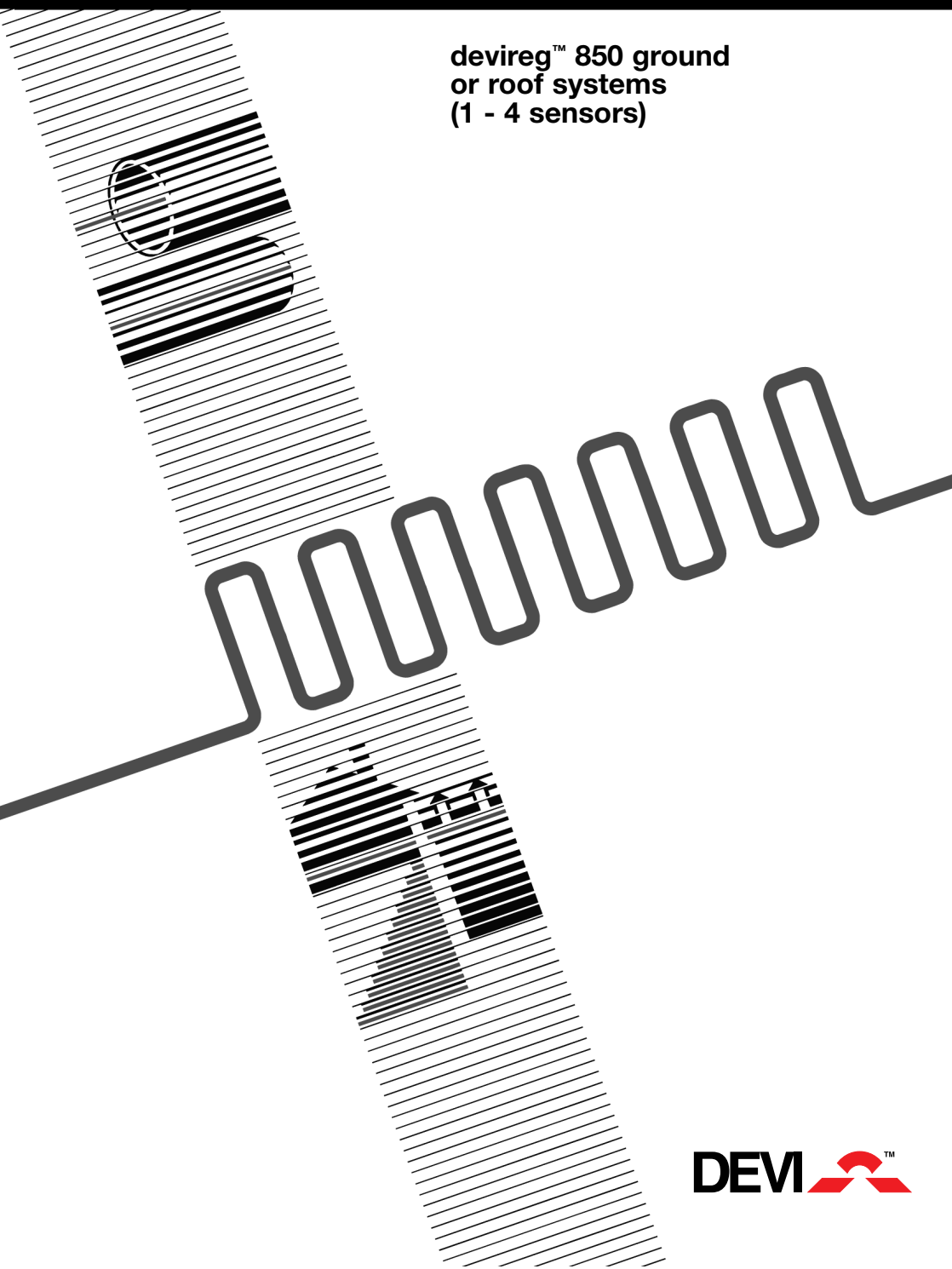


devireg™ 850 ground
or roof systems
(1 - 4 sensors)



Contents:

- 1. Installation instructions - ground systems
 - 1.a. Placing the ground sensor(s)
 - 1.b. Installing feeder cable(s)
 - 1.c. Installing sensor(s)/sensor tube(s)
 - 1.d. System description
- 2. Installation instructions - roof systems
 - 2.a. Placing the roof sensor(s)
 - 2.b. Installing feeder cable(s)
 - 2.c. Installing sensor(s)
 - 2.d. System description
- 3. Connection diagrams & setup of devireg™ 850
- 4. User guidelines & navigation structure
- 5. Technical specifications & factory settings
- 6. Warranty conditions & warranty certificate

**NB! The installation must only be carried out by an authorised electrician.
A disconnection must be incorporated in the fixed wiring to ensure all-pole disconnection from the supply mains.**

Appendix A: System configuration - PSU & feeder cable
Appendix B: Output pr. m²

1. Installation instructions (ground)

The devireg™ 850 system is used to keep outdoor areas free of ice and snow, e.g. parking areas, paths, garage entrances, steps, ramps, roadways, bridges.

