



Installation, Operation, and Maintenance

Horizontal Steam and Hot Water Unit

Heaters

J30-11111

⚠ SAFETY WARNING

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

July 2026

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TRANE
TECHNOLOGIES™



Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:



WARNING

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



CAUTION

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

NOTICE

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

Important Environmental Concerns

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

Important Responsible Refrigerant Practices

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

⚠ WARNING

Proper Field Wiring and Grounding Required!

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

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER** PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.

⚠ WARNING**Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

⚠ WARNING**Cancer and Reproductive Harm!**

This product can expose you to chemicals including lead and bisphenol A (BPA), which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Model Number Description

Digit 1, 2, 3— Product Type

UHS = Horizontal Steam or Hot Water Unit Heater

Digit 4 — Development Sequence

B

Digit 5, 6, 7— Capacity/Coil Type

Hot Water Only Serpentine Type Coil

A08 = 8,030 BTU/HR

A18 = 18,400 BTU/HR

A25 = 24,800 BTU/HR

A36 = 35,900 BTU/HR

Steam or Hot Water Header Type Coil

018 = 18,000 BTU/HR

024 = 24,000 BTU/HR

036 = 36,000 BTU/HR

048 = 48,000 BTU/HR

060 = 60,000 BTU/HR

072 = 72,000 BTU/HR

084 = 84,000 BTU/HR

096 = 96,000 BTU/HR

108 = 108,000 BTU/HR

120 = 120,000 BTU/HR

132 = 132,000 BTU/HR

144 = 144,000 BTU/HR

156 = 156,000 BTU/HR

180 = 180,000 BTU/HR

204 = 204,000 BTU/HR

240 = 240,000 BTU/HR

280 = 280,000 BTU/HR

300 = 300,000 BTU/HR

360 = 360,000 BTU/HR

Digit 8 — Voltage

1 = 115/1/60

3 = 230/1/60 (115 V motor with Transformer)

4 = 208/3/60

5 = 230/3/60

6 = 460/3/60

Digit 9 — Motor Type

E = Explosion Proof

T = Totally Enclosed

Digit 10 — Design Sequence

A

Digit 11 — Tube Material

A = Copper

Digit 12 — Fan Guard

0 = Standard Fan Guard

1 = OSHA Fan Guard

2 = Standard Fan Guard with Shelf Mount

4 = None (Note: Not available for model UHS. Only available on model UHP.)

Digit 13 — Special Coating

0 = No Special Coating

A = Phenolic Coating (Baked)

B = Epoxy

C = Epoxy Phenolic

Digit 14 — Disconnect Switch

0 = None

1 = Disconnect switch

Digit 15— Thermostats (Line Voltage)

0 = None

C = Line Voltage Thermostat with Fan Switch

D = Programmable Line Voltage Thermostat with Fan Switch

Digit 16 — Thermostat Cover

0 = None

A = Locking Thermostat Cover

Digit 17 — Manual Starter

0 = None

A = Manual Starter

Digit 18 — Steam and Hot Water Control

0 = None

1 = Strap on Hot Water Control

2 = Steam Pressure Control (Open on rise in pressure)

3 = Steam Pressure Control (Close on rise in pressure)

4 = 5.0 Amp Speed Control Switch (Capacities 018 – 108 only)

5 = Options 1 and 4

6 = Options 2 and 4

7 = Options 3 and 4

Digit 19 — Vertical Louver

0 = None

A = Vertical Louver



General Information

Description

Horizontal hydronic unit heaters are available in both serpentine and header type units. Serpentine units offer outputs from 8,030 to 35,900 BTU's (2.4 to 10.5 kW) and are ideal for hot water (only) installations with limited clearances. Header type horizontal units range from 18,000 to 360,000 (5.3 to 105.5 kW) and can operate with either hot water or steam. Both units are furnished with totally enclosed motors, with explosion proof motors as optional on header types. The designs are certified by ETL to CSA-C22.2, UL1995, and UL 60335-2-40. **Do not alter these units in any way and do not attach any ductwork to the units.**

Figure 1. Serpentine type



Figure 2. Header type



UL 60335-2-40 Summary Information

Clearance Requirements

For sufficient airflow, maintain 2 feet (0.61m) clearance from the front and back of the unit, and 7 inches (0.18m) from the top of the unit. Also provide sufficient clearance around units for maintenance purposes.

Electrical Connections

Standard units are shipped for use on 115 volt, 60 hertz single phase electric power. The motor nameplate and electrical rating on the transformer should be checked before energizing the unit heater electrical system. All external wiring must conform to ANSI/NFPA No. 70, National Electrical Code (or the latest edition) and applicable current local codes; in Canada, to the Canadian Electrical Code, Part 1 CSA Standard C22.1. The short circuit current rating (SCCR) for this unit is 5kA.

Disconnection must be incorporated in fixed wiring.

See "Wiring Installation," p. 30 and "Options," p. 32 for additional wiring details.

Figure 3. Manual control with single phase motor

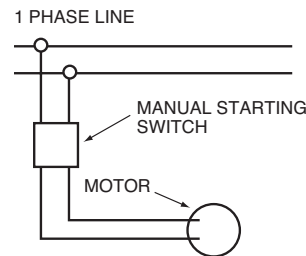
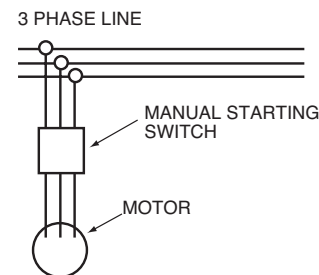


Figure 4. Manual control with three phase motor



Hydronic Requirements

All Horizontal Unit Heaters are shipped fully assembled and may be used for steam or hot water applications (serpentine models are hot water only). Coils are factory tested at 200 psig (1379 kPa) under water.

- **USA:** Under maximum conditions, coils are rated for 150 PSI (1034 kPa) for steam pressure and up to 150 PSI (1034 kPa) or 320°F (160°C) for hot water.
- **Canada:** Under maximum conditions, coils are rated for 15 PSI (103 kPa) for steam pressure and up to 150 PSI (1034 kPa) or 320°F (160°C) for hot water.

Safety Information

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death, serious injury, and equipment or property damage.

Do not alter the unit heater.

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

NOTICE

Unit Damage!

Failure to follow instructions below could result in damaging the unit.

Verify all power sources conform to the requirements of the unit heater.

⚠ WARNING

Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury, or property damage.

Do not depend upon a thermostat or other switch as sole means of disconnecting power when installing or servicing heater. Always disconnect power at main circuit breaker.

⚠ WARNING

Rotating Components!

Failure to follow instructions below could result in death or serious injury.

Keep hands, clothing, and jewelry away from moving parts. Check the equipment for foreign objects before starting the equipment.

⚠ WARNING

Electric Shock Hazard!

Failure to follow instructions below could result in death or serious injury, or property damage.

The heater must be securely and adequately grounded by connecting a grounded conductor between the service panel and the heater. A qualified licensed electrician should install the conductor and test the grounding.

Follow installation instructions CAREFULLY to avoid creating unsafe conditions. All external wiring must conform to applicable current local codes, and to the latest edition of the National Electric Code, ANSI/NFPA No. 70. In Canada, all external wiring must conform to the Canadian Electric Code, Part 1 CSA Standard C22.1. All wiring should be done and checked by a qualified electrician, using copper wire only. All steam or water connections should be made and leak-tested by a suitably qualified individual, per instructions in this manual. Also follow procedures listed on the ["Equipment Startup," p. 38.](#)

To meet ETL and OSHA requirements, units mounted below 8 feet (2.4m) from the floor must be equipped with an OSHA fan guard.

It is good practice to have a shutoff switch on the electrical power lines controlling the heater. Whenever a unit is serviced, shut power off to the unit.

Because these units are installed in most instances higher than 8 feet, proper type of ladders or scaffolding should be used, as set up by OSHA requirements. Never place a ladder against the unit for support.

In industrial plants, professional maintenance crews should service this equipment.

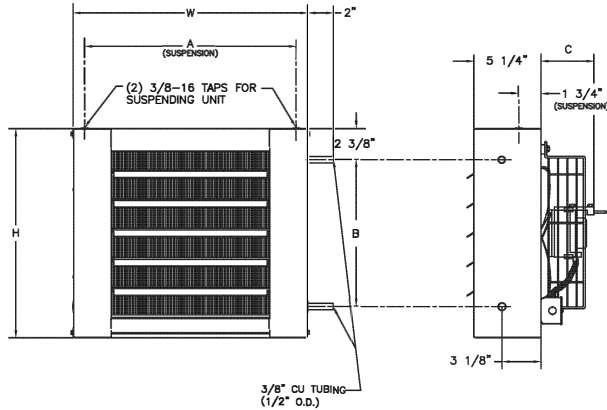
All Horizontal Unit Heaters are shipped fully assembled and may be used for steam or hot water applications (serpentine models are hot water only). Coils are factory tested at 200 PSIG (1379 kPa) under water.

- **USA:** Under maximum conditions, coils are rated for 150 PSI (1034 kPa) for steam pressure and up to 150 PSI (1034 kPa) or 320°F (160°C) for hot water.
- **Canada:** Under maximum conditions, coils are rated for 15 PSI (103 kPa) for steam pressure and up to 150 PSI (1034 kPa) or 320°F (160°C) for hot water.

Each unit is packaged individually and marked for proper identification. Use normal care in handling and during installation to prevent damage to the coils fins, fan and casing.

Dimensional Data

Figure 5. Serpentine type — models A08, A18, A25, A36



Note: Motors are totally enclosed, thermally protected, sleeve bearing, with 2"(h) x 4"(w) conduit connection boxes. 3/8-16 nutserts are attached to enclosure for balanced hanging.

Figure 6. Header type — models 18 to 360

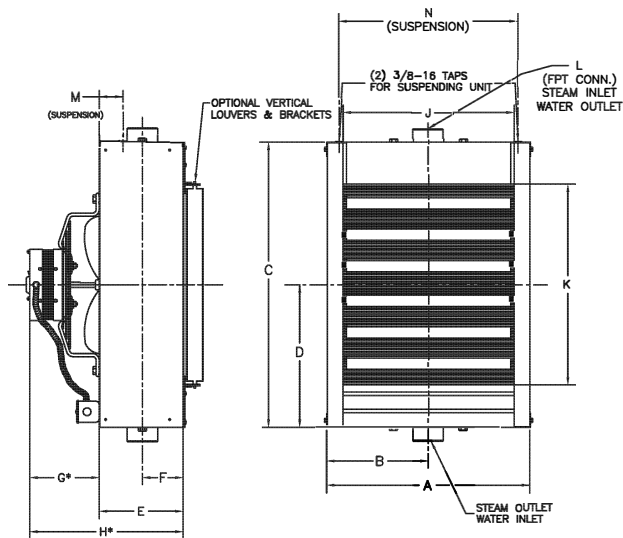


Table 1. Serpentine models

UNIT SIZE	H inches (mm)	W inches (mm)	A inches (mm)	B inches (mm)	C inches (mm)	Number Of Louvers	Nominal Fan Diameter inches (mm)	Approximate ship wt. lbs. (kg)
A08	16 (406)	18 (457)	16-7/32 (412)	11-1/4 (286)	4-1/4 (108)	5	9 (229)	22 (10.0)
A18	16 (406)	18 (457)	16-7/32 (412)	11-1/4 (286)	4-1/4 (108)	5	10 (254)	24 (10.9)
A25	16 (406)	18 (457)	16-7/32 (412)	11-1/4 (286)	4-1/4 (108)	5	10 (254)	25 (11.3)
A36	18-1/2 (470)	20-1/2 (521)	18-22/32 (475)	13-3/4 (349)	5-11/16 (144)	6	12 (305)	31 (14.0)

