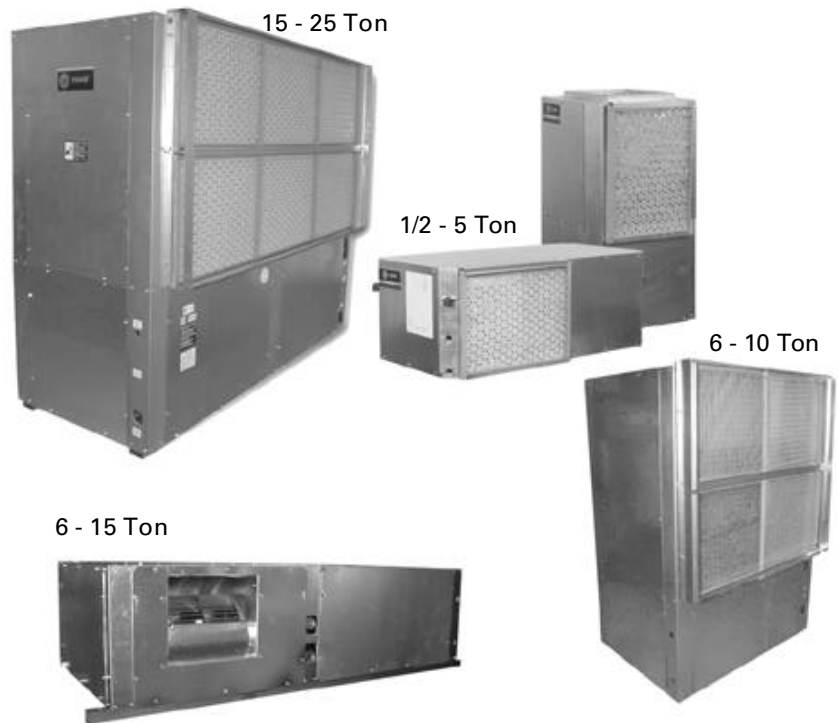




Installation Owner Diagnostics

Axiom™ Horizontal/Vertical Water-Source Comfort System Models GEH and GEV



Models

"A" and later Design Sequence

GEH

006 - 060 — 60 HZ
006 - 060 — 50 HZ
072 - 180 — 60 HZ
072 - 150 — 50 HZ

GEV

006 - 060 — 60 HZ
006 - 060 — 50 HZ
072 - 300 — 60 HZ
072 - 240 — 50 HZ



Notice

NOTICE:

Warnings and Cautions appear at appropriate sections throughout this manual. 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, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

CAUTION -Indicates a situation that may result in equipment or property-damage-only accidents.

Important!

Equipment is shipped FOB (Free on Board) at the manufacturer. Therefore, freight claims for damages against the carrier must be initiated by the receiver.

NOTICE:

Unit contains HCFC (R-22) Refrigerant

Instructions!

Section 608, Paragraph C of the 1990 Clean Air Act states:

Effective July 1, 1992, it shall be unlawful for any person, in course of maintaining, servicing, repairing, or disposing of an air conditioning system, to knowingly vent or release any CFC or HCFC refrigerant. Minimal releases (air purges or refrigerant hoses) associated with good faith attempts to recapture or recycle are exempt from the ban on venting.

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Pre-installation Checklist

⚠ 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.

Jobsite Inspection

Always perform the following checks before accepting a unit:

1. Verify that the nameplate data matches the data on the sales order and bill of lading (including electrical data).
2. Verify that the power supply complies with the unit nameplate specifications.
3. 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 SOLD TO party and future freight claims MAY NOT be accepted by the freight company.*
4. Verify that the refrigerant charge has been retained during shipment by use of gauges. Schrader taps are located internal to the cabinet.
5. After assuring that charge has been retained, reinstall the schrader caps to assure that refrigerant leakage does not occur.

⚠ WARNING **Microbial Growth!**

Wet interior unit insulation can become an amplification site for microbial growth (mold), which may cause odors and serious health related indoor air quality problems. If there is evidence of microbial growth (mold) on the interior insulation, remove or replace the insulation prior to operating the system. Failure to remove microbial growth could result in serious health problems.

Jobsite Storage

This unit is intended for indoor use only. To protect the unit from damage due to the elements, and to prevent possible IAQ contaminant sources from growing, the unit should be stored indoors. If indoor storage is not possible, the following provisions for outdoor storage must be met:

1. Place the unit(s) on a dry surface or raise above the ground to assure adequate air circulation beneath the unit.
2. Cover the unit(s) with a water proof tarp to protect them from the elements.
3. Make provisions for continuous venting of the covered units to prevent moisture from standing on the unit(s) surfaces. Wet interior unit insulation can become an amplification site for microbial growth (mold) which has been determined to be a cause of odors and serious health related indoor air quality problems.
4. Store units in the normal UP orientation to maintain oil in the compressor.
5. Horizontal units may be stacked no more than three units high. Do not stack the vertical unit configurations.

General Information

Unit Nameplate

The unit nameplate is located on the outside of the control box access panel at the front of the unit. 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 shell.

Unit Description

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

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).

Controls

The **control system** offered to control the unit is a Basic 24 Volt control for the 1/2 through 5 ton sizes, a Deluxe 24 Volt control *option* for all unit sizes, a Tracer™ ZN510, LonTalk™ certified control *option* for the 1/2 through 5 ton unit sizes, or a Tracer ZN524, LonTalk certified control *option* for all unit sizes.

All power wiring to the equipment is made at the unit contactor for the 1/2 through 5 ton, and at the high voltage terminal block for the 6 through 25 ton. All low voltage wiring is made at the unit's low voltage terminal board.

System Input Devices and Functions

A thermostat, zone sensor or building automation system is required to operate the water-source heat pump. The flexibility of having several mode ca-

pabilities depends upon the type of sensor and/or remote panel selected. Troubleshooting and connection diagrams for the 24 Volt control systems may be located in the back of this manual. All digital control troubleshooting tips and connection diagrams are located in WSHP-IOP-2 (ZN510) or WSHP-PRB002-EN (ZN524).

Basic 24V Controls

Safety devices for equipment containing the basic 24V control option include a low pressure switch or suction line temperature sensor to prevent compressor operation during low temperature activity. The switch or sensor is set to activate at refrigerant pressures of 20 psig (1/2 to 5 ton units) or 7 psig (6 to 25 ton units) to fit most applications.

A high pressure switch prevents compressor operation during high or excessive discharge pressures exceeding 395 psig.

The lockout relay communicates the low or high pressure situation to the compressor to prevent operation. For units that contain a condensate overflow switch option, a condensate overflow situation will also be communicated to the compressor through the lockout relay if an overflow condition exists. The relay may be reset at the thermostat, or by cycling power to the unit.

General alarm is accomplished through the lockout relay and is used in driving light emitting diodes (LEDs). This feature will drive dry contacts only, and cannot be used to drive field installed control inputs.

(option) Deluxe 24V Controls

Units containing the Deluxe 24V control design will incorporate a microprocessor-based control board. The Trane microprocessor board is factory wired to a terminal strip to provide all necessary terminals for field connection. The deluxe board is equipped with a random start relay, anti-short cycle timer, brown out protection,

compressor disable, condensate overflow, unit safety control, diagnostics and a generic relay (which may be available for field use). See page 56 for diagnostic information and thermostat connections.

(option) Tracer ZN510 or ZN524 Controls

The digital ZN510 and ZN524 controller is designed to support the 1/2 through 25 ton water-source heat pumps in either a standalone, peer-to-peer with a Tracer Loop Controller, or as a full building automation (open protocol) system. The 1/2 through 5 ton units that incorporate direct digital controls will typically come equipped with the ZN510 control board. The exception to this would be if the equipment contained hot gas reheat, waterside economizer, or boilerless control with electric heat. The ZN524 digital control board is designed to interface and run these mechanical options. All units over 5 tons would ship with the Tracer ZN524 control board.

For installation, operation and diagnostics of the ZN510 and ZN524 WSHP-IOP-2 (ZN510) and/or WSHP-PRB002-EN (ZN524).

(option) Waterside Economizer

Instructions for mechanical connection of the waterside economizer to the water-source heat pump may be found in the dimensional section of this manual.

The waterside economizer is designed to begin economizing mode when water temperatures fall below the *field adjustable* temperature of 25, 35, 45, 55 or 65 F (for the Deluxe control option), or below the programmed setpoint (for the ZN524 control option).

When the temperature is less than the setpoint, fluid will flow into the economizing coil, while simultaneously halting mechanical operation of the compressor. Mechanical cooling will continue on a call for a second stage from the thermostat or system control.



General Information

(option) **Boilerless Control/Electric Heat**

Systems that do not contain a boiler may contain a boilerless control with electric heat. Trane offers both a factory mounted electric heat option, and a field mounted duct heater option.

If the 1/2 through 5 ton GEH and GEV unit incorporates the factory mounted option, the unit will ship from the factory with an internally mounted nichrome open wire heating element, designed to start-up electric heat as the systems primary heat in the event entering water temperature falls below 55 F. Once the entering water temperature rises above 60 F, the boilerless controller returns the unit to normal compressor heating operation, and locks out the electric heater.

If the unit contains a cooling only heat pump design, the electric heat contactor is wired directly to the thermostat for primary heating, and the compressor contactor for cooling.

For units comprised of the field installed duct heater option, the unit will ship from the factory with controls available to interface with the field provided electric heat selection.

Note: For geothermal applications, the boilerless controller has an adjustable setting of 25, 35, 45, 55 and 60 degrees.

(option) **Supplemental or Boilerless Electric Heat**

The 6 through 25 ton models which contain boilerless control electric heat or supplemental electric heat will contain the controls interface ONLY for field provided electric heat selection. The heater for this model shall be external to the equipment by the contractor for ease of installation. All power connections for the electric heater will be completely separate from the unit for field supplied electric heat.

Note: When the unit has boilerless control, the electric heat is not used as supplemental electric heat, but as a primary heat.

(option) **Hot Gas Reheat**

With the reheat option, the return-air from the space is conditioned by the air-to-refrigerant coil, then reheated by the reheat coil to control not only the space temperature, but to also reduce the relative humidity of the space. When operating in the reheat mode (meaning the sensible temperature has been met in the space), the humidistat signals the reheat relay coil to energize, allowing the high pressure refrigerant gas to flow from the compressor through the reheat valve, into the reversing valve, or reheat coil for dehumidification.

A switching relay has been provided for the reheat application to adjust the blower motor from normal operation to low speed when the hot gas reheat is energized (for 1/2 through 5 ton equipment only).

Notes:

- *A high static blower motor is required to support the hot gas reheat option for the 1/2 through 5 ton equipment.*
- *Units containing the hot gas reheat option should not be used as a make-up air unit.*
- *Water regulating valves should not be used with the hot gas reheat option. Trane places a thermal expansion valve on all WSHPs as well as GSHPs to regulate refrigerant flow vs. water flow to the unit.*

Dimensions/Weights

Table 1: Unit weights

GEH 60 HZ	GEH 50 HZ	GEV 60 HZ	GEV 50 HZ	Shipping Weight with pallet	Shipping Weight w/o pallet
006-015	006-012			188 lb (85 kg)	158 lb (71 kg)
018-030	015-024			278 lb (125 kg)	248 lb (112 kg)
036-042	030-036			318 lb (143 kg)	288 lb (130 kg)
048-060	042-060			428 lb (193 kg)	398 lb (179 kg)
072	-			701 lb (318 kg)	652 lb (296 kg)
090	072			714 lb (325 kg)	666 lb (303 kg)
120	090			831 lb (377 kg)	789 lb (359 kg)
150	120			907 lb (412 kg)	865 lb (393 kg)
180	150			999 lb (454 kg)	957 lb (435 kg)
		006-015	006-012	178 lb (80 kg)	158 lb (71 kg)
		018-030, 040	015-024	268 lb (121 kg)	248 lb (112 kg)
		036, 042	030, 036	308 lb (139 kg)	288 lb (130 kg)
		048, 060	042-060	396 lb (178 kg)	248 lb (112 kg)
					Operating Weight
		072	-	617 lb (280 kg)	577 (262 kg)
		090	072	648 (294 kg)	608 (276 kg)
		120	090	861 (391 kg)	821 (373 kg)
		150	120	1215 lb (547 kg)	1170 lb (527 kg)
		180	150	1225 lb (551 kg)	1180 lb (531 kg)
		240	180	1615 lb (727 kg)	1580 lb (711 kg)
		300	240	1665 lb (749 kg)	1640 lb (738 kg)

⚠ WARNING
Improper Unit Lift!
 Test lift unit approximately 24 inches to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level. Failure to properly lift unit could result in death or serious injury or possible equipment or property-only damage.

Table 2: Waterside economizer weight

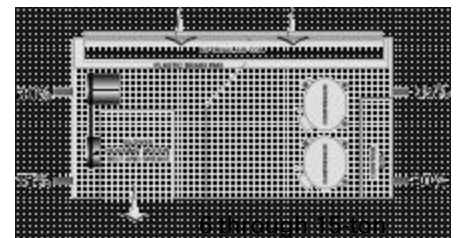
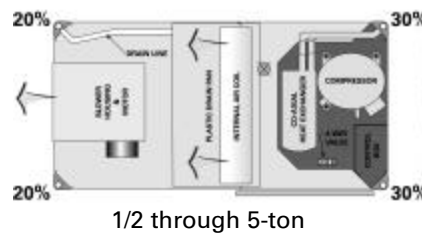
GEV 60 HZ	GEV 50 HZ	Economizer Weight
072	-	148 lb (67 kg)
090	072	168 lb (76 kg)
120	090	207 lb (94 kg)
150, 180	120, 150	275 lb (125 kg)
240	180	310 lb (141 kg)
300	240	395 lb (179 kg)

GEH 60 HZ	GEH 50 HZ	Economizer Weight
006-015	006-012	54 lb (24.5 kg)
018-030	015-024	65 lb (29.5 kg)
036-042	030-036	76 lb (35 kg)
048-060	042-060	97 lb (44 kg)

GEH 60 HZ	GEH 50 HZ	Economizer Weight
072	-	138 lb (63 kg)
090	072	144 lb (65 kg)
120	090	166 lb (75 kg)
150	120	213 lb (97 kg)
180	150	213 lb (97 kg)

Weight Distribution for Hanging the GEH Model

- Approximate weight distribution for proper hanging of the GEH unit is indicated by the diagram to the right.
- Tolerance on the weights determined are ± 15%.
- Total weights for each unit size are listed above.



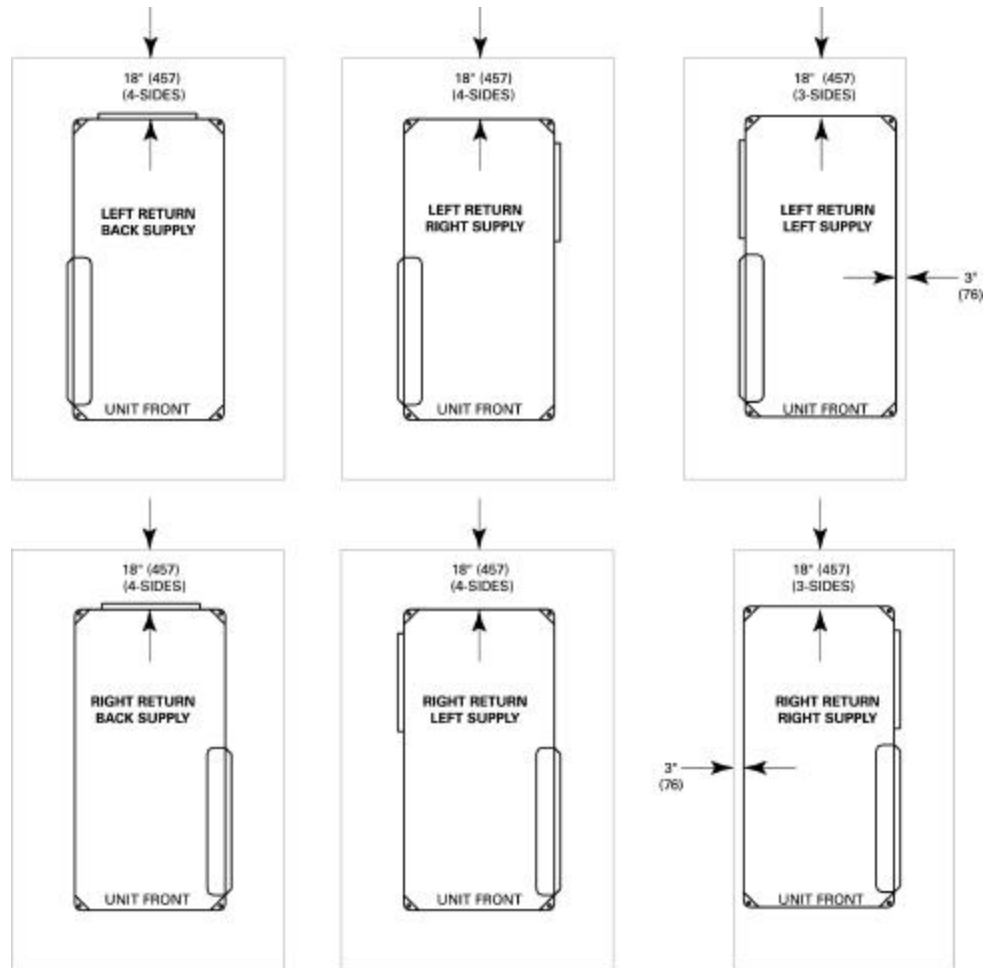
Dimensions/Weights Clearance

GEH Clearance Dimensions

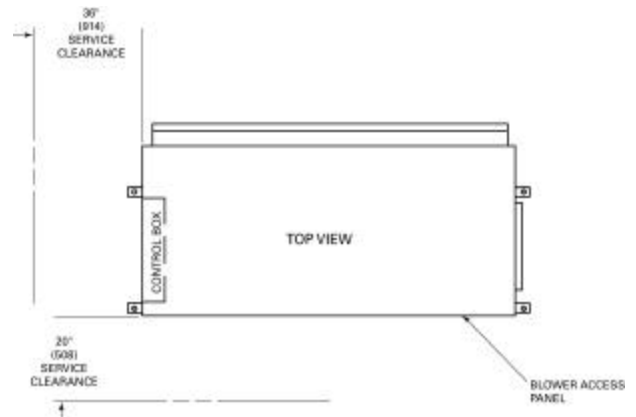
Access to the unit for service purposes should be provided at installation. All 1/2 through 5 ton configurations require an 18" (457 mm) surround clearance from other mechanical and electrical equipment (where shown) to enable panel removal from the unit for service/maintenance ability. Some local codes require a greater service clearance than listed below. Check all code requirements prior to unit installations.

Equipment containing a same-side supply/return combination requires a 3" (229 mm) limitation on one side. Access to the TXV may not be possible with this 3" (229 mm) clearance. This configuration is typically applied in a corridor installation, where space limitations force the left or right side of the unit against a wall.

Service clearance dimensions for the 6 through 15 ton horizontal includes a two side access appropriate for control and blower motor/wheel access. Some local codes require a greater service clearance than listed below. Check all code requirements prior to unit installations.



GEH 1/2 through 5 Ton Clearance



GEH 6 through 15 Ton Clearance

Dimensions/Weights Clearance

GEV 1/2 through 5 Ton Clearance Dimensions (Figure 1)

Access to the unit for service purposes should be provided at installation. All configurations require an 24" (610 mm) surround clearance from other mechanical and electrical equipment (where shown) to enable panel removal from the unit for service/maintenance ability. Some local codes require a greater service clearance than listed below. Check all code requirements prior to unit installations. Units in a *free return* application will require more than a 1" (25.4) clearance to provide proper air flow to the units air-to-refrigerant coil.

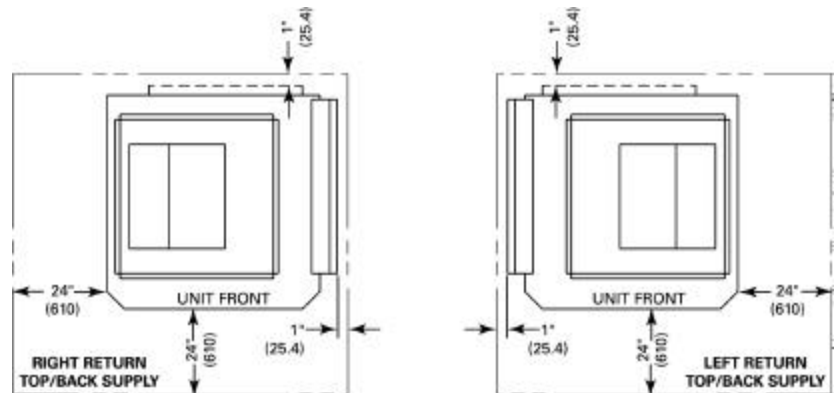


Figure 1: GEV 1/2 through 5 Ton Clearance

GEV 6 through 10 Ton Clearance Dimensions (Figure 2)

Minimum access for service clearances are provided below. Any one unit side other than the control panel or return-air side may be placed against a wall. The unit may be serviced through the three remaining open sides. Some local codes require a greater service clearance than listed below. Check all code requirements prior to unit installations.

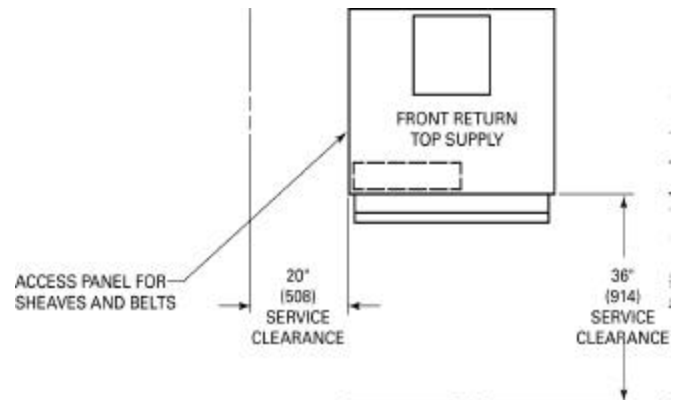


Figure 2: GEV 6 through 10 Ton Clearance

GEV 12 1/2 through 25 Ton Clearance Dimensions (Figure 3)

The diagram below outlines the minimum required unit service clearances. Any one unit side other than the control panel or return-air side may be placed against a wall. The unit may be serviced through the three remaining open sides. Some local codes require a greater service clearance than listed below. Check all code requirements prior to unit installations.

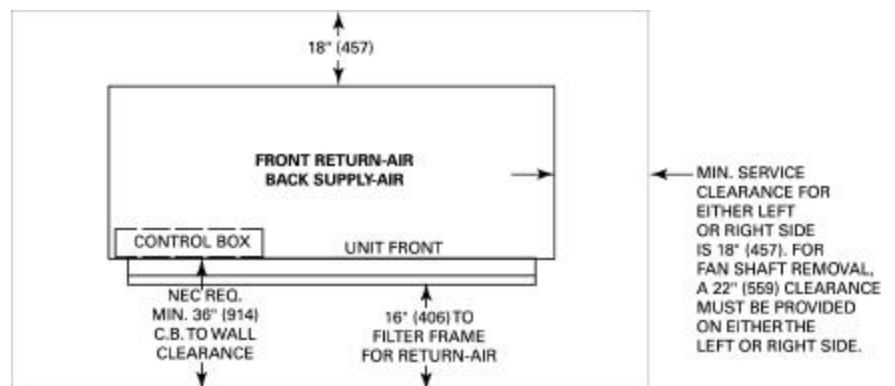
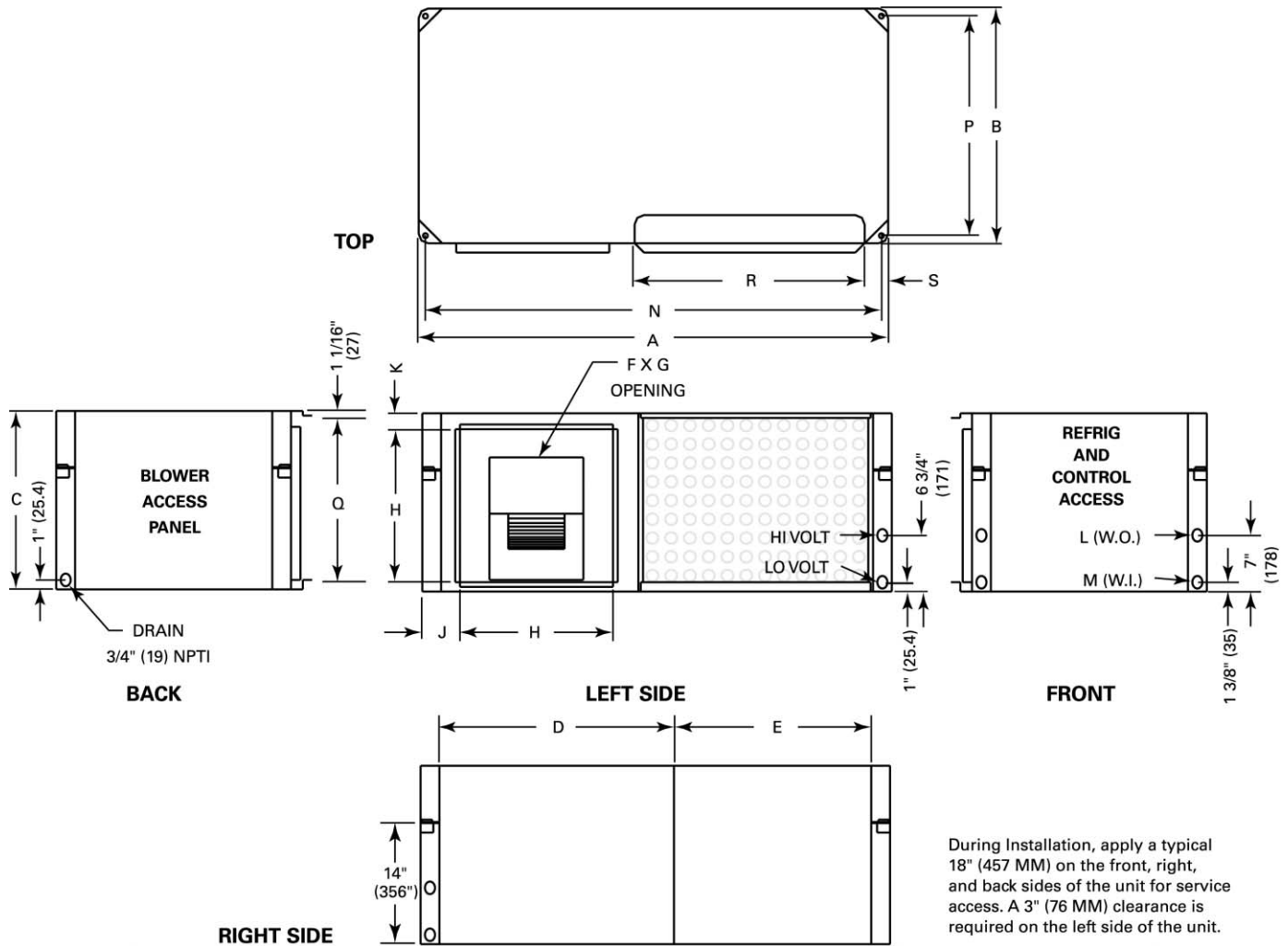


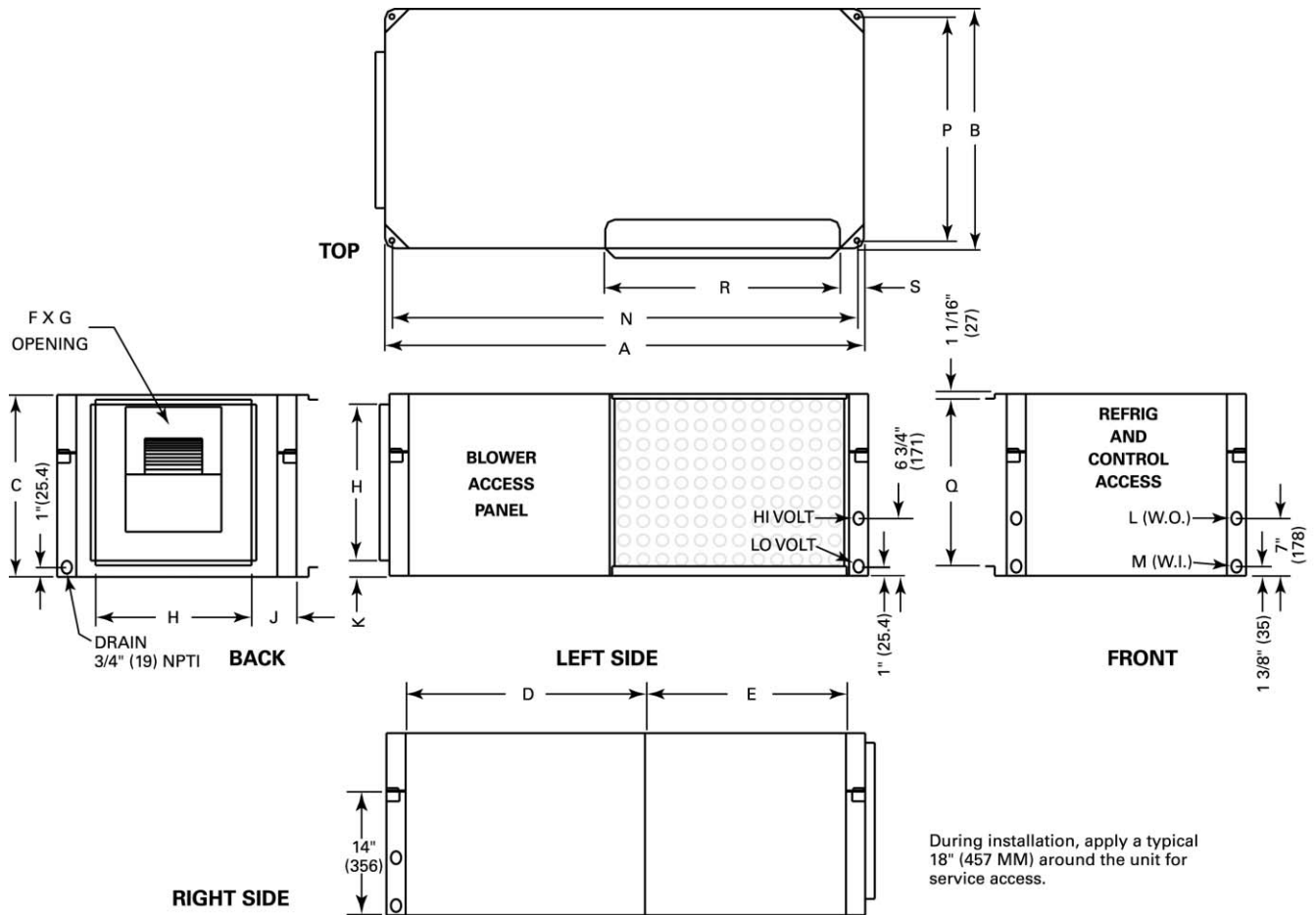
Figure 3: GEV 12 1/2 through 25 Ton Clearance

Dimensions/Weights Left Return/Left Supply



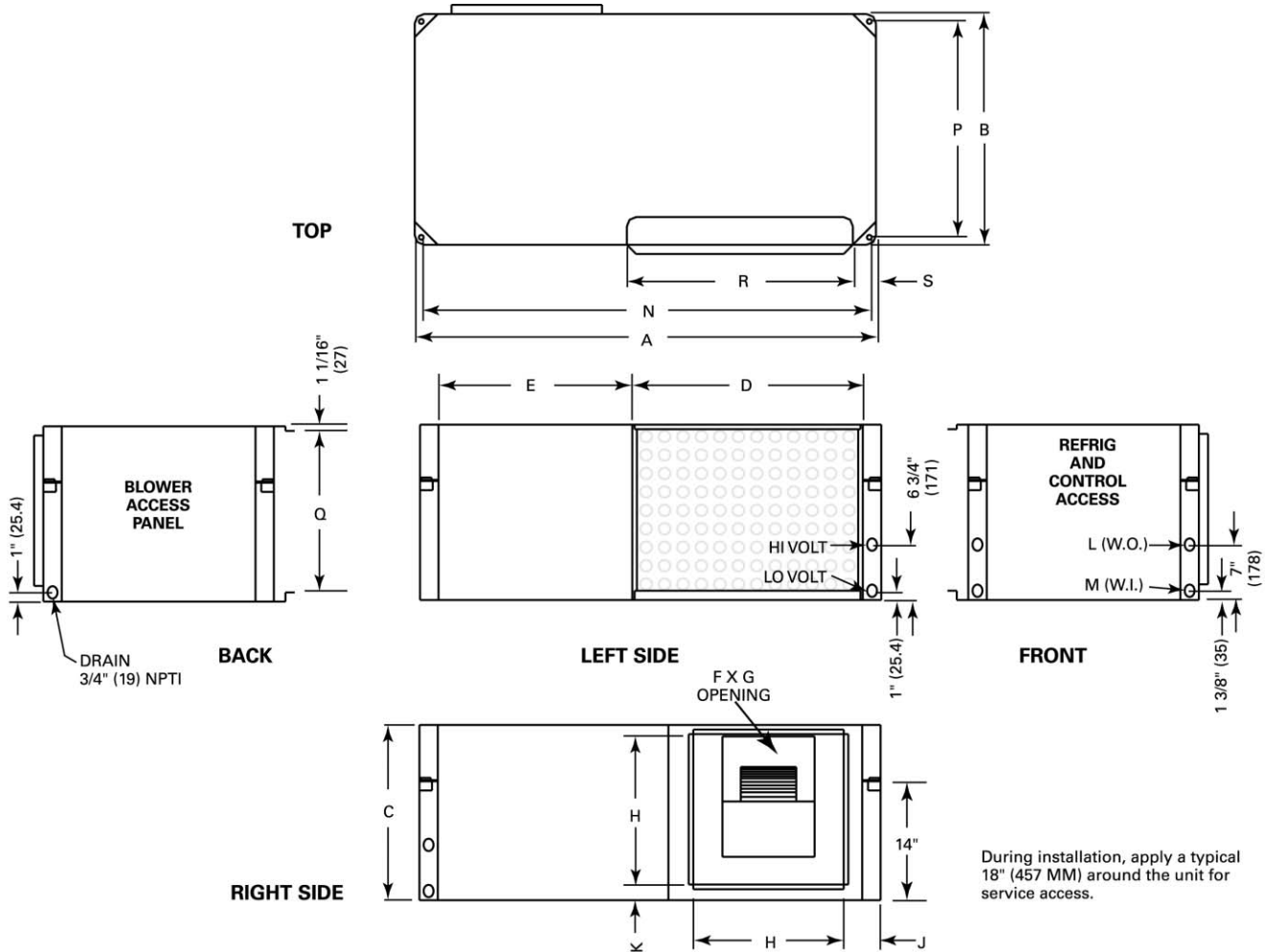
Unit	A	B	C	D	E	F	G	H	J	K	L NPTI	M NPTI	N	P	Q	R	S
006, 009	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	8" (203)	11 1/2" (292)	4 1/4" (108)	2 1/8" (54)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
012, 015	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	9 7/8" (251)	11 1/2" (292)	4 1/4" (108)	2 5/8" (67)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
018	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	9 3/4" (248)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
024, 030	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	11 3/8" (289)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
036, 042	50" (1270)	25" (635)	19" (483)	25" (635)	20" (508)	10 1/2" (267)	13 1/2" (343)	16 3/8" (416)	4" (102)	1 3/4" (45)	3/4" (19)	3/4" (19)	48 3/4" (1238)	23 3/4" (603)	17 5/8" (448)	23 1/2" (597)	3 1/4" (83)
048, 060	58" (1473)	33" (838)	21" (533)	25" (635)	28" (711)	13 7/8" (352)	13 7/8" (352)	18" (457)	6 5/8" (168)	2" (51)	1" (25.4)	1" (25.4)	56 3/4" (1441)	31 3/4" (806)	19 5/8" (498)	23 1/2" (597)	5 1/2" (140)

Dimensions/Weights Left Return/Back Supply



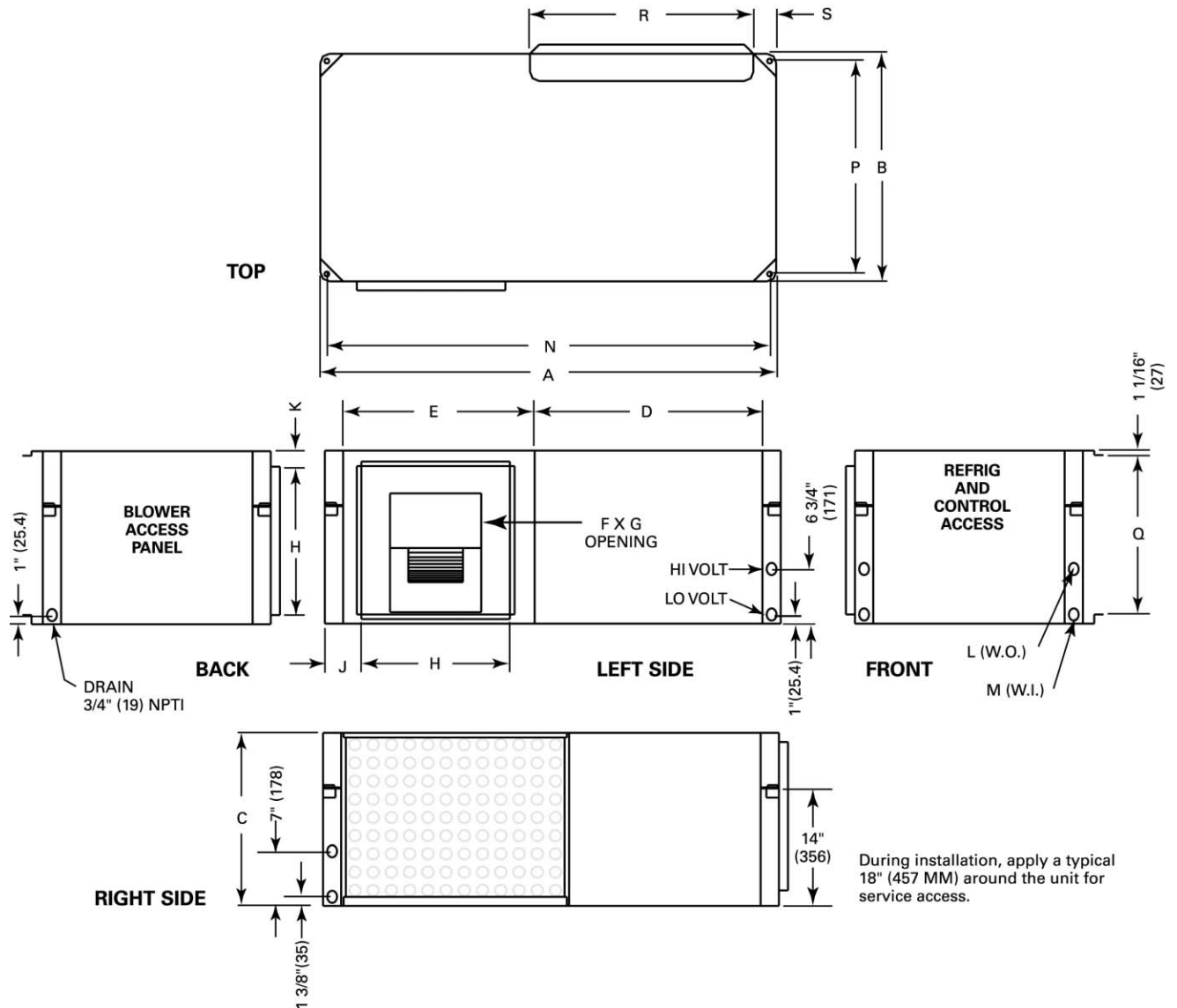
Unit	A	B	C	D	E	F	G	H	J	K	L NPTI	M NPTI	N	P	Q	R	S
006,009	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	8" (203)	11 1/2" (292)	4 1/4" (108)	2 1/8" (54)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
012, 015	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	9 7/8" (251)	11 1/2" (292)	4 1/4" (108)	2 5/8" (67)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
018	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	9 3/4" (248)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
024, 030	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	11 3/8" (289)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
036, 042	50" (1270)	25" (635)	19" (483)	25" (635)	20" (508)	10 1/2" (267)	13 1/2" (343)	16 3/8" (416)	4" (102)	1 3/4" (45)	3/4" (19)	3/4" (19)	48 3/4" (1238)	23 3/4" (603)	17 5/8" (448)	23 1/2" (597)	3 1/4" (83)
048, 060	58" (1473)	33" (838)	21" (533)	25" (635)	28" (711)	13 7/8" (352)	13 7/8" (352)	18" (457)	6 5/8" (168)	2" (51)	1" (25.4)	1" (25.4)	56 3/4" (1441)	31 3/4" (806)	19 5/8" (498)	23 1/2" (597)	5 1/2" (140)

Dimensions/Weights Left Return/Right Supply



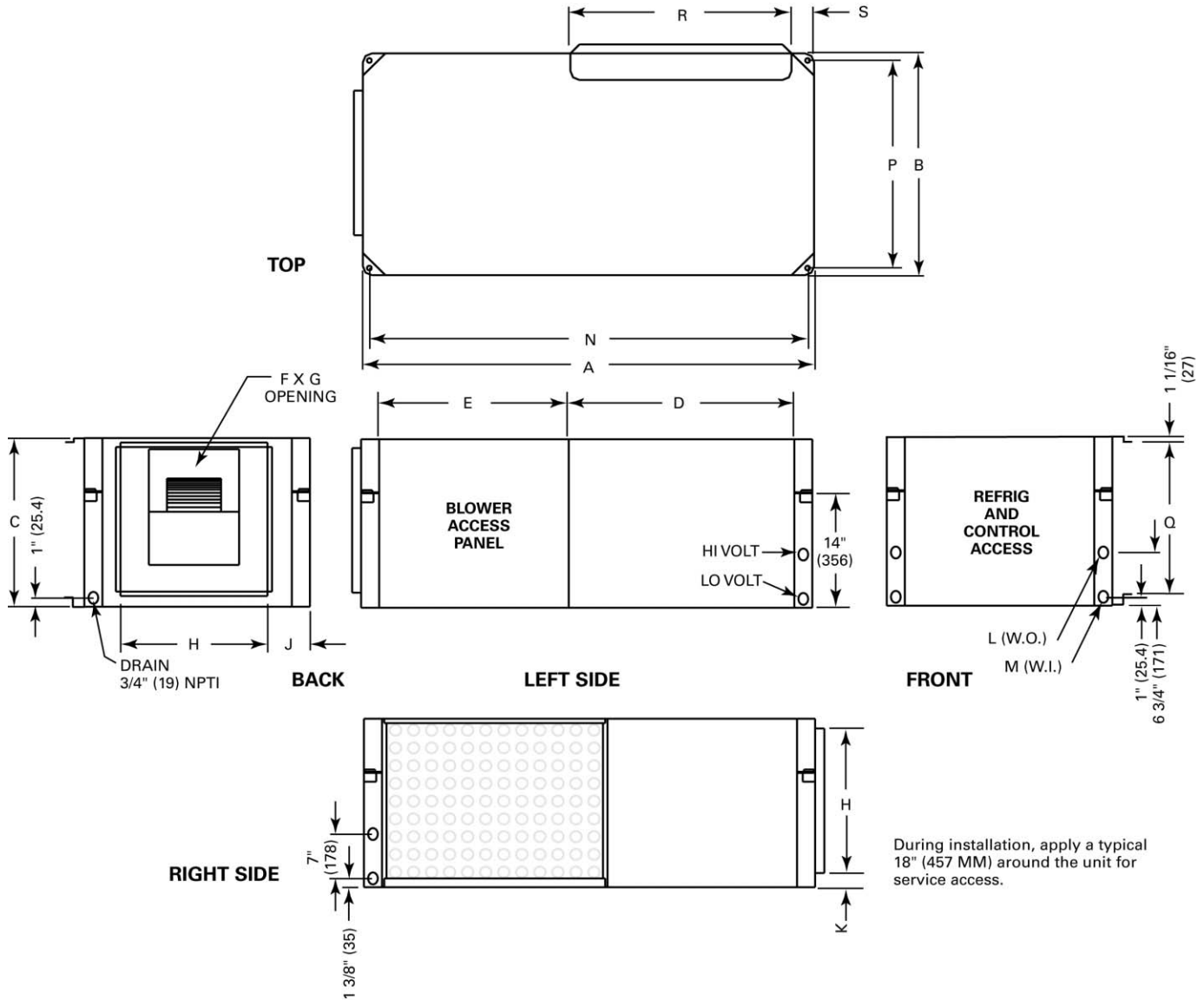
Unit 60 HZ	Unit 50 HZ	A	B	C	D	E	F	G	H	J	K	L NPTI	M NPTI	N	P	Q	R
006-009	006	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	8" (203)	11 1/2" (292)	4 1/4" (108)	2 1/8" (54)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)
012-015	009-012	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	9 7/8" (251)	11 1/2" (292)	4 1/4" (108)	2 5/8" (67)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)
018	015	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	9 3/4" (248)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)
024-030	018-024	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	11 3/8" (289)	13 1/2" (343)	4 1/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)
036-042	030-036	50" (1270)	25" (635)	19" (483)	25" (635)	20" (508)	10 1/2" (267)	13 1/2" (343)	16 3/8" (416)	4" (102)	1 3/4" (45)	3/4" (19)	3/4" (19)	48 3/4" (1238)	23 3/4" (603)	17 5/8" (448)	23 1/2" (597)
048-060	042-060	58" (1473)	33" (838)	21" (533)	29 1/2" (749)	21 1/2" (546)	13 7/8" (352)	13 7/8" (352)	18" (457)	6 5/8" (168)	2" (51)	1" (25.4)	1" (25.4)	56 3/4" (1441)	31 3/4" (806)	19 5/8" (498)	23 1/2" (597)

