

DEVI[®]
by Danfoss



Installation Guide

Self-limiting cables on drum

Intelligent solutions
with lasting effect

Visit DEVI.com

DEVI[®]
by Danfoss

Table of Contents

1	Introduction	4
2	Safety instructions	4
3	Installation guidelines	4
4	Application overview	4
5	Thermostats/controllers	5
6	Accessories	6
6.1	Fixing elements	6
6.2	Connection kits	7
7	Typical installations	10
7.1	Typical pipe tracing installation	10
7.2	Typical roof protection installation	11
8	Standard compliance	12
9	Warranty	12

1 Introduction

In this installation guide, the phrase "heating cable" refers to self-limiting cables on drums.

To get the full installation guide, warranty registration, product information, tips & tricks, addresses, etc. visit www.devi.com.

2 Safety instructions

Heating cables must always be installed according to local building regulations and wiring rules as well as the guidelines in this installation manual.

- De-energize all power circuits before installation and service.
- Residual current device (RCD) protection is required. RCD trip rating is max. 30 mA.
- The screen from each heating cable must be connected to earthing terminal in accordance with local electricity regulations.
- Heating cables must be connected via a switch providing all pole disconnection.
- The heating cable must be equipped with a correctly sized fuse or circuit breaker according to local regulations.
- Never exceed the maximum heat density (W/m or W/m^2) for the actual application. Refer to Application Guide.
- Heating cable must be used together with an appropriate thermostat to secure against overheating and reduce energy consumption.

The presence of a heating cable must

- Be made evident by affixing caution signs in the fuse box and in the distribution board or markings at the power connection fittings and/or frequently along the circuit line where clearly visible (tracing).
- Be stated in any electrical documentation following the installation.

For use with sprinkler systems

- The alarm output shall be connected to and monitored by the fire detection alarm system.
- Systems shall be permanently connected to the power supply.
- Minimum ambient temperature shall not be less than $-5^{\circ}C$.
- If backup power is being provided for the building electrical systems, it shall also provide backup power supply for the trace heating system.
- Heating system for sprinkler systems should be indicated by "for supply piping and branch lines including sprinkler heads".

3 Installation guidelines


- It is not recommended to install heating cables at temperatures below $-5^{\circ}C$.
- Heating cable bending diameter must be at least 10 times the cable diameter (to the inside of the cable).
- Do not bend connections.
- Free end from cold lead and kit components must be protected by installer to avoid water from coming in.
- Ensure that the cable is sufficiently fixed and mounted according to the installation guide.
- The heating cables must be temperature controlled.
- Ensure controllers and sensors are connected according to the applicable installation guide and/or application guide.
- Measure, verify and record insulation resistance during installation.
- Persons involved in the installation and testing of electrical trace heating systems shall be suitably trained in all special techniques required. Installations are intended to be carried out under the supervision of a qualified person.

4 Application overview

	Pipe tracing	Tank frost protection	Sprinkler systems	Domestic hot water	Roof and gutter
DEVlpipeguard™ LSZH (T)	✓	✓	✓		
DEVlpipeguard™ (B)	✓	✓			
DEVlpipeguard™ Industry	✓	✓			
DEVlhotwatt™ (B)				✓	
DEVliceeguard™ (T)					✓
DEVliceeguard™ (B)					✓

Heating cables can be customized for the specific project, depending, length of heating cable and length of cold leads.

DEVliceeguard™ heating cables should not be in direct contact with bitumen. For more details contact your local DEVI sales company.

 **Note:** It is the full responsibility of the installer/designer to use proper cold lead dimensioned for the purpose and assembly sets that establish sufficient mechanical strength, flammability resistance, UV resistance and water proofing - and to design the heating unit with correct output for the specific application to avoid overheating of the cable or building materials.

Regarding other types of applications please contact your local DEVI sales company.

More information about applications (maximum linear output, specific output, heating circuit length, voltage etc.) can be found at www.devi.com

	Pipe tracing	Tank frost protection	Sprinkler systems	Domestic hot water	Roof and gutter
DEVireg™ 330	✓	✓	✓		
DEVireg™ 316	✓	✓			✓
DEVireg™ 610	✓		✓		
DEVireg™ 850 IV					✓
DEVireg™ Hotwater				✓	
DEVireg™ Multi	✓	✓	✓		✓

The DEVireg™ thermostat/controller must be commissioned as prescribed in the installation instruction and adjusted where local conditions vary in relation to factory settings. Before every heating season or at least once per year, check for faults in the switchboard, thermostat and sensors.

