amot

HOW TO SELECT THE RIGHT TEMPERATURE CONTROL VALVE

The Selection Guide

Checklist

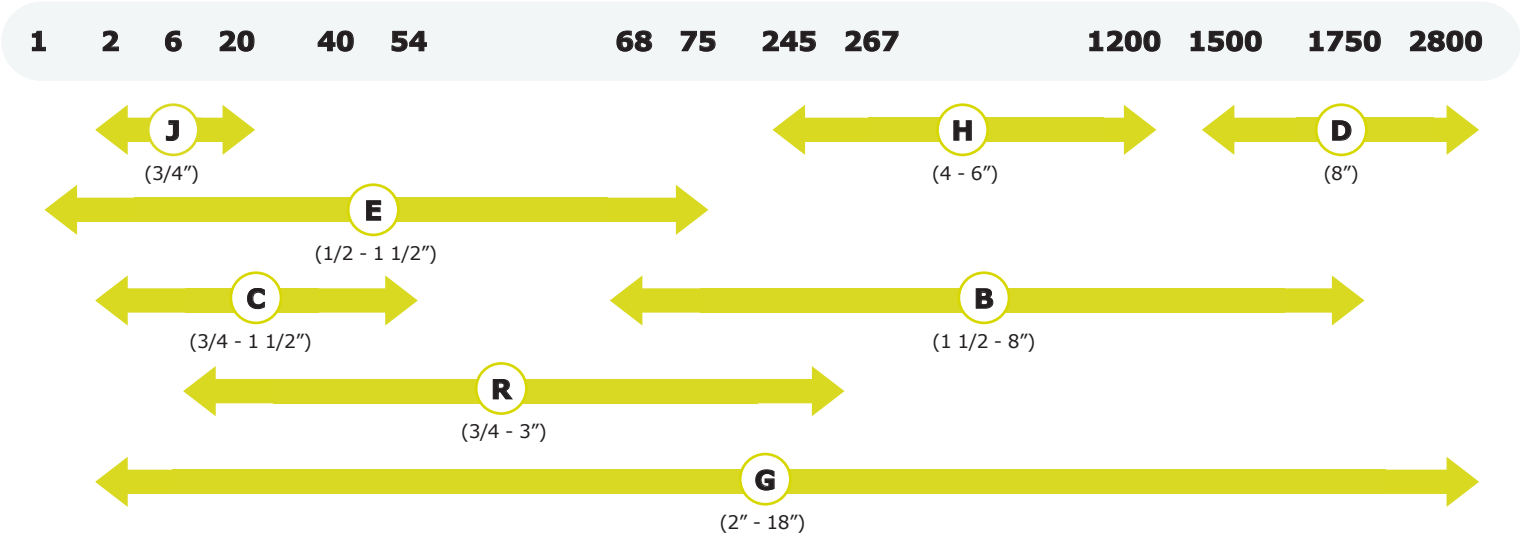
- Flow Rate
- Actuation Method
- Flow Configuration
- Body Material
- Seal Material
- Elements
- Special Features

AMOT temperature control valves provide a simple and reliable way to control the temperature of fluids that are vital to the operation of industrial machines and process equipment. They are often used in turbines, compressors, and engine jacket water and lubrication oil cooling systems. Additionally, they are suitable for process control and industrial applications where fluids must be mixed or diverted depending on their temperatures.

Since AMOT offers such a large selection of different sizes, actuation methods, body materials, and customized features, selecting the right valve for your application requires careful consideration of how the valve will be used and the environment in which it will be installed.

Flow Rate (GPM)

One of the first things to consider is your required flow rate, as this will determine the valve size. If you know your flow rate, the chart below will help narrow down the choices. Note: these values are for water; heavier fluids will lower the maximum range.



Actuation Method

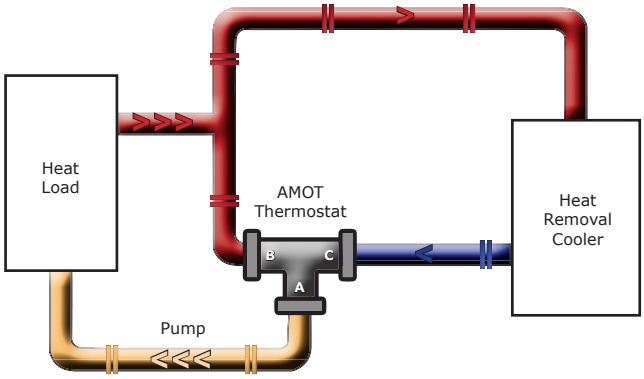
It is important to consider your application requirements and business goals when deciding if you need a thermostatic control valve or actuated control valve.

Self-actuated (thermostatic valves) "Fit and Forgot Solution"	**vs.**	**Externally-actuated valves (Model G) "Performance Improvement Solution"**
One preset temperature setting		Flexible temperature adjustment
Standard control range (+/- 3-5°F)		Precise temperature control (+/-1°F)
Self-contained; no extra parts needed		Complete system: controller, temperature sensor, etc.
Fully mechanical		Requires electric or pneumatic activation source

Flow Configuration

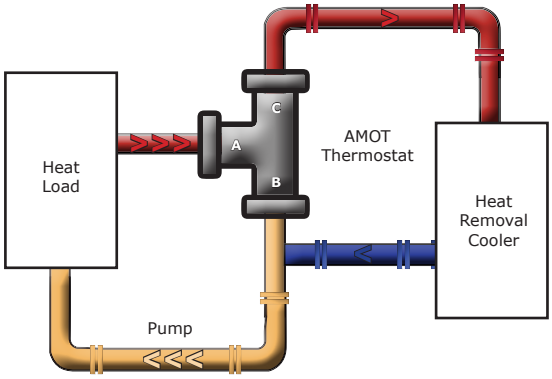
Our temperature control valves work equally well in both mixing and diverting applications, as illustrated in the drawings below.

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.

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.

Body Material

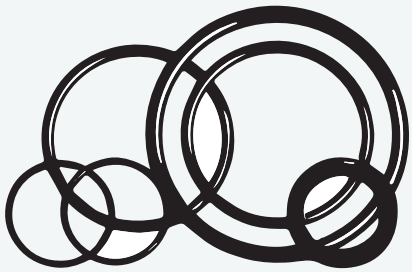
Different body materials work best in different applications.

- Cast Iron: General use for most water, glycol, and oil systems
- Ductile Iron: High strength at lower cost than steel; best for marine applications
- Steel: High strength, high pressure rating
- Stainless Steel: Highest corrosion resistance, high strength, high pressure rating
- Bronze: Best for salt water and Navy applications
- Aluminum: For low cost, high pressure service

Seal Material

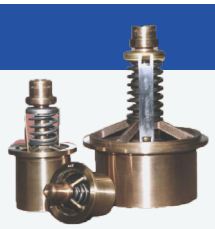
Buna seals are standard and work best for petroleum-based oils, water, and glycol. AMOT offers alternative seal materials for applications where Buna is not compatible with the working fluid.

- Viton: High temperature and synthetic oils
- Neoprene: Refrigeration applications using ammonia or freon



Elements

Standard bronze and steel elements work well in almost all applications. However, if your application contains corrosive fluids, such as ammonia or salt water, we recommend electroless nickel plated elements for protection.



Special Features

The last thing to consider is whether any special features are required by your applications. This can include:

- Element leak holes
- Manual override
- Nonstandard end connections
- Industry certifications

3-Way Temperature Control Valve

Model G, Version G and Accessories

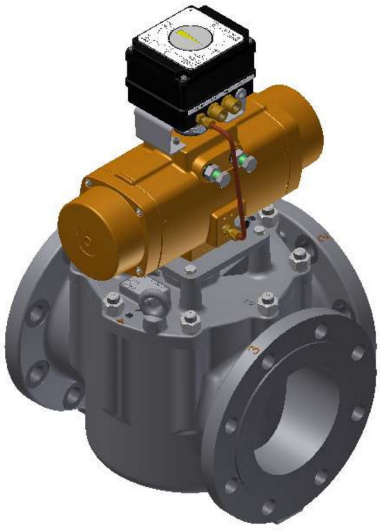
Typical applications

For engines, turbines, gearboxes and heat exchangers:

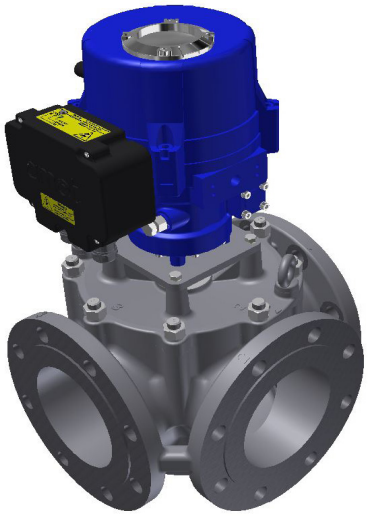
- Charge air cooling
- Secondary cooling systems
- Fuel and lube oil preheating
- Co-generation
- Engine jacket water

For refineries, chemical plants and oil reproduction:

- Waste heat boilers
- Product coolers
- Product heaters
- Product condensers



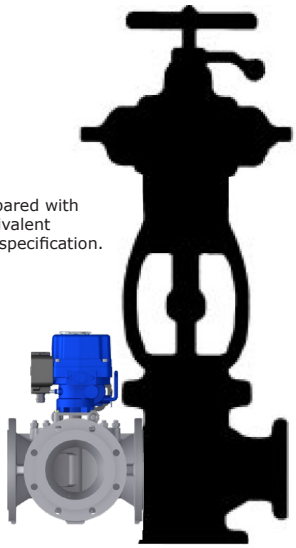
Pneumatic GG valve



Electric GG valve

Key benefits

- Ease of integration - valve size matches pipe size, resulting in reduced installation time and installation costs
- Flexible design - ports can be configured to suit installation
- Low pressure drop - compared to other valve types
- Small physical size
- Hand wheel allows manual adjustment of valve (optional on pneumatic valve) - simplified set up and maintenance



G valve compared with a typical equivalent competitor's specification.

Now even more compact

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Overview

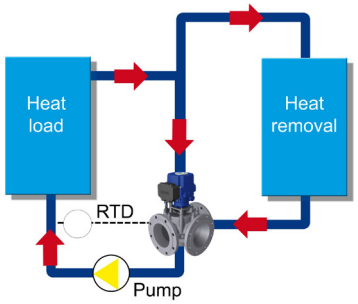
AMOT G valves are 3-way control valves consisting of a heavy duty rotary valve and either a quarter turn electric or pneumatic actuator. The valves provide a high degree of accuracy and repeatability for accurate temperature control and are equally accurate in mixing or diverting service over a wide flow range.

The heavy duty rotor design provides tight temperature control without high maintenance requirements. The system is available in three standard control configurations: electric; pneumatic; and electro-pneumatic, offering flexibility for most requirements. Designed for high vibration service, the AMOT G valves are qualified to Lloyd's Marine Requirements for shipboard service. Valves can be directly mounted to reciprocating machinery, such as diesel engines, without vibration isolation. The heavy duty actuators are specially reinforced to provide vibration resistance.

The standard valves are suitable for a variety of fluids such as water, water/glycol, sea water, lubricating and hydraulic oils. Optional body materials are available for services involving synthetic or fire resistant oils, deionized water and ammonia or freon in oil.

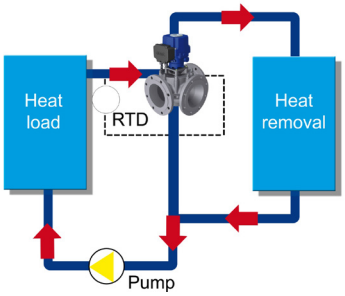
Applications

Mixing Applications



Lubricating oil temperature control is normally configured in a mixing application controlling the return temperature to the heat load. The temperature is normally measured as close as possible to the sump return.

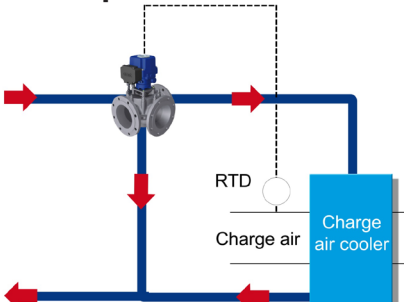
Diverting Applications



Jacket water cooling in diverting applications regulates the outlet coolant water temperature from a diesel or gas engine. The valve either sends water to a cooler or bypass loop, accurately maintaining the temperature.

The temperature is normally measured at the outlet from the heat source.

Charge Air Temperature Control

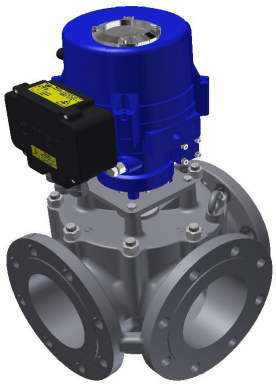


The intercooler is used to cool high temperature turbo charger air.

In this application the G Valve regulates the flow of cooling water through an intercooler, increasing efficiency, enhancing performance and helping to meet today's environmental requirements.

System Types

Electric Valve



Electric GG Valve

For the electric valve, the actuator of the G valve assembly uses an electric motor which rotates in either direction in response to the ON-OFF signals received. The motor drives a gearbox connected to the rotor shaft and turns the valve rotor clockwise or counter-clockwise, a maximum of 90 degrees. At the end of travel, limit switches are incorporated to isolate the electrical supply to the motor when the valve rotor has reached either end of the rotation. A feedback hall sensor is standard and provides position indication to the control system.

The electric actuator is a rugged, compact and lightweight quarter turn actuator having enclosure protection to IP65.

The actuator is powered by an electric motor driving a worm-type gearbox. The worm gearbox prevents reverse drive due to fluid forces. It is fitted with manual override as standard, enabling valve operation without power.

A thermal cutout is fitted preventing overheating. Limit switches at each end of stroke disconnect motor power when end stroke is reached. These can also be used for remote indication.

See page 15 for more information on the electric actuator.

Electric System

Temperature Probe 8060

PID Controller 8071/2D, IP67 enclosure

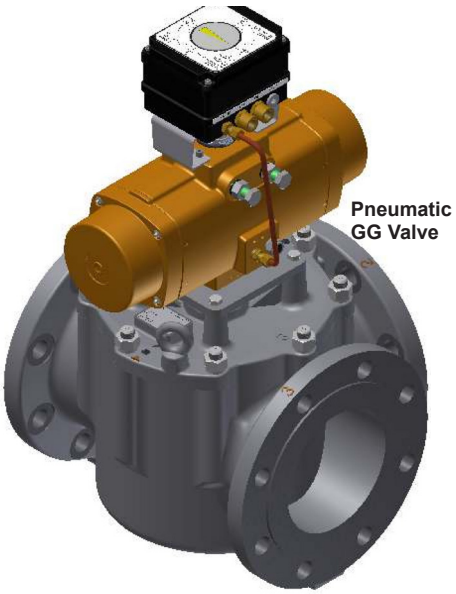
GG Valve

The electric valve system incorporates the use of an electrically actuated three-way control valve with an electronic controller. The 8071D PID Controller can be either panel or wall mounted (see page 18 for more information). The system is completed with a temperature sensor type 8060 (see page 18 for details).

The electric G Valve system is simple to install with standard four core cable, and provides more accurate measurement and control than typical pneumatically operated systems.

System Types continued

Pneumatic Valve

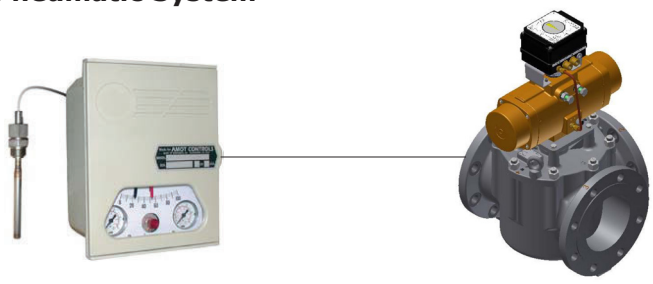


The pneumatic valve uses a spring return pneumatic actuator and positioner to control the rotation of the valve in response to an input signal from a pneumatic or electro-pneumatic control system. The pneumatic control system sends a pneumatic signal ranging from 0.21 to 1.03 bar (3 to 15 psi) to the actuator to correctly position the valve at the desired temperature setting. The pneumatic control system usually consists of a P+I pneumatic controller, sensor and the necessary air supply conditioning equipment (regulators, filters and water traps).

The pneumatic actuator is a rugged, quarter turn, double piston actuator operating on a scotch yoke principle.

The actuator is fitted with spring return as standard allowing fail-safe configuration if necessary. It is also fitted with a valve positioner enabling accurate and repeatable movement. See page 16 for more information on the pneumatic actuator.

Pneumatic System

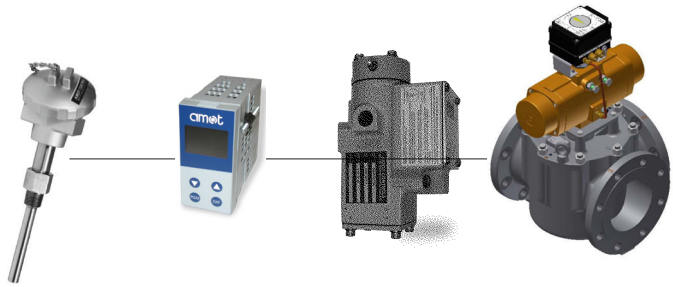


SG80 Temperature Controller and Sensor

GG Valve

The pneumatic valve system incorporates a pneumatically actuated three-way control valve with controller and integral temperature sensor, the SG80, which can be panel or wall mounted. For more information on the SG80, see page 20. The pneumatic G valve system is ideal when there is a lack of electricity or when a fail-safe system is needed.

Electro-Pneumatic System



Temperature Probe 8060

Temperature Controller 8071D

Electro-Pneumatic Converter 8064A

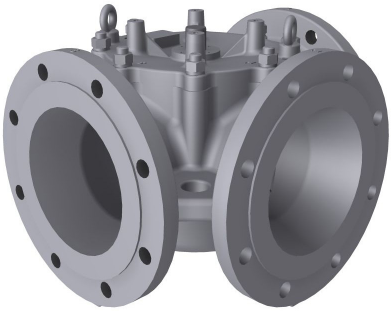
GG Valve

The electro-pneumatic valve system combines both electric and pneumatic technology, consisting of a pneumatically actuated three-way control valve with an electro-pneumatic converter, type 8064A. See page 19 for more details.

The probe sends a resistance signal to the electronic controller, which in turn sends a 4 to 20mA signal to an I/P converter that converts this to a pneumatic signal.

The electro-pneumatic system combines the features and functionality of the AMOT electronic control system with the fail-safe action benefits of a pneumatically actuated valve.

Overview of Valve Body



Valve Body

Key features and benefits

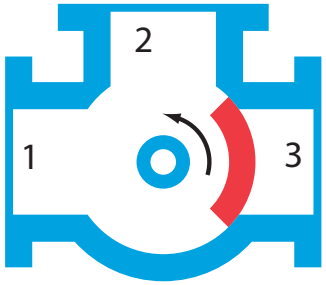
- Lightweight and compact
- Configurable ports - allowing flexibility on installation
- Low pressure drop - enables savings on either valve or pump size
- High accuracy providing better temperature control

Specification

Flow to:	720m³/hr	3,170 US gpm
	For valves with higher flow rates see datasheet GEF_GPD_Temp_Control_Valve	
Sizes:	**Standard flow**	**High flow**
	80mm - 200mm (3” - 8”)	80mm - 200mm (2” - 8”)
	For 250 mm (10”) and above see Datasheet GEF_GPD_Temp_Control_Valve	
Body material:	Ductile iron	High performance iron, for fresh water, lubricating oils
Seal material:	Flourocarbon (Viton, FKM)	
Flanges:	EN 1092, ASME and JIS standards.	
Maximum internal valve pressure:	10 bar	(145 psi)
Maximum temperature of fluid:	100°C	(212°F)
Vibration:	Exceeds the requirements of Lloyd’s Register Type Approval System, Test Specification Number 1, 2002, Vibration Test 2. For both electric and pneumatic:	

Frequency range	Displacement	Acceleration	Lloyd’s
5 - 25 Hz	+/- 1.6mm		+/- 1.6mm
25 - 100 Hz		+/- 5.0g (49 m/s²)	+/- 4.0g (39 m/s²)
100 - 300 Hz		+/- 1.0g (9.81 m/s²) 90 minute	No requirement

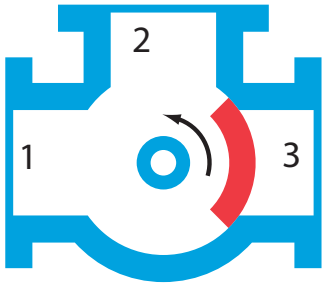
Modes of Operation - Electrically Actuated



The unique construction of the AMOT G valve provides total flexibility by allowing you to select the valve port positions most ideally suited to meet your application requirements. There are two main types of mode of operation: 90° rotor that allows either ports 1 or 3 to be selected as the common port; and 180° rotor that requires port 2 to be the common port. Arrow indicates valve movement with increasing temperature or mA, as viewed from above (see diagram). For electrically actuated valves, on loss of signal the actuator is set up by default to stop in its current position.

