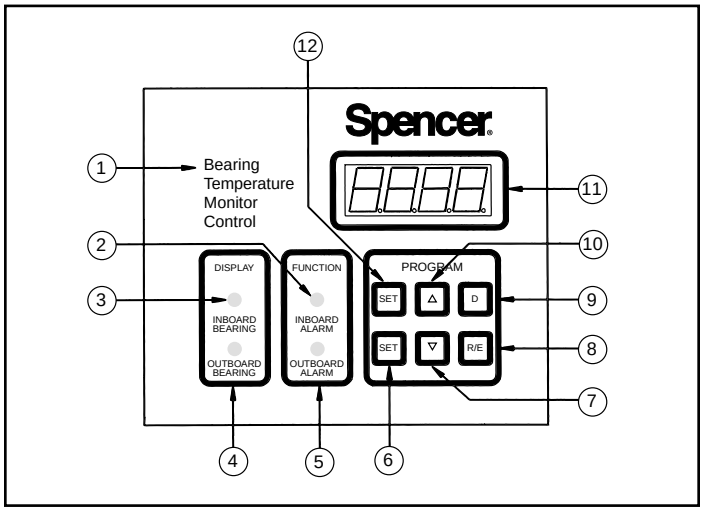
Spencer®
Bearing Temperature Monitor Control

Operating Instructions

Important

Read and become familiar with this manual prior to uncrating and installing your Spencer equipment. This precision equipment is capable of extended service and lifespan. Realization of this potential can best be achieved through proper handling and adherence to the instructions detailed herein. Damage resulting from failure to follow correct procedures will void warranty.

The Spencer Turbine Company Windsor, Connecticut 06095 **Form BTMC**



1. Keypad Identifier
2. Inboard Bearing Alarm LED
   (OFF = Normal, Flash = Warning, ON = Shutdown)
3. Inboard Bearing Temperature
   Display When LED ON
4. Outboard Bearing Temperature
   Display When LED ON
5. Outboard Bearing LED
   (OFF = Normal, Flash = Warning, ON = Shutdown)
6. Outboard Bearing “Set” Button
7. “Scroll Down” Button
8. Reset/Enter Set Points
9. Display Select Button
10. “Scroll Up” Button
11. 4-Digit Digital Display (7 Segment LED)
12. Inboard Bearing “Set” Button

I. Overview

The *Bearing Temperature Monitor Control (BTMC)* will monitor the temperature of the inboard and outboard bearings of a blower or vacuum producer. It will also provide alarm warning indication and high alarm shutdown. The lower portion of the panel is divided into three categories: *Display, Function,* and *Program*. The *Display* group is linked to the *4-digit digital display* (11), indicating which input is being read. The *Function* group acts as a status indicator for alarm indication. Finally, the *Program* group contains push buttons that allow the user to interface with the controller.

The *BTMC* is programmed at Spencer with machine-specific data, allowing for more precise control in a machine and controller "matched set" configuration. The *Inboard Bearing* and *Outboard Bearing* set point range will therefore be tailored to the blower or vacuum producer (e.g., for a bearing with a nominal operating set point of 220 degrees, a minimum of 200 and a maximum 240 degrees would be the allowable adjustment range).

II. Applying Power

When power is applied to the BTMC, an initialization sequence takes place. The controller’s *4-digit display* will indicate: **8.8.8.8. followed by 0000, 1111, 2222, 3333, ... 9999, SPENCER BtnC**. When the initialization sequence is complete, the *Inboard Bearing* LED (Light Emitting Diode) (3) will light to indicate that the inboard bearing is being monitored.

By pressing the *Display* button *"D"* (9), the digital display may be changed from "Inboard Bearing" to "Outboard Bearing" and vice versa. The corresponding LED (3) or (4) will light up to indicate which bearing is being monitored. **Note: Both bearings are monitored simultaneously, however only one bearing may be viewed at a time.**

III. Alarm Set Points

The BTMC Universal Controller has two fully programmable set points. These set points are for the Inboard Bearing (Inlet end) and Outboard Bearing (Discharge end).

Inboard Bearing:
The *Inboard Alarm* set point can be adjusted by pressing the upper *Set* button (12). The *Inboard Alarm LED* (2) will illuminate and the digital display (11) will show the *Inboard Alarm* set point in degrees F with the tenths digit flashing. To change the tenths digit in the set point, press the *Up* button (10) or the *Down* button (7). To change to the units digit, press the *Display* button*"D"* (9) and the units digit will flash. Now press the *Up* button (10) or the *Down* button (7). Pressing the *"D"* button (9) shifts the numerical place value to the left, allowing for a quicker change. To save the new set point and return to the temperature display (normal operation), press the *Reset/Enter "R/E"* button (8).

Outboard Bearing:
The *Outboard Alarm* set point can be adjusted by pressing the lower *Set* button (6). The *Outboard Alarm LED* (5) will illuminate and the digital display (11) will show the *Outboard Alarm* set point in degrees F with the tenths digit flashing. To change the tenths digit in the set point, press the *Up* button (10) or the *Down* button (7). To change to the units digit, press the *Display* button *"D"* (9) and the units digit will flash. Now press the *Up* button (10) or the *Down* button (7). Pressing the *"D"* button (9) shifts the numerical place value to the left, allowing for a quicker change. To save the new set point and return to the temperature display (normal operation), press the *Reset/Enter "R/E"* button (8).

