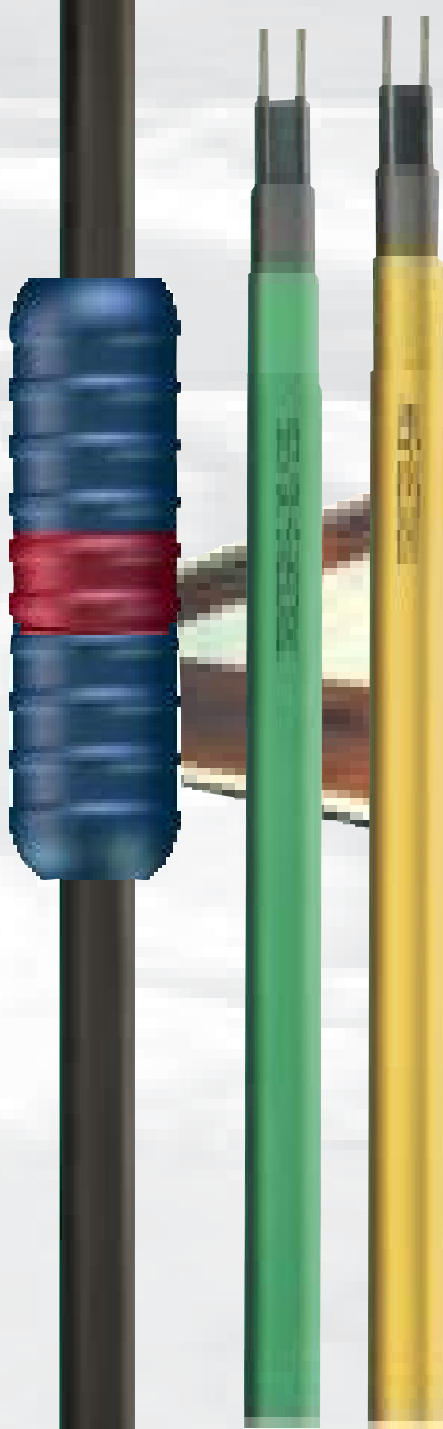


Brand new!

TWISTO connection system

Double-insulated heating tapes



TRICER-S/ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost

VDE



All data and pictures in this list represent our current technological level and are correct and reliable to the best of our knowledge, do, however, not represent a binding feature warranty. Such a warranty is effected exclusively with the BARTEC norms.

Changes, faults and printing errors do not justify and claim for damages.

Any liability is subject to the general terms and conditions of the BARTEC GmbH.

It is the user's own responsibility to decide upon the suitability and employment of the products.

This list is supplemented by our documentations for the TRICER-S, ICEFREE-S and AQUA-S systems as well as by the "Installation and Operation" manual, the installation instructions and the TWISTO installation instructions.

Subject to technical changes without further notice.

Brochure TRICER-S/ICEFREE-S

Ausgabe 9/2000

TRICER-S/ICEFREE-S

S e l f - l i m i t i n g a n d
double-insulated heating tapes for
p r o t e c t i o n a g a i n s t f r o s t

NEW

NEW

Contents

Electric anti-freeze heating systems

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TRICER-S/ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost

Frost protection today

The safe and modern solution:

The electric frost protection heating system

The heat output from a BARTEC heating tape helps to keep pipes and surfaces at a preset temperature preventing freezing. Different heat losses at the pipe are compensated for.

The heating tape is easy and safe to install. It is laid alongside the piping/gutter and fastened directly to it and is cut to the correct length during the installation procedure. The TRICER-S/ICEFREE-S systems work under a normal 230 V voltage supply...

... and frost damages are an old snowman's hat!

**Easy
Safe
Economic**

Frost and frost damage

Every year frost and cold weather cause substantial damages to buildings and parts of their plants:

- frozen and burst pipes
- clogged-up sewage pipes
- iced-up gutters
- burst drainpipes

These lead to high financial burdens and are a nuisance for user and operator of a plant.

In the case of water damage caused by burst pipes or gutters we may well talk about sums of five figures or more - not to mention the lasting effects on the building itself due to humidity and fungi attacks..

The break down of a heating system is not only a nuisance but also brings along the risk of freezing the heating pipework. The extent of the damage is usually recognised too late and the repair works then extremely expensive.

Conventional frost protection

Up to now we have many different methods to prevent our plants from freezing:

- frost-proof project planning and construction,
if technically feasible.
- Draining and emptying the pipework,
if not needed during the wintertime, for example water pipes in the garden.
- Thick thermal insulation
even during long periods of sub-zero temperatures, the thickest thermal insulation is in sufficient to prevent non-flowing media from freezing.
- Permanent flow
... in theory.

How the heating tape works

BARTEC's TRICER-S and ICEFREE-S heating tapes are self-limiting heating tapes with a positive temperature coefficient. This means:

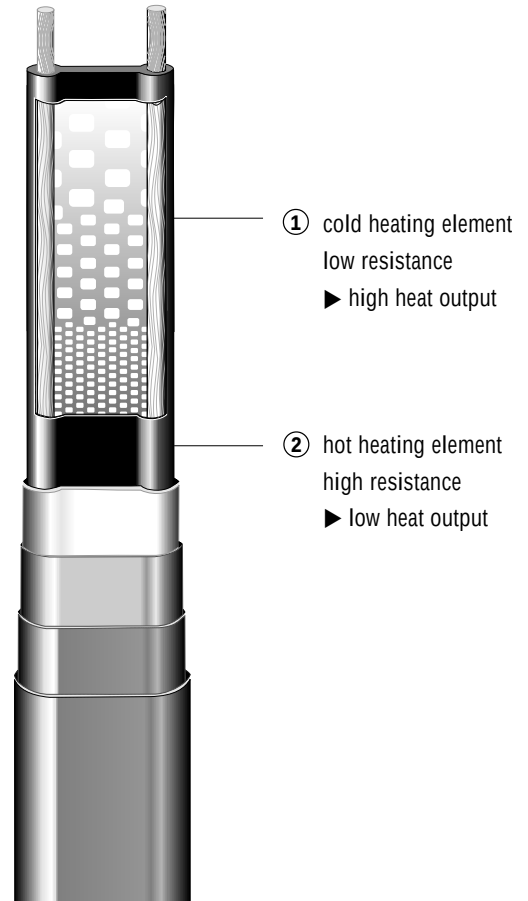
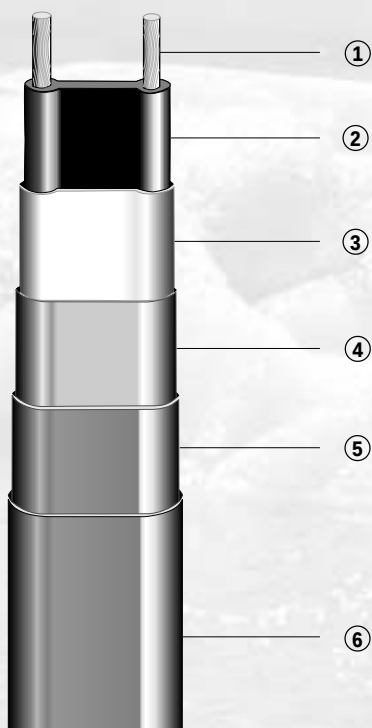
① At low temperatures (cold heating element) the conductive carbon molecules contract microscopically creating many electrical circuits, thus generating a high heat output. This reaction takes place along the entire length of the heating tape relative to the ambient temperatures, dissipating heat at the respective points along the pipe.

