Temperature Detectors for Moving Bearings

Models 4102D, E, J & M

Typical applications

- Accurate and reliable in engines used for gas compression, power generation, pipeline, marine and general industrial service
- Monitors bearings, shafts and other moving parts for unsafe high temperature levels
- Responds to increased bearing temperatures caused by:
  - Tight, worn or out-of-round bearings
  - Cracked or broken shafts
  - Power or compressor cylinder overload
  - Lack of lubrication fluid
  - Tight packing glands
  - Torsional vibration
  - Mis-alignment
  - Other sources of temperature rise

Model 4102D/E/J Temperature Detector

Model 6702X Spare Fuse Rod

Model 4102M Miniature Temperature Detector

Key features and benefits

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

Model 7334X Spare Fuse Rod

amot

www.amot.com

Temp. Detectors for Moving Bearings - Model 4102D/E/J/M

Contents

⚠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. Detectors for Moving Bearings - Model 4102D/E/J/M

Overview

AMOT Model 4102D/E/J temperature detectors and Model 4102M miniature temperature detectors 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 4102M valves provide the same low cost reliability for small bearings that have been field proven by their larger counterparts (Model 4102D/E/J) in larger stationary bearing applications.

Operation

AMOT Model 4102 temperature detectors are a safety device suitable for monitoring bearing temperature. A thin film of eutectic alloy (less than 0.01 mm^3 in volume) secures a spring-loaded fuse rod. When the temperature increases, the sensing end melts the alloy and the fuse rod is instantly released moving outwards.

Due to their small eutectic mass, the detectors are virtually as responsive as thermocouples. Model 4102 temperature detectors do not require the impractical wiring of electrical sensors.

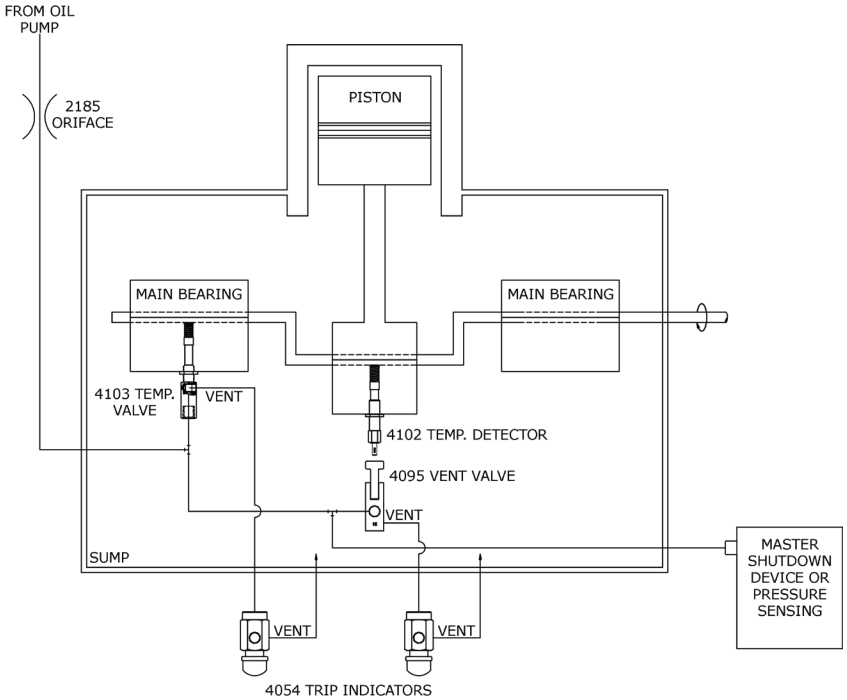
The trip temperature will be between 79°C and 173°C (174°F to 343°F), depending on fuse rod selection. To convert the detector tripping action into a usable signal, use the AMOT Model 4095 vent valve or Model 4395.

Model 4102 temperature detectors are designed for use in moving parts such as connecting rod bearings. For stationary bearing applications, refer to AMOT model 4103, in which the vent valve is incorporated in the temperature detector.