	Electric actuator (switched live input)		**Electric actuator direct acting (4-20mA input)**		**Electric actuator reverse acting (20-4mA input)**	
	Cold position	Hot position	4mA (cold)	20mA (hot)	20mA (cold)	4mA (hot)
Mode 32						
Mode 21						
Mode 12						
Mode 23						
Mode 13						
Mode 31						

Modes of Operation - Pneumatically Actuated



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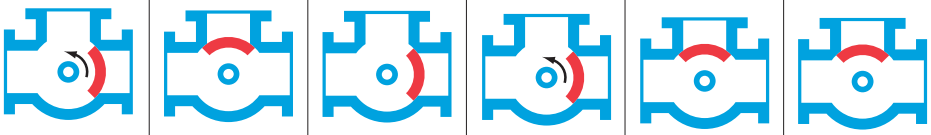
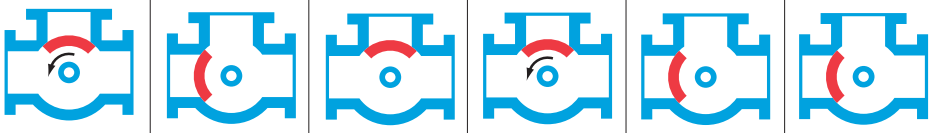
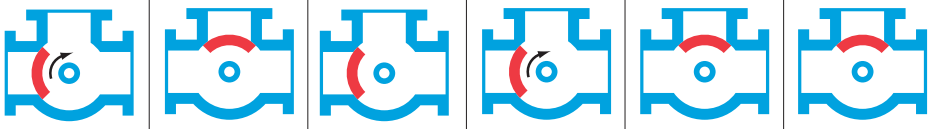
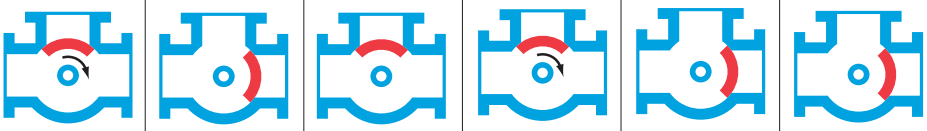
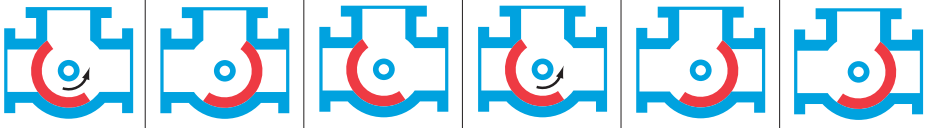
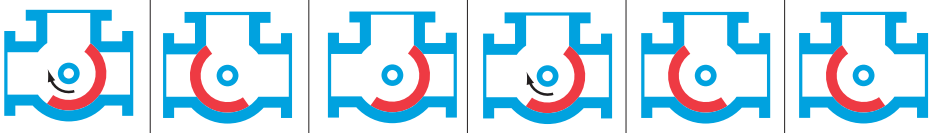
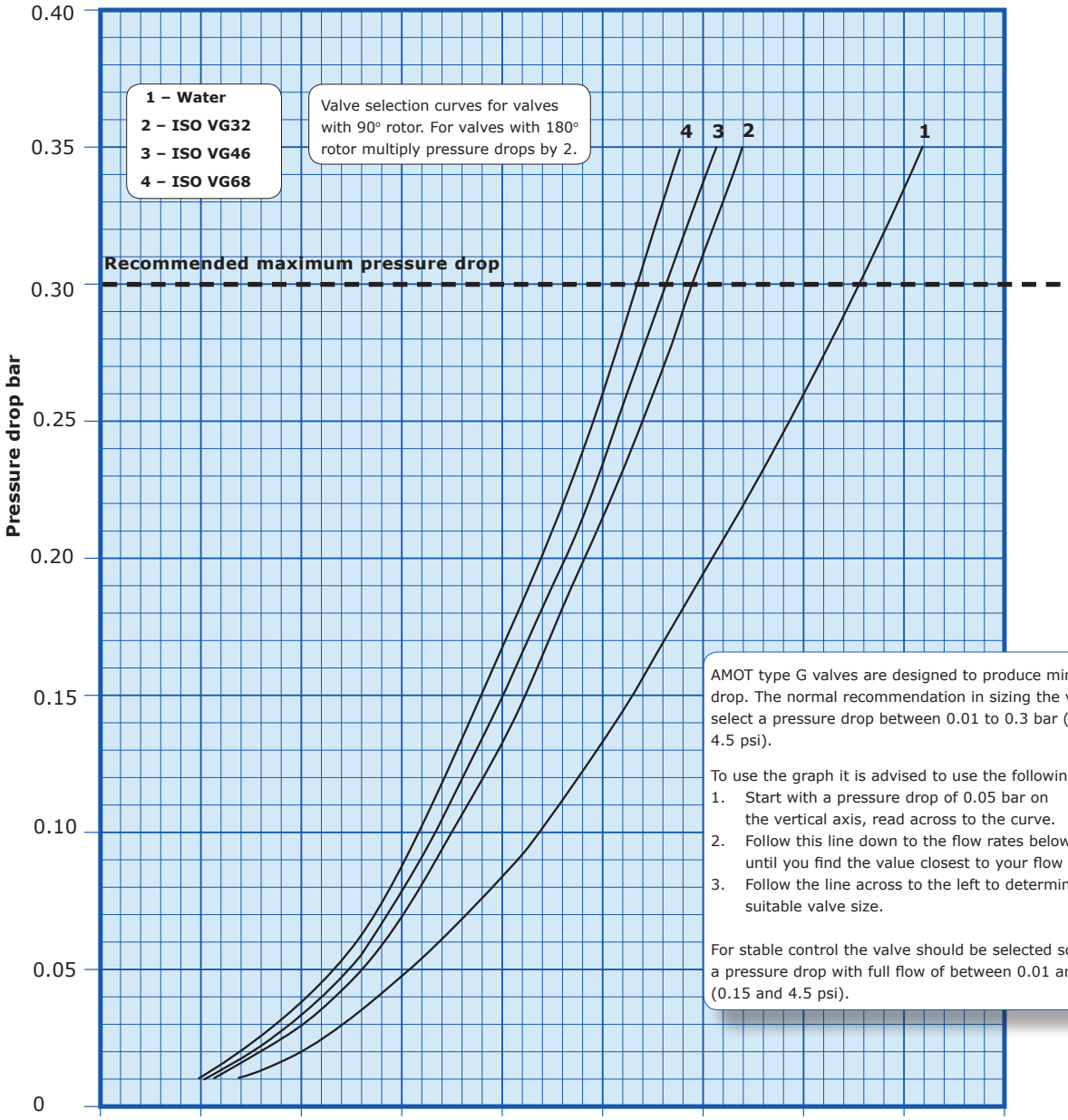
	Pneumatic actuator direct acting			**Pneumatic actuator reverse acting**		
	3 PSI (cold)	15 PSI (hot)	No signal	15 PSI (cold)	3 PSI (hot)	No signal
Mode 32						
Mode 21						
Mode 12						
Mode 23						
Mode 13						
Mode 31						

Valve Sizing (Metric units)

Valve Flowrate Selection (Flowrate m^3/hr)



AMOT type G valves are designed to produce minimal pressure drop. The normal recommendation in sizing the valves is to select a pressure drop between 0.01 to 0.3 bar (0.15 and 4.5 psi).

To use the graph it is advised to use the following method:

1. Start with a pressure drop of 0.05 bar on the vertical axis, read across to the curve.
2. Follow this line down to the flow rates below until you find the value closest to your flow rate.
3. Follow the line across to the left to determine suitable valve size.

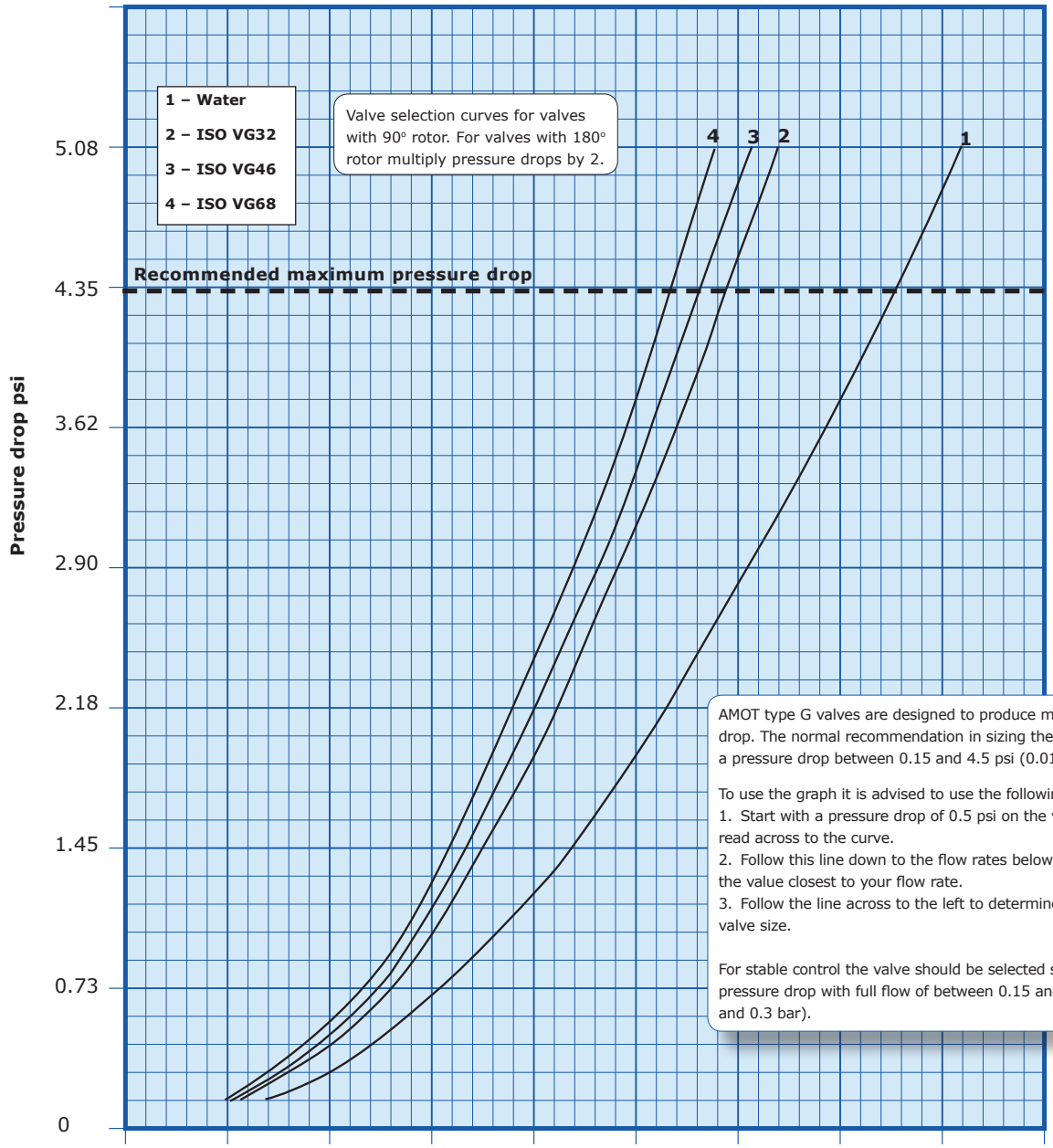
For stable control the valve should be selected so as to provide a pressure drop with full flow of between 0.01 and 0.3 bar (0.15 and 4.5 psi).

Size DN (Inches)										
	Standard Flow	High Flow								
	80 (3)	50 (2)	7	14	20	26	33	39	46	52
	100 (4)	80 (3)	19	35	51	67	83	99	115	131
	125 & 150 (5 & 6)	100 (4)	29	54	79	104	129	154	179	204
	200 (8)	150 (6)	66	122	178	235	291	347	403	459
		200 (8)								
	250 (10)									
	300 (12)	250 (10)								
	350 (14)	300(12)								
	400 (16)	350 (14)								
	450 (18)	400 (16)								

Currently only available in GEF/GPD versions.
See Datasheet GEF_GPD_Temp_Control_Valve for data

Valve Sizing (English units)

Valve Flowrate Selection (Flowrate USg/m)



AMOT type G valves are designed to produce minimal pressure drop. The normal recommendation in sizing the valves is to select a pressure drop between 0.15 and 4.5 psi (0.01 to 0.3 bar).

To use the graph it is advised to use the following method:
1. Start with a pressure drop of 0.5 psi on the vertical axis, read across to the curve.
2. Follow this line down to the flow rates below until you find the value closest to your flow rate.
3. Follow the line across to the left to determine suitable valve size.

For stable control the valve should be selected so as to provide a pressure drop with full flow of between 0.15 and 4.5 psi (0.01 and 0.3 bar).

Size inches (DN)	Standard Flow	High Flow								
	3 (80)	2 (50)	31	62	88	114	145	172	203	229
	4 (100)	3 (80)	84	154	225	295	365	436	506	577
	5 & 6 (125 & 150)	4 (100)	128	238	348	458	568	678	788	898
	8 (200)	6 (150)	291	537	784	1035	1281	1528	1774	2021
		8 (200)								
	10 (250)									
	2 (300)	10 (250)								
	14 (350)	12 (300)								
	16 (400)	14 (350)								
	18 (450)	16 (400)								

Currently only available in GEF/GPD versions.
See Datasheet GEF_GPD_Temp_Control_Valve for data

Valve Sizing

Viscosity Correction

Example:

From the graph below:

100 cSt = correction factor of 0.68

0.68 x flow coefficient = corrected flow coefficient (Kv or Cv)

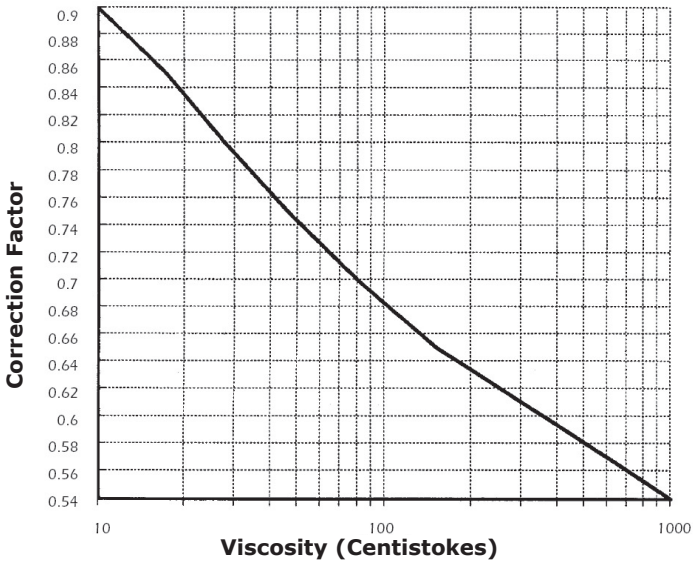
Some approximate viscosities (cSt) of SAE oils at 40°C (110°F) are shown below, based on leading oil manufacturers published data.

For the selection of valves for more viscous fluids than water, the following must be calculated:

Viscosity: Find the viscosity of the fluid in which the valve is to operate. The viscosity is normally expressed in centistokes. Where ISO oil is used, the grade number is also the viscosity eg ISO VG46 is 46 centistokes at 40°C (104°F).

Viscosity correction: By using the correction graph below, the flow coefficient correction factor can be established. The correction figure obtained from the graph should then be multiplied by the original flow coefficient which can then be used in the standard valve sizing formulae.

Viscosity Correction Curve (Fv)



Some approximate viscosities (cSt) of SAE oils at 40°C (104°F) are shown below, based on leading oil manufacturers' published data.

SAE Oil 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

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

Valve Sizing

Valve Sizing Calculations

Valve Flowrate

See the table below for examples of Kv and Cv:

Size DN (in)	Standard flow		80 (3)	100 (4)	150 (6)	200 (8)		250 (10)	300 (12)	350 (14)	400 (16)	450 (18)
	High flow	50 (2)		80 (3)	100 (4)	150 (6)	200 (8)		250 (10)	300 (12)	350 (14)	400 (16)
Kv			82	207	323	729	1296					
Cv			96	242	378	851	1513					

Currently only available in GEF/GPD versions.
See Datasheet GEF_GPD_Temp_Control_Valve for data

Pressure Drop

The G valve is designed to produce minimal pressure drop. The normal recommendation when determining the size of an AMOT G valve is a pressure drop between 0.01 and 0.3 bar (0.15 and 4.5 psi). **Note:** Kv and Cv values are applicable to 90° rotor versions only.

Kv is the flow coefficient in metric units. It is defined as the flow rate in cubic meters per hour (m^3/h) of water at a temperature of 16º celsius with a pressure drop across the valve of 1 bar. Cv is the imperial coefficient. It is defined as the flow rate in US Gallons per minute [gpm] of water at a temperature of 60º fahrenheit with a pressure drop across the valve of 1 psi. (Kv = 0.865 Cv / Cv = 1.156 Kv)

The basic formula to determine the Kv of a valve is:

$$Kv = Q\sqrt{\frac{SG}{Dp}}$$

Q = Flow (m^3/h)
Dp = Pressure drop (bar)
SG = Specific gravity of fluid
Kv = Valve flow coefficient

There are two other ways that this formula can be used to find the flow in m^3/h or pressure drop of a valve in bar:

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

The basic formula to determine the Cv of a valve is:

$$Cv = Q\sqrt{\frac{SG}{Dp}}$$

Q = Flow (US gallons/min)
Dp = Pressure drop (psi)
SG = Specific gravity of fluid
Cv = Valve flow coefficient

There are two other ways that this formula can be used to find the flow in US gallons/minute or pressure drop of a valve in PSI:

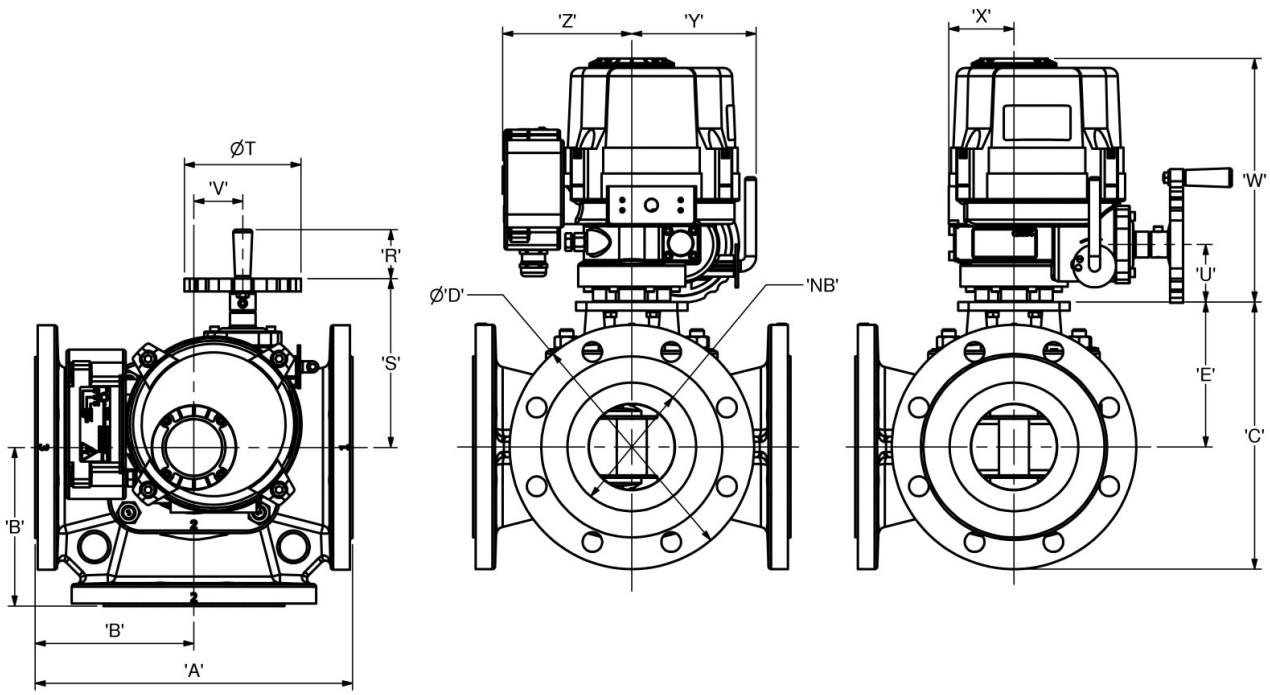
$$Q = Cv\sqrt{\frac{Dp}{SG}} \qquad Dp = \left[\frac{Q}{Cv}\right]^2 SG$$

Valve Bypass Flowrates

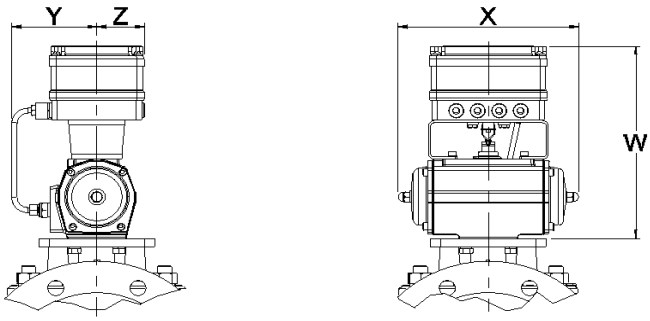
The AMOT G Valve is not a tight shutoff valve. When used in a reasonably balanced pressure system there will be some small amounts of leakage between ports. The actual amount of leakage will vary with the pressure difference between these ports. Consult AMOT for further information if the application is sensitive to leakage rates or if high pressure differences are likely to occur.

