

Ice and Snow Detector

series 605



Function

The 605100A ice and snow detector is a microprocessor-based detector which activates a single zone melting system. The detector uses inputs from connected sensor(s) to provide automatic early detection of ice and snow conditions. Matching sensors include slab sensors for use in the detection of ice & snow on pavement type surfaces, or gutter sensors for the detection of ice & snow on elevated surfaces such as rooftops, satellite dishes and gutters.

When the detector senses a need for heat, the output (isolated SPST dry contact rate 24V – 6A) relay closes activating a heating system and when in the "no heat needed" mode, the output contact is opened. An optional "idle mode" function allows a slab to remain at an elevated temperature, to allow faster melt response in the event ice or snow conditions come about.

The large liquid crystal display (LCD) allows for viewing the system status and operating information. The detector allows for adjustments of moisture detection sensitivity, warm weather shut down (WWSD) temperature, minimum heating time, cold weather cut out (CWCO) temperature, and idle temperature (if option selected). A 24VDC alarm output activates if there is a failure in the detector or in a sensor.

U.S. Patent 6,276,202

Product range

Code 605100A	Ice and snow detector control unit with wall mount power transformer.
Code 605020A	Temperature and moisture sensor for slab with 65' cable and brass holding sleeve
Code 605050A	Temperature and moisture sensor for slab with 165' cable and brass holding sleeve
Code 605021A	Temperature and moisture sensor for slab with 65' cable and adaptor ring
Code 605051A	Temperature and moisture sensor for slab with 165' cable and adaptor ring
Code 605030	Temperature and moisture sensor for gutters, flat roofs and dish antenna with 20' cable
Code 150004	Outdoor air temperature sensor wall mount required to enable idle mode function

Technical specification

Materials:	Polycarbonate
Ambient temperature:	Indoor use only 32 to 120° F (0 to 50° C)
Humidity:	0 to 95% non-condensing
Power requirements:	20.4 to 26.4 VAC
Power consumption (including sensor power):	20 VA
Dry contact output relay voltage:	24 V
Dry contact output relay load rating:	6 Amp resistive / 2 Amp reactive
Alarm output voltage max load:	24VDC = 15mA
Minimum heating time adjustment:	30 to 600 minutes
Detecting temperature range – Active mode:	-25 to 40°F (-32 to 5°C)
Hi temperature-warm weather shut down (WWSD) adjustment:	26 to 40°F (-3 to 5°C)
Lo temperature-cold weather cut out (CWCO) adjustment:	-25 to 25°F (-32 to -4°C)
Idling mode temperature range – Active mode:	-50 to 40°F (-45 to 5°C)
Idling mode low temperature cut out adjustment:	-50 to 25°F (-45 to -4°C)
Moisture sensitivity adjustment:	5 to 95

Gutter Sensor

Materials:	Plastic polymer
Dimensions:	5 ⁷ / ₈ " (150) L x 1 ¹ / ₄ " (32) W x 5 ¹ / ₈ " (16) H
Cable:	18 AWG, 4 conductor, polyurethane jacket
Cable length:	20' (6m)
Ambient Temperature:	-25 to 175° F (-32 to 80° C)

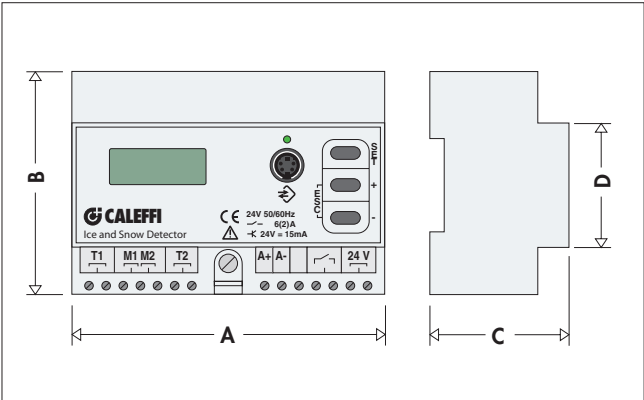
Slab Sensor

Materials:	Brass
Sensor dimensions:	2 ¹ / ₁₆ " (68) Dia x 1 ¹ / ₄ " (31) H
Slab socket dimensions:	2 ¹ / ₁₆ " (68) Dia x 2 ⁵ / ₈ " (67) H
Cable:	18 AWG, 4 conductor, polyurethane jacket
Cable length:	65' (20m) & 165' (50m)
Ambient Temperature:	-25 to 175° F (-32 to 80° C)

