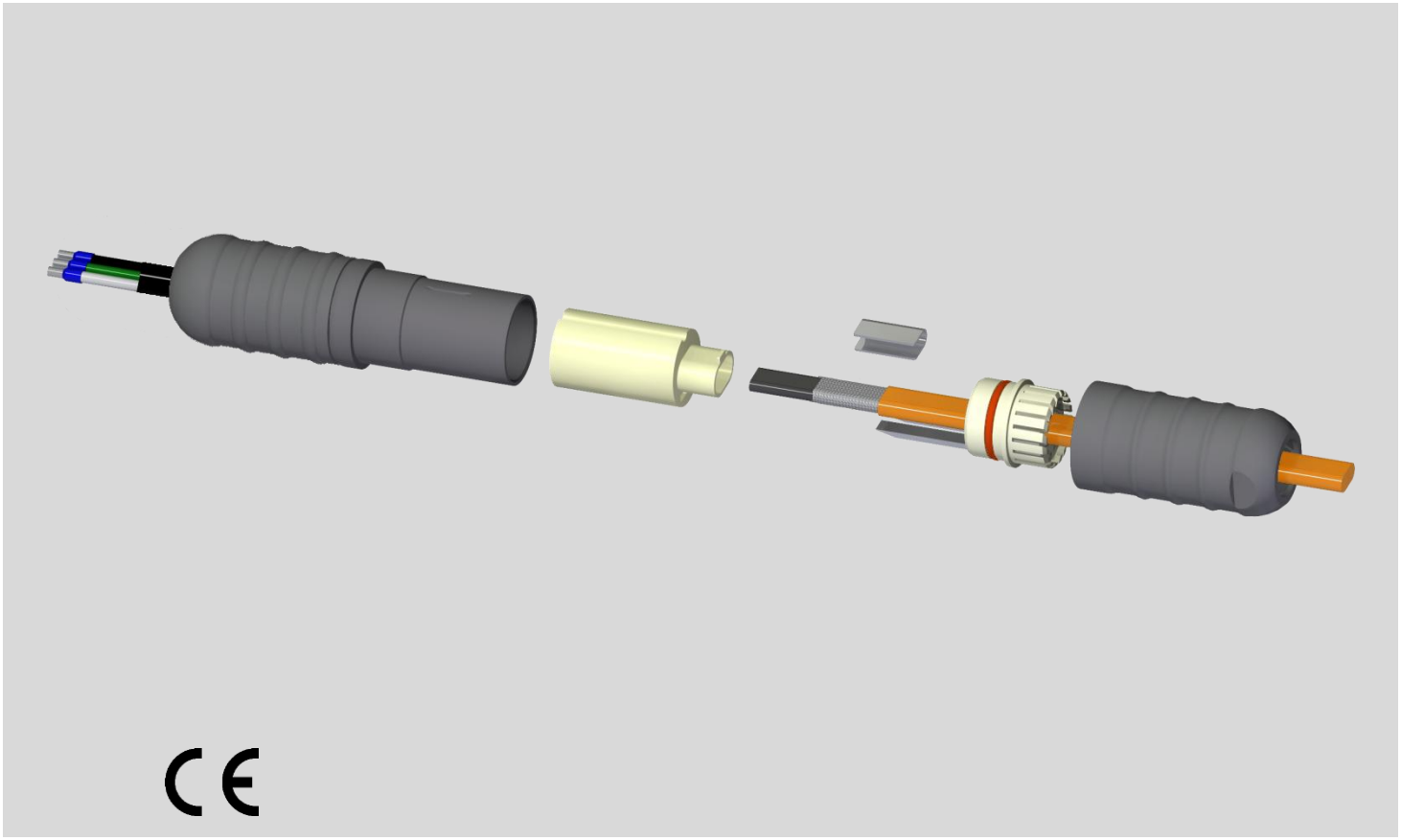
BARTEC

TWISTO/L-B

Installation Instructions

Connection and Termination Technology TWISTO/L-B
in a Heating System FT and/or PSB (Type 27-56L*)



Origin Installation Instructions

Language: EN

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1. Product Description

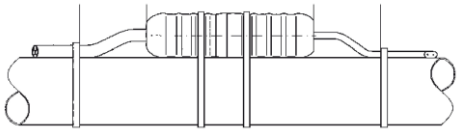
TWISTO/L-B is a modular connection and termination system designed to connect BARTEC FT and PSB heating cables to a low-voltage power supply or to connect the heating cables to each other. It is designed for use outside of potentially explosive atmospheres.

