Thermostatic Control Valves

Model H

Overview

AMOT Model H thermostatic valves are available in a wide selection of sizes and settings to fill a multitude of fluid temperature control requirements. These valves may be mounted in any position and use the proven expanding wax principle to actuate the 3-way temperature element assemblies. Model H valves may be used for diverting or mixing service. They are used to provide reliable control of fluid temperatures in engine water jacket and lubricating oil cooling systems. Other applications include electronic and battery cooling circuits, pump temperature relief valves etc.

Key benefits

- No external power source required - simple, low cost installation
- No user setting needed - 'fit and forget' solution
- Small number of parts - simple maintenance and low cost of ownership
- Robust design capable of high vibration and shock applications
- Easy installation, operates in any mounting position
- Element can be replaced/removed while the valve remains in-line

Typical applications

- Lubricating oil temperature control
- Jacket water high temperature (HT)
- Secondary water low temperature (LT)
- Heat recovery
- Water saving applications
- Boiler inlet temperature control
- Co-generation, cooling towers
- Temperature mixing or diverting
- Engine and compressor cooling system

Key features

- Flow rates of 56 - 280m^3/hr (245 - 1232 US gpm)
- Combinations available:
  Housings in steel, stainless steel
- DN100 - DN150 (4 - 6") pipe size
- Flanged connections
- Tamper-proof temperature settings from 13°C to 116°C (55°F to 240°F)

Accreditations available

- PED* Suitable for Group 1 & 2 liquids (Ensure materials are compatible)
- ATEX* Ex 11 2 G X
- CE * Complies with all relevant EU directives
- CRN Canadian registration available in select provinces

* Contact AMOT for more information.

Leakholes

In some applications, it is necessary to have leak holes drilled in the element to ensure a small flow between ports A and C. Leak holes are available in sizes ranging from 6.3mm to 19mm (1/4 to 3/4”). Element leak holes allow a small flow through Port C maintaining flow through the cooler at all times.

Leak holes prevent condensation or freezing of cooler, and during start-up, slow down the warm-up time. In 2-way applications with Port B blocked and circuit cold, leak holes are necessary to ensure sensing of temperature changes.

Temperature Settings

A wide selection of element materials, seals, and temperatures are available. Follow the equipment manufacturers’ guidelines for heating/cooling systems.

Temperature settings are available from 13°C to 116°C (55°F to 240°F). Refer to the Temperature & Element Characteristics table on page 6 for specific temperature settings. In general the temperature quoted is the nominal operating temperature in diverting mode on water systems.

For long life, AMOT valves should not be operated continuously at temperatures in excess of 14°C (25°F) of their maximum continuous rating. If this condition is anticipated then consult AMOT for suitable alternatives.

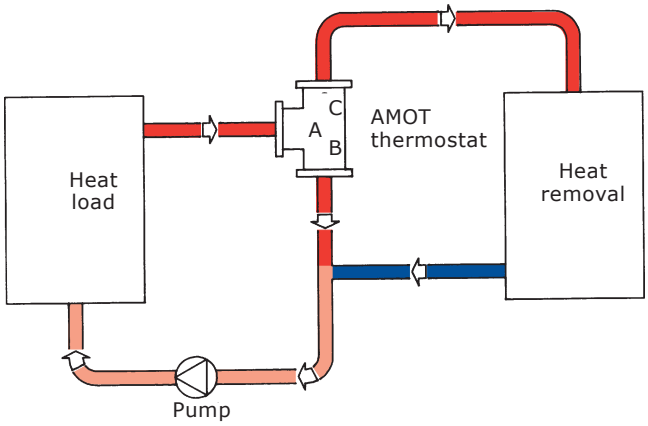
For mixing and oil circuits, the temperature may be one to two degrees higher due to flow, viscosity and other system parameters.

Elements and seals are available in a variety of materials. These materials are suitable for most applications.

