

Thermostatic Control Valve

Model J

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



Model J

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
- Automatic self-sensing control with positive proportional valve action

Key features

- Flow rates of 2 - 8 m³/hr (8 - 35 US gpm)
- Combinations available:
 - Housings in aluminum or bronze
- DN20 (¾") pipe size
- Threaded connections
- Tamper-proof temperature settings from 18°C - 113°C (65°F - 235°F)
- Pressure ratings up to 24 bar (348 psi)

Accreditations available

- PED Suitable for Group 1 & 2 liquids (Ensure materials are compatible)
- CE Complies with all relevant EU directives

Thermostatic Control Valve - Model J

Contents

Overview	3
Applications	4
Valve Characteristics	4
Pressure drop	4
Flow coefficient	5
Viscosity correction	6
Viscosity correction curve	6
SAE oils viscosities	6
Available versions	7
Temperature and element characteristics	7
Element type and seal material	7
How to Order	8
Specification	9
Valve Dimensions	9
Maintenance and Service Parts	11
Ordering from Americas and Canada	11
Service kits	11
Service kit model number structure	11
Ordering from Europe and Asia-PAC	11
Seal(s)	11
Element	11
Seal part numbers	12
Element part number structure	12
Service parts	13
Contact	14

Thermostatic Control Valve - Model J

Overview

AMOT Model J 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. The JO, JR and JE valves are suitable for oil temperature control in equipment such as engines, transmissions and compressors.

The JW is a special 2-way unit used for temperature control of cooling water supplies in 'water saver' applications.

All model J valves use a fully enclosed temperature element that is factory set and provides tamper proof operation.

Housing materials

- Aluminum
- Bronze

Seal materials

- Buna N/Nitrile
- Viton
- Neoprene

Element materials

- Bronze, brass and stainless steel
- Nickel plated/stainless steel
- Stainless steel

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 0.8 mm - 6.3 mm ($1/32''$ - $1/4''$).

Please refer to the Leakhole size (G) section of the valve selection table on page 8 to determine the hole size required for specific applications.

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 18°C - 113°C (65°F - 235°F). Refer to the temperature and element characteristics table on page 7 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.

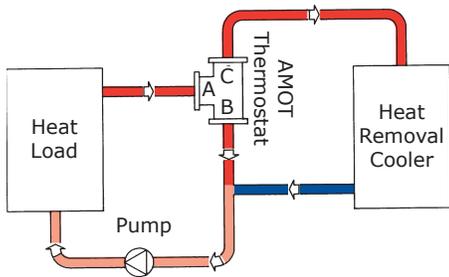
Elements and seals are available in a variety of materials. These materials are suitable for most applications. Please contact AMOT for material compatibility information.

Thermostatic Control Valve - Model J

Applications

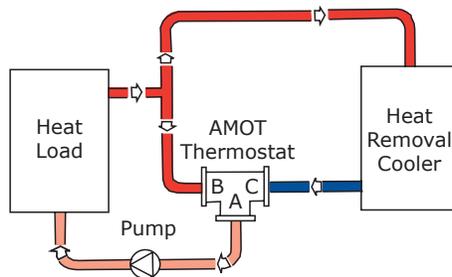
Diverting Applications

When valves are used for diverting services, 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.



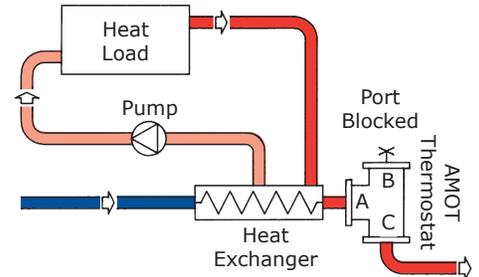
Mixing Applications

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 so as to produce the desired outlet temperature leaving Port A.



