwalk around the unit is strongly recommended to provide easy access for unit maintenance and service.

Recommendations for installing the supply air and return air ductwork joining the roof curb are included in the curb instruction booklet. See dimensional data on pages 17 through 20 for roof curb sizing.

Note: *For sound consideration, cut only the holes in the roof deck for the duct work penetrations. Do not cut out the entire roof deck within the curb perimeter.*

If Curb Accessory Kit is not used:

The duct work can be attached directly to the factory provided flanges around the unit's supply and return air openings. Be sure to use flexible duct connections at the unit.

For built-up curbs supplied by others, gaskets must be installed around the curb perimeter flange and the supply and return air opening flanges.

Note: *For sound consideration, cut only the holes in the roof deck for the duct work penetrations. Do not cut out the entire roof deck within the curb perimeter.*

Rigging the Unit

A rigging illustration and center-of-gravity dimensional data table are shown in Table 1, p. 28. Refer to the typical unit operating weights table before proceeding.

1. Remove the two screws from each end of the unit that secures the wooden shipping top. Remove the wooden top and metal retaining brackets. Remove the protective covering from around the unit.
2. Rig the unit. Attach adequate strength lifting slings to all four lifting brackets in the unit base rail. Do not use cables, chains, or slings except as shown.
3. Install a lifting bar, (as shown in the illustration), to protect the unit, and to facilitate a uniform lift. The minimum distance between the lifting hook and the top of the unit should be 7-feet.
4. Test lift the unit to ensure it is properly rigged and balanced. Make any necessary rigging adjustments.
5. Lift the unit and position it into place.
6. Downflow units; align the base rail of the unit with the curb rail while lowering the unit onto the curb. Make sure that the gasket on the curb is not damaged while positioning the unit.
7. Set the unit onto the curb; check for levelness.
8. Ensure unit-to-curb seal is tight and without buckles or cracks.
9. Install and connect a condensate drain line to the evaporator drain connection.

Supply/Return Pipe

Connect the supply and return line to the water inlet and outlet of the unit. On open loop systems, an in-line strainer or mesh screen should be used to eliminate contaminants from entering the water-to refrigerant heat exchanger.

An isolation valve, p/t plugs and automatic balancing device are also recommended to separate the closed/open loop from the mechanical device.

Drain Connection

An evaporator condensate drain connection is provided on each unit. The condensate drain pan is factory installed to drain condensate to the back side of the unit. It can be converted to drain condensate out of the front of the unit or through the base

To convert drain condensate out the front of the unit:

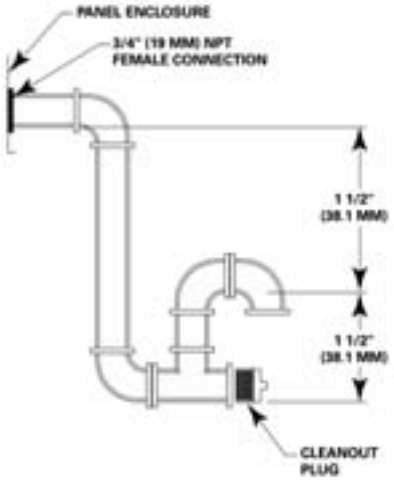
1. Remove the evaporator access panel and supply air access panels.
2. Remove the support panel that the condensate drain pan exits through.
3. Slide the condensate drain pan out of the unit and rotate 180°.
4. Slide the condensate drain pan back into the unit, align the drain with the grommeted opening in the rear support panel and push until the coupling is seated in the grommet.
5. Replace the front support panel by aligning the panel with tabs in the raceway. Align the condensate drain pan support in the grommeted hole as the panel is put in place.
6. Replace the evaporator access panel and the supply air access panels.

To convert drain condensate through the base of the unit:

1. Remove the evaporator access panel and supply air access panels.
2. Remove the support panel that the condensate drain pan exits through.
3. Slide the condensate drain pan out of the unit.
4. Place on a level surface in the position it was removed from the unit.
5. Remove the plug knockout in the bottom of the drain pan to convert it to through the base drainage.
6. Plug the original condensate drain opening with a field supplied 3/4-inch NPT plug.
7. Slide the condensate drain pan back into the unit, align the drain support with the grommeted opening in the rear support panel and push until the support is seated in the grommet.
8. Replace the front support panel by aligning the panel with tabs in the raceway. Align the plugged condensate drain pan coupling in the grommeted hole as the panel is put in place.
9. Replace evaporator access panel and supply air access panels.
10. A condensate trap must be installed at the unit due to the drain connection being on the negative pressure side of the fan. Install the p-trap using the guidelines below.

A condensate drain line must be connected to the p-trap. Pitch the drain lines at least 1/2-inch for every 10-feet of horizontal run to assure proper condensate flow. Do not allow the horizontal run to sag causing a possible double-trap condition which could result in condensate backup due to air lock.

Figure 20.



Horizontal Discharge Conversion

Units are factory shipped in the downflow discharge configuration, but can be field converted to a horizontal discharge configuration. Some, but not all units require a different thermal cut-out limit switch (which is wire tied near the terminal block in the heater compartment) if the horizontal discharge configuration is used.

The following units require a limit switch change out for the horizontal discharge. The additional limit switch is shipped attached to the blower housing.

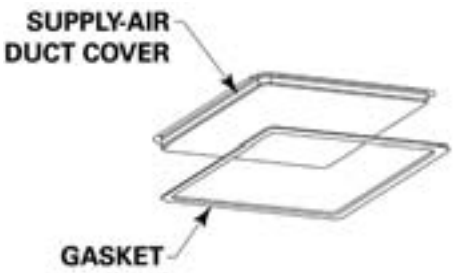
If any of the units listed in the following list are installed in the downflow discharge configuration, remove the wire tied TCO-A (located near the terminal block in the heater compartment) and discard.

Conversion 3 through 5-Ton Units

To convert a unit from down flow to horizontal discharge,

1. Remove the return and supply duct covers.
2. Apply gasket to the supply duct cover as shown in Figure 21, p. 32.

Figure 21. Gasket Installation



3. Position duct covers. Rotate the supply duct cover 90-degrees to allow it to be slid into the supply opening.

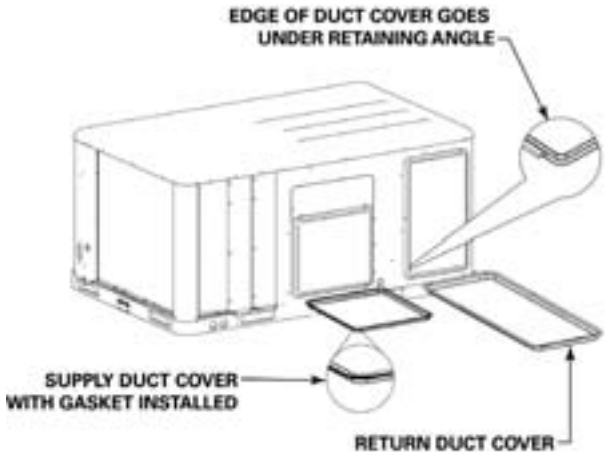
Figure 22. Duct cover with gasket installed

Note: *If the unit is equipped with a return air smoke detector, refer to the field conversion for horizontal discharge before installing the return air duct cover.*

4. Slide the duct covers into the duct openings until the end ward edge of the duct cover engages with the two retaining clips on the duct flanges. Secure the outward edge of each duct cover with two screws.

Note: *If unit should include a limit switch change out, proceed to the TCO-A instruction sheet on* "TCO-A Instructions," p. 33.

Figure 23. Installing duct cover



Conversion 6 through 10-Ton Units

To convert a unit from down flow to horizontal discharge,

1. Remove the return and supply duct covers.
2. Apply gasket to the return duct cover as shown in Figure 22.
3. Position the duct covers as shown below. The supply duct cover is installed over the down flow return opening by engaging one side of the panel under a retaining angle and securing the other side with three screws.

Note: *If the unit is equipped with a return air smoke detector, refer to the field conversion for horizontal discharge before installing the return air duct cover.*

4. Slide return duct cover into supply openings until end ward edge of the duct cover engages with the two retaining clips on the duct flanges. Secure the outward edge of each duct cover with two screws.

Note: *If unit should include a limit switch change out, proceed to the TCO-A instruction sheet on this page.*

TCO-A Instructions

If the unit being installed is listed in the following table, and is equipped with the corresponding model number of factory installed electric heater package in the table, the limit control TCO-A must be replace with the extra limit control shipped in the heater compartment. Replace TCO-A following the instruction in steps 1 through 4. If the unit being installed does not have a factory installed electric heater package, or is equipped with a factory installed electric heater model that does not correspond to models listed below, skip steps 1 through 4, and go on to the next step in the installation process.

Note: *See Table 7, p. 40 for electric heater kit part #s and equipment models.*

1. Remove the heater section access panel and open the electric heater front panel.
2. TCO-A is the limit control located in the central part of the heater mounting plate and that is located on the bottom of the two heater element assemblies. To replace this device, first remove the two wires connected to the terminals. Next, remove the two screws which secure it to the heater element mounting plate. Once TCO-A has been removed from the heater element mounting plate, discard this device.
3. Obtain the replacement TCO-A which is secured by a wire tie near the electric heater terminal block in the heater compartment. Attach it to the heater element mounting plate with the two screws that were removed in step 2 above. Connect the two wires that were unhooked in step 2 to the terminals on the new TCO-A. Refer to the heater package wiring diagram to assure that the wiring is connected properly.
4. Close the electric heater dead front panel and replace heat section access panel.