Dimensions

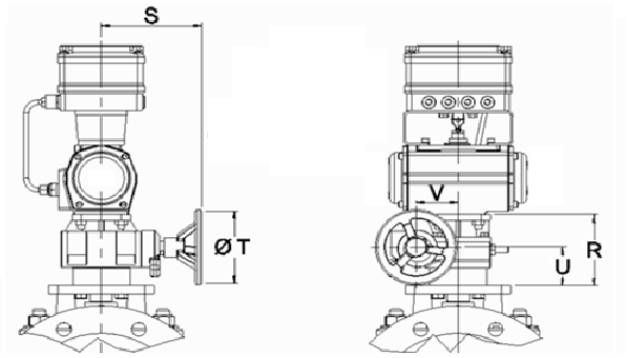
Electrically Actuated with Manual Override



Pneumatically Actuated



Pneumatically Actuated with Manual Override



See page 14 for dimensions

Dimensions continued

Dimensions in mm

Valve Type	Valve Body						Electrically Actuated									Pneumatically Actuated									Valve Type
	NB	A	B	C	D	E	R	S	T	U	V	W	X	Y	Z	R*	S*	T*	U*	V*	W	X	Y	Z	
03GGS	80	280	140	207	200	107	57	197	136	67	57	284	76	145	151	95	123	100	52	52	245	192	95	53	03GGS
03GGH				227	200	127																			03GGH
04GGS	100	300	150	242	229	128																			04GGS
04GGH				281	224	169																			04GGH
05GGS	125	340	170	296	254	169																			05GGH
06GGS	150	370	185	312	285	169																			06GGS
06GGH				346	285	191										100	155	200	45	79	297	362	115	53	06GGH
08GGS	200	450	225	371	343	191										113									08GGS
08GGH				418	340	235																			08GGH

Dimensions in inches

Valve Type	Valve Body						Electrically Actuated									Pneumatically Actuated									Valve Type
	NB	A	B	C	D	E	R	S	T	U	V	W	X	Y	Z	R*	S*	T*	U*	V*	W	X	Y	Z	
03GGS	3.00	11.02	5.51	8.15	7.87	4.21	2.24	7.76	5.35	2.64	2.24	11.18	2.99	5.71	5.95	3.74	4.84	3.94	2.05	2.05	9.65	7.56	3.74	2.09	03GGS
03GGH				8.94	7.87	5.00																			03GGH
04GGS	4.00	11.81	5.91	9.53	9.02	5.04																			04GGS
04GGH				11.06	8.82	6.65																			04GGH
05GGS	5.00	13.39	6.69	11.65	10.00	6.65																			05GGS
06GGS	6.00	14.57	7.28	12.28	11.22	6.65																			06GGS
06GGH				13.62	11.22	7.52										3.94	6.10	7.87	1.77	3.11	11.69	14.25	4.53	2.09	06GGH
08GGS	8.00	17.72	8.86	14.61	13.50	7.52										4.45									08GGS
08GGH				16.46	13.39	9.25																			08GGH

* Relevant only to pneumatic actuator with manual override version.

Bolthole dimensions are as per the relevant specification chosen in the model coding. Full dimensional details can be provided on request.

Overview of Electric Actuation

Electric Actuator

Key features and benefits

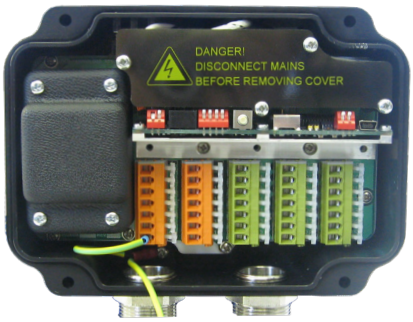
- Self-locking with minimum backlash in the transmission - prevents valve movement due to flow
- Auxiliary limit switches for user connection
- Manual override fitted as standard - valve can be operated in event of power failure
- Two torque switches - provide protection in event of actuator overloading

Specification

Power	115V ± 10% or 230V ± 10%	50/60Hz single phase
Limit switches	Two open/close SPDT	250V AC, 10A
Motor thermal protection	Fitted as standard	
Angular rotation	110° max	Quarter turn
Position sensor	Contactless half effect	
Cable entry	2 x M25 x 1.5	IP68 glands provided
Mechanical stop	Two adjustable screws	
Manual override	Fitted as standard	
Materials	Steel, aluminum alloy, aluminum bronze, polycarbonate	
External coating	Dry powder polyester	
Weatherproof enclosure	IP67, NEMA 4 and 6	
Ambient temperature	-20°C to +70°C	(-4°F to +158°F)
Ambient humidity	90% RH max (non-condensing)	
Anti-condensation heater	7 - 10W	
Vibration resistance	5 - 100 Hz	5g
	100 - 300 Hz	1g

Performance		**Duty cycle 20°C**	**Stroke time (secs)**		**Max currrent (A)**	
Standard	**High flow**		**50 Hz**	**60 Hz**	**220V**	**110V**
	50	Currently only available in GEF/GPD versions. See Datasheet GEF_GPD_Temp_Control_Valve for data				
80 - 200	80 - 200	65%	25	21	0.88	1.7
250 - 450	250 - 400	Currently only available in GEF/GPD versions. See Datasheet GEF_GPD_Temp_Control_Valve for data				

Electronic Positioner



Electronic Positioner

The AMOT actuator/valve positioner is configured to accept an industry standard 4-20mA position demand input signal, and uses this to operate internal solid state switching to drive the motor.

The microprocessor based unit uses the signal from the contactless position sensor to accurately position the actuator, taking into account motor response time and actuator overshoot.

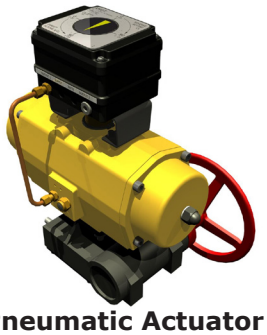
The positioner is split into two parts, housed in the terminal box. There is a power module, in which all high voltage circuits are fully encapsulated to withstand high vibration, and a control board. This design allows for easy maintenance.

There are three LEDs on the terminal box on the side of the actuator, providing clear visual indication of actuator status. Two alarm outputs allow for remote fault monitoring.

User configuration allows:

- The input can be selected from 4-20mA, 0-20mA, 0-5V, 0-10V and 2-10V by switches.
- 4-20mA output, which shows actual valve position, can be configured to retransmit the demand input signal.
- A switch allows for easy configuration of which end of stroke corresponds with a 4mA demand.
- The action on sensor fail can be selected from moving to either the 4mA or the 20mA positions, but is factory set to not moving.
- The deadband can be increased to aid performance with noisy input signals.
- When necessary, such as after maintenance, the actuator can be recalibrated at the touch of a button.

Overview of Pneumatic Actuation



Pneumatic Actuator

Key features and benefits

- A rugged quarter turn, double piston, rack and pinion pneumatic actuator with spring return and valve positioner as standard.
- Can be configured fail-safe

Specification

Housing	Cast aluminum base, steel cover and two part Polyurethane paint finish.	
Supply pressure	6 to 8 bar	(90 to 115 psi)
Signal pressure	0.21 to 1.03 bar	(3 to 15 psi)
Pressure connections	G 1/4	(1/4 NPT)
Manual override	Optional	

How to Order

Use the table below to select the unique specification of your G valve:

Example Code	06GG	S	D	B	S	32	EA	B	CA	-AA	Code Description		
Valve Body Selection											**Nominal Bore Size**		**Comments**
	Valve Size & Model 02GG										2 Inch (DN50)		High Flow Only
	Valve Size & Model 03GG										3 Inch (DN80)		
	Valve Size & Model 04GG										4 Inch (DN100)		
	Valve Size & Model 05GG										5 Inch (DN 125)		Standard Flow only
	Valve Size & Model 06GG										6 Inch (DN150)		
	Valve Size & Model 08GG										8 Inch (DN200)		
	Valve Flow Type										**Valve Flow Type** (Refer to flow coefficient table for Cv/Kv data)		
		S									Standard Flow Valve		
		H									High Flow Valve		
	Valve Body										**Body Material**		
			D								Ductile Iron		
	Valve Flange Connection Standard and Class										**Flange Class**	**Flange Standard**	**Flat / Raised Face**
				A							PN6	EN 1092	Raised
				B							PN10	EN 1092	Raised
				C							PN16	EN 1092	Raised
				F							125 lb (Flat Face)	ASME	Flat
				J							150 lb	ASME	Raised
				L							10K	JIS	Flat
				M							5K	JIS	Flat
	Rotor Type										**Rotor Type**		
					S						Standard Rotor		
	Valve Mode of Operation										**Rotor Position**		**Rotation Starting From Cold Position**
											Cold Process	**Hot Process**	
						12					Port 1	Port 2	Clockwise
						23					Port 2	Port 3	
						31					Port 3	Port 1	
						21					Port 2	Port 1	Anticlockwise
						32					Port 3	Port 2	
						13					Port 1	Port 3	
Actuator Selection											**Power Supply**	**Air Connection**	**Manual override**
	Valve Actuation Type Electric Actuator Power Supply Pneumatic Actuator Air Connections & Manual override					Elec	EA				100 -120 Vac 50/60Hz	-	Fitted as Standard
						Elec	EB				200 - 240 Vac 50/60Hz	-	Fitted as Standard
						Pneu	P1				-	G1/4 (1/4" BSPP)	Not Fitted
						Pneu	P2				-	1/4" NPT	Not Fitted
						Pneu	P3				-	G1/4 (1/4" BSPP)	Fitted
						Pneu	P4				-	1/4" NPT	Fitted
	Actuator Control Input Signal										**Input Signal**	**Comments**	
							Elec	A			Relays, Switched Live Supply		
							Elec	B			4-20mA	On Increasing Temperature	
							Elec	C			20-4mA		
							Pne	1			3-15psi		
							Pne	2			15-3psi		
	Actuator Feedback Signal										**Feedback Signal**		
								Electric	AA		None	Not applicable for Actuator Control Input Signal codes B or C	
								Electric	CA		4-20mA Position Retransmit		
								Electric	EA		20-4mA Position Retransmit		
								Pne	00		None		
	Customer Special Options									-AA	Standard Product		
										-***	Customer Special Code Assigned		

Accessories

PID Valve Controllers 8071/8072D and Solid State Relays 47581L001

PID Controller 8072D

Solid State Relay 47581L001

PID Controller 8071D

Key features and benefits

- Fully programmable PID-based control - allows easy system configuration
- Universal inputs; RTD's, thermocouple, or standard 4-20mA signal gives maximum system design flexibility
- Can be operated in manual mode - easy maintenance and set up

For further information and how to order these products see Datasheet_8071_2_D_47851.pdf

3-Wire PT100 Temperature Sensor - 8060

Temperature Sensor 8060

Key features and benefits

- 3 wire RTDs - accurate temperature measurement
- Excellent long term stability
- Good linearity
- Can use standard 3-core cable

For further information and how to order this product see Datasheet_8060_temp_sensor.pdf

Accessories

Solid State Relay Module - 8073C

Relay Module

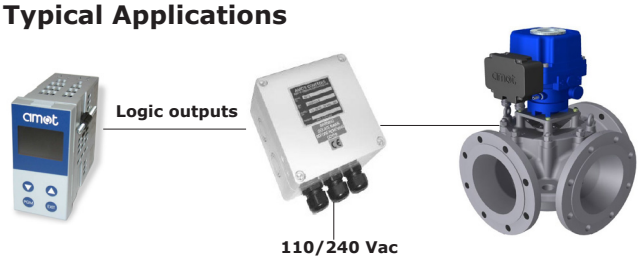
8073C

Key features and benefits

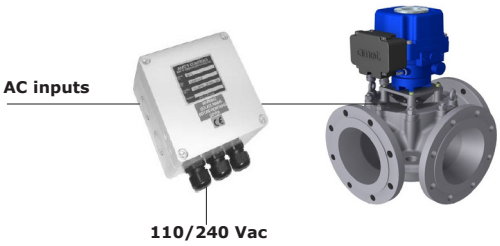
- IP67 enclosure
- Alternative to using two SSRs type 47581L001
- Good linearity
- Can use standard 3-core cable

The 8073C relay module incorporates two solid state relays with terminations in an IP67 enclosure. The 8073C is designed to be used with the 8071D controller logic outputs to drive voltages for the electrically actuated G valve. Features include: zero-crossing switching, relay and logic level inputs and IP67 enclosure.

Typical Applications



Interface with 8071D controller



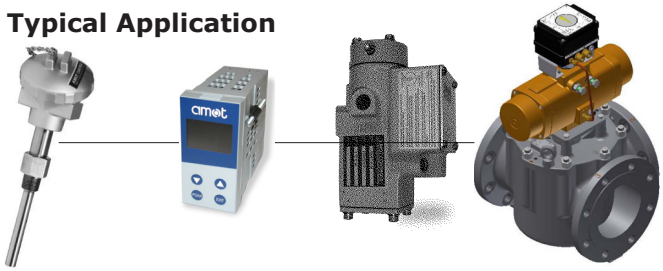
Interface with AC input signals

For further information and how to order this product see Datasheet_8073C_SSR.pdf

Electro-Pneumatic Converter - 8064A

Electro-Pneumatic Converter - 8064A

Typical Application



Temperature Probe 8060 | Temperature Controller 8071D | Electro-Pneumatic Converter 8064A | G Valve

Key features and benefits

- High vibration resistance - Lloyds 4G
- Suitable for longer pipe runs
- Fully adjustable for optimised system operation
- ATEX hazardous area certification

For further information and how to order this product see Datasheet_8064A_C_elect_pneu_converter.pdf

Accessories

Electro-Pneumatic Converter - 8064C

Typical Application

Electro-Pneumatic Converter - 8064C

Electro-pneumatic system

Temperature probe 8060 | Temperature controller 8071D | Electro-pneumatic converter 8064C | G valve

Key features and benefits

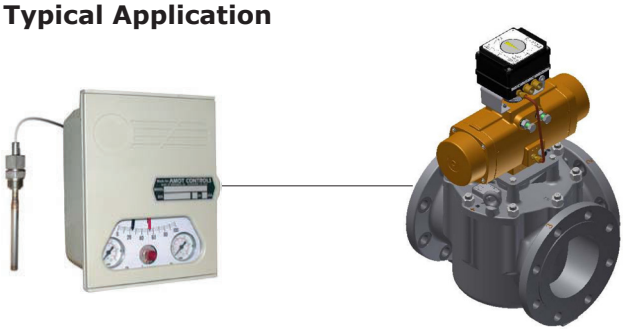
- Accepts high supply pressure - avoids use of additional regulator
- Factory set for ease of installation
- Low cost alternative to 8064A
- ATEX hazardous area certification

For further information and how to order this product see Datasheet_8064A_C_elect_pneu_converter.pdf

Pneumatic Indicator Controller - SG80

Pneumatic Indicator Controller SG80

Typical Application



SG80 Temperature Controller and Sensor | G Valve

Key features and benefits

- Complete stand alone controller, no other control components required - reduced system cost
- Easily removable components - low maintenance
- Good dynamic response - gives optimum engine performance
- Compatible with every type of pneumatic valve - flexible

For further information and how to order this product see Datasheet_SG80_Pneu_Ind_Controller.pdf

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Thermostatic Control Valve
Model B

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 B

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 15 - 400 m^3/hr (68 - 1750 US gpm)
- Combinations available:
  - Housings in cast iron, ductile iron, bronze, carbon steel, stainless steel
- DN40 - DN200 (1 ½" - 8") pipe sizes
- Threaded and flanged connections
- Tamper-proof temperature settings from 13°C - 116°C (55°F - 240°F)
- Pressure ratings up to 45 bar (655 psi)

Accreditations available

- PED — Suitable for Group 1 & 2 liquids (Ensure materials are compatible)
- ATEX — Ⓔx II 2G Ex h IIC T6...T3 Gb X
- CE — Complies with all relevant EU directives

amot

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Overview

AMOT Model B 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 model B valves may be used for diverting or mixing service.

They make very economical temperature limiting valves for engine and lubricating oil cooling, and to prevent scalding in hot water supply systems; such as in emergency water systems for labs. Radiant heating systems can use these valves in limiting water temperature to prevent surface cracking and over-heating of plastic piping. Other applications include electronic and battery cooling circuits, pump temperature relief valves etc.

Housing materials

- Cast iron
- Steel
- Ductile iron
- Bronze
- Stainless steel

Seal materials

- Buna N/Nitrile
- Viton
- Neoprene

Element materials

- A combination of bronze, brass and stainless steel (standard)
- A combination of nickel plated and 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 1.6 mm - 12.7 mm ($1/16$" - $1/2$").

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 13°C - 116°C (55°F - 240°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.

Manual override (BM & BR)

Model BM

For BM type valves, in automatic mode the valve will control the temperature automatically, but actuating the manual override mechanism(s) on top of the valve will move the element(s) to the fully extended (hot) position, regardless of temperature. Each element assembly has its own manual override.

Model BR

BR type valves are fitted with a manual override which allows a progressive opening of port A to C. Manual override is often a requirement for marine applications. Each element assembly has its own manual override.

Manual override should only be used in case of an emergency or element failure.

Applications

Diverting Applications

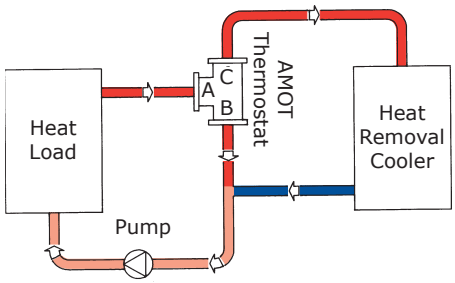
When valves are used for diverting services, the inlet is Port A (temperature sensing port), with Port C being connected to the cooler, and Port B connected to the cooler by-pass line.

