

Installation Manual
Socket and Cover Plate 0111
Snowmelt Sensor 0110



SNO-0111
SNO-0110

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HBX SNO-0111/ SNO-0110 SNOWMELT SENSOR/ SOCKET AND COVER PLATE

INTRODUCTION

This manual will help with the installation, parameter setting, troubleshooting and general maintenance requirements for the snowmelt sensor, socket and cover plate. To guarantee the safe and reliable operation of your snowmelt system, you must first read this manual in detail and take particular note to any and all warnings.

DESCRIPTION

Together the SNO-0110 (sensor & cable) and the SNO-0111 (socket and cover plate) make up the sensor portions of the HBX Snowmelt System. The SNO-0110 snow/ice sensor is an optical design that is capable of sensing snow conditions. This allows the user to set a preferred starting condition for the snowmelt system. The SNO-0110 is design to be mounted in the slab however because of the optical design it can also be remotely installed.

The SNO-0111 socket and cover plate allows for the concrete, asphalt, etc. to be poured prior to the installation of the Snowmelt Control, and the SNO-0110 snow/ice sensor.



Only suitably qualified individuals with formal training in electrical and HVAC controls should attempt the installation of this equipment. Incorrect wiring and installation will affect the warranty provided with this unit. Wiring must be completed in accordance with the codes and practices applicable to the jurisdiction for the actual installation.

SAFETY SYMBOLS & WARNING



Point of Interest

This point clarifies pertinent information, or brings your attention to an action that may have adverse effects on the installation process.



Moderate Hazard

This action may cause personal injury or have adverse effects on the installation process if handled incorrectly.



Drawing Reference

Refer to the specified electrical or mechanical drawing at the back of the manual.

RECEIPT & INSPECTION

The SNO-0110/SNO-0111 has gone through rigorous quality control tests at the factory before shipment. After receipt and before installation perform the following checks:

Receipt

After receiving, inspect the unit for any possible physical damage that may have occurred during transportation.

Inspection

After unpacking the unit make sure the boxes contain:

SNO-0110 Package:

- Optical snowmelt sensor
- 30 meters of 22AWG 2 pair shielded cable
- 4 x Stainless steel 4 x 25mm machine screws
- Rubberized Slab Sensor

SNO-0111 Package:

- Sensor socket
- Cover plate (dud sensor)
- 4 x Stainless steel 4 x 25mm machine screws
- 2x M5 machine screws



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

TECHNICAL DATA AND DIMENSIONS**TECHNICAL DATA****Materials:**

Polycarbonate and brass

Weight:

0.45 KG (1.00 lb)

Socket Dimensions:

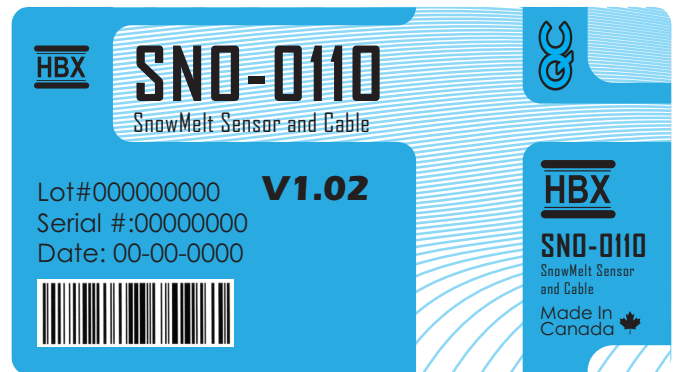
140mm W x 105mm H x 140mm D

Sensor Dimensions:

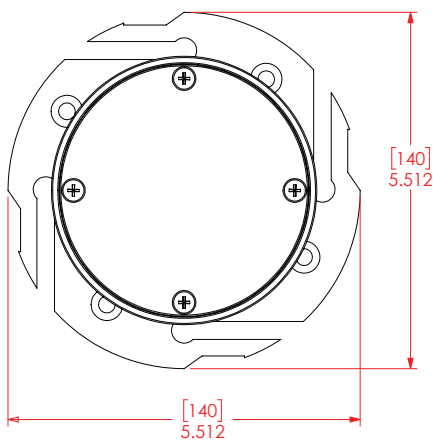
100mm W x 38mm H x 100mm D

Nameplate Information:

