



Unit Heaters & Door Heaters

Installation, Operation and Maintenance of Armstrong Unit Heaters & Door Heaters



These installation, operation and technical instructions should be used by experienced personnel as a guide to ensure that Armstrong Unit Heaters & Door Heaters function in a correct manner. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact your local representative or Armstrong if further information is required.

Introduction

Successful performance and long life of Armstrong Unit/Door Heaters are largely dependent upon proper installation, operation and maintenance procedures. The recommendations in this manual should be followed as closely as possible to ensure that Armstrong Unit/Door Heaters are installed and operated properly.

RECEIVING, UNPACKING AND INSPECTION

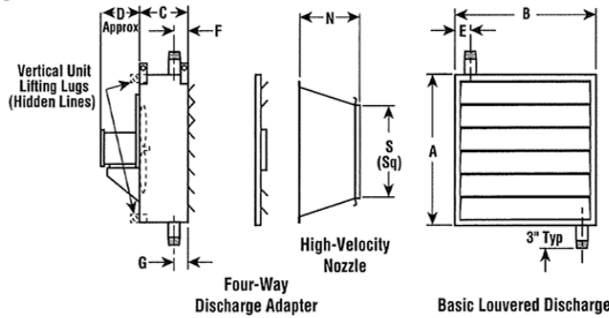
Armstrong Unit/Door Heaters have been carefully packaged at the factory for safe, damage

free shipment. However, if the carton or crate shows evidence of damage upon receipt from the shipping carrier, make sure a notation is placed on the bill of lading.

The Unit/Door Heaters should be unpacked as soon as possible and thoroughly inspected for damage. To unpack, remove the top and sides of the shipping container leaving the heater on the skid. If the heaters must be stored until installation, they should be covered and stored in a clean dry area.

Dimensions and Weights

10" Through 20" Units



24" Through 48" Units

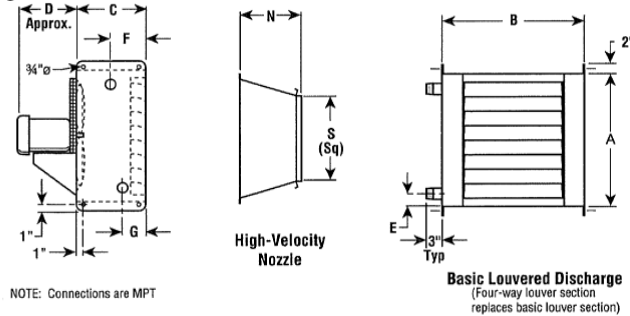


Table 2-1. Sound Data

Unit Heater Size	dBA Sound Pressure Level at 3 Feet from Unit
101	63
102	63
121	63
122	63
141	66
142	65
161	74
162	73
181	77
182	76
201	81
202	81
241	82
242	82
301	84
302	83
361	85
362	85
421	84
422	83
481	85
482	85

Sound Data

Since unit heaters use fans and motors to move air, sound is a natural result. The sound rating of a particular unit may limit its use in a given application. The following sound rating table is presented to allow you to select a unit based upon an acceptable sound level.