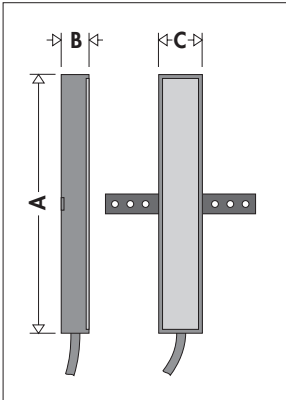
Outdoor Air Temperature Sensor

Materials:	ABS polycarbonate
Dimensions:	1 ⁵ / ₈ " (42) L x 1" (26) W x 1 ³ / ₄ " (64) H
Ambient Temperature:	-50 to 302° F (-45 to 150° C)
Thermistor type:	2,000 Ohms

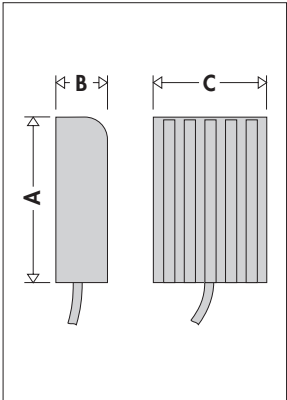
Dimensions



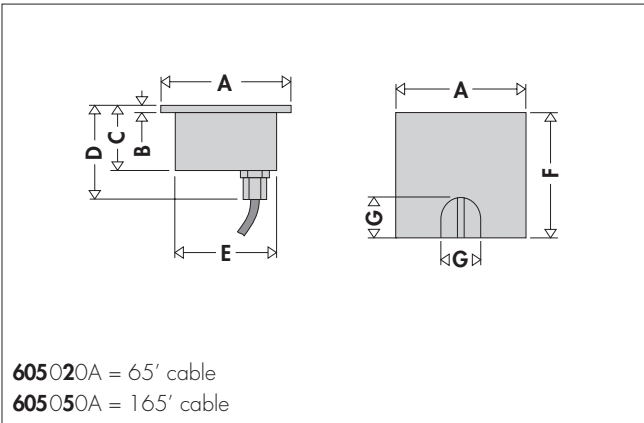
Code	A	B	C	D
605100A	4 1/4"	3 1/2"	2 3/8"	1 3/4"



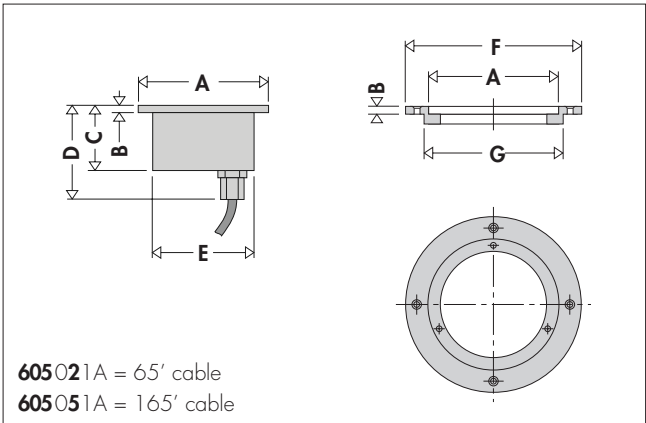
Code	A	B	C
605030	5 7/8"	5/8"	1 1/4"



Code	A	B	C
150004	2 1/2"	1"	1 5/8"



Code	A	B	C	D	E	F	G
6050_0A	Ø 2 11/16"	3/16"	1 1/4"	2"	2 3/16"	2 5/8"	15/16"



Code	A	B	C	D	E	F	G
6050_1A	Ø 2 11/16"	3/16"	1 1/4"	2"	2 3/16"	3 7/16"	2 7/8"

Operating principle

The operation of the 605100A ice and snow detector is based on the behavior of the power consumption of a PTC resistor embedded in the sensors. The power consumption depends on not only the surface temperature, but also by the heat loss effect from evaporation when moisture (water) is present.

