

# Temperature Valve for Static Bearings

## Models 4103D/M

### Typical applications

- Monitors medium to large stationary bearings
- Responds to high temperatures caused by:
  - Tight, worn or out-of-round bearings
  - Cracked or broken shafts
  - Power or compressor cylinder overload
  - Tight packing glands
  - Torsional vibration
  - Lack of lubrication
- Can be applied to liquid systems by installing in an AMOT 6721L Well
- For larger moving bearing applications, refer to model 4102 temperature detectors datasheet located at [www.amot.com](http://www.amot.com)

### Key features and benefits

- Provides early warning of problems - avoids high cost bearing failures
- Instant response to excessive bearing temperatures
- Use with oil, air or gas
- Compact design - easy, low cost installation
- Minimal maintenance - low cost of ownership

### Accreditations available

- PED      Suitable for Group 1 & 2 liquids  
(Ensure materials are compatible)



**Model 4103D  
Temperature Valve**



**Model 6710X Spare  
Fuse Rod**



**Model 4103M Miniature  
Temperature Valve**



**Model 7280X Spare  
Fuse Rod**



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# Temp. Valve for Static Bearings - Models 4103D/M

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### **WARNING**

A Warning indicates a hazardous situation that, if not avoided, could result in death or serious injury to personnel. The text of the warning describes the hazard and details of the precautions that must be applied before the step of the procedure is carried out.

# Temp. Valve for Static Bearings - Models 4103D/M

## Overview

AMOT Model 4103D Temperature Valves and Model 4103M Miniature Temperature Valves are ideal for use on medium and high speed engines. The valves initiate a warning or shutdown upon a sudden temperature rise in critical machine parts caused by tight, worn or out-of-round bearings, tight packing glands, cracked or broken shafts, torsional vibration, power or compressor cylinder overload, lack of lubricant flow and many other sources.

The 4103M valves provide the same low cost reliability for small bearings that have been field proven by their larger counterparts (Model 4103D) in larger stationary bearing applications.

## Operation

The range of 4103 temperature valves provides a reliable sensor, which will trip upon temperature rise.

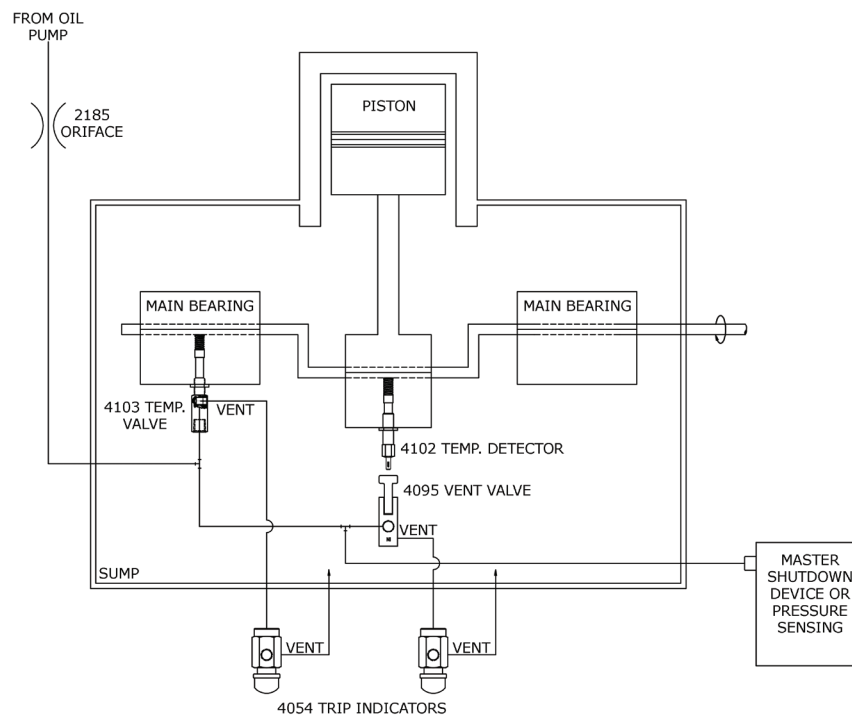
The valves have a stainless steel body containing a normally closed valve sealed with a Viton ball. The temperature sensing portion is a thin film of eutectic alloy located near the tip of the fuse rod assembly. The eutectic alloy, less than 0.01 mm<sup>3</sup> in volume, secures a spring-loaded fuse rod until the temperature at the sensing end of the rod melts the alloy. The fuse rod is then instantly released and allows the spring-loaded rod to unseat the Viton valve ball.