The devireg™ 850 is fully automatic and operated digitally by means of the intelligent sensors located in the heated terrain. Every sensor measures both temperature and moisture, and the system turns the heating elements on and off on the basis of these readings.

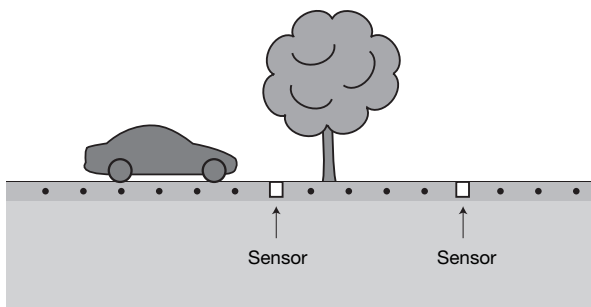
By combining moisture and temperature readings, the system is able to save around 75% energy compared with systems which only measure temperature readings. The digital sensors used for the devireg™ 850 also provide the most exact readings when compared with corresponding analogue systems. The result is optimum functionality and low energy consumption.

1.a. Placing the ground sensor(s)

Correct placing of the sensor(s) is important for the system to work as intended. Some basic guidelines:

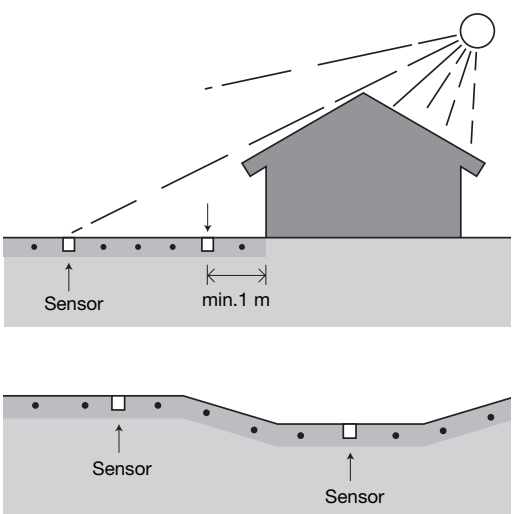
The number of ground sensors:

- 1) The more sensors you add to your system the better the performance.
- 2) The basic principle is to place one sensor where the snow/ice will appear first (for fast detection) and one sensor where the snow/ice will disappear last (for complete melting). If it is not obvious just place the sensors as far apart from each other as possible.
- 3) With only one sensor you will have to decide what is most important:
 - a) fast detection and activation of the system or
 - b) securing a complete melting of all snow/ice.



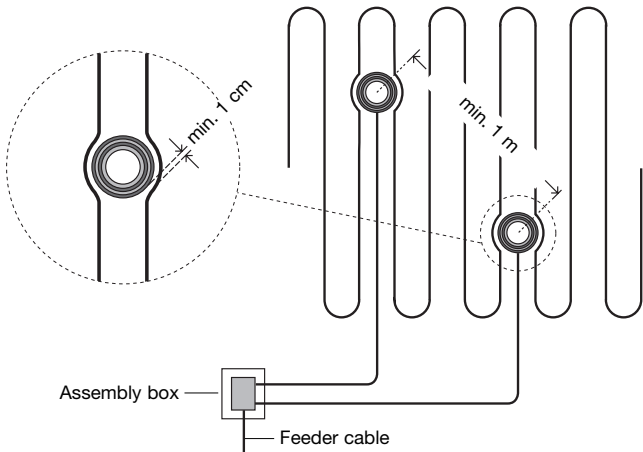
A one sensor ground system will be less fast regarding detection and activation than a two sensor ground system, where one sensor measures the ground temperature and the other sensor measures the moist.

- 4) With more than two sensors it is possible to cover problem spots where snow usually is not detected or where snow is not completely melted when the system stops.