- Cast Iron - for most water and oil systems, best value
- Ductile Iron - High strength at lower cost than steel
- Steel - High strength, high pressure rating
- Stainless Steel - Highest corrosion resistance, high strength, high pressure rating
- Bronze - for salt water and Navy applications
- Aluminum - for low cost high pressure service

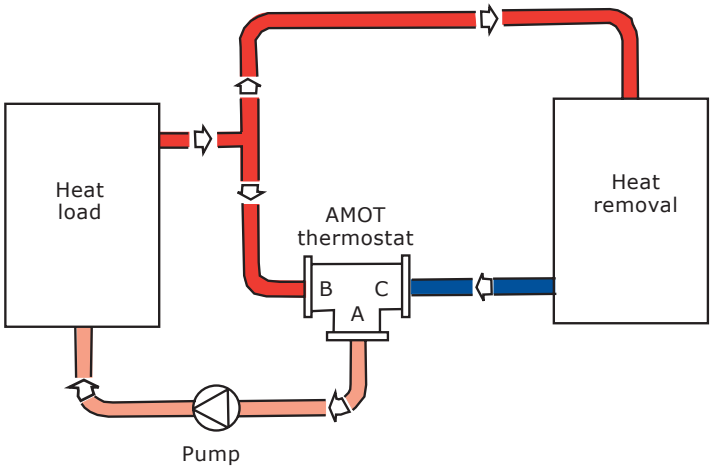
Applications

Diverting Applications



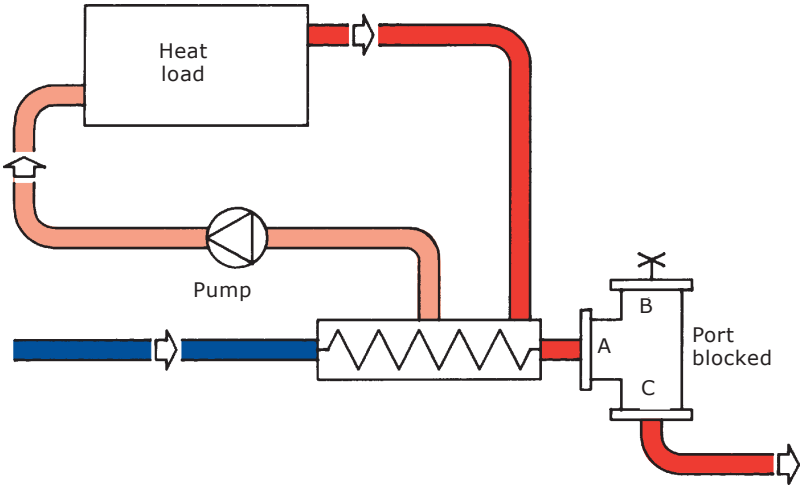
When valves are used for diverting service, the inlet is Port A (temperature sensing port), with Port C being connected to the cooler, and Port B connected to the cooler by-pass line.

Mixing Applications



When valves are used for mixing service, Port C is the cold fluid inlet port from the cooler, Port B is the hot by-pass fluid inlet, and Port A the common outlet. Port A is the temperature sensing port and will mix the hot and cold fluids in the correct proportion to produce the desired outlet temperature leaving Port A.

