



### Mounted Bearing Temperature Sensors



Large fan drive motors are often plagued with bearing problems. Here is a possible solution for preventing fan bearing problems from being disastrous.

What I am suggesting is the use of temperature sensors mounted in each mounted pillow block bearing. These sensors are used in conjunction with a replacement grease fitting assembly.

The outputs from the sensors are wired, using a simple 14 ga to 24 ga wire, 2 conductors per sensor, up to 5,000 ft away, into a control panel, HB/RB, that allows you all the flexibility and warning you need so that the motor can be protected against a bearing failure.

The system uses rugged switching type PTC (Positive Temperature Coefficient) thermistors as sensors and is the Maxi-Tronic HB series of temperature sensors <http://www.maxitronic.com> (800-659-8250). Please refer to the [HB PTC Q&A sheet](#).


These PTC thermistors are similar to those used in electric motor stators for temperature protection and actually 'switch' or exhibit a large increase in resistance at its transition temperature. They are rugged and reliable. A worthy choice.

#### **As an aside:**

I have noticed over the years that motor manufacturers are using the Motor Frame Size 447/9T for larger and larger motor horsepower ratings. This is the largest 'T' frame motor available and at present I can buy a 250,300,350,400 and 450HP @1800 rpm all on this frame size. The increase in HP is achieved by making the stator and rotor stacks longer in each increasing size. The shaft height stays the same and thus the overall height of the motor. My suspicion is that the air gap between the rotor and the stator stays roughly the same over this HP range. It looks to me that if the motor was taller ie in the 500 frame range then the air gap would be larger allowing more leeway if bearings or housing/shaft machine work started to become a problem. The bottom line is that if I had one or more of these motors in my plant I would keep a very close eye on them for any changes in bearing temperatures over time as this would be the first warning of possible damage to come, which could occur very quickly in some cases.

If I had a bearing temperature monitoring system connected to a group of similar motors, over time I could learn a lot about the temperatures to expect, when a good motor, one that has lasted a long time without problems is compared to a recently installed motor, and I could learn what happens when a motor starts cold and then warms up to see if my alignment was optimum for the installation. The time to spot problems is at installation or reinstallation after problems. This is the time to nip possible problems in the bud before they get any worse.

In conclusion then, I highly recommend the use of such a system as the one above.

I have included several pages from the manufacturers web site for further exploration.....

## GENERAL DESCRIPTION

Maxi-Tronic, Inc. HB Temperature Sensors are rugged temperature sensors for monitoring bearing temperatures. They are designed for easy installation into existing grease fittings and have a flow-through design for applying grease.

## FEATURES

- ✓ Available with Thermocouple, RTD, or PTC temperature sensors.
- ✓ 2-piece design with an outer ‘housing’ and a variety of inner sensor ‘inserts’:
  - The outer housing screws into the existing grease fitting (1/8” or 1/4”) and has its own grease fitting with flow-through design for applying grease to the bearing.
  - The insert screws into the housing until it just touches the bearing race. A temperature sensor embedded in the tip provides quick response to temperature changes.
- ✓ Works with Maxi-Tronic HBRB8/16 Controllers and MTDT24 Temperature Scanners.
- ✓ Compatible with MaxiTrack hazard monitoring software for anytime-anywhere monitoring.
- ✓ Easy hookup to PLCs.



## SPECIFICATIONS

- Approved for Class II, Div. 2, Groups G
- Stainless steel housing and insert.
- Integral 1/2” conduit fitting.
- 8 insert lengths accommodate any size bearing.

### Type “T” thermocouple sensors:

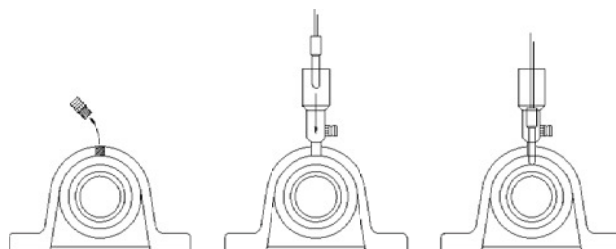
- 22 AWG leads (copper and constantan).
- Requires Type “T” extension wire (leadwire) when wiring the sensors. Maintain polarity.
- Compatible with Maxi-Tronic MTDT24 Temperature Scanners, PLCs with a thermocouple input card, or other thermocouple input devices.

