

MSC-1 Control Panel

for Snow & Ice Melting Installations

Installation & Operation Instructions

General

The MSC-1 Control Panel manages snow and ice melting equipment for sidewalks, driveways, gutters, downspouts, etc... Suitable for controlling heating cables and mats, self-regulating cables and hydronic systems, the MSC-1 can monitor snow and ice accumulation in three separate zones. The MSC-1 programming allows each zone to be controlled independently or on a priority mode basis. In the "priority" mode for example, one zone can be given priority and the other zones cannot be energized until the melting/de-icing in that zone is complete. This can then reduce the loading on the circuit by ensuring that multiple zones are not energized simultaneously. The MSC-1's program allows customization of the key elements necessary for intelligent and efficient snow melting control.

The MSC-1 can access information from three different types of moisture sensors—surface (or in-ground, MSP-1), aerial (MSA-1) and gutter (MSG-1)—and one type of temperature sensor (TS-1). The surface, aerial and gutter sensors detect moisture—snow, ice, sleet, etc.—and send appropriate signals to the MSC-1. Similarly, the temperature sensor sends temperature data back to the MSC-1. Independent temperature and moisture information is processed by the MSC-1 to ensure that heating equipment will only be energized when precipitation occurs during freezing conditions. For each of the MSC-1 control zones up to two individual moisture sensors can be connected, however for

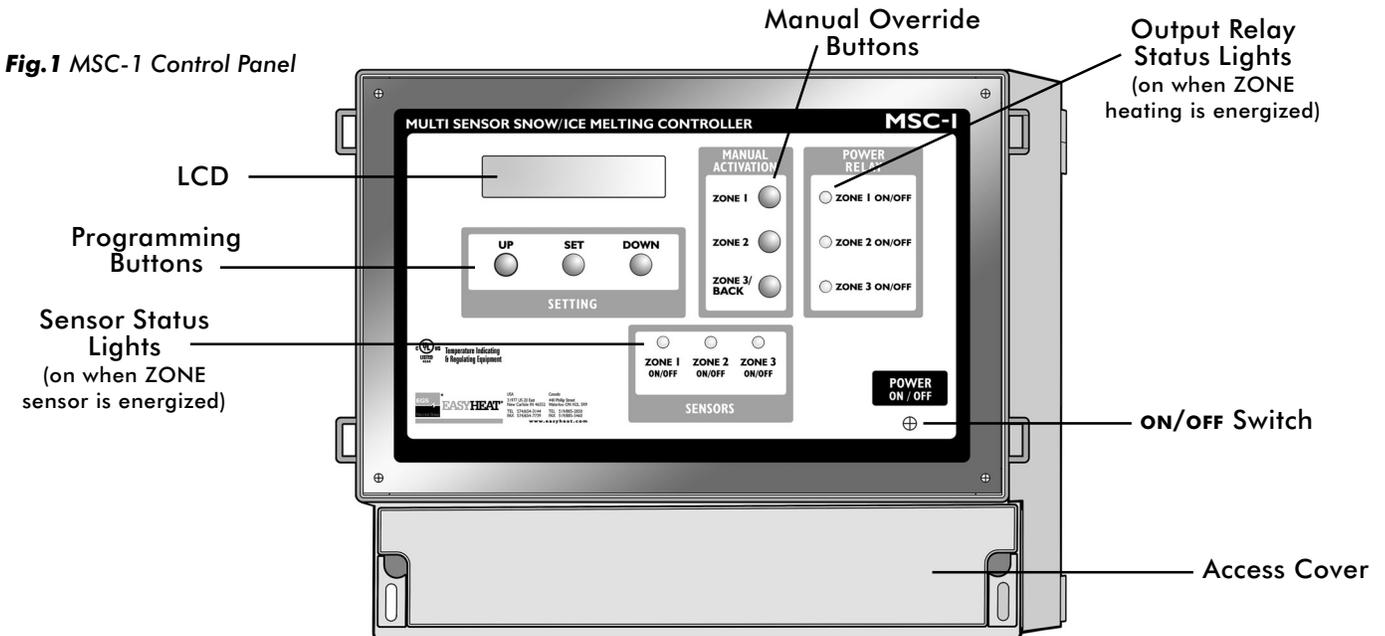
each zone only one of these may be an in-ground sensor. Each MSC-1 must have a temperature sensor, TS-1, in order to function; a TS-1 is included with each MSC-1.

The MSC-1 is housed in an enclosure suitable for commercial/ industrial indoor applications (NEMA 4, 4X) and features an LCD display, programming and associated indicator lights for operation of each zone.

The MSC-1 is powered by 120VAC; control signal relays provide a 120VAC output to operate the coils of external contactors. See Fig. 1 & 2.

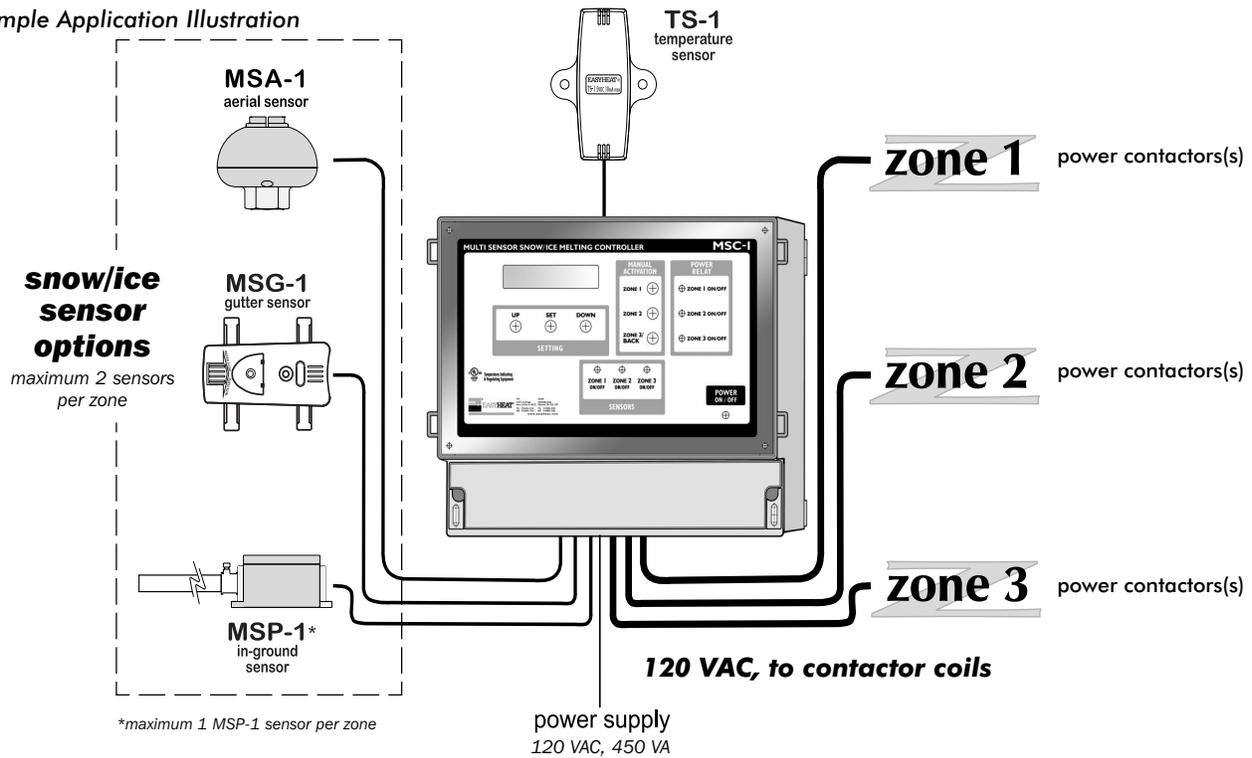
Pre-Programmed Configuration

The MSC-1 Control Panel is delivered preprogrammed for a one zone system, for use with either an aerial (MSA-1) or gutter (MSG-1) sensor. (Note that the MSC-1 does not distinguish between the gutter and aerial sensors). The off temperature (the MSC-1 will not energize the heating equipment when the ambient temperature is warmer than this) is pre-set to 37°F (3°C), and relay hold time (the length of time that the heating equipment will stay energized after no longer senses the presence of ice/snow in the zone) is 2.0 hours. If the snow/ice melting system has been designed to operate in this manner, then no programming is required: simply wire as per the following instructions.



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Fig.2 Sample Application Illustration



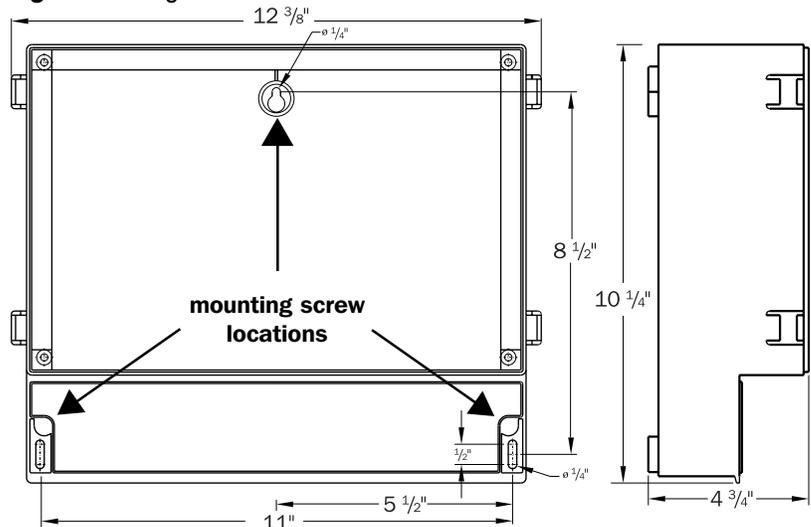
WARNINGS

1. This is not a "do-it-yourself" product. A qualified electrician must install the MSC-1.
2. If after carefully reading these instructions you still have questions regarding installation, operation or maintenance of this product, call the numbers listed for assistance.
3. Prior to installation, check the MSC-1 Control Panel for possible shipping damage. Do not install a damaged MSC-1 Control Panel.
4. All heating equipment, controls & associated systems must be installed in compliance with the latest editions of all applicable electrical codes and ordinances.
5. The MSC-1 has been designed to accept only EasyHeat moisture and temperature sensor inputs. The risk of fire or electric shock exists if the MSC-1 is connected to any device other than an EasyHeat sensor.
6. Do not connect heating equipment directly to the MSC-1 Control Panel. The MSC-1 control signal relays provide an output to operate external contactors only. The risk of fire or electric shock exists if the heating equipment is directly connected to the MSC-1 Control Panel.
7. These instructions must be saved and made available to owners or users of this product and/or transferred to future owners.
8. Secure the MSC-1 in an indoor location. The MSC-1 Control Panel is not suitable for installations environments subject to condensing moisture or those exposed to temperature extremes.
9. Avoid shock or vibration.