A stainless steel ball is an optional item for use with lube oil as the control medium if high pressures are to be encountered. Generally, the standard Viton is recommended for use with air, gas or lube oil control systems because it provides a leak-tight seal.

### **WARNING**

Do not heat unrestrained fuse rod assemblies. They fire with sufficient force to cause injury. Failure to restrain or aim the fuse rod in a safe direction can lead to serious bodily injury.

## Typical Application



**Figure 1**

# Temp. Valve for Static Bearings - Models 4103D/M

## Installation Design Considerations

- AMOT Model 4103 temperature valves are the basic sensing units in a safety system and must be tied into the system through connecting tubing.
- Not recommended for installation where oil may leak along the unsealed fuse rod shaft.
- Air/gas systems are more versatile and will give faster response than an oil pressured system. Oil is used in many systems within an engine as shown in figure 1.
- Connecting tubing should be  $\frac{5}{16}$ " O.D. Close-tee each sensing device to the control pressure line and pipe them in series with the pressure sensing valve being the last component in the line. Care should be taken not to over tighten the fitting in the VENT port since it may interfere with the tripping action.

### Model 4103D - figure 2

- Model 4103D valves can be installed by themselves (figures 1 & 2), in adapters (figure 4) or in a well (figure 5).
- Control pressure source may be clean, dry air, or a non-corrosive liquid such as lubricating oil at up to 90 psi.
- Removal of one shim ⑫ changes the direction of the vent port approximately  $90^\circ$  when the valve is tightened. The shims may be removed as necessary to obtain the required vent location.
- Care must be used to obtain the proper relationship between the pin on the fuse rod assembly and the valve ball ⑦. Installed depths (Table 1 on page 6) are available in  $\frac{1}{2}$ " increments from  $1\frac{7}{8}$ " to  $9\frac{7}{8}$ " and must be held to within  $\pm \frac{1}{16}$ " when the unit is installed. To accomplish this setting, use one or both of the following methods:
  - Air pressure - Install the valve in the mounting hole and apply slight air pressure to the IN port of the valve. Turn the valve into the hole until it starts to leak at the VENT port, then back off one turn and tighten in place with locknut ⑥.
  - Gauge - Install the valve in the mounting hole and thread it in until the gauge strikes the  $\frac{3}{16}$ " diameter fuse rod when inserted in the VENT port. Turn the valve back out until the gauge slides past the  $\frac{3}{16}$ " rod and seats fully, with the small pin located in the gauge slot. Remove the gauge and thread the valve in one or two turns and tighten in place with locknut ⑥.

### Model 4103M - figure 3

- Control pressure source may be clean, dry air, gas, or a non-corrosive liquid such as lubricating oil at up to 60 psi. The use of gas may not be desired in a hazardous location.
- When installing, allow at least  $\frac{1}{4}$ " of thread engagement when the end of the fuse rod is at the normal (untripped) position. To obtain the proper relationship between the end of the fuse rod assembly ⑦ and the valve ball ③, use the following method:
  - Install the valve in the mounting hole and apply slight air pressure to the IN port of the valve. Turn the valve into the hole until it starts to leak at the VENT port, then back off one turn and tighten in place with locknut ⑤.