As the ambient temperature falls - the heat output increases.

② As temperature increases (hot heating element) the electrical current paths created by the carbon molecules are interrupted. The interruption of the electrical current paths increases the resistance of the conductive carbon paths thus reducing the heat output of the heating tape.

As the ambient temperature rises - the heat output decreases.

This special advantage substantially contributes to the high efficiency of BARTEC's self-limiting heating tapes. Safety is guaranteed since there is no danger of excessive heating.



Structure of the heating tape

Tape configuration

- current-carrying conductor of tinned copper 1,2 mm² ①
- self-limiting, irradiated synthetic heating element ②
- bonded jacket insulation ③
- insulating material of polyolefin ④
- protective sheaths of *polyolefin/fluoropolymer ⑤ ⑥

Bonded Jacket

The Bonded Jacket ③ is a unique feature of BARTEC's heating tapes. This insulation is fused to the heating element ② thus guaranteeing a perfect protection against the ingress of moisture.

Double-insulation

Two outer *polyolefin/fluoropolymer sheaths ⑤ ⑥ protect the heating tape against mechanical strain.

*Outer sheath of fluoropolymer is only applicable to tape versions TRICER-S-H and TRICER-S-OIL/26

TRICER-S/ICEFREE-S

Self-limiting and double-insulated heating tapes for protection against frost

System descriptions

The TRICER-S system

Frost protection and temperature maintenance for pipes

Cold water pipes are subject to different heat losses according to the prevailing ambient temperatures.

The amount of heat loss depends on the following parameters:

- nominal diameter of the pipe
- thickness and quality of the thermal insulation
- ambient temperature

In order to prevent cold water pipes from freezing BARTEC can offer you two different heating tapes, each with its very own individual characteristics:

TRICER-S-10 for pipes with low heat losses

TRICER-S-26 for pipes with high heat losses

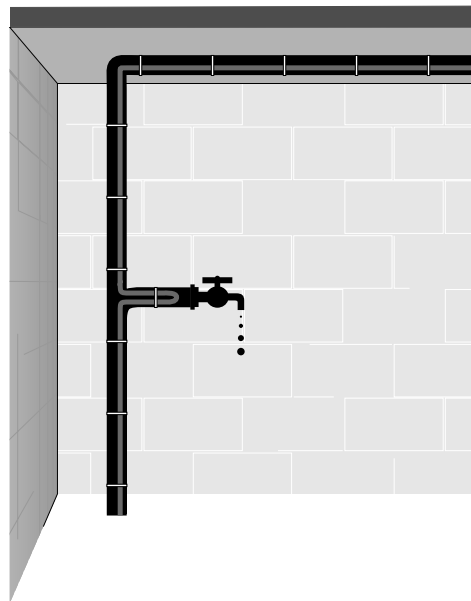


In many underground car parks, electric trace heating systems take care of comfort and safety

When to use trace heating

Temperature maintenance of fat and waste drain pipes in canteens and large kitchens

Frost protection for cold water pipes, fire sprinkler systems, hose reel and water extinguishing systems, chilled water pipes, circulation pipes, heating pipes in underground car parks, basement, multi-storey car parks, loading bays, un-heated attics, loft spaces, stables.



In low ambient temperatures, pipes transporting greasy waste water from drain to grease valve are prone to grease deposits accumulating on their inner walls which may very well clog up the whole route.

Our highly efficient electric trace heating tape installed under the thermal insulation prevents such blockages.

TRICER-S-H safely maintains the pipe at the required temperature level, usually between + 40° C and + 50° C thus eliminating any internal deposits of grease.

The self-limiting **TRICER-S-H** heating tape is highly efficient and temperature-resistant up to 100° C and therefore can also be used for the frost protection on heating pipes with inlet temperatures of more than 70° C.

The ICEFREE-S system

Frost protection and temperature maintenance for gutters, roof surfaces and drainpipes

Snowfall and long-lasting cold periods easily ice up gutters, roof surfaces and drainpipes susceptible to frost. Sunny intervals then cause melt water which eventually freezes again.

This may cause the gutters and drainpipes to fill up with ice. The consequences more often than not are bent or broken gutters and frozen or burst drainpipes.

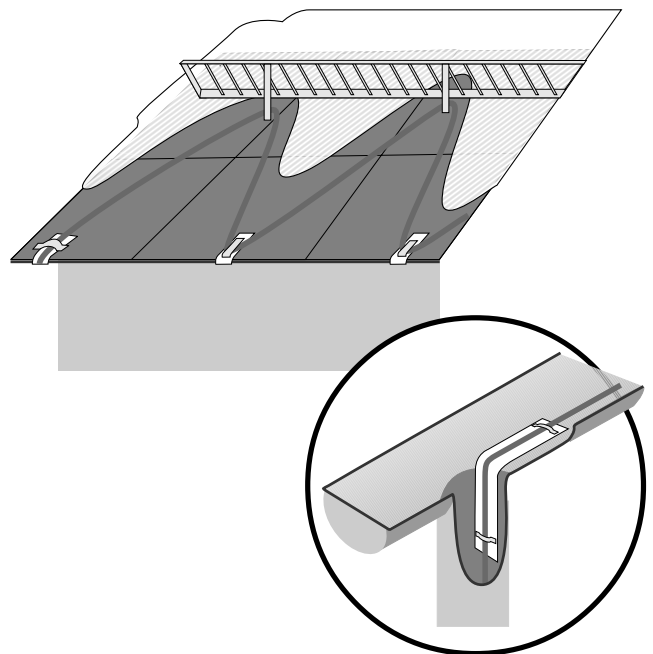
The melt water in turn damages the face and the interior of the buildings. In addition, falling icicles create a potential risk of injury for pedestrians.

An electric trace heating system with self-limiting heating tapes together with its high efficient and economical features ensure perfect protection against frost and offer a viable solution to the problem.



When to use trace heating

Frost protection for public buildings for gutters, roof surfaces, drainpipes, shed gutters, flat roof tops, north side roof draining.



System structure

The TRICER-S/ICEFREE-S system consists of six different components:

TRICER-S/ICEFREE-S heating tape

TWISTO connection system

Installation accessories

Automatic control equipment

Control cabinets

CONTECH project planning software

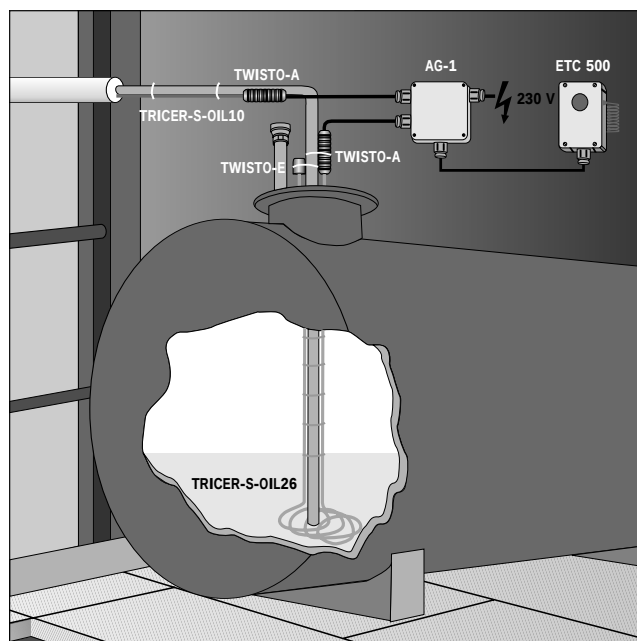
Self-limiting and
double-insulated heating tapes for
protection against frost

The TRICER-S-OIL 26 system

During the winter, the heating oil in tanks standing outside or in unheated rooms can cool down so much as to release paraffin. This may happen already at a temperature of around +5° C.

