

Temperature Controllers

Model T667A, B, C

Instruction

Application

The T667A, B, and C Temperature Controllers (Figures 1 and 2) are designed for industrial heating and cooling applications such as heat-treating baths, ovens, cooling chambers, and similar industrial units. In a typical application, the T667 may be used with an M644 Modutrol Motor, M640 Actionator Motor, or solenoid valve for precise temperature control.

- The T667A controls by means of a SPDT MICRO SWITCH snapswitch with a fixed differential.
- The T667B incorporates the same switching action with an adjustable differential.
- The T667C has manual reset and fixed differential. It is used as a high limit controller.

Features

The T667 is fully enclosed with a steel case and a zinc die-cast cover, providing excellent resistance to environmental effects.

The T667A and T667B set point is visible through a window on the front of the control, and is easily set by a front

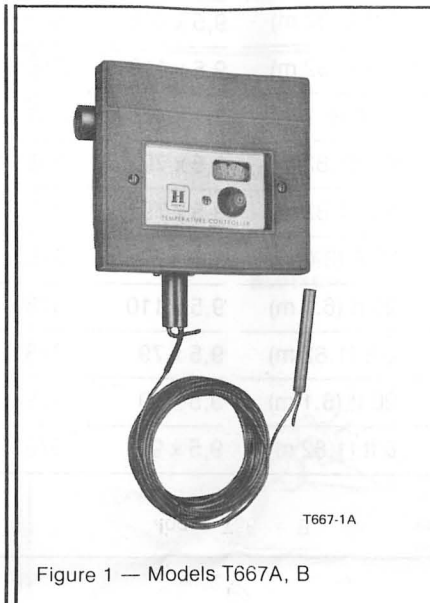


Figure 1 — Models T667A, B

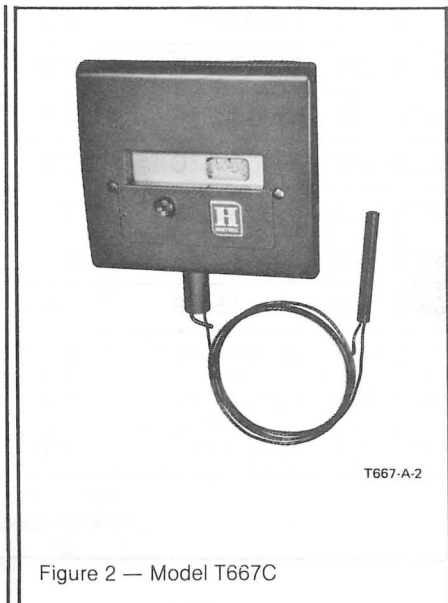


Figure 2 — Model T667C

accessible knob. The T667C differs by having a manual reset button on the front of the case, and the set point adjustment concealed under the front cover. Ambient compensation is built in-

to the T667 to compensate for temperature effect on the case and capillary.

The controller can be either surface mounted or flush mounted by using external mounting brackets.

