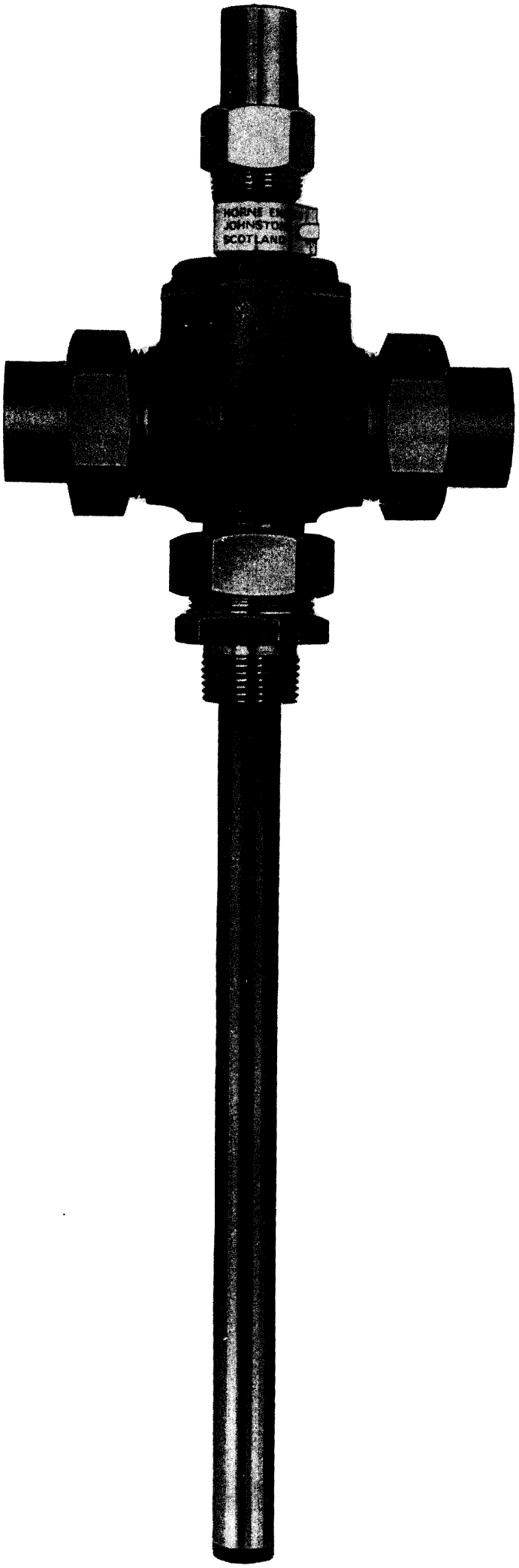


HORNE EA1 THERMOSTATIC VALVE

Applications:

Temperature control in hot water calorifiers and process heat exchangers.

Heating Medium:

Steam or primary hot water.

Features:

Quality, reliability, ease of maintenance.
Direct acting requiring no outside power supply.

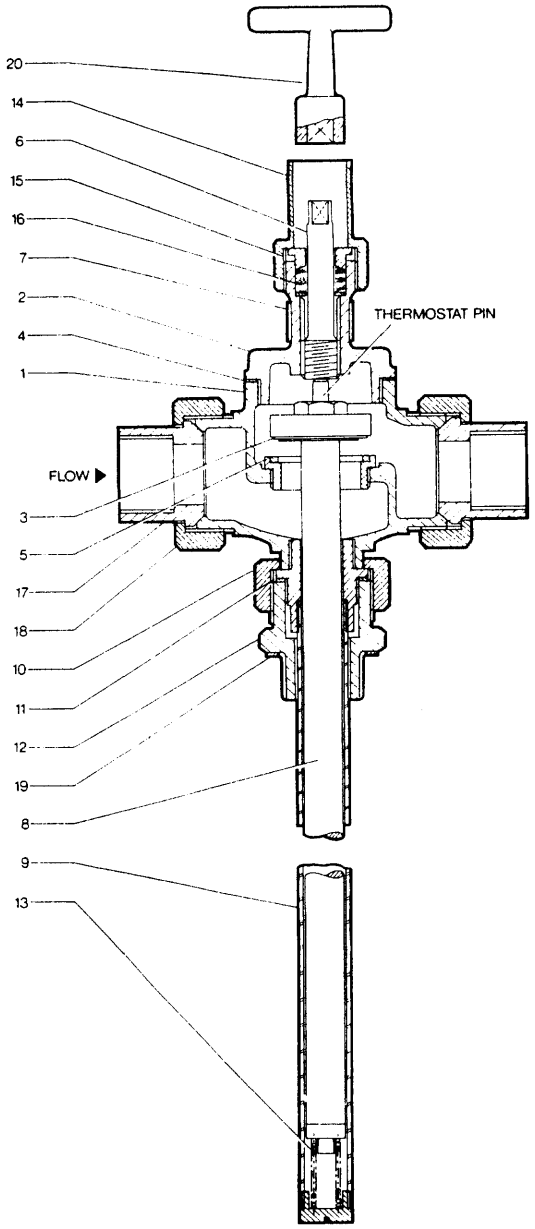
Sizes:

15mm	20mm	25mm	32mm	40mm	50mm
1/2"	3/4"	1"	1 1/4"	1 1/2"	2"

Pipe Connections:

Screwed or flanged to suit requirements.

EA1 Thermostatic Valve Parts List



1 Valve Body
2 Cover
3 Valve Disk
4 Cover Joint
5 Valve Seat
6 Adjusting Screw
7 Serial No. Plate
8 Element Sub. Assembly
9 Thermostat Pocket
10 Heater Coupling Nut
11 Coupling Joint
12 Screwed Adaptor
13 Valve Opening Spring
14 Gland Nut
15 Gland
16 Gland Packing
17 Pipe Coupling
18 Pipe Coupling Nut
19 Heater Joint
20 Temp. Adjusting Key

Note:—
The Valve Disk 3 is part of the thermostat element sub-assembly 8 and cannot be supplied as a separate item.

How it works

The Thermostat Element (8) contains a material with a high co-efficient of expansion. When the temperature in the calorifier or heat exchanger rises, the material in the element expands and pushes the thermostat pin upwards. The pin is held in contact with the Temperature Adjusting Screw (6) by the pressure of steam or primary hot water passing through the valve and by the Valve Opening Spring (13). As a result, the Thermostat Element and Valve Disk (3) are forced down towards the Valve Seat (5). As the valve closes, the steam or primary hot water passing through it is throttled and the temperature in the calorifier or heat exchanger is controlled. If the temperature continues to rise, the valve will close completely cutting off the flow of steam or primary hot water.

When the temperature round the element falls, the material in the element contracts and the thermostat pin retracts into the element allowing the valve to open.

The temperature adjusting screw governs the distance travelled by the element and valve disk before the valve closes. The greater the distance, the higher the temperature at which the valve will control.