Field Installed Power Wiring

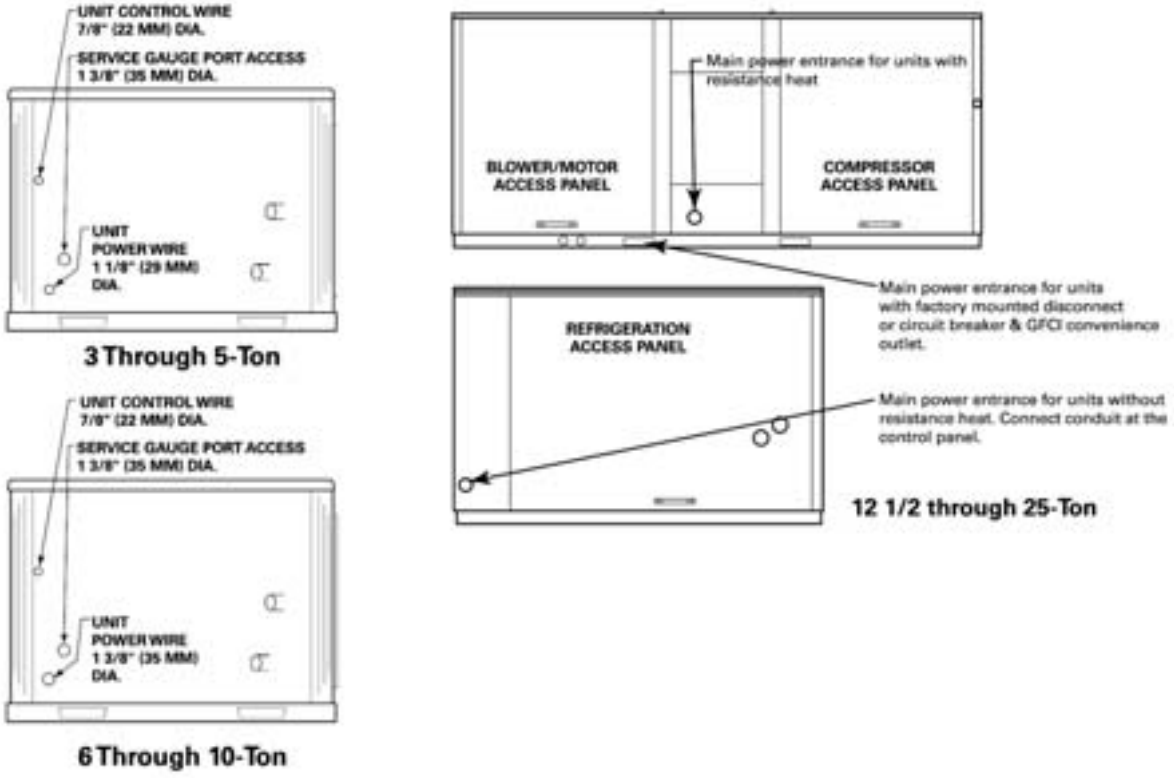
⚠ WARNING

Proper Field Wiring and Grounding Required!

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes. Failure to follow code could result in death or serious injury.

Verify that the power supply available is compatible with the unit's nameplate. The available supply power must be within 10% of the rated voltage stamped on the nameplate. Use only copper conductors to connect the power supply to the unit.

Figure 24. Electrical entrance



Main Unit Power Wiring

1. If the unit is NOT equipped with an optional factory installed non-fused disconnect switch or circuit breaker, a field supplied disconnect switch must be installed at or near the unit in accordance with the National Electric Code (NEC latest edition).
2. Location of the applicable electric service entrance may be found in Figure 24, p. 34.
3. Complete the unit's power wiring connections onto either; the main terminal wire connectors inside the unit control panel, the factory mounted non-fused disconnect switch (UCD) or circuit breaker (UCB). Refer to the customer connection diagram that is shipped with the unit for specific termination points.
4. Provide proper grounding for the unit in accordance with the local and national codes.

Field Installed Control Wiring

An overall layout of the various control options available with the required number of conductors for each control device may be found on Figure 25, p. 35 and Figure 26, p. 36.

Note: *All field wiring must conform to NEC guidelines as well as state and local codes.*

Control Power Transformer

The 24-volt control power transformers are to be used only with the accessories called out in this manual. Transformers rated greater than 50 VA are equipped with internal circuit breakers. If a circuit breaker trips, turn OFF all power to the unit before attempting to reset it.

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/ tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

The transformer is located in the control panel.The circuit breaker is located on the left side of the transformer and can be reset by pressing in on the black reset button.

Figure 25.

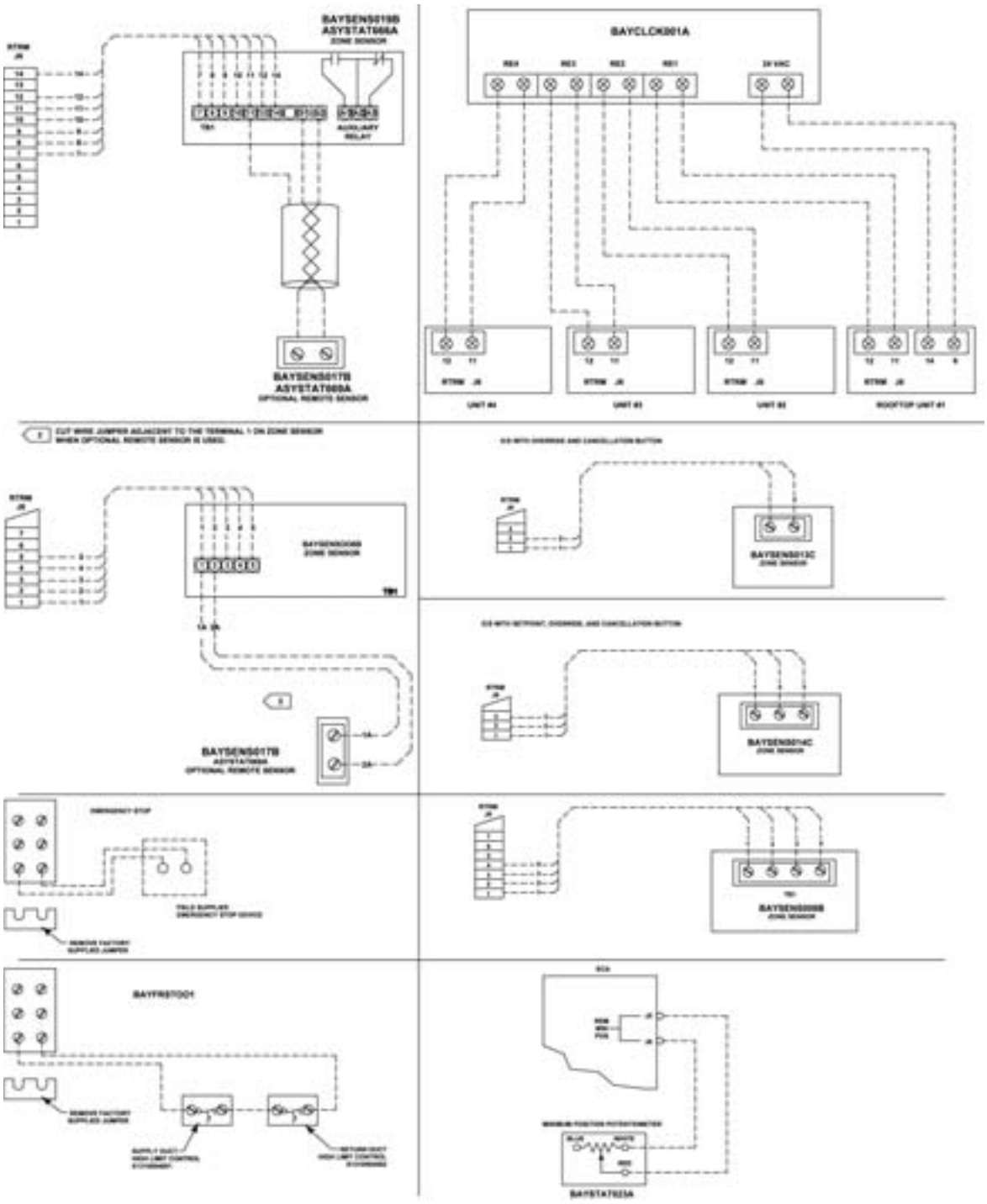
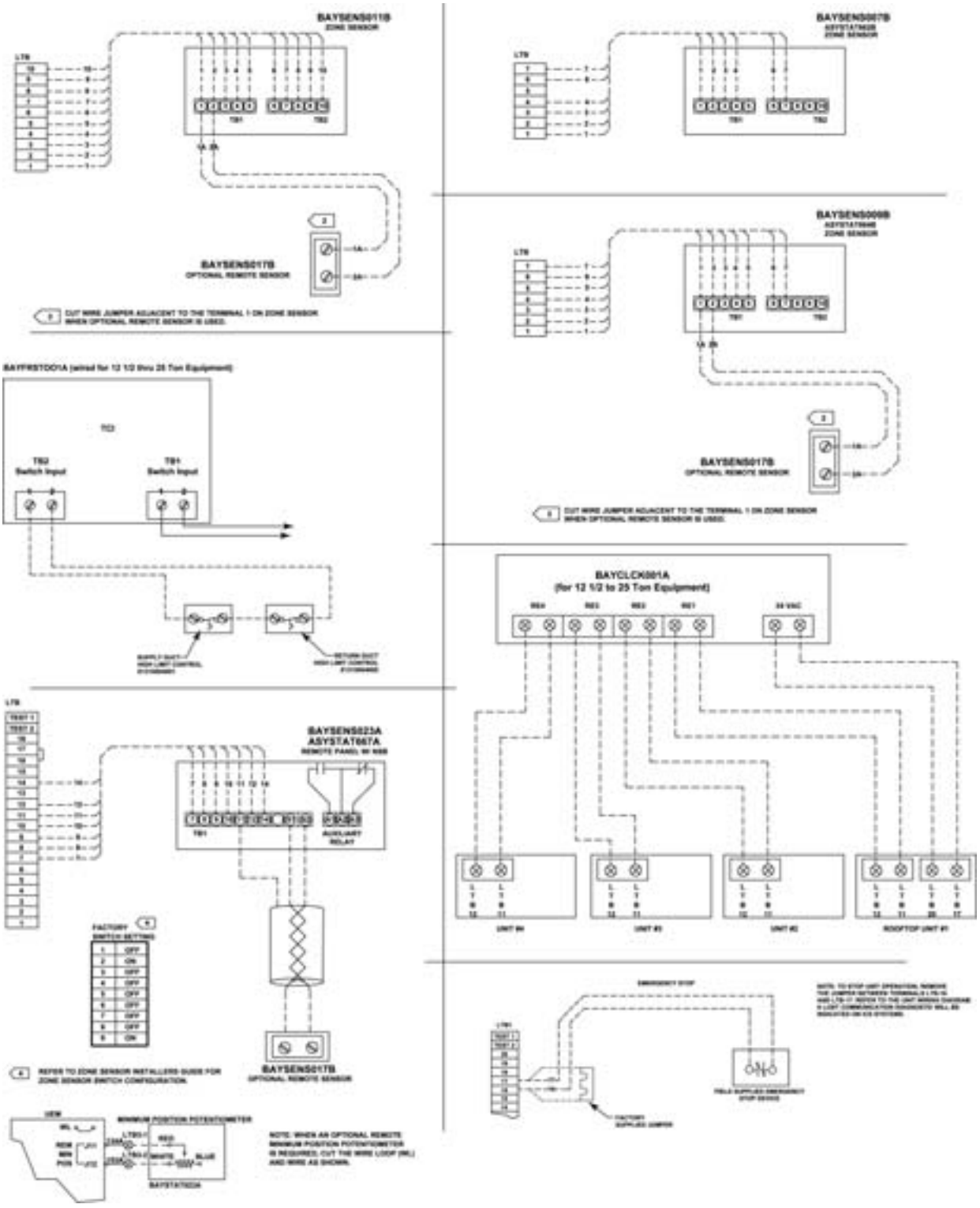


Figure 26.