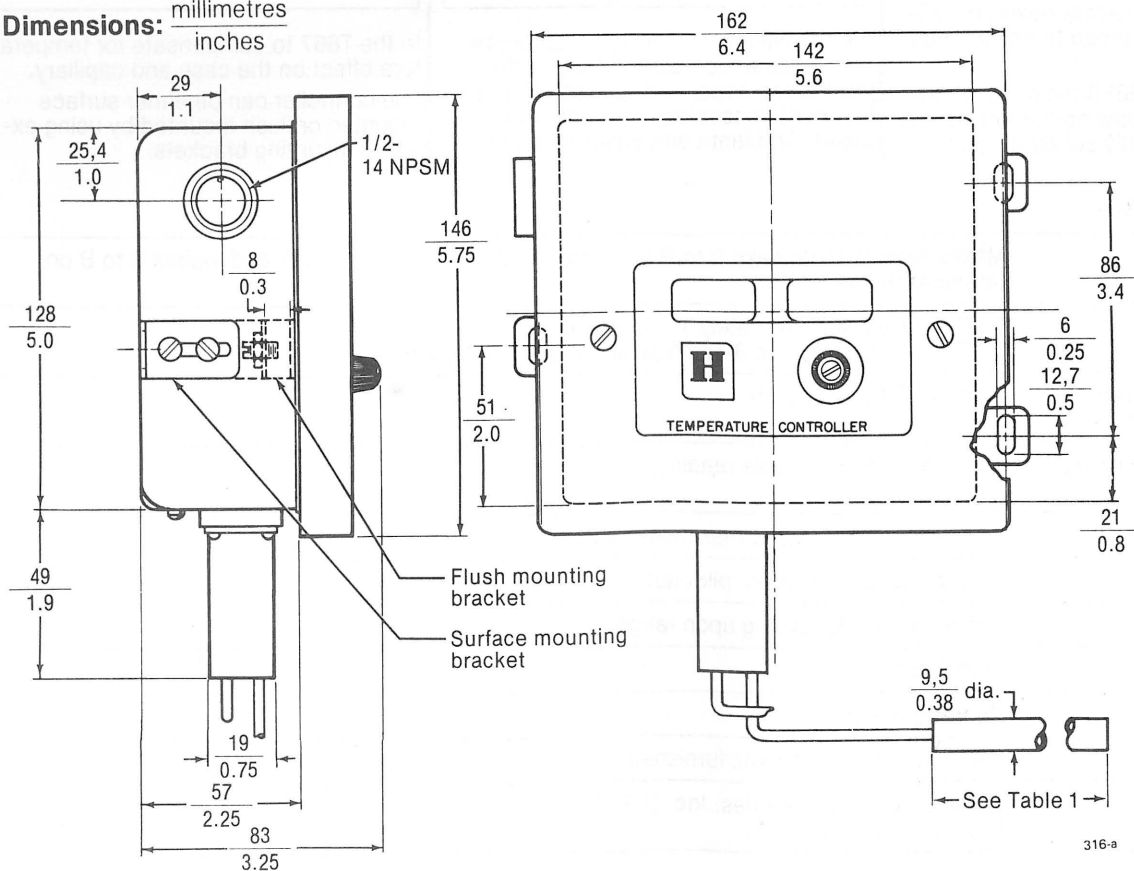
Specifications

Switching Action	Makes R to W and breaks R to B on temperature rise; breaks R to W and makes R to B on temperature fall
Differential	T667A: Fixed, approximately 1% of span T667B: Adjustable, 1 to 3-1/2% of span, additive to set point
Ambient Temperature Compensation Range	0 to 55°C (30 to 130°F)
Maximum Safe Operating Temperature	110% of maximum scale reading
Accuracy	±2% at center of scale, maximum; typically within ±1%
Electrical Rating	62.5 VA at 120/240 Vac, pilot duty
Scale Length	4 to 5 inches, depending upon range
Capillary Length	(See Table 1.)
Dimensions	(Refer to Figure 3.)
Mounting	Surface or flush, brackets furnished
Listing Body	Underwriters' Laboratories, Inc. (T667A) Factory Mutual (T667C)

TABLE 1 - Models, Ranges, Bulbs, and Fill Material

Model No.	Scale Range	Scale Divisions	Element Length	Bulb Size Diameter x Length		Bulb Material	Fill Material
				Millimeters	Inches		
T667A 1174	-150 to +150°F	5°F	6 ft (1.82 m)	9,5 x 73	3/8 x 2-7/8	Copper	Alcohol
T667A 1182	-50 to +100°F	2°F	6 ft (1.82 m)	9,5 x 148	3/8 x 5-13/16		Toluene
T667A 1190	0 to 150°F	2°F	6 ft (1.82 m)	9,5 x 148	3/8 x 5-13/16		Toluene
T667A 1208	50 to 250°F	2°F	6 ft (1.82 m)	9,5 x 110	3/8 x 4-5/16		Toluene
T667A 1224	50 to 250°F	2°F	20 ft (6.1 m)	9,5 x 110	3/8 x 4-5/16		Toluene
T667A 1232	10 to 200°C	2°C	6 ft (1.82 m)	9,5 x 79	3/8 x 3-1/8		Silicone Oil
T667A 1216	50 to 400°F	5°F	6 ft (1.82 m)	9,5 x 79	3/8 x 3-1/8		Silicone Oil
T667A 1323	50 to 400°F	5°F	10 ft (3.05 m)	9,5 x 79	3/8 x 3-1/8		Silicone Oil
T667B 1066	50 to 250°F	2°F	20 ft (6.1 m)	9,5 x 110	3/8 x 4-5/16		Toluene
T667C 1057	50 to 400°F	5°F	6 ft (1.82 m)	9,5 x 79	3/8 x 3-1/8	Stainless Steel	Silicone Oil
T667C 1065	50 to 400°F	5°F	20 ft (6.1 m)	9,5 x 79	3/8 x 3-1/8		Silicone Oil
T667C 1099	50 to 400°F	5°F	6 ft (1.82 m)	9,5 x 90	3/8 x 3-9/16		Silicone Oil

