



Heat Tracing Course



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PRODUCT SPECIFICATIONS

BSX™ SELF-REGULATING HEATING CABLE

APPLICATION

BSX self-regulating heating cables are designed to provide freeze protection or process temperature maintenance to metallic and nonmetallic piping, tanks and equipment.

The heat output of BSX cable varies in response to the surrounding conditions along the entire length of a circuit. Whenever the heat loss of the insulated pipe, tank or equipment increases (as ambient temperature drops), the heat output of the cable increases. Conversely, when the heat loss decreases (as the ambient temperature rises or product flows), the cable reacts by reducing its heat output. This self-regulating feature allows BSX to be overlapped without temperature upset damage to the cable.

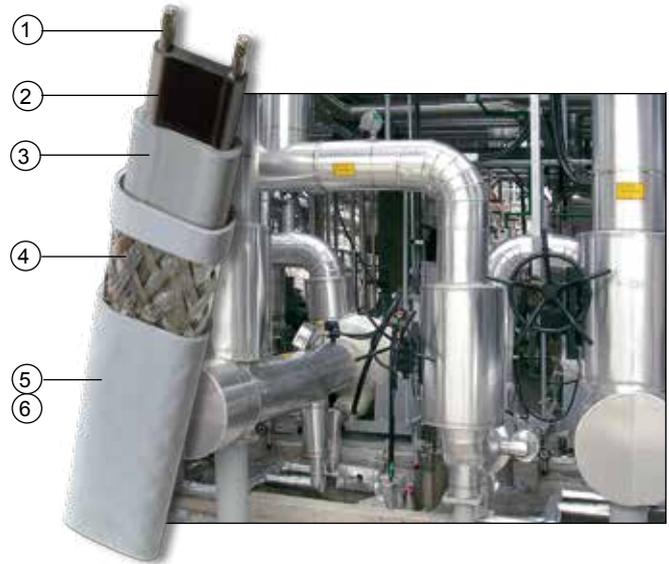
BSX cables are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IECEx Scheme.

RATINGS

Available Watt densities.....	9, 15, 25, 32 W/m at 10°C
Nominal supply voltage ¹	230 Vac
Maximum maintenance temperature	65°C
Maximum continuous exposure temperature	
Power-off	85°C
Minimum installation temperature.....	-60°C
Minimum bend radius	
@ -15°C	10 mm
@ -60°C	32 mm
T-rating ²	
9, 15, 25 W/m	T6 85°C
32 W/m.....	T5 100°C
Based on stabilised design ³	T6 85°C

Notes

1. Cable may be energised at other voltages; contact Thermon for design assistance.
2. T-rating per internationally recognised testing agency guidelines.
3. Thermon heating cables are approved for the listed T-ratings using the stabilised design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.



CONSTRUCTION

- 1 Nickel-plated copper bus wires (1.3 mm²)
- 2 Radiation cross-linked semiconductive heating matrix
- 3 Radiation cross-linked dielectric insulation
- 4 Tinned copper braid
- 5 Polyolefin overjacket provides additional protection to cable and braid where exposure to aqueous inorganic chemicals is expected.

OPTIONS

- 6 FOJ Fluoropolymer overjacket over tinned copper braid provides additional protection to cable and braid where exposure to organic chemicals or corrosives is expected.

BASIC ACCESSORIES

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables.

All cables require a connection kit to comply with approval requirements. Information on accessories to complete a heater circuit installation can be found in the "Heating Cable Systems Accessories" product specification sheet (Form TEP0010U).

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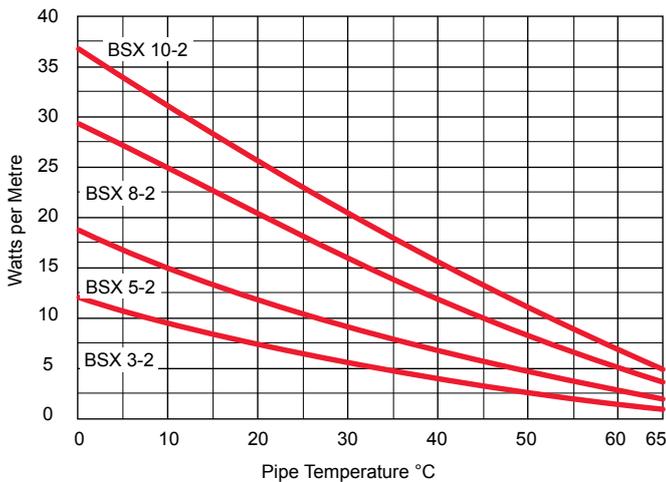
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POWER OUTPUT CURVES

The power outputs shown apply to cable installed on insulated metallic pipe (using the procedures outlined in IEEE Standard 515) at the service voltages stated below. For use on other service voltages, contact Thermon.

Product Type 230 Vac Nominal	Power Output at 10°C W/m
BSX 3-2	9
BSX 5-2	15
BSX 8-2	25
BSX 10-2	32



CERTIFICATIONS/APPROVALS

Certificate FM13 ATEX 0052 in accordance with the EU ATEX Directive 94/9/EC

International Electrotechnical Commission IEC Certification Scheme for Explosive Atmospheres FMG 13.0020

Factory Mutual Research Ordinary and Hazardous (Classified) Locations

Underwriters Laboratories Inc. Hazardous (Classified) Locations

BSX has additional hazardous area approvals including:
 • DNV • Lloyd's • TIIS • CCE/CSIR • GOST-R
 Contact Thermon for additional approvals and specific information.

CIRCUIT BREAKER SIZING AND TYPE 1

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

Type B Circuit Breakers

Product Type	230 Vac Service Voltage	Start-Up Temperature ² °C	Max. Circuit Length ³ vs. Breaker Size Metres		
			16 A	25 A	32 A
BSX 3-2		10	191	226	226
		0	191	226	226
		-20	156	226	226
BSX 5-2		-40	127	199	226
		10	117	184	184
		0	117	184	184
BSX 8-2		-20	98	153	184
		-40	80	125	160
		10	93	146	146
BSX 10-2		0	93	146	146
		-20	74	116	146
		-40	61	95	122
BSX 10-2		10	67	105	120
		0	58	91	117
		-20	45	71	91
		-40	37	58	75

Type C Circuit Breakers

Product Type	230 Vac Service Voltage	Start-Up Temperature ² °C	Max. Circuit Length ³ vs. Breaker Size Metres		
			16 A	25 A	32 A
BSX 3-2		10	191	226	226
		0	191	226	226
		-20	156	226	226
BSX 5-2		-40	127	199	226
		10	117	184	184
		0	117	184	184
BSX 8-2		-20	98	153	184
		-40	80	125	160
		10	93	146	146
BSX 10-2		0	93	146	146
		-20	78	122	146
		-40	64	100	128
BSX 10-2		10	77	120	120
		0	75	117	120
		-20	59	92	118
		-40	48	75	96

Notes

1. Maximum circuit lengths shown are based on an instantaneous trip current characteristic per IEC 60898 at the referenced start-up temperature and a 10°C maintenance temperature. For maximum circuit lengths with other trip current characteristics contact Thermon.
2. While a heat tracing system is generally designed to keep the contents of a pipe at the desired maintain temperature, the cable may be energized at lower temperatures. For design data with lower start-up temperatures than represented above contact Thermon for design assistance.
3. The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments.



PRODUCT SPECIFICATIONS

HTSX™ SELF-REGULATING HEATING CABLE

APPLICATION

HTSX self-regulating heating cables are designed specifically for process temperature maintenance or freeze protection where high temperature exposure capability is required. HTSX withstands the temperature exposures associated with steam purging.

The heat output of HTSX cable varies in response to the surrounding temperature. Variations in the ambient temperature or heat lost through the thermal insulation are compensated for automatically along the entire length of a heat-traced pipe.

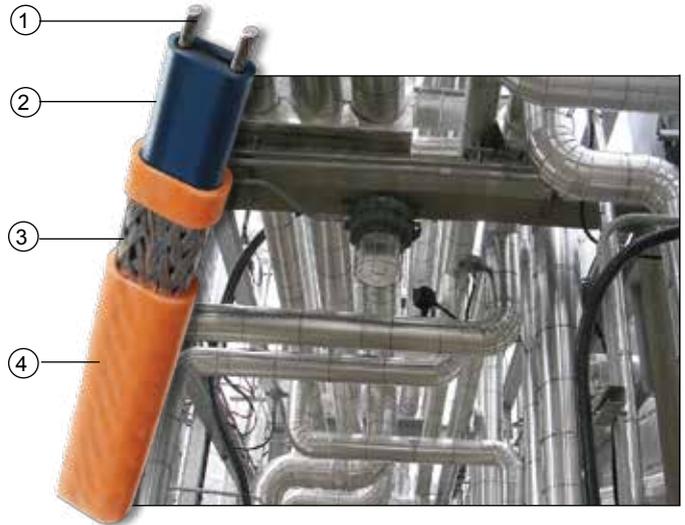
HTSX cables are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IECEx Scheme.

RATINGS

Available watt densities ..9, 19, 29, 38, 48, 64 W/m @ 10°C	
Nominal supply voltages ¹	230 Vac
Max. maintenance temperature.....	150°C
Max. exposure temperature	
Intermittent power-on or off	250°C
Continuous power-off	204°C
Minimum installation temperature.....	-60°C
Minimum bend radius	
@ -15°C	10 mm
@ -60°C	32 mm
T-rating ²	
HTSX 3-2, 6-2, 9-2, 12-2, 15-2.....	T3
HTSX 20-2	T2
Based on stabilised design ³	T3 to T6

Notes

1. Cable may be energised at other voltages; contact Thermon for design assistance.
2. T-rating per internationally recognised testing agency guidelines.
3. Thermon heating cables are approved for the listed T-ratings using the stabilised design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance..



CONSTRUCTION

- 1 Nickel-plated copper bus wires (1.3 mm²)
- 2 Heating matrix and fluoropolymer dielectric insulation
- 3 Plated copper braid
- 4 Fluoropolymer overjacket provides additional protection to cable and braid where exposure to chemicals or corrosives is expected.

BASIC ACCESSORIES

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables.

All cables require a suitably certified connection kit to comply with approval requirements.

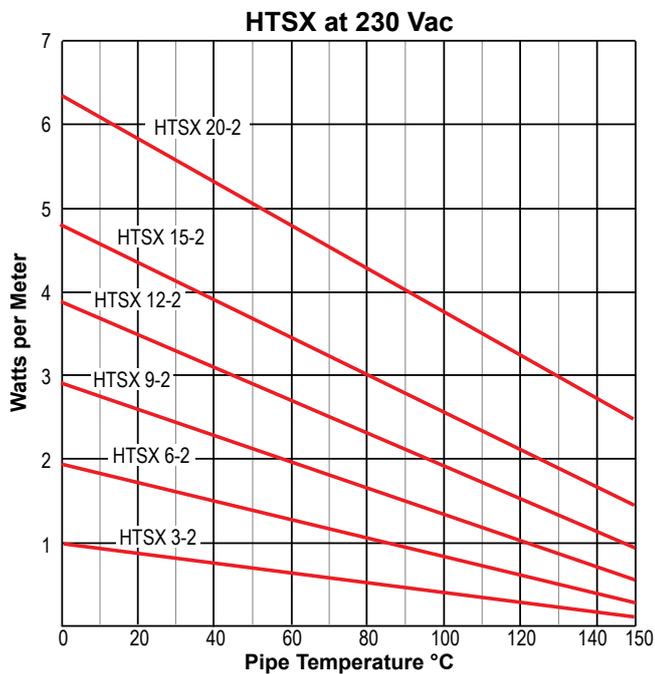
Hot end terminations > 230°C must be completed using the Terminator ZS/ZE or Terminator ZE-B kits.



POWER OUTPUT CURVES 1

The power outputs shown apply to overjacketed cable installed on insulated metallic pipe at the service voltage stated below.

Product Type 230 Vac Nominal	Power Output at 10°C W/m
HTSX 3-2	9
HTSX 6-2	19
HTSX 9-2	29
HTSX 12-2	38
HTSX 15-2	48
HTSX 20-2	64



CERTIFICATIONS/APPROVALS

CE Certificate FM12 ATEX 0014X in accordance with the EU ATEX Directive 94/9/EC

IEC International Electrotechnical Commission IEC Certification Scheme for Explosive Atmospheres FMG 12.0004X

HTSX has additional hazardous area approvals including:
 • DNV • Lloyd's • TIIS • CCE/CSIR • TRCU
 Contact Thermon for additional approvals and specific information.

CIRCUIT BREAKER SIZING AND TYPE 2

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

Type B Circuit Breakers

Product Type	230 Vac Service Voltage Start-Up Temperature 3 °C	Max. Circuit Length 4 vs. Breaker Size Metres		
		16 A	25 A	32 A
HTSX 3-2	10	177	215	215
	0	177	215	215
	-20	171	215	215
	-40	134	215	215
HTSX 6-2	10	114	152	152
	0	114	152	152
	-20	114	152	152
	-40	95	152	152
HTSX 9-2	10	82	123	123
	0	82	123	123
	-20	82	123	123
	-40	72	120	123
HTSX 12-2	10	65	106	106
	0	65	106	106
	-20	64	106	106
	-40	57	94	106
HTSX 15-2	10	47	77	94
	0	45	74	94
	-20	41	67	89
	-40	37	60	79
HTSX 20-2	10	34	55	73
	0	33	52	69
	-20	30	48	62
	-40	27	43	57

Type C Circuit Breakers

Product Type	230 Vac Service Voltage Start-Up Temperature 3 °C	Max. Circuit Length 4 vs. Breaker Size Metres		
		16 A	25 A	32 A
HTSX 3-2	10	177	215	215
	0	177	215	215
	-20	171	215	215
	-40	134	215	215
HTSX 6-2	10	114	152	152
	0	114	152	152
	-20	114	152	152
	-40	95	152	152
HTSX 9-2	10	82	123	123
	0	82	123	123
	-20	82	123	123
	-40	73	123	123
HTSX 12-2	10	65	106	106
	0	65	106	106
	-20	65	106	106
	-40	58	96	106
HTSX 15-2	10	47	77	94
	0	47	77	94
	-20	47	76	94
	-40	42	69	91
HTSX 20-2	10	39	64	81
	0	39	64	81
	-20	36	59	78
	-40	33	53	70

Note

- For more precise power output values as a function of pipe temperature, refer to CompuTrace®.
- Maximum circuit lengths shown are based on an instantaneous trip current characteristic per IEC 60898 at the referenced start-up temperature and a 10°C maintenance temperature. For maximum circuit lengths with other trip current characteristics contact Thermon.
- While a heat tracing system is generally designed to keep the contents of a pipe at the desired maintain temperature, the cable may be energized at lower temperatures. For design data with lower start-up temperatures than represented above contact Thermon for design assistance.
- The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments.



PRODUCT SPECIFICATIONS

USX™

SELF-REGULATING HEAT TRACING

APPLICATION

USX self-regulating heat tracing is specifically engineered for critical process maintenance and freeze protection applications where ultra high temperature ratings are required. USX enables the use of ambient sensing controls for applications with continuous exposure temperatures up to 240°C (464°F). Constructed using Thermon’s unique and proven monolithic co-extrusion process, USX advances self-regulating heat tracing technology to the ultimate frontiers of performance and reliability.

The heat output of USX heat tracing varies in response to the surrounding temperature. Variations in the ambient temperature or heat lost through the thermal insulation are compensated for automatically along the entire length of a heat-traced pipe.

USX heat tracing is approved for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IECEx Scheme.

RATINGS

Available power densities . 10, 20, 30, 39, 49, 66 W/m @ 10°C
(3, 6, 9, 12, 15, 20 W/ft @ 50°F)

Supply voltages ¹ 230 Vac

Max. operating temperature
Continuous (power-on) 240°C (464°F)

Max. exposure temperature
Intermittent (power-on or off) 250°C (482°F)
Continuous (power-off) 240°C (464°F)

Minimum installation temperature -60°C (-76°F)

Minimum bend radius
@ -15°C (5°F) 10 mm (0.38")
@ -60°C (-76°F) 32 mm (1.25")

T-rating ²
3-2, 6-2, 9-2, 12-2, 15-2 T3 200°C (392°F)
20-2 T2 300 C (572 F)
Based on stabilized design ³ T3 to T6

Notes

1. Heat tracing may be energized at other voltages; contact Thermon for design assistance.
2. T-rating per internationally recognized testing agency guidelines.
3. Thermon heat tracing is approved for the listed T-ratings using the stabilized design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.

Specific Conditions of Use:

1. Heat tracing systems must be installed using the manufacturer’s suitably rated accessory kits in accordance with the applicable instructions.
2. For insulated externally heated surfaces, lower T- class systems may be obtained by utilizing stabilized design of a trace heating system using methods described in IEC 60079-30-2, using CompuTrace® Electric Heat Tracing Design Software or by Thermon Engineering. The system design parameters, including the resulting T-class, shall be retained as a record of system documentation for each stabilized system design for as long as the system is in use. The parameters in the system documentation shall be checked during commissioning of the system.



CONSTRUCTION

- 1 Nickel-plated copper bus wires 1.3 mm²
- 2 Monolithic co-extruded semiconductive heating matrix and fluoropolymer dielectric insulation
- 3 Nickel-plated copper braid
- 4 Fluoropolymer overjacket provides additional protection where exposure to chemicals or corrosives is expected.

BASIC ACCESSORIES

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heat tracing.

All heat tracing requires a suitably certified connection kit to comply with approval requirements.

Hot end terminations > 230°C (446°F) must be completed using the Terminator ZS/ZE, or ZE-B kits.

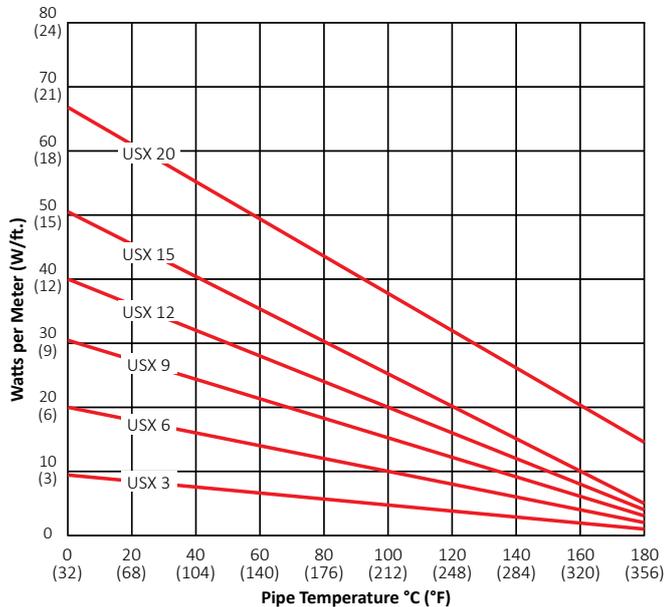


USX™ SELF-REGULATING HEAT TRACING

POWER OUTPUT CURVES¹

The power outputs shown apply to heat tracing installed on insulated metallic pipe (using the procedures outlined in IEC/IEEE 60079-30-1 at the service voltage stated below. For use on other service voltages, contact Thermon.

Product Type 230 Vac Nominal	Power Output at 10°C W/m
USX 3-2	9
USX 6-2	19
USX 9-2	29
USX 12-2	38
USX 15-2	48
USX 20-2	64



CERTIFICATIONS/APPROVALS



*Temperature Class:
T3 for EPL Gb; T200°C for EPL Db; for USX 3-1, 3-2, 6-1, 6-2, 9-1, 9-2, 12-1, 12-2, 15-2 215°C (T2) for EPL Gb; T215°C for EPL Db; for USX 15-1, 20-1 230°C (T2) for EPL Gb; T230°C for EPL Db; for USX 20-2 -60°C ≤ Ta ≤ +55°C IP 66

CSANe 20ATEX3059
IECEX CSA 20.0006

Note

- For more precise power output values as a function of pipe temperature, refer to CompuTrace®.
- Maximum circuit lengths shown are based on an instantaneous trip current characteristic per IEC 60898 at the referenced start-up temperature and a 10°C maintenance temperature. For maximum circuit lengths with other trip current characteristics contact Thermon.
- While a heat tracing system is generally designed to keep the contents of a pipe at the desired maintain temperature, the cable may be energized at lower temperatures. For design data with lower start-up temperatures than represented above contact Thermon for design assistance.
- The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments.