INSTALLATION INSTRUCTIONS

1. Mount the MSC-1 securely to the wall with three #10 screws, mount in an upright position in an indoor location, in an area that is dry and not subject to temperature extremes. See Fig.3 for mounting details.
2. Four 1/2" connectors have been installed on the MSC-1 Control Panel box to facilitate connection of electrical conduit for input power supply wiring, and contactor output wiring.
3. Remove the front access cover to begin connecting wiring. On the back of the access cover is a label that may be used as a wiring guide.
4. Connection to the MSC-1 is done through terminal blocks. Fish the wire being connected through the adjacent knock-out, and pull out approximately 12" of wire. The top half of the terminal block is removable for easy wiring, gently pull up on the top half to remove. After connecting to the wire to the top half gently set it back into the base, while carefully pulling back excess wire through the knockout.

Fig.3 Mounting: mounts to wall via three #10 screws



INSTALLATION INSTRUCTIONS (continued)

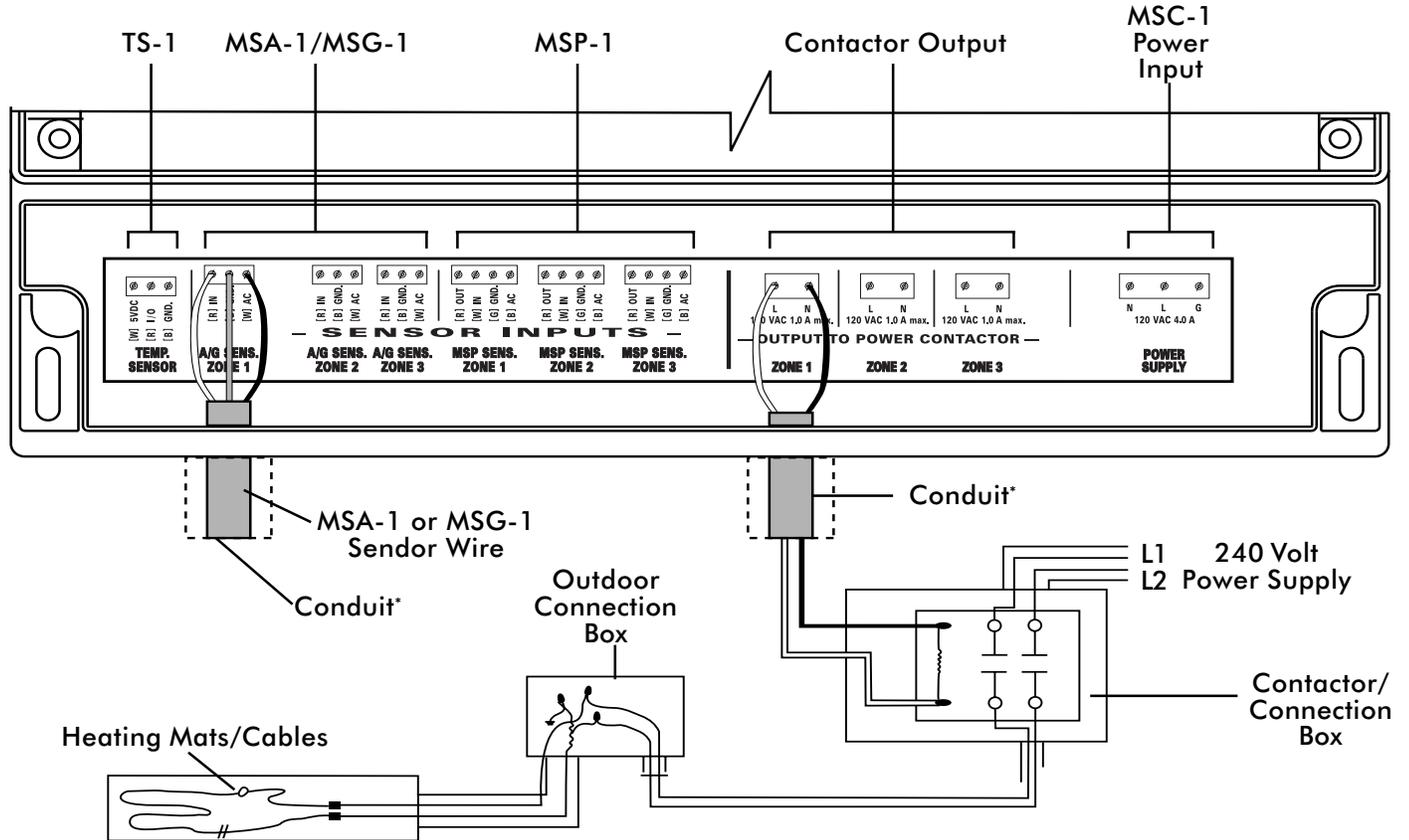
5. The MSC-1 terminal blocks serve 5 distinct connection sectors (see Fig 4), they are:

- 1) TS-1 - temperature sensor,
- 2) MSA-1 aerial sensors / MSG-1 gutter sensors (one each per zone),
- 3) MSP-1 in-ground sensors (one each per zone),
- 4) Output to power contactors (one each per zone),
- 5) Power supply.

Connection to each sector is described below.

6. The TS-1 is connected to the left-most terminal block, identified as **TEMP. SENSOR**. The MSC-1 will not function if the TS-1 wire colour codes are not properly matched at the terminal block. See Fig.4
7. The MSA-1 or the MSG-1 may be connected to any one of the 3 terminal blocks, identified as **A/G. SENS**. The Zone number at the terminal block correlates to a snow-melting zone, ensure that the sensor is connected to the proper zone terminal. The MSC-1 will not function properly if the MSA-1/MSG-1 wire colour codes are not properly matched at the terminal block. See Fig.4
8. The MSP-1 may be connected to any one of the 3 terminal blocks identified as **PAV. SENS**. The Zone number at the terminal block correlates to a snow-melting zone, ensure that the sensor is connected to the proper zone terminal. The MSC-1 will not function properly if the MSP-1 wire colour codes are not properly matched at the terminal block. See Fig.4
9. The outputs to the power contactors may be connected to any one of the 3 terminal blocks in the -OUTPUT TO POWER CONTACTORS- segment, **ZONE#1, 2 or 3**.
The Zone number at the terminal block correlates to a snow-melting zone, ensure that the output being connected matches the sensor inputs connected. The output wire must be connected with the polarity as noted, ensure voltage and amperages are suitable for the contactor being used. The MSC-1 will not function properly if the output connections are improperly made. See Fig.4
10. The power supply is connected to the right-most terminal block, identified as **POWER SUPPLY**. The power supply wires must be connected with the polarity as noted, ensure supply voltage is correct and noted ampacity is available. The MSC-1 will not function if the power supply connections are improperly made. See Fig.4
11. At this point a quick check on the power supply wiring can be made. Energize the supply circuit for the MSC-1 Control Panel, and turn on the MSC-1 via the toggle switch, the LCD should illuminate at this point. Reattach the front access cover, connection of the MSC-1 is complete.
12. Each of the MSA-1, MSG-1 or MSP-1 sensors connected to the MSC-1 must be activated by programming the MSC-1; to do so, follow the steps in the programming section of this instruction.

Fig.4 MSC-1 Control Panel (access cover removed)



*As required by electrical codes

OPERATION

The MSC-1 is a programmable controller, capable of controlling three separate snow/ ice melting zones. A control relay for each zone is included in the MSC-1 to operate a contactor for each zone to energize the snow/ice melting equipment. There are two operating mode selections possible with the MSC-1:

Mode 1 – Independent

In this mode each snow/ice melting zone is controlled independently. Mode 1 allows all 3 zones to be energized simultaneously. This mode is best used where circuit loading is not a concern (e.g. adequate circuit ampacity is available to operate the entire snow/ice melting load simultaneously).

Mode 2 – Priority

In this mode each zone is controlled on a priority basis, with the most critical zone (always Zone 1) being melted first, followed then by the less critical zones. Mode 2 allows only 1 of the zones to be energized at a time. This mode is best used where circuit loading is a concern. A slight delay is provided when switching power between zones to ensure circuits are not overloaded. Set-up in Mode 2 must be done either with Zones 1 & 2, (with Zone 3 not being used), or Zones 1, 2 & 3. Operation is sequential, beginning with Zone 1. When Zone 1 is melted, the MSC-1 de-energizes it and then energizes Zone 2. However if snow/ice is detected on

Zone 1, Zone 2 is de-energized and Zone 1 re-energized. Similar logic applies for Zone 2 & 3; i.e. the lower numbered zone always takes priority.

The Priority mode available in the MSC-1 can reduce circuit loading by splitting up a large snow melting area into separate, smaller zones. For example, if a large area would require 90 Amps of current, this could be split into two separate zones of, say, 50 Amps in one zone and 40 Amps in the other. Then, by programming the MSC-1 in the Priority Mode, only one zone will be enabled at any one time, resulting in a maximum circuit loading of 50 Amps. Similarly, the area could be split into three zones of, say 25, 35 and 30 Amps; in this case circuit loading would be 35 Amps maximum. It should be further noted that when in Priority mode, the MSC-1 always gives priority to Zone 1; when Zone 1 is completely melted, then Zone 2 is enabled until melted, and then, finally Zone 3; i.e. Zone 1 always has higher priority over Zone 2, which has higher priority over Zone 3. Further, if snow/ice is detected in a zone with higher priority, then operation reverts to the zone with higher priority. For example, if melting has been completed in Zone 1, and Zone 2 has thus been enabled, then if snow/ice is detected in Zone 1, operation in Zone 2 will be suspended, and Zone 1 will be re-enabled until melting is again complete, at which time melting in Zone 2 will recommence.

