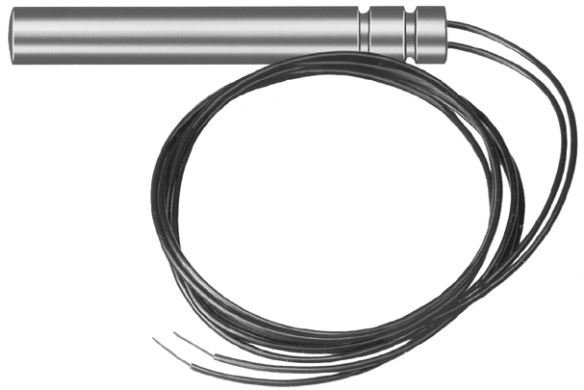


C7170A,B Encapsulated Temperature Sensor

The C7170A,B Temperature Sensors are for use with electronic controllers where linear PTC sensors are required (W7100, W7600, W7620, or Excel 500, for example), and with R7380J,L Indicating Controllers in immersion or strap-mounted discharge applications.



- Requires no settings or calibration.
- Platinum positive temperature coefficient (PTC) sensing element.
- High accuracy temperature sensing (+/-2° F [1.1° C]) for wide range of temperatures (-40° F to +257° F [-40° C to +125° C]).
- Resistance range is 2900 to 4400 ohms (C7170A); 840 to 1500 ohms (C7170B).
- Can be located up to 1195 ft [364 m] from the R7380.
- Suitable for mounting in immersion well.
- Can be strapmounted to discharge pipe of boiler or chiller.

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Specifications

IMPORTANT: *The specifications given in this publication do not include normal manufacturing tolerances. Therefore, an individual unit may not exactly match the listed specifications. Also, this product is tested and calibrated under closely controlled conditions and some minor differences in performance can be expected if those conditions are changed.*

MODEL: The C7170A,B Temperature Sensors are for use with electronic controllers where linear PTC sensors are required (W7100, W7600, W7620, or Excel 500, for example), and with R7380J,L Indicating Controllers in immersion or strap-mounted discharge applications.

C7170A: Use with W7100, W7600, W7620, R7380J,L.
C7170B: Use with Excel 500.

ELECTRICAL RATING: 30 Vac maximum.

TEMPERATURE SENSOR RESISTANCE: (see Figs. 5 and 6)

Temperature °C	-10	0	10	20	30	40
Temperature °F	14	32	50	68	86	104
Resistance in ohms—C7170A	3,178	3,266	3,353	3,440	3,527	3,613
Resistance in ohms—C7170B	961	1,000	1,039	1,078	1,117	1,155

SENSING ACCURACY: With R7380, $\pm 2^{\circ}\text{F}$ [1.1°C].

AMBIENT TEMPERATURE RANGES:

Operating and Shipping: -40°F to $+257^{\circ}\text{F}$ [-40°C to $+125^{\circ}\text{C}$].

HUMIDITY: 90 percent relative humidity at 90°F [32°C] noncondensing environment.

MOUNTING: Strap-on or immersion mounting; see Accessories.

DIMENSIONS: See Fig. 1.

LEADWIRE LENGTH (Specify when ordering):

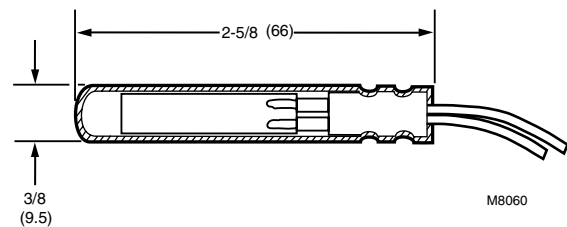
24 in. [61 cm] pigtail leads
80 in. [240 cm] quick connect

LEAD LENGTH: 1195 ft [364 m] maximum.

ACCESSORIES:

4074CAV: Shielded Cable, 50 ft [15 m].
4074CAW: Shielded Cable, 100 ft [30.4 m].
4074CAY: Shielded Cable, 200 ft [61 m].
105900 Pipe Strap: Fits up to $3/4$ in. [19 mm] O.D. pipe.
121371A Immersion Well: $1/2$ in. [13 mm] NPT copper.
121371E Immersion Well: $1/2$ in. [13 mm] NPT stainless steel.
107408 Heat Conductive Compound: 4 oz. [113 g] can.