2-way Water Saving Applications

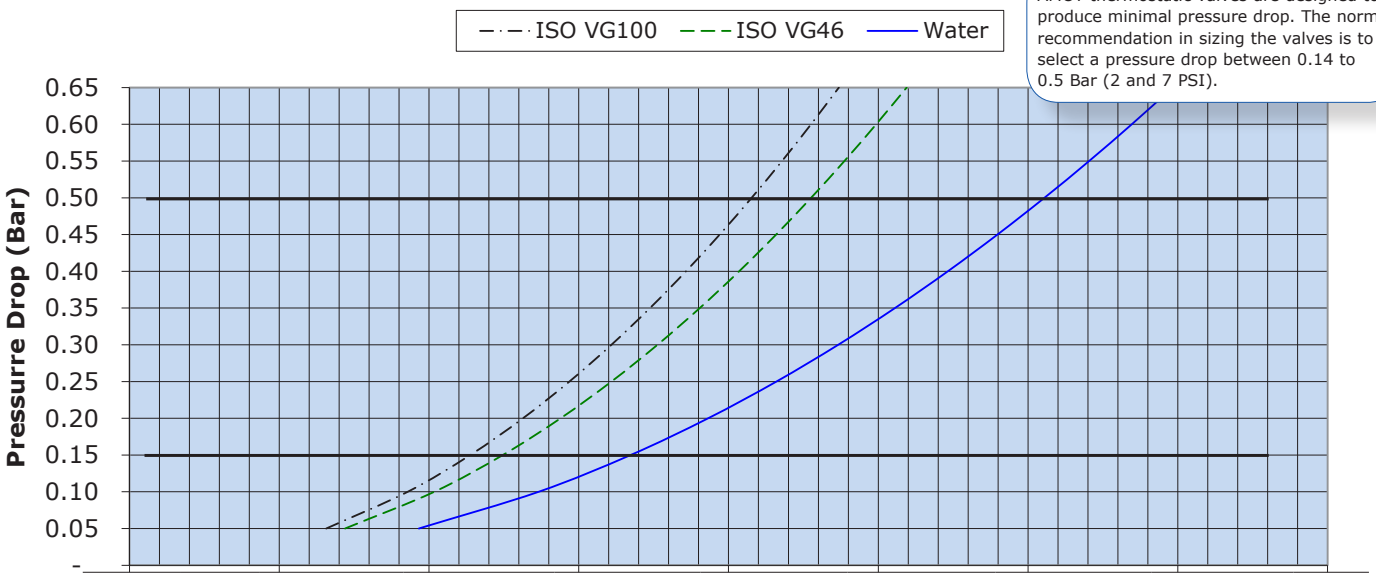


Valve as shown maintains minimum flow through cooler to conserve water. Requires internal leak hole to permit small flow for sensing.

Valve characteristics

Pressure drop - Metric units

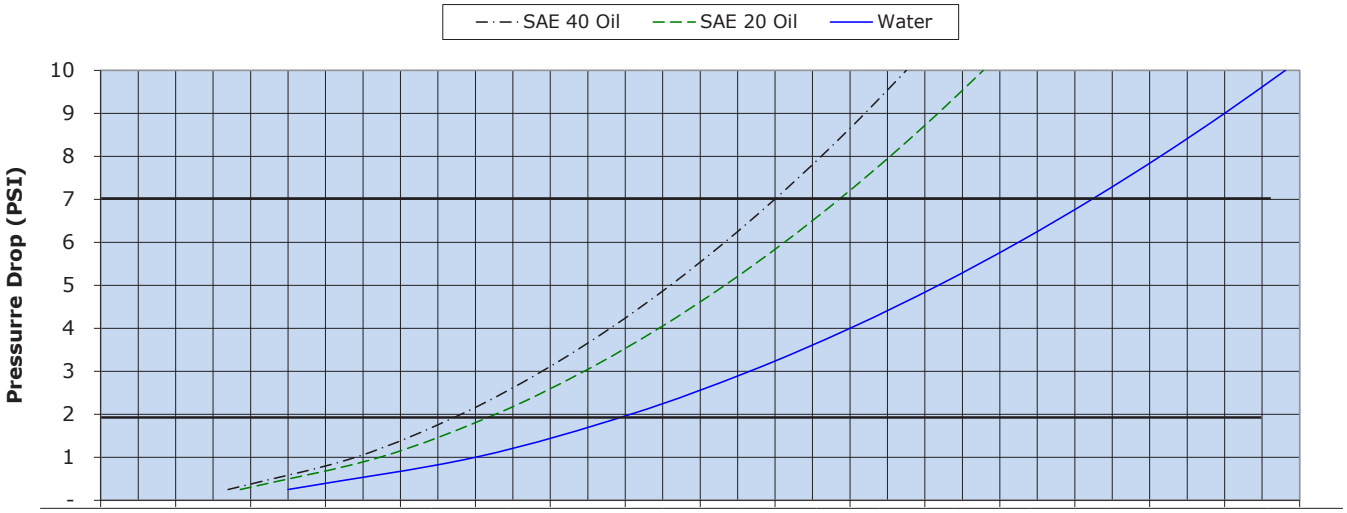
AMOT thermostatic valves are designed to produce minimal pressure drop. The normal recommendation in sizing the valves is to select a pressure drop between 0.14 to 0.5 Bar (2 and 7 PSI).