Table 2. Header models

UNIT SIZE	A inches (mm)	B inches (mm)	C inches (mm)	D inches (mm)	E inches (mm)	F inches (mm)	G ^(a) inches (mm)	H ^(a) inches (mm)	J inches (mm)	K inches (mm)	L inches (mm)	M inches (mm)	N inches (mm)	Number of Louvers	Nominal Fan Diameter inches (mm)	Approximate Ship Wt. lbs. (kg)
18	14-5/8 (371)	7-5/16 (186)	15 (381)	7-1/2 (191)	6-1/8 (156)	2-15/16 (75)	3-1/4 (83)	9-3/8 (238)	12-1/4 (311)	9-1/2 (241)	1-1/4 (32)	2-1/4 (57)	12-7/8 (327)	4	9 (229)	26 (11.8)
24 36	14-5/8 (371)	7-5/16 (186)	18 (457)	9 (229)	6-1/8 (156)	2-15/16 (75)	3-1/4 (83)	9-3/8 (238)	12-1/4 (311)	12-1/2 (318)	1-1/4 (32)	2-1/4 (57)	12-7/8 (327)	5	10 (254)	30 (13.6)
48	17-1/8 (435)	8-9/16 (217)	20-1/2 (521)	10-1/4 (260)	5-7/8 (149)	2-15/16 (75)	5-11/16 (144)	11-7/16 (291)	14-3/4 (375)	15 (381)	1-1/4 (32)	1-3/4 (44)	15-3/8 (391)	6	12 (305)	41 (18.6)
60	17-1/8 (435)	8-9/16 (217)	20-1/2 (521)	10-1/4 (260)	5-7/8 (149)	2-15/16 (75)	5-1/16 (129)	10-15/16 (278)	14-3/4 (375)	15 (381)	1-1/4 (32)	1-3/4 (44)	15-3/8 (391)	6	12 (305)	41 (18.6)
72	18-3/8 (467)	9-3/16 (233)	21-3/4 (552)	10-7/8 (276)	6 (152)	2-15/16 (75)	5-1/16 (129)	11-1/16 (281)	16 (406)	16-1/4 (413)	1-1/4 (32)	1-3/4 (44)	16-5/8 (422)	7	14 (356)	44 (19.9)
84	20-7/8 (530)	10-7/16 (265)	24-1/4 (616)	12-1/8 (308)	6-1/8 (156)	2-15/16 (75)	5-11/16 (144)	11-13/16 (300)	18-1/2 (470)	18-3/4 (476)	1-1/4 (32)	1-3/4 (44)	19-1/8 (486)	8	14 (356)	47 (21.3)
96 108	19-5/8 (498)	9-13/16 (249)	24 (610)	12 (305)	6-5/16 (160)	3-3/16 (81)	7-1/2 (191)	13-13/16 (351)	17-1/4 (438)	17-1/2 (445)	1-1/2 (38)	1-3/4 (44)	17-7/8 (454)	8	16 (406)	49 (22.2)
120	20-7/8 (530)	10-7/16 (265)	25-1/4 (641)	12-5/8 (321)	6-5/16 (160)	3-3/16 (81)	6-11/16 (170)	13 (330)	18-1/2 (470)	18-3/4 (476)	1-1/2 (38)	1-3/4 (44)	19-1/8 (486)	8	18 (457)	59 (26.7)
132 144	23-3/8 (594)	11-11/16 (297)	27-3/4 (705)	13-7/8 (352)	6-5/16 (160)	3-3/16 (81)	7-5/8 (194)	14 (356)	21 (533)	21-1/4 (540)	1-1/2 (38)	1-3/4 (44)	21-5/8 (549)	9	18 (457)	74 (33.5)
156	23-3/8 (594)	11-11/16 (297)	27-3/4 (705)	13-7/8 (352)	6-5/16 (160)	3-3/16 (81)	7-7/16 (194)	13-3/4 (349)	21 (533)	21-1/4 (540)	1-1/2 (38)	1-3/4 (44)	21-5/8 (549)	9	18 (457)	74 (33.5)
180 204	24-5/8 (625)	12-5/16 (313)	29 (737)	14-1/2 (368)	6-3/8 (162)	3-3/16 (81)	7-7/16 (194)	13-3/4 (349)	22-1/4 (565)	22-1/2 (572)	1-1/2 (38)	1-3/4 (44)	22-7/8 (581)	9	18 (457)	90 (40.8)
240	27-7/8 (708)	13-15/16 (354)	30-1/4 (768)	15-1/8 (384)	8-1/8 (206)	3-3/16 (81)	5-7/8 (149)	14 (356)	25-1/2 (648)	23-3/4 (603)	2 (51)	1-3/4 (44)	26-1/8 (664)	10	20 (508)	143 (65)
280	27-7/8 (708)	13-15/16 (354)	30-1/4 (768)	15-1/8 (384)	8-1/8 (206)	3-3/16 (81)	9-5/8 (244)	17-3/4 (451)	25-1/2 (648)	23-3/4 (603)	2 (51)	1-3/4 (44)	26-1/8 (664)	10	20 (508)	154 (70)
300 360	33-3/8 (848)	16-11/16 (424)	37-3/4 (959)	18-7/8 (479)	9 (229)	3-3/16 (81)	9-5/8 (244)	18-5/8 (473)	31 (787)	31-1/4 (794)	2 (51)	1-3/4 (44)	31-5/8 (803)	13	24 (610)	203 (92)

Notes:

1. OSHA guard standard on all serpentine models and header models 18 thru 48 supplied with 1 phase motors (dimensions shown in tables).
 2. Standard motor and standard guard shown.
 3. Optional OSHA guards are available for units with standard 1 phase motors.
 4. All 3 phase and explosion proof motors are shelf mounted.
- (a) Applies to standard motor with standard fan guard. When optional motors or OSHA fan guards are requested, dimensions will vary according to the substitutions made.



Steam Performance Data

Table 3. Header type models only

Unit Size	Output BTU/HR ^(a) (kW)	Conden- sate lbs/hr (kg/hr)	EDR Sq. Ft. (Sq. m)	Final Air Temp °F (°C)	Motor		Nominal CFM (m ³ /s)	Outlet FPM (m/s)	Nominal Amps at 15 VAC ^(b)	Nominal Fan Diameter Inches (mm)
					HP (kW)	RPM				
18	18,000 (5.3)	18.0 (8.2)	75 (7.0)	12 (39)	16 Watts	1550	395 (.186)	395 (2.007)	0.80	9 (228.6)
	16,200 (4.7)	16.2 (7.3)	68 (6.3)	105 (41)		1350	330 (.156)	330 (1.676)		9 (228.6)
24	24,000 (7.0)	24.5 (11.1)	100 (9.3)	109 (43)	16 Watts	1550	450 (.212)	150 (2.286)	0.80	10 (254.0)
	21,600 (6.3)	22.0 (10.0)	90 (8.4)	112 (44)		1350	380 (.179)	380 (1.930)		10 (254.0)
36	36,000 (10.5)	37.0 (16.8)	150 (13.9)	119 (48)	25 Watts	1550	550 (.260)	550 (2.794)	1.2	10 (254.0)
	32,400 (9.5)	33.0 (14.9)	135 (12.5)	120 (49)		1350	480 (.227)	480 (2.438)		10 (254.0)
48	48,000 (14.1)	49.0 (22.2)	200 (18.6)	119 (48)	1/20 (.037)	1000	750 (.354)	550 (2.794)	1.4	12 (304.8)
	43,200 (12.7)	44.0 (19.9)	180 (16.7)	123 (51)		900	630 (.297)	460 (2.337)		12 (304.8)
60	60,000 (17.6)	61.0 (27.6)	250 (23.2)	121 (49)	1/20 (.037)	1000	900 (.425)	650 (3.302)	1.4	12 (304.8)
	54,000 (15.8)	55.0 (24.9)	225 (20.9)	131 (55)		900	700 (.330)	510 (2.591)		12 (304.8)
72	72,000 (21.1)	73.0 (33.1)	300 (27.9)	120 (49)	1/20 (.037)	1000	1100 (.519)	800 (4.064)	1.4	14 (355.6)
	64,800 (19.0)	66.0 (29.9)	270 (25.1)	123 (51)		900	950 (.448)	700 (3.556)		14 (355.6)
84	84,000 (24.6)	85.0 (38.5)	35 (32.5)	115 (46)	1/12 (0.62)	1000	1400 (.661)	900 (4.572)	2.2	14 (355.6)
	75,600 (22.2)	76.0 (34.4)	315 (29.3)	123 (51)		900	1100 (.519)	750 (3.810)		14 (355.6)
96	96,000 (28.1)	97.0 (43.9)	400 (37.2)	123 (51)	1/12 (0.62)	1000	1400 (.661)	930 (4.724)	2.2	16 (406.4)
	86,400 (25.3)	88.0 (39.9)	360 (33.4)	132 (56)		900	1100 (.519)	800 (4.064)		16 (406.4)

Table 3. Header type models only (continued)

Unit Size	Output BTU/HR ^(a) (kW)	Conden- sate lbs/hr (kg/hr)	EDR Sq. Ft. (Sq. m)	Final Air Temp °F (°C)	Motor		Nominal CFM (m ³ /s)	Outlet FPM (m/s)	Nominal Amps at 15 VAC ^(b)	Nominal Fan Diameter Inches (mm)
					HP (kW)	RPM				
108	108,000 (316.)	110.0 (49.8)	450 (41.8)	115 (46)	1/12 (0.62)	1000	1800 (.850)	1000 (5.080)	2.2	16 (406.4)
	97,200 (28.5)	98.0 (44.4)	405 (37.6)	120 (49)		900	1500 (.708)	900 (4.572)		16 (406.4)
120	120,000 (35.2)	122.0 (55.3)	500 (46.5)	118 (48)	1/3 (.249)	1140	1900 (.897)	900 (4.572)	4.5	18 (457.2)
132	132,000 (38.7)	134.0 (60.7)	550 (51.1)	121 (49)	1/3 (.249)	1140	2000 (.944)	950 (4.826)	4.5	18 (457.2)
144	144,000 (42.2)	146.0 (66.1)	600 (55.7)	120 (49)	1/3 (.249)	1140	2200 (1.038)	1000 (5.080)	4.5	18 (457.2)
156	156,000 (45.7)	160.0 (72.5)	650 (60.4)	115 (46)	1/3 (.249)	1140	2600 (1.277)	1150 (5.842)	4.5	18 (457.2)
180	180,000 (52.7)	190.0 (86.1)	770 (71.5)	135 (57)	1/3 (.249)	1140	2200 (1.038)	800 (4.064)	4.5	18 (457.2)
204	204,000 (59.8)	208.0 (94.2)	850 (79.0)	124 (51)	1/3 (.249)	1140	2900 (1.369)	1000 (5.080)	4.5	18 (457.2)
240	240,000 (70.3)	244.0 (110.5)	1000 (92.9)	123 (51)	1/3 (.249)	1140	3500 (1.652)	900 (4.572)	4.5	20 (508.0)
280	280,000 (82.0)	280.0 (126.8)	1100 (102.2)	121 (49)	1/2 (.373)	1100	4200 (1.982)	980 (4.978)	5.4	20 (508.0)
300	300,000 (87.9)	310.0 (104.4)	1250 (116.1)	117 (47)	1/2 (.373)	1100	5000 (2.360)	7000 (3.556)	5.4	24 (609.6)
360	360,000 (105.5)	366.0 (165.8)	1500 (139.4)	120 (49)	1/2 (.373)	1100	550 (2.596)	1000 (5.080)	5.4	24 (609.6)

Notes:

- Performance based on 2 LBS steam pressure (13.8 kpa) at heater with air entering @ 60°F (16°C).
- For Sound Ratings, see "Hot Water Performance Data," p. 14 and "Sound Ratings," p. 18.

^(a) For the lower output, an optional Speed Controller must be ordered.

^(b) Stated AMP is full load for the standard motors. AMP draw varies by motor manufacturer ± 0.2 AMPS. Please see the unit's motor data plate for exact (FLA) Full Load Amp rating. For additional motor data, see [Motor Data](#), p. 20.