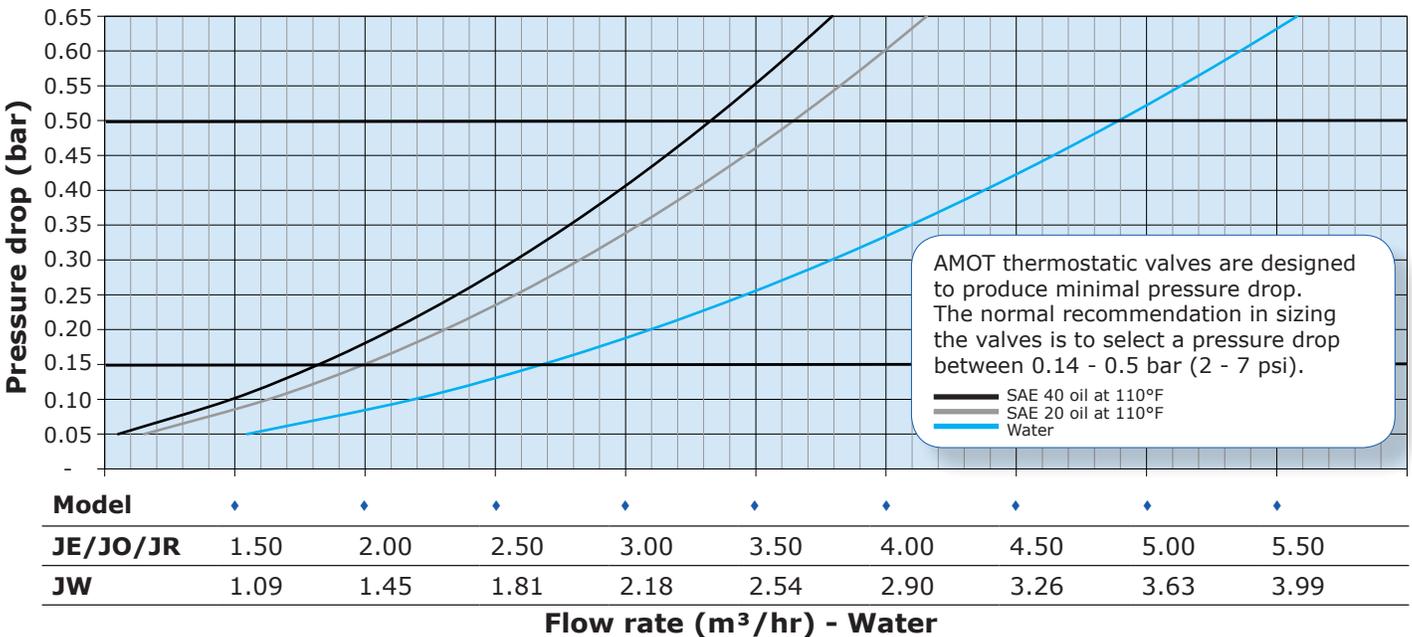
2-Way Water Saving Applications

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



Valve Characteristics

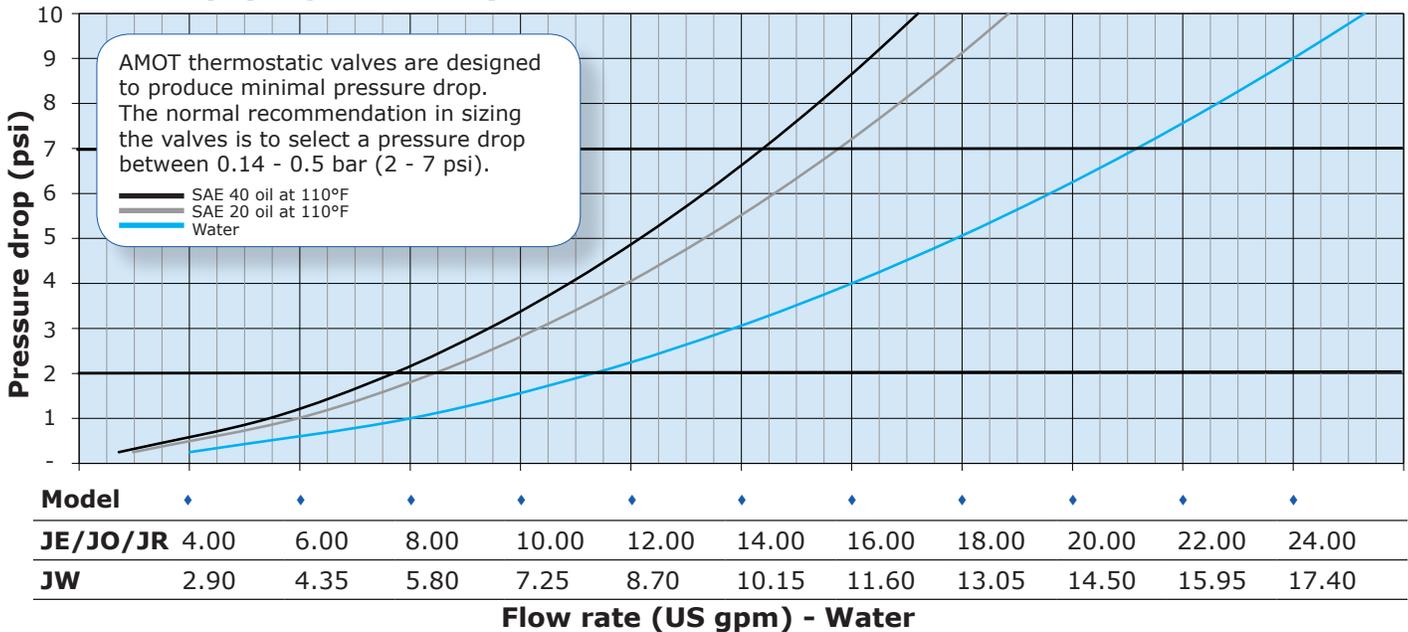
Pressure drop (Metric units)