Dimensions: millimetres
inches



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Figure 3 — Model T667 Dimensions to Nearest Millimetre

Installation

Before installing, uncoil the capillary carefully to prevent it from kinking.

Mounting

The T667 Indicating Temperature Controller can be either surface or flush mounted using the brackets furnished. Since the device is self-compensating, the height differential between the case and the bulb is limited only by the capillary length.

IMPORTANT: The bulb should be located where it will be exposed to the average temperature of the medium to be controlled. Do not locate the bulb near a hot or cold inlet.

Use of the Compression Fittings

Order compression fittings separately. See Table 2.

The following steps should be followed when mounting the bulb in a sealed container (see Figures 4 and 5).

1. Drain the system (when used in a liquid).
2. Screw the fitting into an appropriate pipe tapping.
3. Place the packing nut on the capillary.
4. Slide the bulb completely through the fitting.
5. Place the composition packing ring and the four-slotted brass washers on the capillary in the order shown in Figure 4. Turn the brass washers so that the slots are 180 degrees from each other.
6. Insert the seal assembly in the fitting, and tighten the packing nut.
7. Refill the system (when used with a liquid).

TABLE 2 - Compression Fittings

Spud Thread	Part Numbers	
	Brass	Stainless Steel
1/2 NPT	7617 ACT	7617 ACS
3/4 NPT	7617 ACP	7617 ACQ

