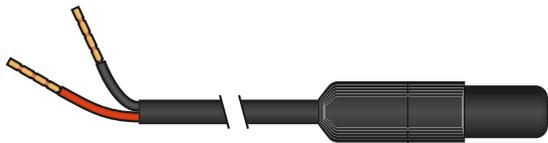




10K Sensors / Slab Sensors

Installation, Operation, and Maintenance Manual



Sensor Descriptions

Outdoor Sensor #30070

The HeatLink® Outdoor Sensor #30070 includes a 10 kΩ thermistor which provides an accurate measurement of the outdoor temperature. The #30070 sensor is protected by a white U.V. resistant PVC plastic enclosure.



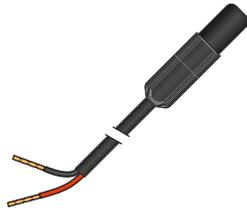
Slab Sensor #30079

The HeatLink® Slab Sensor #30079 has a stainless steel sleeve which is designed for use in concrete, thin-set or grout. The #30079 is supplied with 10' (3 m) of 2 conductor zipcord.



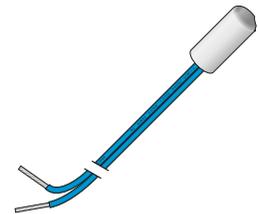
Slab Sensors #30072 / #30073

The HeatLink® Slab Sensors #30072 and #30073 have a PVC plastic sleeve which is designed for use in soils or concrete. The #30072 is supplied with 20 ft. (6m) and the #30073 is supplied with 40 ft. (12m) of 2 conductor cable.



Universal Sensor #30071

The HeatLink® Universal Sensor #30071 has a brass sleeve for fast response and a wide operating range. This sensor can be used in a multitude of applications. The #30071 is supplied with 10 inches (250mm) of two conductor wire.

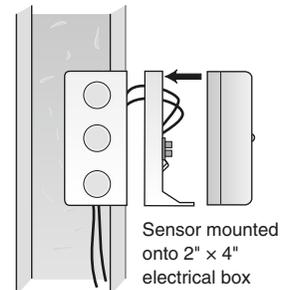
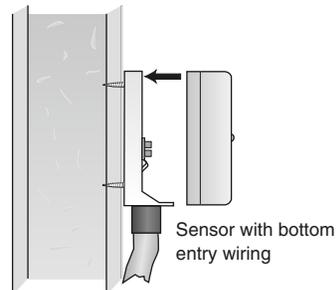
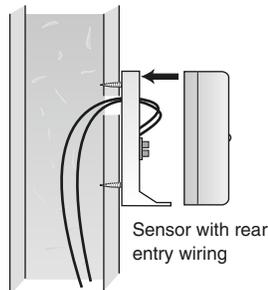


Installation - Outdoor Sensor #30070

Step One - Mounting the sensor

Note: The temperature sensor (thermistor) is built into the #30070 enclosure.

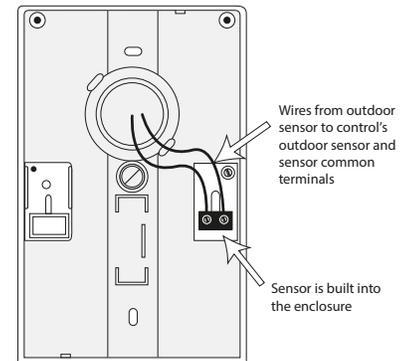
- Remove the screw and pull the front cover off the sensor enclosure.
- The #30070 can either be mounted directly onto a wall or a 2" x 4" electrical box. When the #30070 is wall mounted, the wiring should enter through the back or bottom of the enclosure. Do not mount the #30070 with the conduit knockout facing upwards as rain could enter the enclosure and damage the sensor.



- In order to prevent heat transmitted through the wall from affecting the sensor reading, it may be necessary to install an insulating barrier behind the enclosure.
- The #30070 should be mounted on a wall which best represents the heat load on the building (a northern wall for most buildings and a southern facing wall for buildings with large south facing glass areas). The #30070 should not be exposed to heat sources such as ventilation or window openings.
- The #30070 should be installed at an elevation above the ground that will prevent accidental damage or tampering.

Step Two - Wiring and Testing the Sensor

- Connect 18 AWG or similar wire to the two terminals provided in the enclosure and run the wires from the #30070 to the control. Do not run the wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference (EMI), shielded cable or twisted pair should be used or the wires can be run in a grounded metal conduit. If using shielded cable, the shield wire should be connected to the Com Sen terminal on the control and not to earth ground.
- Follow the sensor testing instructions in this brochure and connect the wires to the control.
- Replace the front cover of the sensor enclosure.