⚠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



Installation Factors

- Control pressure source may be clean dry air/gas (for versatile, non-hazardous locations).
- Maximum pressure to IN port of the vent valve is 60 psi.
- Install the vent valve above the oil level in the sump to facilitate manual re-setting.
- Each sensing device should be connected to control pressure lines and piped in series ending with the master safety control/alarm component.
- Must NOT be installed with the fuse rod tip permitted to dip in the sump.
- Not recommended for installation where oil may leak along the unsealed fuse rod shaft.
- See Fig. 1 or Fig. 2, on page 6 and 7 respectively, for general method of installation.

Valve Characteristics

Installed depth

Table 1 - 4102D/E/J

Code	Installed depth			
	Minimum		Maximum	
	mm	inches	mm	inches
04	50.8	2″	63.5	2 ½″
05	63.5	2 ½″	76.2	3″
06	76.2	3″	88.9	3 ½″
07	88.9	3 ½″	101.6	4″
08	101.6	4″	114.3	4 ½″
09	114.3	4 ½″	127.0	5″
10	127.0	5″	140.0	5 ½″
11	140.0	5 ½″	152.4	6″
12	152.4	6″	165.0	6 ½″
13	165.0	6 ½″	178.0	7″
14	178.0	7″	191.0	7 ½″
15	191.0	7 ½″	203.0	8″
16	203.0	8″	216.0	8 ½″
17	216.0	8 ½″	229.0	9″
18	229.0	9″	241.0	9 ½″
19	241.0	9 ½″	254.0	10″
20	254.0	10″	267.0	10 ½″

Table 2 - 4102M

Code	Installed depth			
	Minimum		Maximum	
	mm	inches	mm	inches
00	19.1	¾″	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″

Valve Characteristics Continued

Fuse rod length code selection

Table 3 - 4102D/E/J							
Install depth code (Table 1)	Projection length						
	Flush	½"	1"	1 ½"	2"	2 ½"	3"
	Fuse rod length code						
04	04	05	06	07	08	09	10
05	05	06	07	08	09	10	11
06	06	07	08	09	10	11	12
07	07	08	09	10	11	12	13
08	08	09	10	11	12	13	14
09	09	10	11	12	13	14	15
10	10	11	12	13	14	15	16
11	11	12	13	14	15	16	17
12	12	13	14	15	16	17	18
13	13	14	15	16	17	18	19
14	14	15	16	17	18	19	20
15	15	16	17	18	19	20	21
16	16	17	18	19	20	21	22
17	17	18	19	20	21	22	23
18	18	19	20	21	22	23	24
19	19	20	21	22	23	24	25
20	20	21	22	23	24	25	26

Table 4 - 4102M					
Install depth code (Table 2)	Projection length				
	Flush	¼"	½"	¾"	1"
	Fuse rod length code				
00	01	02	03	04	05
01	06	07	08	09	10
02	07	08	09	10	11
03	08	09	10	11	12
04	09	10	11	12	13
05	10	11	12	13	14
06	11	12	13	14	15
07	12	13	14	15	16

Fuse rod length

Table 5 - 4102D/E/J					
Fuse rod lengths					
Code (Table 3)	mm	inches	Code (Table 3)	mm	inches
04	85.7	3 3/8"	16	238.1	9 3/8"
05	98.4	3 7/8"	17	250.8	9 7/8"
06	111.1	4 3/8"	18	263.5	10 3/8"
07	123.8	4 7/8"	19	276.2	10 7/8"
08	136.5	5 3/8"	20	288.9	11 3/8"
09	149.2	5 7/8"	21	301.6	11 7/8"
10	161.9	6 3/8"	22	314.3	12 3/8"
11	174.6	6 7/8"	23	327.0	12 7/8"
12	187.3	7 3/8"	24	339.7	13 3/8"
13	200.0	7 7/8"	25	352.4	13 7/8"
14	212.7	8 3/8"	26	365.1	14 3/8"
15	225.4	8 7/8"			