Steam Performance Data

Steam Calculations and Correction Factors

Table 4. Steam calculations

				EXAMPLE: – UNIT SIZE _____ 24 Steam Pressure _____ 10 PSI Entering Air Temp. _____ 40°F
1.	Capacity	A. For 2 lbs. steam, 60°F entering air	Read output directly from "Steam Performance Data," p. 10: 24,000 BTU/HR. (Ref., Std. 24).	
		B. For higher steam pressures and/or EAT's above or below 60°F	Multiply output from "Steam Performance Data," p. 10 by appropriate correction factor from Table 5, p. 12.	24,000 x 1.29 = 30,960 BTU/HR
2.	Final Air Temperature	A. For 2 lbs. steam, 60°F entering air	Read temperature directly from : "Steam Performance Data," p. 10, 109°F. (Ref., Std. 24).	
		B. For capacities calculated in 1.B. (above)	Output from 1. B. $\frac{1.085 \times \text{CFM from "Steam Performance Data," p. 10}}{1.085 \times 450} + \text{EAT} = \text{Final Air Temp}$	$\frac{30,960}{1.085 \times 450} + 40 = 103.4^\circ\text{F}$
3.	Final Air Volume	A. For 2 lbs. steam, 60°F entering air	$\frac{460 + \text{Final Air Temp from "Steam Performance Data," p. 10}}{530} + \text{Nom. CFM from "Steam Performance Data," p. 10} = \text{Final Air Volume}$	$\frac{460 + 109}{530} \times 450 = 483 \text{ CFM}$
		B. For final air temperatures calculated in 2.B. (above)	$\frac{460 + \text{Final Air Temp 2.B.}}{530} + \text{Nom. CFM from "Steam Performance Data," p. 10} = \text{Final Air Volume}$	$\frac{460 + 103.4}{530} \times 450 = 478 \text{ CFM}$
4.	Condensation Per Hour	A. For 2 lbs. steam, 60°F entering air	Read lbs. per hour from "Steam Performance Data," p. 10: 24.5 lbs./hr (Ref., Std. 24).	
		B. For capacities calculated in 1.B. (above)	$\frac{\text{Output from 1. B.}}{\text{Latent heat from Table 6, p. 13}} = \text{lbs. per hour of condensate}$	$\frac{30,960}{953} = 32.5 \text{ lbs./hr}$

Table 5. Steam correction factors based on 2 PSI (13.8 kPa) steam and 60°F (16°C) EAT

Entering Air Temperature °F (°C)	Steam Pressure (Saturated) — lbs. per square inch (kPa)												
	0 0	2 (13.8)	5 (34.5)	10 (68.9)	15 (103.4)	20 (137.9)	30 (206.8)	40 (275.8)	50 (344.7)	75 (517.1)	100 (689.4)	125 (861.8)	150 (1,034-.1)
30 –(1)	1.19	1.24	1.29	1.38	1.44	1.50	1.60	1.68	1.70	1.90	2.02	2.11	2.20
40 (4)	1.11	1.16	1.21	1.29	1.34	1.42	1.51	1.60	1.66	1.81	1.93	2.02	2.11

Table 5. Steam correction factors based on 2 PSI (13.8 kPa) steam and 60°F (16°C) EAT (continued)

Entering Air Tempera- ture °F (°C)	Steam Pressure (Saturated) — lbs. per square inch (kPa)												
	0 0	2 (13.8)	5 (34.5)	10 (68.9)	15 (103.4)	20 (137.9)	30 (206.8)	40 (275.8)	50 (344.7)	75 (517.1)	100 (689.4)	125 (861.8)	150 (1,034-.1)
50 (10)	1.03	1.08	1.13	1.21	1.28	1.33	1.43	1.51	1.58	1.72	1.84	1.93	2.02
60 (16)	0.96	1.00	1.05	1.13	1.19	1.25	1.35	1.43	1.50	1.64	1.75	1.84	1.93
70 (21)	0.88	0.93	0.97	1.06	1.12	1.17	1.27	1.35	1.42	1.55	1.66	1.76	1.84
80 (27)	0.81	0.85	0.90	0.98	1.04	1.10	1.19	1.27	1.34	1.47	1.58	1.68	1.76
90 (32)	0.74	0.78	0.83	0.91	0.97	1.02	1.12	1.19	1.26	1.39	1.50	1.59	1.67
100 (38)	0.67	0.71	0.76	0.84	0.89	0.95	1.04	1.12	1.19	1.32	1.42	1.51	1.59

Table 6. Properties of saturated steam

Steam Pressure In PSIG (kPa)													
Steam Pressure PSI (kPa)	0 (0)	2 (13.8)	5 (34.5)	10 (68.9)	15 (103.4)	20 (137.9)	30 (206.8)	40 (275.8)	50 (344.7)	75 (517.1)	100 (689.4)	125 (891.8)	150 (1,034-.1)
Steam Temperature °F (°C)	212 (100)	218.5 (103.6)	227.1 (108.4)	239.4 (115.2)	249.8 (121.0)	258.8 (126.0)	274.0 (134.4)	286.7 (141.5)	297.7 (147.6)	319.9 (159.9)	337.9 (169.9)	352.9 (178.3)	365.9 (185.5)
Latent Heat of Steam Btu/lbm (KJ/ Kg)	970 (2256)	966 (2247)	961 (2235)	953 (2217)	946 (2200)	940 (2186)	929 (2161)	920 (2140)	912 (2121)	891 (2072)	881 (2049)	868 (2019)	857 (1993)



Hot Water Performance Data

Table 7. Serpentine and header type models

Unit Size	Output BTU/HR ^(a) (kW)	Flow Rate GPM (L/s)	Final Air Temp °F (°C)	Pressure Drop FT./H ₂ O (m/water)	Motor		Nominal CFM (m ³ /s)	Outlet FPM (m/s)	Nominal Amps at 155VAC ^(b)	Sound Rating
					HP (kW)	RPM				
A08	8,030 (2.4)	0.8 (.050)	91 (33)	0.8 (.050)	16 watts	1550	245 (.116)	250 (1.270)	0.80	II
	6,800 (2.0)		90 (32)			1350	210 (.099)	215 (1.092)		I
A18	18,400 (5.4)	1.9 (.120)	94 (34)	2.20 (.671)	16 watts	1550	500 (.236)	500 (2.540)	0.80	II
	15,650 (4.6)		96 (36)			1350	420 (.198)	420 (2.134)		I
A25	24,800 (7.3)	2.5 (.158)	102 (39)	2.20 (.671)	25 watts	1550	580 (.274)	590 (2.997)	1.2	II
	21,230 (6.2)		106 (41)			1350	460 (.217)	450 (2.286)		I
A36	35,900 (10.5)	3.6 (.227)	99 (37)	3.00 (.914)	1/20 (.037)	1000	850 (.401)	550 (2.794)	1.4	II
	32,300 (9.5)		100 (38)			900	750 (.354)	480 (2.438)		I
18	13,050 (3.8)	1.3 (.082)	96 (35)	0.005 (.002)	16 watts	1550	395 (.186)	395 (2.007)	0.80	II
	11,725 (3.4)		99 (37)			1350	350 (.165)	350 (1.778)		I
24	17,400 (5.1)	1.8 (.114)	96 (36)	0.014 (.004)	16 watts	1550	450 (.212)	450 (2.286)	0.80	II
	15,600 (4.6)		98 (37)			1350	380 (.179)	380 (1.930)		I
36	26,100 (7.6)	2.7 (.170)	103 (39)	0.09 (.027)	25 watts	1150	550 (.260)	550 (2.794)	1.2	II
	23,500 (6.9)		103 (39)			1350	480 (.227)	480 (2.438)		I
48	34,800 (10.2)	3.5 (.221)	103 (39)	0.12 (.037)	1/20 (.037)	1000	750 (.354)	550 (2.794)	1.4	II
	31,300 (9.2)		111 (44)			900	630 (.297)	460 (2.337)		I
60	43,600 (12.8)	4.4 (.278)	105 (41)	.017 (.052)	1/20 (.037)	1000	900 (.425)	650 (3.302)	1.4	II
	39,200 (11.5)		112 (44)			900	700 (.330)	510 (2.591)		I
72	52,300 (15.3)	5.03 (.334)	104 (40)	0.23 (.070)	1/20 (.037)	1000	1100 (.519)	800 (4.064)	1.4	II
	47,000 (13.8)		106 (41)			900	950 (.448)	700 (3.556)		I
84	61,000 (17.9)	6.1 (.385)	100 (38)	0.24 (.073)	1/12 (.062)	1000	1400 (.661)	900 (4.572)	2.2	III
	54,900 (16.1)		106 (41)			900	1100 (.519)	750 (3.810)		II

Table 7. Serpentine and header type models (continued)

Unit Size	Output BTU/HR ^(a) (kW)	Flow Rate GPM (L/s)	Final Air Temp °F (°C)	Pressure Drop FT./H ₂ O (m/water)	Motor		Nominal CFM (m ³ /s)	Outlet FPM (m/s)	Nominal Amps at 155VAC ^(b)	Sound Rating
					HP (kW)	RPM				
96	69,700 (20.4)	7.0 (.442)	106 (41)	0.29 (.088)	1/12 (.062)	1000	1400 (.661)	930 (4.724)	2.2	III
	62,700 (18.4)		113 (45)			900	1100 (.519)	800 (4.064)		II
108	78,400 (23.0)	7.9 (.498)	100 (38)	0.36 (.110)	1/12 (.062)	1000	1800 (.850)	1000 (5.080)	2.2	III
	70,500 (20.7)		103 (39)			900	1500 (.708)	900 (4.572)		II
120	87,100 (25.5)	8.8 (.555)	102 (39)	0.39 (.119)	1/3 (.249)	1140	1900 (.897)	900 (4.572)	4.5	III
132	95,800 (28.1)	9.6 (.606)	104 (40)	0.41 (.125)	1/3 (.249)	1140	2000 (.944)	950 (4.826)	4.5	IV
144	104,000 (30.5)	10.4 (.656)	104 (40)	0.43 (.131)	1/3 (.249)	1140	2200 (1.038)	1000 (5.080)	4.5	IV
156	11,300 (33.1)	11.3 (.713)	100 (38)	0.53 (.612)	1/3 (.249)	1140	2600 (1.227)	1150 (5.842)	4.5	IV
180	11,800 (34.6)	11.8 (.744)	110 (43)	0.6 (.183)	1/3 (.249)	1140	2200 (1.038)	800 (4.064)	4.5	III
204	148,000 (43.4)	14.9 (.940)	107 (42)	0.79 (.241)	1/3 (.249)	1140	2900 (1.369)	1000 (5.080)	4.5	IV
240	174,000 (51.0)	17.4 (1.098)	106 (41)	1.06 (.323)	1/3 (.249)	1140	3500 (1.652)	900 (4.572)	4.5	IV
280	209,100 (61.3)	21.0 (1.325)	106 (41)	1.33 (.405)	1/2 (.373)	1100	4200 (1.982)	980 (4.978)	5.4	IV
300	230,000 (67.4)	23.0 (1.451)	102 (39)	2.1 (.640)	1/2 (.373)	1100	5000 (2.360)	700 (3.556)	5.4	IV
360	261,300 (76.6)	26.2 (1.653)	103 (39)	2.1 (.640)	1/2 (.373)	1100	5500 (2.596)	1000 (5.080)	5.4	IV

Notes:

- Performance based on 200°F (93°C) EWT, 60°F (16°C) EAT, 20°F (11°C)TD.
- For fan diameter, see "Dimensional Data," p. 8

^(a) For the lower output, an optional Speed Controller must be ordered.

^(b) Stated AMP is full load for standard motors. AMP draw varies by motor manufacturer ± 0.2 AMPS. Please see unit's motor data plate for exact (FLA) Full Load Amp rating. For additional motor data, see [Motor Data](#), p. 20.

Hot Water Calculations and Correction Factors

Table 8. Hot water calculations

				Example: Unit Size — 24 Entering Water Temp. — 160°F Entering Air Temp. — 40°F Water Temperature Drop — 10°F
1.	Capacity at 20°F TD	A. For 200°F EWT, 60°F EAT	Read output directly from Table 7 , p. 14, 17,400 BTU/HR (Ref., Std. 24).	
		B. For EWT and/or EAT above or below standard	Multiply output from Table 7 , p. 14 by factor from Table 9 , p. 16	17,400 x .878 = 15,277 BTU/HR.