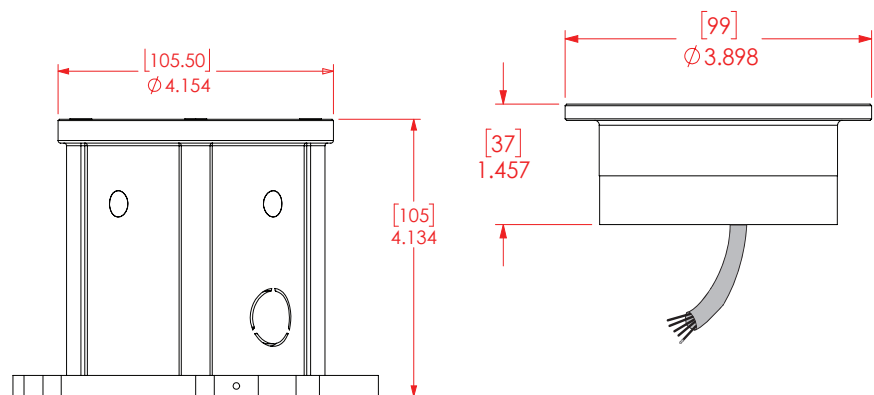
The exterior label contains specific information unique to your HBX Snowmelt Sensor and identifies some of the basic features. The label displays the serial number which will match the serial number on the SNO-XXXX Control, the lot number, and the bar code.

**DIMENSIONS**

Top View



Side View



SNO-0111 socket and SNO-0110 optical sensor installation checklist

Prior to slab material installation	Completed
Optical sensor location will not be obstructed from allowing free falling snow to fall onto the optical sensor. (Roof overhangs, trees, walls etc.)	
Slab, walkway, driveway, and or deck construction has been determined to know what type of install should be followed (table 1.1)	
Drainage established for socket (the conduit utilized for the wiring can not be used as the drainage). Consider the substrate and if it will freeze such as sand, washed rock is ideal.	
Socket installed and levelled	
Conduit ran for optical sensor cable to the socket	
Conduit ran for remote auxiliary slab sensor (for remote installs, or future consideration)	
Install a pull wire in the conduit to pull socket wiring through easily	
After slab, walkway, driveway, and or deck material installed	
Check level of socket, if it has been tampered with consider the remote application	
Remove dud sensor cover, if brass ring of the dud sensor has remained remove it	
Test drainage of socket again and ensure it has not been compromised	
Ensure there are no high points or rocks/pebbles where lip of the optical sensor will sit, remove if any are present	
Pull optical sensor wire through conduit & (if needed) remote auxiliary slab sensor field supplied wiring. Ensure not to damage the wires.	
Make a water proof connection that is accessible for remote auxiliary slab sensor	
Install 4 Phillips screws to secure optical sensor, do not over tighten	
Wire optical & if needed remote sensor accordingly to SNO-0550 installation manual	

Internal vs. Remote recommendation (table 1.1)

When should the SNO-0110 Optical Sensor be installed in slab and when should it be installed remotely, and the remote slab sensor used?	In slab	Remotely	In slab w/ remote sensor
Concrete	Y	Y	Y
Pavers	N	Y	Y
Asphalt	N	Y	Y
Car wash	N	Y	N
Ramp mounting w/proper drainage	Y	Y	Y
Slab on slab	N	Y	N

Remote mounting the SNO-0110 possible locations, on a roof, on top of a fence post, attached to a retaining wall as long as the sensor is level or above the wall, in a rock bed are a few suggestions. Always ensuring that there is adequate drainage for the sensor and socket.