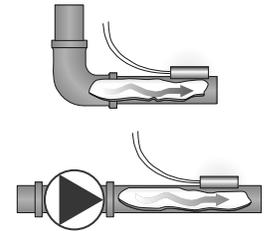
**Installation - Universal Sensor #30071****Step One - Mounting the Sensor**

Note: This sensor is designed to mount on a pipe or in a temperature immersion well.

The Universal Sensor can be strapped directly to the pipe using the cable tie provided. Insulation should be placed around the sensor to reduce the effect of air currents on the sensor measurement.



The Universal Sensor should be placed downstream of a pump or after an elbow or similar fitting. This is especially important if large diameter pipes are used as the thermal stratification within the pipe can result in erroneous sensor readings. Proper sensor location requires that the fluid is thoroughly mixed within the pipe before it reaches the sensor.

**Step Two - Wiring and Testing the Sensor**

Caution: Do not run sensor wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference, shielded cable or twisted pair should be used or the wires can be run in a grounded metal conduit. If using shielded cable, the shield wire should be connected to the Com Sen terminal on the control and not to earth ground.

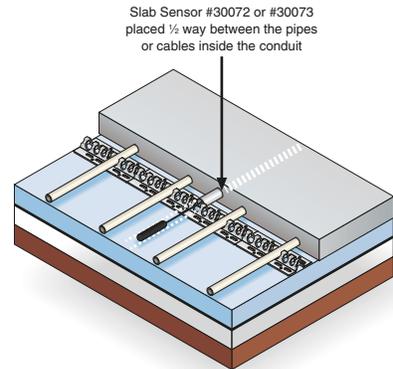
- Follow the sensor testing instructions given in this brochure and then connect the wires to the control.

Installation - Slab Sensors #30072 & #30073

Step One - Mounting the Sensor

Note: Proper placement of these sensors is critical for correct operation of the control.

These sensors are designed to be embedded in the slab material. However, it is recommended that the sensors be installed in a plastic or metal conduit embedded in the slab. If there is ever a sensor failure, this allows the sensor to be removed and replaced. The sensor should be placed 1" (25 mm) below the slab surface and ½ way between the pipes or electric cables.



Step Two - Wiring and Testing the Sensor

Important: Do not run sensor wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference, shielded cable or twisted pair should be used or the wires can be run in a grounded metal conduit. The ground wire should be connected to the common sensor terminal on the control and not to earth ground.

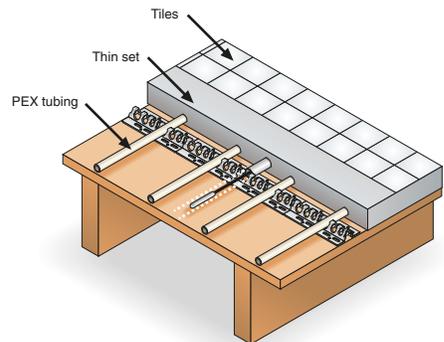
The Slab Sensor #30072 is supplied with 20' (6 m) of cable and the Slab Sensor #30073 is supplied with 40' (12 m) of cable. If a longer length is required, 18 AWG wire can be spliced onto the two wires from the sensor. The splices should be properly soldered and protected in an accessible, waterproof junction box. Follow the sensor testing instructions given in this brochure and then connect the wires to the control.

Installation - Slab Sensor #30079

Step One - Installing the Sensor

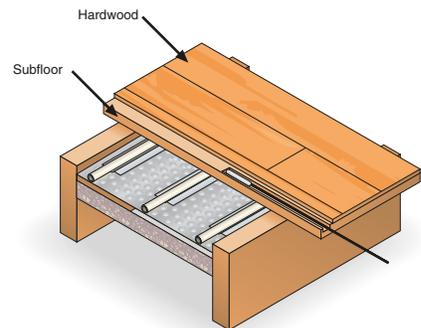
Thin-Set or Thin Pour Applications

If the floor covering is to be installed over either a thin-set or thin-pour material of sufficient depth, the #30079 slab sensor can be placed directly into either the thin-set material or the thin-pour material and covered over. Ensure that the sensor is located in such a position that the attached wire is able to reach to a suitable junction location. Splices within the thin-set or thin-pour should be avoided to ensure trouble free operation. The sensor should be located mid way between the heating elements to ensure a proper temperature reading.



