INSTALLATION INSTRUCTIONS

U35
HEATING

EN-V 1.01

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1 GENERAL

1.1 About these instructions

These operating instructions enable the safe and efficient handling of our VAHLE products. This document is an integral part of the installation and must be kept accessible to operating and maintenance personnel in the immediate vicinity. The basic requirement for safe working is compliance with all specified safety instructions and instructions. This documentation does not give instructions for operating the plant/machine in which our system is integrated. In addition, the local accident prevention regulations and general safety regulations for the use of the system apply. Illustrations serve the basic understanding and may deviate from the actual version.

1.2 Symbols

Safety instructions in this manual are identified by symbols. Each safety instruction begins with signal word that indicates the severity of the hazard. The various types of warnings and safety instructions and their structure are explained below.

DANGER!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates an immediately dangerous situation that will result in death or serious injury unless avoided.

► The actions to prevent the hazard are identified here

DANGER!

The source of an electrical hazard is described here.

This combination of a symbol and a signal word indicates an immediately dangerous situation related to electricity that will result in death or serious injury unless avoided.

► The actions to prevent the hazard are identified here

WARNING!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates a potentially dangerous situation that may result in death or serious injury unless avoided.

► The actions to prevent the hazard are identified here

CAUTION!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates an potentially dangerous situation that may result in light or moderate injury unless avoided.

► The actions to prevent the hazard are identified here

NOTICE!

The source of the hazard is described here.

This combination of a symbol and a signal word indicates a potentially dangerous situation that may result in property or environmental damage unless avoided.

► The actions to prevent the hazard are identified here

NOTICE!

This indicates a reference to another place in this text or another document.

This combination of a symbol and a signal word indicates a reference to another place in this text or in a different document.

► The places in the text or references to other documents are identified here.

TIPS AND RECOMMENDATIONS!

► Simple tips and recommendations from our long years of experience are provided here.

1.3 Copyright protection

The contents of this manual are protected by copyright. Their use is permitted within the scope of the use of the installation. No further use is permitted without the written permission of the manufacturer. This manual may not be copied, given to any third party, reproduced in any form or by any means, including, but not limited to, exploitation and / or communication of the contents without the written permission of the manufacturer, except for internal purposes.

1.4 Disclaimer

The information in this document has been compiled in consideration of applicable standards and regulations, accepted rules of engineering, as well as our years of knowledge and experience.

The manufacturer shall not be liable for damages resulting from:

- Failure to observe the technical documentation
- Uses other than the intended use
- Use by personnel without the required training
- Unauthorized modifications or technical changes
- Use of non-approved spare parts or accessories

The actual scope of delivery may vary from the descriptions and images in this document in case of custom versions, the selection of additional order options, or due to latest technical changes.

The obligations agreed in the supply contract, the general terms and conditions and the terms and conditions of delivery, and the laws and regulations applicable at the time the contract was signed all apply.

We reserve the right to make technical changes to improve the usability and for further development.

1.5 Customer service

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Country of origin: Germany

1.6 Warranty

The information in this document has been compiled in consideration of applicable standards and regulations, accepted rules of engineering, as well as our years of knowledge and experience.

The warranty period and the scope of the warranty are defined in the terms of your contract and the terms and conditions of delivery of Vahle GmbH & Co. KG.

Our general terms of warranty and delivery are published on our website.
www.vahle.de

⚠ WARNING!

No liability in case of unauthorized changes, modifications, or accessories!

Changes or modifications to the delivered product require the permission of the manufacturer. Genuine spare parts and manufacturer-approved accessories provide safety. The use of non-approved parts voids any liability of the manufacturer.

► Always consult the manufacturer first!

The warranty becomes void in case of any of the events below:

- The product is changed without permission from Vahle.
- The buyer performs the assembly or repairs himself during the warranty period or has repairs performed by third parties.
- If the product has been handled or maintained inappropriately.
- Use of spare parts that are not genuine Vahle parts.
- Failure to observe the information in this documentation.

2 SAFETY INSTRUCTIONS

2.1 Safety

This section gives an overview of all important safety aspects relating to the protection of personnel as well as the safe use and fault-free operation. Other, task-specific safety instructions can be found in the sections on the individual phases of the product's life.

DANGER!

Failure to observe the safety instructions may result in risks to life and health!

2.2 Intended use

Conductor rails can freeze in outdoor areas due to ambient temperatures near freezing point. The contact surfaces for the current collectors can freeze over. This layer of ice is formed by freezing condensation or white frost (freezing humidity) and forms an insulating layer between the conductor rail and the carbon brush due to its high electrical resistance. The conductor rail heating system provides reliable protection against freezing over and can be used for all insulated Vahle conductor rails (except U20, U30 and U40).

2.3 General risks

The following section describes residual risks that arise even if the device is used as intended. Observe the safety instructions listed here in the other sections of these instructions to reduce the risk of injuries or damage to property and equipment and to avoid dangerous situations.

Do not change or modify the system inappropriately!

WARNING!

