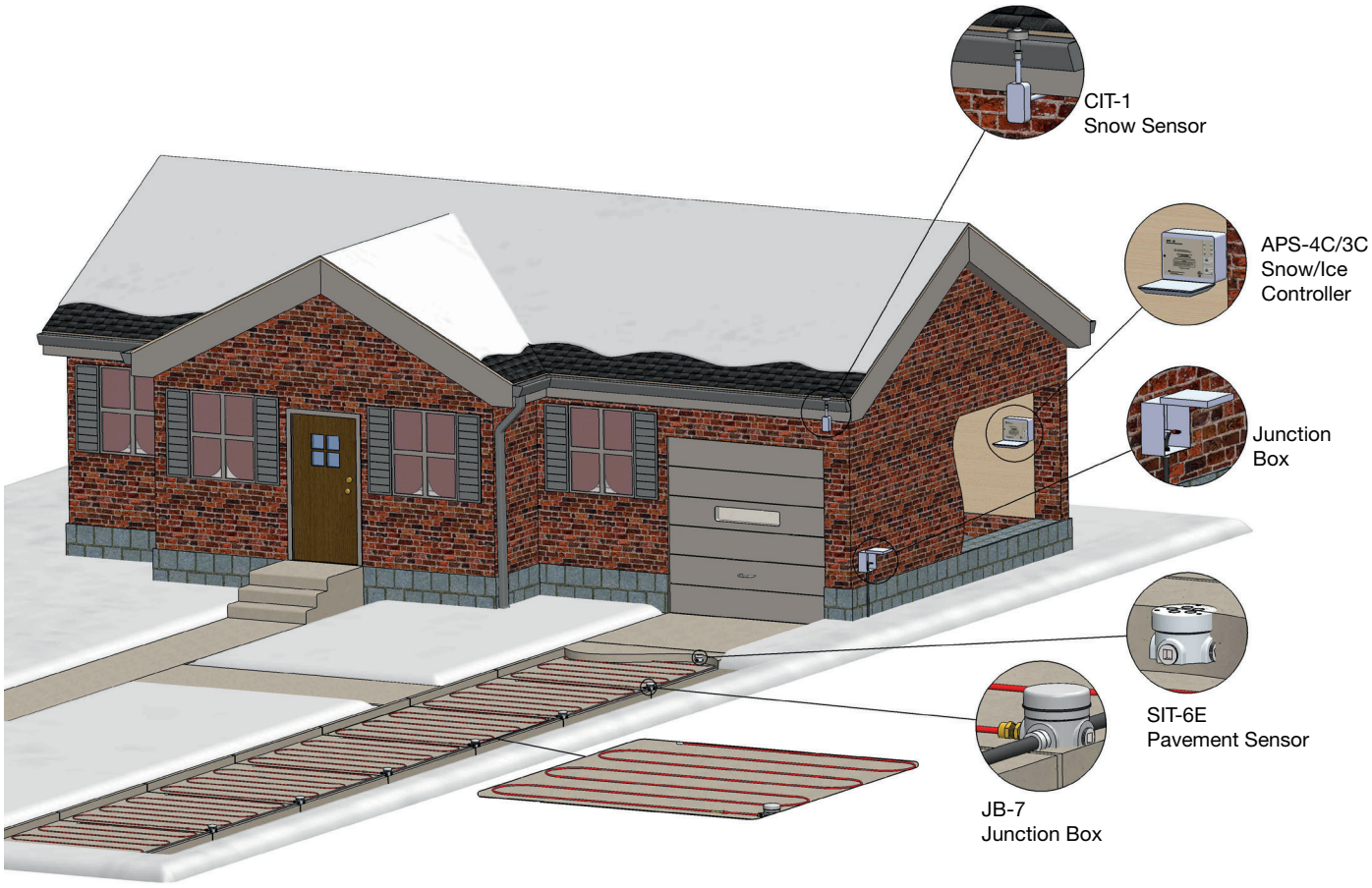
Installation & Operation Instructions for Mineral Insulated Heating Cable Embedded Snow Melting Applications



Chromalox®
PRECISION HEAT AND CONTROL

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Mineral Insulated Heating Cable

