

Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference. Installation by qualified professional technician only. Not for residential use.

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

## Description

Horizontal hydronic unit heaters are available in both serpentine and header type units. Serpentine units offer outputs from 8,000 to 38,900 BTUH (2.4 to 11.4 kW) and are ideal for hot water (only) installations with limited clearances. Header type units range from 18,000 to 360,000 BTUH (5.3 to 105.5 kW) and can operate with either hot water or steam. The designs are certified by CSA (per CAN/CSA-C22.2 and UL1995). **Do not alter these units in any way and do not attach ductwork to them.** Units are for use in non-explosive and non-corrosive environments only. If you have any questions after reading this manual, contact the manufacturer.

### ⚠ WARNING

**Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.**

**NOTE:** It is the equipment owners' responsibility to provide any scaffolding or other apparatus required to perform emergency service or annual/periodic maintenance to this equipment.



**Figure 1 – Serpentine Type**  
(5PV19A, 5PV22A, 5PV26A, 5YH18A)



**Figure 2 – Header Type**  
(1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV20A, 5PV23A, 5PV24A, 5PV27A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A, 5YH19A, 5YH20A)

## Installer's Responsibility

**Installer Please Note:** This equipment has been tested and inspected. It has been shipped free from defects from our factory. However, during shipment and installation, problems such as loose wires, leaks or loose fasteners may occur. **It is the installer's responsibility to inspect and correct any problems that may be found.**

## Unpacking

Inspect shipment immediately when received to determine if any damage has occurred to the unit during shipment. After the unit has been uncrated, check for any visible damage to the unit. If any damage is found, the consignee should sign the bill of lading indicating such damage and immediately file claim for damage with the transportation company.



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# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

## General Safety Information

**▲ WARNING** *Failure to comply with the general safety information may result in extensive property damage, severe personal injury or death.*

**▲ WARNING** *Do not alter the unit heater in any way or damage to the unit and/or severe personal injury or death may occur!*

**▲ WARNING** *Disconnect all power supplies before installing or servicing the heater. If the power disconnect is out of sight, lock it in the open position and tag it to prevent unexpected application of power. Failure to do so could result in fatal electric shock, or severe personal injury.*

**▲ CAUTION** *Insure that all power sources conform to the requirements of the unit heater or damage to the unit will result!*

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

Make certain that the power source conforms to the electrical requirements of the heater.

**▲ WARNING** *Do not depend upon a thermostat or other switch as sole means of disconnecting power when installing or servicing heater. Always disconnect power at main circuit breaker as described above. Failure to do so could result in fatal electric shock.*

Special attention must be given to any grounding information pertaining to this heater. To prevent the risk of electrocution, the heater must be securely and adequately grounded. This should be accomplished by connecting a grounded conductor between the service panel and the heater. To ensure a proper ground, the grounding means must be tested by a qualified electrician.

Do not insert fingers or foreign objects into the heater or its air moving device. Do not block or tamper with the heater in any manner while in operation or just after it has been turned off, as some parts may be hot enough to cause injury.

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

It is good practice to have a shutoff switch on the electrical power lines controlling the heater. Whenever a unit is serviced, shut power off to the unit. Since these units are installed in most instances higher than 8 feet (2.4m), proper type of ladders or scaffolding should be used, as set up by OSHA requirements (see Note on cover).

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

All Horizontal Unit Heaters are shipped fully assembled and may be used for steam or hot water applications. Coils are factory tested at 250 psig (1723.5 kg). Each unit is packaged individually and marked for proper identification. Use normal care in handling and during installation to prevent damage to the coils fins, fan and casing.

Unless otherwise specified, the following conversions may be used for calculating SI unit measurements:

- 1 foot = 0.305 m
- 1 inch = 25.4 mm
- 1 psig = 6.894 kPa
- 1 pound = 0.453 kg
- 1 gallon = 3.785 L
- 1 inch water column = 0.249 kPa
- meter/second = FPM ÷ 196.8
- liter/second = CFM x 0.472
- 1000 Btu per hour = 0.293 kW
- 1000 Btu/Cu. Ft. = 37.5 MJ/m<sup>3</sup>
- 1 cubic foot = 0.028 m<sup>3</sup>

# Models 1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV19A, 5PV20A, 5PV22A-5PV24A, 5PV26A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A & 5YH18A- 5YH20A

Table 1-Specifications

Model No.	MBTUH Output 2 PSI Steam	MBTUH Output 200° F Water	Pipe Conn., NPT Inches	Max. Mtg. Height Ft.*	Max. Air Throw Ft.*	Fan CFM	Fan Guard**	Motor FPM HP***	Motor Amps @ 115VAC	Motor Speed RPM
<i>Header Coil Units</i>										
5PV31A	18.0	13.1	1¼	8	20	395	OSHA	16W	0.80	1550
3DUF7	24.0	17.4	1¼	8	24	450	OSHA	16W	0.80	1550
5PV43A	36.0	26.1	1¼	9	28	550	OSHA	25W	1.20	1550
5PV46A	48.0	34.8	1¼	9	30	750	OSHA	1/20	1.40	1000
5PV48A 5PV47A	60.0	43.6	1¼	10	30	900	OSHA None	1/20	1.40	1000
5PV50A 5PV49A	72.0	52.3	1¼	10	29	1100	OSHA None	1/20	1.40	1000
5PV51A 5YH20A	84.0	61.0	1¼	10	30	1400	OSHA None	1/12	2.20	1000
5PV53A 5PV52A	96.0	69.7	1½	11	38	1400	OSHA None	1/12	2.20	1000
5PV16A 5PV15A	108.0	78.4	1½	11	40	1800	OSHA None	1/12	2.20	1000
5PV20A 5YH19A	120.0	87.1	1½	12	40	1900	OSHA None	1/3	4.50	1140
5PV24A 5PV23A	132.0	95.8	1½	13	54	2000	OSHA None	1/3	4.50	1140
5PV28A 5PV27A	144.0	104.0	1½	13	55	2200	OSHA None	1/3	4.50	1140
5PV30A 5PV29A	156.0	113.0	1½	13	55	2600	OSHA None	1/3	4.50	1140
5PV33A 5PV32A	180.0	118.0	1½	13	53	2200	OSHA None	1/3	4.50	1140
5PV35A 5PV34A	204.0	148.0	1½	13	55	2900	OSHA None	1/3	4.50	1140
1EBC1 5PV38A	240.0	174.0	2	14	57	3500	OSHA None	1/3	4.50	1140
1EBC2 5PV40A	280.0	209.1	2	14	57	4200	OSHA None	1/2	5.40	1100
1EBC3 5PV42A	300.0	230.0	2	15	58	5000	OSHA None	1/2	5.40	1100
1EBC4 5PV45A	360.0	261.3	2	15	60	5500	OSHA None	1/2	5.40	1100
<i>Serpentine Coil Units</i>										
5YH18A	—	8.0	¾ cu.	8	20	245	OSHA	16W	0.80	1550
5PV19A	—	18.4	¾ cu.	8	25	500	OSHA	16W	0.80	1550
5PV22A	—	24.8	¾ cu.	9	29	580	OSHA	25W	1.20	1550
5PV26A	—	38.9	¾ cu.	9	29	850	OSHA	1/20	1.40	1000

\* See Figure 6 Page10.

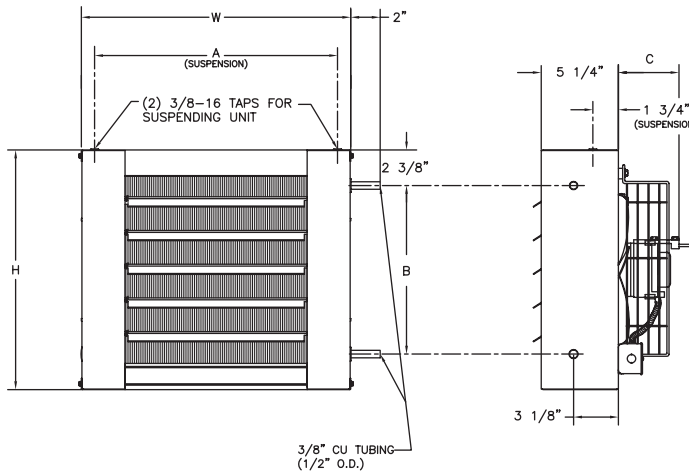
\*\* Heaters mounted less than 8 feet above floor must have OSHA Compliant fan guards.

\*\*\* All Motors are thermally protected sleeve bearing type with 3½ cubic inch conduit boxes. 1/3 and 1/2 HP motors are open drip proof; all others are totally enclosed

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

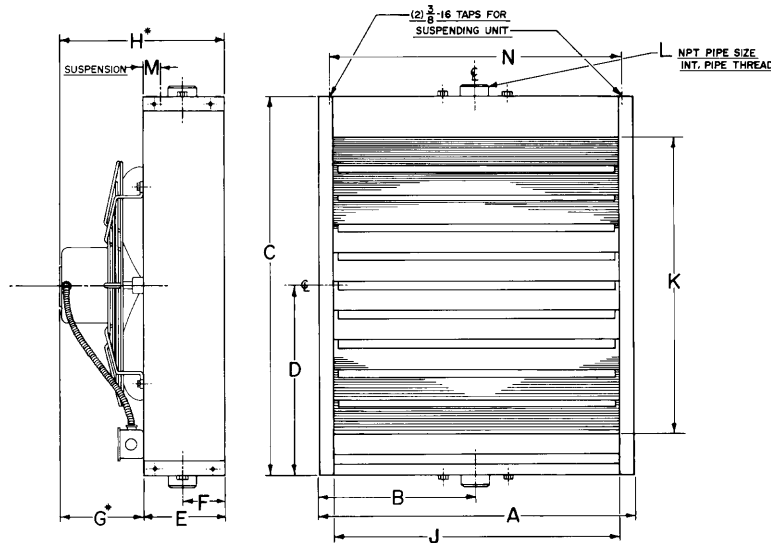
## Dimensional Data

**Figure 3 – Serpentine Type**  
 Models 5PV19A, 5PV22A, 5PV26A, 5YH18A



**Figure 4 – Header Type**

Models 1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV20A, 5PV23A, 5PV24A, 5PV27A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A, 5YH19A, 5YH20A



NOTE: Pipe connections for all serpentine type units are right hand as shown. 3/8-16 nutserts are attached to enclosures of all heaters for balanced hanging.