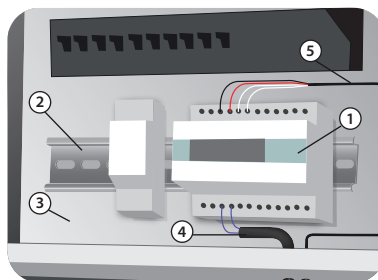
Each heating cable screen must be earthed in accordance with local electric regulations and connected to a residual current device (RCD).

The DEVireg™ thermostat must be commissioned as prescribed in the thermostat manual. Recommended temperature setting is according to Application Guide or Installation Guide.

More information about thermostats and controllers can be found at www.devi.com.

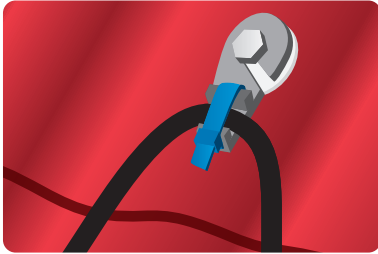
Sensors:

- Sensors can be live (230 V) components and must be treated according to specific Installation Guide and local standards.
- Sensors can be extended using cable with the same cable construction and cross sections (up to 50 m, sensors for DEVireg™ 850 IV should be extended according to Installation guide).
- See section 7 for specific installations.

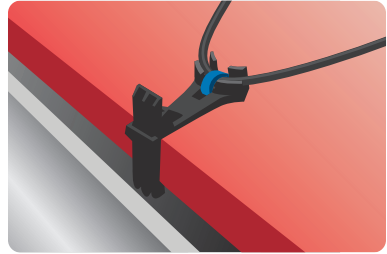


1 - Controller; 2 - DIN-rail; 3 - Electric cabinet; 4 - Cold lead connection; 5 - Sensor connection

A comprehensive range of accessories for self-limiting cables is available.
In order to find all accessories please refer to Product Catalogue or visit www.devi.com

6.1 Fixing elements**DEVIclip™ Roof Hook**

For fixing cables to roofing screws, UV protected.

**DEVIclip™ Guard Hook**

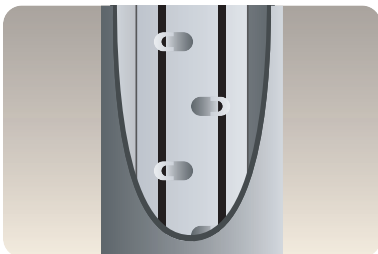
For fixing cables to the snow guard and roof edge, UV protected.

**DEVIclip™ Relief**

For relieving cables hanging in downpipes.

**Spaceclip**

For attaching cables and relieving from sharp edges.

**DEVIfast™ Double**

For fixing cable loops in downpipes.

**DEVI Aluminium Tape**

For ensuring efficient heat transfer.

6.2 Connection kits
Connection kits

	DEVIpipelineguard™ LSZH (T), DEVliceeguard™ (T)	DEVIpipelineguard™ (B), DEVlhotwatt™ (B), DEVliceeguard™ (B)	DEVIpipelineguard™ Industry
DEVlconnecto		✓	
DEVl EasyConnect	✓		
Connection kits for DEVIpipelineguard™ Industry			✓

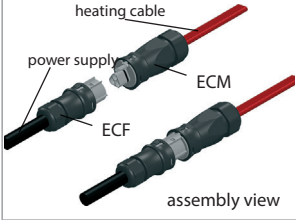
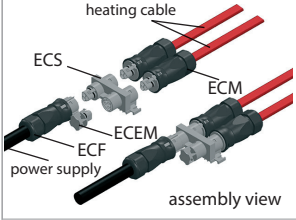
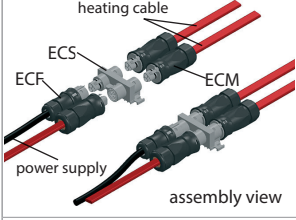
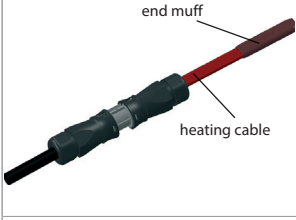
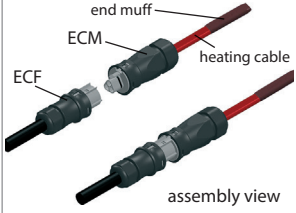
DEVlconnecto