CIRCUIT BREAKER SIZING AND TYPE²

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

Type B Circuit Breakers

Product Type	230 Vac Service Voltage	Start-Up Temperature ³ °C	Max. Circuit Length ⁴ vs. Breaker Size Metres		
			16 A	25 A	32 A
USX 3-2	230	10	177	215	215
		0	177	215	215
		-20	171	215	215
		-40	134	215	215
USX 6-2	230	10	114	152	152
		0	114	152	152
		-20	114	152	152
		-40	95	152	152
USX 9-2	230	10	82	123	123
		0	82	123	123
		-20	82	123	123
		-40	72	120	123
USX 12-2	230	10	65	106	106
		0	65	106	106
		-20	64	106	106
		-40	57	94	106
USX 15-2	230	10	47	77	94
		0	45	74	94
		-20	41	67	89
		-40	37	60	79
USX 20-2	230	10	34	55	73
		0	33	52	69
		-20	30	48	62
		-40	27	43	57

Type C Circuit Breakers

Product Type	230 Vac Service Voltage	Start-Up Temperature ³ °C	Max. Circuit Length ⁴ vs. Breaker Size Metres		
			16 A	25 A	32 A
USX 3-2	230	10	177	215	215
		0	177	215	215
		-20	171	215	215
		-40	134	215	215
USX 6-2	230	10	114	152	152
		0	114	152	152
		-20	114	152	152
		-40	95	152	152
USX 9-2	230	10	82	123	123
		0	82	123	123
		-20	82	123	123
		-40	73	123	123
USX 12-2	230	10	65	106	106
		0	65	106	106
		-20	65	106	106
		-40	58	96	106
USX 15-2	230	10	47	77	94
		0	47	77	94
		-20	47	76	94
		-40	42	69	91
USX 20-2	230	10	39	64	81
		0	39	64	81
		-20	36	59	78
		-40	33	53	70



PRODUCT SPECIFICATIONS

VSX™ SELF-REGULATING HEATING CABLE

APPLICATION

High performance VSX self-regulating heating cables are designed specifically for process temperature maintenance or freeze protection where high maintain temperatures or high temperature exposure is required. VSX withstands the temperature exposures associated with steam purging.

The heat output of VSX cable varies in response to the surrounding temperature by reducing its thermal output with increasing temperature and can be overlapped without temperature upset damage to the cable.

VSX cables are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IEC Ex Scheme.

RATINGS

Available Watt densities.....	15, 32, 48, 64 W/m at 10°C
Nominal supply voltage ¹	230 Vac
Maximum maintenance temperature	150°C
Maximum continuous exposure temperature	
Intermittent power-on	232°C
Intermittent power-off	250°C
Continuous power-off	204°C
Minimum installation temperature.....	-60°C
Minimum bend radius	
@ -15°C	10 mm
@ -60°C	32 mm
T-rating ²	
15, 32, 48 and 64 W/m	T3 200°C
Based on stabilised design ³	T4 to T6

Notes

1. Cable may be energised at other voltages; contact Thermon for design assistance.
2. T-rating per internationally recognised testing agency guidelines.
3. Thermon heating cables are approved for the listed T-ratings using the stabilised design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.
4. Information on additional accessories to complete a heater circuit installation and to comply with approval requirements can be found in the "Self-Regulating Cables Systems Accessories" product specification sheet (Form TEP0010U).



CONSTRUCTION

- 1 Nickel-plated copper bus wires (2.1 mm²)
- 2 Semiconductive heating matrix and fluoropolymer dielectric insulation
- 3 Nickel-plated copper braid
- 4 Fluoropolymer overjacket provides additional protection to cable and braid where exposure to chemicals or corrosives is expected.

BASIC ACCESSORIES ⁴

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables.

All cables require a connection kit to comply with approval requirements. Information on accessories to complete a heater circuit installation can be found in the "Heating Cable Systems Accessories" product specification sheet (Form TEP0010U).

PRODUCT FEATURES

- Withstands continuous flammability testing according to IEC 60332-1: 1993 (only FOJ version)
- Can be installed at temperatures to -60°C

THERMON The Heat Tracing Specialists®



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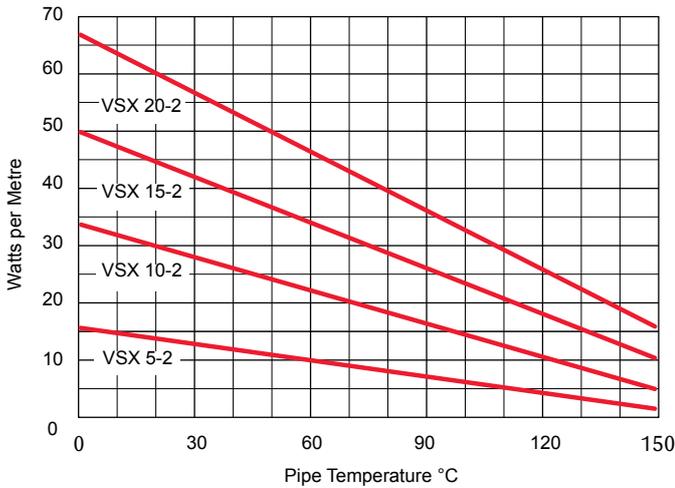


POWER OUTPUT CURVES

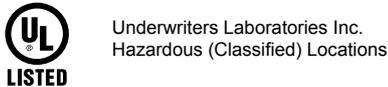
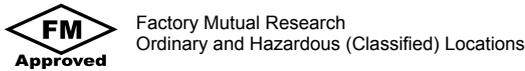
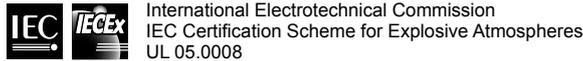
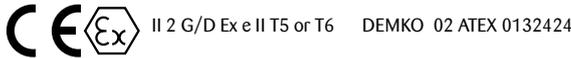
The power outputs shown apply to cable installed on insulated metallic pipe (using the procedures outlined in IEEE Standard 515) at the service voltages stated below. For use on other service voltages, contact Thermon.

Product Type 230 Vac Nominal	Power Output at 10°C W/m
VSX 5-2	15
VSX 10-2	32
VSX 15-2	48
VSX 20-2	64

VSX at 230 Vac



CERTIFICATIONS/APPROVALS



VSX has additional hazardous area approvals including:
 • DNV • Lloyd's • JIS • CCE/CMRS • GGTN
 Contact Thermon for additional approvals and specific information.

CIRCUIT BREAKER SIZING AND TYPE 1

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

Type B Circuit Breakers

230 Vac Service Voltage Product Type	Start-Up Temperature 2 °C	Max. Circuit Length 3 vs. Breaker Size Meters			
		16A	25A	32A	40A
VSX 5-2	10	98	167	203	203
	0	98	167	203	203
	-20	98	167	203	203
	-40	85	147	203	203
VSX 10-2	10	63	105	144	163
	0	63	105	144	163
	-20	56	93	128	163
	-40	49	80	108	151
VSX 15-2	10	40	65	86	115
	0	37	60	79	105
	-20	33	53	70	91
	-40	30	47	62	81
VSX 20-2	10	27	43	56	72
	0	25	40	53	68
	-20	23	36	47	60
	-40	21	33	42	55

Type C Circuit Breakers

230 Vac Service Voltage Product Type	Start-Up Temperature 2 °C	Max. Circuit Length 3 vs. Breaker Size Meters			
		16A	25A	32A	40A
VSX 5-2	10	98	167	203	203
	0	98	167	203	203
	-20	98	167	203	203
	-40	85	147	203	203
VSX 10-2	10	63	105	144	163
	0	63	105	144	163
	-20	59	98	136	163
	-40	51	84	115	163
VSX 15-2	10	46	76	102	139
	0	46	75	101	139
	-20	40	65	88	119
	-40	36	59	78	105
VSX 20-2	10	34	54	72	95
	0	32	51	68	89
	-20	28	46	60	79
	-40	26	42	55	71

Notes

1. Maximum circuit lengths shown are based on an instantaneous trip current characteristic per IEC 60898 at the referenced start-up temperature and a 10°C maintenance temperature. For maximum circuit lengths with other trip current characteristics contact Thermon.
2. While a heat tracing system is generally designed to keep the contents of a pipe at the desired maintain temperature, the cable may be energized at lower temperatures. For design data with lower start-up temperatures than represented above contact Thermon for design assistance.
3. The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments..



PRODUCT SPECIFICATIONS

VSX™ -HT

SELF-REGULATING HEATING CABLE

APPLICATION

High performance VSX-HT self-regulating heating cables are designed specifically for process temperature maintenance or freeze protection where high maintain temperatures or high temperature exposures are required. VSX-HT withstands the temperature exposures associated with steam purging.

The heat output of VSX-HT cable varies in response to the surrounding temperature by reducing its thermal output with increasing temperature and can be overlapped without temperature upset damage to the cable.

VSX-HT cables are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IEC Ex Scheme.

RATINGS

Available Watt densities.....	15, 32, 48, 64 W/m at 10°C
Nominal supply voltage ¹	230 Vac
Maximum maintenance temperature	200°C
Maximum continuous exposure temperature	
Intermittent power-on or off.....	250°C
Minimum installation temperature	-60°C
Minimum bend radius	
@ -15°C	10 mm
@ -60°C	32 mm
T-rating ²	
15 and 32 W/m	T3 200°C
48 and 64 W/m	T2 230°C
Based on stabilised design ³	T2 to T6

Notes

1. Cable may be energised at other voltages; contact Thermon for design assistance.
2. T-rating per internationally recognised testing agency guidelines.
3. Thermon heating cables are approved for the listed T-ratings using the stabilised design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.
4. Information on additional accessories to complete a heater circuit installation and to comply with approval requirements can be found in the "Self-Regulating Cables Systems Accessories" product specification sheet (Form TEP0010U).



CONSTRUCTION

- 1 Nickel-plated copper bus wires (2.1 mm²)
- 2 Semiconductive heating matrix and fluoropolymer dielectric insulation
- 3 Nickel-plated copper braid
- 4 Fluoropolymer overjacket provides additional protection to cable and braid where exposure to chemicals or corrosives is expected.

BASIC ACCESSORIES⁴

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables.

All cables require a connection kit to comply with approval requirements. Information on accessories to complete a heater circuit installation can be found in the "Heating Cable Systems Accessories" product specification sheet (Form TEP0010U).

Hot end terminations > 220°C must be completed using the Terminator DS/DE, ZS/ZE, DE-B, ZE-B kits.

Note:

- "D" Kits Division 2 and Zone 2 Areas
- "Z" Kits Zone 1 Areas



VSX™ -HT

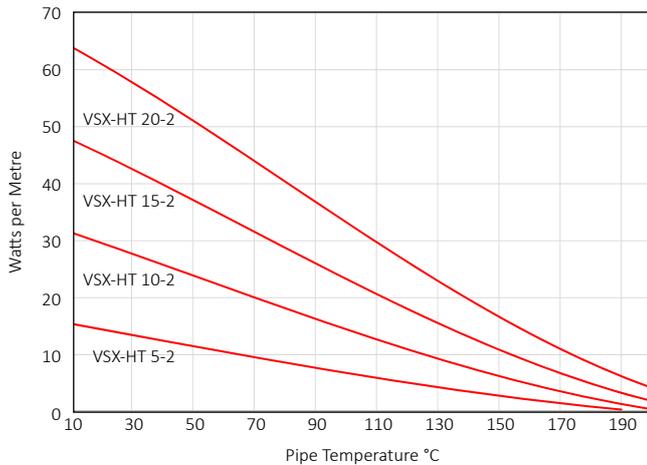
SELF-REGULATING HEATING CABLE

POWER OUTPUT CURVES

The power outputs shown apply to cable installed on insulated metallic pipe (using the procedures outlined in IEC/IEEE 60079-30-1) at the service voltages stated below. For use on other service voltages, contact Thermon.

Product Type 230 Vac Nominal	Power Output at 10°C W/m
VSX-HT 5-2	15
VSX-HT 10-2	32
VSX-HT 15-2	48
VSX-HT 20-2	64

VSX-HT at 230 Vac



CERTIFICATIONS/APPROVALS

CE **Ex** Certificate FM 18ATEX0009X
In accordance with the ATEX Directive 2014/34/EU

IEC **IECEx** International Electrotechnical Commission
IEC Certification Scheme for Explosive Atmospheres
FMG 18.0002X

FM
Approved Factory Mutual Research
Ordinary and Hazardous (Classified) Locations

VSX-HT has additional hazardous area approvals including:
DNV • Lloyd's • JIS • CCE/CMRS • GGTN • CSA • TR CU • TR-Fire
ABS • CIMFR • CQST • CLASS NK • JIS • KOSHA RM RS • TIIS
Contact Thermon for latest status of approvals and specific information.

CIRCUIT BREAKER SIZING AND TYPE ¹

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

Type B Circuit Breakers

Product Type	230 Vac Service Voltage Start-Up Temperature ² °C	Max. Circuit Length ³ vs. Breaker Size - Meters			
		16A	25A	32A	40A
VSX-HT 5-2	10	98	167	203	203
	0	98	167	203	203
	-20	98	167	203	203
	-40	98	167	203	203
VSX-HT 10-2	10	64	105	144	144
	0	64	105	144	144
	-20	63	105	144	144
	-40	59	98	144	144
VSX-HT 15-2	10	40	65	86	114
	0	39	62	82	109
	-20	36	58	76	101
	-40	34	54	72	94
VSX-HT 20-2	10	28	45	60	77
	0	28	44	57	74
	-20	26	41	53	69
	-40	24	39	51	65

Type C Circuit Breakers

Product Type	230 Vac Service Voltage Start-Up Temperature ² °C	Max. Circuit Length ³ vs. Breaker Size - Meters			
		16A	25A	32A	40A
VSX-HT 5-2	10	98	167	203	203
	0	98	167	203	203
	-20	98	167	203	203
	-40	98	167	203	203
VSX-HT 10-2	10	64	105	144	163
	0	64	105	144	163
	-20	64	105	144	163
	-40	62	103	144	163
VSX-HT 15-2	10	46	76	102	139
	0	46	76	102	139
	-20	44	72	97	132
	-40	42	68	91	124
VSX-HT 20-2	10	36	58	77	102
	0	35	56	74	98
	-20	32	52	69	91
	-40	31	49	65	85

Notes

1. Maximum circuit lengths shown are based on an instantaneous trip current characteristic per IEC 60898 at the referenced start-up temperature and a 10°C maintenance temperature. For maximum circuit lengths with other trip current characteristics contact Thermon.
2. While a heat tracing system is generally designed to keep the contents of a pipe at the desired maintain temperature, the cable may be energized at lower temperatures. For design data with lower start-up temperatures than represented above contact Thermon for design assistance.
3. The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments..



PRODUCT SPECIFICATIONS

HPT™ POWER-LIMITING HEATING CABLE

APPLICATION

High performance HPT power-limiting heating cables are designed specifically for process temperature maintenance or freeze protection where high maintain temperatures or high temperature exposure is required. HPT withstands the temperature exposures associated with steam purging.

A coiled resistor alloy heating element provides the power-limiting feature of HPT. This PTC (Positive Temperature Coefficient) characteristic decreases the cable’s power output as the heat-traced product temperature increases and allows the cable to be overlapped during installation. The composite construction of the heating element and fibre substrate, plus an additional fibre cushion layer, provides an exceptionally durable high performance heating cable.

HPT cables are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IECEx System.

RATINGS

Available Watt densities.....	15, 30, 45, 60 W/m at 10°C
Nominal supply voltage ¹	230 Vac
Maximum maintenance temperature	
HPT-5.....	215°C
HPT-10	195°C
HPT-15	180°C
HPT-20	150°C
Maximum continuous exposure temperature	
Power-off	260°C
Minimum installation temperature	-60°C
Minimum bend radius	
@ -15°C	10 mm
@ -60°C	32 mm
T-rating ²	
Based on stabilised design ³	T6...T2

Notes

1. Cable may be energised at other voltages; contact Thermon for design assistance.
2. T-rating per internationally recognised testing agency guidelines.
3. Thermon heating cables are approved for the listed T-ratings using the stabilised design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.



CONSTRUCTION

- 1 Nickel-plated copper bus wires (3.3 mm²)
- 2 Composite metal alloy/fibre
- 3 Heater bus connection (not shown)
- 4 Fibreglass braid
- 5 Fluoropolymer dielectric insulation
- 6 Nickel-plated copper braid
- 7 Fluoropolymer overjacket

BASIC ACCESSORIES

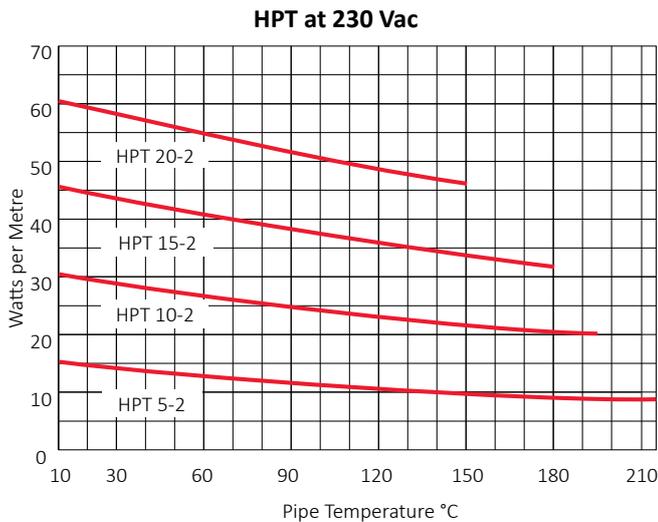
Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables. All HPT cables require connection kits to comply with approval requirements. Information on accessories to complete a heater circuit installation can be found in the “Heating Cable Systems Accessories” product specification sheet (Form TEP0010U).



POWER OUTPUT CURVES

The power outputs shown apply to overjacketed cable installed on insulated metallic pipe at the service voltage stated below.

Product Type 230 Vac Nominal	Zone Length cm	Power Output at 10°C W/m
HPT 5-2	76	15
HPT 10-2	61	30
HPT 15-2	61	46
HPT 20-2	61	61



CIRCUIT BREAKER SIZING ¹

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

Type B and C Circuit Breakers

Product Type	Start-Up Temperature ² °C	Max. Circuit Length ³ vs. Breaker Size Metres				
		16 A	25 A	32 A	40 A	50 A
HPT 5-2	10	167	271			
	0	167	271			
	-20	167	271			
	-40	167	271			
HPT 10-2	10	85	136	180	191	
	0	85	136	180	191	
	-20	85	136	180	191	
	-40	85	136	180	191	
HPT 15-2	10	57	92	120	155	156
	0	57	92	120	155	156
	-20	57	92	120	155	156
	-40	57	92	120	155	156
HPT 20-2	10	44	70	91	117	130
	0	44	70	90	116	130
	-20	42	67	86	110	130
	-40	40	64	82	105	130

CERTIFICATIONS/APPROVALS



II 2 G Ex 60079-30-1 IIC T6...T2 Gb
II 2 D Ex 60079-30-1 IIIC T85 °C...T300 °C Db
DEKRA 16ATEX0093



International Electrotechnical Commission
IEC Certification System for Explosive Atmospheres
IECEx DEK 16.0046



FM Approvals
Ordinary and Hazardous (Classified) Locations



Underwriters Laboratories Inc.
Hazardous (Classified) Locations

Notes

1. Maximum circuit lengths shown are based on an instantaneous trip current characteristic per IEC 60898 at the referenced start-up temperature and a 10°C maintenance temperature. For maximum circuit lengths with other trip current characteristics contact Thermon.
2. While a heat tracing system is generally designed to keep the contents of a pipe at the desired maintain temperature, the cable may be energized at lower temperatures. For design data with lower start-up temperatures than represented above contact Thermon for design assistance.
3. The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments.



PRODUCT SPECIFICATIONS

TESH™

SERIES CONSTANT WATT HEATING CABLE

APPLICATION

TESH series resistance constant Watt heating cables are used where circuit lengths exceed the limitations of parallel resistance heating cables. TESH withstands the temperature exposures associated with steam purging.

The series circuitry of TESH provides consistent Watt-per-metre power output along the entire length of the cable with no voltage drop. A glassceramic tape layer adds additional protection to the heating cable and a fluoropolymer overjacket provides chemical resistance while maintaining maximum flexibility. The construction of the cable meets the 7 Joule impact test per EN50019.

TESH cables are approved for use in ordinary (nonclassified) areas and Catagories 2 and 3 ATEX classified areas.