Date of socket install: _____

Date of sensor install: _____

Installed by: _____

of: _____

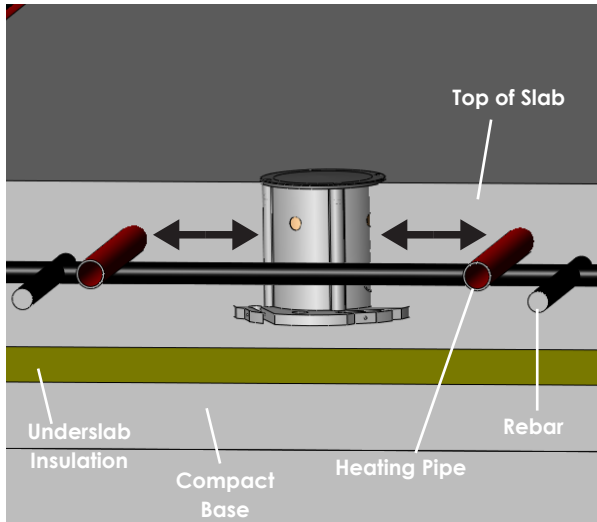


Figure 1 - Snowmelt sensor location

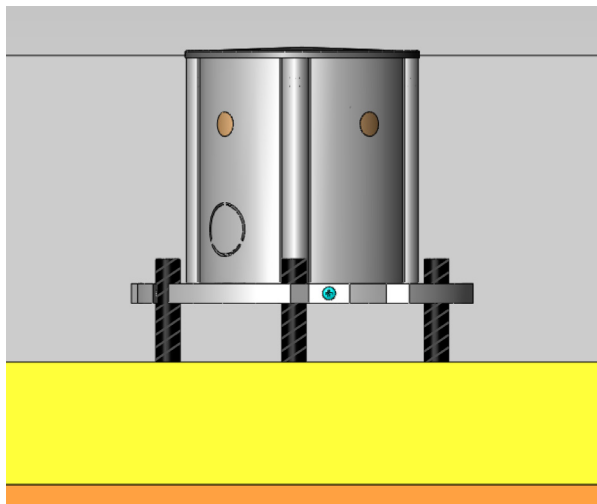


Figure 2 - Leveling the socket and cover plate

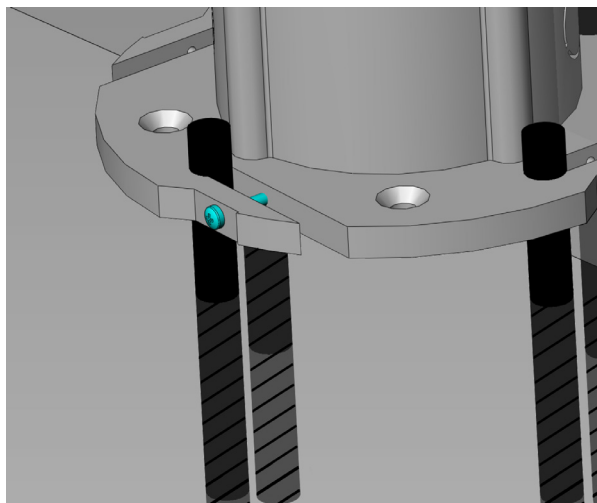


Figure 3 - Tightening the socket onto the rebar

INSTALLATION AND WIRING

INSTALLATION:

1. Slab Sensor Location

Installing the sensor at the correct location in the slab is critical for a properly functioning snow/ice melting system. The sensor should be located where snowfall is normal and not affected by surrounding buildings. Also, the sensor must not be installed where standing water could accumulate on its surface.

The sensor location should also be halfway between the two heating pipes that are installed in the slab (see figure 1). There is a thermistor built into the sensor that senses the slab temperature at all times. Keeping the sensor away from pipes in the slab ensures the accurate operation of your snow/ice melting system.

2. Mounting the Socket and cover plate

When mounting the socket and cover plate in the snowmelt slab use rebar mounted in the soil below to level the socket and cover plate so that the cover plate is level with the finished grade of the snow melting surface (see figure 2).

When the socket and cover plate are level use a screw to tighten the socket onto the rebar. (see figure 3)



Failure to mount the socket properly may result in incorrect or faulty sensor readings.

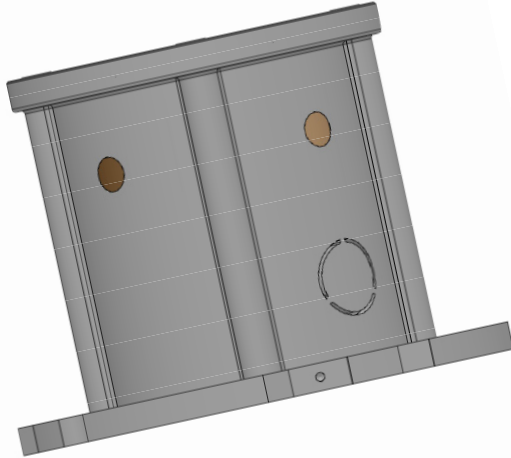
2a. Ramp Mounting (Optional)

The socket and cover plate can also be mounted on a ramp. Make sure to locate the socket and cover plate near the bottom of the ramp. This will allow for proper ice melting when the melted snow flows down (see figure 4).

3. Brass Plugs

On the socket there are 4 brass plugs. These plugs are designed to make contact with the brass ring on the sensor so the sensor can get proper slab temperatures. Take care not to press these plugs in or out as they are properly set at the factory. Manipulation of the plugs may result in the sensor not fitting properly in the socket (see figure 5).

Take special care to clean the brass surfaces on the inside of the socket. Making sure to clean any concrete that may have accumulated on them. Failure to do so may result in the sensor not making proper contact and not reading the slab temperature properly.



4. Drainage

Install the socket directly on top of gravel in order to provide good drainage. If that is not possible, please ensure that you provide some other means of water drainage for the socket. Build up of water will freeze and damage sensor voiding the warranty. Note that even if drainage is initially provided during the installation of the socket it must be checked again after the concrete, or sand, or asphalt is installed ensuring that the drainage remains unobstructed, it has been filled in with concrete, sand or asphalt this will void the warranty of the optical sensor if it is installed in this scenario. Never use the wire conduit as drainage. This can damage the sensor wire resulting in damage to the control and/or sensor.