Embedded Snow Melting Applications Installation and Operation Instructions

Inspection

- Open package and visually check for breaks or damage to the cable. File claim with carrier if damage is found.
- Never energize the cable when its coiled. Test only when its laid out straight.
- After removing the cable from the carton, check the insulation resistance of the unit from buss wires to the cable metal sheath. Test shall be conducted at 1000Vdc but in absence of this type of equipment a 500Vdc test will detect most failures.
- When the cable is received cable should have a minimum insulation resistance of 20 MΩ

General Design and Installation Notes:

- Standard spacing of cables is typically 6”. Cables can be spaced up to 12”. Do not install any cable closer than 6” from the edge of slab. If cables are spaced more than 12”, the area between the cable runs may not melt completely.
- Do not bend cable tighter than 3” inside diameter.
- Do not overlap cable.
- Design system so that cables do not cross expansion joints. If cables must cross expansion joints, see diagram in this document.
- For snow melting in pedestrian areas watt density should generally be designed at 50 watts per square foot.
- For snow melting in vehicle areas, use 40 to 50 watts per square foot.

Installing Cable in Concrete:

1. Heater(s) should be installed in a uniform pattern similar to that shown in **Figure 1**. Cable depth should be 2 inches to 3 inches below the finished surface.
2. When installing the heaters to an existing slab, the cables should be secured using the SSP-1 spacer strip as shown in **Figure 2**, or by attaching to a wire mesh.
3. The minimum bend radius of the cable is 6 times the diameter. Do not bend the cable too sharply. Do not make a bend in the cable within 2 inches of the brazed hot-cold joint or termination sleeve.
4. Once the heater is in place and secured, prior to covering, conduct a insulation resistance check on the unit(s) at 1000Vdc. The insulation resistance reading must be no less than 20 MΩ.

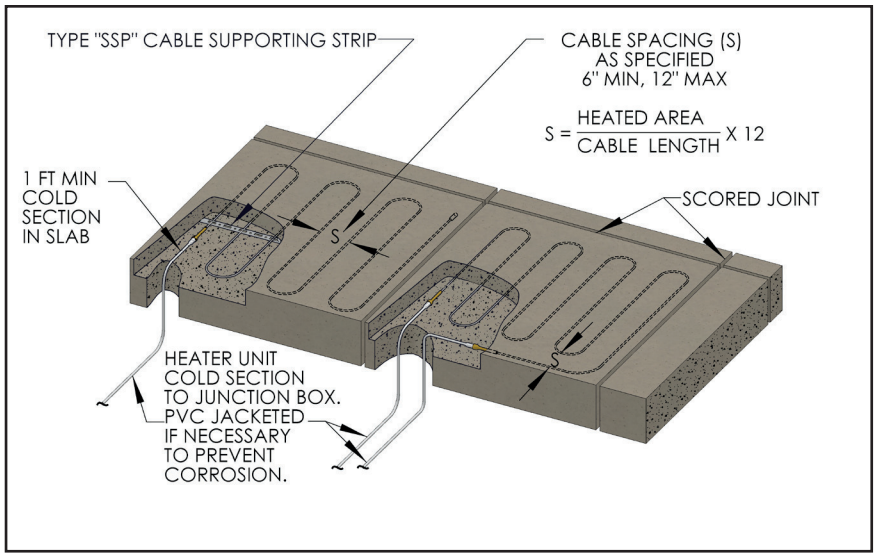


Figure 1
Typical Installation

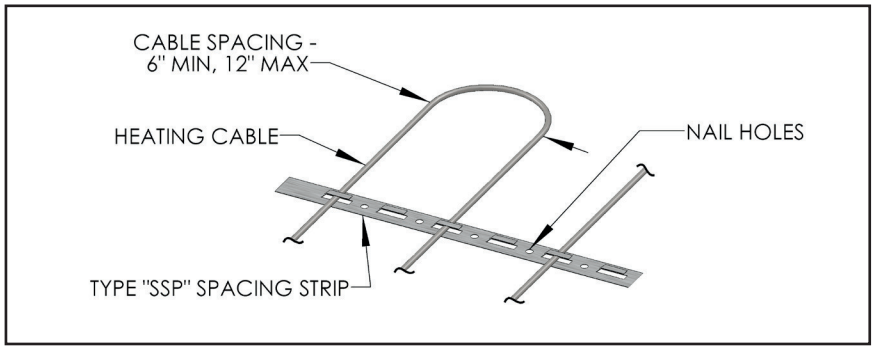


Figure 2
Type SSP Spacer Strip

Expansion and Construction Joints:

Should it be necessary to pass the heating cable through an expansion joint, it should be done as shown in Figure 3A or 3B. Use method shown in Figure 3A to pass under joints. Allow 12” of cable to loop under joint.