Zone Assignment

The MSC-1 uses the concept of a zone system to most efficiently control snow/ice melting equipment. The term “zone” means an area (either surface area or roof/gutter area, or some combination of both) heated by a specific set of snow/ice melting equipment that is controlled in a common manner. The MSC-1 allows for up to three zones, and each zone can have multiple moisture sensors for, say, roof/gutter, aerial and/or surface snow/ice detection. If any one of the sensors detects moisture, the heating equipment may be energized. The moisture sensor in the zone should be, generally, “surrounded” by the heating equipment to ensure that the heating equipment is only energized when there is indeed snow/ice present in the zone.

Zones can be used to represent different areas; for example a parking ramp area could be one zone while roof/gutter de-icing on the same building could be another zone. Similarly, two sidewalks on different sides of the same building (possibly one on the north side and one on the south side) could represent two separate zones. The perimeter of a football stadium could be split into three separate zones to reflect different weather conditions on different sides of the building.

It is also important to give consideration to the assignment of zones; usually, high traffic areas will be given priority, with lower traffic areas given lower priority. Zones can be easily reassigned at the wiring terminals of the MSC-1.

Manual Operation

The power to any one of the snow-melting zones may be activated manually by pressing and holding the **ZONE X** button until the information below appears on the LCD screen. Manual activation will only work as long as the ambient temperature is below the MSC-1 shut-off temperature. The duration of the time the zone will remain energized (Time Delay) is pre-set to 2.0 hours; this can be adjusted by following the programming instructions below. The minimum and maximum settings possible are noted on the LCD, adjustable in 0.5 hour increments.

M. Time Delay Zone 1
min.0 <2.0H> Max.10

Pressing **UP** increases the delay time.
Pressing **DOWN** decreases the delay time.
Press the **SET** button to accept the chosen delay time.

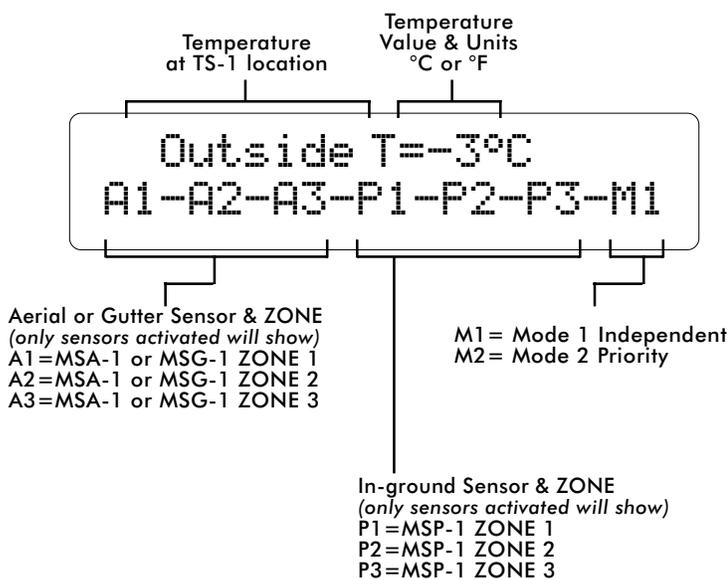
Once the delay time is set, the MSC-1 returns to normal control function, and energizes the heating equipment for the selected zone.

To de-energize the manually activated heating equipment, follow the above steps but set the time delay to 0.0 hours. Once the **SET** button is pressed the heating equipment will quickly de-energize.

When operating in Mode 2 – Priority, the manual override works as described if no snow melting zones are energized. If any snow-melting zone is energized the manual override only works to energize the higher priority zone, thereby de-energizing the lower priority zone.

It is important to note that manual operation is not possible if the MSC-1 has already energized the zone, and that manual control will be overridden if the zone moisture sensor detects precipitation.

LCD Explanation



Programming Instructions

The MSC-1 program has been structured into 6 levels; within each of these levels are further degrees of selection. Each programming step is clearly described on the LCD, and easily adjusted by the **"UP"**, **"DOWN"**, and **"SET"** buttons.

During programming:

- All regular operating functions of the MSC-1 are suspended.
- If a button is not pressed for approximately 90 seconds, the program will return to normal operation, saving programming changes made up to the point exited.
- Pressing the **BACK** button results in an exit from the programming sequence, with the changes made up to that point saved.

Resetting to Factory Conditions

When the MSC-1 is first energized, and during the time the initial LCD display (MSC Ver. X.X) screen shows push the **UP** and **DOWN** buttons simultaneously to access the option to revert to factory set conditions. Use the **UP** or **DOWN** button to select "yes" or "no"; the program accepts the selection and returns to normal operation.

To begin programming the MSC-1 hold the **SET** button down for 5 seconds. The display will start in program level 1. To move to other levels use the **UP** or **DOWN** buttons.

Level 1. Temperature Unit Selection

PROGRAM MODE
1. Degree: °C or °F

The default temperature units setting is °F.

To move to the next level use the **UP** or **DOWN** buttons. Press the **SET** button to select the temperature display units.

1. Degree: °C or °F
<°C > <°F >

Pressing **UP** selects Degrees C.

Pressing **DOWN** selects Degrees F.

After pressing the **UP** or **DOWN** button, the program automatically accepts the selection and advances to the next program level.

Level 2. Operating Mode Selection

PROGRAM MODE
2. Mode: 1 or 2

The default mode setting is Mode 1.

To move to the next level use the **UP** or **DOWN** buttons. Press the **SET** button to select the operating mode.

2. Mode: 1 or 2
<No.1 > <No.2 >

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Pressing **UP** selects Mode 1 (Independent).
Pressing **DOWN** selects Mode 2 (Priority).
After pressing the **UP** button for Mode 1, the program automatically accepts the selection and advances to the next program level.
After pressing the **DOWN** button for Mode 2, the program automatically accepts the selection and then moves to another input screen, as shown below.

```
2. Mode No.2
<2zones>  <3zones>
```

Pressing **UP** selects a 2 Zone system (Zone 1 & 2).
Pressing **DOWN** selects a 3 Zone system (Zone 1, 2 & 3).
After pressing the **UP** or **DOWN** button, the program automatically accepts the selection and advances to the next program level.

Level 3. Sensor Activation/De-activation

```
PROGRAM MODE
3.Sensor Activation
```

The default sensor activation setting is for an aerial (MSA-1), or gutter (MSG-1) sensor, zone1.
To move to the next level use the **UP** or **DOWN** buttons.
Press the **SET** button to begin the process to activate or deactivate sensors. Each of the 3 control zones may have up to 2 individual sensors, for a total of 6 sensors. <A/G.ZoneX> refers to either an MSA-1 or MSG-1 sensor, <P.ZoneX>, refers to an MSP-1 in-ground sensor. The activation/deactivation operation for all 6 sensors must be stepped through before this operation is complete.

```
3.Sensor Activation
Yes <A/G.Zone1> No
```

```
3.Sensor Activation
Yes <A/G.Zone2> No
```

```
3.Sensor Activation
Yes <A/G.Zone3> No
```

```
3.Sensor Activation
Yes <P.Zone1> No
```

```
3.Sensor Activation
Yes <P.Zone2> No
```

```
3.Sensor Activation
Yes <P.Zone3> No
```

Pressing **UP** activates the selected sensor.
Pressing **DOWN** de-activates the selected sensor.
After pressing the **UP** or **DOWN** button for <P.Zone3>, the program automatically accepts the selections and advances to the next program level.

Level 4. Ambient Off Temperature Setting

```
PROGRAM MODE
4.Ambient Off Temp.
```

The default ambient off temperature is 37°F (3°C).
To move to the next level use the **UP** or **DOWN** buttons.
Press the **SET** button to adjust the ambient off temperature, the temperature above which the MSC-1 will no longer energize the heating equipment. The minimum and maximum settings possible are noted on the LCD.

```
4.Ambient Off Temp.
min.34 <37°F> Max.50
```

Pressing **UP** increases the degree setting.
Pressing **DOWN** decreases the degree setting.
Press the **SET** button to accept the chosen ambient off temperature and advances to the next program level.

Level 5. Slab Off Temperature Setting

```
PROGRAM MODE
5.Slab Off Temp.
```

The default slab off temperature is 50°F (10°C).
To move to the next level use the **UP** or **DOWN** buttons.
Press the **SET** button to adjust the slab off temperature, the temperature above which the MSC-1 will de-energize the in-ground heating equipment. The minimum and maximum settings possible are noted on the LCD.

```
5.Slab Off Temp.
min.41 <50°F> Max.68
```

Pressing **UP** increases the degree setting.
Pressing **DOWN** decreases the degree setting.
Press the **SET** button to accept the chosen slab off temperature and advances to the next program level.

Level 6. Setting the Relay Hold Time

```
PROGRAM MODE
6.Relay Hold Time
```

The default relay hold time is 3.0 hours for all zones.
To move to the next level use the **UP** or **DOWN** buttons.

Press the **SET** button to adjust the relay hold time for the snow melting zones. The relay hold time is the amount of time the snow melting zone remains energized after the moisture sensor is dry. Each of the 3 zones is set independently, in 0.5 hour increments. The minimum and maximum settings possible are noted on the LCD. The relay hold times for all 3 sensors must be stepped through before this operation is complete.

6.Relay Hold Time Z1
min.0 <3.0H> Max.10

6.Relay Hold Time Z2
min.0 <3.0H> Max.10

6.Relay Hold Time Z3
min.0 <3.0H> Max.10

Pressing **UP** increases the relay hold time.
Pressing **DOWN** decreases the relay hold time.
Press the **SET** button to accept the chosen relay hold time and advance to the timing for the next zone.

After the hold time for Zone 3 has been set the program automatically returns to programming Level #1 "Temperature Unit Selection". To exit the programming sequence and return to normal control operation press the **BACK** button.