5. Installing the Sensor

Once the snow melting surface is finished you can install the optical sensor. Clean any excess debris from inside the socket and on the lip of the socket. Fish the optical sensor wire through the pre-installed conduit.



At this time check the drainage of the socket again.

Once the snow/ice sensor is properly inserted into the socket put the four screws back in place to secure it.

Take special care to align the screw holes from the snow/ice sensor to those on the socket. Once the sensor is pressed into place prying up the sensor to line up the holes will result in damage to the sensor and, potentially, the socket.

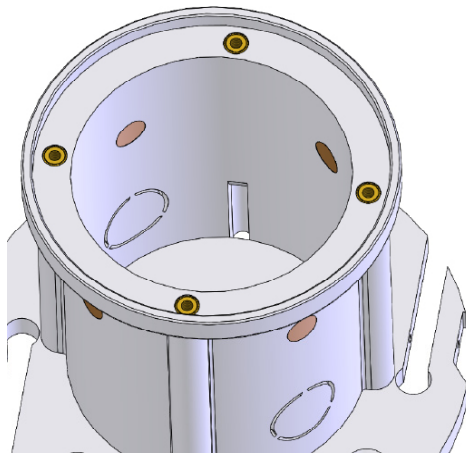
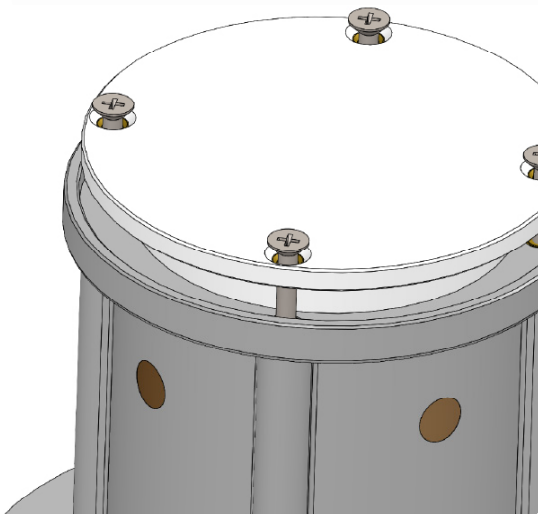
6. Remote Sensor Location

When using asphalt, paving stones and/or equivalent the remote installation has to be used.



When drainage cannot be accommodated the sensor has to be installed remotely as well.

When remote mounting the optical sensor the external slab sensor provided must be used in order for the control to be able to read the slab temperature. Having the sensor installed in a conduit is recommended, if the sensor is being installed after the slab is poured you will need to core a hole into the concrete



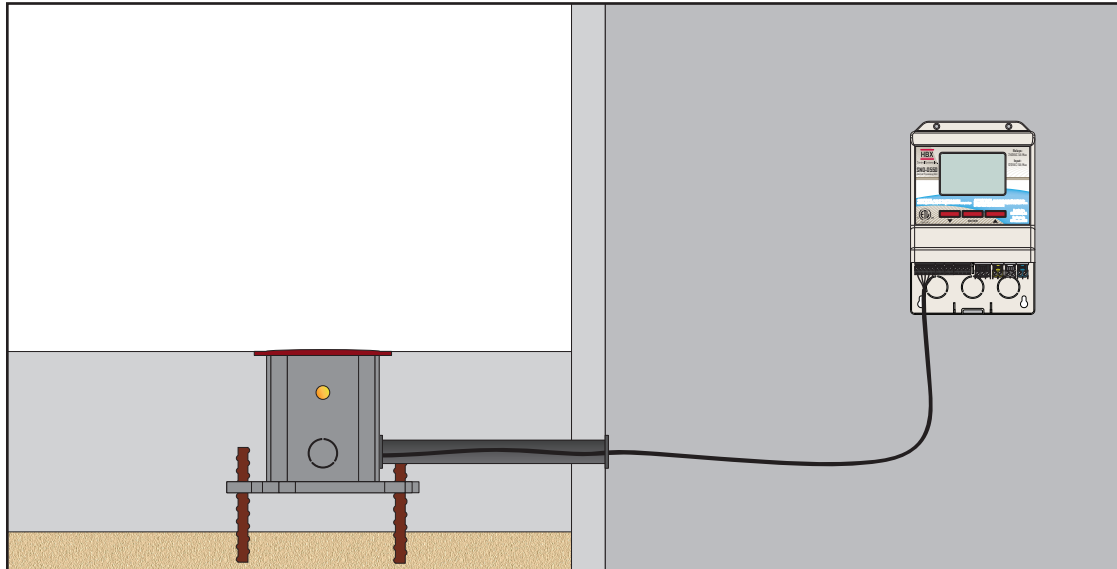


Figure 7 - Snowmelt sensor installation

You must select the control setting for remote slab to yes (i.e. 'Y'). This will let the control know that you have remotely mounted the snow/ice sensor. See the proper snow control manual for more information. See drawing 2 (Page 8) for the correct wiring of a remote slab sensor.

