Model 4102 M, B

Miniature Temperature Detectors

4102
Temperature Detectors

7334X Replaceable
Fuse Rod Assembly

Features

The protection of bearings, shafts, and other moving parts from damage due to unsafe high temperature levels.

- **RELIABLE PROTECTION**
- **INSTANT RESPONSE**
- **SMALL SIZE**
- **EASE OF INSTALLATION**
- **SIZE SELECTION**

Applications

- **HIGH BEARING AND FLUID TEMPERATURE DETECTION**
- **POWER OR COMPRESSOR CYLINDER OVERLOAD**
- **HIGH PACKING GLAND TEMPERATURE DETECTION**

AMOT Model 4102 Miniature Temperature Detectors, like the 4103 Valve Series, incorporate an old heat detecting principle to provide a safety device suitable for modern low and medium speed engines. A thin film of eutectic alloy, less than 0.001 cubic inch in volume, secures a spring loaded fuse rod until the temperature at the sensing end of the rod melts the alloy. The fuse rode is then instantly released and moves outward 1/4". This instant response, in addition to relatively small size, makes the 4102 ideal for use in moving parts such as connecting rod bearings which must be protected from excessive temperatures. Such temperatures may arise from 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.

These devices have been thoroughly field tested by AMOT and several of the largest engine and compressor users. They have proven accurate and reliable in many types of engines in gas compression, power generation, pipeline, marine and general industrial service. They have the most efficient response of any mechanical device now in use. Due to their small eutectic mass, the detectors are nearly as responsive as, and in some cases, more reliable than thermocouples. AMOT Model 4102 Miniature Temperature Detectors do not require the impractical electrical wiring of electrical sensors.

To convert the detector tripping action into a usable signal, an AMOT Model 4095 Vent Valve is required as shown in Fig. 1.

AMOT 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.

Installation

AMOT Model 4102 Miniature Temperature Detectors are the basic sensing units in a safety system. They trip a vent valve which must be tied into the system through connecting tubing. Control pressure may be clean, dry air, gas, or a noncorrosive liquid such as lubricating oil.

Air or gas can be used on some applications, however, the use of gas may not be desired in a hazardous location. Air systems are more versatile and will give faster response than an oil pressured system.

Oil is normally used in systems within an engine as shown in Figure 2. Connecting tubing should be 5/16" O.D. Close-tee each sensing device to the control pressure line and pipe them in series with the Master Safety Control or alarm being the last component in the line.

Maximum pressure to the IN port of the 4095 Vent Valve is 60 psi.

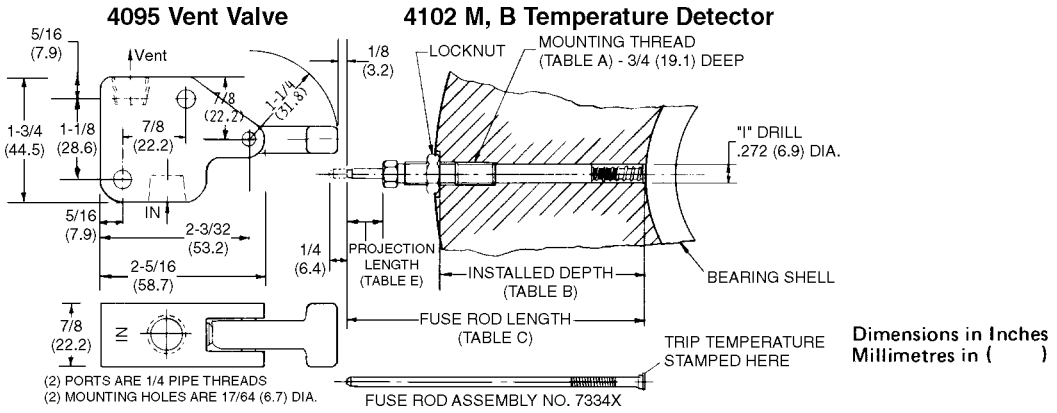
Figure 1 illustrates the general method of installing the Model 4102 in a moving part. An AMOT 4095 Vent Valve is mounted on a bracket near the Fuse Rod tip. If possible, the vent valve should be installed above the oil level in the sump. This makes possible visual checking and aids in manually resetting the valve when hot. This type of installation further prevents the possibility of a “drag” effect tipping the vent valve lever when the fuse rod tip passes in very cold oil. Normally, a 1/8" gap is left between the valve trip lever and the fuse rod tip. When the 4102 trips, the extended rod will strike the vent valve handle on the next pass and initiate the alarm or shutdown sequence.