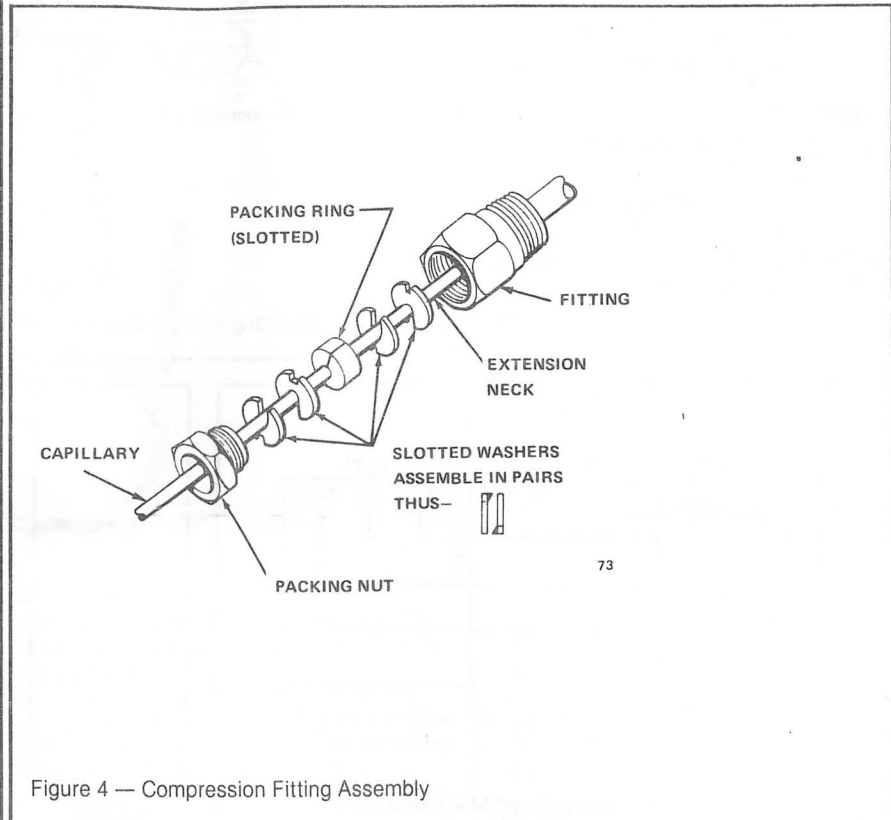


Figure 4 — Compression Fitting Assembly

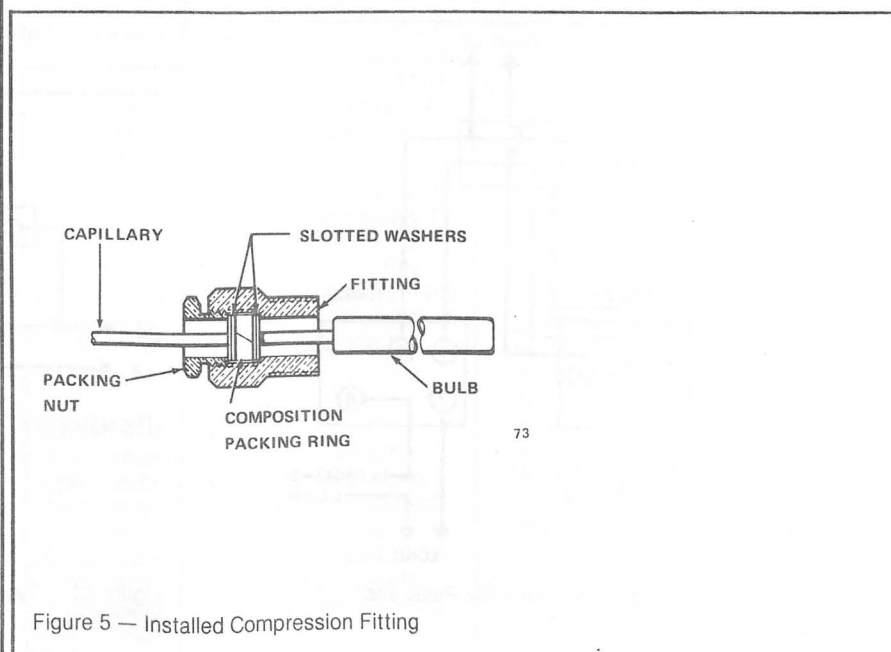


Figure 5 — Installed Compression Fitting

Use of Separable Wells

Order separable wells separately.

If the remote bulb is located in an agitated bath or corrosive substance, use a separate well to protect the bulb. Refer to the installation instructions supplied with the equipment for the location of the well. After installing the well, slide the remote bulb into the well until the bulb bottoms. Refer to Figure 6. Place the spring clip over the capillary, and push the clip into the well, capturing the capillary and holding the bulb in place.

Wiring

All wiring must agree with applicable wiring codes.

NOTE: Remove cardboard packing stops before replacing cover.

See Figures 7, 8, 9, and 10 for typical wiring hookup methods.

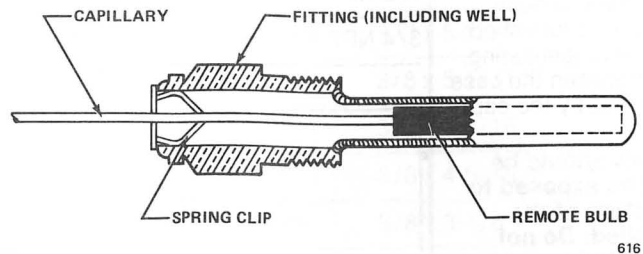
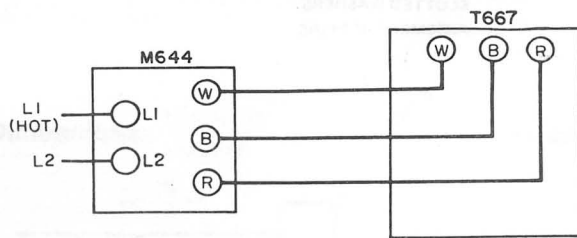
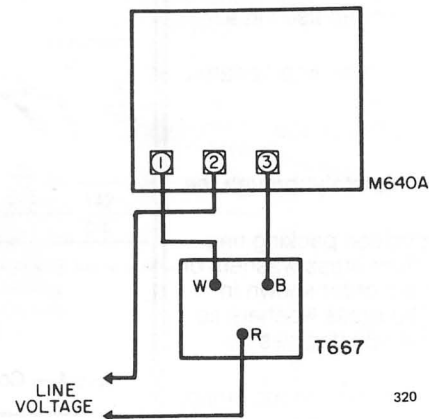