ORDERING OF SPARE PARTS

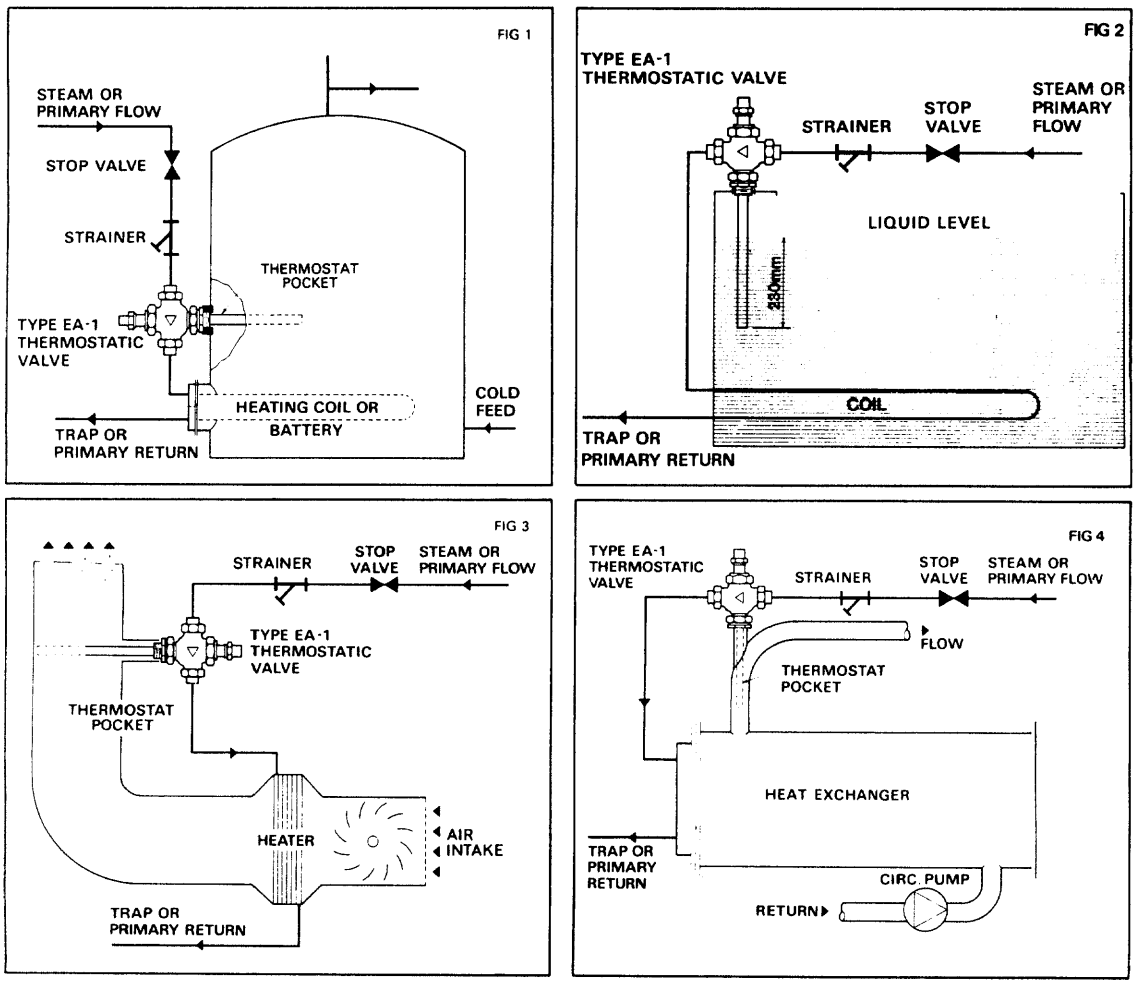
The serial number stamped on the Serial Number Plate (7) should be quoted when ordering spare parts.

Normally the only spare part required is the Thermostat Element Sub-Assembly (8) which includes the Valve Disk (3) and thermostat pin. The Valve Seat (5) can easily be replaced if necessary.

Recommendations for installing

1. Valves must be fitted above the heating coil or surface.
2. Valves may be fitted in any attitude with the thermostat element level with or below the valve body. Valves should not be fitted with the element above the level of the valve body.
3. A strainer should be fitted in the pipeline before each valve.
4. Where an EA1 Horne Thermostatic Valve is fitted to a heater also containing an electrical immersion heater, the electrical thermostat must be set in a slightly lower temperature than the setting for the Horne Thermostatic Valve.

Typical applications



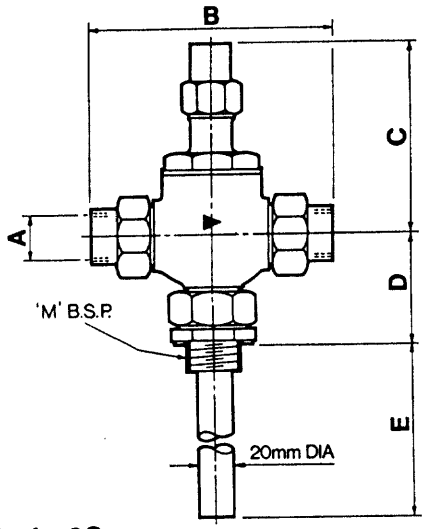
Storage Calorifier or Heater (Fig. 1)
The thermostat pocket must be above the heating coil or battery. It should be kept as low in the heater as possible to obtain maximum storage capacity.

Open Topped Tank or Vat (Fig. 2)
The valve can be fitted vertically into an open topped tank or vat. If the liquid level can vary, the thermostat pocket must be long enough to ensure that, at the lowest liquid level, at least 230mm of the pocket is immersed in the liquid.