Valve								
4" H	25	50	75	100	125	150	175	200
5" H	43	85	128	171	214	256	299	342
6" H	46	93	139	185	231	278	324	370

Flow Rate for Water (m³/hr)

Pressure drop - English units



Valve														
4" H	150	200	250	300	350	400	450	500	550	600	650	700	750	800
5" H	256	342	427	512	598	683	769	854	939	1025	1110	1196	1281	1366
6" H	277	370	462	554	647	739	832	924	1016	1109	1201	1294	1386	1478

Flow Rate for Water (US gpm)

Valve characteristics

Flow coefficient

Flow coefficients (calculated)		
Size	**Kv**	**Cv**
4H	200	232
5H	369	427
6H	400	464

Kv is the flow coefficient in metric units. It is defined as the flow rate in cubic meters per hour (m³/h) of water at a temperature of 16° Celsius with a pressure drop across the valve of 1 bar. The basic formula to find a valve's Kv is shown below:

$$DP = \left(\frac{Q}{Kv}\right)^2 SG \qquad Q = Kv\sqrt{\frac{DP}{SG}}$$

Q = Flow in m³/hr
DP = Pressure drop (Bar)
SG = Specific gravity of fluid (Water = 1.0)
Kv = Valve flow coefficient

Cv is the flow coefficient in English units. It is defined as the flow rate in US Gallons per minute (gpm) of water at a temperature of 60° Fahrenheit with a pressure drop across the valve of 1 psi. The basic formula to find a valve's Cv is shown below:

$$DP = \left(\frac{Q}{Cv}\right)^2 SG \qquad Q = Cv\sqrt{\frac{DP}{SG}}$$

Q = Flow in US gallons
DP = Pressure drop (Psi)
SG = Specific gravity of fluid (Water = 1.0)
Cv = Valve flow coefficient

Specifications

Flow rate	56 to 280m³/hr	(245 to 1232 US gpm)
Recommended pressure drop	0.14 to 0.5 bar	(2 to 7 PSI)
Body materials	Steel (BS: 3100 A1, ASTM/ANSI A216-WCB)	For high strength/pressure ratings
	Stainless steel	
Seal materials	Nitrile (Buna N)	
	Viton	
Mounting position	Any orientation	
Ports	Below nominal temperature	Ports A and B connected
	Above nominal temperature	Ports A and C connected
Port connections	ANSI flanges	
Maximum working pressures	ANSI 150 lb	16 bar (230 psi)
	ANSI 300 lb	45 bar (655 psi) 4" valve only
Valve size (nominal bore)	100mm, 125mm and 150mm	(4", 5" and 6")
Control temperatures	13˚C to 116˚C See element characteristics table	55˚F to 240˚F
Accreditations*	PED	Suitable for Group 1 & 2 liquids. (Ensure materials are compatible.)
	ATEX	11 2 G X
		Complies with all relevant EU directives
	CRN	In selected provinces

* Contact AMOT

How to order - **Americas**

Use the tables below to select the unique specification of your H Valve.

A	Valve Size
4	100 mm (4”)
5	125 mm (5”)
6	150 mm (6”)

BB	Valve Type
HO	Standard
HM	Manual override

C	Housing Material
S	Steel
R	Stainless steel

D	Port Connection
B	Flanged PN10
C	Flanged PN16
H[1]	Flanged ANSI 300 lbs (4” only)
J[1]	Flanged ANSI 150 lbs

Example: **Model** | **A** | **BB** | **C** | **D** | **EEE** | **FF** | **G** | - | **H** |

EEE	Control temp.		Rated range				Max temp. cont.	
	°C	°F	Crack open		Full open		°C	°F
			°C	°F	°C	°F		
055	13	55	8	47	20	68	35	95
075	24	75	20	68	30	86	38	100
090	32	90	27	81	35	95	43	110
095	35	95	29	85	41	105	49	120
100	38	100	34	94	42	108	50	122
105	41	105	35	95	45	113	55	131
110	43	110	38	100	47	117	56	133
115	46	115	40	104	50	122	61	142
120	49	120	43	110	54	130	66	150
130	54	130	51	124	60	140	68	155
135	57	135	54	129	63	145	71	160
140	60	140	57	135	66	151	74	165
150	66	150	63	145	72	161	82	180
155	68	155	66	150	74	165	85	185
160	71	160	68	155	78	173	88	190
165	74	165	71	160	79	175	88	190
170	77	170	74	165	83	181	93	200
175	79	175	77	170	85	185	102	215
180	82	180	79	175	88	191	104	220
195	91	195	86	188	98	209	107	225
205	96	205	93	200	102	215	108	226
215	102	215	98	209	107	225	115	239
230	110	230	104	219	116	239	118	244
240	116	240	108	227	122	252	123	254