The various components of a TWISTO/L-B - module or a TWISTO/L-B - set are listed in the table below. This table also shows the available modules.

Components	Module TWISTO/L-B							
	-A	-E	-S	-C	-T	-TE2	-TE3	-X
1 Enclosure	1		1		2	1	1	2
2 Enclosure					1	1	2	2
3 Threaded cap	1		1	2	3	2	3	4
4 Cutting sleeve	1		1	2	3	2	3	4
5 Clamping plate	1		1	2	3	2	3	4
6 Clamping sleeve	1		1	2	3	2	3	4
7 Enclosure				1				
8 End cap		1	1		1	2	3	2

Module legend	
-A	Connection with a fixed cable, 2 m length
-E	End termination
-S	Set consisting of Connection (-A) and end termination (-E)
-C	Splicing
-T	Branch with 2 x 0.3 m cable, pre-assembled and ready for installation
-TE2	Branch with a fixed cable, 2 m length and 1 x 0.3 m cable, pre-assembled and ready for installation
-TE3	Branch with a fixed cable, 2 m length and 2 x 0.3 m cable, pre-assembled and ready for installation
-X	X-Branch with 3 x 0.3 m cable, pre-assembled and ready for installation

The installed TWISTO/L-B - modules together with the connected heating cable FT or PSB form the heating system FT or PSB. The respective heating system FT or PSB is used as a stationary self-regulating trace heating system on pipes, gutters and tanks.



Installation example: Pipe installation

Installation example: Gutter installation

2. Safety

The Connection and Termination Technology TWISTO/L-B is built according to the State-of-the-Art and safe to use. To ensure safe operation a careful planning of the heating system, proper transportation and professional installation, commissioning and maintenance of all components used are required.

The TWISTO/L-B may only be operated and used in accordance with their Intended Use and in compliance with this Installation Instructions and the applicable National Standards and authorizations.

Improper use or misuse of the product may result in serious injury or death. Damage to the product, the heating system and surrounding components is also possible.

Technical modifications to the components of the TWISTO/L-B or the heating cable is not allowed.

Read this Installation Instructions carefully and completely before working with the TWISTO/L-B or the heating system. You must read, understand and observe the contents of this Installation Instructions before installing, commissioning, operating, using or servicing the product or the heating system.

This Installation Instructions must be kept for further reference and made available near the TWISTO/L-B or the heating system. It must be available for all persons or parties involved at all times. If applicable, leave it with the end user. Pass it on to future owners.

In this manual is the term Connection and Termination Technology TWISTO/L-B and TWISTO/L-B used. Both terms describes the same product in a short and long term.

2.1. Intended Use

The modular Connection and Termination Technology TWISTO/L-B is intended for use to connect the BARTEC FT and -PSB heating cables to a low-voltage power supply or to connect the heating cables to each other. It is intended for use outside of potentially explosive atmospheres.

The TWISTO/L-B is intended to connect the following types of BARTEC heating cables FT and PSB:

FT-210-xxyyP	FT-225-xxyyP
FT-215-xxyyP	FT-233-xxyyP
07-5853-710F / -710P	07-5853-725F / -725P
07-5853-715F / -715P	07-5853-733F / -733P

Observe description of types in Technical Data in this Installation Instructions. Be sure to connect the same type of heating cable and the same power output of the heating cable using TWISTO/L-B.

All components of the heating system may be operated in accordance with their Intended Use and within their specifications (Technical Data). Observe all applicable directives and standards and relevant national regulations.