# Models 1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV19A, 5PV20A, 5PV22A-5PV24A, 5PV26A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A & 5YH18A- 5YH20A

## Dimensional Data

Table 2 – Serpentine Models (See Figure 3 on page 4)

MODEL NO.	CAPACITY BTUH	H inches (mm)	W inches (mm)	A inches (mm)	B inches (mm)	C inches (mm)	NO. OF LOUVERS	NOM. FAN DIAM. inches (mm)	APPROX. SHIP WT. lbs. (kg)
5YH18A	8030	16 (406)	18 (457)	16 <sup>7</sup> / <sub>32</sub> (412)	11 <sup>1</sup> / <sub>4</sub> (286)	4 <sup>1</sup> / <sub>4</sub> (108)	5	9 (229)	22 (10.0)
5PV19A	18400	16 (406)	18 (457)	16 <sup>7</sup> / <sub>32</sub> (412)	11 <sup>1</sup> / <sub>4</sub> (286)	4 <sup>1</sup> / <sub>4</sub> (108)	5	10 (254)	24 (10.9)
5PV22A	24800	16 (406)	18 (457)	16 <sup>7</sup> / <sub>32</sub> (412)	11 <sup>1</sup> / <sub>4</sub> (286)	4 <sup>1</sup> / <sub>4</sub> (108)	5	10 (254)	25 (11.3)
5PV26A	38900	18 <sup>1</sup> / <sub>2</sub> (470)	20 <sup>1</sup> / <sub>2</sub> (521)	18 <sup>22</sup> / <sub>32</sub> (475)	13 <sup>3</sup> / <sub>4</sub> (349)	5 <sup>11</sup> / <sub>16</sub> (144)	6	12 (305)	31 (14.0)

Table 3 – Header Models (See Figure 4 on page 4)

MODEL NO.	CAPACITY MBTUH	A inches (mm)	B inches (mm)	C inches (mm)	D inches (mm)	E inches (mm)	F inches (mm)	G inches (mm)	H inches (mm)	J inches (mm)	K inches (mm)	L inches (mm)	M inches (mm)	N inches (mm)	NO. OF LOUVERS	NOM. FAN DIAM. inches (mm)	APPROX. SHIP WT. lbs. (kg)
5PV31A	18	14 <sup>3</sup> / <sub>8</sub> (371)	7 <sup>5</sup> / <sub>16</sub> (186)	15 (381)	7 <sup>1</sup> / <sub>2</sub> (191)	6 <sup>1</sup> / <sub>8</sub> (156)	2 <sup>15</sup> / <sub>16</sub> (75)	3 <sup>1</sup> / <sub>4</sub> (83)	9 <sup>3</sup> / <sub>8</sub> (238)	12 <sup>1</sup> / <sub>4</sub> (311)	9 <sup>1</sup> / <sub>2</sub> (241)	1 <sup>1</sup> / <sub>4</sub> (32)	2 <sup>1</sup> / <sub>4</sub> (57)	12 <sup>7</sup> / <sub>8</sub> (327)	4	9 (229)	26 (11.8)
3DUF7	24	14 <sup>5</sup> / <sub>8</sub> (371)	7 <sup>5</sup> / <sub>16</sub> (186)	18 (457)	9 (229)	6 <sup>1</sup> / <sub>8</sub> (156)	2 <sup>15</sup> / <sub>16</sub> (75)	3 <sup>1</sup> / <sub>4</sub> (83)	9 <sup>3</sup> / <sub>8</sub> (238)	12 <sup>1</sup> / <sub>4</sub> (311)	12 <sup>1</sup> / <sub>2</sub> (318)	1 <sup>1</sup> / <sub>4</sub> (32)	2 <sup>1</sup> / <sub>4</sub> (57)	12 <sup>7</sup> / <sub>8</sub> (327)	5	10 (254)	30 (13.6)
5PV43A	36	17 <sup>1</sup> / <sub>8</sub> (435)	8 <sup>9</sup> / <sub>16</sub> (217)	20 <sup>1</sup> / <sub>2</sub> (521)	10 <sup>1</sup> / <sub>4</sub> (260)	5 <sup>7</sup> / <sub>8</sub> (149)	2 <sup>15</sup> / <sub>16</sub> (75)	5 <sup>11</sup> / <sub>16</sub> (144)	11 <sup>7</sup> / <sub>16</sub> (291)	14 <sup>3</sup> / <sub>4</sub> (375)	15 (381)	1 <sup>1</sup> / <sub>4</sub> (32)	1 <sup>3</sup> / <sub>4</sub> (44)	15 <sup>3</sup> / <sub>8</sub> (391)	6	12 (305)	41 (18.6)
5PV46A	48	17 <sup>1</sup> / <sub>8</sub> (435)	8 <sup>9</sup> / <sub>16</sub> (217)	20 <sup>1</sup> / <sub>2</sub> (521)	10 <sup>1</sup> / <sub>4</sub> (260)	5 <sup>7</sup> / <sub>8</sub> (149)	2 <sup>15</sup> / <sub>16</sub> (75)	5 <sup>11</sup> / <sub>16</sub> (144)	11 <sup>7</sup> / <sub>16</sub> (291)	14 <sup>3</sup> / <sub>4</sub> (375)	15 (381)	1 <sup>1</sup> / <sub>4</sub> (32)	1 <sup>3</sup> / <sub>4</sub> (44)	15 <sup>3</sup> / <sub>8</sub> (391)	6	12 (305)	41 (18.6)
5PV47A, 5PV48A	60	18 <sup>3</sup> / <sub>8</sub> (467)	9 <sup>3</sup> / <sub>16</sub> (233)	21 <sup>3</sup> / <sub>4</sub> (552)	10 <sup>7</sup> / <sub>8</sub> (276)	6 (152)	2 <sup>15</sup> / <sub>16</sub> (75)	5 <sup>1</sup> / <sub>16</sub> (129)	11 <sup>1</sup> / <sub>16</sub> (281)	16 (406)	16 <sup>1</sup> / <sub>4</sub> (413)	1 <sup>1</sup> / <sub>4</sub> (32)	1 <sup>3</sup> / <sub>4</sub> (44)	16 <sup>5</sup> / <sub>8</sub> (422)	7	14 (356)	44 (19.9)
5PV49A, 5PV50A	72	20 <sup>7</sup> / <sub>8</sub> (530)	10 <sup>7</sup> / <sub>16</sub> (265)	24 <sup>1</sup> / <sub>4</sub> (616)	12 <sup>1</sup> / <sub>8</sub> (308)	6 <sup>1</sup> / <sub>8</sub> (156)	2 <sup>15</sup> / <sub>16</sub> (75)	5 <sup>11</sup> / <sub>16</sub> (144)	11 <sup>13</sup> / <sub>16</sub> (300)	18 <sup>1</sup> / <sub>2</sub> (470)	18 <sup>3</sup> / <sub>4</sub> (476)	1 <sup>1</sup> / <sub>4</sub> (32)	1 <sup>3</sup> / <sub>4</sub> (44)	19 <sup>1</sup> / <sub>8</sub> (486)	8	14 (356)	47 (21.3)
5PV51A, 5YH20A	84	19 <sup>5</sup> / <sub>8</sub> (498)	9 <sup>13</sup> / <sub>16</sub> (249)	24 (610)	12 (305)	6 <sup>5</sup> / <sub>16</sub> (160)	3 <sup>3</sup> / <sub>16</sub> (81)	7 <sup>1</sup> / <sub>2</sub> (191)	13 <sup>13</sup> / <sub>16</sub> (351)	17 <sup>1</sup> / <sub>4</sub> (438)	17 <sup>1</sup> / <sub>2</sub> (445)	1 <sup>1</sup> / <sub>2</sub> (38)	1 <sup>3</sup> / <sub>4</sub> (44)	17 <sup>7</sup> / <sub>8</sub> (454)	8	16 (406)	49 (22.2)
5PV52A, 5PV53A	96	20 <sup>7</sup> / <sub>8</sub> (530)	10 <sup>7</sup> / <sub>16</sub> (265)	25 <sup>1</sup> / <sub>4</sub> (641)	12 <sup>5</sup> / <sub>8</sub> (321)	6 <sup>5</sup> / <sub>16</sub> (160)	3 <sup>3</sup> / <sub>16</sub> (81)	6 <sup>11</sup> / <sub>16</sub> (170)	13 (330)	18 <sup>1</sup> / <sub>2</sub> (470)	18 <sup>3</sup> / <sub>4</sub> (476)	1 <sup>1</sup> / <sub>2</sub> (38)	1 <sup>3</sup> / <sub>4</sub> (44)	19 <sup>1</sup> / <sub>8</sub> (486)	8	18 (457)	59 (26.7)
5PV20A, 5YH19A	120	23 <sup>3</sup> / <sub>8</sub> (594)	11 <sup>11</sup> / <sub>16</sub> (297)	27 <sup>3</sup> / <sub>4</sub> (705)	13 <sup>7</sup> / <sub>8</sub> (352)	6 <sup>5</sup> / <sub>16</sub> (160)	3 <sup>3</sup> / <sub>16</sub> (81)	7 <sup>7</sup> / <sub>16</sub> (194)	13 <sup>3</sup> / <sub>4</sub> (349)	21 (533)	21 <sup>1</sup> / <sub>4</sub> (540)	1 <sup>1</sup> / <sub>2</sub> (38)	1 <sup>3</sup> / <sub>4</sub> (44)	21 <sup>5</sup> / <sub>8</sub> (549)	9	18 (457)	74 (33.5)
5PV23A, 5PV24A	132	23 <sup>3</sup> / <sub>8</sub> (594)	11 <sup>11</sup> / <sub>16</sub> (297)	27 <sup>3</sup> / <sub>4</sub> (705)	13 <sup>7</sup> / <sub>8</sub> (352)	6 <sup>5</sup> / <sub>16</sub> (160)	3 <sup>3</sup> / <sub>16</sub> (81)	7 <sup>7</sup> / <sub>16</sub> (194)	13 <sup>3</sup> / <sub>4</sub> (349)	21 (533)	21 <sup>1</sup> / <sub>4</sub> (540)	1 <sup>1</sup> / <sub>2</sub> (38)	1 <sup>3</sup> / <sub>4</sub> (44)	21 <sup>5</sup> / <sub>8</sub> (549)	9	18 (457)	74 (33.5)
5PV27A, 5PV28A	144	23 <sup>3</sup> / <sub>8</sub> (594)	11 <sup>11</sup> / <sub>16</sub> (297)	27 <sup>3</sup> / <sub>4</sub> (705)	13 <sup>7</sup> / <sub>8</sub> (352)	6 <sup>5</sup> / <sub>16</sub> (160)	3 <sup>3</sup> / <sub>16</sub> (81)	7 <sup>7</sup> / <sub>16</sub> (194)	13 <sup>3</sup> / <sub>4</sub> (349)	21 (533)	21 <sup>1</sup> / <sub>4</sub> (540)	1 <sup>1</sup> / <sub>2</sub> (38)	1 <sup>3</sup> / <sub>4</sub> (44)	21 <sup>5</sup> / <sub>8</sub> (549)	9	18 (457)	74 (33.5)
5PV29A, 5PV30A	156	24 <sup>5</sup> / <sub>8</sub> (625)	12 <sup>5</sup> / <sub>16</sub> (313)	29 (737)	14 <sup>1</sup> / <sub>2</sub> (368)	6 <sup>3</sup> / <sub>8</sub> (162)	3 <sup>3</sup> / <sub>16</sub> (81)	7 <sup>7</sup> / <sub>16</sub> (194)	13 <sup>3</sup> / <sub>4</sub> (349)	22 <sup>1</sup> / <sub>4</sub> (565)	22 <sup>1</sup> / <sub>2</sub> (572)	1 <sup>1</sup> / <sub>2</sub> (38)	1 <sup>3</sup> / <sub>4</sub> (44)	22 <sup>7</sup> / <sub>8</sub> (581)	9	18 (457)	90 (40.8)
5PV32A, 5PV33A	180	27 <sup>7</sup> / <sub>8</sub> (708)	13 <sup>15</sup> / <sub>16</sub> (354)	30 <sup>1</sup> / <sub>4</sub> (768)	15 <sup>1</sup> / <sub>8</sub> (384)	8 <sup>1</sup> / <sub>8</sub> (206)	3 <sup>3</sup> / <sub>16</sub> (81)	5 <sup>7</sup> / <sub>8</sub> (149)	14 (356)	25 <sup>1</sup> / <sub>2</sub> (648)	23 <sup>3</sup> / <sub>4</sub> (603)	2 (51)	1 <sup>3</sup> / <sub>4</sub> (44)	26 <sup>1</sup> / <sub>8</sub> (664)	10	20 (508)	125 (56.6)
1EBC1, 5PV38A	240	27 <sup>7</sup> / <sub>8</sub> (708)	13 <sup>15</sup> / <sub>16</sub> (354)	30 <sup>1</sup> / <sub>4</sub> (768)	15 <sup>1</sup> / <sub>8</sub> (384)	8 <sup>1</sup> / <sub>8</sub> (206)	3 <sup>3</sup> / <sub>16</sub> (81)	5 <sup>7</sup> / <sub>8</sub> (149)	14 (356)	25 <sup>1</sup> / <sub>2</sub> (648)	23 <sup>3</sup> / <sub>4</sub> (603)	2 (51)	1 <sup>3</sup> / <sub>4</sub> (44)	26 <sup>1</sup> / <sub>8</sub> (664)	10	20 (508)	125 (56.6)
1EBC2, 5PV40A	280	33 <sup>3</sup> / <sub>8</sub> (848)	16 <sup>11</sup> / <sub>16</sub> (424)	37 <sup>3</sup> / <sub>4</sub> (959)	18 <sup>7</sup> / <sub>8</sub> (479)	9 (229)	3 <sup>3</sup> / <sub>16</sub> (81)	9 <sup>5</sup> / <sub>8</sub> (244)	17 <sup>3</sup> / <sub>4</sub> (451)	25 <sup>1</sup> / <sub>2</sub> (648)	23 <sup>3</sup> / <sub>4</sub> (603)	2 (51)	1 <sup>3</sup> / <sub>4</sub> (44)	26 <sup>1</sup> / <sub>8</sub> (664)	10	20 (508)	118 (53.5)
1EBC3, 5PV42A	300	33 <sup>3</sup> / <sub>8</sub> (848)	16 <sup>11</sup> / <sub>16</sub> (424)	37 <sup>3</sup> / <sub>4</sub> (959)	18 <sup>7</sup> / <sub>8</sub> (479)	9 (229)	3 <sup>3</sup> / <sub>16</sub> (81)	9 <sup>5</sup> / <sub>8</sub> (244)	18 <sup>5</sup> / <sub>8</sub> (473)	31 (787)	31 <sup>1</sup> / <sub>4</sub> (794)	2 (51)	1 <sup>3</sup> / <sub>4</sub> (44)	31 <sup>5</sup> / <sub>8</sub> (803)	13	24 (610)	154 (69.8)
1EBC4, 5PV45A	360																