Hot Water Performance Data

Table 8. Hot water calculations (continued)

2.	Capacity at other TD's	For TD's from 5 to 60°F	Multiply output obtained in 1. A. or 1.B. (above) by appropriate factor from Table 10, p. 16	1.A. - 17,400 x 1.15 = 20,010 BTU/HR. – OR – 1.B. - 15,277 x 1.15 = 17,569 BTU/HR.
3.	GPM at other TD's	For TD's from 5 to 60°F	Multiply GPM of unit for 20°F TD, from Table 7, p. 14 by appropriate factor from Table 10, p. 16	1.8 x 2.30 = 4.14 GPM (Applies only to units with Std. 200° EWT, 60°F EAT) For all others calculate using formula: GPM = $\frac{\text{BTU}}{500 \times \text{TD}}$
4.	Capacity at other rates of water flow		Multiply output from Table 7, p. 14 by factor from Table 12, p. 17	
5.	Pressure loss at other TD's	For TD's from 5 to 60°F	Multiply PD of unit for 20°F TD, from Table 7, p. 14 by appropriate factor from Table 10, p. 16	.014 x 5.00 = .07 Ft. H ₂ O

Table 9. Hot water conversion factors based on 200°F (93°C) entering water, 60°F (16°C) entering air and 20°F (11°C) temperature drop

Entering Air Temperature °F (°C)	Entering Water Temperature — °F (°C)										
	100° (38)	120° (49)	140° (60)	160° (71)	180° (82)	200° (93)	220° (104)	240° (116)	260° (127)	280° (138)	300° (149)
30 -(1)	0.518	0.666	0.814	0.963	1.120	1.268	1.408	1.555	1.702	1.850	1.997
40 (4)	0.439	0.585	0.731	0.878	1.025	1.172	1.317	1.464	1.609	1.755	1.908
50 (10)	0.361	0.506	0.651	0.796	0.941	1.085	1.231	1.375	1.518	1.663	1.824
60 (16)	0.286	0.429	0.571	0.715	0.857	1.000	1.143	1.286	1.429	1.571	1.717
70 (21)	0.212	0.353	0.494	0.636	0.777	0.918	1.060	1.201	1.342	1.483	1.630
80 (27)	0.140	0.279	0.419	0.558	0.698	0.837	0.977	1.117	1.257	1.397	1.545
90 (32)	0.069	0.207	0.345	0.483	0.621	0.759	0.897	1.035	1.173	1.311	1.462
100 (38)	0.000	0.137	0.273	0.409	0.546	0.682	0.818	0.955	1.094	1.230	1.371

Table 10. Hot water output, flow rate and pressure loss factors based on standard conditions of 200°F (93°C) entering water, 60°F (16°C) entering air and 20°F (11°C) water drop

Use factors from this table to obtain approximate results	Temperature Drop °F (°C)								
	5 (3)	10 (6)	15 (8)	20 (11)	25 (14)	30 (17)	40 (22)	50 (28)	60 (33)
To obtain output for other Water Temperature Drops, multiply basic output rating by applicable Factor.	1.25	1.15	1.08	1.00	0.94	0.90	0.83	0.76	0.72
To obtain flow for other Water Temperature Drops, multiply basic rate rating by applicable factor.	5.00	2.30	1.44	1.00	0.74	0.59	0.40	0.30	0.24
To obtain Pressure Loss Feet (Meters) of Water for other temperature Drops, multiply Basic loss at 20°F (11°C) drop by Factor.	10.00	5.00	2.00	1.00	0.60	0.40	0.20	0.13	0.07

Table 11. Minimum water flow

Unit Size	A08	A18	A25	A36	18	24	36	48	60	72	84	96
Minimum GPM (L/s)	0.125 (.008)	0.125 (.008)	0.125 (.008)	0.125 (.008)	0.750 (.047)	1.240 (.078)	1.240 (.078)	1.490 (.094)	1.490 (.094)	1.620 (.102)	1.860 (.117)	3.350 (.211)
Unit Size	108	120	132	144	156	180	204	240	280	300	360	
Minimum GPM (L/s)	3.35 (.211)	3.60 (.227)	4.09 (.258)	4.09 (.258)	4.09 (.258)	4.34 (.274)	4.34 (.274)	4.59 (.290)	4.59 (.290)	6.08 (.384)	6.08 (.384)	

Table 12. Heating capacity factors for various rates of water flow

% of Rated Water Flow	25%	50%	75%	100%	125%	150%	175%
Heating Capacity Factor	0.80	0.89	0.96	1.00	1.04	1.07	1.10

Sound Ratings

The performance data listed in [Table 7, p. 14](#) includes sound ratings. The ratings provide a guide in determining the acceptable degree of loudness in particular occupancy situations.

Certain general rules apply to specific selection of unit heaters with regard to degree of quietness (or loudness):

- The greater the fan diameter, the higher the sound level.
- The higher the motor RPM, the higher the sound level. Note that on most units the lower the speed mode results in lowering the sound rating one increment.
- Selecting a larger number of smaller units generally results in lower overall noise levels than fewer large units.

All horizontal steam and hot water unit heater motors, whether fan guard or shelf-mounted, are isolated from the mechanical mount by resilient isolators. This mounting along with balanced fan blades and excellent overall construction integrity, assures you the utmost in quiet operation.

The following table outlines sound ratings for various applications. The lower the number, the quieter the unit and the lower the sound requirement.

Table 13. Sound rating

Type of area	Sound Rating
Apartment, assembly hall, classrooms churches, courtrooms, executive offices, hospitals, libraries, museums, theatres	I
Dining rooms, general offices, recreation areas, small retail stores	II
Restaurants, banks, cafeterias, department stores, public buildings, service stations	III
Gymnasiums, health clubs, laundromats, supermarkets	IV
Garages, small machine shops, light manufacturing	V
Factories, foundries, steel mills	III-VII ^(a)

^(a) Depending on specific use in these facilities, size of operation, and other factors.



Corrections When Using Glycol Solution in System

Table 14. Corrections when using glycol solution in system

		Propylene glycol
Heat transfer @180°F with no increase in flow rate	20% solution	.97 ^(a)
	50% solution	.90 ^(a)
G.P.M. Req'd. @180°F, 20° Δ t (no correction to pump curve)		1.10% ^(a)
Pump Head Req'd. @180°F w/increase in G.P. M.		1.23% ^(a)
Specify gravity (water = 1.0)		1.045-1.055 ^(a)
Pounds/gallons at 60°F (water = 8.3453 Pound/Gallon)		8.77
pH at 50% by volume		9.5
Freezing point by volume	55%	-28°F (-33.3°C)
	40%	-13°F (-25°C)
	30%	+ 4°F (-15.6°C)
	20%	+ 17°F (-8.3°C)

^(a) Compared to water

Table 15. Approximate factors at varying altitudes

Altitude	Factor
Sea level - 1000 ft. (0 - 305 m)	1.00
1000 ft. - 3000 ft. (305 - 914 m)	.958
3000 ft. - 5000 ft. (914 - 1524 m)	.929
5000 ft. - 7000 ft. (1524 - 2134 m)	.900
7000 ft. - 10000 ft. (2134 - 3048 m)	.871



Motor Data

All motors are constant speed and operate at top speed as indicated in motor data. Models 18 through 108, including A08, A18, A25, and A36 can be run at reduced speed with addition of optional variable speed switch. This switch is factory-calibrated for low and high speed ratings, with intermediate speeds infinitely controllable. Models 120 through 360 operate at constant speed as indicated in motor data. All 1/4 HP motors are P.S.C.

Motors under 1/3 HP are totally enclosed, frame mounted, 115/1/60 with thermal overload protection and permanently lubricated sleeve bearings with optional speed controller available. 1/3 HP (115/1/60) motors are open frame constant speed with thermal over-load protection and ball bearings. 1/3 HP (230V) and 1/2 HP (230V) motors are open frame constant speed with thermal overload protection and ball bearings.

1/3 and 1/2 HP motors are available as 230V single and 3 phase in open frame and explosion-proof housings, all available as options. 1/3 and 1/2 HP motors operate at single speed only.

Stated AMP draw is Full Load Amp (FLA). AMP draw varies by motor manufacturer ± 0.2 AMPS. Verify FLA per unit motor data plate.

Note: Select appropriate AMP MCA, and MOP for the multiple voltage motors. For example, the AMP, MCA, and MOP for Models 360 with a 460 volt Totally Enclosed motor is 1.3, 1.6 and 2.9 respectively.

Important: For units with explosion proof motors, junction box is field provided.

Table 16. Totally enclosed motor type

Unit Size	AMP	MCA	MOP	HP	RPM
115/1/60					
18, 24, A08, A18	0.8	1	1.8	16W ^(a)	1550
A36	1.4	1.8	3.2	1/20 ^(a)	1000
36, A25	1.2	1.5	2.7	25W ^(a)	1550
48, 60, 72	1.4	1.8	3.2	1/20 ^(a)	1000
84, 96, 108	2.2	2.8	5.0	1/12 ^(a)	1000
120, 132, 144 156, 180, 204 240	4.5	5.6	10.1	1/3	1140
280, 300, 360	5.4	6.8	12.2	1/2	1100
230/1/60					
18, 24, A08, A18	0.4	0.5	0.9	16W	1550
A36	1.4	1.8	3.2	1/20 ^(b)	1000
36, A25	0.6	0.8	1.4	25W	1550
48, 60, 72	1.4	1.8	3.2	1/20 ^(b)	1000
84, 96, 108	2.2	2.8	5.0	1/12 ^(b)	1000
120, 132, 144, 156, 180, 204, 240	4.5	5.6	10.1	1/3 ^(b)	1140
280, 300, 360	5.4	6.8	12.2	1/2 ^(b)	1100
208-230/460/3/60					
48, 60, 72, 84, 96, 108, 120, 132, 144, 156, 180, 204, 240 280, 300, 360	2.6-2.6/1.3	3.3-3.3/1.6	5.9-5.9/2.9	1/2 ^(c)	1140

^(a) Optional variable speed switch is available.

^(b) 230/1/60 unit has 115/1/60 motor supplied with field installed stepdown transformer.

^(c) These motors are without thermal overload protection. Motors without thermal overload protection must be installed with optional manual starter or field provided overload protection.

Table 17. Explosion proof with thermal overload motor type

Unit Size	AMP	MCA	MOP	HP	RPM	AMP	MCA	MOP	HP	RPM
115-230/1/60						230/460/3/60				
48, 60, 72, 84, 96, 108, 120, 132	3.7	4.6	8.3	1/6 ^(a)	1140	—	—	—	—	—
144, 156, 180, 204	5.4	6.8	12.2	1/4 ^(a)	1140	2.2/1.1	2.8/1.4	5.0/2.5	1/3	1140
240	7.8/3.9	9.8/4.9	17.6/8.8	1/3 ^(b)	1140	2.2/1.1	2.8/1.4	5.0/2.5	1/3	1140
280, 300, 360	9.6/4.8	12.0/6.0	21.6/10.8	1/2 ^(b)	1140	2.2/1.1	2.8/1.4	5.0/2.5	1/3	1140

^(a) 230/1/60 unit has 115/1/60 motor supplied with field installed stepdown transformer.

^(b) These motors are 115/230 volts.

Location

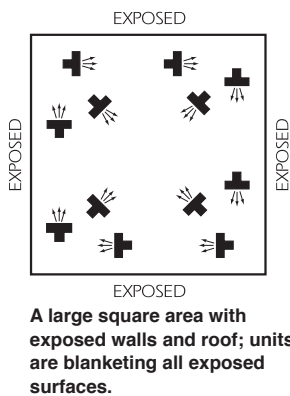
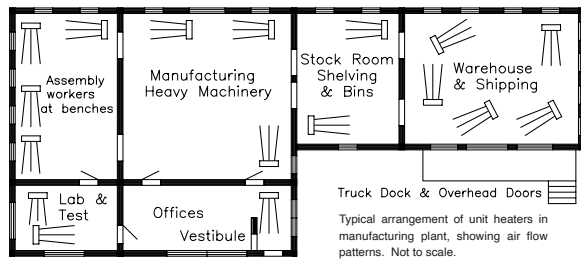
It is assumed that the design engineer has selected, sized, and located in the area to be heated. However, the information given here may be of additional help to the installer. These sketches indicate suggested basic locations for different types of unit heaters.

Horizontal unit heaters should be located to give a circulatory motion, preferably in the outer perimeter of the building. The units should be spaced to properly blanket the areas with warm air.

