



Version: A

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ThermTrace Super (TTS) Installation instructions

The HTS ThermTrace Super (TTS) series are an industrial grade of self-limiting parallel circuit heating cables which can be used in applications such as freeze protection and process temperature maintenance up to 120 °C.

They are specially designed for use in potentially **explosive gas or combustible dust atmospheres**.

ATEX: Group II Category 2, EN 60079-0:2006, EN 62086-1:2005, EN 61241-0:2006, EN 61241-1:2004

IEC: Zone 1 or Zone 21, IEC 60079-0:2004, IEC 62086-1:2001, IEC 60079-30-1:2007, IEC 61241-0:2004, IEC 61241-1:2004.

Marking

Nominal operating voltage of 230 Vac: HTS D-65843 ThermTrace Super **xx** TTS-2-BOT **xx** W/m @ 10°C 230V / max 254V

0344  II 2GD Ex e II Ty Ex tD A21 T **zz** °C KEMA 08ATEX0160 U see  (lot no)

Production year

The year of production of the HTS ThermTrace Super (TTS) is recognizable in the Production-Lot-Number of the cable:

PTZD=2004, PTZE=2005, PTZF=2006, PTZG=2007, PTZH=2008, PTZI=2009, PTZJ=2010, PTZK=2011, PTZL=2012

Operating Conditions

Minimum installation temperature	-60 °C	Maximum withstand temperature	+120 °C, power "on"
Minimum start-up temperature	-60 °C		+190 °C, power "off"
Minimum bending radius	25 mm		

Electrical data

<u>60</u>	<u>TTS</u>	-	<u>2</u>	-	<u>BOT</u>
I	II		III		IV

Designation	Explanation	Value	Explanation
I	Power output rating at 10 °C, xx	10	10 W/m
		15	15 W/m
		20	20 W/m
		25	25 W/m
		30	30 W/m
		45	45 W/m
		60	60 W/m
II	Cable Series Designation	TTS	
III	Rated voltage	2	≤ 254 Vac
IV	Overjacket options	BOT	Fluoropolymer overjacket

**ThermTrace Super (TTS) Installation instructions****Temperature class and specified maximum surface temperature “T”****Product classification approach**

Rated voltage	Power output rating	T-class determined by Product classification approach, T_y	Specified maximum surface temperature “T” ¹ , zz
254 Vac	10, 15, 20, 25, 30, 45 W/m	T3	195 °C
	60 W/m	T2	200 °C

Notes:

¹: Established according to EN 62086-1 clause 5.1.11.3 and IEC 60079-30-1 clause 5.1.13.3, exposing the cable to fault conditions such as exceeding the maximum operating temperature, in power “on” condition, declared by the manufacturer.

Systems approach, design verification method

Rated voltage	Power output rating	Maximum exposure temperature	T-class, T_y	Specified maximum surface temperature “T” ¹ , zz
254 Vac	10 W/m	105 °C	T4	130 °C
	15 W/m	70 °C	T4	130 °C
	20 W/m	60 °C	T4	130 °C
	25 W/m	55 °C	T4	130 °C
	30 W/m	25 °C	T4	130 °C
	45 W/m	120 °C	T3	195 °C
	60 W/m	120 °C	T3	195 °C

Conditions for systems approach, design verification method

For insulated externally heated surfaces lower T-class systems may be obtained by ensuring that the heating cable shall not be exposed to temperatures exceeding those listed under maximum exposure temperature.

The T-class obtained through systems approach is based on the energy balance of heat loss and heat production of the system at a certain temperature. The maximum exposure temperature of the system including the resulting T-class and heating cable type shall be provided as a record of system documentation for each stabilized designed system. The parameters in the system documentation shall be checked during commissioning of the system.

The system documentation shall be kept by the owner of the system and be available at all times for as long as the system is in use.