Temperature Stand-by

Whenever the ambient air temperature exceeds the ambient off temp, the MSC-1 goes into a "temperature stand-by" mode, at which time all moisture sensors are de-activated. As soon as the ambient air temperature drops below the ambient off temp, the sensors are reactivated and operation begins as normal.

Outside T = 10°F
Temperature Stand-by

Specifications

Electrical

Power Requirements
120 VAC, 50/60hz, 480 VA

Control Relays - Outputs
120VAC, Pilot Duty, 120VA

Power Supply - Sensors
24VAC, Class 3, 12VA

Temperature Sensor Supply
5VDC, Class 2, 0.5VA

Mechanical
NEMA 4, 4X plastic enclosure

System Memory
Nonvolatile: no data loss with a loss of system power

Dimensions
11" wide (cabinet; 12.375" overall width)
X 10.25" high
X 4.75" deep

Certification
UL Listed to US and Canadian safety standards

Environmental Specifications
Ambient Operating Temperature Range
-4°F to 50°F / -20°C to 70°C
Relative Humidity
0 to 90% RH, non condensing
Storage Temperature
-4°F to 185°F / -20°C to 85°C

Temperature extremes may adversely affect components such as the Liquid Crystal Display (LCD).

Error Messages

The MSC-1 will display an error message whenever a problem is detected with the connection to the TS-1 or any of the MSP-1's. Note that the connection status to a gutter (MSG-1) or aerial (MSA-1) sensor is not monitored by the MSC-1.

TS-1 Error

Manual only <M1>
Error!- TS-1 <cancel>

MSP-1 Error

Error!- P-1
<cancel>

The error screen will flash intermittently with the standard operating screen. To cancel the error message press the **DOWN** button when the error screen is showing.

If there is a TS-1 error all automatic operation of the MSC-1 ceases, however manual operation of each zone is still possible.

If there is an MSP-1 error, automatic control of the associated zone is suspended, again manual operation is still possible. Once the sensor problem has been fixed turn off the power to the MSC-1 Control Panel at the toggle switch, reconnect the sensor wiring to the terminal block, then after a minimum 10 seconds turn back on the power. The MSC-1 program will recognize the sensor and begin normal operation.

LIMITED WARRANTY AND LIABILITY

Easy Heat warrants that if there are any defects in material or workmanship in any heating cable or accessory during the first year after the date of purchase. We will provide new products to replace any defective items, or we will refund the purchase price paid for the accessory or cable, not including any labor or other installation costs. As an alternate, we may elect to repair the cable or accessory at our factory with all shipping and other removal costs borne by the purchaser.

We further warrant that for a period of twelve (12) months after the date of performance any services performed hereunder will be in a good and skillful manner, based on our understanding of pertinent technical data as of the date of performance of such services. Easy Heat's sole responsibility and liability in the event of any defect, error, omission, or failure in the services rendered hereunder shall be to provide corrected services of the type provided for herein, designed to correct such defect, error, omissions, or failure, and in no event shall Easy Heat's liability with respect to such warranty exceed the amount received by it from the Buyer on account of such services.

Our obligation to provide corrected services, new products, refund the purchase price, or perform the repair described above is conditioned upon (a) the installation of the accessory or cable conforming to the specifications set forth in our installation instructions and (b) the accessory or cable not having been damaged by mechanical or electrical activities unrelated to the operation of the accessory or cable.

A refund of your purchase price, provision of replacement products, repair of the accessory or cable or provision of corrected services as described above, shall be your sole and exclusive remedy for a breach of this warranty. THESE ARE THE SOLE AND EXCLUSIVE WARRANTIES GIVEN BY EASY HEAT WITH RESPECT TO THE GOODS AND SERVICES AND ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO EASY HEAT IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT EASY HEAT'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY EASY HEAT FOR YOUR USE OR PURPOSE.

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence, unauthorized modification or alteration, use beyond rate capacity, or improper installation, maintenance or application. To the extent that you or your agents have supplied specifications, information, representation of operating conditions or other data to Easy Heat in the selection or design of the Goods and the preparation of Easy Heat's quotation, and in the event that actual operating

conditions or other conditions differ from those represented by you, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

If within thirty (30) days after your discovery of any warranty defects within the warranty period, you notify Easy Heat thereof in writing, Easy Heat shall, at its option, repair, correct or replace F.O.B. point of manufacture, or refund the purchase price for that portion of the Goods found by Easy Heat to be defective. Failure by you to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of your claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment of the repaired or replaced goods, whichever is longer.

This limited warranty does not cover any costs relating to the repair or replacement of any accessory or cable at the installation site. Our accessories and cables are not easily accessible. A failed accessory or cable usually cannot be easily repaired. Replacement of a failed accessory or cable will require that the materials under which it is installed be removed to permit replacement of the accessory or cable. **We will not reimburse any costs relating to the repair or replacement of any accessory or cable at the installation site.**

IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL EASY HEAT'S LIABILITY TO YOU AND/OR YOUR CUSTOMERS EXCEED THE PRICE PAID BY YOU FOR THE SPECIFIC GOODS PROVIDED BY EASY HEAT GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. YOU AGREE THAT WE SHALL NOT BE LIABLE TO YOU OR YOUR CUSTOMERS FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL OR PUNITIVE DAMAGES. No agent, employee or representative of ours has authority to bind us to any affirmation, representation or warranty concerning the goods sold unless such affirmation, representation or warranty is specifically incorporated by written agreement.

To obtain new products, arrange repair of existing product, or a refund under this warranty, please contact Easy Heat with a description of the defect and proof of purchase at the address noted herein.

DISCLAIMER

All information presented in this document was believed correct at the time of printing. We reserve the rights to make any modifications of this document without any prior notification.





MSC-1 Control Panel for Snow & Ice Melting Installations *Specification & Application Guide*

The MSC-1 Control Panel manages snow and ice melting systems for sidewalks, driveways, gutters and downspouts. Suitable for controlling heating cables and mats, self-regulating cables and hydronic systems, the MSC-1 can monitor snow and ice accumulation in three separate snow melting application zones. The MSC-1 programming allows each zone to be controlled independently or on a priority basis.

General

The MSC-1 is housed in an enclosure suitable for commercial/industrial applications (NEMA 4, 4X) and features an LCD display, programming and associated indicator lights for operation of each zone.

The control signal relays operate external contactors.

Features

- Automatic snow/ice melting control
- Manual zone activation
- Suitable for NEMA 4, 4X
- UL Listed to US and Canadian safety standards
- *Hold on Time*: Adjustable 0-10 hours in half-hour increments
- Maximizes energy efficiency
- Monitors and controls 3 separate zones, sequentially or independently
- Reduced power requirements when Priority operation mode is used

Electrical

Power Requirements
120 VAC, 450 VA

System Memory
Nonvolatile: no data loss with a loss of system power

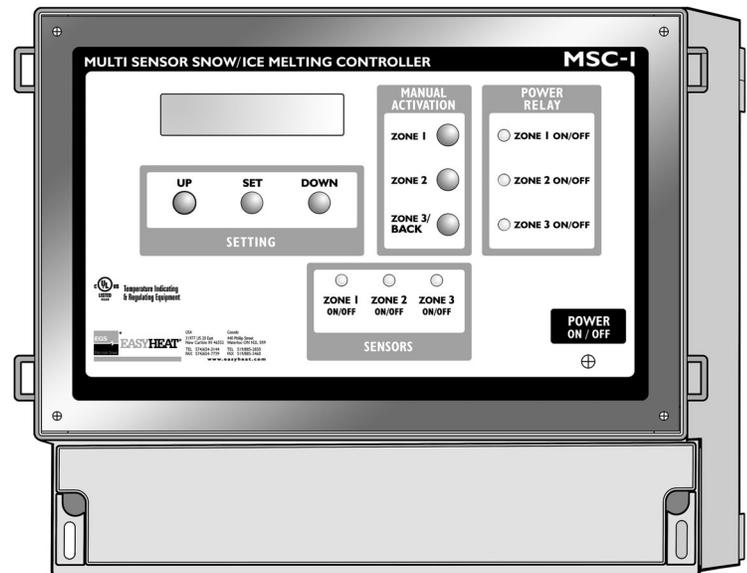
Control Relays
120VAC, 5 Amp contacts

Mechanical

NEMA 4, 4X plastic enclosure

Dimensions

11" wide (cabinet; 12.375" overall width)
X 10.25" high
X 4.75" deep



Operating Modes

Mode 1 – Independent

- programmable for 3 independent snow melting systems (zones) for any combination of snow/ice melting or roof & gutter de-icing systems
- Controlling any combination

Mode 2 – Priority

- sequentially operating 3 snow melting zones with individual zone priority level of 1 to 3
- With one in-ground sensor per zone and an optional Aerial sensor for priority zone 1

Manual Bypass

Manually cycles from 0-10 hours in half-hour increments

Environmental Specifications

Ambient Operating Temperature Range

-4°F to 50°F / -20°C to 70°C

Relative Humidity

0 to 90% RH, non condensing

Storage Temperature

-4°F to 185°F / -20°C to 85°C

Temperature extremes may adversely affect components such as the Liquid Crystal Display (LCD).