Table 2-2. Dimensions and Weights

Model Size	Dimensions (in)										Basic Unit with Horizontal or Vertical Louvers Weights by Core Type (lbs)			Additional Weight for High-Velocity Discharge Nozzle (lbs)
	A	B	C	D	E	F	G	Conn. MPT	N	S	ST/AL	ST/ST	SS/SS	
101	15	17 ³ / ₄	12	9	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	1 ¹ / ₂	10	7	95	150	95	11
102											135	155	145	
121	17 ¹ / ₄	19 ³ / ₄	12	9	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	1 ¹ / ₂	10 ³ / ₄	9 ³ / ₄	105	120	110	14
122											150	180	165	
141	19 ¹ / ₂	21 ³ / ₄	12	9	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	1 ¹ / ₂	11 ¹ / ₂	11 ³ / ₄	120	140	125	16
142											175	210	190	
161	22	23 ³ / ₄	12	9	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	1 ¹ / ₂	12 ¹ / ₄	14 ¹ / ₄	135	165	145	19
162											195	240	220	
181	24 ¹ / ₄	25 ³ / ₄	12	9	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	1 ¹ / ₂	13	16 ³ / ₄	150	185	160	22
182											220	280	250	
201	26 ¹ / ₂	27 ³ / ₄	12	9	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	1 ¹ / ₂	13 ³ / ₄	18	170	210	180	24
202											245	315	285	
241	32	34 ¹ / ₄	18	12	1 ³ / ₈	4 ¹ / ₂	4 ¹ / ₄	2	14 ¹ / ₂	20 ³ / ₄	290	350	320	17
242											360	470	420	
301	39 ¹ / ₄	40 ¹ / ₄	18	12 ¹ / ₂	2 ⁷ / ₁₆	6 ³ / ₄	4 ¹ / ₄	2	18 ¹³ / ₁₆	26	360	460	410	31
302											460	650	550	
361	45 ¹ / ₄	46 ¹ / ₄	18	12 ¹ / ₂	1 ¹³ / ₁₆	6 ¹ / ₂	4 ¹ / ₂	2 ¹ / ₂	22 ⁷ / ₈	29 ¹ / ₂	440	560	500	47
362											550	800	680	
421	52 ¹ / ₄	52 ¹ / ₄	22	15	2 ⁵ / ₈	6 ¹ / ₄	4 ³ / ₄	3	29 ³ / ₈	33	680	850	770	35
422											830	1,150	1,010	
481	59 ¹ / ₄	58 ¹ / ₄	22	15	2 ⁵ / ₈	6 ¹ / ₄	4 ³ / ₄	3	31 ¹ / ₄	38	800	1,030	920	47
482											990	1,430	1,240	

Installation

Horizontal unit heaters should be located along the walls and should be positioned to provide a circular air flow along these walls. In other words, air should progress along the walls and around the room.

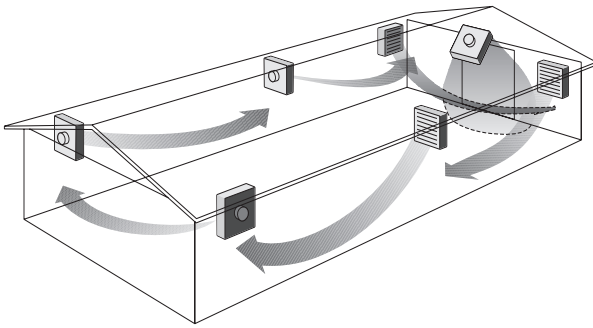
Vertical discharge units should be mounted above the areas to be heated.

Mounting heights, throws and spreads are shown on the charts on page 4.

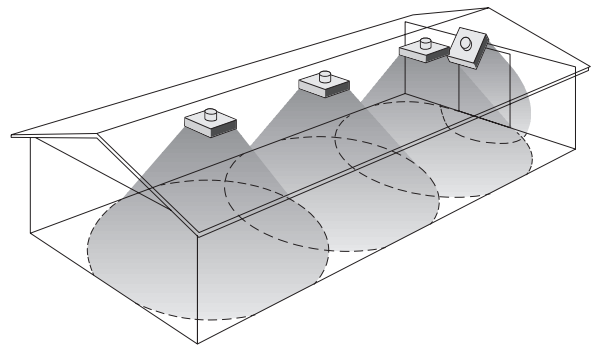
To mount the Unit/Door Heaters, use the skid provided to raise the heater to its mounting location. Mount the heater from the ceiling by connecting rods to the mounting tabs of the heater. The mounting rods should be attached to solid building members to prevent settling and piping stresses.

The heaters must be installed level so proper drainage can be obtained if steam is the heating medium. Use a spirit level rather than building references.

Typical Arrangements

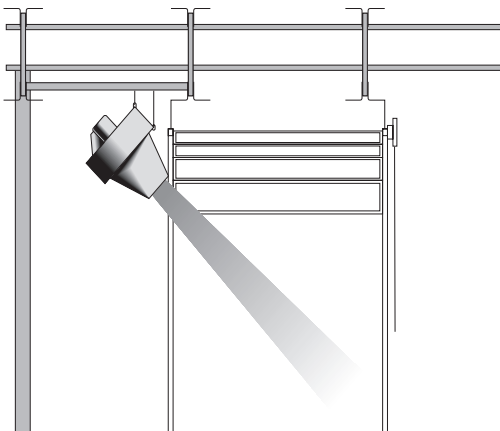


Horizontal unit heaters provide a sweeping effect over outside walls are sufficient to heat most buildings except those with large central floor areas.