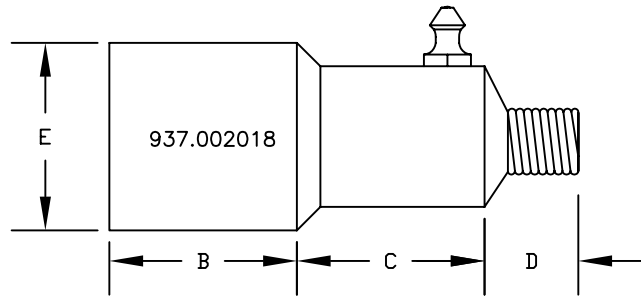
### PTC thermistors sensors:

- Switching-type PTC thermistor with a “J” response curve.
- Switching (transition) temperature is 140F.
- Compatible with Maxi-Tronic HBRB8/16 Controllers, PLCs with a PTC input card, or other thermistor input devices.

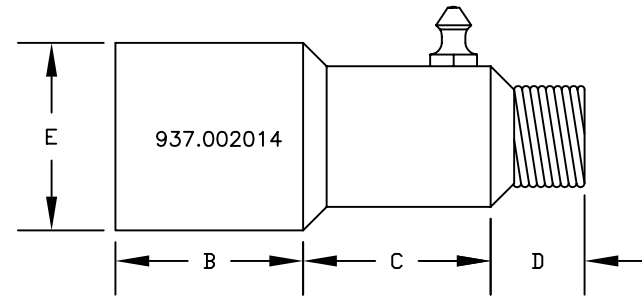
### RTD sensors:

- Ultra stable industry standard 100 Ohm “PT100” type sensor (Class B).
- Do not exceed 1mA maximum measurement current:  $100 \text{ Ohm} * 1 \text{ mA} = .1 \text{ VDC}$
- Compatible with PLCs and other RTD input devices.



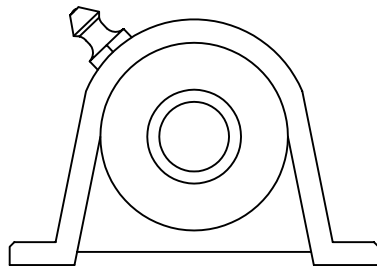


DIMENSION	DESCRIPTION	SIZE
A	TOTAL BODY LENGTH	2.5"
B	.50" CONDUIT THREAD (INSIDE)	1"
C	INSIDE PROBE ADJUSTMENT AREA	1"
D	.125" INSTALLATION THREAD	.50"
E	WIDEST POINT OF BODY	1"



DIMENSION	DESCRIPTION	SIZE
A	TOTAL BODY LENGTH	2.5"
B	.50" CONDUIT THREAD (INSIDE)	1"
C	INSIDE PROBE ADJUSTMENT AREA	1"
D	.25" INSTALLATION THREAD	.50"
E	WIDEST POINT OF BODY	1"

SENSOR HOUSINGS MADE FROM STAINLESS STEEL



STANDARD PILLOW BLOCK

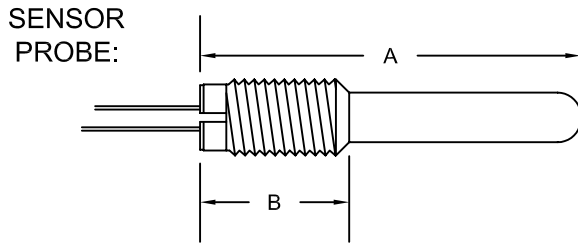
SENSOR FOR STANDARD PILLOW BLOCK:  
 MAXI-TRONIC TRMPERATURE SENSOR .125" GREASE FITTING 937.002018  
 MAXI-TRONIC TEMPERATURE SENSOR .250" GREASE FITTING 937.002014