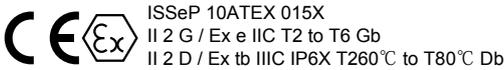
RATINGS

- Maximum watt density25 W/m
- Maximum supply voltage 750 Vac
- Maximum continuous exposure temperature
- Power-off260°C
- Minimum installation temperature.....-60°C
- Minimum bend radius 5 x cable O.D.
- T-rating ¹ T2 to T6
- (using the principles of stabilized design or limiters)²

Notes

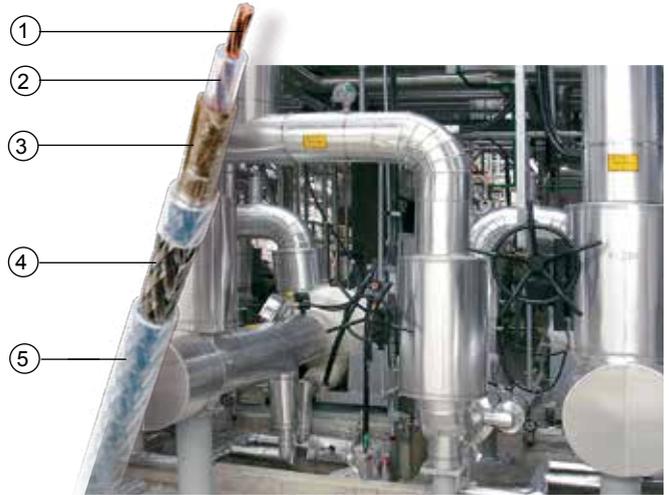
1. T-rating per internationally recognised testing agency guidelines.
2. Thermon heating cables are approved for the listed T-ratings using the stabilised design method. This enables the cable to operate in hazardous areas without limiting thermostats. The T-rating may be determined using CompuTrace® Electric Heat Tracing Design Software or contact Thermon for design assistance.

CERTIFICATIONS/APPROVALS



TESH has additional hazardous area approvals including:
 • GGTN • Kazakhstan • TR CU • Gospromnadzor • CQST
 • FSETAN • RS • TCCEXEE

Contact Thermon for additional approvals and specific information.



CONSTRUCTION

- 1 Heating conductor
- 2 Fluoropolymer dielectric insulation
- 3 Glassceramic tape
- 4 Nickel-plated copper braid (BN)
- 5 Fluoropolymer overjacket

PRODUCT FEATURES

- Withstands continuous flamibility testing according to IEC 60332-1: 1993
- Allows cable to be installed at temperatures to -60°C

STABILISED DESIGN

The Watt density limitation for TESH cables is directly related to the desired maintain temperature. Thermon is able to ensure the T-rating based on a stabilised design that enables series constant Watt heating cables to operate in hazardous areas without limiting thermostats. TESH cable output and T-rating are dependent upon supply voltage, cable resistance, temperature conditions as well as additional variables. Contact Thermon for design assistance.

BASIC ACCESSORIES

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables.

All cables require a connection kit to comply with approval requirements. Information on accessories to complete a heater circuit installation can be found in the "Heating Cable Systems Accessories" product specification sheet (Form TEP0010U).

THERMON The Heat Tracing Specialists®



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 For the Thermon office nearest you visit us at . . . www.thermon.com



AVAILABLE CABLES

Product Type	Resistance Ohm/m at 20°C	Conductor Size mm ²	Max. Cable Length ¹ m (with 30 mA earth-fault protection)	Cable Diameter mm
TESH 2.9	0.0029	6.00	1435	7.0
TESH 4.4	0.0044	4.00	1525	6.3
TESH 7	0.0072	2.50	1855	5.5
TESH 10	0.010	1.79	1775	5.1
TESH 11.7	0.0117	1.50	2025	4.9
TESH 15	0.015	1.20	2090	4.7
TESH 17.8	0.0178	1.00	2275	4.6
TESH 25	0.025	1.11	2525	4.6
TESH 31.5	0.0315	1.60	2400	4.9
TESH 50	0.050	1.02	2335	4.7
TESH 65	0.065	0.75	1890	4.4
TESH 80	0.080	1.21	2190	4.3
TESH 100	0.100	1.50	2025	4.9
TESH 150	0.150	1.02	2335	4.6
TESH 200	0.200	0.75	2605	4.4
TESH 320	0.320	0.92	2420	4.5
TESH 380	0.380	0.79	2555	4.4
TESH 480	0.480	0.64	2765	4.3
TESH 600	0.600	0.49	3010	4.2
TESH 700	0.700	0.43	3155	4.1
TESH 810	0.810	0.62	2780	4.3
TESH 1000	1.000	0.49	3010	4.2
TESH 1440	1.440	0.34	3395	4.1
TESH 1750	1.750	0.29	3615	4.1
TESH 2000	2.000	0.55	2900	4.2
TESH 3000	3.000	0.34	3395	4.1
TESH 8000	8.000	0.14	4455	3.8

Note

1. Longer circuit lengths are possible based on earth-fault protection with higher earth-fault ratings; contact Thermon.

CIRCUIT BREAKER SIZING AND TYPE

Maximum circuit lengths for various circuit breaker amperages are shown below. Circuit breaker sizing and earth-fault protection should be based on applicable local codes. For information on design and performance on other voltages, contact Thermon.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.



PRODUCT SPECIFICATIONS

MIQ™ MINERAL INSULATED HEATING CABLE

APPLICATION

MIQ high performance mineral insulated heating cables are used extensively for high temperature maintenance, high temperature exposure and/or high watt density applications which exceed the limitations of thermoplastic insulated cables.

Thermon's MIQ mineral insulated cables are manufactured using Alloy 825, a high nickel/chromium alloy which is ideally suited for high temperature service that offers exceptional resistance to stress corrosion in chloride, acid, salt and alkaline environments.

MIQ cables are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX directive and the IEC Ex scheme.

RATINGS

Rated voltage ¹	300 and 600 Vac
Maximum maintenance temperature ²	500°C
Maximum continuous exposure temperature	
Power-off	600°C
Maximum Watt density ²	260 W/m
Minimum installation temperature	-60°C
Minimum bend radius	6 x cable O.D.

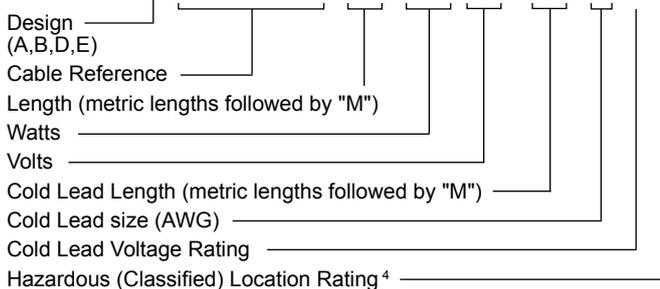
CONSTRUCTION

- 1 Solid alloy or copper conductor
- 2 Compacted magnesium oxide insulation
- 3 Seamless alloy 825 (DIN 2.4858) sheath

MIQ CATALOG REFERENCE NUMBER

A complete catalogue reference number includes the following components:

D / MIQ-60E3H-1S / 60M / 1334 / 230 / 1.2M / 12 / 6 / 1



Notes

1. Specific voltage depends on circuit length and design conditions.
2. Watt density limitations are correlated to maintain temperatures.
3. See details on page 2 for more information.
4. If the field is blank, then the heating cable set is intended for ordinary (non-classified) locations or D2, AEx de, or Ex de hazardous (classified) locations. If the value in the field is "1", then the heating cable set is intended for D1, AEx d, or Exd hazardous (classified) locations.

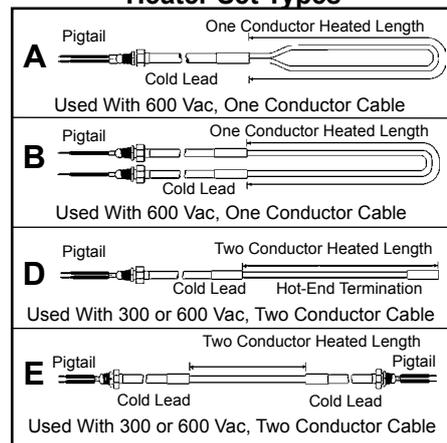


MIQ HEATER SETS

Thermon MIQ cable sets are available in four factory fabricated configurations: Type A, B, D or E. The standard assemblies consist of a predetermined length of heating cable joined to a standard 1.2 m or 2.1 m nonheating cold lead with 305 mm long thermoplastic insulated pigtailed.

The nonheating section of the unit is sealed and fitted with a high pressure, liquid-tight M20, M25 or M32 brass gland ³ for connection into the supply junction box.

Heater Set Types



THERMON The Heat Tracing Specialists®



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AVAILABLE CABLES

600 Vac Cable—Two Conductor—Heater Set Type D or E

Catalog Number	Resistance ¹ ohms/km	Nominal Diameter mm
MIQ-11E0H-2S	36100	5.2
MIQ-90E1H-2S	29500	5.7
MIQ-60E1H-2S	19700	5.8
MIQ-40E1H-2S	13100	6.1
MIQ-20E1H-2S	6600	6.5
MIQ-10E1H-2S	3300	6.5
MIQ-70E2H-2S	2300	6.7
MIQ-50E2H-2S	1640	7.1
MIQ-30E2H-2S	980	7.6
MIQ-20E2H-2S	660	6.5
MIQ-15E2H-2S	490	6.7
MIQ-10E2H-2S	330	7.1
MIQ-70E3H-2S	230	7.5
MIQ-50E3H-2S	164	7.9
MIQ-40E3H-2S	131	8.3
MIQ-30E3H-2S	98	8.8
MIQ-20E3H-2S	66	6.9
MIQ-16E3H-2S	52	7.1
MIQ-13E3H-2S	43	7.4
MIQ-10E3H-2S	34	7.6
MIQ-81E4H-2S	27	7.6

600 Vac Cable—One Conductor—Heater Set Type A or B

Catalog Number	Resistance ¹ ohms/km	Nominal Diameter mm
MIQ-20E1H-1S	6560	4.3
MIQ-16E1H-1S	5250	4.3
MIQ-13E1H-1S	4270	4.3
MIQ-10E1H-1S	3280	4.3
MIQ-85E2H-1S	2790	4.3
MIQ-70E2H-1S	2300	4.3
MIQ-50E2H-1S	1650	4.3
MIQ-38E2H-1S	1250	4.3
MIQ-30E2H-1S	980	4.3
MIQ-25E2H-1S	820	4.3
MIQ-20E2H-1S	660	4.4
MIQ-17E2H-1S	560	4.6
MIQ-15E2H-1S	490	4.3
MIQ-10E2H-1S	330	4.3
MIQ-80E3H-1S	260	4.3
MIQ-70E3H-1S	230	4.3
MIQ-60E3H-1S	200	4.3
MIQ-40E3H-1S	130	4.4
MIQ-30E3H-1S	98	4.7
MIQ-20E3H-1S	66	5.1
MIQ-10E3H-1S	33	4.3
MIQ-65E4H-1S	21	4.6
MIQ-40E4H-1S	13	4.8
MIQ-25E4H-1S	8	5.3
MIQ-16E4H-1S	5	5.7

Notes

1. All resistances shown are per length of cable at 20°C and are subject to a ±10% manufacturing tolerance.
2. Flameproof system must be specified, contact Thermon.

300 Vac Cable—Two Conductor—Heater Set Type D or E

Catalog Number	Resistance ¹ ohms/km	Nominal Diameter mm
MIQ-11E0L-2S	36100	4.1
MIQ-90E1L-2S	29500	4.1
MIQ-75E1L-2S	24600	4.1
MIQ-60E1L-2S	19700	4.1
MIQ-50E1L-2S	16400	4.1
MIQ-40E1L-2S	13100	4.1
MIQ-32E1L-2S	10500	4.1
MIQ-27E1L-2S	9020	4.1
MIQ-25E1L-2S	8200	4.1
MIQ-20E1L-2S	6560	4.1
MIQ-17E1L-2S	5580	4.1
MIQ-14E1L-2S	4590	4.1
MIQ-10E1L-2S	3280	4.2
MIQ-70E2L-2S	2300	4.6
MIQ-50E2L-2S	1640	4.8
MIQ-30E2L-2S	980	4.3
MIQ-25E2L-2S	820	4.3
MIQ-20E2L-2S	660	4.3
MIQ-15E2L-2S	490	4.4
MIQ-10E2L-2S	330	4.8
MIQ-70E3L-2S	230	5.2
MIQ-50E3L-2S	164	5.7

AVAILABLE MIQ COLD LEADS

Cold Lead Size AWG (mm ²)	Heater Sets A/D/E Current Rating (A)	Gland Size	Heater Set B Current Rating (A)	Gland Size
12 (3,3)	20	M20	25	M20
10 (5,3)	30	M25	40	M20
8 (8,4)	45	M32	50	M25

CIRCUIT BREAKER SIZING AND TYPE

Maximum circuit lengths for MIQ heating cables will be a function of cable resistance, cable set power and operating voltage. Circuit length, breaker sizing and earth-fault protection should be based on applicable local codes.

Earth-fault protection of equipment should be provided for each branch circuit supplying electric heating equipment.

CERTIFICATIONS/APPROVALS

 II 2 G Ex d IIC T1 to T6 2
II 2 G Ex de IIC T1 to T6
II 2 D Ex tD A21 IP66 T450°C to T85°C

 International Electrotechnical Commission
IEC Certification Scheme for Explosive Atmospheres
FMG 09.0006

 Factory Mutual Research
Ordinary and Hazardous (Classified) Locations

Tab

2

2

Tab



PRODUCT SPECIFICATIONS
Terminator™
 HEATING CABLE TERMINATION KITS

APPLICATION

Terminator nonmetallic heating cable termination kits are designed specifically for rapid, trouble-free installation of Thermon heating cables. The integral design of these nonmetallic kits combines the pipe-mounted fitting, heating cable grommet and cable strain relief into a single assembly. Screws for securing the covers of the kits have been eliminated to simplify cover installation while providing additional security (a tool is required to remove the cover after installation).

Terminator kits are approved for use in ordinary (nonclassified) areas, and are certified to the ATEX directive for use in Category 2 and 3 (Zone 1 and 2) classified area's.

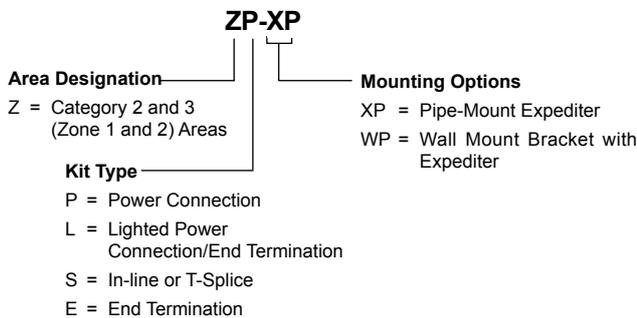
ETK Circuit fabrication kits are required for use with all Thermon Parallel Heating Cables Connection Kits. Kits for termination of SX cables include a power connection boot, end cap, RTV adhesive and a caution label. Kits for termination of HPT and FP cables also include tape strip and a distinct grommet.

SCTK Splice connection termination kits are required when preparing outside-the-insulation splices with all Thermon Parallel Heating Cables Connection Kits. Kits for terminations of SX cables include 2 splice connection boots, assorted wire nuts and RTV adhesive. Kits for termination of HPT and FP cables also include a distinct grommet.

RATINGS

Enclosure rating..... IP66
 Maximum pipe exposure temperature ¹..... 250°C
 Minimum installation temperature ¹ -60°C
 Operating ambient temperature..... -60°C to +55°C
 Maximum voltage rating ² 600 Vac

PRODUCT REFERENCE LEGEND



Kits for BSX, RSX, HTSX, KSX, TSX, VSX, HPT and FP Cables:

ZP-R = Power Connection Kit (ATEX only)

Kits for TESH, TES Cables

ZP-M = Power Connection Kit

Kits for TEK, HTEK Cables



Terminator Beacon

Terminator DP

CONSTRUCTION

- 1 Junction box, glass-reinforced polymer with DIN rail mounted terminal blocks
- 2 Pipe-mount expediter, glass-reinforced polymer
- 3 Stainless steel mounting bracket
- 4 LED end of circuit light (available on Beacon only).

CERTIFICATIONS/APPROVALS

  Certificate FM10ATEX0058X in accordance with EU ATEX Directive 94/9/EC

  Certificate DEMKO01ATEX0021995 in accordance with EU ATEX Directive 94/9/EC

  International Electrotechnical Commission IEC Certification Scheme for Explosive Atmospheres FMG 10.0022X

 FM Approvals Ordinary and Hazardous (Classified) Locations

 Underwriters Laboratories Inc. Ordinary and Hazardous (Classified) Locations

Terminator has additional hazardous area approvals including:
 • ABS • CSA • CQST • DNA • KOSHA • Lloyds • TR TC

Notes

1. Minimum and maximum temperatures may be further limited by the temperature ratings for the heating cables. Consult appropriate specification sheets.
2. Terminator Beacon operating voltage rating is 100-277 Vac.
3. Terminator ZP and ZL are shipped with an M25-B-Exe EEx e approved blind plug that can be replaced with an EEx e approved gland to permit power or heating cable connection or an EEx e approved blind plug to permit In-Line T-Splice, End Termination Lighted Power Connection or End Termination.

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Terminator™

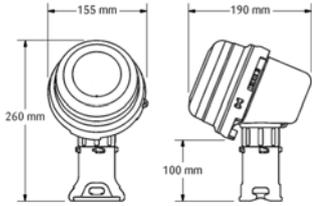
HEATING CABLE TERMINATION KITS

Terminator ZP is designed to fabricate power connections, in-line/T-splice connections or for making end terminations for heating circuits. Electrical connections are made using terminal blocks.

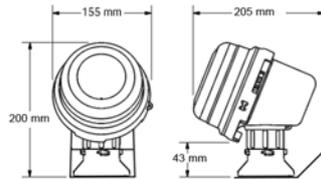
Terminator ZL (not shown) is designed to provide visual indication of an energized heating circuit. The kit may be utilized as a power connection or an end termination kit. Electrical connections are made using terminal blocks.

Terminator ZS/ZE is designed to fabricate accessible outside-the-insulation splices or end terminations of Thermon Heating Cables. Electrical connections are made using wire fasteners. (For applications requiring terminations to be made with terminal block connections, the Terminator ZP kit may be used.)

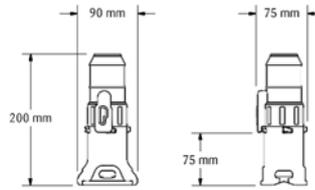
Terminator ZE-B are designed to provide visual indication of an energized heating circuit. The ZE-B utilize a high intensity LED assembly for superior day or night visibility. Electrical connections are made using wire fasteners. (For applications requiring terminations to be made with terminal block connections, the Terminator ZL kit may be used.)



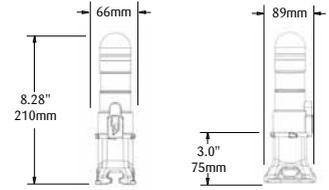
**Terminator ZP or ZL
with Pipe Mount Expediter**



**Terminator ZP or ZL
with Wall Mount Bracket**



Terminator ZS/ZE



Terminator ZE-B

	ZP	ZP-M	ZP-R	ZE-B	ZL	ZS/ZE
Enclosure Ratings	IP66	IP66	IP66	IP66	IP66	IP66
Max. Pipe Exposure Temperature	250°C	250°C	250°C	250°C	250°C	250°C
Min. Installation Temperature	-60°C	-60°C	-60°C	-60°C	-60°C	-60°C
Operating Ambient Temperature	-60°C to +55°C	-60°C to +55°C	-60°C to +55°C	-60°C to +45°C	-60°C to +55°C	-60°C to +55°C
Electrical Connection	Terminal Blocks ³	Terminal Blocks ³	Terminal Blocks ³	Wire Fasteners	Terminal Block ⁴	Wire Fasteners
Number of Power Connections	1 to 3 Cables	1 Cable	3 Cables (Max)	1 Cable	1 Cable	N/A
Number of In-Line/T-Splices	2 to 3 Cables	2 Cables	n/a	n/a	n/a	1 Inline
Number of End Terminations	1 to 2 Cables on ZP	1 Cable	3 Phases Wye	1 Cable	1 Cable	1 to 2 Cables ⁵
Maximum Conductor Size ¹	6 mm ²	16 mm ²	6 mm ²	6 mm ²	6 mm ²	N/A
Maximum Voltage Rating	750 Vac	750 Vac	750 Vac	277 Vac	See Indicating Lamp	750 Vac
Maximum Rated Current ¹	50 Amps	85 Amps	50 Amps	50 Amps	50 Amps	N/A
T-rating, Ta ² = 40°C	T4 @ 46 Amps T6 @ 22 Amps	T4 @ 46 Amps T6 @ 22 Amps	T4 @ 46 Amps T6 @ 22 Amps	T6	T4 @ 46 Amps T6 @ 22 Amps	T4 @ 46 Amps T6 @ 22 Amps
Indicating Lamp Service Life Rating	n/a	n/a	n/a	n/a	100,000 Hours	N/A
Indicating Lamp Operating Voltage Range	n/a	n/a	n/a	100 to 277 Vac	12 to 270 Vac	N/A

Notes

1. Alternate terminal block configurations are available, contact factory.
2. Higher Ambient temperatures are possible. Consult Thermon for corresponding T-rating.
3. Terminator ZP kit includes four line terminal blocks and two ground terminal blocks.
4. Terminator ZL kit includes four line terminal blocks and two ground terminal blocks.
5. Terminator ZE kit allows up to 3 cables to be terminated; additional ET end caps may be ordered separately.



