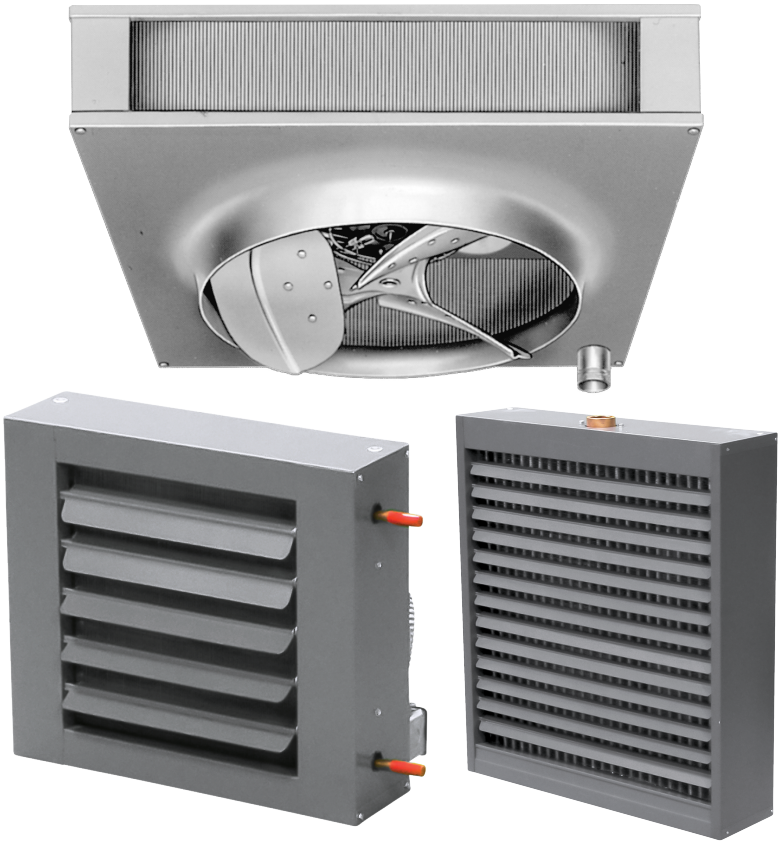
Product Catalog

Propeller Unit Heaters

8.0 to 705.6 MBh



June 2026

UH-PRC001D-EN

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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Revision History

Table of Contents

Introduction

The square, compact design of the Model P and rectangular Model S allow easy handling and installation. In most cases, only one person is needed to carry a unit.

What's more, the Model P can be stored standing on end. This means several units can be loaded on a single skid for moving from one point to another.

Yet, the benefits of this compact design go beyond ease of installation. They continue with attractive styling. The Model S unit's simple, clean-line symmetry and the Model P unit's classic modern shape enhance any industrial facility.

Figure 1. Model P vertical unit heater

Figure 2. Model S horizontal unit heater, header type (with optional vertical louver kit installed)

Model Number Description

Service Model Number Description

Digit 1,2,3 — Product Type

UHP
UHS

Digit 4 — Development Sequence

B

Digit 5, 6, 7 — Capacity/Coil Type

Hot Water Only "Serpentine Type Coil" Model S

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" Model S

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

Steam or Hot Water Model P

042 = 42,000 BTU/HR
064 = 64,000 BTU/HR
080 = 80,000 BTU/HR
102 = 102,000 BTU/HR
122 = 122,000 BTU/HR
146 = 146,000 BTU/HR
166 = 166,000 BTU/HR
202 = 202,000 BTU/HR
252 = 252,000 BTU/HR
280 = 280,000 BTU/HR
336 = 336,000 BTU/HR
384 = 384,000 BTU/HR
500 = 500,000 BTU/HR
600 = 600,000 BTU/HR
720 = 720,000 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 (P only)

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
E = Explosion-proof Thermostat (Model S only)

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 (Model S Capacities up to 108, Model P Capacities up to 102, 115/1/60 TE Motor 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
B = Louver Cone Diffuser (P only)
C = Louver Cone Diffuser with Coating (P only)

Features and Benefits

Features and Benefits: Overview

Trane propeller unit heaters feature the largest selection of standard sizes from any line in the industry. In fact, vertical Model P and horizontal Model S unit heaters provide enough ‘off-the-shelf’ selections to fit almost any application.

The versatile two-in-one Model P is available in 15 sizes with capacities from 41.3 MBh to 705.6 MBh. The companion standard and bypass Model S is available in 23 sizes with the capacities from 8.0 MBh up to 360 MBh. Both are designed for durability, attractiveness and compactness. These features combined with economical operation, give strategically sized Trane unit heaters an edge unmatched by any other manufacturer.

Two Units in One – The Versatile Model P

The Trane Model P can be quickly field converted from standard to low final temperature PL design simply by removing the unit’s patented knockout air ports. This unique two-in-one design allows the stocking wholesaler to cut inventories in half and still meet most customer application requirements.

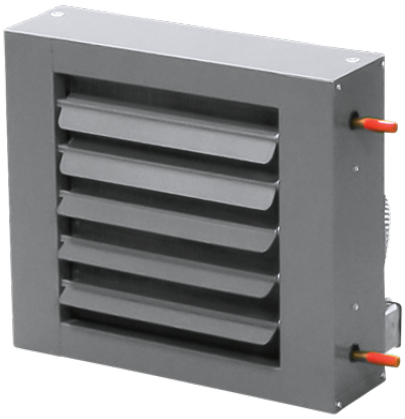
Patented Trane louver cone diffusers allow directional flexibility of heated air.

Figure 3. Model P with louver cone diffuser installed

The Space Saving Model S

The Side Connection type Model S unit features functional styling in a space-saving design. This hot water unit heater is available in capacities from 8.0 to 35.9 MBh and is ideal for applications where clearance is limited.

Figure 4. Model S horizontal unit heater, serpentine style



The Heavy-Duty Model S

The versatile Header-Type unit can be used with either steam or hot water systems and is available in capacities from 18.0 to 360.0 MBh. Rugged cast brass headers and mechanically bonded fins provide reliable heating to suit a wide variety of solutions.

Figure 5. Model S horizontal unit heater, header style

Note: *Vertical louvers are available for all Model S units to put heat where it's needed. See* *Figure 2, p. 6* *for example.*

Horizontal Unit Heaters Construction and Features

Motors

115 volt, single speed motors are standard. Most models can be supplied with single phase, explosion proof motors. For standard motors in 230 volt or three-phase configuration, and three-phase explosion-proof motors, see the motor data-portion of the Performance Data chapter for availability.

Fan Guards

All models with standard (non explosion-proof) single phase 115 or 230 volt motors utilize a wire fan guard as a motor mount.

OSHA type guards are standard on all serpentine type models and header type models 18 through 48 when equipped with single-phase standard motors. Optional OSHA type guards are available for header type models 60 through 360 when equipped with single-phase standard motors.

All models with three-phase or explosion-proof motors are shelf-mounted. Standard type fan guards can be added as an optional accessory.

Horizontal and Vertical Louvers

Horizontal louvers are standard on all models. Vertical louvers are an optional accessory on all models. Vertical louvers are shipped loose for field installation.

Thermostats

Line voltage wall thermostats are in stock for immediate shipment. All models are 115V, SPST with bi-metal thermometer, setpoint adjustment, 40 to 90°F (5 to 30°C) range 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. Plastic tamper proof one size fits all thermostat guards are also available.

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 a high or low limit.

Steam Pressure Control

SPST switch opens on a rise in pressure. Control is automatically reset, has a range of 0 to 15 PSIG (0 to 103 KPa) and has an adjustable differential. Other actions, ranges, circuits and manual reset models are 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 up to S-108 and P-102 with standard motors (115V) 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 H.P. and 230V motors operate only at rated speed and CFM – See .“Performance Data,” p. 24.

Vertical Unit Heaters Construction and Features

Vertical projection unit heaters provide heat where it is required in commercial and industrial applications. Mounted near the ceiling, this unit provides air circulation and reduces stratification, without occupying otherwise usable building space. Units can be provided with an optional diffuser for patterned discharge, or, without a diffuser for higher velocity spot heating near doorways and other high loss areas.

Figure 6. Model P vertical unit heater

Vertical units are available in fifteen sizes for steam or hot water heating. Steam capacities range from 140 to 2,580 E.D.R. (26.0 to 705 MBh) (2 PSI with 60°F E.A.T.). Hot water capacities range from 18.9 to 519.4 MBh (200°F E.W.T./20°F drop with 60°F E. A.T.).

Construction

The unit casing is formed by two square steel plates. The bottom plate forms an orifice for air delivery. Air ports are stamped in the top plate of standard units for easy conversion of low output units.

Fan

Aluminum blade fans are quiet, factory balanced and sturdy for standard or sparkproof applications.

Heating Element

Hot water-steam coils are rectangular 3 or 4-sided, one-pass, multiple circuit, with aluminum fins mechanically bonded to the tubes. Standard coils are seamless copper tubing. Supply and return connections are steel pipe. Coils are factory tested at 400 PSIG (2758 kPa) under water. Under maximum conditions in the U.S., coils are rated for 75 PSI (517 kPa) for steam pressure and up to 225 PSI (1551 kPa) or 325°F (162.8°C) for hot water. Under maximum conditions in Canada, coils are rated for 15 PSI (103 kPa) for steam pressure and up to 225 PSI (1551 kPa) or 325°F (162.8°C) for hot water.

Motors

Standard motors are 115/60/1, totally enclosed, with thermal overload protection for all units through size P- 280. Standard motors for sizes 42, 64 and 80 are shaded pole, sleeve bearing. The P-102 motor is permanent split capacitor type with sleeve

bearings. Motor for unit sizes 122 through 280 are permanent split capacitor types with permanently lubricated ball bearings. Motors used on unit sizes 336 through 720 are 230/ 460/60/3, totally enclosed, with permanently lubricated ball bearings. Unit sizes smaller than 336 are also available with 230/460/60/3 motors.

All motors fractional H.P. and integral H.P., have Class “B” insulation. The 115/60/1 motors used as standard on unit sizes 42 through 102 can be operated at multiple speeds with the addition of a solid-state control.

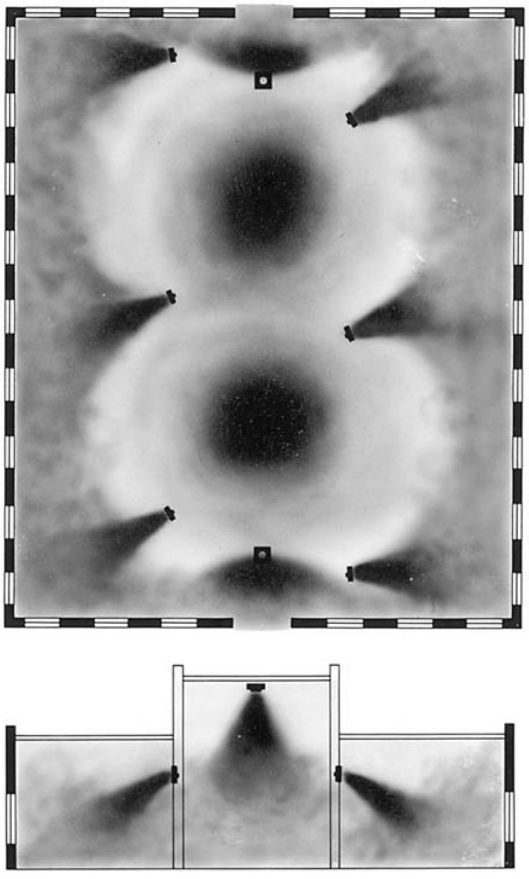
All units are available with 1140 rpm explosion-proof motors.

Application Consideration

In locating or spotting Trane Propeller Unit Heaters – either the Model S Horizontal or Model P Projection Unit Heater – the following general rules should be considered.

- Spot units at points of greatest heat loss. Blanket outside doorways effectively and provide ample coverage for exposed window areas.
- Units, especially in the case of the Model S Horizontal Unit Heater, should be arranged to blow toward or along exposed walls, preferably striking the wall at a slight angle so that the heated air exerts a wiping effect along the wall. Balance of units required to supply Btu requirements should be spaced strategically in balance of the area.
- Unit heaters should be arranged to blow into open spaces such as aisles and not directly at any worker. An exception to this rule involves the use of the Model P Unit Heater equipped with the Louver Cone Diffuser. This combination can be used effectively over closely spaced bins or machines without regard for open space. But not even the Model P Unit Heater with Louver Cone Diffuser should be in such close proximity to the workers to cause discomfort.
- The Trane solid-state speed control will provide maximum capacity flexibility and quieter operation. Note that this speed controller is available only on selected models.
- Mounting heights and distance of throw recommendations as given elsewhere in this catalog should be carefully observed.
- In the case of Model P Units, they should be spotted so that they will most effectively prevent stratification of excessively warm air at the ceiling. By carefully observing this rule, this type of unit may be used between seasons to tap waste heat at the ceiling and drive it down to occupied zones, thereby eliminating the need for added heat on the system.
- Do not spot units close to any obstruction that will impede the full and natural air delivery of the unit.

Figure 7. Floorplan and elevation of a typical industrial building with suggested Model S and P layout



The floor plan and elevation of a typical industrial building showing how a Trane Unit Heater System will heat various parts. Where ceilings are high in the main manufacturing section, large Projection Heaters without diffusers are used. Where ceilings are exceptionally high, as in crane bays, Model P Units with Louver Cone Diffusers provide up to 45% greater throw to top the

ceiling heat reservoir. Model P Units with half closed Louver Cones blanket doorways. Model S Units with Louver Fins blanket windows.

Typical Factory

In the typical industrial building, where ceilings are high, Model P Unit Heaters may be used without diffusers.

In plants where the ceilings are exceptionally high, such as in crane bays as illustrated in Figure 7, p. 12, Model P Units with Louver Cone Diffusers can increase the downward projection of heat by as much as 45% over units without diffusers.

Model P Units with the Louver Cone Diffusers can also be used to blanket doorways effectively, as shown in Figure 7, p. 12 by simply adjusting half of the louvers vertically, and half closed.

Model S horizontal-type units are ideal for mounting in plant areas where ceilings are low. In fact, due to the extremely small height of the serpentine type Model S, and because all piping connections are made on the side of the unit, the serpentine type Model S provides a greater saving in headroom than other horizontal unit heater makes.

As illustrated in Figure 7, p. 12, the Model S Unit Heaters may be mounted conveniently from the ceiling, or from building structural supports and beams. With adjustable louvers, they are ideal for blanketing windows, and Model S Bypass Unit Heaters, provide further flexibility of application where greater throw and more effective distribution of air in the living zone is required.

Horizontal and Vertical Unit Heater Piping and Installation

The illustrations in this portion of the catalog depict five different typical piping configurations. Proper selection should be based on the operational characteristics of the source supply. For selection and sizing of piping, traps, filters and other piping specialities, ASHRAE guides and specialty manufacturer's literature should be consulted. We assume that the type and total design of systems has been selected or approved by a qualified engineer. The installation and service manual should be consulted for further information on installation, operation, drainage and system cleaning.