Figure 6 — Mounting Remote Bulb in a Separable Well



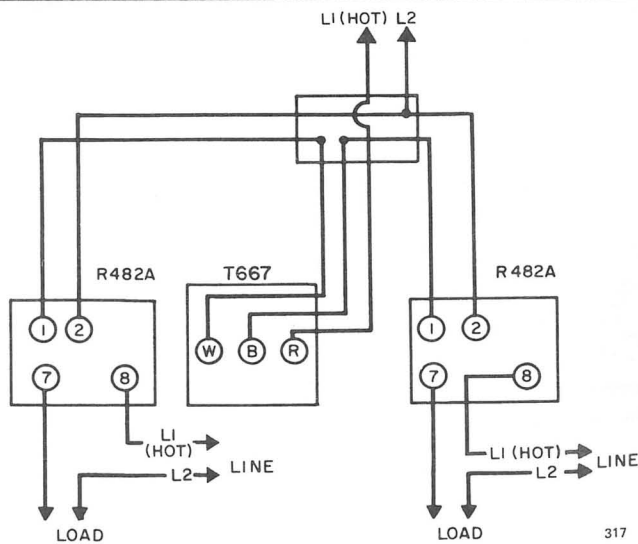
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Figure 7 — Typical Wiring Hookup for an M644 Modutrol Motor



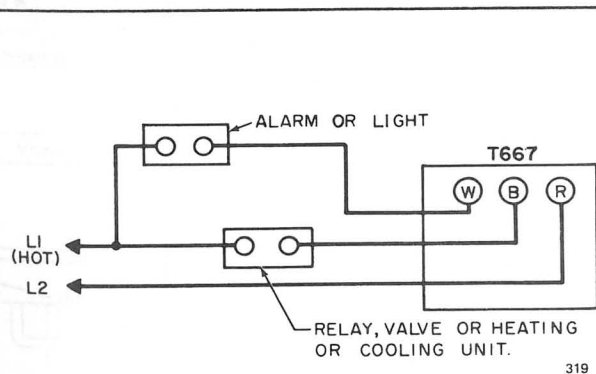
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Figure 8 — Typical Hookup for an M640 Actionator Motor



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Figure 9 — Typical Wiring Hookup for R482 Relay and T667 Controller



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Figure 10 — Typical Hookup for Alarm Signal and Heating or Cooling Unit

TABLE 3 - MICRO SWITCH Parts List for T667A, B and C

Model	Switch	Frame	Cover Insert
T667A	112188	112198	96-906
T667B	117027	112198S	117741
T667C	105165	112198	96-906