Use method in Figure 3B when it is not possible to pass under the joint or a two-pour slab is used.

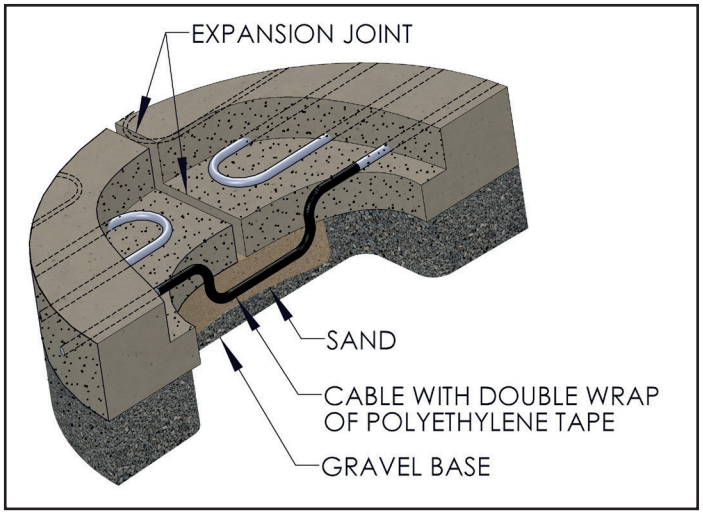


Figure 3A
Typical Expansion Joint Detail

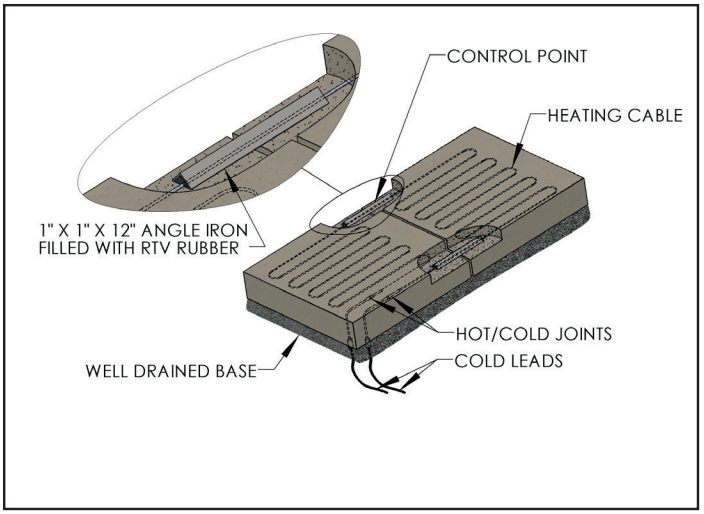


Figure 3B
Typical Expansion Joint Detail

Installing Cable in Asphalt:

Heater(s) should be installed in a uniform pattern and held in position on the base slab using SSP-1 spacer strip or by attaching to mesh. After the cables are in place a small amount of asphalt should be put over the cables and tamped. The final topping course should be a minimum of 2 inches in thickness after compaction.

The minimum bend radius of the cable is 6 times the diameter. Do not bend the cable too sharply. Do not make a bend in the cable within 2 inches of the brazed hot-cold joint or termination sleeve.

Once the heater is in place and secured, prior to covering, conduct a insulation resistance check on the unit(s) at 1000Vdc. The insulation resistance reading must be no less than 20 MΩ.

Special Surface Treatments

When slab surfaces are to be topped with decorative tile, brick, marble, granite, etc. it is recommended that the cable be attached to the reinforcing. If this is not possible, then the cable should be installed in the grout beneath the tile as shown in **Figure 4**. Once cable is correctly positioned, the base slab surface must be prepared properly to receive the topping. Care must be taken when applying the decorative topping not to damage the cable.

Heater Unit Termination:

Each heater unit is terminated with a brazed seal and pressure fitting for attaching cable into conduit hub. See **Figure 5** for details.