Dimensions/Weights Right Return/Left Supply



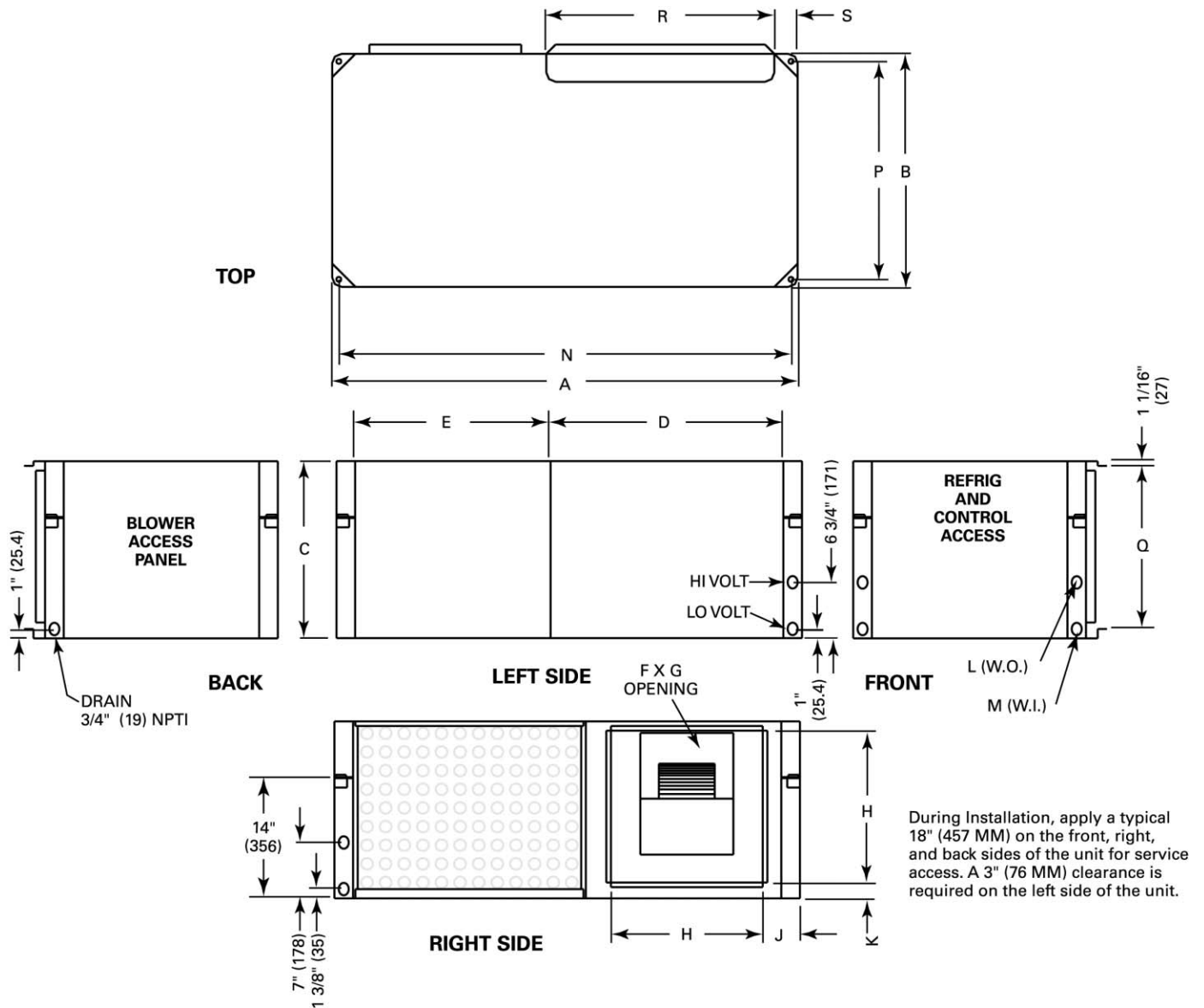
Unit	A	B	C	D	E	F	G	H	J	K	L NPTI	M NPTI	N	P	Q	R	S
006,009	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	8" (203)	11 1/2" (292)	4 1/4" (108)	2 1/8" (54)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
012, 015	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	9 7/8" (251)	11 1/2" (292)	4 1/4" (108)	2 5/8" (67)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
018	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	9 3/4" (248)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
024, 030	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	11 3/8" (289)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
036, 042	50" (1270)	25" (635)	19" (483)	25" (635)	20" (508)	10 1/2" (267)	13 1/2" (343)	16 3/8" (416)	4" (102)	1 3/4" (45)	3/4" (19)	3/4" (19)	48 3/4" (1238)	23 3/4" (603)	17 5/8" (448)	23 1/2" (597)	3 1/4" (83)
048, 060	58" (1473)	33" (838)	21" (533)	25" (635)	28" (711)	13 7/8" (352)	13 7/8" (352)	18" (457)	6 5/8" (168)	2" (51)	1" (25.4)	1" (25.4)	56 3/4" (1441)	31 3/4" (806)	19 5/8" (498)	23 1/2" (597)	5 1/2" (140)

Dimensions/Weights Right Return/Back Supply



Unit	A	B	C	D	E	F	G	H	J	K	L NPTI	M NPTI	N	P	Q	R	S
006, 009	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	8" (203)	11 1/2" (292)	4 1/4" (108)	2 1/8" (54)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
012, 015	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	9 7/8" (251)	11 1/2" (292)	4 1/4" (108)	2 5/8" (67)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
018	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	9 3/4" (248)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
024, 030	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	11 3/8" (289)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
036, 042	50" (1270)	25" (635)	19" (483)	25" (635)	20" (508)	10 1/2" (267)	13 1/2" (343)	16 3/8" (416)	4" (102)	1 3/4" (45)	3/4" (19)	3/4" (19)	48 3/4" (1238)	23 3/4" (603)	17 5/8" (448)	23 1/2" (597)	3 1/4" (83)
048, 060	58" (1473)	33" (838)	21" (533)	25" (635)	28" (711)	13 7/8" (352)	13 7/8" (352)	18" (457)	6 5/8" (168)	2" (51)	1" (25.4)	1" (25.4)	56 3/4" (1441)	31 3/4" (806)	19 5/8" (498)	23 1/2" (597)	5 1/2" (140)

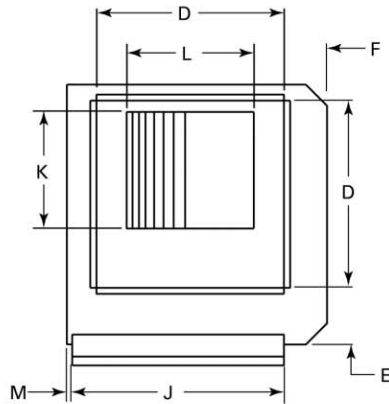
Dimensions/Weights Right Return/Right Supply



Unit	A	B	C	D	E	F	G	H	J	K	L NPTI	M NPTI	N	P	Q	R	S
006,009	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	8" (203)	11 1/2" (292)	4 1/4" (108)	2 1/8" (54)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
012, 015	40" (1016)	20" (508)	15" (381)	20" (508)	15" (381)	6 7/8" (175)	9 7/8" (251)	11 1/2" (292)	4 1/4" (108)	2 5/8" (67)	1/2" (12.7)	1/2" (12.7)	38 3/4" (984)	18 3/4" (476)	13 5/8" (346)	18 1/2" (470)	3 3/8" (86)
018	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	9 3/4" (248)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
024, 030	46" (1168)	23" (584)	17" (432)	23" (584)	18" (457)	8 1/4" (210)	11 3/8" (289)	13 1/2" (343)	4 3/4" (121)	2 7/8" (73)	3/4" (19)	3/4" (19)	44 3/4" (1137)	21 3/4" (552)	15 5/8" (397)	18 1/2" (470)	4 1/4" (108)
036, 042	50" (1270)	25" (635)	19" (483)	25" (635)	20" (508)	10 1/2" (267)	13 1/2" (343)	16 3/8" (416)	4" (102)	1 3/4" (45)	3/4" (19)	3/4" (19)	48 3/4" (1238)	23 3/4" (603)	17 5/8" (448)	23 1/2" (597)	3 1/4" (83)
048, 060	58" (1473)	33" (838)	21" (533)	25" (635)	28" (711)	13 7/8" (352)	13 7/8" (352)	18" (457)	6 5/8" (168)	2" (51)	1" (25.4)	1" (25.4)	56 3/4" (1441)	31 3/4" (806)	19 5/8" (498)	23 1/2" (597)	5 1/2" (140)



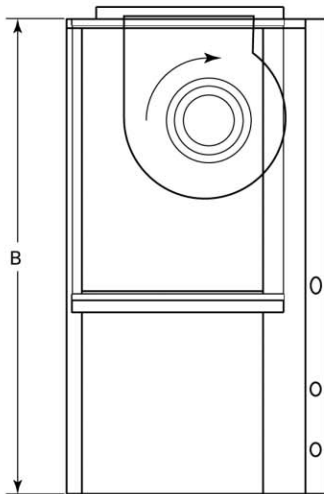
Dimensions/Weights Left Return/Top Supply



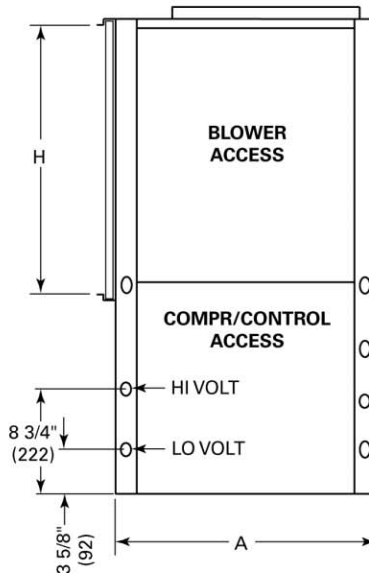
TOP

N During installation, apply a typical 24-inch access at the front service access panel

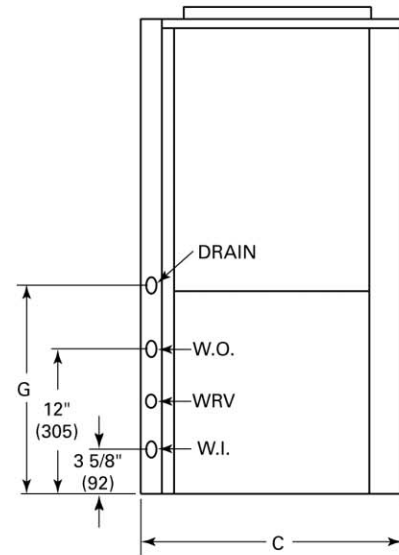
N



LEFT SIDE



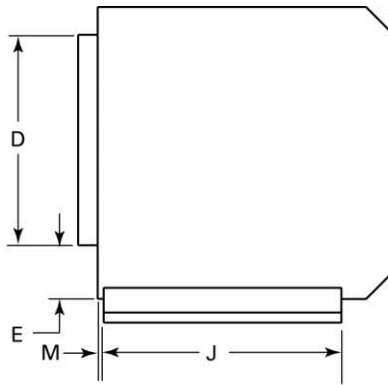
FRONT



RIGHT SIDE

Unit GEV	A	B	C	D	E	F	G	H	J	K	L	M	N	W.I. NPTI	W.O. NPTI	Drain FPT
006-015	19 1/2" (495)	31 1/4" (794)	21 1/2" (546)	11 1/2" (292)	4" (102)	3 3/4" (95)	16 1/2" (419)	15" (381)	18" (457)	6 7/8" (175)	8" (203)	3/4" (19)	2" (51)	1/2" (12.7)	1/2" (12.7)	3/4" (19)
018, 024, 030, 040	21 1/2" (546)	39 1/4" (997)	21 1/2" (546)	13 1/2" (343)	4" (102)	4" (1021)	17 1/2" (445)	23 3/4" (603)	17" (432)	8 1/4" (368)	9 3/4" (248)	3/4" (19)	2" (51)	3/4" (19)	3/4" (19)	3/4" (19)
											11 3/8" (289)					
036, 042	24 1/2" (622)	41 7/8" (1064)	26 1/2" (673)	18" (457)	3 1/4" (83)	1 7/8" (48)	19 1/2" (495)	19" (483)	23" (584)	10 1/2" (267)	13 1/2" (343)	1 3/4" (19)	0	3/4" (19)	3/4" (19)	3/4" (19)
Std-048	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 7/8" (352)	13 7/8" (352)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)
Hi-048, 060	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 1/8" (333)	11 3/8" (289)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)

Dimensions/Weights Left Return/Back Supply

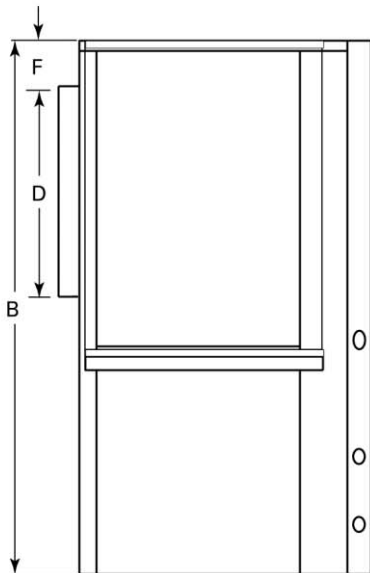


TOP

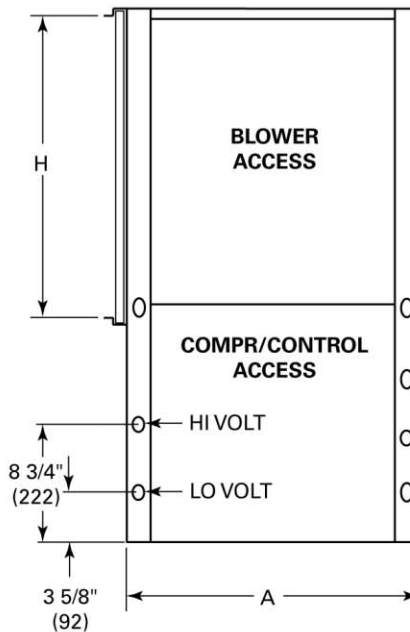
N

N

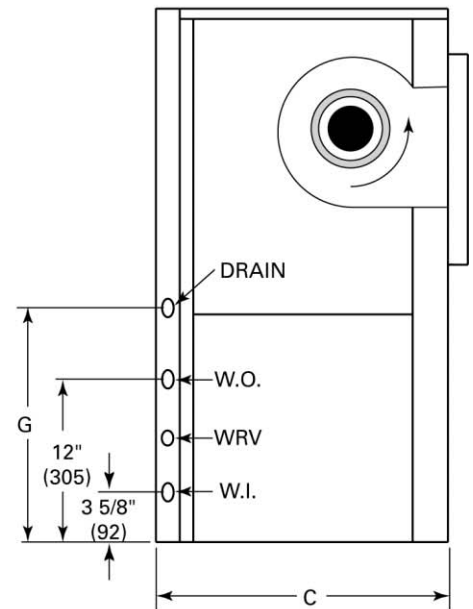
During installation, apply a typical 24-inch access at the front service access panel



LEFT SIDE



FRONT



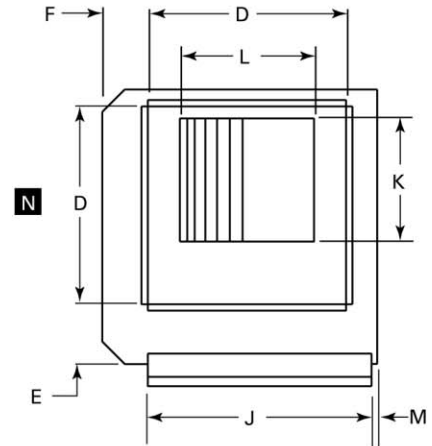
RIGHT SIDE

Unit GEV	A	B	C	D	E	F	G	H	J	K	L	M	N	W.I. NPTI	W.O. NPTI	Drain FPT
006-015	19 1/2" (495)	31 1/4" (794)	21 1/2" (546)	11 1/2" (292)	4" (102)	3 3/4" (95)	16 1/2" (419)	15" (381)	18" (457)	6 7/8" (175)	8" (203)	3/4" (19)	2" (51)	3/4" (12.7)	3/4" (12.7)	3/4" (19)
018, 024, 030, 040	21 1/2" (546)	39 1/4" (997)	21 1/2" (546)	13 1/2" (343)	4" (102)	4" (102)	17 1/2" (445)	23 3/4" (603)	17" (432)	8 1/4" (368)	9 3/4" (248) 11 3/8" (289)	3/4" (19)	2" (51)	3/4" (19)	3/4" (19)	3/4" (19)
036, 042	24 1/2" (622)	41 7/8" (1064)	26 1/2" (673)	18" (457)	3 1/4" (83)	1 7/8" (48)	19 1/2" (495)	19" (483)	23" (584)	10 1/2" (267)	13 1/2" (343)	1 3/4" (19)	0	3/4" (19)	3/4" (19)	3/4" (19)
Std-048	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 7/8" (352)	13 7/8" (352)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)
Hi-048, 060	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 1/8" (333)	11 3/8" (289)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)

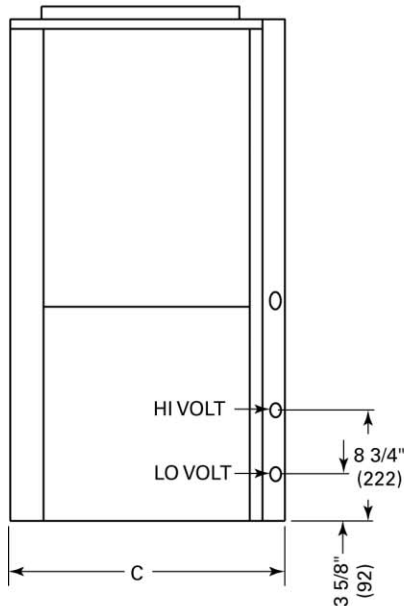
Dimensions/Weights

Right Return/Top Supply

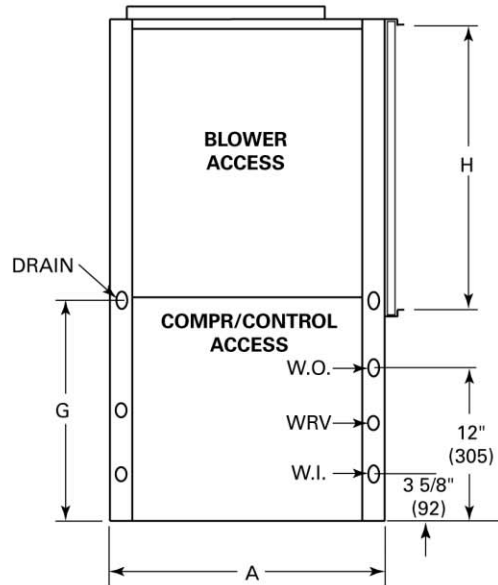
N During installation, apply a typical 24-inch access at the front service access panel



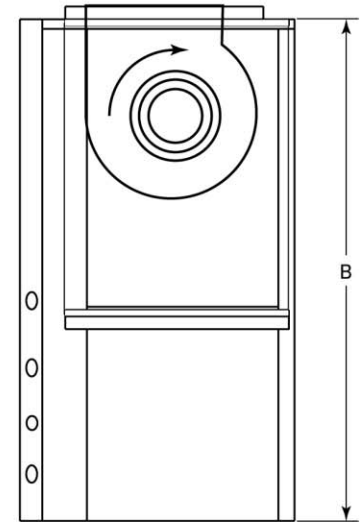
TOP



LEFT SIDE



FRONT



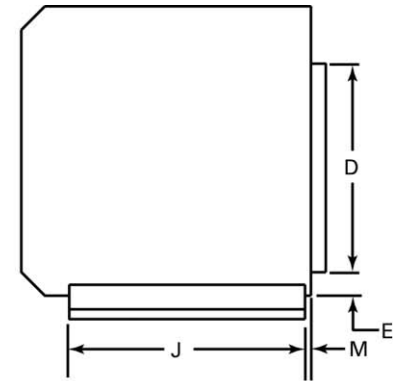
RIGHT SIDE

Unit GEV	A	B	C	D	E	F	G	H	J	K	L	M	N	W.I. NPTI	W.O. NPTI	Drain FPT
006-015	19 1/2" (495)	31 1/4" (794)	21 1/2" (546)	11 1/2" (292)	4" (102)	3 3/4" (95)	16 1/2" (419)	15" (381)	18" (457)	6 7/8" (175)	8" (203)	3/4" (19)	2" (51)	1/2" (12.7)	1/2" (12.7)	3/4" (19)
018, 024, 030, 040	21 1/2" (546)	39 1/4" (997)	21 1/2" (546)	13 1/2" (343)	4" (102)	4" (102)	17 1/2" (445)	23 3/4" (603)	17" (432)	8 1/4" (368)	9 3/4" (248)	3/4" (19)	2" (51)	3/4" (19)	3/4" (19)	3/4" (19)
											11 3/8" (289)					
036, 042	24 1/2" (622)	41 7/8" (1064)	26 1/2" (673)	18" (457)	3 1/4" (83)	1 7/8" (48)	19 1/2" (495)	19" (483)	23" (584)	10 1/2" (267)	13 1/2" (343)	1 3/4" (19)	0	3/4" (19)	3/4" (19)	3/4" (19)
Std-048	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 7/8" (352)	13 7/8" (352)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)
Hi-048, 060	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 1/8" (333)	11 3/8" (289)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)

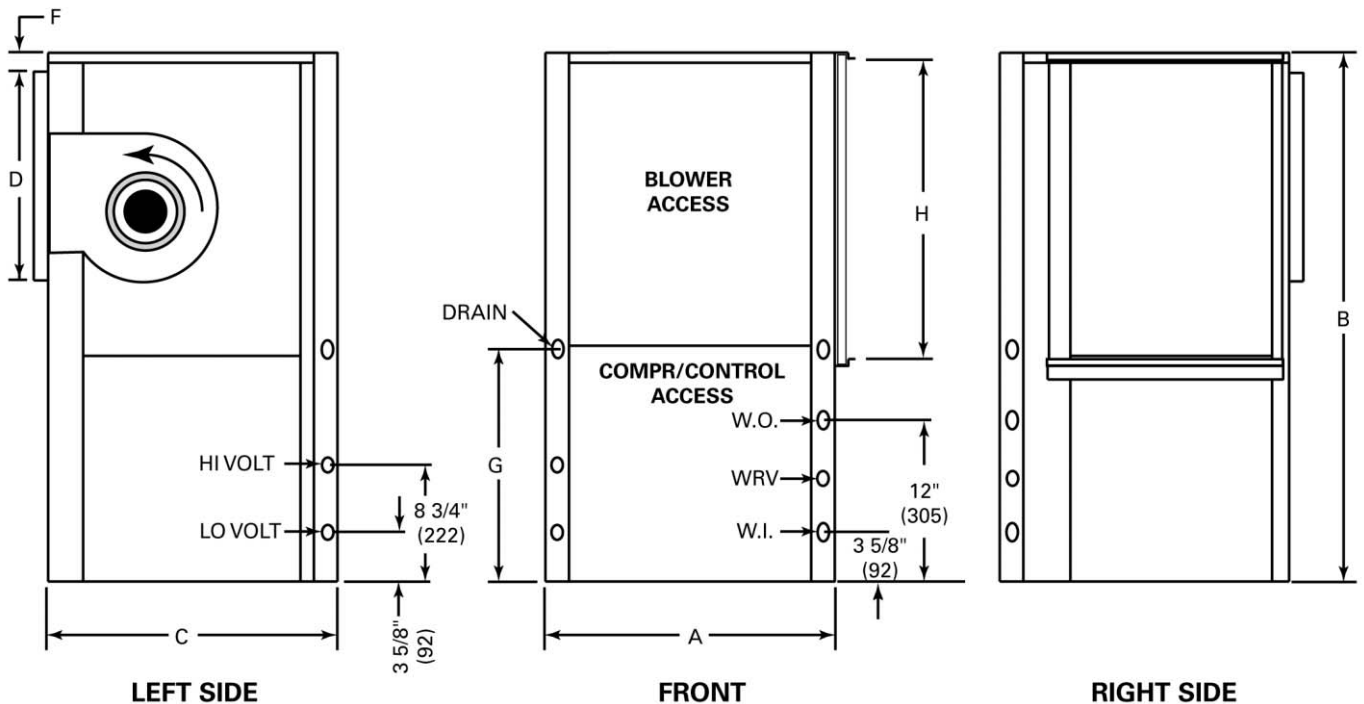
Dimensions/Weights Right Return/Back Supply

N During installation, apply a typical 24-inch access at the front service access panel

N



TOP



LEFT SIDE

FRONT

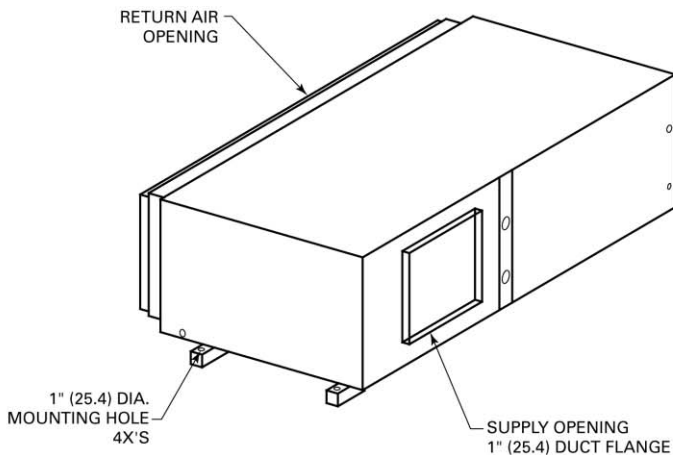
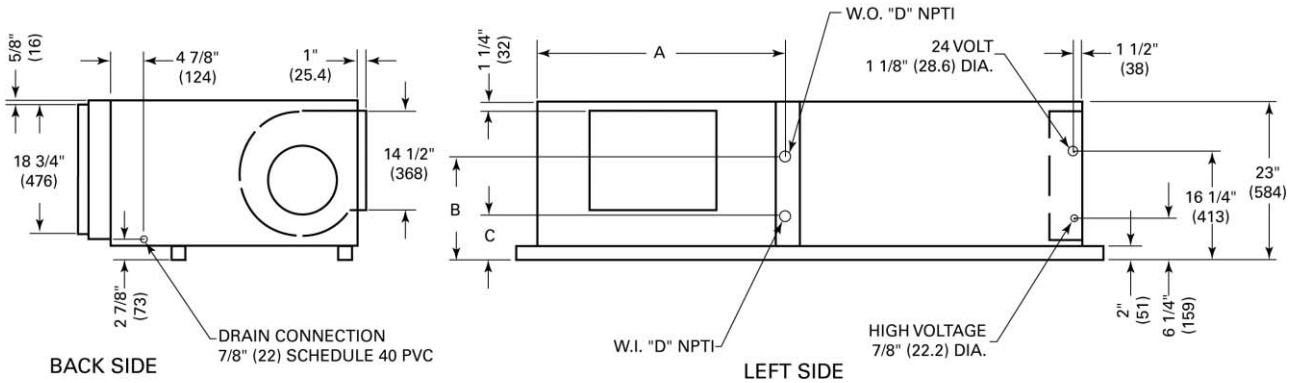
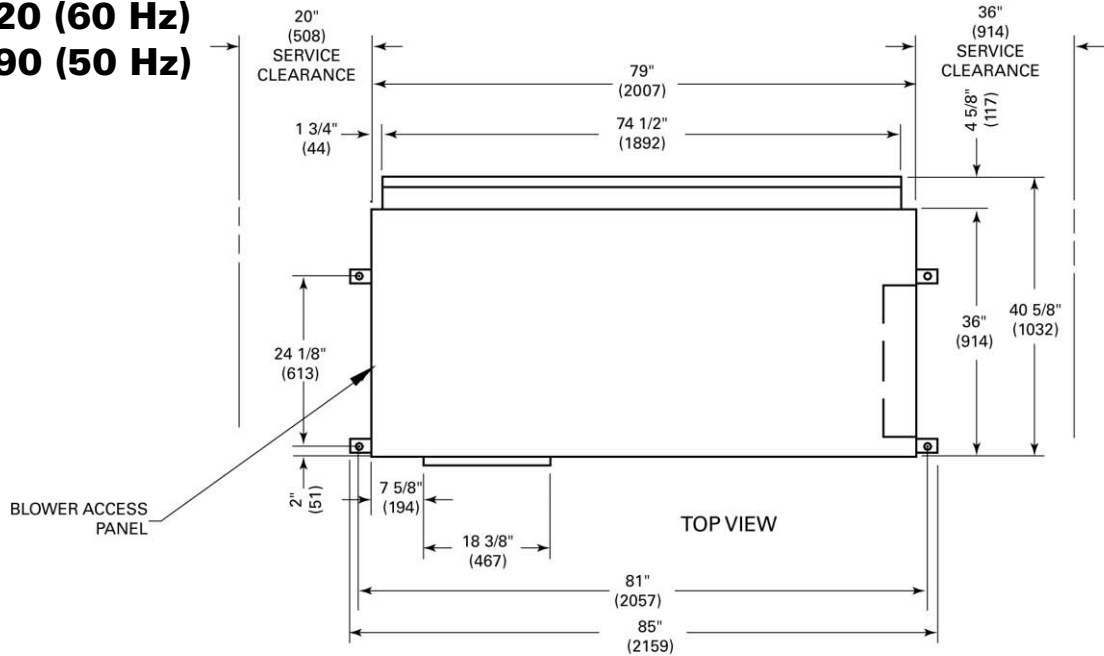
RIGHT SIDE

Unit GEV	A	B	C	D	E	F	G	H	J	K	L	M	N	W.I. NPTI	W.O. NPTI	Drain FPT
006-015	19 1/2" (495)	31 1/4" (794)	21 1/2" (546)	11 1/2" (292)	4" (102)	3 3/4" (95)	16 1/2" (419)	15" (381)	18" (457)	6 7/8" (175)	8" (203)	3/4" (19)	2" (51)	3/4" (12.7)	3/4" (12.7)	3/4" (19)
018, 024, 030, 040	21 1/2" (546)	39 1/4" (997)	21 1/2" (546)	13 1/2" (343)	4" (102)	4" (102)	17 1/2" (445)	23 3/4" (603)	17" (432)	8 1/4" (368)	9 3/4" (248) 11 3/8" (289)	3/4" (19)	2" (51)	3/4" (19)	3/4" (19)	3/4" (19)
036, 042	24 1/2" (622)	41 7/8" (1064)	26 1/2" (673)	18" (457)	3 1/4" (83)	1 7/8" (48)	19 1/2" (495)	19" (483)	23" (584)	10 1/2" (267)	13 1/2" (343)	1 3/4" (19)	0	3/4" (19)	3/4" (19)	3/4" (19)
Std-048	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 7/8" (352)	13 7/8" (352)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)
Hi-048, 060	26 1/2" (673)	46 7/8" (1191)	30 1/2" (775)	18" (457)	4 1/4" (108)	2" (51)	21 1/2" (546)	29" (737)	27" (686)	13 1/8" (333)	11 3/8" (289)	2 1/4" (57)	3 1/2" (89)	1" (25.4)	1" (25.4)	3/4" (19)



Dimensional Data GEH-Right Return/Left Supply

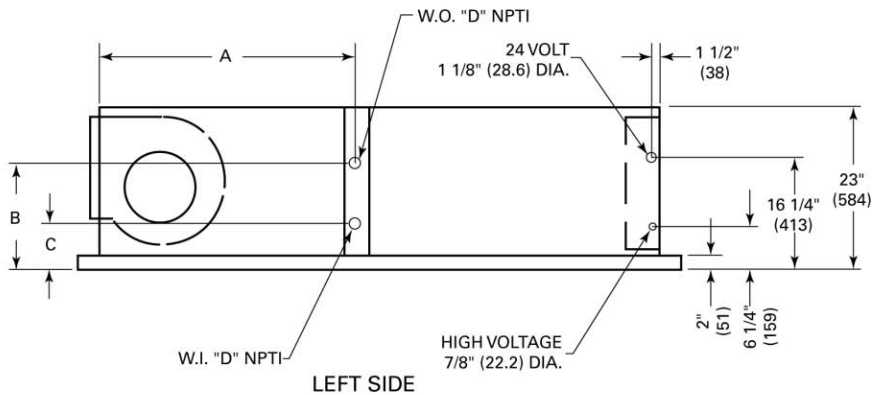
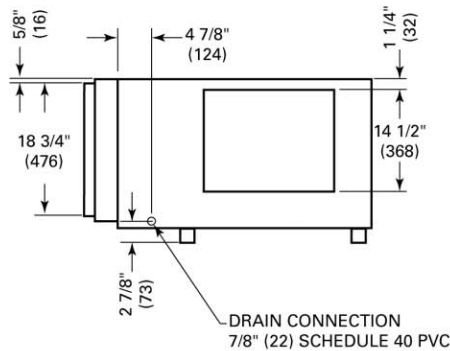
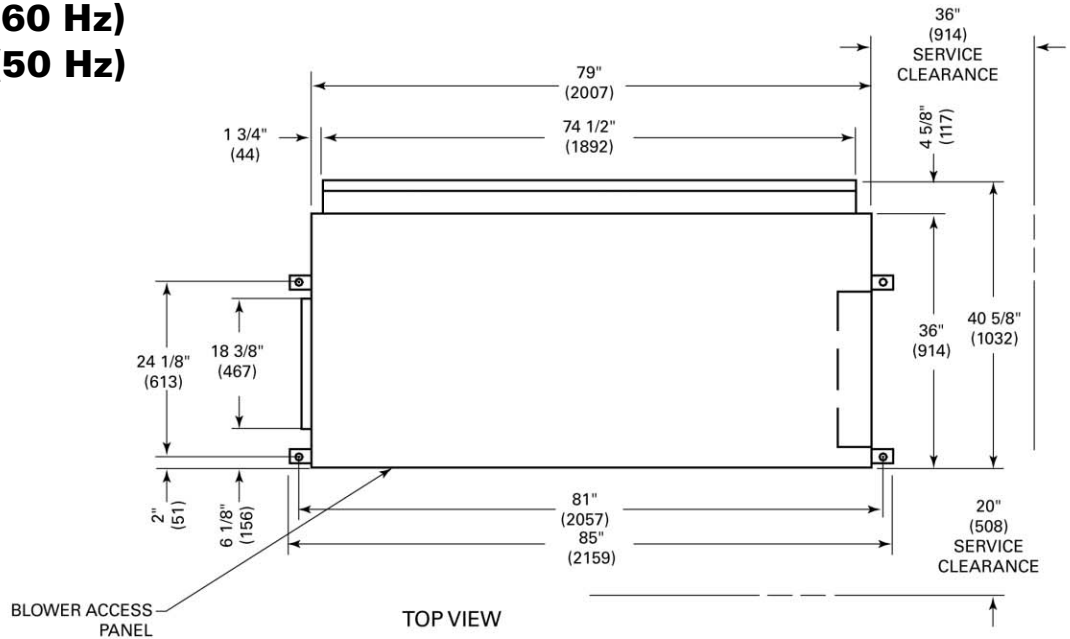
GEH 072-120 (60 Hz)
GEH 072-090 (50 Hz)



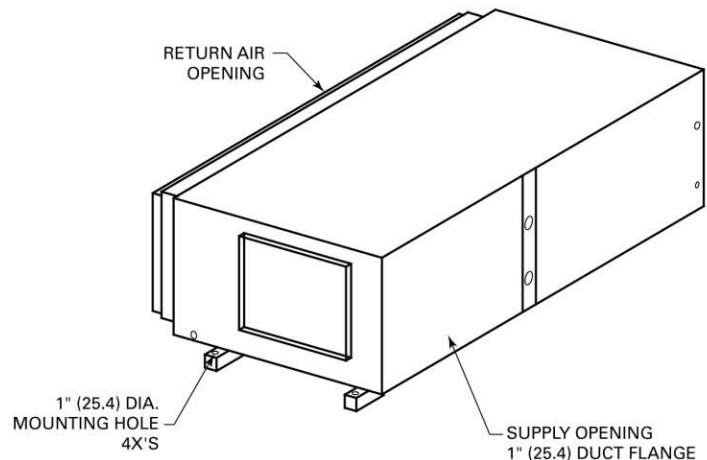
GEH 60 Hz	GEH 50 Hz	A	B	C	D
072	-	36 1/4" (921)	15 5/8" (397)	6 5/8" (168)	1 1/4" (32)
090	072	36 1/8" (917)	12 3/4" (324)	6 3/4" (171)	1 1/4" (32)
120	090	36 1/8" (917)	13" (330)	7 1/4" (184)	1 1/2" (38)

Dimensional Data GEH-Right Return/Back Supply

GEH 072-120 (60 Hz)
GEH 072-090 (50 Hz)

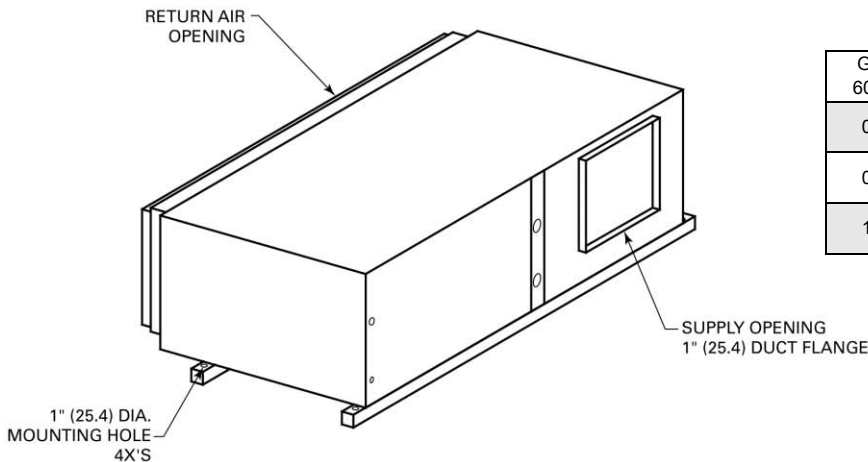
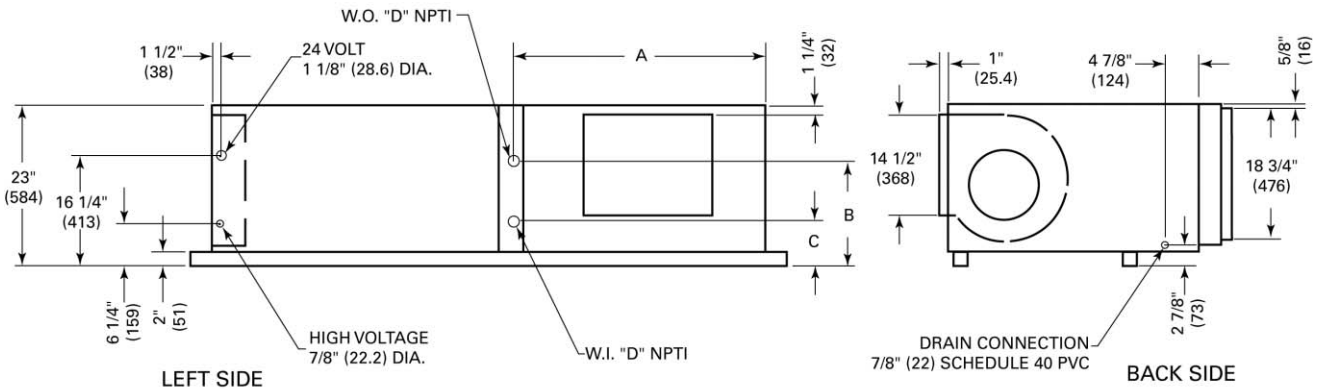
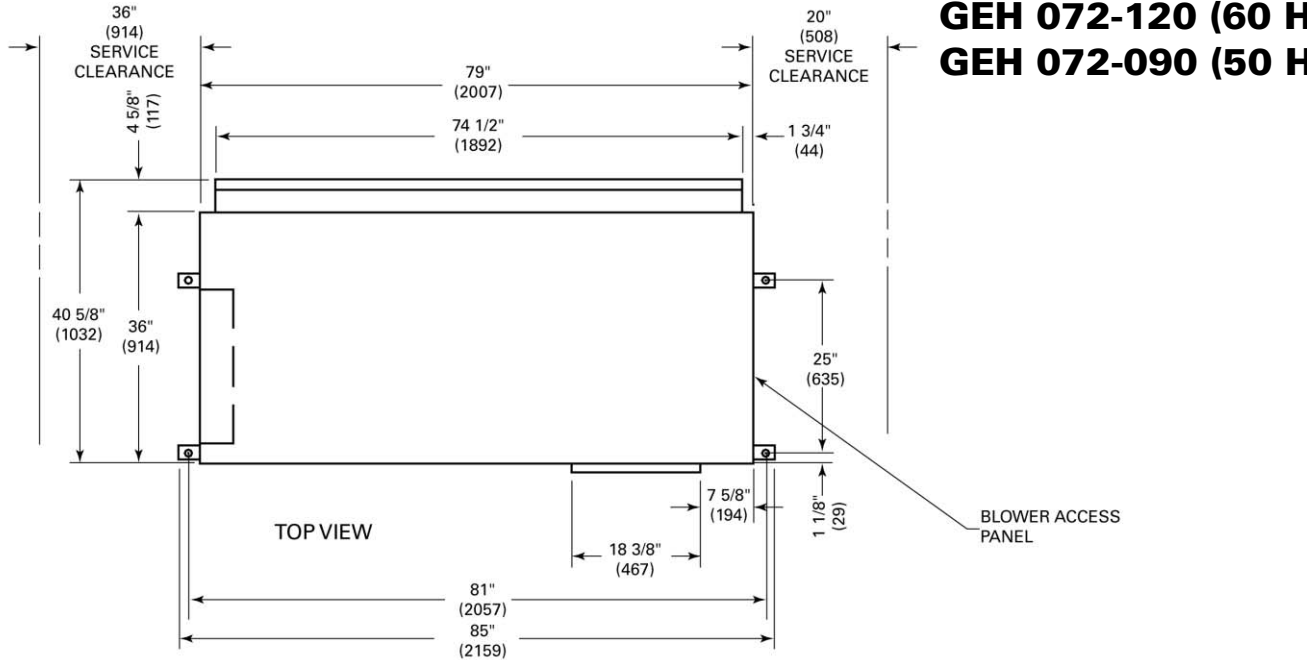


GEH 60 Hz	GEH 50 Hz	A	B	C	D
072	-	36 1/4" (921)	15 5/8" (397)	6 5/8" (168)	1 1/4" (32)
090	072	36 1/8" (917)	12 3/4" (324)	6 3/4" (171)	1 1/4" (32)
120	090	36 1/8" (917)	13" (330)	7 1/4" (184)	1 1/2" (38)



Dimensional Data GEH-Left Return/Right Supply

GEH 072-120 (60 Hz)
GEH 072-090 (50 Hz)