Model 4102 must NOT be installed with the fuse rod tip permitted to dip in the sump.

As shown in Figure 1, the unit should be screwed into a mounting hole in the bearing support until the proper projection length is obtained. This may be measured or a simple tubing gauge of the proper length may be made to slip over the fuse rod tip. Tighten in place with the locknut.

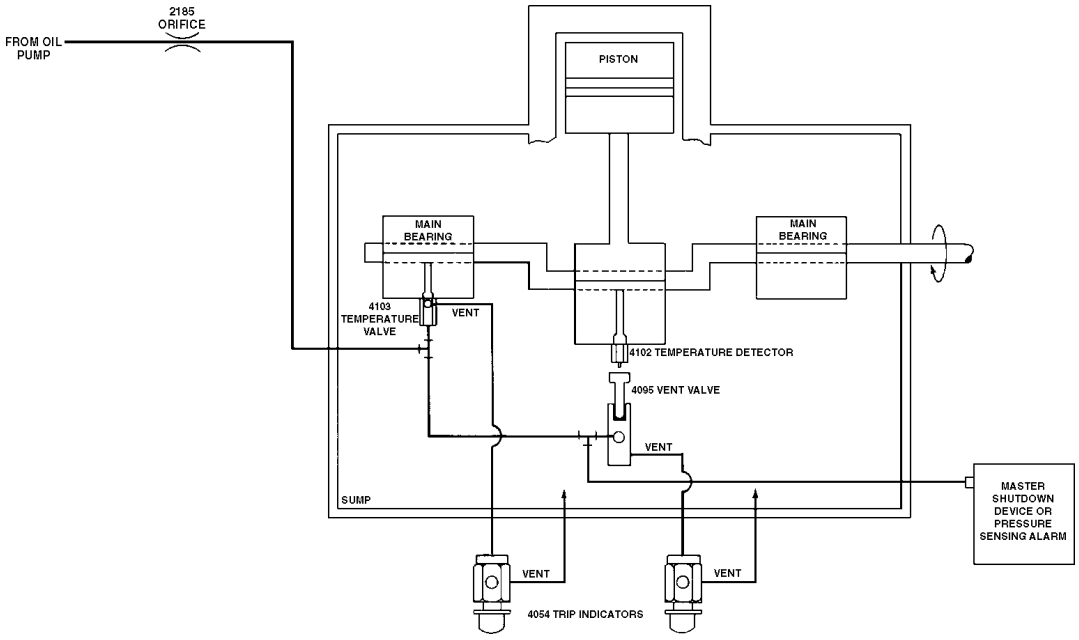
Dimensions

Figure 1



Typical Application

Figure 2



How to Order

When ordering please specify the following:

1. Indicate Model 4102.
2. Installed Depth, see Table B.
3. Fuse Rod Length, see Table C
4. Fuse Rod Projection Length (in 1/4" increments up to 1"), see Table E.
5. Trip Temperature in °F; 174, 197, 217, 228, 253, 291, or 343.

This unit may be ordered using the full description as shown above or by constructing a Model No. using the Model Code System.

When communicating with AMOT regarding operation of a control, always give the Model No. and Serial No. If ordering service parts, also include the Description, Part No. only, please also include the Form No. Revision No. and date of this brochure.

How to Order Replacement Fuse Rods

When ordering please specify the following:

Indicate Fuse Rod Assembly Model 7334X plus the proper code numbers from Tablle C & D of the Model Code System.