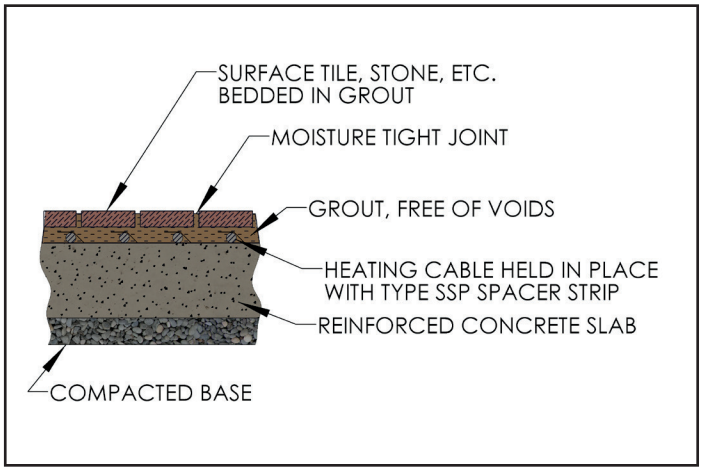


Figure 4
Typical Detail With Cable In Grout

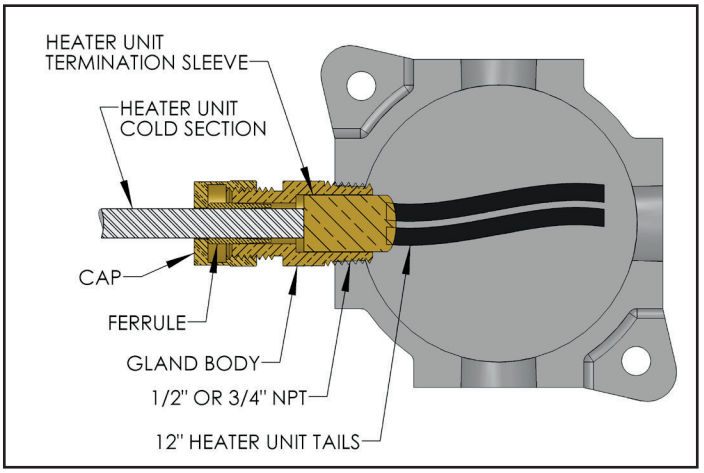
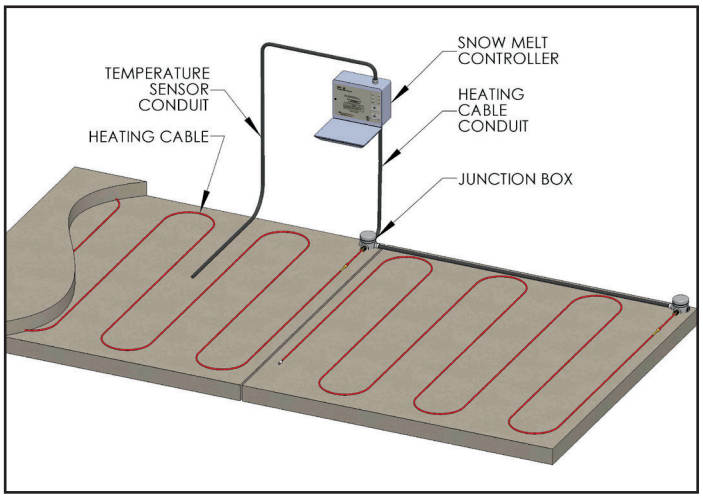


Figure 5
Typical Detail With Cable In Grout

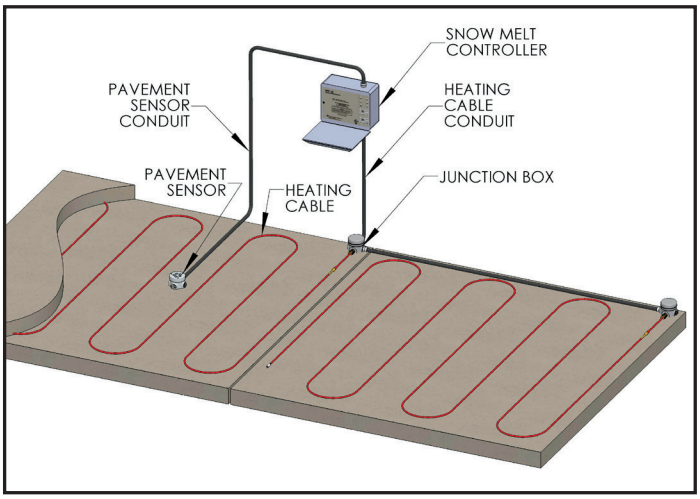
Slab Temperature Sensor:

To prevent cable from being energized during times its not needed and for energy efficiency, a separate slab sensing thermostat or integral temperature sensor should be used. These sensors should be used in conjunction with the automatic snow melting control panels. The temperature sensor should be installed between two runs of heating cable and should be installed in metal conduit. Do not allow the conduit to touch the heating cable and cap the metal conduit so that it is water tight. The conduit should be long enough to extend to the middle of the area being heated.