Air Duct (Fig. 3)
The thermostat pocket should be at least 1 metre long. This is to prevent heat from the steam or primary hot water travelling down the thermostat pocket and affecting the element. It is best to fit the valve 2 — 3 metres from the heater battery to ensure that the heated air is thoroughly mixed before reaching the thermostat element.

Non-Storage Calorifier or Heater (Fig. 4)
The thermostat pocket must be fitted as close to the heater shell as possible. The EA1 valve is only suitable in the 15mm —½" and 20mm —¾" sizes for use on non-storage heaters and pumped circulation through the heater must be maintained at all times.

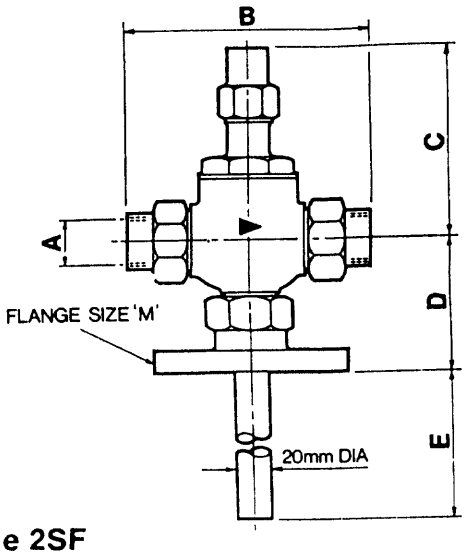
Alternative mountings and pipe connections



Style 3S

Valve Size mm	'A' ins BSP	B mm	C mm	D mm	E mm Spec. A & B*	E mm Spec. C & D*	M ins BSP
15	½	152	130	70	305	360	1
20	¾	152	130	73	305	360	1
25	1	165	130	75	305	360	1
32	1¼	200	160	95	457	457	1½
40	1½	220	160	102	457	457	1½
50	2	260	165	105	457	457	1½

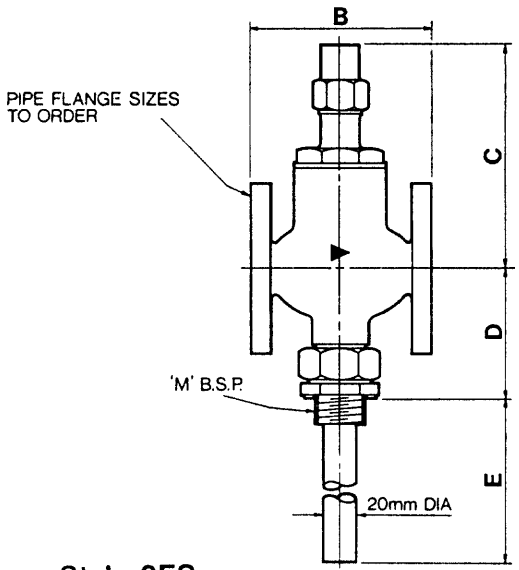
* see back page for details of specifications



Style 2SF

Valve Size mm	'A' ins BSP	B mm	C mm	D mm	E mm Spec. A & B*	E mm Spec. C & D*	M ins BS10 Table 'D'	M BS4504 n.p. 16 bar
15	½	152	130	83	292	350	1¼	25
20	¾	152	130	86	292	350	1¼	25
25	1	165	130	87	292	350	1¼	25
32	1¼	200	160	108	445	445	1½	32
40	1½	220	160	114	445	445	1½	32
50	2	260	165	118	445	445	1½	32

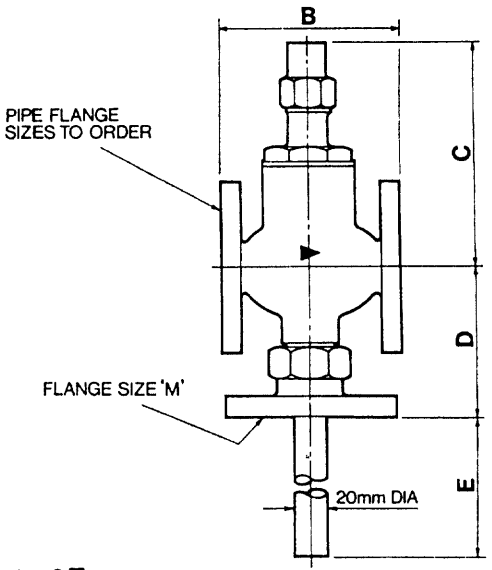
* see back page for details of specifications