Piping and installation is typical for both horizontal and vertical unit heaters – except side connections (see Figure 12, p. 15).

Figure 8. Forced hot water

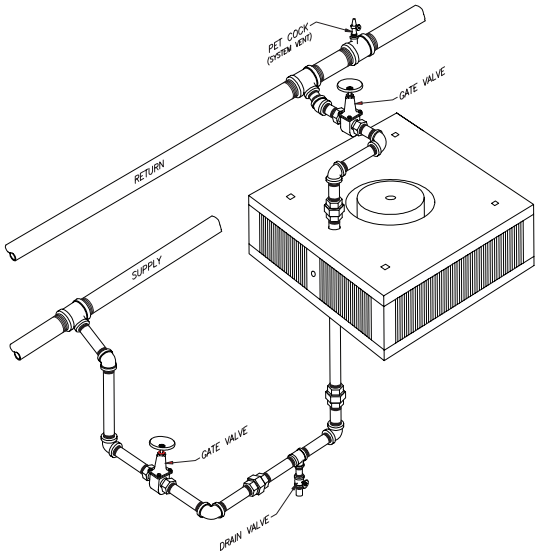


Figure 9. Low pressure steam gravity

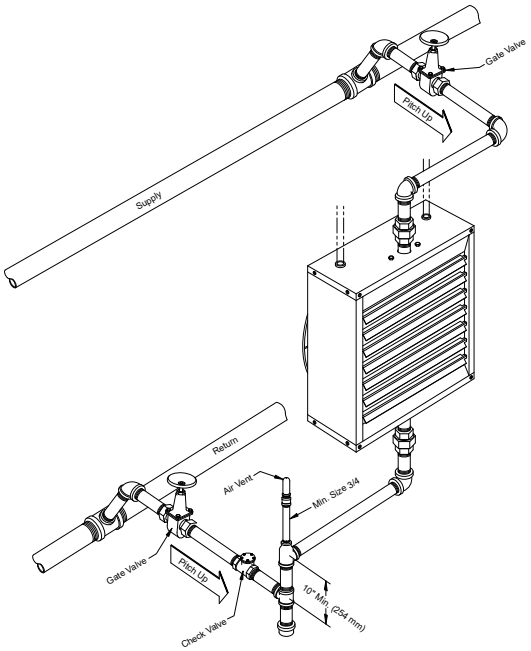


Figure 10. High pressure steam

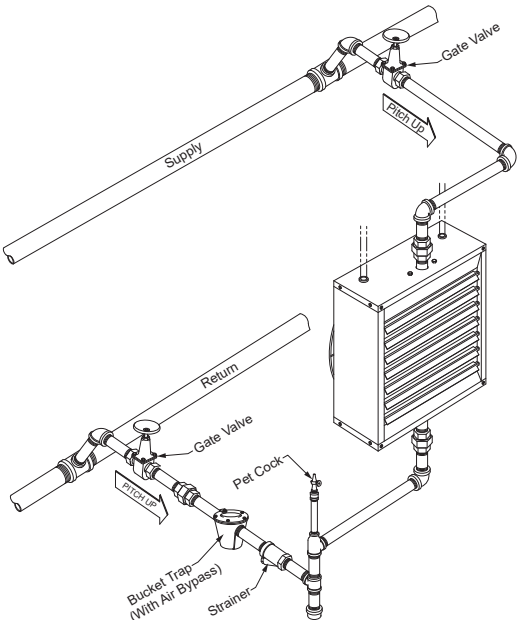


Figure 11. Low pressure vapor or vacuum

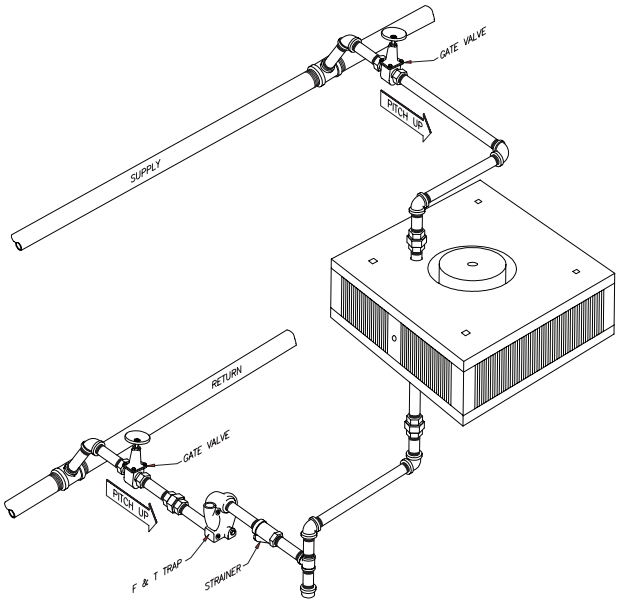
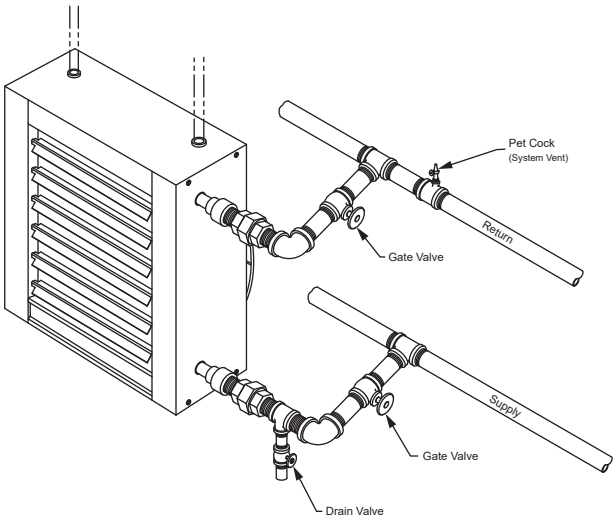


Figure 12. Forced hot water (serpentine units)



Selection Procedure

Trane Propeller Unit Heaters

Both Model S and Model P Propeller Unit Heaters are ideally suited to such a wide variety of installations that there can be no hard and fast rules regulating their selection. In determining the type and size of the units for any building, the following points are generally considered:

BTU Requirements

While the choice of units depends upon several important factors, the total Btu requirement is usually determined first. In calculating heat loss, methods as recommended by the ASHRAE Guide may be used, or any other procedure which is known to be acceptable.

Type of Building

Once the total Btu requirement is known, the type of building together with its architecture and its purpose is considered.

In the many cases where a combination of space characteristics is found, a combination of Model S and Model P Unit Heaters may be used to create the most satisfactory heating system.

The Model P Unit Heater has the natural ability to tap the reservoir of heated air which collects at the ceiling level and return it to active service in the floor zone.

The Model P can be used on either high or low ceilings. From high mounting positions the Model P will allow ample clearance for moving objects and can project heat down into occupied areas regardless of obstacles which would restrict the flow of air from horizontal units.

From low mounting positions the Model P, with proper diffusion, can be used without disturbing nearby occupants with direct blasts of high velocity heated air, or requiring return lines so low as to leave insufficient head room.

The superior horizontal action of the Model S, on the other hand, is ideal for creating a wiping effect of warm air along exposed walls which neutralizes drafts at their source, beaming heat down narrow aisles and production lines, and blanketing large windows, doors and other points of high heat loss.

Spacing of Units

It is the usual practice to divide the building into areas with like exposures, or in relation to heat load distribution desired.

In general, Model S Unit Heaters may be selected for buildings where direct horizontal air currents are desired and where there are no obstacles to interrupt the flow of air from the heaters.

Model P Unit Heaters are successfully used where high or low mounting heights are required and should ordinarily be specified with diffusers, depending upon the mounting height and application.

Mounting Heights

The maximum effective mounting height is determined by the outlet temperature of the air, the outlet velocity, the cfm for which the heater is designed, and if a diffuser is used – the setting of its blades.

The higher the outlet temperature of the air, the more difficult it is to force it down into the living zone.

The cfm also affects the mounting height as a large volume of air will travel farther than a small volume under the same initial conditions of temperature and velocity.

In the preliminary planning stages, it is well to remember that the lowest possible mounting height is desirable in order to get the most heat down to the floor line and to allow the greatest possible diffusion adjustment to provide tailor-made distribution for each area.

In providing for the use of diffusers please remember, adjustment of a Louver Cone Diffuser to deflect the air toward the horizontal immediately lowers the mounting height limit. Adjustment for lateral deflection with the Louver Fin Diffuser shortens the distance of throw.

Diffusion

The use of Trane Louver Cone or Louver Fin Diffusers influences the selection of units in two principal ways:

1. It is seldom necessary to install oversized heaters to extend the maximum effective mounting height of the Model P or the distance of throw of the Model S. Conversely, Trane Diffusers enable extremely low mounting since the adjustable blades direct heat where it is wanted without creating uncomfortable hot spots near the units.
2. After the original selection has been made, units may be located with confidence because adjustments in heat distribution are possible to accommodate future changes or unforeseen draft conditions.

Air Changes

Better diffusion and more even temperatures can be maintained in a heated space when the rate of air recirculation through the heaters is relatively high. For buildings where large numbers of people are engaged, it is desirable to provide for a greater number of air changes than for sparsely occupied areas. A greater number of small units are used where wide diffusion and even temperatures are necessary. A few centrally located units of large capacity would be used where there are few occupants.

Comfort Conditions and Economy

Air circulation, diffusion and spacing of units are closely related to economy and comfort in the selection of unit heaters. The more units used to provide the required number of Btu's, the more comfortable will be the conditions for personnel. On the other hand, a few large units can be selected to provide plenty of heat at low first cost, but may be slower in response and thorough distribution of heat. Here again, adjustable diffusion equipment can go a long way toward saving the buyer first cost expense while still providing completely satisfactory comfort conditions.

Formula

The following formula is used to arrive at final air temperature volume when 70° F (Standard Air Basis) is known or vice versa:

Cfm at final temp. =

$$\text{Cfm at } 70\text{F} \times \frac{460 + \text{Final temp}}{460 + 70}$$

Cfm at 70 F =

$$\text{Cfm final air} \times \frac{460 + 70}{460 + \text{Final temp}}$$

Determining Special Steam Capacities

Where capacity of the unit under standard conditions is known – 2 lbs. steam, 60 F entering air – and it is desired to know the capacity of this same unit under different steam and air conditions, follow instructions given in "Example 1," p. 17.

Where a set of conditions is given – Btu, temperature rise, final temperature, cfm, steam pressure available, etc. See "Example 2:," p. 19.

Useful Data

Btu/240=Sq. Ft. of radiation (EDR)

Btu/Latent heat=Lbs. of water per hour

Cfm x Temp. Rise x 1.085 = Btu.

Specific heat of air (70 F) = 0.241

Specific weight of one cubic foot of air (70 F) =0.075.

Cfm x 60 = cfh.

Therefore, 0.241 x 0.075 x 60 = 1.085

Example 1

Given: Model 60S Horizontal Propeller Unit Heater with a rated capacity of 60,000 Btu at 2 lbs. steam with 60° F entering air.

Desired: Capacity of this unit using 15 lbs. steam and 40° F entering air.

Selection Procedure

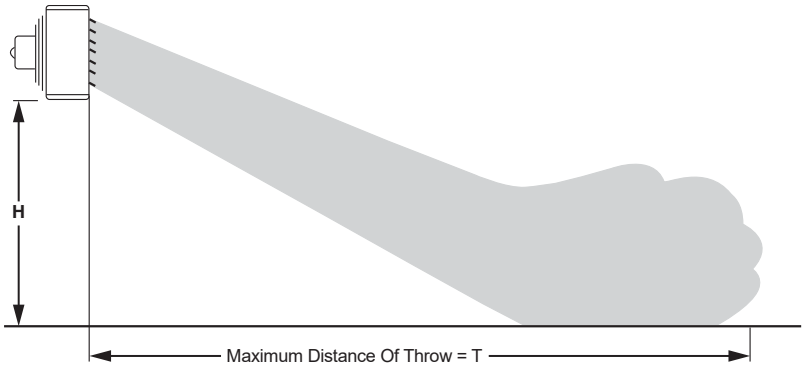
Under 40° F and across from 15 lbs. in Table 2, p. 20, we find the factor 1.34. 60,000 x 1.34 = 80,400 Btu per hour.

Table 1. Max. mounting heights and distance of throw for model s units (based on 2 lbs steam pressure 60°F entering Air)

Unit Size	Outlet Velocity (FPM)	CFM	Final Temp (°F)	Mounting Height (ft.)	Max Throw (ft.)
A08[a]	250	245	91	8	20
A18[a]	500	500	94	8	25
A25[a]	590	580	102	9	29
A36[a]	550	850	99	9	29
018	395	395	102	8	20
024	450	450	109	8	24
036	550	550	119	9	28
048	550	750	119	9	30
060	650	900	121	10	30
072	800	1100	120	10	29
084	900	1400	115	10	30
096	930	1400	123	11	38
108	1000	1800	115	11	40
120	900	1900	118	12	40
132	950	2000	121	13	54
144	1000	2200	120	13	55
156	1150	2600	115	13	55
180	800	2200	135	13	53
204	1000	2900	124	13	55
240	900	3500	123	14	57
280	980	4200	121	14	57
300	700	5000	117	15	58
360	1000	5500	120	15	60

[a] Serpentine type Model S units are hot water only. Values shown for these units are based on 200°F EWT, 60°F EAT, 20°F TD.

Figure 13.



Determining Amount of Condensate

To determine the amount of condensate, divide the capacity in BTU by the latent heat of steam:

80,400/945=85 lbs per hour.

945=Latent Heat of Steam at 15 psi. (See).

Determining Final Temperature

Final temperature of air leaving Trane Unit Heaters may be determined as follows:

Inlet Air Temp. + Btu rating/Cfm X 1.085=Final Temp

Inlet Air Temp. 40F + 80,400/900 (from Table 7, p. 24) X 1.085=Final Temp.

Example 2:

Problem: A Trane Model S Horizontal Unit Heater is desired to deliver 200,000 Btu per hour in a garage where ventilation is required. Entering air temperature is 40° F. Steam at 30 lbs. pressure is available. Temperature to be maintained is 70° F.

Solution: Under 40 F and across from 30 lbs. in Table 2, p. 20, find the factor 1.51.

Equivalent capacity of required unit at 2 lbs. steam 60° F entering air is

Required Btu per hour/F=200,000/ 1.51=132,500 Btu

From Table 7, p. 24, select a Number 132S Unit Heater with a capacity of 132,000 Btu per hour with standard coil, and at 2 lbs. steam and 60 F entering air.

The capacity of this unit at 30 lbs. steam and 40° F entering air is:

1.51 x 132,000 = 199,300 Btu per hour.

Surplus Capacity

While the ventilation load is being handled, any air entering the space over the desired room temperature should be considered in the heating calculations. This surplus capacity can be found by multiplying the difference between the final temperature leaving the heater and the room temperature to be maintained by 1.085 and that by the cfm. That amount of heat can be used to offset heat losses.

Model S

Maximum mounting heights for Model S Unit Heaters are given in Table 1, p. 18. When equipped with optional vertical louvers, direction of air flow can be adjusted both horizontally and vertically.