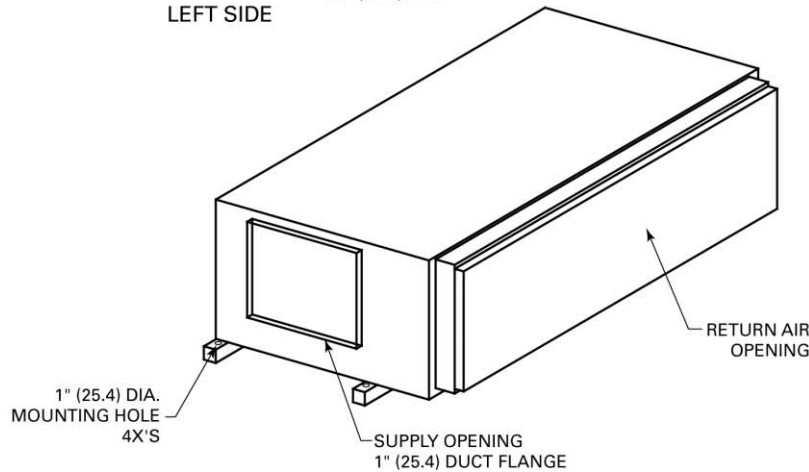
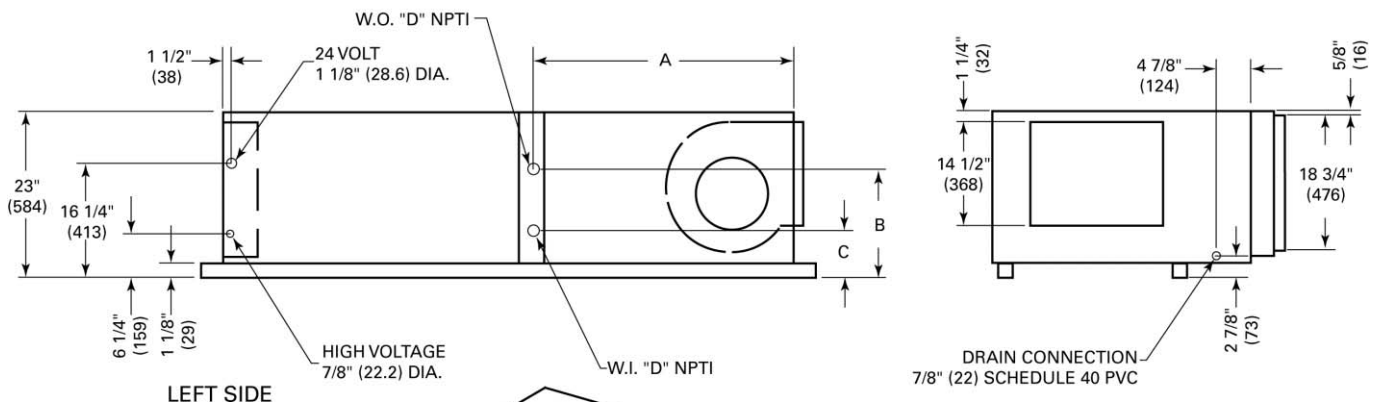
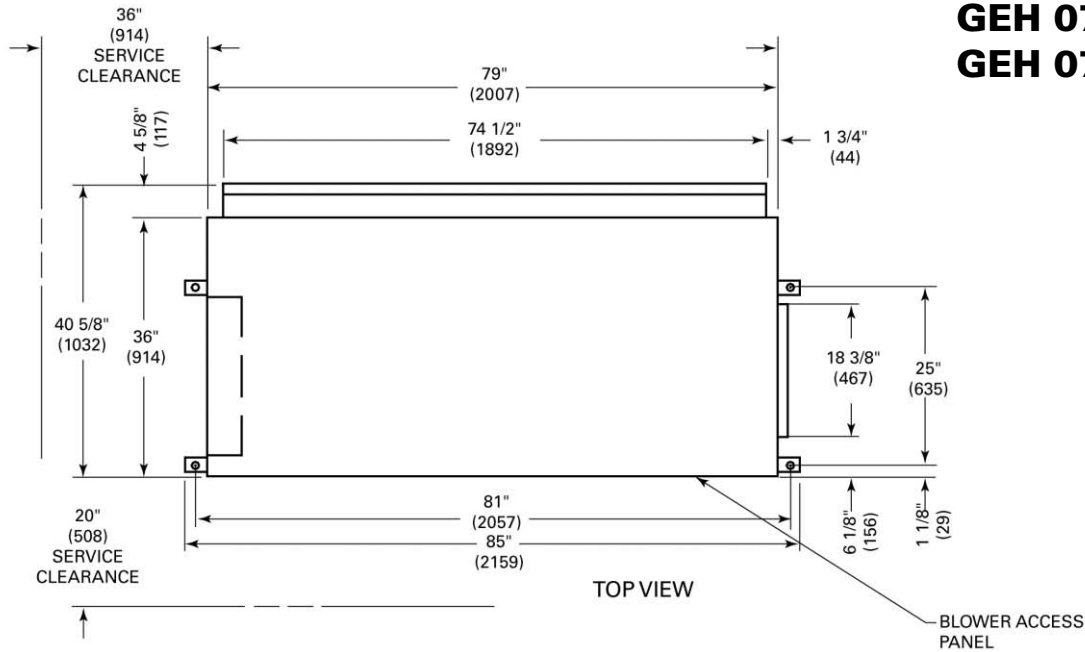


GEH 60 Hz	GEH 50 Hz	A	B	C	D
072	-	36 1/8" (917)	17" (432)	8" (203)	1 1/4" (32)
090	072	36 1/8" (917)	13 3/4" (349)	7 3/4" (197)	1 1/4" (32)
120	090	36 1/8" (917)	13" (330)	7 1/4" (184)	1 1/2" (38)

Dimensional Data

GEH-Left Return/Back Supply

GEH 072-120 (60 Hz)
GEH 072-090 (50 Hz)

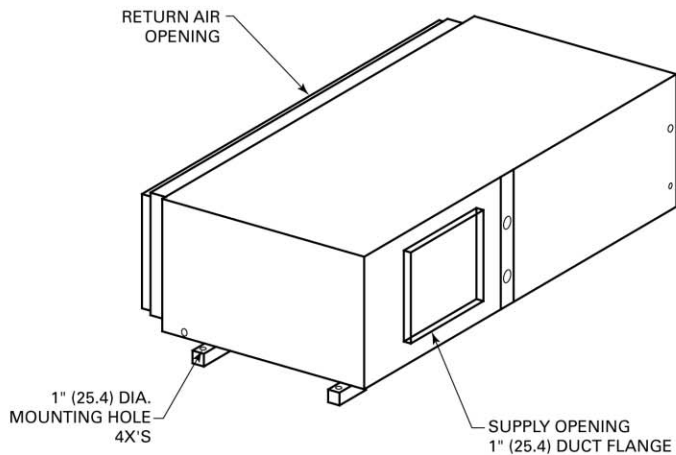
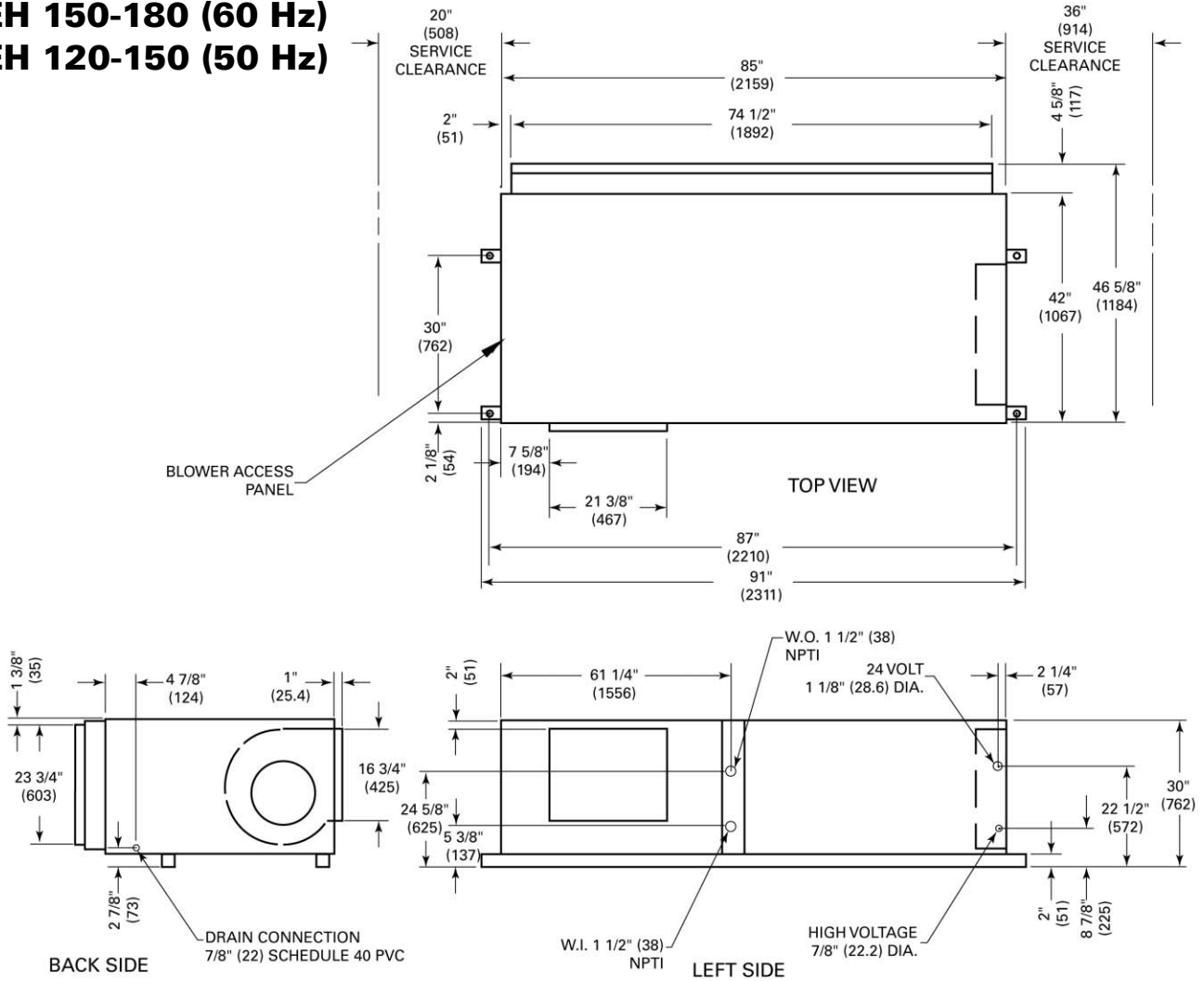


GEH 60 Hz	GEH 50 Hz	A	B	C	D
072	-	36 1/8" (917)	17" (432)	8" (203)	1 1/4" (32)
090	072	36 1/8" (917)	13 3/4" (349)	7 3/4" (197)	1 1/4" (32)
120	090	36 1/8" (917)	13" (330)	7 1/4" (184)	1 1/2" (38)



Dimensional Data GEH-Right Return/Left Supply

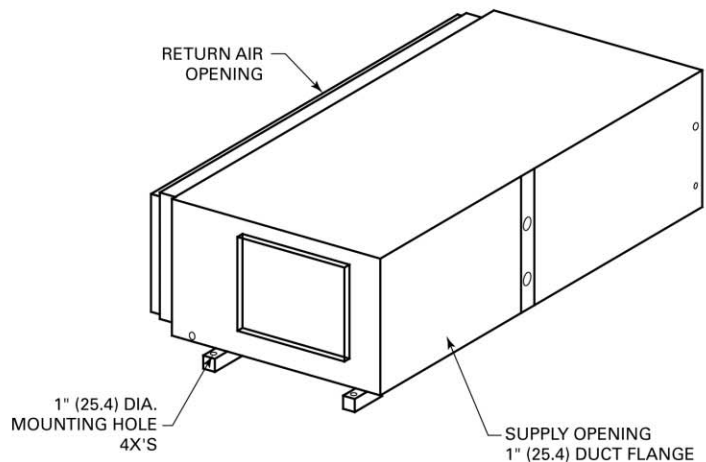
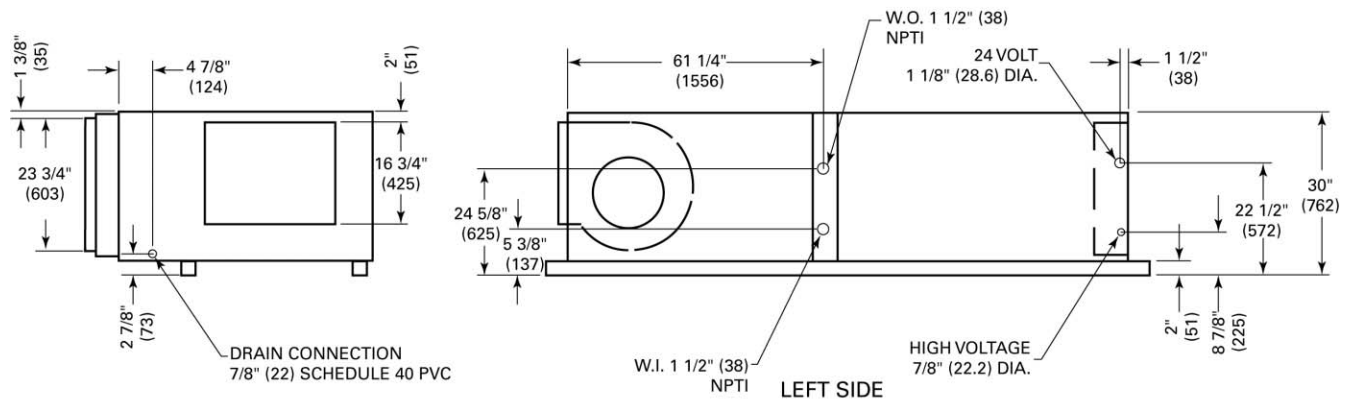
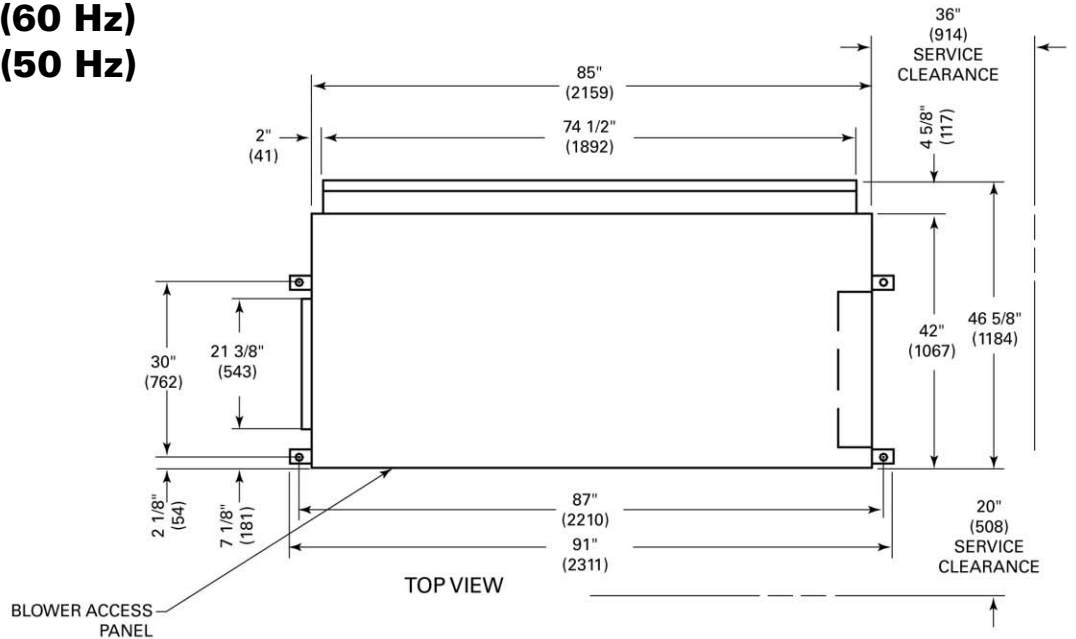
GEH 150-180 (60 Hz)
GEH 120-150 (50 Hz)



Dimensional Data

GEH-Right Return/Back Supply

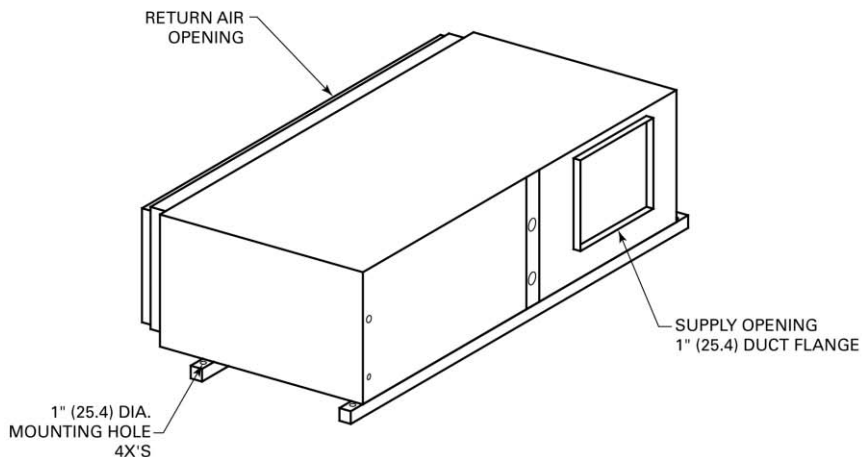
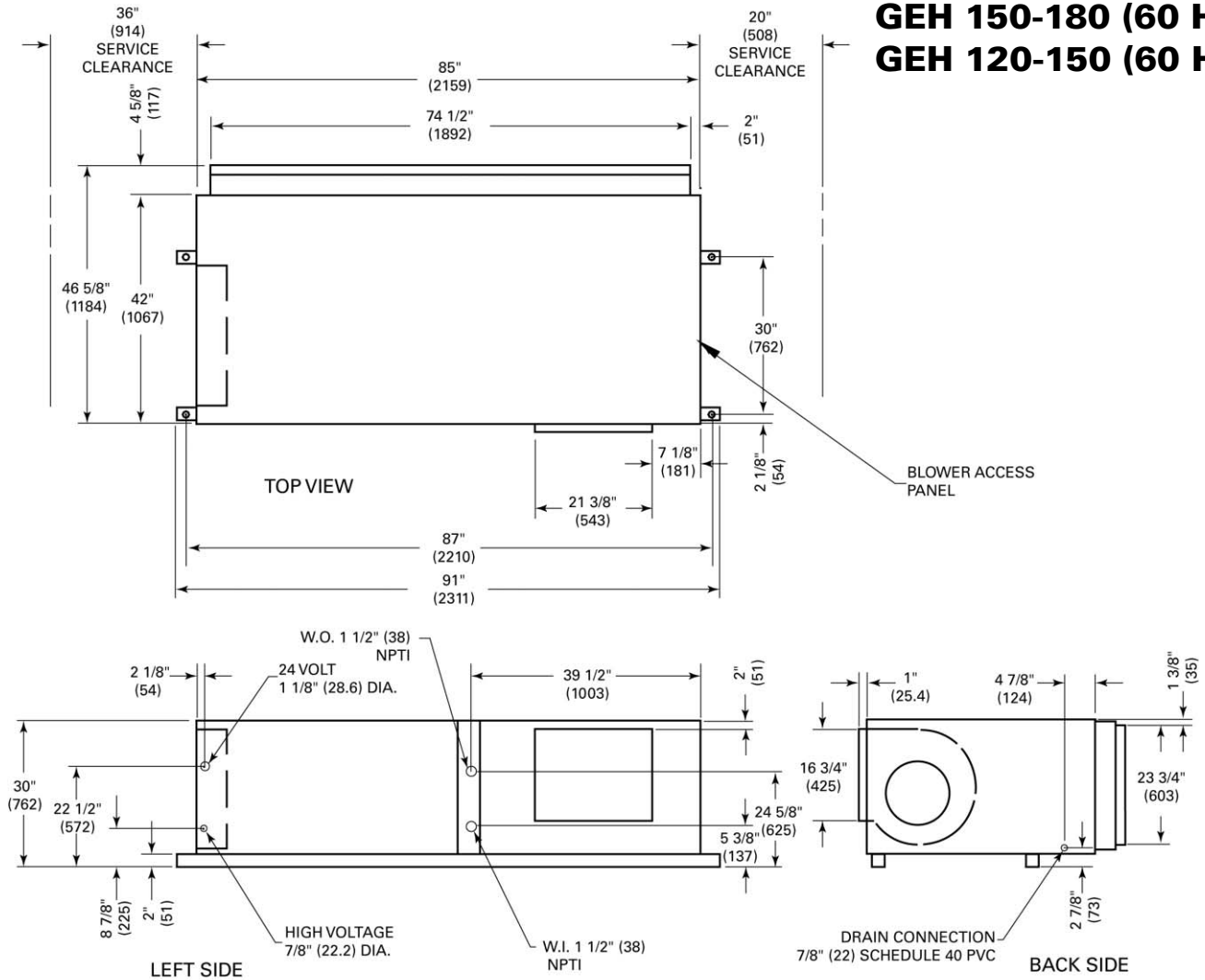
GEH 150-180 (60 Hz)
GEH 120-150 (50 Hz)



Dimensional Data

GEH-Left Return/Right Supply

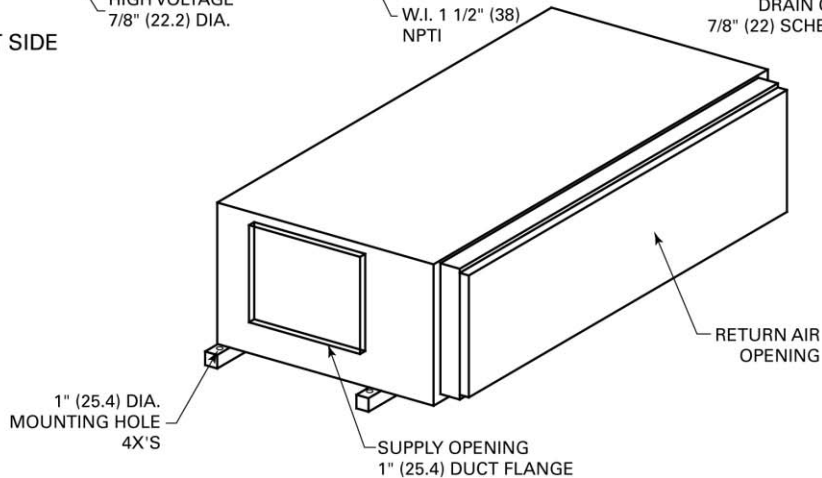
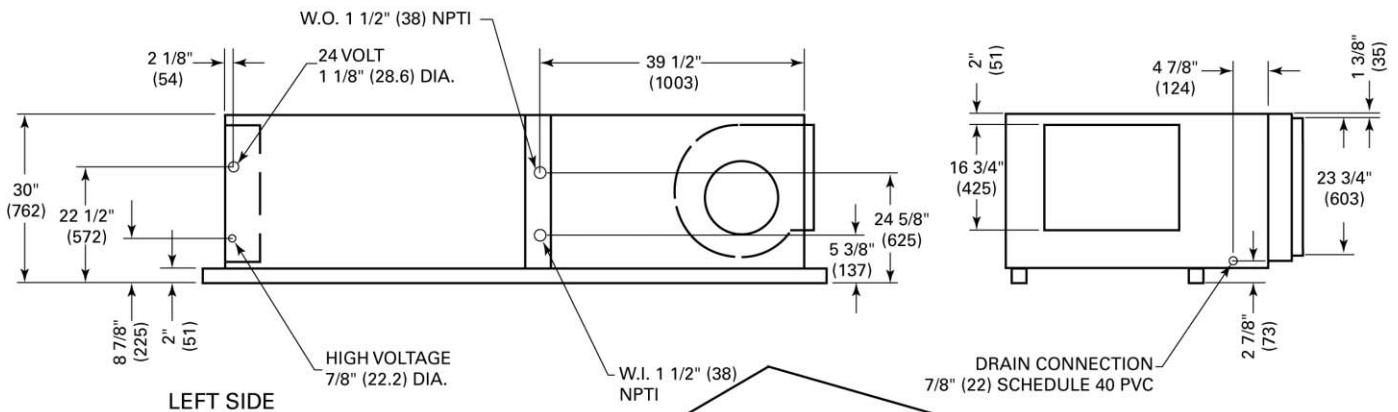
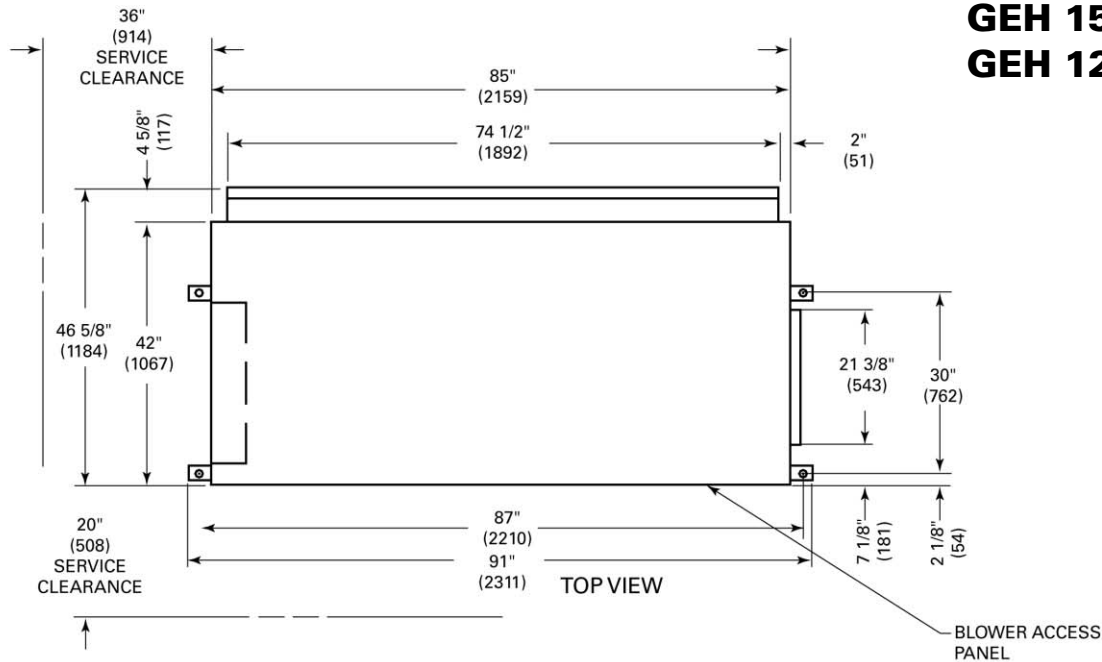
GEH 150-180 (60 Hz)
GEH 120-150 (60 Hz)



Dimensional Data

GEH-Left Return/Back Supply

GEH 150-180 (60 Hz)
GEH 120-150 (50 Hz)

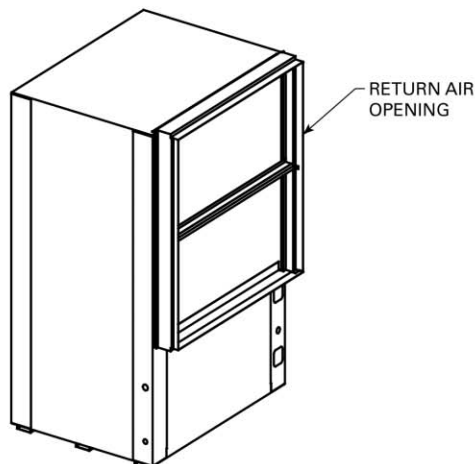
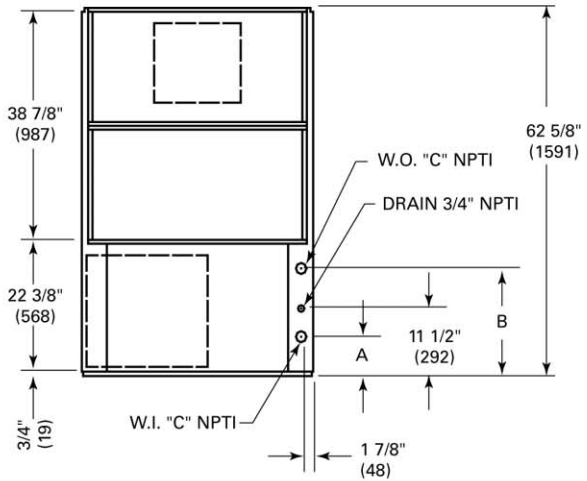
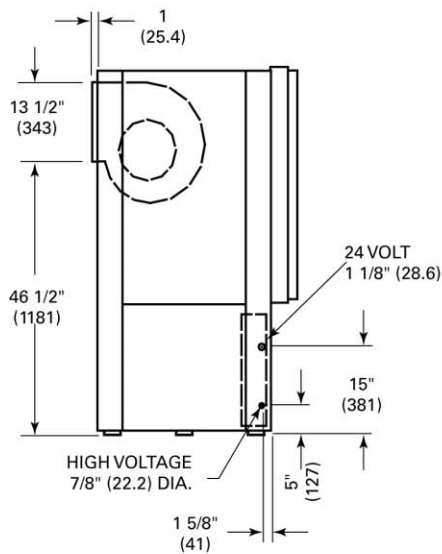
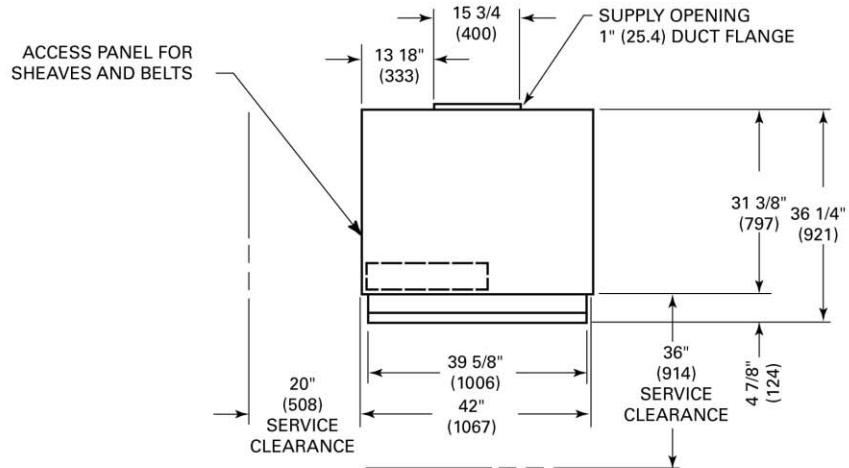




Dimensions/Weights Front Return/Back Supply

6 - 10 Ton (60 HZ)
6 and 7 1/2 Ton (50 HZ)

Unit Size	A	B	C
6 Ton	6 5/8" (168)	18 3/8" (467)	1 1/4"
7.5 Ton	6 5/8" (168)	18 3/8" (403)	1 1/4"
10 Ton	6 1/2" (165)	18 1/2" (470)	1 1/2"



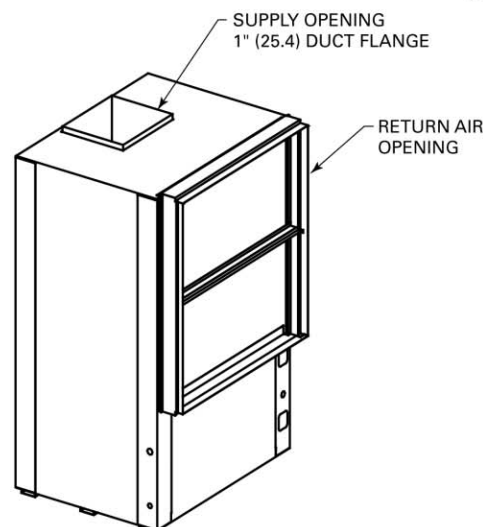
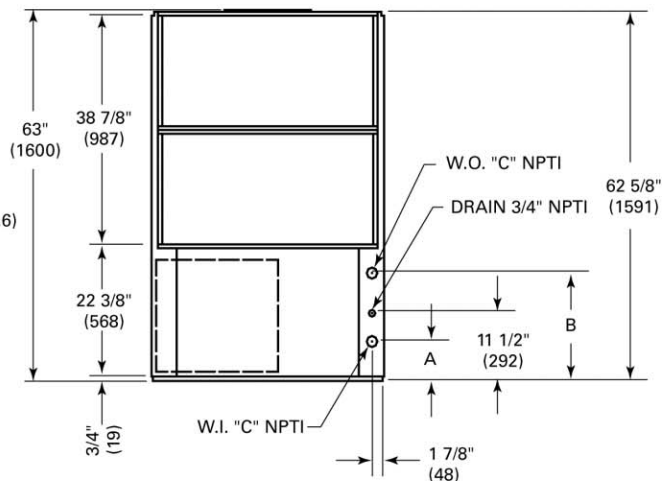
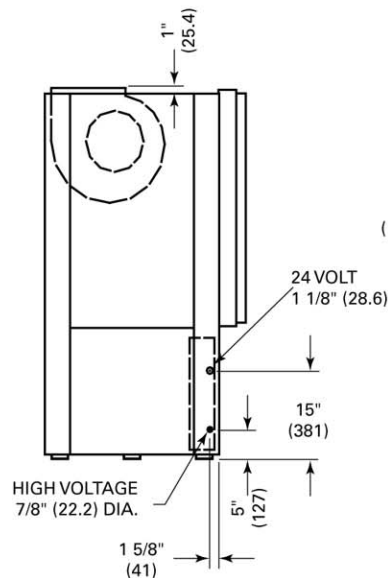
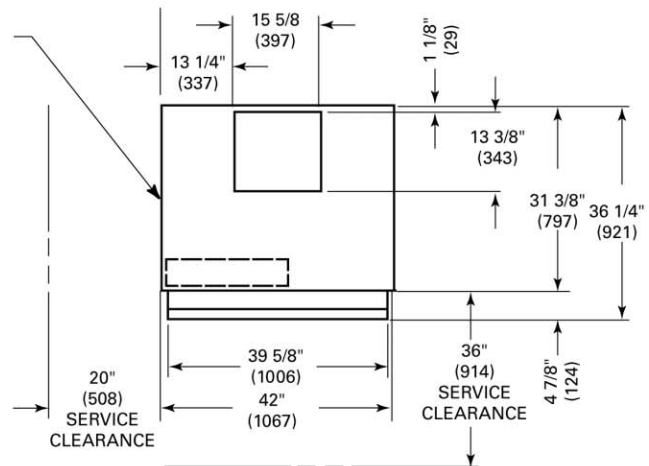
Dimensions/Weights

Front Return/Top Supply

6 - 10 Ton (60 HZ)
6 and 7 1/2 Ton (50 HZ)

Unit Size	A	B	C
6 Ton	6 5/8" (168)	18 3/8" (467)	1 1/4"
7.5 Ton	6 5/8" (168)	18 3/8" (403)	1 1/4"
10 Ton	6 1/2" (165)	18 1/2" (470)	1 1/2"

ACCESS PANEL FOR SHEAVES AND BELTS



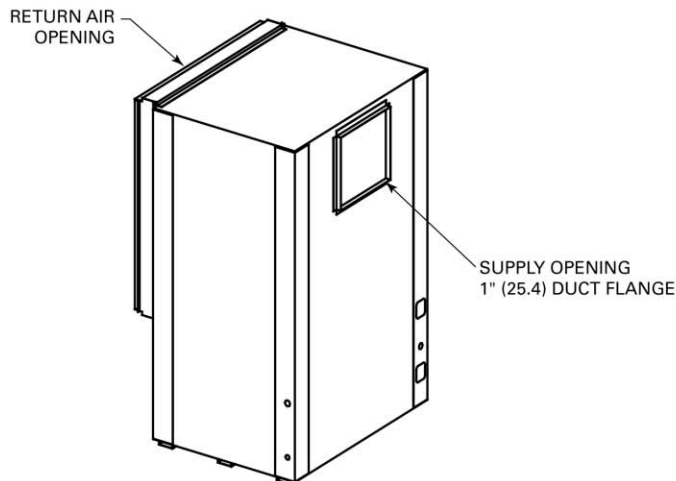
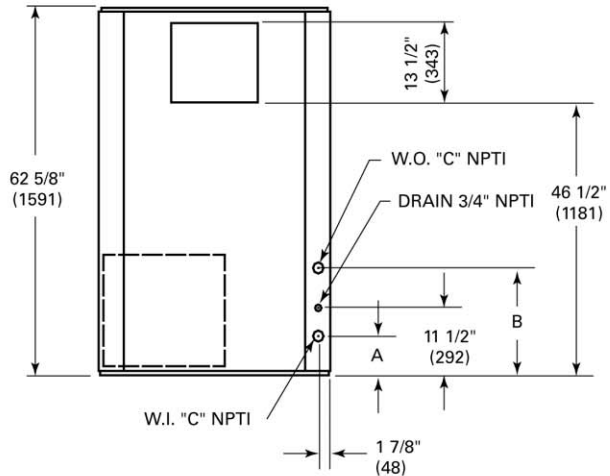
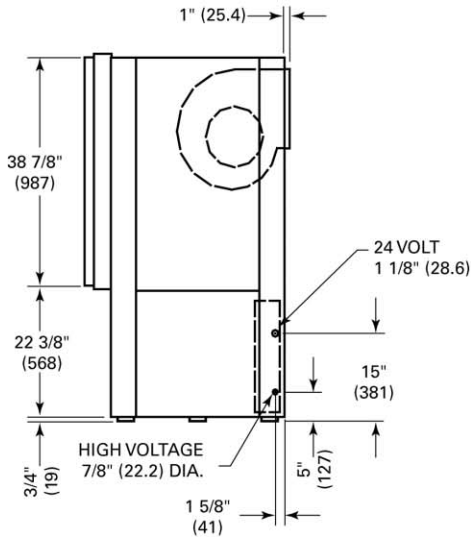
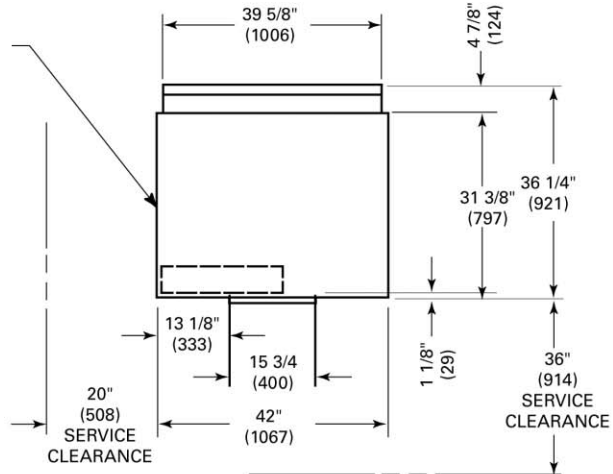


Dimensions/Weights Back Return/Front Supply

**6 - 10 Ton (60 HZ)
6 and 7 1/2 Ton (50 HZ)**

Unit Size	A	B	C
6 Ton	6 5/8" (168)	18 3/8" (467)	1 1/4"
7.5 Ton	6 5/8" (168)	18 3/8" (403)	1 1/4"
10 Ton	6 1/2" (165)	18 1/2" (470)	1 1/2"

ACCESS PANEL FOR SHEAVES AND BELTS



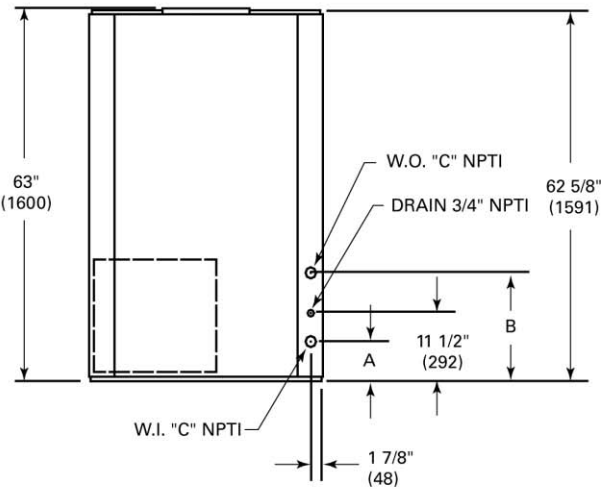
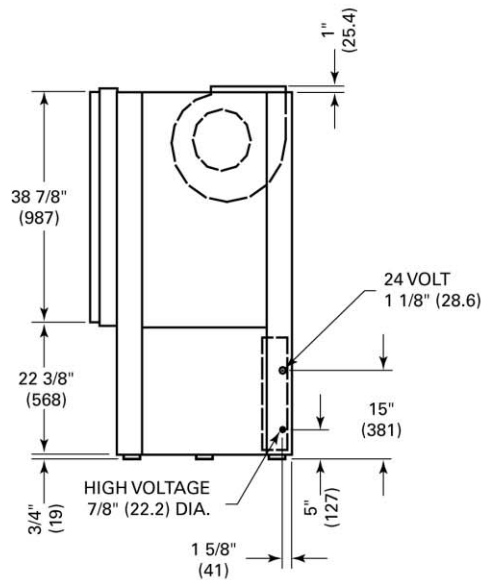
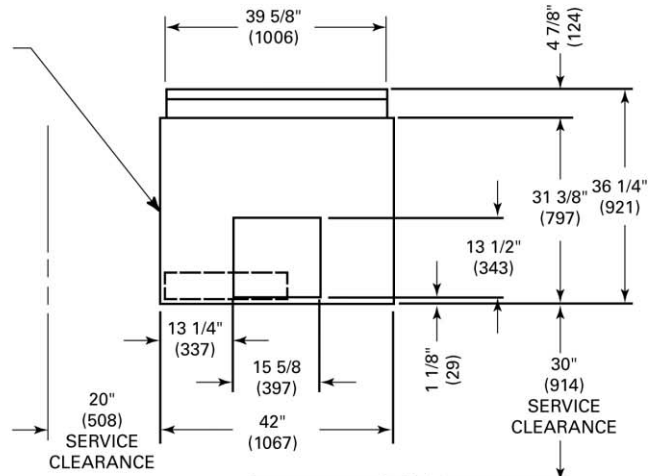
Dimensions/Weights

Back Return/Top Supply

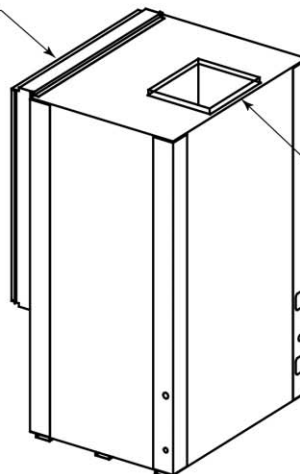
6 - 10 Ton (60 HZ)
6 and 7 1/2 Ton (50 HZ)

Unit Size	A	B	C
6 Ton	6 5/8" (168)	18 3/8" (467)	1 1/4"
7.5 Ton	6 5/8" (168)	18 3/8" (403)	1 1/4"
10 Ton	6 1/2" (165)	18 1/2" (470)	1 1/2"

ACCESS PANEL FOR SHEAVES AND BELTS



RETURN AIR OPENING

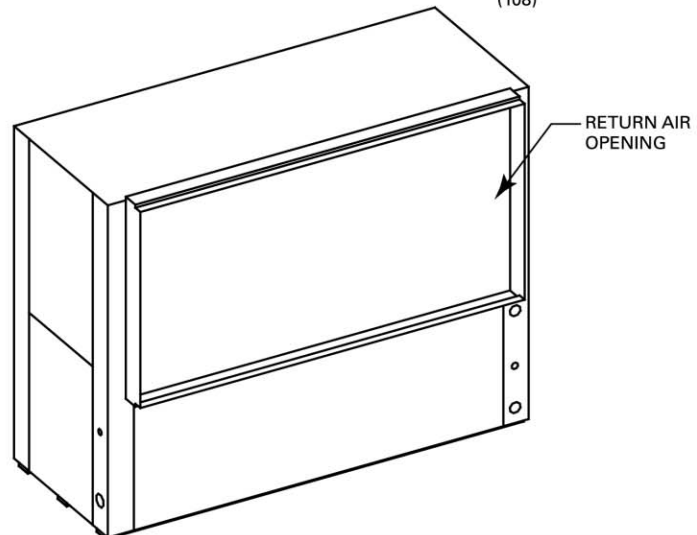
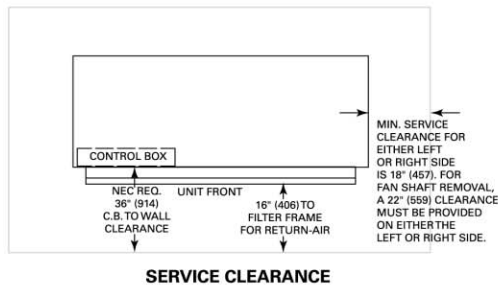
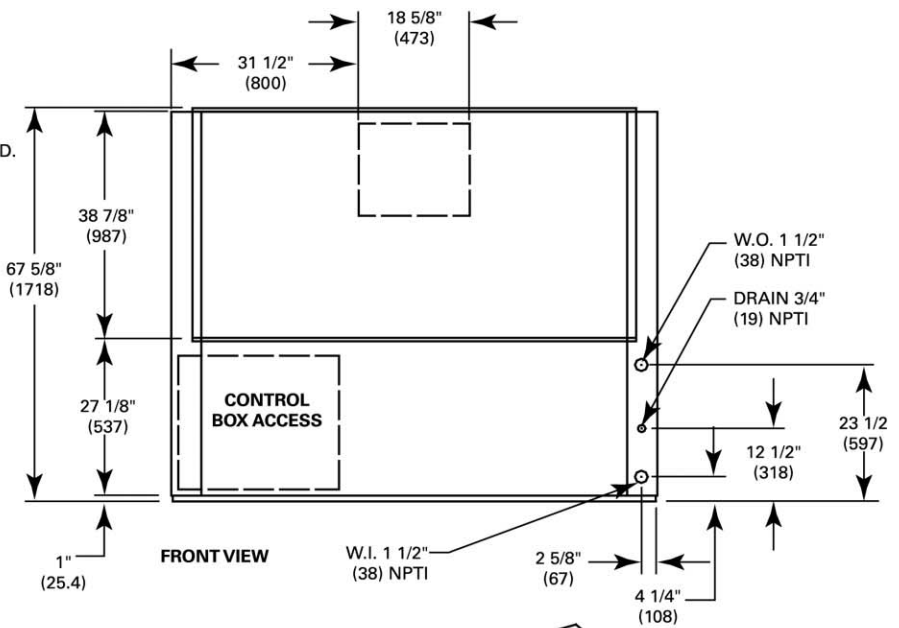
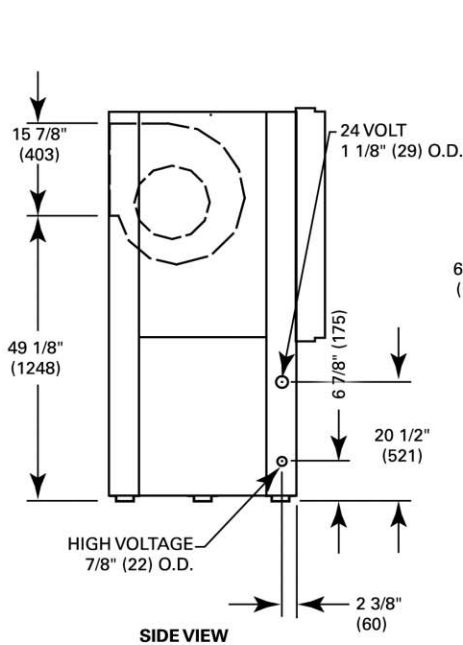
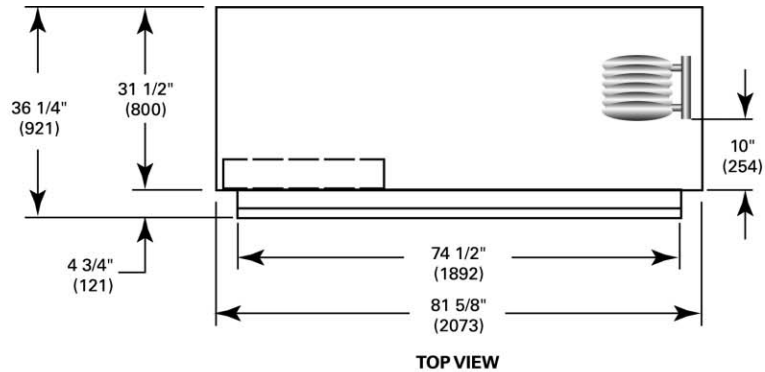