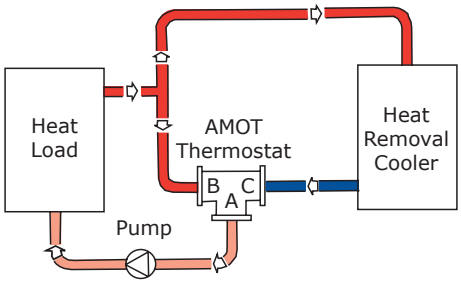
Mixing Applications

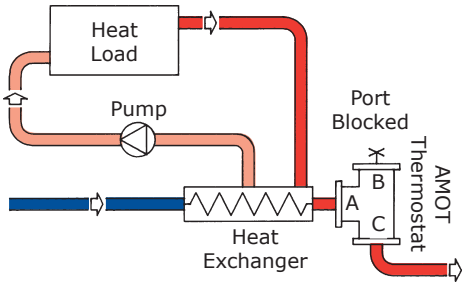
When valves are used for mixing service, Port C is the cold fluid inlet port from the cooler, Port B is the hot by-pass fluid inlet, and Port A the common outlet. Port A is the temperature sensing port and will mix the hot and cold fluids in the correct proportion so as to produce the desired outlet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

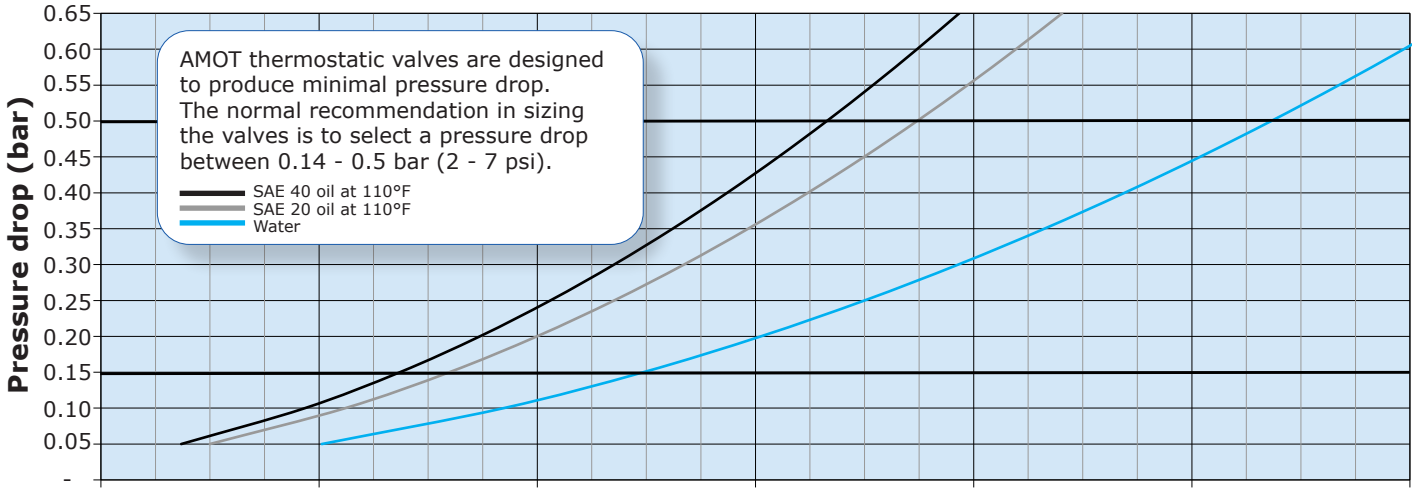






Valve Characteristics

Pressure drop (Metric units)

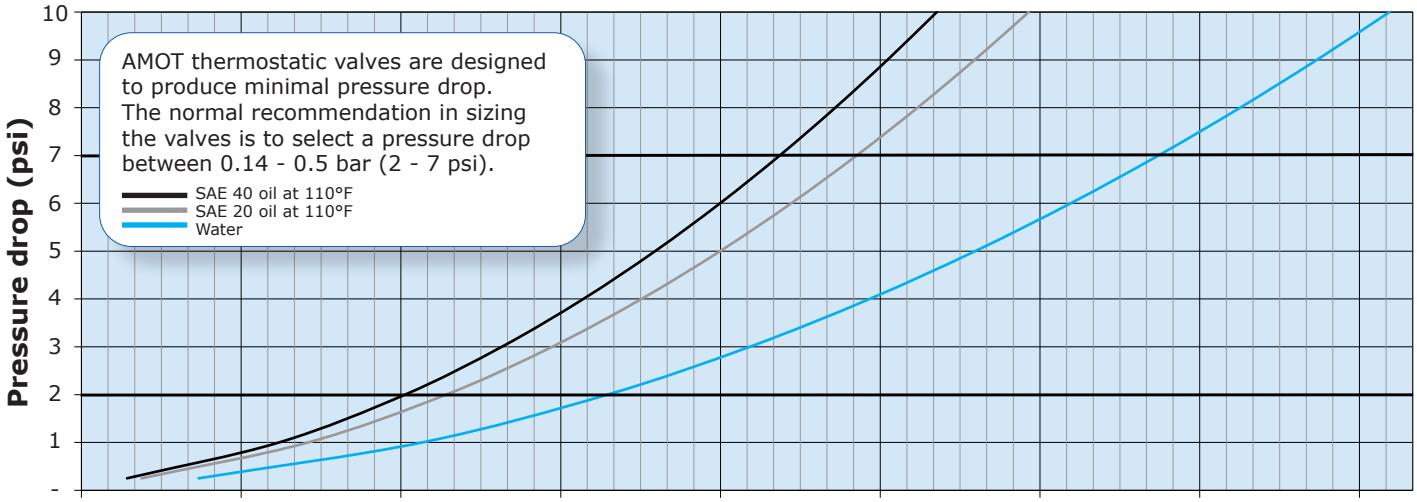


Size	♦	♦	♦	♦	♦	♦
1 ½	8	12	16	20	24	28
2	10	15	20	24	29	34
2 ½	18	26	35	44	53	61
3	19	29	39	48	58	68
33	27	40	54	67	81	94
4	39	59	78	98	117	137
5	58	88	117	146	175	205
6	88	131	175	219	263	306
8	127	190	254	317	381	444

Flow rate (m^3/hr) - Water

Valve Characteristics Continued

Pressure drop (English units)



Size	♦	♦	♦	♦	♦	♦	♦	♦
1 ½	25	40	55	70	85	100	115	130
2	30	49	67	85	103	121	140	158
2 ½	52	83	114	145	176	207	238	269
3	60	96	132	168	204	240	277	313
33	83	133	183	233	283	333	383	433
4	121	193	266	338	411	483	556	628
5	181	290	398	507	615	724	832	941
6	271	434	597	760	923	1,086	1,249	1,411
8	393	629	864	1,100	1,336	1,571	1,807	2,043

Flow rate (US gpm) - Water

Flow coefficient

Flow coefficient (calculated)		
Size	**Kv**	**Cv**
1 ½	36	42
2	44	51
2 ½	79	91
3	87	101
33	121	140
4	176	203
5	263	304
6	394	456
8	571	660

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 (m^3/hr) of water at a temperature of 16º Celsius with a pressure drop across the valve of 1 bar. The basic formula to find a valve's Kv is shown below:

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

Q = Flow in m^3/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 60º Fahrenheit with a pressure drop across the valve of 1 psi. The basic formula to find a valve's Cv is shown below:

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

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

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)

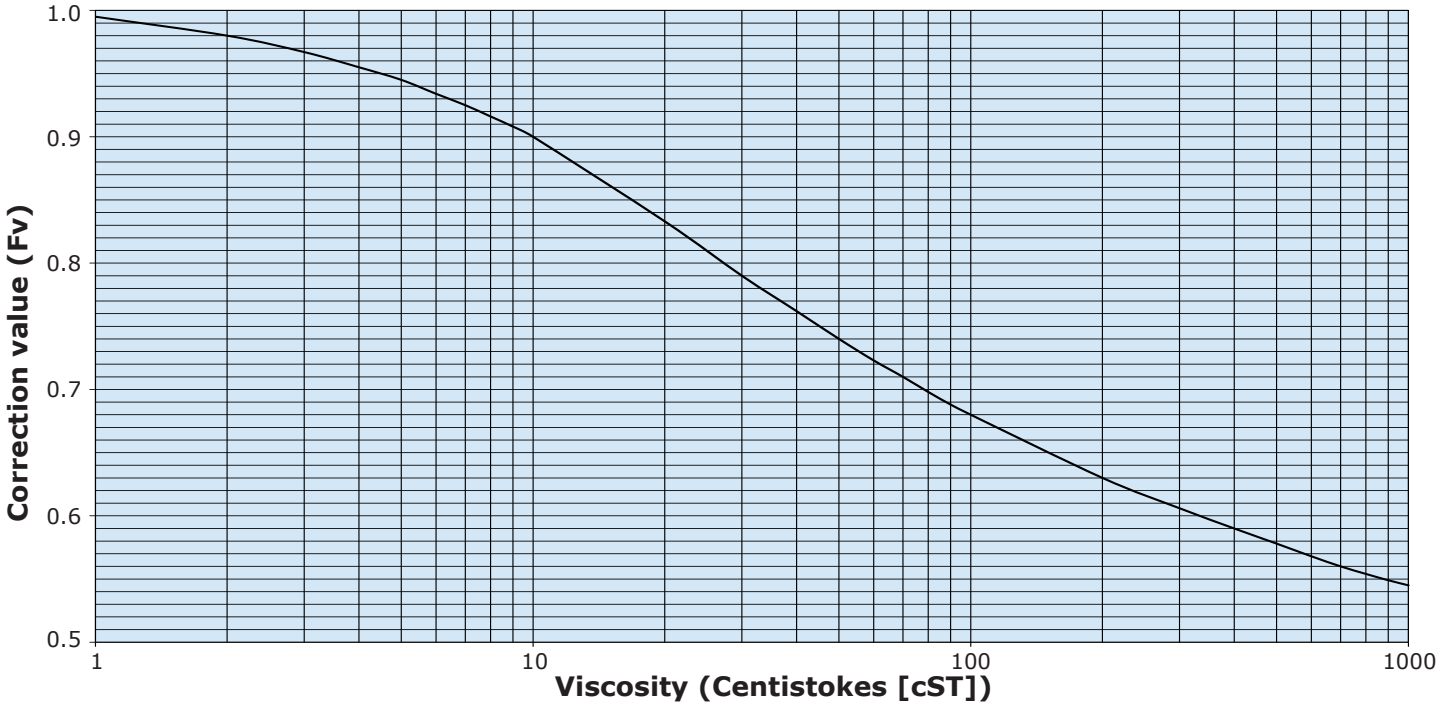
- Viscosity correction

  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

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.

Valve Characteristics Continued

Available versions

Cast iron	Ductile iron	Bronze	Steel/ Stainless Steel
Threaded	**Threaded**	**Threaded**	**Threaded**
1 ½ BG/BH/BO	1 ½ BO	1 ½ BO	1 ½ / 2 BO
2 BH/BO	**Flanged**	2 BO	**Flanged**
Flanged	2 BC/BF/BM/BR	**Flanged**	2 BC/BM/BR/BF
2 BC/BF/BG/BM/BR	2 ½ BF/BM/BO/BR	1 ½ BM	2 ½ BM/BO/BR
2 ½ BM/BO/BR	3 BM/BO/BR	2 BC/BF/BM/BR	3 BM/BO/BR
3 BM/BO/BR	4 BM/BO/BR	2 ½ BM/BO/BR	4 BO/BR
33 BO/BR	5 BM/BO/BR	3 BM/BO/BR	5BM/BO/BR
4 BM/BO/BR	6 BM/BO/BR	4 BM/BO/BR	6BM/BO/BR
5 BM/BO/BR	8 BO/BR	5 BM/BO/BR	8BM/BO/BR
6 BM/BO/BR		6 BM/BO/BR	
8 BO/BR		8 BO/BR	

Port connections

Flanged		Threaded	
Code	**Description**	**Code**	**Description**
A	PN6	T	NPT
B	PN10	U	BSP (PL)
C	PN16		
F	ASME 125 lb		
H	ASME 300 lb		
J	ASME 150 lb		
K	ASME 600 lb		
L	JIS 10K		
P	JIS 5K		

Temperature and element characteristics

Code	Control temp.		Rated range				Max temp. cont.	
			Crack open		Full open			
	°C	°F	°C	°F	°C	°F	°C	°F
055	13	55	8	47	20	68	35	95
057	14	57	10	50	18	65	30	86
068	20	68	14	57	26	79	40	104
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	93	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
145	63	145	60	140	69	156	79	174
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
185	85	185	82	180	91	196	106	223
190	88	190	85	185	94	201	107	224
195	91	195	87	188	98	209	107	225
205	96	205	93	200	102	215	108	226
215	102	215	98	209	107	225	115	239
225	107	225	102	216	113	236	118	244
230	110	230	104	219	115	239	118	244
240	116	240	108	227	122	252	123	254

Element type and seal material

Code	Element type	Element construction	Seal material
01	1096X	Standard	Buna N/Nitrile
02	1096P	Nickel plated	Viton
03	1096X	Standard	Viton
05	6836S	Saltwater	Buna N/Nitrile
07	2433X	Standard manual override	Buna N/Nitrile
08	2433P	Nickel plated manual override	Viton
09	6938S	Saltwater manual override	Buna N/Nitrile
11	5566X	Short stroke, high overtemp.	Buna N/Nitrile
20	5566X	Short stroke, high overtemp.	Viton
44	1096X	Standard	Neoprene
45	1096P	Nickel plated	Neoprene
53	2433X	Standard manual override	Viton
66	48920X	Standard with SS cage & sliding valve	Buna N/Nitrile
67	49580X	Standard manual override with SS cage & sliding valve	Buna N/Nitrile
70	48920X	Standard with SS cage & sliding valve	Viton
71	49580X	Standard manual override with SS cage & sliding valve	Viton

How to Order

Use the table below to select the unique specification of your Model B Thermostatic Control Valve.

USA/Canada Example	3	BO	S	J	110	01	B			Code description	Comments
Europe/Asia-PAC Example	4	BR	C	F	095	07	-C	4	-AA		
										Valve size (A) - inches (mm)	
Valve size (A)	1 ½									1 ½" (40)	1 Element
	2									2" (50)	1 Element
	2 ½									2 ½" (65)	2 Elements
	3									3" (80)	2 Elements
	33									3" (80)	3 Elements
	4									4" (100)	4 Elements
	5									5" (125)	6 Elements
	6									6" (150)	9 Elements
	8									8" (200)	16 Elements
										Valve model (B)	
Valve model (B)		BC								Flanged "T" configuration	2"
		BF								Flanged "F" configuration	2" - 2 ½"
		BG								Screwed/Screw retained sleeves	1 ½" - 2"
		BH								Screwed high pressure	1 ½" - 2"
		BM								Manual override	1 ½" - 6" (USA/Canada ONLY)
		BO								Screwed connections	1 ½" - 2"
		BO								Flanged	2 ½" - 8"
		BR								Manual override	2" - 8" (Europe/Asia-PAC ONLY)
										Body material (C)	
Body material (C)			B							Bronze	Valve size ≠ 33
			C							Cast iron	All valve sizes
			D							Ductile iron	Valve size ≠ 1½, 33
			R							Stainless steel	Valve size = 1½, 2, 2 ½, 3, 4, 5, 6, 8
			S							Steel	Valve size = 1½ ,2, 2 ½, 3, 4, 5, 6, 8
										Port connection (D)	
Port connection (D)				*						For port connections available, refer to the port connections table on page 7.	
										Control temperature °F (E)	
Control temperature °F (E)					**					For temperatures available, refer to the temperature and element characteristics table on page 7.	
										Element and seal material (F)	
Element and seal material (F)						***				For element types and seal materials available, refer to the element type and seal material table on page 7.	
										Leakhole size (G) - inches (mm)	
Leakhole size (G)										None - Standard	USA/Canada ONLY
							0			None - Standard	Europe/Asia-PAC ONLY
							A			1/2" (13)	
							B			1/4" (6.5)	
							C			3/8" (9.5)	
							D			1/8" (3.2)	
							E			1/16" (1.6)	
							F			3/32" (2.4)	
							G			3/16" (5)	
							H			5/16" (8)	
										Leakhole quantity (H) ** Europe/Asia-PAC ONLY	
										Number of elements with a SINGLE (1) leakhole	
										Valve size = 1 ½" - 6"	**Valve size = 8"**
Leakhole quantity (H) **Europe/Asia-PAC ONLY								0		None	None
								1		1 (Max for 1 ½" & 2" valve sizes)	2
								2		2 (Max for 2 ½" & 3" valve sizes)	4
								3		3 (Max for 3" (33) valve size)	6
								4		4 (Max for 4" valve size)	8
								5		5	10
								6		6 (Max for 5 " valve size)	12
								7		7	14
								8		8	16 (Max for 8" valve size)
								9		9 (Max for 6" valve size)	None
										Customer special requirements (J)	
Customer special requirements (J)										Standard	USA/Canada ONLY
									-AA	Standard	Europe/Asia-PAC ONLY
									-***	Customer special code	

Maximum Working Pressures

Measurements in bar (psi)

Material	Valve size and model									
	1 ½ B	2 B	2 BG/BH	2 ½ B	3 B	33 B	4 B	5 B	6 B	8 B
Bronze	10 (150)	10 (150)	–	10 (150)	10 (150)	–	10 (150)	10 (150)	10 (150)	10 (150)
Cast iron	10 (150)	10 (150)	22 (320)	10 (150)	10 (150)	6 (87)	10 (150)	10 (150)	10 (150)	10 (150)
Ductile iron	–	16 (230)	–	16 (230)	16 (230)	–	16 (230)	10 (150)	10 (150)	10 (150)
Steel/Stainless steel	45 (655)	45 (655)	–	45 (655)	45 (655)	–	20 (290)	20 (290)	15 (218)	15 (218)

NOTE: Certain flange options will lower the maximum working pressure of the valve. e.g. Choosing PN6 flanges (Port connection (D) = A) will give 6 bar (87 psi) maximum working pressure.

Specification

		Metric units	English units
Flow rate		15 - 400 m^3/hr	68 - 1750 US gpm
Body materials	Bronze	Seawater, shock resistance and low magnetic permeability	
	Cast iron	Fresh water and lubricating oils	
	Ductile iron	High performance iron	
	Steel	High strength/pressure ratings	
	Stainless steel	Corrosive and special applications	
Seal materials	Buna N/Nitrile, Viton and Neoprene		
Mounting position	Any orientation		
Ports	Below nominal temperature	Ports A and B connected	
	Above nominal temperature	Ports A and C connected	
Port connections	Screwed	40 and 50 mm BSP (PL) or NPT	1 ½" and 2" BSP (PL) or NPT
	Flanged	50 - 200 mm DIN, ASME, JIS	2" - 8" DIN, ASME, JIS
Valve sizes (nominal bore)		40, 50, 65, 80, 100, 120, 150 and 200 mm	1 ½", 2", 2 ½", 3", 4", 5", 6" and 8"
Control temperatures		13 - 116 °C	55 - 240 °F
Accreditations available	PED	40 - 150 mm (1 ½" - 6") inclusive suitable for Group 1 & 2 liquids. 50 - 80 mm (2" - 3") with Port connection (D) = H (300 lb flanges) and 200 mm (8") suitable for Group 2 liquids only. (Ensure materials are compatible)	
	ATEX	Ex II 2G Ex h IIC T6...T3 Gb X	
	CE	Complies with all relevant EU directives	

Weights

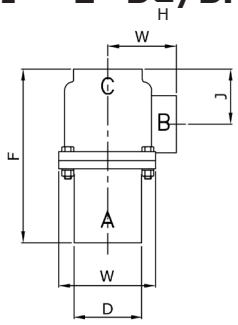
Approximate weights in kg (lbs)

Material	Valve size and model													
	1 ½ BG/BH	1 ½ BM	1 ½ BO	2 BC/BM/BR	2 BF	2 BG/BH	2 BO	2 ½ B	3 B	33 B	4 B	5 B	6 B	8 B
Bronze	-	13 (29)	13 (29)	26 (57)	22 (49)	-	13 (29)	29 (64)	36 (79)	-	68 (150)	109 (240)	136 (300)	315 (694)
Cast iron/Ductile iron	11 (24)	-	11 (24)	18 (40)	18 (40)	11 (24)	11 (24)	24 (53)	27 (59)	35 (77)	61 (134)	91 (201)	123 (271)	285 (628)
Steel/Stainless steel	-	-	13 (29)	20 (44)	22 (49)	-	13 (29)	34 (75)	36 (79)	-	61 (134)	92 (203)	137 (302)	371 (818)

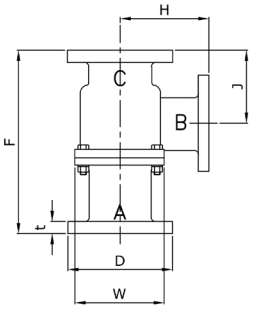
Valve Dimensions

Note: Contact AMOT for detailed outline drawings when required.