Table 6 - 4102M					
Fuse rod lengths					
Code (Table 4)	mm	inches	Code (Table 4)	mm	inches
01	39.7	1 9/16"	09	81.0	3 3/16"
02	46.0	1 13/16"	10	87.3	3 7/16"
03	52.4	2 1/16"	11	93.7	3 11/16"
04	58.7	2 5/16"	12	100.0	3 15/16"
05	65.1	2 9/16"	13	106.4	4 3/16"
06	61.9	2 7/16"	14	112.7	4 7/16"
07	68.3	2 11/16"	15	119.1	4 11/16"
08	74.6	2 15/16"	16	125.4	4 15/16"

Temp. Detectors for Moving Bearings - Model 4102D/E/J/M

How to Order

Use the table below to select the unique specification of your Model 4102 Temperature Detector.

Example	4102	D	04	C	09	197	-AA	**Code description**	**Comments**
								Basic model (A)	
Basic model (A)	4102							Brass body	Eutectic alloy sensor
								Mounting thread (B)	
Mounting thread (B)		D						½ - 20 NF	
		E						⅝ - 11 NC	
		J						M14 X 2	
		M						5/16 - 24 NF	
								Installed depth code (C)	
Installed depth code (C)[1]			*					For installed depth codes available, refer to Tables 1 and 2 on page 4.	
								Revision level (D)	
Revision level (D)				C					
								Fuse rod length code (E)	
Fuse rod length code (E)[1]					**			For fuse rod length codes available, refer to Tables 3-6 on pages 4 and 5.	
								Trip temperature °F (F)	
Trip temperature °F (F)						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
								Customer special requirements (G)	
Customer special requirements (G)							-AA	Standard	May be omitted
							-**	Made-to-order	

NOTES:

[1] Consult Tables 3 and 4 for projection lengths, for 4102D/E/J and 4102M respectively, on page 5.

Specification

		Metric units	**English units**
Body material	Brass		
Sensing material	Eutectic alloy		
Trip temperature range		79°C - 173°C	174°F - 343°F
Maximum allowable temperature		173°C	343°F
Tripped movement		8 mm	5/16"
Net weight		0.1 kg	¼ lb