Model Code System

4102 M 04 C 12 228 ( ) — Basic Model No.; Revision Level; Special Requirements (MTO) Made-to-Order

Replacement Fuse Rod: 7334X 09 T 197

Table A

Mounting Thread

Code No.	Thread
M	5/16-24 NF
B	M8 X 1.25

Table B

Installed Depth

Code No.	Minimum *		Maximum *	
00	3/4	(19.1)	1-1/16	(27.0)
01	1-5/8	(41.3)	1-15/16	(49.2)
02	1-7/8	(47.6)	2-3/16	(55.6)
03	2-1/8	(54.0)	2-7/16	(61.9)
04	2-3/8	(60.3)	2-11/16	(68.3)
05	2-5/8	(66.7)	2-15/16	(74.6)
06	2-7/8	(73.0)	3-3/16	(81.0)
07	3-1/8	(79.4)	3-7/16	(87.3)

Table C

Fuse Rod Length

Code No.	Length *	
01	1-9/16	(39.6)
02	1-13/16	(46.0)
03	2-1/16	(52.3)
04	2-5/16	(58.7)
05	2-9/16	(65.0)
06	2-7/16	(62.0)
07	2-11/16	(68.3)
08	2-15/16	(74.7)
09	3-3/16	(81.0)
10	3-7/16	(87.4)
11	3-11/16	(93.7)
12	3-15/16	(100.1)
13	4-3/16	(106.4)
14	4-7/16	(112.8)
15	4-11/16	(119.1)
16	4-15/16	(125.5)

Table D

Trip Temperature

°F	(°C)
174	(79)
197	(92)
217	(103)
228	(109)
253	(123)
291	(144)
343	(173)

* Dimensions in inches; millimeters in ( ).

See Figure 1 for dimension identification.

Table E

Fuse Rod Selection Chart (use with Table C)

Install Depth Code No. (From Table B)	Projection Length				
	Flush	1/4"	1/2"	3/4"	1"
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

NOTE: Letters or numbers in the MTO space, other than nothing, AI or AA, indicate the unit is built to special requirements and some of the other code numbers may not be valid. Check with the factory for full specification of such models.

Maintenance

It is recommended that the overall safety system be checked monthly for proper functioning by simulating an unsafe condition.

AMOT recommends maintenance including visual inspection 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 (4) with a twisting motion. Hold it by the ends and visually examine the eutectic alloy area for exposed alloy. Visible allow 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. Fuse Rod Assemblies should be replaced if the crimp section becomes loose.

Life expectancy of Fuse Rod Assemblies is five (5) years under normal operating conditions and proper maintenance.

If desired, maintenance of the Fuse Rod Assemblies themselves may include random sampling and test firing to ensure correct temperature.

WARNING

When unrestrained Fuse Rod Assemblies are heated, they fire with sufficient force to cause injury or damage. Be sure that the Fuse Rod is restrained or aimed in a safe direction.

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.

Fuse Rod Assembly Replacement

When a Model 4102 Miniature Temperature Detector 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. To replace Fuse Rod Assembly (4), remove the entire Temperature Detector from the mounting hole and withdraw the expended Fuse Rod with the rod tip and Loading Spring (3). Insert the new Fuse Rod Assembly and reassemble the Temperature Detector with the Loading Spring fully seated on the Rod Tip. Reinstall the unit in the mounting hole and adjust the depth as described under installation.

Statement of Policy

AMOT Controls Corporation is ready to aid the user in the applications of Model 4102 Miniature Temperature Detectors to the extent of its knowledge and experience. Decisions such as actual location of the installation, insertion length, details of machining, mounting of vent valves and connection to the safety system should only be made by the user after he has physically checked the equipment under consideration.

AMOT can be responsible only for proper operation of the devices providing they have been installed according to AMOT's instruction. AMOT cannot be responsible for improper adjustment, location, connections, or problems arising from stress concentration. Should there be any reservations or unresolved details concerning the application, the user should contact the manufacturer of the protected equipment for additional information.

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