Fig. 1—Approximate dimensions of C7170A Encapsulated Temperature Sensor in in. [mm].



Ordering Information

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE Catalog or price sheets for complete ordering number, or specify—

1. Model number.
2. Leadwire length.
3. Accessories, if required.
4. Order additional system components and accessories as needed.

In Canada—Honeywell Limited/Limitee, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9. International Sales and Service offices in all principal cities of the world.

Installation

WHEN INSTALLING THIS PRODUCT...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.



CAUTION

Disconnect power supply before making wiring connections to prevent electrical shock or equipment damage.

LOCATION AND MOUNTING

The C7170A,B Encapsulated Temperature Sensor can be installed by strapping the sensor to the outside of a boiler or chiller output pipe, or by placing the sensor in the fluid of a boiler or chiller using an immersion well. Instructions for both types of installations follow.

Strapping The C7170A,B To A Boiler Or Chiller Output Pipe

Some applications require that the sensor be strapped to the outside of a pipe. Strap-on mounting avoids the need for an immersion well and pipe fittings, and also eliminates the system draining, refilling, and bleeding necessary to install the immersion well. The 105900 Pipe Strap or metal hose clamps can be used in this application. The pipe strap will fit up to 3/4 in. O.D. pipe.

External mounting of the sensor produces a slight offset in the temperature control point. The control temperature could be increased up to 5° F [2.8° C] with a bare sensor strapped to the discharge pipe. Use a heat conductive compound and apply insulation around the C7170A,B and pipe to decrease the temperature offset. Obtain any necessary straps, clamps and insulation locally.

The sensor bulb should be located at a point on the discharge pipe approximately 3 ft [1 m] from the boiler or chiller. Refer to Fig. 2.

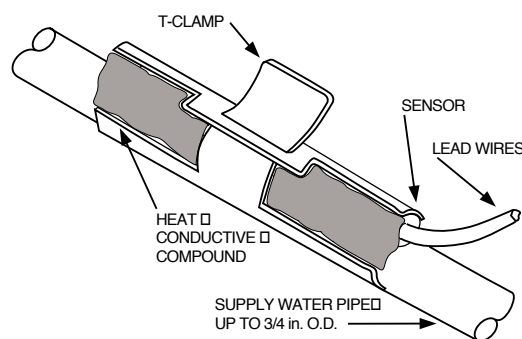
PROCEDURE

1. Remove any insulation on the pipe, leaving about 6 in. [15 cm] of the pipe exposed. With care, most insulating materials may be able to be reused to cover the sensor when the installation is complete.
2. Clean the pipe surface for good sensor-to-pipe contact. Apply heat conductive compound to the pipe at the selected location.

3. Press the sensor bulb into the heat conductive compound and fasten to the discharge pipe with 105900 Pipe Clamp, duct hanger wire or with metal hose clamps. See Fig. 2.

IMPORTANT: Do not overtighten clamps to the point of distorting the sensor. Overtightening the clamps could cause a shift in calibration or failure of the sensor.

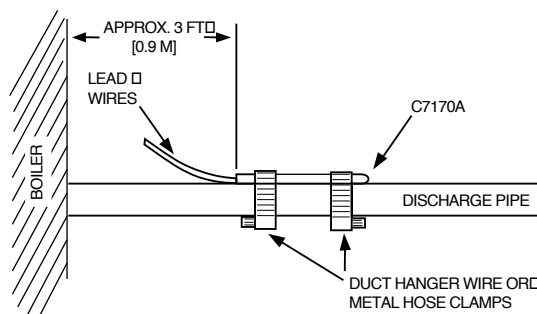
Fig. 2—Strap-on mounting of C7170A,B Encapsulated Temperature Sensor on boiler/chiller discharge pipe.



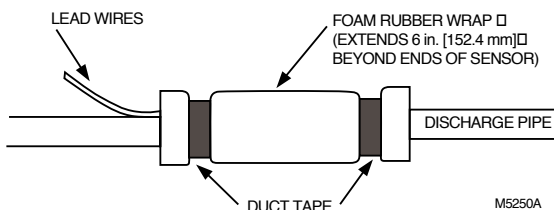
C7170A STRAPPED TO PIPE

CAUTION

DO NOT OVERTIGHTEN CLAMPS TO THE POINT OF DISTORTING THE SENSOR. OVERTIGHTENING CLAMPS WILL CAUSE A SIGNIFICANT SHIFT IN CALIBRATION.