FF	Element & Seal Material		
	P/N	Element material	O-rings
01	9760X	Standard element	Nitrile (Buna N)
02	9760P	Nickel plated element and cage	Viton
03	9760X	Standard element and cage	Viton
05	9760P	Nickel plated manual override element and cage	Viton
07	9844X	Standard manual override element	Nitrile (Buna N)
08	9844P	Nickel plated manual override element and cage	Viton
09	9844X	Standard manual override element	Viton
16	9844X	Standard manual override element	Neoprene

G	Leakhole Size
0	Leave blank if none
B	6.4 mm (1/4”)
C	12.7 mm (1/2”)
D	19 mm (3/4”)

H[2]	Accreditations / Certifications
	Leave blank if non-accredited/ certified unit
XXX	Customer special requirements code (use for certifications)

Notes:

[1] See Table 1 below for available models with ANSI connections.

[2] Contact factory for custom product.

Table 1 - Available Models with ANSI Connections

ANSI Connections	Models
ANSI 150 lb flanges	4HOSJ, 4HMSJ, 5HOSJ, 5HMSJ, 6HOSJ, 6HMSJ
ANSI 300 lb flanges	4HOSH, 4HMSH

How to order - **EU countries**

Use the tables below to select the unique specification of your H Valve.

A	Valve Size
4	100 mm (4”)
5	125 mm (5”)
6	150 mm (6”)

BB	Valve Type
HO	Standard
HM	Manual override

C	Housing Material
S	Steel
R	Stainless steel

D	Port Connection
B	Flanged PN10
C	Flanged PN16
H[1]	Flanged ANSI 300 lbs (4” only)
J[1]	Flanged ANSI 150 lbs

Example: **Model** **A** **BB** **C** **D** **EEE** **FF** - **G** - **H**

EEE	Control temp.		Rated range				Max temp. cont.	
	°C	°F	Crack open		Full open		°C	°F
			°C	°F	°C	°F		
055	13	55	8	47	20	68	35	95
075	24	75	20	68	30	86	38	100
090	32	90	27	81	35	95	43	110
095	35	95	29	85	41	105	49	120
100	38	100	34	94	42	108	50	122
105	41	105	35	95	45	113	55	131
110	43	110	38	100	47	117	56	133
115	46	115	40	104	50	122	61	142
120	49	120	43	110	54	130	66	150
130	54	130	51	124	60	140	68	155
135	57	135	54	129	63	145	71	160
140	60	140	57	135	66	151	74	165
150	66	150	63	145	72	161	82	180
155	68	155	66	150	74	165	85	185
160	71	160	68	155	78	173	88	190
165	74	165	71	160	79	175	88	190
170	77	170	74	165	83	181	93	200
175	79	175	77	170	85	185	102	215
180	82	180	79	175	88	191	104	220
195	91	195	86	188	98	209	107	225
205	96	205	93	200	102	215	108	226
215	102	215	98	209	107	225	115	239
230	110	230	104	219	116	239	118	244
240	116	240	108	227	122	252	123	254

FF	Element & Seal Material		
	P/N	Element material	O-rings
01	9760X	Standard element	Nitrile (Buna N)
02	9760P	Nickel plated element and cage	Viton
03	9760X	Standard element and cage	Viton
05	9760P	Nickel plated manual override element and cage	Viton
07	9844X	Standard manual override element	Nitrile (Buna N)
08	9844P	Nickel plated manual override element and cage	Viton
09	9844X	Standard manual override element	Viton
16	9844X	Standard manualoverride element	Neoprene

G	Leakhole Size
0	None
B	6.4 mm (1/4”)
C	12.7 mm (1/2”)
D	19 mm (3/4”)

H[2]	Accreditations / Certifications
AA	Accreditations / Certifications required (Standard)
XXX	Special requirements code

Notes:

[1] See Table 1 below for available models with ANSI connections.