BAYSENS011B
BAYSENS007B
BAYSENS017B
BAYSENS006B
BAYSENS017B
BAYFRSTDO1A (wired for 12 1/2 thru 25 Ton Equipment)
TS2
Switch Input
TS1
Switch Input
BAYCLCK001A
(for 12 1/2 to 25 Ton Equipment)
24 VAC
BAYSENS023A
AS/YSTAT067A
BAYSENS017B
FACTORY
SWITCH SETTING
UNIT #4
UNIT #3
UNIT #2
ROOFTOP UNIT #1
EMERGENCY STOP
FIELD SUPPLIED EMERGENCY
STOP DEVICE
FACTORY
SUPPLIED JUMPER
MINIMUM POSITION POTENTIOMETER
BAYSTAT023A

Controls Using 24 VAC

Before installing any wire, refer to the electrical access locations in Figure 24, p. 34.

1. Use copper conductors unless otherwise specified.
2. Ensure that the AC control wiring between the controls and the unit's termination point does not exceed three (3) ohms/conductor for the length of the run.

Note: *Resistance in excess of 3-ohms per conductor may cause component failure due to insufficient AC voltage supply.*

3. Check all loads and conductors for grounds, shorts, and mis-wiring.
4. Do not run the AC low voltage wiring in the same conduit with the high voltage power wiring.
5. Route low voltage wire per Figure 27 below.

Figure 27. Wire Routing

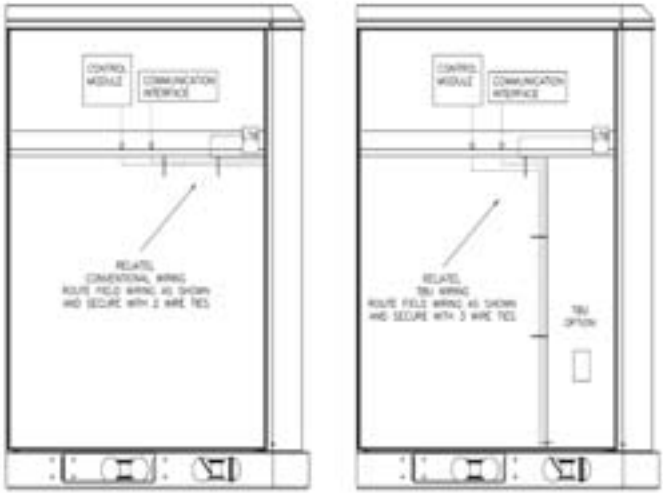


Table 4. 24V AC conductors

Distance from unit to Control	Recommended Wire Size
000-460 feet	18 gauge
461-732 feet	16 gauge
733-1000 feet	14 gauge

Controls using DC Analog Input/Outputs (Standard Low Voltage Multi-conductor Wire)

Before installing any connecting wire between the unit utilizing a DC analog input/output signal,

refer to Figure 24, p. 34 for electrical access locations provided on the unit.

1. Review Table 5, it lists the conductor sizing guidelines that must be followed when interconnecting the DC binary output devices and the system components utilizing a DC analog input/output signal to the unit.

Note: *Resistance in excess of 2.5 ohms per conductor can cause deviations in the accuracy of the controls.*

2. Ensure that the wiring between controls and the unit's termination point does not exceed two and a half (2.5) ohms/conductor for the length of the run.
3. Do not run the electrical wires transporting DC signals in or around conduit housing high voltage wires.
4. Route low voltage wiring per Figure 27.

Table 5. DC conductors; zone sensor module wiring

Distance from unit to Control	Recommended Wire Size
0-150 feet	22 gauge
151-240 feet	20 gauge
241-385 feet	18 gauge
386-610 feet	16 gauge
611-970 feet	14 gauge

Electrical Requirements

Table 6. Electrical perfomance

Model No.	Unit Volts	Total Unit FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device
GERE036	208/60/1	24.6	18.6	105.0	1	6.00	0.75	1	29.3	45
	230/60/1	24.6	18.6	105.0	1	6.00	0.75	1	29.3	45
	208/60/3	18.5	13.5	88.0	1	5.00	1	1	21.9	35
	230/60/3	18.5	13.5	88.0	1	5.00	1	1	21.9	35
	460/60/3	8.9	6.4	39.0	1	2.50	1	1	10.5	15
	575/60/3	6.8	5.1	34.0	1	1.70	1	1	8.1	15
GERE048	208/60/1	30.7	23.1	134.0	1	7.60	1	1	36.5	50
	230/60/1	30.7	23.1	134.0	1	7.60	1	1	36.5	50
	208/60/3	21.0	16.0	91.0	1	5.00	1	1	25.0	40
	230/60/3	21.0	16.0	91.0	1	5.00	1	1	25.0	40
	460/60/3	9.6	7.1	46.0	1	2.50	1	1	11.4	15
	575/60/3	7.3	5.6	37.0	1	1.70	1	1	8.7	15
GERE060	208/60/1	35.2	27.6	158.0	1	7.60	1	1	42.1	60
	230/60/1	35.2	27.6	158.0	1	7.60	1	1	42.1	60
	208/60/3	23.1	18.1	137.0	1	5.00	1	1	27.6	45
	230/60/3	23.1	18.1	137.0	1	5.00	1	1	27.6	45
	460/60/3	11.5	9.0	62.0	1	2.50	1	1	13.8	20
	575/60/3	8.5	6.8	50.0	1	1.70	1	1	10.2	15
GERE072	208/60/3	27.4	22.4	149.0	1	5.00	1	1	33.0	50
	230/60/3	27.4	22.4	149.0	1	5.00	1	1	33.0	50
	460/60/3	13.1	10.6	75.0	1	2.50	1	1	15.8	25
	575/60/3	9.2	7.7	54.0	1	1.50	1	1	11.1	15
	208/60/3	28.7	22.4	149.0	1	6.30	2	1	34.3	50
	230/60/3	28.7	22.4	149.0	1	6.30	2	1	34.3	50
	460/60/3	13.7	10.6	75.0	1	3.10	2	1	16.4	25
	575/60/3	10.1	7.7	54.0	1	2.40	2	1	12.0	15
GERE090	208/60/3	28.6	25.0	164.0	1	3.60	1	1	34.9	50
	230/60/3	28.6	25.0	164.0	1	3.60	1	1	34.9	50
	460/60/3	13.9	12.2	100.0	1	1.70	1	1	17.0	25
	575/60/3	10.4	9.0	78.0	1	1.40	1	1	12.7	20
	208/60/3	34.4	25.0	164.0	1	9.40	3	1	40.7	60
	230/60/3	34.4	25.0	164.0	1	9.40	3	1	40.7	60
	460/60/3	16.8	12.2	100.0	1	4.60	3	1	19.9	30
	575/60/3	12.4	9.0	78.0	1	3.40	3	1	14.7	20
GERE120	208/60/3	26.6	18.1	137.0	2	8.50	3.6	1	49.2	60
	230/60/3	26.6	18.1	137.0	2	8.50	3.6	1	49.2	60
	460/60/3	13.3	9.0	62.0	2	4.30	3.6	1	24.6	30
	575/60/3	11.1	6.8	50.0	2	4.30	3.6	1	19.6	25

Table 6. Electrical perfomance

Model No.	Unit Volts	Total Unit FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device
GERE150	208/60/3	33.0	22.4	149.0	2	10.60	3	1	61.0	80
	230/60/3	33.0	22.4	149.0	2	10.60	3	1	61.0	80
	460/60/3	15.4	10.6	75.0	2	4.80	3	1	28.7	35
	575/60/3	11.8	7.9	54.0	2	3.90	3	1	21.7	25
	208/60/3	39.1	22.4	149.0	2	16.70	5	1	67.1	80
	230/60/3	39.1	22.4	149.0	2	16.70	5	1	67.1	80
	460/60/3	18.2	10.6	75.0	2	7.60	5	1	31.5	40
	575/60/3	14.0	7.9	54.0	2	6.10	5	1	23.9	30
GERE180	208/60/3	35.6	25.0	164.0	2	10.60	3	1	66.9	90
	230/60/3	35.6	25.0	164.0	2	10.60	3	1	66.9	90
	460/60/3	17.3	12.5	100.0	2	4.80	3	1	32.9	45
	575/60/3	14.2	10.3	78.0	2	3.90	3	1	27.1	35
	208/60/3	41.7	25.0	164.0	2	16.70	5	1	73.0	90
	230/60/3	41.7	25.0	164.0	2	16.70	5	1	73.0	90
	460/60/3	20.1	12.5	100.0	2	7.60	5	1	35.7	45
	575/60/3	16.4	10.3	78.0	2	6.10	5	1	29.3	35
GERE240	208/60/3	55.8	39.1	267.0	2	16.70	5	1	104.7	125
	230/60/3	55.8	39.1	267.0	2	16.70	5	1	104.7	125
	460/60/3	24.9	17.3	142.0	2	7.60	5	1	46.5	60
	575/60/3	21.5	15.4	103.0	2	6.10	5	1	40.8	50
	208/60/3	56.7	39.1	267.0	2	17.60	7.5	1	105.6	125
	230/60/3	56.7	39.1	267.0	2	17.60	7.5	1	105.6	125
	460/60/3	25.9	17.3	142.0	2	8.60	7.5	1	47.5	60
	575/60/3	22.4	15.4	103.0	2	7.00	7.5	1	41.7	50
GERE300	208/60/3	63.3	39.1	267.0	2	24.20	7.5	1	112.2	150
	230/60/3	63.3	39.1	267.0	2	24.20	7.5	1	112.2	150
	460/60/3	29.6	18.6	103.0	2	11.00	7.5	1	52.9	70
	575/60/3	24.4	15.4	160.0	2	9.00	7.5	1	43.7	50