ENGLISH

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

Table 4-Steam Performance Data

Header Type Models Only

Model No.	Output BTU/HR (kW)	Cond. lbs./hr. (kg/hr)	E.D.R. Sq. Ft. (sq. m)	Final Air Deg. °F (Deg. °C)	Motor HP (kW)	RPM	Nominal CFM (m³/s)	Outlet FPM (m/s)	Nom. Amps @ 115VAC†	Nom. Fan Diam. Inches (mm)
5PV31A	18,000 (5.3)	18.0 (8.2)	75 (7.0)	102 (39)	16 Watts	1550	395 (.186)	395 (2.007)	0.80	9 (228.6)
3DUF7	24,000 (7.0)	24.5 (11.1)	100 (9.3)	109 (43)	16 Watts	1550	450 (.212)	450 (2.286)	0.80	10 (254.0)
5PV43A	36,000 (10.5)	37.0 (16.8)	150 (13.9)	119 (48)	25 Watts	1550	550 (.260)	550 (2.794)	1.2	10 (254.0)
5PV46A	48,000 (14.1)	49.0 (22.2)	200 (18.6)	119 (48)	1/20 (.037)	1000	750 (.354)	550 (2.794)	1.4	12 (304.8)
5PV47A, 5PV48A	60,000 (17.6)	61.0 (27.6)	250 (23.2)	121 (49)	1/20 (.037)	1000	900 (.425)	650 (3.302)	1.4	12 (304.8)
5PV49A, 5PV50A	72,000 (21.1)	73.0 (33.1)	300 (27.9)	120 (49)	1/20 (.037)	1000	1100 (.519)	800 (4.064)	1.4	14 (355.6)
5PV51A, 5YH20A	84,000 (24.6)	85.0 (38.5)	350 (32.5)	115 (46)	1/12 (.062)	1000	1400 (.661)	900 (4.572)	2.2	14 (355.6)
5PV52A, 5PV53A	96,000 (28.1)	97.0 (43.9)	400 (37.2)	123 (51)	1/12 (.062)	1000	1400 (.661)	930 (4.724)	2.2	16 (406.4)
5PV15A, 5PV16A	108,000 (31.6)	110.0 (49.8)	450 (41.8)	115 (46)	1/12 (.062)	1000	1800 (.850)	1000 (5.080)	2.2	16 (406.4)
5PV20A, 5YH19A	120,000 (35.2)	122.0 (55.3)	500 (46.5)	118 (48)	1/3 (.249)	1140	1900 (.897)	900 (4.572)	4.5	18 (457.2)
5PV23A, 5PV24A	132,000 (38.7)	134.0 (60.7)	550 (51.1)	121 (49)	1/3 (.249)	1140	2000 (.944)	950 (4.826)	4.5	18 (457.2)
5PV27A, 5PV28A	144,000 (42.2)	146.0 (66.1)	600 (55.7)	120 (49)	1/3 (.249)	1140	2200 (1.038)	1000 (5.080)	4.5	18 (457.2)
5PV29A, 5PV30A	156,000 (45.7)	160.0 (72.5)	650 (60.4)	115 (46)	1/3 (.249)	1140	2600 (1.227)	1150 (5.842)	4.5	18 (457.2)
5PV32A, 5PV33A	180,000 (52.7)	190.0 (86.1)	770 (71.5)	135 (57)	1/3 (.249)	1140	2200 (1.038)	800 (4.064)	4.5	18 (457.2)
5PV34A, 5PV35A	204,000 (59.8)	208.0 (94.2)	850 (79.0)	124 (51)	1/3 (.249)	1140	2900 (1.369)	1000 (5.080)	4.5	18 (457.2)
1EBC1, 5PV38A	240,000 (70.3)	244.0 (110.5)	1000 (92.9)	123 (51)	1/3 (.249)	1140	3500 (1.652)	900 (4.572)	4.5	20 (508.0)
1EBC2, 5PV40A	280,000 (82.0)	280.0 (126.8)	1100 (102.2)	121 (49)	1/2 (.373)	1100	4200 (1.982)	980 (4.978)	5.4	20 (508.0)
1EBC3, 5PV42A	300,000 (87.9)	310.0 (140.4)	1250 (116.1)	117 (47)	1/2 (.373)	1100	5000 (2.360)	700 (3.556)	5.4	24 (609.6)
1EBC4, 5PV45A	360,000 (105.5)	366.0 (165.8)	1500 (139.4)	120 (49)	1/2 (.373)	1100	5500 (2.596)	1000 (5.080)	5.4	24 (609.6)

Performance based on 2# steam pressure (13.8 kpa) at heater with air entering @ 60°F (16°C).

Use conversion Table on page 2 for all metric conversions.

†Stated amp is full load for the standard motor. Amp draw varies by motor manufacturer ± 0.2 amps. Please see your unit's motor data plate for exact full load amp rating.