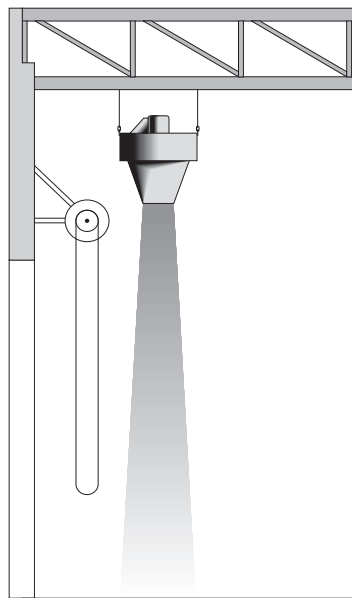


Four-way vertical discharge units are used to heat large central areas and buildings with high ceilings or buildings with large heat loss through the ceiling.

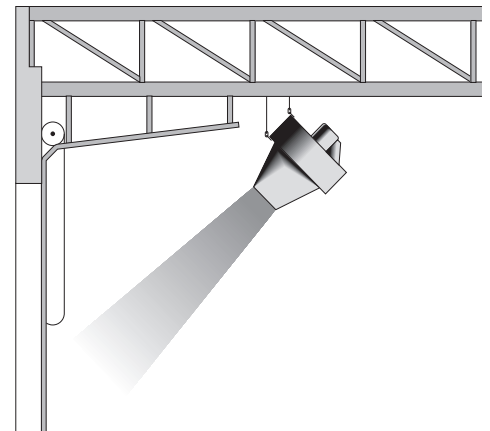
Door Heater Arrangements



Side-mounting 45° discharge for low ceiling applications

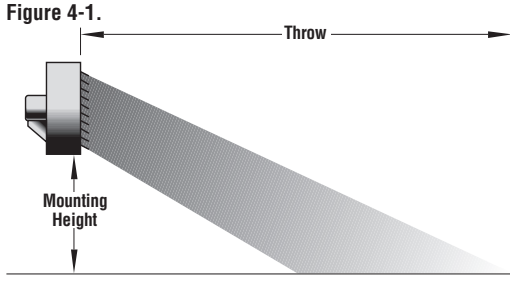


Vertical discharge for roll-up or sliding doors.

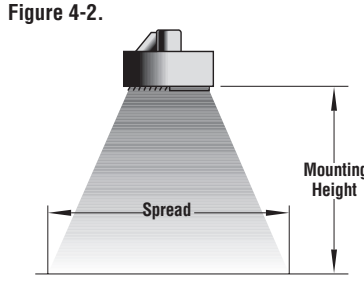


Front-mounting 45° discharge for overhead doors.

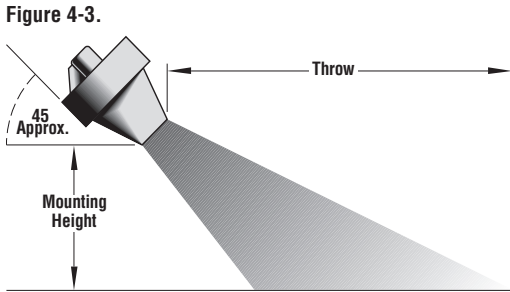
Mounting Heights, Throws and Spreads



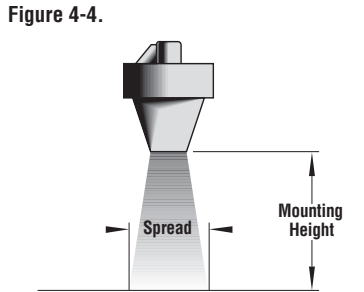
Horizontal Discharge—Standard Louvers



Vertical Discharge—Four-Way Louvers



Horizontal Discharge—High-Velocity Nozzle



Vertical Discharge—High-Velocity Nozzle

The mounting heights, throws and spread listed below are based on an air temperature rise of 40 degrees F. To determine these values for temperature rises other than 40 degrees apply the correction factors located to the right of the main table below. Determine the actual temperature rise by referring to the appropriate table in Armstrong Unit/ Door Heater Catalog 326.