Risk of death from improper replacement or removal!

Errors during the removal or replacement of components may cause life-threatening situations or significant property damage

► Observe the safety instructions before beginning any removal work.

2.3.1 Danger from electrical energy

Perform the following safety work according to VDE 0105-100 (this work must be carried out by a qualified electrician, see chapter: "2 security").

Activate

The required separation distances must be established.

Secure against restart

During work, a prohibition sign must be attached reliably on switching handles or drives of switches, control units, pressure and sensing devices, safety parts, circuity breakers that have been used to unlock a system part or that can be used to connect electricity. If this is not possible, then the clearly associated prohibition sign must be nearby. Existing mechanical interlocking devices against restart must be used for manually operated switches.

Determine absence of voltage

Absence of voltage is to be determined at or as close as possible to the work site at all poles. Absence of voltage must be checked with a voltage tester immediately before and after use.

Grounding and short-circuiting

Parts on which work will be performed at the work place must first be grounded and then short circuited. Grounding and short-circuiting must be visible from the workplace. Deviating from the above, it is permitted to ground and short-circuit near the work place if this is required due to local conditions or for safety reasons. Devices for grounding and short-circuiting must always first be connected with the grounding system or the ground electrode and afterwards with the parts to be grounded. Grounding and short circuiting may be waived in certain low-voltage systems (see VDE 0100-100).

Cover adjacent, live parts or isolate them

Before starting work, check whether it is appropriate to make adjacent parts voltage-free.

DANGER!

Danger of life due to electrical current!

Contact with live parts can result in life-threating injuries.

► Make sure that the components are not live or in tension unauthorized approximation.

2.4 Responsibilities of the operating company

Definition of the operating company

The owner is listed in the order confirmation and has the following owner obligations:

Owner obligations

The system is put to commercial use. The owner of the system is therefore subject to laws and regulations on workplace health and safety. In addition to the safety instructions in this document, the safety, accident prevention, and environmental regulations for the system's field of application must be followed. The following applies in particular:

- The owner ensures protection against electric shock (contact protection).
- The owner must inform himself about applicable workplace health and safety regulations and conduct a risk assessment for additional hazards that may arise from the special operating conditions at the installation site. These must be implemented as facility instructions for the operation of the system.
- Over the entire time, the owner has to verify that the instructions drafted by him for the operation of the system conform to the current state of applicable regulations and adapt the instructions as necessary.
- The owner must clearly define responsibilities for the installation, operation, maintenance, and cleaning of the system.
- The owner must ensure that all employees who handle the system have read and understood the operating instructions. The owner is also required to provide training periodically and instruct personnel about the risks.

The owner is also responsible for ensuring that the system is always in good technical condition. The following therefore applies:

- The owner must ensure that the maintenance intervals described in this documentation are observed.
- Control and safety devices provided by the owner for the operation of the system must be checked for completeness and functional safety.
- The owner must ensure that assembly and installation comply with EN 60204.
- The owner must ensure that all components are de-energized in the event of an emergency off. This applies in particular to the parallel busbar.

2.5 Personnel requirements

2.5.1 Qualifications

The tasks described in this manual present various requirements to the qualifications of the persons performing them.

⚠ WARNING!

Hazard in case of insufficient qualification of personnel!

Insufficiently qualified persons are unable to judge the risks when working on the system, which puts them and others at risk if severe or fatal injuries.

- ► All work must be performed by qualified personnel only.
- ► Insufficiently qualified personnel must stay out of the work area.

Operator

The operator has been instructed by the owner about the tasks assigned to him and the risks of inappropriate actions. An operator may perform tasks that go beyond normal operation only if this is indicated in the instructions and the owner has expressly assigned him with such a task.

Electrically qualified person (see VDE 0105-100)

Due to their professional training, knowledge, experience, and knowledge of the relevant standards and regulations, professional electricians are able to carry out work on electrical installations and to independently recognize and avoid possible hazards. The professional electrician has been specifically trained for his/her professional working environment and is conversant with the relevant standards and regulations.

Qualified personnel

Qualified personnel are able, based on their technical training, knowledge, experience, and familiarity with applicable regulations, to perform the assigned tasks and independently detect and avoid potential hazards.

Instructed personnel

The instructed person has been instructed by the owner about the assigned tasks and the risks of inappropriate actions. Such persons must also have read and understood these safety instructions and observe them during their work.

This may need to be confirmed by the customer/user with a signature.

2.6 Personal protective equipment

Every person who is instructed to work on the system or in the vicinity of the system (support personnel) must wear personal protective clothing/equipment for the suitable type of their work. Personal protective equipment has the purpose of protecting personnel against hazards to their health and safety at work. The owner is responsible to ensure that protective equipment is worn.

Personal protective equipment is described below:

Safety shoes

Safety shoes protect against falling parts as well as against slipping.

Protective goggles

Protective goggles protect against flying particles and liquid sprays.

Helmet

Helmets protect against falling or flying parts and materials.

Gloves

Gloves protect hands against chafing and abrasion, cuts and punctures, as well as against contact with hot surfaces.