The ice and snow detector monitors for temperature every 25 minutes. If the temperature sensor detects a surface temperature within the active mode range (defined as the temperature range) between the warm weather shut down and the cold weather cut out settings, the detector then checks for the presence of moisture by applying a small control power to the PTC sensing element to melt any possible ice or snow into moisture. After a time delay of approximately 90 seconds, the detector determines whether the sensor surface is wet or dry by analyzing the power consumption of the PTC sensing element. If moisture is detected, the output (isolated SPST dry contact rated 24V – 6A) relay closes activating the heating system for at least the minimum heating run time. If at the end of the heating run time no moisture is detected, the control power of the sensing PTC resistor switches off for 25 minutes before starting the sensing cycle over again.

The detector can be configured with either one or two sensors (either slab or gutter but must be the same type). When using a second sensor, heat activation occurs if either sensor detects ice or snow, thus providing greater detection flexibility and dramatically reducing the chances of potentially costly “missed melt” situations due to sun/shade movement. A second sensor also provides redundant reliability - in the event of a fault in one of the sensors, the detection system will continue to function with the other sensor. The moisture sensitivity can be adjusted independently for each sensor. The default setting is for one slab sensor.

To enable idle mode, one slab or one gutter sensor must be connected to the detector with the outdoor air temperature sensor.

Slab idling mode option allows slab temperature to be maintained at an elevated level to allow for quicker melting when ice & snow conditions occur. Especially useful in extremely cold northern climates and in “safety critical” applications such as hospital emergency entry ways and corporate entry ways with heavy foot traffic. The default setting is for slab idle mode not activated.

Operating settings

Warm weather shut down (WWSD): Defines the temperature above which the detector will be switched off. Range is 26 to 40°F (-3 to 5°C). The default setting is 35°F.

Cold weather cut out (CWCO): Defines the temperature below which the detector will be switched off. Range is -25 to 25°F (-32 to -4°C). The default setting is 5°F.

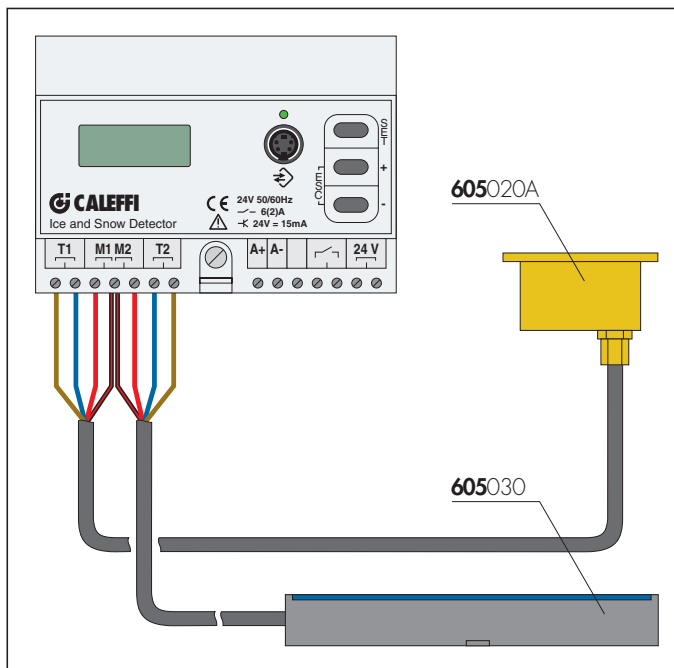
Moisture sensitivity: Adjustable level of sensitivity for moisture detection. Range is from 5 to 95. At value 5, the sensor is very sensitive and even slight moisture will be detected. At value 95, moisture will be very heavy before being detected. The default setting is 50.

Minimum heating run time: Adjustable minimum time for which the heating system will be kept operative once an ice or snow condition is detected. Range is 30 to 600 minutes. The default setting is 120 minutes.

Construction details

The sensor head measure surface temperature and moisture. Two types of sensors are located inside the sensor head which are completely embedded in a protective polymer. One NTC sensor measures the surface temperature and one hybrid PTC sensor measure the moisture (more reliable than sensors with metallic electrode which can become dirty, corroded or short circuited).