Mounting the unit at or below maximum mounting height will insure that heated air reaches the living zone.

Model P

Maximum mounting heights for Model P Unit Heaters are given in Table 4, p. 21. These distances are figured from the floor line to the bottom plate of the unit heater.

Where ceilings are unusually low, a nearly horizontal flow of air can be obtained by equipping these units with Louver Cone Diffusers. The individually adjustable blades of the Louver Cone permit an infinite variety of adjustments to meet any on-the-job problems. By setting the blades vertically to straighten the airstream, as much as 45% increase in throw can be obtained.

Hot Water Selection Example

Selection Procedure

Select the proper size of unit heater for whatever application desired, as illustrated by the following examples.

Select a Model S horizontal unit heater to deliver 95 MBh with 220°F entering water temperature (EWT), 70°F entering air temperature (EAT) and a 30°F water temperature drop (WTD).

1. Determine GPM: GPM=Btu/hr/ (485) WTD=95000/485x30=6.53
2. See to select the conversion factor at 220° EWT and 70° EAT. Factor is 1.06.
3. Determine equivalent MBh at standard conditions (200° EWT, 60° EAT). Equiv. MBh=MBh/ Factor=95/1.06=89.6.
4. Select unit size from Table 16, p. 29. Select the unit which will provide 89.6 MBh In this example, the selection indicates a Model S 132 unit heater.

To determine the actual capacity of this Model S 132 at operating conditions (220° EWT and 70° EAT) proceed as follows:

1. Determine the MBh at 6.53 GPM by applying factor from . Multiply this MBh by the water flow factor (95.8 MBh X .95=91.0 MBh).
2. Multiply this MBh by the conversion factor 91.0 X 1.06 = 96,500.
3. The GPM remains constant = 6.53 GPM.
4. Calculate the water temperature drop WTD=Btu/hr/GPM x 485 = 96,500/(6.53)(485) = 30.5.

Table 2. Factors for determining steam capacity of model s horizontal unit heaters at various pressures and temperatures (table based on 2 psig and 60°F entering air)

	Steam Pressure PSIG	Temperature of Entering Air (°F)							
		30	40	50	60	70	80	90	100
Blow Through Type	0	1.19	1.11	1.03	0.96	0.88	0.81	0.74	0.67
	2	1.24	1.16	1.08	1.00	0.93	0.85	0.78	0.71
	5	1.29	1.21	1.13	1.05	0.97	0.90	0.83	0.76
	10	1.38	1.29	1.21	1.13	1.06	0.98	0.91	0.84
	15	1.44	1.34	1.28	1.19	1.12	1.04	0.97	0.89
	20	1.50	1.42	1.33	1.25	1.17	1.10	1.02	0.95
	30	1.60	1.51	1.43	1.35	1.27	1.19	1.12	1.04
	40	1.68	1.60	1.51	1.43	1.35	1.27	1.19	1.12
	50	1.70	1.60	1.58	1.50	1.42	1.34	1.26	1.19
	60	1.81	1.73	1.64	1.56	1.47	1.39	1.31	1.24
	70	1.87	1.78	1.70	1.61	1.53	1.45	1.37	1.29
	75	1.90	1.81	1.72	1.64	1.55	1.47	1.39	1.32
	100	2.02	1.93	1.84	1.75	1.66	1.58	1.50	1.42
	125	2.11	2.02	1.93	1.84	1.76	1.68	1.59	1.51
	150	2.20	2.11	2.02	1.93	1.84	1.76	1.67	1.59

Note: To determine the Btu per hour capacity of a Model S Horizontal Unit Heater at any steam pressure and entering air temperature multiply rated capacity at 2 psig steam 60 F entering air (Table 7, p. 24) by factor from above table.

Table 3. Factors for determining steam capacity of model p projection unit heaters at various pressures and temperatures (table based on 2 PSIG and 60° F entering air)

	Steam Pressure PSIG	Temperature of Entering Air (°F)											
		-10	0	10	20	30	40	50	60	70	80	90	100
Draw-Through Unit	0	*1.49*	*1.41*	*1.33*	*1.25*	1.18	1.11	1.03	0.96	0.90	0.83	0.76	0.69
	2	*1.52*	*1.45*	*1.37*	*1.29*	1.22	1.15	1.07	1.00	0.93	0.86	0.80	0.73
	5	*1.58*	*1.50*	*1.42*	*1.34*	1.27	1.20	1.12	1.05	0.98	0.91	0.85	0.78
	10	1.64	1.57	1.49	1.41	1.34	1.27	1.19	1.12	1.05	0.98	0.91	0.85
	15	1.70	1.62	1.55	1.47	1.40	1.32	1.25	1.18	1.11	1.04	0.97	0.90
	20	1.75	1.67	1.60	1.52	1.45	1.37	1.30	1.23	1.16	1.09	1.02	0.96
	30	1.83	1.75	1.68	1.61	1.53	1.46	1.39	1.32	1.25	1.18	1.11	1.04
	40	1.90	1.82	1.75	1.68	1.61	1.53	1.46	1.39	1.32	1.25	1.18	1.11
	50	1.96	1.87	1.81	1.74	1.67	1.59	1.52	1.45	1.38	1.31	1.24	1.17
	60	2.02	1.94	1.87	1.79	1.72	1.64	1.57	1.50	1.43	1.36	1.29	1.22
	70	2.07	1.99	1.92	1.84	1.76	1.69	1.62	1.55	1.47	1.40	1.33	1.27
	75	2.10	2.02	1.94	1.86	1.79	1.71	1.64	1.57	1.49	1.42	1.36	1.29

Note: To determine the Btu per hour capacity of a Model P projection unit heater at any steam pressure and entering air temperature, multiply rated capacity at 2 psig steam 60 F entering air (Table 8, p. 25) by factor from Table 3, p. 21. Factors in italics: Units should not be operated when entering air is below freezing at steam pressures below 10 psig.

Table 4. Maximum mounting heights in feet for model p unit heaters with and without louver cone diffuser

	Steam Pressure (PSI)				
Unit Size	**2**	**5**	**10**	**50**	**75**
42-P	10.5	10.0	10.0	9.0	8.0
	12.5	**12.0**	**12.0**	**11.0**	**10.0**
42-P LS[a]	8.0	8.0	8.0	8.0	8.0
	9.0	**8.5**	**8.5**	**8.0**	**8.0**
42-P-L[b]	12.5	12.0	12.0	10.5	9.5
	14.5	**14.0**	**13.5**	**12.0**	**11.5**
42-P-L LS	9.0	8.5	8.5	8.0	8.0
	10.5	**10.0**	**10.0**	**9.0**	**8.5**
64-P	12.0	11.5	11.5	10.0	9.5
	14.5	**14.0**	**14.0**	**12.0**	**11.5**
64-P LS	9. 5	9.0	9.0	8.0	8.0
	11.5	**11.0**	**11.0**	**9.5**	**9.0**
64-P-L	15.0	14.5	14.5	12.5	12.0
	19.0	**18.5**	**18.5**	**16.5**	**16.0**
64-P-L LS	11.5	11.0	11.0	9.5	8.0
	14.0	**13.5**	**13.5**	**12.0**	**11.5**
80-P	15.0	14.5	14.0	12.0	11.5
	18.5	**18.0**	**17.5**	**15.5**	**13.5**
80-P LS	11.0	10.5	10.5	9.0	8.5
	13.5	**13.0**	**13.0**	**11.5**	**11.0**
80-P-L	18.0	17.5	17.5	15.0	14.0
	22.0	**21.0**	**21.0**	**19.0**	**18.0**
80-P-L LS	13.0	12.5	12.0	11.0	10.5
	17.0	**16.5**	**16.0**	**14.0**	**13.5**
102-P	14.0	13.5	13.0	11.5	11.0
	17.0	**16.5**	**16.0**	**14.0**	**13.5**
102-P LS	11.0	10.5	10.5	9.5	9.0
	13.5	**13.0**	**13.0**	**12.0**	**11.5**
102-P-L	17.5	17.0	16.5	15.0	14.5
	21.5	**21.0**	**20.5**	**18.5**	**17.5**

Table 4. Maximum mounting heights in feet for model p unit heaters with and without louver cone diffuser (continued)

102-P-L LS	15.0	14.5	14.5	13.0	12.5
	18.5	**18.0**	**18.0**	**16.0**	**15.0**
122-P	16.0	15.5	15.5	14.0	13.5
	19.5	**19.0**	**18.5**	**17.0**	**16.0**
122-P-L	21.0	20.5	20.0	17.5	17.0
	26.0	**25.5**	**25.0**	**22.5**	**21.5**
146-P	15.5	15.0	14.5	13.0	12.0
	19.0	**18.5**	**18.0**	**16.0**	**15.5**
146-P-L	18.0	17.5	17.5	15.0	14.0
	22.5	**22.0**	**21.5**	**18.5**	**18.0**
166-P	18.0	17.5	17.0	14.5	14.0
	22.5	**22.0**	**21.5**	**19.0**	**18.0**
166-P-L	22.0	21.5	21.0	18.5	17.5
	27.5	**27.0**	**26.5**	**23.5**	**22.5**
202-P	22.0	21.5	21.0	18.5	17.5
	27.5	**27.0**	**26.5**	**24.0**	**23.0**
202-P-L	25.5	25.0	24.5	22.0	21.0
	31.5	**31.0**	**30.5**	**27.0**	**26.0**
252-P	20.0	19.5	19.0	17.0	16.0
	25.0	**24.0**	**23.5**	**20.5**	**19.5**
252-P-L	24.0	23.5	23.0	20.0	19.0
	29.5	**28.5**	**28.0**	**24.5**	**23.5**
280-P	21.0	20.5	20.0	17.5	17.0
	26.0	**25.5**	**25.0**	**22.0**	**21.0**
280-P-L	25.5	25.0	24.5	21.0	20.0
	32.0	**31.0**	**30.0**	**26.0**	**25.0**
336-P	24.0	23.0	22.0	20.0	19.0
	30.0	**29.0**	**28.0**	**25.0**	**24.0**
336-P-L	29.0	28.5	28.0	25.0	24.0
	36.0	**35.0**	**34.0**	**30.0**	**29.0**
384-P	28.5	28.0	27.5	24.0	23.0
	35.5	**35.0**	**34.0**	**30.0**	**29.0**
384-P-L	32.5	31.5	30.5	27.5	26.5
	41.0	**40.0**	**39.0**	**35.0**	**33.5**
500-P	29.5	29.0	28.5	25.0	24.0
	36.5	**36.0**	**35.5**	**32.0**	**30.5**
500-P-L	35.0	34.0	33.0	29.0	28.0
	43.5	**42.5**	**41.5**	**35.0**	**34.0**
600-P	34.0	33.0	32.0	28.0	27.0
	42.5	**41.5**	**40.5**	**36.0**	**34.5**

Table 4. Maximum mounting heights in feet for model p unit heaters with and without louver cone diffuser (continued)

600-P-L	37.0	36.0	35.0	31.0	30.0
	46.5	**45.5**	**44.5**	**39.0**	**37.0**
720-P	38.5	37.5	36.5	32.0	30.5
	48.0	**47.0**	**46.0**	**40.0**	**39.0**
720-P-L	42.5	41.5	40.5	35.0	33.5
	53.0	**52.0**	**51.0**	**44.0**	**42.0**

(a) LS = Low speed.

(b) PL = Model P low final temperature model with all air ports open. Figures in bold face show maximum mounting height with louver cone diffusers set vertically. To meet ETL and OSHA requirements, Model P Unit Heaters mounted lower than 8.0 ft. from the floor must be equipped with an OSHA fan guard. This data is based on 60° F entering air temperature. In providing for the use of diffusers, it must be remembered that adjustment of a LCD to deflect air toward horizontal immediately lowers the mounting height limit.

Table 5. Maximum spread in feet

Unit Size: P	42	64	80	102	122	146	166	202	252	280	336	384	500	600	720
Spread ft	15	17	20	24	26	27	28	32	35	37	45	50	54	57	60

Additional Selection Data

Motor and Fan Speeds

Motor and fan speeds are selected to provide efficient performance. The solid-state speed control will provide an infinite number of speeds between the highest and the lowest cataloged fan speeds. The speed control is not calibrated in specific fan speeds. For use on units with 115 volt/60 cycle/1 phase, 1/8 hp and smaller standard motors only.

Standard and Bypass Units

Standard models meet most requirements and are most economical. Bypass units meet conditions as mentioned above, and are also used where low final temperature is specified.

25 and 50 Cycle Unit Heat Capacities

Table 6, p. 23 shows the Btu, cfm, and the hp required on unit heaters when operated on 25 or 50 cycle circuits. The multipliers in Table 6, p. 23 may be applied to standard 60 cycle unit capacities to determine the capacities of the same unit when operating on 25 or 50 cycle current. These multipliers may be used on units cataloged at 1050 to 1150 RPM.

For the smaller Trane Unit Heaters cataloged at 1550 RPM, the capacity data in the catalog may be applied to either 25 or 50 cycle service.

Table 6. Factors for determining unit heater capacities at 25 or 50 cycles

RPM		Multiplier to be applied to 60-cycle 1100 RPM Ratings		
25 CY	**50 CY**	**BTU**	**CFM**	**HP**
1425	1425	1.17	1.25	1.95
—	950	0.87	0.833	0.572
710	710	0.7	0.623	0.242

Performance Data

Steam Performance Data

Horizontal Unit Heaters

Table 7. Standard units

Model No.	Total MBh	Cond. lbs./hr.	E.D.R. Sq. Ft.	LAT °F	Motor HP	Motor RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
S-18	18,000	18.0	75	102	16 Watts	1550	395	395	II
	16,200	16.2	68	105		1350	330	330	I
S-24	24,000	24.5	100	109	16 Watts	1550	450	450	II
	21,600	22.0	90	112		1350	380	380	I
S-36	36,000	37.0	150	119	25 Watts	1550	550	550	II
	32,400	33.0	135	120		1350	480	480	I
S-48	48,000	49.0	200	119	1/20	1000	750	550	II
	43,200	44.0	180	123		900	630	460	I
S-60	60,000	61.0	250	121	1/20	1000	900	650	II
	54,000	55.0	225	131		900	700	510	I
S-72	72,000	73.0	300	120	1/20	1000	1100	800	II
	64,800	66.0	270	123		900	950	700	I
S-84	84,000	85.0	350	115	1/12	1000	1400	900	III
	75,600	76.0	315	123		900	1100	750	II
S-96	96,000	97.0	400	123	1/12	1000	1400	930	III
	86,400	88.0	360	132		900	1100	800	II
S-108	1,08,000	110.0	450	115	1/12	1000	1800	1000	III
	97,200	98.0	405	120		900	1500	900	II
S-120	1,20,000	122.0	500	118	1/3	1140	1900	900	III
S-132	1,32,000	134.0	550	121	1/3	1140	2000	950	IV
S-144	1,44,000	146.0	600	120	1/3	1140	2200	1000	IV
S-156	1,56,000	160.0	650	115	1/3	1140	2600	1150	IV
S-180	1,80,000	190.0	770	135	1/3	1140	2200	800	III
S-204	2,04,000	208.0	850	124	1/3	1140	2900	1000	IV
S-240	2,40,000	244.0	1000	123	1/3	1140	3500	900	IV
S-280	2,80,000	280.0	1100	121	1/2	1100	4200	980	IV
S-300	3,00,000	310.0	1250	117	1/2	1100	5000	700	IV
S-360	3,60,000	366.0	1500	120	1/2	1100	5500	1000	IV

Notes:

1. Performance based on two-pound steam pressure at heater with air entering @ 60° F (max working pressure 150 PSI, 320° F)
2. For Sound Ratings, see the Technical and Mounting Data-portion of this chapter.
3. For the lower output, an optional Speed Controller must be ordered.