Placing the individualβ ground sensor:

- 1) The sensor must be placed within the heated area and at least 1 m from the edge of the area, if possible.
- 2) The sensor must be placed in between the heating cables - a distance of minimum 1 cm should be maintained between the sensor tube and the heating cable.
- 3) There must be a distance of minimum 1 m between the two sensors.



1.b. Installing a feeder cable(s)

A feeder cable for a sensor may be needed.

A 15-meter cable is supplied with each sensor.

Approx. 0.5 m of this cable should be coiled inside the bottom of the sensor tube. The remaining cable may be lengthened in accordance with the following table. The feeder cable must be a four wire cable.

See appendix A: system configuration - PSU & feeder cable.

1.c. Installing a sensor and a tube

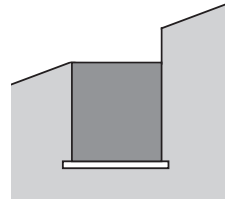
The sensor and the tube may be installed in connection with the actual construction work and connected at a later date. The following applies for all types of installations:

1: Please ensure that the tube is sealed when the concrete is poured.

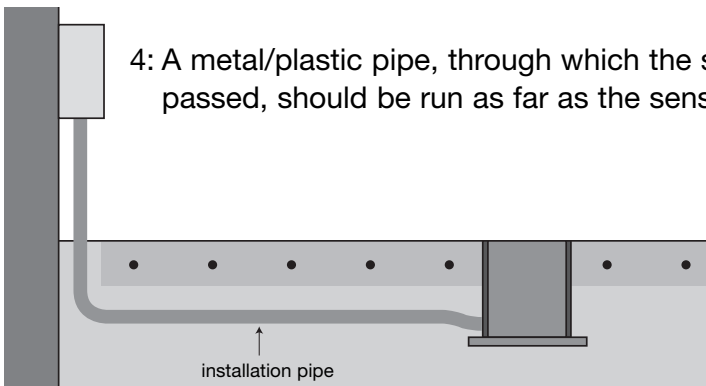
2: The tube must be positioned so that it is flush with the surrounding terrain. The sensor must be placed so that the upper brass surface is horizontal.

3: The base below the tube must be hard, e.g. a concrete plate or similar, in order to ensure that the sensor is not pushed into the ground if e.g. a lorry runs over it.

The tube is designed to be mounted on a plate using the two screw holes inside the tube.

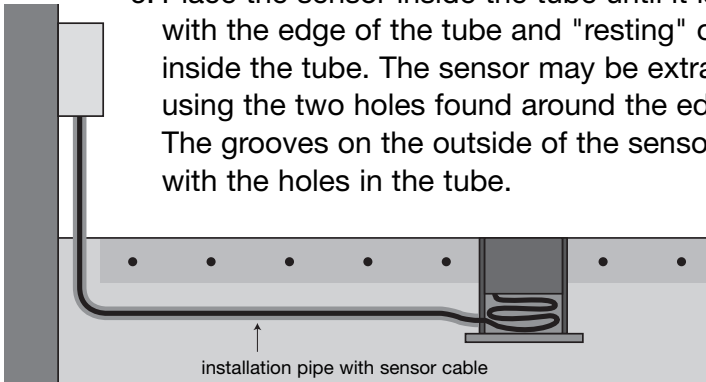


- 4: A metal/plastic pipe, through which the sensor cable may be passed, should be run as far as the sensor tube.



- 5: Coil approx. 0.5 m of the sensor cable inside the tube.

- 6: Place the sensor inside the tube until it is horizontally flush with the edge of the tube and "resting" on the internal collar inside the tube. The sensor may be extracted at a later date using the two holes found around the edge of the sensor tube. The grooves on the outside of the sensor should correspond with the holes in the tube.



Installation in asphalt:

The temperature **must not exceed 80°C** around the sensor/ tube. A wooden block or similar may be placed in the area where the tube/sensor can be placed subsequently.

The installation pipe used for the sensor cable should, in that case, be a metal tube that can withstand the high temperatures.

1.d. System description

The devireg™ 850 functions on the basis of a combination of temperature and moisture. The temperature and the moisture are registered by the sensor(s) placed in the area. You must be aware of the following conditions if you choose to adjust the factory settings.

Melting temperature

Changing the melting temperature will affect when the system is activated in case of moisture and low temperatures. The factory setting is 4°C. This means that the heating system will be activated if the temperature falls below 4°C and moisture is detected.

Standby temperature (maintained ground temperature)

The higher the standby temperature the faster the system will be able to melt ice and snow.