PRODUCT SPECIFICATIONS

Terminator™ ZT

PIPEWALL SENSING THERMOSTATS

APPLICATION . . .

Electric Heat Tracing Control

The ZT is designed for use as an adjustable control thermostat for freeze protection and temperature maintenance applications requiring tankwall or pipewall sensing. The ZT is available in four temperature control and bulb exposure temperature ranges and has a flexible capillary armoring complete with capillary gland and insulation entry device. The ZT includes an expediter to facilitate attaching the thermostat directly on the pipe and permits two heating cables to enter and be connected within the enclosure.

Terminator ZT kit is approved for use in ordinary (nonclassified) and hazardous (classified) area's.

RATINGS/SPECIFICATIONS . . .

Enclosure rating	IP66
Maximum pipe exposure temperature	250°C
Minimum installation temperature	-60°C
Operating ambient temperature	
-60°C ≤ Ta ≤ +55°C	16 Amps Max, T6 85°C
-60°C ≤ Ta ≤ +50°C	25 Amps Max, T5 100°C
Voltage rating	230 Vac nominal up to 253 Vac ¹
Switch rating	25 A (Ohmic, NC contact)
Switch type	Controller
Electrical connection ²	Terminal block ³
Adjustable control range ⁴	
ZT-C-100	0°C to 100°C
ZT-C-200	0°C to 200°C
ZT-C-300	0°C to 300°C
ZT-C-500	20°C to 500°C
Maximum control differential/accuracy	
ZT-C-100	7% / -1 K to +7 K
ZT-C-200	2.5% / -2 K to +10 K
ZT-C-300	2.5% / -2 K to +16 K
ZT-C-500	2.5% / -2 K to +28 K
Maximum bulb exposure temperature	
ZT-C-100	230°C
ZT-C-200	230°C
ZT-C-300	345°C
ZT-C-500	530°C
Bulb dimensions/material/capillary length	
ZT-C-100	6 x 76 mm/stainless steel/1 m
ZT-C-200	6 x 76 mm/stainless steel/1 m
ZT-C-300	6 x 55 mm/stainless steel/1 m
ZT-C-500	6 x 280 mm/stainless steel/1 m
Max. electrical switching frequency	180 cycles/hour
Electrical durability operating cycles	min. 100.000 cycles
Mechanical durability operating cycles	min. 300.000 cycles

Notes . . .

- 400 Vac/16A version available on request.
- Thermostats are shipped with an M25 dust cap that can be replaced with an Ex e approved gland to permit power or heating cable connection.
- Terminal block consists of six line/load terminals and two PE terminals.
- The 300°C and 500°C thermostats are only available in wall mount bracket.



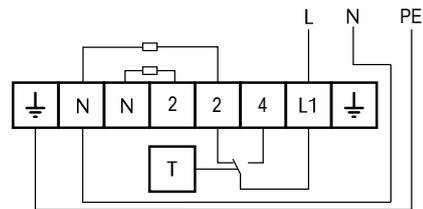
CONSTRUCTION . . .

- Junction Box, Glass-Reinforced Polymer with DIN Rail Mounted Terminal Blocks
- Pipe-Mount Expediter, Glass-Reinforced Polymer
- Capillary Temperature Sensor

CERTIFICATIONS/APPROVALS . . .

II 2 G Ex db eb IIC T5-T6 FM10ATEX0058X
 II 2 D Ex tb IIIC T100°C-T85°C
International Electrotechnical Commission
 IEC Certification Scheme for Explosive Atmospheres
 FMG 10.0022X

TYPICAL WIRING DIAGRAM . . .



PRODUCT REFERENCE LEGEND . . .

ZT-C-100-P	
Area Designation Z = Zone Areas	Cable Profile P = RSX, TSX, VSX, BSX, HTSX, KSX, FP, HPT MI = MIS, MIQ M = TEK, HTEK
Kit Type T = Thermostat	Control Range 100 = 0°C to 100°C 200 = 0°C to 200°C 300 = 0°C to 300°C 500 = 20°C to 500°C
Switch Type C = Controller	

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PRODUCT SPECIFICATIONS
TraceNet™ ECM™
 ELECTRONIC CONTROL MODULE

APPLICATION

The TraceNet ECM is an electronic control module specifically designed for controlling electric heat trace circuits used in freeze protection and temperature maintenance applications. Available in both pipe (XP) and wall (WP) mount version. The ECM serves both the temperature control as well as the sensor and power connection for a heat trace circuit.

The ECM is housed in a glass reinforced nonmetallic enclosure with an environmental protection rating of IP66. Depending on options selected, the ECM may be used as a combination of temperature control and limiter, or as a temperature controller. Rotary switches are provided for adjusting temperature control and limiter set points. The standard version of the ECM communicates on a physical network of RS485 by using a Mod-bus RTU communication protocol. Additionally, an alternate 4-20mA communication network output option is available.

The ECM is approved for use in both ordinary (non-classified) and hazardous (classified) areas.

RATINGS

Operating/control voltage ... 120 Vac+10%/-10% (50/60 Hz)
 230 VAC+10%/-10% (50/60 Hz)
 Operating ambient range-60°C to 55°C
 Minimum ambient storage range -74°C
 Control switch type options.....SPST and DPST
 Switching current ratings¹
 SPST..... 30/30/20 amps (25°C, 40°C, 55°C)
 DPST 28/23/17 amps (25°C, 40°C, 55°C)
 Alarm output current rating.....2 A
 Electrical connection.....terminal blocks³
 Adjustable temp. control range.....0° to 500°C
 Measurement range-60° to 500°C
 Measurement accuracy (ambient)
 ± 1°C (0°C to +55°C)
 ± 2°C (0°C to -60°C)
 Temperature sensor(s) 100 Ohm three wire Platinum RTD
 High temp. alarm/tripprogrammable
 (auto or manual reset)
 RTD input circuitryintrinsically safe (Ex i)
 Life expectancy.....250,000 cycles

CERTIFICATIONS/APPROVALS

CE Certificate SIRA 12ATEX5239X
 II 2(2) G Ex eb mb [ib] IIC T4 Gb
 II 2(2) D Ex tb IIIC T135°C IP66 Db

IEC Certificate IECEx SIR 12.0103X
 Ex eb mb [ib] IIC T4 Gb
 Ex tb IIIC T135°C Db

ECM has additional hazardous approvals including:
 CSA, TRCU, TCCE, INMETRO



CONSTRUCTION

- 1 Pipe-mount expediter², glass-reinforced polymer
- 2 Three-wire RTD sensor (order separately)
- 3 Junction box, glass-reinforced polymer
- 4 Stainless steel mounting bracket

PRODUCT FEATURES

- Encapsulated electronics and control
- One temperature control module for wide range of temperature control and limiter applications
- Energy saving accurate electronic temperature control action
- Data highway communication capability
- Selectable automatic or manual reset limiter action
- Control/limiter setting in degrees Centigrade or degrees Fahrenheit
- Combines power junction box and control module in one unit

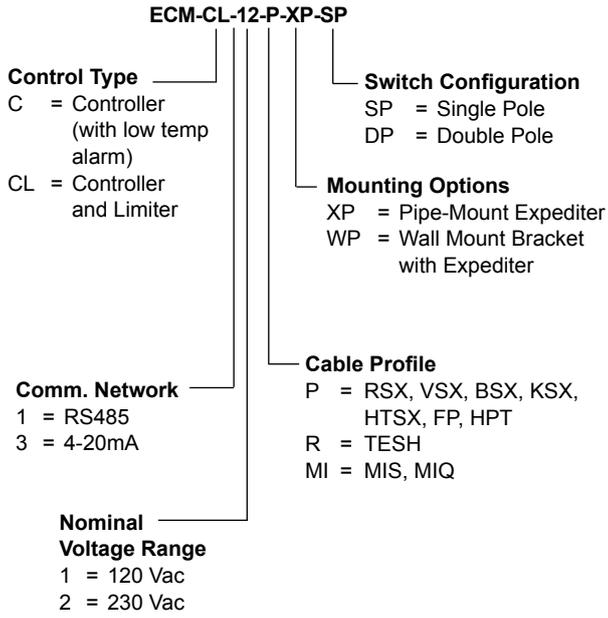
Notes

1. When located outdoors and subject to solar gain, some current de-rating will be required. Contact Thermon for additional information.
2. The pipe mount expediter has a maximum pipe exposure temperature of 250°C.
3. The terminal blocks consist of:
 (6) 10 mm² line/load/PE terminals
 (3) 3 mm² comm. port terminals
 (3) 3 mm² alarm relay terminals
 (2 x 3) 2.5 mm² sensor terminals
 See installation instructions for maximum wire size.
4. Refer to Form TEP0010U, System Accessories - Heat Tracing Cables for additional accessories.

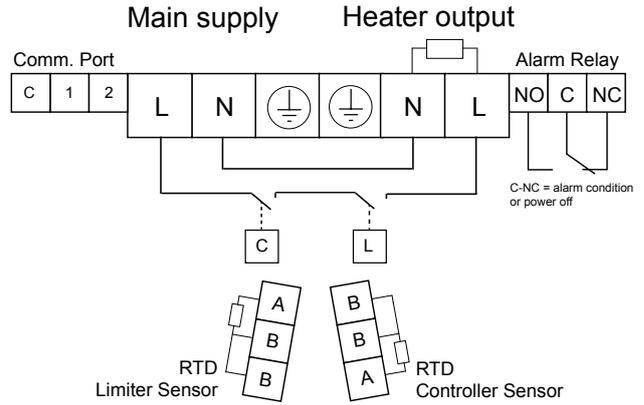
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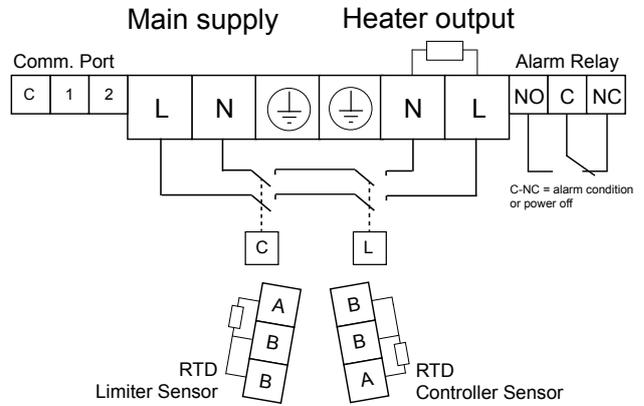
PRODUCT REFERENCE LEGEND



TYPICAL WIRING DIAGRAM (for controller with limiter) Single Pole



Double Pole





PRODUCT SPECIFICATIONS

SYSTEM ACCESSORIES

HEAT TRACING CABLES

APPLICATION FREEZE PROTECTION AND PROCESS TEMPERATURE MAINTENANCE

The following information relates to power connection kits, end termination kits and common installation accessories used with Thermon BSX™, RSX™, KSX™, HTSX™, VSX™, FP, HPT, MIS, MIQ and TEK heating cables.



Terminator ZP... is designed to fabricate power connections, in-line/T-splice connections or for making end terminations. The Terminator ZP-XP is suitable for use in hazardous areas (Ex e T6/T4), harsh industrial environments and has a IP66 rating. The upfront positioning of the terminal block permits easy access during assembly and for future routine maintenance.

The Terminator ZP kit includes; Pipe-mounted expediter with suitable grommet, Junction box with two M25 entries and one M25-B-Exe blind plug, Four 6-mm² line/load terminals, Two 6-mm² earth terminals, Terminals rated to 22 amps (T6 85°C) or 46 amps (T4 135°C), Maximum voltage rating of 750 Vac. Wallmount version is available.

Product Reference Legend:

- ZP-XP** and **ZP-WP** RSX, VSX, BSX, HTSX, KSX, FP, HPT
- ZP-R-XP** and **ZP-R-WP** TESH
- ZP-MI-WP** MIS, MIQ
- ZP-M-XP** TEK

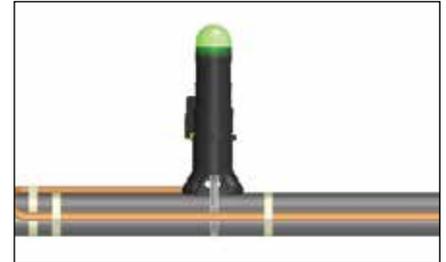


Terminator ZL... is designed to provide visual indication of an energized heating circuit. The kit may be utilized as a power connection or an end termination kit. Electrical connections are made in terminal blocks utilizing nickel-plated copper terminals to ensure corrosion-free electrical integrity.

The Terminator ZL kit includes; IP66 rated junction box, yellow LED indicating lamp, four 6-mm² line/load terminals, two 6-mm² earth terminal, pipe-mounted fitting, heater cable grommet.

Product Reference Legend:

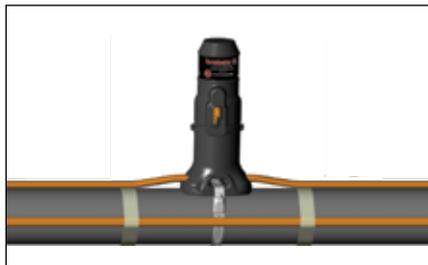
- ZL-XP** and **ZL-WP** RSX, VSX, BSX, HTSX, KSX, FP, HPT



Terminator Beacon... end-of-circuit light kits are designed specifically for rapid, trouble-free installation of Thermon self-regulating and power-limiting, parallel resistance polymer insulated heating cables. The Terminator Beacon utilizes a high intensity green LED assembly for superior day or night visibility.

Product Reference Legend:

- ZE-B**.... BSX, RSX, HTSX, KSX, VSX, FP, HPT



Terminator ZS/ZE... designed to fabricate accessible outside-the-insulation splices or end terminations of Thermon Heating Cables. Electrical connections are made using wire fasteners (for applications requiring terminations to be made with terminal block connections, the Terminator ZP kit may be used).

Product Reference Legend:

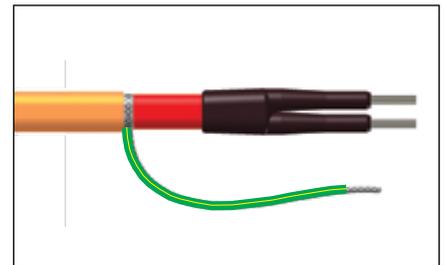
- ZS/ZE-XP**..... BSX, RSX, HTSX, KSX, VSX, FP, HPT



PETK...circuit fabrication kits are required for use with all Thermon Parallel Heating Cables Connection Kits. Kits for termination of SX cables include a power connection boot, end cap, RTV adhesive and a caution label. Kits for termination of HPT and FP cables also include tape strip and a distinct grommet.

Product Reference Legend:

- PETK-1** BSX, RSX, VSX
- PETK-2** KSX, HTSX
- PETK-3** FP, HPT
- PETK-3-ECM** FP, HPT
- PETK-3-ZT** FP, HPT
- PETK-4** HPT > 240°C



SCKT...splice connection termination kits are required when preparing outside-the-insulation splices with all Thermon Parallel Heating Cables Connection Kits. Kits for terminations of SX cables include 2 splice connection boots, assorted wire nuts and RTV adhesive. Kits for termination of HPT and FP cables also include a distinct grommet.

Product Reference Legend:

- SCKT-1** BSX, RSX, VSX
- SCKT-2** KSX, HTSX
- SCKT-3** FP, HPT

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SYSTEM ACCESSORIES

HEAT TRACING CABLES

CABLE END TERMINATION KITS, ATTACHMENT TAPES AND MISCELLANEOUS ITEMS



CS-L*-Ex.... Circuit switch with lamp to be used as an in-line isolation switch for single phase, phase-phase and 3-phase heat tracing circuits. Available in 16 A, 25 A and 40 A versions.



B-4, B-10, B-21... stainless steel attachment bands for securing Thermon nonmetallic kits to pipes.

B-4... for pipes up to 100 mm diameter

B-10... for pipes up to 250 mm diameter

B-21... for pipes up to 530 mm diameter

ABA-25... for pipes up to 25 mm diameter

ABA-40... for pipes up to 40 mm diameter

Terminator-LN-Tool... for tightening the locnuts of the Terminator kits. Tool is recommended to ensure enclosure is properly secured to the pipe-mounted expediter.



Insulation Entry Kits (IEK)... are used for inserting permanent circular and noncircular cables into the insulation. The kit protects and seals the cable while penetrating the insulation cladding.

Item Description	Cable	Torque Value (Nm)
IEK-14	HTSX, KSX, FP	4,5
IEK-18	HPT, KSR	5,5
IEK-19	BSX, FLX	8,0
IEK-20	VSX, RSX	8,0
IEK-TES-1LT	TESH / PT100	1,5



Tracer Cable Glands non-metallic... These polyamide cable glands are used for inserting permanent circular and non-circular cables into the enclosure. The glands are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IECEx Scheme.

Item Name	Cable	Torque Value (Nm)
M25-14-EXE	HTSX, KSX, FP	4,5
M25-18-EXE	HPT, KSR	5,5
M25-19-EXE	BSX, FLX	8,0
M25-20-EXE	VSX, RSX	8,0
M20 EXE + PT100 + TESH (8161 7-13)	TESH, also for PT100 / Power	1,5



Power Cable Glands non-metallic... These polyamide glands are used for inserting power cables into the enclosure. The glands are certified for use in ordinary (nonclassified) areas and in potentially explosive atmospheres in accordance with the ATEX Directive and the IECEx Scheme.

Item Name	Dia. (mm) min - max	Torque Value (Nm)	Ambient Temp.
M20 EXE	4,0 - 13,0	1,5	-60° to 75°C
+ PT100 + TESH (8161 7-13)	7,0 - 17,0	2,0	-60° to 75°C
M25 EXE	7,0 - 17,0	2,0	-60° to 75°C
(8161 10-17)			



FT-1L, FT-1H... fixing tape for attaching heating cable to piping every 300 mm or as required by code or specification.

AL-20H, AL-30H... aluminium tapes for continuous (longitudinal) covering cable to piping and/or equipment.

Item Number	Max. Temp. (Exposure)	Min. Temp. (Installation)	Size (mm x m)
FT-1L	93 °C	5 °C	12 x 33
FT-1H	260 °C	-40 °C	12 x 33
AL-20H	150 °C	-5 °C	50 x 55
AL-30H	150 °C	-5 °C	76 x 55



SK-SX-OJ... Ex e approved under-the-insulation repair and splice kit for overjacketed SX cables. Kit includes stainless steel shells, screws, grommets, RTV adhesive/sealant, insulation tape and the necessary wire pins/lugs.



CL... vinyl-based peel-and-stick caution labels are intended for direct exposure to industrial environments. Electrically heated pipelines and vessels should be clearly identified at frequent intervals along the pipeline or vessel. Caution labels should be placed at 3 to 6-m intervals or as required by code or specification. Additional languages or other texts are available; contact Thermon.



XP-1... pre-drilled stainless steel (type 304) mounting bracket designed for mounting Thermon junction boxes and thermostats directly to the pipework. The bracket is easily secured to the pipe using B-4, B-10 or B-21 attachment bands. The XP-1 utilises a 110-mm standoff.