HEATING CABLE SYSTEMS

USA
31977 US 20 East
New Carlisle IN 46552
TEL 574/654-3144
FAX 574/654-7739

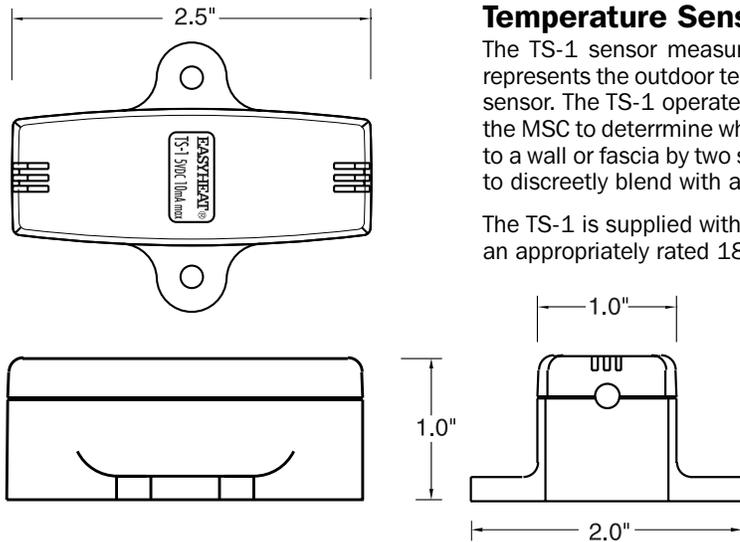
Canada
440 Phillip Street
Waterloo ON N2L 5R9
TEL 519/885-2850
FAX 519/885-5460

www.easyheat.com

Sensors for MSC-1

The MSC-1 can access information from three different types of moisture sensors—surface (in-ground), aerial and gutter—and one type of temperature sensor. The surface, aerial and gutter sensors detect moisture—snow, ice, sleet, etc.—and send appropriate signals to the MSC-1. Similarly, the temperature sensor sends temperature data back to the MSC-1. Independent temperature and moisture information is processed by the MSC-1 to ensure that heating equipment will only be energized during freezing conditions. Each MSC-1 must have a temperature sensor, TS-1, in order to function. The TS-1 (see below) is included with each MSC-1.

Maximum of two moisture sensors per zone, except maximum of one in-ground sensor per zone.

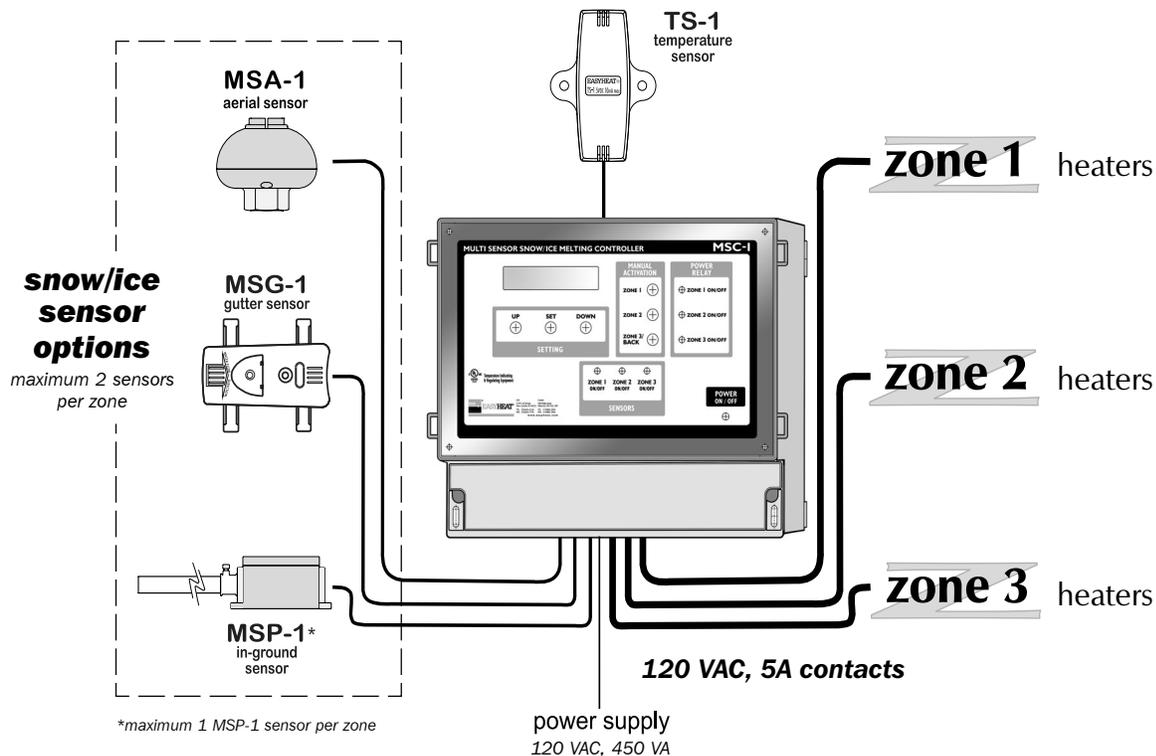


Temperature Sensor (TS-1)

The TS-1 sensor measures outside temperatures and is placed in the area that best represents the outdoor temperature conditions. Each MSC-1 includes a TS-1 temperature sensor. The TS-1 operates on low voltage provided by the MSC-1 control unit and allows the MSC to determine when to activate snowmelting or de-icing equipment. Easily affixed to a wall or fascia by two screws, the TS-1's small size and neutral color allows the sensor to discreetly blend with almost any background.

The TS-1 is supplied with 10' of connection wire which may be extended up to 500' with an appropriately rated 18 – 20 AWG 3 wire unshielded cable.

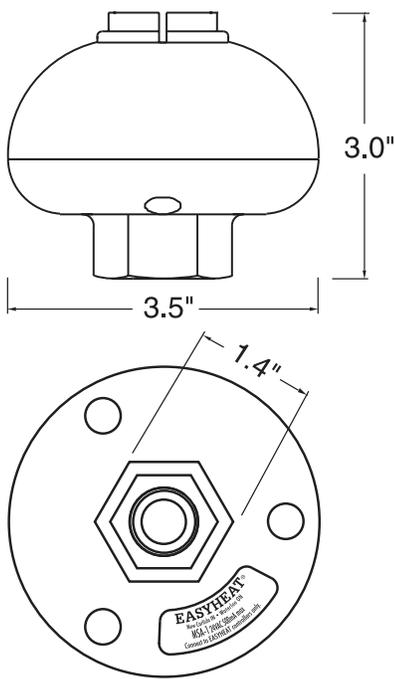
Sample Application Illustration



Optional Aerial Sensor (MSA-1)

The MSA-1 sensor detects falling or blowing snow coming in contact with the sensor grid, then sends a signal to the MSC-1 to energize heating equipment (snow melting or de-icing cables, etc.). (The TS-1 temperature sensor ensures that heating equipment will only be energized during freezing conditions.) The sensor operates on low voltage supplied by the MSC-1 control unit, has a built in 1/2" NPT conduit connection and includes 10' of wire for connection back to the MSC-1.

The MSA-1 is well suited for mast mounting and custom positioning. Rounded features and neutral color allows the sensor to discreetly blend into almost any environment.

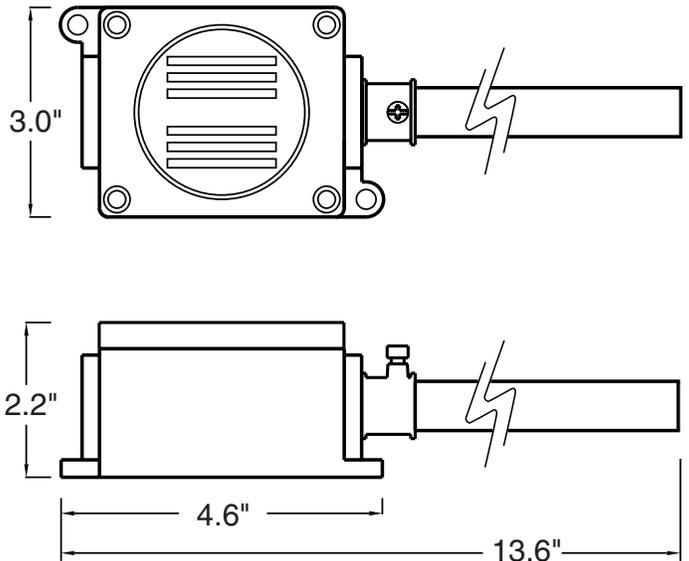


The MSA-1 connection wire may be extended up to 500' with an appropriately rated 18-20 AWG 3 wire unshielded cable.

Optional In-ground Sensor (MSP-1)

The MSP-1 in-ground sensor is encased within a rugged enclosure and is intended to be embedded within the surface being heated. The MSP-1 is supplied with a protective field cover to simplify asphalt or concrete installations, and comes with 30' of wire for connection back to the MSC-1 control unit. The sensor has an integral 1/2" NPT conduit connection. The MSP-1 connection wire may be extended up to 500' with an appropriately rated 18-20 AWG 4 wire shielded or unshielded cable.

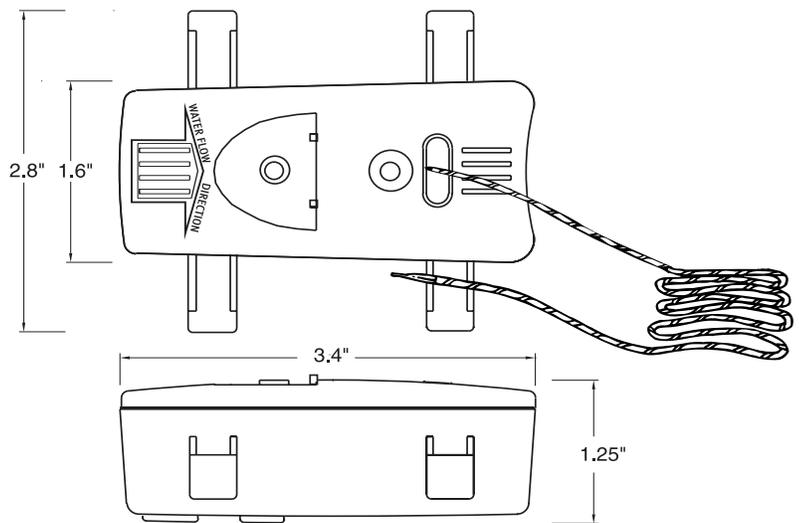
The low voltage MSP-1 monitors the temperature of the surface being heated and also senses falling or drifting snow. The control unit can then disable the heating equipment (heating mats, cables, etc.) when the surface temperature rises above about 41°F (5°C). The result of this dual sensing (temperature and snow) technology is the optimum means of keeping snow melting costs to a minimum while still providing reliable snow detection and melting capabilities.