Table 7. Electrical Perfomance for units with electric heat (single point connection)

					Standard Indoor Motor		Oversized Indoor Motor	
Unit Model Number	Heater Model Number	Electric Heat Amps	Electric Heat kW	Control Stages	Mimimum Circuit Ampacity	Max Overcurrent Protection	Mimimum Circuit Ampacity	Max Overcurrent Protection
208 Volt Single Phase							—	—
GERE036	BAYHTRE105*	18.3	3.8	1	52.1	60	—	—
	BAYHTRE110*	36.1	7.5	2	74.4	80	—	—
	BAYHTRE114*	50.0	10.4	2	91.8	100	—	—
GERE048	BAYHTRE105*	18.3	3.8	1	59.4	70	—	—
	BAYHTRE110*	36.1	7.5	2	81.6	90	—	—
	BAYHTRE114*	50.0	10.4	2	99.0	100	—	—
	BAYHTRE118*	63.5	13.2	2	115.9	125	—	—
GERE060	BAYHTRE105*	18.3	3.8	1	65.0	80	—	—
	BAYHTRE110*	36.1	7.5	2	87.2	100	—	—
	BAYHTRE114*	50.0	10.4	2	104.6	110	—	—
	BAYHTRE118*	63.5	13.2	2	121.5	125	—	—
230 Volt Single Phase								
GERE036	BAYHTRE105*	20.8	5.0	1	55.3	60	—	—
	BAYHTRE110*	41.7	10.0	2	81.4	90	—	—
	BAYHTRE114*	57.5	13.8	2	101.1	110	—	—
GERE048	BAYHTRE105*	20.8	5.0	1	62.5	80	—	—
	BAYHTRE110*	41.7	10.0	2	88.6	100	—	—
	BAYHTRE114*	57.5	13.8	2	108.4	110	—	—
	BAYHTRE118*	73.3	17.6	2	128.1	150	—	—
GERE060	BAYHTRE105*	20.8	5.0	1	68.1	90	—	—
	BAYHTRE110*	41.7	10.0	2	94.2	110	—	—
	BAYHTRE114*	57.5	13.8	2	114.0	125	—	—
	BAYHTRE118*	73.3	17.6	2	133.7	150	—	—
208 Volt Three Phase								
GERE036	BAYHTRE306*	12.5	4.5	1	37.5	45	—	—
	BAYHTRE312*	25.0	9.0	2	53.1	60	—	—
	BAYHTRE318*	36.4	13.1	2	67.4	70	—	—
GERE048	BAYHTRE306*	12.5	4.5	1	40.6	50	—	—
	BAYHTRE312*	25.0	9.0	2	56.3	60	—	—
	BAYHTRE318*	36.4	13.1	2	70.5	80	—	—
GERE060	BAYHTRE306*	12.5	4.5	1	43.3	50	—	—
	BAYHTRE312*	25.0	9.0	2	58.9	70	—	—
	BAYHTRE318*	36.4	13.1	2	73.1	80	—	—
	BAYHTRX323*	48.0	17.3	2	87.6	90	—	—
GERE072	BAYHTRW309A	6.8	18.9	1	56.6	70	57.9	70
	BAYHTRW318A	13.5	37.5	1	79.9	90	81.2	90
	BAYHTRW327A	20.3	56.3	2	103.4	110	104.7	110
	BAYHTRW336A	27.0	74.9	2	126.6	150	127.9	150
GERE090	BAYHTRU309A	6.8	18.9	1	58.4	70	64.2	80
	BAYHTRU318A	13.5	37.5	1	81.7	90	87.5	100
	BAYHTRU327A	20.3	56.3	2	105.3	110	111.1	125
	BAYHTRU336A	27.0	74.9	2	128.5	150	134.3	150

Table 7. Electrical Perfomance for units with electric heat (single point connection)

Unit Model Number	Heater Model Number	Electric Heat Amps	Electric Heat kW	Control Stages	Standard Indoor Motor		Oversized Indoor Motor	
					Mimimum Circuit Ampacity	Max Overcurrent Protection	Mimimum Circuit Ampacity	Max Overcurrent Protection
GERE120	BAYHTRB318A	13.5	37.5	1	96.1	100	—	—
	BAYHTRB327A	20.3	56.3	2	119.7	125	—	—
	BAYHTRB336A	27.0	74.9	2	142.9	150	—	—
	BAYHTRB354A	40.6	112.7	2	190.1	200	—	—
GERE150	AYDHTRK318/ AYHHTRM318	37.5	13.5	1	107.9	110	114.0	125
	AYDHTRK336/ AYHHTRM336	74.9	27.0	2	154.6	175	160.7	175
	AYDHTRK354/ AYHHTRM354	112.4	40.5	2	201.5	225	207.6	225
GERE180	AYDHTRK318/ AYHHTRM318	37.5	13.5	1	113.7	125	119.8	125
	AYDHTRK336/ AYHHTRM336	74.9	27.0	2	160.5	175	166.6	175
	AYDHTRK354/ AYHHTRM354	112.4	40.5	2	207.4	225	213.5	225
GERE240	AYDHTRL336/ AYHHTRN336	74.9	27.0	2	198.3	200	199.2	200
	AYDHTRL354/ AYHHTRN354	112.4	40.5	2	245.2	250	246.1	250
	AYDHTRK372/ AYHHTRN372	149.9	54.0	2	292.1	300	293.0	300
GERE300	AYDHTRL336/ AYHHTRN336	74.9	27.0	2	205.8	225	—	—
	AYDHTRL354/ AYHHTRN354	112.4	40.5	2	252.7	300	—	—
	AYDHTRK372/ AYHHTRN372	149.9	54.0	2	299.6	300	—	—
230 Volt Three Phase								
GERE036	BAYHTRE306*	14.4	6.0	1	39.9	45	—	—
	BAYHTRE312*	28.9	12.0	2	58.0	60	—	—
	BAYHTRE318*	41.9	17.4	2	74.3	80	—	—
GERE048	BAYHTRE306*	14.4	6.0	1	43.0	50	—	—
	BAYHTRE312*	28.9	12.0	2	61.1	70	—	—
	BAYHTRE318*	41.9	17.4	2	77.4	80	—	—
GERE060	BAYHTRE306*	14.4	6.0	1	45.6	60	—	—
	BAYHTRE312*	28.9	12.0	2	63.8	70	—	—
	BAYHTRE318*	41.9	17.4	2	80.0	80	—	—
	BAYHTRX323*	55.3	23.0	2	96.8	100	—	—
GERE072	BAYHTRW309A	9.0	21.7	1	60.1	70	61.4	70
	BAYHTRW318A	18.0	43.3	1	87.1	90	88.4	100
	BAYHTRW327A	27.0	65.0	2	114.2	125	115.5	125
	BAYHTRW336A	36.0	86.6	2	141.3	150	142.6	150
GERE090	BAYHTRU309A	9.0	21.7	1	61.9	80	67.7	80
	BAYHTRU318A	18.0	43.3	1	89.0	100	94.8	100
	BAYHTRU327A	27.0	65.0	2	116.0	125	121.8	125
	BAYHTRU336A	36.0	86.6	2	143.1	150	148.9	150

Table 7. Electrical Perfomance for units with electric heat (single point connection)

Unit Model Number	Heater Model Number	Electric Heat Amps	Electric Heat kW	Control Stages	Standard Indoor Motor		Oversized Indoor Motor	
					Mimimum Circuit Ampacity	Max Overcurrent Protection	Mimimum Circuit Ampacity	Max Overcurrent Protection
GERE120	BAYHTRB318A	18.0	43.3	1	103.4	110	—	—
	BAYHTRB327A	27.0	65.0	2	130.4	150	—	—
	BAYHTRB336A	36.0	86.6	2	157.5	175	—	—
	BAYHTRB354A	54.0	129.9	2	211.6	225	—	—
GERE150	AYDHTRK318/ AYHHTRM318	43.3	18.0	1	115.1	125	121.2	125
	AYDHTRK336/ AYHHTRM336	86.6	36.0	2	169.3	175	175.4	200
	AYDHTRK354/ AYHHTRM354	129.9	54.0	2	223.4	225	229.5	250
GERE180	AYDHTRK318/ AYHHTRM318	43.3	18.0	1	121.0	125	127.1	150
	AYDHTRK336/ AYHHTRM336	86.6	36.0	2	175.1	200	181.2	200
	AYDHTRK354/ AYHHTRM354	129.9	54.0	2	229.2	250	235.3	250
GERE240	AYDHTRL336/ AYHHTRN336	86.6	36.0	2	212.9	225	213.8	225
	AYDHTRL354/ AYHHTRN354	129.9	54.0	2	267.1	300	268.0	300
	AYDHTRK372/ AYHHTRN372	173.2	72.0	2	321.2	300	322.1	300
GERE300	AYDHTRL336/ AYHHTRN336	86.6	36.0	2	220.4	225	—	—
	AYDHTRL354/ AYHHTRN354	129.9	54.0	2	274.6	300	—	—
	AYDHTRK372/ AYHHTRN372	173.2	72.0	2	328.7	300	—	—
460 Volt Three Phase								
GERE036	BAYHTRE406*	7.2	6.0	1	19.5	20	—	—
	BAYHTRE412*	14.4	12.0	2	28.5	30	—	—
	BAYHTRE418*	20.9	17.4	2	36.6	40	—	—
GERE048	BAYHTRE406*	7.2	6.0	1	20.4	25	—	—
	BAYHTRE412*	14.4	12.0	2	29.4	30	—	—
	BAYHTRE418*	20.9	17.4	2	37.5	40	—	—
GERE060	BAYHTRE406*	7.2	6.0	1	22.8	25	—	—
	BAYHTRE412*	14.4	12.0	2	31.8	35	—	—
	BAYHTRE418*	20.9	17.4	2	39.9	40	—	—
	BAYHTRX423*	27.7	23.0	2	48.4	50	—	—
GERE072	BAYHTRW409A	9.0	10.8	1	29.3	35	29.9	35
	BAYHTRW418A	18.0	21.7	1	42.8	45	43.4	45
	BAYHTRW427A	27.0	32.5	2	56.3	60	56.9	60
	BAYHTRW436A	36.0	43.3	2	69.9	70	70.5	80
GERE090	BAYHTRU409A	9.0	10.8	1	30.5	35	33.4	40
	BAYHTRU418A	18.0	21.7	1	44.0	50	46.9	50
	BAYHTRU427A	27.0	32.5	2	57.5	60	60.4	70
	BAYHTRU436A	36.0	43.3	2	71.1	80	74.0	80