ThermTrace Super (TTS) Installation instructions

Safety Instructions

The assembly of all heat trace connections must be completed carefully according to the manufacturer's installation manual supplied with the connection sets. Connections and terminations for installation with this trace heating cable shall be certified according to the requirements of the applicable standards for their types of protection for potential explosive gas and combustible dust atmospheres, as well as the requirements of EN 62086-1 and IEC 60079-30-1 as integral parts of this trace heating system.

For the connection of the HTS ThermTrace Super series trace heating cables to power certified glands, enclosures and terminals shall be used that are suitable for the application and are correctly installed. The cable glands shall be mounted in an enclosure in such a way that the ingress protection rating IP64 according to EN-IEC 60529 is ensured.

The minimum circuit protection requirements for trace heating systems for use in hazardous areas are as follows:

1. A means of isolating line conductors from the supply;
2. Over-current protection provided for each branch circuit;
3. A means of protecting against earth faults which depend on the type of system earthing (see IEC 60364-3 for definitions). The copper braid must be used as a ground wire, especially as the electrical resistance is less than 18.2 Ω/km .
4. For TT and TN systems: a residual-current protective device for each branch circuit having a rated residual operating current not greater than 300 mA. The device shall have a break time not exceeding 150 ms at five times the rated residual operating current. Values of 30 mA and 30 ms are preferred unless there is evidence that this will result in a marked increase in nuisance tripping.
5. For IT systems: an electrical monitoring device shall be installed to disconnect the supply whenever the electrical resistance is not greater than 50 Ω/V of rated voltage.

Installation regulations:

When installing on locations where explosive atmospheres may be present, regulations of IEC / EN 60079-14 are applicable.

Furthermore in most countries where the product is installed, national regulations may be applicable. Those regulations are mostly obligatory.

In Germany VDE 0100, VDE 0721 Part 1 and Part 2A3 must be observed. Thermal safety class 0 based on VDE 0721 Part 2A3, paragraph E10 is achieved through the construction character of the heating cable.

General rules on handling heating cables

Storage: The heating tapes must be stored in dry and clean places. The storage temperature should be between -55 °C and +65 °C. Keep ends of trace heaters dry before and during installation.

Handling: Avoid excessive pulling or bending of the tape when winding and unwinding during transport and assembly. To avoid damaging the insulation, exercise care if there are any sharp corners and edges, such as for example on flanges or holding devices.

Bending: Never bend the high edge of the tape and never exceed a bending radius of 25 mm.

Installation Instructions

Before installation:

- The surface of the pipe must be dry and clean.
- Check the voltage in the power supply. A deviation from the nominal operating voltage will change the heating power.
- The size of the protective equipment may not be larger than the heating tape specifications and must agree with the length of tape to be installed. Circuit breakers of type C in conformance with the EN 60898 standard are recommended.
- Only carry out the installation at temperature above the specified minimum installation temperature.

**ThermTrace Super (TTS) Installation instructions**

- Before installing any connection to the cable, check the electrical resistance between the bus wires and the braid. It must be at least 10 MΩ for a minimum supply voltage of 500 Vdc. The use of 2500 Vdc megaohmmeter is recommended.

De-energise all power circuits before installation or servicing.

Only use connection systems that protect the electrical connection and the cable ends against the penetration of water or moisture.

The metal sheath/braid of this trace heater must be connected to a suitable earthing terminal.

Do not splice the bus wires. This would result in a short circuit.

The presence of the trace heaters shall be made evident by the posting of caution signs or markings at appropriate locations and/or at frequent intervals along the circuit.

- This trace heating cable shall be installed by an electrician trained for installation of trace heating.
- Unwind the heating cable from the spool in a straight manner and cut to size. Do not exceed the maximum installation circuit lengths.
- Improper installation or the use of improper components must be avoided to prevent moisture migration which can lead to electrical arcing.
- Every defective cable or component must be replaced as soon as possible.
- All gaskets used for the heat trace connections must be replaced after every disassembly.