MAXI-TRONIC, INC. MASON, OHIO

SCALE: NONE	APPROVED BY:	DRAWN BY: JTL
DATE:6/29/04		

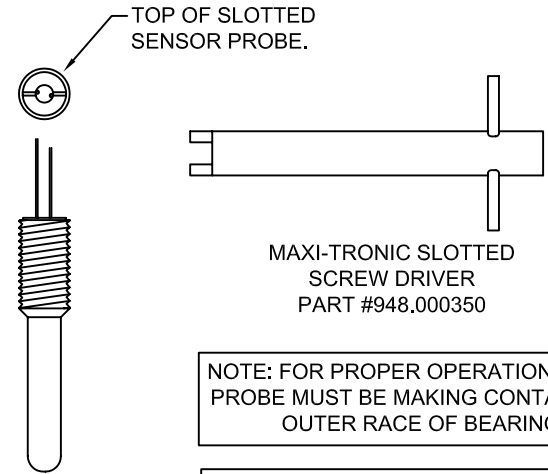
HOT BEARING INSERT HOUSING  
 STANDARD VERSION

TEMPERATURE SENSOR GREASE FITTING HB SERIES	DRAWING NUMBER A-94-87-HB1
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**A** DIMENSION IS TOTAL LENGTH OF PROBE.  
**B** DIMENSION: ALL SENSOR PROBES HAVE .5" ADJUSTMENT THREAD..

NOTE: SENSOR PROBES CAN BE ORDERED IN TOTAL LENGTHS OF:  
STANDARD LENGTHS: 1.50", 2.00", 2.50", 2.75", 3.00", 3.50", 4.00", 4.50"

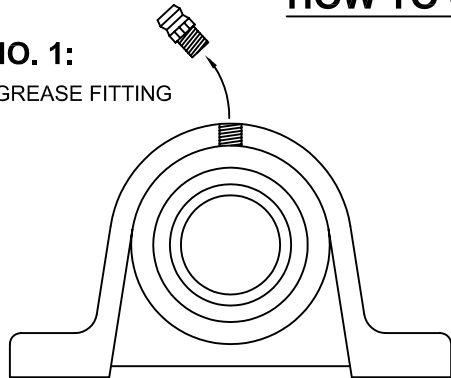


NOTE: FOR PROPER OPERATION SENSOR PROBE MUST BE MAKING CONTACT WITH OUTER RACE OF BEARING!!!

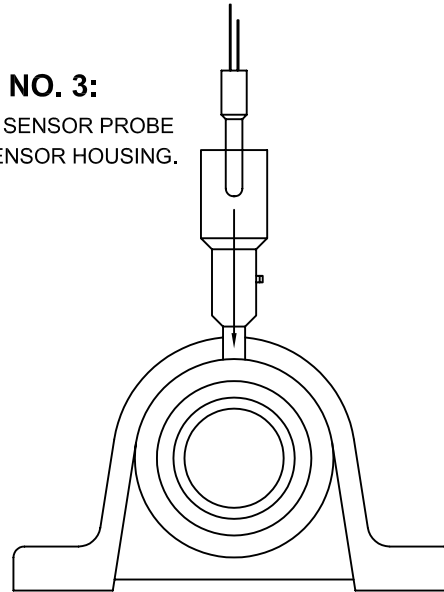
NOTE: BE SURE SENSOR HAS NOT BOTTOMED OUT WITHIN THE OUTER HOUSING BEFORE TOUCHING THE BEARING RACE.