SUPPLY OPENING
 1" (25.4) DUCT FLANGE



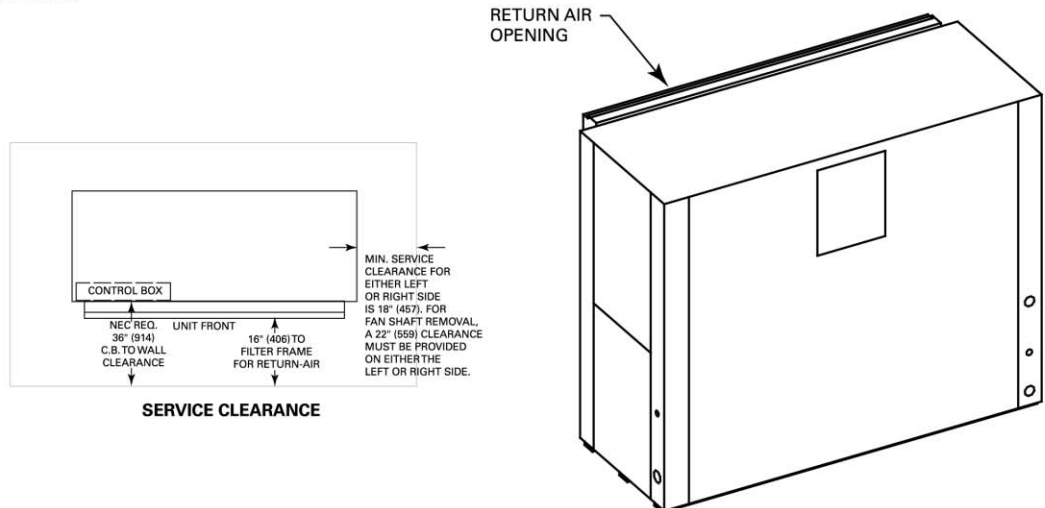
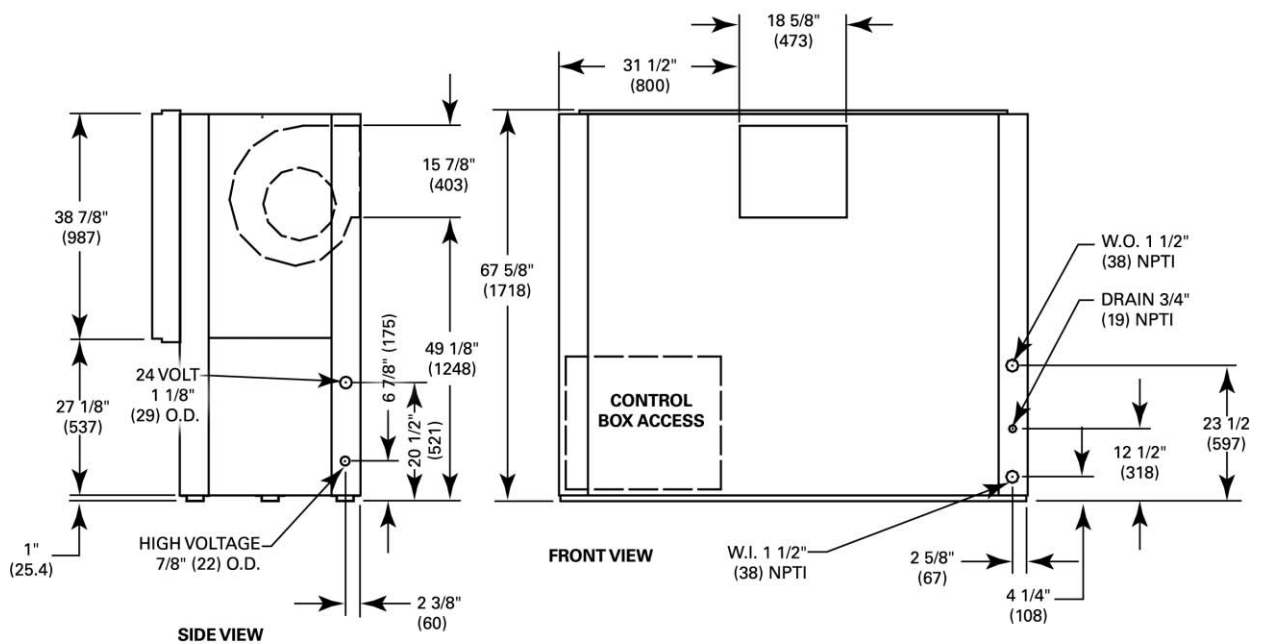
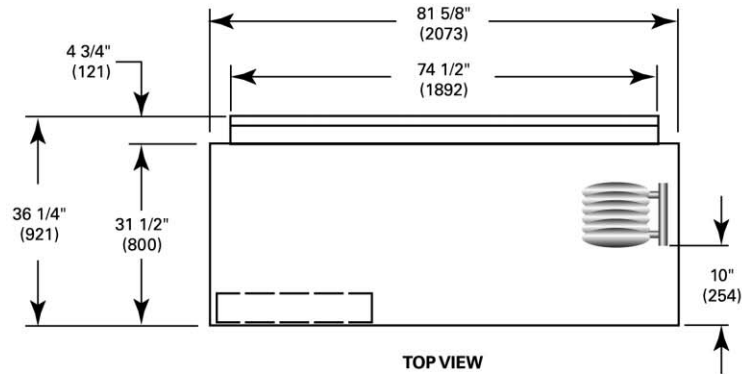
Dimensions/Weights Front Return/Back Supply

**12 1/2 and 15 Ton (60 HZ)
and
10 and 12 1/2 Ton (50 HZ)**



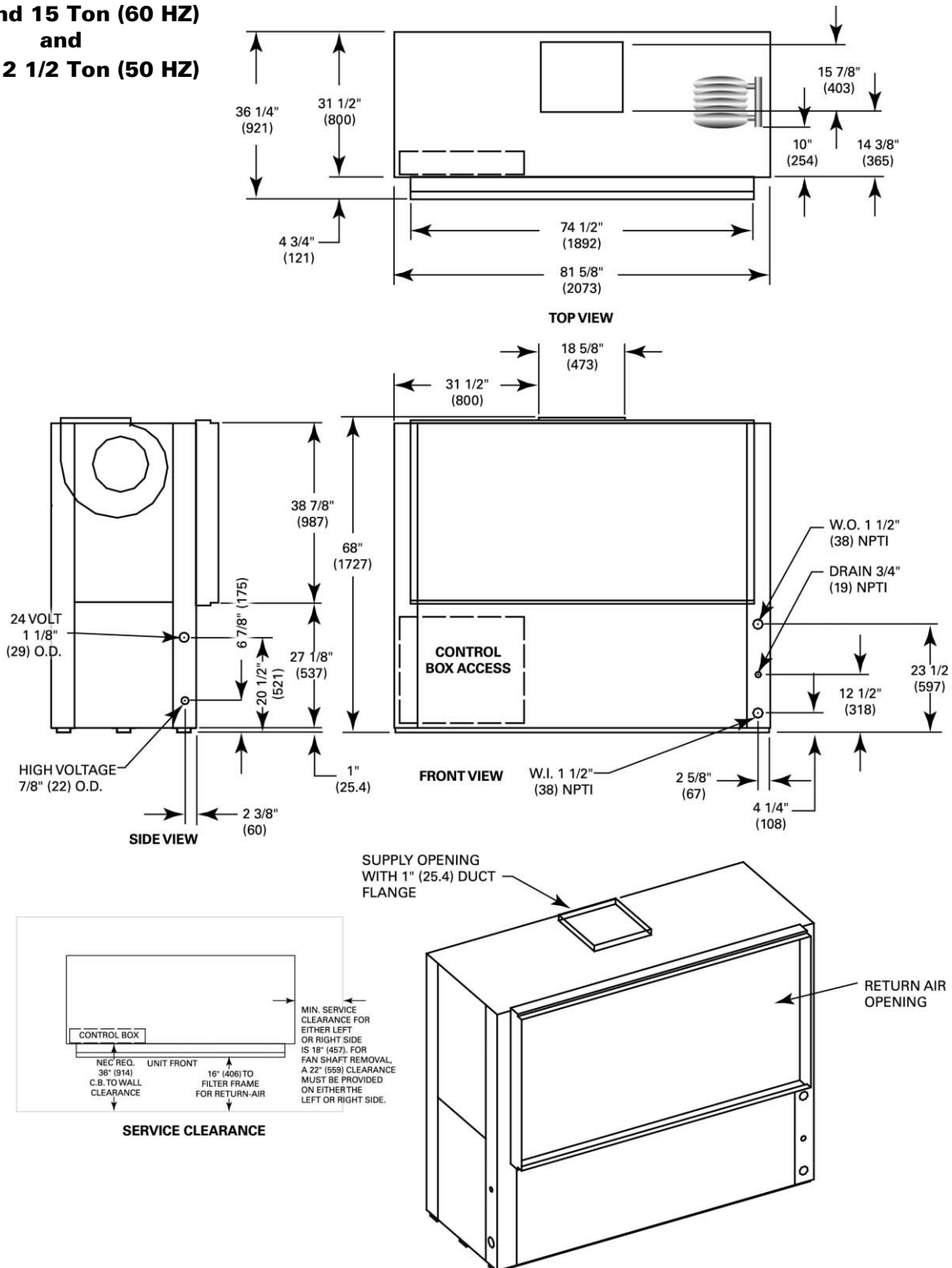
Dimensions/Weights Back Return/Front Supply

**12 1/2 and 15 Ton (60 HZ)
and
10 and 12 1/2 Ton (50 HZ)**



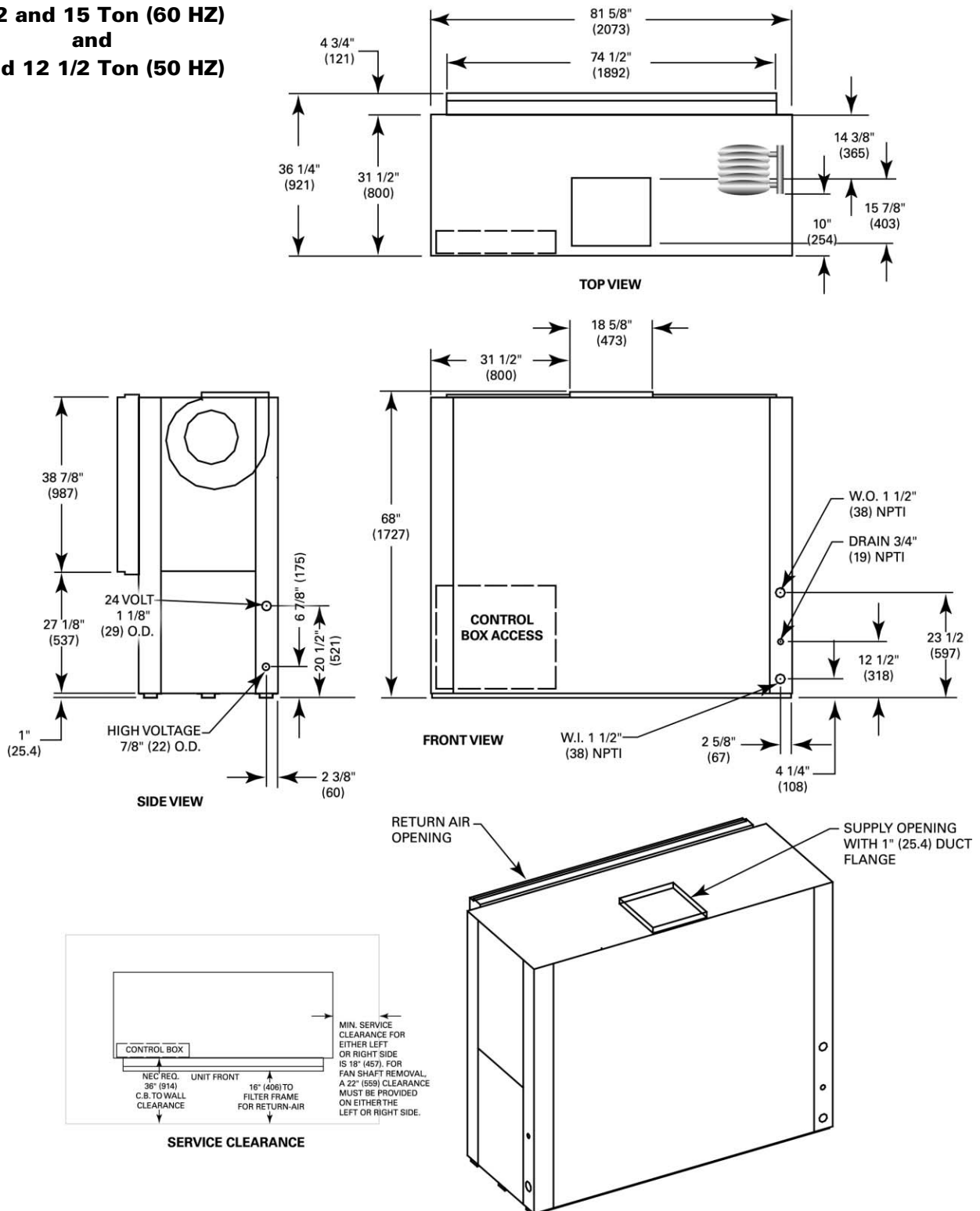
Dimensions/Weights Front Return/Top Supply

**12 1/2 and 15 Ton (60 HZ)
and
10 and 12 1/2 Ton (50 HZ)**



Dimensions/Weights Back Return/Top Supply

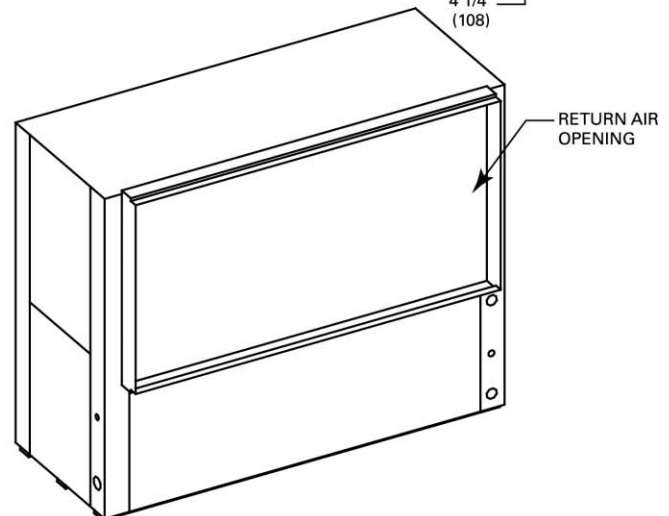
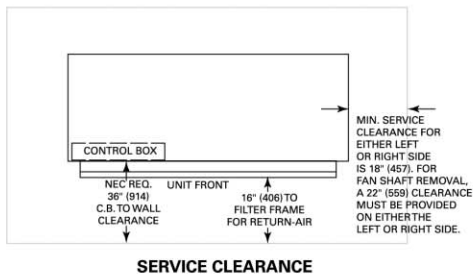
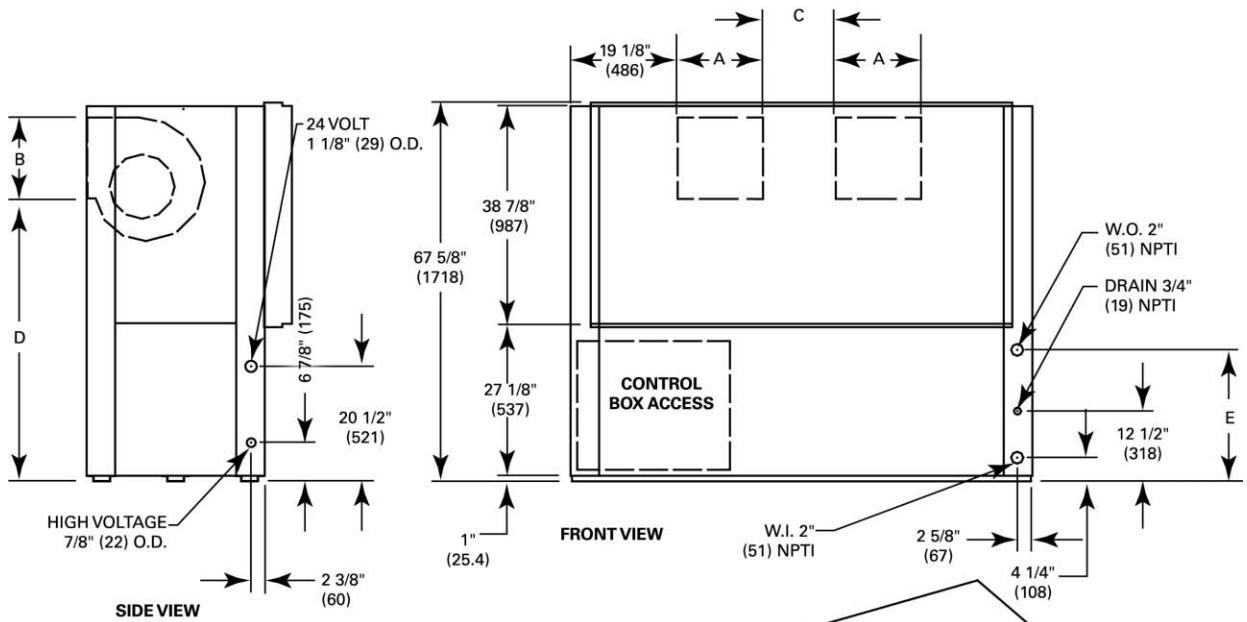
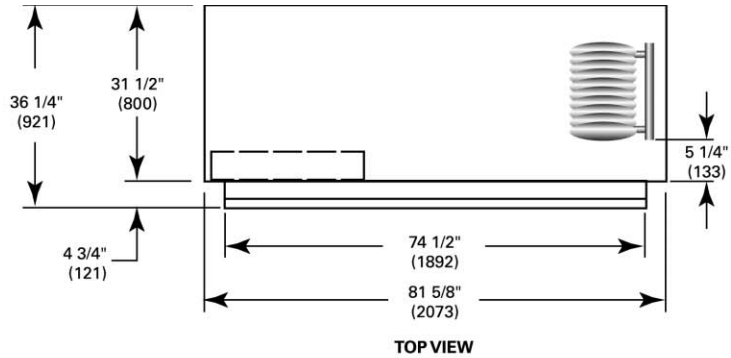
**12 1/2 and 15 Ton (60 HZ)
and
10 and 12 1/2 Ton (50 HZ)**





Dimensions/Weights Front Return/Back Supply

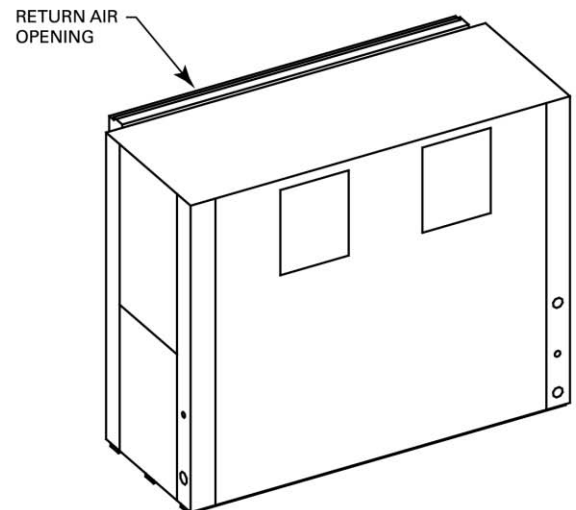
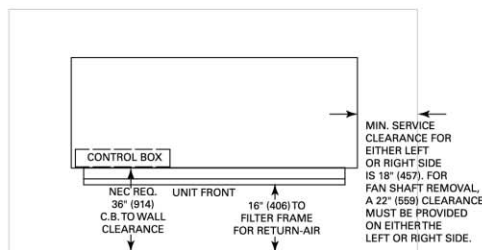
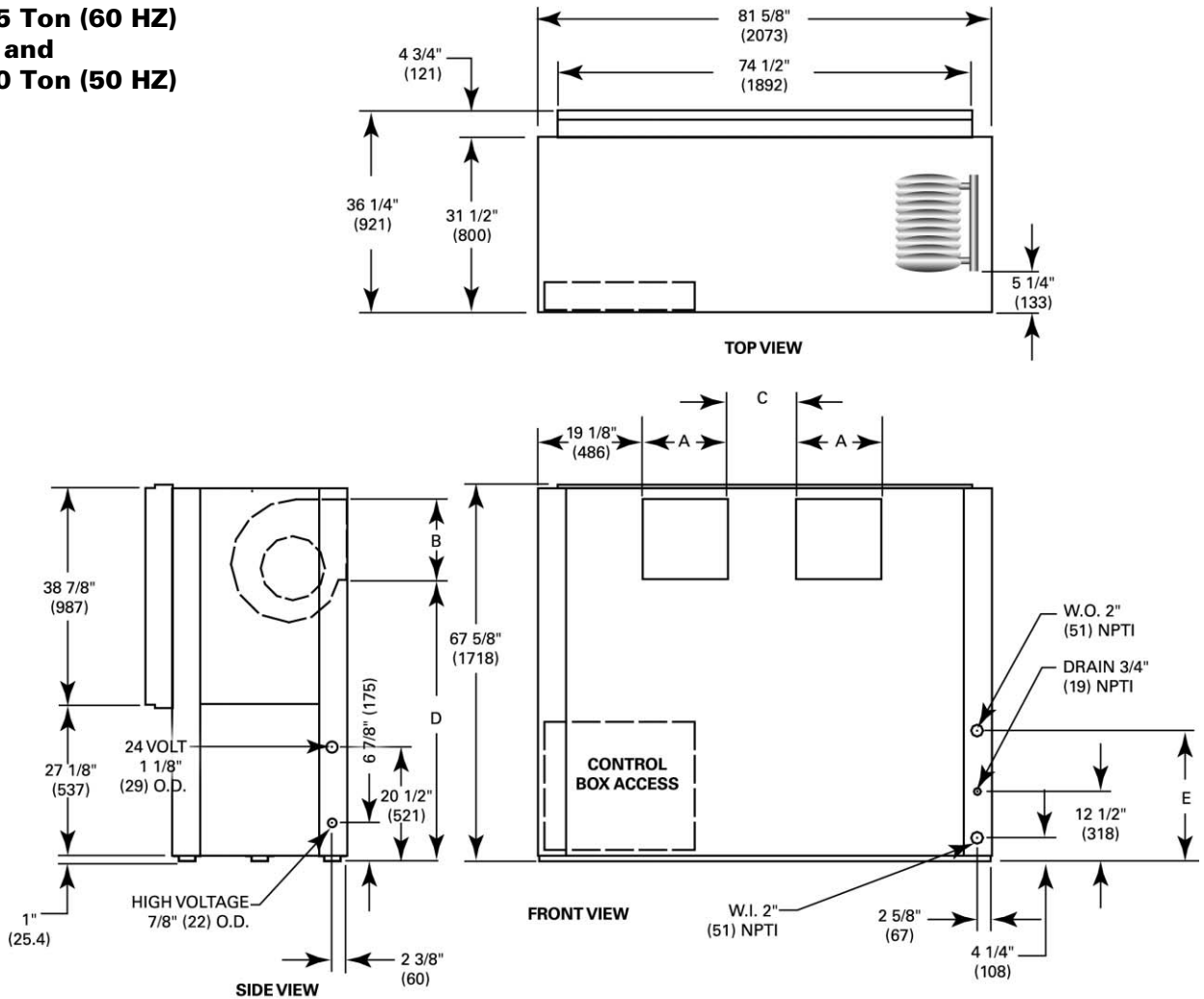
**20 and 25 Ton (60 HZ)
and
15 and 20 Ton (50 HZ)**



Unit 60 HZ	Unit 50 HZ	A	B	C	D	E
20 Ton	15 Ton	15 5/8" (397)	13 1/2" (341)	12" (305)	51 5/8" (1310)	20 7/8" (530)
25 Ton Std Static	20 Ton Std Static	14 3/4" (375)	15 7/8" (403)	13 7/8" (352)	49 1/8" (1248)	23 1/2" (597)
25 Ton High Static	20 Ton High Static	15 5/8" (397)	13 1/2" (343)	12" (305)	51 5/8" (1311)	23 1/2" (597)

Dimensions/Weights Back Return/Front Supply

**20 and 25 Ton (60 HZ)
and
15 and 20 Ton (50 HZ)**

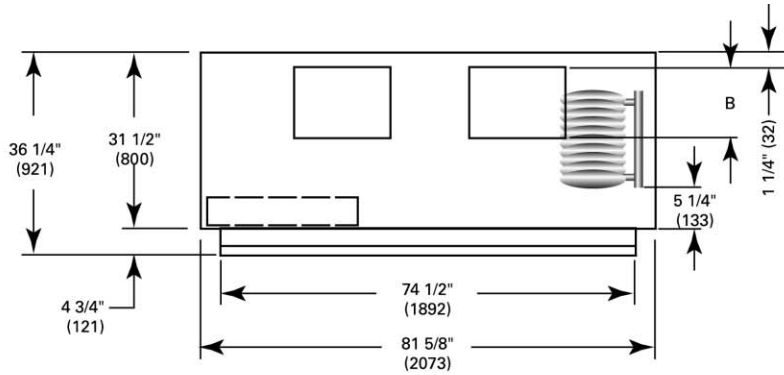


Unit 60 HZ	Unit 50 HZ	A	B	C	D	E
20 Ton	15 Ton	15 5/8" (397)	13 1/2" (341)	12" (305)	51 5/8" (1310)	20 7/8" (530)
25 Ton Std Static	20 Ton Std Static	14 3/4" (375)	15 7/8" (403)	13 7/8" (352)	49 1/8" (1248)	23 1/2" (597)
25 Ton High Static	20 Ton High Static	15 5/8" (397)	13 1/2" (343)	12" (305)	51 5/8" (1311)	23 1/2" (597)

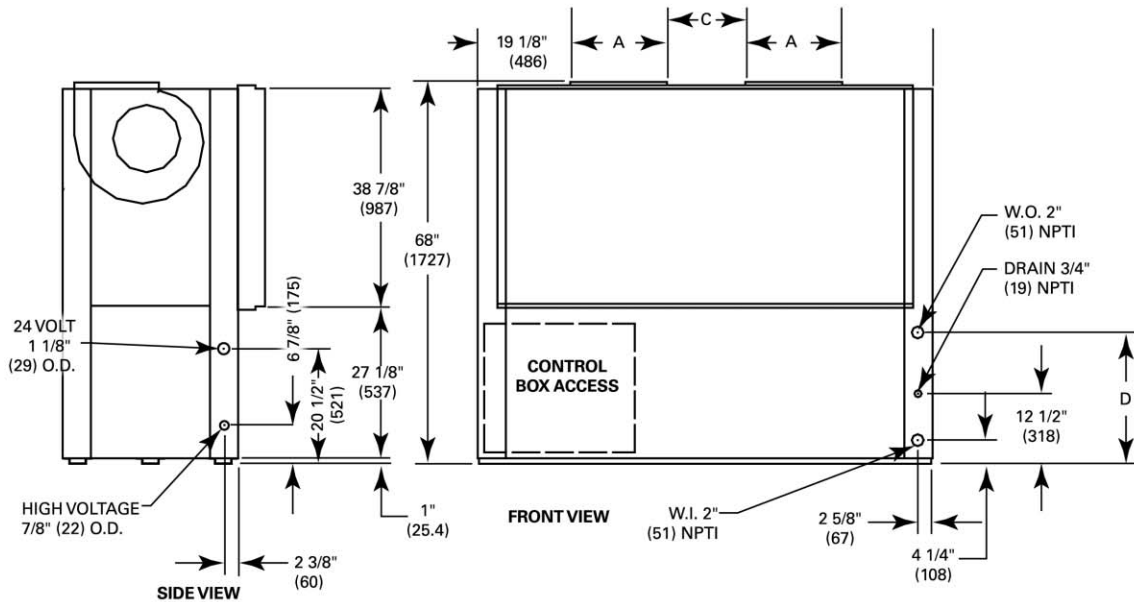


Dimensions/Weights Front Return/Top Supply

**20 and 25 Ton (60 HZ)
and
15 and 20 Ton (50 HZ)**

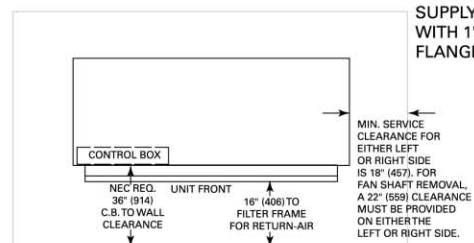


TOP VIEW

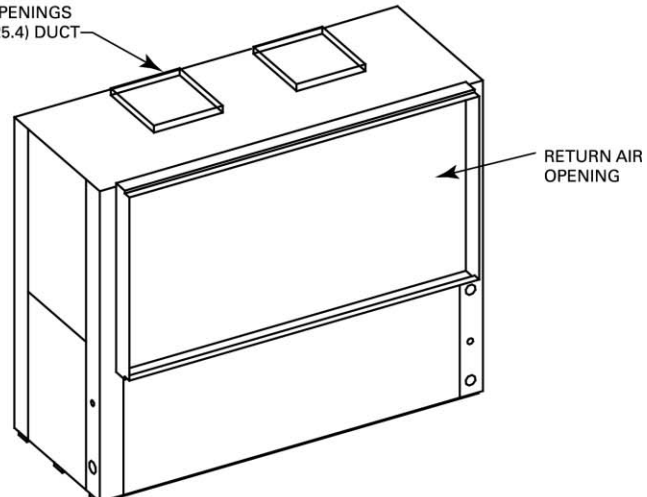


FRONT VIEW

SIDE VIEW



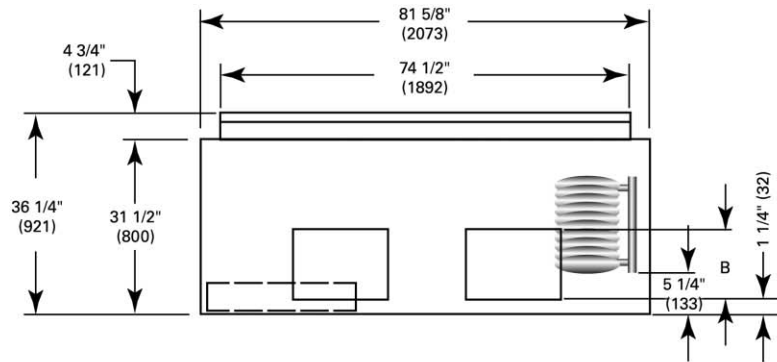
SERVICE CLEARANCE



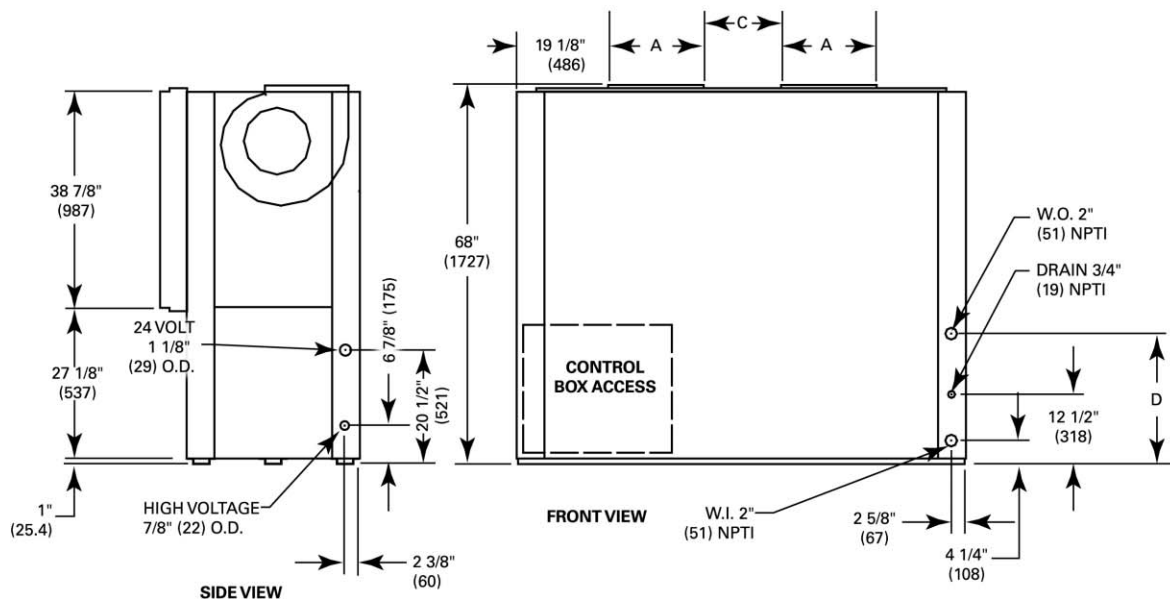
Unit 60 HZ	Unit 50 HZ	A	B	C	D
20 Ton	15 Ton	15 5/8" (397)	13 1/2" (341)	12" (305)	20 7/8" (530)
25 Ton Std Static	20 Ton Std Static	14 3/4" (375)	15 7/8" (403)	13 7/8" (352)	23 1/2" (597)
25 Ton High Static	20 Ton High Static	15 5/8" (397)	13 1/2" (343)	12" (305)	23 1/2" (597)

Dimensions/Weights Back Return/Top Supply

**20 and 25 Ton (60 HZ)
and
15 and 20 Ton (50 HZ)**

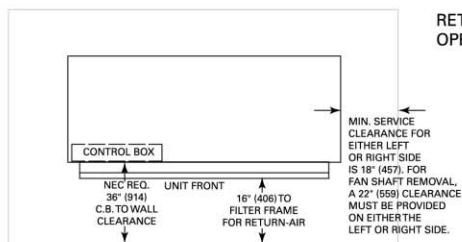


TOP VIEW

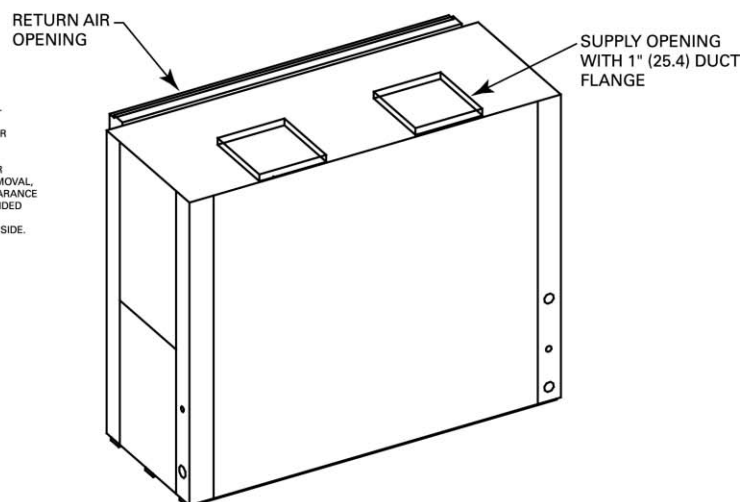


SIDE VIEW

FRONT VIEW



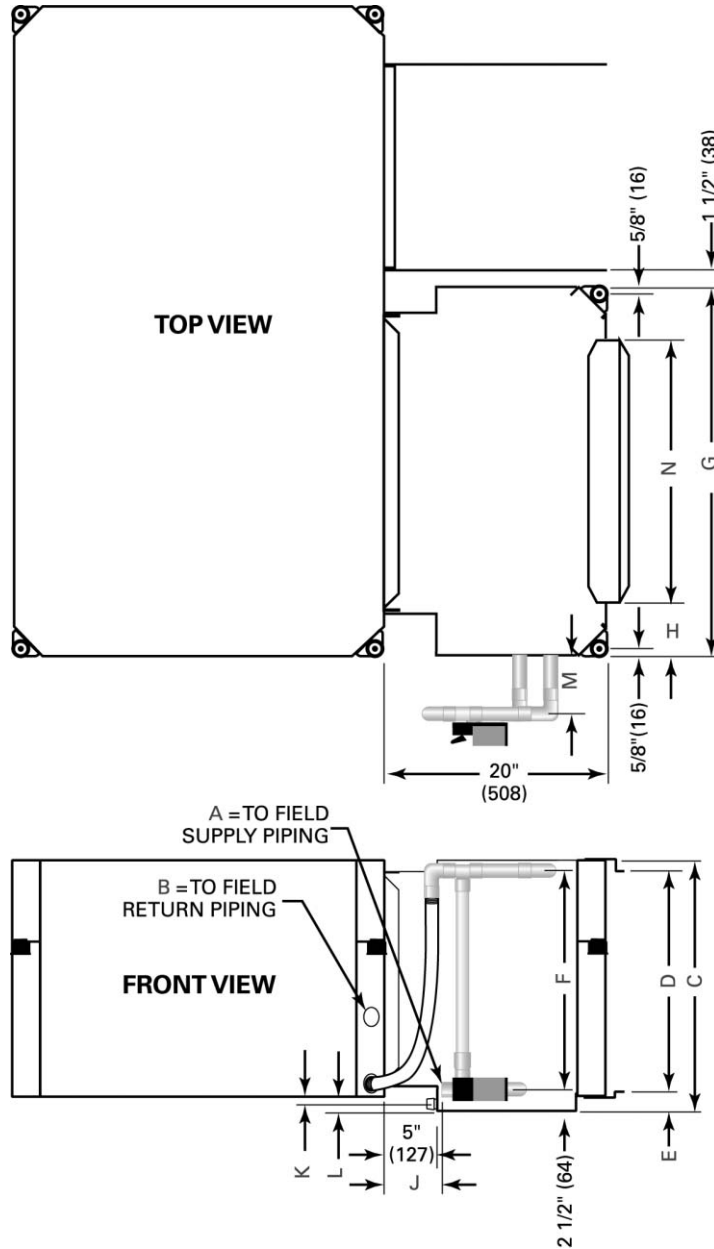
SERVICE CLEARANCE



Unit 60 HZ	Unit 50 HZ	A	B	C	D
20 Ton	15 Ton	15 5/8" (397)	13 1/2" (341)	12" (305)	20 7/8" (530)
25 Ton Std Static	20 Ton Std Static	14 3/4" (375)	15 7/8" (403)	13 7/8" (352)	23 1/2" (597)
25 Ton High Static	20 Ton High Static	15 5/8" (397)	13 1/2" (343)	12" (305)	23 1/2" (597)

Dimensions/Weights Waterside Economizer

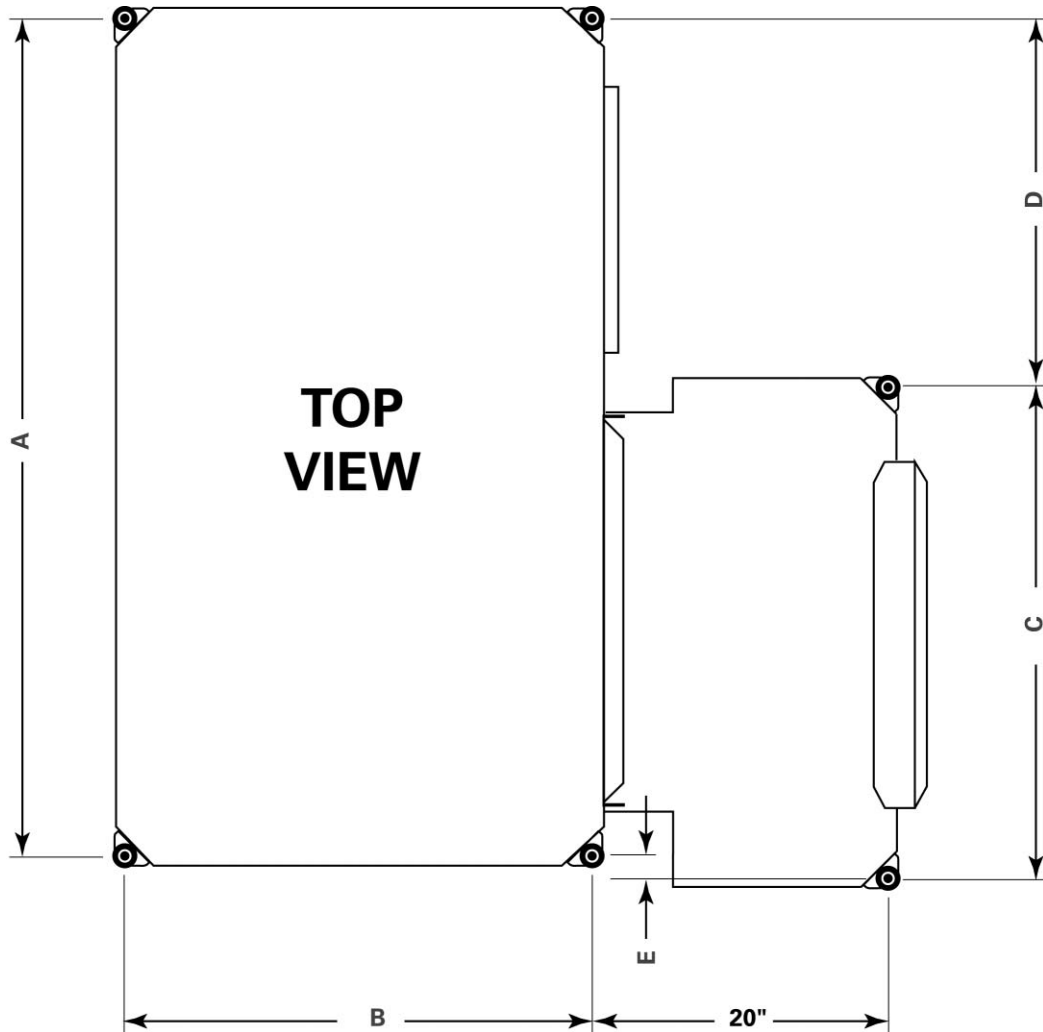
Model GEH



Unit 60 HZ	Unit 50 HZ	A NPTI	B NPTI	C	D	E	F	G	H	J	K	L	M	N	Filter Size (nominal)
006-015	006-012	1/2" (12.7)	1/2" (12.7)	16 1/8" (410)	13 5/8" (346)	1 1/2" (38)	10 3/4" (273)	23" (584)	2 1/4" (57)	7 1/2" (191)	1/2" (12.7)	1" (25.4)	4" (102)	18 1/2" (470)	14 3/4" x 23 3/4" 375 mm x 518 mm
018-030	015-024	3/4" (19)	3/4" (19)	18 1/2" (470)	15 5/8" (397)	1 1/2" (38)	13 3/4" (349)	26" (660)	3 1/4" (83)	6 7/8" (175)	1/2" (12.7)	1" (25.4)	4" (102)	18 1/2" (470)	16 3/4" x 23 3/4" 426 mm x 603 mm
036-042	030-036	3/4" (19)	3/4" (19)	21" (533)	17 5/8" (448)	2 1/4" (57)	16 1/2" (419)	30" (762)	3 3/4" (95)	6 1/4" (159)	1 1/4" (32)	2" (50.8)	4 1/2" (114)	23 1/2" (597)	18 3/4" x 25 1/2" 476 mm x 648 mm
048, 060	042-060	1" (25.4)	1" (25.4)	23 1/8" (587)	19 5/8" (498)	2 1/2" (64)	19 1/2" (495)	34" (864)	5 1/4" (133)	5 7/8" (149)	1 1/4" (32)	2" (50.8)	4 1/2" (114)	23 1/2" (597)	20 3/4" x 29 7/8" 528 mm x 759 mm