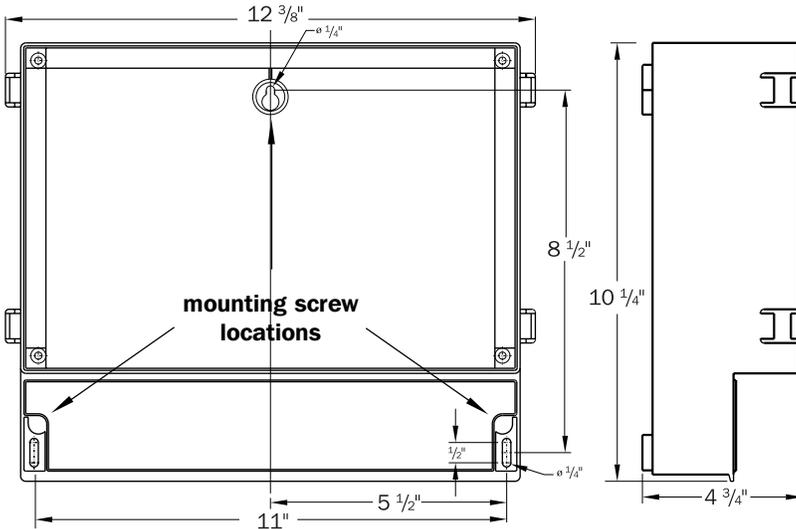
Optional Gutter Sensor (MSG-1)

The MSG-1 detects moisture on roofs and in gutters. Roof moisture detection is made with the unique sensor wire design, gutter moisture detection is made by the traditional sensing grid. (The TS-1 temperature sensor ensures that heating equipment will only be energized during freezing conditions.) The combination roof and gutter detection system provides quick detection of potentially damaging roof and gutter icing conditions. As soon as moisture is detected, the MSG-1 sends a signal to the MSC-1 to energize de-icing cables.

The sensor operates on low voltage provided by the MSC-1 control unit and includes 10' of wire, for connection back to the MSC-1, and mounting hardware for attachment in the gutter. The MSG-1 connection wire may be extended up to 500' with an appropriately rated 18-20 AWG 3 wire unshielded cable.



4 **MSC-1 Control Panel for Snow Melting Specification & Application Guide**



Mounting

Mounts to wall via three #10 screws.

Ordering Information

By component

Easy Heat Item #	Description	Ctn Qty	Ctn Wt	UPC
MSC-1	Controller (includes TS-1 temperature sensor)	1	8.5 lbs	0-13627-01500-5
MSA-1	Aerial Sensor	1	2.0 lbs	0-13627-01501-2
MSG-1	Gutter Sensor	1	2.0 lbs	0-13627-01502-9
MSP-1	In-Ground Sensor	1	6.5 lbs	0-13627-01503-6
TS-1	Temperature Sensor (for replacement)	1	1.5 lbs	0-13627-01504-3

By system

Easy Heat Item #	Description	UPC
MSCA-1	Controller (w/TS-1) and MSA-1 Aerial Sensor	0-13627-01505-0
MSCG-1	Controller (w/TS-1) and MSG-1 Gutter Sensor	0-13627-01506-7
MSCP-1	Controller (w/TS-1) and MSP-1 In-Ground Sensor	0-13627-01507-4

LIMITED WARRANTY

Easy Heat warrants that if there are any defects in material or workmanship in any heating cable or accessory during the first year after the date of purchase. We will provide new products to replace any defective items, or we will refund the purchase price paid for the accessory or cable, not including any labor or other installation costs. As an alternate, we may elect to repair the cable or accessory at our factory with all shipping and other removal costs borne by the purchaser.

We further warrant that for a period of twelve (12) months after the date of performance any services performed hereunder will be in a good and skillful manner, based on our understanding of pertinent technical data as of the date of performance of such services. Easy Heat's sole responsibility and liability in the event of any defect, error, omission, or failure in the services rendered hereunder shall be to provide corrected services of the type provided for herein, designed to correct such defect, error, omissions, or failure, and in no event shall Easy Heat's liability with respect to such warranty exceed the amount received by it from the Buyer on account of such services.

Our obligation to provide corrected services, new products, refund the purchase price, or perform the repair described above is conditioned upon (a) the installation of the accessory or cable conforming to the specifications set forth in our installation instructions and (b) the accessory or cable not having been damaged by mechanical or electrical activities unrelated to the operation of the accessory or cable.

A refund of your purchase price, provision of replacement products, repair of the accessory or cable or provision of corrected services as described above, shall be your sole and exclusive remedy for a breach of this warranty. THESE ARE THE SOLE AND EXCLUSIVE WARRANTIES GIVEN BY EASY HEAT WITH RESPECT TO THE GOODS AND SERVICES AND ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO EASY HEAT IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT EASY HEAT'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY EASY HEAT FOR YOUR USE OR PURPOSE.

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence, unauthorized modification or alteration, use beyond rate capacity, or improper installation, maintenance or application. To the extent that you or your agents have supplied specifications, information,

representation of operating conditions or other data to Easy Heat in the selection or design of the Goods and the preparation of Easy Heat's quotation, and in the event that actual operating conditions or other conditions differ from those represented by you, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

If within thirty (30) days after your discovery of any warranty defects within the warranty period, you notify Easy Heat thereof in writing, Easy Heat shall, at its option, repair, correct or replace F.O.B. point of manufacture, or refund the purchase price for, that portion of the Goods found by Easy Heat to be defective. Failure by you to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of your claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment of the repaired or replaced goods, whichever is longer.

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www.easyheat.com

MSP-1

EASYHEAT®

In-ground Moisture Sensor for MSC-1 Panel for Snow & Ice Melting Installations Installation & Operation Instructions

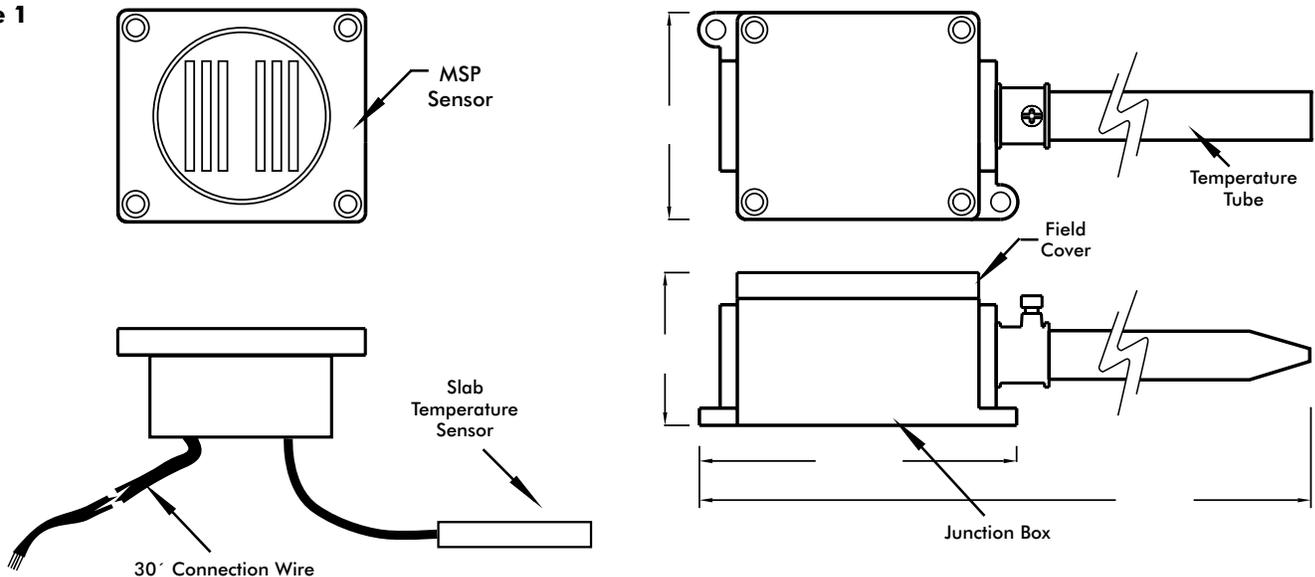
GENERAL

The MSP-1 in-ground sensor is encased within a rugged enclosure and is intended to be embedded within the surface being heated, usually concrete or asphalt. The MSP-1 is supplied with a protective field cover to simplify asphalt or concrete installations, and comes with 30' of wire for connection back to the MSC-1 control unit. The sensor has an integral 1/2" NPT conduit connection. The MSP-1 connection wire may be extended up to 500' with an appropriately rated 18-20AWG 4 wire shielded cable.

The low voltage MSP-1 senses falling or drifting snow by melting it on the "grid" area of the sensor and then detecting the presence of moisture by measuring an electrical signal between the grid bars. The MSP-1 also measures the temperature of the surface. This "dual sensing" technique allows the MSC-1 to control the heating equipment (mats, cables, etc..) in the optimum manner possible. This assures minimum energy costs while still providing reliable surface snow detection.

The main components of the MSG-1 are shown in Fig.1.

Figure 1



WARNINGS

1. This is not a "do-it-yourself" product. A qualified electrician must install the MSP-1.
2. If after carefully reading these instructions you still have questions regarding installation, operation or maintenance of this product, call the numbers listed for assistance.
3. Prior to installation, check the MSP-1 body, enclosure and wires for possible shipping damage. Do not install a damaged MSP-1 sensor.
4. All heating equipment, controls & associated systems must be installed in compliance with the latest editions of all applicable electrical codes and ordinances.
5. The MSP-1 has been designed for the sole purpose of connection to an EasyHeat MSC-1 Control Panel. The risk of fire or electric shock exists if the MSP-1 is connected to any device other than an MSC-1 Control Panel.
6. These instructions must be saved and made available to owners or users of this product and/or transferred to future owners.
7. The MSP-1 should not be located in areas of excessive heavy traffic. Ensure surface drainage is unimpeded and that the placement is in an area free of debris accumulation to prevent any damage to the sensing surface.
8. Do not install an MSP-1 Sensor when the ambient temperature is colder than 32°F (0°C). Installing the sensor below this temperature will damage the connection wire and result in the risk of fire or electrical shock.