The heating system must be designed carefully, installation and commissioning must be carried out in accordance with the design specifications. Always use appropriately designed Overcurrent Protection Equipment.

Observe and follow this Installation Instructions including the phases of life cycles.

2.2. Foreseeable Misuse

The following activities are a misuse of TWISTO/L-B and are **not allowed**. Usage:

- for purposes other than those described in the Intended Use
- of the product or the heating system with non-approved heating cables
- in a potentially explosive atmosphere
- beyond its Technical Data
- without observing the maximum heating circuit length
- outside of the approved workpiece- and ambient temperature
- without mounted end cap of the heating cable
- without properly completed Acceptance Report
- without mounted warning label “Electrical Heated“
- without observing this Installation Instructions and all applicable national installation regulations

2.3. Personal Qualification

Trained personnel may use the Connection and Termination Technology TWISTO/L-B only. Personnel must have a basic understanding of electrical engineering.

2.4. Symbols and Information Signs

The warnings are intended to protect from dangerous situations and property damage.

In this Installation Instructions, the severity of possible hazards is indicated by the following kind of warnings:

DANGER!

Indicates an immediate danger to the life and health of persons.

Failure to comply this warning will result in serious injury or death.

WARNING!

Indicates a possible danger to the life and health of persons.

Failure to comply this warning may result in serious injury or death.

CAUTION!

Indicates a possible danger to the health of persons.

Failure to comply this warning may result in injury.

NOTICE!

Indicates the possibility of material damage.

Failure to comply this warning may result in damaging the product or surrounding products.

3. Technical Data

Module TWISTO/L-B	
EU-Compliance	CE
Supply voltage	max. 250 V AC max. 16 A
Ambient temperature range, temperature classes	T60: -25°C to +60°C T85: -25°C to +85°C

Heating system: TWISTO/L-B with heating cable	
Supply voltage	max. 250 V AC max. 16 A
Ingress protection	IP66
Operating temperature range of the heating system	T60: -25°C to +60°C T85: -25°C to +85°C
Continuous operating temperature range, energized of the heating cable	-25°C to +65°C
Continuous exposure temperature range, de-energized of the heating cable	-25°C to +85°C

Max. Heating Circuit Length: Heating System FT

Type	Start-up temperature at 230 V AC, 16 A		
	-20°C	0°C	+10°C
FT-210-xxyyP	163	202	202
FT-215-xxyyP	115	144	153
FT-225-xxyyP	70	86	91
FT-233-xxyyP	44	54	57

Max. heating circuit length in meter for heating cable FT with overcurrent protection, trip characteristic C

Table legend

xx	**metal sheating, protective cover**	
14	Braid	Polyolefine
15	Braid	Flurpolymer
40	Foil with running strands	Polyolefine
yy	**Color code**	
10	black	
20	gray	

Other colors may be used by manufacturer.

Max. Heating Circuit Length: Heating System PSB

Type	Start-up temperature at 230 V AC, 16 A		
	-20°C	0°C	+10°C
07-5853-710F 07-5853-710P	163	202	202
07-5853-715F 07-5853-715P	115	144	153
07-5853-725F 07-5853-725P	70	86	91
07-5853-733F 07-5853-733P	44	54	57

Max. heating circuit length in meter for heating cable PSB with overcurrent protection, trip characteristic C

Table legend

	Protective cover
F	Flurpolymer
P	Polyolefine

The copper braid of the respective heating cable can be used as Protective Earth (PE). The resistance of the heating cable is <18,2 Ω/km.

The continuous operating temperature of the heating cable must not exceed +65°C (energized) and the continuous exposure temperature must not exceed +85°C (de-energized) for a cumulative total of 1,000 hours.

If the operating temperature of the heating system exceeds +60°C (T60) or +85°C (T85), separate the TWISTO/L-B thermically to ensure compliance with the temperature class.

A Residual Current Device (RCD) with a rated current of 30 mA should be used.

4. Installation

Install the Connection and Termination Technology TWISTO/L-B carefully and in accordance with the design specifications of the heating system, the Technical Data of each component to be use and this Installation Instructions.