Dimensions/Weights Waterside Economizer

Hanging Unit

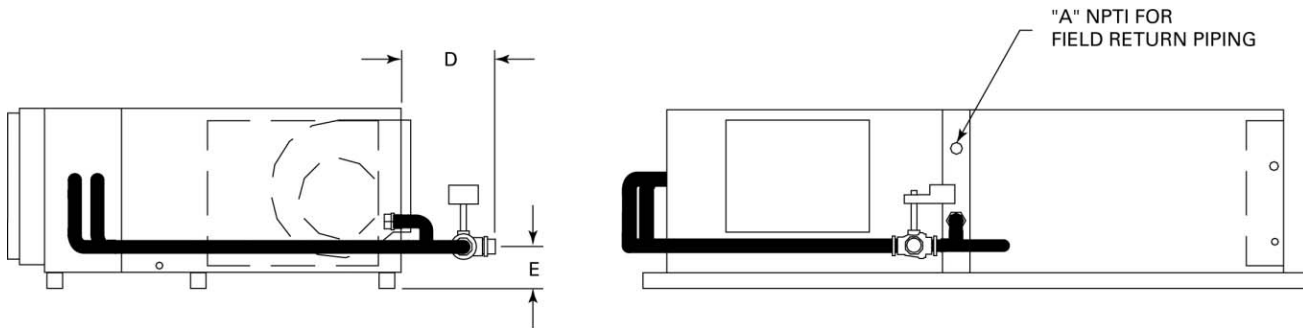
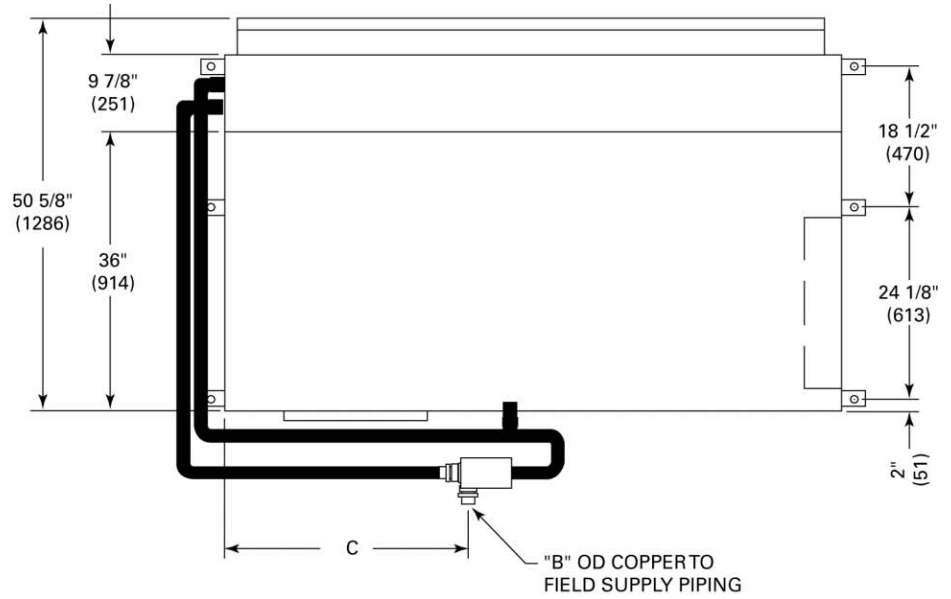


Unit 60 HZ	Unit 50 HZ	A	B	C	D	E	Hanging Weight	Shipping Weight
006-015	006-012	38 3/4" (984)	18 3/4" (476)	21 3/4" (552)	17" (432)	0"	54 lbs (24.5 kg)	84 lbs (38.2 kg)
018-030	015-024	44 3/4" (1137)	21 3/4" (552)	24 3/4" (629)	21" (533)	1" (25.4)	65 lbs (29.5 kg)	95 lbs (43.2 kg)
036-042	030-036	48 3/4" (1238)	23 3/4" (603)	28 3/4" (730)	21" (533)	2" (50.8)	76 lbs (35 kg)	106 lbs (48 kg)
048-060	042-060	56 3/4" (1442)	31 3/4" (806)	32 3/4" (832)	25" (635)	1" (25.4)	97 lbs (44 kg)	127 lbs (58 kg)



Dimensional Data Waterside Economizer

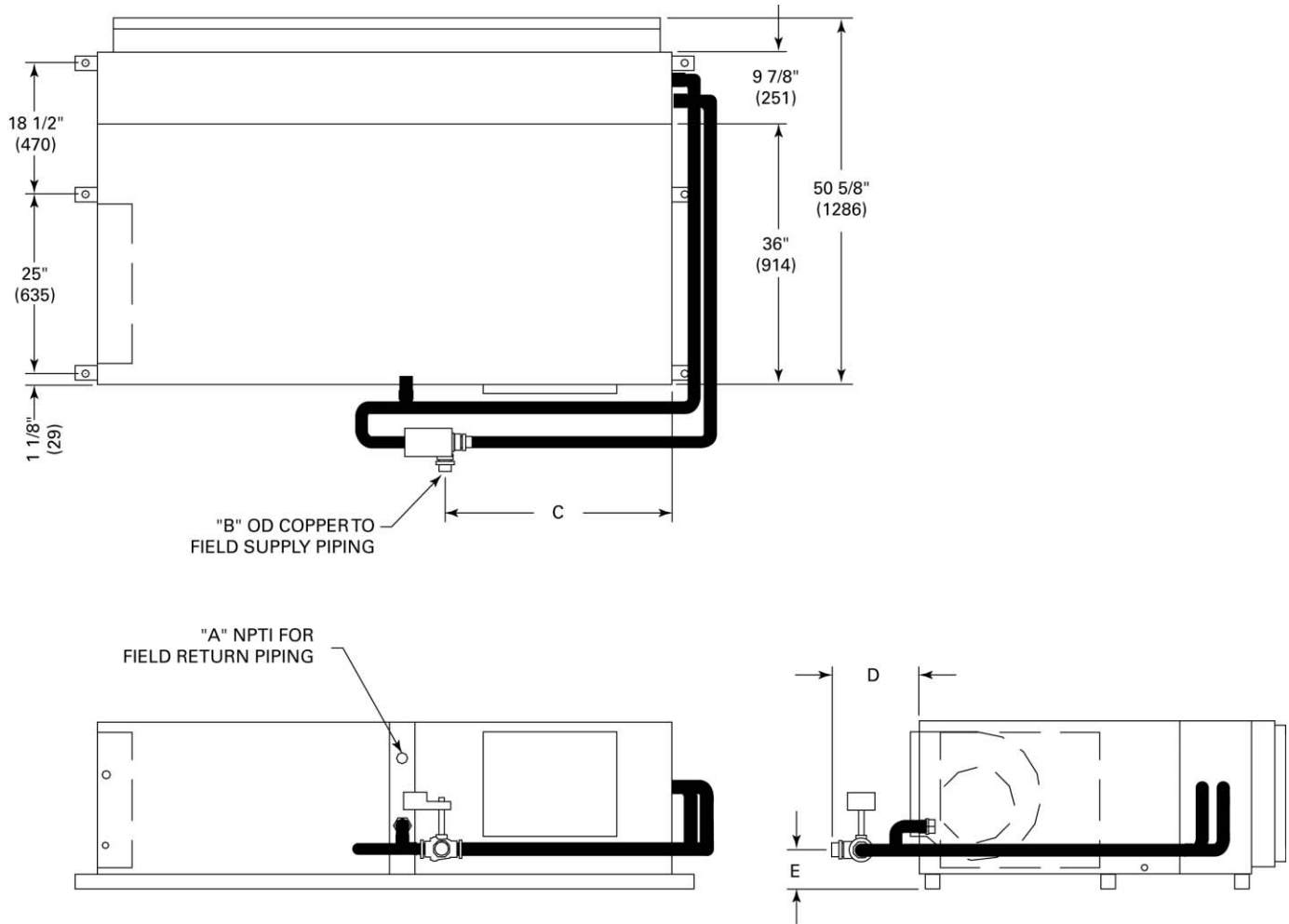
GEH 072-120, Right Return (60 Hz)
GEH 072-090, Right Return (50 Hz)



GEH 60 Hz	GEH 50 Hz	A	B	C	D	E
072-090	072	1 1/4" (32)	1 3/8" (35)	31" (787)	9 7/8" (251)	3 7/8" (98)
120	090	1 1/2" (38)	1 5/8" (41)	30 3/4" (781)	12 1/2" (318)	4 1/2" (114)

Dimensional Data Waterside Economizer

GEH 072-120, Left Return (60 Hz) GEH 072-090, Left Return (50 Hz)

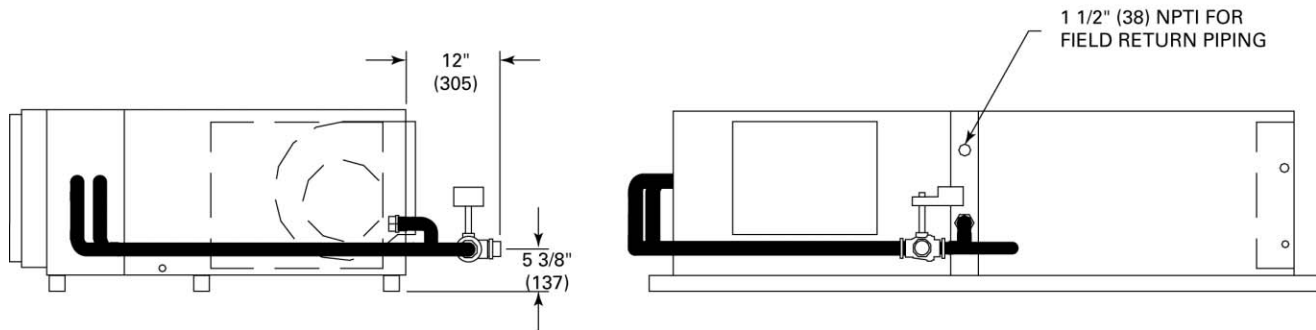
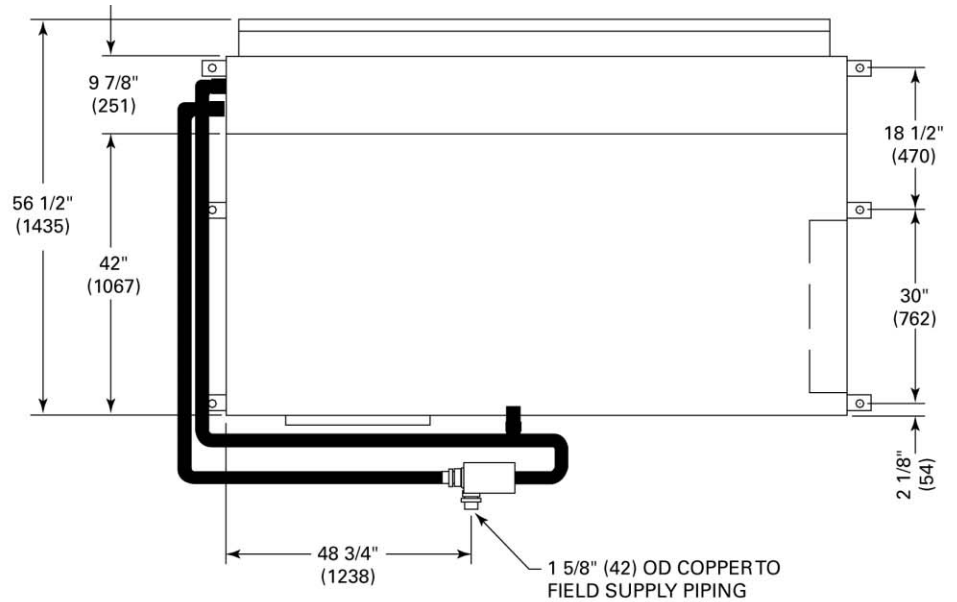


GEH 60 Hz	GEH 50 Hz	A	B	C	D	E
072-090	072	1 1/4" (32)	1 3/8" (35)	31" (787)	9 7/8" (251)	3 7/8" (98)
120	090	1 1/2" (38)	1 5/8" (41)	30 3/4" (781)	12 1/2" (318)	4 1/2" (114)



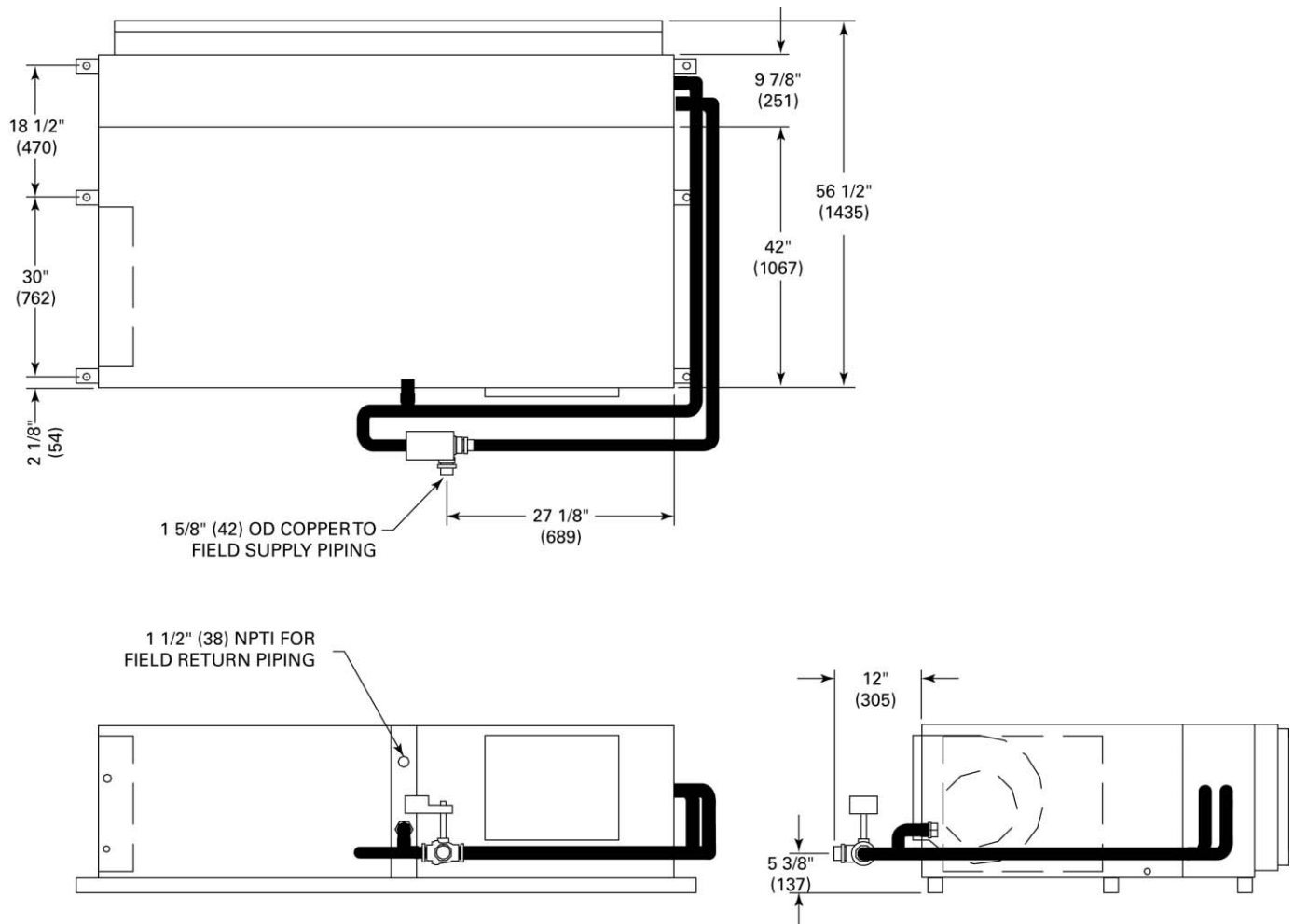
Dimensional Data Waterside Economizer

GEH 150-180, Right Return (60 Hz)
GEH 120-150, Right Return (50 Hz)



Dimensional Data Waterside Economizer

GEH 150-180, Left Return (60 Hz)
GEH 120-150, Left Return (50 Hz)

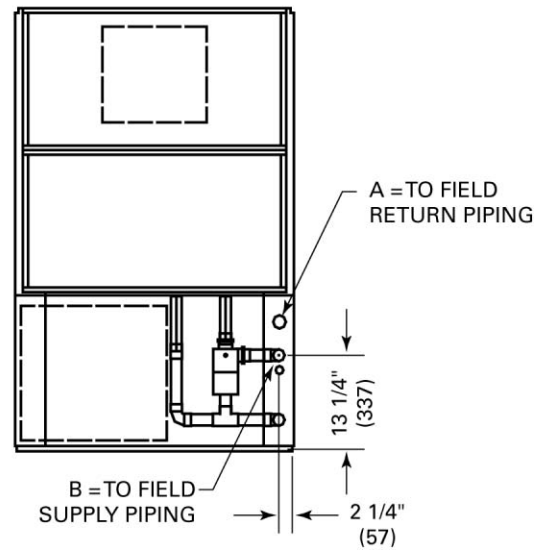
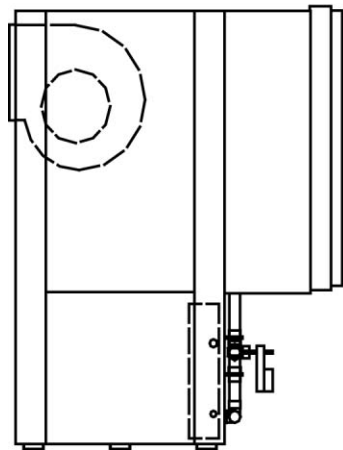
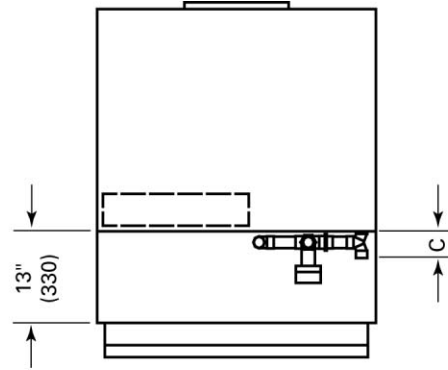




Dimensions/Weights Waterside Economizer

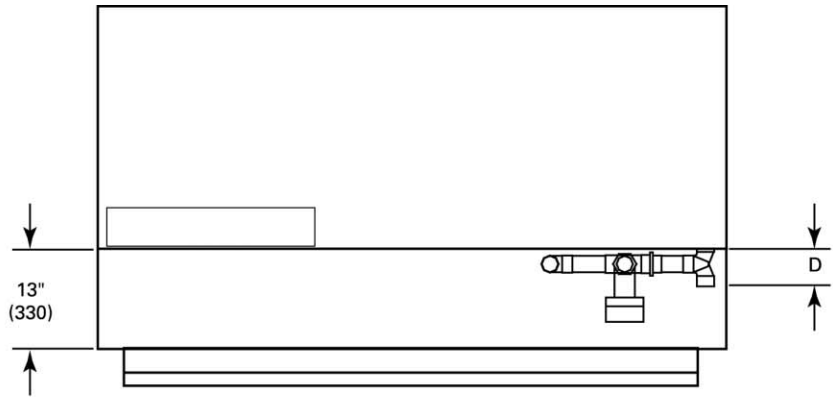
6 - 10 Ton (60 HZ)
6 and 7 1/2 Ton (50 HZ)

Unit Size	A	B	C
6 & 7 1/2 Ton	1 3/8" (35)	1 3/8" (35)	4" (102)
10 Ton	1 5/8" (41)	1 5/8" (41)	4 3/8" (111)

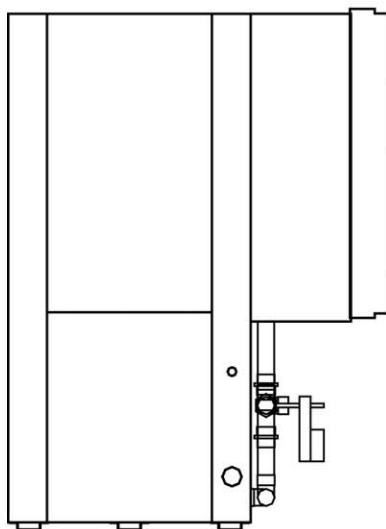


Dimensions/Weights Waterside Economizer

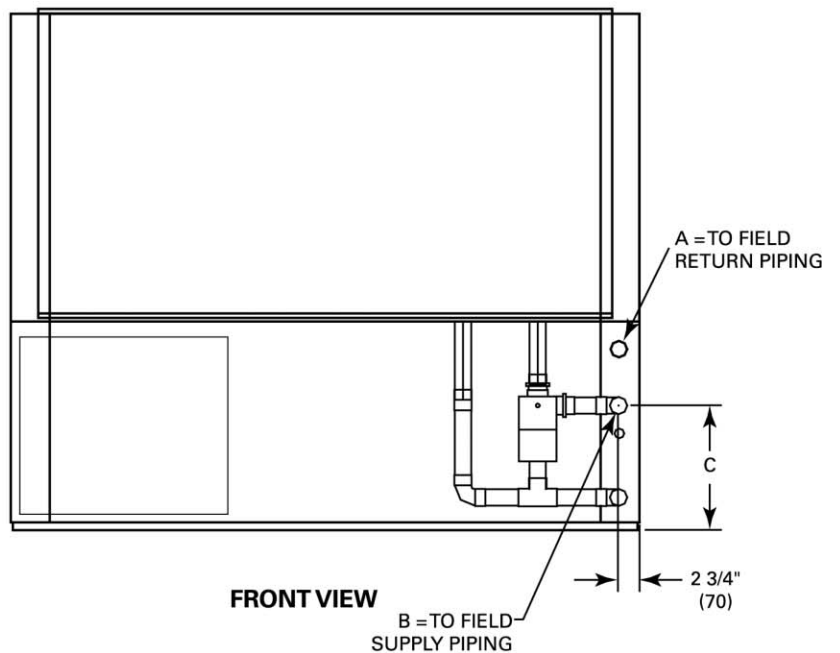
GEV 12 1/2 through 25 Ton



TOP VIEW



SIDE VIEW



FRONT VIEW

Unit 60 HZ	Unit 50 HZ	A NPTI	B I.D.	C	D	OPERATING WEIGHT
12 1/2, 15 Ton	10, 12 1/2 Ton	1 1/2" (38)	1 5/8" (41)	15 7/8" (403)	4 3/8" (111)	275 lb (125 kg)
20 Ton	15 Ton	2" (51)	2 1/8" (54)	16 1/4" (413)	4 7/8" (124)	310 lb (141 kg)
25 Ton	20 Ton					395 lb (179)



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.

- 1 Remove packaging and inspect the unit. Check the unit for shipping damage and material shortage; file a freight claim and notify appropriate sales representation.

Note: The 1/2 through 5 ton units have been tied to the skid by (2) shipping bolts. The removal of these bolts will require a 3/8" (9.7 mm) ratchet with a 1/2" (12.7 mm) socket.

The GEV 6 through 25 ton units have been anchored to the skid with (4) angle brackets. Remove these brackets before lifting unit into place.

The GEH 6 through 15 ton units are anchored to the cross brace of the skid with (4) wood screws. Remove these screws prior to lifting the unit into place.

- 2 Verify the correct model, options and voltage from the unit nameplate.
- 3 Pull out all field attached parts (i.e. filter rack, duct collar, filter and mounting screws) from the unit packaging for field mounting.
- 4 Verify the installation location of the unit will provide the required clearance for proper operation.
- 5 Remove refrigeration access panel and inspect the unit. Be certain the refrigerant tubing has clearance from adjacent parts.

- 6 Fabricate and install duct work.
- 7 Install and connect a condensate drain line and trap to the drain connection.

⚠ 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.

Main Electrical

- 8 Verify the power supply complies with the unit nameplate specifications.
- 9 Inspect all control panel components; tighten any loose connections.
- 10 Connect properly sized and protected power supply wiring to a field-supplied/installed disconnect switch and to the main power terminal block **1K1** for 1/2 through 5 ton equipment **or 1TB1** for 6 through 25 ton equipment **in the unit control panel.**
- 11 Install proper grounding wires to an earth ground.

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

Electric Heat Requirements

- 12 Verify that the power supply complies with the electric heater specifications on the unit and heater nameplate.

- 13 Inspect the heater junction box and control panel; tighten any loose connections.
- 14 Check electric heat circuits for continuity.

Low Voltage Wiring (AC & DC) Requirements

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

Filter Installation

- 17 Each unit ships with 1" (25.4) or 2" (50.8 mm) filters. The quantity of filters is determined by unit size. The horizontal 1/2 through 5 ton units requires a field installation of the 1 1/2" filter rack. All sheet-metal bracket, filter and hardware are in a box located on the side of the unit within the unit packaging. All 1/2 through 25 ton verticals and 6 through 15 ton horizontal units ship with the filter rack and filters factory installed.

Note: Do not operate the unit without filters.

Installation

Supply-Air Ductwork

Install the 1" (25.4 mm) supply-air duct flange to the vertical and horizontal equipment with the (8) 5/16" (7.94 mm) factory supplied Torx head screws. The duct collar assembly for each unit is located:

- Model GEH 1/2 to 5 ton = in a box on the side of the unit
- Model GEV 1/2 to 10ton = inside of the refrigeration section of the unit
- Model GEH 6 to 15 ton = of the refrigeration section of the unit
- Model GEV 12 1/2 to 25 ton = factory ship with a duct collar installed for units containing a top supply-air location. For units with a back or front supply-air location, the duct collar assembly must be ordered separately from the factory, or be field provided.

When attaching the field ductwork to the unit, provide a watertight flexible connector at the unit to prevent operating sounds from transmitting through the ductwork. See *Figure 4*.

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

Return-Air Ductwork

Install the 1 1/2" (25.4/50.8 mm) adjustable filter rack to the horizontal equipment only with the use of (4) 5/16" (7.94 mm) factory supplied Torx head screws. The vertical equipment factory ships with the filter rack and filter(s) installed.

When attaching the field ductwork to the unit, provide a water tight flexible connector at the unit to prevent operating sounds from transmitting through the ductwork. See *Figure 5*.

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

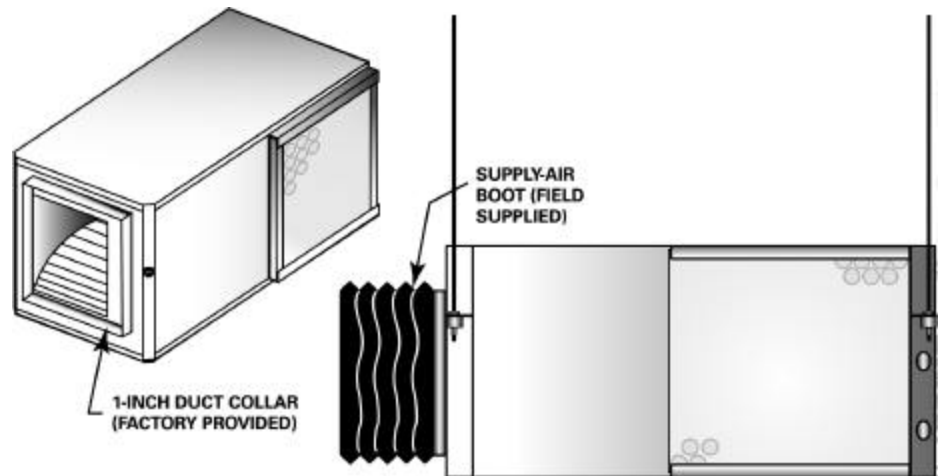


Figure 4: Flexible supply-air connector (field provided)

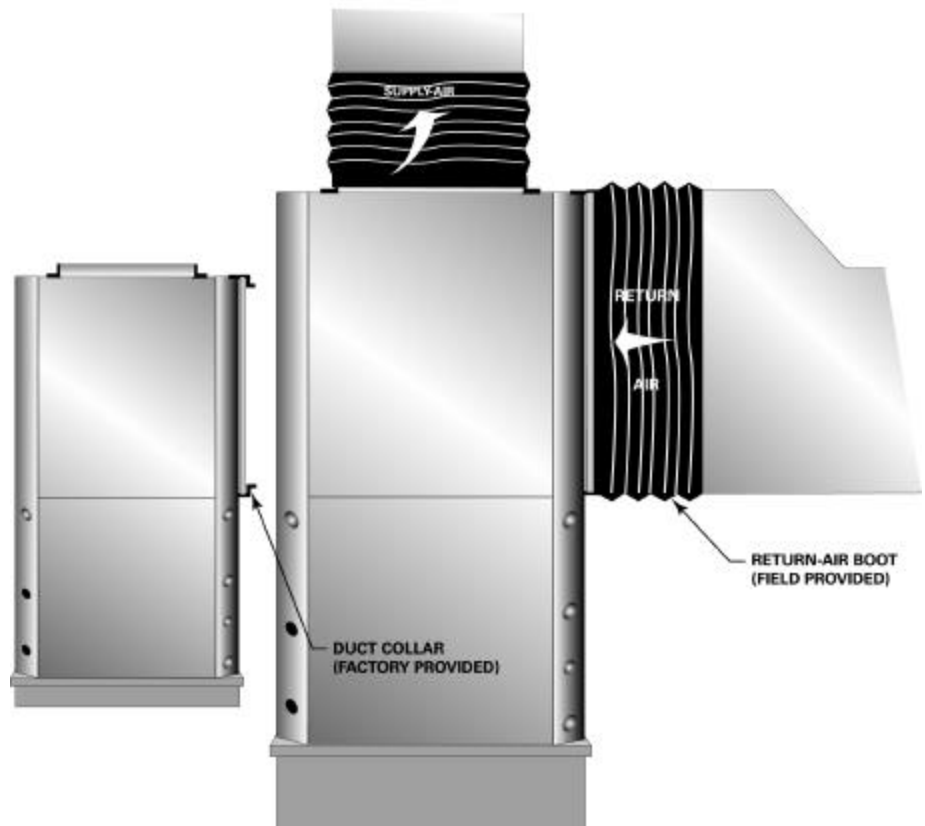


Figure 5: Flexible return-air connector (field provided)

Installation

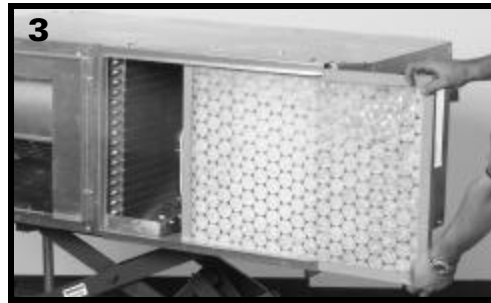
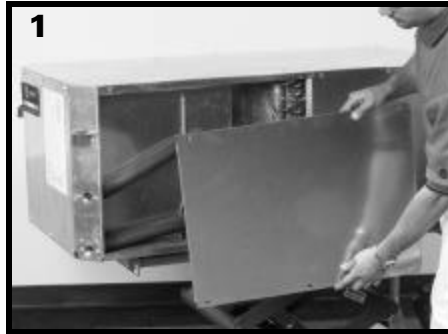
Dual Filtration (GEH 1/2 to 5 ton)

The horizontal, GEH model, allows the installer flexibility in design applications such as a dual filtration option. With the dual filtration design, the unit will contain a lower static which translates into a decrease in filter maintenance. For installation of a dual filtration accessory for the GEH model, verify that an extra set of return-air filter racks and filter have been ordered from the factory. This accessory will be shipped separate from the unit, and should be located in a separate box than the unit.

(1) Remove the return-air side panel from the GEH unit. This panel is held in place by six Torx head screws.

(2) Install the top/bottom filter rack at the new opening. The 1 1/2" (25.4/50.8 mm) adjustable filter rack is held in place with four Torx head screws that once held the panel.

(3) Install the 1 1/2" (25.4/50.8 mm) filter.

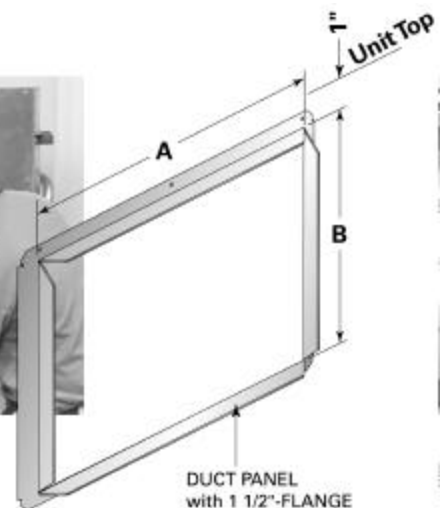


Note:
The dual-filtration design is typically used in a free-return application.

Return-Air Duct Panel

The return-air arrangement may be easily converted from a free return-air system, to a ducted return-air system with the addition of a return-air side panel on the GEH unit. By replacing the filter racks with the return-air panel, a complete seal from the ductwork to the unit is possible. The 1 1/2" (38 mm) duct flange facilitates ease of field hook-up to the mechanical system.

(1) Install the return-air duct panel to the return-air opening with the six Torx head screws provided for the filter rack assembly.



Note:
The ducted panel design is typically used in combination with a field installed ceiling filter rack design.

Table 3: Opening size and part number

Unit Size 60 HZ	Unit Size 50 HZ	A	B	Duct Collar Part Number
006-015	006-012	17 1/2" (445)	13" (330)	4474 1133 0100
018-030	015-024	20 1/2" (521)	15" (381)	4474 1134 0100
036-042	030-036	22 1/2" (572)	17" (432)	4474 1135 0100
048-060	042-060	26 1/2" (673)	19" (483)	4474 1136 0100

Installation

Sound Attenuation Pad

For sound sensitive installations, a vibration pad (field provided) should be placed beneath the horizontal or vertical equipment. For the horizontal unit, the pad should be approximately twice the size of the unit foot print. For the vertical unit, the pad should be 1/2" (12.7 mm) thick, and equal to the overall unit foot print.

Hanging the Horizontal Unit

To hang the horizontal configuration:

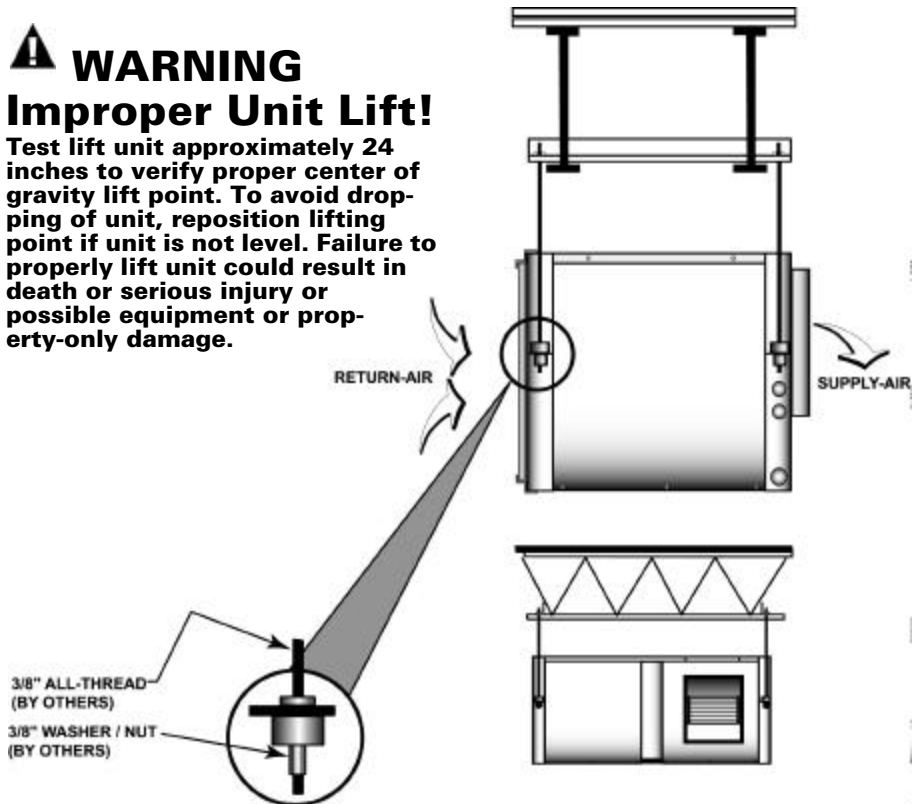
- (1) Install the hanging isolators (located in the return-air section of the unit) into the four hanging brackets.

- (2) Secure the equipment to a joist, concrete, etc. with the use of 3/8" (9.7 mm) field provided (all-thread) rod. Each corner should contain field provided nuts and washers to complete the hanging installation.

- (3) Unit slope or pitch should conform to national and local codes. This is the responsibility of the contractor.

⚠ WARNING Improper Unit Lift!

Test lift unit approximately 24 inches to verify proper center of gravity lift point. To avoid dropping of unit, reposition lifting point if unit is not level. Failure to properly lift unit could result in death or serious injury or possible equipment or property-only damage.



Condensate Drain Connection

Install proper trapping to the equipment. The unit drain connection is 3/4" (19 mm) for all GEH and GEV models.

When designing the condensate trap for the water-source system, it's important to consider the unit's draw-thru design requiring negative pressure trapping.

In a properly trapped system, when condensate forms during normal operation, the water level in the trap rises until there is a constant flow. It is imperative to maintain water in the trap and not allow the trap to dry out during heating season. Keeping trap primed at all times will enable the water to flow properly. See Figure 6 for appropriate dimensions required in a negative pressure system.

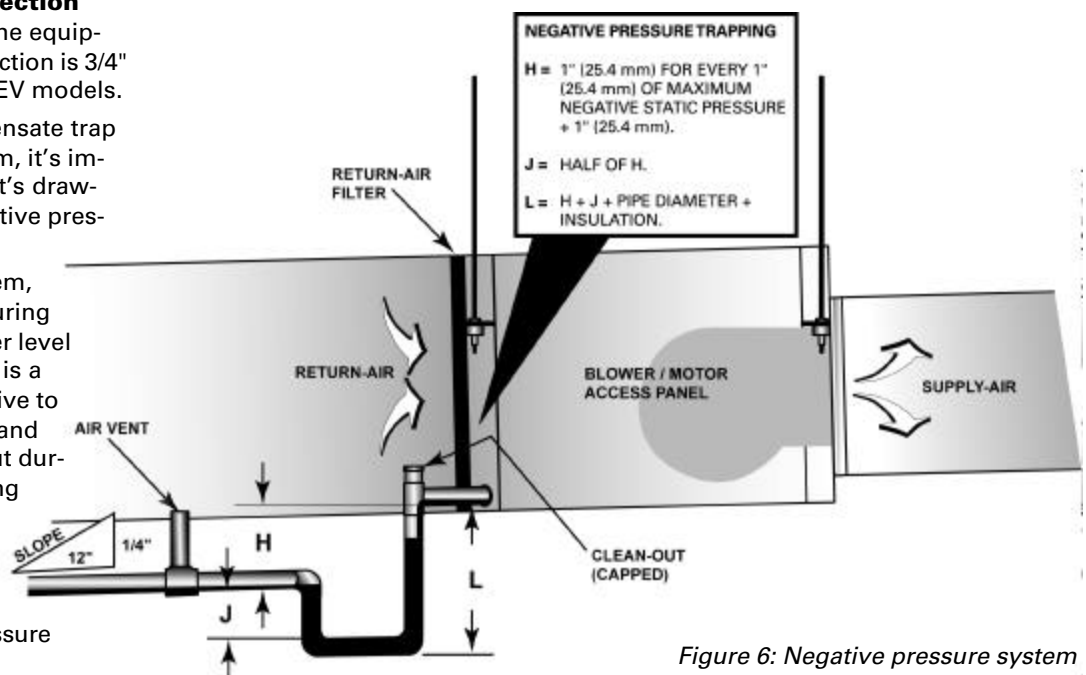


Figure 6: Negative pressure system

Installation

Supply/Return Pipe Connections

Connect the supply and return hoses to the water-inlet (from supply) and water-outlet (to return) of the unit. For vibration isolation, it is recommended that flexible steel braided hoses be installed instead of hard piping the equipment to the main loop system. Figure 7 shows connection of a Hays Measurflo balancing hose kit to the water-in and water-out of a vertical unit.

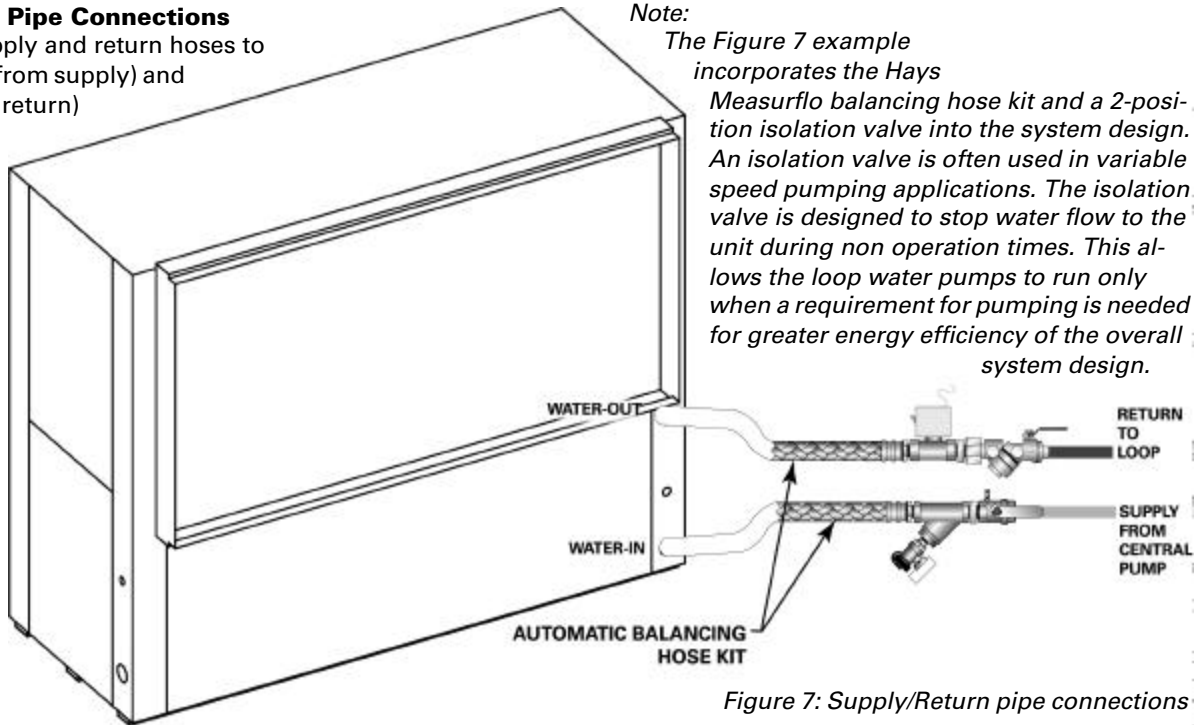


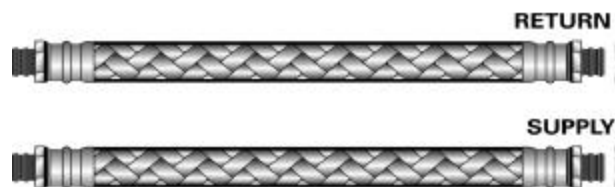
Figure 7: Supply/Return pipe connections

Types of Hose Connections

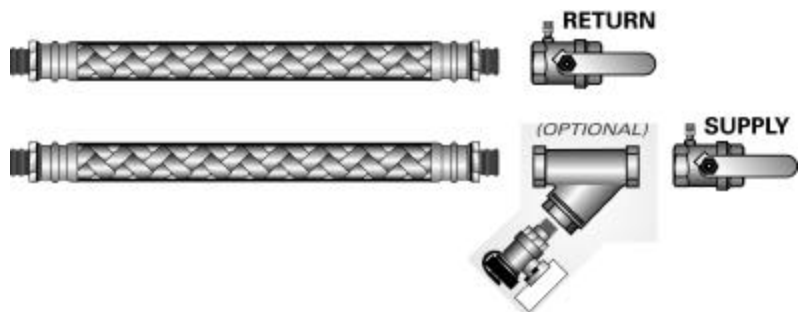
Whether installing the units in a central pump (main/auxiliary pump for the entire zone) design, or as a distributed pump (1-pump per unit) design, a shut-off device and flexible hose is recommended to transition from the hard piping of the closed or open loop water system to the unit. There are multiple hose combinations which may be used to fit the design or specification criteria for the installation.

(1) A steel braided hose without a shut-off device is the least expensive means of connecting the heat pump to the supply/return water loop.

(2) With the addition of a shut-off device on the supply and return of the system, the unit may be isolated during service or maintenance situation. This system may be installed as a wide open (full water flow to the equipment) design, or manually balanced by utilizing the pressure/temperature ports on the top of the ball valve/shut-off device.



Option 1: Flexible hoses



Option 2: Flexible hoses with ball valves

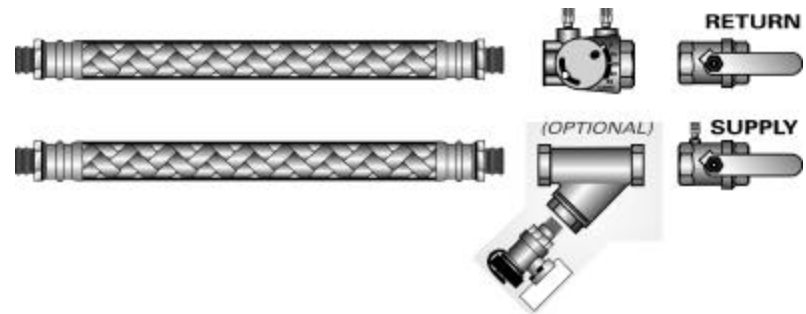
Installation

Types of Hose Connections

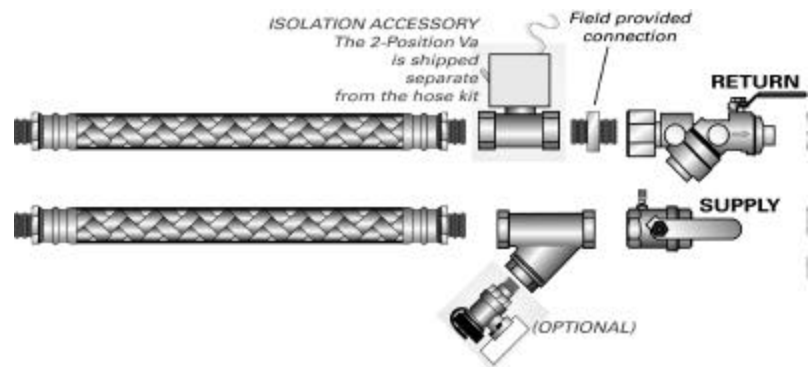
(3) A circuit setter provides a means of manually balancing the water flow to the heat pump. This manual in-line balancing method is accurate up to $\pm 20\%$. In order to determine flow rate, the user must record both handle position, and differential pressure drop. Then, the user must consult a chart containing both pieces of information and make the necessary adjustments to the circuit setter.