XP-1-140X140 JB-K-0, JB-K-1, JB-K-2
 XP-1-WP Terminator WP

Tab

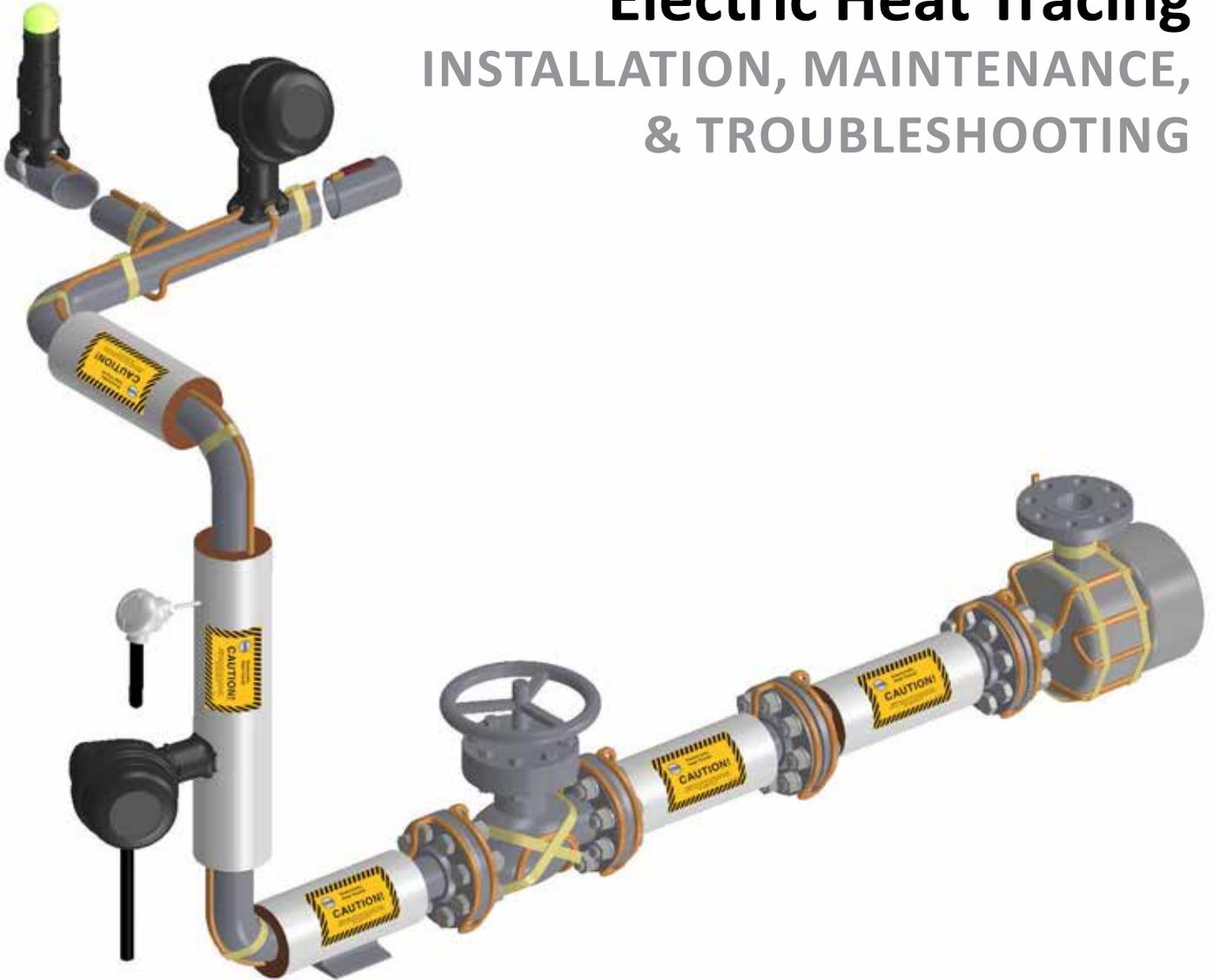
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Tab

Electric Heat Tracing

INSTALLATION, MAINTENANCE, & TROUBLESHOOTING



About These Instructions

The installation instructions within this document describe the installation of Thermon trace heating systems in typical piping applications and are suitable for use with the flexible trace heating products listed on page 3.

These instructions are not intended for mineral-insulated (MI) trace heaters. Instructions and documentation for other products and applications may be found at www.thermon.com.

For translations of this document in languages other than English, please contact Thermon. The English language version of this document shall govern.

IMPORTANT: To maintain warranty coverage of the trace heating system, the steps in these installation instructions, including testing, must be followed and documented on the Installation Report (page 11), wherever required in the text.

Safety and Site Practice

- Installation shall be carried out under the supervision of a qualified person.
- Persons involved in the installation and testing of electric trace heating systems shall be suitably trained in all special techniques required, including:
 - the purpose and function of the electrical trace heating system,
 - its associated power supply and control equipment, and
 - how to recognise and avoid the hazards associated with its operation and maintenance.
- All personnel shall use all appropriate personal protective equipment (PPE), including protective clothing, to protect against potential arc flash and shock hazards.
- All personnel shall comply with all applicable safety and health guidelines, including Thermon requirements, the regulations outlined in EN/IEC 60079-14 and EN/IEC/IEEE 60079-30-2 for hazardous areas (as applicable), and any other applicable national and local electric codes.
- During installation, the trace heating system parameters shall be verified. Tests shall be performed in the field **and documented in the Installation Report** (page 11) as instructed.

Thermon Flexible Polymer-Insulated Trace Heaters

Type ¹	Marking/Usage ¹	Specific Conditions of Use	Minimum Installation Temp.	Minimum Bend Radius
Self-Regulating Trace Heaters				
BSX™	CE1725 II 2 G Ex eb IIC T5 or T6, II 2 D Ex tb IIIC T100°C or T85°C FM 13ATEX0052 IECEX FMG 13.0020 Ex eb IIC T5 or T6, Ex tb IIIC T100°C or T85°C	–	–60 °C	10 mm @ –15 °C 32 mm @ –60 °C
RSX™ 2,3	CE1725 II 2 G Ex eb IIC T6...120°C (T4), II 2 D Ex tb IIIC T80°C...T120°C KEMA 07ATEX0179 IECEX KEM 07.0052 Ex eb IIC T6...120°C (T4), Ex tb IIIC T80°C...T120°C	–	–50 °C	10 mm @ –15 °C 32 mm @ –50 °C
			With-FOJ option: –60 °C	10 mm @ –15 °C 32 mm @ –60 °C
HTSX™ 2,4	CE1725 II 2 G Ex eb IIC T2 or T3, II 2 D Ex tb IIIC T300°C or T200°C FM 12ATEX0014X IECEX FMG 12.0004X Ex eb IIC T2...T3, Ex tb IIIC T300°C...T200°C	See note 6	–60 °C	10 mm @ –15 °C 32 mm @ –60 °C
KSX™ 2,4	CE1725 II 2 G Ex e II T3 to T6, II 2 D Ex tD A21 IP66/IP67 T200°C to T85°C FM 07ATEX0027 IECEX FMG 06.0009 Ex e II T3 to T6, Ex tD A21 IP66/IP67 T200°C to T85°C	–	–60 °C	10 mm @ –15 °C 32 mm @ –60 °C
VSX™	CE1725 II 2 G & D Ex e II T3 DEMKO 02ATEX0152667 IECEX UL 05.0008X Ex e II T3	–	–60 °C	10 mm @ –15 °C 32 mm @ –60 °C
VSX-HT™	CE1725 II 2 G Ex 60079-30-1 IIC T6...T2 Gb, II 2 D Ex 60079-30-1 IIIC T85°C...T300°C Db FM 18ATEX0009X IECEX FMG 18.0002X Ex 60079-30-1 IIC T6...T230°C (T2) Gb, Ex 60079-30-1 IIIC T85°C...T230°C Db	–	–60 °C	10 mm @ –15 °C 32 mm @ –60 °C
Power-Limiting Trace Heaters				
HPT™ 5	CE1725 II 2 G Ex 60079-30-1 IIC T6...T2 Gb, II 2 D Ex 60079-30-1 IIIC T85 °C...T300 °C Db DEKRA 16ATEX0093 IECEX DEK 16.0046 Ex 60079-30-1 IIC T6...T2 Gb, Ex 60079-30-1 IIIC T85°C...T300°C Db	–	–60 °C	10 mm @ –15 °C 32 mm @ –60 °C
Parallel Constant-Watt Trace Heaters				
FP	CE1725 II 2 G Ex e II T3 to T6, II 2 D Ex tD A21 IP66/IP67 T200°C to T85°C FM 07ATEX0016 IECEX FMG 06.0008 Ex e II T3 to T6, Ex tD A21 IP66/IP67 T200°C to T85°C	–	–60 °C	10 mm @ –15 °C 19 mm @ –60 °C
Series Constant-Watt Trace Heaters				
HTEK™, TEK™	CE1725 II 2 G Ex eb IIC T260°C (T2) to T6, Ex tb IIIC T260°C to T85°C FM 11ATEX0050 IECEX CCVE 11.0002 Ex eb IIC T260°C (T2) to T6, Ex tb IIIC T260°C to T85°C	–	–60 °C	22 mm @ –15 °C 32 mm @ –60 °C
TESH™	CE1725 II 2 G Ex e IIC T2 to T6 Gb, II 2 D Ex tb IIIC IP6X T260°C to T80°C Db ISSeP 10ATEX015X	–	–60 °C	5 times the outside diameter

Notes

- Temperature ratings may vary within a trace heater product type. Always verify that the temperature ratings and markings of the trace heater are appropriate for the specific installation location.
- EN 60079-0:2012+A11:2013, EN 60079-30-1:2007, EN 60079-31:2014, IEC 60079-0:2011, IEC 60079-30-1:2007, IEC 60079-31:2013
- For use with integral components: TBX-3LC, ET-6C, PETK-1, SCTK-1, SK-SX, HS-PBSK-HD, and HS-ET-6C-HD. Also for use with other suitably certified connection kits such as Thermon Terminator series.
- For use with integral components: ET-8C, PETK-2, SCTK-2, TBX-4LC, and SK-SX. Also for use with other suitably certified connection kits such as Thermon Terminator series.
- For use with integral components: ET (-6C,-7C,-8C), TBX-4LC, PETK kits (-3,-3D,-4,-HPTXR), SCTK (-3,-3D,-4,-HPTXR), HPEK, and HPSK. Also for use with other suitably certified connection kits such as Thermon Terminator series.
- For insulated externally heated surfaces, lower T-class systems may be obtained by utilizing stabilised design of a trace heating system using methods described in IEC/IEEE/EN 60079-30-1. Clause 4.5, using CompuTrace Electric Heat Tracing Design Software or by Thermon Engineering. The system design parameters, including the resulting T-class, shall be retained as a record of system documentation for each stabilised system design for as long as the system is in use. The parameters in the system documentation shall be checked during commissioning of the system.

About Electric Trace Heating Systems

Thermon electric trace heating systems are used for freeze protection or temperature maintenance of piping, tanks, and instrumentation. They may be installed in ordinary (nonclassified) and hazardous (classified) locations, depending on the specific trace heater options and approvals¹.

A typical self-regulating electric trace heating system (as depicted in Illustration A) may consist of the following components:

1. Electric trace heater (may be self-regulating, power-limiting, parallel constant-watt, or series constant-watt)¹.
2. Power connection kit².
3. RTD sensor or control thermostat².
4. In-line/T-splice kit (permitting two or three cables to be spliced together).
5. Cable end termination.
- 5a. End of circuit light kit.
6. Attachment tape (use on 30cm intervals, or as required by code or specification).
7. "Electric Heat Tracing- Caution" label.
8. Thermal insulation⁴ and vapor barrier.

The absence of any of these items can cause a system to malfunction or represent a safety hazard.

Notes

- 1 See Page 3 for trace heater types and approvals.
- 2 Power connections must be used with correctly-installed certified enclosures that are suitable for the application (such as Terminator™). When connecting Ex e certified terminals using associated accessories, the required creepage distances and clearances shall be observed.
- 3 Temperature control is recommended for all freeze-protection and temperature-maintenance trace heating applications.
- 4 All heat-traced lines must be thermally insulated.

Trace Heating System Design

- The design of electrical resistance trace heating systems shall be overseen by persons knowledgeable of trace heating, following the design methodology for explosive atmospheres as specified by Thermon Engineering or CompuTrace Electric Heat Tracing Design Software.
- For insulated externally heated surfaces, lower T-class systems may be obtained by utilizing stabilised designs or controlled designs using methods described in IEC/IEEE/EN 60079-30-1, Clause 4.5, using CompuTrace Electric Heat Tracing Design Software or by Thermon Engineering. The system design parameters, including the resulting T-class, shall be retained as a record of system documentation for each design for at least as long as the system is in use. The parameters in the system documentation shall be checked during commissioning of the system.
- The stabilised design method may be used for self-regulating, power-limiting, and constant-watt heating cables without a limiting device.
- Series heating cable output and T-rating are dependent upon several variables, including supply voltage, cable resistance, and temperature conditions.

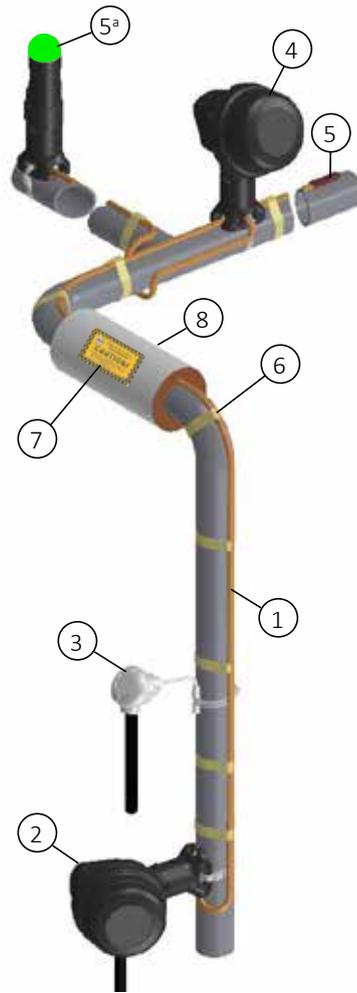


Illustration A: Typical Trace Heating Installation

Upon Receiving the Trace Heater

1. Make sure that the correct type (including the correct nominal power output and voltage level) has been received.

All flexible trace heaters, of the types covered in this document, are printed with the catalog number, voltage rating and power output (in W/m or W/ft) on the jacket. To verify the year of construction, please contact Thermon with the batch code number printed on the trace heater jacket.

2. **Record the reel number, reel length, trace heater type, and nominal power output and voltage in the Pre-Installation section of the Installation Report** (page 11).
3. Visually inspect cable for any damage incurred during shipment. **Note any observed damage** in the Installation Report.
4. Perform the Insulation Resistance (IR) Test, described on this page, to confirm the trace heater's electrical integrity. **Record the reading** in the Installation Report.
5. Store the trace heater in a dry location.

Before Installing

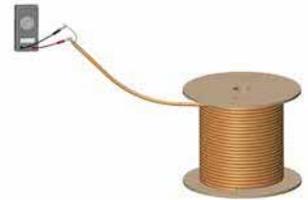
- Be sure all piping and equipment to be traced have been completely installed and pressure-tested.
- Ensure that all surface areas where the trace heater is to be installed are reasonably clean. Remove any dirt, rust, and scale with a wire brush. Remove oil and grease films with a suitable solvent.
- De-energise power sources before installation.
- Keep ends of trace heaters and kit components dry before and during the installation.

Insulation Resistance (IR) Testing

The insulation resistance (IR) test establishes the electrical integrity of the trace heater. For the flexible trace heaters covered in this document, the IR test should be performed with a megger capable of delivering a voltage of at least 500 Vdc.

1. If not done already, prepare the conductors of the trace heater according to the instructions accompanying the power and end termination kit(s) provided with the system.
2. Connect the megger's positive lead to the cable bus wires, shorted together.
3. Connect the megger's negative lead to the metallic braid.
4. Set the megger test voltage to 500 Vdc.
5. Energise the megger for 60 seconds.
6. Readings of at least 20 MΩ are acceptable.

Readings below 20 MΩ usually indicate that the electrical insulation of the trace heater has been compromised.



Check the trace heater for signs of physical damage between the braid and the heating element. Small cuts or scuffmarks on the outer jacket will not affect the megger reading unless there is penetration through the braid and dielectric insulation jacket.

Initial Trace Heater Installation

- Begin installing the trace heater at the proposed end-of-circuit location, following the guidance in the isometric system diagrams (if provided).
- Lay out the trace heater on the pipe, at the 4 or 8 o'clock position (Illustration B), securing it tightly against the pipe with attachment tape. Wrap bands of tape around the trace heater and pipe at intervals of 30 cm or less, keeping the trace heater in close contact with the pipe.
- If accessibility is a problem, the trace heater may be installed at the 10 or 2 o'clock position.
- Refer to Table 1 (page 7) to estimate the number of rolls of attachment tape required, based on the pipe length and diameter¹.
- A continuous covering of aluminum foil tape may also be required under special circumstances, including:
 - where spray or foam² thermal insulation will be applied,
 - where nonmetallic piping is used, or
 - design requirements dictate the use of aluminum tape.
- Allow extra length of trace heater for power connections, splices, and any in-line heat sinks (Illustration C). See page 7 and page 8 for details on how to properly install the trace heater at these sites and the allowance of trace heater required.
- Install temperature sensors at least 90° away from trace heater locations.
- **CAUTION:** For series constant-watt trace heaters (HTEK, TEK, TESH), do not allow the heating portion of the trace heater to touch, cross over, or overlap itself.
- **CAUTION:** Do not exceed the trace heater's specified minimum bend radius. Refer to page 3 of this document for the minimum bend radius of the specific trace heater type.

Notes

- 1 Table 1 assumes circumferential bands every 30 cm along the length of the piping.
- 2 Verify that the curing temperature of the insulation is less than the exposure temperature of the trace heater.

Illustration B: Heating Cable vs. Sensor Location

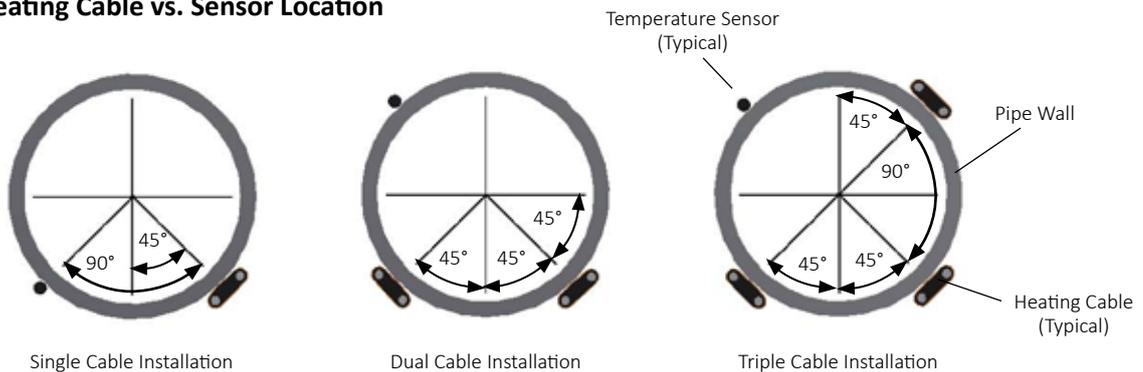


Illustration C: Temporary Installation

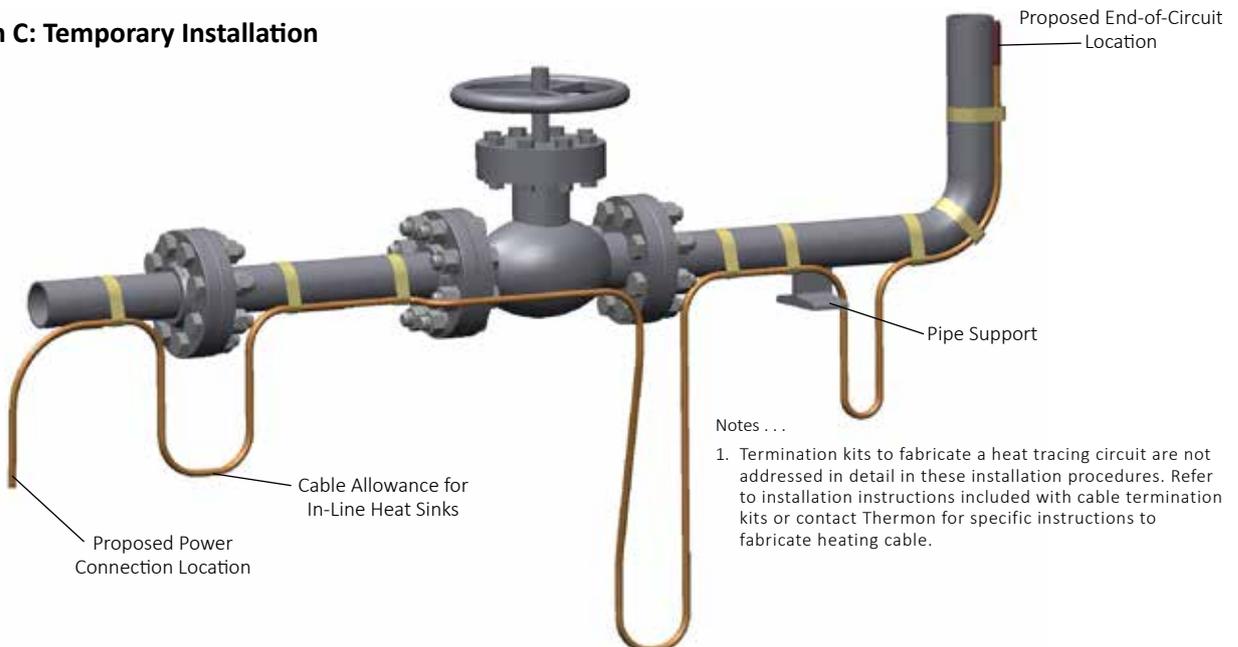


Table 1: Attachment Tape (Approximate Linear Pipe Length Allowance Per Roll)

Pipe Size mm	12-25	32	40	50	80	100	150	200	250	300	350	400	450	500	600	750
Length of Pipe/ Roll of Tape m	109.7	79.2	67.0	54.9	45.7	36.6	27.4	21.3	18.2	15.2	12.2	10.7	9.1	7.6	6.0	4.6

Installation on Elbows, Pipe Supports, and Flanges

- **Elbows:** Locate the trace heater on the outside radius of the elbow (Illustration D). Secure the trace heater to the pipe with attachment tape on each side of the elbow.
- **Pipe Supports:** For uninsulated pipe supports, allow twice the length of the support, plus an additional 40 cm of trace heater. Install the trace heater in a loop, following Illustration E as a guide.