FOAM TAPED OVER STRAPPED SENSOR



M5250A

4. If available, replace the pipe insulation; otherwise, cover the sensor with foam rubber insulation extending at least 6 in. [15 cm] past each end of the sensor. Overlap the foam wrap at least one-third the diameter of the pipe.
5. Fasten the insulation in place with duct tape. Do not allow the duct tape to contact the pipe.

Installing The C7170A,B In An Immersion Well

When the C7170A,B sensor is mounted in the fluid of the boiler or chiller system, an immersion well (not included, see Accessories) must be used to hold the sensor bulb in the system. Locate an existing pipe plug in the system where a representative fluid temperature can be monitored. If an existing pipe plug is not available, a hole must be tapped or an adapter inserted into a pipe junction at the boiler/chiller.

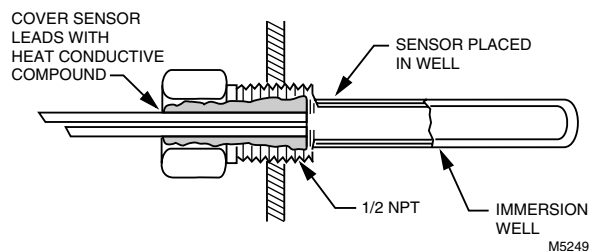
! CAUTION

When installing the C7170A,B in an immersion well, make sure that the lead wire end of the sensor capsule is completely covered by heat conductive compound to protect the sensor from damage caused by water condensation. See Fig. 3.

PROCEDURE

1. Drain system until the fluid level is below the pipe tapping.
2. Remove the pipe plug from the tapping, and clean the hole threads.
3. Apply a moderate amount of pipe dope to the immersion well threads, and screw the well into the hole.
4. Fill the space between the sensor and the well with heat conductive compound for optimum temperature response. Place the heat conductive compound into the well. Push the sensor into the bottom of the well. Tape the leadwires to a fixed object close to the well but off the boiler or chiller to prevent the sensor from being pulled out.
5. Make sure the leadwire end of the sensor is completely covered by heat conductive compound to protect the sensor from water condensation damage.
6. Refill the system. Check for fluid leaks at the well when the system is in operation.

Fig. 3—C7170A,B Encapsulated Temperature Sensor installed in immersion well.



WIRING

! CAUTION

Wiring should be kept at least one foot away from large inductive loads such as motors line starters, lighting ballasts, and large power distribution panels. Failure to follow these wiring practices may introduce electrical interference (noise) which can cause erratic system operation. Shielded cable is required in installations where these guidelines cannot be met. Ground shield only to grounded controller case.

IMPORTANT: *Erratic temperature readings from a sensor can be caused by the wiring practices described below. These must be avoided to assure proper operation. Use shielded cable to reduce interference if rerouting of sensor wiring is not possible.*

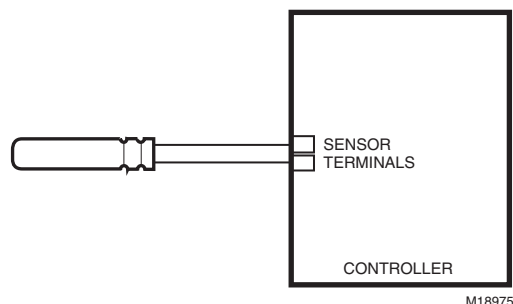
- a. Do not route temperature sensor wiring with building power wiring, next to control contactors or near light dimming circuits, electric motors or welding equipment.
- b. Avoid poor wiring connections.
- c. Avoid intermittent or missing building earth ground. Do not mount sensor in incorrect environment.

Resistance in the C7170A Sensor wiring positively offsets the temperature sensed by 1 degree F for every 4.8 ohms [8.6 ohms/°C] of resistance. Use short wire lengths or larger gauge wire when longer lengths are necessary.

Resistance in the C7170B Sensor wiring positively offsets the temperature sensed by one degree Fahrenheit for every 2.1 ohms [1 degree Celsius for every 3.85 ohms] of resistance. Use short wire lengths or use larger gauge wire when longer wire lengths are necessary.