Thermostatic Control Valve - Model J

Valve Characteristics Continued

Pressure drop (English units)



Flow coefficient

Flow coefficient (calculated)		
Model	Kv	Cv
JE/JO/JR	6.92	8
JW	5.02	5.8

Kv = 0.865 Cv

Cv = 1.156 Kv

Kv is the flow coefficient in metric units. It is defined as the flow rate in cubic meters per hour (m³/hr) 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:

$$Kv = Q \sqrt{\frac{SG}{DP}} \quad Q = Kv \sqrt{\frac{DP}{SG}} \quad DP = \left[\frac{Q}{Kv} \right]^2 SG$$

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

Cv is the imperial coefficient. 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:

$$Cv = Q \sqrt{\frac{SG}{DP}} \quad Q = Cv \sqrt{\frac{DP}{SG}} \quad DP = \left[\frac{Q}{Cv} \right]^2 SG$$

Q = Flow in US Gallons/Min
 DP = Pressure drop (psi)
 SG = Specific gravity of fluid (Water = 1.0)
 Cv = Valve flow coefficient (English units)

Thermostatic Control Valve - Model J

Valve Characteristics Continued

Viscosity correction

For the selection of valves for use with more viscous fluids than water, the following must be calculated in addition to using the previously mentioned formulae:

- Viscosity

Find the viscosity of the fluid to be used in the valve. This will generally be in centistokes (cST).

ISO grade oil is easy to calculate as the grade no. is the viscosity.

I.e. ISO VG 46 = 46 centistokes at 43°C (110°F)

- Viscosity correction

Once the viscosity value has been found, the flow coefficient correction factor can be established using the viscosity correction graph below.