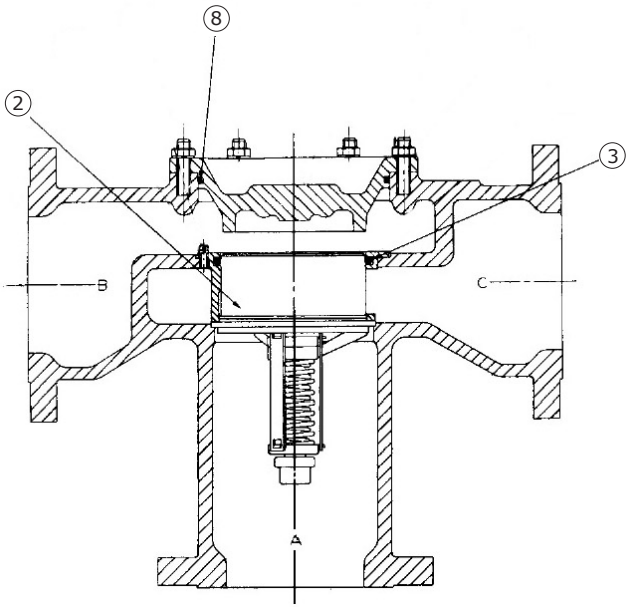
[2] Contact factory for custom product.

Table 1 - Available Models with ANSI Connections

ANSI Connections	Models
ANSI 150 lb flanges	4HOSJ, 4HMSJ, 5HOSJ, 5HMSJ, 6HOSJ, 6HMSJ
ANSI 300 lb flanges	4HOSH, 4HMSH

Recommended spares

Model HO



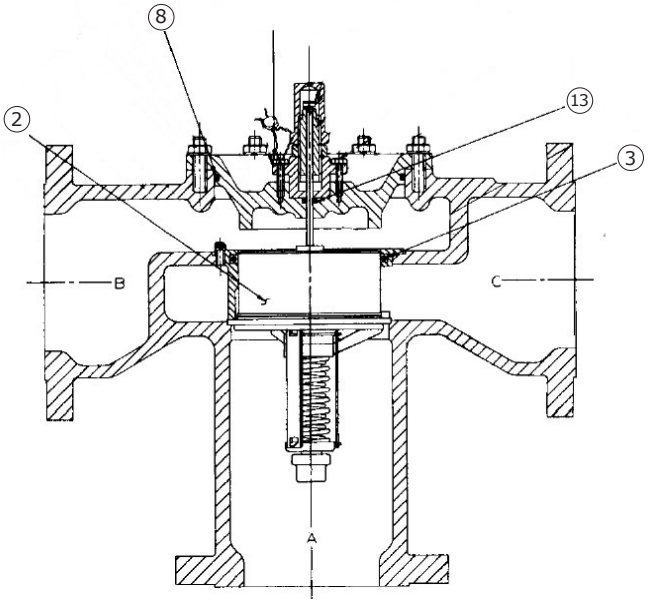
Replacement parts include:

② Element

③ O-ring

⑧ Housing O-ring seal

Model HM



Replacement parts include:

② Element

③ O-ring

⑧ Housing O-ring seal, Buna N, Viton

⑬ O-ring, stem seal, Buna N, Viton

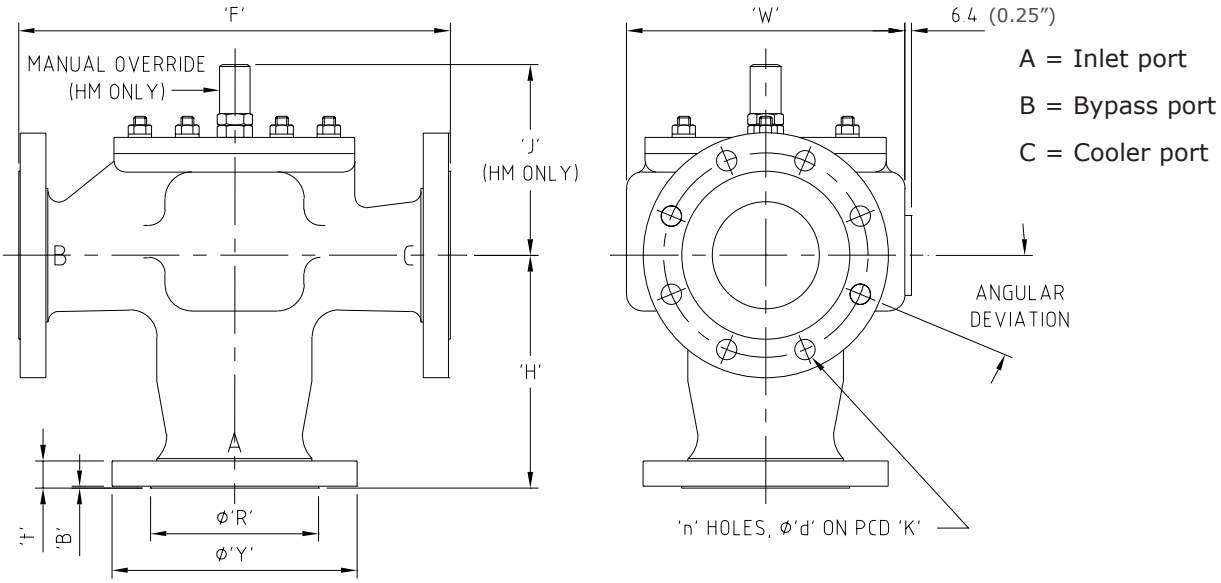
Ref no.	Part no.	Qty	Description
②	9760X (temp)	1 or 2	Element assembly
	9760P (temp)		Element assembly, plated
	9844X (temp)		Element assembly, manual override
③	11009L001	1 or 2	O-ring, element, Nitrile (Buna N) (Std)
	11009L002		O-ring, element Viton
⑧	11007L001	1 or 2	O-ring, housing, Nitrile (Buna N)
	11007L002		O-ring, housing, Viton
⑬	11148	1 or 2	O-ring, stem seal, Nitrile (Buna N)
	11148L001		O-ring, stem seal, Viton

When properly applied and installed, AMOT thermostatic valves should operate for years with minimal maintenance. An inspection at two or three year intervals is adequate to detect and make provision for normal wear. The frequency of element replacement will depend on the operating conditions and the type of fluid being controlled. Because of the diaphragm and plug construction of the wax actuated element, calibration will be maintained over thousands of cycles.

Whenever elements are replaced, the O-ring seals should also be replaced. The parts may be ordered individually by their part number.

Valve dimensions

Model HO and HM



Dimensions

Dimension	4HOSJ/ HMSJ		4HOSH/ 4HMSH		5HOSJ/ 5HMSJ		6HOSJ/ HMSJ	
	mm	in	mm	in	mm	in	mm	in
Nominal bore	100	4.0	100	4.0	125	5.0	150	6.0
Y	229	9.0	254	10.0	254	10.0	279	11.0
R	157	6.19	157	6.19	186	7.13	216	8.50
B	1.6	0.06	1.6	0.06	1.6	0.06	1.6	0.06
F	403	15.88	414	16.31	489	19.25	489	19.25
t	24	0.94	32	1.25	24	0.94	26	1.02
H	218	8.56	224	8.81	279	11.00	279	11.00
W	260	10.3	260	10.3	463	18.3	463	18.3
J (HM only)	178	7.0	178	7.0	184	7.3	184	7.3

Flange drilling (mm)

Flange	4HOSJ/ HMSJ		4HOSH/ 4HMSH		5HOSJ/ 5HMSJ		6HOSJ/ HMSJ	
	mm	in	mm	in	mm	in	mm	in
d	19	0.75	22	0.88	22	0.88	22	0.88
K	191	7.50	198	7.80	216	8.50	241	9.50
n	8		8		8		8	
Angular deviation	22.5°		22.5°		22.5°		22.5°	

Weight

Material	4HOSJ/ 4HMSJ		4HOSH/ 4HMSH		5HOSJ/ 5HMSJ		6HOSJ/ 6HMSJ	
	kg	lb	kg	lb	kg	lb	kg	lb
Weight	68	150	68	150	91	200	120	265

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