Temperature Only



Temperature and Moisture



Control, Monitoring, and Power Distribution

Chromalox snow melt systems should be controlled in one of the following three ways.

Manual On/Off Control

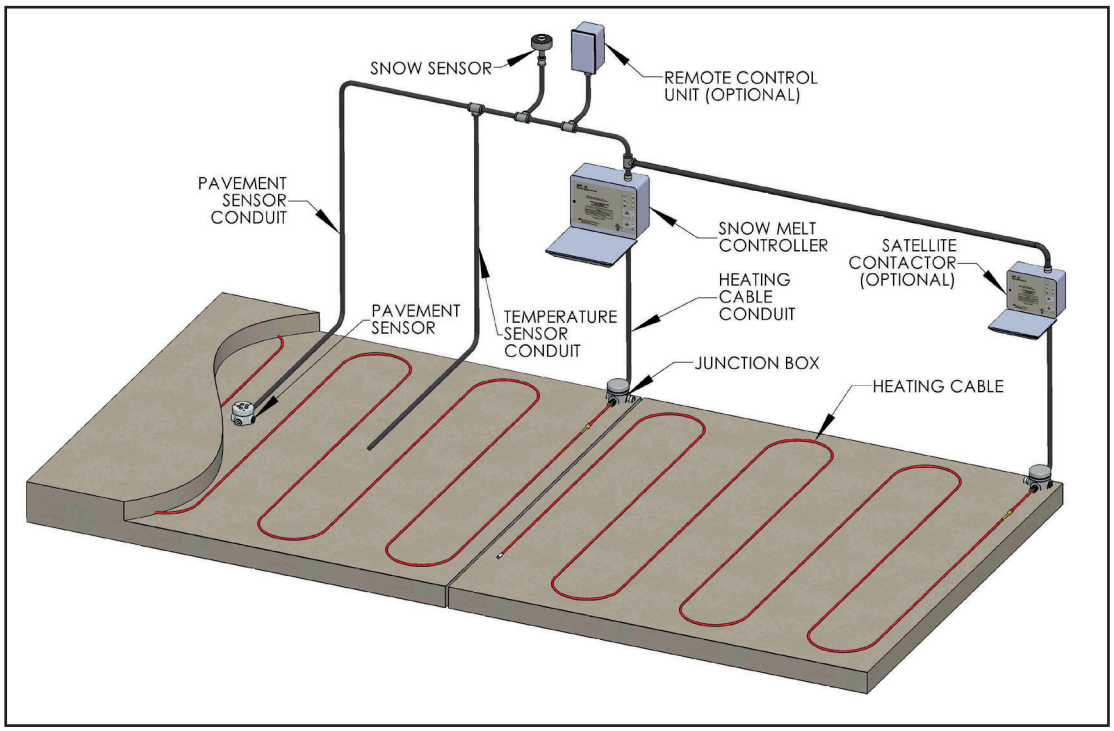
- The power or circuit breakers are manually operated.

Slab Sensing Thermostat

- The system will energize when the slab temperature drops below the freezing. The system will come on even when moisture is not present. Therefore this is not the most energy efficient method of control.

Automatic Snow Controller

- The method shown below is the most energy efficient method. The cable will be automatically energized when moisture is present and the temperature is below freezing. The system will also be de-energized automatically once the slab reaches the temperature set point. A built-in timer keeps the system energized for a set time to allow slab to dry completely once the moisture is no longer present.



Wiring:

Branch circuit wiring MUST comply with local and national electric codes. Heater unit cold sections are available in any length to reach remote junction box locations. If any portion of the cold section is to be buried it must be buried at a minimum depth of 18 inches.

Junction boxes are preferably located indoor as in **Figure 6**. Outdoor wall mounted junction boxes must be of weatherproof construction and located at least three feet above grade as in **Figure 7**. Outdoor on-grade, flush mounted junction boxes, as in **Figure 8**, must be provided with a drain and gasketed cover. Boxes installed in the slab should be avoided due to possibility of the accumulation of condensate.