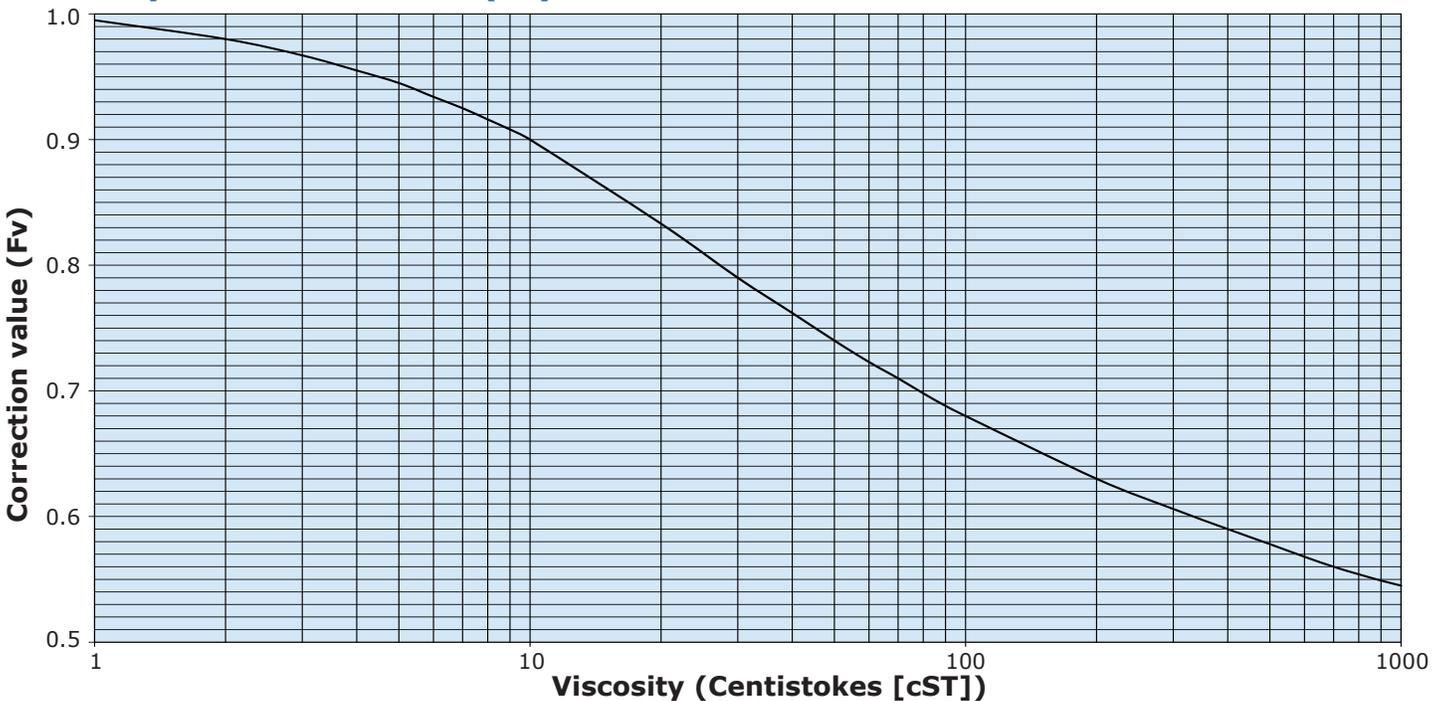
The correction value (Fv) that is produced by the graph should then be multiplied by the original flow coefficient. This gives the corrected flow coefficient, which can then be used in the standard formula.

e.g.:

100 cST = correction factor of 0.68

0.68 x flow co. = corrected flow co. (Kv or Cv)

Viscosity correction curve (Fv)



SAE oils viscosities

Engine oils	
Oil	cST
SAE 5W	6.8
SAE 10W	32
SAE 20	46
SAE 20W	68
SAE 30	100
SAE 40	150
SAE 50	220
6 B	394
8 B	571

Gear oils	
Oil	cST
SAE 75W	22
SAE 80W	46
SAE 85W	100
SAE 90	150
SAE 140	460

Approximate viscosities of SAE oils at 43°C (110°F) (cST).

Based on leading oil manufacturers' published data.

Thermostatic Control Valve - Model J

Valve Characteristics Continued

Available versions

AMOT Model J thermostatic valve is available in various versions to fit different applications:

- Model JO** - The most commonly selected version because it is a 3-way low cost unit and fits most applications. Standard versions come in ¾" size and use an aluminum body with stainless steel and bronze internals. Standard seals are Buna N/Nitrile.
- Model JR** - The JR model is a special version of the Model JO for diverting service. It has a pressure relieving feature which will relieve from Port A to Port B at differential pressures above 50 psi. For use in diverting systems when the valve attempts to divert full flow to the cooler but the cold oil in the cooler creates excessive pressure loss. The relief is activated allowing oil flow to bypass the cooler maintaining the oil pressure to the equipment. The model JR is not recommended for mixing service.
- Model JW** - The standard version is a 2-way bronze valve for open cooling systems using city, reservoir or river water as the cooling fluid. The valve provides direct temperature control while limiting the amount of water used.
- Model JE** - A special version of the JO with an external sensing probe. It is an excellent choice for sensing a process fluid temperature while controlling a separate heating or cooling line.

Aluminum	Bronze
JE	JE
JO	JO
JR	JR
	JW

Temperature and element characteristics

Code	Control temp.		Rated range				Max temp. cont.	
			Crack open		Full open			
	°C	°F	°C	°F	°C	°F	°C	°F
065	18	65	15	59	25	77	47	116
075	24	75	20	68	29	84	60	140
085	30	85	24	75	34	93	63	145
095	35	95	30	86	40	104	73	163
100	38	100	33	91	42	108	62	143
110	43	110	38	100	47	117	82	180
120	49	120	43	110	55	131	86	187
130	54	130	49	120	60	140	95	203
140	60	140	54	130	66	150	95	203
150	66	150	60	140	71	160	100	212
160	71	160	66	150	77	170	100	212
170	77	170	73	163	82	180	100	212
175	79	175	77	170	85	185	105	221
180	82	180	79	175	88	190	110	230
190	87	190	85	185	93	200	110	230
200	93	200	90	194	100	212	110	230
205	96	205	93	200	103	218	110	230
215	102	215	96	205	107	225	115	239
225	107	225	101	214	114	237	120	248
235	114	237	107	225	123	253	125	257