Style 2FS

Valve Size mm	B mm	C mm	D mm	E mm Spec. A & B*	E mm Spec. C & D*	M ins BSP
15	114	137	92	305	360	1
20	121	137	92	305	360	1
25	133	140	95	305	360	1
32	140	160	105	457	457	1½
40	152	160	111	457	457	1½
50	178	165	114	457	457	1½

* see back page for details of specifications



Style 3F

Valve Size mm	B mm	C mm	D mm	E mm Spec. A & B*	E mm Spec. C & D*	M ins BS10 Table 'D'	M BS4504 n.p. 16 bar
15	114	137	105	292	350	1¼	25
20	121	137	105	292	350	1¼	25
25	133	140	108	292	350	1¼	25
32	140	160	121	445	445	1½	32
40	152	160	124	445	445	1½	32
50	178	165	127	445	445	1½	32

* see back page for details of specifications

3 Way EA1 Thermostatic Valve

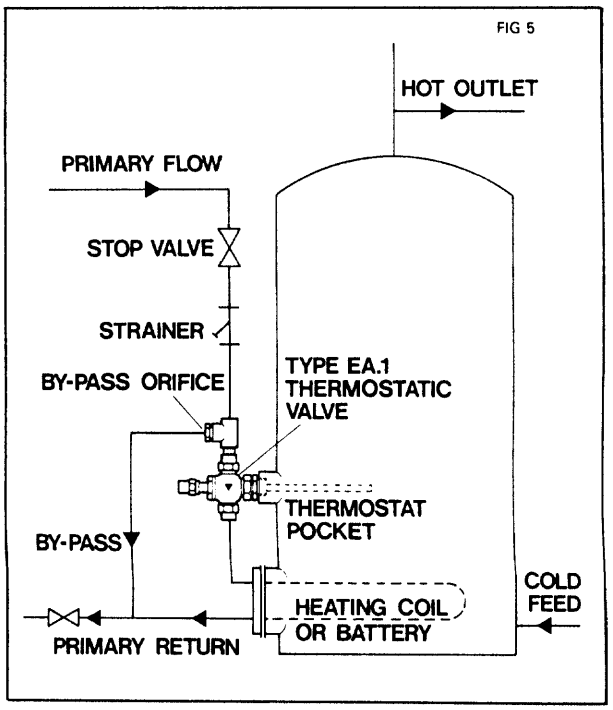
The EA1 valve is available in a 3 way version as shown in Fig. 5 below.

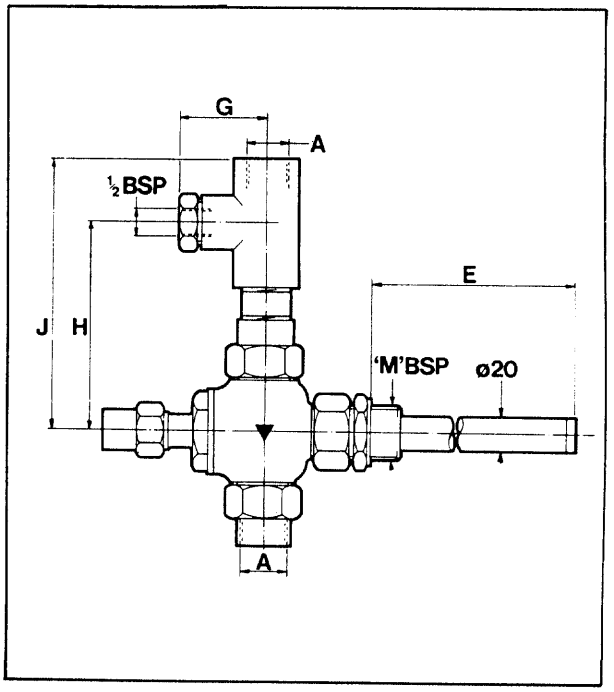
A by-pass at the inlet to the EA1 valve allows primary hot water to continue flowing when the EA1 valve is closed and the primary flow to the heating battery is stopped.