In order to prevent such "oil flakes", BARTEC has developed a simple and, at the same time, low cost solution. The oil tank's suction side is heated by means of a self-limiting heating tape. This is done by leading the TRICER-S-OIL26 heating tape in and out of the tank lid via a heavy-gauge conduit gland.

The internal tank heating system is supplied as an assembly kit and, depending on the individual tank size, consists of heating tape, connection system, gland set, cable tail, terminal box and installation instructions.



Unique and compact connection system for the configuration of heating circuits with self-limiting, double-insulated heating tapes.

In order to increase the reliability and economic features of the heating system, a temperature controller should be provided. When the temperature falls below the cut-in temperature, e.g. + 5° C, the temperature controller or thermostat automatically switches on the trace heating system.

If you use our BARTEC ETC 500 ambient temperature controllers, the assembly kits can be switched directly via the controller for tanks up to 40 000 litres.

For tank sizes greater than 60 000 litres, a corresponding power contactor must be provided for the increased electrical load.

- Economical and safe thanks to the self-limiting feature
- Mechanically robust thanks to the two protective coatings (total insulation)
- Bonded Jacket - Insulation against ingress of moisture.
- Certified quality
 - VDE certificate and international approval
 - TRICER-S-OIL26 has been **TÜV-verified**

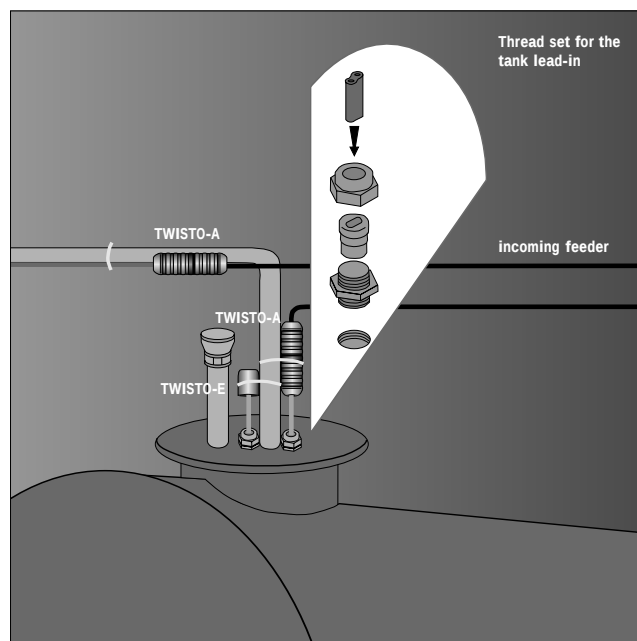
The TRICER-S-OIL10 system Heating of oil pipes

Standstill periods at low temperatures (such as off-peak temperature decay) very easily affect the oil viscosity in case of single-phase systems. This may cause the overall breakdown of the heating system and, consequently, high repair costs.

BARTEC has developed a simple and safe solution: the heating of the oil pipes.

The BARTEC's self-limiting TRICER-S-OIL10 heating tape is laid along the oil pipes, and fastened either with adhesive tape or cable ties.

Prerequisite is a corresponding insulation of the oil pipe:
Insulation thickness = nominal width of the pipe (100%)



Installation

TRICER-S-OIL10

The heating tape is laid along the pipe underneath the insulation and fastened with adhesive tape or cable ties.

Where pipes are buried underground, the pipe must be traced with the heating tape, then insulated with thermal insulation and finally clad with a protective covering such as sheet metal or other conduit before laying in the ground. More information can be found in our "Installation and Operation" manual.

TRICER-S-OIL26

The TRICER-S-OIL26 type of heating tape is fitted to the oil tanks suction outlet.

The heating tape is fed in through the tank lid by means of two / four heavy-gauge conduit glands (gland set).

Heating tape connection and end termination are located above the tank lid.

TRICER-S/ICEFREE-S

Self-limiting and double-insulated heating tapes for protection against frost

System components

NEW

for the TRICER-S and ICEFREE-S systems

TRICER-S and ICEFREE-S heating tapes

BARTEC's new TRICER-S and ICEFREE-S heating tapes are **double-insulated and self-limiting**. The self-limiting feature compensates for any heat losses as needed. An efficient and economic operation of the system is guaranteed.

The radial network of the polymer heating element promises safety even at high temperatures. Its double-insulation offers a perfect mechanical protection.

The coloured outer jacket identifies the type of heating tape and allows its quick and easy installation.

TRICER-S-OIL

These heating tapes are equipped with a robust and oil-resistant outer jacket that ideally protect the heating tapes even in the event of a pipe leak at the oil tubing.

The TRICER-S-OIL 26 type of heating tape is TÜV-approved and certified. The self-limiting feature of the heating tape assures that its surface temperature is kept below the flash point of the oil (+ 55 °C), with or without a temperature controller or thermostat.

A word on double-insulation

Most of the domestic appliances we use daily are double-insulated. Machine tools, electric drills, hairdryers, electric shavers, lamps and other appliances meet these high safety requirements. As an equivalent to the braided versions, the VDE 0254 regulation allows the use of a double-insulation as protective measures against electric shocks. BARTEC's S-series heating tapes meet all of these requirements. They are equipped with two outer jackets. That is why they guarantee an ideal protection against mechanical stress – **a safety plus benefit**.

The BARTEC double-insulated heating tapes hold the VDE mark of conformity.