Picture	Name	Description
	DEVlconnecto B-S	Heating cable connection with 1,5 m power cable and end terminal
	DEVlconnecto B-C	Heating cable slice/extension for connecting two heating cables
	DEVlconnecto B-T	Heating cable T-branch as a T-junction for three heating cables and 1 end terminal
	DEVlconnecto B-TE2	Heating cable double connection with 1,5 m power cable and 2 end terminals
	DEVlconnecto B-TE3	Heating cable T-branch with 1,5 m power cable and 3 end terminals
	DEVlconnecto B-X	Heating cable X-branch for 4 heating cables incl. 2 end terminals
	DEVlconnecto B-A	Heating cable connection with power cable 1,5 m without end terminal
	DEVlconnecto B-E	Heating cable end terminal
	DEVlconnecto Bracket	For installation of the DEVlconnecto connection outside the insulation

Installation Guide

Self-limiting cables on drum

DEVI EasyConnect

Picture	Name	Description
 <p>heating cable power supply ECM ECF assembly view</p>	<p>DEVI EasyConnect EC-1</p>	<p>Power supply connection set</p>
 <p>heating cable ECS ECM ECF ECEM power supply assembly view</p>	<p>DEVI EasyConnect EC-2</p>	<p>Power supply connection set for 2 cables</p>
 <p>heating cable ECS ECM ECF ECEM power supply assembly view</p>	<p>DEVI EasyConnect EC-3</p>	<p>Power supply connection set for 3 cables</p>
 <p>end muff heating cable</p>	<p>DEVI EasyConnect EC-ETK</p>	<p>End plug set</p>
 <p>end muff ECM heating cable ECF assembly view</p>	<p>DEVI EasyConnect EC-1+ETK</p>	<p>Power supply connection set with end plug</p>

Installation Guide

Self-limiting cables on drum

7 Typical installations

7.1 Typical pipe tracing installation

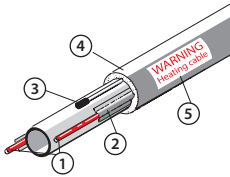


Fig. 1

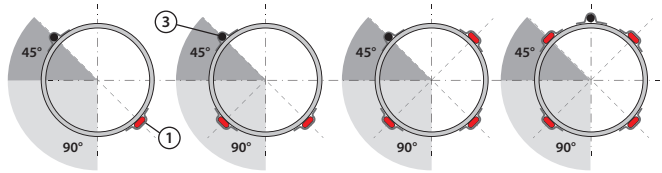
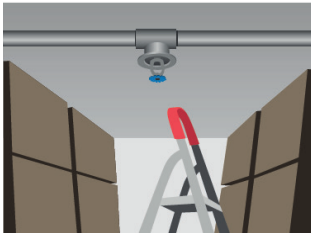
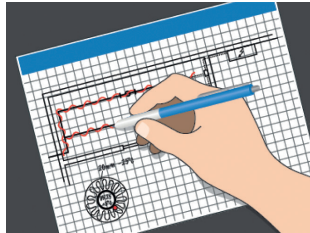


Fig. 2

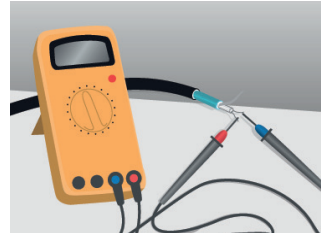
1 - Heating cable; 2 - Aluminum tape; 3 - Wire sensor; 4 - Insulation; 5 - Warning label/tape



1. Check the pipe system to be heated and make sure that the pipes are dry, smooth and tight. Check and prepare the switch board.