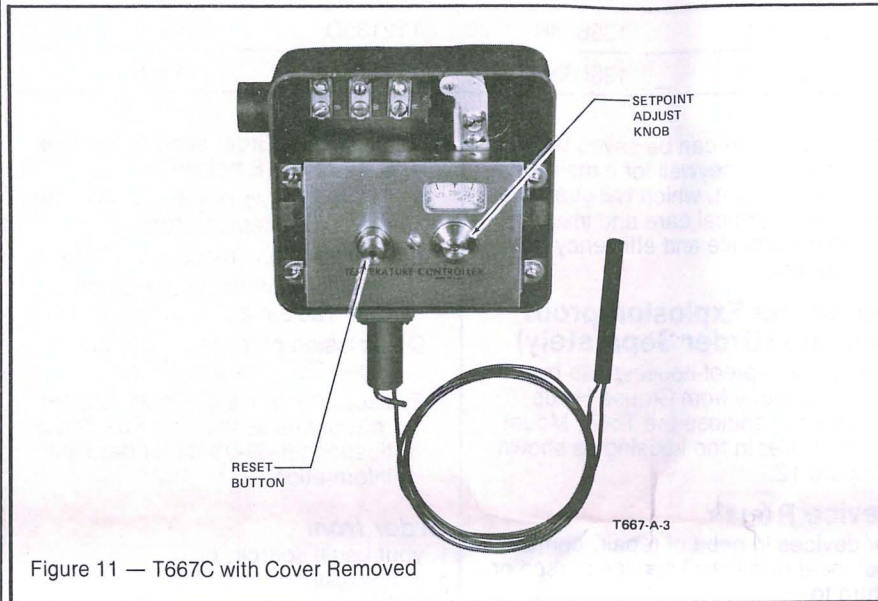


Figure 11 — T667C with Cover Removed

Operation

The T667A, B, and C Indicating Temperature Controllers consist of a MICRO SWITCH snap switch (see Table 3) actuated through a lever system by a bellows-type, remote bulb, liquid-filled thermal system. The set point is visible through a glass window on the face of the controller. Set point is changed by means of a knob on the face of the controller for the T667A and B by a screw concealed under the cover for the T667C.

Ambient temperature compensation of the case is provided by the movement of the entire lever system by means of a bimetal.

Setting and Adjusting

Set Point - T667A, B, C

T667A and B

The T667A and B have a set point knob on the front cover. Turn the knob until the desired set point temperature is indicated through the scale window.

T667C

The T667C has a set point adjustment screw concealed under the cover (Figure 11). Remove the two cover screws, and lift off the cover. Turn the adjustment screw until the desired set point temperature is indicated on the scaleplate. Replace the cover.

IMPORTANT: After the T667C has reached its set point (breaking R to B and making R to W) on a temperature rise, either the bulb temperature must be lowered or the set point raised 25°F before pushing the reset button to reset the controller.

Differential - T667B Only

Remove the two cover screws, and lift off the cover. The differential is adjusted by turning the white knurled dial on the switch. The switch is located above and behind the faceplate. The faceplate need not be removed.

The differential dial is marked A-B-C-D-E-F, corresponding to approximately 1 (A) to 3-1/2% (F) of the controller's temperature span. Line up the letter corresponding to the desired differential vertically (and opposite the small indicator on the switch body). Replace the cover.

Calibration

Though carefully checked and accurately calibrated at the factory, abnormal shocks during shipping may affect the calibration's accuracy. If your device appears to be out of calibration, it may be checked and, if necessary, recalibrated by observing the following procedure.

T667A and B

Maintain the sensing bulb at a constant temperature, preferably at the midpoint of the temperature span. Remove the controller cover. Then proceed, as follows.

1. Adjust the set point scale to the minimum set point. Connect a test light or other indicating device between the R and B terminals on the terminal strip. The test light should remain out until the set point is adjusted in step 2.
2. Slowly increase the setting on the controller until the light just snaps on. At this point the scale should indicate the temperature at which the sensing bulb is being maintained. If the two temperatures (bulb temperature and scale reading) coincide, the controller is in calibration, and no further checking is required. If, however, the readings are not the same, continue with the following steps.
3. Select the scale set point which coincides with the bulb temperature. With the cover removed, you will notice two screw heads immediately above the scale viewing window. The first screw (smaller diameter) immediately above the window is a locking screw. The second (larger diameter) flat head screw is the calibration adjustment screw.
4. Remove the blue sealing cement, loosen the locking screw, and adjust the calibration screw until the indicating light snaps on. Do not adjust further than necessary.
5. Retighten the locking screw.
6. Check the calibration by repeating steps 1 and 2.

T667C

Maintain the sensing bulb at a constant temperature, preferably at the midpoint of the temperature span. remove the controller's cover. Then proceed, as follows.

1. Adjust the set point scale to the maximum set point. Connect a test light or other indicating device between the R and B terminals on the terminal strip. The test light should remain out until the set point is adjusted in Step 2.
2. Slowly decrease the setting of the controller until the light just snaps off. At this point the scale should indicate the temperature at which the sensing bulb is being maintained. If the two temperatures (bulb temperature and scale reading) coincide, the controller is in calibration, and no further checking is required. If, however, the readings are not the same, continue with the following steps.
3. Select the scale set point which coincides with the bulb temperature. With the cover removed, you will notice

TABLE 4 - Element Assembly Parts List for T667A, B and C

Material	Range	Element Assembly		Cam Assembly	Bimetal Compensation
		6 Foot	20 Foot		
Copper	-150 to 150°F	133638N	133638P	112135P	114817
	-50 to 100°F	133638A	133638E	112135A	114817
	0 to 150°F	133638B	133638F	112135B	114817
	50 to 250°F	133638C	133638G	112135C	114817
	50 to 400°F	133638D	133638H	112135D	114818
	10 to 200°C	133638D	133638H	112135L	114818

two screw heads immediately above the scale viewing window. The first screw (smaller diameter) immediately above the window is a locking screw. The second (larger diameter) flat head screw is the calibration adjustment screw.