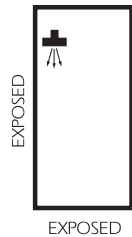
The unit should be suspended from connections provided in the unit by means of rods. The rods should then be attached to solid supports of the building.

Add clearances to combustibles, including clearances for sufficient airflow and unit maintenance. See "Installation," p. 23.

Figure 7. Location

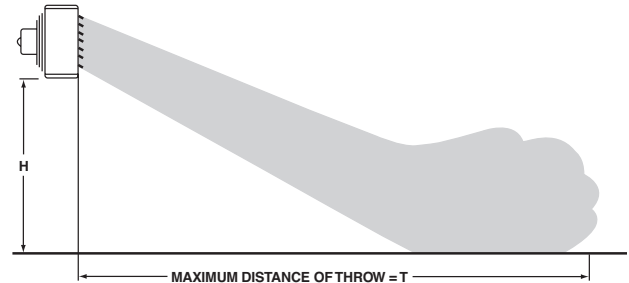


A narrow area with two exposed walls either with or without roof exposure.



A small area with exposed walls requiring one unit.

Figure 8. Mounting height and approximate heat throw



Note: Based on 2 PSI (13.8 kPa) steam pressure and 60°F (16°C) entering air temperature

Table 18. Mounting height and approximate heat throw

Unit Size	Maximum Mounting HT. ft (m)	Approx. Max. Throw ft (m)
A08	8 (2.4)	20 (6.1)
A18	8 (2.4)	25 (7.6)
A25	9 (2.7)	29 (8.8)
A36	9 (2.7)	29 (8.8)
18	8 (2.4)	20 (6.1)
24	8 (2.4)	24 (7.3)
36	9 (2.7)	28 (8.5)
48	9 (2.7)	30 (9.1)
60	10 (3.0)	30 (9.1)
72	10 (3.0)	29 (8.8)
84	10 (3.0)	30 (9.1)
96	11 (3.4)	38 (11.6)
108	11 (3.4)	40 (12.2)
120	12 (3.7)	40 (12.2)
132	13 (4.0)	54 (16.5)
144	13 (4.0)	55 (16.8)
156	13 (4.0)	55 (16.8)
180	13 (4.0)	53 (16.2)
204	13 (4.0)	55 (16.8)
240	14 (4.3)	57 (17.4)
280	14 (4.3)	57 (17.4)
300	15 (4.6)	58 (17.7)
360	15 (4.6)	60 (18.3)



Installation

⚠ WARNING

Heavy Objects!

Failure to properly lift unit could result in death or serious injury or possible equipment or property damage.

Verify that the lifting and suspension methods used during field installation can uniformly support the heater's weight at all times.

⚠ WARNING

Heavy Objects!

Failure to properly lift unit could result in death or serious injury or possible equipment or property damage.

Verify the heater is mounted to a structure that can support its weight. Do not use piping or electrical conduit for support, and do not lean objects like ladders against the heater or its conduit.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death, serious injury, and equipment or property damage.

- Confirm all hardware used in the suspension of each unit heater is more than adequate for the job.
- Do not use washers between the unit nutsert and jam nut. Use of a washer may cause the nutsert to dislodge from the unit.

NOTICE

Unit Damage!

Failure to follow instructions below could result in damaging the unit.

Unit heaters must be hung level from side to side and from front to back.

Install unit heaters to meet Occupational Safety and Health Act (OSHA) and ETL requirements. Unit heaters mounted lower than 8 feet (2.4m) from the floor must be equipped with an OSHA fan guard.

Important: Units equipped with the motor mounted to the fan guard require two point suspension. Units equipped with a shelf mounted motor are required to be suspended at four points. Refer to [Figure 5, p. 8](#) and [Figure 6, p. 8](#) for two point suspension and refer to [Figure 9, p. 24](#) for four point suspension.

Nutserts are provided at the top of all units for suspension purposes. Support rods should support the total unit weight to assure that no strain is placed on supply and return piping. Provisions for removal of the unit from the suspension rods may be desirable for servicing purposes.

Units must hang level vertically and horizontally.

For sufficient airflow, maintain 2 feet (0.61m) clearance from the front and back of the unit, and 7 inches (0.18m) from the top of the unit. Also provide sufficient clearance around units for maintenance purposes.

Maximum altitude for this unit is 14,000 feet (4,267 meters) unless otherwise noted. For altitudes higher than 14,000 feet (4,267 meters), contact your customer service representative.

Isolators are not required but may be desirable for some applications. Refer to [Table 1, p. 8](#) and [Table 2, p. 9](#).

Piping

To provide proper coil operation, follow all piping recommendations listed in this manual.

See [Figure 10, p. 25](#) through [Figure 14, p. 28](#) for proper pipe connections.

Follow standard practices and codes when installing the piping. Provide swing joints for expansion purposes, unions and shut-off valves for servicing purposes and as illustrated in [Figure 9, p. 24](#) through [Figure 14, p. 28](#), valves and traps for control purposes. Use 45 degree angle run-offs from all supply and return mains.

Dirt pockets should be the same pipe size as the return tapping of the unit heater. Also, pipe size in the branch-off should be the same size as the tapping in the traps. Beyond the trap, the return lateral pipe should be increased one size up to the return main.

It is assumed that the design engineer has selected the type of system to be used. The sketches shown are for different types of steam systems or hot water systems. For sizing of piping, traps, filter, etc., consult ASHRAE guides or the manufacturer literature on these products.

It is important that the system be kept clean. Care should be exercised that excessive joint materials or foreign substances be kept out of the system.

On steam systems it is recommended that the unit be installed level for proper condensate drainage. Swing joints should be used in piping, and pipes should be pitched down from units so that condensate can drain freely.

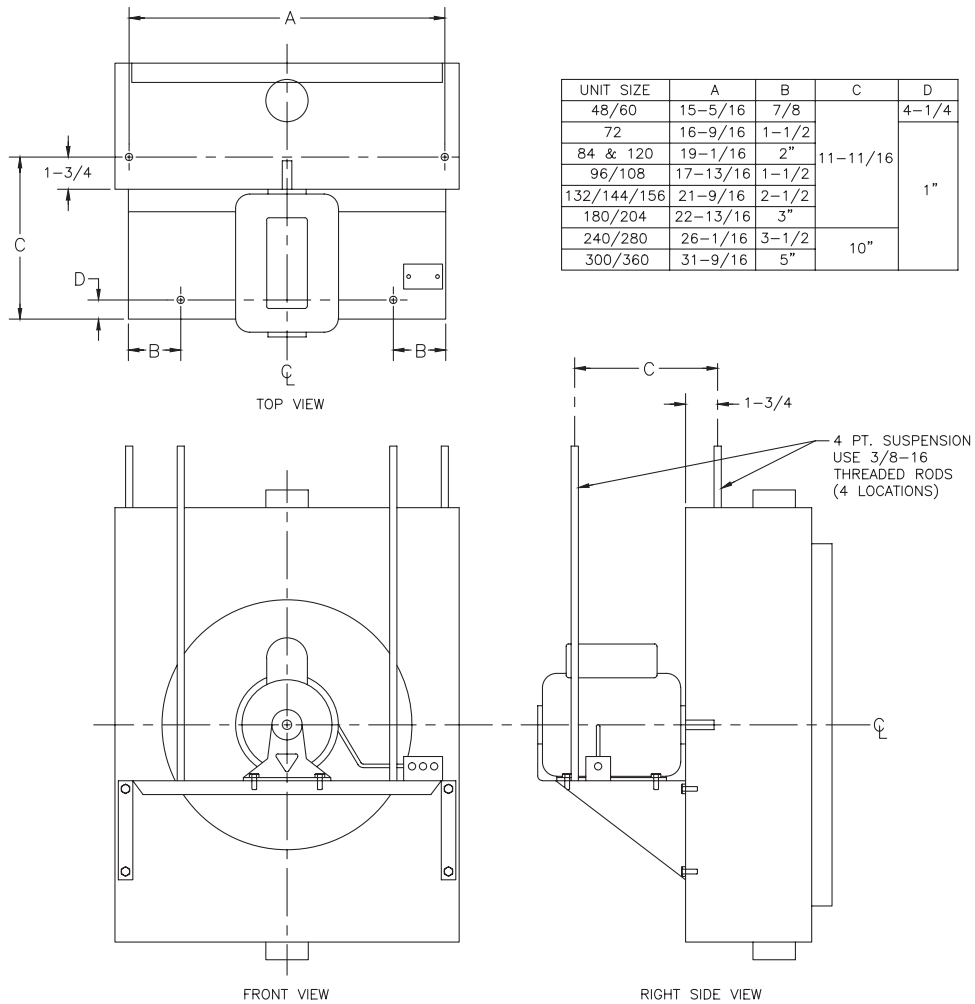
Figure 9. Four point suspension - shelf mounted motors only