The new generation of heating tapes

Double-insulated heating tapes

Type of heating tape	Application
TRICER-S-10	frost protection on pipes with low heat losses
TRICER-S-26	frost protection and temperature maintenance on pipes with high heat losses
TRICER-S-H	frost protection on heating pipes and temperature maintenance on pipes with grease and fatty effluents
ICEFREE-S	frost protection in gutters, drainpipes and on roof surfaces
TRICER-S-OIL10	frost protection and temperature maintenance on oil pipes
TRICER-S-OIL26	frost protection and temperature maintenance in oil tanks

Selection table

Type of heating tape	Nominal power	Colour outer sheath	Material outer sheath	UV-resistant	Max. ambient temperature	
					ON (cont.)	OFF (1000 hours cumul.)
TRICER-S-10	10 W/m at + 5 °C	green	polyolefin	no	+ 65 °C	+ 85 °C
TRICER-S-26	26 W/m at + 5 °C	green	polyolefin	no	+ 65 °C	+ 85 °C
TRICER-S-H	33 W/m at + 5 °C	yellow	fluoropolymer	yes	+ 80 °C	+ 100 °C
ICEFREE-S	18 W/m at 0 °C air 36 W/m in ice water	black	polyolefin	yes	+ 65 °C	+ 85 °C
TRICER-S-OIL10	10 W/m at + 5 °C	grey	fluoropolymer	yes	+ 65 °C	+ 85 °C
TRICER-S-OIL26	26 W/m at + 5 °C	grey	fluoropolymer	yes	+ 65 °C	+ 85 °C

- **Double-insulated**
thus safe and reliable
- **Maintenance-free**
- **Economic**
thanks to temperature-dependent power output
- **Low operating costs**
thanks to precise controlling
- **No overheating**
thanks to self-limitation
- **Quick and easy installation**
thanks to TWISTO connection system
- **Coordinated system solutions**
- **Certified quality**

Technical data

Nominal voltage	AC 230 V
Minimum bend radius	25 mm
Minimum installation temperature	- 30 °C
Dimensions	11,5 x 5,5 mm
Certificates/Approvals	VDE, SEV / SVGW, ÖVE
Verifications	CE, TÜV

Ordering information

Type of heating tape	Order No.
TRICER-S-10	40582108
TRICER-S-26	40582268
TRICER-S-H	40582338
ICEFREE-S	40582188
TRICER-S-OIL10	40582105
TRICER-S-OIL26	40582265

TRICER-S/ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost

TWISTO connection system

Now you can prepare BARTEC's self-limiting and double-insulated heating tapes in an even simpler and quicker way.

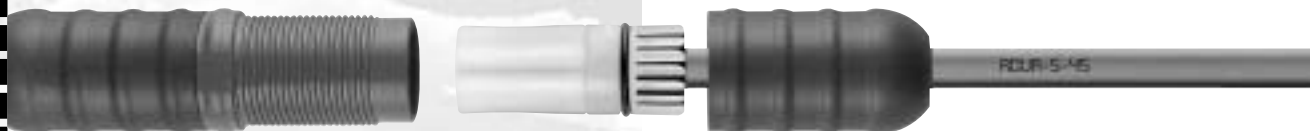
In no time at all with **TWISTO – the new connection system**.

All you have to do is cut off the heating tape with a diagonal wire cutter and feed it into the clamping sleeve. Then connect the heating tapes by simply rotating the sleeve caps until they meet with no visible gaps.

TWISTO allows quick and economic connections and terminations with branch-offs in one, two or three directions, including power supply connection cables when required.

TWISTO the new connection system for double-insulated heating tapes

Easy preparation and short installation times



1. cut off heating tape ensuring a straight cut
2. insert heating tape through sleeve caps into clamping sleeve
3. rotate sleeve caps until they meet

It takes less than 1 minute to establish the connection, less than 15 seconds to prepare the termination!

Advantages

- **Reduction of installation costs**
thanks to its easy and fast handling
- **Increased installation safety**
no removal of the outer sheath, no heat-shrinking, no accurate measuring
- **Safe electrical connections**
thanks to the precise clamping technology

Technical data

Rated voltage	AC 250 V
Nominal current	16 A
Exposure temperature	continuous: max. + 80 °C short-term: max. + 100 °C (1000 h cumulative) minimum: - 25 °C
Housing material	polyamide, resistant to uv-rays
Ingress protection	IP 68
Approvals	VDE No. 12 00 83 SEV / SVGW / ÖVE / CE

TWISTO connection system

TWISTO-S

Order no. 61401100



TWISTO-S heating tape connection and end termination

heating tape connection and end termination as a set

length: 1.5 m diameter: 2 x 1.5 mm²

TWISTO-C

Order no. 61402000

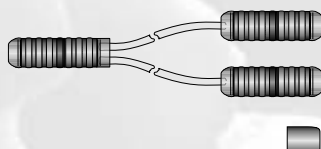


TWISTO-C heating tape splice connection

for joining heating tape to heating tape.

TWISTO-T

Order no. 61403100

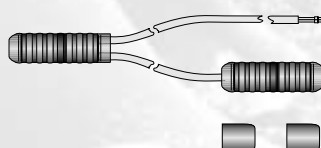


TWISTO-T heating tape connection

T-junction in three directions, with 1x heating tape end termination.

TWISTO-TE2

Order no. 61402200



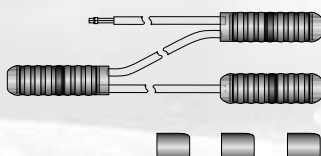
TWISTO-TE2 heating tape connection

T-junction in two directions, with centre fed power connection cable and 2 x heating tape end terminations.

length: 1.5 m diameter: 2 x 1.5 mm²

TWISTO-TE3

Order no. 61403300



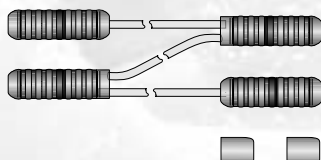
TWISTO-TE3 heating tape connection

T-junction in three directions, with centre fed power connection cable and 3 x heating tape end terminations.

length: 1.5 m diameter: 2 x 1.5 mm²

TWISTO-X

Order no. 61404200



TWISTO-X heating tape connection

X-junction in four directions, with 2 x heating tape end terminations.

length: 1.5 m diameter: 2 x 1.5 mm²

TWISTO-A

Order no. 61401000



TWISTO-A heating tape connection

with pre-wired 2 x 1,5 mm² power cable.

length: 1.5 m

TWISTO-E

Order no. 61400100



TWISTO-E heating tape end termination

TRICER-S/ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost

Installation accessories TRICER-S

AG-1 Order no. 61410002

AK-1 Order no. 61304001

AK-2 Order no. 61304002

PK-1 Order no. 61400010

GWB-1 Order no. 61400009

KBI-1 Order no. 61400012

Installation accessories

BARTEC can also provide you with all the necessary accessories. Adhesive tapes, cable ties, fixing straps, identification labels, enclosures, junction boxes and support brackets supplement out trace heating programme.

Junction box AG-1

of thermoplastic

Dimensions 93 x 93 x 55 mm

Type of protection IP 65 with 5 through terminals, 4 mm²

Aluminium tape AK-1

for the heating tape installation on plastic pipes

Roll 50 m long, 50 mm wide

Aluminium tape AK-2

for the heating tape installation on plastic pipes

Roll 100 m long, 50 mm wide

Polyester tape PK-1

for the heating tape installation on metal pipes

Roll 50 m long, 50 mm wide

Glass fibre textile tape GWB-1

for the heating tape installation on metal pipes

Roll 50 m long, 12 mm wide

Cable ties KBI-1

for securing the heating tape and support brackets to the pipework

360 mm long, 7,5 mm wide, VPE: 100 per pack

IDF-1 Order no. 61400007

IDF-2 Order no. 61400008

KZS Order no. 61304000



Installation accessories ICEFREE-S

KBI Order no. 61400011

ASH Order no. 61400000

KAS Order no. 61400013

Insulation entry kit IDF-1

to protect and seal the heating tape where it passes through the thermal insulation sheet metal cladding

Insulation entry kit IDF-2

to protect and seal the connection cable where it passes through the thermal insulation sheet metal cladding

Over insulation caution label KZS

pre-printed "Electrically heated"
to be attached to the thermal insulation every 5 m.