(4) For self balancing flow control, a Hays Measurflo® balancing hose kit provides a constant flow rate over the pressure differential range of 2 to 80 psid. As system pressures change (through the addition of heat pumps, for example) each individual flow control valve will automatically adjust to the new system conditions.

Additional accessories, such as a strainer are recommended for use to eliminate contaminants from entering the co-axial water-to-refrigerant heat exchanger.



Option 3: Flexible hoses with ball valves and circuit setter



Option 4: Flexible hoses with automatic balancing flow control

Cleaning and Flushing the Water Loop

After the piping system is complete, the flexible hose connectors should be doubled back to complete the water circuit external to the unit (avoiding trash settle-out in the condenser). An extra pipe may be necessary to connect the hose kits.

(1) Water circulation system should be filled with clean water using the water make up connections. Note: Air vents should be open during filling.

(2) With the air vents closed, start the circulating pump and then crack the air vents to bleed off the trapped air, assuring circulation through all components of the system.

Note: Make up water must be available to the system to replace the volume formerly occupied by the air that is bled off.

(3) With the air vented and the water circulating, the entire system should be checked for leaks with repairs made as required.

(4) Operate the supplementary heat system (boiler) making checks per manufacturer's instructions. During this operation, visual checks should be made for leaks that may have occurred due to increased heat. Repair as required.

(5) Open the system at the lowest point for the initial blow down (making sure the make up water is equal to the water being dumped). Continue blow down until the water leaving the drain runs clear, but not less than 2 hours.

(6) Shut down pumps and supplementary heat system. Reconnect the hoses placing the water-to-refrigerant heat exchanger in the water circulating system.

Note: Vents should be open when the pumps and supplementary heat system are shut down.

Installation

Connecting a Water Regulating Valve

The water regulating valve assembly is shipped as a separate item. Connections from the valve assembly to the unit must be made by the installing contractor.

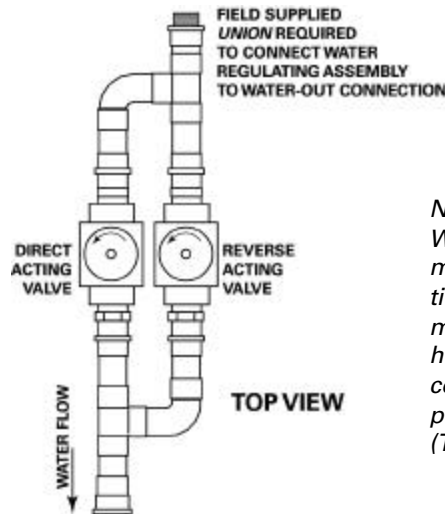
IMPORTANT: These valves are not positive shut-off devices. Use a slow-closing solenoid valve in the heat pump's leaving water line **to assure positive shut-off** in variable-pumping applications.

Installation for Single Compressor Units

(1) Connect the MPT connection on the valve assembly to the unit water out FPT connection. *Note: A field supplied union or elbow may be required to connect the water regulating valve assembly to the unit. All field supplied fittings should be brass or copper.*

(2) Connect the valve depressor with a 1/4" (6.35 mm) flare nut to the 1/4" (6.35 mm) schrader tap on the unit. *Note: The pressure-sensing lines from both regulators have been "tee'd" together.*

(3) Adjust the regulator head pressure to meet specified conditions. See Table 4.



Note:

Water regulating valves are most commonly applied with vapor-cycle refrigeration systems that use capillary tube metering devices to maintain suitable head or suction pressure levels for proper compressor loading. They are seldom applied when thermal expansion valves (TXV's) are used.

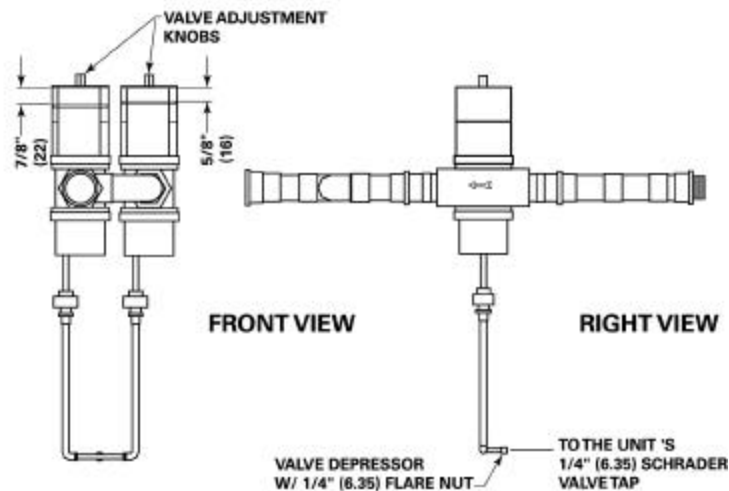


Table 4: Typical water regulating valve operating pressures

Water Temp Entering WSHP Unit	Discharge Pressure Cooling Cycle 80F Return Air	Suction Pressure Heating Cycle 70F Return-Air
45 F	160 psig (minimum)	46-54 psig
50 F	160 psig (minimum)	52-60 psig
55 F	160 psig (minimum)	56-66 psig
60 F	166-190 psig	60-72 psig
65 F	178-204 psig	62-74 psig

Note: If the unit has not been ordered with a water regulating tap, and the tap is field installed, it is important the tap be made on the copper tube between the reversing valve and the water-to-refrigerant heat exchanger. This is the only part of the heat pump refrigerant circuit that serves as both a discharge line during the cooling cycle, and a suction line during the heating cycle. To avoid shavings, particles and dirt from entering the system, it is recommended that the 1/4" (6.35 mm) hole be burned in the copper vs. drilled in the copper.

Installation for Multiple Compressor Units

A water regulating schrader option is not available factory shipped on the 12 1/2 through 25 ton units. All preparations for the acceptance of a water regulating valve assembly must be made in the field.

Installation Power Wiring

Field Installed Power Wiring

Power wiring to the equipment must conform to National and Local Electric Codes (NEC) by a professional electrician.

⚠ 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.

Verify that the power supply available is compatible with the unit's nameplate. Use only copper conductors to connect the power supply to the unit.

CAUTION Use Copper Conductors Only!

Unit terminals are not designed to accept other types of conductors. Failure to use copper conductors may result in equipment damage.

Main Unit Power Wiring

A field supplied disconnect switch must be installed at or near the unit in accordance with the National Electric Code (NEC latest edition).

Location of the applicable electric service entrance for HIGH (line voltage) may be found on the unit submittal at the front of this manual (pages 10 through 47).

The high voltage connection is made at the 1K1 contactor or 1TB1 power block inside the unit control box. See *Figure 8*. Refer to the customer connection diagram that is shipped with the unit for specific termination points.

Provide proper grounding for the unit in accordance with the local and national 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.

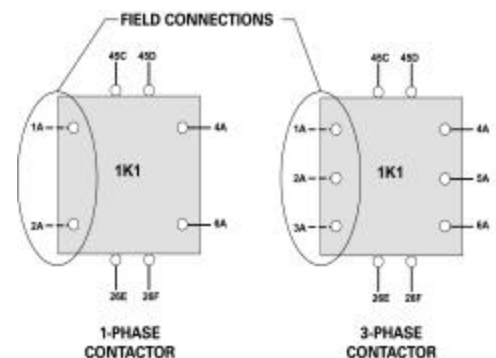


Figure 8: Example of power wiring

Installation

Low Voltage Wiring

Thermostat Location

Location of the thermostat or zone sensor is an important element of effective room control.

Areas where the thermostat or zone sensor should *not* be located include: Behind doors or corners; Near hot or cold air ducts; Near radiant heat (heat emitted from appliances or the sun); Near concealed pipes or chimneys; On outside walls or other non conditioned surfaces; In air-flows from adjacent zones or other units. See *Figure 9* for thermostat/sensor location.

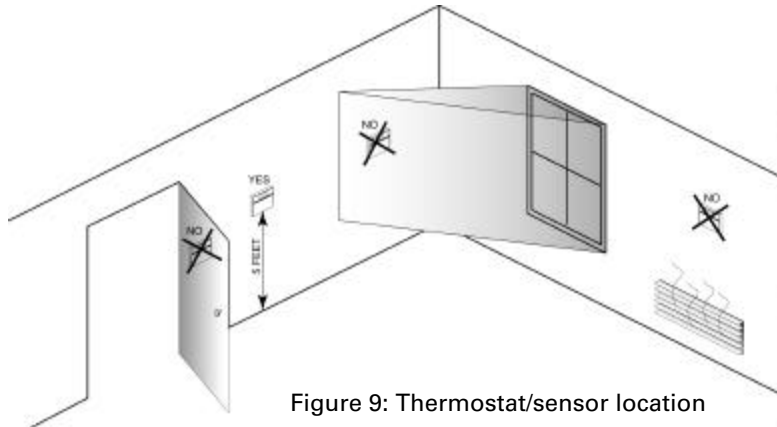


Figure 9: Thermostat/sensor location

Controls Using 24 VAC

Before installing any wire, refer to the electrical access locations on the unit submittals located on page 10.

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.

Check all loads and conductors for grounds, shorts, and mis-wiring.

Use copper conductors unless otherwise specified.

Do not run the AC low voltage wiring in the same conduit with the high voltage power wiring.

Table 5: 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

Low voltage connection diagrams for basic and deluxe 24 volt control packages mounted on 1/2 through 5 ton equipment sizes are shown in *Figure 10*.

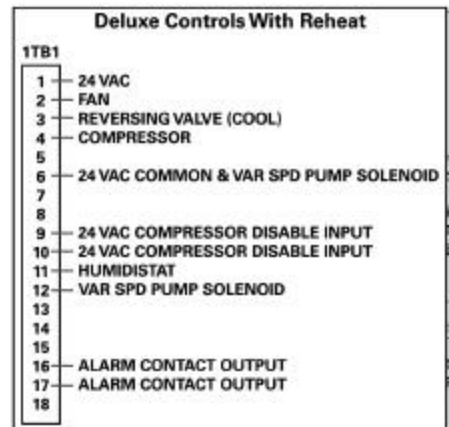
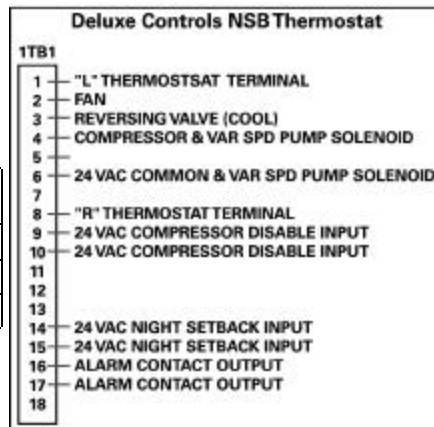
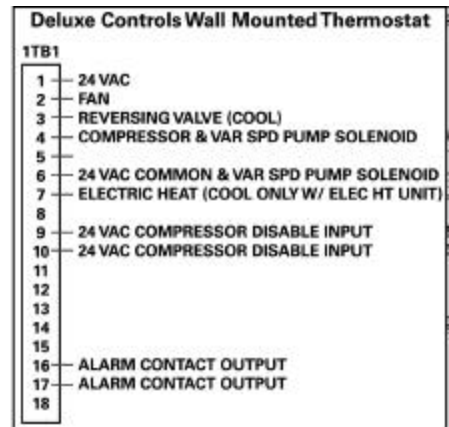
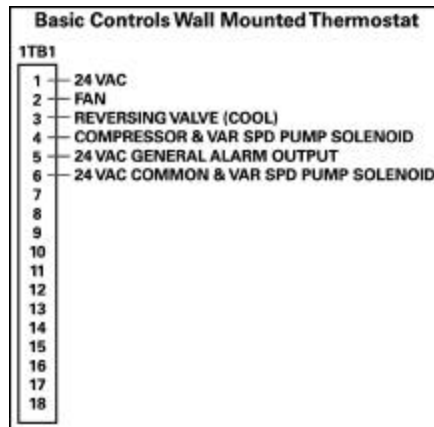


Figure 10: Low voltage connection (1/2 through 5 ton equipment)

Installation

Low Voltage Wiring

Controls Using 24 VAC

There are two factory thermostat options for the dual circuited (6 through 25 ton) equipment. Low voltage connection diagrams for deluxe 24 volt control packages for these thermostats mounted on 6 through 25 ton equipment sizes are shown in *Figure 11*.

For controls using DC analog input/outputs, see appropriate installation, operation and diagnostic manuals for connection. WSHP-IOP-2 (ZN510) and WSHP-PRB002-EN (ZN524).

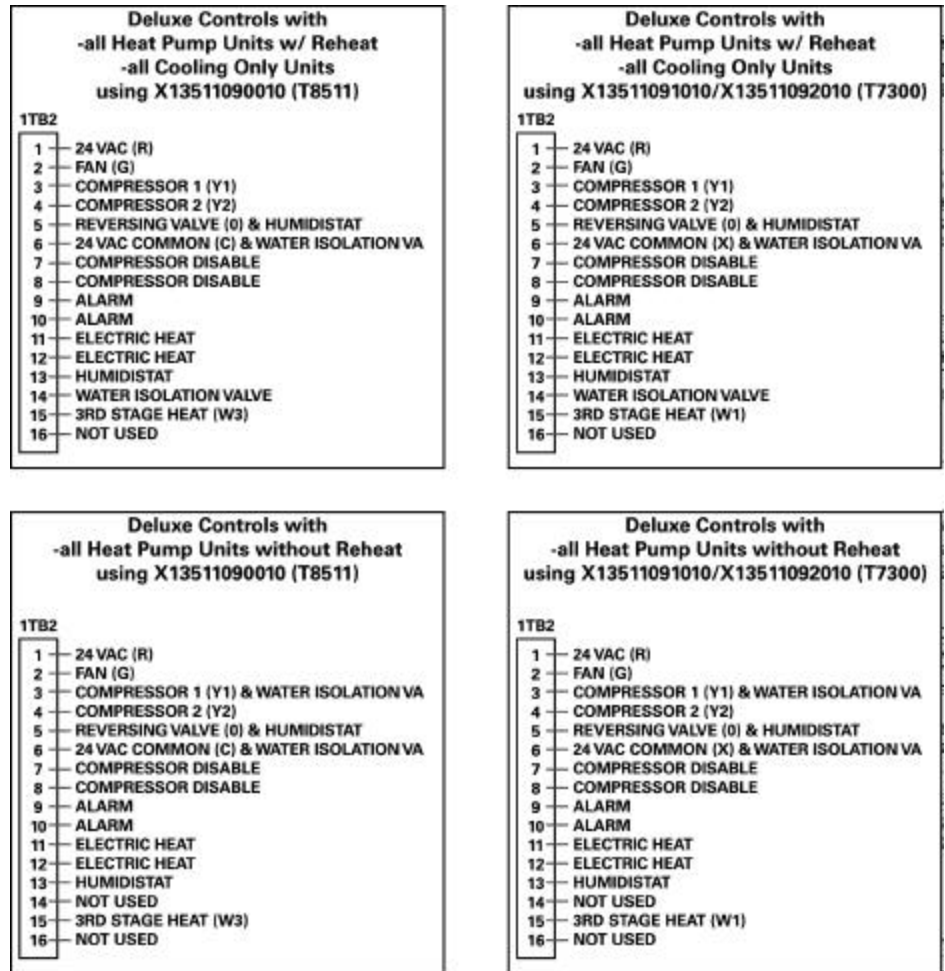


Figure 11: Low voltage connection (6 to 25 ton)

Deluxe Board Diagnostics

Three light emitting diodes (LEDs) are provided for indicating the operating mode of the Deluxe Controller. The LEDs are intended to aid in troubleshooting and for unit maintenance. The LEDs are labeled on the circuit board with numbers as referenced in Table 6.

Table 6: Deluxe controller diagnostic LEDs

Color: Green		Color: Red		Controller Mode
LED1	LED2	LED3		
OFF	OFF	OFF		Control OFF
ON	OFF	OFF		Normal/Compressor OFF
ON	OFF	FLASH		Anti-short cycle
ON	OFF	ON		Normal/Compressor ON
FLASH	ON	OFF		Brownout Condition
ON	FLASH	ON		Soft Lockout (low pressure)
ON	FLASH	FLASH		Soft Lockout (high pressure)
ON	ON	ON		Manual Lockout (low pressure)
ON	ON	FLASH		Manual Lockout (high pressure)
ON	FLASH	OFF		Manual Lockout (condensate overflow)
ON	ON	OFF		Compressor Disable








Installation

Air Flow Adjustment

Blower Motor Speed-Tap Retrofit (for 1/2 Through 5 Ton Units ONLY)

Motors installed in the unit include 4-speed and 3-speed configurations. All voltages include a 4-speed configuration, with the exception of 380V, 415V, 460V which contain a 3-speed arrangement and 575V which contains a 2-speed arrangement. To modify the rpm of the motor, the following steps may be followed.

<p>⚠ 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.</p> <p>Step 1</p>	 <p>Step 2 Remove service access panel at the unit front.</p>	 <p>Step 3 Find the blower motor relay. The relay is highlighted above. The relay location is consistent in all control configurations.</p>
 <p>Step 4: For units w/o Hot Gas Reheat Remove undesired speed-tap wire from 1K4 relay at spade 3. Wire tie the lead, to eliminate a short. For units with Hot Gas Reheat Remove undesired speed-tap wire from 1K8 relay at spade 6. Wire tie the lead, to eliminate a short.</p>	 <p>Step 5: For units w/o Hot Gas Reheat Select desired speed-tap wire. Connect desired speed tap wire to 1K4 relay at spade 3. For units with Hot Gas Reheat Select desired speed-tap wire. Connect desired speed tap wire to 1K8 relay at spade 6.</p>	 <p>Step 6: Install service front panel. Reconnect power to the unit.</p>

4-Speed Motor (115, 208, 230, 265)

Lead Colors				
	Black	Blue	Orange	Red
Lead Speed	High	Medium High	Medium Low	Low

3-Speed Motor (380, 415, 460)

Lead Colors			
	Black	Blue	Orange
Lead Speed	High	Medium	Low

2-Speed Motor (575)

Lead Colors		
	Black	Blue
Lead Speed	High	Low

Note: When using the medium or low speed tap, the purple wire must be jumpered to the high speed tap (blk).

Installation

Air Flow Adjustment

Air Flow Adjustment

(6 through 25 ton units *ONLY*)

To increase CFM, loosen the turns open set screw on the sheave, and turn the sheave clockwise.

To decrease CFM, Loosen the turns open set screw on the sheave, and turn the sheave counterclockwise.

To increase belt tension, loosen the adjustment bolt and pull motor mounting plate back until the belt is tight. Tighten the adjustment bolt after the belt has reached the desired tension.

See *Figure 12* for fan motor and sheave adjustment.

WARNING

Rotating Components! 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.

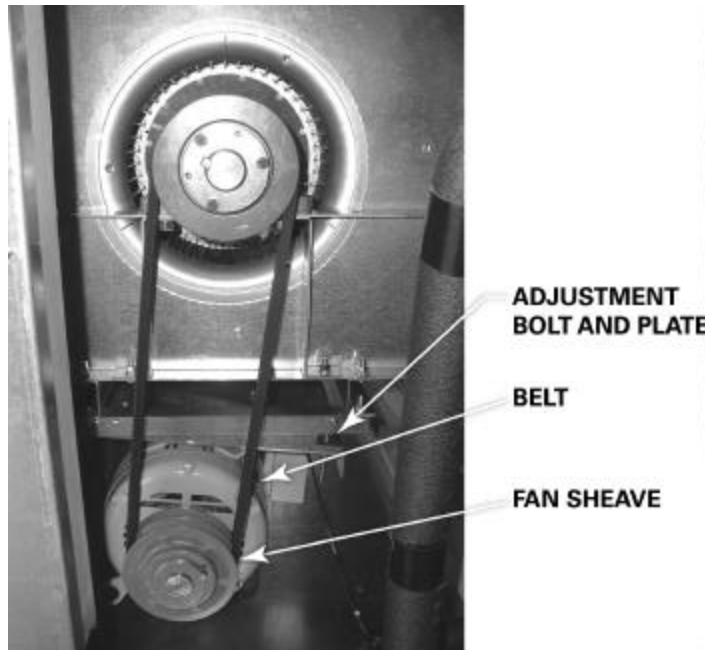


Figure 12: Fan motor and sheave adjustment

Installation

Waterside Economizer

⚠ 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 following steps were sequenced to aid in the installation and mating of a water side economizer to a water-source heat pump (GEH 1/2 to 5 ton).

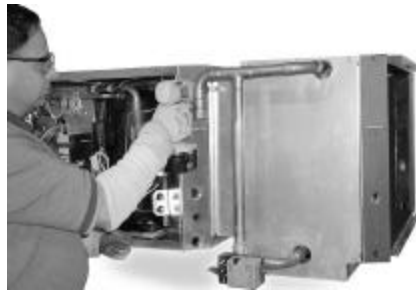
- 1 Remove the control side service panel of the water-source heat pump unit.
- 2 Remove rubber isolation grommets from the return-air section. Place them in a convenient location.
- 3 Attach ducted panel to the water-source heat pump unit with six factory provided Torx® head screws. *This panel is shipped loose with the water-source heat pump but must be field installed to the unit.*



Step 3

- 4 Attach the water side economizing unit to the ducted panel of the water-source heat pump with 10-factory provided Torx head screws. The economizing package fits to the outside of the of the water-source heat pump. *Trane recommends the mating of the*

systems be made via 3-screws spaced evenly across the top, 3-screws spaced evenly across the bottom (installed immediately after hanging the unit), and 2-screws on each side.



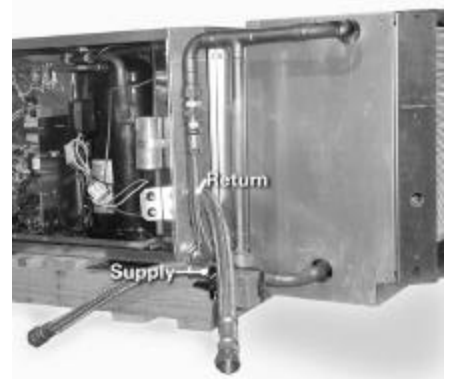
Step 4

- 5 Install the 18-inch steel braided hose between the upper most piping connection of the economizer, and the water-in of the heat pump. *The hose is shipped loose with the water-side economizer.*



Step 5

- 6 Install the SUPPLY and RETURN hoses to the (1) 2-position valve's threaded connection (2) water-out threaded connection of the water-source heat pump.

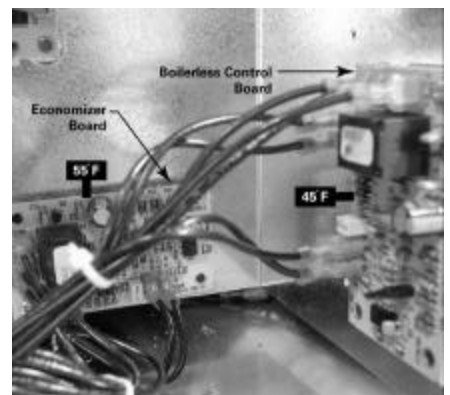


Step 6

- 7 **VERIFY**

The control board for the water side economizer is located at the back of the control box. The temperature rating of this board is factory set to 55°F.

For units with boilerless (electric heat) control and water side economizer, the boilerless control board is factory set to 45°F.



Step 7

Installation

Waterside Economizer

- 8 Thread the bulb and wire through the low voltage hole of the water-source heat pump.



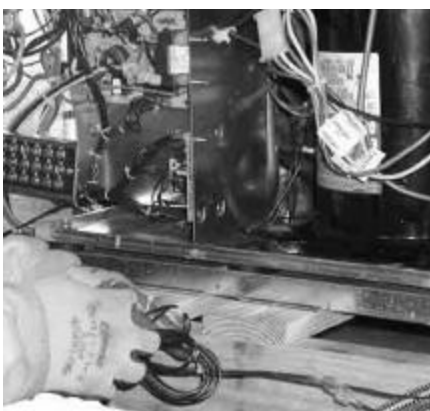
Step 8

- 9 Wire-tie the sensor to the water SUPPLY side of the piping (ON, or BEFORE) the 2-position valve.



Step 9

- 10 Bundle excess sensor wire, and wire tie the bundle neatly.



Step 10

- 11 Thread the valve's wire lead through the low voltage hole of the heat pump.



Step 11

- 12 Wire the valve to the terminal strip according to the unit wire diagram located on the service control panel.



RED = 1TB1-14
BLK = 1TB1-18
WHT = 1TB1-15

- 13 Bundle excess valve wire, and wire tie the bundle neatly.



Step 13

- 14 Install control side service panel.

- 15 Install the six hanging isolation grommets into the hanging brackets *The unit isolators were located in the return-air section of the unit. See Step 2. Isolators for the economizing package are located with the economizer.*



Step 15

- 16 Insulate the economizing piping package and the supply/return/by-pass hoses (3-hoses) via field provided pipe insulation. *Insulating the piping will stop condensation from forming on the pipe and dripping onto the ceiling tiles.*

Note: Trane does not provide insulation on the economizing piping package. This insulation must be field provided and field installed.

- 17 Install filter rack (top and bottom) to the economizing package. *The filter rack is located in the unit's packaging along with the filter.*

- 18 Hang Unit. See page 51 for hanging of the packaged unit. *Bottom screws referenced in step 4 must be installed at this time.*



Installation Waterside Economizer

- 19 Field pipe the drain lines of the waterside economizer and water-source heat pump together prior to installing a condensate trap. See page 51 for proper trapping of condensation.



Step 19

Unit 60 HZ	Unit 50 HZ	Waterside Economizer Part Number
006-015	006-012	4474 1690 0100
018-030	015-024	4474 1691 0100
036-042	030-036	4474 1692 0100
048-060	042-060	4474 1693 0100

Installation Waterside Economizer

⚠ 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 following steps were sequenced to aid in the installation and mating of a waterside economizer to a water-source heat pump (GEV and GEH 6 through 25 ton models).

- 1 Remove the filter frame from the unit.
- 2 Remove the waterside service panel from the unit.
- 3 Remove the control box service panel from the unit.
- 4 Remove the economizer and miscellaneous mounting parts from it's packaging.
- 5 **GEV ONLY:** Mount the economizer support angle (4475 1637 0100) found in the economizer packaging in the same holes of the return air filter frame removed in step 1. *The support angle screws into the unit roof*
- 6 **GEV ONLY:** Hang the economizer assembly from the economizer support angle mounted in step 5.
- 7 Secure the economizer to the unit using the four plates (4475 1630 0100) found in the economizer packaging. Two plates should be applied to each economizer side. **GEV ONLY:** *Secure the bracket on the bottom of the economizer*

cabinet to the unit compressor compartment center post.

- 8 Install the field portion of the water piping and the 3-way valve together.
- 9 **VERIFY**
The control board for the waterside economizer is located at the back of the control box. The temperature rating of this board is factory set to 55°F.
- 10 Thread the economizer's entering water temperature sensor (4RT1) through the water-in line of the water-source heat pump. This sensor is used by the economizer's 3-way valve to determine if water flow should be directed through the waterside economizing coil.
- 11 Tie wrap the thermistor to the water line (supply side) upstream of the water pipe to the economizer. *The thermistor must be situated so that the thermistor is capable of reading the actual entering water temperature regardless of the economizer's on or off situation.*
- 12 Insulate the thermistor with tubing insulation.
- 13 Tie wrap each end of the tubing insulation to prevent air filtration. *The tie wraps and insulation are located in a baggie and shipped inside of the unit.*
- 14 Thread the factory wire harness through the low voltage hole of the heat pump to the 3-way valve's wire harness.

- 15 Connect the factory installed wire harness to the to the wire harness supplied with the 3-way valve.

Actuator Wire # Color	Factory Harness Wire # Color
1 BLK	= 25L-Black
2 WHT	= 23T-White
3 WHT	= 73A-White

- 16 Bundle excess valve wire, and wire tie the bundle neatly.
- 17 Install control side service panel to the heat pump.
- 18 Install the unit filter frame to the economizing inlet.
- 19 Insulate the economizing piping package with field supplied pipe insulation. *Insulating the piping will help stop condensation from forming on the pipe.*
- 20 Install waterside service panel to the heat pump.
- 21 Field pipe the drain lines of the waterside economizer and water-source heat pump together prior to installing a condensate trap. See page 51 for proper trapping of condensation. *The economizer condensate line must be trapped prior to the unit's drain line. This helps prevent air from being sucked through the drain line causing condensate to spit or build-up in the economizer or unit drain pans.*

Note: Trane does not provide insulation on the economizing piping package. This insulation must be field provided and field installed.



Installation Waterside Economizer

Start-up Sequence

- 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 9-12°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 against values in Table 7 on page 75. **NOTE:** *If cooling mode is activated, and the entering water temperature of the heat pump falls below 55°F, the 2-position, water side economizing valve will become energized (open) and compressor operation will halt allowing for free cooling in the space.*
- 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 5-9 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 against values in Table 7 on page 75. **NOTE:** *For units with boilerless electric heat option...In heating mode, if the entering water temperature of the heat pump falls below 45°F, the electric heater will be energized, and compressor operation will halt. Once the entering water temperature rises above 50°F, the boilerless controls returns the unit to normal operation.*
- 11 Set the thermostat to maintain the desired space temperature.
- 12 Instruct the owner on system operation.

Installation Waterside Economizer

Waterside Economizing Three-Way Valve Specifications

Unit Size 60 HZ	Unit Size 50 HZ	Valve Connection Size	Valve Pressure Rating	Valve Close-off Pressure	Valve Temperature Range	Actuator
GEH 006-015	GEH 006-012	1/2" FPT	600 psi	200 psi	0°F to 212°F -18°C to 121°C	<ul style="list-style-type: none"> • Non-spring return type • 24 VAC +/- 20% • 135 second stroke time • 10 C_v at full port
GEH 018-042	GEH 015-036	3/4" FPT	600 psi	200 psi	0°F to 212°F -18°C to 121°C	<ul style="list-style-type: none"> • Non-spring return type • 24 VAC +/- 20% • 135 second stroke time • 30 C_v at full port
GEH 048-060	GEH 042-060	1" FPT	600 psi	200 psi	0°F to 212°F -18°C to 121°C	<ul style="list-style-type: none"> • Non-spring return type • 24 VAC +/- 20% • 135 second stroke time • 23 C_v at full port
GEV/GEH 6 - 7 1/2 Ton	GEV 6 Ton	1 1/4" FPT	600 psi	200 psi	0°F to 212°F -18°C to 121°C	<ul style="list-style-type: none"> • Non-spring return type • 24 VAC +/- 20% • 135 second stroke time • 33 C_v at full port
GEV/GEH 10-15 Ton	GEV/GEH 7 1/2-12 1/2 Ton	1 1/2" FPT	600 psi	200 psi	0°F to 212°F -18°C to 121°C	<ul style="list-style-type: none"> • Non-spring return type • 24 VAC +/- 20% • 135 second stroke time • 37 C_v at full port
GEV 20 & 25 Ton	GEV 15 & 20 Ton	2" FPT	600 psi	200 psi	0°F to 212°F -18°C to 121°C	<ul style="list-style-type: none"> • Non-spring return type • 24 VAC +/- 20% • 135 second stroke time • 57 C_v at full port

The valve body is constructed from forged brass with nickel plating, with the ball and stem constructed of stainless steel.

For other information pertaining to the economizing water valve, see the valve's data plate.



Electrical Requirements

E1-Electrical performance

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Comp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps
006	115/60/1	6.8	5.70	36.2	1	9.1	1.20	1/12	1	8.3	15	0	0
	208/60/1	3.4	2.80	17.7	1	4.6	0.60	1/12	1	4.1	15	0	0
	208/60/1	4.48	2.8	17.7	1	4.6	0.60	1/12	1	5.6	15	0.82	3.9
	230/60/1	3.4	2.80	17.7	1	4.6	0.60	1/12	1	4.1	15	0	0
	230/60/1	4.88	2.8	17.7	1	4.6	0.60	1/12	1	6.1	15	1.00	4.3
	220-240/50/1	3.6	3.10	18.8	1	5.2	0.52	1/12	1	4.4	15	0	0
	220-240/50/1	7.3	3.1	18.8	1	5.2	0.52	1/12	1	9.2	15	1.64	6.8
	265/60/1	3.0	2.45	15.0	1	3.9	0.52	1/12	1	3.6	15	0	0
009	265/60/1	5.5	2.5	15.0	1	3.9	0.52	1/12	1	6.9	15	1.33	5.0
	115/60/1	8.3	7.20	45.6	1	10.9	1.20	1/12	1	10.2	15	0	0
	208/60/1	4.0	3.40	22.2	1	6.4	0.60	1/12	1	4.9	15	0	0
	208/60/1	6.48	3.4	22.2	1	6.4	0.60	1/12	1	8.1	15	1.23	5.9
	230/60/1	4.0	3.40	22.2	1	6.4	0.60	1/12	1	4.9	15	0	0
	230/60/1	7.08	3.4	22.2	1	6.4	0.60	1/12	1	8.9	15	1.50	6.5
	220-240/50/1	5.0	4.30	22.2	1	6.6	0.72	1/8	1	6.1	15	0	0
	220-240/50/1	9.72	4.3	22.2	1	6.6	0.72	1/8	1	12.2	15	2.17	9.0
012	265/60/1	3.6	3.10	18.8	1	5.2	0.52	1/12	1	4.4	15	0	0
	265/60/1	8.0	3.1	18.8	1	5.2	0.52	1/12	1	10.0	15	2.00	7.5
	115/60/1	12.2	10.60	56.7	1	16.0	1.57	1/8	1	14.8	25	0	0
	208/60/1	5.7	5.00	27.9	1	8.3	0.70	1/8	1	7.0	15	0	0
	208/60/1	8.5	5.0	27.9	1	8.3	0.70	1/8	1	10.6	15	1.63	7.8
	230/60/1	5.7	5.00	27.9	1	8.3	0.70	1/8	1	7.0	15	0	0
	230/60/1	9.4	5.0	27.9	1	8.3	0.70	1/8	1	11.8	15	2.00	8.7
	220-240/50/1	5.5	4.80	27.0	1	8.5	0.72	1/8	1	6.7	15	0	0
015 - Std Static	220-240/50/1	12.02	4.8	27.0	1	8.5	0.72	1/8	1	15.0	15	2.70	11.3
	265/60/1	5.0	4.30	22.2	1	6.6	0.72	1/8	1	6.1	15	0	0
015 - Hi Static	265/60/1	10.72	4.3	22.2	1	6.6	0.72	1/8	1	13.4	15	2.65	10.0
	220-240/50/1	7.1	6.3	32.0	1	10.0	0.80	1/8	1	8.7	15	0	0
018 - Std Static	220-240/50/1	14.5	6.3	32.0	1	10.0	0.80	1/8	1	18.1	20	3.28	13.7
	208/60/1	6.1	5.40	29.0	1	9.2	0.70	1/8	1	7.5	15	0	0
	208/60/1	10.3	5.4	29.0	1	9.2	0.70	1/8	1	12.9	15	2.00	9.6
	230/60/1	6.1	5.40	29.0	1	9.2	0.70	1/8	1	7.5	15	0	0
	230/60/1	11.6	5.4	29.0	1	9.2	0.70	1/8	1	14.5	15	2.50	10.9
	220-240/50/1	7.8	6.30	32.0	1	10.0	1.53	1/3	1	9.4	15	0	0
	220-240/50/1	15.23	6.3	32.0	1	10.0	1.53	1/3	1	19.0	20	3.28	13.7
	265/60/1	5.5	4.80	27.0	1	8.5	0.72	1/8	1	6.7	15	0	0
018 - Hi Static	265/60/1	13.22	4.8	27.0	1	8.5	0.72	1/8	1	16.5	20	3.30	12.5
	208/60/1	8.5	7.6	45.0	1	13.0	0.9	1/8	1	10.4	15	0	0
	208/60/1	12.7	7.6	45.0	1	13.0	0.90	1/8	1	15.9	20	2.46	11.8
	230/60/1	8.5	7.6	45.0	1	13.0	0.90	1/8	1	10.4	15	0	0
	230/60/1	13.9	7.6	45.0	1	13.0	0.90	1/8	1	17.4	20	3.0	13.0
	265/60/1	7.1	6.3	32.0	1	10.0	0.80	1/8	1	8.7	15	0	0
	265/60/1	15.9	6.3	32.0	1	10.0	0.80	1/8	1	19.9	20	4.00	15.1
	208/60/1	9.4	7.60	45.0	1	13.0	2.10	1/3	1	11.6	15	0	0
018 - Hi Static	208/60/1	13.6	7.6	45.0	1	13.0	2.10	1/3	1	17.4	20	2.46	11.8
	230/60/1	9.4	7.60	45.0	1	13.0	2.10	1/3	1	11.6	15	0	0
	230/60/1	14.8	7.6	45.0	1	13.0	2.10	1/3	1	18.9	20	3.00	13.0
	220-240/50/1	11.4	9.90	55.0	1	13.8	1.53	1/3	1	13.9	20	0	0
	220-240/50/1	19.63	9.9	55.0	1	13.8	1.53	1/3	1	24.5	25	4.35	18.1
	265/60/1	7.8	6.30	32.0	1	10.0	1.53	1/3	1	9.4	15	0	0
	265/60/1	16.63	6.3	32.0	1	10.0	1.53	1/3	1	20.8	25	4.00	15.1
	380-415/50/3	4.9	3.90	25.0	1	5.4	0.95	1/3	1	5.8	15	0	0
380-415/50/3	11.45	3.9	25.0	1	5.4	0.95	1/3	1	14.3	15	4.35	10.5	



Electrical Requirements

E2-Electrical performance (continued)

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Comp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps	
024	208/60/1	12.7	10.90	56.0	1	15.3	2.10	1/3	1	15.7	25	0	0	
	208/60/1	17.5	10.9	56.0	1	15.3	2.10	1/3	1	22.3	25	3.26	15.7	
	230/60/1	12.7	10.90	56.0	1	15.3	2.10	1/3	1	15.7	25	0	0	
	230/60/1	19.2	10.9	56.0	1	15.3	2.10	1/3	1	24.0	25	4.00	17.4	
	220-240/50/1	12.4	10.90	58.0	1	15.3	1.53	1/3	1	15.2	25	0	0	
	220-240/50/1	24.03	10.9	58.0	1	15.3	1.53	1/3	1	30.0	35	5.40	22.5	
	265/60/1	11.4	9.90	55.0	1	13.8	1.53	1/3	1	13.9	20	0	0	
	265/60/1	21.53	9.9	55.0	1	13.8	1.53	1/3	1	26.9	30	5.30	20.0	
	208/60/3	9.3	7.50	51.0	1	10.5	2.10	1/3	1	11.5	15	0	0	
	208/60/3	10.8	7.5	51.0	1	10.5	2.10	1/3	1	13.9	15	3.26	9.0	
	230/60/3	9.3	7.50	51.0	1	10.5	2.10	1/3	1	11.5	15	0	0	
	230/60/3	11.8	7.5	51.0	1	10.5	2.10	1/3	1	15.1	15	4.00	10.0	
	380-415/50/3	5.0	4.00	28.0	1	5.6	0.95	1/3	1	6.0	15	0	0	
	380-415/50/3	8.45	4.0	28.0	1	5.6	0.95	1/3	1	10.6	15	5.40	7.5	
	460/60/3	4.9	3.90	25.0	1	5.4	0.95	1/3	1	5.8	15	0	0	
	460/60/3	7.65	3.9	25.0	1	5.4	0.95	1/3	1	9.6	15	5.30	6.7	
	030	208/60/1	14.2	12.40	61.0	1	17.4	2.10	1/3	1	17.6	30	0	0
208/60/1		21.5	12.4	61.0	1	17.4	2.10	1/3	1	27.3	30	4.10	19.7	
230/60/1		14.2	12.40	61.0	1	17.4	2.10	1/3	1	17.6	30	0	0	
230/60/1		23.5	12.4	61.0	1	17.4	2.10	1/3	1	29.8	30	5.00	21.7	
220-240/50/1		16.4	13.60	64.0	1	19.1	2.77	1/2	1	19.8	30	0	0	
220-240/50/1		29.97	13.6	64.0	1	19.1	2.77	1/2	1	37.5	40	6.52	27.2	
265/60/1		12.4	10.90	58.0	1	15.3	1.53	1/3	1	15.2	25	0	0	
265/60/1		26.43	10.9	58.0	1	15.3	1.53	1/3	1	33.0	35	6.60	24.9	
208/60/3		9.5	7.70	55.0	1	10.8	2.10	1/3	1	11.7	15	0	0	
208/60/3		13.2	7.7	55.0	1	10.8	2.10	1/3	1	16.9	20	4.10	11.4	
230/60/3		9.5	7.70	55.0	1	10.8	2.10	1/3	1	11.7	15	0	0	
230/60/3		14.4	7.7	55.0	1	10.8	2.10	1/3	1	18.4	20	5.00	12.6	
380-415/50/3		6.6	4.90	33.0	1	6.9	1.70	1/2	1	7.8	15	0	0	
380-415/50/3		10.8	4.9	33.0	1	6.9	1.70	1/2	1	13.5	15	6.52	9.1	
460/60/3		5.0	4.00	28.0	1	5.6	0.95	1/3	1	6.0	15	0	0	
460/60/3		9.25	4.0	28.0	1	5.6	0.95	1/3	1	11.6	15	6.60	8.3	
036		208/60/1	19.3	16.00	82.0	1	22.4	3.60	1/2	1	23.6	35	0	0
	208/60/1	26.87	16.0	82.0	1	22.4	3.60	1/2	1	34.0	35	4.90	23.6	
	230/60/1	19.3	16.00	82.0	1	22.4	3.60	1/2	1	23.6	35	0	0	
	230/60/1	29.37	16.0	82.0	1	22.4	3.60	1/2	1	37.1	40	6.00	26.1	
	265/60/1	16.4	13.60	64.0	1	19.1	2.77	1/2	1	19.8	30	0	0	
	265/60/1	32.77	13.6	64.0	1	19.1	2.77	1/2	1	41.0	45	7.95	30.0	
	208/60/3	13.7	10.40	65.5	1	14.6	3.60	1/2	1	16.6	25	0	0	
	208/60/3	16.87	10.4	65.5	1	14.6	3.60	1/2	1	21.5	25	4.90	13.6	
	230/60/3	13.7	10.40	65.5	1	14.6	3.60	1/2	1	16.6	25	0	0	
	230/60/3	18.37	10.4	65.5	1	14.6	3.60	1/2	1	23.4	25	6.00	15.1	
	380-415/50/3	6.5	4.80	40.0	1	6.7	1.70	1/2	1	7.7	15	0	0	
	380-415/50/3	11.6	4.8	40.0	1	6.7	1.70	1/2	1	14.5	15	7.15	9.9	
	460/60/3	6.6	4.90	33.0	1	6.9	1.70	1/2	1	7.8	15	0	0	
	460/60/3	11.7	4.9	33.0	1	6.9	1.70	1/2	1	14.6	15	7.95	10.0	
	GEV 040	208/60/1	19.4	16.1	82.0	1	22.5	3.60	1/2	1	23.6	35	0	0
		208/60/1	29.27	16.1	82.0	1	22.5	3.60	1/2	1	37.0	40	5.40	26.0
		230/60/1	19.4	16.1	82.0	1	22.5	3.60	1/2	1	23.7	35	0	0
230/60/1		31.97	16.1	82.0	1	22.5	3.60	1/2	1	40.4	45	6.60	28.7	
265/60/1		17.8	15.0	83.0	1	21.0	2.77	1/2	1	21.5	35	0	0	
265/60/1		35.97	15.0	83.0	1	0.0	2.77	1/2	1	45.0	45	8.80	33.2	
208/60/3		13.3	10.0	70.0	1	14.0	3.60	1/2	1	16.1	25	0	0	
208/60/3		18.27	10.0	70.0	1	14.0	3.60	1/2	1	23.3	25	5.40	15.0	
230/60/3		13.3	10.0	70.0	1	14.0	3.60	1/2	1	16.1	25	0	0	
230/60/3		19.87	10.0	70.0	1	14.0	3.60	1/2	1	25.3	25	6.60	16.6	
460/60/3		6.8	5.1	33.0	1	7.1	1.70	1/2	1	8.1	15	0	0	
460/60/3		12.7	5.1	33.0	1	7.1	1.70	1/2	1	15.9	20	8.80	11.0	



Electrical Requirements

E3-Electrical performance (continued)