NOTES

1. Minimum mounting height should not be less than 7 feet
2. Mounting height is measured from bottom of unit to floor
3. Values in the table were determined with louvers at 45°
4. If four-way discharge louvers are used for horizontal applications, multiply throws by 0.8
5. Values given are based upon average conditions and could be severely affected by such factors as obstructions, cross drafts, etc.

Table 4-1. Unit Heater Mounting Heights, Throws and Spreads

Model Size	Horizontal Louvered			Vertical Louvered			Horizontal High Velocity			Vertical High Velocity		
	Outlet Velocity FPM	Max. Mounting Height (ft)	Throw (ft)	Outlet Velocity FPM	Max. Mounting Height (ft)	Spread (ft)	Outlet Velocity FPM	Max. Mounting Height (ft)	Throw (ft)	Outlet Velocity FPM	Max. Mounting Height (ft)	Spread (ft)
102	550	9	22	600	9	24	2,000	11	30	2,000	15	13
122	730	12	37	800	13	38	2,000	14	49	2,000	22	20
142	840	13	45	920	15	46	2,000	16	62	2,000	26	24
162	970	15	56	1,060	17	51	2,000	18	75	2,000	29	27
182	1,050	16	66	1,160	18	55	2,000	19	86	2,000	31	29
202	1,030	16	69	1,130	18	56	2,000	19	92	2,000	31	29
242	1,170	17	73	1,280	19	59	2,000	20	97	2,000	32	30
302	1,180	19	74	1,320	20	62	2,000	23	98	2,000	34	32
362	1,000	20	78	1,210	20	62	2,000	24	110	2,000	34	32
422	1,020	21	110	1,130	21	66	2,000	25	145	2,000	36	34
482	1,040	22	110	1,150	22	70	2,000	26	147	2,000	37	35
101	600	10	30	660	10	25	2,310	12	40	2,310	17	15
121	750	12	44	820	13	38	2,050	14	58	2,050	22	20
141	1,090	14	53	1,200	16	48	2,620	17	72	2,620	27	25
161	1,110	15	66	1,220	17	52	2,290	18	88	2,290	29	27
181	1,200	16	72	1,320	18	55	2,270	19	94	2,270	31	29
201	1,220	17	76	1,340	18	56	2,380	20	101	2,380	31	29
241	1,360	18	82	1,500	19	59	2,340	22	109	2,340	32	30
301	1,340	20	84	1,500	20	62	2,270	24	112	2,270	34	32
361	1,220	21	88	1,340	21	65	2,210	25	122	2,210	36	34
421	1,110	21	118	1,230	21	66	2,180	25	158	2,180	36	34
481	1,140	22	118	1,270	22	70	2,210	26	160	2,210	37	35

Table 4-2. Discharge Temperature Correction Factors

Actual ΔT	Correction Factor
10	1.18
20	1.12
30	1.06
40	1.00
50	0.94
60	0.88
70	0.82
80	0.72
90	0.70
100	0.64
110	0.58
120	0.51
130	0.45
140	0.39
150	0.33