**Steam Calculations and Correction Factors (Header Type Models Only)**

		<b>EXAMPLE: –</b> UNIT SIZE: _3DUF7(24MBTUH) Steam Pressure ____ 10 PSI Entering Air Temp. __ 40°F
<b>I. CAPACITY</b>		
A. For 2 lbs. steam, 60° entering air	Read output directly from Table 4, 24,000 BTU/HR.	
B. For higher steam pressures and/or E.A.T.'s above or below 60°F	Multiply output from Table 4 by appropriate correction factor from Table 5 (below).	24,000 x 1.29 = 30,960 BTU/HR.
<b>II. FINAL AIR TEMPERATURE</b>		
A. For 2 lbs. steam, 60° entering air	Read temperature directly from Table 4, 109°F.	
B. For capacities calculated in I.B. (above)	$\frac{\text{Output from I.B.}}{1.085 \times \text{CFM from Table 4}} + \text{E.A.T.} = \text{Final Air Temp.}$	$\frac{30,960}{1.085 \times 450} + 40 = 103.4^\circ\text{F.}$
<b>III. FINAL AIR VOLUME</b>		
A. For 2 lbs. steam, 60° entering air	$\frac{460 + \text{Final Air Temp from Table 4}}{530} \times \frac{\text{Nom. CFM from Table 4}}{\text{Table 4}} = \text{Final Air Volume}$	$\frac{460 + 109}{530} \times 450 = 483 \text{ CFM}$
B. For final air temperatures calculated in II. B. (above)	$\frac{460 + \text{Final Air Temp from II.B.}}{530} \times \frac{\text{Nom. CFM from Table 4}}{\text{Table 4}} = \text{Final Air Volume}$	$\frac{460 + 103.4}{530} \times 450 = 478 \text{ CFM}$
<b>IV. CONDENSATE PER HOUR</b>		
A. For 2 lbs. steam, 60° entering air	Read lbs. per hour from Table 4, 24.5 LBS./HR.	
B. For capacities calculated in I.B. (above)	$\frac{\text{Output from I.B.}}{\text{Latent Heat From Table 6}} = \text{lbs. per hour of condensate}$	$\frac{30,960}{953} = 32.5 \text{ LBS./HR.}$

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**Table 5 - Steam Correction Factors based on 2 PSI (13.8 kPa) Steam and 60°F (16°C) E.A.T.**

ENTERING AIR TEMPERATURE °F (°C)	STEAM PRESSURE (SATURATED) — LBS. PER SQ. IN. (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	1.60	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 6 - Properties of Saturated Steam**

	STEAM PRESSURE IN LBS. PER SQUARE INCH GAUGE (PSIG)												
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 (861.8)	150 (1,034.1)
Steam Temperature-°F (°C)	212.0 (100.0)	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)

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

Table 7-Hot Water Performance Data

Serpentine and Header Type Models

Model No.	Output BTU/ HR (kW)	Flow Rate GPM (L/s)	Final Air Temp. °F (°C)	Press. Drop FT./H <sub>2</sub> O (m/water)	Motor HP (kW)	RPM	Nominal CFM (m <sup>3</sup> /s)	Outlet Air Velocity FPM (m/s)	Nom. Amps @ 115VAC†	Sound Rating
5YH18A	8,030 (2.4)	0.8 (.050)	91 (33)	0.80 (.244)	16 Watts	1550	245 (.116)	250 (1.270)	0.80	II
5PV19A	18,400 (5.4)	1.9 (.120)	94 (34)	2.20 (.671)	16 Watts	1550	500 (.236)	500 (2.540)	0.80	II
5PV22A	24,800 (7.3)	2.5 (.158)	102 (39)	2.20 (.671)	25 Watts	1550	580 (.274)	590 (2.997)	1.2	II
5PV26A	38,900 (10.5)	3.6 (.227)	99 (37)	3.00 (.914)	1/20 (.037)	1000	850 (.401)	550 (2.794)	1.4	II
5PV31A	13,050 (3.8)	1.3 (.082)	95 (35)	0.005 (.002)	16 Watts	1550	395 (.186)	395 (2.007)	0.80	II
3DUF7	17,400 (5.1)	1.8 (.114)	96 (36)	0.014 (.004)	16 Watts	1550	450 (.212)	450 (2.286)	0.80	II
5PV43A	26,100 (7.6)	2.7 (.170)	103 (39)	0.09 (.027)	25 Watts	1550	550 (.260)	550 (2.794)	1.2	II
5PV46A	34,800 (10.2)	3.5 (.221)	103 (39)	0.12 (.037)	1/20 (.037)	1000	750 (.354)	550 (2.794)	1.4	II
5PV47A, 5PV48A	43,600 (12.8)	4.4 (.278)	105 (41)	0.17 (.052)	1/20 (.037)	1000	900 (.425)	650 (3.302)	1.4	II
5PV49A, 5PV50A	52,300 (15.3)	5.3 (.334)	104 (40)	0.23 (.070)	1/20 (.037)	1000	1100 (.519)	800 (4.064)	1.4	II
5PV51A, 5YH20A	61,000 (17.9)	6.1 (.385)	100 (38)	0.24 (.073)	1/12 (.062)	1000	1400 (.661)	900 (4.572)	2.2	III
5PV52A, 5PV53A	69,700 (20.4)	7.0 (.442)	106 (41)	0.29 (.088)	1/12 (.062)	1000	1400 (.661)	930 (4.724)	2.2	III
5PV15A, 5PV16A	78,400 (23.0)	7.9 (.498)	100 (38)	0.36 (.110)	1/12 (.062)	1000	1800 (.850)	1000 (5.080)	2.2	III
5PV20A, 5YH19A	87,100 (25.5)	8.8 (.555)	102 (39)	0.39 (.119)	1/3 (.249)	1140	1900 (.897)	900 (4.572)	4.5	III
5PV23A, 5PV24A	95,800 (28.1)	9.6 (.606)	104 (40)	0.41 (.125)	1/3 (.249)	1140	2000 (.944)	950 (4.826)	4.5	IV
5PV27A, 5PV28A	104,000 (30.5)	10.4 (.656)	104 (40)	0.43 (.131)	1/3 (.249)	1140	2200 (1.038)	1000 (5.080)	4.5	IV
5PV29A, 5PV30A	113,000 (33.1)	11.3 (.713)	100 (38)	0.53 (.162)	1/3 (.249)	1140	2600 (1.227)	1150 (5.842)	4.5	IV
5PV32A, 5PV33A	118,000 (34.6)	11.8 (.744)	110 (43)	0.6 (.183)	1/3 (.249)	1140	2200 (1.038)	800 (4.064)	4.5	III
5PV34A, 5PV35A	148,000 (43.4)	14.9 (.940)	107 (42)	0.79 (.241)	1/3 (.249)	1140	2900 (1.369)	1000 (5.080)	4.5	IV
1EBC1, 5PV38A	174,000 (51.0)	17.4 (1.098)	106 (41)	1.06 (.323)	1/3 (.249)	1140	3500 (1.652)	900 (4.572)	4.5	IV
1EBC2, 5PV40A	209,100 (61.3)	21.0 (1.325)	106 (41)	1.33 (.405)	1/2 (.373)	1100	4200 (1.982)	980 (4.978)	5.4	IV
1EBC3, 5PV42A	230,000 (67.4)	23.0 (1.451)	102 (39)	2.1 (.640)	1/2 (.373)	1100	5000 (2.360)	700 (3.556)	5.4	IV
1EBC4, 5PV45A	261,300 (76.6)	26.2 (1.653)	103 (39)	2.1 (.640)	1/2 (.373)	1100	5500 (2.596)	1000 (5.080)	5.4	IV

Performance based on 200°F (93°C) EWT, 60°F (16°C) E.A.T., 20°F (11°C)TD.

† Stated amp is full load for the standard motor. Amp draw varies by motor manufacturer ± 0.2 amps. Please see your unit's motor data plate for exact full load amp rating.



**Hot Water Calculations and Correction Factors (Serpentine and Header Type Models)**

EXAMPLE: –  
UNIT SIZE: \_\_\_\_\_ 3DUF7 (24 MBTUH)  
Entering Water Temp. \_\_\_\_\_ 160°F  
Entering Air Temp. \_\_\_\_\_ 40°F  
Water Temperature Drop \_\_\_\_\_ 10°F

<b>I. CAPACITY @ 20° TD:</b> A. For 200° EWT, 60° EAT	Read output directly from Table 7, 17,400 BTU/HR.	
B. For EWT and/or EAT above or below Standard	Multiply output from Table 7 by factor from Table 8 (below).	17,400 x .878 = 15,277 BTU/HR.
<b>II. CAPACITY AT OTHER TD's</b> A. For TD's from 5 to 60°F	Multiply output obtained in IA. or IB. (above) by appropriate factor from Table 9 (below)	IA - 17,400 x 1.15 = 20,010 BTU/HR. – OR – IB - 15,277 x 1.15 = 17,569 BTU/HR.
<b>III. GPM AT OTHER TD's</b> A. For TD's from 5 to 60°F	Multiply GPM of unit for 20° TD, from Table 7 by appropriate factor from Table 9 (below).	1.8 x 2.30 = 4.14 GPM (Applies only to units with Std. 200° EWT, 60° EAT.) For all others calculate using formula – $GPM = \frac{BTU}{500 \times TD}$
<b>IV. CAPACITY AT OTHER RATES OF WATER FLOW</b>	Multiply output from Table 7 by factor from Table 11 (below).	
<b>V. PRESSURE LOSS AT OTHER TD's</b> A. For TD's from 5 to 60°F	Multiply P.D. of unit for 20° TD, from Table 7 by appropriate factor from Table 9 (below).	.014 x 5.00 = .07 Ft. H <sub>2</sub> O

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**Table 8 - Hot Water Conversion Factors based on 200° (93°C) Entering Water, 60° (16°C) Entering Air and 20° (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

\* = not aligned vertically

**Table 9 — 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 & 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	.94	.90	.83	.76	.72
To obtain flow for other Water Temperature Drops, multiply basic rate rating by applicable Factor.*	5.00	2.30	1.44	1.00	.74	.59	.40	.30	.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	.60	.40	.20	.13	.07

**\*Table 10 — Minimum Water Flow**

MODEL MBTUH	8.03	18.4	24.8	38.9	13.05	17.4	26.1	34.8	43.6	52.3	61.0	69.7
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)
MODEL MBTUH	78.4	87.1	95.8	104.0	113.0	118.0	148.0	174.0	209.1	230.0	261.3	
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 11 - Heating Capacity Factors for Various Rates of Water Flow**

% of Rated Water Flow	25%	50%	75%	100%	125%	150%	175%
Heating Capacity Factor	.80	.89	.96	1.00	1.04	1.07	1.10

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

## Location

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

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

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

Add clearances to combustibles.