WARNING!

Fire and electric shock hazard due to electrical trace heating system

Risk of injury due to electric current

Observe Installation Instructions and Technical Data of TWISTO/L-B!

Install a strain relief for each TWISTO/L-B!

Do not short-circuit the bus wires or bus wires and grounding braid!

Commissioning of the TWISTO/L-B only with mounted end cap at the end of the heating cable!

De-energize all power circuits or the heating system before installation. Ensure the voltage-free status of the heating system.

Installation notes for TWISTO/L-B

Replace each defective and out-of-shape heating cable grommet of TWISTO/L-B.

After opening the enclosure of the TWISTO/L-B-module, the grommet (O-ring) must be replaced.

Use only approved types of heating cables. Refer to chapter 2.1 Intended Use.

Observe Technical Data of TWISTO/L-B, especially Operating temperature ranges of the heating system, max. heating circuit length and supply voltage.

Include external conductive parts in the protective measure (protective conductor) to prevent indirect contact.

Ensure the voltage-free status of the heating system before installation of TWISTO/L-B.

De-energize the power circuit or the heating system before opening the enclosure of the TWISTO/L-B-module.

Commissioning of the TWISTO/L-B only with mounted end cap at the end of the heating cable.

Install a strain relief for each TWISTO/L-B.

Protect the TWISTO/L-B-module from direct contact with moisture and direct sunlight.

If using the TWISTO/L-B in a gutter heating system, install the TWISTO/L-B in a protected place outside the gutter.

Removing or altering the thermal insulation of the medium to be heated (e.g. a pipe) is not permitted. Altering the temperature settings outside of the design specifications of the heating system is not permitted. Overheating or freezing of the medium to be heated (e.g. a pipe) is possible.

Always use temperate-resistant adhesive tape for mounting the TWISTO/L-B. Observe adhesive tape distance of max. 200 mm.

Installation notes for heating cable

Do not short-circuit the bus wires or bus wires and grounding braid. Installing of the heating cable accordingly to the design specifications of the heating system.

Don’t bend the heating cable on the narrow axis. Observe bending radius of min. 25 mm.

Always use temperate-resistant adhesive tape for mounting the heating cable. Observe tape distance of max. 200 mm.

Installation is permitted only with plasticizer-free cable ties or adhesive tape. Do not use PVC adhesive tape!

Ensure the close contact of the heating cable to the medium to be heated (e.g. the pipe) along its entire length. If necessary, reduce the adhesive tape distance.

Recommendation:

When using plastic pipes as medium to be heated install aluminum foil or aluminum tape between the heating cable and the plastic pipe for better heat transfer.

Required tools

Wire cutters Utility knife

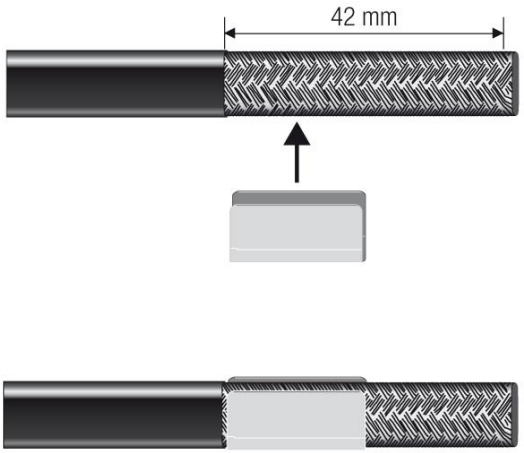
Connecting the heating cable

Cut off the heating cable ensuring a straight cut.

Slide on the threaded cap and clamping sleeve onto the heating cable. Observe orientation of threaded cap and clamping sleeve to each other and to the end of the heating cable.

1

Remove 42 mm of the outer jacket on the end of the heating cable. Slide on the clamping sheet onto the grounding braid or the foil, depending on the type of material used. Be sure to slide on the clamping sheet completely, as far as possible.



2

Heating cable with grounding braid, without foil:

Fold back the grounding braid and slide it on top of the clamping sheet.