An orifice plate ensures that the primary flow will pass to the heating coil or battery as soon as the EA1 valve opens.

Storage Calorifier or Heater (Fig. 5)
The thermostat pocket must be above the heating coil or battery. A ½" bore pipe is connected between the by-pass orifice and the primary return from the heating coil or battery.

The EA1 thermostatic valve with by-pass can be used on any of the typical applications shown on Page 3.



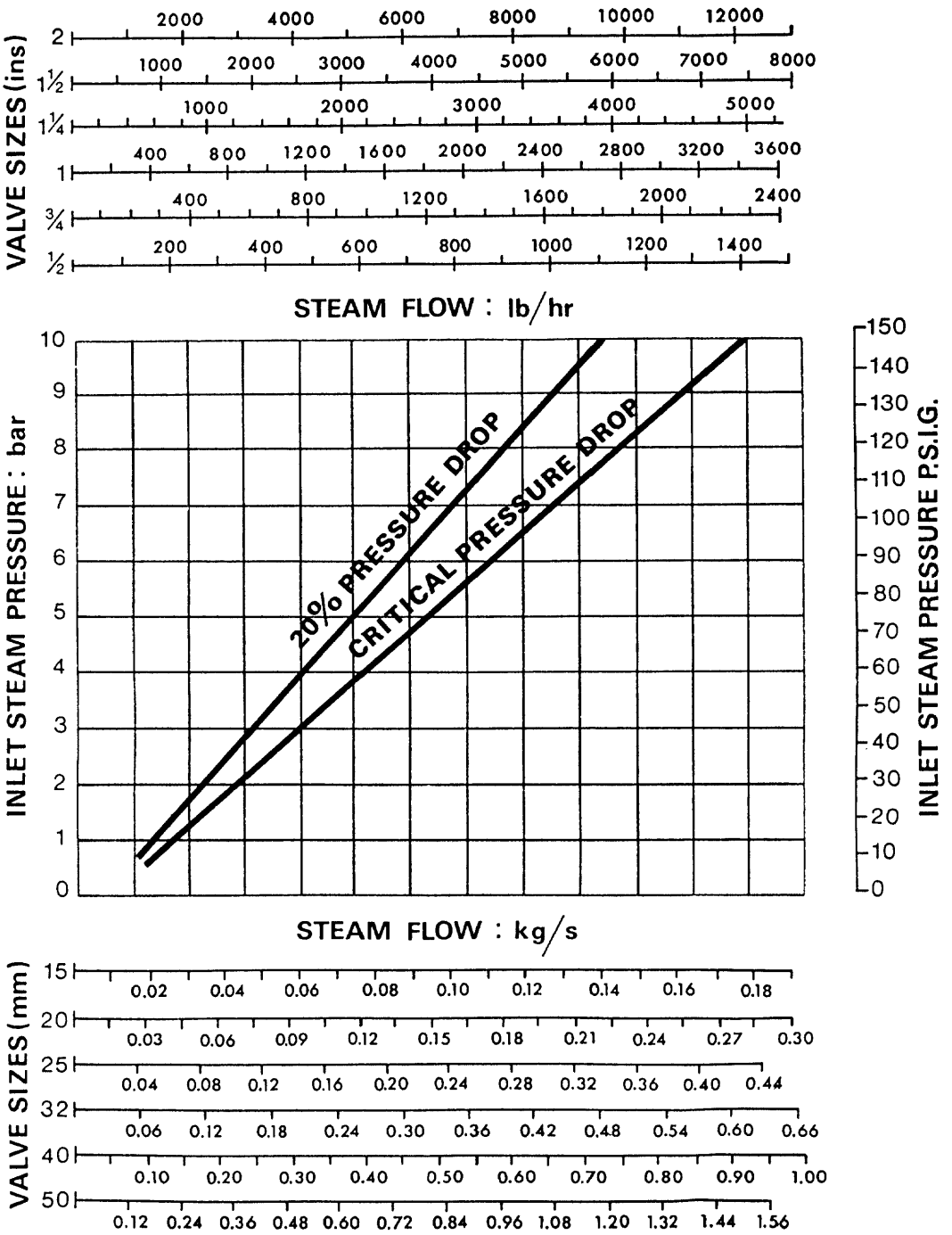


Style 3SD

Valve Size mm	A BSP	E mm Spec. A&B	E mm Spec. C&D	G mm approx.	H mm approx.	J mm approx.	M INS BSP
15	½	305	380	55	130	165	1
20	¾	305	380	50	140	175	1
25	1	305	380	60	150	190	1
32	1¼	457	457	65	175	220	1½
40	1½	457	457	65	185	230	1½
50	2	457	457	75	215	260	1½