Element type and seal material

Code	Valve model	Element type	Element construction	Seal material
01	JE/JO/JW	9654X	Standard	Buna N/ Nitrile
	JR	9902X		
02	JE/JO/JW	9654P	Nickel Plated	Viton
	JR	9902P		
03	JE/JO/JW	9654X	Standard	Viton
	JR	9902X		
05	JE/JO/JW	9654X	Standard	Neoprene
	JR	9902X		
06	JE/JO/JW	9654P	Nickel Plated	Neoprene
	JR	9902P		

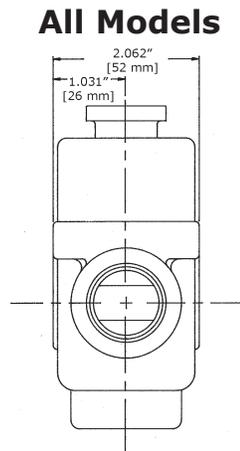
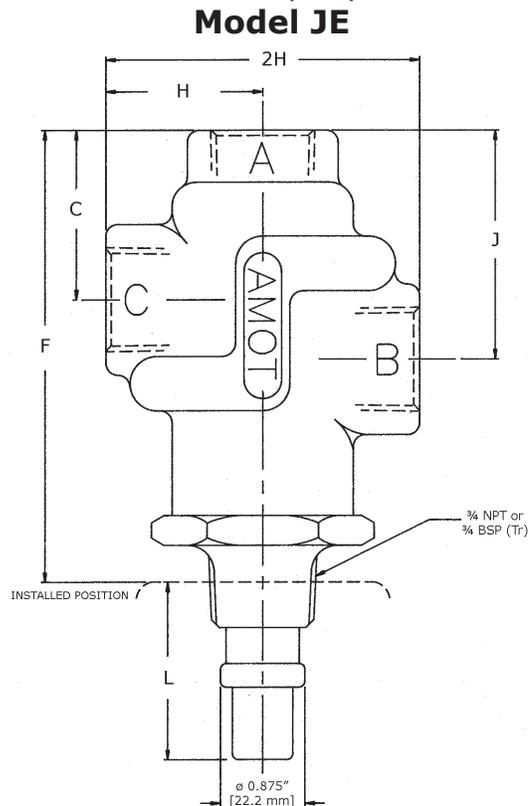
Thermostatic Control Valve - Model J

Specification

		Metric units	English units
Flow rate		2 - 8 m ³ /hr	8 - 35 gpm
Body materials	Aluminum BS:1490 Grade:M25TF	For light weight	
	Bronze		
Seal materials	Buna N/Nitrile, Viton, and Neoprene		
Mounting position	Any orientation BSP, NPT, JIS, SAE		
Ports	Below nominal temperature	Ports A and B connected	
	Above nominal temperature	Ports A and C connected	
Port connections	Screwed	20 mm	¾"
Valve sizes (nominal bore)		20 mm	¾"
Recommended pressure drop		0.14 - 0.5 bar	2 - 7 psi
Control temperatures		18°C - 113°C	65°F - 235°F
Maximum working pressure		24 bar	350 psi
Approximate weight		0.6 kg	1.3 lbs
Accreditations available	PED	Suitable for Group 1 & 2 liquids (Ensure materials are compatible)	
	CE	Complies with all relevant EU directives	

Valve Dimensions

Dimensions - inches (mm)