Figure 5

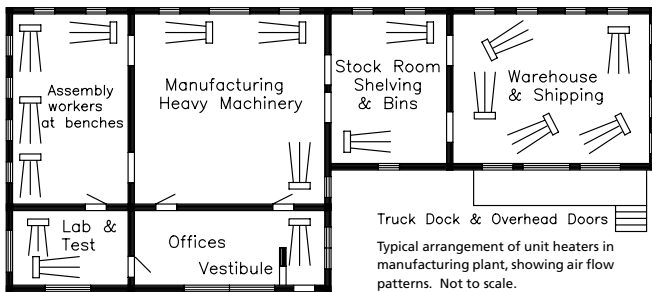
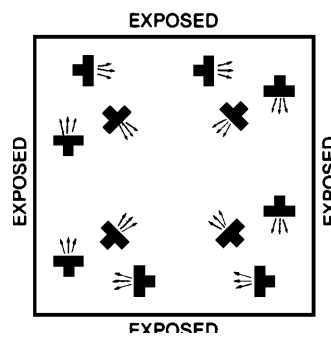
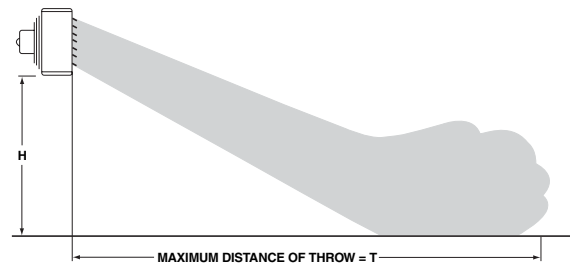


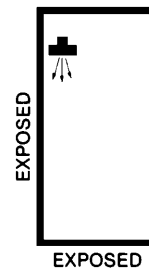
Figure 6

**MOUNTING HEIGHT AND APPROX. HEAT THROW** (see Table 1 on page 3)  
Based on 2 PSI (13.8 kPa) steam pressure and 60°F (16°C) entering air temperature



A large square area with exposed walls and roof; units are blanketing all exposed surfaces.

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



A small area with exposed walls requiring one unit.

E  
N  
G  
L  
I  
S  
H

# Models 1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV19A, 5PV20A, 5PV22A-5PV24A, 5PV26A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A & 5YH18A- 5YH20A

## Installation UNIT MOUNTING

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

**NOTE:** Units are equipped with the motor mounted to the fan guard and require two point suspension. Refer to Figures 3 and 4 for two point suspension.

**▲ CAUTION** *Unit heaters must be hung level from side to side and from front to back. Failure to do so will result in poor performance and/or premature failure of the unit.*

**▲ WARNING** *Make certain that the lifting methods used to lift the heater and the method of suspension used in the field installation of the heater are capable of uniformly supporting the weight of the heater at all times. Failure to heed this warning may result in property damage or personal injury!*

**▲ WARNING** *Insure that all hardware used in the suspension of each unit heater is more than adequate for the job. Failure to do so may result in extensive property damage, severe personal injury, or death!*

**▲ WARNING** *Make sure that the structure to which the unit heater is to be mounted is capable of safely supporting its weight. Under no circumstances must the gas lines, the venting system or the electrical conduit be used to support the heater; or should any other objects (i.e. ladder, person) lean against the heater gas lines, venting system or the electrical conduit for support. Failure to heed these warnings may result in property damage, personal injury, or death.*

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

Units must hang level vertically and horizontally.

Provide sufficient clearance around units for maintenance purposes.

Isolators are not required but may be desirable for some applications. Refer to "Dimensional Data" in Tables 2 and 3.

### PIPING

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

See Figures 8 through 12 for proper pipe connections.

Follow standard practices and codes when installing the piping. Provide swing joints for expansion purposes, unions and shut-off valves for servicing purposes and as illustrated in Figures 8 through 12, valves and traps for control purposes. Use 45 degree angle run-offs from all supply and return mains.

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

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

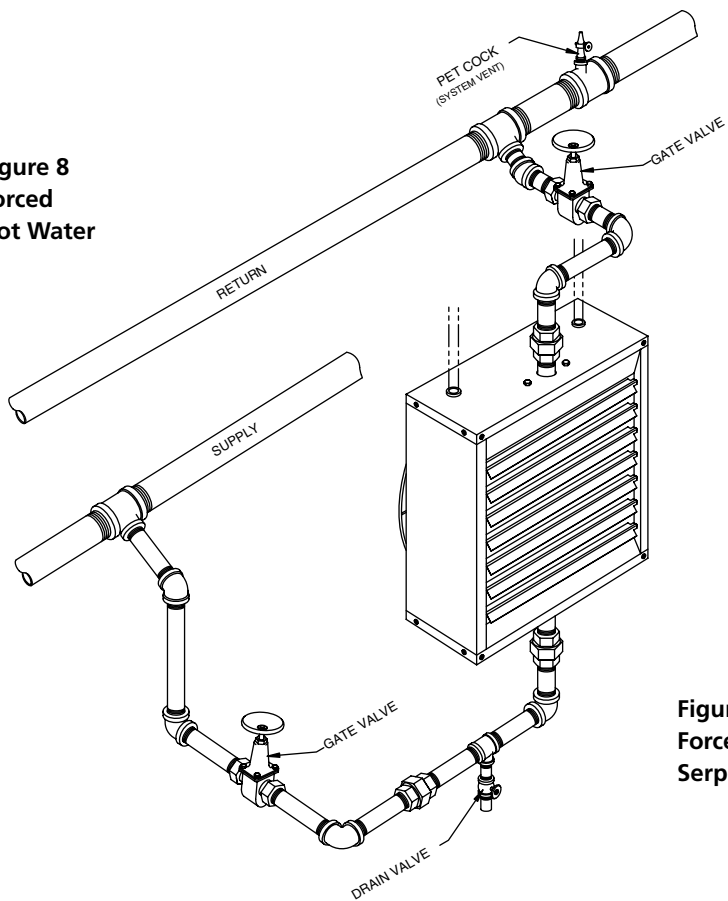
It is important that the system be kept clean. Care should be exercised that excessive joint materials or foreign substances be kept out of the system.

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

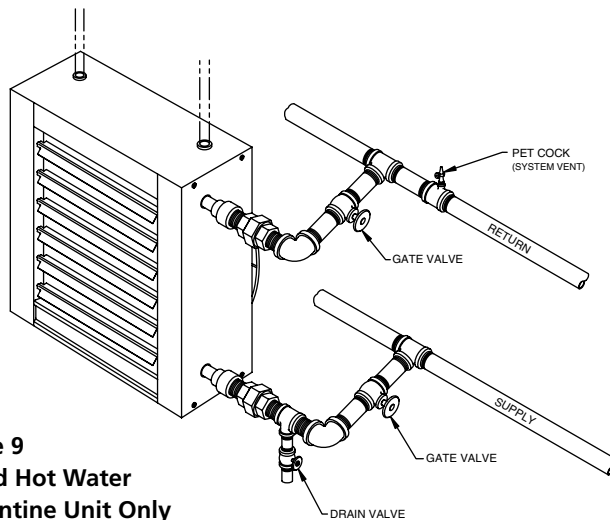
**Installation (Continued)**

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**Figure 8  
Forced  
Hot Water**