Table 7. Electrical Perfomance for units with electric heat (single point connection)

Unit Model Number	Heater Model Number	Electric Heat Amps	Electric Heat kW	Control Stages	Standard Indoor Motor		Oversized Indoor Motor	
					Mimimum Circuit Ampacity	Max Overcurrent Protection	Mimimum Circuit Ampacity	Max Overcurrent Protection
GERE120	BAYHTRB418A	18.0	21.7	1	51.6	60	—	—
	BAYHTRB427A	27.0	32.5	2	65.1	70	—	—
	BAYHTRB436A	36.0	43.3	2	78.7	80	—	—
	BAYHTRB454A	54.0	65.0	2	105.7	110	—	—
GERE150	AYDHTRK418/ AYHHTRM418	21.7	18.0	1	55.8	60	58.6	60
	AYDHTRK436/ AYHHTRP436	43.3	36.0	2	82.8	90	85.6	90
	AYDHTRK454/ AYHHTRM454	65.0	54.0	2	109.9	110	112.7	125
GERE180	AYDHTRK418/ AYHHTRM418	21.7	18.0	1	60.1	70	62.9	70
	AYDHTRK436/ AYHHTRP436	43.3	36.0	2	87.1	90	89.9	90
	AYDHTRK454/ AYHHTRM454	65.0	54.0	2	114.2	125	117.0	125
GERE240	AYDHTRL436/ AYHHTRN436	43.3	36.0	2	100.7	110	101.7	110
	AYDHTRL454/ AYHHTRN454	65.0	54.0	2	127.8	150	128.8	150
	AYDHTRK472/ AYHHTRN472	86.6	72.0	2	154.8	175	155.8	175
GERE300	AYDHTRL436/ AYHHTRN436	43.3	36.0	2	107.0	110	—	—
	AYDHTRL454/ AYHHTRN454	65.0	54.0	2	134.1	150	—	—
	AYDHTRK472/ AYHHTRN472	86.6	72.0	2	161.1	175	—	—
575 Volt Three Phase								
GERE036	BAYHTREW06*	5.8	6.0	1	15.3	20	—	—
	BAYHTREW12*	11.5	12.0	2	22.5	25	—	—
	BAYHTREW18*	16.7	17.4	2	29.0	30	—	—
GERE048	BAYHTREW06*	5.8	6.0	1	16.0	20	—	—
	BAYHTREW12*	11.5	12.0	2	23.1	25	—	—
	BAYHTREW18*	16.7	17.4	2	29.6	30	—	—
GERE060	BAYHTREW06*	5.8	6.0	1	17.5	20	—	—
	BAYHTREW12*	11.5	12.0	2	24.6	25	—	—
	BAYHTREW18*	16.7	17.4	2	31.1	35	—	—
	BAYHTRXW23*	22.1	23.0	2	37.8	40	—	—
GERE072	BAYHTRWW18A	18.0	17.3	1	32.8	35	33.7	35
	BAYHTRWW27A	27.0	26.0	2	43.6	45	44.5	45
	BAYHTRWW36A	36.0	34.6	2	54.4	60	55.3	60
GERE090	BAYHTRUW18A	18.0	17.3	1	34.3	35	36.3	40
	BAYHTRUW27A	27.0	26.0	2	45.1	50	47.1	50
	BAYHTRUW36A	36.0	34.6	2	56.0	60	58.0	60
GERE120	BAYHTRBW18A	18.0	17.3	1	41.2	45	—	—
	BAYHTRBW36A	36.0	34.6	2	62.9	70	—	—
	BAYHTRBW54A	54.0	52.0	2	84.6	90	—	—

Table 7. Electrical Perfomance for units with electric heat (single point connection)

					Standard Indoor Motor		Oversized Indoor Motor	
Unit Model Number	Heater Model Number	Electric Heat Amps	Electric Heat kW	Control Stages	Mimimum Circuit Ampacity	Max Overcurrent Protection	Mimimum Circuit Ampacity	Max Overcurrent Protection
GERE150	AYDHTRKW18/ AYHHTRMW18	17.3	18.0	1	43.3	45	45.5	50
	AYDHTRKW36/ AYHHTRMW36	34.6	36.0	2	64.9	70	67.1	70
	AYDHTRKW54/ AYHHTRMW54	52.0	54.0	2	86.7	90	88.9	90
GERE180	AYDHTRKW18/ AYHHTRMW18	17.3	18.0	1	48.7	50	50.9	60
	AYDHTRKW36/ AYHHTRMW36	34.6	36.0	2	70.3	80	72.5	80
	AYDHTRKW54/ AYHHTRMW54	52.0	54.0	2	92.1	100	94.3	100
GERE240	AYDHTRLW36/ AYHHTRNW36	34.6	36.0	2	84.0	90	84.9	90
	AYDHTRLW54/ AYHHTRNW54	52.0	54.0	2	105.8	110	106.7	110
	AYDHTRKW72/ AYHHTRNW72	69.3	72.0	2	127.4	150	128.3	150
GERE300	AYDHTRMW36/ AYHHTRMW36	34.6	36.0	2	86.9	90	—	—
	AYDHTRLW54/ AYHHTRNW54	52.0	54.0	2	108.7	110	—	—
	AYDHTRKW72/ AYHHTRNW72	69.3	72.0	2	130.3	150	—	—

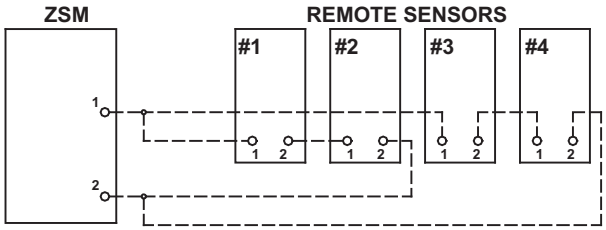
Pre-Start

Space Temperature Averaging

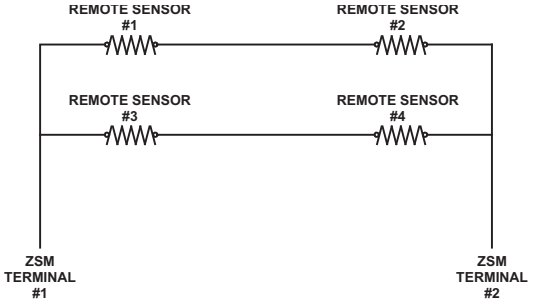
Space temperature averaging is accomplished by wiring a number of remote sensors in a series/parallel circuit.

Using the BAYSENS016* or BAYSENS017*, at least four sensors are required to accomplish space temperature averaging.

Figure 28. Example 1

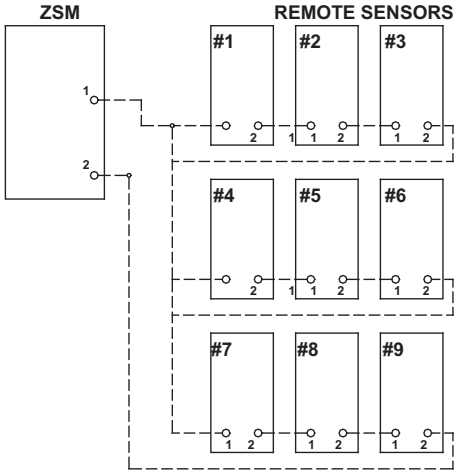


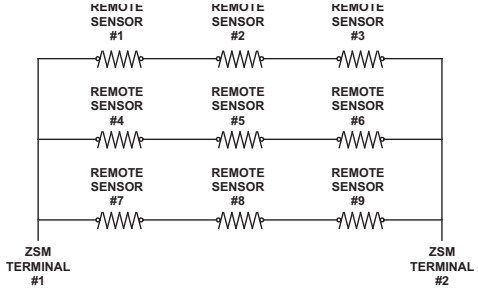
Example #1 illustrates two series circuits with two sensors in each circuit wired in parallel. The square of any number of remote sensors require.



Example #2 illustrates three sensors squared in a series/parallel circuit. Using BAYSENS032*, two sensors are required to accomplish space temperature averaging.

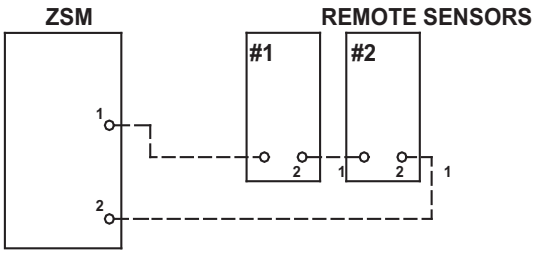
Figure 29. Example 2





Example #3 illustrates the circuit required for this sensor.

Figure 30. Example 3



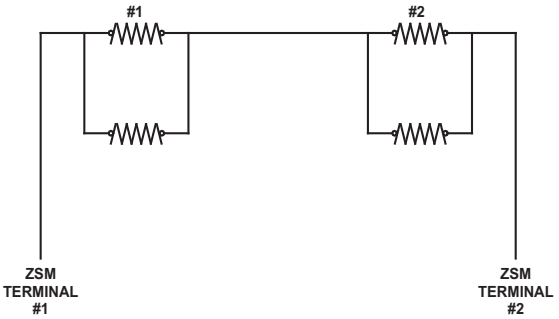


Table 8 lists the temperature versus resistance coefficient for all sensors.

Table 8. Temp vs. Resistance

Degrees F	Nominal Resistance K-Ohms	Degrees F	Nominal Resistance K-Ohms
-20	170.1	45	22.85
-15	143.5	50	19.96
-10	121.4	55	17.47
-5	103.0	60	15.33
0	87.56	65	13.49
5	74.65	70	11.89
10	63.80	75	10.50
15	54.66	80	9.297
20	46.94	85	8.247
25	40.40	90	7.330
30	34.85	95	6.528
35	30.18	100	5.824
40	26.22		

*Temperature vs. resistance coefficient is negative

Voltage Imbalance

⚠WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Three phase electrical power to the unit must meet stringent requirements for the unit to operate properly. Measure each leg (phase-to-phase) of the power supply. Each reading must fall within the utilization range listed on the unit nameplate. If any of the readings do not fall within the proper tolerances, notify the power company to correct this situation before operating the unit.