* see back page for details of specifications

Sizing Chart (Steam)

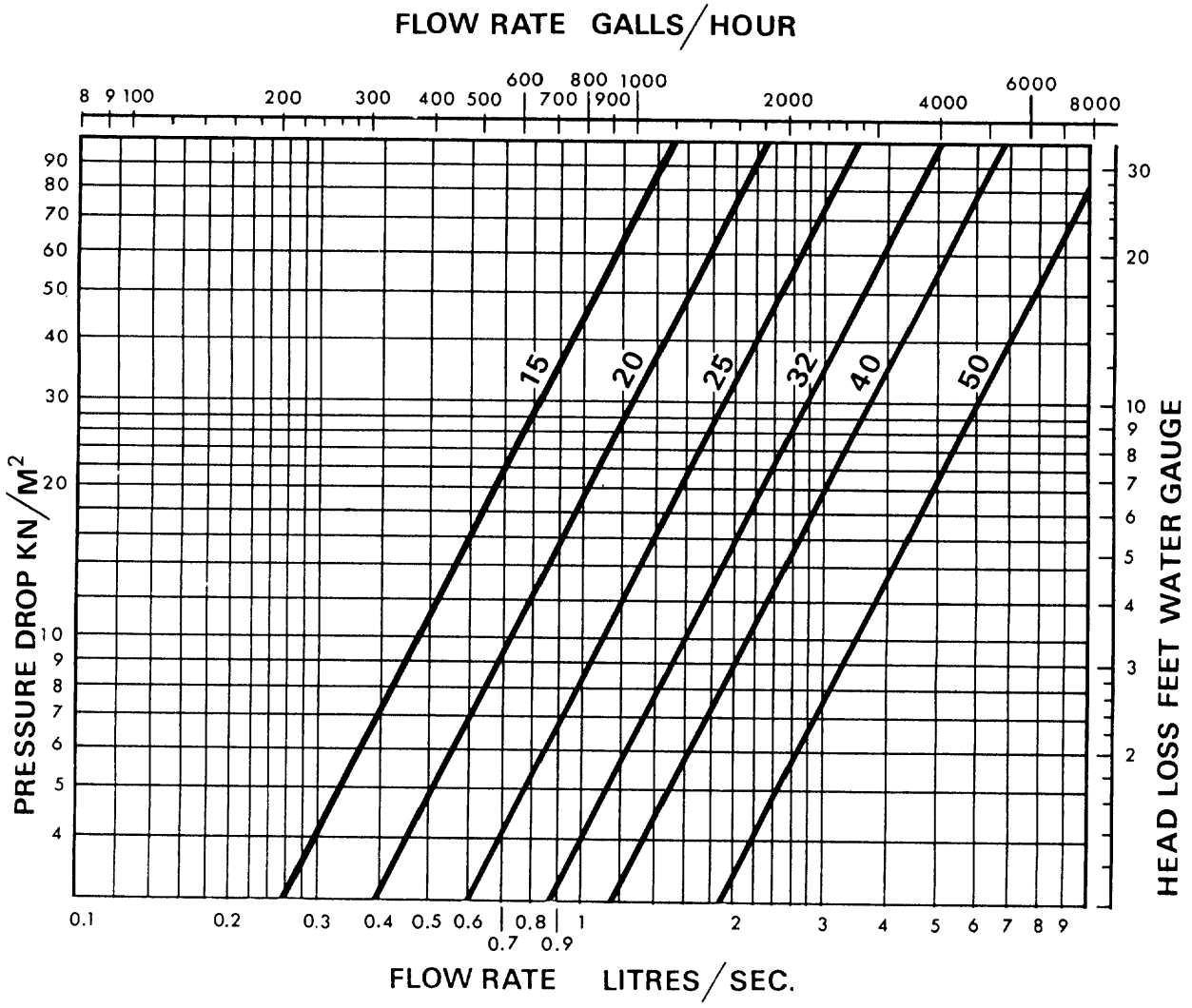


It is preferable to choose an EA1 valve size which fits between the *20% pressure drop line* and the *critical pressure drop line.*
Do not choose a size below the *critical pressure drop line.*
Sizes can be chosen above the *20% pressure drop line* but they should be as close to the line as possible.