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INSTALLATION INSTRUCTIONS

1. The MSP-1 should be located in area that best represents the zone being heated. Placement must be made in a reasonably level area, where surface drainage is unimpeded and free of debris accumulation. Avoid unusual sunny spots or standing water areas, both may adversely affect snow-sensing performance. If the MSP-1 mounting location is further than 30 feet from the MSC-1, then the MSP-1 connection wire must be routed to a junction box, and additional connection wire (up to 500' with an appropriately rated 18-20AWG 4 wire shielded cable) must be routed from the junction box to the MSC-1. Ensure that all electrical connections into a junction box are water-tight as appropriate. See Fig.2, Fig.5.
2. The MSP-1 box is supplied with a field cover to prevent it from being accidentally filled with asphalt or concrete during surfacing operations. After surfacing operations are completed the top of the field cover must be level with the top surface of the pavement or concrete. Prior to surfacing, adjust the height of the box up or down as necessary to maintain the level. See Fig. 2.
3. The MSP-1 box should be installed at the same time as the snow melting equipment. Centre the box between parallel runs of heating cable or piping, with the temperature tube running centred between the parallel heater runs. Connect supply conduit to the box as required. See Fig. 3.
4. Once the surface material has cured the MSP-1 sensor may be installed. Remove the field cover. Fish the connection wire through the conduit back to the MSC-1 or junction box. Feed the MSP-1 slab temperature sensor into the temperature tube, until it reaches the end. Set the sensor into the box and secure with the screws provided. See Fig. 4.
5. The MSP-1 is wired directly to the appropriate zone sensor terminal block on the MSC-1 control panel.

Figure 2 — MSP-1 Junction Box Section View

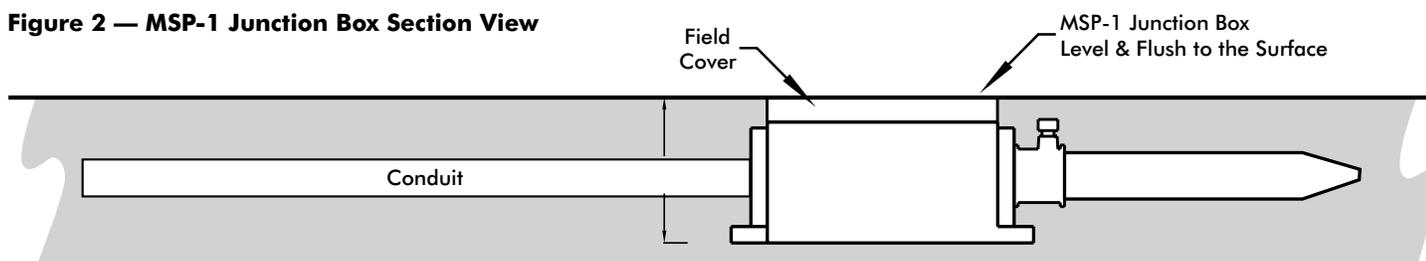


Figure 3 — MSP-1 Junction Box Installation, Plan View

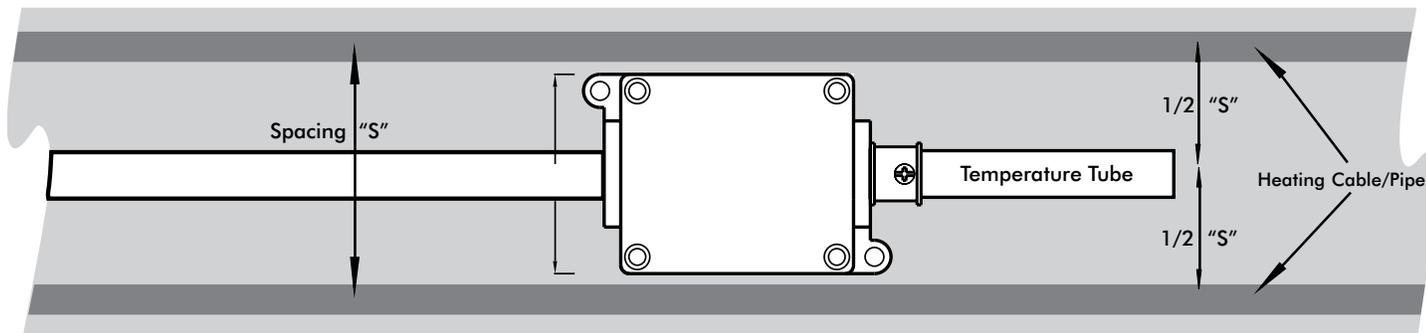


Figure 4 — MSP-1 Sensor Installation

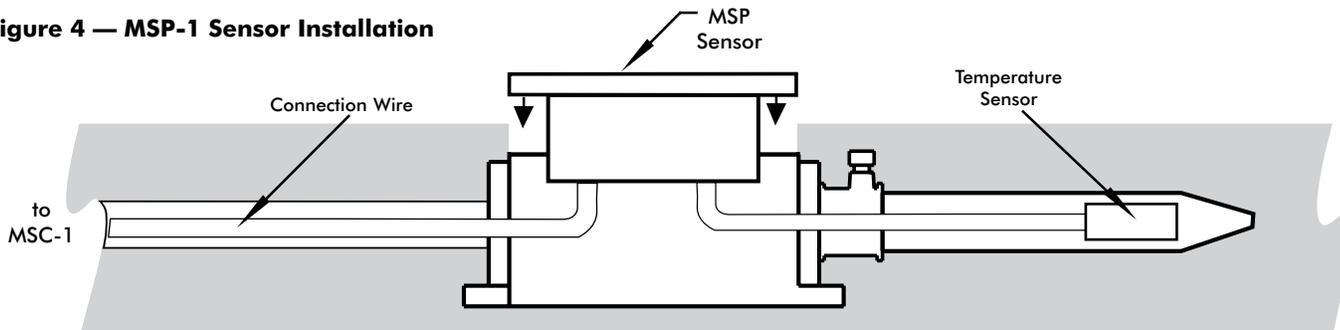
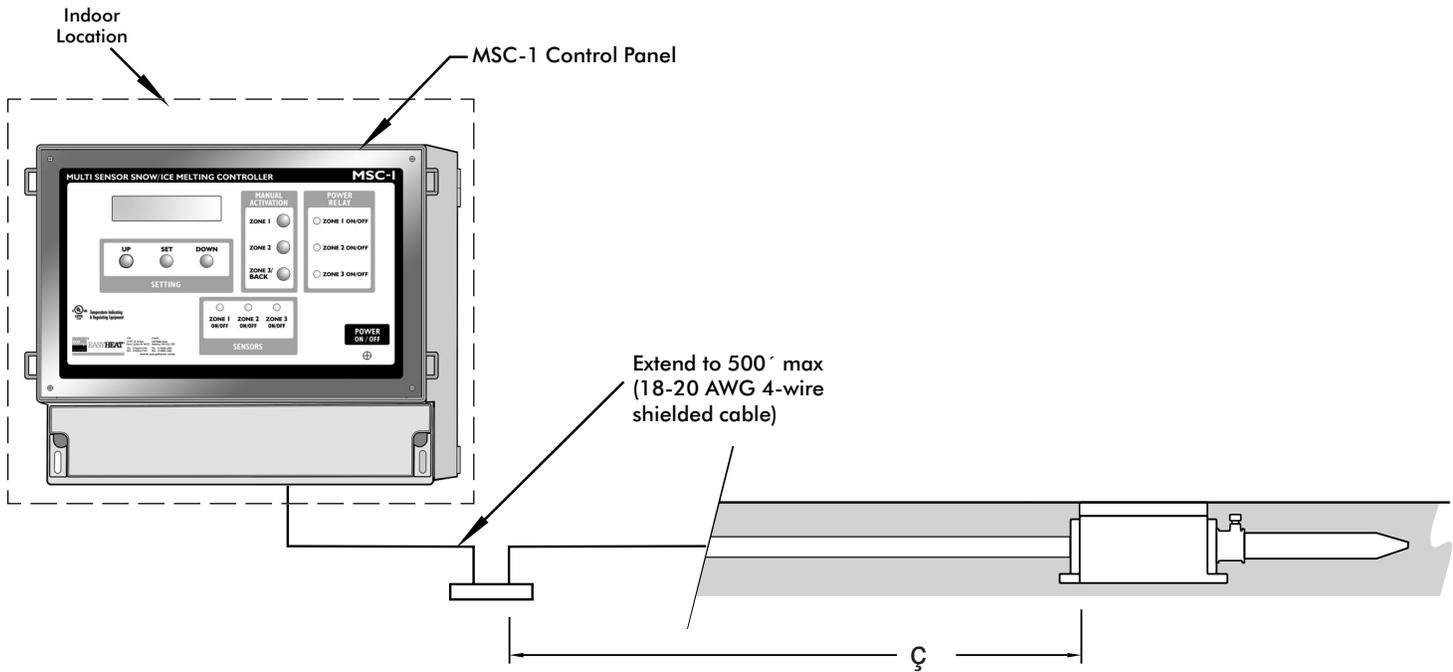


Figure 5 — MSP-1 Connection Reference



OPERATION INSTRUCTIONS

The MSP-1 snow melting control is designed to send a signal to the MSC-1 control panel indicating when snow or ice conditions exist. The MSC-1 control panel uses this information, along with temperature data from the TS-1 to determine when de-icing equipment should be energized.

The MSP-1 may be tested for functionality if the outside temperature and the heated slab temperature is below 3°C (37°F). Apply a small amount of moisture onto the surface of the sensor, the MSC-1 should energize the heating equipment in the associated zone. After this test, dry the sensor surface, the heating equipment in the associated zone should de-energize after the pre-set hold time.

Every year in the fall the MSP-1 must be inspected for physical damage and to clean up the snow sensor surface. To clean the snow sensor surface:

1. Disconnect MSP-1 from the power supply.
2. Scrub the surface of the snow sensor with a nylon brush.
3. Reconnect MSP-1 to the power supply.