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Cmp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps	
042 - Hi Static	208/60/1	21.3	18.00	96.0	1	25.2	3.60	1/2	1	26.1	40	0	0	
	208/60/1	30.67	18.0	96.0	1	25.2	3.60	1/2	1	38.8	40	5.70	27.4	
	230/60/1	21.3	18.00	96.0	1	25.2	3.60	1/2	1	26.1	40	0	0	
	230/60/1	33.67	18.0	96.0	1	25.2	3.60	1/2	1	42.5	45	7.00	30.4	
	208/60/3	14.7	11.40	75.0	1	16.0	3.60	1/2	1	17.9	25	0	0	
	208/60/3	19.07	11.4	75.0	1	16.0	3.60	1/2	1	24.3	25	5.70	15.8	
	230/60/3	14.7	11.40	75.0	1	16.0	3.60	1/2	1	17.9	25	0	0	
	230/60/3	20.87	11.4	75.0	1	16.0	3.60	1/2	1	26.5	30	7.00	17.6	
	380-415/50/3	9.1	6.40	42.0	1	8.9	2.70	1	1	10.7	15	0	0	
	380-415/50/3	14.7	6.4	42.0	1	8.9	2.70	1	1	18.4	20	8.60	12.0	
	460/60/3	6.5	4.80	40.0	1	6.7	1.70	1/2	1	7.7	15	0	0	
	460/60/3	13.4	4.8	40.0	1	6.7	1.70	1/2	1	16.8	20	9.30	11.7	
	575/60/3	5.4	4.10	31.0	1	5.7	1.31	1/2	1	6.4	15	0	0	
042 - Std Static	380-415/50/3	7.8	6.4	42.0	1	8.9	1.40	1/2	1	9.4	15	0	0	
380-415/50/3	13.4	6.4	42.0	1	8.9	1.40	1/2	1	16.8	20	8.60	12.0		
048 - Hi Static	208/60/1	25.8	20.40	102.0	1	28.5	5.40	1	1	30.9	50	0	0	
	208/60/1	36.7	20.4	102.0	1	28.5	5.40	1	1	45.9	50	6.50	31.3	
	230/60/1	25.8	20.40	102.0	1	28.5	5.40	1	1	30.9	50	0	0	
	230/60/1	40.2	20.4	102.0	1	28.5	5.40	1	1	50.3	60	8.00	34.8	
	208/60/3	19.4	14.00	91.0	1	19.7	5.40	1	1	22.9	35	0	0	
	208/60/3	23.4	14.0	91.0	1	19.7	5.40	1	1	29.3	35	6.50	18.0	
	230/60/3	19.4	14.00	91.0	1	19.7	5.40	1	1	22.9	35	0	0	
	230/60/3	25.5	14.0	91.0	1	19.7	5.40	1	1	31.9	35	8.00	20.1	
	380-415/50/3	10.2	7.50	49.5	1	10.5	2.70	1	1	12.1	15	0	0	
	380-415/50/3	14.7	7.5	49.5	1	10.5	2.70	1	1	18.4	20	8.60	12.0	
	460/60/3	9.1	6.40	42.0	1	8.9	2.70	1	1	10.7	15	0	0	
	460/60/3	16.0	6.4	42.0	1	8.9	2.70	1	1	20.0	25	10.60	13.3	
	575/60/3	7.4	5.20	39.0	1	7.3	2.20	1	1	8.7	15	0	0	
048 - Std Static	208/60/1	23.2	20.4	102.0	1	28.5	2.80	1/2	1	28.3	50	0	0	
	208/60/1	34.1	20.4	102.0	1	28.5	2.80	1/2	1	42.6	50	6.50	31.3	
	230/60/1	23.2	20.4	102.0	1	28.5	2.80	1/2	1	28.3	50	0	0	
	230/60/1	37.6	20.4	102.0	1	28.5	2.80	1/2	1	47.0	50	8.00	34.8	
	208/60/3	16.8	14.0	91.0	1	19.7	2.80	1/2	1	20.3	35	0	0	
	208/60/3	20.8	14.0	91.0	1	19.7	2.80	1/2	1	26.0	35	6.50	18.0	
	230/60/3	16.8	14.0	91.0	1	19.7	2.80	1/2	1	20.3	35	0	0	
	230/60/3	22.9	14.0	91.0	1	19.7	2.80	1/2	1	28.6	35	8.00	20.1	
	460/60/3	7.8	6.4	42.0	1	8.9	1.40	1/2	1	9.4	15	0	0	
	460/60/3	14.7	6.4	42.0	1	8.9	1.40	1/2	1	18.4	25	10.60	13.3	
	575/60/3	6.3	5.2	39.0	1	7.3	1.10	1/2	1	7.6	15	0	0	
	060	208/60/1	33.4	28.00	169.0	1	39.0	5.40	1	1	40.4	60	0	0
		208/60/1	36.7	28.0	169.0	1	39.0	5.4	1	1	45.9	60	6.50	31.3
230/60/1		33.4	28.00	169.0	1	35.0	5.40	1	1	40.4	60	0	0	
230/60/1		40.2	28.0	169.0	1	39.0	5.4	1	1	50.3	60	8.00	34.8	
208/60/3		25.4	20.00	123.0	1	28.0	5.40	1	1	30.4	50	0	0	
208/60/3		25.4	20.0	123.0	1	27.0	5.4	1	1	30.4	50	6.50	18.0	
230/60/3		25.4	20.00	123.0	1	28.0	5.40	1	1	30.4	50	0	0	
230/60/3		25.5	20.0	123.0	1	27.0	5.4	1	1	31.9	50	8.00	20.1	
380-415/50/3		12.8	10.00	62.0	1	14.0	2.70	1	1	15.2	25	0	0	
380-415/50/3		14.7	10.0	62.0	1	14.0	2.7	1	1	18.4	25	8.60	12.0	
460/60/3		10.2	7.50	49.5	1	10.5	2.70	1	1	12.1	15	0	0	
460/60/3		16.0	7.5	49.5	1	10.5	2.7	1	1	20.0	25	10.60	13.3	
575/60/3		8.6	6.40	40.0	1	9.0	2.20	1	1	10.2	15	0	0	



Electrical Requirements

E4-Electrical performance (continued)

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Cmp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps
GEH 072	208/60/1	38.6	16.00	82.0	2	22.4	6.55	1	1	42.6	50		
	230/60/1	38.5	16.00	82.0	2	22.4	6.47	1	1	42.5	50		
	208/60/1	41.3	16.00	82.0	2	22.4	9.34	1.5	1	45.3	60		
	230/60/1	40.9	16.00	82.0	2	22.4	8.94	1.5	1	44.9	60		
	208/60/1	43.2	16.00	82.0	2	22.4	11.20	2	1	47.2	60		
	230/60/1	42.2	16.00	82.0	2	22.4	10.23	2	1	46.2	60		
	380-415/50/3	12.9	6.40	42.0	2	8.9	1.70	0.75	1	14.5	20		
	208/60/3	24.3	10.40	65.5	2	14.6	3.50	1	1	26.9	35		
	230/60/3	24.6	10.40	65.5	2	14.6	3.80	1	1	27.2	35		
	380-415/50/3	13.3	6.40	42.0	2	8.9	2.10	1	1	14.9	20		
	460/60/3	11.6	4.90	33.0	2	6.9	1.80	1	1	12.8	15		
	208/60/3	26.4	10.40	65.5	2	14.6	5.60	1.5	1	29.0	35		
	230/60/3	25.6	10.40	65.5	2	14.6	4.80	1.5	1	28.2	35		
	380-415/50/3	14.2	6.40	42.0	2	8.9	3.00	1.5	1	15.8	20		
	460/60/3	23.5	4.90	33.0	2	6.9	2.40	1.5	1	13.4	15		
	208/60/3	27.9	10.40	65.5	2	14.6	7.10	2	1	30.5	40		
	230/60/3	27.0	10.40	65.5	2	14.6	6.20	2	1	29.6	40		
	380-415/50/3	14.6	6.40	42.0	2	8.9	3.40	2	1	16.2	20		
	460/60/3	12.9	4.90	33.0	2	6.9	3.11	2	1	14.1	15		
	380-415/50/3	16.7	6.40	42.0	2	8.9	5.50	3	1	18.3	25		
GEV 072	208/60/1	38.6	16.00	82.0	2	22.4	6.55	1	1	42.6	50		
	230/60/1	38.5	16.00	82.0	2	22.4	6.47	1	1	42.5	50		
	208/60/1	41.3	16.00	82.0	2	22.4	9.34	1.5	1	45.3	60		
	230/60/1	40.9	16.00	82.0	2	22.4	8.94	1.5	1	44.9	60		
	208/60/1	43.2	16.00	82.0	2	22.4	11.20	2	1	47.2	60		
	230/60/1	42.2	16.00	82.0	2	22.4	10.23	2	1	46.2	60		
	380-415/50/3	12.9	6.40	42.0	2	8.9	1.70	.75	1	14.5	20		
	208/60/3	24.3	10.40	65.6	2	14.6	3.50	1	1	26.9	35		
	230/60/3	24.6	10.40	65.6	2	14.6	3.80	1	1	27.2	35		
	380-415/50/3	13.3	6.40	42.0	2	8.9	2.10	1	1	14.9	20		
	460/60/3	11.6	4.90	33.0	2	6.9	1.80	1	1	12.8	15		
	208/60/3	26.4	10.40	65.6	2	14.6	5.60	1.5	1	29.0	35		
	230/60/3	25.6	10.40	65.6	2	14.6	4.80	1.5	1	28.2	35		
	380-415/50/3	14.2	6.40	42.0	2	8.9	3.00	1.5	1	15.8	20		
	460/60/3	12.2	4.90	33.0	2	6.9	2.40	1.5	1	13.4	15		
	208/60/3	27.9	10.40	65.6	2	14.6	7.10	2	1	30.5	40		
	230/60/3	27.0	10.40	65.6	2	14.6	6.20	2	1	29.6	40		
	380-415/50/3	14.6	6.40	42.0	2	8.9	3.40	2	1	16.2	20		
	460/60/3	12.9	4.90	33.0	2	6.9	3.11	2	1	14.1	15		
	GEH 090	208/60/3	28.9	11.4/14.00	75.0/91.0	2	16.0/19.7	3.50	1	1	32.4	45	
230/60/3		29.2	11.4/14.00	75.0/91.0	2	16.0/19.7	3.80	1	1	32.7	45		
460/60/3		13.0	4.8/6.40	40.0/42.0	2	6.7/8.9	1.80	1	1	14.6	20		
575/60/3		11.0	4.1/5.20	31.0/39.0	2	5.2/7.3	1.70	1	1	12.3	15		
208/60/3		31.0	11.4/14.00	75.0/91.0	2	16.0/19.7	5.60	1.5	1	34.5	45		
230/60/3		30.2	11.4/14.00	75.0/91.0	2	16.0/19.7	4.80	1.5	1	33.7	45		
380-415/50/3		18.0	4.8/7.50	40.0/46.5	2	6.7/10.5	3.00	1.5	1	19.9	25		
460/60/3		13.6	4.8/6.40	40.0/42.0	2	6.7/8.9	2.40	1.5	1	15.2	20		
575/60/3		11.2	4.1/5.20	31.0/39.0	2	5.2/7.3	1.90	1.5	1	12.5	15		
208/60/3		32.5	11.4/14.00	75.0/91.0	2	16.0/19.7	7.10	2	1	36.0	50		
230/60/3		31.6	11.4/14.00	75.0/91.0	2	16.0/19.7	6.20	2	1	35.1	45		
380-415/50/3		18.4	4.8/7.50	40.0/46.5	2	6.7/10.5	3.40	2	1	20.3	25		
460/60/3		14.3	4.8/6.40	40.0/42.0	2	6.7/8.9	3.11	2	1	15.9	20		
575/60/3		11.6	4.1/5.20	31.0/39.0	2	5.2/7.3	2.30	2	1	12.9	15		
208/60/3		34.8	11.4/14.00	75.0/91.0	2	16.0/19.7	9.40	3	1	38.3	50		
230/60/3		33.6	11.4/14.00	75.0/91.0	2	16.0/19.7	8.20	3	1	37.1	50		
380-415/50/3		20.5	4.8/7.50	40.0/46.5	2	6.7/10.5	5.50	3	1	22.4	25		
460/60/3		15.3	4.8/6.40	40.0/42.0	2	6.7/8.9	4.10	3	1	16.9	20		
575/60/3		12.6	4.1/5.20	31.0/39.0	2	5.2/7.3	3.30	3	1	13.9	15		



Electrical Requirements

E5-Electrical performance (continued)

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Comp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps
GEV 090	208/60/3	28.9	11.4/14.00	75.0/91.0	2	16.0/19.7	3.50	1	1	32.4	45		
	230/60/3	29.2	11.4/14.00	75.0/91.0	2	16.0/19.7	3.80	1	1	32.7	45		
	380-415/50/3	17.1	4.8/7.50	40.0/46.5	2	6.7/10.5	2.10	1	1	19.0	25		
	460/60/3	13.0	4.8/6.40	40.0/42.0	2	6.7/8.9	1.80	1	1	14.6	20		
	575/60/3	11.0	4.1/5.20	31.0/39.0	2	5.2/7.3	1.70	1	1	12.3	15		
	208/60/3	31.0	11.4/14.00	75.0/91.0	2	16.0/19.7	5.60	1.5	1	34.5	45		
	230/60/3	30.2	11.4/14.00	75.0/91.0	2	16.0/19.7	4.80	1.5	1	33.7	45		
	380-415/50/3	18.0	4.8/7.50	40.0/46.5	2	6.7/10.5	3.00	1.5	1	19.9	25		
	460/60/3	13.6	4.8/6.40	40.0/42.0	2	6.7/8.9	2.40	1.5	1	15.2	20		
	575/60/3	11.2	4.1/5.20	31.0/39.0	2	5.2/7.3	1.90	1.5	1	12.5	15		
	208/60/3	32.5	11.4/14.00	75.0/91.0	2	16.0/19.7	7.10	2	1	36.0	50		
	230/60/3	31.6	11.4/14.00	75.0/91.0	2	16.0/19.7	6.20	2	1	35.1	45		
	380-415/50/3	18.4	4.8/7.50	40.0/46.5	2	6.7/10.5	3.40	2	1	20.3	25		
	460/60/3	14.3	4.8/6.40	40.0/42.0	2	6.7/8.9	3.11	2	1	15.9	20		
	575/60/3	11.6	4.1/5.20	31.0/39.0	2	5.2/7.3	2.30	2	1	12.9	15		
	208/60/3	34.8	11.4/14.00	75.0/91.0	2	16.0/19.7	9.40	3	1	38.3	50		
230/60/3	33.6	11.4/14.00	75.0/91.0	2	16.0/19.7	8.20	3	1	37.1	50			
380-415/50/3	20.5	4.8/7.50	40.0/46.5	2	6.7/10.5	5.50	3	1	22.4	25			
460/60/3	15.3	4.8/6.40	40.0/42.0	2	6.7/8.9	4.10	3	1	16.9	20			
575/60/3	12.6	4.1/5.20	31.0/39.0	2	5.2/7.3	3.30	3	1	13.9	15			
GEH 120	380-415/50/3	20.3	9.10	58.0	2	12.8	2.10	1	1	22.6	25		
	208/60/3	44.2	19.30	123.0	2	27.0	5.60	1.5	1	49.0	60		
	230/60/3	43.4	19.30	123.0	2	27.0	4.80	1.5	1	48.2	60		
	380-415/50/3	21.2	9.10	58.0	2	12.8	3.00	1.5	1	23.5	30		
	460/60/3	17.4	7.50	49.5	2	10.5	2.40	1.5	1	19.3	25		
	575/60/3	14.7	6.40	40.0	2	9.0	1.90	1.5	1	16.3	20		
	208/60/3	45.7	19.30	123.0	2	27.0	7.10	2	1	50.5	60		
	230/60/3	44.8	19.30	123.0	2	27.0	6.20	2	1	49.6	60		
	380-415/50/3	21.6	9.10	58.0	2	12.8	3.40	2	1	23.9	30		
	460/60/3	18.1	7.50	49.5	2	10.5	3.11	2	1	20.0	25		
	575/60/3	15.1	6.40	40.0	2	9.0	2.30	2	1	16.7	20		
	208/60/3	48.0	19.30	123.0	2	27.0	9.40	3	1	52.8	70		
	230/60/3	46.8	19.30	123.0	2	27.0	8.20	3	1	51.6	70		
	380-415/50/3	23.7	9.10	58.0	2	12.8	5.50	3	1	26.0	35		
	460/60/3	19.1	7.50	49.5	2	10.5	4.10	3	1	21.0	25		
	575/60/3	16.1	6.40	40.0	2	9.0	3.30	3	1	17.7	20		
	208/60/3	54.6	19.30	123.0	2	27.0	16.00	5	1	59.4	70		
	230/60/3	52.6	19.30	123.0	2	27.0	14.00	5	1	57.4	70		
	380-415/50/3	27.5	9.10	58.0	2	12.8	9.30	5	1	29.8	40		
	460/60/3	22.0	7.50	49.5	2	10.5	7.00	5	1	23.9	30		
575/60/3	18.0	6.40	40.0	2	9.0	5.20	5	1	19.6	25			
GEV 120	208/60/3	44.2	19.30	123.0	2	27.0	5.60	1.5	1	49.0	60		
	230/60/3	43.4	19.30	123.0	2	27.0	4.80	1.5	1	48.2	60		
	460/60/3	17.4	7.50	49.5	2	10.5	2.40	1.5	1	19.3	25		
	575/60/3	14.7	6.40	40.0	2	9.0	1.90	1.5	1	16.3	20		
	208/60/3	45.7	19.30	123.0	2	27.0	7.10	2	1	50.5	60		
	230/60/3	44.8	19.30	123.0	2	27.0	6.20	2	1	49.6	60		
	460/60/3	18.1	7.50	49.5	2	10.5	3.11	2	1	20.0	25		
	575/60/3	15.1	6.40	40.0	2	9.0	2.30	2	1	16.7	20		
	208/60/3	48.0	19.30	123.0	2	27.0	9.40	3	1	52.8	70		
	230/60/3	46.8	19.30	123.0	2	27.0	8.20	3	1	51.6	70		
	460/60/3	19.1	7.50	49.5	2	10.5	4.10	3	1	21.0	25		
	575/60/3	16.1	6.40	40.0	2	9.0	3.30	3	1	17.7	20		
	208/60/3	54.6	19.30	123.0	2	27.0	16.00	5	1	59.4	70		
	230/60/3	52.6	19.30	123.0	2	27.0	14.00	5	1	57.4	70		
	460/60/3	22.0	7.50	49.5	2	10.5	7.00	5	1	23.9	30		
	575/60/3	18.0	6.40	40.0	2	9.0	5.20	5	1	19.6	25		
	380-415/50/3	23	10.00	64.0	2	14.0	3.00	1.5	1	25.5	35		
	380-415/50/3	23.4	10.00	64.0	2	14.0	3.40	2	1	25.9	35		
	380-415/50/3	25.5	10.00	64.0	2	14.0	5.50	3	1	28.0	35		



Electrical Requirements

E6-Electrical performance (continued)

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Cmp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps
GEH 150	208/60/3	44.2	19.30	137.0	2	27.0	5.60	1.5	1	49.0	60		
	230/60/3	43.4	19.30	137.0	2	27.0	4.80	1.5	1	48.2	60		
	380-415/50/3	27.0	12.00	90.5	2	17.0	3.00	1.5	1	30.0	40		
	460/60/3	20.6	9.10	62.0	2	12.8	2.40	1.5	1	22.9	30		
	575/60/3	17.7	7.90	50.0	2	11.0	1.90	1.5	1	19.7	25		
	208/60/3	45.7	19.30	137.0	2	27.0	7.10	2	1	50.5	60		
	230/60/3	44.8	19.30	137.0	2	27.0	6.20	2	1	49.6	60		
	380-415/50/3	27.4	12.00	90.5	2	17.0	3.40	2	1	30.4	40		
	460/60/3	21.3	9.10	62.0	2	12.8	3.11	2	1	23.6	30		
	575/60/3	18.1	7.90	50.0	2	11.0	2.30	2	1	20.1	25		
	208/60/3	48.0	19.30	137.0	2	27.0	9.40	3	1	52.8	70		
	230/60/3	46.8	19.30	137.0	2	27.0	8.20	3	1	51.6	70		
	380-415/50/3	29.5	12.00	90.5	2	17.0	5.50	3	1	32.5	40		
	460/60/3	22.3	9.10	62.0	2	12.8	4.10	3	1	24.6	30		
	575/60/3	19.1	7.90	50.0	2	11.0	3.30	3	1	21.1	25		
	208/60/3	54.6	19.30	137.0	2	27.0	16.00	5	1	59.4	70		
	230/60/3	52.6	19.30	137.0	2	27.0	14.00	5	1	57.4	70		
	380-415/50/3	33.3	12.00	90.5	2	17.0	9.30	5	1	36.3	45		
	460/60/3	25.2	9.10	62.0	2	12.8	7.00	5	1	27.5	35		
	575/60/3	21.0	7.90	50.0	2	11.0	5.20	5	1	23.0	30		
GEV 150	208/60/3	45.7	19.30	137.0	2	27.0	7.10	2	1	50.5	60		
	230/60/3	44.8	19.30	137.0	2	27.0	6.20	2	1	49.6	60		
	380-420/50/3	23	10.00	64.0	2	14.0	3.00	1.5	1	25.5	35		
	460/60/3	23.11	10.00	62.0	2	14.0	3.11	2	1	25.6	35		
	575/60/3	18	7.85	50.0	2	11.0	2.30	2	1	20.0	25		
	208/60/3	48	19.30	137.0	2	27.0	9.40	3	1	52.8	70		
	230/60/3	46.8	19.30	137.0	2	27.0	8.20	3	1	51.6	70		
	380-420/50/3	23.4	10.00	64.0	2	14.0	3.40	2	1	25.9	35		
	460/60/3	24.1	10.00	62.0	2	14.0	4.10	3	1	26.6	35		
	575/60/3	19	7.85	50.0	2	11.0	3.30	3	1	21.0	25		
	208/60/3	54.6	19.30	137.0	2	27.0	16.00	5	1	59.4	70		
	230/60/3	52.6	19.30	137.0	2	27.0	14.00	5	1	57.4	70		
	380-420/50/3	25.5	10.00	64.0	2	14.0	5.50	3	1	28.0	35		
	460/60/3	27	10.00	62.0	2	14.0	7.00	5	1	29.5	35		
	575/60/3	20.9	7.85	50.0	2	11.0	5.20	5	1	22.9	30		
	208/60/3	57.1	25.00	164.0	2	35.0	7.10	2	1	63.4	80		
	230/60/3	56.2	25.00	164.0	2	35.0	6.20	2	1	62.5	80		
460/60/3	27.1	12.00	100.0	2	17.0	3.11	2	1	30.1	40			
575/60/3	20.9	9.30	78.0	2	13.0	2.30	2	1	23.2	30			
208/60/3	59.4	25.00	164.0	2	35.0	9.40	3	1	65.7	90			
230/60/3	58.2	25.00	164.0	2	35.0	8.20	3	1	64.5	80			
460/60/3	28.1	12.00	100.0	2	17.0	4.10	3	1	31.1	40			
575/60/3	21.9	9.30	78.0	2	13.0	3.30	3	1	24.2	30			
208/60/3	66.0	25.00	164.0	2	35.0	16.00	5	1	72.3	90			
230/60/3	64.0	25.00	164.0	2	35.0	14.00	5	1	70.3	90			
460/60/3	31.0	12.00	100.0	2	17.0	7.00	5	1	34.0	45			
575/60/3	23.8	9.30	78.0	2	13.0	5.20	5	1	26.1	35			
208/60/3	75.0	25.00	164.0	2	35.0	25.00	7.5	1	81.3	100			
230/60/3	71.6	25.00	164.0	2	35.0	21.60	7.5	1	77.9	100			
460/60/3	34.8	12.00	100.0	2	17.0	10.80	7.5	1	37.8	45			
575/60/3	26.8	9.30	78.0	2	13.0	8.20	7.5	1	29.1	35			



Electrical Requirements

E7-Electrical performance (continued)

Model No.	Volts	Total FLA	Comp RLA (ea)	Comp LRA (ea)	No. of Compres.	Cmp MCC	Blower Motor FLA	Blower Motor HP	Fan Motor Num	Minimum Circuit Ampacity	Maximum Overcurrent Protective Device	Electric Heat kW	Electric Heat Amps
GEV 180	208/60/3	59.4	25.00	164.0	2	35.0	9.40	3	1	65.7	90		
	230/60/3	58.2	25.00	164.0	2	35.0	8.20	3	1	64.5	80		
	380-420/50/3	27.4	12.00	90.5	2	17.0	3.40	2	1	30.4	40		
	460/60/3	28.1	12.00	100.0	2	17.0	4.10	3	1	31.1	40		
	575/60/3	21.9	9.30	78.0	2	13.0	3.30	3	1	24.2	30		
	208/60/3	66	25.00	164.0	2	35.0	16.00	5	1	72.3	90		
	230/60/3	64	25.00	164.0	2	35.0	14.00	5	1	70.3	90		
	380-420/50/3	29.5	12.00	90.5	2	17.0	5.50	3	1	32.5	40		
	460/60/3	31	12.00	100.0	2	17.0	7.00	5	1	34.0	45		
	575/60/3	23.8	9.30	78.0	2	13.0	5.20	5	1	26.1	35		
	208/60/3	75	25.00	164.0	2	35.0	25.00	7.5	1	81.3	100		
	230/60/3	71.6	25.00	164.0	2	35.0	21.60	7.5	1	77.9	100		
	380-420/50/3	33.3	12.00	90.5	2	17.0	9.30	5	1	36.3	45		
	460/60/3	34.8	12.00	100.0	2	17.0	10.80	7.5	1	37.8	45		
	575/60/3	26.8	9.30	78.0	2	13.0	8.20	7.5	1	29.1	35		
	GEV 240	208/60/3	79.4	31.70	232.0	2	49.5	16.00	5	1	87.4	110	
230/60/3		77.4	31.70	261.0	2	49.5	14.00	5	1	85.4	110		
380-420/50/3		38.9	16.70	133.0	2	26.0	5.50	3	1	43.1	50		
460/60/3		35.2	14.10	112.0	2	22.0	7.00	5	1	38.7	50		
575/60/3		27.6	11.20	92.0	2	17.5	5.20	5	1	30.4	40		
208/60/3		88.4	31.70	232.0	2	49.5	25.00	7.5	1	96.4	125		
230/60/3		85	31.70	261.0	2	49.5	21.60	7.5	1	93.0	110		
380-420/50/3		42.7	16.70	133.0	2	26.0	9.30	5	1	46.9	60		
460/60/3		39	14.10	112.0	2	22.0	10.80	7.5	1	42.5	50		
575/60/3		30.6	11.20	92.0	2	17.5	8.20	7.5	1	33.4	40		
208/60/3		96.4	31.70	232.0	2	49.5	33.00	10	1	104.7	125		
230/60/3		91.4	31.70	261.0	2	49.5	28.00	10	1	99.4	125		
380-420/50/3		46.4	16.70	133.0	2	26.0	13.00	7.5	1	50.6	60		
460/60/3		42.2	14.10	112.0	2	22.0	14.00	10	1	45.7	50		
575/60/3		33.4	11.20	92.0	2	17.5	11.00	10	1	36.2	45		
208/60/3		108.2	31.70	232.0	2	49.5	44.80	15	1	119.5	150		
230/60/3	104	31.70	261.0	2	49.5	40.60	15	1	114.2	150			
380-420/50/3	50.9	16.70	133.0	2	26.0	17.50	10	1	55.3	70			
460/60/3	48.5	14.10	112.0	2	22.0	20.30	15	1	53.6	70			
575/60/3	38.6	11.20	92.0	2	17.5	16.20	15	1	42.7	50			
GEV 300	208/60/3	110.2	47.10	245.0	2	66.0	16.00	5	1	122.0	150		
	230/60/3	108.2	47.10	245.0	2	66.0	14.00	5	1	120.0	150		
	380-420/50/3	44.7	19.60	118.0	2	27.5	5.50	3	1	49.6	60		
	460/60/3	46.2	19.60	125.0	2	27.5	7.00	5	1	51.1	70		
	575/60/3	36.8	15.80	100.0	2	22.2	5.20	5	1	40.8	50		
	208/60/3	119.2	47.10	245.0	2	66.0	25.00	7.5	1	131.0	175		
	230/60/3	115.8	47.10	245.0	2	66.0	21.60	7.5	1	127.6	150		
	380-420/50/3	48.5	19.60	118.0	2	27.5	9.30	5	1	53.4	70		
	460/60/3	50	19.60	125.0	2	27.5	10.80	7.5	1	54.9	70		
	575/60/3	39.8	15.80	100.0	2	22.2	8.20	7.5	1	43.8	50		
	208/60/3	127.2	47.10	245.0	2	66.0	33.00	10	1	139.0	175		
	230/60/3	122.2	47.10	245.0	2	66.0	28.00	10	1	134.0	175		
	380-420/50/3	52.2	19.60	118.0	2	27.5	13.00	7.5	1	57.1	70		
	460/60/3	53.2	19.60	125.0	2	27.5	14.00	10	1	58.1	70		
	575/60/3	42.6	15.80	100.0	2	22.2	11.00	10	1	46.6	60		
	208/60/3	139	47.10	245.0	2	66.0	44.80	15	1	150.8	175		
230/60/3	134.8	47.10	245.0	2	66.0	40.60	15	1	146.6	175			
380-420/50/3	56.7	19.60	118.0	2	27.5	17.50	10	1	61.6	80			
460/60/3	59.5	19.60	125.0	2	27.5	20.30	15	1	64.6	80			
575/60/3	47.8	15.80	100.0	2	22.2	16.20	15	1	51.9	60			

E8-Electrical minimum and maximum

Digit 8	Rated Voltage	HZ	Ph	Minimum Utilization Voltage	Maximum Utilization Voltage
0	115	60	1	104	126
1	208	60	1	197	229
2	230	60	1	207	253
3	208	60	3	187	229
4	460	60	3	414	506

E8-Electrical minimum and maximum (continued)

Digit 8	Rated Voltage	HZ	Ph	Minimum Utilization Voltage	Maximum Utilization Voltage
5	575	60	3	518	633
6	220-240	50	1	198	264
7	265	60	1	239	292
8	230	60	3	207	253
9	380-415	60	3	342	456



Pre-Start Checklist

Pre-Start-up Checklist

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

- Is the high voltage power supply correct and in accordance with the nameplate ratings?
- Is phasing of the unit correct per compressor rotation (scroll compressor only)?
- 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 vibration isolation provided? (i.e. unit isolation pad, hosekits)
- Is unit serviceable? *(See clearance specifications on pages 8 and 9).*
- Are the low/high-side pressure temperature caps secure and in place?
- Are all the unit access panels 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, pitched and primed?
- Is the zone sensor correctly wired and in a good location?
- Does the indoor blower turn freely without rubbing?
- 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?



Sequence of Operation

Initial Unit Start-up

Note: Start-up for the Terminal Unit Controller (TUC) may be found in WSHP-IOP-1. Start-up for the Tracer ZN510 controller may be found in WSHP-IOP-2. Start-up for the Tracer ZN524 controller may be found in WSHP-PRB002-EN.

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 9-12 °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 against values in Table 7. (Page 75).
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 5-9°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 against values in Table 7. (Page 75)
11. Set the thermostat to maintain the desired space temperature.
12. Instruct the owner on system operation.



Operation Pressures

Operating Pressures

GENERAL: There are many variables (airflow, air temperatures) in an air conditioning system that will affect operating refrigerant pressures and temperatures. The charts below shows approximate conditions and is based on air flow at the rated SCFM, entering air at 80.6 °F(DB), 66.2 °F(WB) in cooling, 68 °F(DB) in heating. (+)Heating data with 35 °F EWT is based on the use of an anti-freeze solution having a freezing point 20 °F lower than the minimum expected entering temperature.

Table 7: Operating pressures in cooling/heating

Model GEH/GEV	Entering Water Temp, °F	Water Flow GPM	Operating Data							
			Cooling				Heating			
			Suction Pres- sure, PSIG	Discharge Pressure, PSIG	Water Temp Rise °F	Air Temp Drop °F DB	Suction Pressure PSIG	Discharge Pressure PSIG	Water Temp Drop °F	Air Temp Rise °F DB
006 (60 HZ)	35°	1.2					42 - 48	165 - 210	6 - 7	23 - 29
		1.5					45 - 52	168 - 214	5 - 6	23 - 29
	45°	1.2	68 - 78	143 - 182	14 - 18	24 - 30	52 - 60	176 - 224	7 - 9	26 - 34
		1.5	68 - 78	134 - 170	11 - 14	24 - 31	56 - 64	180 - 229	6 - 7	27 - 34
	55°	1.2	68 - 79	139 - 177	13 - 17	23 - 30	63 - 73	189 - 241	8 - 10	30 - 39
		1.5	68 - 78	129 - 164	11 - 14	24 - 30	67 - 77	193 - 246	7 - 8	31 - 39
	68°	1.2	71 - 82	153 - 195	13 - 16	23 - 29	78 - 90	206 - 262	10 - 12	35 - 45
		1.5	70 - 81	144 - 183	10 - 13	23 - 29	82 - 94	210 - 268	8 - 10	36 - 45
	75°	1.2	73 - 84	172 - 219	13 - 16	23 - 29	85 - 98	214 - 272	10 - 13	38 - 48
		1.5	72 - 83	163 - 207	10 - 13	23 - 29	89 - 103	219 - 279	8 - 11	38 - 48
	86°	1.2	75 - 86	206 - 262	12 - 16	22 - 28	95 - 109	225 - 287	11 - 14	41 - 52
		1.5	74 - 85	196 - 250	10 - 13	23 - 29	99 - 114	231 - 294	9 - 12	41 - 52
	95°	1.2	76 - 87	231 - 294	12 - 16	22 - 28				
		1.5	75 - 86	222 - 282	10 - 13	22 - 28				
009 (60 HZ) 006 (50 HZ)	35°	1.7					44 - 50	163 - 208	5 - 7	21 - 26
		2.1					45 - 51	166 - 211	4 - 5	21 - 27
	45°	1.7	69 - 79	134 - 171	13 - 16	21 - 27	52 - 60	174 - 221	6 - 8	24 - 30
		2.1	69 - 79	131 - 167	10 - 13	21 - 27	54 - 62	176 - 224	5 - 7	24 - 31
	55°	1.7	71 - 81	137 - 174	12 - 16	20 - 26	63 - 72	186 - 236	7 - 9	27 - 34
		2.1	70 - 81	132 - 168	10 - 13	20 - 26	65 - 75	188 - 239	6 - 8	28 - 35
	68°	1.7	72 - 83	157 - 199	12 - 15	20 - 25	78 - 89	201 - 256	9 - 11	31 - 40
		2.1	72 - 83	151 - 192	10 - 12	20 - 25	80 - 92	204 - 259	7 - 9	32 - 40
	75°	1.7	73 - 84	173 - 221	12 - 15	19 - 24	85 - 98	211 - 268	9 - 12	33 - 42
		2.1	73 - 84	167 - 212	10 - 12	19 - 25	87 - 100	213 - 271	8 - 10	34 - 43
	86°	1.7	75 - 86	205 - 261	11 - 15	19 - 24	96 - 110	221 - 281	10 - 13	36 - 46
		2.1	74 - 86	198 - 252	9 - 12	19 - 24	97 - 112	223 - 284	9 - 11	37 - 47
	95°	1.7	76 - 88	235 - 299	11 - 14	18 - 23				
		2.1	76 - 87	228 - 290	9 - 12	18 - 23				
012 (60 HZ) 009 (50 HZ)	35°	2.2					42 - 48	159 - 202	5 - 7	21 - 27
		2.8					43 - 50	161 - 205	4 - 6	21 - 27
	45°	2.2	68 - 78	149 - 190	14 - 18	22 - 28	52 - 59	170 - 216	6 - 8	24 - 30
		2.8	68 - 79	144 - 184	11 - 14	23 - 29	53 - 61	172 - 218	5 - 7	24 - 31
	55°	2.2	69 - 80	133 - 169	13 - 17	21 - 27	58 - 66	178 - 227	7 - 9	26 - 33
		2.8	70 - 80	128 - 163	10 - 13	22 - 27	59 - 68	180 - 229	6 - 7	27 - 34
	68°	2.2	71 - 82	158 - 201	13 - 16	21 - 26	63 - 72	184 - 234	8 - 10	29 - 37
		2.8	71 - 82	153 - 195	10 - 13	21 - 26	64 - 74	186 - 237	6 - 8	29 - 37
	75°	2.2	72 - 83	175 - 223	13 - 16	20 - 26	67 - 77	187 - 238	9 - 11	30 - 38
		2.8	72 - 83	170 - 217	10 - 13	20 - 26	68 - 79	189 - 240	7 - 9	30 - 39
	86°	2.2	74 - 85	204 - 259	13 - 16	19 - 25	71 - 81	194 - 247	9 - 12	32 - 40
		2.8	74 - 85	199 - 253	10 - 13	20 - 25	72 - 83	196 - 249	7 - 9	32 - 41
	95°	2.2	75 - 86	235 - 299	12 - 16	19 - 24				
		2.8	75 - 86	230 - 293	10 - 12	19 - 24				
015 (60 HZ) 012 (50 HZ)	35°	2.8					43 - 49	166 - 211	5 - 6	20 - 26
		3.5					44 - 51	167 - 213	4 - 5	21 - 26
	45°	2.8	69 - 79	117 - 149	12 - 16	21 - 27	52 - 60	179 - 227	6 - 8	23 - 30
		3.5	68 - 79	112 - 143	10 - 13	21 - 27	54 - 62	180 - 230	5 - 6	24 - 30
	55°	2.8	70 - 80	127 - 162	12 - 15	21 - 26	62 - 72	191 - 244	7 - 9	27 - 34
		3.5	69 - 80	123 - 156	10 - 12	20 - 26	64 - 73	193 - 246	6 - 8	27 - 35
	68°	2.8	71 - 82	151 - 192	12 - 15	20 - 25	74 - 85	207 - 264	8 - 11	31 - 39
		3.5	71 - 82	147 - 187	9 - 12	20 - 25	75 - 87	209 - 266	7 - 9	31 - 39
	75°	2.8	72 - 83	168 - 213	11 - 15	19 - 25	79 - 91	214 - 272	9 - 11	32 - 41
		3.5	72 - 83	164 - 208	9 - 12	19 - 25	80 - 92	216 - 275	7 - 9	33 - 41
	86°	2.8	74 - 85	199 - 254	11 - 14	19 - 24	83 - 96	215 - 274	10 - 12	34 - 43
		3.5	73 - 84	194 - 247	9 - 11	19 - 24	84 - 97	217 - 276	8 - 10	34 - 43
	95°	2.8	75 - 86	228 - 291	11 - 14	18 - 23				
		3.5	75 - 86	222 - 283	9 - 11	18 - 23				



Operation Pressures

Model GEH/GEV	Entering Water Temp, °F	Water Flow GPM	Operating Data							
			Cooling				Heating			
			Suction Pres- sure, PSIG	Discharge Pressure, PSIG	Water Temp Rise °F	Air Temp Drop °F DB	Suction Pressure PSIG	Discharge Pressure PSIG	Water Temp Drop °F	Air Temp Rise °F DB
018 (60 HZ) 015 (50 HZ)	35°	3.3					39 - 45	155 - 197	5 - 7	21 - 26
		4.2					40 - 46	156 - 198	4 - 5	21 - 27
	45°	3.3	70 - 81	110 - 141	14 - 18	23 - 29	47 - 55	164 - 209	6 - 8	24 - 30
		4.2	70 - 80	107 - 136	11 - 14	23 - 29	49 - 56	165 - 211	5 - 6	24 - 31
	55°	3.3	72 - 83	132 - 167	14 - 18	23 - 29	56 - 65	174 - 222	7 - 9	27 - 34
		4.2	72 - 82	127 - 162	11 - 14	23 - 29	58 - 67	176 - 224	6 - 8	27 - 35
	68°	3.3	74 - 85	149 - 190	13 - 17	22 - 28	68 - 78	188 - 239	9 - 11	31 - 39
		4.2	74 - 85	144 - 183	10 - 13	22 - 28	70 - 80	189 - 241	7 - 9	32 - 40
	75°	3.3	75 - 87	164 - 209	13 - 16	21 - 27	74 - 85	195 - 248	10 - 12	33 - 42
		4.2	75 - 86	159 - 202	10 - 13	21 - 27	76 - 87	197 - 251	8 - 10	34 - 43
	86°	3.3	77 - 88	195 - 248	13 - 16	20 - 26	83 - 96	207 - 263	10 - 13	36 - 46
		4.2	76 - 88	189 - 240	10 - 13	20 - 26	85 - 98	209 - 266	8 - 11	37 - 47
	95°	3.3	78 - 89	223 - 284	13 - 16	19 - 24				
		4.2	77 - 89	217 - 276	10 - 13	19 - 25				
024 (60 HZ) 018 (50 HZ)	35°	4.4					42 - 48	163 - 207	6 - 7	21 - 27
		5.5					43 - 49	164 - 209	5 - 6	22 - 28
	45°	4.4	67 - 77	125 - 160	15 - 18	23 - 30	50 - 58	175 - 223	7 - 9	25 - 32
		5.5	66 - 76	120 - 153	12 - 15	23 - 30	52 - 59	177 - 225	6 - 7	26 - 32
	55°	4.4	69 - 79	137 - 174	14 - 18	22 - 28	59 - 68	188 - 239	8 - 10	29 - 36
		5.5	68 - 79	131 - 166	12 - 15	22 - 29	61 - 70	190 - 242	7 - 8	29 - 37
	68°	4.4	72 - 82	163 - 207	14 - 17	21 - 27	70 - 81	204 - 259	9 - 12	33 - 42
		5.5	71 - 82	155 - 198	11 - 14	22 - 28	72 - 82	206 - 263	8 - 10	33 - 42
	75°	4.4	73 - 84	181 - 231	14 - 17	21 - 27	75 - 87	211 - 269	10 - 13	35 - 44
		5.5	73 - 83	174 - 221	11 - 14	21 - 27	77 - 88	214 - 272	8 - 10	35 - 45
	86°	4.4	75 - 86	215 - 274	13 - 17	20 - 26	82 - 95	220 - 281	11 - 14	37 - 47
		5.5	74 - 86	207 - 263	10 - 13	20 - 26	84 - 97	223 - 284	9 - 11	38 - 48
	95°	4.4	77 - 88	246 - 313	13 - 16	19 - 25				
		5.5	76 - 87	238 - 302	10 - 13	20 - 25				
030 (60 HZ) 024 (50 HZ)	35°	5.5					42 - 48	161 - 205	5 - 6	20 - 25
		6.9					43 - 50	163 - 207	4 - 5	20 - 26
	45°	5.5	67 - 77	118 - 151	13 - 16	22 - 28	51 - 58	172 - 219	6 - 8	23 - 29
		6.9	67 - 77	115 - 146	10 - 13	22 - 27	52 - 59	174 - 221	5 - 6	23 - 30
	55°	5.5	68 - 78	129 - 165	12 - 16	21 - 27	59 - 68	185 - 235	7 - 9	26 - 33
		6.9	67 - 77	126 - 160	10 - 13	21 - 27	60 - 69	187 - 238	6 - 7	27 - 34
	68°	5.5	71 - 82	154 - 196	12 - 15	20 - 26	69 - 80	199 - 254	8 - 10	30 - 38
		6.9	71 - 82	150 - 191	10 - 12	21 - 26	71 - 81	201 - 256	7 - 8	30 - 39
	75°	5.5	73 - 84	171 - 217	12 - 15	20 - 25	74 - 86	206 - 262	9 - 11	32 - 40
		6.9	73 - 83	166 - 212	10 - 12	20 - 26	76 - 87	208 - 264	7 - 9	32 - 41
	86°	5.5	75 - 86	201 - 256	12 - 15	19 - 25	81 - 93	217 - 277	9 - 12	34 - 43
		6.9	74 - 86	196 - 250	9 - 12	20 - 25	82 - 95	219 - 279	8 - 10	34 - 44
	95°	5.5	76 - 88	229 - 292	11 - 14	19 - 24				
		6.9	76 - 87	224 - 285	9 - 11	19 - 24				
036 (60 HZ) 030 (50 HZ)	35°	6.6					39 - 45	155 - 198	5 - 6	19 - 24
		8.3					41 - 47	158 - 201	4 - 5	19 - 24
	45°	6.6	66 - 77	118 - 150	13 - 16	21 - 26	49 - 57	169 - 215	6 - 8	23 - 29
		8.3	66 - 76	113 - 144	10 - 13	21 - 26	51 - 58	170 - 217	5 - 6	23 - 29
	55°	6.6	69 - 79	132 - 168	12 - 16	20 - 26	59 - 68	181 - 230	7 - 9	26 - 33
		8.3	69 - 79	126 - 161	10 - 13	21 - 26	60 - 69	183 - 233	6 - 8	26 - 34
	68°	6.6	71 - 82	156 - 199	12 - 16	20 - 25	72 - 83	197 - 251	9 - 11	30 - 39
		8.3	71 - 82	151 - 192	10 - 13	20 - 26	74 - 85	200 - 254	7 - 9	31 - 39
	75°	6.6	73 - 84	173 - 220	12 - 15	20 - 25	78 - 90	206 - 262	10 - 12	33 - 42
		8.3	73 - 84	167 - 212	10 - 12	20 - 26	80 - 93	209 - 266	8 - 10	33 - 42
	86°	6.6	75 - 86	202 - 257	12 - 15	20 - 25	88 - 101	218 - 278	10 - 13	35 - 45
		8.3	74 - 86	195 - 248	10 - 12	20 - 26	91 - 104	222 - 282	8 - 11	36 - 45
	95°	6.6	76 - 88	228 - 290	12 - 15	20 - 25				
		8.3	76 - 88	221 - 282	10 - 12	20 - 26				
040 (60 HZ)	35°	7.4					39 - 45	167 - 213	5 - 6	19 - 25
		9.2					40 - 46	168 - 214	4 - 5	20 - 25
	45°	7.4	63 - 73	119 - 151	13 - 16	21 - 27	48 - 56	180 - 230	6 - 7	23 - 29
		9.2	62 - 72	115 - 147	10 - 13	21 - 27	50 - 58	181 - 231	5 - 6	23 - 29
	55°	7.4	66 - 76	133 - 169	13 - 16	21 - 27	57 - 65	194 - 246	7 - 8	26 - 33
		9.2	66 - 76	128 - 164	10 - 13	21 - 27	59 - 67	195 - 249	5 - 7	26 - 33
	68°	7.4	69 - 79	157 - 199	12 - 16	21 - 26	69 - 79	211 - 269	8 - 10	30 - 38
		9.2	69 - 79	151 - 193	10 - 12	21 - 26	71 - 81	213 - 271	6 - 8	30 - 39
	75°	7.4	71 - 81	172 - 218	12 - 15	20 - 26	76 - 88	221 - 281	9 - 11	32 - 41
		9.2	71 - 81	166 - 212	10 - 12	20 - 26	78 - 90	223 - 283	7 - 9	33 - 42
	86°	7.4	73 - 83	200 - 254	12 - 15	20 - 25	83 - 95	234 - 298	9 - 12	35 - 44
		9.2	73 - 83	193 - 245	9 - 12	20 - 25	85 - 97	236 - 300	8 - 10	35 - 45
	95°	7.4	74 - 86	225 - 287	11 - 14	19 - 24				
		9.2	74 - 86	217 - 277	9 - 12	19 - 24				