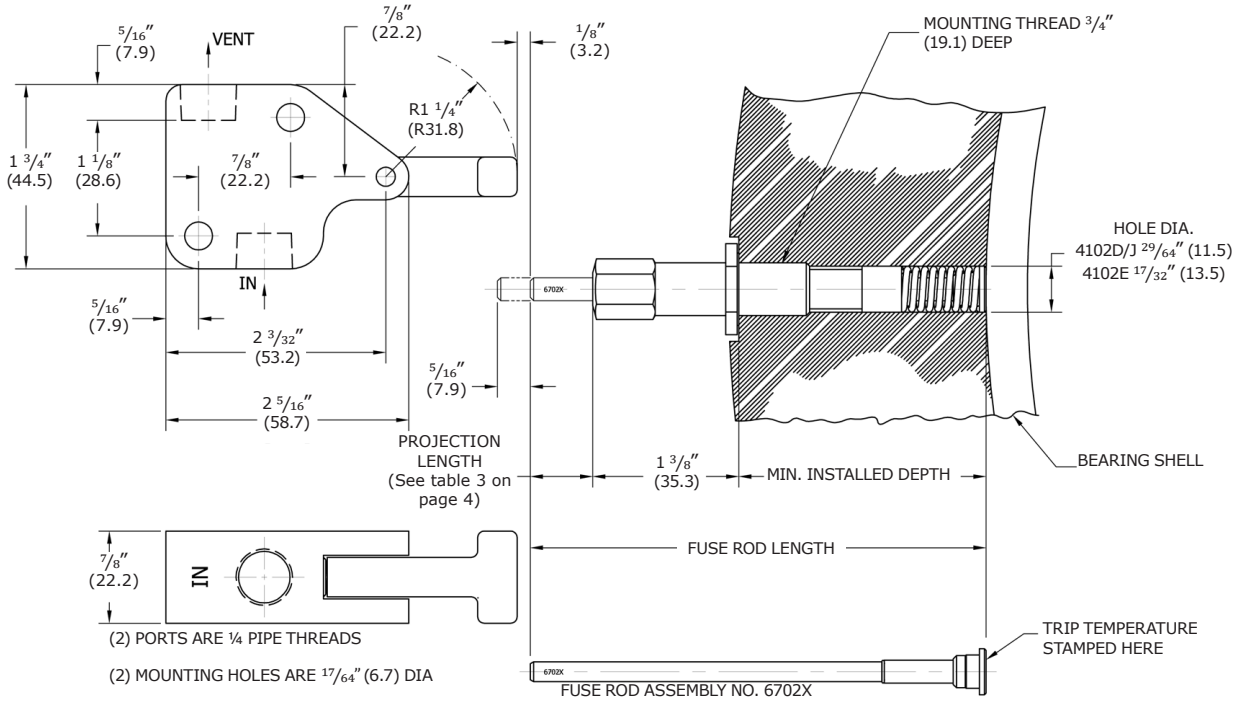
Dimensions

Dimensions - inches (mm)