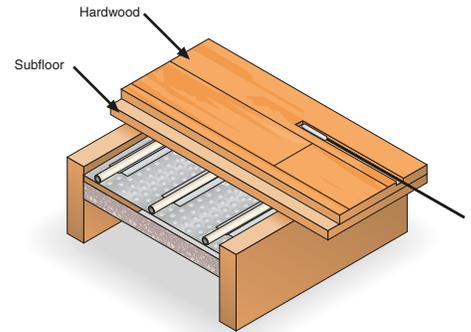
Thin Floor Coverings (less than 3/8" (10 mm))

If a thin floor covering is to be installed directly to the subfloor, a groove 1/8" (4 mm) wide by 1/16" (2 mm) deep can be cut into the surface of the subfloor to accommodate the wire for the sensor. Ensure that the sensor is located in such a position that the attached wire is able to reach to a suitable junction location. Splices under the floor covering should be avoided to ensure trouble free operation. A groove 3/16" (5 mm) wide by 3/16" (5 mm) deep by 1-3/4" (45 mm) long should be cut to accommodate the sensor. The sensor should be located mid way between the heating elements to ensure a proper temperature reading.

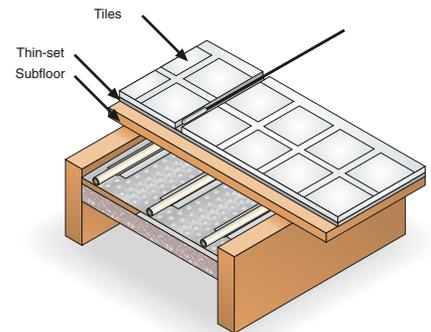


Thin Floor Coverings (less than 3/8" (10 mm))

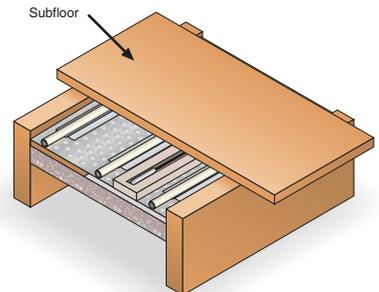
If a thin floor covering is to be installed directly to the subfloor, a groove 1/8" (4 mm) wide by 1/16" (2 mm) deep can be cut into the surface of the subfloor to accommodate the wire for the sensor. Ensure that the sensor is located in such a position that the attached wire is able to reach to a suitable junction location. Splices under the floor covering should be avoided to ensure trouble free operation. A groove 3/16" (5 mm) wide by 3/16" (5 mm) deep by 1-3/4" (45 mm) long should be cut to accommodate the sensor. The sensor should be located mid way between the heating elements to ensure a proper temperature reading.

**Tile Floor Coverings**

If a Slab Sensor #30079 is to be installed into an existing tile floor with sufficiently large grout lines, the sensor and wire can be installed in one of the grout lines between the tiles. Select a low traffic area of the floor that is mid way between the heating elements for the sensor location. Ensure that the sensor is located in such a position that the attached wire is able to reach to a suitable junction location. Splices within the grout should be avoided to ensure trouble free operation. Remove the appropriate grout line and place the sensor and wire in the floor. Re-grout the area.

**Installing the Sensor to the Bottom of a Subfloor**

If the sensor is to be installed to the bottom of a subfloor, cut a piece of 1" (25 mm) thick rigid insulation into a 6" (150 mm) by 6" (150 mm) square. A groove 3/16" (5 mm) wide by 3/16" (5 mm) deep by 1-3/4" (45 mm) long should be cut into the insulation to accommodate the sensor. Place the sensor in the groove and sandwich the sensor between the insulation and the subfloor. Use a suitable fastening method to affix the insulation to the subfloor.

**Step Two - Wiring and Testing the Sensor**

Important: Do not run sensor wires parallel to telephone or power cables. If the sensor wires are located in an area with strong sources of electromagnetic interference, shielded cable or twisted pair should be used or the wires can be run in a grounded metal conduit.

The Slab Sensor #30079 is supplied with 10' (3 m) of cable. If a longer length is required, 24 AWG or larger wire can be spliced onto the two wires from the sensor. The splices should be properly soldered and protected in an accessible junction box. Follow the sensor testing instructions given in this brochure and then connect the wires to the control.

Sensor Testing Instructions

A good quality test meter capable of measuring up to 5,000 kΩ (1 kΩ = 1000 Ω) is required to measure the sensor resistance. In addition to this, the actual temperature must be measured with either a good quality digital thermometer, or if a thermometer is not available, a second sensor can be placed alongside the one to be tested and the readings compared.

First measure the temperature using the thermometer and then measure the resistance of the sensor at the control. The wires from the sensor must not be connected to the control while the test is performed. Using the chart on the following page, estimate the temperature measured by the sensor. The sensor and thermometer readings should be close. If the test meter reads a very high resistance, there may be a broken wire, a poor wiring connection or a defective sensor. If the resistance is very low, the wiring may be shorted, there may be moisture in the sensor or the sensor may be defective. To test for a defective sensor, measure the resistance directly at the sensor location.