- **Flanges:** Loop the trace heater around the pipe on each side of, and adjacent to, the flange (Illustration F). Be sure to keep the trace heater in close contact with the flange throughout the length of the bend.

Refer to Table 2 (page 8) for typical flange allowances.

Insulated pipe supports do not require additional length of trace heater.

Illustration D: Pipe Elbow

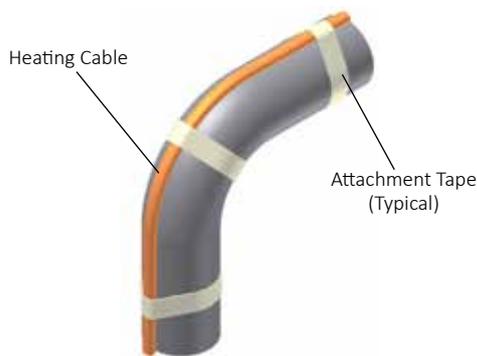


Illustration E: Uninsulated Pipe Support

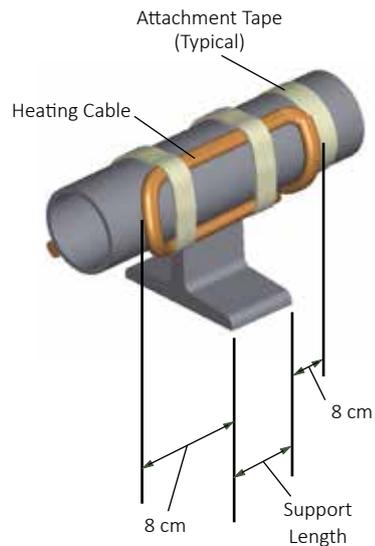
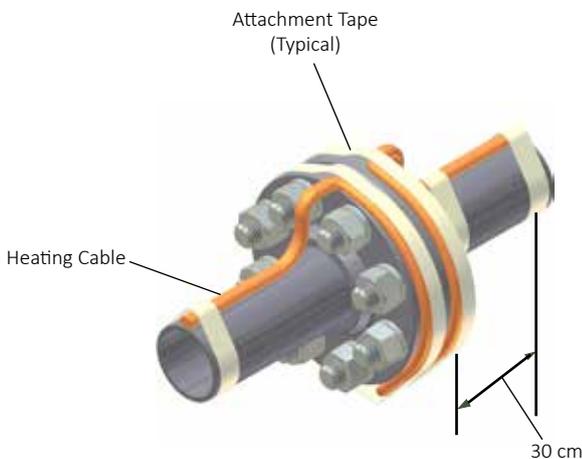


Illustration F: Pipe Flange



Note: Flange allowance will vary based on method of insulating flange and adjacent piping.



Circuit Layout on Support

Note . . .

1. Only applicable for pipe ≥ 50 mm.

Installation on Valves and Pumps

- Valves, pumps, and other miscellaneous equipment require additional passes of trace heater to offset the increased heat loss that occurs at these sites.
- Refer to the isometric system drawings, provided by Thermon Engineering, for allowances specific to each line and circuit.

Allowances for typical valves and pumps are provided in Table 2.

- Install the trace heaters using a looping technique, using Illustrations G and H as a guide, such that the valve or pump may be removed for required service and maintenance.
- Keep the trace heater in close contact with the pipe and heat sink areas, to compensate for additional heat loss.

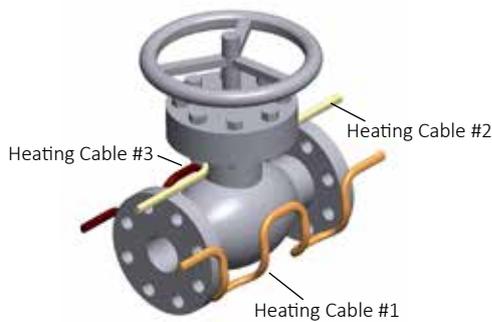
Table 2: Typical Valve, Pump, and Flange Allowances¹

Pipe Size (mm)	Valve Allowance (M)			Pump Allowance (M)		Flange Allowance (M)
	Screwed or Welded	Flanged	Butterfly	Screwed	Flanged	
12	0.20	0.30	0.00	0.30	0.61	0.38
20	0.20	0.46	0.00	0.46	0.91	0.46
25	0.30	0.61	0.30	0.61	1.22	0.46
32	0.50	0.61	0.30	0.91	1.37	0.61
40	0.50	0.76	0.46	0.91	1.52	0.61
50	0.60	0.76	0.61	1.22	1.68	0.69
80	0.80	1.07	0.76	1.52	2.13	0.69
100	1.20	1.52	0.91	2.44	3.05	0.84
150	2.10	2.44	1.07	4.27	4.88	0.99
200	2.90	3.35	1.22	5.79	6.71	1.14
250	3.80	4.27	1.22	7.62	8.53	1.30
300	4.60	5.03	1.52	9.14	10.06	1.52
350	5.50	5.94	1.68	10.97	11.89	1.68
400	6.60	7.01	1.83	13.11	14.02	1.83
450	7.80	8.23	1.98	15.54	16.46	1.98
500	8.70	9.14	2.13	17.37	18.29	2.21
550	10.40	10.97	2.44	20.73	21.95	2.51
600	12.20	12.80	3.05	24.38	25.60	3.05

¹ Allowance is the total length of additional trace heater to be installed. If multiple passes are used, total allowance may be divided among the individual passes.

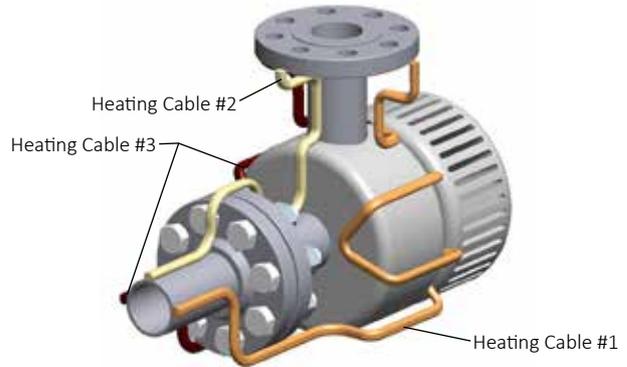
Valve allowances are based on 150-pound class valves; more passes are required for higher-rated valves.

Illustration G: Typical Valve Detail

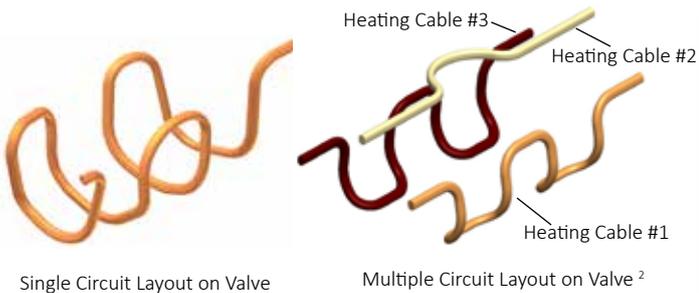


Heating Cable Serpentine on Valve

Illustration H: Typical Pump Detail

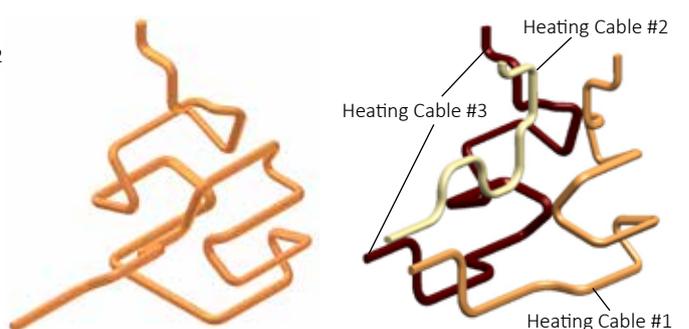


Heating Cable Serpentine on Pump



Single Circuit Layout on Valve

Multiple Circuit Layout on Valve²



Single Circuit Layout on Pump

Multiple Circuit Layout on Pump²

Completing the Trace Heater Installation

1. Secure the end-of-circuit termination kit and work back toward the power supply (Illustration I).
2. Keep the trace heater in secure contact with the pipe, using bands of attachment tape at least every 30 cm.
3. Secure any required temperature sensors to the pipe using attachment tape.
4. Complete any required splice connections in accordance with the installation instructions provided with the splice kit.
5. Install any power connection kits in accordance with the detailed installation instructions provided with the kit.
6. Connect the metallic braid of the trace heater to a suitable earthing/ground terminal.
7. Before completing the power connections, perform an Insulation Resistance (IR) Test (page 5) and **record the result in the After Installation** section of the Installation Report (page 11). The recorded value shall not be less than 20 MΩ.
8. **Record the line number and all other associated circuit information** in the After Installation section of the Installation Report.

Illustration I: Final Cable Attachment



Installing Thermal Insulation

Properly installed and well-maintained thermal insulation is critical to the performance of the trace heating system. Without proper insulation, heat losses are generally too high to be offset by a conventional heat tracing system.

1. Properly insulate all heat sinks, including pipe supports, hangers, flanges, and in most cases, valve bonnets.
2. Install a protective vapor barrier over the insulation, regardless of the type or thickness of insulation used. The vapor barrier protects the insulation from moisture intrusion and physical damage and ensures the proper performance of the trace heating system.
3. Seal all penetrations around the vapor barrier.
4. After ensuring that the insulation is weather-tight, **document the completion of the insulation** in the After Installation of Thermal Insulation section of the Installation Report (page 11).

After Installing Thermal Insulation

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

1. Apply the provided peel-and-stick “Electric Heat Tracing- Caution” labels along the pipe, on the outermost surface of the thermal insulation or vapor barrier, at intervals of 3 m or less.
2. Apply the caution labels at any other appropriate locations, such as valves.

Circuit Protection Requirements

- Each branch circuit must use over-current protection that isolates all appropriate power conductors from the supply (typically circuit breakers).
- Earth fault equipment protection is required for each circuit.
- For typical installations (with TT and TN grounding systems), the means of protection must include a residual current protective device for each branch circuit.
- For fixed-level earth/ground-fault circuit interrupters, a minimum 30 mA trip level is recommended. The preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater, as specified by Thermon Engineering.
- Where conditions of maintenance and supervision ensure that only qualified persons will service the installed systems, and continued circuit operation is necessary for the safe operation of the equipment or processes, earth-fault detection without interruption is acceptable if alarmed in a manner to assure an acknowledged response.
- For IT grounding systems, a means of protection against earth faults is required that includes an electrical insulation monitoring device that shall disconnect the supply whenever the electrical resistance is not greater than 50 ohms/volt of rated voltage.

Final Inspection

1. After installing the thermal insulation and vapor barrier **BUT BEFORE ENERGIZING THE CIRCUIT**, repeat the IR test to verify that the trace heater has not been damaged during installation. **Record the IR value** in the After Installation of Thermal Insulation section of the Installation Report (page 11).
2. For Series Heating Cables, measure the electric loop resistance and **record the resistance values** in the Installation Report.
3. Ensure that all junction boxes, temperature controllers, cable glands, etc., are properly secured.
4. If a temperature controller is used, force the circuit on and energise the circuit at the rated voltage.
5. After 5 minutes, measure the voltage, current, pipe temperature, and ambient temperature. **Record these values in the Final Commissioning section of the Installation Report.**
6. If a control device is used, verify its settings to ensure that the maximum surface temperature does not exceed the system T-rating, in accordance with IEC/IEEE/EN 60079-30-1, Clause 4.

Documentation Retention

The trace heating system documentation shall be retained for each trace heating circuit for as long as the system is in use. This includes:

- System Design Parameters And T-Class
- Isometric Circuit Diagrams
- Maintenance Records
- Operating History
- These Instructions
- All Other Documentation Provided By Thermon

Installation Report

Project Information					
Project No.		Installer			
Unit No.					
Customer Reference No.		Inspector			
Thermon Reference No.					
Pre-Installation					
Reel No.		Insulation Resistance (IR)			
Reel Length	m/ft	Single-Phase:		MΩ/GΩ	
Trace Heater Type		3-Phase	<u>L₁</u>	MΩ/GΩ	
Power Output (nom.)	W/m/W/ft	(for Series	<u>L₂</u>	MΩ/GΩ	
Voltage (nom.)	V	Trace Heaters):	<u>L₃</u>	MΩ/GΩ	
Notes		Tested By/Date			
		Witnessed By/Date			
After Installation					
Line No.		Braid Connected to Ground?			
Equipment No.		Unused Entries Plugged Off?			
Circuit/Heater No.		Insulation Resistance (IR)			
Circuit Switch No.		Single-Phase:		MΩ/GΩ	
Thermostat No.		3-Phase	<u>L₁</u>	MΩ/GΩ	
Junction Box No.		(for Series	<u>L₂</u>	MΩ/GΩ	
Panel No.		Trace Heaters):	<u>L₃</u>	MΩ/GΩ	
Breaker No.					
Trace Heater Line Length	m/ft				
Notes		Tested By/Date			
		Witnessed By/Date			
After Installation of Thermal Insulation					
Insulation Weather-Tight?		Insulation Resistance (IR)			
Caution Labels Placed?		Single-Phase:		MΩ/GΩ	
Electrical Loop Resistance (for Series Trace Heaters)	<u>L-L</u>	Ω	3-Phase	<u>L₁</u>	MΩ/GΩ
	<u>L₁-L₂</u>	Ω	(for Series	<u>L₂</u>	MΩ/GΩ
	<u>L₂-L₃</u>	Ω	Trace Heaters):	<u>L₃</u>	MΩ/GΩ
	<u>L₃-L₁</u>	Ω			
Notes		Tested By/Date			
		Witnessed By/Date			
Final Commissioning					
Perform final measurements after energising circuit for 5 minutes.					
Ambient Temperature	°C/°F	Voltage		V	
Pipe Temperature	°C/°F	Current		A	
Notes		Tested By/Date			
		Witnessed By/Date			

NOTE: All Insulation Resistance (IR) values shall be at least 20 MΩ for a successful installation.

Maintenance and Repair

- Once the system has been successfully installed, an ongoing preventive maintenance program should be implemented, using qualified personnel. The trace heating system should be inspected and tested on a regular basis, at least once per year.
- Keep records of the operating and maintenance history for each circuit, including all test results performed during maintenance and inspection. Record-keeping during scheduled maintenance will help to establish a “normal” range of operation. Insulation resistance readings that deviate from the normal range may indicate problems with a circuit.
- If the system fails any test, refer to the troubleshooting guide below to address the issue. De-energise the affected circuits and make the necessary repairs immediately.

Before maintenance, repair, or modification

CAUTION: Consult the trace heating system documentation prior to maintenance, repair, or modification.

1. Identify the circuit or equipment to be de-energised and all possible sources of electrical energy supplies to the specific circuit and equipment.
2. De-energise all power sources.
3. Apply lockout/tagout devices according to established procedures.
4. Test for the absence of voltage with an approved voltmeter (where the voltmeter is tested on a known circuit voltage prior to and immediately following application).
5. For protection against the accidental energizing of supply conductors, apply temporary jumpers rated for the available fault duty between each supply conductor and earth/ground.

NOTE: In the event of an earth fault or over-current interruption, devices shall not be reset until the cause of the trip has been investigated by qualified personnel.

After maintenance, repair, or modification

1. Test the operation of each affected circuit.
2. The insulation resistance of the trace heater shall be measured and recorded and shall not be less than 20 MΩ.
3. Visually verify that all circuit-disconnect devices are open before reconnecting power.

Troubleshooting Guide

This troubleshooting guide aims to help to diagnose and resolve many issues on-site.

Many problems with electric trace heating systems can be attributed to two causes:

- Wet, damaged, or missing insulation. Visually inspect the insulation along the entire length of the circuit, making sure that it is intact and dry throughout.

- Physical damage incurred from recent repairs and maintenance to any in-line or nearby equipment.

Other possible causes are listed below, with their symptoms and potential remedies.

If any circuit is suspected to be damaged, de-energise the circuit and perform the Insulation Resistance Test outlined on page 5. Readings below 20 MΩ indicate that the trace heater may be physically damaged.

Symptom	Possible Cause	Remedy
No heat/no current	• Loss of power/voltage	• Check the circuit breaker and electrical connections
	• Controller setpoint too low	• Verify/adjust setpoint
	• High-temperature limit switch activated	• May require manual reset to re-enable trace heating circuit
	• “Open” series heating circuit	• Repair or replace circuit ¹
	• Controller failure	• Repair sensor or controller ²

Symptom	Possible Cause	Remedy
Low system temperature	• Controller setpoint too low	• Verify/adjust setpoint
	• Temperature sensor located too close to trace heater or other heat source; may be accompanied by excessive cycling of control relays/contacts	• Relocate sensor
	• Insulation material and/or thickness different than designed	• Replace insulation; increase insulation thickness (if dry); review design ³
	• Ambient temperature lower than designed	• Install higher-output trace heater; increase insulation thickness; review design ³
	• Low voltage (check at power connection point)	• Adjust voltage to meet design requirements ³
Low temperature in sections	• Wet, damaged, or missing insulation	• Repair or replace insulation and barrier
	• Trace heater damaged	• Repair or replace section; splice kits are available from Thermon
	• Heat sinks (valves, pumps, pipe supports, etc.)	• Insulate heat sinks or increase passes of tracing on heat sinks
	• Significant changes in elevation along length of the heat-traced pipe	• Consider dividing heating circuit into separate, independently controlled segments
High system temperature	• Controller “on” continuously	• Adjust setpoint or replace sensor ²
	• Controller fails with contacts closed	• Replace sensor or controller ²
	• Sensor located on uninsulated pipe or too close to heatsink	• Relocate sensor to an area representative of conditions along length of pipe
	• Backup heating circuit controller “on” continuously	• Adjust setpoint or replace backup controller
Excessive cycling	• Temperature sensor located too close to trace heater or other heat source; may be accompanied by low system temperature	• Relocate sensor
	• Ambient temperature near controller setpoint	• Temporarily alter controller setpoint
	• Connected voltage too high	• Lower voltage
	• Trace heater output too high (overdesign)	• Install lower-output trace heater or lower the voltage
	• Controller differential too narrow	• Widen the differential or replace controller to avoid premature contact failure
Temperature variations along pipe	• Inconsistent trace heater installation along pipe	• Check consistency of trace heater installation, especially at heat sinks
	• Inconsistent trace heater performance	• Compare calculated power per unit length ($W \times A/\text{length}$) for the measured pipe temperature with designed trace heater output for the same temperature; regional damage to trace heater can cause partial failure
	• Unanticipated flow patterns or process operating temperatures	• Redistribute heating circuits to accommodate existing flow patterns; confirm process conditions

Notes

- 1 Flexible, polymer-jacketed trace heaters (such as those covered in this document) may be field-spliced. Mineral-insulated (MI) trace heaters typically require replacement.
- 2 Mechanical thermostat sensors cannot be repaired or replaced. RTD and thermocouple sensors may be replaced. Some controllers have replaceable contacts/relays or may require a manual reset if a “trip-off” condition was detected.
- 3 Before making any changes to system parameters, consult Thermon for the impact on trace heater performance.