WIRING:



Proper sensor installation is key to a properly performing snowmelt system. All applicable electrical codes should be followed.

Take special care that the sensor wire is not run with any high voltage wiring as this may result in faulty readings. The sensor is supplied with 30 meters of 22 awg shielded cable. If the sensor is more than 30 meters from the control extend the wire from the end of the sensor wire. When extending the cable (to a maximum of 60 meters) use 18AWG shielded cable. If possible, use 2 pair shielded 18AWG for best results. You must also extend the shield wire and attach it to the same point as the black wire on the SNO-0100 or SNO-0550. If this is not done, the temperature sensor in the SNO-0110 will not work properly.

6. Maintenance

In order to ensure the long term accuracy of your snow/ice melting system you should clear away any mud, rocks, or other debris that might obstruct the sensors optics.

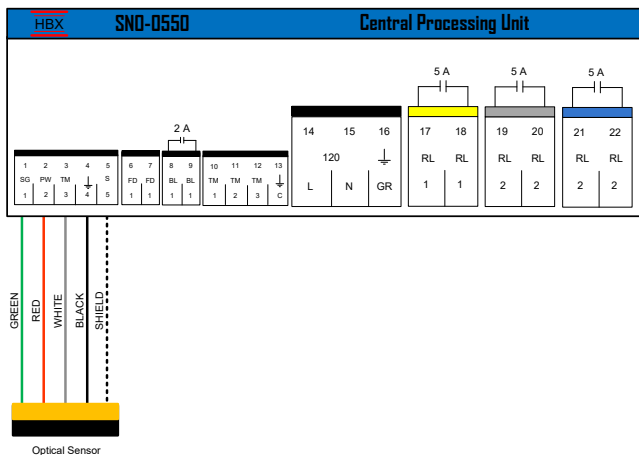
In the unlikely event that the sensor becomes inoperable carefully remove it from the socket and follow the installation procedure to install a new sensor.

In order to ensure the long term accuracy of your snow/ice melting system you should clear away any mud, rocks or other debris that might obstruct the sensor. Also quality drainage of the socket should be verified every year.

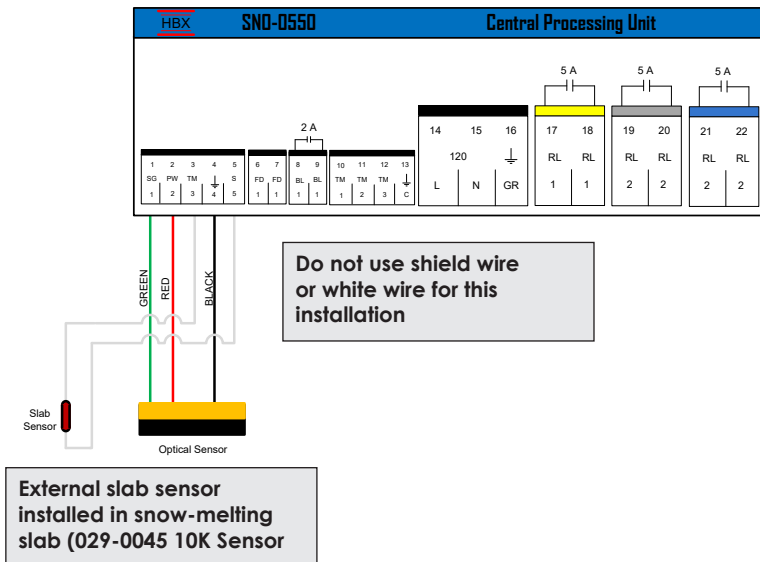


The sensor (SNO-0110) can be removed easily by inserting 2x M5 machine screws into the socket. Remove all four 25mm screws before inserting the M5 screws.