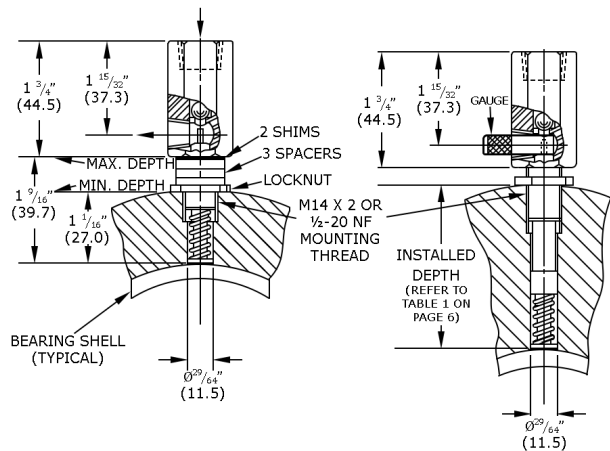


Figure 2 - Model 4103D

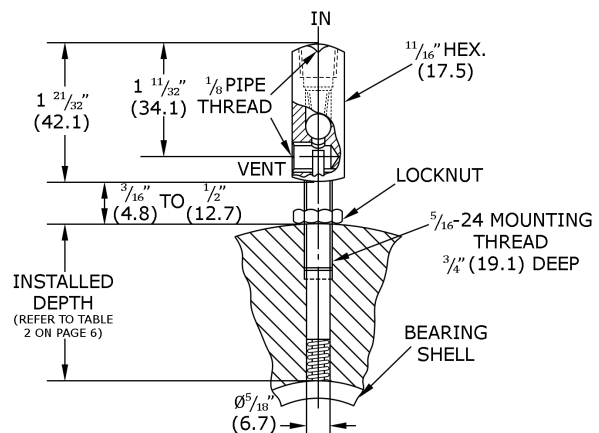


Figure 3 - Model 4103M

# Temp. Valve for Static Bearings - Models 4103D/M

## Installation Design Considerations

### Spacers

AMOT Model 4103D valves are used where standard metal thicknesses are held by machined surfaces. The locknut ⑥ and spacer ⑪ (P/N: 6661) arrangement permits installing the valve without the used of a gauge in standard depths of 1 1/16" to 1 9/16" as follows:

	Installed depth	
	mm	inches
Nut plus 3 spacers	27.0	1 1/16"
Nut plus 2 spacers	30.2	1 3/16"
Nut plus 1 spacer	33.3	1 5/16"
Nut only	36.5	1 7/16"
No nut or spacers	39.7	1 9/16"

### Adapters

Adapter P/N	Length (L)	
	mm	inches
6660L001	111	4 3/8"
6660L002	63.5	2 1/2"
6660L003	31.8	1 1/4"
6660L004	152.4	6"
6660L005	127	5"
6660L006	73	2 7/8"
6660L007	117.5	4 5/8"
6660L008	38.1	1 1/2"

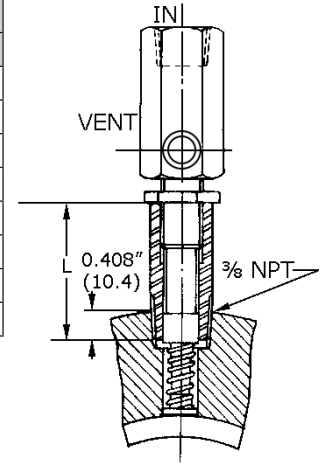


Figure 4

### Thermowells

Model 4103D can be with an optional thermowell. Use the table below to select the unique specification of your thermowell for your Model 4103D Temperature Valve.