On the other hand the higher the standby temperature the higher the running costs. So, determining the standby temperature is a trade-off between fast melting or low running costs. The factory setting is -3 C°.

Moisture level

The "moisture level" decides when the system detects moist. The lower the setting, the more sensitive the system is to moisture. The factory setting is 50.

Post-heat

It is possible to modify the post-heat period, i.e. the period during which the heating system continues to be active once it has detected that the area is dry. The factory setting is 1 hour.

High security – higher energy consumption

If a high degree of security against ice and snow is wanted, adjust the settings of the parameters: the standby temperature and the melting temperature should be higher and the moisture level lower (close to setting 5).

Finally, you should prolong the post-heat period.

This will give a high degree of security in even dry areas.

Low security – lower energy consumption

Conversely, low energy consumption and a moderate level of security against ice and snow could be prioritised.

In this case the standby temperature and the melting temperature should be lower and the moisture level higher.

Finally, you should shorten the post-heat period.

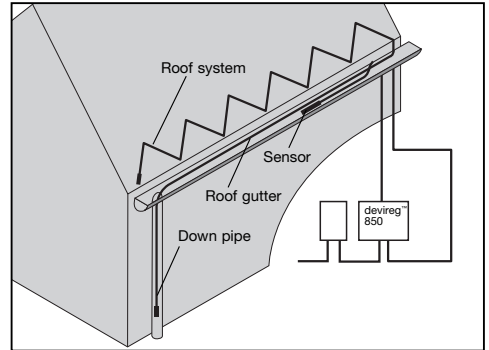
This will give a relatively low energy consumption, but the area may remain wet and icy in short periods.

The factory settings are average values providing a relatively high degree of security and a moderate energy consumption.

See appendix B: Output pr. m²

2. Installation instructions (roof)

The devireg™ 850 roof system is used for frost protection in roof gutters, valley gutters and down pipes; and to prevent icicles from causing damage. The system also can be used to reduce/remove the snow weight from the roof.

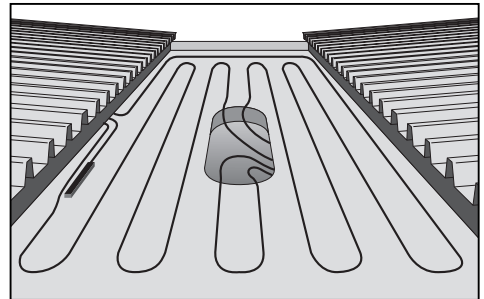


The devireg™ 850 is fully automatic and operated digitally by means of the intelligent sensor(s). The sensor(s) measures both temperature and moisture, and the system turns the heating elements on and off based on these readings.

By combining moisture and temperature readings, the system is able to save around 75% energy compared with systems which only measure temperature readings. The digital sensor used for the devireg™ 850 also provides the most exact readings when compared with corresponding analogue systems. The result is optimum efficiency and low energy consumption.

2.a. Placing the roof sensor(s)

Correct placing of the sensor(s) is important for the system to work as intended. Some basic guidelines:



The number of roof sensors:

- 1) The more sensors you add to your system the better the performance.
- 2) The basic principle is to place one sensor where the snow/ice will appear first (for fast detection) and one sensor where the snow/ice will disappear last (for complete melting).
If it is not obvious just place the sensors as far apart from each other as possible.
- 3) With more than two sensors it is also possible to cover problem spots where snow usually is not detected or where snow is not completely melted when the system stops.

Placing the individual roof sensor:

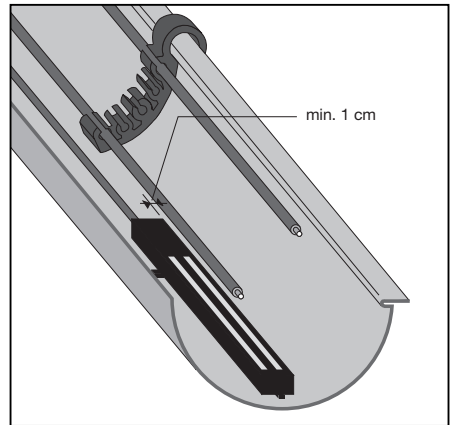
- 1) The sensor should be installed in the heated surroundings – most often in the roof gutter, but it could also be installed on the roof in special applications.
- 2) The sensor should be located where the first water and snow is expected to “hit” the roof/ gutter. Make sure the sensor is placed in an open environment, and is not covered by trees, other buildings, shadows etc., and preferably where ice and snow usually cause the most problems.
- 3) There is no general recommendation for placing a sensor with regards to direction (N, S, E, W). Based on experience the most likely position is in the North (North/West) roof gutter.