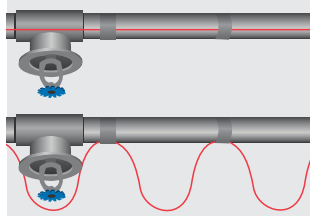
2. Draw a plan positioning cable(s), sensors and thermostat, cable connections, cold tail, connection box, cable paths and switch board.



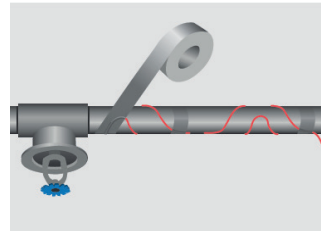
3. Check the insulation resistance of the heating cables. The measured value shall be no less than 50 MΩ.



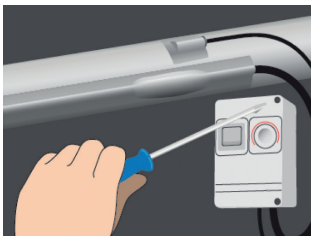
4. Make connection and end terminations using only authorized accessories.



5. Straight lines and sensor must be fitted as shown at Fig.2. Twisted lines are attached as shown for every approx. 1 m pipe with aluminum tape.



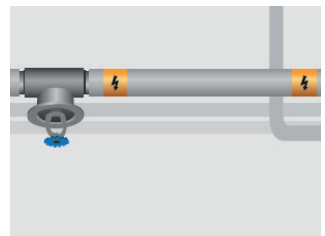
6. Apply aluminum tape below (mandatory for plastic pipes) and on top on the whole length of the cable. Make sure that the cables do not cross sharp edges.



7. Attach and cover the sensor and the tip on top of the pipe with aluminum tape. Extend cold tails/leads and keep connections dry. Mount connection box on the pipe or close to it and install the thermostat on the pipe or near it (depends on thermostat).



8. Re-check the insulation resistance. Connect cables to connection boxes and to the switch board.



9. After insulation, place safety marking tape on the insulation jacket or pipe trenches for every 5 m. In subsurface installations, a cover ribbon with a warning sign must be laid 10 cm above the cables.

Installation Guide

Self-limiting cables on drum

7.2 Typical roof protection installation

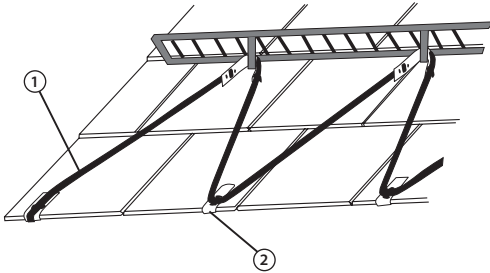


Fig. 3

1 - Heating cable (UV protected); 2 - Fixing element; 3 - Roof sensor

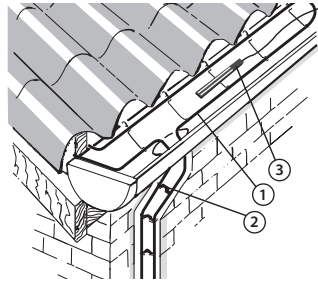
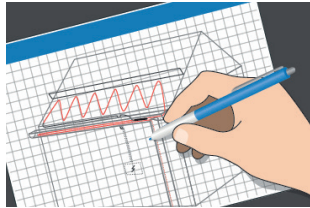


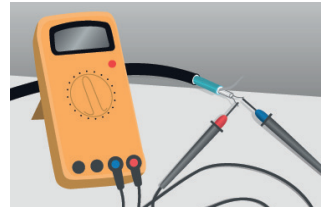
Fig. 4



1. Prepare the installation site properly by removing sharp objects, leaves and mud. Check and prepare the switchboard.



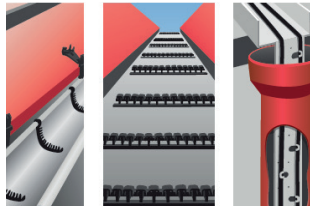
2. Develop the layout plan for cable(s), sensors and thermostats, cable connections/ cold tails, connection box, cable paths and a switchboard.