Piping

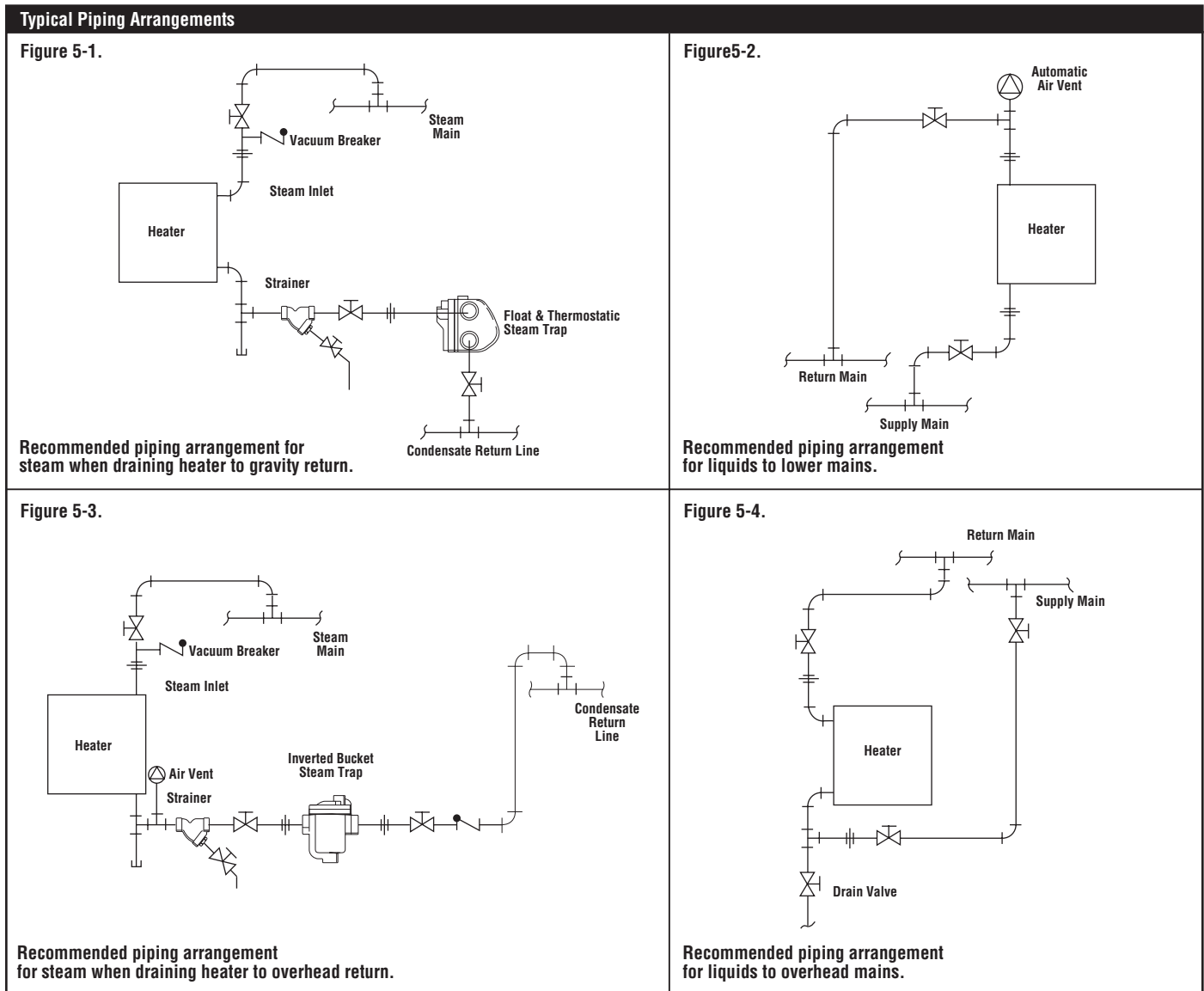
The piping **must not** be supported by the coil connections. Adequate hangers and expansion joints must be installed to prevent undue stresses.

It is important that the system be kept clean. Care should be exercised when making up pipe connections so that excess joint material or foreign substances are kept out of the system. Allow for movement in the piping to provide for expansion and contraction, preferably by use of swing joints in connecting piping. It is recommended that coil

isolation valves be fitted to isolate coils without shutting down the whole system.

Use only Float and thermostatic or inverted bucket type steam traps. The use of any other type voids the warranty.