Procedure

1. Disconnect power supply before making wiring connections to prevent electric shock or equipment damage. All wiring must agree with local codes, ordinances, and regulations.
2. Wire the C7170A,B to the controller using the procedures and diagrams for that device. Keep wiring runs as short as practical but less than 1195 ft [364 m]. If wiring distances longer than 50 ft are expected, order the shielded cable, see Accessories. A general wiring hookup is shown in Fig. 4. For specific limitations and wiring diagrams, refer to the instructions provided with the controller used with this sensor.

Fig. 4—General wiring hookup for C7170A,B Encapsulated Temperature Sensor.

Operation and Checkout

OPERATION

The C7170A,B is a highly accurate solid state sensor for use in applications requiring a broad temperature sensing range. Unlike thermistors, the C7170A,B has a positive temperature coefficient (PTC); resistance increases as the temperature increases. As shown in Fig. 5, the resistance curve for the C7170A increases by 4.8 ohms per degree Fahrenheit temperature rise [8.6 ohms per degree Celsius]. Since the C7170A curve represented in Fig. 5 is the same as the curve used by the C7100A sensor, these sensors are interchangeable.

As shown in Fig. 6, the resistance curve for the C7170B increases by 2.1 ohms per degree Fahrenheit temperature rise [3.85 ohms per degree Celsius]. Since the C7170B curve in Fig. 6 is the same as the curve used by the C7100D, C7130B, and C7031-PT1000 Sensors, these sensors are all interchangeable.

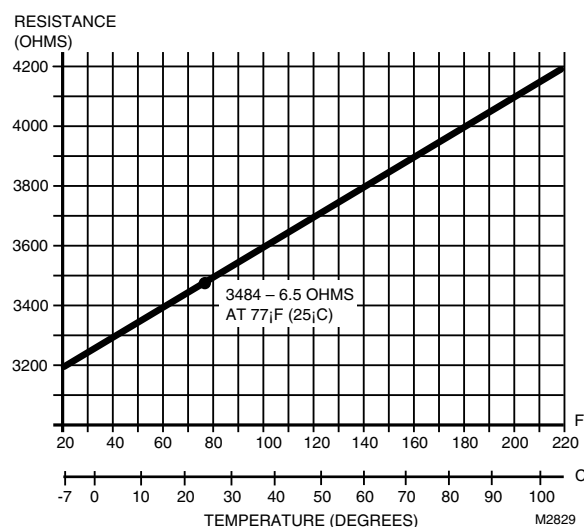
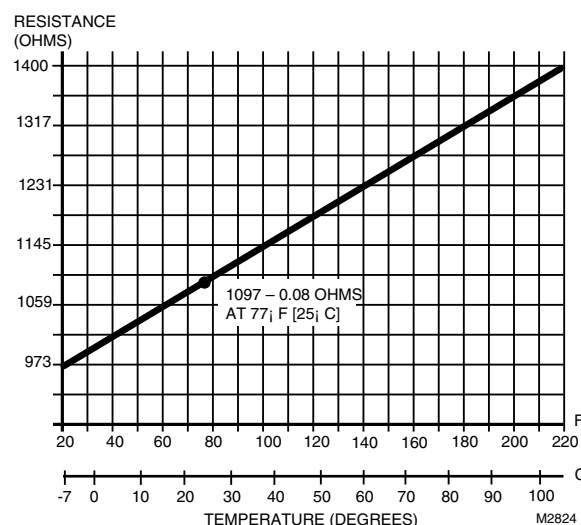
CHECKOUT

1. Measure the fluid temperature at the sensor location with an accurate thermometer $\pm 1^\circ\text{F}$ [0.5°C], allowing time for the thermometer to stabilize before reading. Use an ohmmeter to measure the resistance across the sensor wires. Then verify sensor accuracy with the temperature/resistance curve in Fig. 5 or 6.

2. Check shield ground on wiring (zero resistance to ground). Replace if necessary.

3. Check connectors at both ends of the wiring for the proper connection. Tighten or replace as necessary.

4. Check sensor for correct installation: clamps (where used) not too tight, heat conductive compound correctly applied (see Installation section).

Fig. 5—C7170A temperature/resistance curve.**Fig. 6—C7170B temperature/resistance curve.**



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