Excessive three phase voltage imbalance between phases will cause motors to overheat and eventually fail. The maximum allowable voltage imbalance is 2%. Measure and record the voltage between phases 1, 2, and 3 and calculate the amount of imbalance as follows:

$$\% \text{ Voltage Imbalance} = \frac{100 \times AV - VD}{AV}$$

where;

$$AV \text{ (average voltage)} = \frac{\text{Volt 1} + \text{Volt 2} + \text{Volt 3}}{3}$$

V1, V2, V3 = Line Voltage Readings

VD = Line Voltage reading that deviates the farthest from the average voltage.

Example: If the voltage readings of the supply power measured 221, 230 and 227, the average volts would be:

$$\frac{221+230+227}{3} = 226 \text{ Avg.}$$

VD (reading farthest from average) = 221

The percentage of Imbalance equals:

$$100 \times \frac{226 - 221}{226} = 2.2\%$$

The 2.2% imbalance in this example exceeds the maximum allowable imbalance of 2.0%. This much imbalance between phases can equal as much as a 20% current imbalance with a resulting increase in motor winding temperatures that will decrease motor life. If the voltage imbalance is over 2%, notify the proper agencies to correct the voltage problem before operating this equipment.

Electrical Phasing (Three Phase Motors)

The compressor motor(s) and the supply fan motor are internally connected for the proper rotation when the incoming power supply is phased as A, B, C.

Proper electrical supply phasing can be quickly determined and corrected before starting the unit by an instrument such as an Associated Research Model 45 Phase Sequence Indicator and following the steps below:

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

1. Turn the field supplied disconnect switch that provides power to the main power terminal block or to the Line side of the optional factory mounted disconnect switch to the OFF position.
2. Connect the phase sequence indicator leads to the terminal block or the Line side of the optional factory mounted disconnect switch as follows:

   Black (phase A) to L1

   Red (phase B) to L2

   Yellow (phase C) to L3
3. Close the field supplied main power disconnect switch or circuit protector switch that provides the supply power to the unit.
4. Observe the ABC and CBA phase indicator lights on the face of the sequencer. The ABC indicator light will glow

if the phase is ABC. If the CBA indicator light glows, open the disconnect switch or circuit protection switch and reverse any two power wires.

5. Restore the main electrical power and recheck the phasing. If the phasing is correct, open the disconnect switch or circuit protection switch and remove the phase sequence indicator.

Compressor Crankcase Heaters (Optional)

Each compressor can be equipped with a crankcase heater. The proper operation of the crankcase heater is important to maintain an elevated compressor oil temperature during the OFF cycle to reduce oil foaming during compressor starts. Oil foaming occurs when refrigerant condenses in the compressor and mixes with the oil. In lower ambient conditions, refrigerant migration to the compressor could increase.

When the compressor starts, the sudden reduction in crankcase pressure causes the liquid refrigerant to boil rapidly causing the oil to foam. This condition could damage compressor bearings due to reduced lubrication and could cause compressor mechanical failures.

Before starting the unit in the COOLING mode, set the system switch to the OFF position and turn the main power disconnect to the ON position and allow the crankcase heater to operate a minimum of 8-hours.

Before closing the main power disconnect switch, ensure that the SYSTEM selection switch is in the OFF position and the FAN selection switch is in the AUTO position.

Close the main power disconnect switch and the unit mounted disconnect switch, if applicable.

Upon power initialization, the RTRM performs self-diagnostic checks to ensure that all internal controls are functional. It also checks the configuration parameters against the components connected to the system. The Liteport LED, located on the RTRM module, is turned ON within one second of power-up if internal operation is okay.

Use one of the following TEST procedures to bypass some time delays and to start the unit at the control panel. Each step of unit operation can be activated individually by temporarily shorting across the TEST terminals for two or three seconds. The Liteport LED will blink when the test mode has been initiated. The unit can be left in any TEST step for up to one hour before it will automatically terminate, or it can be terminated by opening the main power disconnect switch. Once the test mode has been terminated, the Liteport LED will glow continuously and the unit will revert to the SYSTEM control.

Test Modes

There are three methods in which the TEST mode may be cycled at LTB-Test 1 and LTB-Test 2.

Step Test Mode: This method initiates the different components of the unit, one at a time, by temporarily shorting across the two test terminals for two or three seconds.

For the initial start-up of the unit, this method initiates the different components of the unit, one at a time, by temporarily shorting across the two test terminals for two or three seconds.

Resistance Test Mode: This method may be used for start-up providing a decade box for variable resistance outputs. This method initiates the different components of the unit, one at a time, when a specific resistance value is placed across the two test terminals. The unit will remain in the specific test mode for approximately one hour even though the resistance is left on the test terminals.

Auto Test Mode: This method is not recommended for start-up due to the short timing between individual component steps. This method initiates the different components of the unit, one at a time, when a jumper is installed across the test terminals. The unit will start the first test step and change to the next step every 30 seconds. At the end of the test mode, control of the unit will automatically revert to the applied SYSTEM control method.

For unit test steps, test modes and step resistance values to cycle the various components, see Table 9.

Table 9. Service Test Guide

Test Step	Mode	Fan	Econ (Note 2)	Compr 1	Compr 2	Heat 1	Heat 2	Ohms
1	Fan	ON	Min Position Setpoint 0%	OFF	OFF	OFF	OFF	2.2K
	Min Ventilation	ON	Selectable	OFF	OFF	OFF	OFF	
2	EconomizerTest Open	ON	OPEN	OFF	OFF	OFF	OFF	3.3K
3	CoolStage-1	ON	Min Position	ON(Note 1)	OFF	OFF	OFF	4.7K
4(Note 3)	CoolStage-2	ON	Min Position	ON(Note 1)	ON (Note 1)	OFF	OFF	6.8K
5(Note 3)	Heat Stage-1	ON	Min	OFF	OFF	ON	OFF	10K
6(Note 3)	HeatStage-2	ON	Min	OFF	OFF	ON	ON	15K

Notes:
1. The condenser fans will operate any time a compressor is ON providing the outdoor temperatures are within the operating values.
2. The exhaust fan will turn on anytime the economizer damper position is equal to or greater than the exhaust fan setpoint.
3. Steps for optional accessories and non-applicable modes in unit will be skipped.

Verifying Proper Air Flow (Units with DD Indoor Fan)

Much of the systems performance and reliability is closely associated with, and dependent upon having the proper airflow supplied both to the space that is being conditioned and across the evaporator coil.

The fan motor is factory wired to operate on low speed in the cooling and heating mode. It can be rewired for high speed operation should the application require it. Refer to the wiring diagram on the unit.

The fan motor is specifically designed to operate within the Blower Horse Power (BHP) parameters listed in the fan performance tables of the unit Service Facts. By understanding that these motors will safely work within these conditions, before an oversized motor is required, will allow the air distribution system to be set up properly and diagnostics enhanced should a problem occur.

When verifying direct drive fan performance, the tables must be used somewhat differently than those of belt driven fans. Fan performance diagnostics can be easily recognized when these tables are used correctly.

Before starting the SERVICE TEST, set the minimum position setpoint for the economizer to 0% using the setpoint potentiometer located on the Economizer Control (ECA), if applicable.

Using Table 9, momentarily jump across the Test 1 and Test 2 terminals on LTB1 one time to start the minimum ventilation test.

With the fan operating properly, determine the total system external static pressure (inches w.c.) by:

1. Measuring the supply and return duct static pressure.
2. Using the accessory pressure drop table in the Service Facts, calculate the total static pressure drop for all of the accessories installed on the unit; (i.e. curb, economizer, etc.)

Note: *Static pressure is based on desired CFM and may not be actual static pressure.*

3. Add the total accessory static pressure drop (Step 2) to the duct external static pressure (Step 1). The sum of these two values represents the total system external static pressure.

⚠WARNING

Live Electrical Components!

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4. Measure the amperage at the supply fan contactor and compare it with the full load amp (FLA) rating printed on the motor nameplate.
   a. Calculate the theoretical BHP

$$\frac{\text{Actual Motor Amps x Motor HP}}{\text{Motor Nameplate Amps}}$$

   b. Using the fan performance tables in the unit Service Facts, plot the total external static pressure (Step 3) and the BHP (Step 4a) to obtain the operating CFM.

When plotted, if the two values can not be interpolated correspondingly, the static pressure will most likely be the least accurate measurement. Because of the direct drive motor operation, the RPM performance is relatively constant making the operating current a very reliable diagnostic tool.

Example: GERE060 single phase, low speed

$$\frac{\text{Actual Motor Amp (5.25)}}{\text{Motor Nameplate Amps (5.3)}} = 99\%$$

0.99 x Motor HP (0.6) = .59 BHP

The actual external static pressure is approximately 0.45" w.c., airflow equals 2100 CFM.

If the static pressure reading was higher, motor current would have to be lower proportionately to get an accurate CFM measurement in direct drive applications.

5. If the required CFM is too low, (external static pressure is high causing motor HP output to be below table value),
   a. Relieve supply and/or return duct static.
   b. Change indoor fan speed to HIGH and repeat steps 1 through 4.
6. If the required CFM is too high, (external static pressure is low causing motor HP output to be above table value), increase supply and/or return duct static.
7. To stop the SERVICE TEST, turn the main power disconnect switch to the OFF position or proceed to the next component start-up procedure.

Verifying Proper Air Flow (Units with Belt Drive Fan)

Much of the systems performance and reliability is closely associated with, and dependent upon having the proper airflow supplied both to the space that is being conditioned and across the evaporator coil.

The fan speed is changed by opening or closing the adjustable motor sheave.

Before starting the SERVICE TEST, set the minimum position setpoint for the economizer to 0% using the setpoint potentiometer located on the Economizer Control (ECA), if applicable.

Using Table 9, p. 48, momentarily jump across the Test 1 and Test 2 terminals on LTB1 one time to start the minimum ventilation test.

⚠WARNING

Rotating Components!

During installation, testing, servicing and troubleshooting of this product it may be necessary to measure the speed of rotating components. Have a qualified or licensed service individual who has been properly trained in handling exposed rotating components perform these tasks. Failure to follow all safety precautions when exposed to rotating components could result in death or serious injury.