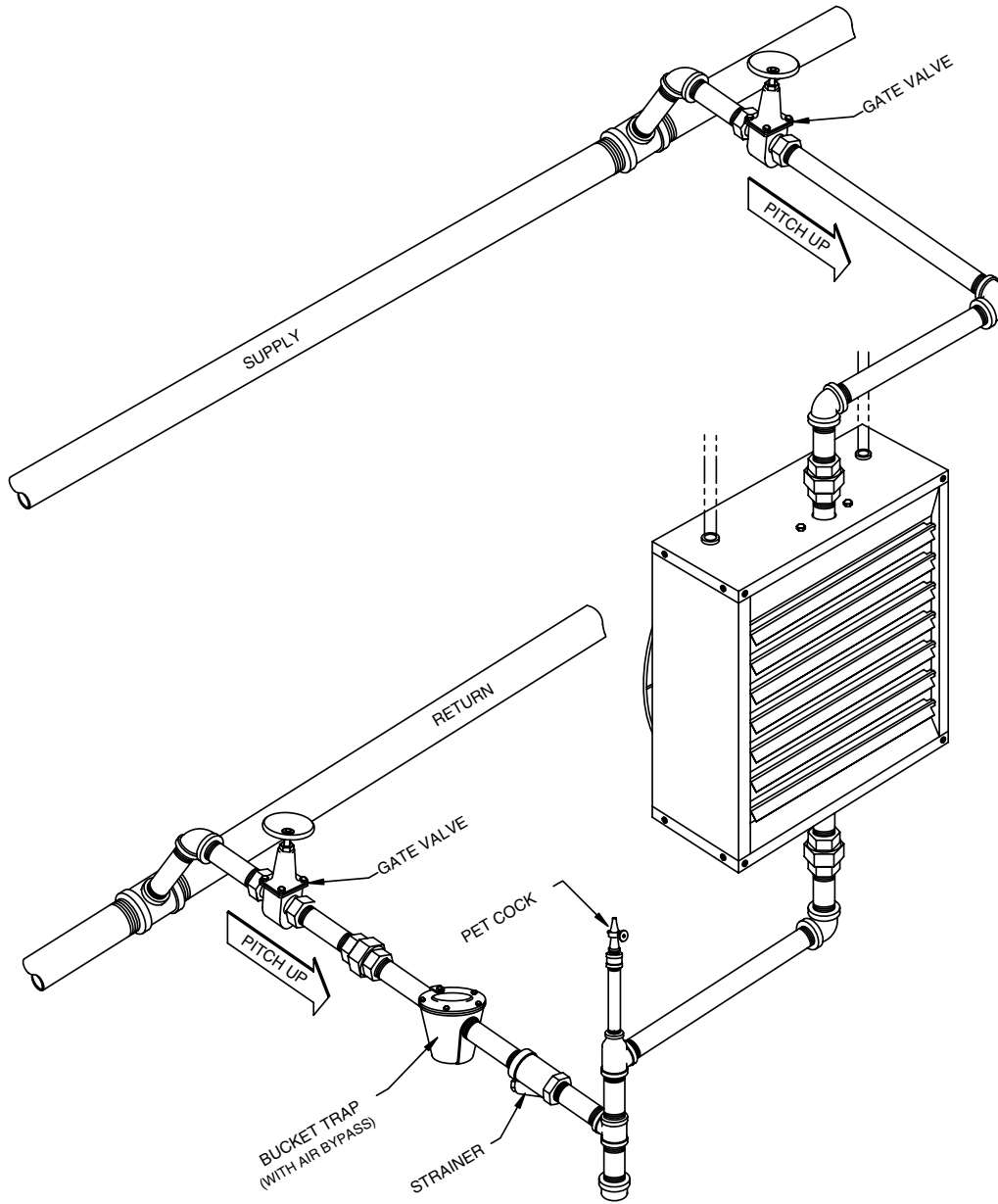


**Figure 9  
Forced Hot Water  
Serpentine Unit Only**



**Installation (Continued)**

Figure 10  
High Pressure  
Steam

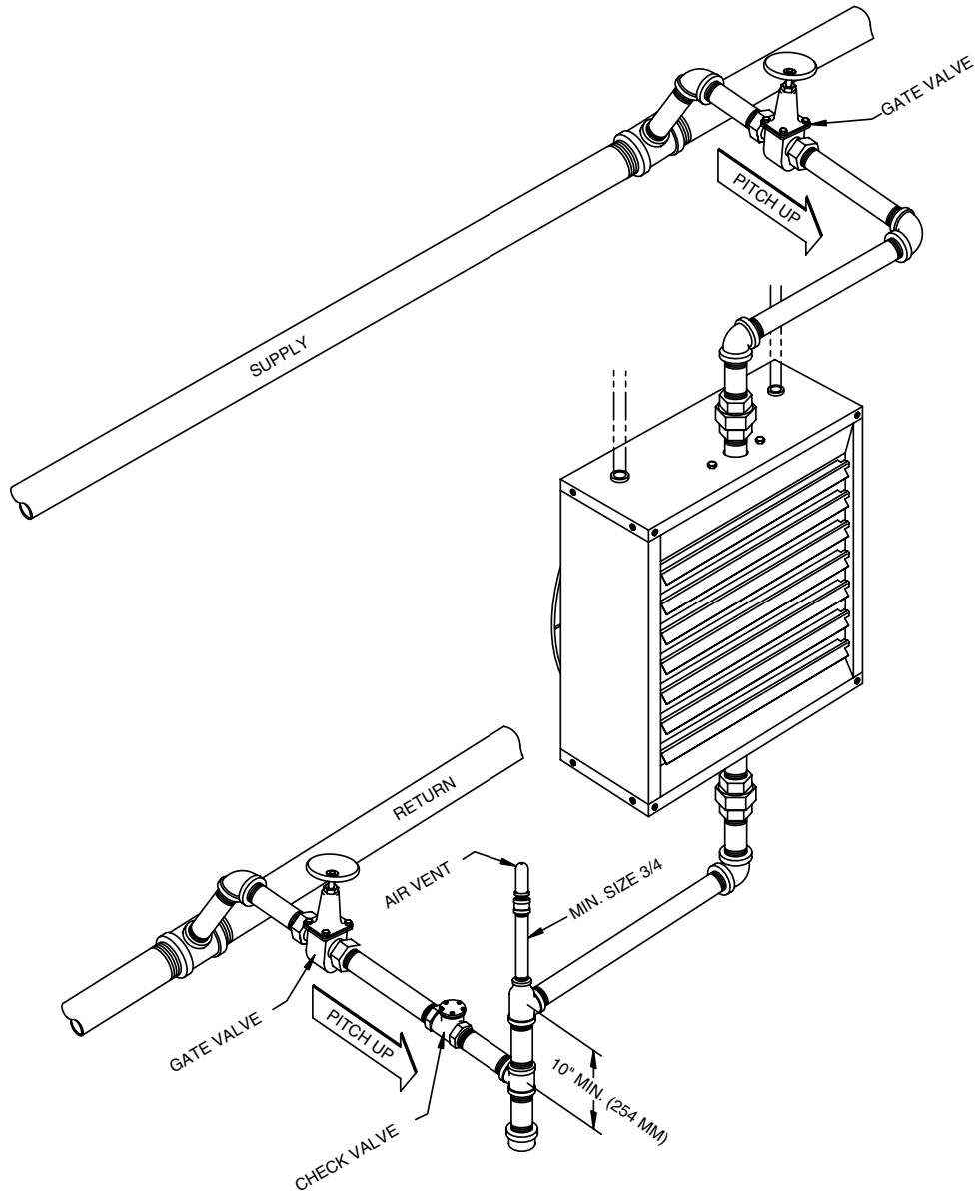


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**Installation (Continued)**

Figure 11  
Low Pressure  
Steam Gravity

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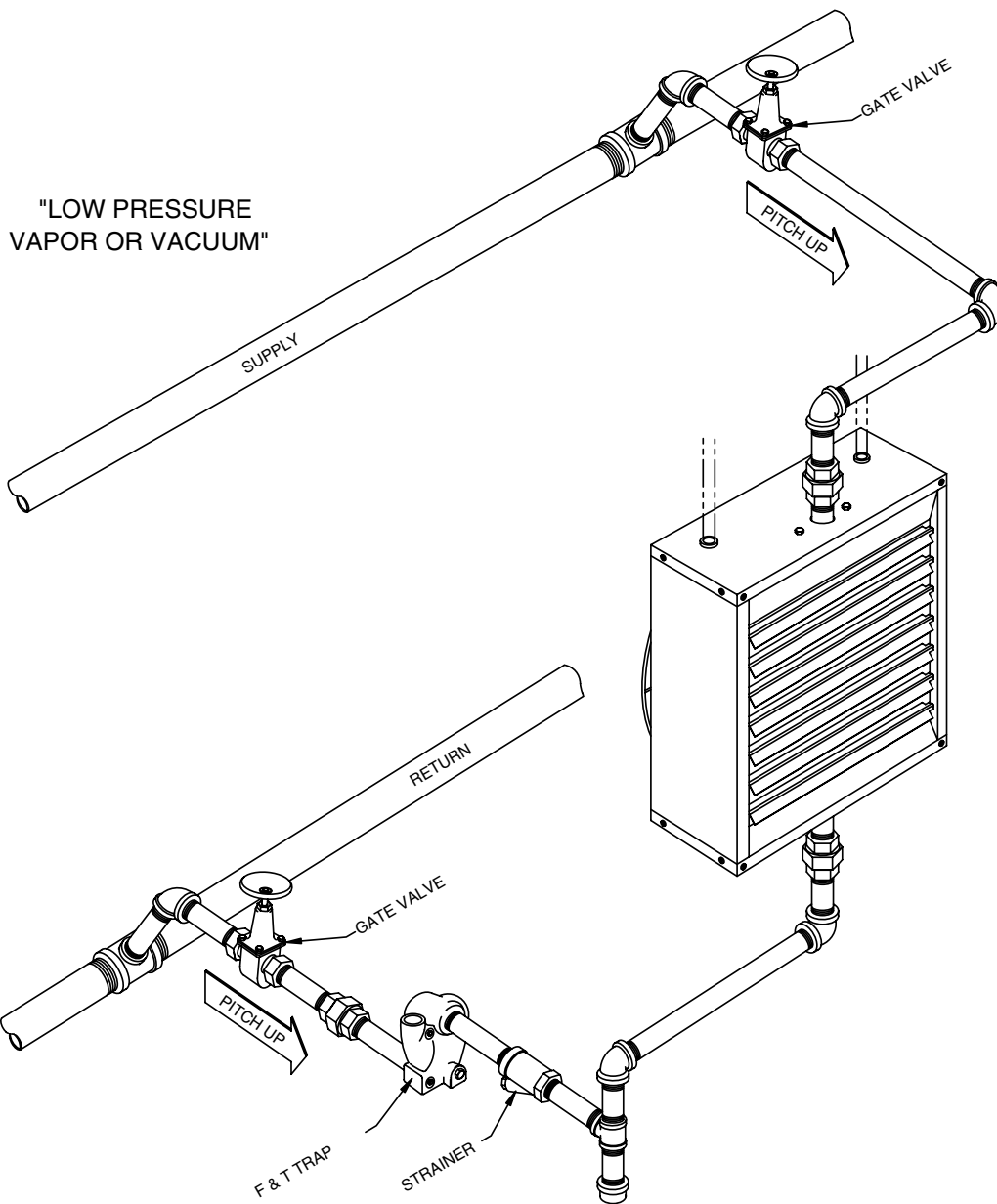


### Installation (Continued)

Figure 12

Low Pressure

Vapor Or Vacuu



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# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

## Electrical Connections

### ▲ WARNING

**HAZARDOUS VOLTAGE!  
DISCONNECT ALL  
ELECTRIC POWER  
INCLUDING REMOTE  
DISCONNECTS BEFORE  
SERVICING. Failure to  
disconnect power  
before servicing can  
cause severe personal  
injury or death.**



Units are shipped for use on 115 volt, 60 hertz single phase electric power. The motor nameplate and electrical rating on the transformer should be checked before energizing the unit heater electrical system. All external wiring must conform to ANSI/NFPA No. 70-2006, National Electrical Code (or the latest edition) and applicable current local codes; in Canada, to the Canadian Electrical Code, Part 1 CSA Standard C22.1.

**▲ CAUTION** *Do not use any tools (i.e. screw-driver, pliers, etc.) across the terminals to check for power. Use a voltmeter.*

It is recommended that the electrical power supply to each unit heater be provided by a separate, fused and permanently live electrical circuit. A disconnect switch of suitable electrical rating for each unit heater should be located as close to the controls as possible. Each unit heater must be electrically grounded in accordance with National Electric Code, ANSI/NFPA No. 70-2006 (or the latest edition of) or CSA Standard C22.1. Sample wiring connections are depicted in Figures 12 through 22.

### OPERATION

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

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

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

### THERMOSTAT WIRING AND LOCATION

**NOTE:** The thermostat must be mounted on a vertical vibration-free surface free from air currents and in accordance with the furnished instructions.

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

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

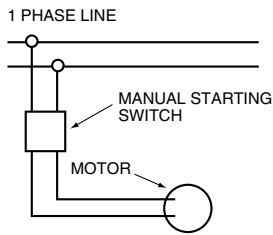
**NOTICE:** For all wiring connections, refer to the wiring diagram on the motor nameplate. Should any original wire supplied with the heater have to be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C.