Cable ties KBI

resistant to ultra-violet rays, for securing the heating tape to the high quality steel ASH spacer bar
20 per pack

Spacer bar ASH

- for equal spacing of two heating tapes when laid in the gutter
 - to protect the heating tape from sharp edges and burrs
- Material: high-quality steel, dimensions: 260 x 25 x 1,5 mm

Edge protector kit KAS

consisting of:
5 ASH spacer bars
10 KBI cable ties

TRICER-S/ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost

Frost detector

ETC 500 Order no. 10140011



Automatic control equipment

**The TRICER-S system
temperature controller as an ambient
thermostat**

**ETC 500 frost detector
with external ambient sensor**

as ambient thermostat for smaller plants

Technical data

Nominal voltage	AC 230 V 50 Hz
Switching capacity	16 A
Temperature range	0 °C to + 40 °C
Switching differential	approx. 1,5 K
Dimensions	112 x 145 x 68 mm
Ingress protection	IP 54
Certification	CE



ETC 220 Order no. 10111002

Controller with pipe mounting sensor

ETC 220 electronic temperature controller with remote sensor

Electronic temperature controller with remote sensor for wall mounting and sub-distribution boards.

Technical data

Nominal voltage	AC 230 V
Switching capacity	max. 16 A
Temperature range	0 °C to 60 °C
Display	LED's for heating system, sensor breakage
Sensor length	4 m*
Outputs	Volt-free change-over contacts
Switching differential	approx. 1.5 k
Ingress protection	IP 65
Certification	CE

*May be extended up to 50 m using 2 x 1.5 mm² cable in a protective conduit or using an armoured cable. A screened cable must be used if installed in metal conduits or in close proximity to power cables.



ETC 440 Order no. 10140005

ETC 443 Order no. 10140008

ETC 440/443 electronic thermostat for DIN rail mounting

This electronic thermostat for rail mounting is designed for the room temperature control with room and floor sensor, for the employments as differential thermostat in gutter heating systems, for smaller surface heating systems etc.

Technical data

Voltage	AC 230 V
Contact	changeover NO/NC
Load carrying capacity	10 A
Inductive load	approx. 3 A
Ambient temperature	- 10 °C to + 50 °C
Type of protection	IP 20
Certifications	CE
Display	LED
Sensor type	NTC 2 kΩ/+ 25 °C

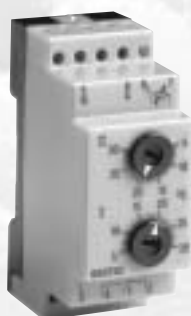
TRICER-S/ICEFREE-S

Self-limiting and double-insulated heating tapes for protection against frost



ETC 520 Order no. 10140012

Frost detector for gutters



ETC 400 Order no. 10140004

Automatic control equipment

The ICEFREE-S system

Frost detector ETC 520 for gutters

For installations less than 30 m we recommend our frost detector for gutters. This two-position controller switches on the trace heating only when the ambient temperature reaches a certain limit where snow and ice may form.

Example: Setting NC contact +5 °C, setting NO contact -5 °C

Technical data

Nominal voltage	AC 230 V
Switching capacity	max. 16 A
Temperature range	-15 °C to +15 °C
Contacts	1 NC contact, 1 NO contact
Switching differential	approx. 1 - 3 K
Adjustment	internally, after removal of front cover
Ingress protection	IP 65
Switch type	bi-metallic strip
Housing dimensions	122 x 120 x 55

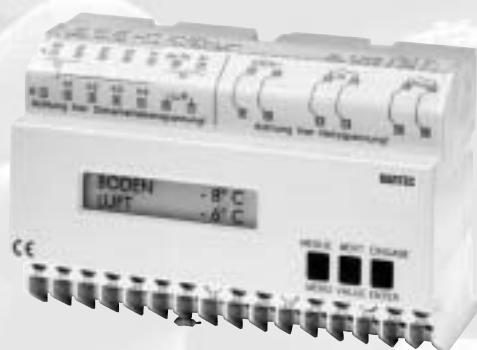
Electronic temperature controller ETC 400

This electronic temperature controller, suitable for rail mounting, is designed as a differential thermostat for gutter heating systems or smaller surface heating systems etc.

Technical data

Nominal voltage	AC 230 V
Switching capacity	10 A
Temperature range, 1 and 2	- 10 °C to + 30 °C
Outputs	Volt-free change-over contacts
Switching differential	0.5 K
Ingress protection	IP 20
Sensor type	NTC
Certification	CE

Ice detector



EME 900 Order no. 10140003

EME 900 Ice detector

For large installations we recommend the use of the electronic ice detector EME. The unit not only monitors the humidity of the air but also the ambient temperature. If the temperature falls and the humidity rises above a pre-set value simultaneously, the trace heating is switched on. If any one of the two values is not exceeded, the gutter heating remains turned off. The humidity sensor is heated in order to thaw any ice or snow.

Compared to thermostatically controlled installations, using our system can save you as much as 80% of energy!

Technical data of the control unit

Nominal voltage	AC 230 V
Switching capacity	max. 10 A
Outputs	1 NO contact
Temperature settings	0 °C to 5 °C
Humidity settings	1 to 6 (1 = sensitive, 6 = non-sensitive)
LEDs for	heat ON, operation, temperature, humidity
Ingress protection	IP 40
Housing dimensions	105 x 63 x 73

Technical data of the sensors

Operating voltage	ice and snow sensor	DC 8 V
	temperature sensor	-
Power consumption	ice and snow sensor	approx. 3 W
	temperature sensor	-
Connection cable	ice and snow sensor	5 x 0,25 mm ² , length 4 m
	temperature sensor	2 x 0,5 mm ² , length 4 m



TRICER-S/ICEFREE-S

Self-limiting and double-insulated heating tapes for protection against frost



Control cabinets for frost protection heating systems

To protect against frost and conserve energy we recommend that a thermostat controls the trace heating system. For more complex installations and more than 3 heating circuits we recommend a control cabinet.

BARTEC's control cabinets make things easier and safer:

Ready to use

to match the BARTEC heating tape system

Fully equipped

with all the necessary circuit breakers, contactors, switches etc.