2.b. Installing a feeder cable

A feeder cable for a sensor may be needed. A 15-meter of cable is supplied with the sensor.

This may be lengthened in accordance with the following table. (The feeder cable must be a four-wire cable).

See appendix A: System configuration - PSU & feeder cable.



2.c. Installing sensor(s)

- A sensor should be placed between or next to the heating cables. Note, however, that a distance of minimum 1 cm should be maintained between a sensor and the heating cable.
- A sensor must be placed so that the upper brass surface is horizontal.
- To withhold a sensor in the right position there are different ways to mount it. Either use the attachments on the sensor or glue it to the surface or simply place it in the roof gutter. The attachments can be removed when not used.

2.d. System description

The devireg™ 850 functions on the basis of a combination of temperature and moisture. Be aware of the following conditions if other basic settings are chosen.

Melting temperature

Changing the melting temperature will affect when the system is activated in case of moisture and low temperatures. The factory setting is 1.5°C. This means that the heating system will be activated if the temperature falls below 1.5°C and moisture is detected.

Moisture level

The moisture level decides when the system detects “moist” or “no moist”. The lower the setting, the more sensitive the system is to moisture. The factory setting is 50.

Post-heat

The post-heat period indicates the period during which the heating system continues to be active once the sensor has detected that the roof/gutter is dry and free of ice and snow. The factory setting is 1 hour.

High security – higher energy consumption

If a high degree of security against ice and snow is wanted, adjust the settings of the parameters: the standby temperature and the melting temperature should be higher and the moisture level lower (close to setting 5). Finally, you should prolong the post-heat period.

This will give a high degree of security in even dry areas.

Low security – lower energy consumption

Conversely, low energy consumption and a moderate level of security against ice and snow could be prioritised.

In this case the standby temperature and the melting temperature should be lower and the moisture level higher.

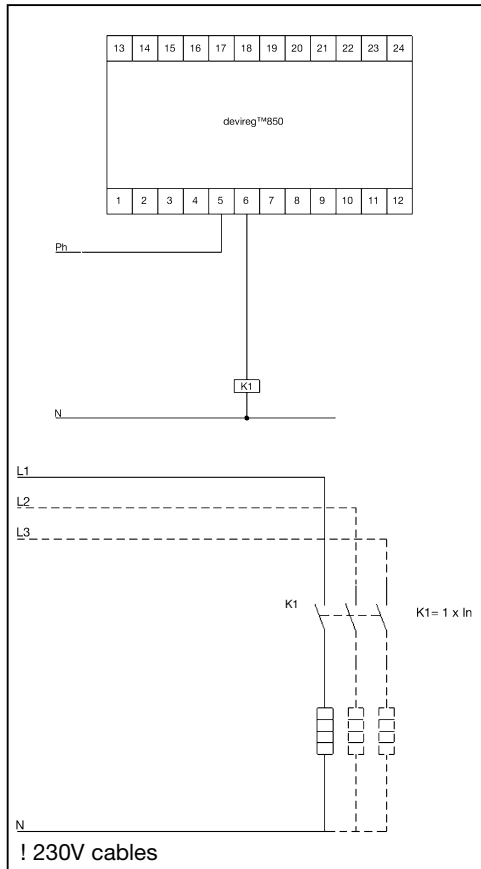
Finally, you should shorten the post-heat period.

This will give a relatively low energy consumption, but the area may remain wet and icy in short periods.

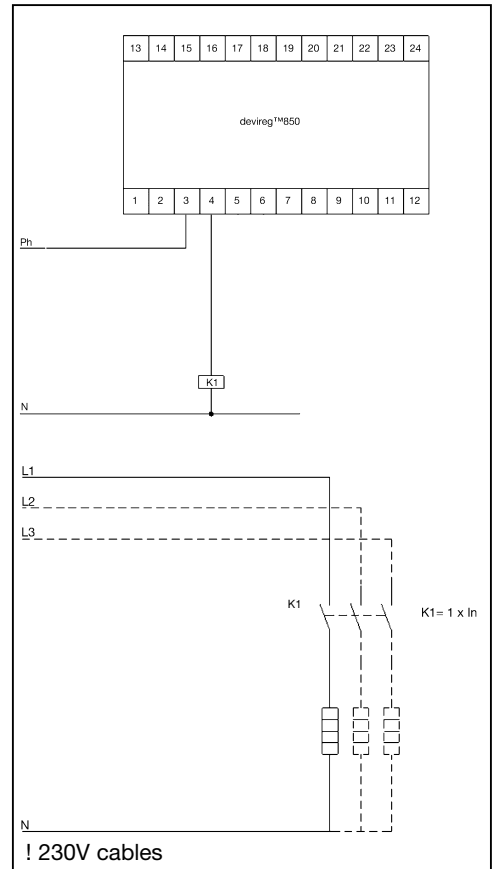
The factory settings are average values providing a relatively high degree of security and a moderate energy consumption.