3a

Heating cable with foil:

Fold back the running strands. Cut off and remove the foil that overlaps the clamping sheet.

3b

Observe orientation of the sleeve and clamping sleeve to each other. The nose of the sleeve and the groove of the clamping sleeve must fit together exactly.

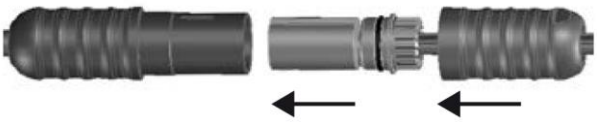
4

Slide in the heating cable into the sleeve till the end of the heating cable is flush to the outside of the sleeve.

right wrong

5

1. Slide in the clamping sleeve into the sleeve.
2. Slide in the sleeve/clamping sleeve – combination into the enclosure to be use.
   Observe the orientation of the anti-rotation lock, the nose of the enclosure and the groove of the sleeve must fit together exactly.
3. Slide on the threaded cap onto the enclosure and tighten until locked in place.



6

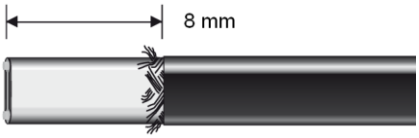
Installation of the end cap

Cut off the heating cable ensuring a straight cut.

Remove 20 mm of the outer jacket and grounding braid or foil, depending on the type of material used.

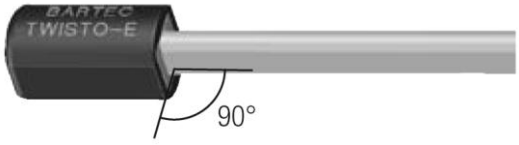
Cut off the dismantled area of the heating cable to a length of 8 mm.

Note: The additional step makes work easier for you.



7

Slide on the end cap all the way onto the heating cable.



8

5. Commissioning

WARNING!

Fire and electric shock hazard due to electrical trace heating system

Risk of injury due to electric current

Observe Installation Instructions and Technical Data of TWISTO/L-B!

Observe the max. heating circuit length, operating temperature range of the heating system, continuous operating temperature range (energized) and continuous exposure temperature range (de-energized) of the heating cable!

Commissioning of the TWISTO/L-B only with mounted end cap at the end of the heating cable!

De-energize all power circuits or the heating system before installation. Ensure the voltage-free status of the heating system!

Operation of the TWISTO/L-B and the heating system with properly completed Acceptance Report only.

During Commissioning, the customer or installer must verify the safe operation of the heating system. The details, measurements and Technical Data of the Commissioning must be documented in the Acceptance Report. Ensure complete documentation of the Commissioning.

Checks at Commissioning:

Visual inspection for all Instructions, warnings, safety notes and Technical Data giving in the Installation Instructions.

Additional check for

- Permanent marking of each heating circuit, specifying the manufacturer, model, power output, and voltage
- Mounting the end cap at the heating cable
- Observing the operating temperature range of the heating system, continuous operating temperature range (energized) and continuous exposure temperature range (de-energized) of the heating cable

At this visual check mount the “Electrically traced” warning label onto the outer and finally visible sheet of the pipe isolation.

Functional inspection and isolation resistance measurement according to the Installation Instructions.

Ensure the voltage-free status of the heating system before connecting to the supply voltage. Connecting the heating cable to the supply voltage. Overcurrent Protection Equipment and Residual Current Device (RCD) ensure the faultless state of the heating system. After about 5 to 10 minutes the heating cable should be warm in full length.

Applying the Isolation Resistance Measurement

Use an Insulation resistance meter with a test voltage of min. 500 V DC and max. 2000 V DC. Insulation resistance should be min. min. 50 MΩ for each heating circuit, regardless of the length of the heating cable.

Conducting the measurement between the bus wires and the grounding braid or foil with running strands, depending on the type of material used. Additional measurement between the grounding braid or foil with running strands and the grounded pipe or gutter.

6. Operation

The TWISTO/L-B-Modules are designed for a service lifetime of more than 10 years.