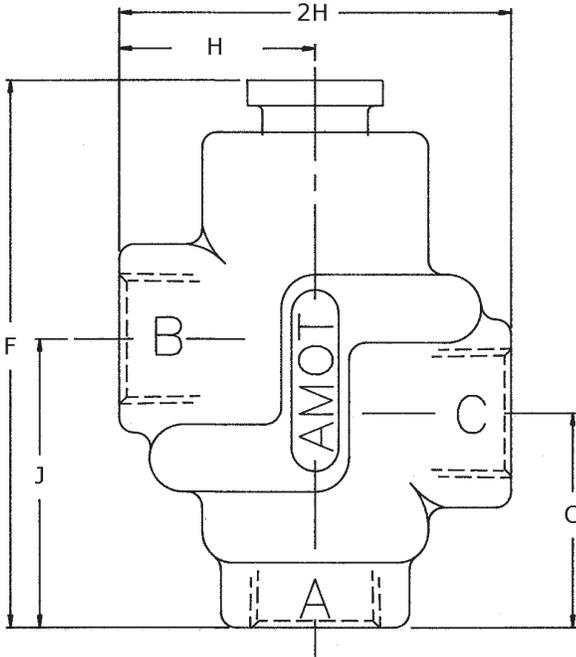
Valve model (B)	Port connection (D)	Dimensions				
		F	H	J	L	C
JE	T, U, V	4 11/16\" (119)	1 5/8\" (41)	2 21/64\" (5.91)	Refer to the Extension (H) section of the valve selection table on page 8 for installed depths.	1 49/64\" (44.8)
	W	4 7/8\" (125)	2\" (51)	2 5/16\" (59)		1 3/4\" (44)

Thermostatic Control Valve - Model J

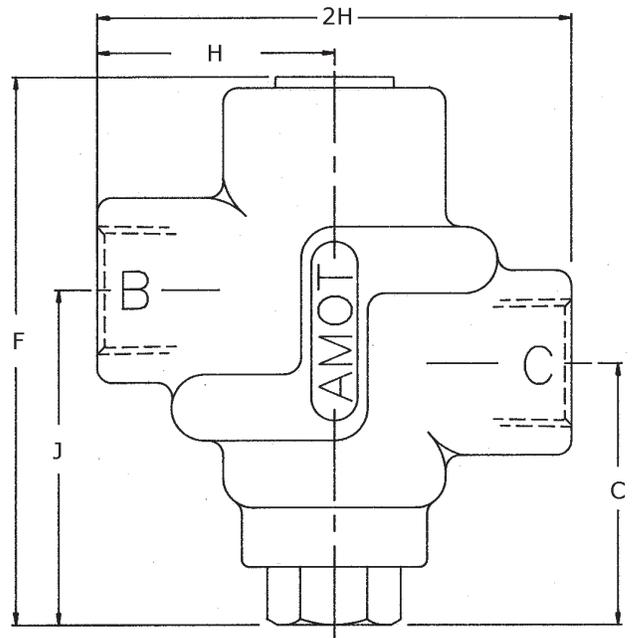
Valve Dimensions Continued

Dimensions - inches (mm)

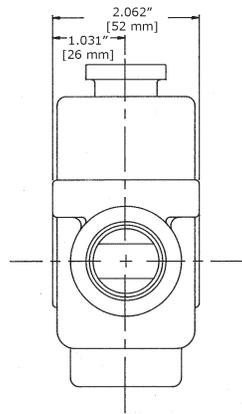
Model JO/JR



Model JW



All Models



Valve model (B)	Port connection (D)	Threaded dimensions			
		F	H	J	C
JO/JR	T, U, V	4 9/16" (116)	1 5/8" (41)	2 5/16" (59)	1 3/4" (44)
	W	4 15/16" (125)	2" (51)	2 11/16" (68)	2 1/8" (54)
JW	ALL	4 5/8" (117)	2" (51)	2 13/16" (71)	2 1/4" (57)

Thermostatic Control Valve - Model J

Maintenance and Service Parts

Over time, exposure to foreign chemicals and particulate matter as well as prolonged operation at extreme conditions may reduce the effectiveness of the control valve. At such time, AMOT Thermostatic Valves can be restored to original performance by installing an AMOT thermostatic valve service kit or by purchasing and installing new seal(s) and a new temperature element.

Service kits are ONLY available for purchase from the Americas and Canada locations. If ordering from the Europe or Asia-PAC locations please purchase seal(s) and element individually to properly service your valve.

Service kits include all new seal(s) and a thermostatic element required for normal maintenance. Whenever an element is replaced, the seal(s) should also be replaced.

Ordering from Americas and Canada Service kits

Service kits are ONLY available for purchase from the Americas and Canada locations.

Service kits are available with seal(s) and element required to service the valve. Order service kits using the AMOT valve part number and nominal temperature setting.

Service kit model number structure

- 1) Omit Valve size (A).
- 2) Replace the Body material (C) and Port connection (D) with "KIT-".
- 3) If Special (J) is not blank, please contact the facility.