**HOW TO SELECT THE PROPER PROBE LENGTH:**

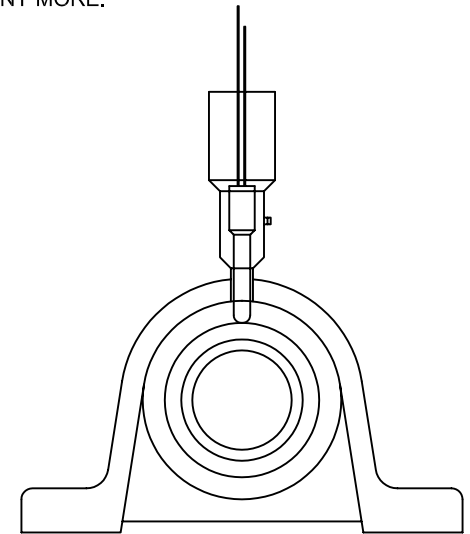
**STEP NO. 1:**  
REMOVE GREASE FITTING



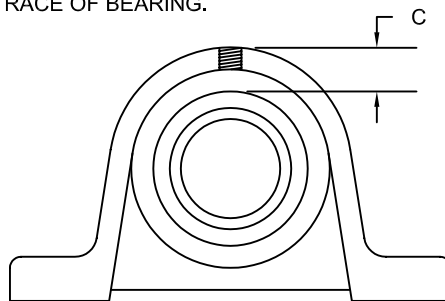
**STEP NO. 3:**  
INSERT SENSOR PROBE INTO SENSOR HOUSING.



**STEP NO. 4:**  
USING MAXI-RONIC SLOTTED SCREW DRIVER, SCREW SENSOR PROBE INTO HOUSING UNTIL PROBE BOTTOMS OUT ON OUTER RACE. THE POINT WHERE PROBE WILL NOT SCREW DOWN ANY MORE.



**STEP NO. 2:**  
MEASURE DISTANCE C FROM TOP OF PILLOW BLOCK TO OUTER RACE OF BEARING.



SENSOR PROBE LENGTH NEEDED = C DIMENSION + 1.50"  
EXAMPLE: C DIMENSION = .75" .75" + 1.50" = 2.25" SENSOR LENGTH

"A" Insert Length	Minimum To Maximum Dimension "C"
1.5"	.0 To .250
2.0"	.0 To .750
2.5"	.750 To 1.250
2.75"	1.0 To 1.500
3.0"	1.250 To 1.750
3.5"	1.750 To 2.250
4.0"	2.250 To 2.750
4.5"	2.750 To 3.250

**MAXI-TRONIC**  
3530 IRWIN SIMPSON ROAD  
MASON, OHIO 45896  
MAXI-TRONIC **HB PTC** TYPE SERIES TEMPERATURE MONITORS  
**MOST ASKED QUESTIONS**

- Q. What type of sensor is used within the HB Sensor?  
A. PTC - Positive Temperature Coefficient thermistor.
- Q. How far from the electronic housing can I run wire to the HB temperature sensors?  
A. Up to 5,000 feet.
- Q. What type of wire must I use with the sensors?  
A. Any copper wire 14 to 24 gauge. Two conductors per sensor. Sensors can be wired in series if 14 to 18 gauge is used.
- Q. What happens if a sensor wire gets pulled loose?  
A. The station indicator will signal as if the temperature sensor is in alarm status.
- Q. Can the temperature sensor be damaged by not having the wires connected properly?  
A. No. The sensors have no polarity. As long as either wire is run to the sensor station and the other to the station sensor common, there will be no damage.
- Q. What voltage does the sensor have?  
A. 12 volts DC/4 to 12 milliamps current.
- Q. Are the sensors approved for hazardous locations?  
A. Yes, they are UL®-CUL approved for Class II Division 2 Group F & G.
- Q. How do I connect my field wiring to the temperature sensor?  
A. Sensor inserts have a 6'-2 conductor pigtail for making all wiring connections.
- Q. If necessary, can the temperature sensor be replaced without having to replace the complete housing?  
A. Yes. The insert can be easily replaced by user if ever needed.
- Q. Can different length sensors be obtained?  
A. Yes. Maxi-Tronic offers different length sensor elements to accommodate varying types of monitoring.
- Q. Do electronic circuits work in fail-safe operation?  
A. Yes. If the PC Board fails, Sensor fails, wiring is damaged, etc., the electronics will signal as if that station has a high temperature alarm.
- Q. Can I purchase more than one system in a single housing?  
A. Yes. You can order any number of systems in one housing.
- Q. Can I purchase the HB temperature system and have it incorporated into the RB mis-alignment and MT motion sensor system?  
A. Yes. You can have any combination of units in one system housing.

800.659.8250  
[www.maxitronic.com](http://www.maxitronic.com)