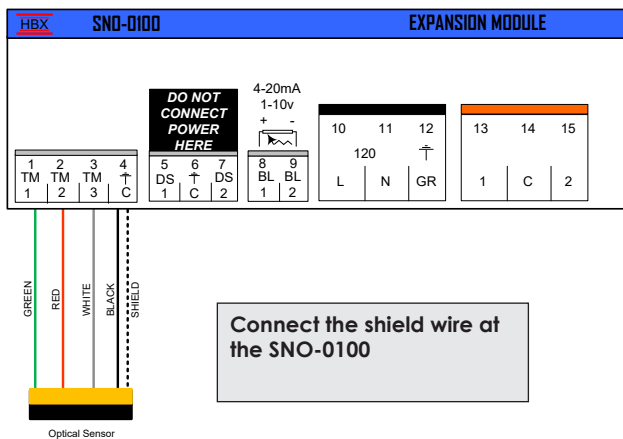
SNO-0110 - DRAWING 001 SLAB SNOW/ICE SENSOR WIRING WITH A SNO-0550



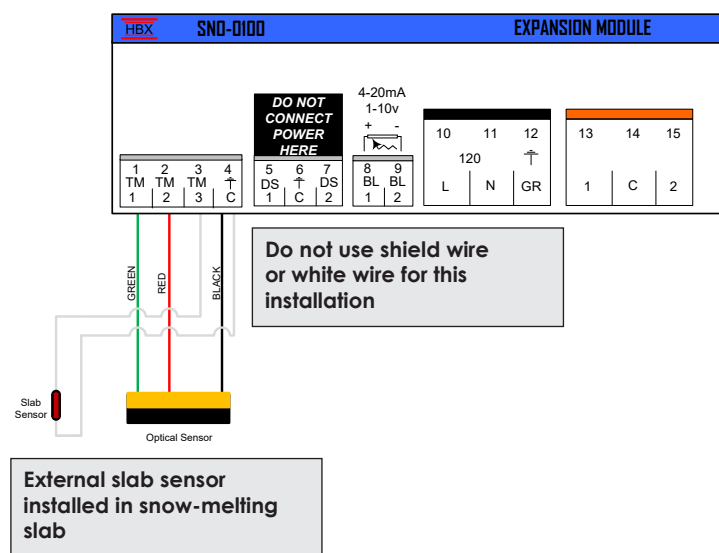
SNO-0110 - DRAWING 002 REMOTE INSTALL - SNOW/ICE SENSOR WITH A SNO-0550



SNO-0110 - DRAWING 003 SLAB SNOW/ICE SENSOR WIRING WITH A SNO-1000/0100

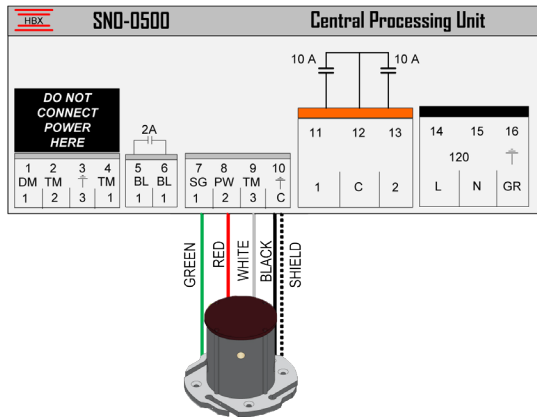


SNO-0110 - DRAWING 004 REMOTE INSTALL - SNOW/ICE SENSOR WITH A SNO-1000/0100

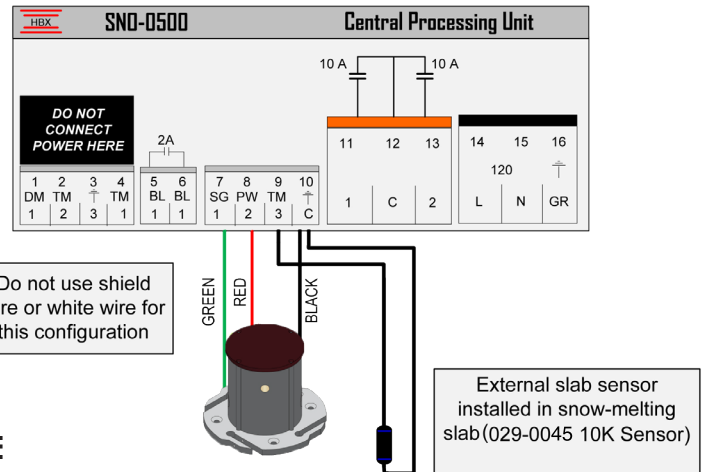


These are not engineered drawings and do not necessarily include all the components for an entire system. They are intended as representations of how the Sensor may be wired into a control for a sample application. It is the responsibility of the installer to seek professional advice and/or install the system to meet all necessary codes for the jurisdiction of the actual installation.