See appendix B: Output pr. m²

B - 230V, 1-3 P/1-3 loads - ground



C -230V, 1-3 P/1-3 loads - roof



If the sensors are connected before the devireg™ 850 is turned on they will appear in random order.

Setup of devireg™ 850

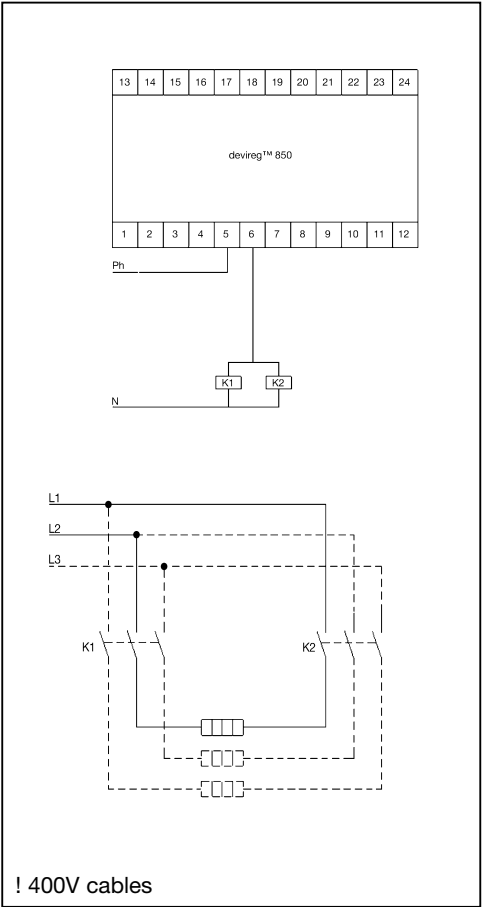
The following will be required when turning on the devireg™ 850:

1. Select language
2. Select system (ground or roof)
3. Connect/add sensor(s)
4. Confirm the number of sensors when ALL sensors (ground or roof) have been connected.

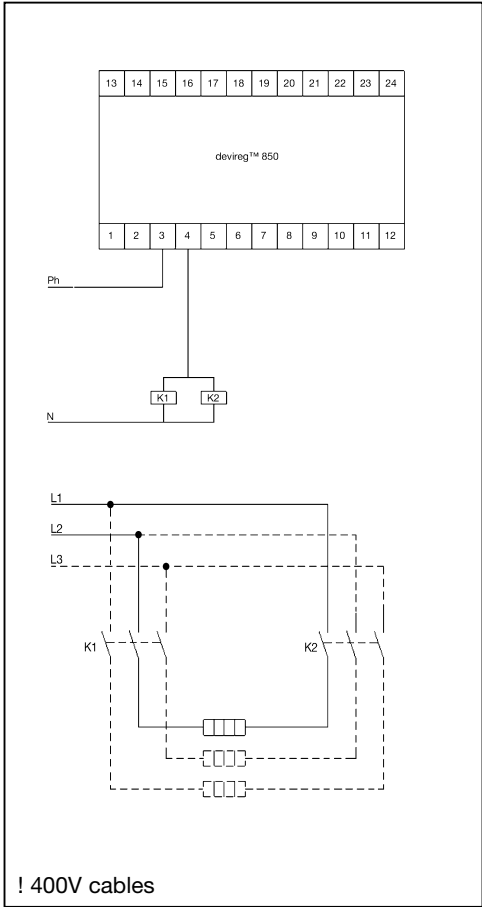
In case of irresolvable problems due to a wrong choice of language etc.:

Master reset: press » & ◻ for 8 seconds.