4102D/E/J

Figure 1 **4095 Vent Valve** **4102 D/E/J**

4395 Electric Switch



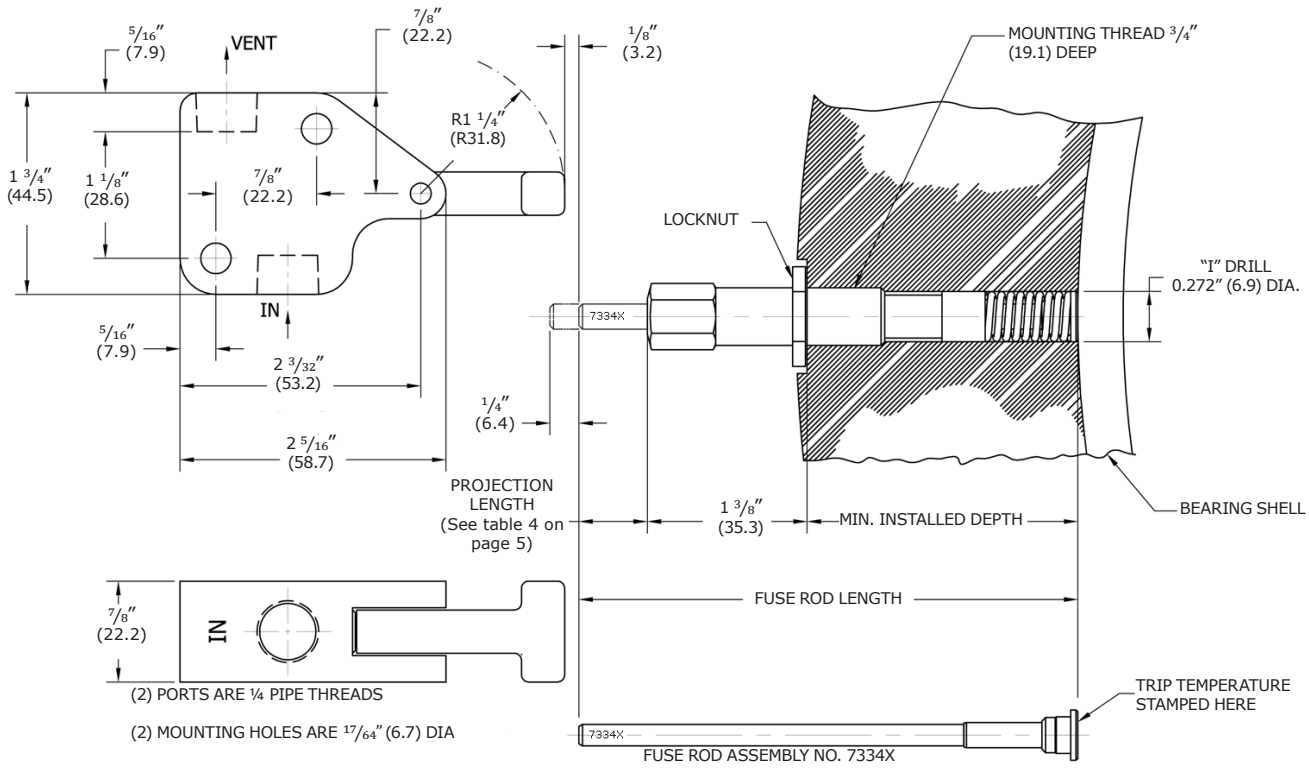
⚠WARNING

Do not heat unrestrained fuse rod assemblies. They fire with sufficient force to cause injury.

4102M

Figure 2 **4095 Vent Valve** **4102M**

4395 Electric Switch



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 temperature detector. At such time, AMOT Temperature Detectors 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 in the service parts table below. Fuse rod assemblies ④ 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.

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.

To test fuse rods, heat a mixture of 50% glycol and 50% water, stirring constantly. Place the fuse rod in the heated liquid. Use a mercury thermometer to check the temperature of the liquid. The fuse rod assembly should trip within 4°F of the temperature stamped on the bottom of the rod. DO NOT attempt to resolder a eutectic fuse rod; the rod expends upon firing.

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.

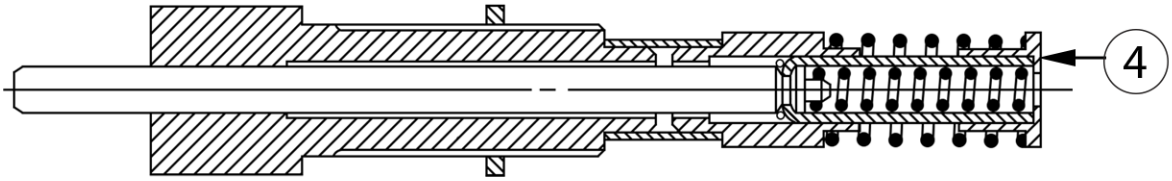
How to order replacement fuse rod assemblies

Replacement fuse rod assemblies are available with all of the parts required to service your 4102 Temperature Detector.

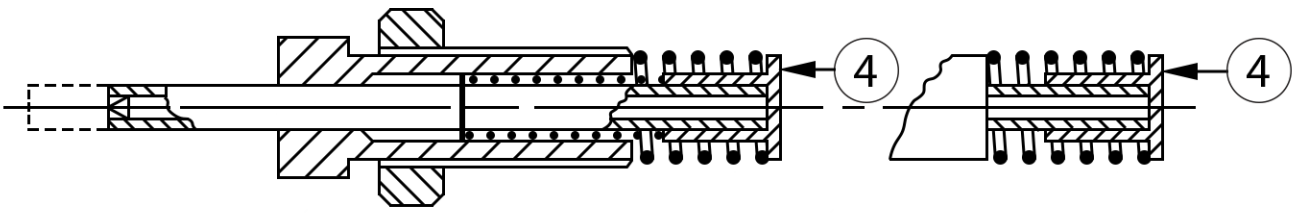
In the event that a fuse rod needs to be replaced, please order the fuse rod assembly and the service instructions using the part numbers and quantities given in the service parts table below.

Service parts			
Ref no.	**Part no.**	**Qty.**	**AMOT part description**
4	*Refer to table on page 9*	1	Fuse rod assembly
-	ISB-4102-001	1	4102D/E/J/M Installation and Service Bulletin

4102D/E/J



4102M



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.

Example	6702X	11	T	217	**Code description**	
					Model code (A)	
Model code (A)	6702X				4102D/E/J ONLY	
	7334X				4102M ONLY	
					Fuse rod length code (B)	
Fuse rod length code (B)		*			For fuse rod lengths available, refer to Tables 5-6 on page 5.	
					Type (C)	
Type (C)			T		Temperature	
					Trip temperature °F (D)	
Trip temperature °F (D)				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

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