Protective work clothes

Work clothing is close fitting and resistant to tearing, with close-fitting sleeves and without any projecting parts. It is designed to protect against being caught by moving parts of machinery. However, it must not reduce mobility. Do not wear rings, necklaces, or other jewelry. Long hair must be covered (cap, hat, hairnet or similar). Fall-arrest equipment, face and hearing protection acc. to DGUV Regulation 112-189.

Hearing protection

To protect against severe and permanent hearing loss.

Breathing protection

To protect against severe and chronic conditions of the airways.

2.7 Safety devices

⚠ WARNING!

Danger from non-functional safety devices!

Non-functional or disabled safety devices cause a risk of severe injuries or even death.

► Before beginning any work, verify that all safety devices are functional and installed properly.

► Never disable or override safety devices.

In addition to locally applicable safety regulations, the following safety instructions must be observed.

The following accident prevention regulations (UVV; Germany), respectively the new Accident Prevention Regulations – Principles of Prevention (DGUV Regulation 1; Germany) must always be observed.

2.8 Conduct in case of danger or accident

Precautions:

- Have first-aid equipment (first-aid kit, blankets etc.) and fire extinguisher ready.
- Maintain free access for emergency services vehicles.

Conduct in case of accident:

- Secure site of accident and call first aid personnel.
- Alert emergency services.
- Provide first aid

2.9 Signage

The following symbols and information signs may be in the work area. They apply to the immediate environment of their location.

DANGER!

Danger of life due to electrical current!

Contact with live parts can result in life-threating injuries.

► Make sure that the components are not live or in tension unauthorized approximation.

WARNING!

Hazard from illegible signs!

Over time, labels and signs may become soiled or otherwise illegible so that hazards may not be recognized or necessary operating instructions may not be followed.

► Always keep all safety, warning and operating instructions in easily legible condition.

NOTICE!

Observe instructions!

Use the identified device only after this documentation has been read and understood in full.

3 LAYOUT AND FUNCTION

General information on heating

The conductor system is heated by means of a heating conductor which is drawn into the cavity of the conductor rail profile. The heating cable and the length of the heating circuit are designed for a heating output of between 15 - 25 W/m. The supply voltage is 230V, 400V (see order confirmation or system-specific installation plan). In exceptional cases, e.g. if the heating length is short, the power is supplied by a transformer with the appropriate secondary voltage. The heating conductor sections are supplied 1 m longer than the conductor rail length in order to make installation easier.

A heating circuit both starts and ends in a heating conductor feed terminal by connecting the thermistor to the PTC thermistor. The PTC thermistor is then installed up to the heating conductor control. Within the heating circuit it may be necessary to connect the individual heating conductors (cross-pole). A PTC thermistor bridge must be inserted at this point. For this purpose, the heating conductor (heating wire) is reconnected to the PTC thermistor (H07RNF) in one heating conductor feed terminal, and fed in again on the other conductor rail section according to the same principle.

NOTICE!

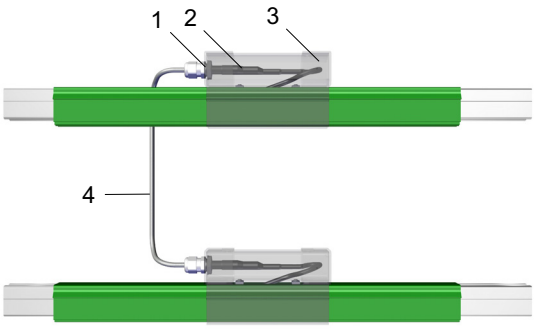
- ► With the U15, the expansion sections cannot be heated and must therefore be bridged
- ► Supply lines from the heating feed terminal to the connection box/heating conductor feed terminal must be supplied and installed by the customer.

⚠ CAUTION!

Risk of damage!

The heating system may only be switched on if the temperature is below +5 °C. The length of the heating circuit may not be shortened arbitrarily to prevent the conductor rail from becoming too hot or too cold. Too much heat destroys the insulation profile. If the temperature is too low, the thawing temperature will not be reached. The same applies to a voltage other than the intended voltage or a different type of heating cable.

If conductor systems are equipped with isolating sections, these may not be bridged with heating conductors! The heating sections are to be installed in such a way that they end at the isolating sections. Heating conductors may also be used in maintenance areas, in which case the heating conductors must also be switched off when the maintenance area is switched off.