EXAMPLE:

If the required steam flow rate is 0.16 kg/s at a pressure of 4 bar, a suitable size of EA1 valve can be found as follows.
Read vertically downwards from the intersection of the horizontal 4 bar pressure line with the 20% pressure drop line and look for the flow rate of 0.16 kg/s on the valve size lines.
It will be seen that 0.16 kg/s could be passed by a 25mm EA1 valve.
Read vertically upwards from the 0.16 kg/s mark on the valve size line and check that the intersection with the horizontal 4 bar pressure line is not below the critical pressure drop line.
It will be seen that a 25mm EA1 valve should be chosen for a flow rate of 0.16 kg/s of steam at 4 bar pressure.

Sizing Chart (Primary Hot Water)



Valve Size mm	15	20	25	32	40	50
K_v Factor	5·25	8·02	12·10	17·63	23·50	38·20

$Q = Kv\sqrt{\Delta p}$
Where Q is flow in m^3/h
Δp is pressure drop in kgf/cm^2

Valve Size ins	½	¾	1	1¼	1½	2
C_v Factor	5·10	7·78	11·73	17·10	22·80	37·00

$Q = C_v\sqrt{\Delta p}$
Where Q is flow in gal/min.
Δp is pressure drop in p.s.i.

The chart above shows the pressure drop against flow rate for each size of EA1 valve when the valve is passing primary hot water and it is in the full open position. A suitable size of EA1 valve can be chosen from the chart by finding the size which passes the required primary flow rate at an acceptable pressure drop.

EXAMPLE:

If the required flow rate of primary hot water is 0.9 l/s, a suitable size of EA1 valve can be found as follows. Read vertically upwards from the 0.9 l/s mark on the horizontal flow rate line. At the intersection of each of the valve size lines, read to the left along the horizontal to find the pressure drop.
Reading vertically upwards from 0.9 l/s and then horizontally from the intersection of the 25mm EA1 valve, the pressure drop is 7 kN/m^2 and from the 20mm EA1 valve, the pressure drop is 16 kN/m^2 .
If 7 kN/m^2 is an acceptable pressure drop and 16 kN/m^2 is too high then a 25mm EA1 valve should be chosen.
If 16 kN/m^2 is an acceptable pressure drop then a 20mm EA1 valve should be chosen.

Standard Specifications

Horne EA1 Thermostatic Valves can be supplied to the following standard specifications:

Specification	Thermostat Pocket	Thermostat Element		
		Max. Pressure Differential	Range of Temperature Adjustment	Element Mark Nr.
A	Copper	ALL SIZES 16 bar 230 p.s.i.g.	45 — 105°C 110 — 220°F	STD
B	Stainless Steel BS1449 Type 316 S16			
C	Copper	15mm, 20mm } 10 bar 25mm 7 bar 32mm 4 bar 40mm 2.7 bar 50mm 1.7 bar	25 — 75°C 80 — 167°F 50 — 100°C 122 — 212°F 75 — 125°C 167 — 257°F 100 — 150°C 212 — 302°F	F5 F2 F6 F7
D	Stainless Steel BS1449 Type 316 S16			

Particulars required when ordering

1. Size of valve required (See Pages 6 and 7 for sizing).
2. Temperature at which the valve is required to control and maximum range of temperature adjustment.
3. Types of connections — screwed or flanged — see Page 4.
4. Required length of thermostat pocket if different from dimension "E" shown on tables on Page 4.
5. Nature of fluid to be heated.
6. Nature of heating medium — steam or water. If steam, state pressure at valve and maximum throughput required to maintain the controlled temperature in the heater. If water, state the flow rate required and the maximum permissible head loss across the valve.
7. Serial letter and number of old Horne valve being replaced, if any.

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Certificate No. FM 1224

ISO 9002/EN 29002/BS 5750 Part 2

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