ELECTRICAL SPECIFICATIONS

Environmental

Working temperature -40°C (-40°F) to 70°C (160°F)
 Humidity environment 0 to 100 %

Supply requirements

Power supply voltage 24VAC
 Maximum amperage 500mA
 Connection Lead length 30 feet



LIMITED WARRANTY

Easy Heat warrants that if there are any defects in material or workmanship in any heating cable or accessory during the first year after the date of purchase. We will provide new products to replace any defective items, or we will refund the purchase price paid for the accessory or cable, not including any labor or other installation costs. As an alternate, we may elect to repair the cable or accessory at our factory with all shipping and other removal costs borne by the purchaser.

We further warrant that for a period of twelve (12) months after the date of performance any services performed hereunder will be in a good and skillful manner, based on our understanding of pertinent technical data as of the date of performance of such services. Easy Heat's sole responsibility and liability in the event of any defect, error, omission, or failure in the services rendered hereunder shall be to provide corrected services of the type provided for herein, designed to correct such defect, error, omissions, or failure, and in no event shall Easy Heat's liability with respect to such warranty exceed the amount received by it from the Buyer on account of such services.

Our obligation to provide corrected services, new products, refund the purchase price, or perform the repair described above is conditioned upon (a) the installation of the accessory or cable conforming to the specifications set forth in our installation instructions and (b) the accessory or cable not having been damaged by mechanical or electrical activities unrelated to the operation of the accessory or cable.

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This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence, unauthorized modification or alteration, use beyond rate capacity, or improper installation, maintenance or application. To the extent that you or your agents have supplied specifications, information, representation of operating conditions or other data to Easy Heat in the selection or design of the Goods and the preparation of Easy Heat's quotation, and in the event that actual operating conditions or other conditions differ from those represented by you, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

If within thirty (30) days after your discovery of any warranty defects within the warranty period, you notify Easy Heat thereof in writing, Easy Heat shall, at its option, repair, correct or replace F.O.B. point of manufacture, or refund the purchase price for, that portion of the Goods found by Easy Heat to be defective. Failure by you to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of your claim for such defects. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment of the repaired or replaced goods, whichever is longer.

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To obtain new products, arrange repair of existing product, or a refund under this warranty, please contact Easy Heat with a description of the defect and proof of purchase at the address noted herein.

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TS-1

Temperature Sensor for MSC-1 Panel for Snow & Ice Melting Installations Installation & Operation Instructions

GENERAL

The TS-1 sensor measures outside temperatures and is placed in an area that best represents the outdoor temperature conditions.

Each MSC-1 includes a TS-1 temperature sensor. The TS-1 operates on low voltage provided by the MSC-1 control unit and allows the MSC to determine when to activate snow-melting or de-icing equipment.

Easily affixed to a wall or fascia by 2 screws, the TS-1's small size and neutral colour allows the sensor to discreetly blend with almost any background.

The TS-1 is supplied with 10' of connection wire which may be extended up to 500' with an appropriately rated 18-20AWG 3 wire unshielded cable.

The main components of the TS-1 are shown in Fig. 1.

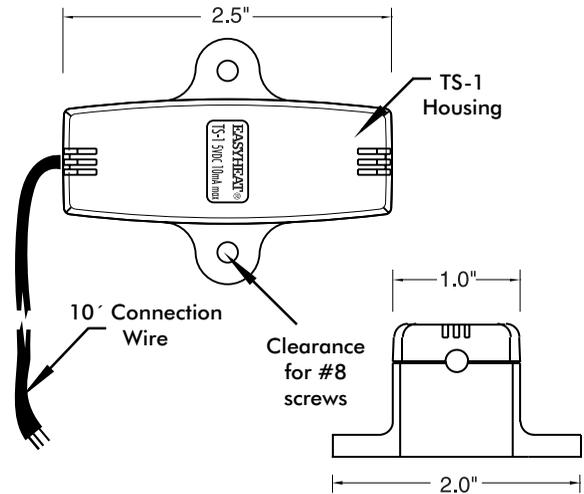


Figure 1

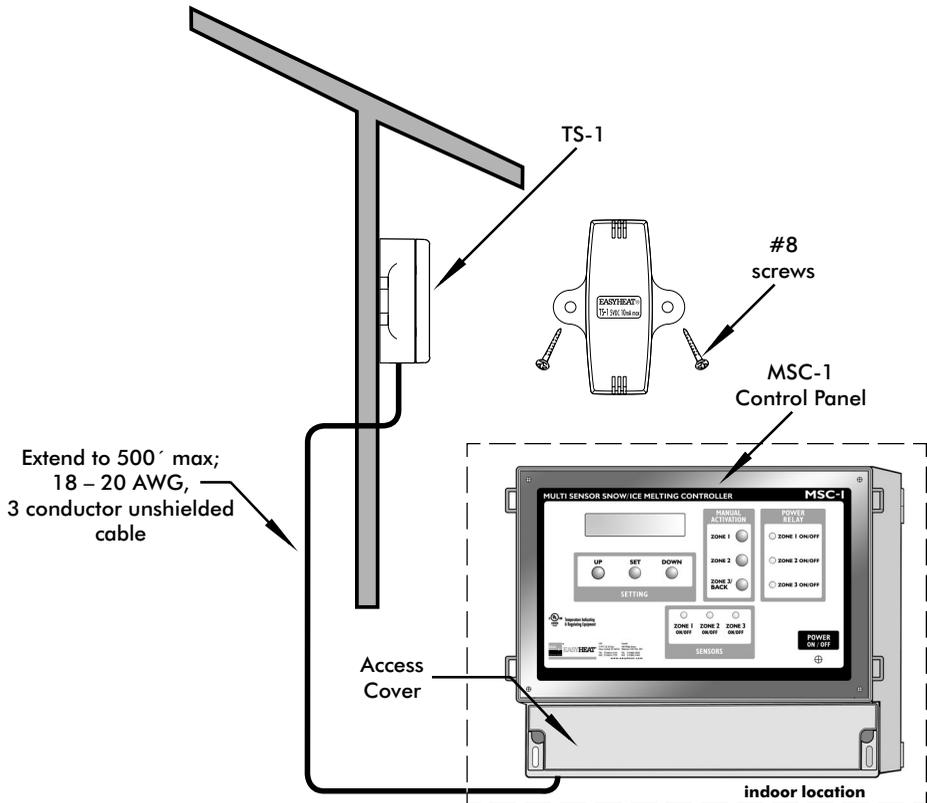
WARNINGS

1. This is not a "do-it-your-self" product. A qualified electrician must install the TS-1.
2. If after carefully reading these instructions you still have questions regarding installation, operation or maintenance of this product, call the numbers listed for assistance.
3. Prior to installation, check the TS-1 body enclosure or wires for possible shipping damages. Do not install a damaged TS-1 controller.
4. All heating equipment, controls & associated systems must be installed in compliance with the latest editions of all applicable electrical codes and ordinances.
5. These instructions must be saved and made available to owners or users of this product and/or transferred to future owners.
6. The TS-1 has been designed for the sole purpose of connection to an EasyHeat MSC-1 Control Panel. The risk of fire or electric shock exists if the TS-1 is connected to any device other than an MSC-1 Control Panel.
8. Mount the TS-1 in an area free of obstructions such as trees, shrubs, etc. to prevent any damage to the sensor.
9. Avoid excessive shock or vibration.
10. Do not install an TS-1 Sensor when the ambient temperature is colder than 32°F (0°C). Installing the sensor below this temperature will damage the connection wire and result in the risk of fire or electrical shock.

INSTALLATION INSTRUCTIONS

1. Mount the TS-1 securely to a wall or fascia by 2 No.8 screws. Mount in a location that has the same weather conditions as the snow & ice melting zones. Avoid direct sunlight or warm exhaust vent areas as this may cause erroneous temperature readings. The unit is water-resistant, but it is not designed to be submerged or immersed in water. Ensure that the mounting location is close (less than 10 feet) to the MSC-1 Control Panel or a suitable connection box. See Fig.2.
2. The TS-1 connection wire may be extended up to 500' with an appropriately rated 18-20AWG 3 wire unshielded cable. Ensure that all electrical connections within connection boxes are sealed to prevent any penetration of water.
3. The TS-1 is wired directly to the temperature sensor terminal block of the MSC-1 control panel.

Figure 2 — TS-1 connection to MSC-1



OPERATION INSTRUCTIONS

The TS-1 temperature sensor provides the MSC-1 control panel with the temperature information necessary to determine if snow or ice conditions exist.

The TS-1 may be tested for functionality by simply observing the temperature indicated on the MSC-1 display, display temperature should match sensor ambient temperature.

If there is further concern about the sensor readings submerge the TS-1 into a glass with ice water for 5 to 10 minutes, the MSC-1 display should read 32°F (0°C).

Every year, in the fall the TS-1 must be inspected for physical damage.

ELECTRICAL SPECIFICATIONS

Environmental

Working temperature	-40°C (-40°F) to 65°C (150°F)
Storage temperature	-45°C (-49°F) to 70°C (160°F)
Humidity environment	0 to 100 %

Supply requirements

Power supply voltage	5VDC
Maximum amperage	10mA

Mounting Hole Size	Clearance for #8 Screw Thread
Connection Lead length	10 feet



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This limited warranty does not cover any costs relating to the repair or replacement of any accessory or cable at the installation site. Our accessories and cables are not easily accessible. A failed accessory or cable usually cannot be easily repaired. Replacement of a failed accessory or cable will require that the materials under which it is installed be removed to permit replacement of the accessory or cable. **We will not reimburse any costs relating to the repair or replacement of any accessory or cable at the installation site.**

IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL EASY HEAT'S LIABILITY TO YOU AND/OR YOUR CUSTOMERS EXCEED THE PRICE PAID BY YOU FOR THE SPECIFIC GOODS PROVIDED BY EASY HEAT GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. YOU AGREE THAT WE SHALL NOT BE LIABLE TO YOU OR YOUR CUSTOMERS FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL OR PUNITIVE DAMAGES. No agent, employee or representative of ours has authority to bind us to any affirmation, representation or warranty concerning the goods sold unless such affirmation, representation or warranty is specifically incorporated by written agreement.

To obtain new products, arrange repair of existing product, or a refund under this warranty, please contact Easy Heat with a description of the defect and proof of purchase at the address noted herein.

DISCLAIMER

All information presented in this document was believed correct at the time of printing. We reserve the rights to make any modifications of this document without any prior notification.



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