Note: If either "Set" button is pressed and no operator intervention occurs for 30 seconds, the controller will switch back to normal operation. (The controller will revert to the last operating display: Inboard Bearing or Outboard Bearing.)

IV. Alarm Status

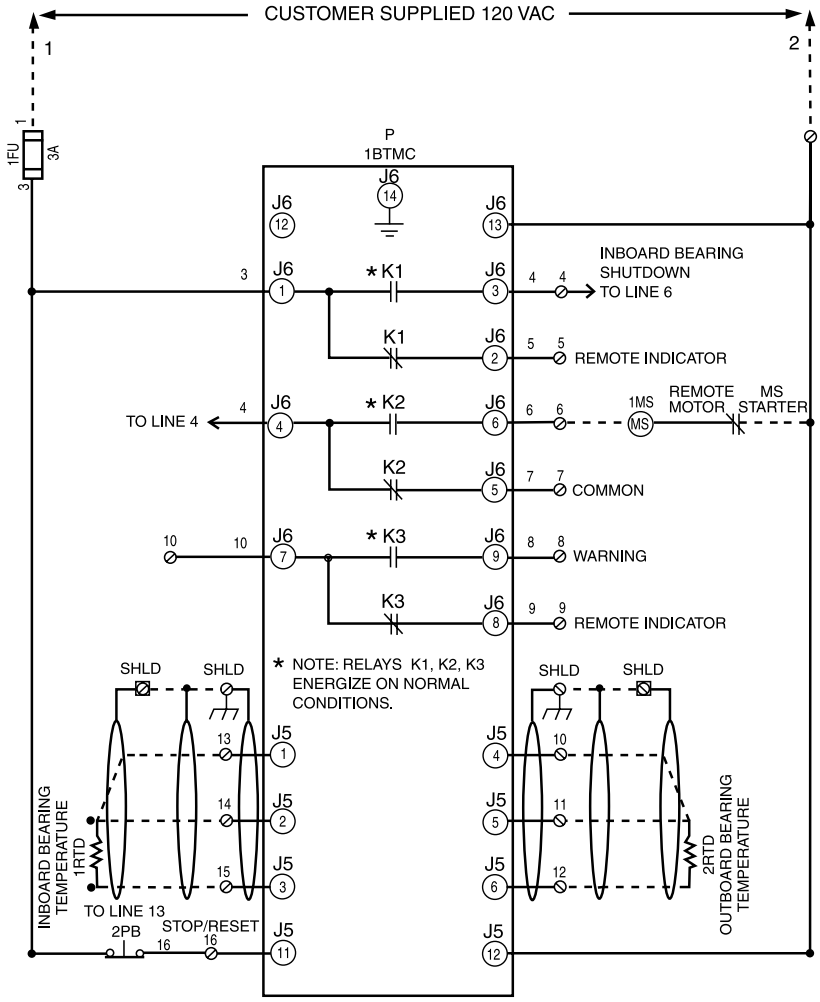
The BTMC has two tiers of fail safe alarm monitoring (the relay is energized in normal operation and de-energized on alarm). The first tier is a *Warning*. When the bearing temperature is 3 percent below the *Alarm* set point, the corresponding alarm LED, *Inboard* (2) or *Outboard* (5), will flash. The flashing LED is a visual indicator that the bearing temperature is close to the shut-down set point and precautionary measures should be taken. A common "Warning" relay (K3) will also be de-energized on alarm. The form "C" contact may be used for remote indication of a "Warning" condition.

The second tier is an *Alarm (Shutdown)*. In the *Alarm* state, the alarm LED, *Inboard* (2) or *Outboard* (5), will illuminate in a steady state when the bearing temperature exceeds the set point. The corresponding relay output will then shut down the blower or vacuum producer (K1 = inboard, K2 = outboard). The relay output may also be used for remote indication of shutdown.

To clear any *Warning* or *Alarm*, the *Reset/Enter "R/E"* button (8) must be pressed for 5 seconds. If the bearing temperature still meets or exceeds the warning or alarm levels, the controller cannot be reset. The bearing must be cooled to an acceptable level before the blower or vacuum producer will be allowed to start up again.

V. Wiring Diagram

BEARING TEMPERATURE MONITOR CONTROL



Note: Dotted lines indicate field wiring.

Specifications			
Dimensions (H x W x D)	Overall $5^{1}/_{8}$ x $6^{1}/_{8}$ x 3	Cutout $4^{3}/_{4}$ x $5^{3}/_{4}$ x (n/a)	Part Number CTB 90009
Digital Display	7 Segment / LED $^{5}/_{8}$ High	Display Inboard/Outboard Bearing Temperature	
Power Supply	120/240 VAC, 1Ø, 50/60 Hz		
Inputs	Analog (2)	100 Ω platinum RTD	
	Digital (1)	120 VAC (Reset)	
Outputs	(3) Provided Rated @: 5 A General Purpose, 250 VAC; $^{1}/_{6}$ HP 120 VAC, 2A Pilot Duty, 120 VAC	Inboard Shutdown, Outboard Shutdown, Common Warning Alarm	
Nema Ratings	1, 2, 12, 4, 4X	Note: N-12, 4 and 4X, Indoor Only	
Agency Approvals	UL 873	File #E151368, 97ME50259, DD/215K	
	CUL	CAN/CSA 22.2, No. 24-93	

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