Vertical Unit Heaters

Table 8. Standard units

Model No.	Total MBh	Cond.lbs./hr	Sq. ft.	LAT °F	Motor HP	Motor RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
P-42	41,300	43	172	124	1/40	1550	595	877	I
	33,600	*55*	*140*	*131*		*1150*	*436*	*658*	
P-64	65,500	68	273	121	1/20	1550	989	1005	II
	52,800	*55*	*220*	*129*		*1150*	*706*	*727*	
P-80	80,600	83	336	122	1550	1550	1200	1220	II
	65,100	*67*	*271*	*130*	*1/20*	*1150*	*858*	*894*	
P-102	101,800	106	424	123	1/8	1070	1490	980	II
	87,900	*91*	*366*	*129*		*850*	*1180*	*783*	
P-122	124,400	129	518	124	1/6	1100	1790	1170	III
P-146	152,000	157	633	123	1/6	1100	2220	1045	III
P-166	173,000	179	720	121	1/6	1100	2620	1230	IV
P-202	210,200	208	838	118	1/4	1100	3200	1495	III
P-252	249,800	260	1040	115	1/4	1100	4180	1205	IV
P-280	283,800	294	1180	119	1/2	1100	4430	1275	IV
P-336	333,400	345	1390	119	3/4	1140	5210	1500	IV
P-384	386,000	400	1610	118	3/4	1140	6140	1770	IV
P-500	496,000	514	2070	117	1-1/2	1160	8020	1640	IV
P-600	585,000	605	2440	117	1-1/2	1160	9450	1930	IV
P-720	705,000	729	2940	119	3	1165	11,000	2250	IV

Notes:

1. Performance based on two-pound steam pressure at heater with air entering @ 60°F.
2. Constant speed units are rated at capacities shown in regular type; capacities shown in italic faced type apply only to units with multi-speed motors.
3. To determine BTU per hour capacities at various steam pressures and entering air temperatures, use conversion factors from . Final temperatures at new conditions can be calculated by applying basic formula.

Table 9. Low output units: standard model units with all air ports open

Model No.	Total MBh	Cond.lbs./hr	Sq. ft.	LAT °F	Motor HP	Motor RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
P-42L	34.8	36	145	108	1/40	1150	668	950	I
	26.0	*27*	*108*	*111*		*1550*	*470*	*672*	
P-64L	57.2	59	238	104	1/20	1150	1200	1190	I
	45.8	*48*	*191*	*109*		*1550*	*862*	*858*	
P-80L	68.0	71	283	106	1/20	1150	1360	1350	II
	55.0	*57*	*229*	*111*		*1550*	*995*	*992*	
P-102L	85.4	89	356	108	1/8	1070	1640	1050	II
	71.2	*74*	*296*	*111*		*850*	*1290*	*827*	

Table 9. Low output units: standard model units with all air ports open (continued)

Model No.	Total MBh	Cond.lbs./hr	Sq. ft.	LAT °F	Motor HP	Motor RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
P-122L	111.0	115	462	107	1/6	1100	2180	1390	III
P-146L	125.0	130	524	109	1/6	1100	2360	1080	III
P-166L	149.0	154	620	107	1/6	1100	2920	1340	IV
P-202L	176.8	183	736	108	1/4	1100	3390	1560	III
P-252L	214.9	224	895	104	1/4	1100	4500	1270	IV
P-280L	251.8	260	1050	106	1/2	1100	5040	1420	IV
P-336L	291.0	302	1210	107	3/4	1140	5700	1610	IV
P-384L	344.0	356	1430	108	3/4	1140	6600	1870	IV
P-500L	428.0	446	1785	102	1-1/2	1160	9380	1860	IV
P-600L	515.0	533	2140	106	1-1/2	1160	10,300	2060	IV
P-720L	620.0	642	2580	108	3	1165	11,900	2380	IV

Notes:

1. Constant speed units are rated at capacities shown in regular type; capacities shown in italic faced type apply only to units with multi-speed motors.
2. To determine BTU per hour capacities at various steam pressures and entering air temperatures, use conversion factors from . Final temperatures at new conditions can be calculated by applying basic formula.

Steam Calculations and Correction Factors

Model P

Table 10. Steam calculations

				EXAMPLE: – UNIT SIZE _____P-42 Steam Pressure ____10 PSI Entering Air Temp. ___40°F
1.	**Capacity**	A. For 2 lbs. steam, 60°F entering air	Read output directly from Table 8, p. 25: 41,300 BTU/HR.	
		B. For higher steam pressures and/or EAT's above or below 60°F	Multiply output from Table 8, p. 25 by appropriate correction factor from Table 11, p. 27.	41,300 x 1.27 = 52,451 BTU/HR.
2.	**Final Air Temperature**	A. For 2 lbs. steam, 60°F entering air	Read temperature directly from Table 8, p. 25: 124°F.	
		B. For capacities calculated in 1.B. (above)	Output from 1.B./1.085 x CFM from Table 8, p. 25+ E.A.T. = Final Air Temp	52,451/1.085 x 595 + 40 = 121.0°F
3.	**Final Air Volume**	A. For 2 lbs. steam, 60°F entering air	460 + Final Air Temp from Table 8, p. 25 /530 x Nom. CFM from Table 8, p. 25 = Final Air Volume	460 + 124/530 x 595 = 655 CFM
		B. For final air temperatures calculated In 2.B. (above)	460 + Final Air Temp from 2.B./530 x Nom. CFM from Table 8, p. 25 = Final Air Volume	460 + 121.0/530 x 595 = 652 CFM
4.	**Condensation Per Hour**	A. For 2 lbs. steam, 60°F entering air	Read lbs. per hour from Table 8, p. 25: 43 LBS./HR.	
		B. For capacities calculated in 1.B. (above)	Output from 1.B./Latent Heat from Table 12, p. 27= lbs. per hour of condensate	52,451/953 = 55.0 LBS./HR.

Table 11. Steam correction factors based on 2 lbs. steam 60°F E.A.T.

Steam pressure - lbs. per sq. in. (saturated)										
Entering Air Temp (°F)	**0**	**2**	**5**	**10**	**15**	**20**	**30**	**40**	**50**	**75**
30°	1.18	1.22	1.27	1.34	1.40	1.45	1.53	1.61	1.67	1.79
40°	1.11	1.15	1.20	1.27	1.32	1.37	1.46	1.53	1.59	1.71
50°	1.03	1.07	1.12	1.19	1.25	1.30	1.39	1.46	1.52	1.64
60°	0.96	1.00	1.05	1.12	1.18	1.23	1.32	1.39	1.45	1.57
70°	0.90	0.93	0.98	1.05	1.11	1.16	1.25	1.32	1.38	1.49
80°	0.83	0.86	0.91	0.98	1.04	1.09	1.18	1.25	1.31	1.42
90°	0.76	0.80	0.85	0.91	0.97	1.02	1.11	1.18	1.24	1.36
100°	0.69	0.73	0.78	0.85	0.90	0.96	1.04	1.11	1.17	1.29

Table 12. Properties of saturated steam

	Steam pressure in lbs. per square inch gauge									
	0	2	5	10	15	20	30	40	50	75
Steam Temperature-°F	212.0	218.5	227.1	239.4	249.8	258.8	274.0	286.7	297.7	319.9
Latent Heat of Steam	970	966	961	953	946	940	929	920	912	891

Notes:

- *Ratings apply only to free inlet and discharge without diffusers.*
- *All motors are constant speed and operate at top speed as indicated in motor data. Sizes 42 through 102 can be run at a 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. Sizes 166 through 720 operate at constant speed as indicated in motor data.*
- *For specific motor data, refer to motor specifications at the end of this chapter.*
- *To correct for entering air temperatures, use 1° temperature rise for each foot in mounting height. As an example, 60° air is required at work area (5 ft. above floor) units are to be mounted at (20 ft.) above floor. Mounting height (20 ft.) minus work height (5 ft.) equals differential (15 ft.) or, 15° rise in air temperature at unit air inlet. Correct for actual inlet air temperature of 75° (60° + 15° = 75° E.A.T.) on .*

Model S

Table 13. 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. 24: 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. 24 by appropriate correction factor from Table 14, p. 28.	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. 24, 109°F. (Ref., Std. 24).	
		B. For capacities calculated in 1.B. (above)	$\frac{\text{Output from 1. B.}}{\text{1.085 x CFM from "Steam Performance Data," p. 24}}$ + EAT = Final Air Temp	$\frac{30{,}960}{1.085 \times 450}$ + 40 = 103.4°F

Table 13. Steam calculations (continued)

3.	**Final Air Volume**	A. For 2 lbs. steam, 60°F entering air	460 + Final Air Temp from "Steam Performance Data," p. 24 / 530 + Nom. CFM from "Steam Performance Data," p. 24= Final Air Volume	460 + 109 / 530 x 450 = 483 CFM
		B. For final air temperatures calculated In 2.B. (above)	460 + Final Air Temp 2.B. / 530 + Nom. CFM from "Steam Performance Data," p. 24= Final Air Volume	460 + 103.4 / 530 x 450 = 478 CFM
4.	**Condensation Per Hour**	A. For 2 lbs. steam, 60°F entering air	Read lbs. per hour from "Steam Performance Data," p. 24: 24.5 lbs./ hr (Ref., Std. 24).	
		B. For capacities calculated in 1.B. (above)	Output from 1. B. / Latent heat from Table 15, p. 28 = lbs. per hour of condensate	30,960 / 953 = 32.5 lbs./hr

Table 14. 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
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 15. 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

Horizontal Unit Heaters

Table 16. Standard output units

Model No.	Total MBh	GPM	LAT °F	WPD	Motor HP	RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
S-A08	8.0	0.80	91	0.80	16 Watts	1550	245	250	II
	6.8		90			1350	210	215	I
S-A18	18.4	1.9	94	2.2	16 Watts	1550	500	500	II
	15.7		96			1350	420	420	I
S-A25	24.8	2.5	102	2.2	25 Watts	1550	580	590	II
	21.2		106			1350	460	450	I
S-A36	35.9	3.6	99	3.0	1/20	1000	850	550	II
	32.3		100			900	750	480	I
S-18	13.1	1.3	95	0.005	16 Watts	1550	395	395	II
	11.7		99			1350	350	350	I
S-24	17.4	1.8	96	0.014	16 Watts	1550	450	450	II
	15.6		98			1350	380	380	I
S-36	26.1	2.7	103	0.09	25 Watts	1550	550	550	II
	23.5		103			1350	480	480	I
S-48	34.8	3.5	103	0.12	1/20	1000	750	550	II
	31.3		111			900	630	460	I
S-60	43.6	4.4	105	0.17	1/20	1000	900	650	II
	39.2		112			900	700	510	I
S-72	52.3	5.3	104	0.23	1/20	1000	1100	800	II
	47.0		106			900	950	700	I
S-84	61.0	6.1	100	0.24	1/12	1000	1400	900	III
	54.9		106			900	1100	750	II
S-96	69.7	7.0	106	0.29	1/12	1000	1400	930	III
	62.7		113			900	1100	800	II
S-108	78.4	7.9	100	0.36	1/12	1000	1800	1000	III
	70.5		103			900	1500	900	II
S-120	87.1	8.8	102	0.39	1/3	1140	1900	900	III
S-132	95.8	9.6	104	0.41	1/3	1140	2000	950	IV
S-144	104.0	10.4	104	0.43	1/3	1140	2200	1000	IV
S-156	113.0	11.3	100	0.53	1/3	1140	2600	1150	IV
S-180	118.0	11.8	110	0.60	1/3	1140	2200	800	III
S-204	148.1	14.9	107	0.79	1/3	1140	2900	1000	IV

Table 16. Standard output units (continued)

Model No.	Total MBh	GPM	LAT °F	WPD	Motor HP	RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
S-240	174.0	17.4	106	1.06	1/3	1140	3500	900	IV
S-280	209.1	21.0	106	1.33	1/2	1100	4200	980	IV
S-300	230.0	23.0	102	2.1	1/2	1100	5000	700	IV
S-360	261.3	26.2	103	2.1	1/2	1100	5500	1000	IV

Notes:
1. Performance based on 200°F EWT, 60°F E.A.T., 20°F WTD.
2. For the lower output, an optional Speed Controller must be ordered.

Vertical Unit Heaters

Table 17. Standard output units

Model No.	Water Temp. Drop	Total MBh	GPM	WPD	LAT °F	Motor HP	RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
P-42	10°	28.8	5.93	0.37	104.6°	1/40	1550	595	877	I
	20°	22.7	2.34	0.06	95.2°					
	30°	16.7	1.15	0.02	85.9°					
P-42[a]	10°	22.9	4.71	0.24	108.3°	1/40	1150	436	658	I
	20°	18.1	1.87	0.04	98.3°					
	30°	13.4	0.92	0.01	88.4°					
P-64	10°	48.1	9.92	1.05	104.8°	1/20	1550	989	1005	II
	20°	39.6	4.08	0.19	96.9°					
	30°	31.1	2.14	0.06	89.0°					
P-64[a]	10°	38.1	7.85	0.67	109.7°	1/20	1150	706	727	II
	20°	31.5	3.24	0.13	101.1°					
	30°	24.8	1.71	0.04	92.4°					
P-80	10°	58.7	12.11	0.98	105.1°	1/20	1550	1200	1220	II
	20°	48.4	4.99	0.18	97.2°					
	30°	38.1	2.62	0.05	89.3°					
P-80[a]	10°	46.5	9.59	0.63	110.0°	1/20	1150	858	894	II
	20°	38.5	3.97	0.12	101.2°					
	30°	30.5	2.09	0.03	92.7°					
P-102	10°	77.2	15.91	2.06	106.6°	1/8	1070	1528	980	II
	20°	68.3	7.03	0.44	101.2°					
	30°	59.3	4.08	0.16	95.8°					
P-102[a]	10°	63.7	13.13	1.43	108.6°	1/8	850	1208	783	II
	20°	56.5	5.82	0.31	103.1°					
	30°	49.2	3.38	0.11	97.6°					
P-122	10°	94.9	19.55	3.04	108.9°	1/6	1100	1790	1170	III
	20°	83.7	8.63	0.65	103.1°					
	30°	72.5	4.98	0.23	97.3°					

Table 17. Standard output units (continued)

Model No.	Water Temp. Drop	Total MBh	GPM	WPD	LAT °F	Motor HP	RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
P-146	10°	117.6	24.24	4.32	108.8°	1/6	1100	2220	1045	III
	20°	105.2	10.84	0.96	103.7°					
	30°	92.8	6.38	0.36	98.5°					
P-166	10°	132.4	27.29	3.67	106.6°	1/6	1100	2620	1230	IV
	20°	118.6	12.22	0.81	101.7°					
	30°	104.8	7.20	0.30	96.9°					
P-202	10°	156.2	32.20	5.02	105.0°	1/4	1100	3200	1495	III
	20°	139.7	14.40	1.11	100.2°					
	30°	123.2	8.47	0.41	95.5°					
P-252	15°	188.9	25.95	3.92	101.8°	1/4	1100	4162	1205	IV
	20°	180.1	18.56	2.10	99.9°					
	30°	162.7	11.18	0.82	96.0°					
P-280	15°	215.4	29.60	5.02	104.8°	1/2	1100	4430	1275	IV
	20°	205.4	21.17	2.68	102.7°					
	30°	185.3	12.73	1.04	98.5°					
P-336	10°	254.9	35.03	6.88	105.1°	3/4	1140	5210	1500	IV
	20°	242.9	25.03	3.67	103.0°					
	30°	218.9	15.04	1.42	98.7°					
P-384	10°	294.7	40.49	6.60	104.2°	3/4	1140	6140	1770	IV
	20°	280.8	28.94	3.52	102.2°					
	30°	253.1	17.39	1.36	98.0°					
P-500	10°	—	—	—	—	1-1/2	1160	8020	1640	III
	20°	368.1	37.93	5.81	102.3°					
	30°	333.6	22.92	2.29	98.3°					
P-600	15°	451.2	62.00	8.78	104.0°	1-1/2	1160	9450	1930	IV
	20°	431.1	44.43	4.72	102.0°					
	30°	391.0	26.86	1.86	98.1°					
P-720	15°	—	—	—	—	3	1165	11,000	2250	IV
	20°	519.4	53.52	5.29	103.5°					
	30°	470.9	32.35	2.08	99.5°					

Notes:

1. For capacities at other conditions, use the correction multipliers in Table 19, p. 33, Table 20, p. 34, Table 21, p. 34,Table 22, p. 34, and Table 23, p. 34.