1 Strain relief
2 Connection thermistor/PTC thermistor
3 UEH housing
4 PTC thermistor bridge

Heating conductor for U35

Every conductor rail cross-section of the U35 can be heated.
The following heating conductors are permitted: **Heating wire EYCEX 5203**

Resistance [Ω / m]	ID no.	Outer diameter [mm]
0.10	0196381/00	5.2
0.15	0196382/00	4.9
0.20	0196383/00	4.8
0.32	0196384/00	4.9
0.38	0196385/00	4.8
0.48	0196386/00	4.7
0.60	0196387/00	4.5
0.70	0196388/00	4.5
0.81	0196389/00	4.6
1.00	0196390/00	4.5
1.44	0196391/00	4.4
2.00	0196392/00	4.6
3.00	0196393/00	4.4
4.00	0196394/00	4.2
4.40	0196395/00	4.3
5.16	0196396/00	4.3
5.60	0196397/00	4.2

Custom components

Component	ID no.
Heating conductor feed terminal UEH 35L	0175189/00
Heating conductor feed terminal UEH 35M	0175120/00
Connecting material for heating conductor/PTC thermistor	1005308/00
Connection box for conductor rail de-icing	0108059/00
Bridge 6 mm² for heating conductor of 300 mm length	10010159

Expansion section with heating conductor bridging

Expansion section with heating conductor bridging	Standard (green up to +55 °C)	Heat-resistant (gray up to +85 °C)	Highly heat-resistant (black up to +130 °C)
UDVH 35/200-400C K4 PH	0175533/00	0175537/00	/
UDVH 35/200-400C K4 PE	0175534/00	0175538/00	/
UDVH 35/500C K4 PH	0175544/00	0175546/00	/
UDVH 35/500C K4 PE	0175545/00	0175547/00	/
UDVH 35/230-450 AE K4 PH	0175531/00	0175535/00	0176044/00
UDVH 35/230-450 AE K4 PE	0175532/00	0175536/00	0176043/00
UDVH 600 AE AE K4 PH	0176042/00	0176040/00	0176032/00

Expansion section with heating conductor bridging	Standard (green up to +55 °C)	Heat-resistant (gray up to +85 °C)	Highly heat-resistant (black up to +130 °C)
UDVH 600 AE AE K4 PE	0176041/00	0176039/00	0176031/00

Standard heating conductor control

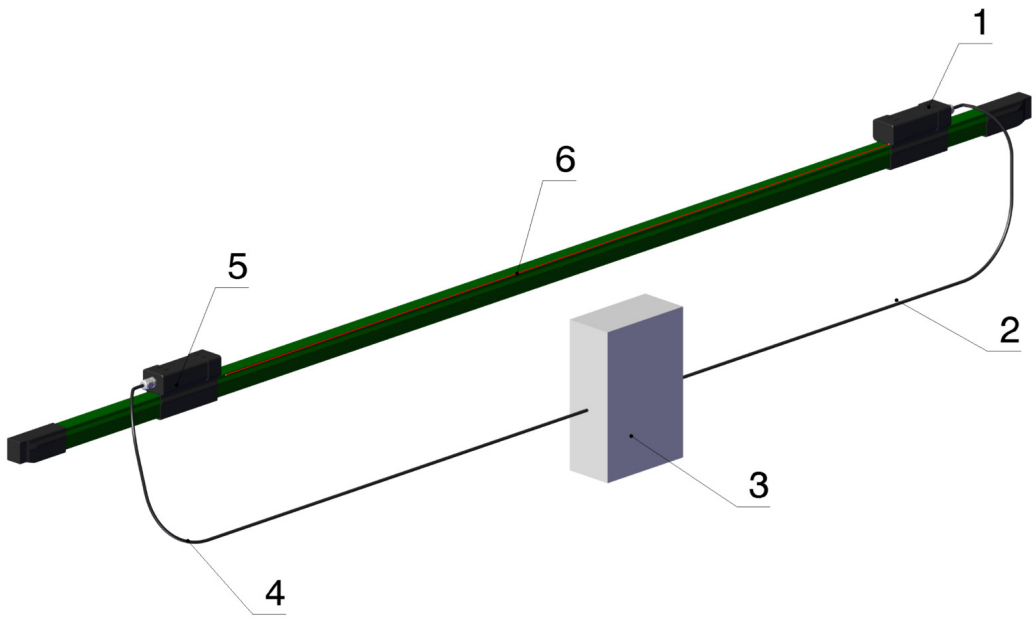
230V			
Current [A]	ID no.		Special features
	including timer		
	Yes	No	
16	0107252/00	0107248/00	
25	0107253/00	0107249/00	
35	0107254/00	0107250/00	
50	0107255/00	0107251/00	

400V			
Current [A]	ID no.		Special features
	including timer		
	Yes	No	
16	0107246/00	0107243/00	VA: 0107936/00
25	0195559/00	0107244/00	
35	0107247/00	0107245/00	
50	0175168/00	0195710/00	