Maximum Circuit Length (m) based on Circuit Breaker Size (Equipment Protection Type C)

	Start-up Temp. (°C)	Operating Voltage ≤ 254 Vac		
		16 A	20 A	32 A
10TTS	+10	200	235	235
	-25	175	235	235
	-60	165	225	235
15TTS	+10	165	189	189
	-25	117	152	189
	-60	110	144	189
20TTS	+10	135	160	160
	-25	100	130	160
	-60	90	122	160
25TTS	+10	120	140	140
	-25	88	120	140
	-60	80	114	136
30TTS	+10	85	114	114
	-25	69	92	114
	-60	65	86	110
45TTS	+10	70	82	82
	-25	49	66	82
	-60	45	62	78
60TTS	+10	50	64	64
	-25	38	52	64
	-60	35	48	60



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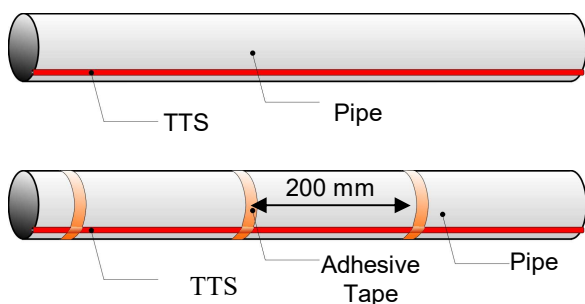
Typical Installation Methods

- As applicable, the heating cable may be wound as a spiral around the heated object or longitudinal to the object. Where possible, to ensure a better heat conduction the heating cable shall be applied longitudinal to the pipe and attached along its flat side.
- The heating cable must be attached to the pipe at max. every 200 mm with temperature resistant adhesive tape.

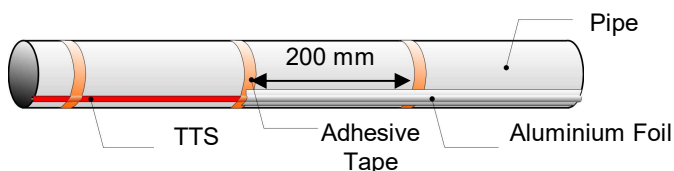
!! Never use adhesive tapes that contain plasticizers or made of PVC. Never use cable ties made of metal or nylon !!

- The thermal conductivity of plastic pipes is much lower than the conductivity of metallic pipes. Therefore it is recommended to put aluminium foil under and over the heating cable to enhance heat distribution and prevent local heat accumulation. Simultaneously the lowered heat transfer due to the lower thermal conductivity of the plastic pipe and the lower heat output of the cable is partially compensated. Check that the installed cables are located where heat is required.

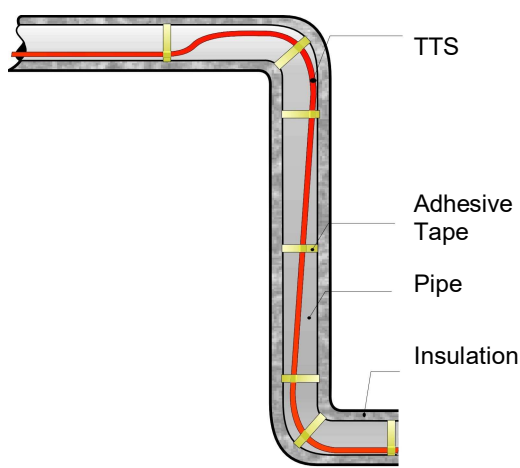
• On a Pipe



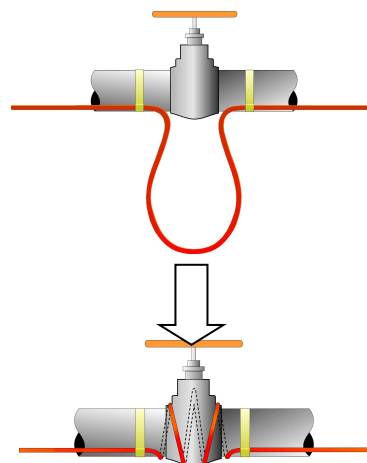
• On a Plastic Pipe only



• On an Elbow



• On a Valve



• On a Flange