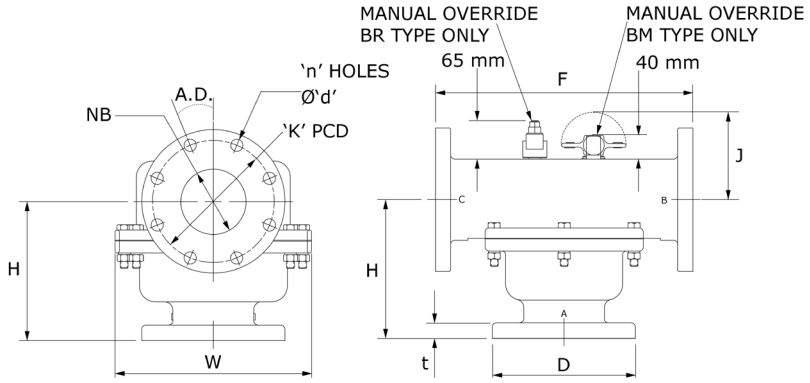
1 ½" - 2" BG/BH/BO



2" BF



2" BC/BM/BR



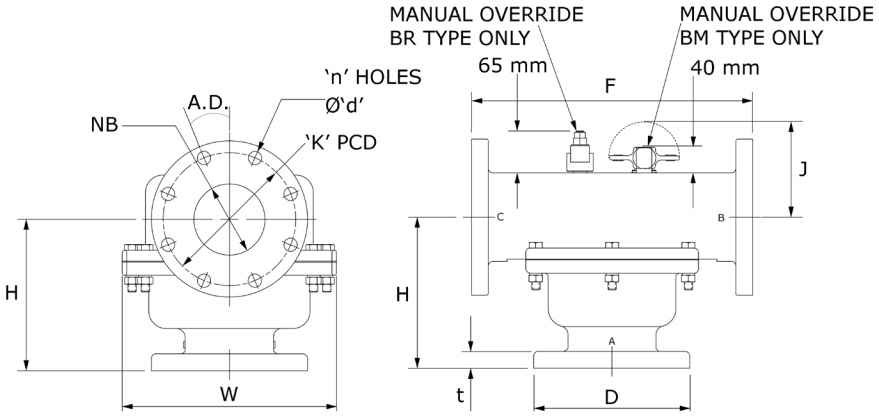
Dimensions - mm (inches)

Dimensions	Port connection (D)	Valve model							
		BG/BO	BH	BM	BC/BM/BR	BF	BFS/BFR	BG/BO	BH
		Nominal bore size - mm (inches)							
		40 (1 ½")			50 (2")				
F		246 (9.69")	271.5 (10.69")	197 (7.76")	225 (8.88")	270 (10.63")	271.5 (10.69")	246 (9.69")	271.5 (10.69")
H		90.5 (3.58")	101.6 (4.00")	149.2 (5.87")	149.2 (5.88")	112.7 (4.44")	115.9 (4.56")	90.5 (3.58")	101.6 (4.00")
J		96.8 (3.81")	103.2 (4.06")	116 (4.56")	149.2 (5.88")	120.7 (4.75")	123.8 (4.88")	96.8 (3.81")	103.2 (1.06")
D		82.6 (3.25")	90.6 (3.56")	128.6 (5.06")	165 (6.50")	165 (6.50")	152.4 (6.00")	82.6 (3.25")	90.6 (3.56")
W		139.7 (5.50")	146.1 (5.75")	139.7 (5.50")	139.7 (5.50")	139.7 (5.50")	139.7 (5.50")	139.7 (5.50")	146.1 (5.75")
NB		-	-	41.3 (1.63")	54 (2.13")	54 (2.13")	54 (2.13")	-	-
t		-	-	14.3 (0.56")	20 (0.79")	20 (0.79")	15.9 (0.63")	-	-
K	A	-	-	-	110 (4.33")	125 (4.92")	-	-	-
	B	-	-	-	125 (4.92")	125 (4.92")	-	-	-
	F/J	-	-	98.4 (3.87")	120.6 (4.75")	120.6 (4.75")	120.6 (4.75")	-	-
Ød	A	-	-	-	14 (0.55")	14 (0.55")	-	-	-
	B	-	-	-	18 (0.71")	18 (0.71")	-	-	-
	F/J	-	-	15.9 (0.63")	19.05 (0.75")	19.05 (0.75")	19.05 (0.75")	-	-
n	A	-	-	-	4	4	-	-	-
	B	-	-	-	4	4	-	-	-
	F/J	-	-	4	4	4	4	-	-
A.D.	A	-	-	-	45°	45°	-	-	-
	B	-	-	-	45°	45°	-	-	-
	F/J	-	-	45°	45°	45°	45°	-	-

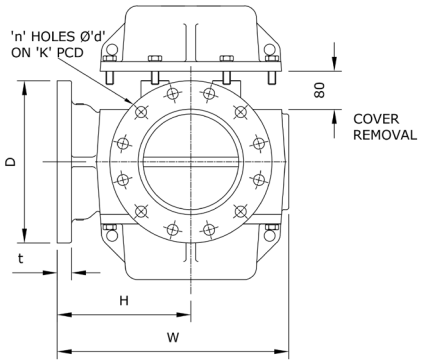
Valve Dimensions Continued

Note: Contact AMOT for detailed outline drawings when required.

2 ½" - 6" BO/BM/BR



8" BO/BR



Dimensions - mm (inches)

Dimensions	Port connection (D)	Valve model						
		BO/BM/BR	BO/BM/BR	33 BO/BR	BO/BM/BR	BO/BM/BR	BO/BM/BR	BO/BR
		Nominal bore size - mm (inches)						
		65 (2 ½")	80 (3")		100 (4")	125 (5")	150 (6")	200 (8")
F		254 (10.00")	267 (10.50")	267 (10.50")	403 (15.88")	489 (19.25")	489 (19.25")	840 (33.07")
H		163.5 (6.44")	169.8 (6.69")	170 (6.69")	215.9 (8.5")	239.7 (9.44")	252.44 (9.94")	280 (11.02")
J		141.3 (5.56")	141.3 (5.56")	141.3 (5.56")	130.2 (5.13")	127 (5.00") or 134 (5.28)#	114.5 (4.56") or 119.5 (4.70)#	315 (12.40") or 330.3 (13)#
D		185 (7.28")	200 (7.87")	200 (7.87")	224 (8.82")	254 (10.00")	285 (11.22")	340 (13.39")
W		209.6 (8.25")	209.6 (8.25")	245 (9.65")	308 (12.13")	349 (13.75")	482.6 (19.00") or 506.3 (19.93)#	485 (19.09") or 488 (19.21)#
NB		63.5 (2.50")	79.4 (3.13")	88 (3.47")	101.6 (4.00")	130.2 (5.13")	155.6 (6.13")	270 (10.63")
t		20 (0.79")	22 (0.87")	22 (0.87")	24 (0.95")	26 (1.02")	26 (1.02")	30 (1.18")
K	A	130 (5.12")	150 (5.91")	160 (6.30")	170 (6.69")	200 (7.87")	225 (8.86")	295 (11.61")
	B	145 (5.71")	160 (6.30")	160 (6.30")	180 (7.09")	210 (8.27")	240 (9.45")	295 (11.61")
	F/J	139.7 (5.50")	152.4 (6.00")	152.4 (6.00")	190.5 (7.50")	216 (8.50")	240 (9.45")	299 (11.77")
Ød	A	14 (0.55")	18 (0.71")	18 (0.71")	18 (0.71")	18 (0.71")	18 (0.71")	22 (0.87")
	B	18 (0.71")	18 (0.71")	18 (0.71")	18 (0.71")	18 (0.71")	23 (0.91")	22 (0.87")
	F/J	19.05 (0.75")	19.05 (0.75")	19.05 (0.75")	19.05 (0.75")	22.2 (0.87")	23 (0.91")	22 (0.87")
n	A	4	4	4	4	8	8	8
	B	4	8	8	8	8	8	8 or 12*
	F/J	4	4	4	8	8	8	8
A.D.	A	45°	45°	45°	45°	22.5°	22.5°	22.5°
	B	45°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5° or 18°*
	F/J	45°	45°	45°	22.5°	22.5°	22.5°	22.5°

* 8 holes on PN10 Flange, 12 holes on PN16 Flange
# Iron & bronze for first value; steel & stainless steel for second value

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 valve. At such time, AMOT Thermostatic Valves can be restored to original performance by installing an AMOT thermostatic valve service kit or a seal kit and new temperature element(s).

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

Service kits include all new thermostatic element(s), seals and gasket required for normal maintenance. Seal kits include new seals and gasket(s). Whenever element(s) are replaced, the seals and gasket(s) should also be replaced.

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.

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 element(s), seals and gasket required to service the valve. Order service kits using the AMOT valve part number and nominal temperature setting. 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.

AMOT does NOT offer service kits for 8BO or 8BR Model B Thermostatic Valves. In order to properly service an 8BO and/or 8BR valve please purchase an element and seal kit. Refer to the ordering instructions on page 12.

Service kit model number structure

1) Replace Body material (C) and Port connection (D) with **"KIT-"**.

2) If Special (J) is not blank, please contact the facility.

Example valve part number							
A	**B**	**C**	**D**	**E**	**F**	**G**	**J**
1 ½	BO	B	T	095	01	D	
Example service kit model number							
A	**B**	**C**	**D**	**E**	**F**	**G**	**J**
1 ½	BO	**KIT-**		095	01	D	

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

Ordering from Europe and Asia-PAC

Seal kits

Seal kits are available with seals and gasket(s) only. Order seal kits using the seal kit model number which is identified by the valve size and element/seal material code 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.

Element(s)

Order temperature elements using the element part number which is identified by the 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.

Maintenance and Service Parts Continued

Ordering from Europe and Asia-PAC continued

Seal kit model number structure

1) Identify the valve size and body material codes, located in the Valve size (A) and Body material (C) sections in the AMOT valve part number, respectively. Locate those values in Table 1 to identify the valve size code.

2) Identify the element/seal material code, located in the Element and seal material (F) section of the AMOT valve part number. Locate that value in Table 2 to identify the seal code.

3) Place first the valve size code then the seal code after the basic part number to complete the seal kit model number, as shown in Table 3.

Table 1 - Valve size code

Valve size code	Valve size (A)	Body material (C)
15	1 ½	ALL
20	2	ALL
25	2 ½	ALL
30	3	ALL
33	33[1]	ALL
40	4[2]	B/C/D
41	4[3]	R/S
50	5[2]	B/C/D
51	5[3]	R/S
60	6[2]	B/C/D
61	6[3]	R/S
80	8[2]	B/C/D
81	8[3]	R/S

Table 2 - Seal code

Seal code	Element/seal material (F)[4]
1	01, 05, 11
2	02, 03, 20
3	44, 45
4	07, 09
5	08, 53

Table 3 - Seal kit identification

	Basic part no.	Valve size code (Table 1)	Seal code (Table 2)
	46342X	15, 20, 25, 30, 33, 40, 41, 50, 51 60, 61, 80, 81	1, 2, 3, 4, 5
Examples			
Valve part number	**Seal kit model number**		
4BORJ15001-D4-AA	46342X	41	1
8BRCF09007-00-AA	46342X	80	4

Element part number structure

1) Identify the element/seal material code, located in the Element and seal material (F) section of the AMOT valve part number.

2) Identify the temperature, located in the Control temperature °F (E) section of the AMOT valve part number.

3) Use those 2 codes to identify the element part number, as shown in Table 4.

Table 4 - Element part number identification

				Temperature °F (E)	Element/seal material (F)[4]				Element part number	Qty.
				055-240	01, 03, 44				1096X(Temp.)	Refer to the Comments on the Valve size (A) section of the How to Order table on page 8.
					02, 45				1096P(Temp.)	
					07, 53				2433X(Temp.)	
					08				2433P(Temp.)	
					11, 20				5566X(Temp.)	
					05				6836S(Temp.)	
					09				6938S(Temp.)	
Examples										
Valve part number									**Element part number**	**Qty.**
4	BO	R	J	150	01	-D	4	-AA	1096X150	4
8	BR	C	F	090	07	-0	0	-AA	2433X090	16

NOTES:

[1] 3" valve with 3 elements.

[2] All body materials except Steel, and stainless steel.

[3] Steel, and stainless steel body materials ONLY.

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

Maintenance and Service Parts Continued

Service parts *(refer to diagrams below and on page 14)*

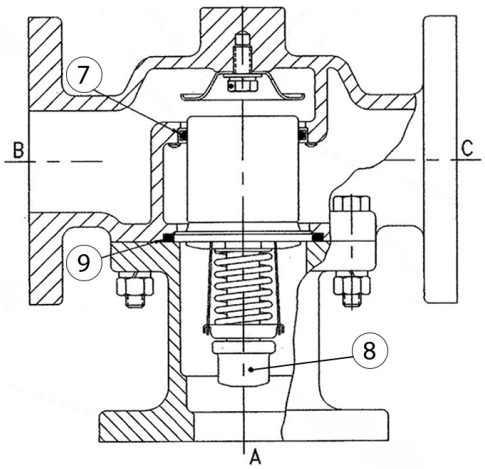
Service kit parts									
Ref no.	Valve size (inches)								Description
	1 ½	2	2 ½	3	3[1]	4	5	6	
	Qty.								
7	1	1	2	2	3	4	6	9	Element seal
8	1	1	2	2	3	4	6	9	Element
9	1	1	2	2	3	4	6	9	Housing seal
9	-	-	-	-	1	1	1	1	Housing gasket
17	1	1	2	2	3	4	6	9	Stem seal

Seal kit parts										
Ref no.	Valve size (inches)									Description
	1 ½	2	2 ½	3	3[1]	4	5	6	8	
	Qty.									
6	-	-	-	-	-	-	-	-	4	Port seal
7	1	1	2	2	3	4	6	9	16	Element seal
9	1	1	2	2	3	4	6	9	16	Housing seal
9	1	1	1	1	1	1	1	1	2	Housing gasket
17	1	1	2	2	3	4	6	9	16	Stem seal

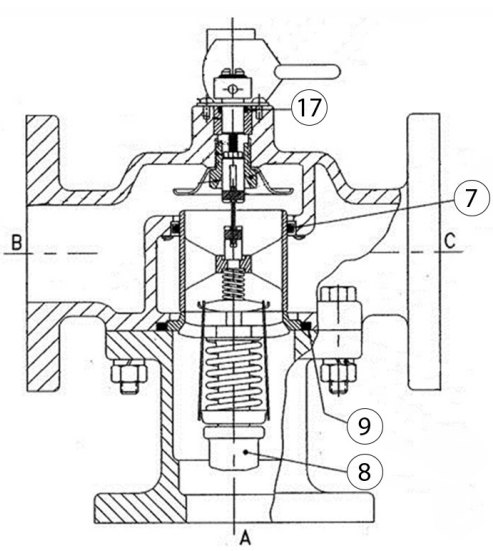
NOTES:

[1] 3" valve with 3 elements.

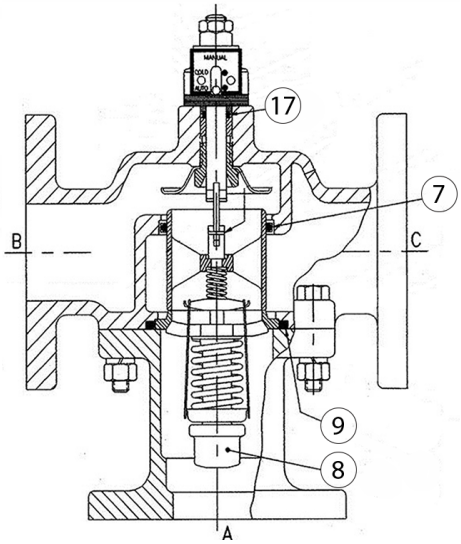
2" BC



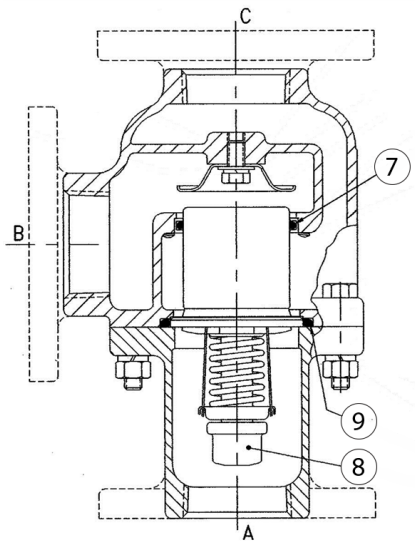
1 ½" & 2" BM



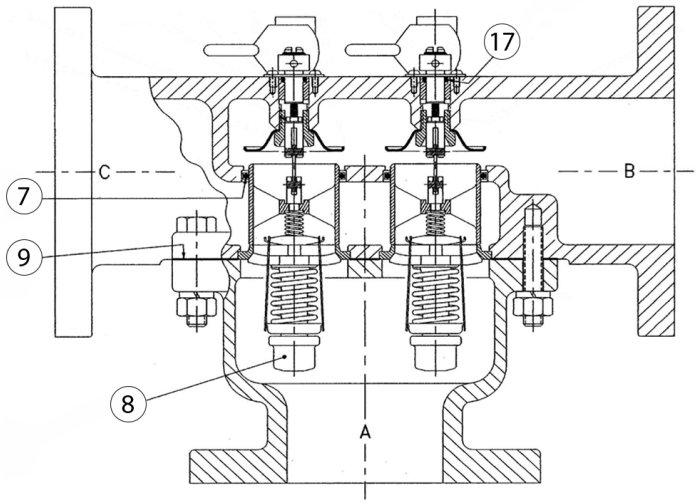
1 ½" & 2" BR



2" BF
1 ½" & 2" BG, BH, BO



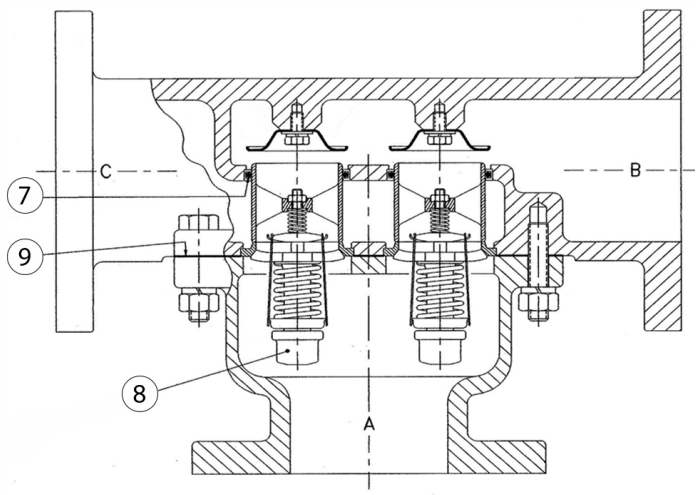
2 ½" - 6" BM



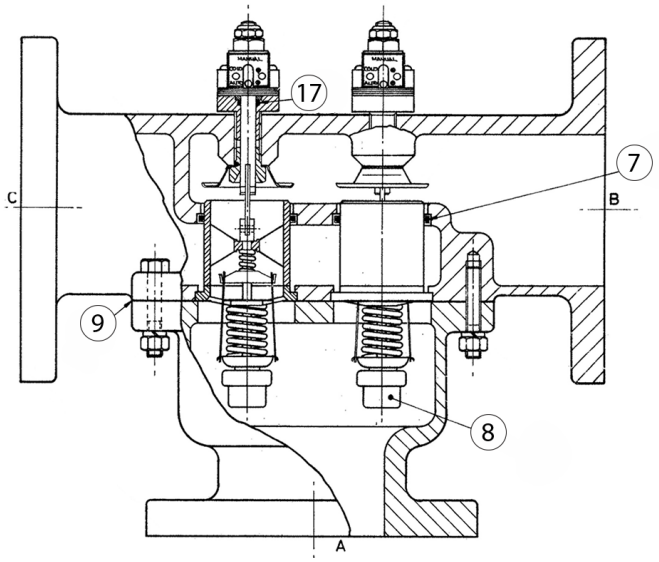
Maintenance and Service Parts Continued

Service parts continued

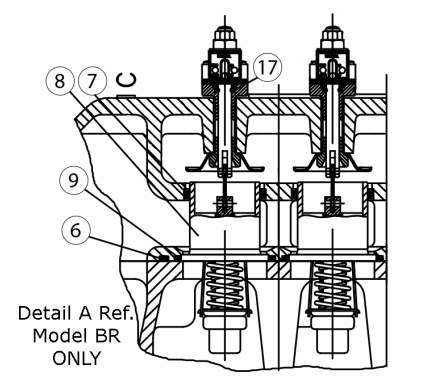
2 ½" - 6" BO
(except for 5B/6B Steel & SS)