Important: Do not apply voltage to a sensor at any time as damage to the sensor may result.

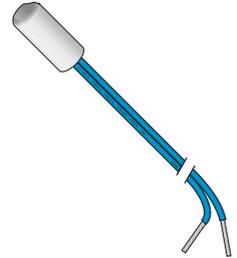
Temperature		Resistance	Temperature		Resistance	Temperature		Resistance	Temperature		Resistance
°F	°C	Ω	°F	°C	Ω	°F	°C	Ω	°F	°C	Ω
-50	-46	490,813	20	-7	46,218	90	32	7,334	160	71	1,689
-45	-43	405,710	25	-4	39,913	95	35	6,532	165	74	1,538
-40	-40	336,606	30	-1	34,558	100	38	5,828	170	77	1,403
-35	-37	280,279	35	2	29,996	105	41	5,210	175	79	1,281
-30	-34	234,196	40	4	26,099	110	43	4,665	180	82	1,172
-25	-32	196,358	45	7	22,763	115	46	4,184	185	85	1,073
-20	-29	165,180	50	10	19,900	120	49	3,760	190	88	983
-15	-26	139,402	55	13	17,436	125	52	3,383	195	91	903
-10	-23	118,018	60	16	15,311	130	54	3,050	200	93	829
-5	-21	100,221	65	18	13,474	135	57	2,754	205	96	763
0	-18	85,362	70	21	11,883	140	60	2,490	210	99	703
5	-15	72,918	75	24	10,501	145	63	2,255	215	102	648
10	-12	62,465	80	27	9,299	150	66	2,045	220	104	598
15	-9	53,658	85	29	8,250	155	68	1,857	225	107	553

Technical Data**Outdoor Sensor #30070**

Literature: L630070
Packaged weight: 0.4 lb. (180 g), White PVC plastic, NEMA type 2
Dimensions: 4-1/2" H x 2-7/8" W x 1-1/2" D (73 x 114 x 38 mm)
Approvals: CSA C US
Operating range: -58 to 140°F (-50 to 60°C)
Sensor: NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C), β=3892

**Universal Sensor #30071**

Literature: L630070
Packaged weight: 0.1 lb. (40 g), brass sleeve, 12" (300 mm) 20 AWG XLPE wire
Dimensions: 3/8" OD x 3/4" (9.5 OD x 19 mm)
Approvals: CSA C US
Operating range: -58 to 255°F (-50 to 125°C)
Sensor: NTC thermistor, 10 kΩ @ 77 °F (25°C ±0.2°C), β=3892

**Slab Sensor #30072**

Literature: L630070
Packaged weight: 0.4 lb. (180 g), PVC sleeve. 20' (6 m) jacketed wire
Dimensions: 3/8" OD x 1-1/2" (11 OD x 38 mm)
Approvals: CSA C US
Operating range: -58 to 140°F (-50 to 60°C)
Sensor: NTC thermistor, 10 kΩ @ 77 °F (25°C ±0.2°C), β=3892

**Slab Sensor #30073**

Literature: L630070
Packaged weight: 0.7 lb. (320 g), PVC sleeve. 40' (12 m) jacketed wire
Dimensions: 3/8" OD x 1-1/2" (11 OD x 38 mm)
Approvals: CSA C US
Operating range: -58 to 140°F (-50 to 60°C)
Sensor: NTC thermistor, 10 kΩ @ 77 °F (25°C ±0.2°C), β=3892

Slab Sensor #30079

Literature: L630070
Packaged weight: 0.1 lb. (50 g), 316 stainless steel, 10' (3 m) 24 AWG, 300 volt PVC insulated Zipcord
Dimensions: 3/8" OD x 1-1/2" (5 OD x 38 mm)
Approvals: CSA C US
Operating range: -58 to 140°F (-50 to 60°C)
Sensor: NTC thermistor, 10 kΩ @ 77°F (25°C ±0.2°C), β=3892



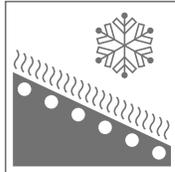


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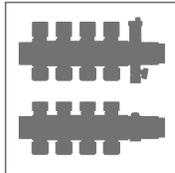


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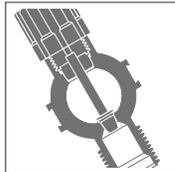


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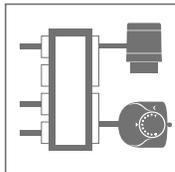
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