Operation Pressures

Model GEH/GEV	Entering Water Temp, °F	Water Flow GPM	Operating Data							
			Cooling				Heating			
			Suction Pres- sure, PSIG	Discharge Pressure, PSIG	Water Temp Rise °F	Air Temp Drop °F DB	Suction Pressure PSIG	Discharge Pressure PSIG	Water Temp Drop °F	Air Temp Rise °F DB
042 (60 HZ) 036 (50 HZ)	35°	7.8					38 - 44	163 - 207	5 - 6	19 - 24
		9.7					40 - 46	165 - 210	4 - 5	19 - 25
	45°	7.8	66 - 76	122 - 155	13 - 16	21 - 27	47 - 54	176 - 225	6 - 7	22 - 28
		9.7	66 - 75	118 - 150	10 - 13	21 - 27	48 - 55	178 - 227	5 - 6	22 - 29
	55°	7.8	67 - 77	133 - 170	13 - 16	21 - 27	55 - 64	192 - 245	7 - 9	25 - 32
		9.7	66 - 76	129 - 164	10 - 13	21 - 27	57 - 66	194 - 247	6 - 7	26 - 32
	68°	7.8	70 - 81	156 - 199	12 - 15	21 - 26	68 - 78	213 - 271	8 - 10	29 - 37
		9.7	70 - 80	151 - 192	10 - 12	21 - 26	69 - 80	215 - 273	7 - 8	30 - 38
	75°	7.8	72 - 82	172 - 219	12 - 15	20 - 26	74 - 85	223 - 283	9 - 11	32 - 40
		9.7	71 - 82	166 - 212	10 - 12	20 - 26	76 - 87	225 - 286	7 - 9	32 - 41
	86°	7.8	73 - 85	200 - 255	12 - 15	19 - 25	83 - 95	236 - 301	10 - 12	34 - 43
		9.7	73 - 84	194 - 248	9 - 12	19 - 25	84 - 97	238 - 303	8 - 10	34 - 44
	95°	7.8	75 - 86	227 - 289	11 - 14	19 - 24				
		9.7	75 - 86	220 - 280	9 - 12	19 - 24				
048 (60 HZ) 042 (50 HZ)	35°	8.8					40 - 46	155 - 197	5 - 6	20 - 25
		11					41 - 47	156 - 199	4 - 5	20 - 26
	45°	8.8	66 - 77	117 - 149	14 - 17	21 - 27	49 - 56	165 - 209	6 - 8	23 - 29
		11	66 - 76	113 - 144	11 - 14	22 - 28	50 - 57	166 - 211	5 - 6	23 - 30
	55°	8.8	69 - 79	132 - 168	13 - 17	21 - 27	57 - 66	175 - 223	7 - 9	26 - 33
		11	68 - 79	127 - 162	11 - 14	21 - 27	59 - 67	177 - 225	6 - 7	27 - 34
	68°	8.8	72 - 82	156 - 199	13 - 17	20 - 26	69 - 79	189 - 241	8 - 11	30 - 38
		11	71 - 82	150 - 192	10 - 13	21 - 26	70 - 81	191 - 243	7 - 9	31 - 39
	75°	8.8	73 - 84	172 - 219	13 - 16	20 - 25	73 - 84	195 - 249	9 - 11	32 - 40
		11	72 - 83	166 - 211	10 - 13	20 - 26	74 - 85	197 - 250	7 - 9	32 - 41
	86°	8.8	74 - 85	200 - 255	12 - 16	19 - 25	77 - 89	201 - 256	9 - 12	33 - 42
		11	74 - 85	193 - 246	10 - 13	19 - 25	78 - 90	202 - 257	8 - 10	34 - 43
	95°	8.8	76 - 87	226 - 288	12 - 15	19 - 24				
		11	75 - 86	219 - 279	10 - 12	19 - 24				
060 (60 HZ) 048 (50 HZ)	35°	11.6					40 - 46	164 - 209	5 - 6	21 - 27
		14.5					41 - 47	166 - 211	4 - 5	21 - 27
	45°	11.6	64 - 74	111 - 142	12 - 15	21 - 27	48 - 55	175 - 223	6 - 8	24 - 31
		14.5	64 - 74	108 - 138	9 - 12	21 - 26	49 - 57	177 - 225	5 - 6	24 - 31
	55°	11.6	67 - 77	127 - 162	12 - 15	20 - 26	58 - 67	187 - 238	7 - 9	27 - 35
		14.5	67 - 77	123 - 156	9 - 12	21 - 26	59 - 68	188 - 240	6 - 7	28 - 35
	68°	11.6	70 - 80	152 - 194	12 - 15	20 - 26	70 - 81	202 - 257	8 - 11	31 - 40
		14.5	69 - 80	147 - 187	9 - 12	20 - 26	72 - 82	203 - 259	7 - 9	32 - 40
	75°	11.6	70 - 81	168 - 214	12 - 15	20 - 25	76 - 88	209 - 266	9 - 12	33 - 42
		14.5	70 - 81	163 - 207	9 - 12	20 - 26	78 - 90	211 - 269	7 - 9	34 - 43
	86°	11.6	71 - 82	197 - 250	11 - 14	20 - 25	85 - 98	220 - 280	10 - 13	36 - 45
		14.5	71 - 82	190 - 242	9 - 12	20 - 25	87 - 100	222 - 282	8 - 10	36 - 46
	95°	11.6	72 - 83	223 - 283	11 - 14	19 - 24				
		14.5	72 - 83	216 - 274	9 - 11	19 - 25				
060 (50 HZ)	35°	11.6					36 - 41	151 - 192	4 - 5	17 - 22
		14.5					37 - 42	152 - 193	3 - 4	17 - 22
	45°	11.6	67 - 77	114 - 145	11 - 14	20 - 26	44 - 51	161 - 206	5 - 7	21 - 26
		14.5	67 - 77	111 - 141	9 - 11	20 - 26	45 - 52	163 - 207	4 - 6	21 - 27
	55°	11.6	70 - 81	129 - 165	11 - 14	20 - 25	54 - 62	173 - 220	6 - 8	23 - 30
		14.5	70 - 80	125 - 159	9 - 11	20 - 25	55 - 64	175 - 222	5 - 6	24 - 30
	68°	11.6	72 - 83	155 - 197	11 - 14	20 - 25	66 - 76	188 - 239	7 - 9	27 - 34
		14.5	72 - 83	149 - 190	9 - 11	20 - 25	68 - 78	190 - 242	6 - 8	27 - 35
	75°	11.6	73 - 84	171 - 217	11 - 14	19 - 25	72 - 83	196 - 249	8 - 10	29 - 37
		14.5	73 - 84	165 - 210	9 - 11	20 - 25	74 - 85	197 - 251	7 - 8	29 - 37
	86°	11.6	74 - 85	199 - 253	11 - 14	19 - 24	81 - 93	2069 - 263	9 - 11	31 - 39
		14.5	74 - 85	193 - 245	9 - 11	19 - 24	83 - 95	208 - 265	7 - 9	31 - 39
	95°	11.6	75 - 86	225 - 286	11 - 13	19 - 24				
		14.5	75 - 86	218 - 277	8 - 11	19 - 24				



Operation Pressures

Operating Data											
Model GEH/GEV	Entering Water Temp, °F	Water Flow GPM	Cooling				Heating				
			Suction Pres- sure, PSIG	Discharge Pressure, PSIG	Water Temp Rise °F	Air Temp Drop °F DB	Suction Pressure PSIG	Discharge Pressure PSIG	Water Temp Drop °F	Air Temp Rise °F DB	
072 (60 HZ)	35	12					26 - 33	139 - 177	5 - 7	14 - 18	
	35	18					27 - 34	140 - 179	3 - 4	14 - 19	
	45	12	69 - 79	107 - 136	14 - 18	21 - 26	36 - 46	152 - 193	7 - 8	18 - 23	
	45	18	68 - 78	98 - 125	9 - 12	21 - 27	37 - 48	153 - 195	4 - 6	19 - 24	
	55	12	70 - 80	127 - 162	14 - 18	20 - 26	47 - 60	165 - 210	8 - 10	22 - 29	
	55	18	69 - 79	118 - 150	9 - 12	20 - 26	49 - 62	168 - 213	5 - 7	23 - 29	
	68	12	71 - 82	156 - 199	13 - 17	19 - 25	63 - 80	184 - 235	9 - 12	28 - 36	
	68	18	70 - 81	145 - 185	9 - 11	20 - 25	66 - 84	188 - 239	6 - 8	29 - 37	
	75	12	72 - 83	173 - 220	13 - 17	19 - 24	71 - 90	194 - 246	10 - 12	31 - 39	
	75	18	71 - 82	161 - 205	9 - 11	19 - 25	76 - 97	200 - 254	7 - 8	32 - 41	
	86	12	74 - 85	202 - 257	13 - 16	18 - 24	84 - 107	209 - 266	11 - 14	35 - 44	
	86	18	73 - 84	188 - 240	8 - 11	19 - 24	91 - 116	217 - 276	7 - 9	37 - 47	
	95	12	76 - 88	228 - 290	12 - 16	18 - 23					
	95	18	75 - 86	213 - 271	8 - 10	18 - 23					
090 (60 HZ) 072 (50 HZ)	35	15.0					26 - 45	139 - 204	5 - 6	16 - 21	
	35	22.5					27 - 46	140 - 206	3 - 4	17 - 22	
	45	15.0	69 - 80	107 - 148	14 - 18	20 - 26	36 - 55	152 - 217	6 - 8	20 - 25	
	45	22.5	68 - 80	98 - 135	9 - 12	20 - 26	37 - 57	153 - 219	4 - 6	20 - 26	
	55	15.0	70 - 80	127 - 173	13 - 17	20 - 25	47 - 66	165 - 231	7 - 9	23 - 30	
	55	22.5	69 - 80	118 - 160	9 - 11	20 - 25	49 - 69	168 - 234	5 - 6	24 - 31	
	68	15.0	71 - 82	156 - 213	13 - 17	19 - 24	63 - 83	184 - 250	9 - 11	28 - 36	
	68	22.5	70 - 82	145 - 196	9 - 11	19 - 25	66 - 87	188 - 254	6 - 8	29 - 37	
	75	15.0	72 - 83	173 - 235	13 - 17	19 - 24	71 - 93	194 - 262	9 - 12	31 - 39	
	75	22.5	71 - 82	161 - 216	9 - 11	19 - 24	76 - 97	200 - 266	6 - 8	32 - 41	
	86	15.0	73 - 85	202 - 274	13 - 16	18 - 23	84 - 110	209 - 281	10 - 13	34 - 44	
	86	22.5	73 - 84	188 - 253	8 - 11	18 - 24	91 - 116	217 - 286	7 - 9	36 - 46	
	95	15.0	74 - 88	228 - 310	12 - 16	18 - 23	0 - 0	0 - 0	83 - 106	-60 - -77	
	95	22.5	74 - 86	213 - 285	8 - 10	18 - 23	0 - 0	0 - 0	83 - 106	-60 - -77	
120 (60 HZ) 090(50 HZ)	35	20	0 - 0	0 - 0	-31 - -40	70 - 90	35 - 45	161 - 204	5 - 6	19 - 24	
	35	30	0 - 0	0 - 0	-31 - -40	70 - 90	36 - 46	162 - 206	3 - 4	19 - 25	
	45	20	70 - 80	116 - 148	13 - 17	19 - 25	43 - 55	170 - 217	6 - 8	22 - 28	
	45	30	70 - 80	106 - 135	9 - 11	19 - 25	45 - 57	172 - 219	4 - 6	22 - 28	
	55	20	70 - 80	136 - 173	13 - 17	19 - 25	52 - 66	181 - 231	8 - 10	24 - 31	
	55	30	70 - 80	126 - 160	9 - 11	19 - 25	54 - 69	183 - 234	5 - 7	25 - 32	
	68	20	71 - 82	167 - 213	13 - 17	19 - 24	65 - 83	196 - 250	9 - 11	28 - 36	
	68	30	71 - 82	154 - 196	9 - 11	19 - 24	68 - 87	200 - 254	6 - 8	29 - 37	
	75	20	72 - 83	185 - 235	13 - 17	19 - 24	73 - 93	205 - 262	9 - 12	31 - 39	
	75	30	71 - 82	170 - 216	8 - 11	19 - 24	76 - 97	209 - 266	6 - 8	31 - 40	
	86	20	73 - 84	215 - 274	13 - 17	18 - 23	87 - 110	220 - 281	11 - 14	34 - 44	
	86	30	73 - 84	199 - 253	8 - 11	18 - 23	91 - 115	225 - 286	7 - 9	35 - 45	
	95	20	74 - 85	244 - 310	13 - 16	18 - 23					
	95	30	74 - 85	224 - 285	8 - 11	18 - 23					



Operation Pressures

Operating Data										
Model GEH/GEV	Entering Water Temp, °F	Water Flow GPM	Cooling				Heating			
			Suction Pressure, PSIG	Discharge Pressure, PSIG	Water Temp Rise °F	Air Temp Drop °F DB	Suction Pressure PSIG	Discharge Pressure PSIG	Water Temp Drop °F	Air Temp Rise °F DB
150 (60 HZ) 120 (50 HZ)	35	25.0					34 - 44	151 - 193	5 - 8	17 - 23
	35	37.5					36 - 46	153 - 196	3 - 5	18 - 24
	45	25.0	69 - 80	100 - 128	12 - 16	18 - 25	42 - 54	160 - 204	7 - 9	20 - 26
	45	37.5	69 - 80	96 - 123	8 - 11	18 - 25	42 - 55	161 - 205	4 - 6	20 - 26
	55	25.0	69 - 80	120 - 153	12 - 16	18 - 24	51 - 65	169 - 216	8 - 11	22 - 29
	55	37.5	69 - 80	115 - 147	8 - 11	18 - 24	54 - 70	172 - 220	5 - 8	23 - 31
	68	25.0	70 - 81	148 - 189	12 - 16	18 - 24	64 - 82	182 - 232	9 - 13	26 - 34
	68	37.5	70 - 81	142 - 182	8 - 11	18 - 24	68 - 88	186 - 238	7 - 9	27 - 36
	75	25.0	71 - 82	164 - 210	12 - 16	18 - 24	71 - 92	189 - 242	10 - 14	28 - 37
	75	37.5	71 - 82	158 - 202	8 - 11	18 - 24	77 - 99	194 - 248	7 - 10	30 - 39
	86	25.0	72 - 84	192 - 246	12 - 16	17 - 23	85 - 109	201 - 257	12 - 16	31 - 41
	86	37.5	72 - 84	185 - 237	8 - 11	18 - 23	92 - 118	208 - 266	8 - 12	33 - 43
	95	25.0	73 - 85	218 - 278	11 - 16	17 - 23				
	95	37.5	73 - 85	210 - 268	7 - 11	17 - 23				
180 (60 HZ) 150 (50 HZ)	35	30					30 - 40	147 - 189	5 - 8	17 - 23
	35	45					32 - 42	150 - 192	3 - 5	18 - 24
	45	30	66 - 77	106 - 136	12 - 17	18 - 25	38 - 49	156 - 199	6 - 9	20 - 26
	45	45	66 - 77	102 - 131	8 - 11	18 - 25	40 - 53	159 - 203	4 - 7	21 - 27
	55	30	66 - 77	126 - 161	12 - 17	18 - 24	46 - 59	165 - 211	8 - 11	23 - 30
	55	45	66 - 77	120 - 153	8 - 11	18 - 24	50 - 64	169 - 216	5 - 8	24 - 31
	68	30	68 - 79	154 - 196	12 - 16	18 - 24	58 - 75	178 - 227	9 - 13	26 - 35
	68	45	67 - 78	147 - 187	8 - 11	18 - 24	63 - 81	183 - 234	6 - 9	28 - 37
	75	30	68 - 80	170 - 217	12 - 16	18 - 24	65 - 84	185 - 237	10 - 14	29 - 37
	75	45	68 - 79	162 - 208	8 - 11	18 - 24	71 - 92	191 - 245	7 - 10	30 - 40
	86	30	70 - 81	199 - 254	12 - 16	17 - 23	78 - 100	198 - 253	12 - 16	32 - 42
	86	45	69 - 81	190 - 243	8 - 11	17 - 23	85 - 109	206 - 263	8 - 12	34 - 44
	95	30	71 - 82	224 - 287	12 - 16	17 - 23				
	95	45	70 - 82	215 - 274	8 - 11	17 - 23				
GEV 240 (60 HZ) 180 (50 HZ)	35	40					31 - 40	157 - 201	5 - 8	19 - 25
	35	60					32 - 42	160 - 204	3 - 5	20 - 26
	45	40	65 - 76	113 - 145	13 - 18	19 - 25	37 - 48	166 - 212	7 - 10	21 - 28
	45	60	65 - 76	109 - 140	9 - 12	19 - 25	40 - 51	168 - 215	4 - 7	22 - 29
	55	40	66 - 77	134 - 171	13 - 18	19 - 25	45 - 58	174 - 223	8 - 11	23 - 31
	55	60	65 - 76	125 - 160	9 - 12	19 - 25	48 - 61	177 - 227	5 - 8	24 - 32
	68	40	67 - 78	163 - 209	13 - 18	18 - 25	55 - 72	186 - 238	9 - 12	27 - 35
	68	60	67 - 77	152 - 195	9 - 12	19 - 25	59 - 76	190 - 243	6 - 9	28 - 36
	75	40	67 - 79	180 - 231	13 - 18	18 - 24	62 - 80	193 - 247	10 - 13	28 - 37
	75	60	67 - 78	169 - 215	9 - 12	18 - 24	66 - 85	198 - 252	7 - 10	30 - 39
	86	40	69 - 80	210 - 269	13 - 18	18 - 24	72 - 93	205 - 261	11 - 15	31 - 41
	86	60	68 - 80	197 - 251	9 - 12	18 - 24	77 - 99	210 - 268	8 - 11	33 - 43
	95	40	70 - 81	238 - 303	13 - 18	18 - 23				
	95	60	69 - 81	222 - 284	9 - 12	18 - 24				
GEV 300 (60 HZ) 240 (50 HZ)	35	50					27 - 36	162 - 207	5 - 7	18 - 24
	35	75					30 - 39	165 - 211	3 - 5	19 - 25
	45	50	64 - 74	115 - 148	13 - 17	18 - 24	35 - 45	171 - 219	6 - 9	20 - 27
	45	75	64 - 74	111 - 142	8 - 12	18 - 24	37 - 49	175 - 224	4 - 6	21 - 28
	55	50	65 - 76	134 - 171	12 - 17	18 - 24	43 - 55	181 - 232	7 - 10	23 - 30
	55	75	66 - 77	128 - 164	8 - 12	18 - 24	46 - 60	186 - 237	5 - 7	24 - 31
	68	50	66 - 77	160 - 205	12 - 16	18 - 23	55 - 71	195 - 249	9 - 12	26 - 34
	68	75	67 - 78	154 - 197	8 - 11	18 - 23	60 - 77	201 - 257	6 - 9	27 - 36
	75	50	67 - 78	176 - 225	12 - 16	17 - 23	62 - 80	203 - 260	10 - 13	28 - 37
	75	75	68 - 79	169 - 216	8 - 11	17 - 23	68 - 87	210 - 268	7 - 10	29 - 39
	86	50	68 - 79	203 - 260	12 - 16	17 - 23	74 - 95	216 - 277	11 - 15	31 - 40
	86	75	69 - 81	196 - 250	8 - 11	17 - 23	81 - 104	224 - 287	8 - 11	33 - 43
	95	50	69 - 81	228 - 292	12 - 16	17 - 22				
	95	75	69 - 80	220 - 281	8 - 11	17 - 22				



Operation Pressures

Water Pressure Drop

Tables 8 and 9 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 8: Cooling water pressure drops (WPD) in feet of head

Unit Size 60 HZ	Unit Size 50 HZ	EWT F	GPM	Ft. Pressure
006	-	86	1.5	2.5
009	006	86	2.1	4.2
012	009	86	2.8	7.6
015	012	86	3.5	6.5
018	015	86	4.2	6.9
024	018	86	5.5	6.9
030	024	86	6.9	12.6
036	030	86	8.3	8.7
040	-	86	9.2	11.4
042	036	86	9.7	12.4
048	042	86	11.0	9.1
060	048	86	14.5	12.5
-	060	86	14.5	12.5
GEH 072	-	86	18.0	12.7
GEH 090	GEH 072	86	22.5	13.2
GEH 120	GEH 090	86	30.0	13.6
GEH 150	GEH 120	86	37.5	13.7
GEH 180	GEH 150	86	45.0	19.3
GEV 072	-	86	18.0	12.7
GEV 090	GEV 072	86	22.5	13.2
GEV 120	GEV 090	86	30.0	13.6
GEV 150	GEV 120	86	37.5	13.7
GEV 180	GEV 150	86	45.0	19.3
GEV 240	GEV 180	86	60.0	13.2
GEV 300	GEV 240	86	75.0	13.1

Table 9: Heating water pressure drops (WPD) in feet of head

Unit Size 60 HZ	Unit Size 50 HZ	EWT F	GPM	Ft. Pressure
006	-	68	1.5	2.7
009	006	68	2.1	4.7
012	009	68	2.8	8.3
015	012	68	3.5	7.2
018	015	68	4.2	7.6
024	018	68	5.5	8.1
030	024	68	6.9	14.5
036	030	68	8.3	9.9
040	-	68	9.2	12.5
042	036	68	9.7	14.0
048	042	68	11.0	9.7
060	048	68	18.0	14.2
-	060	68	14.5	13.5
GEH 072	-	68	18.0	14.4
GEH 090	GEH 072	68	22.5	16.9
GEH 120	GEH 090	68	30.0	15.5
GEH 150	GEH 120	68	37.5	16.4
GEH 180	GEH 150	68	45.0	19.3
GEV 072	-	86	18.0	12.7
GEV 090	GEV 072	86	22.5	13.2
GEV 120	GEV 090	86	30.0	13.6
GEV 150	GEV 120	86	37.5	13.7
GEV 180	GEV 150	86	45.0	19.3
GEV 240	GEV 180	86	60.0	13.2
GEV 300	GEV 240	86	75.0	12.7

Water Volume

Table 10 is provided for use in calculating glycol requirements for the unit.

Table 10: Water volume

Unit Size 60 HZ	Unit Size 50 HZ	Water Side Volume Cubic In.	Water Side Volume Cubic Ft.	Water Side Volume Gallons
006-009	006	13.6	0.008	0.059
012	009	17.0	0.010	0.074
015-018	015	36.0	0.021	0.156
024	018	48.0	0.028	0.208
030	024	55.0	0.032	0.238
036	030	71.0	0.041	0.307
042	036	76.0	0.044	0.329
048	042	105.0	0.061	0.455
060	048, 060	171.0	0.099	0.740
072	-	181.0	0.105	0.783
090	072	214	0.125	0.927
120	090	390	0.227	1.690
150, 180	120, 150	508	0.296	2.201
240	180	779	0.453	3.374
300	240	1057	0.615	4.576



Start-up Checklist and Log

Installing Contractor: 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	<input type="text" value="F"/>	<input type="text" value="F"/>
----------------------------	--------------------------------	--------------------------------

Leaving fluid temperature	<input type="text" value="F"/>	<input type="text" value="F"/>
---------------------------	--------------------------------	--------------------------------

Temperature differential	<input type="text" value="F"/>	<input type="text" value="F"/>
--------------------------	--------------------------------	--------------------------------

Return-air temperature DB/WB	<input type="text" value="F"/>	<input type="text" value="F"/>
------------------------------	--------------------------------	--------------------------------

Supply-air temperature DB/WB	<input type="text" value="F"/>	<input type="text" value="F"/>
------------------------------	--------------------------------	--------------------------------

Temperature differential	<input type="text" value="F"/>	<input type="text" value="F"/>
--------------------------	--------------------------------	--------------------------------

Water coil heat exchanger (Water Pressure IN)	<input type="text" value="PSIG"/>	<input type="text" value="PSIG"/>
--	-----------------------------------	-----------------------------------

Water coil heat exchanger (Water Pressure OUT)	<input type="text" value="PSIG"/>	<input type="text" value="PSIG"/>
---	-----------------------------------	-----------------------------------

Pressure Differential	<input type="text" value="PSIG"/>	<input type="text" value="PSIG"/>
-----------------------	-----------------------------------	-----------------------------------

COMPRESSOR

Amps	<input type="text"/>	<input type="text"/>
------	----------------------	----------------------

Volts	<input type="text"/>	<input type="text"/>
-------	----------------------	----------------------

Discharge line temperature <i>(after 10 minutes)</i>	<input type="text" value="F"/>	<input type="text" value="F"/>
---	--------------------------------	--------------------------------



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:

Size 60 HZ	Size 50 HZ	Filter Size
GEH		
006-015	006-012	14 5/8" x 20 1/4" (371 x 514)
018-030	015-024	16 3/8" x 23 5/8" (416 x 600)
036-042	030-036	18 5/8" x 25 3/8" (473 x 645)
048-060	042-060	20 5/8" x 29 3/4" (524 x 755)
072-120	072-090	20 x 20 (3) (508 x 508)
150-180	120-150	25 x 25 (3) (635 x 635)
GEV		
006-015	006-012	15 7/8" x 19 7/8" (403 x 504)
018-030, 040	015-024	17 7/8" x 24 7/8" (454 x 632)
036-042	030-036	19 7/8" x 24 7/8" (504 x 632)
048-060	042-060	27 7/8" x 29 7/8" (708 x 759)
GEV 072- 120	090	20 x 20 (4) (508 x 508)
150-300	120-240	19 5/8" x 24 5/8" (6) (498 x 625)

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 service person.

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 manufacturer's 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 11*.

Table 11: Water Quality Table

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

Condensate Trap

For units incorporating a negative trap design, ensure that the condensate system is primed with water at all times. Allowing a negative, pressure condensate system to run dry could cause a break in the condensate seal allowing the fan to draw water from the condensate line to spray moisture into the mechanical system. By maintaining a primed condensate trap, a seal will be created and will help prevent these complications.



Warranty Information

Warranty Information

Standard Warranty

The standard water-source heat pump warranty is The Trane Company 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.



Troubleshooting Checklist

⚠ 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.

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
	X	X	Defective compressor overload	Replace (if external)
Blower runs, but compressor does not	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
	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
Insufficient capacity	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
		X	Inadequate GPM	Increase water flow to unit
		X	Water too hot	Decrease temperature
	High pressure switch open	X		Inadequate air flow
X			Dirty filter	Clean/replace
X		X	Overcharged with refrigerant	Decrease charge
X		X	Defective pressure switch	Check or replace

Troubleshooting Checklist

Problem	Heating	Cooling	Cause	Correction
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

Deluxe Controls

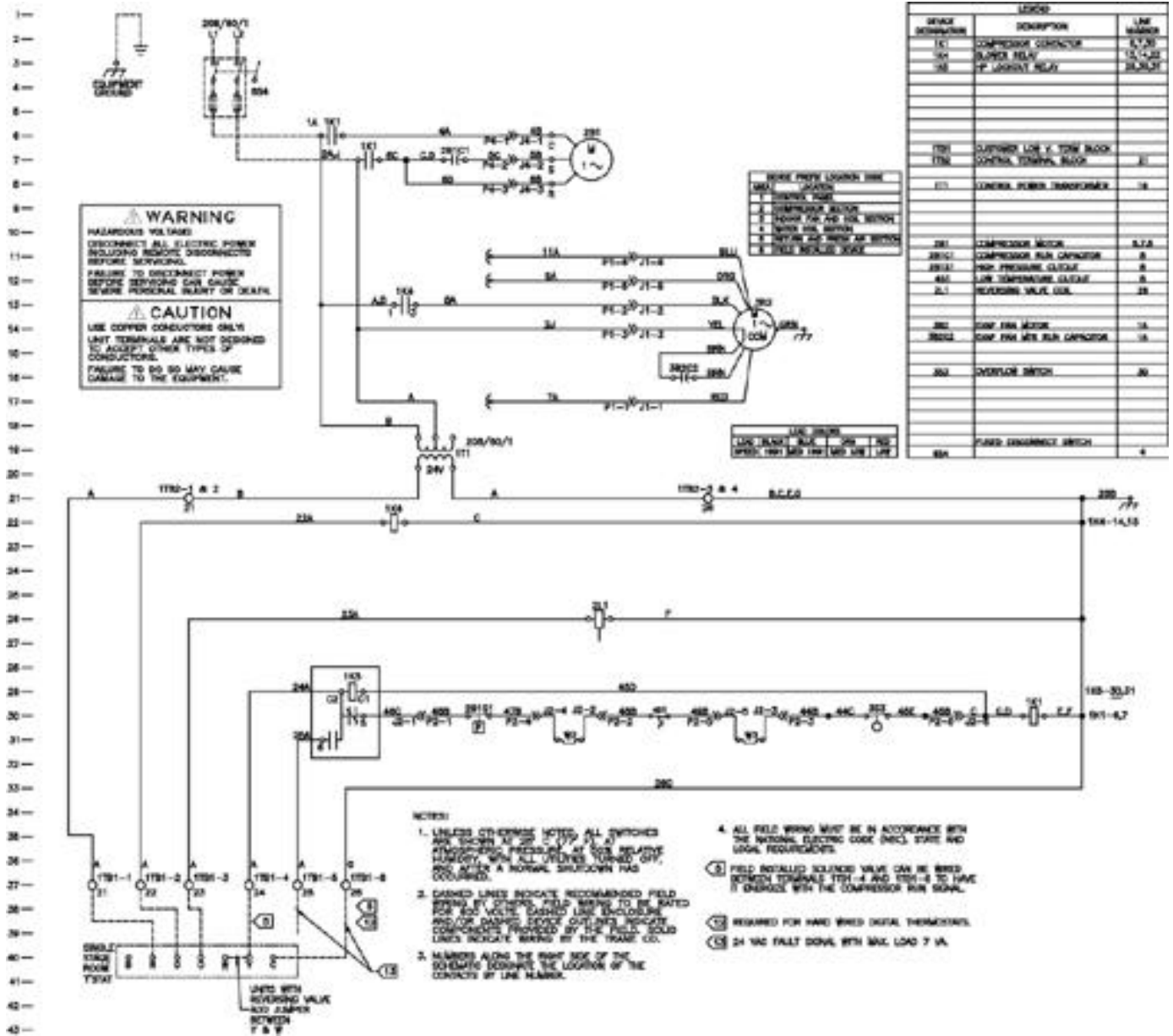
Troubleshooting units which contain the deluxe control option may be made easy by using the three LEDs (light emitting diodes). These LEDs are provided for indicating the operating mode of the controller. The LEDs are intended to aid in troubleshooting maintenance. The LEDs are labeled on the circuit board with numbers as referenced in Table 12.

Table 12: Diagnostic LEDs

Color: Green LED1	Color: Red		Controller Mode
	LED2	LED3	
OFF	OFF	OFF	Control OFF
ON	OFF	OFF	Normal/Compressor OFF
ON	OFF	FLASH	Anti-short cycle
ON	OFF	ON	Normal/Compressor ON
FLASH	ON	OFF	Brownout Condition
ON	FLASH	ON	Soft Lockout (low pressure)
ON	FLASH	FLASH	Soft Lockout (high pressure)
ON	ON	ON	Manual Lockout (low pressure)
ON	ON	FLASH	Manual Lockout (high pressure)
ON	FLASH	OFF	Manual Lockout (condensate overflow)
ON	ON	OFF	Compressor Disable

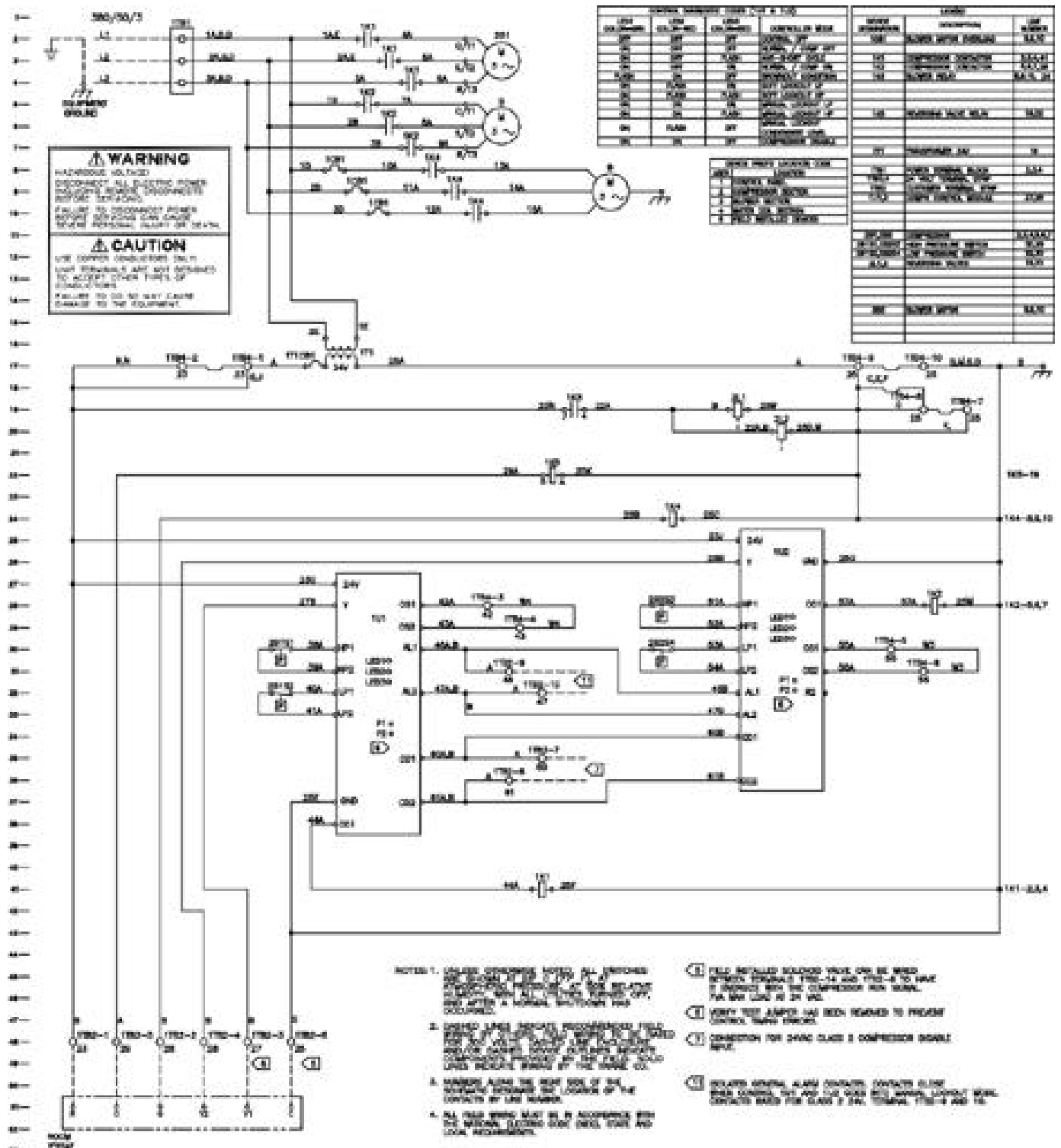
Unit Wiring Basic

208 V-60 HZ-1 PH



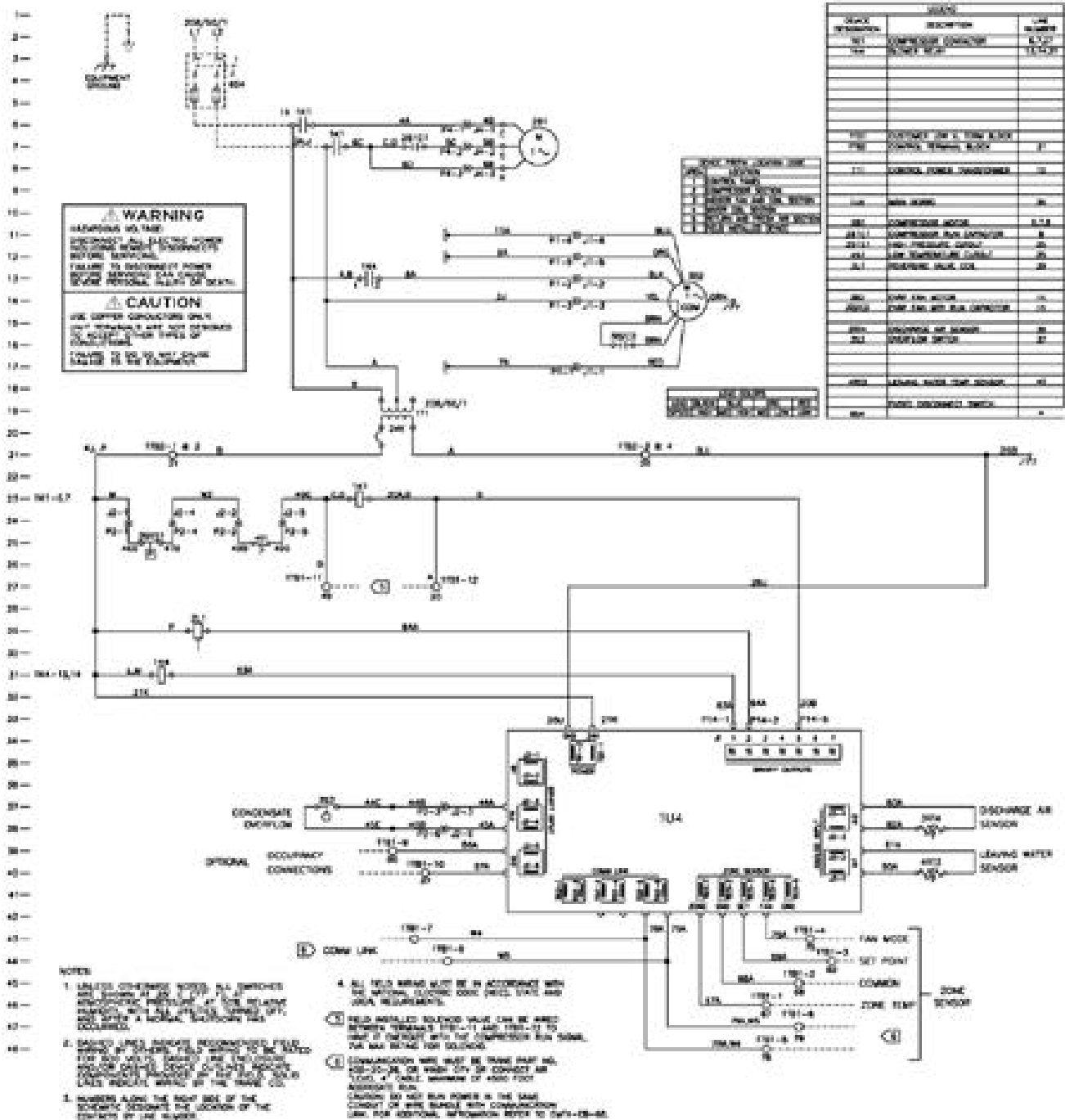
Unit Wiring Deluxe

380-420V-50 HZ-3 PH



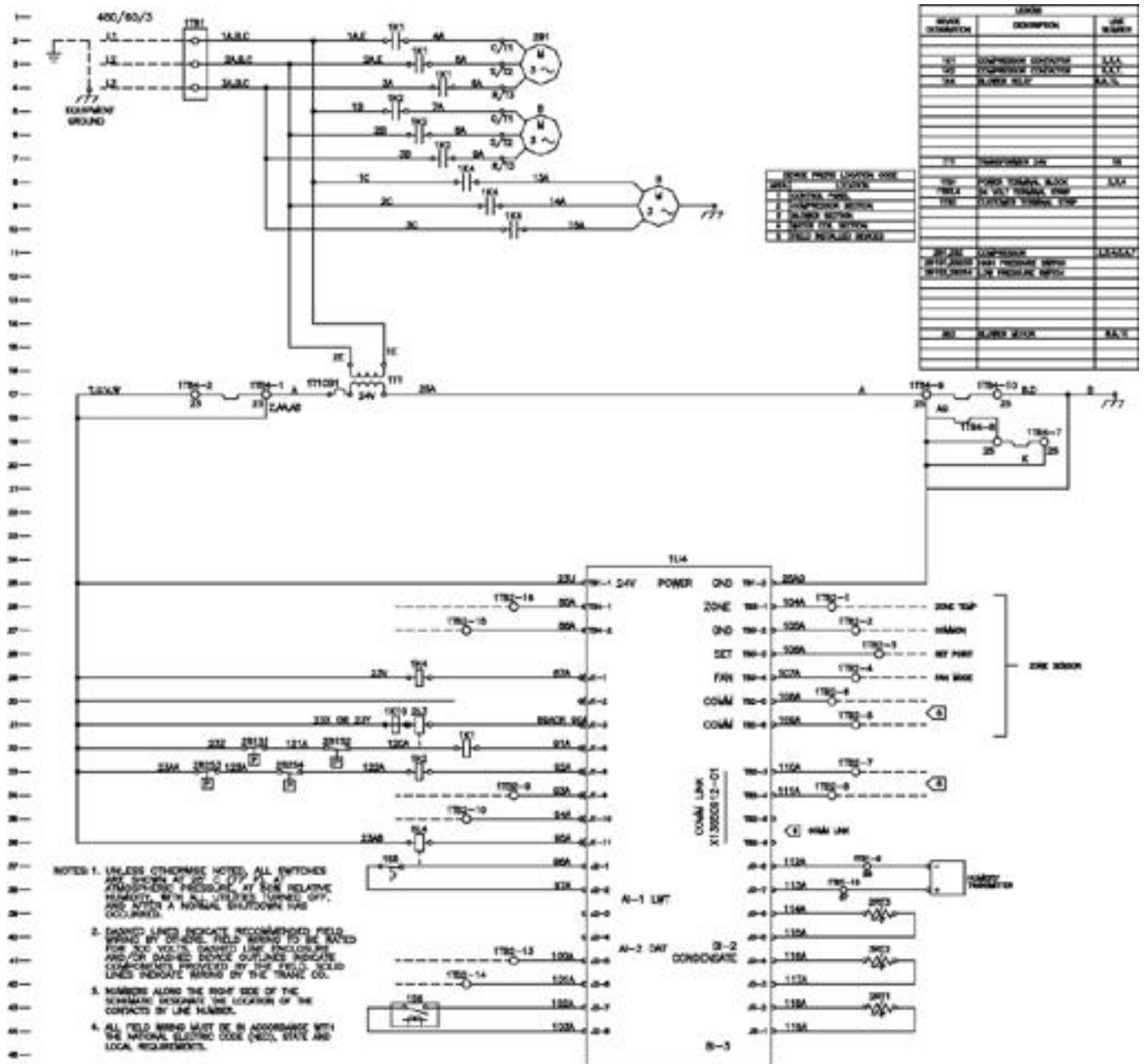
Unit Wiring ZN510

208V-60 HZ-1 PH



Unit Wiring ZN524

460 V-60 HZ-3 PH





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Literature Order Number	WSHP-SVX01D-EN
File Number	SV-UN-WSHP-SVX01D-0404
Supersedes	SV-UN-WSHP-SVX01C-0104
Stocking Location	Inland

Trane has a policy of continuous product and data improvement and reserves the right to change design and specifications without notice.