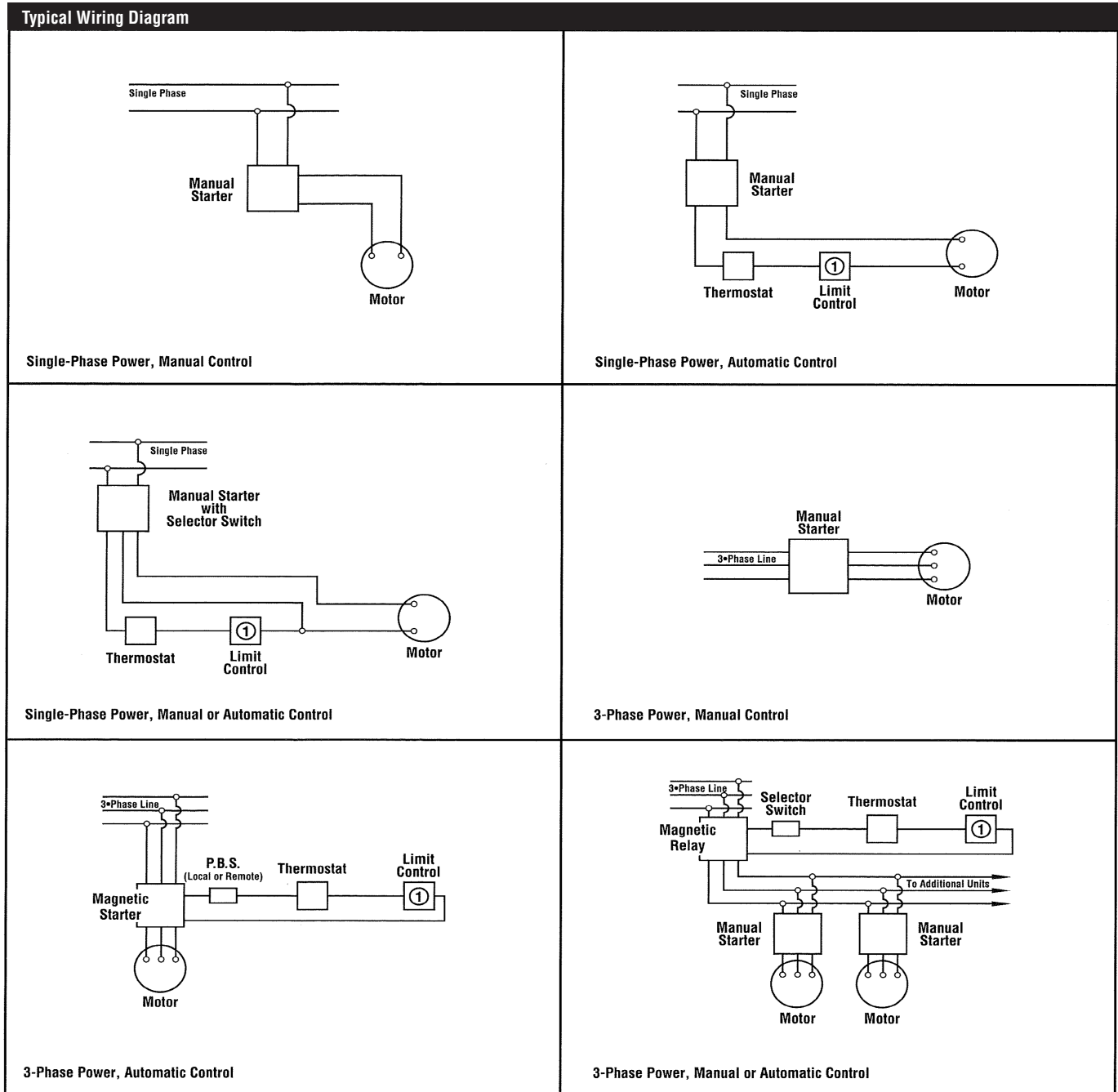
The diagrams below illustrate proper piping and trapping practices. Failure to follow these suggested installation arrangements will result in a poor performing installation.



Electrical Wiring

Wiring of the motor and thermostat (if supplied) should be done by a journeyman electrician. Insure that the motor name plate voltage and the available voltage match.

Typical wiring schematics are shown below. (Not meant to be all inclusive)



NOTE:
 ① Optional
 Thermostat must be rated for motor current if used with manual starter

Model Number

MODEL NUMBER
A **Q** - **182** - **HS** - **T** **58**

FIN TYPE

- A ■ Aluminum Keyfin
- G ■ Steel L Fin
- J ■ 304 Stainless L Fin
- K ■ 316 Stainless L Fin
- P ■ Aluminum Platefin
- B ■ Heavy Aluminum Keyfin
- F ■ Copper Keyfin

NO. FINS/ INCH (SEE NOTE 1)

TUBE MATERIAL

- Q ■ 12 Ga Steel Tube
- R ■ 10 Ga Steel Tube
- W ■ 14 Ga 304L SS Tube
- Y ■ 14 Ga 316L SS Tube

MODEL SIZE

Fan Diameter (in)

No. Rows of Tubes in Core

MOTOR ELECTRICAL CHARACTERISTICS

- 12 ■ 115/1/60
- 20 ■ 208/1/60
- 22 ■ 220/1/60
- 21 ■ 208/3/60
- 23 ■ 230/3/60
- 46 ■ 460/3/60
- 58 ■ 575/3/60