SNO-0110 - DRAWING 003 SLAB SNOW/ICE SENSOR WIRING WITH A SNO-0500



SNO-0110 - DRAWING 004 REMOTE INSTALL - SNOW/ICE SENSOR WITH A SNO-0500



TESTING AND TROUBLESHOOTING PROCEDURE

SNO-0110 - TESTING

1. Thermistor Test

Resistance table for thermistors (outdoor, system)

Temperature	Resistance	Temperature	Resistance	Temperature	Resistance	
°F	°C	°F	°C	°F	°C	
- 22	- 30	177,000	- 0.4	- 18	86,463	
- 18.4	- 28	156,404	3.2	- 16	77,162	
- 14.8	- 26	138,482	6.8	- 14	68,957	
- 11.2	- 24	122,807	10.4	- 12	61,711	
- 7.6	- 22	109,075	14	- 10	55,319	
- 4	- 20	97,060	17.6	- 8	49,640	
				21.2	- 6	44,617
				24.8	- 4	40,153
				28.4	- 2	36,182
				32	0	32,654
				35.6	2	29,498
				39.2	4	26,686

2. Snowmelt Sensor Test

I. Heater Element Resistance Test

With the sensor unplugged, measure the resistance between the Red wire and the black wire. The result should be around 23-26 Ohms with all 30 meters of wire attached.

The Following is applicable to the SNO-0500 and SNO-1000. Refer to SNO-0550 manual for testing Instructions.

II. Slab Sensor Test

Using the above table measure the resistance of the white and shield wires with the sensor unplugged. This will give you the slab sensor reading when the heater is not ON. Take note if the heater was ON and the snowmelt sensor is warm, this will reflect in the slab sensor reading.

III. Heater Element Voltage Test

With the sensor plugged into the control (make sure heater is ON) check the voltage from Red to Black. The voltage should be around 15-17 VDC (versions 1.XX) or 12-15 VDC (versions 2.XX).

IV. Intensity Test

With the sensor plugged into the control (make sure heater is ON) check the voltage between Green and Black. The reading should be around 0.5-1.0 VDC without snow on the optical sensor and 2.0-3.0 VDC with 100% snow.

SNO-0110 - TROUBLESHOOTING Snowmelt Sensor

1. Problem: The slab temperature displayed on the control is very high or shows a sensor error.

Status Screen: Slab Temperature: 185 °F or sensor error.

Explanation: The control is no longer able to read the slab sensor due to an open circuit. In this case the control assumes a slab temperature of t and continues operation, but will not turn On the boiler contacts or injection pump or system pump.

Solution: Verify that the system sensor connection is as described in the Installation Manual of the SNO-0111/SNO-0110.

2. Problem: The snow melt sensor surface temperature is too high and is possibly affecting the slab temperature.

Explanation: Inside the snow melt sensor is a heater and the function is to melt the snow on top of the sensor to measure the percentage of snowfall rate based on the snow landing on the sensor. The temperature emitted by the heater has already been taken into account when calculating the slab temperature. The heater will put 40 °F into the slab temperature when the heater is ON.

3. Problem: The slab temperature displayed on the screen differs from the actual temperature of the slab and will not activate the SNO-0550 when its necessary.

Explanation:

- In this case the brass plugs on the socket are possibly not making proper contact with the concrete and not reading the slab temperature properly due a improper wicking of the heater to the concrete.
- It also could be that the sensor is not installed in concrete but installed in a pavement stone driveway resulting in overheating the sensor.
- It also could be that the sensor heater is putting out too many watts and it is raising the temperature of the sensor more than the 40 °F degrees designed.

Solution

- You can adjust the Snow Idle Temperature and the Melt Temperature according to the deviation between the temperature showed by the SNO-0500 and the slab.
 - An alternative solution can be to install a remote sensor. To do this, you should set it in the programming options so the control knows it's using a remote slab sensor and will no longer look at the slab sensor built into the optical sensor but the new one in the slab. Set the SLAB SENSOR LOCATION to REM from INT. Also take note of the drawing below to determine the proper installation of the remote sensor to the control.

Limited Warranty

HBX Controls warrants each of its products to be free from defects in workmanship and materials under normal use and service for a period of 24 months from date of manufacture or 12 months from date of purchase from an HBX Authorized Dealer, if within the above documented period after date of manufacture. The SNO-0110 snow/ice sensor is guaranteed under a 3 year, parts only, warranty from the date of manufacture.

If the product proves to be defective within the applicable warranty period, HBX on its sole discretion will repair or replace said product. Replacement product may be new or refurbished of equivalent or better specifications, relative to the defective product. Replacement product need not be of identical design or model. Any repair or replacement product pursuant to this warranty shall be warranted for not less than 90 days from date of such repair, irrespective of any earlier expiration of original warranty period. When HBX provides replacement, the defective product becomes the property of HBX Controls.

Warranty Service, within the applicable warranty period, may be obtained by contacting your nearest HBX Controls office via the original Authorized Agent and requesting a Return Material Authorization Number (RMA #). Proof of purchase in the form a dated invoice/receipt must be provided to expedite the issuance of a Factory RMA.