- Check to ensure incoming electrical supply is correct voltage to be hooked up to heating cable.
- Use Circuit Breakers with 30 mA ground fault protection on all heating cable circuits.
- Refer to wiring diagrams of snow melt controls for wiring configurations.

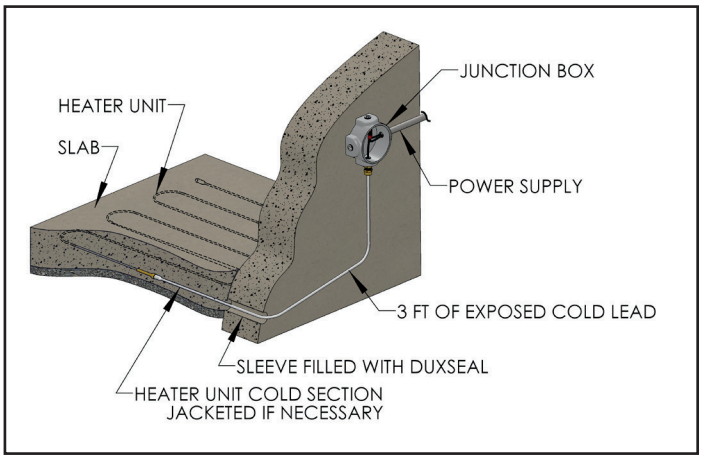


Figure 6
Typical Indoor Junction Box

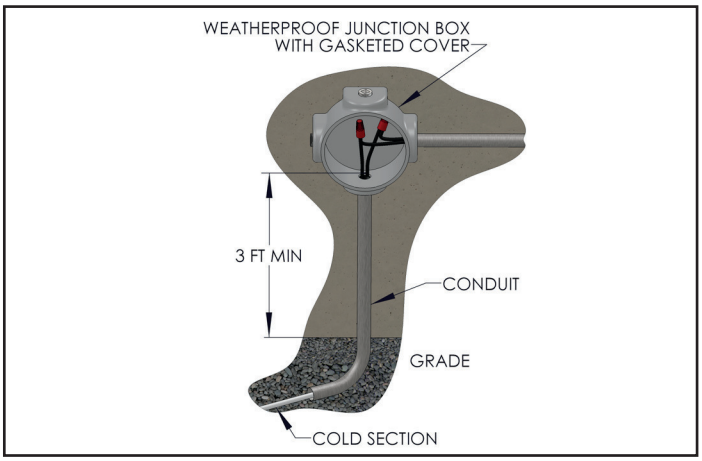


Figure 7
Typical Outdoor, Above Grade, Junction Box Detail

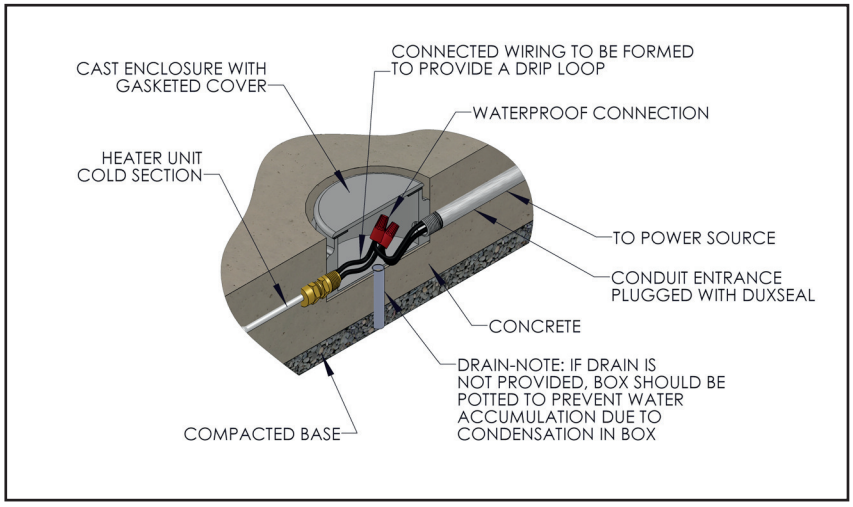


Figure 8
Typical Buried Junction Box

Installing Cable in Stairs (Single Pour):