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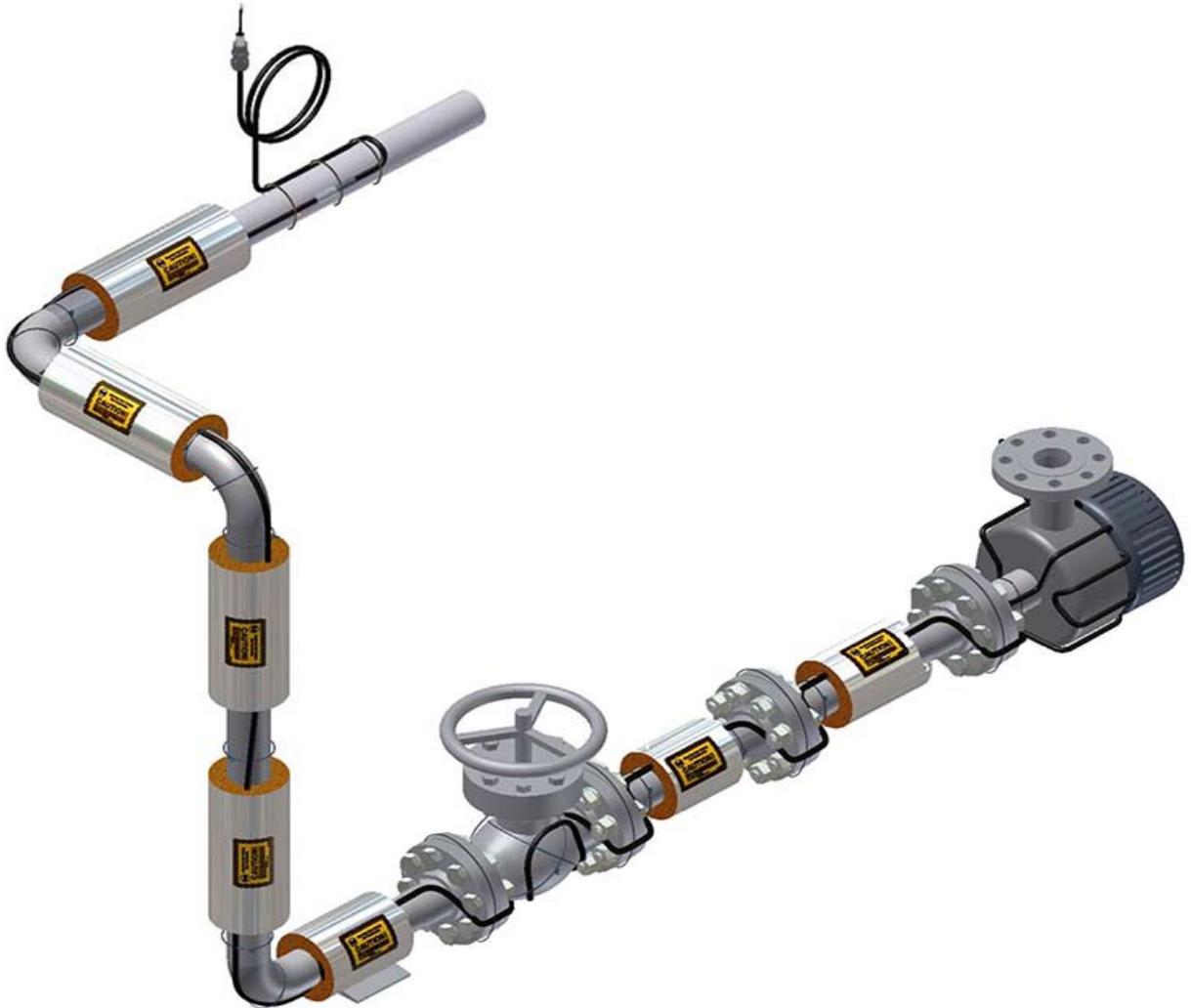
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MI Mineral Insulated Heating Cable

INSTALLATION PROCEDURES



The Heat Tracing Specialists®

MI Mineral Insulated Heating Cable

The following installation procedures are suggested guidelines for the installation of a Thermon MI mineral insulated heat tracing system. Refer to project specifications, if applicable.

The installation must comply with Thermon requirements and be installed in accordance with the regulations as per the norm EN-IEC 60079-14 and EN-IEC 60079-30 for hazardous areas (where applicable), and any other applicable national and local electric codes. **For each installation, the vendor is to provide the design parameters for an engineered system which will designate the cable length, the total cable wattage, and the cold lead length for a specific application.**

Applications . . .

1. MI heating cables are used for freeze protection or temperature maintenance of piping, tanks and instrumentation.
2. Heat tracing cables may be installed in ordinary (nonclassified) and hazardous (classified) locations depending on the specific cable options and approvals.



Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage installation or maintenance, a earth/ground-fault protection device is required for all heat tracing circuits. Bond the metal sheath of the heat tracing cable to a suitable earth terminal.

Site Practice . . .

1. Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.
2. Provide training to employees for understanding the purpose/function of the electrical heat tracing and the electrical power supply/control equipment, and how to recognize and avoid the hazards associated with operation and maintenance.
3. Apply safe work practices including the following:
 - Identify the circuit or equipment to be de-energized and all possible sources of electrical energy supplies to the specific circuit or equipment.
 - Disconnect both legs of the power supply cable at the circuit breakers, disconnect switches, and any other applicable points.
 - Apply lockout/tagout devices according to established procedures.
 - Visually verify that the circuit disconnect devices are open prior to connecting power cable to heat tracers.
 - Test for absence of voltage with an approved voltmeter (where the voltmeter is tested on a known circuit voltage prior to and immediately following application).
 - For protection against accidental energizing of supply conductors, apply temporary jumpers rated for the available fault duty between each supply conductor and earth.

Complete Electric Heat Tracing System¹ . . .

A complete electric heat tracing system may typically include the following components²:

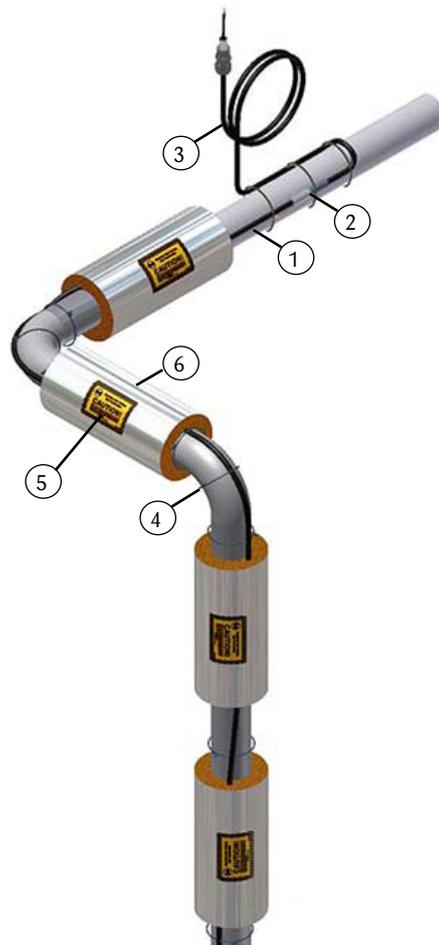
1. MI heat tracing cable.
2. Cable set hot to cold fitting.
3. Cold lead.
4. Stainless steel tie wire (use on 30cm intervals or as required by code or specification).
5. "Electric Heat Tracing" label (peel-and-stick label attaches to insulation weather barrier on 3m intervals or as required by code or specification).
6. Thermal insulation³ and barrier (by others).

The absence of any of these items can cause a system to malfunction or represent a safety hazard.

Notes . . .

1. Thermostat or solid state temperature control device must be used when the system T-rating relies on controlled designs to limit sheath temperature.
2. Illustration depicts a typical MI heating circuit.
3. All heat-traced lines must be thermally insulated.

Illustration A: Typical Heat Tracing Installation



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Heating Cable Installation General Information

1. Identify the heating cable to ensure the proper type and quantity have been received. Factory-fabricated series circuits will have an imprinted I.D. tag with pertinent data. Compare information on heating cable with packing slip and purchase order to verify receipt of correct shipment.
2. Visually inspect materials for damage incurred during shipment.
3. Store in clean dry place. MI cable set cold lead ends must be kept dry before, during, and after installation.
4. Do not connect power to heating cable while in shipping carton or before installed on pipe/vessel.
5. Test insulation resistance of heating cable set when received, when installed with pipe uninsulated and after thermal insulation has been installed. Using a 500 Vdc megohmmeter, the minimum acceptable reading is 20 megohms between conductor and metallic sheath. IEEE 515 and EN-IEC 60079-30 recommend use of a 1000 Vdc megohmmeter. After the application of thermal insulation, the measured value should not be less than 5 megohms.



6. Heating cables shall not touch, cross over, or overlap itself after installation.
7. Metal structures or material used for the support of or on which cables are sets are installed, are to be bonded to earth in accordance with applicable codes.
8. Minimum installation temperature is -60°C.
9. Do not alter heating cable set length.
10. Do not remove metal tags from heating cable set.
11. Thermostat or solid state temperature control device must be used when the system T-rating relies on controlled designs to limit sheath temperature.

12. Heating cable must not be embedded in the thermal insulation.
13. Heating cable set shall be spaced at least 13 mm from any combustible surface.
14. MI cable set cold lead ends must be kept dry before, during and after installation.
15. Do not damage cable by repeatedly bending and straightening at same location.
16. Do not bend cable less than 15 cm away from hot to cold joint, splice, or end termination.
17. Minimum spacing between cable is 25 mm when installing multiple passes or loops.
18. Refer to Thermon form TMP0066 for information on electrical safety precautions for electrical heat tracing.
19. Provisions must be made to protect MI cable from welding slag, grinders, etc.
20. Keep lids on all power and splice junction boxes. Plug any unused entries.
21. At tee branch in a pipeline, particularly if the branch pipe is smaller than the main pipe, double tracing the smaller pipe with the main heating unit may cause unbalanced pipe temperature. Use caution, check schedules to see if permissible.
22. Any excess heating cable must be distributed evenly along pipe and equipment.
23. Junction boxes must be configured to exclude moisture. If applicable, all conduits feeding into the junction box shall be provided with appropriately rated drains to prevent moisture migration into the junction box.

Types of Heating Cables¹ . . .

MIQ (refer to Form TEP0020U)

CE 1725 Ⓢ II 2 G Ex d IIC T1 to T6, Ta=-60°C to +55°C, IP66 or
 II 2 G Ex de IIC T1 to T6, Ta=-60°C to +55°C, IP66 or
 II 2 D Ex tD A21 IP66 T450°C to T85°C, Ta=-60°C to +55°C



FMG 09.0006 Ex d (or de) IIC T1 to T6,
 Ex tD A21 IP66 T450°C to T85°C

MIS (refer to Form TEP0111U)

CE 1725 Ⓢ II 2G Ex e IIC Gb ISSep12ATEX004U

Notes . . .

1. Refer to the heating cable product specification sheets for temperature ratings as limited by the manufacturer.

MI Mineral Insulated Heating Cable

Before Installing Cable . . .

1. Be sure all piping and equipment to be traced is completely installed and pressure tested.
2. Surface areas where heat tracing is to be installed must be reasonably clean. Remove dirt, rust and scale with a wire brush and oil and grease films with a suitable solvent.
3. Review any applicable local codes and standards prior to beginning the installation.
4. Refer to heat tracing isometric drawings for power point location, equipment allowances, etc. Confirm if MI sets are to be connected in series.
5. Confirm measurements of piping length, including in-line equipment before beginning installation.
6. Test insulation resistance of heating cable set when received using a 500 Vdc megohmmeter. The minimum acceptable reading is 20 megohms between conductor and metallic sheath. IEEE 515 and EN-IEC 60079-30 recommend use of a 1000 Vdc megohmmeter.
(Record 1, Checklist on Page 9)

Initial Installation . . .

1. Determine the orientation of the heating cable(s) on the pipe. The upper 90° of the pipe should be avoided to minimize the possibility of mechanical damage to the heating cable. Also, the sides of the pipe should be avoided since this is the normal location of the insulation seams. Refer to Illustration B for typical heating cable orientations.
2. Begin temporary installation at the proposed hot-to-cold junction (power end) location and lay out heating circuit on the pipe. Refer to Illustration A for temporary installation.
3. Make heating cable allowances for valves, flanges, elbows and supports as per the applicable drawings and table on pages 4 thru 6 of these installation procedures.
4. Fix hot-to-cold junction at 15 cm distance on both sides using stainless steel tie wire or banding. Do not loop back cold lead on small diameter pipes where the minimum bending radius will be exceeded.
5. Install cable with slight "wave" on pipe. Secure cable to pipe with stainless steel tie wire or banding.
6. Adjust cable where necessary.

Illustration A: Temporary Installation . . .

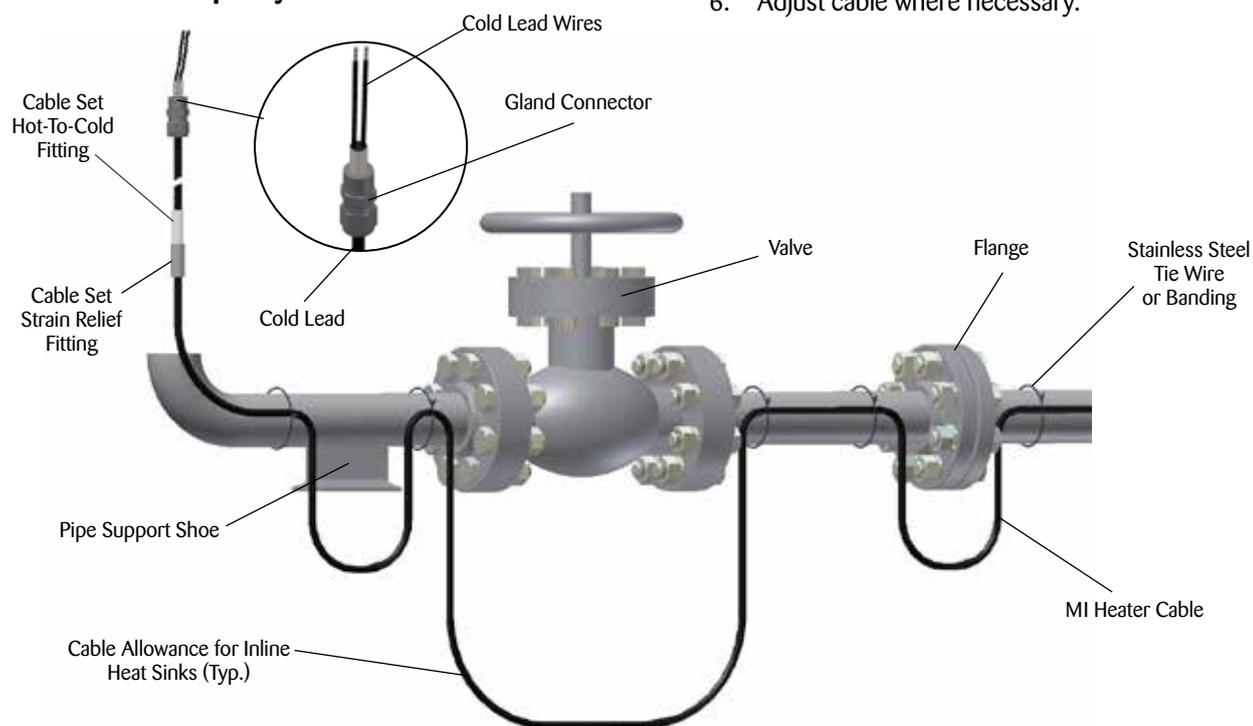
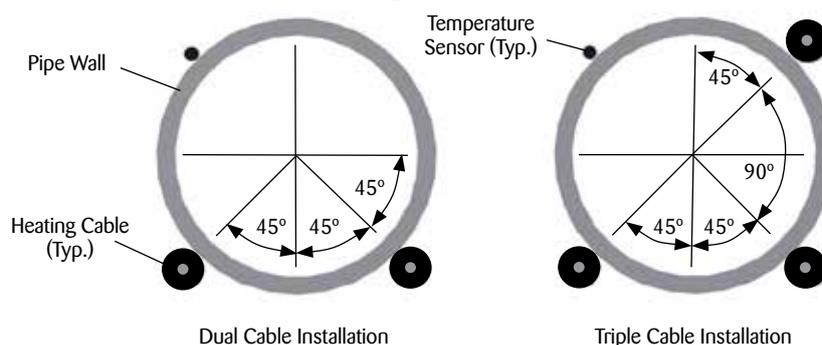


Illustration B: Typical Orientation of Heating Cable and Sensor Location . . .



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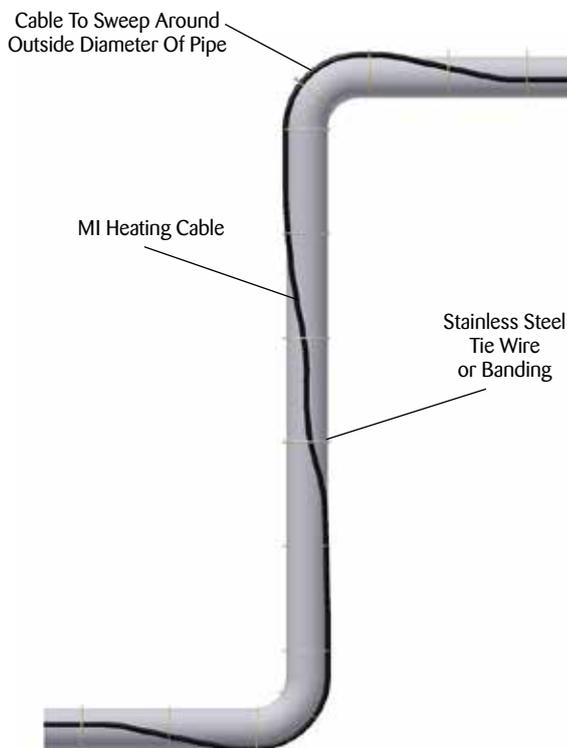
INSTALLATION PROCEDURES

Installation on Elbows, Supports and Flanges . . .

1. Install heating cable in accordance with Illustrations C thru E below. Secure heating cable to piping using stainless steel tie wire or banding.
2. Elbows: Locate the cable on the outside radius of an elbow to provide sufficient heat to compensate for the added piping material. Secure the cable to the pipe on each side of the elbow with stainless steel tie wire or banding.
3. Pipe Supports: Insulated pipe supports require no additional heating cable. For uninsulated supports, allow two times the length of the pipe support plus an additional 40 cm of heating cable.

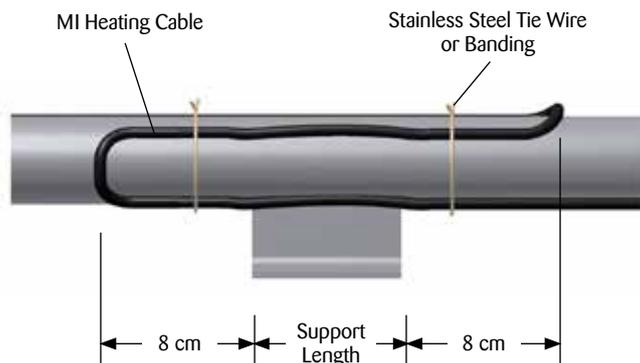
4. Flanges: Heating cable should maintain contact with flange when bending around pipe flanges to compensate for additional heat loss. In potentially explosive areas, it is recommended to secure MI cable with stainless steel banding at all flanges or any other irregular shaped equipment.
5. Minimum bend radius is 6X cable OD. Do not exceed bend radius when completing installation.

Illustration C: Pipe Elbow . . .



Note:
Slack cable can be taken up by running the cable on the outside radius of the pipe elbows. Running the cable on the inside radius of the pipe elbows will add slack to the cable.

Illustration D: Pipe Support . . .



- Notes . . .**
1. Only applicable for pipe ≥ 50 mm.
 2. Loop cable 8 cm past pipe shoe support on both sides.

Illustration E: Pipe Flange . . .



Table 1 Flange Allowance (pair) . . .

Pipe Size	mm	12	19	25	32	40	50	80	100	150	200	250	300	350	400	450	500	600	750
Flange Allowance	mm	150	180	180	180	205	205	255	280	305	330	356	406	457	483	508	533	610	660

MI Mineral Insulated Heating Cable

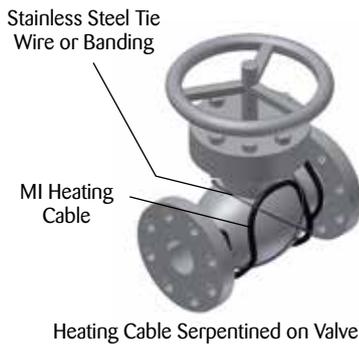
Installation on Valves and Pumps . . .

1. Install heating cable in accordance with Illustrations F and G below. Secure heating cable to piping using stainless steel tie wire or banding.
2. Additional cable is required to provide extra heat at valves, pumps and miscellaneous equipment to offset the increased heat loss associated with these items. Refer to Table 2 for estimated cable requirements for installation on typical valves and pumps.
3. Install heating cable on valves and pumps utilizing a looping technique (this allows the valve or pump to be removed if required). Do not cross cable.
4. Minimum bend radius is 6X cable O.D. Do not exceed bend radius when completing installation.
5. In potentially explosive areas, it is recommended to secure MI cable with stainless steel banding at all flanges, valves or any other irregular shaped equipment.