MOTOR TYPE

- T ■ Totally Enclosed Fan Cooled
- X ■ Explosion Proof
- M ■ Mills & Chemical

CORES

- S ■ Steam Core
- L ■ Liquid Core

DISCHARGE TYPE

- H ■ 2 Way Louver (Usually Hor. Discharge)
- V ■ 2 Way Louver (Usually Vert. Discharge)
- N ■ High Velocity Nozzle (Std on Door Heaters)

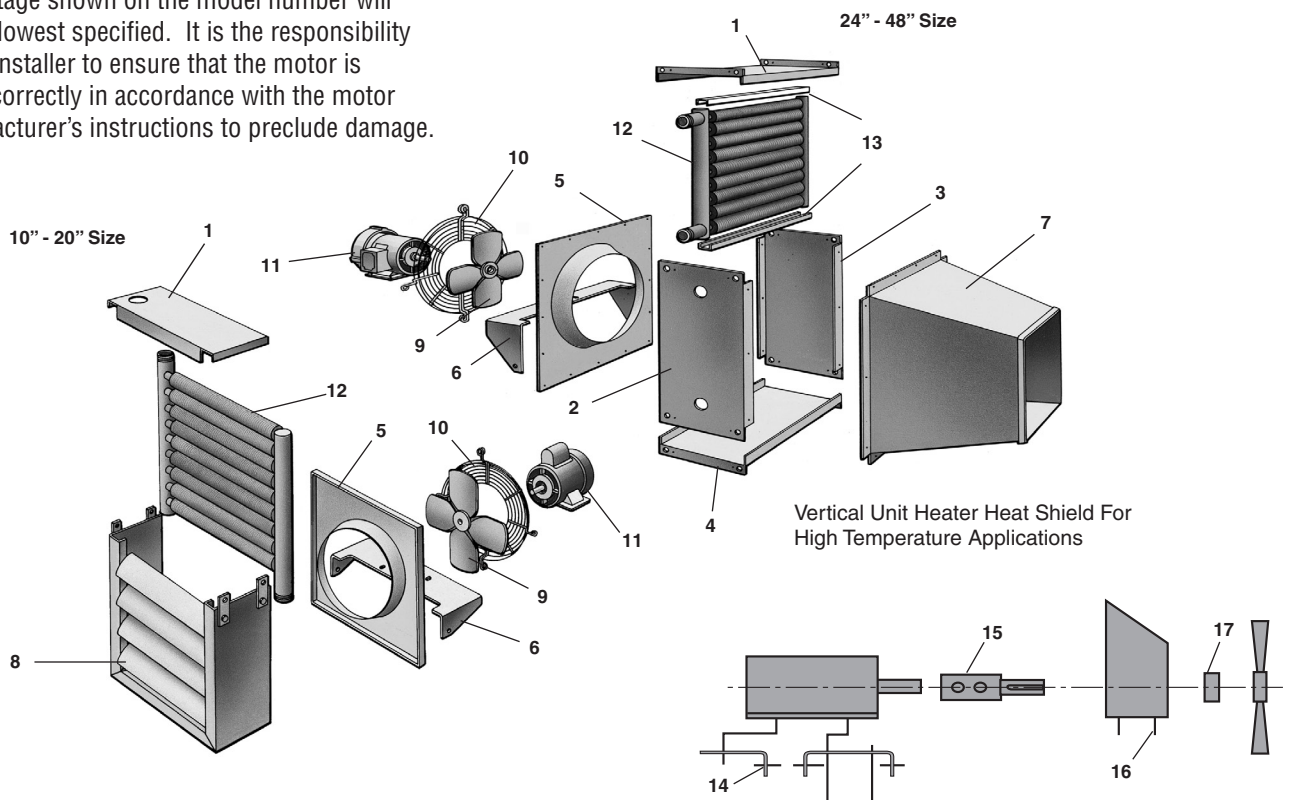
Parts List

Part No.	Name of Part
1	Top Housing
2	Left Housing
3	Right Housing
4	Bottom Housing
5	Back Plate
6	Motor Bracket
7	High Velocity Nozzle
8	Louvre
9	Fan
10	Fan Guard
11	Motor
12	Heating Core
13	Core Supports
14	Angle Bracket to motor
15	Shaft Extension
16	Insulated Heat Shield
17	Teflon Seal

Notes: Motors are standard NEMA Frame available locally. Parts not shown are standard hardware items.