Example	6721L	1	15	Code description		Comments				
				<b>Basic model (A)</b>						
<b>Basic model (A)</b>	6721L			Stainless steel, 3,500 psi						
	9859L			416 Stainless steel, 8,000 psi						
				<b>Thread (B)</b>						
<b>Thread (B)</b>	0			<b>"X"</b>	<b>"Z"</b>					
				1/2-20 UNF	1/2 NPT	6721L				
				1/2-20 UNF	3/4-14 NPT	9859L				
	1			1/2-20 UNF	1/2 BSP (Tr)	6721L ONLY				
				<b>Installed depth (C)</b>						
<b>Installed depth (C)</b>				<b>6721L</b>		<b>9859L</b>				
				<b>mm</b>	<b>inches</b>	<b>mm</b>	<b>inches</b>			
				04	42.9	1 11/16"	41.3	1 5/8"		
				05	55.6	2 3/16"	54.0	2 1/8"		
				06	68.3	2 11/16"	66.7	2 5/8"		
				07	81.0	3 3/16"	79.4	3 1/8"		
				08	93.7	3 11/16"	92.1	3 5/8"		
				09	106.4	4 3/16"	104.8	4 1/8"		
				10	119.1	4 11/16"	117.5	4 5/8"		
				11	131.8	5 3/16"	130.2	5 1/8"		
				12	144.5	5 11/16"	142.9	5 5/8"		
				13	157.2	6 3/16"	-	-		
				14	169.9	6 11/16"	-	-		
				15	182.6	7 3/16"	-	-		
				16	195.3	7 11/16"	-	-		
				17	208.0	8 3/16"	206.4	8 1/8"		
				18	220.7	8 11/16"	-	-		
				19	233.4	9 3/16"	-	-		
				20	246.1	9 11/16"	-	-		

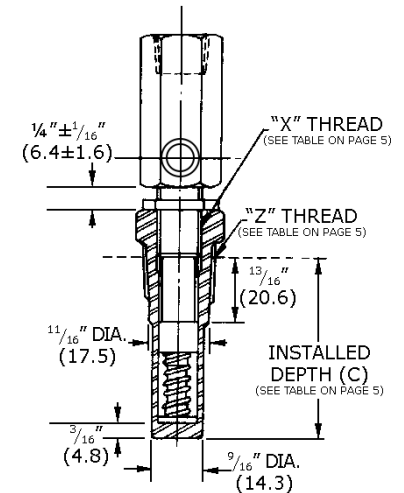


Figure 5

# Temp. Valve for Static Bearings - Models 4103D/M

## Valve Characteristics

### Installed depth and fuse rod length

Table 1 - 4103D				
Code	Installed depth and fuse rod length			
	Minimum		Maximum	
	mm	inches	mm	inches
03	27.0	1 1/16"	39.7	1 9/16"
04	47.6	1 7/8"	57.2	2 1/4"
05	60.3	2 3/8"	69.9	2 3/4"
06	73.0	2 7/8"	82.6	3 1/4"
07	85.7	3 3/8"	95.3	3 3/4"
08	98.4	3 7/8"	108.0	4 1/4"
09	111.1	4 3/8"	120.7	4 3/4"
10	123.8	4 7/8"	133.4	5 1/4"
11	136.5	5 3/8"	146.1	5 3/4"
12	149.2	5 7/8"	158.8	6 1/4"
13	161.9	6 3/8"	171.5	6 3/4"
14	174.6	6 7/8"	184.2	7 1/4"
15	187.3	7 3/8"	196.9	7 3/4"
16	200.0	7 7/8"	209.6	8 1/4"
17	212.7	8 3/8"	222.3	8 3/4"
18	225.4	8 7/8"	235.0	9 1/4"
19	238.1	9 3/8"	247.7	9 3/4"
20	250.8	9 7/8"	260.4	10 1/4"

Table 2 - 4103M				
Code	Installed depth and fuse rod length			
	Minimum		Maximum	
	mm	inches	mm	inches
00	19.1	3/4"	27.0	1 1/16"
01	41.3	1 5/8"	49.2	1 15/16"
02	47.6	1 7/8"	55.6	2 3/16"
03	54.0	2 1/8"	61.9	2 7/16"
04	60.3	2 3/8"	68.3	2 11/16"
05	66.7	2 5/8"	74.6	2 15/16"
06	73.0	2 7/8"	81.0	3 3/16"
07	79.4	3 1/8"	87.3	3 7/16"
08	85.7	3 3/8"	93.7	3 11/16"
09	92.1	3 5/8"	100.0	3 15/16"
10	98.4	3 7/8"	106.4	4 3/16"
11	104.8	4 1/8"	112.7	4 7/16"
12	111.1	4 3/8"	119.1	4 11/16"
13	117.5	4 5/8"	125.4	4 15/16"
14	123.8	4 7/8"	131.8	5 3/16"

# Temp. Valve for Static Bearings - Models 4103D/M

## How to Order

Use the table below to select the unique specification of your Model 4103 Temperature Valve.