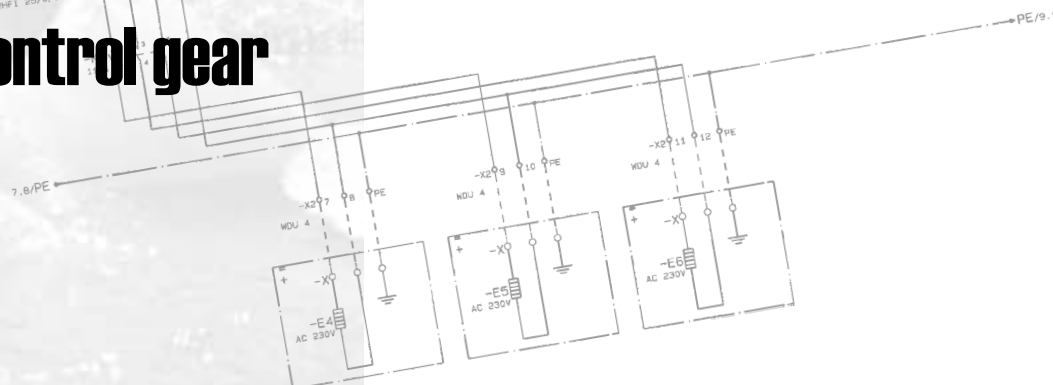
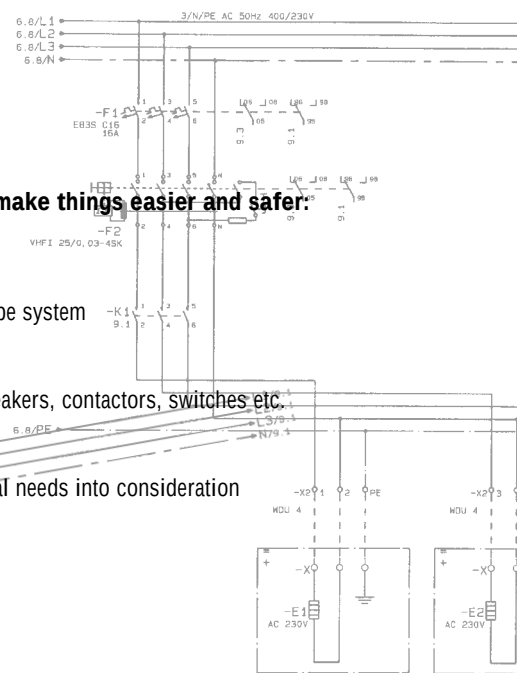
Flexible in its design

we take our customer's individual needs into consideration

Pre-wired and tested

for immediate connection

Safety switchgear and control gear



Selection tables for control cabinets

TRICER-S control cabinets

Name

BSS-03-TR	for 3 heating circuits
BSS-04-TR	for 4 heating circuits
BSS-05-TR	for 5 heating circuits
BSS-06-TR	for 6 heating circuits
BSS-07-TR	for 7 heating circuits
BSS-08-TR	for 8 heating circuits
BSS-09-TR	for 9 heating circuits
BSS-10-TR	for 10 heating circuits
BSS-11-TR	for 11 heating circuits
BSS-12-TR	for 12 heating circuits

Each control cabinet allows the connection of 1 electronic ETC 440 thermostat for 3 heating circuits.

The temperature controllers are not included with the control cabinets. These are to be ordered separately.

ICEFREE-S control cabinets

Name of control cabinets

BSS-03-IC	for 3 heating circuits
BSS-04-IC	for 4 heating circuits
BSS-05-IC	for 5 heating circuits
BSS-06-IC	for 6 heating circuits
BSS-07-IC	for 7 heating circuits
BSS-08-IC	for 8 heating circuits
BSS-09-IC	for 9 heating circuits
BSS-10-IC	for 10 heating circuits
BSS-11-IC	for 11 heating circuits
BSS-12-IC	for 12 heating circuits

All ICEFREE-S control cabinets comprise 1 pre-wired EME 900 ice detector, already mounted and ready to be connected.

Technical data

Housing sheet-steel wall cabinet

Colour RAL grey

Ingress protection IP 54 according to

EN 60 529, IEC publ. 529

Rated voltage 3-phase with AC 230/400 V,

50 Hz with N and PE

according to VDE 0660

Design

Equipment

- Main switch
- Key switch
- Automatic miniature circuit breakers
- Residual Current Device (RCD)
- Power contactors
- Contactor relays
- LEDs for "operation" and "fault"
- Input and output terminals
- common alarm volt-free change-over contacts

TRICER-S/ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost



CONTECH the ideal software

CONTECH

Project planning software

You can now reduce the planning effort for trace heating systems to a minimum thanks to the new CONTECH software.

CONTECH allows you to create designs, quotations and detailed specifications for work and services in a simple and economic way. Extensive help functions with illustrations simplify the job.

For a later review of your detailed design you can store and print your projects.

Help texts replace the user's guide – one more way to make things easier.

CONTECH offers you many advantages

- easy and secure planning
- creation of quotations, material lists and work/services specifications
- data storage and printouts
- help menu with product illustrations and technical data

CONTECH runs under **Windows** and can be utilised for:

AQUA-S	electric warm water trace heating
ICEFREE-S	electric gutter heating and ice prevention
TRICER-S	electric frost protection heating
TRICER-S-OIL	heating for oil pipes and tanks



Input window

Here you insert the individual project data for each heating tape system. Selection tables with preset values are available for technical information. Just one mouse click and the data is transferred to the input window. The software then uses the data inserted in the input window to automatically plan a project and to generate the corresponding list of materials. You can modify, delete or add parts without any problem.

Printout

CONTECH offers the possibility to store and print the calculations as well as the corresponding material list for each customer and project.

The printout indicates

the project data

the heating circuit data

the material list

with quantities, information and order numbers

unit and total prices

with or without discounts

You also have the possibility to create and print out **work/services specifications**.

Hardware requirements

Operating system WINDOWS 3.1 above
 SVGA card (800 x 600)
 2,1 MB hard disk capacity

Printer all standard printers

TRICER-S

Self-limiting and double-insulated heating tapes for protection against frost

For simple applications

Frost protection to cold water and heating pipes

Project planning

The TRICER-S system

Selection of the correct heating tape

A heat loss calculation must be carried out in order to choose the appropriate heating tape for your individual application.

Heating tape	insulation thickness	nominal pipe diameter							
TRICER-S-10	10	10	15	20					
	20	20	25	32	40	50			
	30	25	32	40	50	65	80		
	40	32	40	50	65	80	100		
	50	32	40	50	65	80	100	125	
TRICER-S-26	10	10	15	20	25	32	40	50	
	20	25	32	40	50	65	80	100	
	30	40	50	65	80	100	150	200	
	40	50	65	80	100	150	200	250	
	50	65	80	100	150	200	250	300	
TRICER-S-H	10	32	40	50	65	80	100		
	20	40	50	65	80	100	125	150	
	30	50	65	80	100	125	150	200	
	40	65	80	100	125	150	200	250	
	50	100	125	200	250	300	350		

The above table assumes the following conditions

Minimum ambient temperature - 15 °C Maintain temperature (anti-frost) + 5 °C K-value thermal insulation 0,035 W/mK

We would be happy to calculate your heat losses

All we need is the following accurate information:

- pipe diameter in mm
- K-value of the thermal insulation
- Thickness of the thermal insulation in mm
- Minimum ambient temperatures to be expected
- Desired maintain temperature

For more complex applications and higher maintain temperatures, for instance on fatty effluents and greasy waste water pipes, why not make use of our **CONTECH project planning software** for a quick and easy calculation of the heat losses.

TRICER-S-10 Order no. 40582108
TRICER-S-26 Order no. 40582268
TRICER-S-H Order no. 40582338

TRICER-S-10 for pipes with low heat losses
TRICER-S-26 for pipes with high heat losses
TRICER-S-H for fatty effluents and heating pipes

Determination of the necessary heating tape length

Total length of the pipe to be heated
+ number of heating tape terminations x 0.1 m
+ number of valves and fittings x 0.5 m
+ total length of short branch loops x 0.3 m
= basic total quantity of heating tape

Installation instructions

The heating tape is to be laid along the pipe and secured every 20 cm with adhesive tape. For flanges and pipe clamps/supports, add the necessary heating tape quantity to the basic total quantity.