2. Performance based on 200°F EWT, 20°F T.D., 60°F E.A.T. Performance at 10°F and 30°F T.D. is also shown.

(a) Speed controller option is required for reduced ratings.

Table 18. Low output units standard model p units with all air ports open

Model No.	Water Temp. Drop	Total MBh	GPM	WPD	LAT °F	Motor HP	RPM	Nominal CFM	Outlet Velocity FPM	Sound Rating
P-42L	10°	23.9	4.92	0.26	92.9°	1/40	1550	668	950	I
	20°	18.9	1.95	0.04	86.1°					
	30°	14.0	0.96	0.01	79.3°					
P-42L[a]	10°	16.7	3.45	0.13	92.8°	1/40	1150	470	672	I
	20°	13.5	1.39	0.02	86.4°					
	30°	—	—	—	—					
P-64L	10°	41.5	8.56	1.05	104.8°	1/20	1550	1200	1190	II
	20°	34.2	3.53	0.80	91.9°					
	30°	27.0	1.85	0.15	86.3°					
P-64L[a]	10°	32.4	6.68	0.04	80.7°	1/20	1150	862	858	II
	20°	26.9	2.77	0.50	94.7°					
	30°	21.3	1.46	0.09	88.7°					
P-80L	10°	48.9	10.09	0.03	82.8°	1/20	1550	1360	1350	II
	20°	40.5	4.17	0.69	93.2°					
	30°	32.0	2.20	0.13	87.4°					
P-80L[a]	10°	38.5	7.94	0.04	81.7°	1/20	1150	995	992	II
	20°	32.0	3.29	0.44	95.7°					
	30°	25.4	1.75	0.08	89.6°					
P-102L	10°	63.7	13.13	0.02	83.5°	1/8	1070	1752	1050	II
	20°	56.5	5.82	1.43	93.5°					
	30°	49.2	3.38	0.31	89.7°					
P-102L[a]	10°	54.5	11.24	0.11	85.9°	1/8	850	1499	783	II
	20°	48.5	4.99	1.06	93.5°					
	30°	42.4	2.91	0.23	89.8°					
P-122L	10°	83.7	17.24	0.08	86.1°	1/6	1100	2180	827	III
	20°	73.9	7.62	0.51	91.3					
	30°	64.2	4.41	0.18	87.1°					
P-146L	10°	95.4	19.66	2.92	97.3°	1/6	1100	2360	1080	III
	20°	85.5	8.81	0.65	93.4°					
	30°	75.6	5.20	0.24	89.5°					
P-166L	10°	112.3	23.15	2.70	95.4°	1/6	1100	2920	1340	IV
	20°	100.7	10.38	0.60	91.8°					
	30°	89.2	6.13	0.22	88.1°					
P-202L	10°	135.8	27.98	3.85	96.9°	1/4	1100	3390	1560	III
	20°	121.8	12.52	0.85	93.0°					
	30°	107.3	7.37	0.32	89.2°					
P-252L	15°	168.5	34.72	6.75	94.5°	1/4	1100	4507	1270	IV
	20°	153.8	15.85	1.56	91.4°					
	30°	139.1	9.56	0.61	88.4°					
P-280L	15°	188.9	25.95	3.92	94.5°	1/2	1100	5040	1420	IV
	20°	180.1	18.56	2.10	92.9°					
	30°	162.7	11.18	0.82	89.7°					
P-336L	10°	220.9	30.35	5.26	95.7°	1/6	1100	5700	1610	III
	20°	210.6	21.70	2.81	94.1°					
	30°	189.9	13.05	1.09	90.7°					
P-384L	10°	260.7	35.82	5.24	96.4°	1/6	1100	6600	1870	IV
	20°	248.5	25.61	2.80	94.7°					
	30°	224.2	15.40	1.09	91.3°					

Table 18. Low output units standard model p units with all air ports open (continued)

P-500L	10°	—	—	—	—	1-1/2	1160	9380	1860	IV
	20°	310.5	32.00	4.23	90.5°					
	30°	281.7	19.35	1.67	87.7°					
P-600L	10°	394.4	54.19	6.83	95.3°	1-1/2	1160	10,300	2060	IV
	20°	377.0	38.85	3.68	93.7°					
	30°	342.2	23.51	1.45	90.6°					
P-720L	10°	—	—	—	—	3	1165	11,900	2380	IV
	20°	453.7	46.76	4.11	95.1°					
	30°	411.7	28.28	1.62	91.9°					

Notes:

1. For capacities at other conditions, use the correction multipliers in Table 19, p. 33, Table 20, p. 34, Table 21, p. 34, Table 22, p. 34, and Table 23, p. 34.

2. Performance based on 200°F EWT, 20°F T.D., 60°F E.A.T. Performance at 10°F and 30°F T.D. is also shown.

(a) Speed controller option is required for reduced ratings

Hot Water Calculations and Correction Factors

Model P

Table 19. Hot water calculations and correction factors

				Example: Unit Size — P-42 Entering Water Temp. — 160°F Entering Air Temp. — 40°F Water Temperature Drop — 10°F
1.	**Capacity @ 20°F TD:**	A. For 200°F EWT, 60°F EAT	Read output directly from Table 17, p. 30 and Table 18, p. 32, 22,700 BTU/HR (Ref., Std. P-42, p. 22).	
		B. For EWT and/or EAT above or below Standard	Multiply output from Table 17, p. 30 and Table 18, p. 32 by factor from Table 20, p. 34.	22,700 x .878 = 19,931 BTU/HR.
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 21, p. 34	1.A.- 22,700 x 1.15 = 26,105 BTU/HR. -OR 1.B.- 19,931 x 1.15 = 22,921 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 17, p. 30 by appropriate factor from Table 21, p. 34	2.34 x 2.30 = 5.38 GPM (Applies only to units with. Std. 200°F EWT, 60°F EAT.) For all others calculate using formula - GPM = BTU/500 x TD
4.	**Pressure loss at other TD's**	ForTD's from 5 to 60°F	Multiply P.D. of unit for 20°F TD, from Table 17, p. 30 and Table 18, p. 32 by appropriate factor from Table 21, p. 34	0.06 x 5.00 = 0.30 Ft. H_2O

Table 20. Hot water conversion factors based on 200°F entering water 60°F entering air 20°F temperature drop

	Entering water temperature — 20°F water temperature drop										
Entering Air Temperature (°F)	**100°**	**120°**	**140°**	**160°**	**180°**	**200°**	**220°**	**240°**	**260°**	**280°**	**300°**
30°	0.518	0.666	0.814	0.963	1.120	1.268	1.408	1.555	1.702	1.850	1.997
40°	0.439	0.585	0.731	0.878	1.025	1.172	1.317	1.464	1.609	1.755	1.908
50°	0.361	0.506	0.651	0.796	0.941	1.085	1.231	1.375	1.518	1.663	1.824
60°	0.286	0.429	0.571	0.715	0.857	1.000	1.143	1.286	1.429	1.571	1.717
70°	0.212	0.353	0.494	0.636	0.777	0.918	1.060	1.201	1.342	1.483	1.630
80°	0.140	0.279	0.419	0.558	0.698	0.837	0.977	1.117	1.257	1.397	1.545
90°	0.069	0.207	0.345	0.483	0.621	0.759	0.897	1.035	1.173	1.311	1.462
100°	0	0.137	0.273	0.409	0.546	0.682	0.818	0.955	1.094	1.230	1.371

To obtain the BTU capacity for conditions other than those in the basic capacity tables, multiply the basic rating (200°F entering water, 60°F entering air) by the proper constant from Table 20, p. 34.

Table 21. Hot water btu, gpm and pressure loss factors based on standard conditions of 200°F entering water 60°F entering air and 20°F water drop

Use factors from this table to obtain approximate results	Temperature Drop °F								
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**
To obtain btu for other water temperature drops, multiply basic btu rating by applicable factor.	1.25	1.15	1.08	1.00	0.94	0.90	0.83	0.76	0.72
To obtain GPM for other water temperature drops, multiply basic GPM 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 of water for other temperature drops, multiply basic loss at 20° drop by factor.	10.00	5.00	2.00	1.00	0.60	0.40	0.20	0.13	0.07

Table 22. Minimum water flow - GPM

Model No.	42	64	80	102	146	166	202	252	336	384	500	600	700
Min. GPM	0.55	0.55	0.55	0.55	0.82	0.82	1.10	1.10	1.10	1.10	1.0	1.4	1.6

Table 23. Heating capacity factors for various rates of water flow

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

Model S

Table 24. 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 16, p. 29, 17,400 BTU/HR (Ref., Std. 24).	
		B. For EWT and/or EAT above or below standard	Multiply output from Table 16, p. 29 by factor from Table 26, p. 35	17,400 x .878 = 15,277 BTU/HR.
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 16, p. 29.	1.A. - 17,400 x 1.15 = 20,010 BTU/HR. – OR – 1.B. - 15,277 x 1.15 = 17,569 BTU/HR.

Table 24. Hot water calculations (continued)

3.	**GPM at other TD's**	For TD's from 5 to 60°F	Multiply GPM of unit for 20°F TD, from Table 16, p. 29 by appropriate factor from Table 26, p. 35	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: $GPM = \frac{BTU}{500 \times TD}$
4.	**Capacity at other rates of water flow**		Multiply output from Table 16, p. 29 by factor from Table 28, p. 36	
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 16, p. 29 by appropriate factor from Table 26, p. 35	.014 x 5.00 = .07 Ft. H_20

Table 25. 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 26. 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 27. 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 28. 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

Technical and Mounting Data

Horizontal Unit Heaters

Technical Data

The performance data listed in Table 16, p. 29, Table 17, p. 30, and Table 18, p. 32 include 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 29. Sound rating

Category 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, etc.

Table 30. Corrections when using glycol solution in system

		Propylene Glycol
Heat transfer @ 180°F with no increase inflow rate	20% solution	0.97[a]
	50% solution	0.90[a]
G.P.M. Req'd. @ 180°F, 20°F Δ t (no correction to pump curve)		1.10%[a]
Pump Head Req'd. @ 180°F with increase in G.P.M.		1.23%[a]

Table 30. Corrections when using glycol solution in system (continued)

		Propylene Glycol
Specify gravity (water = 1.0)		1.045 to 1.055[a]
Pounds/Gallons @ 60°F (water = 8.3453 Pound/Gallon)		8.77
pH @ 50% by volume		9.5
Freezing Point by volume	55%	—
	50%	-28°F
	40%	-13°F
	30%	+ 4°F
	20%	+17°F

[a] Compared to water.

Table 31. Approximate factors at varying altitudes

Altitude	Factor
Sea level - 1000 ft.	1.00
1000 ft. - 3000 ft.	0.958
3000 ft. - 5000 ft.	0.929
5000 ft. - 7000 ft.	0.900
7000 ft. - 10000 ft.	0.871

Motor Characteristics Data

Horizontal Unit Heaters

Table 32. Totally enclosed motor type

S Unit Model No.	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

Notes:

1. All motors are constant speed and operate at top speed as indicated in motor data. Models 18 through 108, excluding 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. All 1/4 H.P. motors are P.S.C.
2. Motors under 1/3 H.P. are totally enclosed, frame mounted, 115/1/60 with thermal overload protection and permanently lubricated sleeve bearings with optional speed controller available. 1/3 H.P. (115/1/60) motors are open frame constant speed with thermal over-load protection and ball bearings. 1/3 H.P. (230V) and 1/2 H.P. (230V) motors are open frame constant speed with thermal overload protection and ball bearings.
3. 1/3 and 1/2 H.P. 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 H.P. motors operate at single speed only.
4. Stated AMP draw is Full Load Amp (FLA). AMP draw varies by motor manufacturer ± 0.2 AMPS. Verify FLA per unit motor data plate. Select appropriate AMP and MCA for the multiple voltage motors. For example, the AMP and MCA for Models 360 with a 460 volt Totally Enclosed motor is 1.3 and 1.6 respectively.

Table 32. Totally enclosed motor type (continued)

(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 33. Explosion proof with thermal overload motor type

S Unit Model No.	AMP	MCA	MOP	HP	RPM
115/1/60					
48, 60, 72, 84, 96, 108, 120, 132	3.7	4.6	8.3	1/6	1140
144, 156, 180, 204	5.4	6.8	12.2	1/4	1140
240, 280, 300	7.4	9.3	16.7	1/3(a)	1140
360	7.4	9.3	16.7	1/2(a)	1140
230/1/60					
48, 60, 72, 84, 96, 108, 120, 132	3.7	4.6	8.3	1/6(b)	1140
144, 156, 180, 204	5.4	6.8	12.2	1/4(b)	1140
240, 280, 300	3.7	4.7	8.3	1/3(a)	1140
360	3.7	4.7	8.3	1/2(a)	1140
230/460/3/60					
144, 156, 180, 204, 240, 280, 300, 360	2.2/1.1	2.8/1.4	5.0/2.5	1/3	1140

Notes:
1. All motors are constant speed and operate at top speed as indicated in motor data. Models 18 through 108, excluding 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. All 1/4 H.P. motors are P.S.C.
2. Motors under 1/3 H.P. are totally enclosed, frame mounted, 115/1/60 with thermal overload protection and permanently lubricated sleeve bearings with optional speed controller available. 1/3 H.P. (115/1/60) motors are open frame constant speed with thermal over-load protection and ball bearings. 1/3 H.P. (230V) and 1/2 H.P. (230V) motors are open frame constant speed with thermal overload protection and ball bearings.
3. 1/3 and 1/2 H.P. 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 H.P. motors operate at single speed only.
4. Stated AMP draw is Full Load Amp (FLA). AMP draw varies by motor manufacturer ± 0.2 AMPS. Verify FLA per unit motor data plate.