Figure 10. Forced hot water

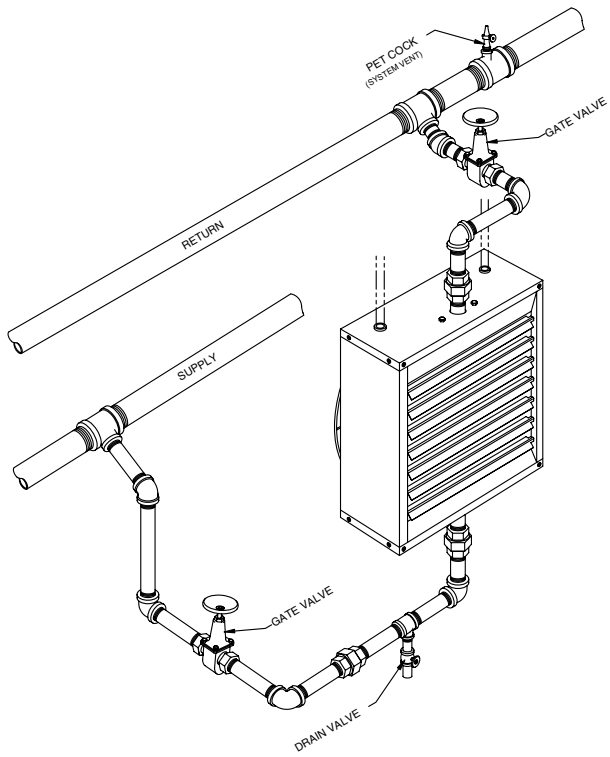


Figure 11. Forced hot water Serpentine unit only

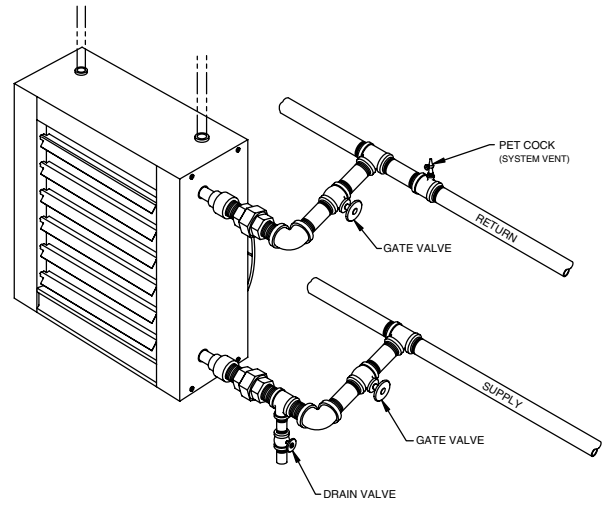


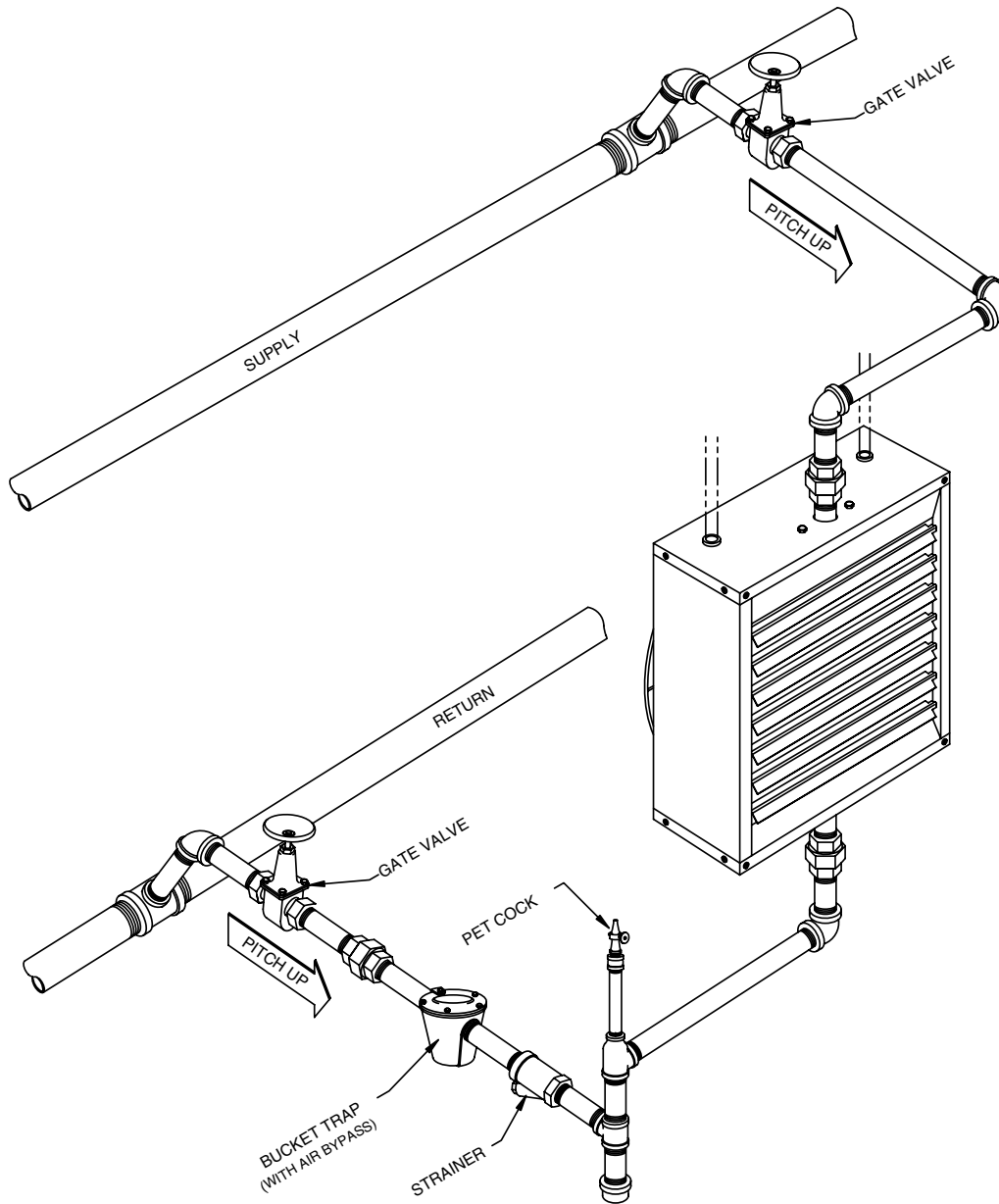
Figure 12. High pressure steam

Figure 13. Low pressure steam gravity

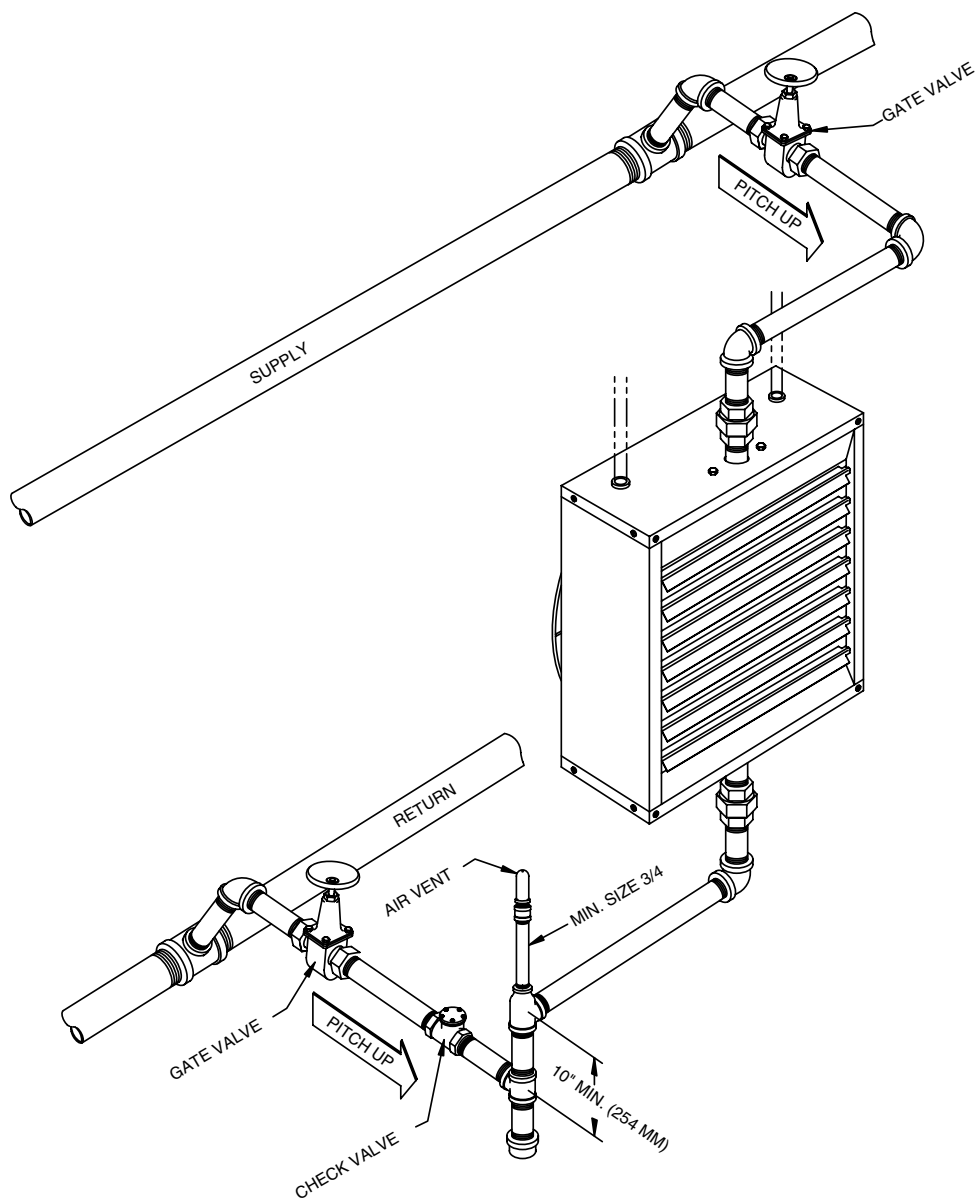
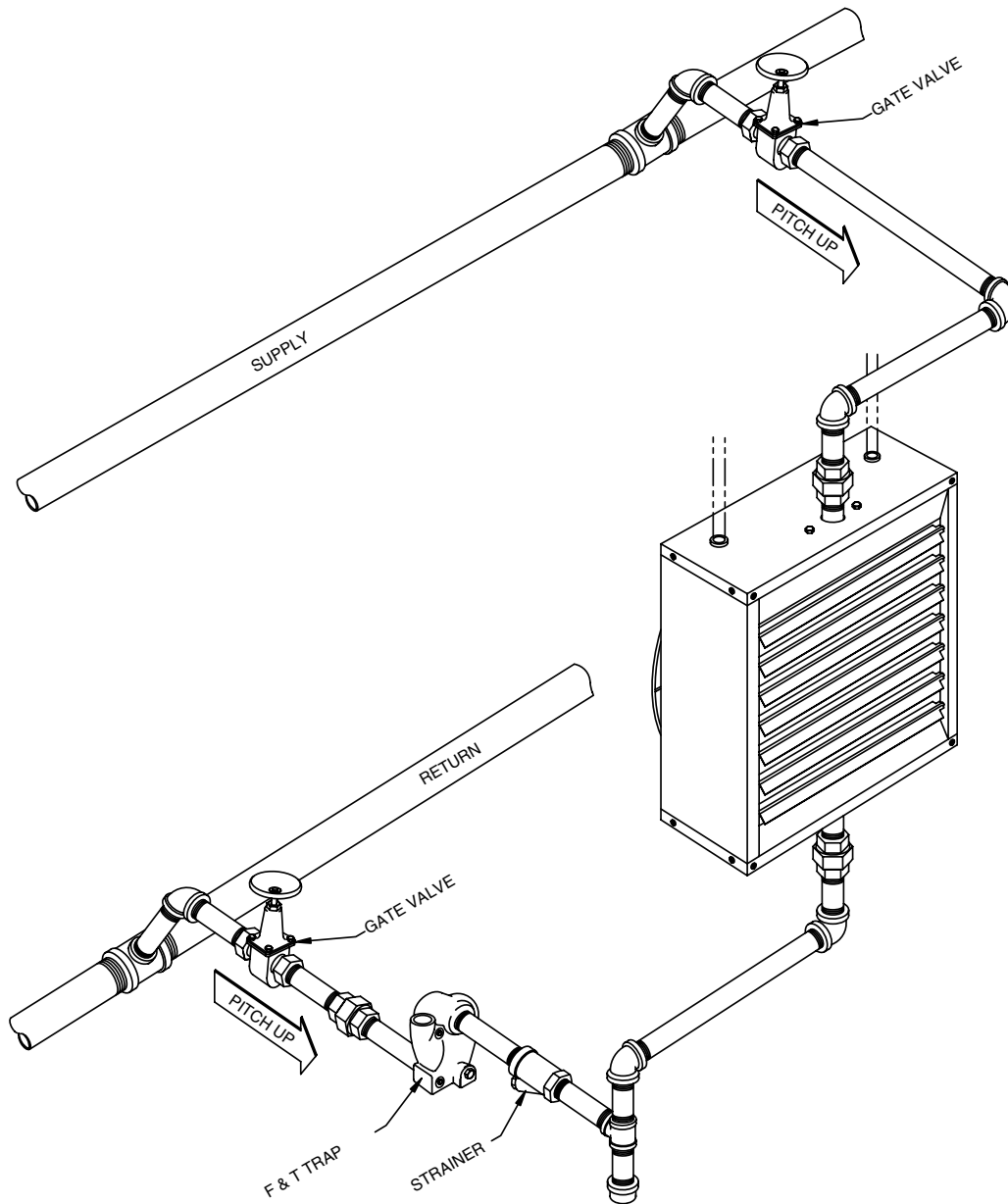


Figure 14. Low pressure vapor or vacuum





Electrical Connections

⚠ WARNING

Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

⚠ WARNING

Risk of Electrocution!

Failure to follow instructions below could result in death or serious injury.

DO NOT use any tools (i.e. screwdriver, pliers, etc.) across the terminals to check for power. You **MUST** use a CAT III or IV voltmeter rated per NFPA 70E.

Standard units are shipped for use on 115 volt, 60 hertz single phase electric power. The motor nameplate and electrical rating on the transformer should be checked before energizing the unit heater electrical system. All external wiring must conform to the latest edition of the National Electric Code, ANSI/NFPA No. 70 and applicable current local codes; in Canada, to the Canadian Electrical Code, Part 1 CSA Standard C22.1. The short-circuit current rating (SCCR) for this unit is 5kA.

Disconnection must be incorporated in fixed wiring.

It is recommended that the electrical power supply to each unit heater be provided by a separate, fused and permanently live electrical circuit. A disconnect switch of suitable electrical rating for each unit heater should be located as close to the controls as possible. Each unit heater must be electrically grounded in accordance with the latest edition of the National Electric Code, ANSI/NFPA No. 70 or and applicable current local codes; In Canada to the Canadian Electrical Code, Part 1, CSA C22.1.

See [Figure 15, p. 30](#) through [Figure 25, p. 31](#) for sample wiring connections.

Operation

Most basic unit heater systems are controlled by a room thermostat. Locate thermostat on inner wall or column so that optimum control could be obtained for that area. Set the thermostat for desired temperature.