NOTES

1. If the number of fins/inch is standard, the numbers between fin type and tube material will be missing.
2. If dual or triple voltage motors are supplied, the voltage shown on the model number will be the lowest specified. It is the responsibility of the installer to ensure that the motor is wired correctly in accordance with the motor manufacturer's instructions to preclude damage.



START-UP AND OPERATION

After initial installation the unit should be started in the following sequence and with the indicated checks.

- Prior to opening valves or starting motors make sure that the unit is clean and that there is no obstruction to the air flow or fan rotation.
- Purge all steam or liquid lines of foreign matter that may have entered during installation.
- With the motor NOT energized, slowly open the steam or liquid valves. Check for leaks. Allow at least 10 minutes for warm-up before energizing the fan motor.
- Energize the motor. Check for correction fan rotation.
- Re-tighten all bolted joints after the unit heater has reached operating temperature.

During normal operation of the unit heater, start-up should always follow the sequence above. At least a 10 minute warm-up is essential before energizing the fan motor to avoid water hammer and excessive thermal stress.

Unit heater output may be controlled by any of the following methods.

- On-Off fan operation
- On-Off steam or liquid operation
- Steam or liquid modulation

On-Off steam operation is recommended on vertical discharge units when steam pressures exceed 50 PSIG or water temperature exceeds 300 degrees to avoid heat damage to the fan motors.

Modulated steam is not recommended on systems with overhead returns or pressurized condensate systems.

Limited Warranty and Remedy

Armstrong-Hunt, Inc. warrants to the original user that Unit/Door Heaters if used in the service and in the manner for which they are intended shall be free from defects in materials and workmanship for a period of three (3) year after installation, but not longer than thirty-nine (39) months from date of shipment, provided, however, that said warranty on copper tube/plate fin cores is limited to one (1) year after installation or fifteen (15) months from the date of shipment. This warranty does not apply to motors or other electrical equipment supplied with said Unit/Door Heaters, nor to core failures due to external or internal corrosion caused by improper selection of materials or improper drainage device selection. CAUTION: Subcooling drainage devices are improper for use on Armstrong-Hunt Unit/Door Heaters. Contact your Armstrong-Hunt Representative for further details. Except as may be expressly provided for in a written agreement between Armstrong-Hunt, Inc. and the user, which is signed by both parties, Armstrong-Hunt, Inc. DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY

MAINTENANCE

Unit heaters are relatively maintenance free. However, the environment in which they operate may dictate periodic cleaning to maintain peak operating efficiency. The following inspections are resulting maintenance should be performed at least once a year or more often if operated in a dirty atmosphere.

- Inspect the unit heaters for dirt buildup. Clean all parts that have accumulated dust and dirt, especially the fan. Buildup on the fan can cause an out of balance condition that can shorten the life of motor bearings. Buildup on the heating coil can seriously affect heat output.
- Lubricate the motor bearing once a year if lubrication is required. (Some motors have permanently lubricated bearings)
- Check and tighten the motor mounts, if loose.

When steam units are shut down during the summer insure that they are completely drained and that the drain is left open to prevent a leaky valve from filling the unit with condensate.

REPLACEMENT PARTS

When ordering replacement parts refer to the parts list on page 7. Provide complete nameplate information including model number and job serial number. Parts should be ordered from your local Armstrong Representative. They may have the parts in stock and if the parts are needed because of an operational problem, they can usually provide information to prevent it's reoccurrence.

IMPLIED WARRANTY OF MERCHANTABILITY OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

The sole and exclusive remedy with respect to the above limited warranty or with respect to any other claim relating to the products or to defects or any condition or use of the products supplied by Armstrong-Hunt, Inc. however caused, and whether such claim is based upon warranty, contract, negligence, strict liability or any other theory, is limited to Armstrong-Hunt, Inc's repair or replacement of the part or product, excluding any labor or any other cost to remove or install said part or product or, at Armstrong-Hunt, Inc.'s option, to repayment of the purchase price. Notice of any such claim must be given in writing to Armstrong-Hunt, Inc. within three months after the expiration of the applicable warranty period. In no event shall Armstrong-Hunt, Inc. be liable for special, direct, indirect, incidental or consequential damages, including, but not limited to, loss of use or profits or to interruption of business activity.



Armstrong Heat Transfer Group

648 Moeller Street, Granby, Quebec J2G 8N1 - Canada Phone: (450) 378-2655 or (450) 375-3787