Once the supply fan has started, check for proper rotation. The direction of rotation is indicated by an arrow on the fan housing. With the fan operating properly, determine the total system airflow (CFM) by;

1. Measuring the actual RPM

⚠WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

2. Measure the amperage at the supply fan contactor and compare it with the full load amp (FLA) rating printed on the motor nameplate.
   a. Calculate the theoretical BHP.

$$\frac{\text{Actual Motor Amps x Motor HP}}{\text{Motor Nameplate Amps}}$$

   b. Using the fan performance tables in the unit Service Facts, plot the total external static pressure (Step 1) and the BHP (Step 2) to obtain the operating CFM.
3. If the required CFM is too low, (external static pressure is high causing motor HP output to be below table value),
   a. Relieve supply and/or return duct static.
   b. Change fan speed and repeat steps 1 and 2.
4. To increase fan RPM; Loosen the pulley adjustment set screw and turn sheave clockwise.
5. To decrease fan RPM; Loosen the pulley adjustment set screw ant turn sheave counterclockwise.
6. If the required CFM is too high, (external static pressure is low causing motor HP output to be above table value), change fan speed and repeat steps 1 and 2.
7. To stop the SERVICE TEST, turn the main power disconnect switch to the OFF position or proceed to the next component start-up procedure.

Fan Belt Adjustment (Units with Belt Drive Fan)

The fan belts must be inspected periodically to assure proper unit operation.

Replacement is necessary if the belts appear frayed or worn. Units with dual belts require a matched set of belts to ensure equal belt length.

⚠WARNING

Rotating Components!

During installation, testing, servicing and troubleshooting of this product it may be necessary to measure the speed of rotating components. Have a qualified or licensed service individual who has been properly trained in handling exposed rotating components perform these tasks. Failure to follow all safety precautions when exposed to rotating components could result in death or serious injury.

When moving or installing the new belts, do not stretch them over the sheaves. Loosen the belts using the belt tension adjustment bolts on the motor mounting base.

Once the new belts are installed, using a Browning™ or Gates™ tension gauge (or equivalent) illustrated in Figure 31; adjust the belt tension as follows:

1. To determine the appropriate belt deflection;
   a. Measure the center-to-center shaft distance (in inches) between the fan and motor sheaves.
   b. Divide the distance measure in Step 1a by 64; the resulting value represents the amount of belt deflection that corresponds to the proper belt tension.
2. Set the large O-ring on the belt tension gauge at the deflection value determined in Step 1b.
3. Set the small O-ring at zero on the force scale of the gauge plunger.
4. Place the large end of the gauge at the center of the belt span; then depress the gauge plunger until the large O-ring is even with the top of the next belt or even with the straightedge placed across the fan and motor sheaves.
5. Remove the belt tension gauge. The small O-ring now indicates a number other than zero on the plunger's force scale. This number represents the force (in pounds) required to give the needed deflection.
6. Compare the "force" scale reading (Step 5) with the appropriate "force" value listed in Table 10. If the "force" reading is outside the range, readjust the belt tension.

Note: *Actual belt deflection "force" must not exceed the maximum force value shown in Table 10.*

7. Recheck the belt tension at least twice during the first 2 to 3-days of operation. Belt tension may decrease until the new belts are "run-in".

Figure 31. Belt tension gauge

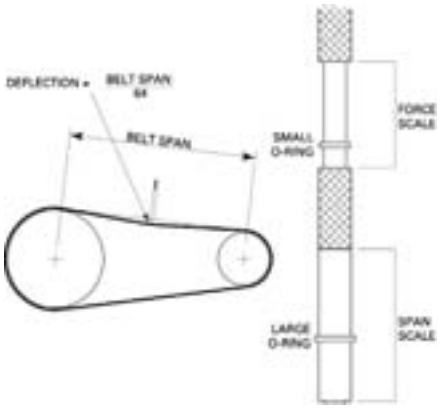

Table 10. Belt tension measurement an deflection ranges

Belts Cross Section		A	B
Small P.D. Range		3.0 - 3.6	3.4 - 4.2
		3.8 - 4.8	4.4 - 5.6
		5.0 - 7.0	5.8 - 8.8
Super Gripbelts	Min	3	4
	Max	4.5	5.5
	Min	3.5	5.125
	Max	5	7.125
	Min	4	6.375
	Max	5.5	8.75
Gripnotch	Min	3.875	5.75
	Max	5.5	8
	Min	4.5	6.5
	Max	6.25	9.125
	Min	5	7.375
	Max	6.875	10.125
Steel Cable Gripbelts	Min	3.25	4.5
	Max	4	5.5
	Min	3.75	5.75
	Max	4.75	7.25
	Min	4.25	7
	Max	5.25	8.75

Return Air Smoke Detector

The return air smoke detector is designed to shut off the unit if smoke is sensed in the return air stream. Sampling the airflow entering the unit at the return air opening performs this function.

In order for the smoke detector to properly sense smoke in the return air stream, the air velocity entering the unit must be between 500 and 4000 feet per minute. Equipment covered in this manual will develop an airflow velocity that falls within these limits over the entire airflow range specified in the fan performance tables.

There are certain models however, if operated at low airflow, will not develop an airflow velocity that falls within the required 500 to 4000 feet per minute range. For these models, the design airflow shall be greater than or equal to the minimum CFM specified in W_C-IOM-1B manual. Failure to follow these instructions will prevent the smoke detector from performing its design function.

Economizer Start-Up

Using Table 9, p. 48 momentarily jump across the Test 1 and Test 2 terminals on LTB1 one time to start the minimum ventilation test.

1. Set the minimum position setpoint for the economizer to the required percentage of minimum ventilation using the setpoint potentiometer located on the Economizer Control (ECA).

   The economizer will drive to its minimum position setpoint, exhaust fans (if applicable) may start at random, and the supply fan will start when the SERVICE TEST is initiated.

⚠WARNING

Unexpected Fan Start Up!

The supply fan will start when Service Test is initiated and the exhaust fan may start at random. The exhaust fan will start anytime the economizer damper position is equal to or greater than the exhaust fan setpoint. Leave all access panels and guards to fan sections in place when performing minimum ventilation test. Failure to follow proper procedure could result in death or serious injury.

   The exhaust fan will start anytime the economizer damper position is equal to or greater than the exhaust fan setpoint.

2. Verify that the dampers stroked to the minimum position.
3. Verify ambient sesor has been mouted into inside corner post grommet.

ReliaTel Control

1. Momentarily jump across the Test 1 and Test 2 terminals on LTB1 one additional time if continuing from previous component start-up or until the desired start-up component test is started.
2. Verify that the dampers stroked to the full open position.
3. To stop the SERVICE TEST, turn the main power disconnect switch to the OFF position or proceed to the next component start-up procedure.

Compressor Start-Up

Using the service test guide in Table 9, p. 48, continue the SERVICE TEST start-up procedure for each compressor circuit.

1. Attach a set of service gauges onto the suction and discharge gauge ports for each circuit. Refer to the refrigerant circuit illustration in the Service Facts.
2. Momentarily jump across the Test 1 and Test 2 terminals on the LTB one additional time if continuing from previous component start-up or until the desired start-up component Test is started.
3. Scroll Compressors
   a. Once each compressor has started, verify that the rotation is correct. If a scroll compressor is rotating backwards, it will not pump and a loud rattling sound can be observed.

⚠WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

   b. If the electrical phasing is correct, before condemning a compressor, interchange any two leads (at the compressor Terminal block) to check the internal phasing. Refer to p. 47 for phase sequencing. If the compressor runs backward for an extended period (15 to 30 minutes), the motor winding can overheat and cause the motor winding thermostat to open.
   c. Check the compressor oil levels. The oil lever in each compressor sight glass should be 1/2 to 3/4 full when they are OFF.

Note: *The scroll compressor uses Trane OIL-42 without substitution. The appropriate oil charge for a 9 and 10-ton scroll compressor is 8-pints. For a 14 and 15-ton scroll compressor, use 14 pints.*

4. After the compressor and condenser fan have started and operated for approximately 30-minutes, observe the operating pressures. Compare the operating pressures to the operating pressure curve in the Service Facts.
5. Check system superheat. Follow the instruction list on the superheat charging curve in the Service Facts.

Note: *Superheat should be within ±5° F of the superheat chart value.*

6. Repeat steps 1 through 4 for each refrigerant circuit.
7. To stop the SERVICE TEST, turn the main power disconnect switch to the OFF position or proceed to the next component start-up procedure.

Heating Start-up

Using Table 9, p. 48 continue the SERVICE TEST start-up procedure for each compressor circuit.

⚠WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

1. Clamp an amp meter around one of the first stage heater power wires at the heater contactor.
2. Momentarily jump across the Test 1 and Test 2 terminals on LTB one additional time if continuing from previous component start-up or until the desired start-up component test is started.
3. Verify that the heater stage is operating properly.
4. Clamp an amp meter around one of the two stage heater power wires at the heater contactor (if applicable).
5. Momentarily jump across the test 1 and test 2 terminals on LTB one additional time if continuing from previous component start-up or until the desired start-up component test is started.
6. Verify that the heater stage is operating properly.
7. To stop the SERVICE TEST, turn the main power disconnect switch to the OFF position or proceed to the next component start-up procedure.

Pre-Startup Checklist

Before energizing the unit, the following system devices must be checked:

- Check all electrical connections for tightness and point of termination accuracy.
- Is the high voltage power supply correct and in accordance with the nameplate ratings?
- Is phasing of the unit correct per compressor rotation?
- Is the field wiring and circuit protection the correct size?
- Is the low voltage control circuit wiring correct per the unit wiring diagram?
- Is the piping system clean/complete and correct? (A recommendation of all system flushing of debris from the water-to-refrigerant heat exchanger, along with air purging from the water-to-refrigerant heat exchanger be done in accordance with the Closed-Loop/Ground Source Heat Pump Systems Installation Guide).
- Is unit serviceable? (See section "Unit Clearances," p. 10 for clearance recommendations.)
- Are the low/high-side pressure temperature caps secure and in place?
- Is the thermostat in the OFF position?
- Is the water flow established and circulating through all the units?
- Is the duct work correctly sized, run, taped, insulated and weather proofed with proper unit arrangement?
- Is the condensate line properly sized, run, trapped and pitched?
- Is the zone sensor (when used) correctly wired and in a proper location?
- Does the indoor blower turn freely without rubbing and is it properly tightened on the shaft? Check the supply fan belts (if applicable) for proper tension and the fan bearings for sufficient lubrication. If the belts require adjustment, or if the bearings need lubricating, refer to the maintenance section for instructions.
- Has all work been done in accordance with applicable local and national codes?
- Has heat transfer fluid been added in the proper mix to prevent freezing in closed system application?
- Are all the unit access panels secure and in place? And, is unit interior free from tools or debris?
- Verify that the Remote panel SYSTEM selection switch, FAN selection switch, and ZONE TEMPERATURE settings for automatic operation are correct.
- Is the main disconnect switch or circuit protector switch that provides the supply power to the unit's terminal block or the unit mounted disconnect switch closed?
- Is the Night Setback panel (if applicable) programmed for proper unoccupied operation?
- For units with economizer option verify ambient sensor is mounted inside corner post grommet.