You can find more detailed information in our "Installation and Operation" manual.

Electrical configuration

Maximum heating tape circuit lengths

Fuse/MCB rating	TRICER-S-10	TRICER-S-26	TRICER-S-H
With 10 A fuses	116 m	60 m	40 m
With 13 A fuses	150 m	78 m	52 m
With 16 A fuses	190 m	85 m	80 m

The maximum heating circuit lengths refer to a start-up temperature of + 5 °C and are designed for a miniature circuit breaker (MCB) with type C-characteristics.

Maximum supply cable lengths

Cable diameter and fuse/MCB rating	TRICER-S-10	TRICER-S-26	TRICER-S-H
Diameter 1,5 mm ² with 10 A fuse/MCB	65 m	50 m	170 m
Diameter 1,5 mm ² with 13 A fuse/MCB	50 m	38 m	130 m
Diameter 1,5 mm ² with 16 A fuse/MCB	40 m	30 m	85 m
Diameter 2,5 mm ² with 10 A fuse/MCB	110 m	85 m	284 m
Diameter 2,5 mm ² with 13 A fuse/MCB	85 m	65 m	115 m
Diameter 2,5 mm ² with 16 A fuse/MCB	65 m	50 m	142 m

Additional information

Refer also to our "Installation and Operation" manual. A double pole Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCD) with 30mA sensitivity is required to protect all heating circuits up to a maximum circuit length of 500m heating tape. A qualified electrician must carry out all connections to the mains voltage supply. All local, statutory regulations and by-laws must be observed and complied with, in particular VDE 0100, SEV NIN 1000-1; 1995. All heating circuits should be tested and recorded as part of the BARTEC system documentation and acceptance certificate.

TRICER-S

Self-limiting and double-insulated heating tapes for protection against frost

TWISTO - connection system

Short title	Description
TWISTO-S	Heating tape connection and end termination as a set
TWISTO-C	Heating tape splice connection
TWISTO-T	T-junction in three directions with 1 x heating tape end termination
TWISTO-TE2	T-junction in two directions with centre fed power connection cable and 2 x heating tape end terminations
TWISTO-TE3	T-junction in three directions with centre fed power connection cable and 3 x heating tape end termination
TWISTO-X	X-junction with 2 x heating tape end termination
TWISTO-A	Heating tape connection with pre-wired 2 x 1,5 mm ² power cable
TWISTO-E	Heating tape end termination

Support brackets may be used when the TWISTO connections are to be installed outside the thermal insulation.

TRICER-S installation accessories

AG-1 Order no. 61410002

KZS Order no. 61304000

AK-1 Order no. 61304001

AK-2 Order no. 61304002

GWB-1 Order no. 61400009

PK-1 Order no. 61400010

KBI-1 Order no. 61400012

IDF-1 Order no. 61400007

IDF-2 Order no. 61400008

Junction box AG-1

1 junction box should be used for each heating circuit.

Over insulation caution labels KZS

Indicates the presence of electric trace heating and must be attached to the thermal insulation every 5 m.

Adhesive tapes AK-1/2, GWB-1, PK-1, KBI-1

Secures heating tape by means of self-adhesive glass cloth textile or polyester tape, or nylon cable ties.

The quantity of self adhesive tape required can be determined by allowing for three turns around the outer diameter of the pipe for every 200 mm fixing point. When installed to non-metallic or plastic pipes, the whole length of the heating tape should be additionally secured by means of an aluminium adhesive tape in order to increase the heat transfer.

Insulation entry kits IDF-1 and IDF-2

To protect and seal the heating tape/connection cable where it passes through the thermal insulation sheet metal cladding.

Automatic control equipment

For safety reasons and to increase the economic features of the electric heating tapes we recommend the use of a corresponding temperature controller.

These controllers switch the trace heating on only when the temperature falls to a critical level.

Temperature controller for larger plants ETC 220, ETC 440 / 443

Temperature controller for smaller plants ETC 500

Each heating circuit should be controlled by its own temperature controller.

Control cabinets

BARTEC's standard control cabinets ensure safe and efficient operation of electric trace heating systems with 3 to 12 heating circuits.

All components required for the control process are completely pre-wired and tested for immediate connection and use.

The control cabinets for the ICEFREE-S system already include the EME ice detector.

Project planning software

For a quick and easy design, BARTEC has developed a new design and calculation software: **CONTECH**.

CONTECH runs under **Windows 95 and 3.11** and allows the user to design even complex trace heating systems quicker and easier.

The software can be used for

designing and planning

creating quotations

generating work/services specifications

of electric trace heating systems.

Specifications

All articles are available with specifications in the datanorm format 3.0 and 4.0.

The CONTECH planning software allows you to individually create and print out specifications for works and services.

ICEFREE-S

Self-limiting and
double-insulated heating tapes for
protection against frost

Project planning

The ICEFREE-S system

Determination of the heating tape length for gutters and drainpipes

Total length of gutter to be protected	
+ Total length of all drainpipes	
+ number of drainpipes	x 1 m
+ number of heating tape terminations	x 0,1 m
+ number of branches	x 0,5 m

= basic total quantity of ICEFREE-S heating tape

Determination of the heating tape length for roof surfaces

Standard loadings: approx. 200 W/m²

The required heat load necessary to keep roof surfaces free from snow and ice largely depends on the building structure, i.e. the type of roof construction.

We would be happy to calculate the heat load necessary for your rooftops and surfaces.

Project planning information

For cases where the gutter width is more than 120 mm you will need twice the length of heating tape per metre length of gutter. The same applies for projects of heights greater than 2000 m above sea level.

Installation instructions

The heating tape is laid out and secured in the gutter. Cable supports are unnecessary for drainpipe lengths of 30 m or less.

The heating tape is then secured in the gutter by means of metal spacers bars (ASH). The ASH metal spacer bar is also used for protection against mechanical damage, for example, at the transition from gutter to drainpipe or to lead the heating tape safely out of the gutter or onto the roof.

ICEFREE-S is **not** suitable for use on bitumen or tar related products such as roofing felt.

For more detailed information refer to our "Installation and Operation" manual.

Electrical configuration

Maximum heating tape circuit lengths

Fuse/MCB rating	ICEFREE-S
10 A	60 m
13 A	68 m
16 A	80 m

Maximum supply cable lengths

Cable diameter and fuse/MCB rating	ICEFREE-S
Diameter 1,5 mm ² with 10 A fuse/MCB	38 m
Diameter 1,5 mm ² with 13 A fuse/MCB	32 m
Diameter 1,5 mm ² with 16 A fuse/MCB	28 m
Diameter 2,5 mm ² with 10 A fuse/MCB	63 m
Diameter 2,5 mm ² with 13 A fuse/MCB	54 m
Diameter 2,5 mm ² with 16 A fuse/MCB	47 m

Additional information

Refer also to our "Installation and Operation" manual. A double pole Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCB) with 30mA sensitivity is required to protect all heating circuits up to a maximum circuit length of 500m heating tape. A qualified electrician must carry out all connections to the mains voltage supply. All local, statutory regulations and by-laws must be observed and complied with, in particular VDE 0100, SEV NIN 1000-1; 1995. All heating circuits should be tested and recorded as part of the BARTEC system documentation and acceptance certificate.