(a) These motors are 115/230 volts.
(b) 230/1/60 unit has 115/1/60 motor supplied with field installed stepdown transformer.

Vertical Unit Heaters

Table 34. Totally Enclosed Motor Type

P Unit Model No.	AMP	MCA	MOP	HP	RPM
115/1/60					
42	1.23(a)	1.6	2.8	1/40(b)	1550
64, 80	2.1(a)	2.6	4.7	1/20(b)	1550
102	1.2(a)	1.5	2.7	1/8(b)	1070
122	2.3(a)	2.9	5.2	1/6	1100
146					
166					
202	3.6(a)	4.5	8.1	1/4	1100
252	3.6(a)	4.5	8.1	1/4	1100
280	5.4(a)	6.8	12.2	1/2	1100
208-230/460/3/60					
42	0.98-1.1/0.55(c)	1.2-1.4/0.7	2.2-2.5/1.2	1/6	1140
64, 80	0.98-1.1/0.55(c)	1.2-1.4/0.7	2.2-2.5/1.2	1/6	1140
102	0.98-1.1/0.55(c)	1.2-1.4/0.7	2.2-2.5/1.2	1/6	1140
122	0.98-1.1/0.55(c)	1.2-1.4/0.7	2.2-2.5/1.2	1/6	1140
146					
166					
202	1.2-1.4/0.7(c)	1.5-1.8/0.9	2.7-3.2/1.6	1/4	1140
252	1.2-1.4/0.7(c)	1.5-1.8/0.9	2.7-3.2/1.6	1/4	1140
280	1.8-2.0/1.0(c)	2.3-2.5/1.3	4.1-4.5/2.3	1/2	1140
336, 384	3.1-3.2/1.6(c)	3.9-4.0/2.0	7.0-7.2/3.6	3/4	1140

Table 34. Totally Enclosed Motor Type (continued)

P Unit Model No.	AMP	MCA	MOP	HP	RPM
500, 600	5.0-4.4/2.2[c]	6.6-6.3/3.1	11.9-11.3/5.6	1-1/2	1160
720	9.6-8.2/4.1[c]	12.4-12.3/6.1	22.3-22.1/11.0	3	1165

Notes:

1. All motors are constant speed and operate at top speed as indicated in motor data. Models 42 through 102 (motors up to 1/8 HP) 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 166 through 720 operate at constant speed as indicated in motor data.
2. Stated draw is Full Load (FLA). AMP draw varies by motor manufacturer ± 0.2 AMPS. Verify FLA on motor data plate. Select appropriate AMP and MCA for the multiple voltage motors. For example, the AMP and MCA for Model 42 with a 230 volt Totally Enclosed motor is 1.1 and 1.4, respectively.
3. Models 336 through 720 are not available with either Totally Enclosed or Explosion Proof with Overload types using 115/1/60 supply voltage.

[a] These motors have automatic thermal overload protection or impedance protection.
[b] Optional variable speed switch is available.
[c] These motors are without thermal overload protection. Motors without thermal overload protection must be installed with the optional manual starter or other field provided overload protection.

Table 35. Explosion proof with thermal overload motor type

Unit Size	AMP	MCA	MOP	HP	RPM
115/1/60					
42	3.8[a]	4.8	8.6	1/6	1140
64	3.8[a]	4.8	8.6	1/6	1140
80					
102	3.8[a]	4.8	8.6	1/6	1140
122	3.8[a]	4.8	8.6	1/6	1140
146					
166					
202	4.4[a]	5.5	9.9	1/4	1140
252	4.4[a]	5.5	9.9	1/4	1140
280	7.8[a]	9.8	17.6	1/2	1140
208-230/460/3/60					
42	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-52/2.5	1/2	1175
64	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
80	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
102	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
122	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
146	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
166	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
202	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
252	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
280	2.2-2.3/1.1[a]	2.8-2.9/1.4	5.0-5.2/2.5	1/2	1175
336	3.1-3.2/1.6[a]	3.9-4.0/2.0	7.0-7.2/3.6	3/4	1145
384	3.1-3.2/1.6[a]	3.9-4.0/2.0	7.0-7.2/3.6	3/4	1145
500	4.6-4.7/2.3[a]	5.8-5.9/2.9	10.4-10.6/5.2	1-1/2	1175
600	4.6-4.7/2.3[a]	5.8-5.9/2.9	10.4-10.6/5.2	1-1/2	1175

Table 35. Explosion proof with thermal overload motor type (continued)

Unit Size	AMP	MCA	MOP	HP	RPM
720	10.0/5.0[b] [c]	12.5/6.3	22.5/11.3	3	1150

Notes:

1. Models 166 through 720 operate at constant speed as indicated in motor data.
2. Stated draw is Full Load (FLA). AMP draw varies by motor manufacturer ± 0.2 AMPS. Verify FLA on motor data plate. Select appropriate AMP and MCA for the multiple voltage motors. For example, the AMP and MCA for Model 80 with a 230 volt Explosion Proof motor is 2.3 and 2.9, respectively.
3. Models 336 through 720 are not available with either Totally Enclosed or Explosion Proof with Overload types using 115/1/60 supply voltage.
4. For units with explosion proof motors, junction box is field provided.

[a] These motors have automatic thermal overload protection or impedance protection.
[b] These motors are 230/460 volts only.
[c] These motors are without thermal overload protection. Motors without thermal overload protection must be installed with the optional manual starter or other field provided overload protection.

Wiring Diagrams

⚠ 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.

1. For internal wiring and overload protection on all starters, consult the control manufacturer for details.
2. When using thermostatic control with a manual starter, be sure that the electrical rating of the thermostat is sufficient to carry the motor current.

Note: *See the Motor Characteristics-portion of the Performance Data chapter for motor characteristics of Individual Unit Heaters*

Figure 14. Manual control with single phase motor

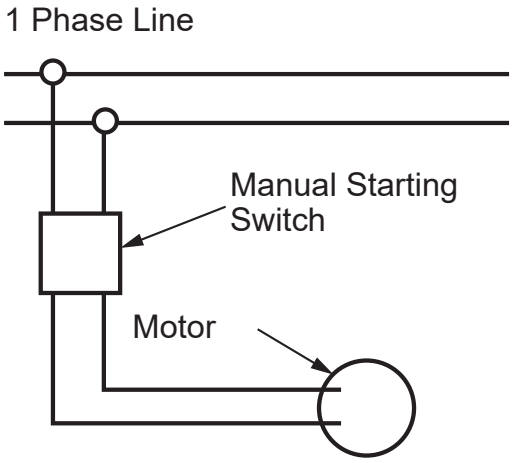


Figure 15. Thermostatic control with manual starter

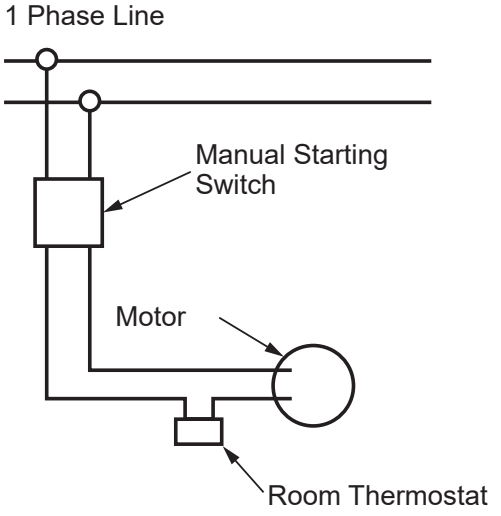


Figure 16. Thermostatic control using magnetic starter operating several units

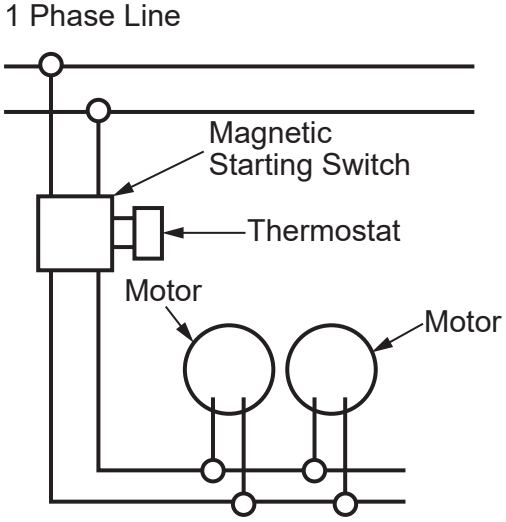


Figure 17. Speed controller with manual starting switch

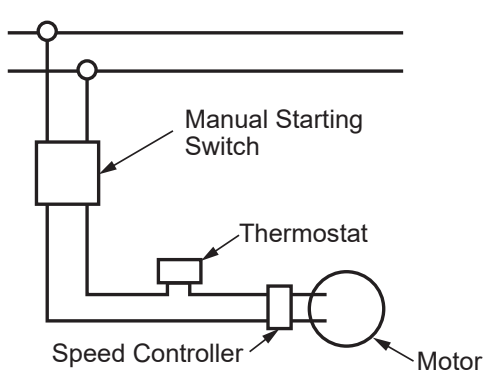


Figure 18. Speed controllers with magnetic starting switch for operating several units

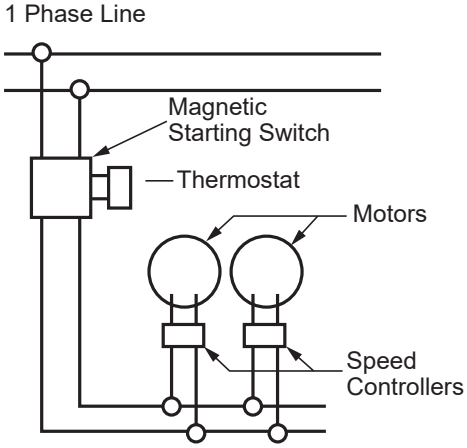


Figure 19. Manual control with three phase motor

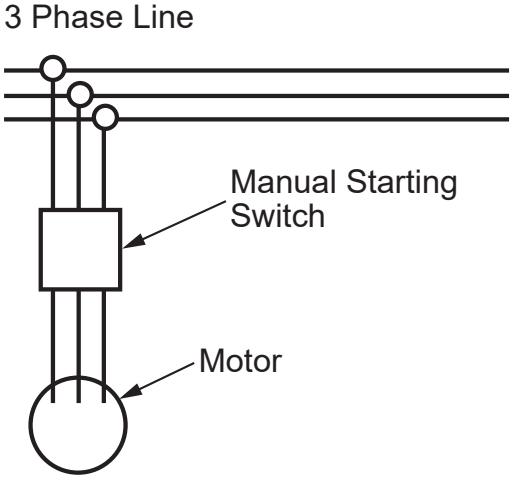
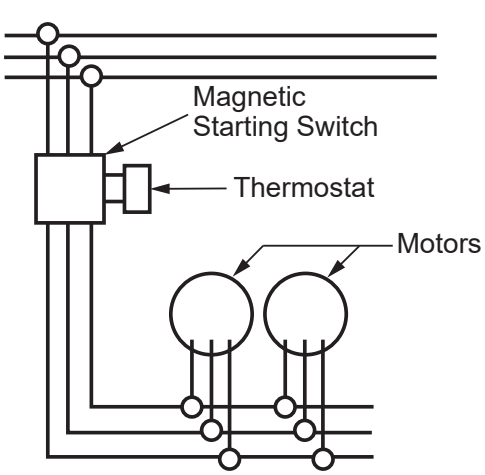


Figure 20. Thermostatic control of several three phase units



Dimensional Data

P Model

Figure 21. Models 42 to 80

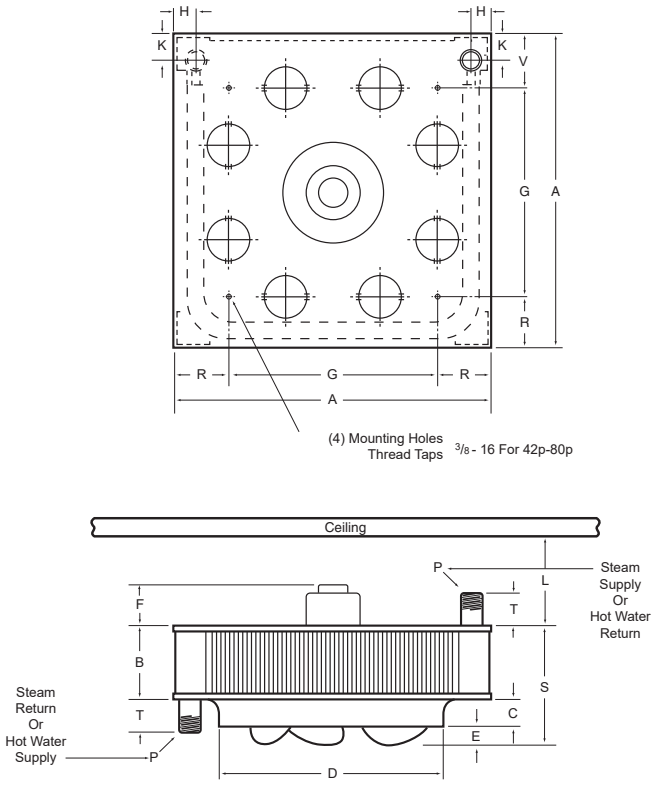


Table 36. Roughing in dimensional data — size 42 to 80

Unit Size	Fan Dia. inches (mm)	A inches (mm)	B inches (mm)	C inches (mm)	D inches (mm)	E inches (mm)	F inches (mm)	inches (mm)	H inches (mm)	K inches (mm)	L Min inches (mm)	P NPT inches (mm)	R inches (mm)	S inches (mm)	T inches (mm)	U inches (mm)	V inches (mm)	Approx. Ship Wt. lbs (kg)
42	11-1/4 (286)	18-1/4 (464)	4-5/8 (117)	1-1/4 (32)	11-3/4 (298)	3/4 (19)	4 (102)	11 (279)	1-3/8 (35)	1-7/8 (48)	7 (178)	1-1/2 (38)	3-5/8 (92)	6-5/8 (168)	2-3/4 (70)	11 (279)	3-5/8 (92)	32 (15)
64	13-1/2 (343)	21-1/4 (540)	4-5/8 (117)	1-5/8 (41)	14 (356)	1 (25)	4 (102)	14 (356)	1-3/8 (35)	1-7/8 (48)	7 (178)	1-1/2 (38)	3-5/8 (92)	7-1/8 (181)	2-3/4 (70)	14 (356)	3-5/8 (92)	40 (18)
80	13-1/2 (343)	21-1/4 (540)	6-1/8 (156)	1-5/8 (41)	14 (356)	1 (25)	3 (76)	14 (356)	1-3/8 (35)	1-7/8 (48)	7 (178)	1-1/2 (38)	3-5/8 (92)	8-5/8 (219)	2-3/4 (70)	14 (356)	3-5/8 (92)	43 (20)