3.1 Schematic diagram of U35 heating system

System example 1 - Simple heating

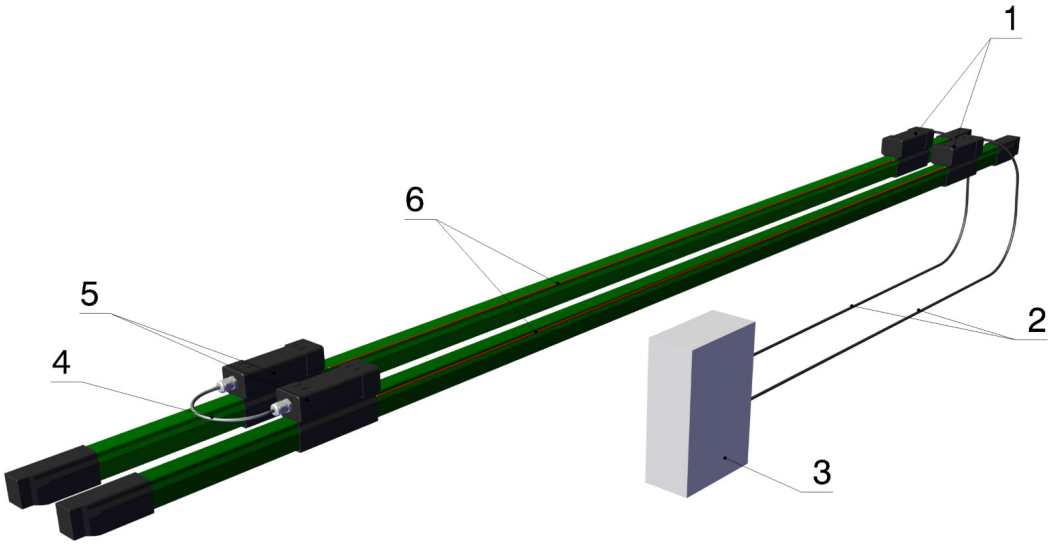
The simple principle of conductor rail heating consists of an infeed terminal and an outfeed terminal, a heating wire and a connection box.



1 Heating infeed terminal
2 PTC thermistor
3 Connection box / heating conductor control
4 PTC thermistor
5 Heating infeed terminal as "outfeed terminal"
6 Heated part of the conductor rail (heating wire)

System example 2 - Heating with pole change via PTC thermistor bridge

In order to generate a pole change, PTC thermistor bridging can be implemented. Instead of proceeding as in example 1, the heating wire can also be bridged on an opposite pole and fed back.



1 Heating infeed terminals
2 PTC thermistor
3 Connection box / heating conductor control
4 PTC thermistor bridging
5 Heating infeed terminal as "outfeed terminal"
6 Heated part of the conductor rail (heating wire)

NOTICE!

Generally, item 2 must be provided by the customer.

4 COMMISSIONING

4.1 Safety instructions for commissioning

⚠ WARNING!

Risk of injury in case of improper operation!

Improper operation may result in serious injury or property damage.

- ► Observe the safety instructions from chapter “2.1 Safety.”
- ► Are all acceptance reports available? (initial startup)
- ► Are there no people in the danger zones?
- ► Was the assembly performed completely according to instructions?
- ► Have excess materials, tools and auxiliary devices been cleared from the danger zones?
- ► Have the electrical system powered up by an authorized electrically trained person (see chapter “2.1 Safety”)

⚠ WARNING!

Danger to unauthorized persons!

Unauthorized persons who do not fulfill the requirements described here may not be aware of the hazards in the relevant working areas.

- ► Keep unauthorized persons clear of the work area
- ► If in doubt, address the relevant person and instruct them to leave the work area if necessary
- ► Interrupt work until unauthorized persons have left the work area

⚠ WARNING!

Hazard in case of insufficient qualification of personnel!

Insufficiently qualified persons are unable to judge the risks when working on the system, which puts them and others at risk if severe or fatal injuries.

- ► All work must be performed by qualified personnel only
- ► Insufficiently qualified personnel must stay out of the work area

⚠ WARNING!

Risk of injury from falling parts!

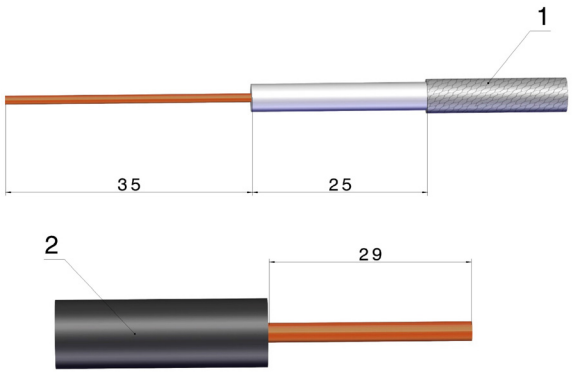
In case of improper use (faulty assembly, misuse, failure to perform maintenance, etc.), there is a risk of parts falling down.