TWISTO connection system

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TWISTO-TE3	T-junction in three directions with centre fed power connection cable and 3 x heating tape end terminations
TWISTO-X	X-junction with 2 x heating tape end termination
TWISTO-A	Heating tape connection with pre-wired cable tail Length 1,5 m, diameter 2 x 1,5 mm ²
TWISTO-E	Heating tape end termination

ICEFREE-S

Self-limiting and double-insulated heating tapes for protection against frost

KBI Order no. 61400011

ASH Order no. 61400000

KAS Order no. 61400013



ICEFREE-S Installation accessories

Cable ties KBI

Cable tie, resistant to ultra-violet rays, for securing the heating tape to the high quality steel ASH spacer bar, 20 er pack.

Spacer bar ASH

Spacer bar for the equal spacing of two heating tapes when laid in the gutter and for protection against sharp edges and burrs.

Material: high-quality steel, dimensions: 260 x 25 x 1,5 mm

Edge protector kit KAS

Consisting of:

5 ASH spacer bars and 10 KBI cable ties

Automatic control equipment

For safety reasons and to increase the economic features of the electric heating tapes we recommend the use of a corresponding temperature controllers.

These controllers switch the trace heating on only when the temperature falls to a critical level.

Temperature controller for larger plants EME 900

Temperature controller for smaller plants ETC 520/ETC 400

Each heating circuit should be controlled by its own temperature controller.

Control cabinets

BARTEC's standard control cabinets ensure safe and efficient operation of electric trace heating systems with 3 to 12 heating circuits.

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of electric trace heating systems.

Specifications

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TRICER-S-OIL10

Self-limiting and double-insulated heating tapes for protection against frost

Heating tape



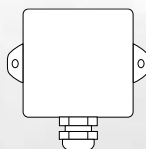
Connection system



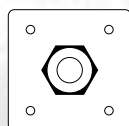
Glass fibre textile tape



Junction box



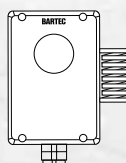
Insulation entry kit



Over insulation caution label



Automatic control equipment



Project planning

Typical working example:

A pipe, size Cu22 x 15 m long, containing fuel oil is to be maintained at a certain temperature. Aprerequisite is that the insulation thickness is the same as the pipe diameter.

Insulation type and thickness = 20 mm Armaflex
Nominal pipe diameter = Cu22
Insulation conductivity: 0,035 W/m K or better

Item	Determination of quantity
Heating tape. TRICER-S-OIL10	Length of pipe + 1 m for each heating tape connection and end termination Working example: 16 m
Connection system TWISTO-S	Corresponding to the number of heating circuits Working example: 1 piece
Glass fibre textile tape GWB-1 Alternative: KBI cable ties (20 per pack)	for Cu22 approx. 60 m pipe/roll Working example: 1 roll 4 m pipe = 1 unit Working example: 4 packs
Insulation entry kit IDF-2 for connection cable (only needed when metal cladding fitted to thermal insulation)	1 IDF-2 / heating tape connection Working example: 1 unit
Over insulation caution label KZS	1 KZS for every 5 m of pipe Working example: 3 units
Junction box AG-1	1 required for up to 2 heating circuits Working example: 1 unit
Control equipment Ambient thermostat ETC 500 Alternative: Electronic temperature controller with remote sensor ETC 440	Corresponds to the number of heating circuits Working example: 1 unit Corresponds to the number of heating circuits Working example: 1 unit



Automatic control equipment

For safety reasons and to increase the economic features of the electric heating tapes we recommend the use of a temperature controller.

For example:

- Frost detector as an ambient thermostat, type ETC 500
- Type ETC 220 electronic thermostat
- Electronic temperature controller with remote sensor, type ETC 220

Additional information:

In cases where there is simultaneous interior tank heating (TRICER-S-OIL26 system) the control of the system can be carried out by one overall thermostat.

In this case special attention must be made to the maximum switching capacity of 16A for the temperature controller.

Installation

The heating tape is laid along the pipe underneath the insulation and fastened with adhesive tape or cable ties.

Where pipes are buried underground, the pipe must first be traced with the heating tape, then insulated with thermal insulation and finally clad with a protective covering such as sheet metal or other conduit before laying in the ground. More information can be found in our "Installation and Operation" manual.

Electrical protection

Each trace heating circuit must be protected by means of an automatic circuit breaker (MCB) rated at 16A with type C-characteristics.

A double pole Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCB) with 30mA sensitivity is required to protect all heating circuits up to a maximum circuit length of 500 m heating tape. A qualified electrician must carry out all connections to the mains voltage supply. All local, statutory regulations and by-laws must be observed and complied with, in particular VDE 0100, SEV NIN 1000-1; 1995. All heating circuits should be tested and recorded as part of the BARTEC system documentation and acceptance certificate.

TRICER-S-OIL26

Self-limiting and double-insulated heating tapes for protection against frost

Project planning

Selection table

Tank contents up to ... litres	Power kW at + 10 °C	Assembly kit Type number
2 000	0,35	TIB 2-S
5 000	0,55	TIB 5-S
10 000	0,70	TIB 10-S
20 000	0,90	TIB 20-S
40 000	1,40	TIB 40-S
60 000 *	2,20	TIB 60-S
80 000 *	2,60	TIB 80-S
100 000 *	3,00	TIB100-S

* Tanks of 60000 litre capacity or greater require two heating circuits and twice the amount of accessories.

Assembly kit

Heating tape



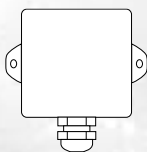
Connection system



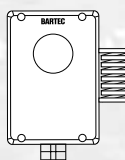
Gland set



Junction box



Control equipment



Assembly kit

Each assembly kit contains the following components for the corresponding tank size:

- Heating tape
- Connection system
- Gland set
- Cable tail
- Junction box
- Installation instructions

Control equipment

An appropriate temperature controller should be used in addition to the assembly kit. We recommend the ambient thermostat ETC 500.

Installation

The TRICER-S-OIL26 is fitted to the oil tank's suction side and led through the tank lid by means of two/four heavy-gauge conduit glands (gland set).

Heating tape connections and terminations are located above the tank lid.

Electrical protection

Each trace heating circuit must be protected by means of an automatic circuit breaker (MCB) rated at 16 A with type C-characteristics.

A double pole Residual Current Device (RCD) or Earth Leakage Circuit Breaker (ELCB) with 30 mA sensitivity is required to protect all heating circuits up to a maximum circuit length of 500 m heating tape. A qualified electrician must carry out all connections to the mains voltage supply. All local, statutory regulations and by-laws must be observed and complied with, in particular VDE 0100, SEV NIN 1000-1; 1995. All heating circuits should be tested and recorded as part of the BARTEC system documentation and acceptance certificate.

Warning:

Tanks of 60000 litre capacity or greater require two heating circuits!

BARTEC

VDE



CE

TÜV
SÜDDEUTSCHLAND