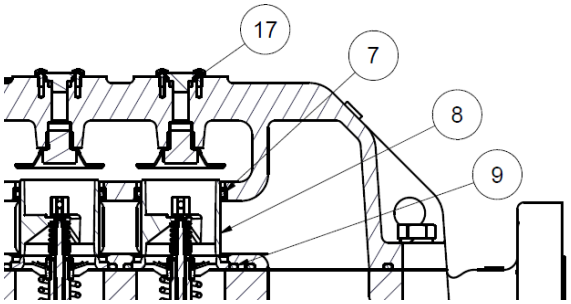
2 ½" - 6" BR

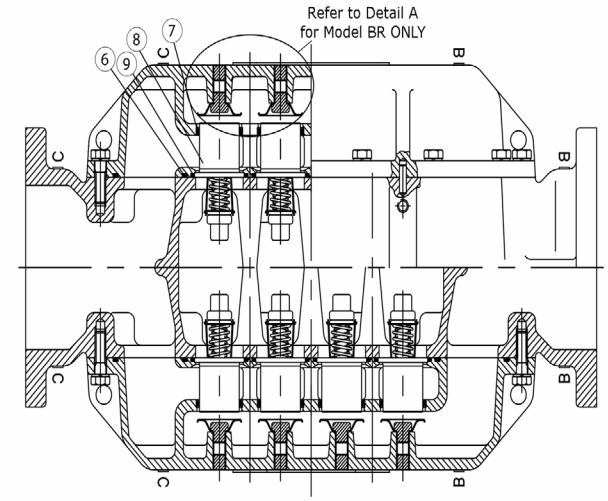


8" BO (all other material)/8BR

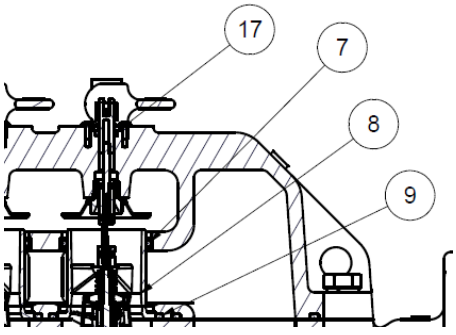


5", 6", 8" BO (steel & ss)





8" BM (steel & ss)



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⚠ WARNING
This product can expose you to chemicals including Lead, which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

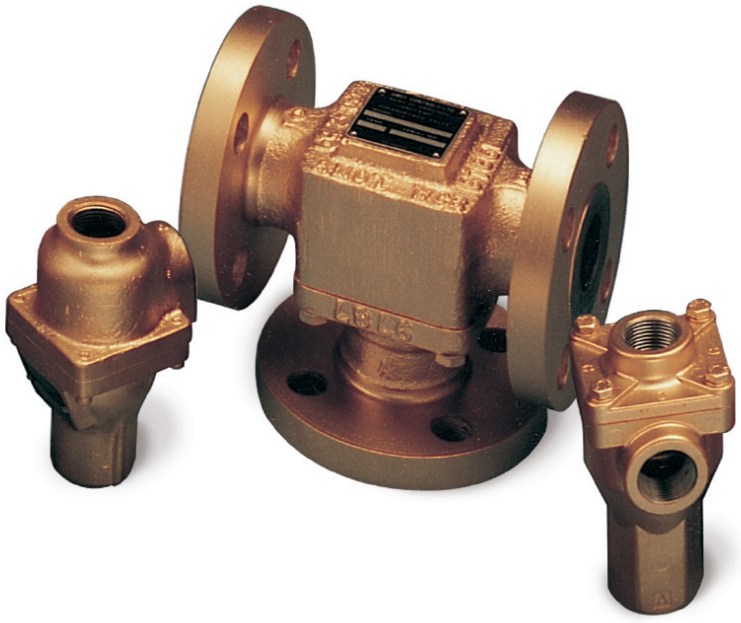
www.amot.com

03V

12/09

Thermostatic Control Valve

C Valve



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

Key benefits

- No external power source required - simple low cost installation
- No user settings 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

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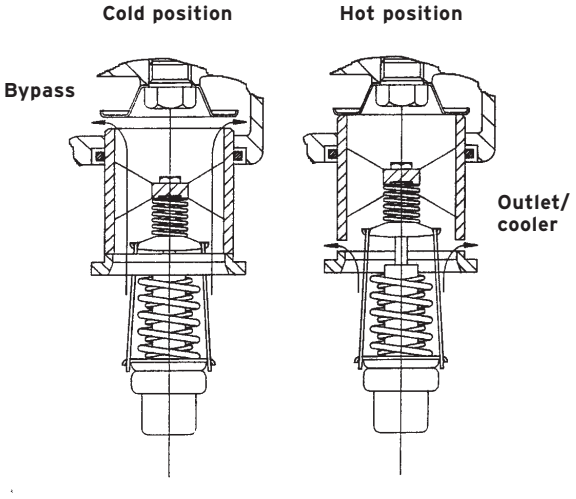
Operation



Note: Typical for sliding valve type elements

The temperature control power is created by the expansion of a wax/copper mixture which is highly sensitive to temperature changes.

Large forces are created by the warming/expansion of the mixture which in turn acts upon the sliding valve, thus regulating the flow.

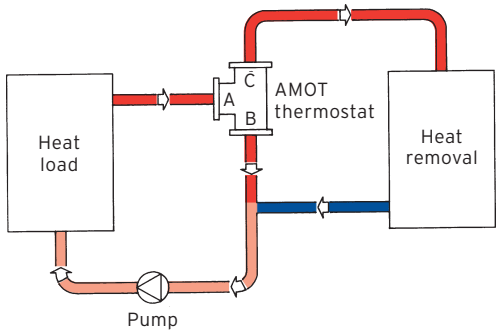
The diagram opposite shows the valve actuation in diverting mode at start and cooling positions.

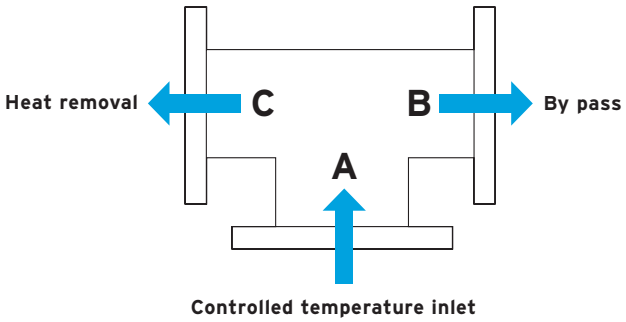
During operation the sliding valve constantly modulates for accurate temperature control.

The reliable rugged construction provides a unit sensitive to temperature variations, not easily disturbed by pressure changes and sudden surges and maintains stable temperatures over a wide range of operating conditions.

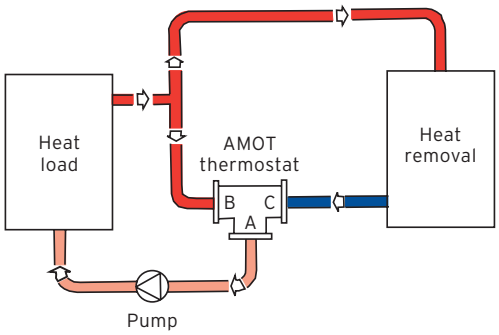
Applications

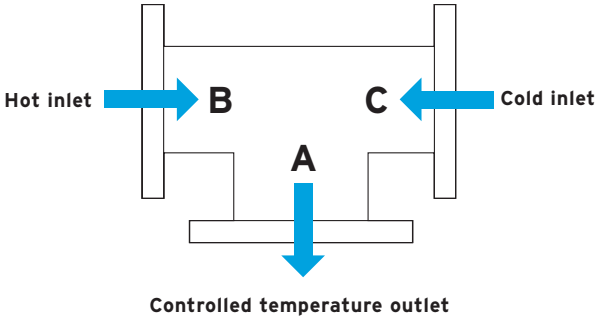
Diverting applications



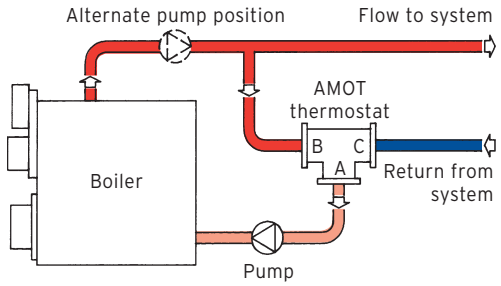


Mixing applications

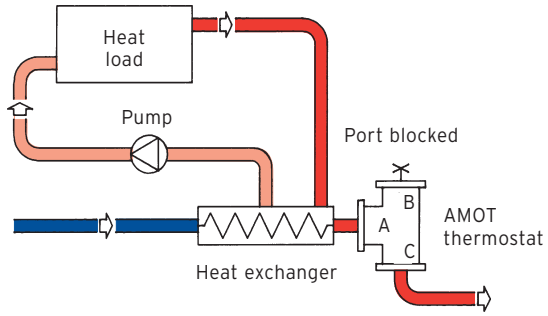




Boiler return applications



Water saving applications



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

Specification

Flow rate	2 – 14m³/hr	
Body materials	Aluminium (BS: 1490 LM25TF)	For light weight
	Bronze (BS: 1400 LG2)	For seawater, shock resistance and low magnetic permeability
	Cast iron (BS: 1452 250)	For fresh water and lubricating oils
	Ductile iron (BS: 2789 420/12)	High performance iron
	Steel (BS: 3100 A1)	For high strength/pressure ratings
	Stainless steel (BS: 3100 316C16F)	Corrosive and special applications
Seal materials	Nitrile	
	Viton	
	Neoprene	
	Ethylene, propylene rubber	
Mounting position	Any orientation	
Ports	Below nominal temperature	Ports A and B connected
	Above nominal temperature	Ports A and C connected
Port connections	Screwed	15, 20, 25, 32 & 40mm (½", ¾", 1", 1¼" & 1½")
	Flanged	40mm (1½")
Valve sizes (nominal bore)	15, 20, 25, 32 & 40mm (½", ¾", 1", 1¼" & 1½")	
Recommended pressure drop	0.14 to 0.5 bar (2 to 7 PSI)	
Control temperatures	18 – 113ºC	See element characteristics table

Accreditations

PED	Suitable for Group 1 & 2 liquids. (Ensure materials are compatible.)
ATEX	Ex 11 2 G X
CE	Complies with all relevant EU directives.

Temperature settings

A wide selection of temperatures are available. Follow the equipment manufacturers' guidelines for oil systems and for specific operating temperatures of cooling/heating systems.

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 their maximum continuous rating. If this condition is anticipated then consult AMOT for suitable alternatives.

For mixing and oil circuits the temperature may be 1 to 2ºC higher due to flow, viscosity and other system parameters.

Leakholes

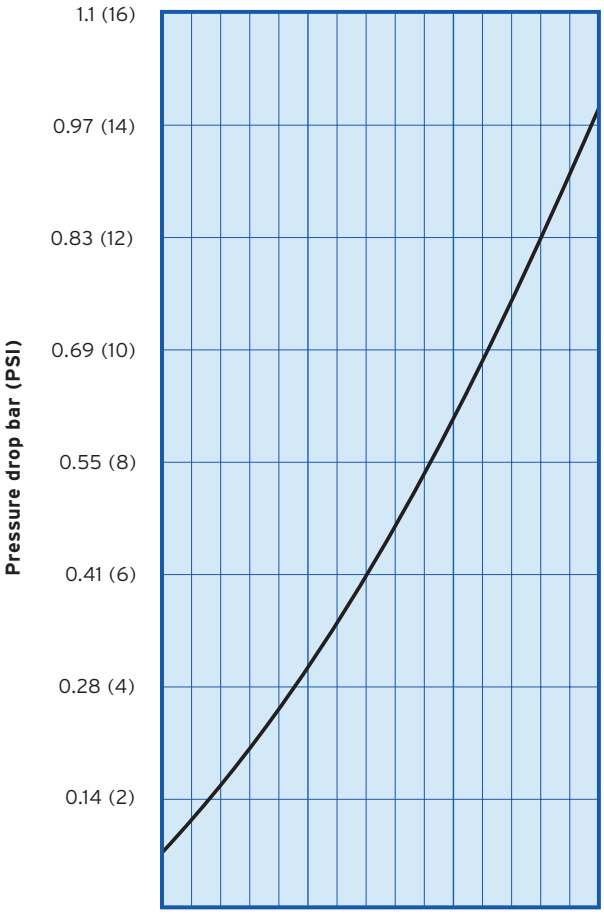
Leakholes can be drilled to allow fluid between ports A and C:

1. To allow small flows to cooler during start up which slows down warm up cycle.
2. To allow small flows to maintain some flow through cooler in order to prevent condensation or, in extreme cases, freezing. In applications where additives are not or cannot be used.

In applications where a valve is used as 2-way, with port 'B' blocked and when the circuit is cold and the valve closed, a leakhole is necessary to ensure small flow in order to detect a temperature change in the system.

Valve characteristics

Pressure drop



Size	♦	♦	♦	♦
½ CM	1.5	3	4.5	6
¾ CM	2	4	6	8
1 CM	2.2	4.4	6.6	8.8
1¼ CM	2.5	5	7.5	10
1½ CM	2.5	5	7.5	10
1¼ CCM	4.4	9	13.3	17.7
1½ CF	2.5	5	7.5	10

Flowrate m^3/hr - water

AMOT thermostatic valves are designed to produce minimal pressure drop.

The normal recommendation in sizing AMOT thermostatic valves is to select a pressure drop between 0.14 to 0.5 bar (2 and 7 PSI).

Flow coefficient

AMOT valve flow coefficient (calculated)		
Size	**Kv**	**Cv**
1/2 CM	6.1	7
3/4 CM	8.2	9.5
1 CM	9	10.4
1 1/4 CM	9.5	11
1 1/2 CM	9.5	11
1 1/4 CCM	17.7	20.5
1 1/2 CF	9.5	11

A Cv is the valve's flow coefficient (Kv is the metric coefficient). It is defined as the number of US gallons per minute of room temperature water which will flow through the valve with a pressure drop of 1 PSI across the valve (see table).

Maximum working pressures

Measurements in bar (PSI)

Material	Pressure
Cast iron, ductile iron and bronze body	10 bar (150 PSI)
Aluminium body	24 bar (350 PSI)
Steel/stainless steel body	48 bar (700 PSI)

Flanged versions

Material	Pressure
Cast iron and bronze body	10 bar (150 PSI)
Steel/stainless steel body (150 ANSI flanges)	16 bar (230 PSI)
Steel/stainless steel body (300 ANSI flanges)	45 bar (655 PSI)

Weight

Weights in KG

Material	1 1/2CM, 3/4CM, 1CM	3/4CMA, 1CMA	3/4CMS, 1CMS	1 1/4 & 1 1/2	1 1/4 CCM	1 1/2 CF*F	1 1/2 CF*J	1 1/2 CF*H
Bronze	2	-	-	3	-	11	-	-
Cast iron	2	-	-	3	4.3	11	-	-
Ductile iron	2	-	-	3	-	-	-	-
Stainless steel	-	-	-	-	-	-	9	13.5
Steel	-	-	3.6	-	-	-	9	13.5
Aluminium	-	1.2	-	-	-	-	-	-

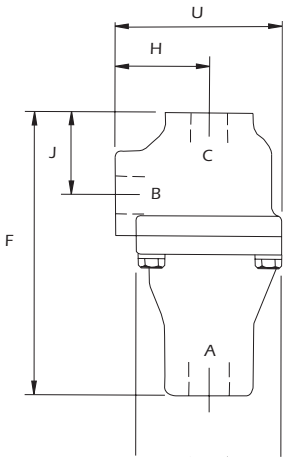
Element characteristics

All temperatures in ºC (ºF)

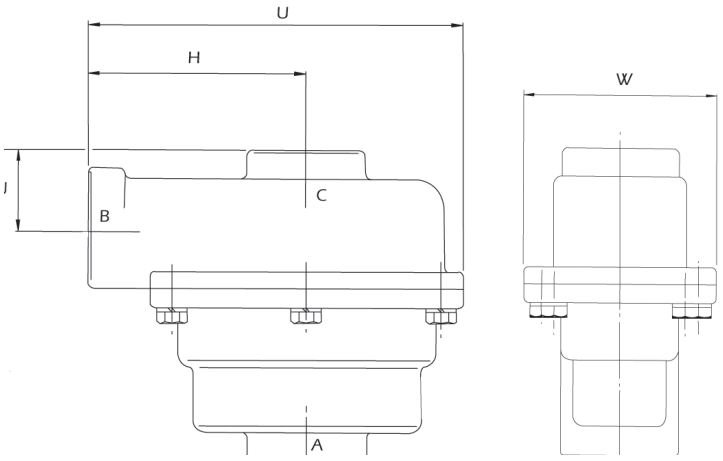
Control temperature	Rated range	Max temperature continuous	Code
18 (65)	15-25 (59-77)	47 (116)	065
23 (75)	20-29 (68-85)	60 (140)	075
30 (85)	24-34 (75-93)	63 (145)	085
35 (95)	30-40 (86-104)	73 (163)	095
38 (100)	33-42 (91-108)	61 (143)	100
43 (110)	38-47 (100-117)	82 (180)	110
49 (120)	43-55 (110-131)	86 (187)	120
54 (130)	49-60 (120-140)	95 (203)	130
60 (140)	54-65 (130-150)	95 (203)	140
65 (150)	60-71 (140-160)	100 (212)	150
71 (160)	65-76 (150-170)	100 (212)	160
76 (170)	72-82 (163-180)	100 (212)	170
80 (175)	76-85 (170-185)	105 (221)	175
82 (180)	79-88 (175-190)	110 (230)	180
87 (190)	85-93 (185-200)	110 (230)	190
93 (200)	90-100 (194-212)	110 (230)	200
96 (205)	93-103 (200-218)	110 (230)	205
101 (215)	96-107 (205-225)	115 (239)	215
107 (225)	101-114 (214-237)	120 (248)	225
113 (235)	107-122 (225-253)	124 (257)	235

Valve dimensions

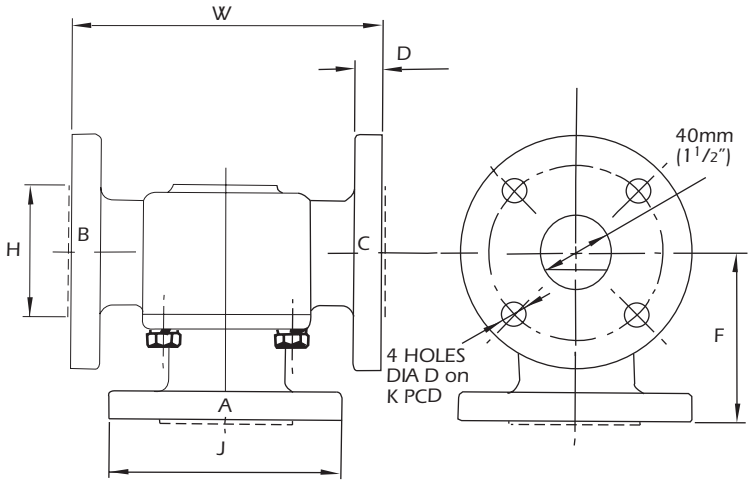
Model CM



Model 1¼ CCM



Model 1½ CF



Dimension (mm)	½CM, ¾CM, 1CM	¾CMA, 1CMA	¾ CMS, 1 CMS	1¼ & 1½ CM	1¼ CCM	1½ CF*F	1½ CF*J	1½ CF*H
H	50.8	54	53.9	73	111	73	73	73
J	44.5	54	54	38.1	39.7	150	127	155.6
F	152.4	160.3	160.3	158.8	155.6	100.8	100.8	120.6
U	90.5	95.3	96.8	115.9	190.5	18	18	20.5
W	79.4	82.6	85.7	85.7	98.4	177.8	177.8	203.2

Flange sizing (mm)

Flange	D	K
ANSI 125 lb	16	98.43
ANSI 150 lb	16	98.43
ANSI 300 lb	22	114.3

Specification check list

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

Please select one characteristic from each section. Each characteristic is associated with a code that you will need to state when ordering.