- Remove the blue sealing cement, loosen the locking screw, and adjust the calibration screw until the indicating light snaps off. Do not adjust further than necessary. Refer to "IMPORTANT" under "Set Point" section concerning manual reset of the T667C.
- Retighten the locking screw. Replace the cover.
- Check calibration by repeating steps 1 and 2.

Maintenance

Mechanical devices must be serviced periodically if they are expected to provide continued satisfactory performance. Controls are not an exception. How accurate and troublefree your control system will be in the years to come depends largely on the maintenance given it. For best results, all devices in your system should be serviced at one time.

Time and trouble can be saved by arranging with Honeywell for a maintenance agreement, which will guarantee expert, economical care and insure both maximum life and efficiency from your system.

Use of the Explosion-proof Housing (Order Separately)

An explosion-proof housing can be ordered directly from Crouse Hinds Company to enclose the T667. Mount the controller in the housing as shown in Figure 12.

Device Repair

For devices in need of repair, contact your local Honeywell service person or return to—

Honeywell
Return Goods Department
Columbia Heights Plant
550 39th Ave. N.E.
Minneapolis, Minnesota 55421

Ordering Information

Specify

- model number,
- range,
- capillary length and material,

4. accessories. (Order separately. See A, B, C, D and E below):

- 311266D Bulb Holder for use when sensing air temperature,
- compression fittings (see Table 2),
- replacement element assemblies (See Table 4 and Form 95-8119),
- explosion-proof case, Crouse Hinds GUB 1523-4-0002,
- separable wells of Monel, copper, mild or stainless steel. See Specification 26-69-03-02 for detailed information.

Order from

- your usual source, or
- Honeywell
1885 Douglas Drive North
Minneapolis, Minnesota 55422
In Canada,
Honeywell Limited
155 Gordon Baker Road
Willowdale, Ontario M2H 3N7

International sales and service offices are in all principal cities of the world.

Specifications are subject to change without notice.

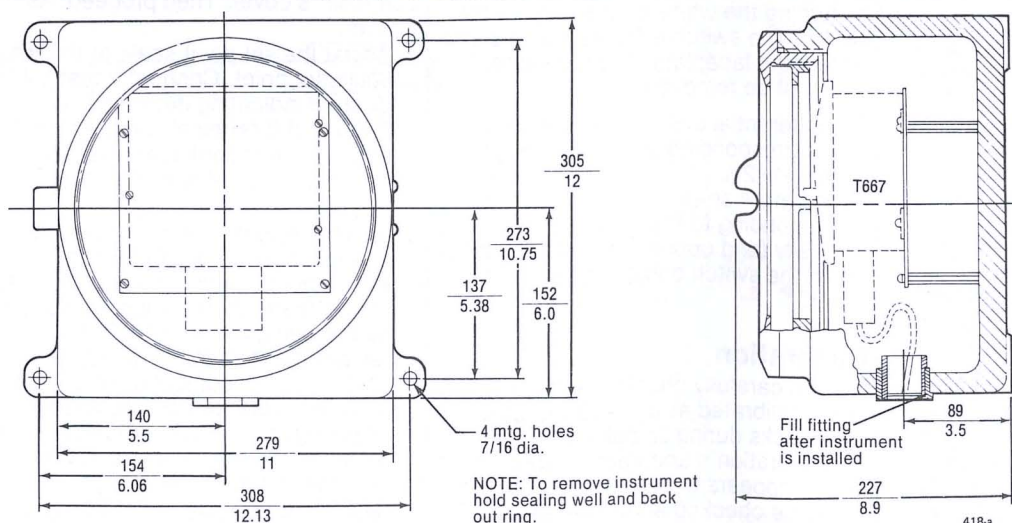


Figure 12 — T667 Mounted in an Explosion-proof Housing