Example	4103	M	02	A	C	228		Code description	Comments	
								<b>Basic model (A)</b>		
<b>Basic model (A)</b>	4103D							Base model for mounting thread and valve port thread (B) = A, D, K, L ONLY		
	4103							Base model for mounting thread and valve port thread (B) = M ONLY		
								<b>Mounting thread and valve port thread (B)</b>		
								<b>Mounting thread</b>	<b>Valve port thread</b>	
<b>Mounting thread and valve port thread (B)</b>	A							M14 X 2	NPT	Basic model (A) = 4103D ONLY. UK ONLY
	D							½-20 NF	NPT	Basic model (A) = 4103D ONLY
	K							M14 X 2	BSP (Tr)	Basic model (A) = 4103D ONLY. UK ONLY
	L							½-20 NF	BSP (Tr)	Basic model (A) = 4103D ONLY. UK ONLY
	M							5/16-24 NF	⅛ NPT	
								<b>Installed depth/fuse rod length code (C)</b>		
<b>Installed depth/fuse rod length code (C)</b>		*						For installed depth and fuse rod length codes available, refer to Tables 1 and 2 on page 4.		
								<b>Valve ball material (D)</b>		
<b>Valve ball material (D)</b>	A							Viton		
	B							Stainless steel		
								<b>Revision level (E)</b>		
<b>Revision level (E)</b>						C				
								<b>Trip temperature °F (F)</b>		
<b>Trip temperature °F (F)</b>							174	174°F	79°C	
							197	197°F	92°C	
							217	217°F	103°C	
							228	228°F	108°C	
							253	253°F	123°C	
							291	291°F	144°C	
							343	343°F	173°C	
								<b>Customer special requirements (G)</b>		
<b>Customer special requirements (G)</b>							-***	Made-to-order		