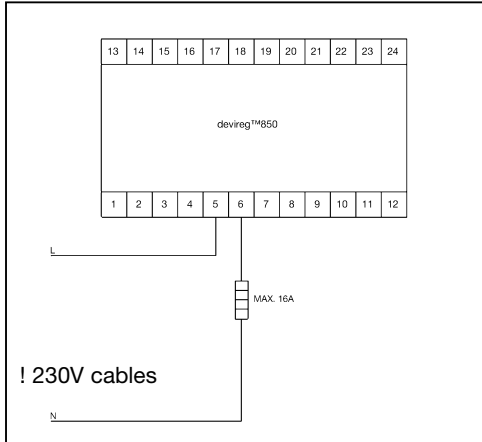
D - 400 V, 2-3 Phase/1-3 Loads - ground



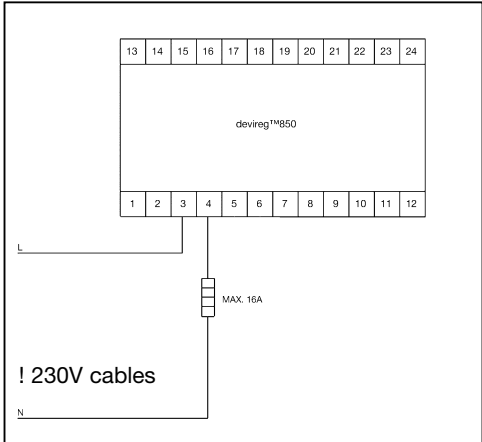
E - 400 V, 2-3 Phase/1-3 Loads - roof



F - Direct connection - ground



G - Direct connection - roof



4. User guidelines

The devireg™ 850 is controlled by means of three buttons.



———— **Info button – only active when lit**



———— **Next menu/next line**



———— **Enter: Confirm/select**

Navigation structure

1. Start screen.
2. View and set operation mode: a. Automatic b. Constant on (0 - 99 hours) c. Constant off
3. View sensor measurements: a. Temp. b. Moist.
4. View system parameters: a. Moisture level b. Standby temperature c. Melting temperature d. Postheat
5. View alarm menu.

6. Installer site:

- a. Set moisture level (5 - 95)
- b. Set standby temp. - ground only (-20°C to 0°C)
- c. Set melting temp. (1.0°C to 9.9°C)
- d. Set postheat (0 to 9 hours)
- e. Clogged drain - on/off (an alarm gets activated after 14 days constantly heating)
- f. View statistics
 - operating time
 - running time
 - relay operations
 -
- g. Change system (ground or roof/number of sensors)
- h. Set language
- i. Restore factory settings

The devireg has an integral alarm function (flash & sound) which monitors the sensors added and the built in microprocessor. When activated please see the alarm menu.

An external alarm can also be added to the system.

5. Technical Specifications

Technical data	
Voltage:	230 VAC +10%/-20%
Power consumption: • devireg™ 850: • Sensor(s):	Max. 3 W ground: max. 13W, roof: max. 8W
Relays (all incl. alarm): • Resistive load: • Inductive load:	250V ~ 16A 1A (power factor 0,3)
IP class: • devireg™ 850: • Sensors:	IP 20 IP 67
Ambient temperature: • devireg™ 850: • Sensor - ground: • Sensor - roof:	-10°C to +40°C -30°C to +70°C -50°C to +70°C
Sensor type:	devibus connected moisture sensor(s)
Sensor lead:	15 m of 4x1mm ² (may be extended in accordance with the table in appendix A)
Indication:	2 x 16-character illuminated display.
Measurements • devireg™ 850 (DIN rail) • Sensor - ground • Sensor tube - ground • Sensor - roof	Depth x Height x Width 53 mm x 86 mm x 105 mm D = 87 mm; height = 74 mm D = 93 mm; height = 98 mm 15 mm x 23,5 mm x 216 mm

Factory settings - ground

Settings		
Function	Factory settings	Options
Moisture level	50	5 to 95 (5 being the most sensitive to moisture)
Standby temperature	-3.0°C	-20°C to 0°C
Melting temperature	4.0°C	1.0°C to 9.9°C
Post-heat	1 hour	0 to 9 hours
Clogged drain	On	On/off
System mode	Automatic	• Automatic • Constant ON (manual timer) • Manually OFF

Factory settings - roof

Settings		
Function	Factory settings	Options
Moisture level	50	5 to 95 (5 being the most sensitive to moisture)
Melting temperature	1.5°C	0.0°C to 9.9°C
Post-heat	1 hour	0 to 9 hours
Clogged drain	On	On/off
System mode	Automatic	• Automatic • Constant ON (manual timer) • Manually OFF

The DEVI Warranty:

You have purchased a DEVI heating system which we are sure will serve to improve the comfort and economy of your home.