Valve size mm (inches)	Code	✔
15 (1/2")	1/2	
20 (3/4")	3/4	
25 (1")	1	
32 (1 1/4")	1 1/4	
40 (1 1/2")	1 1/2	

Type	Code	✔
Single element	CM	
Dual element (1 1/4" size cast iron only)	CCM	
Flanged (1 1/2" only)	CF	

Housing material	Code	✔
Bronze (CM and CF)	B	
Cast iron (CM, CCM and CF)	C	
Ductile iron (CM only)	D	
Aluminium (CM, 3/4" and 1" only)	A	
Steel (3/4" and 1" CM, 1 1/2" CF only)	S	
Stainless steel (3/4" and 1" CM, 1 1/2" CF only)	R	

Port connection	Code	✔
Flanged ANSI 125lb	F	
Flanged ANSI 150lb (steel and stainless steel only)	J	
Flanged ANSI 300lb (steel and stainless steel only)	H	
Threaded NPT to USAS B2.1	T	
Threaded BSP (PL) to BS 21	U	
Threaded BSP (TR) Japanese (JIS)	V	
Threaded to SAE J514H (straight thread, O-ring seal)	W	
Threaded BSP (PL), boss faced DIN 3852 form X (bronze, cast iron and ductile iron only)	R	

Control temperature	Code
See element characteristic table (page vi). Model code located in last column	

Element	Plating	Seals	Code	✔
1125X	-	Nitrile	01	
1125P	Nickel	Viton	02	
3362E	Nickel	EPR	04	
1125X	-	Viton	06	
9778C High over-temperature	Electroless nickel	Neoprene	82	
44844X Saltwater	-	Viton	86	
3362U	-	Neoprene	99	

Leakhole sizes mm (inches)	Code	✔
None	0	
0.8 (1/32")	B	
1.6 (1/16")	C	
2.4 (3/32")	D	
3.2 (1/8")	F	
6.3 (1/4")	G	
5 (3/16")	H	

Leakhole quantity (no. of elements with leak hole, maximum 1 per element)	Code	✔
None	0	
1 (all except CCM)	1	
2 (CCM only)	2	

Special requirements	Code	✔
Standard	AA	
Please contact us with any special requirements Notes		

Once you have made your selection, or if you need advice, please call us on:

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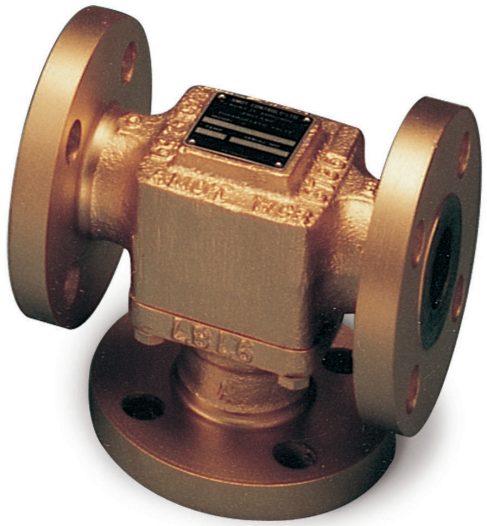
Thermostatic Control Valve

Model E

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 E

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 0.3 - 17 m^3/hr (1.3 - 75 US gpm)
- Combinations available:
  - Housings in cast iron, bronze, carbon steel, stainless steel
- DN15 to DN40 pipe sizes
- Threaded and flanged connections
- Tamper-proof temperature settings from 29°C - 114°C (85°F - 237°F)
- Pressure ratings up to 68 bar (986 psi)

Accreditations available

- PED — Suitable for Group 1 & 2 liquids (Ensure materials are compatible)
- ATEX — Ex II 2G TX X
- CE — Complies with all relevant EU directives

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Overview

AMOT Model E 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 model E valves may be used for diverting, mixing or 2-way water saving limiting valves to prevent scalding in hot water supply systems; such as in emergency water systems for labs. Radiant heating systems can use these valves in limiting water temperature to prevent surface cracking and over-heating of plastic piping. Other applications include electronic and battery cooling circuits, pump temperature relief valves etc.

Housing materials

- Cast iron
- Bronze
- Carbon steel
- Stainless steel

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 1.6 mm - 6.3 mm (1/16" - 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 29°C - 114°C (85°F - 237°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.

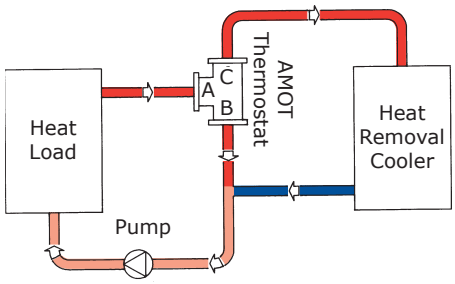
Manual override

If desired, AMOT Model E thermostatic valves can be supplied with a manual override which allows the user to direct flows through Ports A and C.

Applications

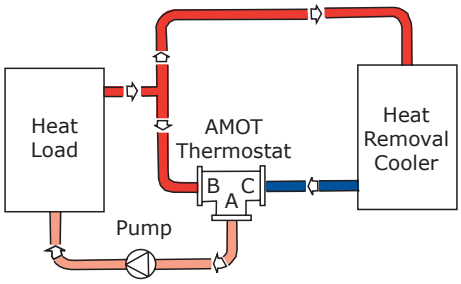
Diverting Applications

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.



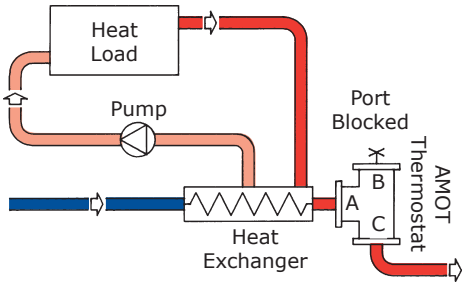
Mixing Applications

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.



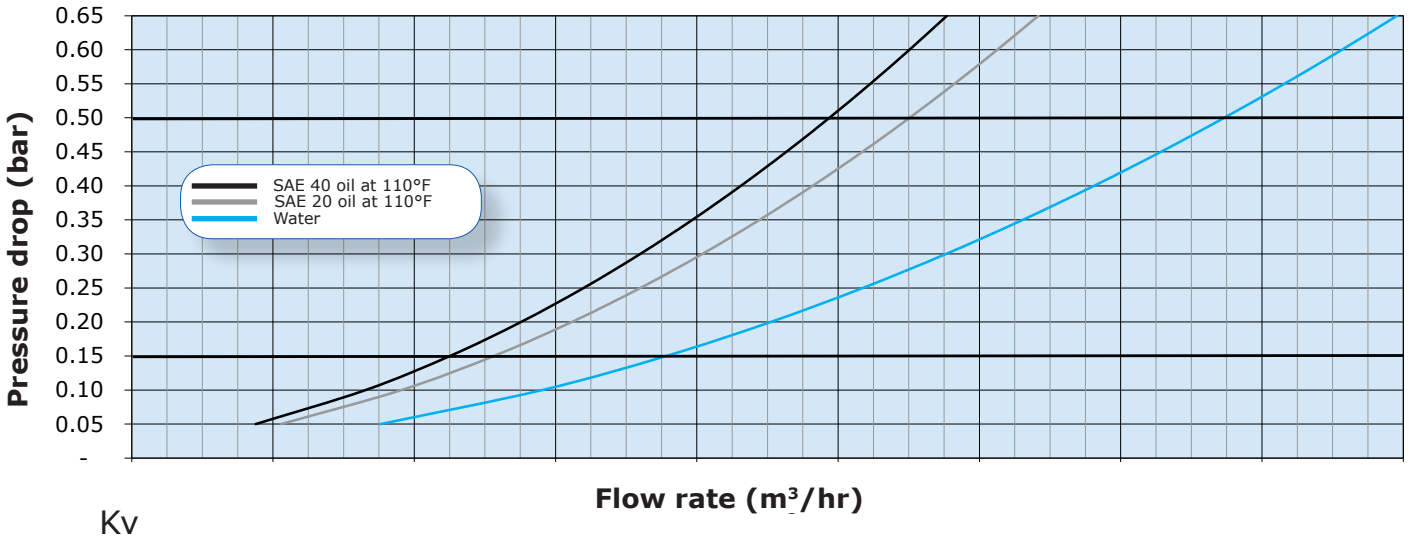
2-Way Water Saving Applications

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)

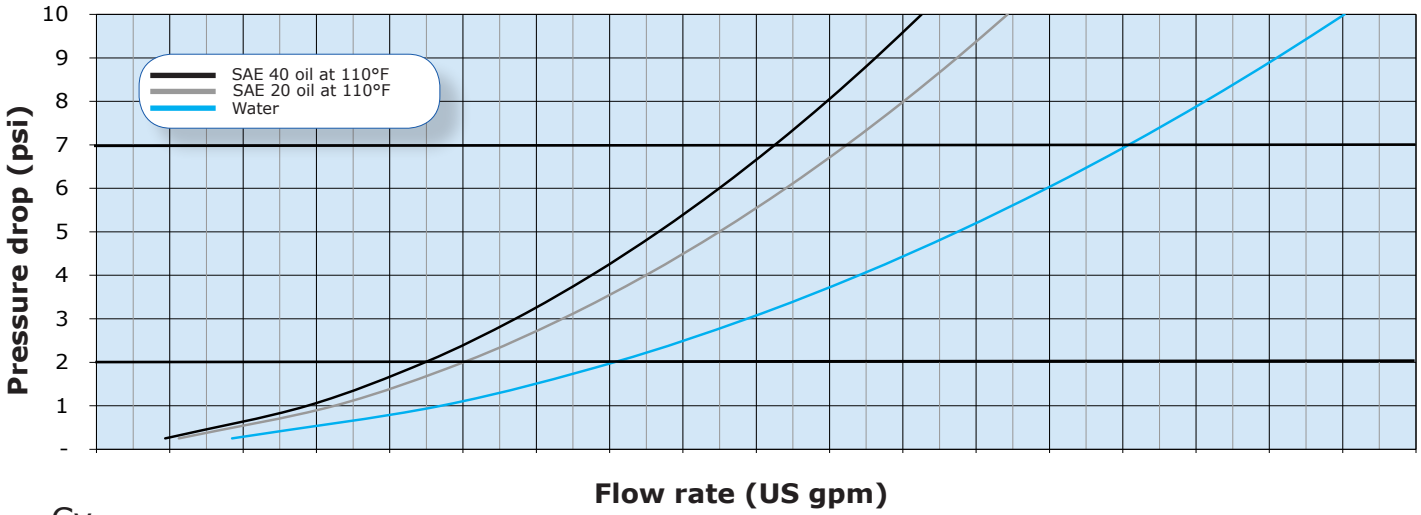


Kv									
0.8	0.14	0.2	0.26	0.33	0.4	0.46	0.52	0.58	0.65
1.6	0.28	0.4	0.52	0.65	0.78	0.9	1.0	1.2	1.3
3	0.52	0.7	1.0	1.2	1.5	1.7	1.9	2.2	2.4
4	0.69	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.2
6	1.0	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.8
8.7	1.5	2.1	2.8	3.5	4.3	5.0	5.6	6.3	7.0
11.5	2.0	2.8	3.7	4.7	5.6	6.6	7.5	8.4	9.3
15	2.6	3.7	4.9	6.1	7.3	8.6	9.7	11.0	12
24.7	4	6	8	10	12	14	16	18	20

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 - 0.5 bar (2 - 7 psi).

Valve Characteristics Continued

Pressure drop (English units)



Cv																	
0.92	0.4	0.5	0.7	0.8	1.0	1.1	1.3	1.5	1.6	1.8	2.0	2.1	2.3	2.4	2.6	2.75	2.9
1.85	0.8	1.0	1.4	1.7	1.9	2.3	2.6	2.9	3.3	3.6	3.9	4.2	4.5	4.9	5.2	5.5	5.8
3.5	1.6	1.9	2.6	3.1	3.6	4.2	4.8	5.5	6.1	6.7	7.3	7.9	8.5	9.1	9.7	10.3	11.0
4.7	2.1	2.5	3.4	4.1	4.8	5.7	6.5	7.3	8.1	9.0	9.8	10.5	11.3	12.1	13.0	13.8	14.6
7	3.1	3.8	5.1	6.2	7.2	8.5	9.7	11.0	12.2	13.4	14.6	15.8	17.0	18.2	19.4	20.6	22.0
10	4.5	5.5	7.5	9.0	10.5	12.3	14.0	15.9	17.7	19.5	21.2	23.0	24.6	26.4	28.2	30.0	31.8
13.3	5.9	7.3	9.9	11.9	13.9	16.3	18.6	21.0	23.4	25.7	28.0	30.3	32.6	35.0	37.3	39.6	42.0
17.4	7.8	9.5	12.9	15.5	18.2	21.2	24.2	27.4	30.5	33.6	36.6	39.5	42.5	45.6	48.6	51.6	54.8
28.5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90

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 - 0.5 bar (2 - 7 psi).

Flow coefficient

Flow coefficient (calculated)		
Size	**Kv**	**Cv**
1/2 E	0.8	0.92
	1.6	1.85
	3	3.5
	4	4.7
3/4 E	0.8	0.92
	1.6	1.85
	3	3.5
	6	7
	8.7	10
1 E	0.8	0.92
	1.6	1.85
	3	3.5
	6	7
	11.5	13.3
	15	17.4
1 ¼ E	24.7	28.5
1 ½ E	24.7	28.5

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 (m^3/hr) of water at a temperature of 16º Celsius with a pressure drop across the valve of 1 bar. The basic formula to find a valve's Kv is shown below:

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

Q = Flow in m^3/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 60º Fahrenheit with a pressure drop across the valve of 1 psi. The basic formula to find a valve's Cv is shown below:

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

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

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)

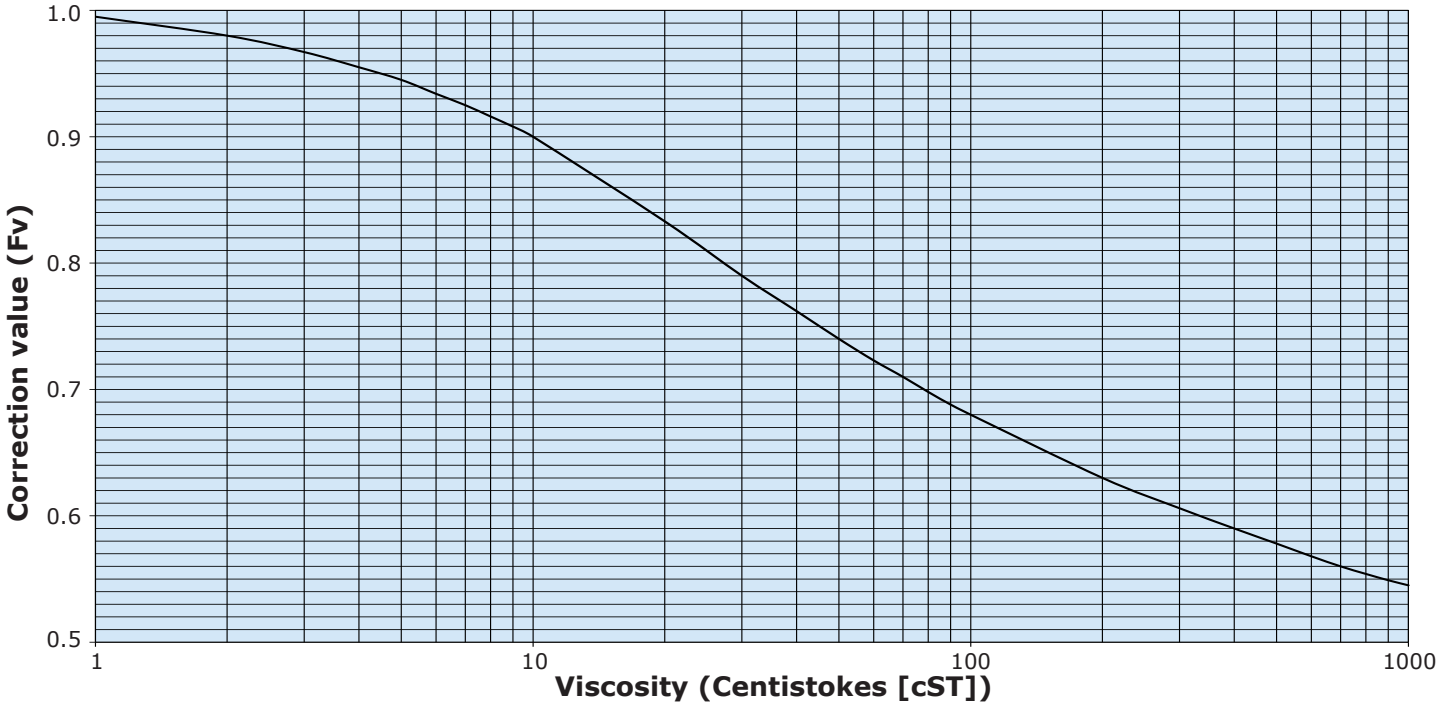
- Viscosity correction

  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.

Valve Characteristics Continued

Available versions

Cast iron	Bronze	Steel	Stainless steel
Threaded	**Threaded**	**Threaded**	**Threaded**
1 ¼ EL	1 ½ EO	NONE	NONE
1 ½ EL	**Flanged**		
1 ½ EM	1 ½ EF	**Flanged**	**Flanged**
1 ½ EO	1 ½ EM	1/2 EF	1/2 EF
Flanged		1/2 EM	1/2 EM
1 ¼ EF		3/4 EF	3/4 EF
1 ½ EF		3/4 EM	3/4 EM
1 ½ EM		1 EF	1 EF
		1 EM	1 EM
		1 ½ EF	1 ½ EF
		1 ½ EM	1 ½ EM

Temperature and element characteristics

Code	Control temp.		Rated range				Max temp. cont.	
			Crack open		Full open			
	°C	°F	°C	°F	°C	°F	°C	°F
085	29	85	26	79	33	93	65	149
095	35	95	30	86	40	104	50	122
100	38	100	33	91	42	108	75	167
110	43	110	38	100	47	117	82	180
120	49	120	44	112	55	131	88	191
130	54	130	49	120	60	140	95	203
140	60	140	54	130	66	151	99	210
150	66	150	60	140	71	160	104	219
160	71	160	66	150	77	170	110	230
170	77	170	72	163	82	180	115	239
175	79	175	77	170	85	185	115	239
180	82	180	79	175	87	190	118	245
190	87	190	85	185	93	200	118	245
205	96	205	93	200	103	218	110	230
235	114	237	107	225	123	253	123	254

Element type and seal material

Code	Valve model	Element type	Element construction	Seal material
01	EF/EL/EO	5435X	Standard	Buna N/Nitrile
02	EF/EL/EO	5435P	Nickel plated	Viton
03	EF/EL/EO	5435X	Standard	Viton
04	EF/EL/EO	5435P	Nickel plated	Buna N/Nitrile
05	EF/EL/EO	5435X	Standard	Neoprene
07	EM	9831X	MO standard	Buna N/Nitrile
	EMRK/EMSK	10912X		
08	EM	9831P	MO nickel plated	Viton
	EMRK/EMSK	10912P		
09	EF/EL/EO	5435P	Nickel plated	Neoprene
11	EM	9831X	MO standard	Viton
	EMRK/EMSK	10912X		
14	EM	9831X	MO standard	Neoprene
	EMRK/EMSK	10912X		

How to Order

Use the table below to select the unique specification of your Model E Thermostatic Control Valve.
See next page for 1/2", 3/4", and 1" sizes.