3. Check the insulation resistance of the heating cables. The measured value shall be no less than 50 MΩ.



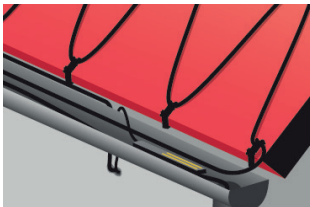
4. Make connection and end terminations using only authorized accessories.



5. Install the connection box and fixing accessories in the gutters, gutter valleys, on the roof and/or the cable.



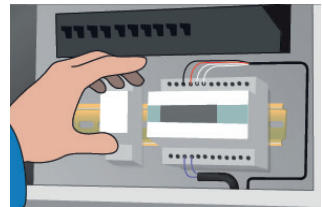
6. Install the cable(s) on the roof, in gutters and downpipes. Check once again and compare the insulation resistance.



7. Install sensors and extend sensor cables, cold tails/terminate cables and place connections dry. Seal all penetrations, e.g. through roofs and walls.



8. Check once again and compare the insulation resistance. The measured value shall be no less than 50 MΩ.



9. Install thermostat/controller and connect cables to the connection boxes and to the switchboard.

Persons involved in the installation and testing of electrical trace heating systems shall be suitably trained in all special techniques required. Installations are intended to be carried out under the supervision of a qualified person.

Additional installation steps should be done according to Application Guide (www.devi.com).

Installation Guide

Self-limiting cables on drum

8 Standard compliance

EN/IEC 62395-1 Electrical resistance trace heating systems for industrial and commercial applications - Part 1: General and testing requirements.

9 Warranty

A 5-year product warranty is valid for:

- self-limiting cables: DEVIceguard™ (T), DEVIceguard™ (B), DEVPipeguard™ Industry, DEVPipeguard™ (B), DEVIhotwatt™ (B).

A 10-year product warranty is valid for:

- self-limiting cable: DEVPipeguard™ LSZH (T).

Should you, against all expectations, experience a problem with your DEVI product, you will find that Danfoss offers DEVWarranty valid from the date of purchase that was no later than 2 years from production date on the following conditions: During the warranty period Danfoss shall offer a new comparable product or repair the product if the product is found to be faulty by reason of defective design, materials or workmanship. The repair or replacement.

The decision to either repair or replace will be solely at the discretion of Danfoss. Danfoss shall not be liable for any consequential or incidental damages including, but not limited to, damages to property or extra utility expenses. No extension of the warranty period following repairs undertaken is granted.

The warranty shall be valid only if the WARRANTY CERTIFICATE is completed correctly and in accordance with the instructions, the

fault is submitted to the installer or the seller without undue delay and proof of purchase is provided. Please note that the WARRANTY CERTIFICATE must be filled in, stamped and signed by the authorized installer performing the installation (Installation date must be indicated). After the installation is performed, store and keep the WARRANTY CERTIFICATE and purchase documents (invoice, receipt or similar) during the whole warranty period.

DEVWarranty shall not cover any damage caused by incorrect conditions of use, incorrect installation or if installation has been carried out by non-authorized electricians. All work will be invoiced in full if Danfoss is required to inspect or repair faults that have arisen as a result of any of the above. The DEVWarranty shall not extend to products which have not been paid in full. Danfoss will, at all times, provide a rapid and effective response to all complaints and inquiries from our customers.

The warranty explicitly excludes all claims exceeding the above conditions.

For full warranty text visit www.devi.com.

devi.danfoss.com/en/warranty/

WARRANTY CERTIFICATE

The DEVWarranty is granted to:

The insulation resistance shall be measured by means of a DC voltage of at least 500 V for one minute.

The measured value shall be no less than 50 MΩ.

Address _____ Stamp _____

Purchase date _____

Serial number of the product _____

Product _____ Art. No. _____

Installation Date & Signature _____ Insulation [MΩ] _____

Connection Date & Signature _____ Insulation [MΩ] _____

Danfoss A/S

Nordborgvej 81
6430 Nordborg, Syddanmark
Denmark

Danfoss A/S
DEVI • devicom • +45 7488 8500 • E-Mail: EH@danfoss.com

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequential changes being necessary in specifications already agreed.
All trademarks in this material are property of the respective companies. Danfoss and all Danfoss logotypes are trademarks of Danfoss A/S. All rights reserved.