1. If installing cable on stairs with an attached landing, where an expansion joint separates the stairs and landing, do not cross the expansion joint with the cable. A separate cable will be needed for the landing.
2. Install junction boxes. When using single conductor cables the junction box will need to be located close to where the cable starts and ends.
3. Plan the cable layout on the steps. Mark locations where rail posts will be installed on the stairs and keep the heating cable away from these areas to avoid damage to the cable.
4. Layout heating cable as shown below and fasten cable to the reinforcement. For steps with a depth of 10.5 to 12 inches three runs of heating cable are needed with the first run being 2 to 3 inches from front of step and the remaining two runs spaced equally apart. For steps with a depth of less then 10.5 inches two runs of cable are needed with first run 2 to 3 inches from the front of step and the second run spaced 5 inches from the first run of cable. Stay at least 4 inches from outer walls, edges, and rail post anchor points.
5. Install hot/cold joint(s) so that they are at least 6 inches from the edge of the slab so to ensure it will be completely embedded.
6. Install the conduit for the slab temperature sensor.
7. Visually inspect cables, cold leads, and junction boxes to insure proper installation.
8. Before concrete is poured check insulation resistance of the cable(s) at 1000 Vdc. Minimum acceptable reading is 20 MΩ.
9. Pour a 2 to 3 inch thickness of concrete over the heating cables and continuously check the insulation resistance while concrete is being poured to ensure no damage is being done to cable(s). Minimum acceptable reading is 20 MΩ at 1000 Vdc.
10. Connect cold leads to the junction box.
11. The slab temperature sensor can be installed after installation of concrete is complete.

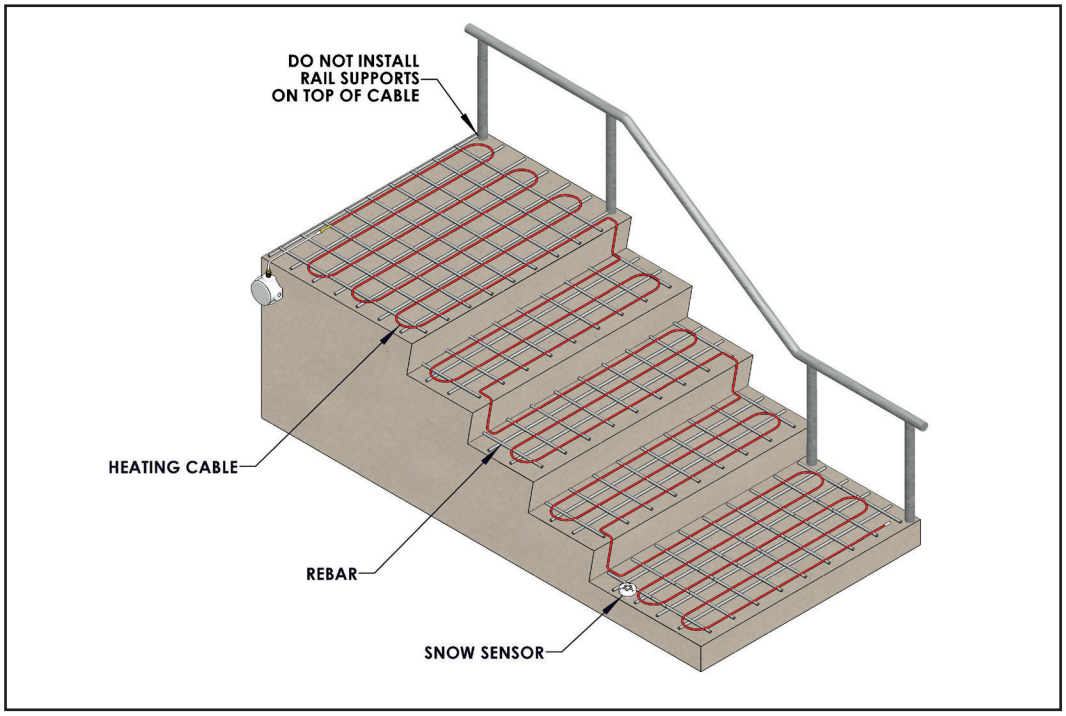


Figure 9
Typical Single Pour Detail

Installing Cable in Stairs (Two Pour or existing):