# Models 1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV19A, 5PV20A, 5PV22A-5PV24A, 5PV26A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A & 5YH18A- 5YH20A

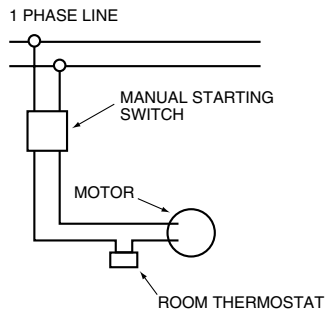
## Wiring Installation

Figure 13



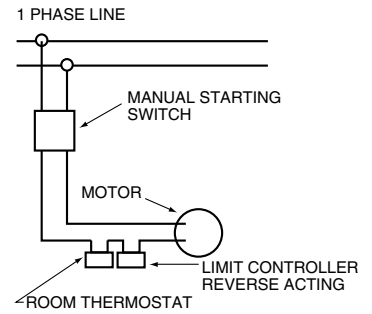
MANUAL CONTROL WITH SINGLE PHASE MOTOR

Figure 14



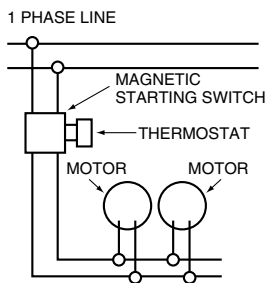
THERMOSTATIC CONTROL WITH MANUAL STARTER

Figure 15



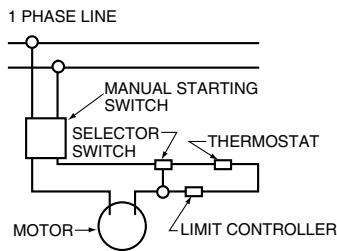
THERMOSTATIC CONTROL WITH REVERSE ACTING CONTROLLER AND MANUAL STARTER

Figure 16



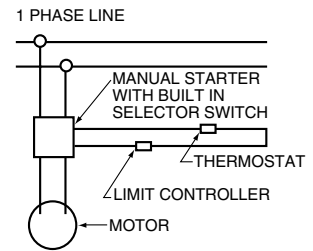
THERMOSTATIC CONTROL USING MAGNETIC STARTER OPERATING SEVERAL UNITS

Figure 17



THREE POSITION SELECTOR SWITCH USED FOR EITHER MANUAL OR THERMOSTATIC CONTROL

Figure 18



THREE POSITION SELECTOR SWITCH BUILT INTO MAGNETIC STARTER FOR MANUAL OR THERMOSTATIC CONTROL

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

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# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

## Maintenance PERIODIC SERVICE

**⚠ WARNING** *Open all disconnect switches and secure in that position before servicing unit. Failure to do so may result in personal injury or death from electrical shock*

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

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

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

**⚠ CAUTION** *Allow rotating fans to stop before servicing to avoid serious injury to fingers and hands.*

## MOTOR LUBRICATION

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

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

The frequency of oiling will depend upon operating conditions and length of running time. Inspect the oilers or oil holes when cleaning the unit. If the unit has a fractional horse-power motor, lubricate at least once a year. Under high ambient conditions or constant fan operation, fractional horse-power motors should be lubricated every 90 days. On those motors without oilers or oil holes, follow the instructions given on the motor nameplate.

**NOTE: The heater system should be checked once a year by a qualified technician. All maintenance/service information should be recorded accordingly on the inspection sheet provided in this manual.**

Should maintenance be required, perform the following inspection and service routine:

Inspect the area near the unit to be sure that there is no combustible material located within the minimum clearance requirements listed in this manual.

## CLEANING THE UNIT

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

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

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

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

## For Repair Parts, call 1-800-323-0620

24 hours a day – 365 days a year

Please provide following information:

- Model number
- Serial number (if any)
- Part description and number shown in parts list

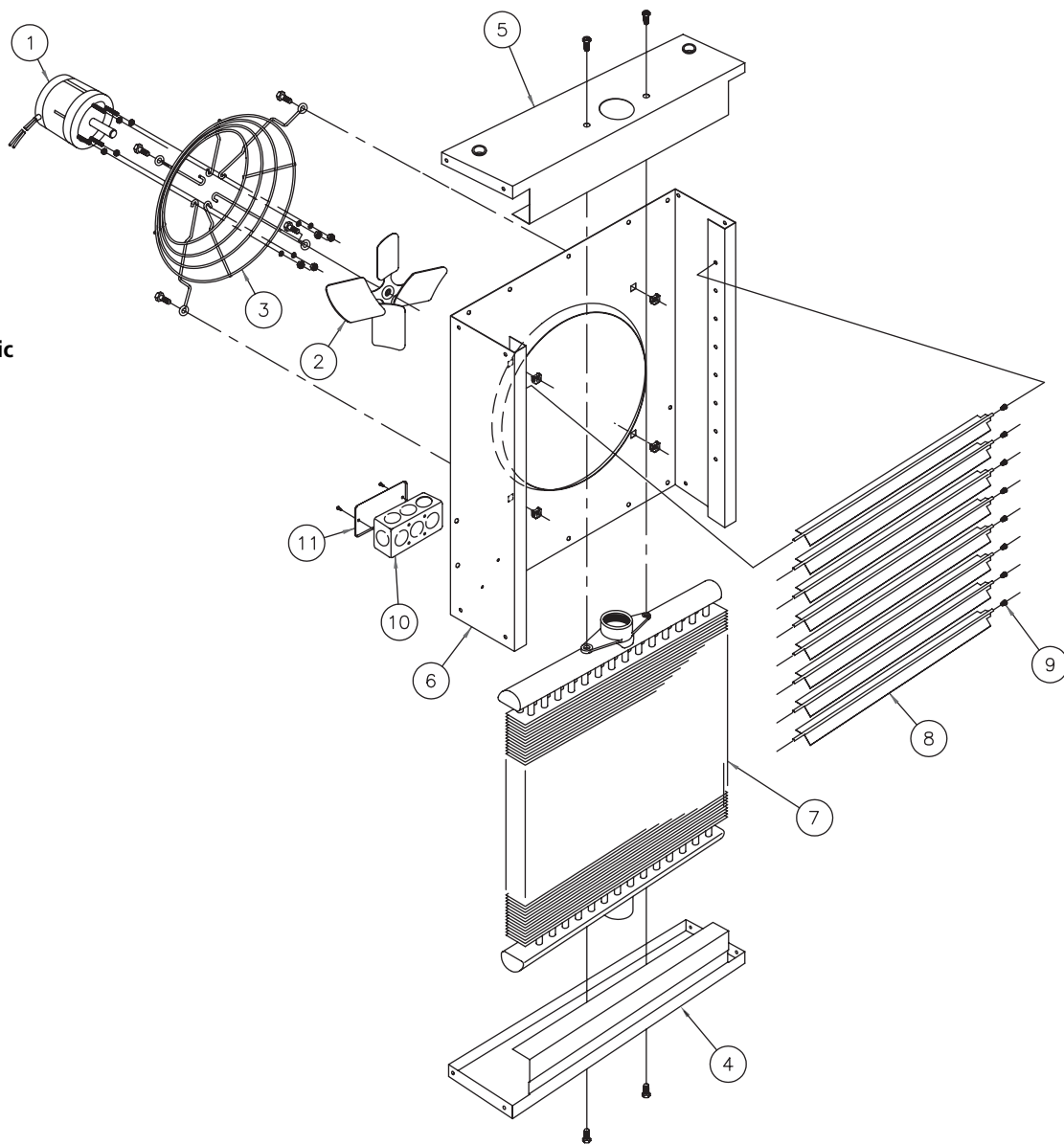


Figure 19  
Horizontal Hydronic  
Unit Heaters

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**1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV19A, 5PV20A, 5PV22A-5PV24A, 5PV26A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A & 5YH18A-5YH20A**

Dayton Operating Instructions and Parts Manual

# Repair Parts List

Ref. No.	Description	Part Numbers for Model										
		NON-OSHA OSHA	5YH18A	5PV19A	5PV22A	5PV26A	5PV31A	3DUF7	5PV43A	5PV46A		
1	Motor 115V		11J31R08361-001	11J31R08361-001	11J31R08361-003	11J31R01871	11J31R08361-001	11J31R08361-001	11J31R08361-003	11J31R01871		
2	Fan Blade		11J34R06999-004	11J34R06999-009	11J34R06999-015	11J34R06999-003	11J34R06999-005	11J34R06999-009	11J34R06999-015	11J34R06999-003		
3	Non-OSHA Fan Guard		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
3	OSHA Fan Guard		11J32R08362-004	11J32R08362-004	11J32R08362-004	11J32R04837	11J32R08362-002	11J32R08362-002	11J32R08362-002	11J32R04837		
4	Bottom Jacket Panel		11251R02709-001	11251R02709-001	11251R02709-001	11251R02709-002	11251R02700-001	11251R02700-001	11251R02700-001	11251R02700-002		
5	Top Jacket Panel Assembly		11251R08539-001	11251R08539-001	11251R08539-001	11251R08539-002	11251R08540-001	11251R08540-001	11251R08540-001	11251R08540-002		
6	Venturi Jacket Panel		11251R01012-001	11251R01012-001	11251R01012-001	11251R01012-002	11251R02856	11251R00803	11251R00803	11251R02701		
7	Coil Assembly		11257R01006-003	11257R01006-001	11257R01006-001	11257R01006-002	11257R01020-001	11257R01020-002	11257R01020-002	11257R01020-004		
8	Horizontal Louvers (Qty)		11257R00272-117 (6)	11257R00272-117 (6)	11257R00272-117 (6)	11257R00272-117 (6)	11257R00272-117 (4)	11257R00272-117 (5)	11257R00272-117 (5)	11257R00272-118 (6)		
9	Louver Cone Spring (Qty)		11J26R01960 (5)	11J26R01960 (5)	11J26R01960 (5)	11J26R01960 (6)	11J26R01960 (4)	11J26R01960 (5)	11J26R01960 (5)	11J26R01960 (6)		
10	Junction Box		11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001		
11	Junction Box Cover		11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001		

(NA) Not Applicable.