Dimensional Data

Figure 22. Models 102-720

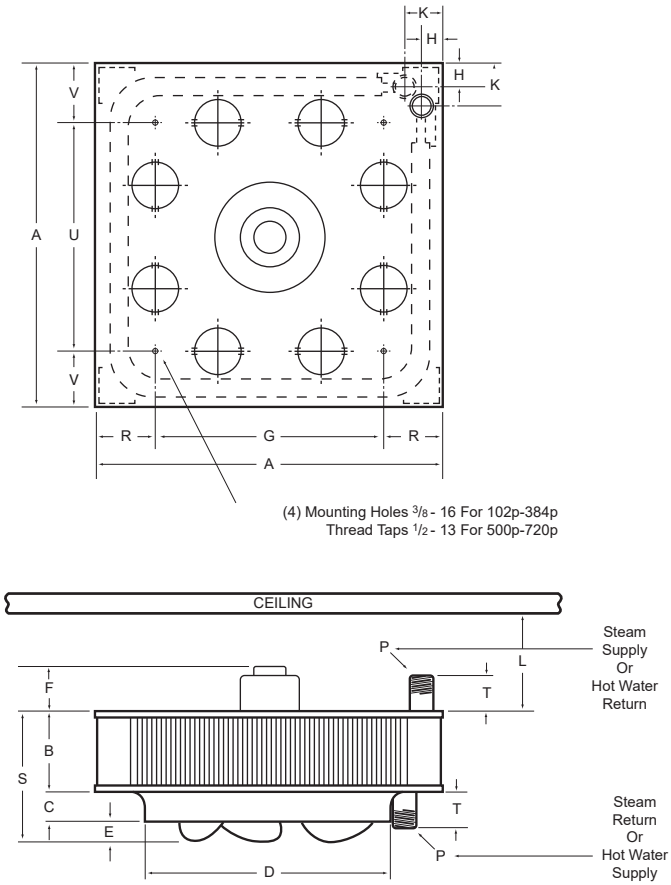


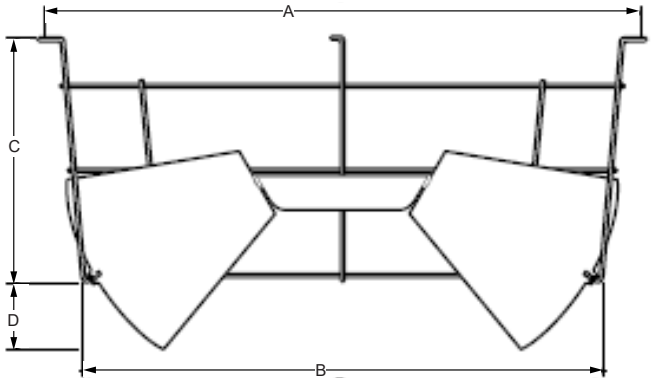
Table 37. Roughing in dimensional data — size 102 to 720

Unit Size	Fan Dia. inches (mm)	A inches (mm)	B inches (mm)	C inches (mm)	D inches (mm)	E inches (mm)	F inches (mm)	inches (mm)	H inches (mm)	K inches (mm)	L Min inches (mm)	P NPT inches (mm)	R inches (mm)	S inches (mm)	T inches (mm)	U inches (mm)	V inches (mm)	Approx. Ship Wt. lbs (kg)
102	16-3/4 (425)	25-1/4 (641)	6-1/8 (156)	2 (51)	17-1/2 (445)	1-1/8 (29)	3 (76)	17 (432)	1-3/8 (35)	2-3/4 (70)	7 (178)	1-1/2 (38)	4-1/8 (105)	9-1/8 (232)	2-3/4 (70)	17 (432)	4-1/8 (105)	63 (29)
122	16-3/4 (425)	25-1/4 (641)	6-1/8 (156)	2 (51)	17-1/2 (445)	1-3/4 (44)	3 (76)	17 (432)	1-3/8 (35)	2-3/4 (70)	7 (178)	1-1/2 (38)	4-1/8 (105)	9-3/4 (248)	2-3/4 (70)	17 (432)	4-1/8 (105)	64 (29)
146	19-3/4 (502)	29-1/2 (749)	6-1/8 (156)	2-3/8 (60)	20-5/8 (524)	1-1/4 (32)	4 (102)	20-1/2 (521)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-1/2 (114)	9-5/8 (244)	2-3/4 (70)	20-1/2 (521)	4-1/2 (114)	80 (36)
166	19-3/4 (502)	29-1/2 (749)	6-1/8 (156)	2-3/8 (60)	20-5/8 (524)	1-3/4 (44)	4 (102)	20-1/2 (521)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-1/2 (114)	10-1/8 (257)	2-3/4 (70)	20-1/2 (521)	4-1/2 (114)	80 (36)
202	19-3/4 (502)	29-1/2 (749)	7-5/8 (194)	2-3/8 (60)	20-5/8 (524)	2 (51)	4 (102)	20-1/2 (521)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-1/2 (114)	12 (305)	2-3/4 (70)	20-1/2 (521)	4-1/2 (114)	86 (39)
252	25-1/4 (641)	37-1/2 (953)	7-5/8 (194)	3 (76)	26-3/8 (670)	1 (25)	3-1/2 (89)	28 (711)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-3/4 (121)	11-5/8 (295)	2-3/4 (70)	18 (457)	9-3/4 (248)	134 (61)
280	25-1/4 (641)	37-1/2 (953)	7-5/8 (194)	3 (76)	26-3/8 (670)	1-1/4 (32)	3-1/2 (89)	28 (711)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-3/4 (121)	11-3/4 (298)	2-3/4 (70)	18 (457)	9-3/4 (248)	139 (63)
336	25-1/4 (641)	37-1/2 (953)	7-5/8 (194)	3 (76)	26-3/8 (670)	2-1/8 (54)	4 (102)	28 (711)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-3/4 (121)	12-3/4 (324)	2-3/4 (70)	18 (457)	9-3/4 (248)	139 (63)
384	25-1/4 (641)	37-1/2 (953)	9-1/8 (232)	3 (76)	26-3/8 (670)	2 (51)	3-1/2 (89)	28 (711)	1-3/4 (44)	3-1/2 (89)	7 (178)	2 (51)	4-3/4 (121)	14-1/8 (359)	2-3/4 (70)	18 (457)	9-3/4 (248)	146 (66)
500	30-1/2 (775)	42 (1067)	9-1/8 (232)	3-1/2 (89)	31-1/4 (794)	1-5/8 (41)	3 (76)	30 (762)	2-1/4 (57)	4-1/4 (108)	7 (178)	2-1/2 (64)	6 (152)	14-1/4 (362)	3 (76)	30 (762)	6 (152)	294 (133)
600	30-1/2 (775)	42 (1067)	12-1/8 (308)	3-1/2 (89)	31-1/4 (794)	2-1/8 (54)	3 (76)	30 (762)	2-1/4 (57)	4-1/4 (108)	7 (178)	2-1/2 (64)	6 (152)	17-3/4 (451)	3 (76)	30 (762)	6 (152)	307 (139)
720	30-1/2 (775)	42 (1067)	13-5/8 (346)	3-1/2 (89)	31-1/4 (794)	3 (76)	4 (102)	30 (762)	2-1/4 (57)	4-1/4 (108)	7 (178)	2-1/2 (64)	6 (152)	20-1/4 (514)	3 (76)	30 (762)	6 (152)	366 (166)

Table 38. Louver cone diffuser roughing in dimensions

Unit Size	A (in.)	B (in.)	C (in.)	D (in.)	No. of Louvers
42	16-1/2	14-1/4	6-1/2	2-5/8	8
64 and 80	20	17	8	3-1/8	8
102 and 122	24-1/4	21	9-3/4	3-15/16	8
146, 166, and 202	28-3/8	24-3/4	11-1/2	4-5/8	8
252, 280, 336, and 384	35-1/2	31-1/2	13-3/4	4	12
500, 600, and 720	41-1/2	37-1/4	17	4-3/4	12

Figure 23. Louver cone diffuser dimensions



S Model

Figure 24. Serpentine type models A08, A18, A25, A36

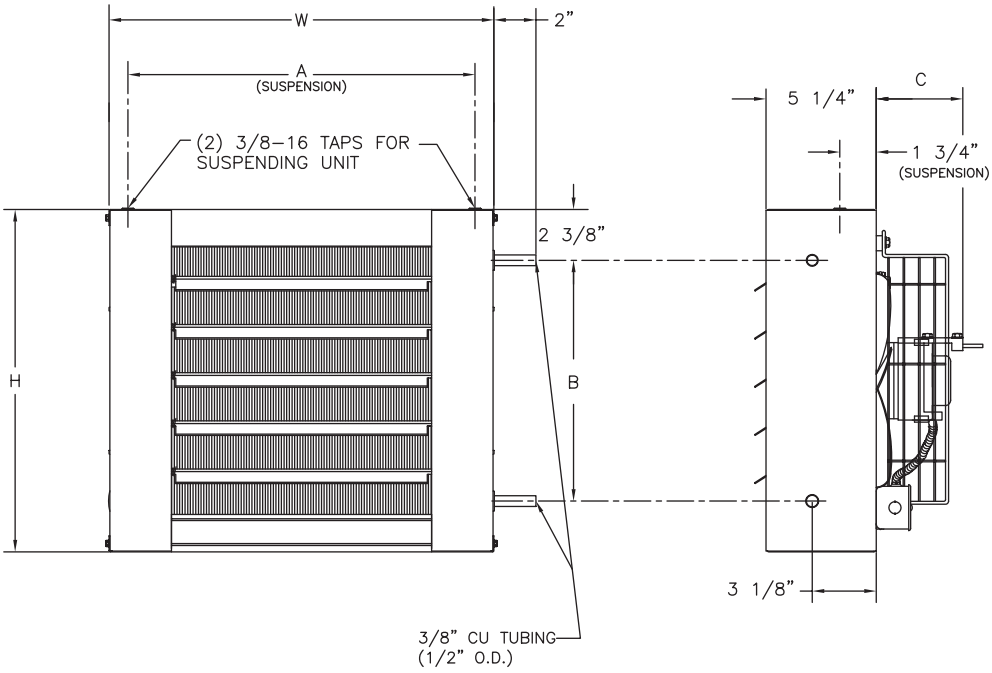


Table 39. Serpentine models

UNIT SIZE	H inches (mm)	W inches (mm)	A inches (mm)	B inches (mm)	C[a] inches (mm)	Number Of Louvers	Nominal Fan Diameter inches (mm)	Approximate ship wt. lbs. (kg)
A08	16 (406)	18 (457)	16–7⁄32 (412)	11–¼ (286)	4–¼ (108)	5	9 (229)	22 (10.0)
A18	16 (406)	18 (457)	16–7⁄32 (412)	11–¼ (286)	4–¼ (108)	5	10 (254)	24 (10.9)
A25	16 (406)	18 (457)	16–7⁄32 (412)	11–¼ (286)	4–¼ (108)	5	10 (254)	25 (11.3)
A36	18–½ (470)	20–½ (521)	18–22⁄32 (475)	13–¾ (349)	5–11⁄16 (144)	6	12 (305)	31 (14.0)

Note: Motors are totally enclosed, thermally protected, sleeve bearing, with 4-inch (w) x 2-inch (h) conduit connection boxes. Nutserts are attached to enclosure for balanced hanging.

[a] Dimension C is to the back of the motor, not motor conduit connector as shown in Figure 24.