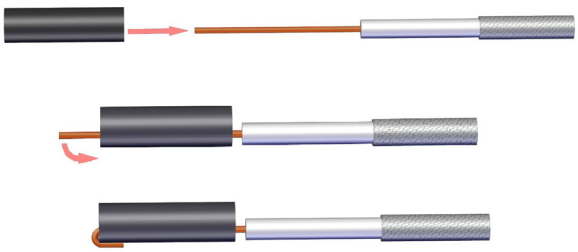
- ► Wear a helmet
- ► Perform regular maintenance

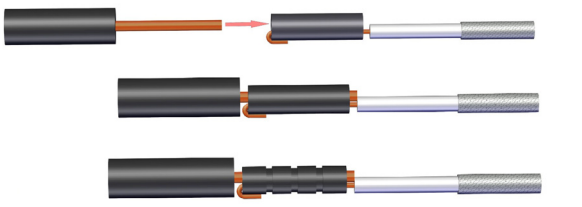
4.2 Heating installation

4.2.1 Connection & repair of heating conductors / PTC thermistor bridges

Connection or repair of heating conductors







Step 1

Required tools:

- ⚒ Stripping pliers
- ⚒ Knife
- ⚒ Wire cutter
- ⚒ Crimping pliers
- ⚒ Hot air blower

Assembly instructions:

1. Strip the insulation from the heating conductor (1) and the PTC thermistor (2) and shorten the outer wire mesh by 25 mm (see illustration).
2. Push the shrink tubing (2 x 45 mm) and (1 x 65 mm) onto the PTC thermistor (heating conductor).

Step 2

Assembly instructions:

1. Push the joint connector onto the resistor and bend the wire.

NOTICE!

After crimping, the shrink tubing can no longer be fitted!

► Slide the shrink tubing onto the PTC thermistor or heating wire beforehand.

Step 3

Assembly instructions:

1. Insert the PTC thermistor or heating conductor into the joint connector.
2. Use crimping pliers to crimp the butt joint connector.

Step 4

Assembly instructions:

1. Seal the transition between the connection with 45 mm shrink tubing using a hot air blower.

Step 5

Assembly instructions:

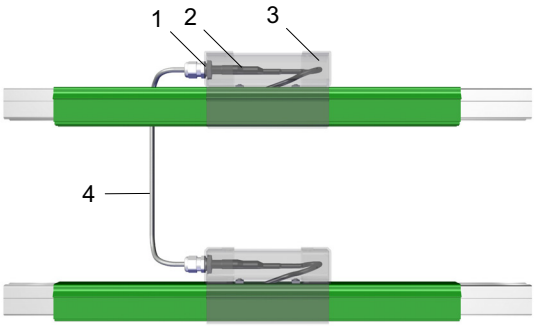
1. Seal the entire connection between PTC thermistor and heating conductor with 65 mm shrink tubing.

⚠ CAUTION!

Risk of damage!

The heating system may only be switched on if the temperature is below +5 °C. The length of the heating circuit may not be shortened arbitrarily to prevent the conductor rail from becoming too hot or too cold. Too much heat destroys the insulation profile. If the temperature is too low, the thawing temperature will not be reached. The same applies to a voltage other than the intended voltage or a different type of heating cable.

If conductor systems are equipped with isolating sections, these may not be bridged with heating conductors! The heating sections are to be installed in such a way that they end at the isolating sections. Heating conductors may also be used in maintenance areas, in which case the heating conductors must also be switched off when the maintenance area is switched off.

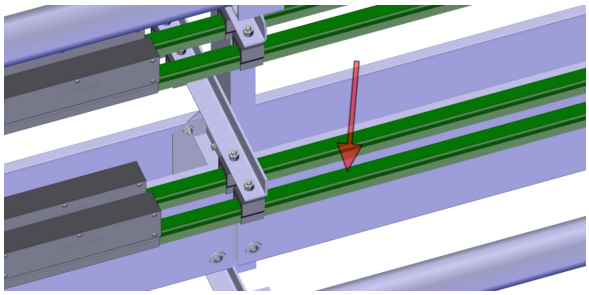


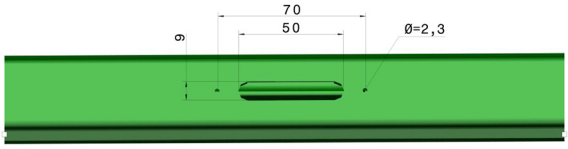
1 Strain relief
2 Connection thermistor/PTC thermistor
3 UEH housing
4 PTC thermistor bridge

NOTICE!

At least two persons are required for installation. Significantly faster assembly is possible with three persons. It is advisable to lay out each heating cable lengthwise at the beginning of installation work.

4.2.2 Pulling in heating wire and installing feed terminal





Step 1

Required tools:

⚒ Marking tool

Assembly instructions:

1. Mark the position at which you intend to install a heating feed terminal.

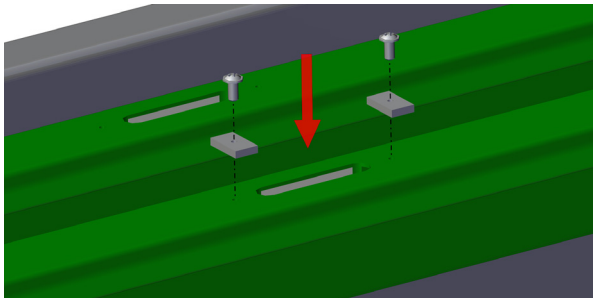
Step 2

Assembly instructions:

1. Drill a slotted hole at the previously marked position and two lateral fixing holes as shown in the illustration on the left. You are free to choose which tools you use for this, but it is important that the surfaces are neatly deburred and that the inner running surfaces of the conductor rail are not damaged.