Ref. No.	Description	Part Numbers for Model										
		NON-OSHA OSHA	5PV47A	5PV48A	5YH20A	5PV52A	5PV53A	5PV15A	5YH19A	5PV23A	5PV27A	5PV28A
1	Motor 115V		11J31R01871	11J31R01871	11J31R01872	11J31R01872	11J31R01872	11J31R01872	11J31R01694	11J31R01694	11J31R01694	
2	Fan Blade		11J34R06999-008	11J34R06999-006	11J34R06999-007	11J34R06999-101	11J34R06999-101	11J34R06999-103	11J34R06999-107	11J34R06999-108	11J34R06999-108	
3	Non-OSHA Fan Guard		11253R0250-001	11253R01873-001	11253R01873-001	11253R01873-001	11253R01873-001	11253R01874-001	11253R01874-001	11253R01874-001	11253R01874-001	
3	OSHA Fan Guard		11M32R04837	11M32R06163	11M32R06163	11M32R06163	11M32R06163	11M32R06164	11M32R06164	11M32R06164	11M32R06164	
4	Bottom Jacket Panel		11251R02700-002	11251R02700-003	11251R02700-004	11251R02700-005	11251R02700-005	11251R02700-006	11251R02700-006	11251R02700-007	11251R02700-007	
5	Top Jacket Panel Assembly		11251R08540-002	11251R08540-003	11251R08540-004	11251R08540-005	11251R08540-005	11251R08540-006	11251R08540-006	11251R08540-007	11251R08540-007	
6	Venturi Jacket Panel		11251R02701	11251R02702	11251R02703	11251R02704	11251R02704	11251R02705	11251R02706	11251R02706	11251R02706	
7	Coil Assembly		11257R01020-004	11257R01020-006	11257R01020-007	11257R01020-007	11257R01020-007	11257R01020-008	11257R01020-008	11257R01020-004	11257R01020-004	
8	Horizontal Louvers (Qty)		11257R00272-118 (6)	11257R00272-119 (7)	11257R00272-120 (8)	11257R00272-121 (8)	11257R00272-121 (8)	11257R00272-121 (8)	11257R00272-122 (9)	11257R00272-122 (9)	11257R00272-122 (9)	
9	Louver Cone Spring (Qty)		11J26R01960 (6)	11J26R01960 (7)	11J26R01960 (8)	11J26R01960 (8)	11J26R01960 (8)	11J26R01960 (8)	11J26R01960 (8)	11J26R01960 (9)	11J26R01960 (9)	
10	Junction Box		11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	
11	Junction Box Cover		11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	

Ref. No.	Description	Part Numbers for Model												
		NON-OSHA OSHA	5PV29A	5PV30A	5PV32A	5PV33A	5PV34A	5PV35A	5PV38A	1EBC1	5PV40A	5PV42A	5PV45A	1EBC4
1	Motor 115V		11J31R01694	11J31R01694	11J31R01694	11J31R01694	11J31R01694	11J31R01694	11R70310112010	11R70310112010	11R70310112010	11R70310112010		
2	Fan Blade		11J34R06999-105	11J34R06999-107	11J34R06999-107	11J34R06999-105	11J34R06999-105	11J34R06999-109	11J34R06999-111	11J34R06999-111	11J34R06999-106	11J34R06999-106		
3	Non-OSHA Fan Guard*		11J32R08288	11253R01874-001	11J32R08288	11253R08423-001	11253R08423-001	11253R08423-001	11253R08423-002	11253R08423-002	11253R08423-002	11253R08423-002		
3	OSHA Fan Guard**		11M32R08291	11M32R06164	11M32R08291	11M32R08291	11M32R08291	11253R08424-001	11253R08424-001	11253R08424-002	11253R08424-002	11253R08424-002		
4	Bottom Jacket Panel		11251R02700-007	11251R02700-008	11251R02700-008	11251R02700-008	11251R02700-009	11251R02700-009	11251R02700-010	11251R02700-010	11251R02700-010	11251R02700-010		
5	Top Jacket Panel Assembly		11251R08540-007	11251R08540-008	11251R08540-008	11251R08540-008	11251R08540-009	11251R08540-009	11251R08540-010	11251R08540-010	11251R08540-010	11251R08540-010		
6	Venturi Jacket Panel		11251R02706	11251R02707	11251R02707	11251R02707	11251R00804	11251R00804	11251R02708	11251R02708	11251R02708	11251R02708		
7	Coil Assembly		11257R01025-004	11257R01025-007	11257R01025-007	11257R01025-007	11257R01025-009	11257R01025-009	11257R01025-011	11257R01025-011	11257R01025-011	11257R01025-011		
8	Horizontal Louvers (Qty)		11257R00272-122 (9)	11257R00272-123 (9)	11257R00272-123 (9)	11257R00272-124 (10)	11257R00272-124 (10)	11257R00272-124 (10)	11257R00272-125 (13)	11257R00272-125 (13)	11257R00272-125 (13)	11257R00272-125 (13)		
9	Louver Cone Spring (Qty)		11J26R01960 (9)	11J26R01960 (9)	11J26R01960 (9)	11J26R01960 (9)	11J26R01960 (10)	11J26R01960 (10)	11J26R01960 (10)	11J26R01960 (10)	11J26R01960 (10)	11J26R01960 (10)		
10	Junction Box		11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001	11J09R00796-001		
11	Junction Box Cover		11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001	11J09R00797-001		

\* Part numbers 11253R08423-001 and 11253R08423-002 are a "Kit" and include a non-OSHA guard and hardware.

\*\* Part numbers 11253R08424-001 and 11253R08424-002 are a "Kit" and include an OSHA guard and hardware.

# Models 1EBC1-1EBC4, 3DUF7, 5PV15A, 5PV16A, 5PV19A, 5PV20A, 5PV22A-5PV24A, 5PV26A-5PV35A, 5PV38A, 5PV40A, 5PV42A, 5PV43A, 5PV45A-5PV53A & 5YH18A- 5YH20A

Table 14 Troubleshooting Chart

Symptom	Possible Cause(s)	Corrective Action
A. Leaking coil	1. Frozen coil 2. Defective coil 3. Corrosion 4. Leak in joint	1. Replace 2. Replace 3. Replace 4. Braze joint if joint is exposed where leak has occurred
B. Poor Output on steam	1. Check for air in coil 2. Lint on coil fins	1. Repair or replace thermostatic air vent 2. Clean coil and fins.
C. Poor output on steam or hot water	1. No circulation of water through coil 2. Short cycling of motor 3. Backward rotating motor	1. Check circulation pump. Check for blocked tubes 2. Check voltage and correct. Check for linted coil and clean. Check for defective overload and repair or replace motor. 3. On single phase motor replace motor. On three phase motor, reverse two leads to change rotation.
D. Noisy or vibrating unit	1. Damaged fan blade 2. Dirty fan blade	1. Change fan blade 2. Clean fan blade

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## EQUIPMENT START-UP

Customer \_\_\_\_\_ Job Name & Number \_\_\_\_\_

### PRE-INSPECTION INFORMATION With power and water/steam off.

Type of Equipment: \_\_\_\_\_ Unit Heater

Serial Number \_\_\_\_\_ Model Number \_\_\_\_\_

Name Plate Voltage: \_\_\_\_\_ Name Plate Amperage: \_\_\_\_\_

Steam Hot Water Rating: \_\_\_\_\_ BTU @ \_\_\_\_\_ °F  
 \_\_\_\_\_ kw @ \_\_\_\_\_ °C

- Are all panels in place?
- Has the unit suffered any external damage? Damage \_\_\_\_\_
- Does the piping and electric wiring appear to be installed in a professional manner?
- Has the piping and electric been inspected by the local authority having jurisdiction?
- Is the supply properly sized for the equipment?
- Were the installation instructions followed when the equipment was installed?
- Have all field installed controls been installed?
- Do you understand all the controls on this equipment? **If not, contact your wholesaler or rep.**  
**(DO NOT START this equipment unless you fully understand the controls.)**



# Dayton Horizontal Hydronic Unit Heaters for Steam and Hot Water

## LIMITED WARRANTY

**DAYTON ONE-YEAR LIMITED WARRANTY.** DAYTON® HORIZONTAL HYDRONIC UNIT HEATERS, MODELS COVERED IN THIS MANUAL, ARE WARRANTED BY DAYTON ELECTRIC MFG. CO. (DAYTON) TO THE ORIGINAL USER AGAINST DEFECTS IN WORKMANSHIP OR MATERIALS UNDER NORMAL USE FOR ONE YEAR AFTER DATE OF PURCHASE. ANY PART WHICH IS DETERMINED TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP AND RETURNED TO AN AUTHORIZED SERVICE LOCATION, AS DAYTON DESIGNATES, SHIPPING COSTS PREPAID, WILL BE, AS THE EXCLUSIVE REMEDY, REPAIRED OR REPLACED AT DAYTON'S OPTION. FOR LIMITED WARRANTY CLAIM PROCEDURES, SEE "PROMPT DISPOSITION" BELOW. THIS LIMITED WARRANTY GIVES PURCHASERS SPECIFIC LEGAL RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.

**LIMITATION OF LIABILITY.** TO THE EXTENT ALLOWABLE UNDER APPLICABLE LAW, DAYTON'S LIABILITY FOR CONSEQUENTIAL AND INCIDENTAL DAMAGES IS EXPRESSLY DISCLAIMED. DAYTON'S LIABILITY IN ALL EVENTS IS LIMITED TO AND SHALL NOT EXCEED THE PURCHASE PRICE PAID.

**WARRANTY DISCLAIMER.** A DILIGENT EFFORT HAS BEEN MADE TO PROVIDE PRODUCT INFORMATION AND ILLUSTRATE THE PRODUCTS IN THIS LITERATURE ACCURATELY; HOWEVER, SUCH INFORMATION AND ILLUSTRATIONS ARE FOR THE SOLE PURPOSE OF IDENTIFICATION, AND DO NOT EXPRESS OR IMPLY A WARRANTY THAT THE PRODUCTS ARE MERCHANTABLE, OR FIT FOR A PARTICULAR PURPOSE, OR THAT THE PRODUCTS WILL NECESSARILY CONFORM TO THE ILLUSTRATIONS OR DESCRIPTIONS. EXCEPT AS PROVIDED BELOW, NO WARRANTY OR AFFIRMATION OF FACT, EXPRESSED OR IMPLIED, OTHER THAN AS STATED IN THE "LIMITED WARRANTY" ABOVE IS MADE OR AUTHORIZED BY DAYTON.

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**Product Suitability.** Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While attempts are made to assure that Dayton products comply with such codes, Dayton cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some jurisdictions do not allow a limitation on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of this Limited Warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.

**Prompt Disposition.** A good faith effort will be made for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date, and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.

**Manufactured for Dayton Electric Mfg. Co., 5959 W. Howard St., Niles, Illinois 60714-4014 U.S.A.**



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