Wiring diagram of the detector system



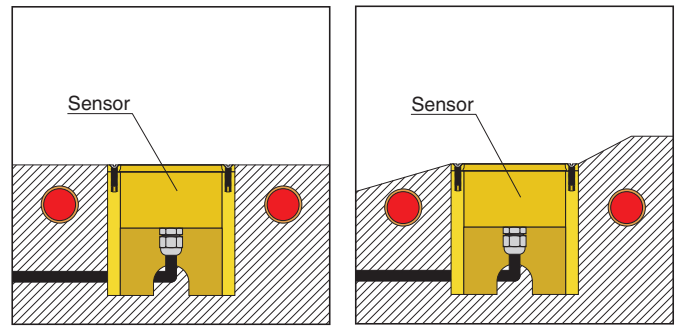
Instructions for the slab sensor installation

It is recommended that the slab sensor is located where low temperatures and high moisture are most probable such as in shaded places. The sensor head must be fitted into the brass holding sleeve supplied with it, which is embedded into the concrete slab between the heating tubes (see diagram) for easy fitting and replacement if necessary.

Important!

The sensors must be installed so that the surface of the sensor head is flush with the surface of the ground. If the slab sensor is fitted on ramps or sloping surfaces they must be positioned horizontally (see diagram) so that water from the melted ice & snow does not drain off the sensor head. This could create a low or no moisture condition.

Installation diagram of slab sensors



Important!

When decorative paver brick and sand types of drive surfaces are installed, it is recommended to make the following adjustments to avoid a low or no moisture sensing condition, because of the reduced thermal conductivity from sensor head to the sand. Increase the minimum heating run time from the default level of 120 minutes to 240 minutes or more. Increase the moisture detection sensitivity by adjusting the setting from the default level of 50 to a value between 15 and 5 (most sensitive).

Instructions for the OAT sensor installation

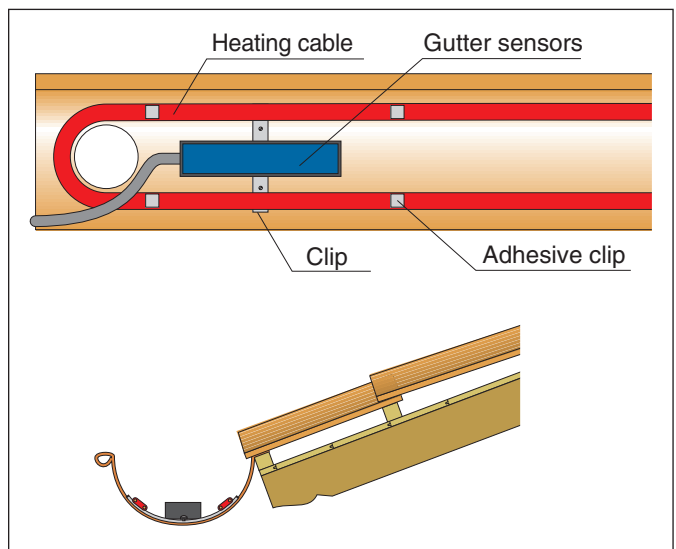
The outdoor air temperature sensor should be mounted on an exterior north wall of a building in the shade to achieve a true outdoor air temperature reading. The enclosure cover slides over thermistor mounting terminal block. The wire connection are made to the two screw terminals that accept 18-22AWG twisted pair wire or shielded cable, routed through the bottom of the enclosure. Attach these wires to terminal connections T2 on the 605100A ice & snow detector.