NOTICE!

- ► All cut and drilling surfaces must be smoothly deburred.
- ► The inner running surface of the profile must not be damaged --> Remove insulating profile before cutting or drilling if necessary.



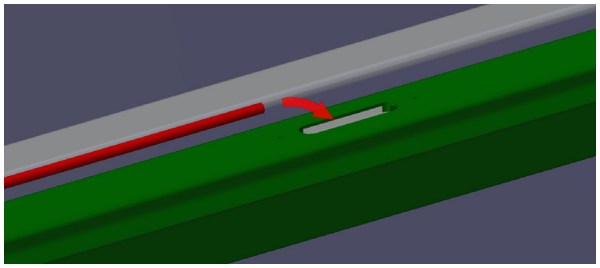
Step 3

Required tools:

⚒ Phillips screwdriver

Assembly instructions:

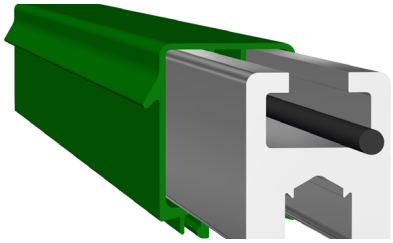
1. Fasten the safety blocks with screws as shown.



Step 4

Assembly instructions:

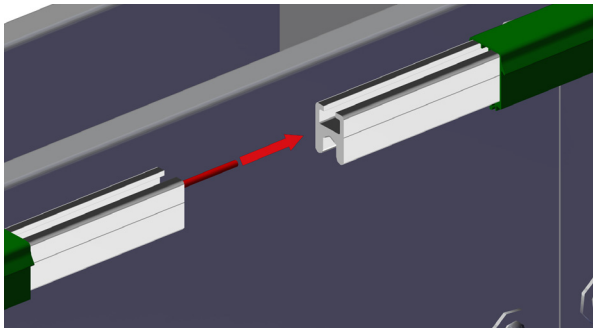
1. Carefully pull the heating wire into the profile. Leave approx. 30 cm of heating wire protruding from the feed opening to connect the feed terminal.



⚠ CAUTION!

Do not draw the heating wire through the lower "free space section", as the conductor rail and current collector could be severely damaged. There is also an increased risk of short circuits!

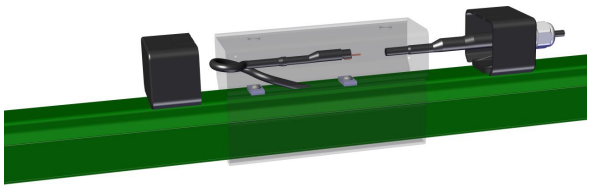
► Only draw the heating wire into the conductor rail profile as shown.



NOTICE!

It is recommended to draw the heating wire into the conductor rail profile prior to installation.

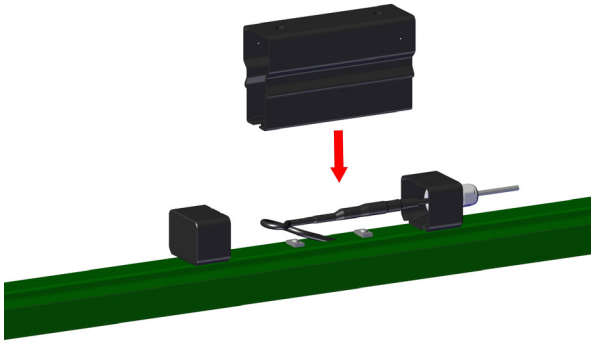
Installing the feed terminal



Step 5

Assembly instructions:

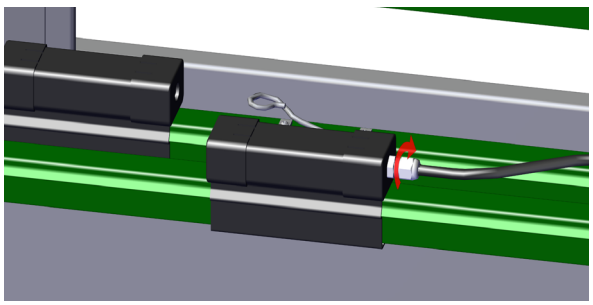
1. Connect the heating conductor/PTC thermistor as described in chapter: " Connection or repair of heating conductors".