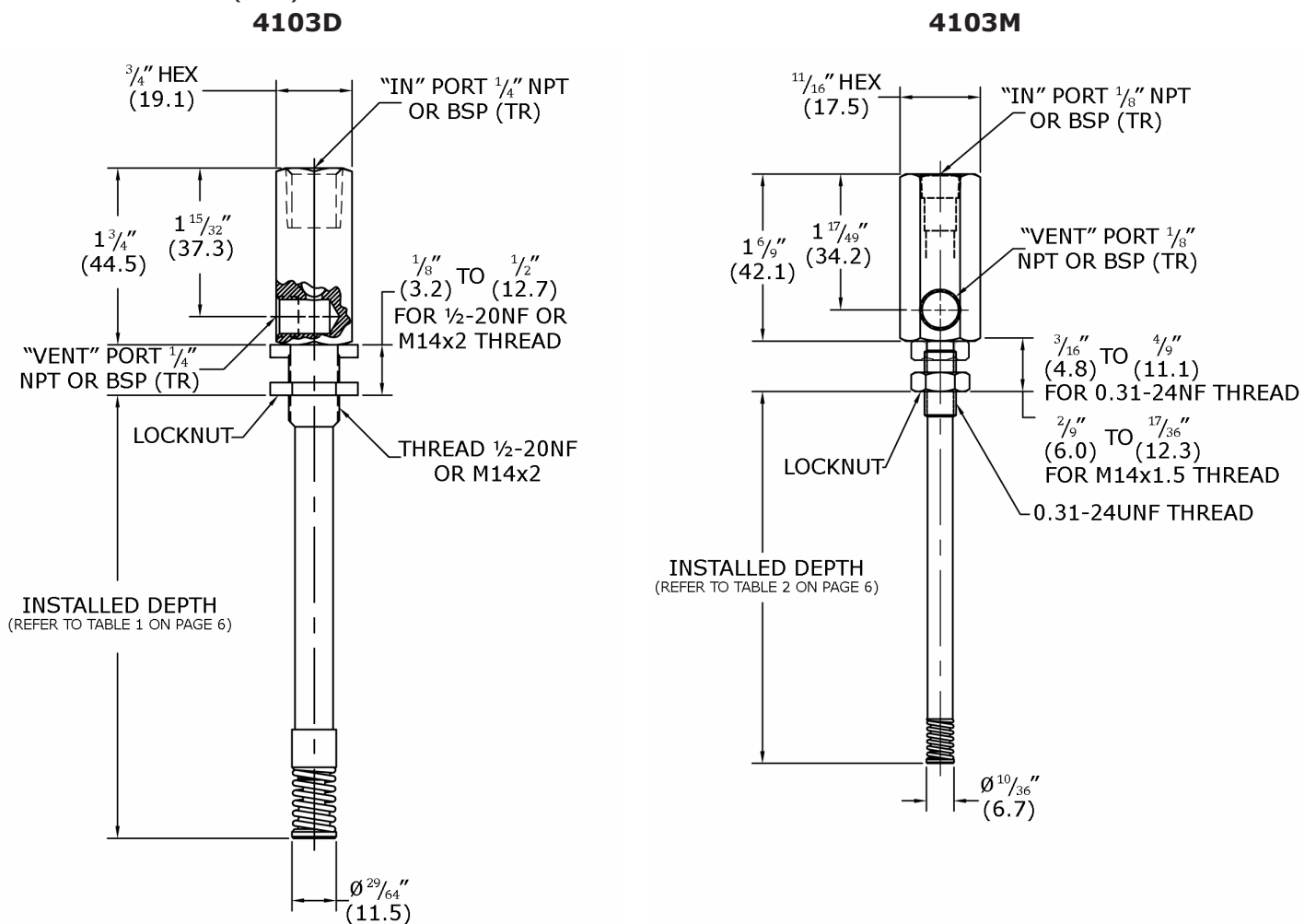
# Temp. Valve for Static Bearings - Models 4103D/M

## Specification

		Metric units	English units
<b>Body material</b>		416 Stainless steel	
<b>Sensing material</b>		Eutectic alloy	
<b>Valve ball material</b>		Viton or stainless steel	
<b>Rod body</b>		Brass	
<b>Trip temperature range</b>		79°C - 173°C	174°F - 343°F
<b>Maximum allowable temperature</b>		173°C	343°F
<b>Maximum control pressure</b>	4103D	6.21 bar	90 psi
	4103M	4.14 bar	60 psi
<b>Tripped movement</b>		8 mm	5/16"
<b>Net weight</b>	4103D	0.2 kg	½ lb
	4103M	0.1 kg	¼ lb

## Dimensions

Dimensions - inches (mm)





# Temp. Valve for Static Bearings - Models 4103D/M

## Maintenance and Service Parts *(refer to diagrams on page 10)*

Over time, exposure to foreign chemicals and particulate matter as well as prolonged operation at extreme conditions may reduce the effectiveness of the temperature valve. At such time, AMOT Temperature Valves can be restored to original performance by replacing the fuse rod. Please order a fuse rod assembly and the service instructions using the part numbers, quantities and descriptions given in the service parts table below.

**AMOT recommends that the overall safety system be checked MONTHLY for proper functioning by simulating an unsafe condition. AMOT recommends maintenance, including visual inspections, at the major overhaul of the engine or YEARLY if lacquering of the lube oil is observed.**

Excessive lacquering can cause sticking which impairs operation. Unscrew the detector from the mounting hole and remove fuse rod assembly with a twisting motion. Hold it by the ends and visually examine the eutectic alloy area for exposed alloy. Visible alloy should be a clean fillet around the two brass sections of the fuse rod assembly. Look for cracks in the brass. A stable fuse rod assembly moves slightly showing no wear.

### How to order replacement fuse rod assemblies

Replacement fuse rod assemblies are available with all of the parts required to service your 4103 Temperature Valve.