The product is designed for continuous use, maintenance is not required.

7. Maintenance

WARNING!

Fire and electric shock hazard due to electrical trace heating system

Risk of injury due to electric current

Observe Installation Instructions and Technical Data of TWISTO/L-B!

Observe the max. heating circuit length, operating temperature range of the heating system, continuous operating temperature range (energized) and continuous exposure temperature range (de-energized) of the heating cable!

Commissioning of the TWISTO/L-B only with mounted end cap at the end of the heating cable!

De-energize all power circuits or the heating system before installation or opening the enclosure of the TWISTO/L-B-module. Ensure the voltage-free status of the heating system.

The product is designed for continuous use, maintenance is not required. If there are faults or technical problems with the heating system, maintenance is required.

Observe these notes:

- De-energize all power circuits or the heating system before opening the enclosure of the TWISTO/L-B-module
- Make sure there is a heating cable spare length of 50 mm before opening the enclosure of the TWISTO/L-B-module (install a strain relief for each TWISTO/L-B)
- Install a strain relief for each TWISTO/L-B-module after some modification of the heating system, if applicable
- Replace each defective and out-of-shape heating cable grommet of TWISTO/L-B.
- After opening the enclosure of the TWISTO/L-B-module, the grommet (O-ring) must be replaced.
- Observe supply voltage of TWISTO/L-B.
- Protect the TWISTO/L-B-module from direct contact with moisture and direct sunlight.
- mount an additionally “Electrically traced” warning label onto the outer and finally visible sheet of the pipe isolation, if applicable

Removing or altering the thermal insulation of the medium to be heated (e.g. a pipe) is not permitted. Altering the temperature settings outside of the design specifications of the heating system is not permitted. Overheating or freezing of the medium to be heated (e.g. a pipe) is possible.

8. Decommissioning, Deinstallation

WARNING!

Fire and electric shock hazard due to electrical trace heating system

Risk of injury due to electric current

De-energize all power circuits or the heating system before opening the enclosure of the TWISTO/L-B-module!

De-energize all power circuits or the heating system before opening the enclosure of the TWISTO/L-B-module. Ensure the voltage-free status of the heating system.

For disposal and recycling observe and follow the local legal regulations. The TWISTO/L-B-module consists mainly of glass-fiber reinforced plastic and metal.

9. Installation Accessories

Art. No.	Description	Usage for		Order No.
		Pipes/Vessels	Gutter	
234006	Insulation entry bushing for PSB, PSBL, power cable	X		05-0020-0472
100706	Polyester adhesive tape, 19 mm x 50 m, max. 100 °C	X		02-5500-0005
100506	Aluminum adhesive tape, 50 mm x 50 m, max. 80 °C	X		02-5500-0003
113450	“Elektrisch beheizt“ warning label german	X	X	05-2144-0046
113550	Electrically traced warning label English	X	X	05-2144-0047
120300	“Tracage électrique” warning label French	X	X	05-2144-0703
207439	Electrically traced warning label Russian	X	X	05-2144-0860
107103	Power cable Ölflex Classic 100, 3 x 1,5 mm²; D = 6,8 mm	X	X	02-4034-0001
413510	Junction box AG-3 G for PSBL or TWISTO-B; for 1-3 heating circuits / IP 66	X	X	05-0079-0049
413511	Junction box AG-3 B, weatherproof, for PSBL or TWISTO-B; for 1-3 heating circuits / IP 66/67/69	X	X	05-0079-0050
126225	Nylon cable ties, length 200 mm, halogenfree, not UV resistant; 1000 pieces p.u.	X		03-6500-0015
128699	KBI-1 cable ties PA6.6, length 360 mm, UV resistant; 100 pieces p.u.		X	61400012
127213	KBI cable ties PA6.6, length 200 mm, UV resistant; 20 pieces p.u.		X	61400011
102537	Spacer/edge protection ASH		X	61400000
100131	Edge protection set		X	61400013
200514	Spacer AH	X		61400005