On steam systems, a low limit may be used to prevent fan from blowing cold air unless the heater has steam passing through the coil.

Small hot water systems could have the circulating pump controlled directly by the room thermostat. On large systems, zone valves could be used to control the individual unit heater where constant water circulation is used on the main system

Thermostat Wiring and Location

NOTICE

Equipment Damage!

Failure to follow instructions below could result in equipment damage.

Follow the provided instructions to mount the thermostat on a vertical vibration-free surface free from air currents.

Mount the thermostat approximately 5 feet (1.5 m) above the floor in an area where it will be exposed to a free circulation of average temperature air. Always refer to the thermostat instructions as well as our unit wiring diagram and wire accordingly. Avoid mounting the thermostat in the following locations:

- **Cold areas** - Outside walls or areas where drafts may affect the operation of the control.
- **Hot areas** - Areas where the sun's rays, radiation, or warm air currents may affect control operation.
- **Dead areas** - Areas where air cannot circulate freely, such as behind doors or in corners.

Important: For all wiring connections, refer to the wiring diagram on the motor nameplate. Should any original wire supplied with the heater have to be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.

Wiring Installation

Notes:

- When using a speed controller, always locate the thermostat between the speed controller and the line, not between the motor and the controller.
- For internal wiring and over-load protection on all starters, consult the control manufacturer for details.
- When using thermostatic control with a manual starter, confirm that the electrical rating of the thermostat is sufficient to carry the motor current.

Figure 15. Manual control with single phase motor

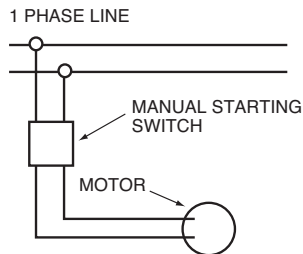


Figure 16. Thermostatic control with manual starter

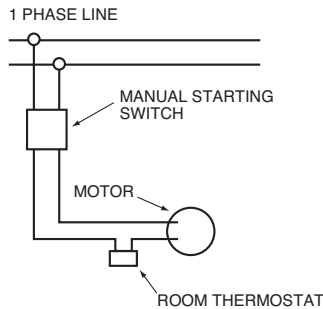


Figure 17. Thermostatic control with reverse acting controller and manual starter

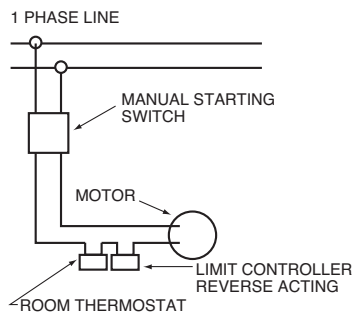


Figure 18. Thermostatic control using magnetic starter operating several units

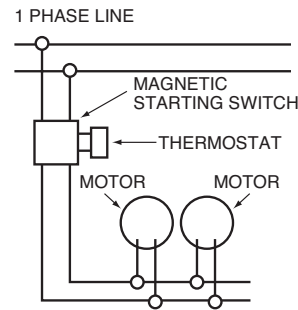


Figure 19. Three position selector switch used for either manual or thermostatic control

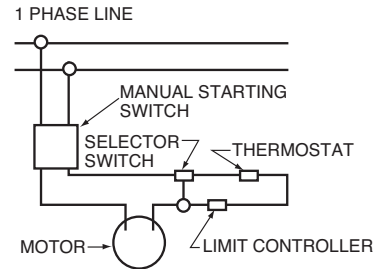


Figure 20. Three position selector switch built into magnetic starter for manual or thermostatic control

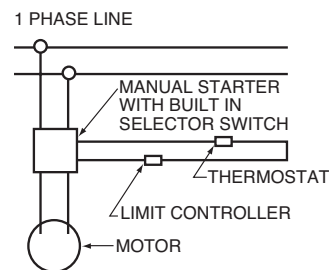


Figure 21. Speed controller with manual starting switch

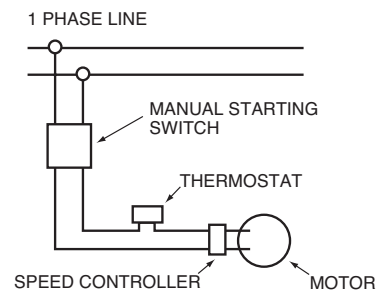


Figure 22. Speed controllers with magnetic starting switch for operating several units

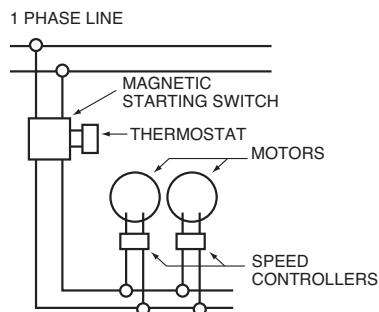


Figure 23. Manual control with three phase motor

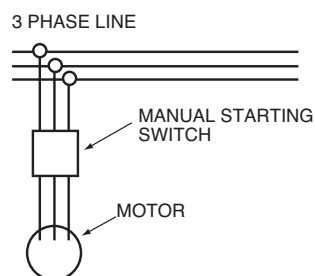


Figure 24. Thermostatic control with limit controller for three phase motor

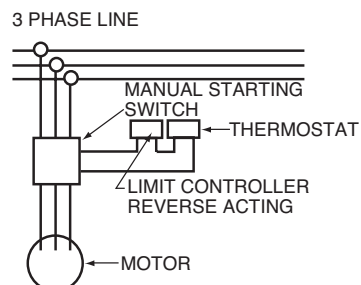
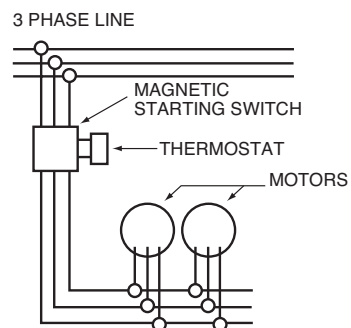


Figure 25. Thermostatic control of several three phase units



Options

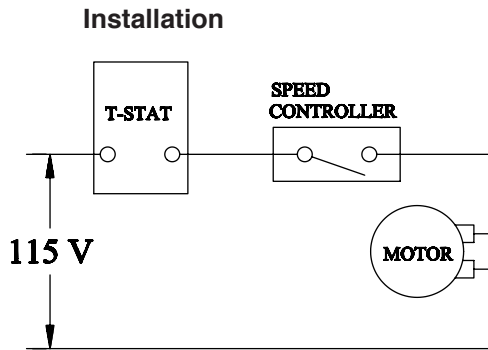
Important: When using electrical accessories, always refer to the accessory manufacturer's installation manual for proper use, location, and wiring instructions.

Variable Speed Control

115 Volt Only (optional)

The solid state speed controller may be installed at any convenient location and is suitable for surface or flush type mounting. A standard electrical single or double gang wall box is recommended as in [Figure 26, p. 32](#).

Figure 26. Wiring diagram of speed control installation



Installation procedure:

1. Attach the control's leads to the electrical leads in the control box using wire nuts. The speed control is to be wired in series with the motor. See wiring diagram in [Figure 26, p. 32](#).
2. Make certain wire nuts are tight with no copper wire being exposed.
3. Place wires and wire nuts back into box allowing room for the control to fit in box also.
4. Mount speed control to box using number 6 flathead screws provided.

Setting the control:

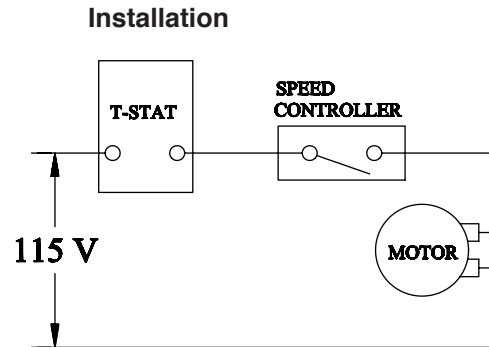
1. Turn the control shaft fully clockwise. If the motor is not running at the desired low speed, adjust the trim on the face of the control for low speed setting using a small screwdriver.
2. Rotate the control shaft counter clockwise. The speed will increase smoothly from minimum to maximum and then switch off.
3. Mount face plate with screw provided and attach control knob.

Variable Speed Control

115 Volt Only (optional)

The solid state speed controller may be installed at any convenient location and is suitable for surface or flush type mounting. A standard electrical single or double gang wall box is recommended as in [Figure 27, p. 32](#).

Figure 27. Wiring diagram of speed control installation



Installation procedure:

1. Attach the control's leads to the electrical leads in the control box using wire nuts. The speed control is to be wired in series with the motor. See wiring diagram in [Figure 27, p. 32](#).
2. Make certain wire nuts are tight with no copper wire being exposed.
3. Place wires and wire nuts back into box allowing room for the control to fit in box also.
4. Mount speed control to box using number 6 flathead screws provided.

Setting the control:

1. Turn the control shaft fully clockwise. If the motor is not running at the desired low speed, adjust the trim on the face of the control for low speed setting using a small screwdriver.
2. Rotate the control shaft counter clockwise. The speed will increase smoothly from minimum to maximum and then switch off.
3. Mount face plate with screw provided and attach control knob.

Strap-On Water Control

A SPDT strap-on type hot water control with 100° to 240°F (38 to 116°C) rated at 10 amps at 120V is also available. Control can be used for direct or reverse acting applications as high or low limit.

Steam Pressure Control

SPDT switch opens on a rise in pressure. Control is automatically reset, has a range of 0 to 15 PSI (0 to 103 kPa), and has an adjustable differential. Other actions, ranges, circuits, and manual reset models are available on request.

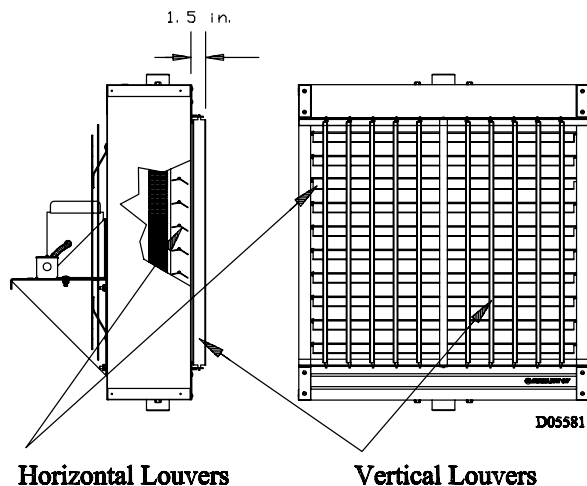
OSHA Fan Guard

All units mounted below 8 feet (2.44m) are required to have an OSHA fan guard. OSHA fan guards are available for all coil sizes (with single phase, standard motors only) but are standard equipment on all serpentine style coils and header style coil sizes 18 through 48.

Horizontal and Vertical Louvers

Horizontal louvers are standard on all models. Vertical louvers are an optional accessory on all models. Vertical louvers are installed on built to order units or shipped loose for field installation.

Figure 28. Horizontal and vertical louver mounting



Thermostats

Line voltage wall thermostats are in stock for immediate shipment. All models are SPST with bimetal thermometer, set point adjustment range 40 to 90°F (5 to 30°C) and selector switches. Standard duty models with "off-auto" and "auto-off-fan" and a heavy duty model with "auto-off-fan" switching are available. Other models available on request.

Manual Starters

Single and three-phase models are available. Standard models are single-speed, toggle-operated, NEMA Type 1 and are surface-mounted.

Note: While these manual starters can be used with explosion-proof motors, they do not meet requirements for use in explosion-proof applications.

Wall Mounted Speed Controllers

Units with standard motors up to Model 108 (115/1/60) can be operated at reduced speeds by addition of optional speed controller. Controller is 5 amps, pre-set at factory for maximum and minimum speeds, with intermediate speeds infinitely controllable. All 1/3, 1/2 HP and 230V motors operate only at rated speed and CFM.



Maintenance

⚠ WARNING

Electrical Shock Hazard!

Failure to follow instructions below could result in death or serious injury, or property damage.

Open all disconnect switches and secure in that position before servicing the unit.

⚠ WARNING

Safety Hazard!