Fuse rod assemblies ⑤ ⑦ (Model 4103D and Model 4103M respectively) should be replaced if the crimp section becomes loose. The life expectancy of fuse rod assemblies is five (5) years, under normal operating conditions and proper maintenance.

When a Model 4103 temperature valve trips, it has detected excessive heat. Check for proper operating temperature of the oil and check the bearing for signs of distress to determine the source of the heat.

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.

In the event that a fuse rod needs to be replaced, please order the fuse rod assembly and the service instructions using the part numbers and quantities given in the service parts table below.

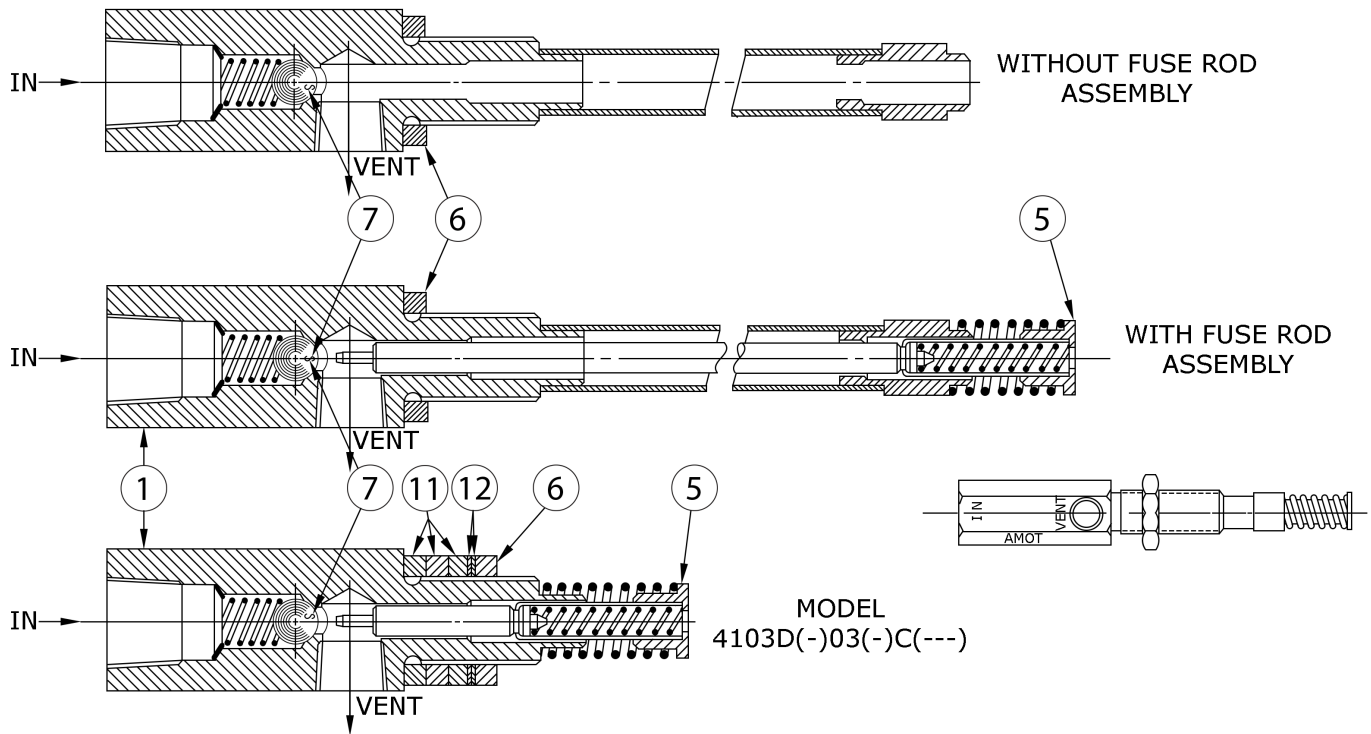
Service parts				
Ref no.	Part no.	Qty.	AMOT part description	Comments
5	*Refer to table on page 11*	1	Fuse rod assembly	4103D ONLY
7	*Refer to table on page 11*	1	Fuse rod assembly	4103M ONLY
-	ISB-4103-001	1	4103D/M Installation and Service Bulletin	