Start Up

Use this form to thoroughly check-out the system and units before and during start-up. (This form need not be returned to the factory unless requested during technical service support).

Job Name: _____

Model Number: _____

Date: _____

Serial Number: _____

In order to minimize troubleshooting and costly system failures, complete the following checks and data entries before the system is put into full operation.

MODE	**Heat**	**Cool**
Entering fluid temperature degrees F		
Leaving fluid temperature degrees F		
Temperature differential degrees F		
Return air temperature DB/WB degrees F		
Supply air temperature DB/WB degrees F		
Temperature differential degrees F		
Water coil heat exchanger (Water Pressure IN) PSIG		
Water coil heat exchanger (Water Pressure OUT) PSIG		
Pressure Differential PSIG		
COMPRESSOR		
Amps		
Volts		
Discharge line temperature (after 10 minutes) degrees F		

Initial Unit Start-up

Start-up with the conventional thermostat is included below:

1. Set the thermostat to the highest position.
2. Set the thermostat system switch to COOL with the fan control to AUTO. The compressor should NOT run.
3. Reduce the thermostat setting until the compressor, reversing valve, solenoid valve, and loop pump are energized. Adjust water flow utilizing pressure/temperature plugs and comparing to tables contained in specification sheet data. Water leaving the heat exchanger should be warmer than the entering water temperature (approximately 9°F-12°F); blower operation should be smooth; compressor and blower amps should be within data plate ratings; the suction line should be cool with no frost observed in the refrigerant circuit.
4. Check the cooling refrigerant pressures.
5. Turn the thermostat system switch to the OFF position. Unit should stop running and the reversing valve should de-energize.
6. Leave unit off for approximately FIVE minutes to allow for pressure equalization.
7. Turn the thermostat to the lowest setting.
8. Set the thermostat system switch to the HEAT position.
9. Adjust the temperature setting upward until the unit is energized. Warm air should blow from the register. A water temperature decrease of approximately 5° F to 9° F leaving the heat exchanger should be noted. The blower and compressor operation should be smooth with no frost observed in the refrigeration circuit.
10. Check the heating refrigerant pressures.
11. Set the thermostat to maintain the desired space temperature.
12. Instruct the owner on system operation.

Water Pressure Drop

Table 11 and Table 12 should be used to define feet of head/pressure drop. Please note the feet of pressure (ft/head) provided is at ARI/ISO standard.

Note: *To calculate feet of head, when using gauges that read in PSIG, multiply PSI by 2.31.*

Table 11. Cooling water pressure drops (WPD) in feet of head

Unit Size	EWTF	GPM	Ft.Pressure
036	86	9.0	11.0
048	86	12.0	9.0
060	86	15.0	13.3
072	86	18.0	11.4
090	86	22.5	12.1
120	86	30.0	15.2
150	86	37.5	13.7
180	86	45	19.3
240	86	60	13.2
300	86	75	13.1

Table 12. Heating water pressure drops (WPD) in feet of head

Unit Size	EWTF	GPM	Ft. Pressure
036	68	9.0	12.0
048	68	12.0	9.7
060	68	15.0	14.3
072	68	18.0	12.3
090	68	22.5	13.1
120	68	30.0	16.4
150	68	37.5	14.8
180	68	45	20.8
240	68	60	14.3

Table 13. Water volume

Unit Size	Water Side Volume Cubic In.	Water Side Volume Cubic Ft.	Water Side Volume Gallons
036	76	.044	.329
048	171	.099	.74
060	171	.099	.74
072	259	.15	1.121
090	210	.122	.910
120	342	.198	1.48
150	508	.296	2.201
180	508	2.96	2.201
240	779	.453	3.374
300	1057	.615	4.576

Maintenance

Preventive Maintenance

Maintenance on the unit is simplified with the following preventive suggestions:

Filter maintenance must be performed to assure proper operation of the equipment. Filters should be inspected at least every three months, and replaced when it is evident they are dirty. Filter sizing includes:

Table 14. Filter sizing

Unit Size	Filter Size nominal inch
036-048	2/ 20 x 30 x 1
060	4/16 x 25 x 2
072-090	4/ 16 x 25 x 2
120	4/ 20 x 25 x 2
150, 180, 300 Downflow	4/20 x 20 x 2
	4/20 x 25 x 2
150, 180, 300 Horizontal	8/20 x 25 x 2
240 Downflow	8/20 x 20 x 2
	4/20 x 16 x 2
240 Horizontal	12/20 x 20 x 2

⚠WARNING

Hazardous Voltage!

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/ tagout procedures to ensure the power can not be inadvertently energized. Failure to disconnect power before servicing could result in death or serious injury.

Check the contactors and relays within the control panel at least once a year. It is good practice to check the tightness of the various wiring connections within the control panel.

A strainer (60 mesh or greater) must be used on an open loop system to keep debris from entering the unit heat exchanger and to ensure a clean system.

For units on well water, it is important to check the cleanliness of the water-to-refrigerant heat exchanger. Should it become contaminated with dirt and scaling as a result of bad water, the heat exchanger will have to be back flushed and cleaned with a chemical that will remove the scale.This service should be performed by an experienced water treatment specialist.

⚠WARNING

Hazardous Chemicals!

Coil cleaning agents can be either acidic or highly alkaline. Handle chemical carefully. Proper handling should include goggles or face shield, chemical resistant gloves, boots, apron or suit as required. For personal safety, refer to the cleaning agent manufacturers Materials Safety Data Sheet and follow all recommended safe handling practices. Failure to follow all safety instructions could result in death or serious injury.

It should be noted that the water quality should be checked periodically. (See Table 15).

Table 15. Water quality

Scaling	
Calcium and magnesium (total hardness)	Less than 350 ppm
Corrosion	
pH	7-9.5
Hydrogen Sulfide	Less than 1 ppm
Sulfates	Less than 25 ppm
Chlorides	Less than 125 ppm
Carbon Dioxide	Less than 75 ppm
Total dissolved solids (TDS)	Less than 1000 ppm
Biological Growth	
Iron Bacteria	Low
Erosion	
Suspended Solids	Low

Note: *For other maintenance information concerning the GERA unit, please read W_C-IOM-1*.*

Troubleshooting

⚠WARNING

Hazardous Service Procedures!

The maintenance and trouble shooting procedures recommended in this section of the manual could result in exposure to electrical, mechanical or other potential safety hazards. Always refer to the safety warnings provided throughout this manual concerning these procedures. When possible, disconnect all electrical power including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. When necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been trained in handling live electrical components per these tasks. Failure to follow all of the recommended safety warnings provided, could result in death or serious injury.

Table 16. Troubleshooting

Problem	Heating	Cooling	Cause	Correction
No response to any thermostat setting	X	X	Main power off	Check fuses
	X	X	Defective control transformer	Replace
	X	X	Broken or loose connection	Repair
	X	X	Defective thermostat	Replace
	X	X	Transformer	Reset Transformer
Unit short cycles	X	X	Thermostat or sensor improperly located	Relocate
Blower runs, but compressor does not	X	X	Defective compressor overload	Replace (if external)
	X	X	Defective compressor contactor	Replace
	X	X	Supply Voltage too low	Correct
	X	X	Defective compressor capacitor	Replace
	X	X	Defective windings	Replace
	X	X	Limit switches open	Check cause/Replace or repair
Insufficient capacity	X	X	Dirty filter	Replace/clean
	X	X	Blower RPM too low	Correct
	X	X	Loss of conditioned air due to leaks in ductwork	Repair leaks
		X	Introduction of excessively hot return air	Correct
	X		Introduction of excessively cold return air	Correct
	X	X	Low on refrigerant charge	Locate leak, repair and recharge by weight (not by superheat)
	X	X	Restricted thermal expansion valve	Replace
	X	X	Defective reversing valve	See WSHP-IOM-# for touch test chart
	X	X	Thermostat improperly located	Relocate
	X	X	Unit undersized	Recalculate heat gains/losses
	X	X	Inadequate water flow	Increase GPM
	X	X	Scaling in heat exchanger	Clean or replace
		X	Water too hot	Decrease temperature
	X		Water too cold	Increase temperature

Table 16. Troubleshooting (continued)

Problem	Heating	Cooling	Cause	Correction
High pressure switch open		X	Inadequate GPM	Increase water flow to unit
		X	Water too hot	Decrease temperature
	X		Inadequate air flow	Check, clean blower and coil
	X		Dirty filter	Clean/replace
	X	X	Overcharged with refrigerant	Decrease charge
	X	X	Defective pressure switch	Check or replace
High head pressure		X	Trash in heat exchanger	Backflush
		X	Low water flow	Increase GPM
	X	X	Overcharge of refrigerant	Decrease charge
	X	X	Non-condensable in system	Evacuate and recharge by weight
	X	X	Water too hot	Decrease temperature
	X		Dirty filter	Clean / replace
	X		Inadequate air flow	Check, clean blower and coil
Low suction pressure	X	X	Undercharged	Locate leak, repair and recharge
	X	X	Restricted thermal expansion valve	Repair / replace
		X	Inadequate air flow	Check, clean blower and coil
		X	Dirty filter	Clean/replace
	X		Inadequate GPM	Increase GPM
Low Pressure switch open	X		Inadequate GPM	Increase GPM
	X		Water too cold	Increase temperature
		X	Inadequate air flow	Increase CFM
		X	Dirty filter	Clean/replace
	X	X	Undercharged with refrigerant	Increase charge
	X	X	Defective pressure switch	Replace
	X	X	Heat transfer fluid too cold	Raise water temperature

Warranty

Standard Warranty

The standard water-source heat pump warranty is Trane parts-only warranty, running 12 months from startup, not to exceed 18-months from shipment.

Extended Warranty

The optional extended warranty is a second through fifth year warranty. The time starts at the end of the standard 1-year coverage through the fifth year.

These extended warranties apply only to new equipment installed in domestic Trane Commercial Systems Group sales territories and must be ordered prior to start-up.

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