1. If installing cable on stairs with an attached landing, where an expansion joint separates the stairs and landing, do not cross the expansion joint with the cable. A separate cable will be needed for the landing.
2. Install junction boxes. When using single conductor cables the junction box will need to be located close to where the cable starts and ends.
3. Plan the cable layout on the steps. Mark locations where rail posts will be installed on the stairs and keep the heating cable away from these areas to avoid damage to the cable.
4. Install prepunched strapping using appropriate fastening method at 3 to 4 feet intervals with additional runs to secure cable loops securely.
5. Layout heating cable as shown below and fasten cable to the prepunched strapping. For steps with a depth of 10.5 to 12 inches three runs of heating cable are needed with the first run being 2 to 3 inches from front of step and the remaining two runs spaced equally apart. For steps with a depth of less then 10.5 inches two runs of cable are needed with first run 2 to 3 inches from the front of step and the second run spaced 5 inches from the first run of cable. Stay at least 4 inches from outer walls, edges, and rail post anchor points.
6. Install hot/cold joint(s) so that they are at least 6 inches from the edge of the slab so to ensure it will be completely embedded.
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11. Connect cold leads to the junction box.
12. The slab temperature sensor can be installed after installation of concrete is complete.

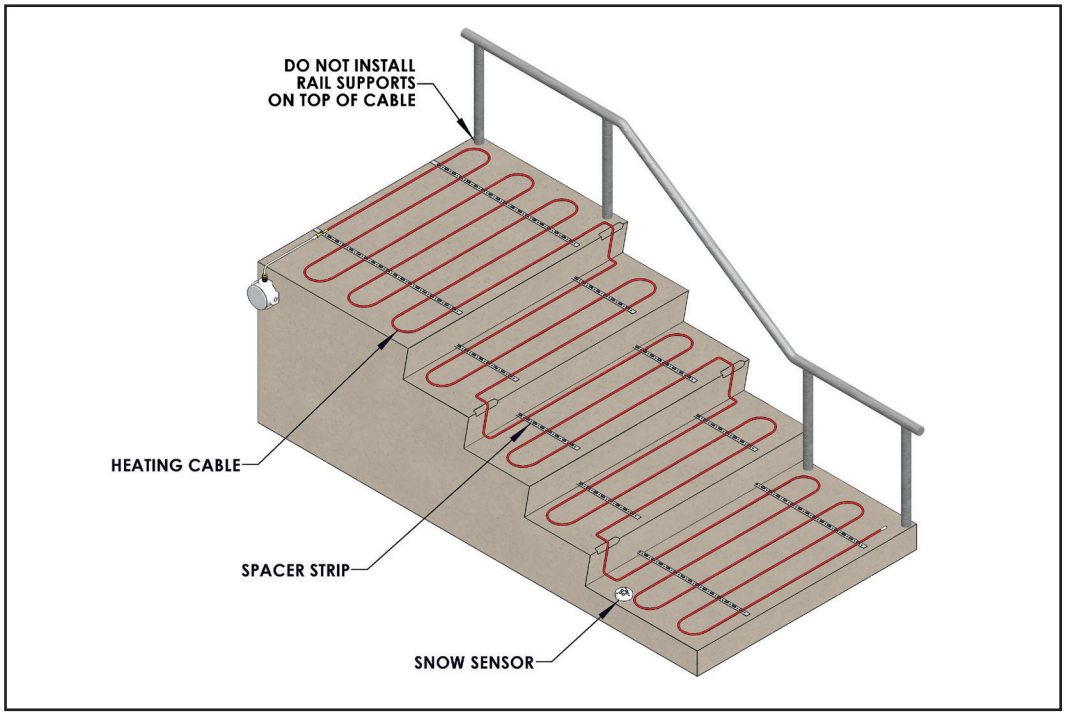

Figure 10
Typical Two Pour Detail

COMMISSIONING AND PREVENTATIVE MAINTENANCE

System Tests

Visual Inspection

- Inspect Junction boxes, cable terminations, and connections to the cable for physical damage.
- Inspect cold leads if they exit the slab for physical damage.
- Insure that moisture is not present in the junction boxes.
- Check that electrical connections are tight and that the NPT connectors are tight and properly grounded.

⚠WARNING

De-energize circuit(s) before performing insulation resistance check

Insulation Resistance Check

This test should be performed 4 times throughout the installation process

- When received - Min. 20 MΩ
- After Install - Min. 20 MΩ
- Continuously while during installation of concrete, asphalt, ect. - Min. 20 MΩ
- Prior to start up (commissioning) - Min. 20 MΩ

This test should also be performed as part of a regular system inspection and after any maintenance or repair work.

Limited Warranty:

Please refer to the Chromalox limited warranty applicable to this product at http://www.chromalox.com/customer-service/policies/termsofsale.aspx.

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