# Temp. Valve for Static Bearings - Models 4103D/M

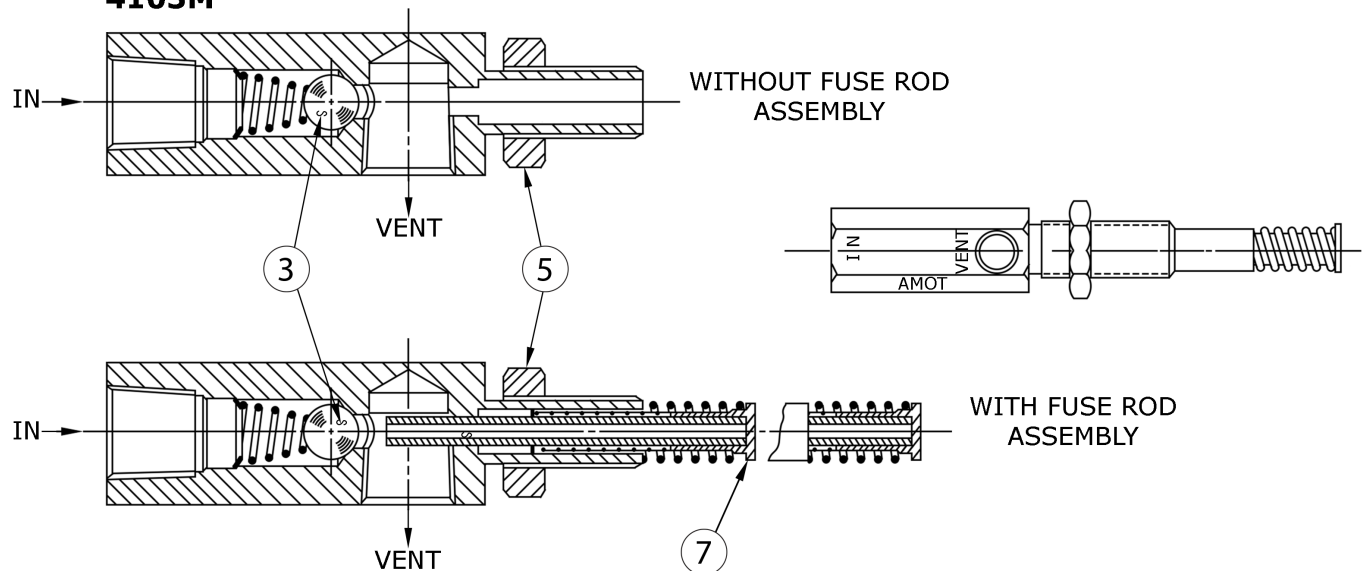
## Maintenance and Service Parts Continued

### How to order replacement fuse rod assemblies continued

#### 4103D



#### 4103M



# Temp. Valve for Static Bearings - Models 4103D/M

## Maintenance and Service Parts Continued

### Replacement fuse rod assembly model number structure

Use the table below to select the unique specification of your replacement fuse rod assembly.

<b>Example</b>	7280X	02	T	228	<b>Code description</b>		
					<b>Model code (A)</b>		
<b>Model code (A)</b>	6710X				4103D ONLY		
	7280X				4103M ONLY		
					<b>Fuse rod length code (B)</b>		
<b>Installed depth/fuse rod length code (B)</b>		*			For fuse rod lengths available, refer to Tables 1-2 on page 6.		
					<b>Type (C)</b>		
<b>Type (C)</b>			T		Temperature		
					<b>Trip temperature °F (D)</b>		
<b>Trip temperature °F (D)</b>				174	174°F	79°C	
				197	197°F	92°C	
				217	217°F	103°C	
				228	228°F	108°C	
				253	253°F	123°C	
				291	291°F	144°C	
				343	343°F	173°C	

# Temp. Valve for Static Bearings - Models 4103D/M

## Contact

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