After an RMA number has been issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit. The RMA number must be visible on the outside of the package and a copy included inside the package. The package must be mailed or otherwise shipped back to HBX with all costs of mailing/shipping/insurance prepaid by the warranty claimant.

Any packages returned to HBX without an approved and visible RMA number will be rejected and shipped back to purchaser at purchaser's expense. HBX reserves the right, if deemed necessary, to charge a reasonable levy for costs incurred, additional to mailing or shipping costs.

Limitation of Warranties

If the HBX product does not operate as warranted above the purchasers sole remedy shall be, at HBX's option, repair or replacement. The foregoing warranties and remedies are exclusive and in lieu of all other warranties, expressed or implied, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose/application. HBX neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale, installation maintenance or use of HBX Controls products.

HBX shall not be liable under this warranty; if its testing and examination discloses that the alleged defect in the product does not exist or was caused by the purchasers or third persons misuse, neglect, improper installation or testing, unauthorized attempts to repair or any other cause beyond the range of intended use, or by accident, fire, lightning or other hazard.

Limitation of Liability

In no event will HBX be liable for any damages, including loss of data, loss of profits, costs of cover or other incidental, consequential or indirect damages arising out of the installation, maintenance, commissioning, performance, failure or interruption of an HBX product, however caused and on any theory of liability. This limitation will apply even if HBX has been advised of the possibility of such damage.

Local Law

This limited warranty statement gives the purchaser specific legal rights. The purchaser may also have other rights which vary from state to state in the United States, from Province to Province in Canada and from Country to Country elsewhere in the world.

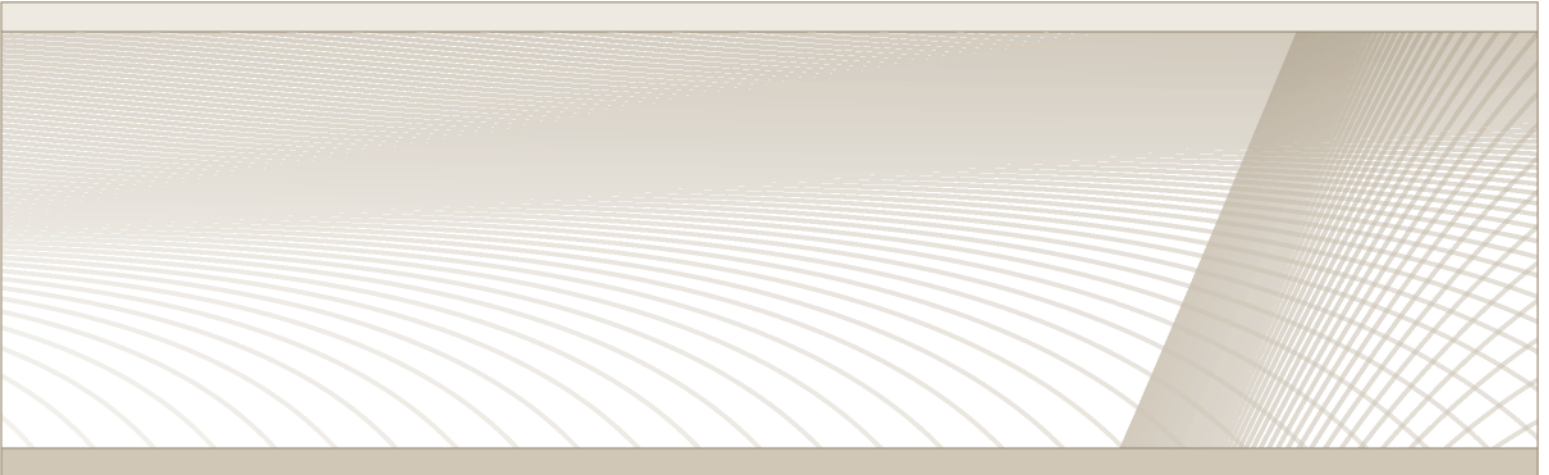
To the extent this Limited Warranty Statement is inconsistent with local law, this statement shall be deemed modified to be consistent with such local law. Under such local law, certain disclaimers and limitations of this statement may not apply to the purchaser. For example, some states in the United States, as well as some governments outside the United States (including Canadian Provinces), may:

Preclude the disclaimers and limitations in this statement from limiting the statutory rights of a consumer (e.g. United Kingdom);

Otherwise restrict the ability of a manufacturer to enforce such disclaimers or limitations; or grant the purchaser additional warranty rights which the manufacturer cannot disclaim, or not allow limitations on the duration of implied warranties.

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