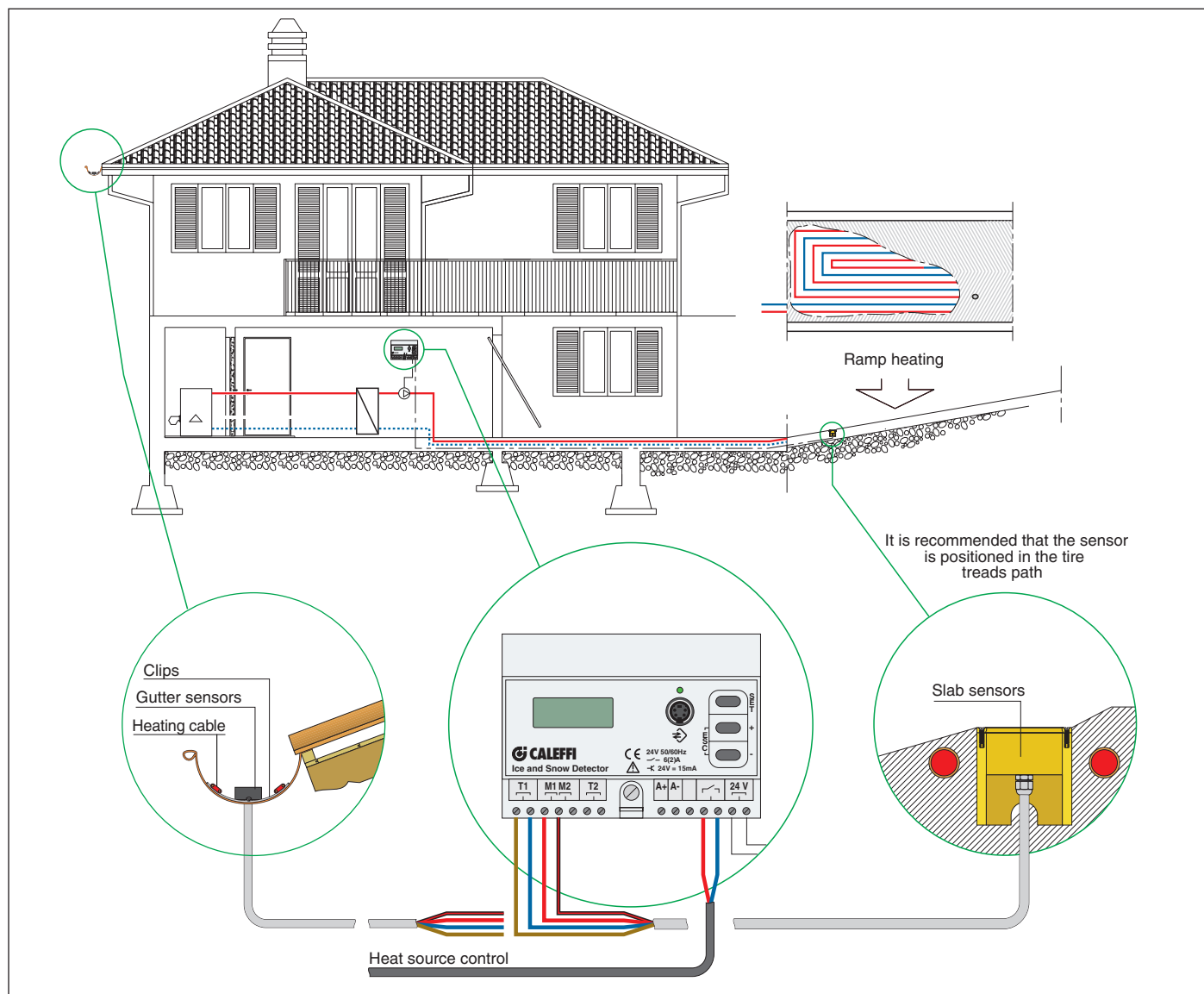
Instructions for the gutter sensor installation

Position the sensor at the center of the gutter using the screws supplied (**warning the thread of the screws must not be longer than 3/8"**). The sensor must be fitted on the drilled metal support supplied which is clipped into the gutter or surface to be controlled, preferably close to the outlet of the gutter itself.

If it is fitted on a dish antenna, it should be fitted horizontally on the lower flat part. The heating cable must be fitted on the back of the dish and fixed with the adhesive clip.

Warning: too much mechanical pressure on the surface of the sensor may damage it.





SPECIFICATION SUMMARIES

Code 605100A

Ice and snow detector control. Power requirements from 20 to 26 VAC. Dry contact output relay voltage 24V max. at load rating of 6 Amp resistive / 2 Amp reative. Alarm output voltage max load: 24VDC = 15mA. Power transformer included.

Code 605020A and 605050A

Temperature and moisture sensor for slab or pavement. Cable length: 65' (20m) and 165' (50m) with brass holding sleeve. Working temperature range: -25 to 175° F (-32 to 80° C).

Code 605021A and 605051A

Temperature and moisture sensor for slab or pavement. Cable length: 65' (20m) and 165' (50m) with brass retro-fit adaptor ring. Working temperature range: -25 to 175° F (-32 to 80° C).

Code 605030

Temperature and moisture sensor for gutters, flat roofs and dish antenna. Cable length: 20' (6m) with mounting hardware included. Working temperature range: -25 to 175° F (-32 to 80° C).

Code 150004

Outdoor Air Temperature sensor wall mounted for Idling mode. Temperature range -50 to 302° F (-45 to 150° C).

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.



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