Ordering from Europe and Asia-PAC Seal(s)

Order seal(s) using the seal part number which is identified by the valve model from the AMOT valve part number; as shown in the seal part numbers table on page 12. Refer to the AMOT valve part number that is printed on the valve nameplate and the AMOT valve part number structure on page 8.

AMOT recommends fully servicing thermostatic control valves with each regularly scheduled major overhaul of the turbine, engine, compressor or other associated equipment. AMOT recommends a service interval of not more than 24 months to ensure optimum valve performance.

AMOT designs and tests all its products to ensure that high quality standards are met. For good product life, carefully follow AMOT's installation and maintenance instructions; failure to do so could result in damage to the equipment being protected or controlled. Thermostatic service kits may also be used for adapting valves to new service temperatures. Please request a new nameplate when adapting valves to a new service temperature by contacting the facility.

Refer to the AMOT valve part number that is printed on the valve nameplate and the AMOT valve part number structure on page 8. The nominal temperature setting is also stamped onto the element flange.

Example valve part number								
A	B	C	D	E	F	G	H	-J
¾	JE	A	T	140	05	N	4	
¾	JO	B	T	110	03	A		
Example service kit model number								
A	B	C	D	E	F	G	H	-J
	JE	KIT-		140	05	N	4	
	JO	KIT-		110	03	A		

A - Valve size D - Port connection G - Leakhole size
B - Valve model E - Control temperature (°F) H - Extension (JE ONLY)
C - Body material F - Element and seal material J - Special

Element

Order a temperature element using the element part number which is identified by the valve model, element/seal material code and nominal temperature setting from the AMOT valve part number. Refer to the AMOT valve part number that is printed on the valve nameplate and the AMOT valve part number structure on page 8.

Thermostatic Control Valve - Model J

Maintenance and Service Parts Continued

Ordering from Europe and Asia-PAC continued

Seal part numbers

Seal part numbers					
Ref no.	Part no.	Qty.	AMOT part description	Valve part number code restrictions	
				Valve model (B)	Element and seal material (F) ¹
5	11197L025	1	O-ring, Buna N	JO, JR, JW	01
	11198L025	1	O-ring, Viton		02, 03
	11199L025	1	O-ring, Neoprene		05, 06
10	308	1	O-ring, Buna N	JR ONLY	01
	308L001	1	O-ring, Viton		02, 03
	308L002	1	O-ring, Neoprene		05, 06
11	11141L001	1	O-ring, Buna N	JW ONLY	01
	11141L002	1	O-ring, Viton		02, 03
	11141L003	1	O-ring, Neoprene		05, 06
13	372	1	O-ring, Buna N		01
	372L001	1	O-ring, Viton		02, 03
	372L002	1	O-ring, Neoprene		05, 06
16	11198L126	1	O-ring, Viton	JE ONLY	02, 03
18	1462L001	1	O-ring, Viton		
20	1392L001	1	O-ring, Viton		
25	1462L001	1	O-ring, Viton		

Element part number structure

- 1) Identify the valve model, located in the Valve model (B) section of the AMOT valve part number. Two examples are shown in the table below.
- 2) Identify the element/seal material code, located in the Element and seal material (F) section of the AMOT valve part number.
- 3) Identify the temperature, located in the Control temperature °F (E) section of the AMOT valve part number.
- 4) Use those 3 codes to identify the proper element part number, as shown in the table below.

Element part number identification										
	Valve model (B)			Temperature °F (E)		Element/seal material (F) ¹			Element part number	Qty.
	JE/JO/JW			065-235		01, 03, 05			9654X(Temp.)	1
						02, 06			9654P(Temp.)	
	JR					01, 03, 05			9902X(Temp.)	
						02, 06			9902P(Temp.)	

Examples

Valve part number								Element part number	Qty.
¾	JE	A	T	085	01	N 4	-AA	9654X085	1
¾	JW	B	T	160	02	A	-AA	9654P160	1

NOTES:

¹ If your element/seal material code does not correspond with the given values, please contact the facility to confirm your element/seal material code.