Failure to follow instructions below could result in death, serious injury, or property damage.

All rotating fans must stop before servicing.

Periodic Service

Because of the simple design of the steam and hot water unit heaters, they are nearly maintenance free. However, depending on the environment, simple maintenance practices should be adopted.

Periodically check the finned surfaces and vacuum these as often as necessary to remove any accumulation of lint and dirt. Check fan blades and remove dirt accumulation. If fan blades are not cleaned they tend to become unbalanced.

Most of the motors supplied on the unit heaters have either ball bearings or sleeve bearings and should not require lubrication for long periods of time. It is however advisable that motor maintenance and lubrication recommended by the motor manufacturer be followed.

Check motors for dirt and dust accumulation, and remove any accumulation as often as necessary. Open type motors may overheat if the dirt or dust is not removed from ventilation openings.

Motor Lubrication

Sleeve Bearings

Motors with oilers or oil holes are lubricated before shipment with a high grade of electric motor oil. Refill when necessary, with the motor at stand-still, until oil reaches the proper level.

Use SAE 20W non-detergent oil for motors operating in ambient temperatures of 32°F to 100°F (0°C to 38°C). Above 100°F (38°C), use an SAE 30W to SAE 50W non-detergent oil. Below 32°F (0°C), a SAE 10W non-detergent oil will be required.

The frequency of oiling will depend upon operating conditions and length of running time. Inspect the oilers or oil holes when cleaning the unit. If the unit has a fractional horse-power motor, lubricate at least once a year. Under high ambient conditions or constant fan operation, fractional horse-power motors should be lubricated every

90 days. On those motors without oilers or oil holes, follow the instructions given on the motor nameplate.

Ball Bearings

Ball bearing motors are pre-lubricated and normally not equipped with grease fittings. However, motors are equipped with removable grease plugs to allow installation of grease fittings if desired by the owner.

Motor manufacturers do not recommend or require on the job lubrication of ball bearing motors. If on-the-job lubrication is required by the owner, use the following procedure:

1. With the motor at a stand-still, remove the vent and grease plugs.
2. Install grease fitting and add grease sparingly.
3. Remove the old grease from the vent relief chamber.
4. Operate the motor a few minutes before reinstalling the vent plug to allow excess grease to escape.

If there is evidence of grease working out around the motor shaft, less grease should be added and the greasing periods lengthened. If grease continues to appear, take the motor to the motor manufacturer's authorized service station for repair.

Note: Consult local motor manufacturer's service facility for information on type of grease and oil to be used.

Cleaning the Unit

The unit casing, fan, diffuser, and coil should be cleaned thoroughly once a year. Coil heat transfer efficiency depends on cleanliness. The following recommended procedures may be performed when lubricating the motor and cleaning the coil.

1. Wipe all excess lubricant from the motor, fan, and casing. Clean the motor thoroughly. A dirty motor will run hot and eventually cause internal damage.
2. Clean the coil:
 - a. Loosen the dirt with a brush on the fan side of the coil. Operate the motor allowing the fan to blow the loosened dirt through the unit.
 - b. Use air pressure or steam on the side of the coil away from the fan.

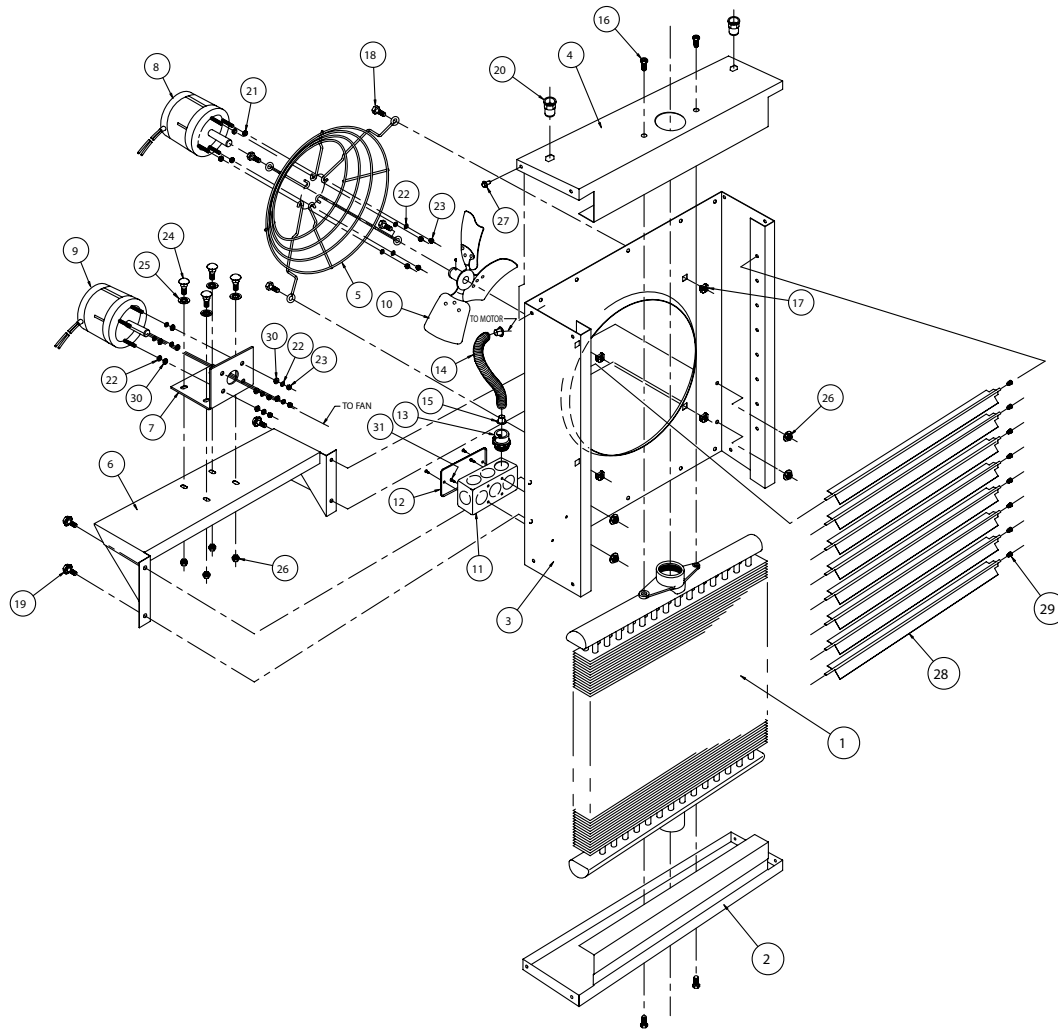
Note: A piece of cheesecloth or a burlap bag may be used to collect the large particles during the cleaning process.

3. Clean the casing, fan blades, fan guard, and diffuser using a damp cloth. Any rust spots on the casing should be cleaned and repainted.
4. Tighten the fan guard, motor frame and fan bolts. Check the fan for clearance in the panel orifice and free rotation.

Replacement Parts

When ordering replacement parts, model, model type (Standard or Exp. Proof), size, and item numbers must be specified. Consult factory for price and availability.

Figure 29. Horizontal steam unit heaters (header style shown)



HORIZONTAL STEAM UNIT HEATER PARTS

1 - Element (1)	10 - Fan (1)	21 - Grommet (4)
2 - Bottom Jacket Panel (1)	11 - Junction Box (1)	22 - Washer, Flat (4)
3 - Venturi Jacket Panel (1)	12 - Junction Box Cover (1)	23 - Nut (4)
4 - Top Jacket Panel (1)	13 - Connector (1)	24 - Bolt (4)
5 - Motor Mount & Fan Guard* [Std. Unit Shown]	14 - Conduit, Flex (1)	25 - Washer, Spring Lock (8)
6 - Motor Mounting Bracket [3 Phase and/or Explosion Proof]*	15 - Anti-Short (2)	26 - Nut (8)
7 - Motor Mounting Angle [3 Phase and/or Explosion Proof]* (1)	16 - Screw (4)	27 - Screw (2)
8 - Motor [Std. Units]*	17 - Nut Retainer (4)	28 - Louvers (Horiz)
9 - Motor [3 Phase and/or Explosion Proof]*	18 - Bolt (3) Models 24 & 36, (4) Models 48/204	29 - Cone Spring
	19 - Flange Screw	30 - Grommet, Stem (4)
	20 - Threaded Inserts	31 - Screw (18)

() = Qty Req'd per unit *Select One

Troubleshooting

Table 19. Troubleshooting

Symptoms	Possible Cause(S)	Corrective Action
Leaking coil	Frozen coil	Replace
	Defective coil	Replace
	Corrosion	Replace
	Leak in joint	Braze joint if joint is exposed where leak has occurred.
Poor output on steam	Check for air in coil	Repair or replace thermostatic air vent.
	Lint on coil fins	Clean coil and fins. Check filter and clean.
Poor output on steam or hot water	No circulation of water through coil	Check circulation pump. Check for blocked tubes.
	Short cycling of motor	Check voltage and correct. Check for linted coil and clean. Check for defective overload and repair or replace motor.
	Backward rotating motor	On single phase motor replace motor. On three phase motor, reverse two leads to change rotation.
Noisy or vibrating unit	Damaged fan blade	Change fan blade.
	Dirty fan blade	Clean fan blade.



Limited Warranty

Horizontal steam and hot water unit heaters

The Manufacturer warrants to the original owner at the original installation site that the Horizontal Steam and Hot Water Unit Heaters (the "Product") will be free from defects in material and workmanship for a period not to exceed one (1) year from startup or eighteen (18) months from date of shipment from the factory, whichever occurs first. If upon examination by the Manufacturer the Product is shown to have a defect in material or workmanship during the warranty period, the Manufacturer will repair or replace, at its option, that part of the Product which is shown to be defective.

This limited warranty does not apply:

1. if the Product has been subjected to misuse or neglect, has been accidentally or intentionally damaged, has not been installed, maintained or operated in accordance with the furnished written instructions, or has been altered or modified in any way.
2. to any expenses, including labor or material, incurred during removal or reinstallation of the defective Product or parts thereof.
3. to any workmanship of the installer of the Product.

This limited warranty is conditional upon:

1. shipment, to the Manufacturer, of that part of the Product thought to be defective. Goods can only be returned with prior written approval from the Manufacturer. All returns must be freight prepaid.
2. determination, in the reasonable opinion of the Manufacturer, that there exists a defect in material or workmanship.

Repair or replacement of any part under this Limited Warranty shall not extend the duration of the warranty with respect to such repaired or replaced part beyond the stated warranty period.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ALL SUCH OTHER WARRANTIES, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS LIMITED WARRANTY. IN NO EVENT SHALL THE MANUFACTURER BE LIABLE IN ANY WAY FOR ANY CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OF ANY NATURE WHATSOEVER, OR FOR ANY AMOUNTS IN EXCESS OF THE SELLING PRICE OF THE PRODUCT OR ANY PARTS THEREOF FOUND TO BE DEFECTIVE. THIS LIMITED WARRANTY GIVES THE ORIGINAL OWNER OF THE PRODUCT SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY BY EACH JURISDICTION.

In the interest of product improvement, we reserve the right to make changes without notice.



Equipment Startup

Customer _____ Job Name and Number _____

Pre-Inspection Information with power and water/steam/off

Type of equipment: Unit heater

Serial Number _____

Model Number _____

Name Plate Voltage: _____

Name Plate Amperage: _____

Steam Hot Water Rating _____ BTU at _____ °F
_____ kw at _____ °C

- ☐ Are all panels in place?
- ☐ Has the unit suffered any external damage? Damage: _____
- ☐ Does the piping and electric wiring appear to be installed in a professional manner?
- ☐ Has the piping and electric been inspected by the local authority having jurisdiction?
- ☐ Is the supply properly sized for the equipment?
- ☐ Were the installation instructions followed when the equipment was installed?
- ☐ Have all field installed controls been installed?
- ☐ Does the user understand all the controls on this equipment? If not, contact the wholesaler or rep. DO NOT start this equipment unless the user fully understands the operation of this equipment.

Fan With power on

- ☐ Check voltage. L1 _____ L2 _____ L3 _____
- ☐ Check fan rotation.
- ☐ Check motor amps. L1 _____ L2 _____ L3 _____



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