Figure 25. Header type models

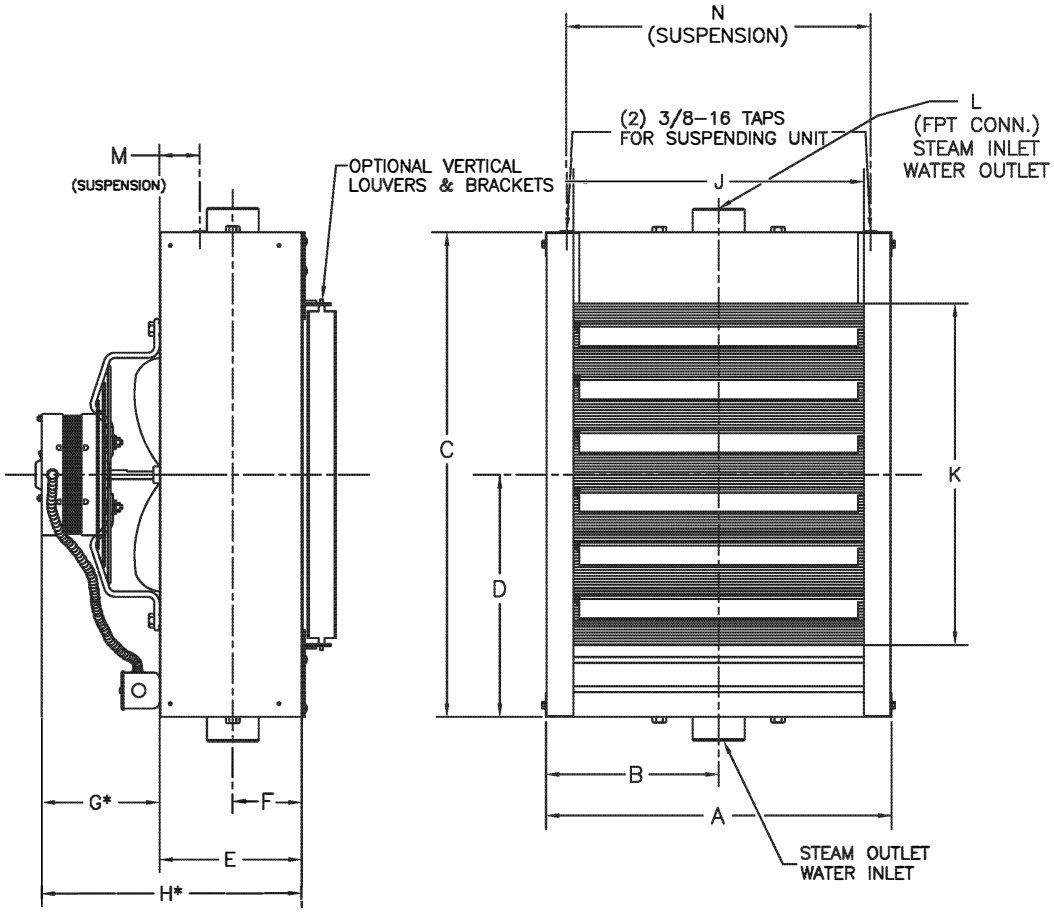


Table 40. Header models

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)	7–½ (191)	6–1/8 (156)	21–5/16 (75)	3–¼ (83)	9–3/8 (238)	12–¼ (311)	9–½ (241)	1–¼ (32)	2–¼ (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)	3–¼ (83)	9–3/8 (238)	12–¼ (311)	12–½ (318)	1–¼ (32)	2–¼ (57)	12–7/8 (327)	5	10 (254)	30 (13.6)
48	17–1/8 (435)	8–9/16 (217)	20–½ (521)	10–¼ (260)	5–7/8 (149)	21–5/16 (75)	5–11/16 (144)	1–17/16 (291)	14–¾ (375)	15 (381)	1–¼ (32)	1–¾ (44)	15–3/8 (391)	6	12 (305)	41 (18.6)
60	17–1/8 (435)	8–9/16 (217)	20–½ (521)	10–¼ (260)	5–7/8 (149)	21–5/16 (75)	5–1/16 (129)	10–15/16 (278)	14–¾ (375)	15 (381)	1–¼ (32)	1–¾ (44)	15–3/8 (391)	6	12 (305)	41 (18.6)
72	18–3/8 (467)	9–3/16 (233)	21–¾ (552)	10–7/8 (276)	6 (152)	2–15/16 (75)	5–1/16 (129)	1–11/16 (281)	16 (406)	16–¼ (413)	1–¼ (32)	1–¾ (44)	16–5/8 (422)	7	14 (356)	44 (19.9)
84	20–7/8 (530)	10–7/16 (265)	24–¼ (616)	12–1/8 (308)	6–1/8 (156)	21–5/16 (75)	5–11/16 (144)	11–13/16 (300)	18–½ (470)	18–¾ (476)	1–¼ (32)	1–¾ (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)	7–½ (191)	13–13/16 (351)	17–¼ (438)	17–½ (445)	1–½ (38)	1–¾ (44)	17–7/8 (454)	8	16 (406)	49 (22.2)
120	20–7/8 (530)	10–7/16 (265)	25–¼ (641)	12–5/8 (321)	6–5/16 (160)	3–3/16 (81)	6–11/16 (170)	13 (330)	18–½ (470)	18–¾ (476)	1–½ (38)	1–¾ (44)	19–1/8 (486)	8	18 (457)	59 (26.7)
132 144	23–3/8 (594)	11–11/16 (297)	27–¾ (705)	13–7/8 (352)	6–5/16 (160)	3–3/16 (81)	7–5/8 (194)	14 (356)	21 (533)	21–¼ (540)	1–½ (38)	1–¾ (44)	2–5/8 (549)	9	18 (457)	74 (33.5)
156	23–3/8 (594)	11–11/16 (297)	27–¾ (705)	13–7/8 (352)	6–5/16 (160)	3–3/16 (81)	7–7/16 (194)	13–¾ (349)	21 (533)	21–¼ (540)	1–½ (38)	1–¾ (44)	21–5/8 (549)	9	18 (457)	74 (33.5)
180 204	24–5/8 (625)	12–5/16 (313)	29 (737)	14–½ (368)	6–3/8 (162)	3–3/16 (81)	7–7/16 (194)	13–¾ (349)	22–¼ (565)	22–½ (572)	1–½ (38)	1–¾ (44)	22–7/8 (581)	9	18 (457)	90 (40.8)
240	27–7/8 (708)	13–15/16 (354)	30–¼ (768)	15–1/8 (384)	8–1/8 (206)	3–3/16 (81)	5–7/8 (149)	14 (356)	25–½ (648)	23–¾ (603)	2 (51)	1–¾ (44)	26–1/8 (664)	10	20 (508)	143 (65)
280	27–7/8 (708)	13–15/16 (354)	30–¼ (768)	15–1/8 (384)	8–1/8 (206)	3–3/16 (81)	9–5/8 (244)	17–¾ (451)	25–½ (648)	23–¾ (603)	2 (51)	1–¾ (44)	26–1/8 (664)	10	20 (508)	154 (70)
300 360	33–3/8 (848)	16–11/16 (424)	37–¾ (959)	18–7/8 (479)	9 (229)	3–3/16 (81)	9–5/8 (244)	18–5/8 (473)	31 (787)	31–¼ (794)	2 (51)	1–¾ (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.

Mechanical Specifications

Horizontal Specifications

General

Furnish and install, where indicated or scheduled on plans Model S horizontal steam/hot water unit heaters. Unit shall be equipped as specified herein. All units shall be installed in a neat and workmanlike manner in accordance with this specification and the manufacturer's installation instruction.

Figure 26. Model S horizontal unit heater, header style

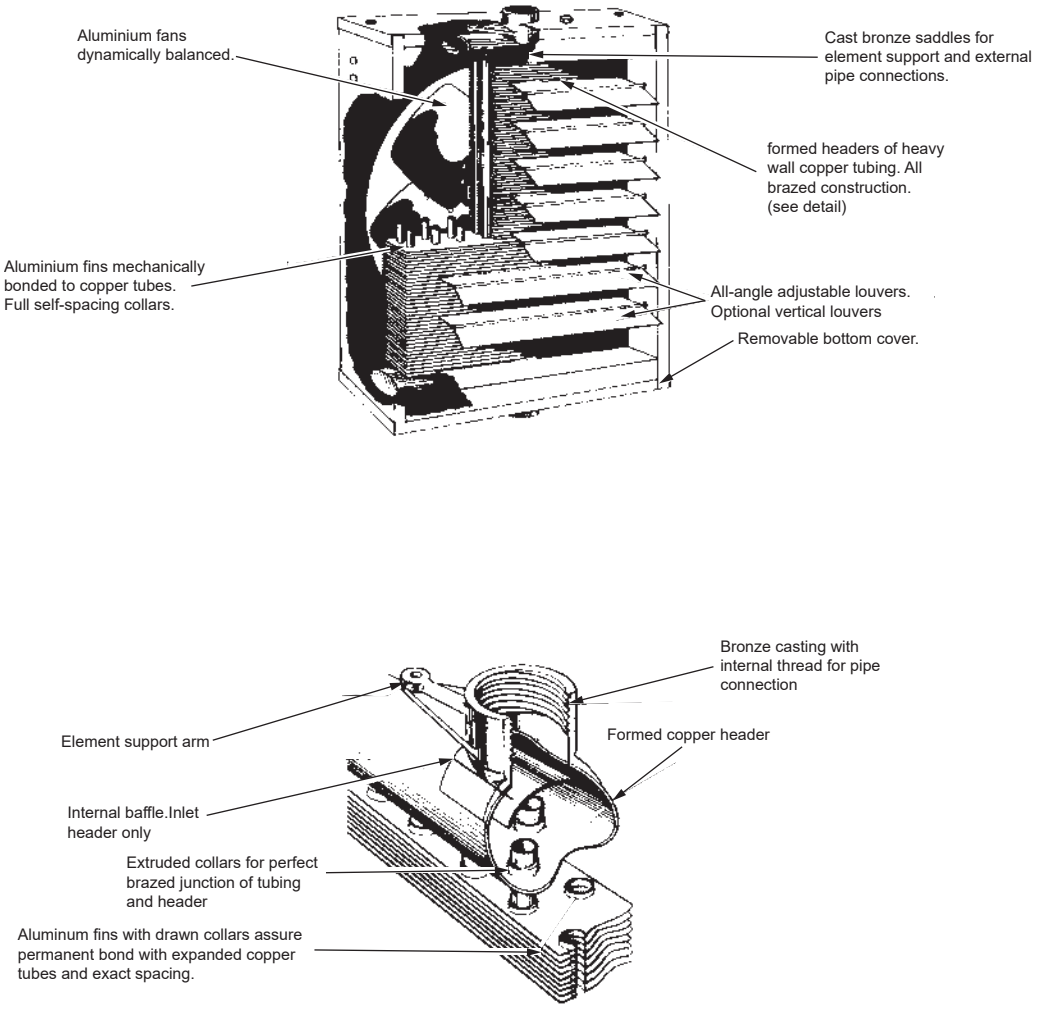
Casing

Casings are fabricated from 20 gauge die-formed steel. Paint finish is lead free, chromate free, alkyd melamine resin base and applied with an electrostatic two-pass system. Finish is baked at 400°F.

Coil Models 18 – 360

Coil elements and headers are heavy wall drawn seamless copper tubing. Element tubes are brazed into extruded header junctions. Pipe connection saddles are cast bronze. Aluminum fins have drawn collars to assure permanent bond with expanded element tubes and exact spacing. All Element Assemblies are submersion tested at factory at 200 P.S.I. Under maximum conditions in the United States, coils are rated for 150 PSI for steam pressure and up to 150 PSI or 320°F for hot water. Under maximum conditions in Canada, coils are rated for 15 PSI for steam pressure and up to 150 PSI or 320°F for hot water. An operating pressure of 75 P.S.I. at 320°F is recommended.

Figure 27. Model S header type coil element details



Motors

Motors are totally enclosed, resilient mounted with class B windings. All motors are designed for horizontal mounting. Motors under 1/3 H.P. are totally enclosed, frame mounted, 115/1/60 with thermal overload protection and permanently lubricated sleeve bearings with optional solid state speed controller available. 1/3 H.P. (115/1/60) motors are open frame construction, with thermal overload protection and ball bearings. 1/3 H.P. at (230V) and1/2 H.P. (230V) motors are open frame construction, with thermal overload protection and ball bearings. 1/3 and 1/2 H.P. motors are available in single and 3 phase in open frame construction or explosion-proof housings, all the above are available as options.

Explosion Proof Motors

An enclosed motor whose enclosure is designed and constructed to withstand an explosion of a specific gas or vapor which may occur within the motor and to prevent the ignition of this gas or vapor surrounding the machine.

Motors comply with the National Electrical Code classification as follows:

- Class I, Group D; all sizes
- Class II, Group F; all sizes
- Class II, Group G; all sizes
- Division I and II Installations
- T-code (T3B)

Explosion proof equipment is not generally available for Class I, Groups A and B and it is necessary to isolate motors from the hazardous area. All explosion proof motors are shelf mounted.

Fans

Fans are aluminum blade, hub type designed and balanced to assure maximum air delivery, low motor horsepower requirements and quiet operation. Blades are spark proof.

Fan Guards

Fan guards are welded steel, zinc plated or painted. To meet ETL and OSHA requirements, units mounted below 8 feet from floor must be equipped with an OSHA fan guard. OSHA fan guards are standard on coil sizes 18 through 48 and optional on coil sizes 60 through 360 with single phase, standard motors only.

Air Deflection Louvers

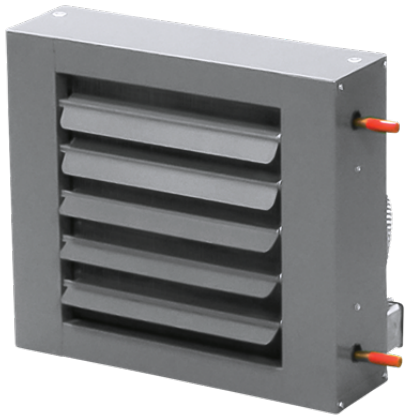
Units are equipped with horizontal, individually adjustable louvers. An optional vertical louver kit is available for four-way air control.

Serpentine Coil Specifications

General

Furnish and install, where indicated or scheduled on plans Model S-A horizontal hot water unit heaters. Unit shall be equipped as specified herein. All units shall be installed in a neat and workmanlike manner in accordance with this specification and the manufacturer's installation instruction.

Figure 28. Model S horizontal unit heater, serpentine style



Casing

Casings are fabricated from 20 gauge die-formed steel. Paint finish is leadfree, chromate free, alkyd melamine resin base and applied with an electrostatic two-pass system. Finish is baked at 400°F.

Coil Models S-A08 – S-A36

Coil is a serpentine design with seamless copper tubing. Aluminum fins have drawn collars to assure permanent bond with expanded tubes. Tubing connection are 3/8 inch copper tubing, type M (.500 O.D.). Coils are factory tested at 200 PSI. Coils have a max operating entering water temperature of 320°F.

Motors

Motors are totally enclosed, resilient mounted with class B windings. All motors are designed for horizontal mounting.

Fans

Fans are aluminum blade type, designed and balanced to assure maximum air delivery, low motor horsepower requirements and quiet operation.

OSHA Fan Guards

OSHA fan guards are welded steel, zinc plated or painted. To meet ETL and OSHA requirements, units mounted below 8 feet from floor must be equipped with an OSHA fan guard. OSHA fan guards are standard on all serpentine model sizes.

Air Deflection Louvers

Units are equipped with horizontal, individually adjustable louvers. An optional vertical louver kit is available for four-way air control.

Vertical Specifications

General

Furnish and install, where indicated or scheduled on plans Model P vertical steam/hot water unit heaters. Unit shall be equipped as specified herein. All units shall be installed in a neat and workmanlike manner in accordance with this specification and the manufacturer's installation instruction.

Figure 29. Model P vertical unit heater

Casing

Casing is formed by two square steel plates. Bottom plate forms orifice for air delivery. Air ports stamped in top plate as standard for easy removal for low final air temperature.

Coil

Hot water/steam coils are rectangular 3 or 4-sided, one-pass, multiple circuit, with aluminum Sigma-Flow® fins mechanically bonded to tubes. Standard coils are seamless .025 copper tubing. Supply and return connections are steel pipe. Coils are factory tested at 400 PSIG under water. Under maximum conditions in the U.S., coils are rated for 75 PSI for steam pressure and up to 225 PSI or 325°F for hot water. Under maximum conditions in Canada, coils are rated for 15 PSI for steam pressure and up to 225 PSI or 325°F for hot water.

Motors

Standard motors are 115/60/1, totally enclosed, with thermal overload protection for all units through size 280P. Standard motors for 42P, 64P and 80P are shaded pole, sleeve bearing. The 102P motor is permanent split capacitor type with sleeve bearings. Motor for unit sizes 122P through 280P are permanent split capacitor types with permanently lubricated ball bearings. Motors used unit sizes 336P through 720P are 230/460/60/3, totally enclosed, with permanently lubricated ball bearings. Unit sizes smaller than 336 are also available with 230/460/60/3 motors.

All motors fractional HP and integral HP, have Class B insulation. The 115/60/1 motors used as standard on unit sizes 42P through 102P can be operated at multiple speeds with the addition of a solid-state speed control.

Explosion Proof Motors

An enclosed motor whose enclosure is designed and constructed to withstand an explosion of a specific gas or vapor which may occur within the motor and to prevent the ignition of this gas or vapor surrounding the machine.

Motors comply with National Electrical Code classification as follows:

- Class I, Group D; all sizes
- Class II, Group F; all sizes
- Class II, Group G; all sizes
- Division I and II Installations
- T-code (T3B)

Explosion proof equipment is not generally available for Class I, Groups A and B and, it is necessary to isolate motors from the hazardous area. All units are available with 1140 RPM explosion-proof motors.

Fan

Fans are aluminum blade designed and balanced for quiet operation. Blades are spark proof.

Optional OSHA Fan Guard and Louver Cone Diffuser

To meet ETL and OSHA requirements, units mounted below 8 feet must be equipped with an OSHA fan guard.

If adjustments to the vertical airflow pattern are desired, the louver cone diffuser can be installed for complete versatility in air diffusion patterns.

Adjustable 18-guage steel blades are held in position by spring steel clips. Note: Vertical unit heaters can support either OSHA fan guard or the louver cone diffuser; both options cannot be installed on the same unit.

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