Thermostatic Control Valve - Model J

Maintenance and Service Parts Continued

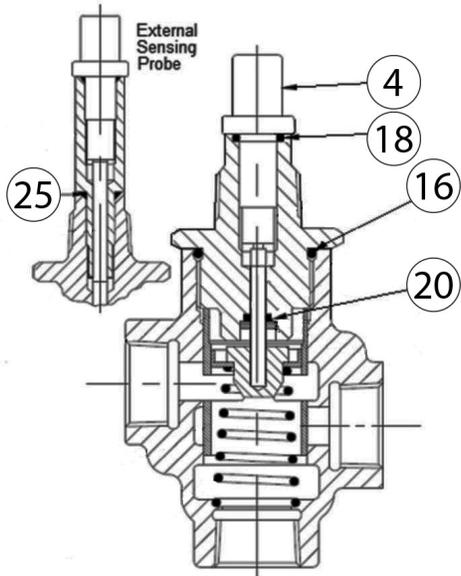
Service parts

Service kit parts					
Ref no.	Qty. ²				Description
	JE	JO	JR	JW	
4	1	1	1	1	Element
5	-	1	1	1	Housing seal
10	-	-	1	-	Seal
11	-	-	-	1	Seal
13	-	-	-	1	Seal
16	1	-	-	-	Housing seal
18	1	-	-	-	Seal
20	1	-	-	-	Seal
25	1	-	-	-	Seal

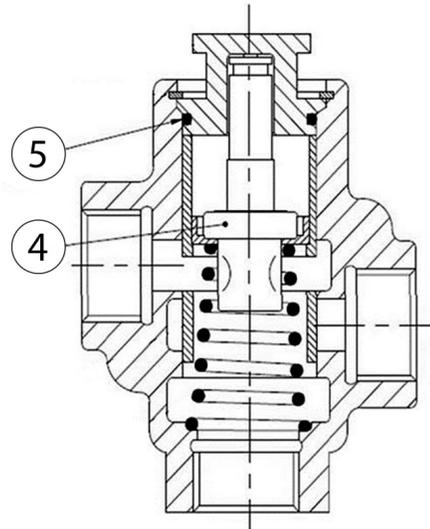
NOTES:

² Some service kits may contain extra parts. Please discard of any extra parts.

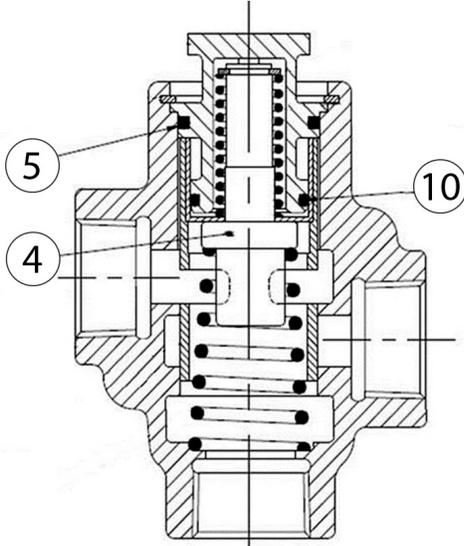
Model JE



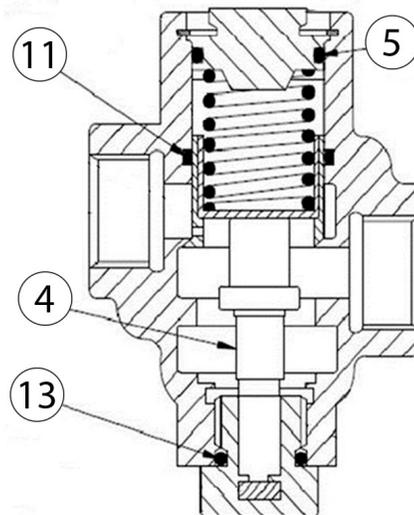
Model JO



Model JR



Model JW



Thermostatic Control Valve - Model J

Contact

Americas

AMOT USA
8824 Fallbrook Dr.
Houston, TX 77064
USA

Tel: +1 (281) 940 1800
Fax: +1 (713) 559 9419
Email: customer.service@amot.com

Asia Pacific

AMOT Shanghai
Bd. 7A, No. 568, Longpan Rd., Malu Jiading
Shanghai 201801
China

Tel: +86 21 5910 4052
Fax: +86 21 5237 8560
Email: shanghai@amot.com

Europe, Middle East and Africa

AMOT UK
Western Way
Bury St. Edmunds
Suffolk, IP33 3SZ
England

Tel: +44 1284 715739
Fax: +44 1284 760256
Email: info@amot.com

AMOT Germany
Rondenbarg 25
22525 Hamburg
Germany

Tel: +49 40 8537 1298
Fax: +49 40 8537 1331
Email: germany@amot.com