DEVI provides a complete heating solution with deviflex™ heating cables or devimat™ heating mats, devireg™ thermostats and devifast™ fixing strips.

Should you, against all expectations, experience a problem with your DEVI heating system, you will find that DEVI, whose products are manufactured in Denmark and sold throughout the European Union, is subject to the standard regulations pertaining to product liability as specified in EU directive 85/374/CEE as well as all applicable legislation in the individual countries on the following conditions:

DEVI offers a 10-year guarantee on all deviflex™ heating cables and devimat™ heating mats, and a 2-year guarantee against material defects and production defects in connection with any other DEVI products.

The guarantee shall be valid only if the GUARANTEE CERTIFICATE is completed correctly and in accordance with the instructions, and provided the fault is inspected by or submitted to DEVI or an authorised DEVI dealer.

Please note that the GUARANTEE CERTIFICATE must be completed in english or local language.

DEVI shall undertake any repair free of charge or supply the customer with a new unit. Repairs shall be carried out at no further cost to the customer. In the case of faulty devireg™ thermostats, DEVI reserves the right to repair the unit free of charge and without any unreasonable delays for the customer.

The DEVI Guarantee shall not cover installations that have been carried out by non-authorised electricians, faults which arise as a result of misuse by other suppliers, damage caused by third parties, incorrect installations or consequential damage. All work will be invoiced in full if DEVI is required to inspect or repair faults that have arisen as a result of any of the above. The DEVI Guarantee shall not extend to equipment which has not been paid in full.

DEVI will, at all times, provide a rapid, effective and honest response to all queries and reasonable demands from our customers.

The above guarantee covers product liability only, while purchases are subject to national legislation.



Warranty Certificate

The DEVI Warranty is granted to:

Name:

Address:

Postal code:

Phone:

Please Observe!

In order to obtain the DEVI Warranty, the following must be carefully filled in. See other conditions on the overleaf

Electrical installation by:

Installation date:

Type of thermostat:

Production code:

Supplier's stamp

DEVI A/S

Ulvehavevej 61

DK-7100 Vejle

Tel. +45 76 42 47 00

Fax +45 76 42 47 03

www.devi.com



Appendix A: System configuration - PSU & feeder cable

1 pcs. PSU 18V dc, 16W **Ground system** **Roof system**

Number of sensors:	1 or 2*	1
Cable type	Max. length (m)	Max. length (m)
1 mm²	65	100
1.5 mm²	100	150
2.5 mm²	165	250
4 mm²	265	400

Ground system

1 pcs. PSU 24V dc, 24W

2 pcs. PSU 24V, 24W in parallel

Number of sensors:	1 or 2*	3	4
Cable type	Max. length (m)	Max. length (m)	Max. length (m)
1 mm²	300	150	80
1.5 mm²	450	225	120
2.5 mm²	750	380	200
4 mm²	1200	600	310

Roof system

1 pcs. PSU 24V dc, 24W

2 pcs. PSU 24V, 24W in parallel

Number of sensors:	1	2	3	4
Cable type	Max. length (m)	Max. length (m)	Max. length (m)	Max. length (m)
1 mm²	400	100	130	75
1.5 mm²	600	150	200	110
2.5 mm²	100	250	330	190
4 mm²	1600	400	525	300

* 1 or 2 ground sensors require the same cable length because only one of the sensors is a warm sensor.

Appendix B: Output per m²

Typical installed ratings for ground and floor applications are shown in the table below.

Area of use	Choice of rating	
	Normal (Denmark)	Maximum (Russia)
Car parks	250-300 W/m ²	300 W/m ²
Driveways	250-300 W/m ²	300 W/m ²
Pavements	250-300 W/m ²	300 W/m ²
Stairs	300-375 W/m ²	400 W/m ²
Loading platforms	300-375 W/m ²	400 W/m ²
Bridges	300-375 W/m ²	400 W/m ²
Roof, tiles, metal	250-300 W/m ²	300 W/m ²
Roof, tar paper	150-300 W/m ²	300 W/m ²
Cold roof		
Roof gutter/down pipe		
Metal	30-40 W/m	50 W/m
Plastic	30-40 W/m	50 W/m
Wood	30-40 W/m	40 W/m
Hot roof		
Roof gutter/down pipe		
Metal	40-50 W/m	50 W/m
Plastic	40-50 W/m	50 W/m
Wood	40 W/m	40 W/m

See the compendium for further information. (www.devi.com).