Step 6

Assembly instructions:

1. Slide the terminal cap over the connected heating conductor as shown. Check that the cover has engaged properly.

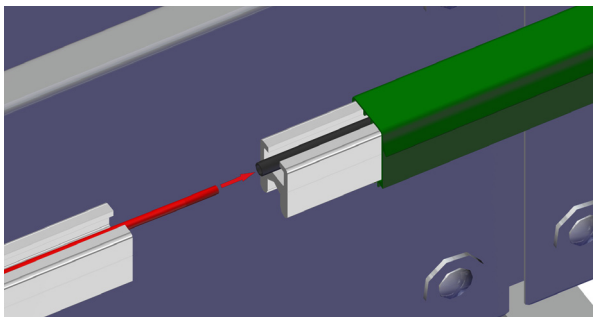


Step 7

Assembly instructions:

1. Tighten the strain relief and check everything is firmly seated.

4.2.3 Drawing in heating wire through expansion section



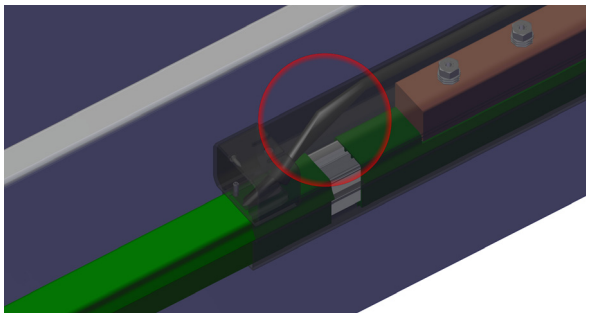
Step 1

Required tools:

⚒ None

Assembly instructions:

1. Now thread the heating wire (red) through the protective tubing of the expansion section.



Step 2

Required tools:

⚒ Phillips screwdriver

Assembly instructions:

1. There is a bottleneck inside the expansion section (see illustration). At this point the heating wire must be rotated slightly to feed it through.

⚠ CAUTION!

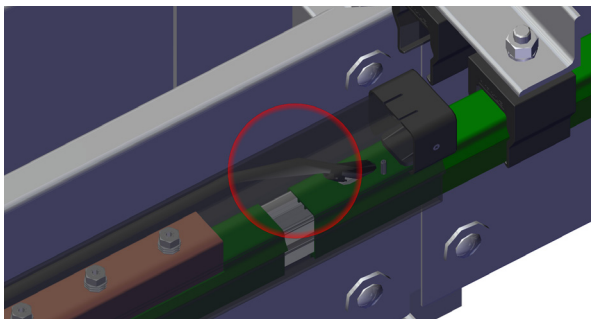
Risk of damage

This bottleneck section of the protective tubing in the expansion section can be damaged during assembly.

► Make sure that the heating wire has no sharp edges and carefully feed the heating wire through the expansion section.

⚠ CAUTION!

The expansion section is sealed and may not be opened!



Step 3

Required tools:

⚒ None

Assembly instructions:

1. The same bottleneck must be overcome at the end of the expansion section. Proceed as in step 2.

4.3 Condition after the installation

⚠ WARNING!

Risk of injury in case of improper operation!

- ► Before the initial start-up, verify that all acceptance reports have been submitted.
- ► Ensure that no people are in danger zones.
- ► Ensure that the system has been fully assembled.
- ► Remove excess materials, tools and aids from dangerous locations.
- ► The electrical system must be installed by a an authorized electrically trained person.
- ► Perform a trial run after proper installation/maintenance.
  Observe the following:
  Perform the first trial run at reduced speed.
  The graphite contacts must run in the rail without vibration.

5 TRANSPORT AND STORAGE

5.1 Safety instructions for transport and storage

NOTICE!

Damage due to improper transport or storage. Improper transport or storage may cause significant property damage!

- ► Storage temperature: 0 °C to +45 °C
- ► Storage location: Indoors, dry, no exposure to chemicals.
- ► Do not expose to direct sunlight.
- ► Exercise caution and observe the symbols on the packaging while unloading the pieces at delivery or during transport on the facilities.

5.2 Transport inspection

Check the delivery for completeness and transport damage upon receipt!

If any external damage is found:

- Refuse delivery or accept delivery only conditionally.
- Note the scope of the damage in the transport documents or on the carrier's delivery note.

NOTICE!

The delivery may be damaged during transport!

Report all defects as soon as they are found. Claims for damages can only be made during the applicable period.

- ► Document and report the defects found.

6 DISASSEMBLY AND DISPOSAL

6.1 Preparation for disassembly

- Switch off the system and secure it against switching back on.
- Physically disconnect the entire power supply from the system.
- Loosen and remove all screws.

DANGER!

Danger of life due to electrical current!

Contact with live parts can result in life-threating injuries.

► Make sure that the components are not live or in tension unauthorized approximation.

6.1.1 Disassembly

During disassembly, always observe the information in chapter 2.3.1 .

WARNING!

Risk of death from improper replacement or removal!

Errors during the removal or replacement of components may cause life-threatening situations or significant property damage

► Observe the safety instructions before beginning any removal work.

CAUTION!

All accessories must be checked for wear.

Only defect-free parts may be reused.

► Use only genuine VAHLE spare parts.

6.2 Disposal

At the end of the system's service life, the system must be disassembled and disposed of in an environmentally friendly manner according to local laws and regulations.

NOTICE!

Electronics are special waste! Observe locally applicable laws and regulations for disposal.

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Technical Documentation

DQS - certified in accordance DIN EN ISO 9001:2015 OHSAS 18001:2007