10. Spare Parts

Art. No.	Description	Order No.
212209	Clamping plate	05-0105-0282
127952	Heating cable grommet	05-1308-0201

11. Declaration of Conformity

EU Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de conformité

№ 21-56L0-7C0001

BARTEC

Wir	We	Nous
	BARTEC GmbH Max-Eyth-Straße 16 97980 Bad Mergentheim Germany	
erklären in alleiniger Verantwortung, dass das Produkt **TWISTO/L-B**	declare under our sole responsibility that the product **TWISTO/L-B**	attestons sous notre seule responsabilité que le produit **TWISTO/L-B**
	Typ 27-56L*-DC*	
auf das sich diese Erklärung bezieht den Anforderungen der folgenden **Richtlinien (RL)** entspricht **NS-Richtlinie 2014/35/EU** **RoHS-Richtlinie 2011/65/EU** **Anhang RoHS-Richtlinie 2015/863/EU** und mit folgenden Normen oder normativen Dokumenten übereinstimmt	to which this declaration relates is in accordance with the provision of the following **directives (D)** **LV -Directive 2014/35/EU** **RoHS-Directive 2011/65/EU** **Annex RoHS-Directive 2015/863/EU** and is in conformity with the following standards or other normative documents	se référant à cette attestation correspond aux dispositions des **directives (D)** suivantes **Directive BT 2014/35/UE** **Directive RoHS 2011/65/UE** **Annexe Directive RoHS 2015/863/UE** et est conforme aux normes ou documents normatifs ci-dessous
	EN 60998-1:2004 **EN 60998-2-3:2004** **EN 60670-1:2005 +A1 :2013**	
Verfahren der internen Fertigungskontrolle	**Procedure of internal control of production**	**Procédure de contrôle interne de fabrication**

CE

Bad Mergentheim, 11.02.2022

i.V Michael Wittmann
Product Management Heating Technology

i.A. Dr. Ulrich Mann
Certification Manager

12. Acceptance Report

Acceptance-/Commissioning Report
for TWISTO/L-B in a Heating System FT and/or PSB (Type 27-56L*)

Customer

Company

Street, Zip code, City

Contact (Tel., E-mail)

Project

Type of inspection

- ☐ Acceptance test of the heating system
- ☐ Commissioning
- ☐ Maintenance and Recommissioning

Application

- ☐ Anti-freeze and Temperature Maintenance on the pipe
- ☐ Gutter/Roof surface trace heating
- ☐ Oil pipe/Oil tank heating (interior)

Visual inspection carried out (according to BARTEC installation instructions)

	Type	Date	Signature
☐ Heating cable			
☐ Connection systems			
☐ Control systems			

Function check carried out (according to BARTEC installation instructions)

	Date	Signature

Connect the heating cable to the power supply (a temporary connection to the construction site power supply is also possible). The earth circuit breaker and RCD must not trip. Each heating cable end has to be lukewarm after 5 to 10 minutes).

Isolation Resistance Measurement carried out (according to BARTEC installation instructions)

	Date	Signature

Use an Insulation resistance meter with a test voltage of min. 500 V DC and max. 2000 V DC. Insulation resistance should be min. min. 50 MΩ for each heating circuit, regardless of the length of the heating cable.
Conducting the measurement between the bus wires and the grounding braid or foil with running strands, depending on the type of material used. Additional measurement between the grounding braid or foil with running strands and the grounded pipe or gutter.

General information

Heating circuit No.	1	2	3	4	5
Heating circuit length (m)					
Visual inspection applied	☐	☐	☐	☐	☐
Functional inspection applied	☐	☐	☐	☐	☐
Isolation Resistance	> 50 MΩ	> 50 MΩ	> 50 MΩ	> 50 MΩ	> 50 MΩ

Note: Visual and functional inspection before mounting the pipe insulation (applying by third party)!

All warranty claims are subject to the submission of a correctly and completely filled-in acceptance report. Make sure to add date and signature.

Requirements checked:	Company, signature test engineer	Company, signature customer
Date, City:		

BARTEC

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