USA/Canada Example	1 ½	EM	R	J	095	14			**Code description**	**Comments**
Europe/Asia-PAC Example	1 ½	EL	C	W	120	03	-0	-AA		
									Valve size (A) - inches (mm)	
Valve size (A)	1 ¼								1 ¼" (32)	
	1 ½								1 ½" (40)	
									Valve model (B)	
Valve model (B)		EF							Flanged	
		EL							Threaded	
		EM							Flanged w/ manual override	1 ½" ONLY
		EO							Threaded	
									Body material (C)	
Body material (C)			B						Bronze	EF, EM and EO ONLY
			C						Cast iron	ALL
			R						Stainless steel	EF and EM ONLY
			S						Carbon steel	
									Port connection (D)	
Port connection (D)				A					PN6	
				B					PN10	
				C					PN16	
				F					ASME 125 lb	Cast iron & bronze ONLY
				H					ASME 300 lb	Steel & stainless steel ONLY
				J					ASME 150 lb	
				K					ASME 600 lb	
				T					NPT to ANSI B2.1	
				U					BSP (PL) to BS 21	
				V					BSP (TR) Japanese (JIS)	
				W					SAE J5 14H	Straight thread, o-ring seal
									Control temperature °F (E)	
Control temperature °F (E)					*				For temperatures available, refer to the temperature and element characteristics table on page 9.	
									Element and seal material (F)	
Element and seal material (F)						**			For element and seal materials available, refer to the element type and seal material table on page 9.	
									Leakhole size (G) - inches (mm)	
Leakhole size (G)									None - Standard	USA/Canada ONLY
							0		None - Standard	Europe/Asia-PAC ONLY
							A		1/8" (3.2)	
							B		1/4" (6.3)	
							C		3/16" (5)	
							D		1/16" (1.6)	
									Customer special requirements (H)	
Customer special requirements (H)									Standard	USA/Canada ONLY
								-AA	Standard	Europe/Asia-PAC ONLY
								-***	Customer special code	

Example Code	½	EF	S	J	120	03	-0	-1	-AA	Code Description
										Valve size (A)
Valve size (A)	1/2									1/2 inch (DN15)
	3/4									3/4 inch (DN20)
	1									1 inch (DN25)
										Valve model (B)
Valve model (B)		EF								Flanged Connections
		EM								Flanged Connections w/ manual override (MO)
										Body material (C)
Body material (C)			S							Steel
			R							Stainless Steel
										Port connection (D)
Port connection (D)				B						EN 1092 PN10
				C						EN 1092 PN16
				H						ASME 300 lb 3/4" and 1" only
				J						ASME 150 lb
				4						EN 1092 PN40 3/4' and 1" only
										Control temperature °F (E)
Control temperature °F (E)					***					For temperatures available, refer to the temperature and element characteristics table on page 9.
										Element and seal material (F)
Element and seal material (F)						**				For element and seal materials available, refer to the element type and seal material table on page 9.
										Leakhole size (G)
Leakhole size (G)							0			None
							A			1/8" Dia.
							B			1/4" Dia.
							C			3/16" Dia.
							D			1/16" Dia.
										Kv, Flow coefficient (Cv)
Kv, Flow coefficient (Cv)								1		0.8 (0.92)
								2		1.6 (1.85)
								3		3 (3.5)
								4		4 (4.7) - 1/2" valve only
								5		6 (7) - 3/4" and 1 " valve only
								6		8.7 (10) - 3/4" valve only
								7		11.5 (13.3) - 1" valve only
								8		15 (17.4) - 1" valve only
										Customer special requirements (H)
Customer special requirements (H)									-AA	Standard
									-***	Customer special code

Specification

		Metric units	English units
Flow rate		9 - 17 m^3/hr	40 - 75 gpm
Body materials & pressure ratings	Cast iron	10 bar	145 psi
	1 ½ EL cast iron	24 bar	348 psi
	Bronze	10 bar	145 psi
	Carbon steel/stainless steel 150 lb flanged	16 bar	232 psi
	Carbon steel/stainless steel 300 lb flanged	45 bar	652 psi
	Carbon steel/stainless steel 600 lb flanged	68 bar	986 psi
Seal materials	Buna N/Nitrile, Viton, and Neoprene		
Mounting position	Any orientation		
Ports	Below nominal temperature	Ports A and B connected	
	Above nominal temperature	Ports A and C connected	
Port connections	Threaded	32 & 40 mm	1 ¼" & 1 ½"
	Flanged	15, 20, 25, 32 & 40 mm	1/2", 3/4", 1, 1 ¼" & 1 ½"
Valve sizes (nominal bore)		15, 20, 25, 32 & 40 mm	1/2", 3/4", 1, 1 ¼" & 1 ½"
Recommended pressure drop		0.14 - 0.5 bar	2 - 7 psi
Control temperatures		29°C - 114°C	85°F - 237°F
Accreditations available	PED	For valves with ASME 600 lb flanges (Port connection (D) = K), suitable for Group 2 liquids ONLY. For all other valves, suitable for Group 1 & 2 liquids. (Ensure materials are compatible)	
	ATEX	Ex II 2G TX X	
	CE	Complies with all relevant EU directives	

Weights

Approximate weights in kg (lbs)

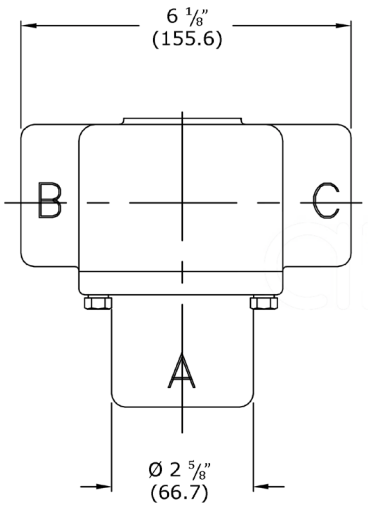
Valve size and model							
1/2 EF	**3/4 EF**	**1 EF**	**1 ½ EL/EO**	**1 ½ EFSK**	**1 ½ EFSH**	**1 ½ EFSJ**	**1 ¼ & 1 ½ EF**
7.5 (16.5)	8 (17.6)	8.5 (18.7)	5 (11)	16 (35)	14 (30)	12 (26.5)	9 (20)

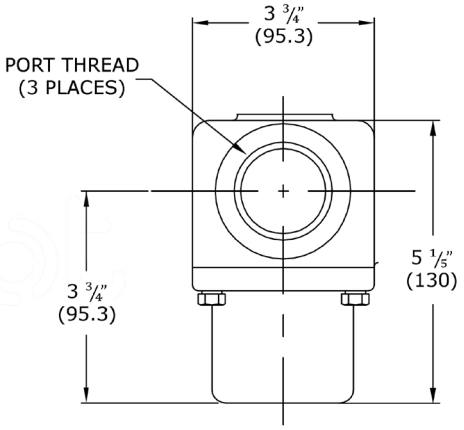
Valve Dimensions

Threaded models

Model 1 ½ EL/EO

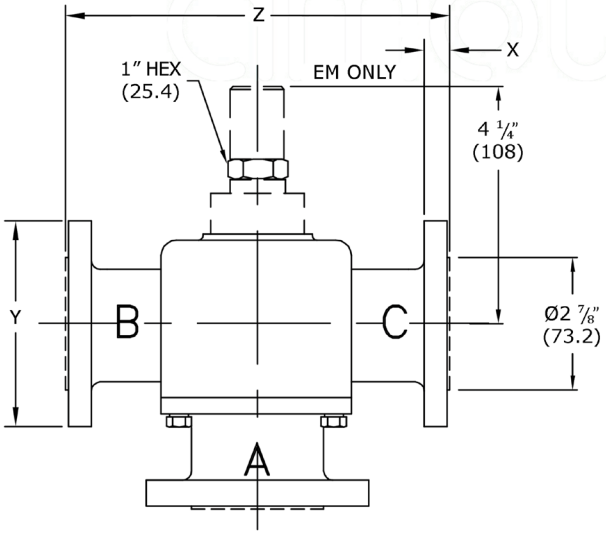
Dimensions - inches (mm)

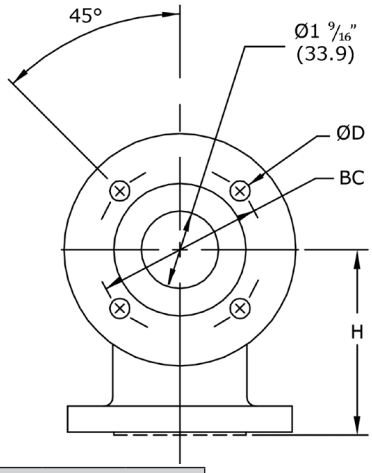




Flanged models

Model 1 ¼ EF, 1 ½ EF/EM





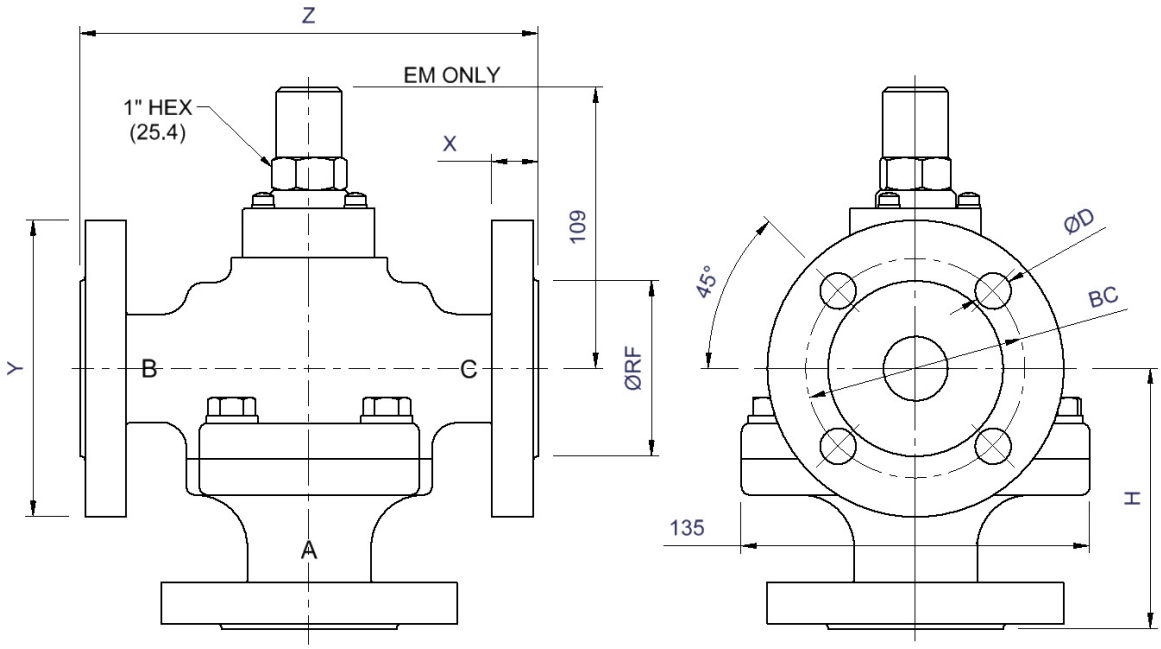
			Flange dimensions					
			H	X	Y	Z	BC	ØD
Port connection (D)[1]	A		-	18/25" (18)	5" (127)	-	3 29/32" (99)	3/5" (15.9)
	B & C		-	18/25" (18)	6" (150)	-	4 2/5" (110)	18/25" (18)
	F	1 ¼ EF	4" (101)	3/5" (15.9)	4 16/25" (117)	7" (177.8)	3 1/2" (89)	3/5" (15.9)
		1 ½ EF	4" (101)	18/25" (18)	5" (127)	7" (177.8)	3 9/10" (98.4)	3/5" (15.9)
	J		4" (101)	18/25" (18)	5" (127)	7" (177.8)	3 9/10" (98.4)	3/5" (15.9)
	H		4 4/5" (120)	4/5" (20.6)	6 3/25" (155)	8" (203.2)	4 1/2" (114)	9/10" (22.2)
	K		5" (127)	1 3/25" (28.5)	6 3/25" (155)	8 3/4" (222.3)	4 1/2" (114)	9/10" (22.2)

NOTES:

[1] See 'Port connection (D)' section in the How to Order table on page 10.

Flanged models

Model 1/2E, 3/4E, 1E



1 E		Flange dimensions						
		H	X	Y	Z	BC	ØD	ØRF
Port Connection (D)[1]	B & C & 4	4″ (101)	18/25″ (18)	4.53″ (115)	7″ (177.8)	3.35″ (85)	.55″ (14)	2.68″ (68)
	J	4″ (101)	.56″ (14.2)	4.3″ (110)	7″ (177.8)	3.13″ (79.4)	0.625″ (15.9)	2″ (50.8)
	H	4″ (101)	0.689″ (17.5)	4.92″ (125)	7″ (177.8)	3.5″ (8.9)	3/4″ (19)	2″ (50.8)

3/4 E		Flange dimensions						
		H	X	Y	Z	BC	ØD	ØRF
Port Connection (D)[1]	B & C & 4	4″ (101)	18/25″ (18)	4.13″ (105)	7″ (177.8)	2.95″ (75)	.55″ (14)	2.28″ (58)
	J	4″ (101)	0.5″ (2.7)	3.94″ (100)	7″ (177.8)	2.75″ (69.9)	0.625″ (15.9)	1.69″ (42.9)
	H	4″ (101)	0.62″ (5.8)	4.53″ (115)	7″ (177.8)	3.25″ (82.6)	3/4″ (19)	1.69″ (42.9)

1/2 E		Flange dimensions						
		H	X	Y	Z	BC	ØD	ØRF
Port Connection (D)[1]	B & C	4.72″ (120)	0.63″ (16)	3.58″ (91)	7″ (177.8)	2.56″ (65)	0.55″ (14)	1.77″ (45)
	J	4.72″ (120)	.44″ (11.1)	3.58″ (91)	7″ (177.8)	2.375″ (60.3)	0.625″ (15.9)	1.375″ (34.9)

NOTES:

[1] See 'Port connection (D)' section in the How to Order table on page 11.

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 valve. At such time, AMOT Thermostatic Valves can be restored to original performance by installing an AMOT thermostatic valve service kit or a seal kit and new temperature element(s).

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

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

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.

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 elements and seals required to service the valve. Order service kits using the AMOT valve part number and nominal temperature setting. 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.

AMOT does NOT offer service kits for EFRK, EFSK, EMRK, and EMSK Model E Thermostatic Valves. In order to properly service an EFRK, EFSK, EMRK, and/or EMSK please purchase an element and seal kit. Refer to the ordering instructions on page 12.

Service kit model number structure

1) Omit the Valve size (A).

2) Replace the Body material (C) and port connection (D) with **"KIT-"**.

3) If Special (H) is not blank, please contact the facility.

Example valve part number							
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
1 ½	EL	C	T	095	01	B	
1 ¼	EF	C	F	100	01		
Example service kit model number							
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	EL	**KIT-**		095	01	B	
	EF	**KIT-**		100	01		

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

Ordering from Europe and Asia-PAC

Seal kits

Seal kits are available with seals and gasket only. Order seal kits using the basic seal kit model number, valve code and seal code 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.

Element

Order temperature elements 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.

Maintenance and Service Parts Continued

Ordering from Europe and Asia-PAC continued

Seal kit model number structure

1) Identify the element/seal material code, located in the Element and seal material (F) section of the AMOT valve part number. Find that value in Table 1 to identify the corresponding seal code.

2) Identify the valve model and port connection, located in the Valve model (B) and Port connection (D) sections of the AMOT valve part number, respectively. Use those values in Table 2 to identify the corresponding valve code.

3) Place first the seal code then the valve code after the basic part number to complete the seal kit model number, as shown in Table 3.

Table 1 - Seal code identification

Seal code	Element/seal material (F)[2]
1	01, 04, 07
2	02, 03, 08, 11
3	05, 09, 14

Table 2 - Valve code identification

Valve code	Valve model (B)	Port connection (D)[3]
01	EF/EL/EO	ALL except K
02	EM	
03	EF/EL/EO	K ONLY
04	EM	

Table 3 - Seal kit identification

	Basic part no.	Seal code (Table 1)	Valve code (Table 2)
	82334X	1, 2, 3	01, 02, 03, 04
Examples			
Valve part number	**Seal kit model number**		
1 ¼ ELCT09501-B-AA	82334X	1	01
1 ½ EMSK12008-0-AA	82334X	2	04

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 Table 4.

2) Identify the body material code, located in the Body material (C) section of the AMOT valve part number.

3) Identify the port connection code, located in the Port connection (D) section of the AMOT valve part number.

4) Identify the element/seal material code, located in the Element and seal material (F) section of the AMOT valve part number.

5) Identify the temperature, located in the Control temperature °F (E) section of the AMOT valve part number.

6) Use those 5 codes to identify the proper element part number, as shown in Table 4.

Table 4 - Element part number identification

	Valve model (B)	Body material (C)	Port connection (D)[3]	Temperature °F (E)	Element/seal material (F)[2]			Element part number	Qty.
	EF/EL/EO	ALL	ALL	085-237	01, 03, 05			5435X(Temp.)	1
					02, 04, 09			5435P(Temp.)	
	EM	B, C	ALL except K		07, 11, 14			9831X(Temp.)	
					08			9831P(Temp.)	
		R, S	K		07, 11, 14			10912X(Temp.)	
					08			10912P(Temp.)	
Examples									
Valve part number								**Element part number**	**Qty.**
1 ¼	EL	C	T	095	01	-B	-AA	5435X095	1
1 ½	EM	S	K	120	08	-0	-AA	10912P120	1

NOTES:

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

[3] If your port connection code does not correspond with the given values, please contact the facility to confirm your port connection code.

Maintenance and Service Parts Continued

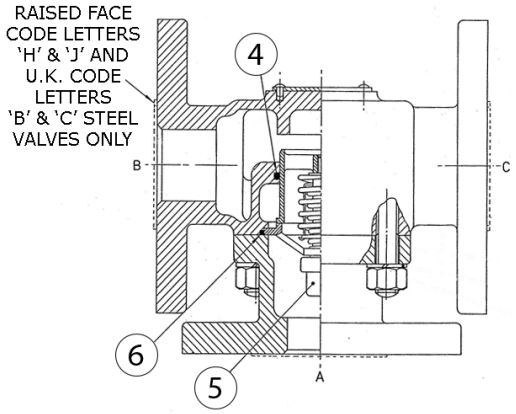
Service parts

Service kit parts[4]			
Ref no.	Qty.		Description
	EF/EL/EO	EM	
4	1	1	Element seal
5	1	1	Element
6	1	1	Housing seal
21	-	1	Shaft seal

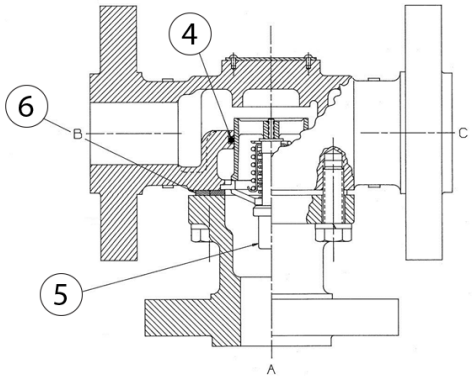
Seal kit parts					
Ref no.	Qty.				Description
	82334X(---)				
	(-)01	(-)02	(-)03	(-)04	
4	1	1	1	1	Element seal
6	1	1	-	-	Housing seal
6	-	-	1	1	Housing gasket
21	-	1	-	1	Shaft seal

NOTES:
[4] Does NOT include EFRK, EFSK, EMRK, or EMSK models.

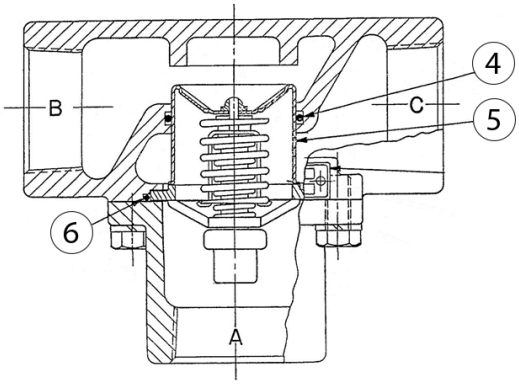
Model EF



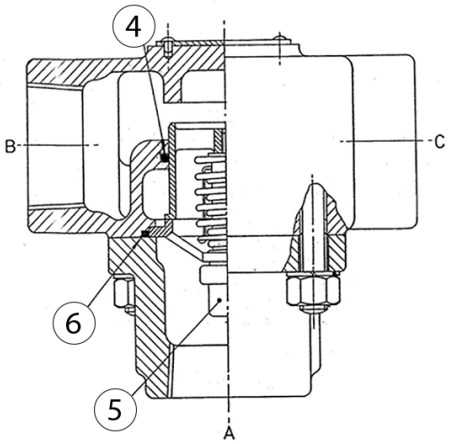
Model EFRK/EFSK



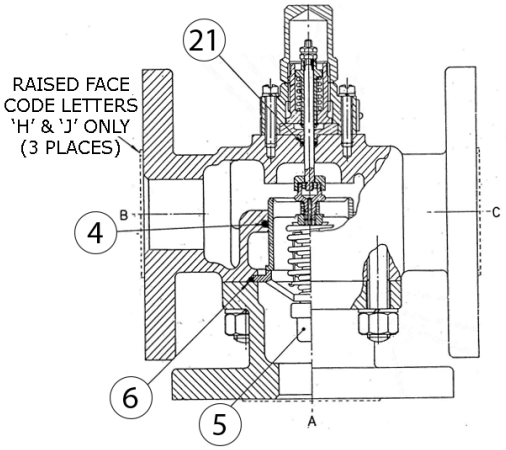
Model EL



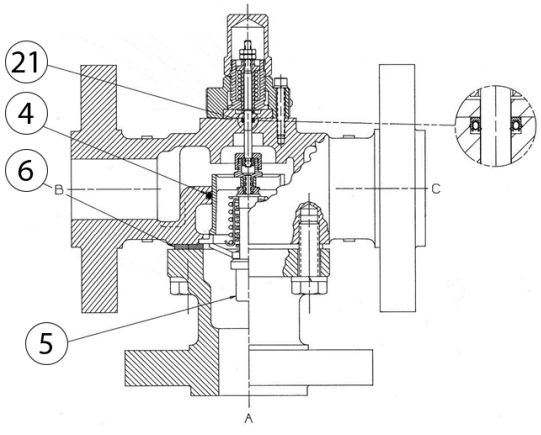
Model EO



Model EM



Model EMRK/EMSK



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⚠ WARNING
This product can expose you to chemicals including Lead, which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

www.amot.com