Table 2: Valve and Pump Allowances

Pipe Size mm	Valve Type			Pump Type	
	Screwed or Welded m	Flanged m	Butterfly m	Screwed m	Flanged m
12	.15	.30	0	.30	.61
19	.23	.46	0	.46	.91
25	.30	.61	.30	.61	1.22
32	.46	.61	.30	.91	1.37
40	.46	.76	.46	.91	1.52
50	.61	.76	.61	1.22	1.68
80	.76	1.07	.76	1.52	2.13
100	1.22	1.52	.91	2.44	3.05
150	2.13	2.44	1.07	4.27	4.88
200	2.90	3.35	1.22	5.79	6.71
250	3.81	4.27	1.22	7.62	8.53
300	4.57	5.03	1.52	9.14	10.06
350	5.49	5.94	1.68	10.97	11.89
400	6.55	7.01	1.83	13.11	14.02
450	7.77	8.23	1.98	15.54	16.46
500	8.69	9.14	2.13	17.37	18.29
600	10.36	10.97	2.44	20.73	21.95
750	12.19	12.80	3.05	24.38	25.60

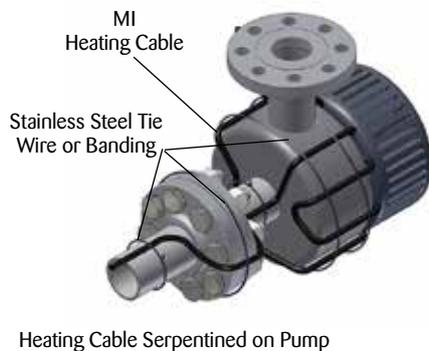
Illustration F: Typical Valve Detail . . .



Notes . . .

1. The valve allowance given is the total amount of additional cable to be installed on the valve. If multiple tracers are used, total valve allowance may be divided among the individual tracers. The total valve allowance may be alternated among tracers for multiple valves in a heat trace circuit.
2. Allowances are for 150 pound valves. More cable is required for higher rated valves.
3. Refer to heat trace isometric drawing for project specific allowances.

Illustration G: Typical Pump Detail . . .



NOTE: Individual MI cable set recommended for pumps.



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INSTALLATION PROCEDURES

Illustration H: Pipe Hanger . . .

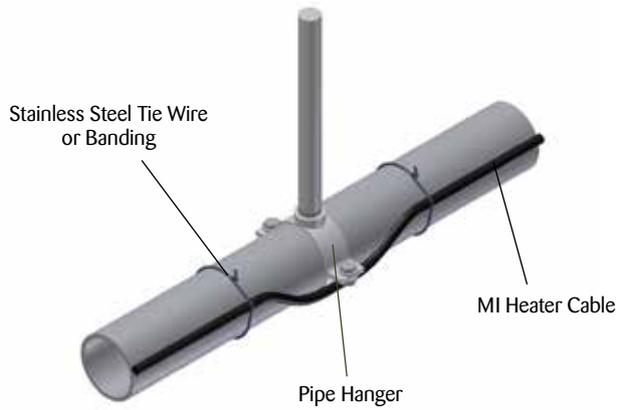
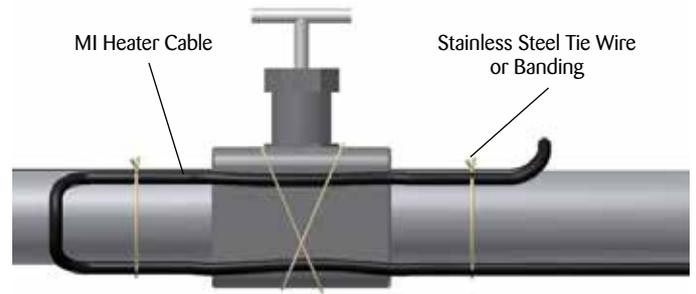


Illustration I: Socket Weld Valve . . .



Notes . . .

1. For small valves (less than 50 mm) it may be impractical to install the correct cable allowance on the valve body itself. It can be installed in a uniform manner across the valve and either side of the pipe as shown above . . .
2. At tee branch pipe line (less than 50 mm) if the branch pipe is double traced and the main pipe is single traced, then there is no additional requirement for cable allowance for valve.

Installation on Tanks and Vessels . . .

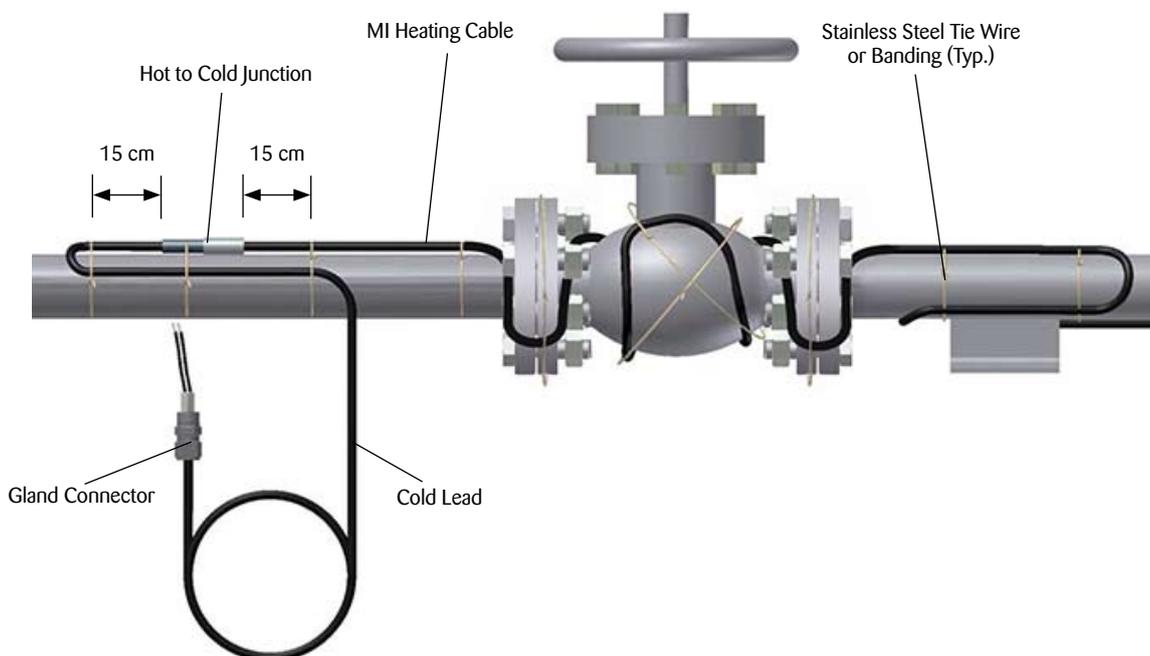
Always install MI cable longitudinally on surface of tanks or vessels. Never spiral wrap MI around circumference of tanks or vessels.

MI Mineral Insulated Heating Cable

Completing the Installation . . .

1. Begin final cable attachment by securing the end of circuit and working back toward the power supply.
 - MI mineral insulated heating cables are typically installed with tie wires or stainless steel banding at 30 cm intervals. Use only Thermon approved banding. Do not over tighten banding or tie wire. These cables may also be installed with heat transfer compound and metal channels.
 - Avoid crossing series constant watt heating cables.
 - If applicable, refer to installation details provided with the project drawings or contact Thermon for additional information regarding installation.
2. Before making power connections, the MI cable should be tested to ensure electrical integrity with at least a 500 Vdc megohmmeter (megger) between the conductors and the metal sheath. IEEE 515 and EN-IEC 60079-30 recommend a test voltage of 1000 Vdc for mineral insulated cable. Minimum resistance should be 20 megohms.
(Record 2, Checklist on Page 9)
3. MI series resistance heating circuits are typically prefabricated at the factory. Junction boxes to complete a typical MI circuit connection to power may not be supplied as part of the system. For Ex d sets, use only Ex d connection fittings. For Ex de sets, use only Ex e connection fittings. Refer to Installation instructions included with power/splice enclosures or contact Thermon for additional information.
4. Route MI cable set cold lead(s) into junction box hub(s). Slowly tighten gland connector with set of wrenches until ferrule begins to make positive contact with cold lead sleeve and cold lead can not be moved by hand. Then tighten fitting 1/8 additional turn.
5. Secure temperature sensor (if required) to pipe utilizing stainless steel banding. Locate temperature sensor as shown in Illustration B.

Illustration J: Typical Installation. . .



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Circuit Protection Requirements . . .

1. Over-current protection (typically circuit breakers) is required for each branch circuit. This protection must isolate all power conductors from the supply.
2. For typical installations (with TT and TN grounding systems), a means of protection against earth faults is required that includes a residual-current protective device for each branch circuit. For fixed-level ground-fault circuit interrupters (such as GFCI circuit breakers), a minimum 30 mA trip level is recommended. The preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater as specified by the heat tracing supplier. Where conditions of maintenance and supervision ensure that only qualified persons will service the installed systems, and continued circuit operation is necessary for the safe operation of the equipment or processes, earth-fault detection without interruption is acceptable if alarmed in a manner to assure an acknowledged response.
3. For IT grounding systems, a means of protection against earth faults is required that includes an electrical insulation monitoring device that shall disconnect the supply whenever the electrical resistance is not greater than 50 ohms/volt of rated voltage.

Thermal Insulation . . .

1. The need for properly installed and well-maintained thermal insulation cannot be overemphasized. Without insulation, heat losses are generally too high to be offset by a conventional heat tracing system.
2. In addition to piping and in-line equipment such as pumps and valves, all heat sinks must be properly insulated. This includes pipe supports, hangers, flanges and, in most cases, valve bonnets.
3. Regardless of the type or thickness of insulation used, a protective barrier should be installed. This protects the insulation from moisture intrusion, physical damage and helps ensure the proper performance of the heat tracing system. Seal around all penetrations through the thermal insulation.
4. After the installation of the thermal insulation and weather barrier but **BEFORE ENERGIZING THE HEATING CIRCUIT**, the megohmmeter test should be repeated. The measured value should not be less than 5 megohms. This should call attention to any damage to the heating cable that may have occurred during the insulation installation. **(Record 3, Checklist on Page 9)**
5. Apply caution labels to insulation weather barrier at required intervals along pipe.

Final Inspection and Documentation . . .

1. It is recommended that the circuit be temporarily energized so that the volts, amps, pipe temperature and ambient temperature may be recorded. This information may be of value for future reference and should be maintained for the historical operating data log. **(Record 4, Checklist on Page 9)**
2. A sample historical operating data log form is included in the Electric Heat Tracing Maintenance and Troubleshooting Guide, Thermon Form TEP0066.
3. Stabilized design can be used for MI heating cables without a limiting device to determine the T-class through the use of the Thermon CompuTrace software or Thermon Engineering.
4. The maximum temperatures provided by Thermon's CompuTrace software and by Thermon engineering are calculated to the methods and requirements of EN-IEC 60079-30.
5. If stabilized design is used, the end user must record the system parameters and the area T-class, and keep these records for the time the heating cable is in operation.
6. Inspect system on a regular basis at least once per year. Record all information after conducting test. If the system fails any test, refer to Thermon's Maintenance and Trouble Shooting Guide for assistance. De-energize circuits affected and make the necessary repairs immediately.
7. Verify the setting of the maximum control device, if provided to limit the T-rating for the circuit design, to insure it limits the maximum surface temperature to be in compliance with clause 4.4.3 of EN-IEC 60079-30-1.

Maintenance and Repair . . .

1. Refer to form TEP0066-Electric Heat Tracing Maintenance and Trouble Shooting Guide.



Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage installation or maintenance, a earth/ground-fault protection device is required for all heat tracing circuits. Bond the metal sheath of the heat tracing cable to a suitable earth terminal.

Checklist for Installation of MI Cables

General Information					
Project Number:		Electrical Contractor:			
Unit Number:		Reference Number:			
Customer Ref. Number:		Inspector:			
Record 1: Prior to Installation					
Cable Type:			Insulation Resistance (M Ohms):		
Reel Length (M):	1	2	Single Phase	L-Earth	
				L ₁ -Earth	
Reel Number:	1	2	3 Phase	L ₂ -Earth	
				L ₃ -Earth	
Tested By/Date:			Witnessed By/Date:		
Record 2: After Cable Installation					
Line Number:			Junction Box Number:		
Equipment Number:			Unused Entries Plugged Off:		
Circuit/Heater Number:			Heater Length (M):	1	2
Circuit Switch Number:			Insulation Resistance (M Ohms):		
Metal Sheath Connected to Earth/Ground:			Single Phase	L-Earth	
				L ₁ -Earth	
Thermostat Number:			3 Phase	L ₂ -Earth	
				L ₃ -Earth	
Tested By/Date:			Witnessed By/Date:		
Record 3: After Thermal Insulation is Installed			Insulation Watertight:		
Insulation Resistance (M Ohms):			Electrical Loop Resistance (Ohms):		
Single Phase	L-Earth		Single Phase	L-L	
3 Phase	L ₁ -Earth		3 Phase	L ₁ -L ₂	
	L ₂ -Earth			L ₂ -L ₃	
	L ₃ -Earth			L ₃ -L ₁	
Tested By/Date:			Witnessed By/Date:		
Record 4: Final Commissioning					
Panel Number:			Ambient Temp. (°C):		
Breaker Number:			Pipe Temp. (°C):		
Volts:			Recorded Amps (after 5 min.):		
Tested By/Date:			Witnessed By/Date:		

***NOTE: Minimum acceptable insulation resistance should be 20 megohms for Records 1 and 2 and 5 Megohms for Record 3.**

For additional product information on Thermon heating cables, refer to the individual product specifications.

Electric Heat Tracing Maintenance and Troubleshooting Guide (refer to Form TEP0066)

MIQ (refer to Form TEP0020U)

MIS (refer to Form TEP0111U)



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***TESH & MI**

Installation Guidelines

**SERIES
HEATING CABLES**



**ISO 9001
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THERMON...The Heat Tracing Specialists®

Introduction

These installation instructions have been made in such a way to comply with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable). Furthermore, any other applicable national and local codes must be applied.

Note:

- In all cases heat tracing systems must be protected by means of earth fault protection of 30 mA to (preferred) 300 mA.
- Materials with **IND** in the product reference are for use in non-hazardous areas only.
- Materials with **Ex** in the product reference are for use in hazardous as well as in non-hazardous areas.



THERMON...The Heat Tracing Specialists®

Upon receipt of Thermon heat tracing materials

Check the supplied materials and quantities against the packing list. In case of deviations please contact Thermon within 3 working days.

A) Inspection of the series heating cable

1. Check the printing or label on the heating cable to make sure that the correct type has been received (if applicable).
2. Check the printing on the cold lead cable to make sure that the cable with the correct conductor size has been received (if applicable).
3. Inspect visually for any damage incurred during shipment.
4. Store in a dry place.
5. Cables should be handled with care to avoid crushing, twisting or kinking.

Caution:

Do not connect power to the heating cable while it is on the reel or in the shipping carton.

B1) Inspection of accessories for heat tracing cable using IND and EX expediter or wall mounted JB-K type.

Cable relevant accessories

Whenever cable entry, power termination or end termination is involved, Thermon series cable accessories are related to the cable dimensions.

M20-PT100/TES-Exe : Gland for TES cables.

M25-TES2-Exe : Gland for TES cables.

MI cold lead cable is supplied with brass M20 or M25 glands.

General accessories

- circuit switches
- thermostats (TED1-..., T1-/T2-..., TC1-..., TS-...)
- junction boxes (JB-K...)
- SS mounting bracket (XP-1...) for junction boxes/ thermostats
- fixing tape (FT-1L/FT-1H)
- aluminium tape (AL-20H/AL-30H)
- SS clamps (ABA-25/ABA-40)/ SS B-type banding (B-4/B-10/B-21)
- SS punch strip
- SS banding + seals
- Tool type LN
- Caution Labels (CL-E-...)
- Insulation Entry Kit (IEK-TES)
- Power and End Termination Kits (PETK-5, -6 and -7)

- Connector set (CETI 1525, TESFIT and CKTES-1 and -2)
- Cable protectors

B2) Inspection of accessories for heat tracing cable using expediter or wall mounted Terminator type.

Cable relevant accessories

Whenever cable entry, power termination or end termination is involved, Thermon series cable accessories are related to the cable dimensions.

M20-PT100/TES-Exe : Gland for TES cables.

M25-TES-Exe : Gland for TES cables.

Z . - R-XP/WP type: TES

Z . - MI-WP type: MI

MI cold lead cable is supplied with brass M20 or M25 glands.

General accessories

- circuit switches
- thermostats (ZT-...)
- junction boxes (ZP-...)
- SS mounting bracket (XP-1-....) for junction boxes/ thermostats
- fixing tape (FT-1L/FT-1H)
- aluminium tape (AL-20H/AL-30H)
- SS clamps (ABA-25/ABA-40)/ SS B-type banding (B-4/B-10/B-21)
- SS punch strip
- SS banding + seals
- Tool type LN
- Caution Labels (CL-E-...)
- Insulation Entry Kit (IEK-TES)
- Power and End Termination Kits (PETK-5, -6 and -7)
- Connector set (CETI 1525, TESFIT and CKTES-1 and -2)
- Cable protectors



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Installation sequence of a heat tracing system

1. Ensure that all piping, instruments and equipment to be traced is completely installed, tested and released.
2. Equipment surfaces should be clean. Any loose scale, oil or rust should be removed. Sharp edges should be avoided.
3. Coating on pipes must be dry before heating cable is installed.
4. Determine which heating circuits can be made from which reels (make a reel schedule if applicable). Install the correct heating cable lengths as indicated in the design. **Any deviation from these lengths will result in a change in output and current!** In most cases series heating cable is supplied by Thermon at the designed length.
5. Start - if possible - to install the long heating circuits first.
6. Take the correct reel for the line to be traced. If the required length of heating cable has been determined, the connection between the cold lead cable to the heating cable can already be made in the workshop (if applicable).
7. A power termination in a junction box or thermostat with (TES only) or without non-metallic expediter can be installed to the heating cable in the workshop. See table 7.1 for further information about non-metallic expediter. The maximum allowed heat output is 16 W/m for which the TES cable can be directly terminated in the junction- or thermostatbox. Above this wattage use a cold lead connector. MI cable must always be provided with cold lead connectors.
8. After installation in junction- or thermostatbox, the heating cable can be meggered. Megger conductor to the braid on both sides of the cable with a 500 - 2500 Vdc test voltage for TES and 1000 Vdc for MI conform the local electrical board. The measured insulation resistance shall not be less than 50 MΩ.

Caution:

 - In case electronic thermostats are used in the system, disconnect them before meggering the heat tracing system.
 - The loop resistance of the heating cable circuit must be measured.
9. Mount the junction- or thermostatbox on the pipe. For horizontal pipes it is recommended to mount the junction- and thermostatbox with non-metallic expediter in an upright position. If a junction- or thermostatbox with non-metallic expediter is mounted horizontal or on the bottom side of a pipe, moisture can accumulate on the grommet inside the non-metallic expediter. To prevent this, the knock-out hole must be opened for draining purposes. Open one hole at horizontal mounting and all holes at the bottom side mounting. Ensure that the junction- or thermostatbox is not mounted too close to pipe mounted fittings, since the outside diameter of the insulation can be such that the junction- or thermostatbox is partly or totally covered by insulation. With a “single phase + neutral” or a “two phase” system, the cable will start from and end at one point. With a “three phase” system three cables should be laid out over the pipe and at the end be connected in star into a termination box.
10. When preparing the cable for application to the surface to be heated, carefully unroll the coil. Do not pull into a spiral. Layout the cable on the pipe. Mount this cable by means of fixing tape (FT-1L/FT-1H) for TES and SS tie wire for MI. Take care not to over flex the hot to cold junction. This part of the cable can be supported by simply re-tying the first loop containing the joint. Cover TES cable with aluminum tape prescribed per design or recommend by Thermon for an output > 10 W/m. For MI, avoid repeated bending and straightening of cable.

Application	Application	
	Max. pipe temperature	Area
Black (Terminator)	232 °C	(Non-) Hazardous
Brown/black (XP)	200 °C	(Non-) Hazardous
Grey (XP)	120 °C	Non-Hazardous

Table 7.1 application XP (Plus)



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Installation sequence of a heat tracing system

Note:

Stainless steel tie wire for MI cable to be supplied by electrical contractor.

Ensure that the heating cable is mounted on the pipe at the right location (see page 11). The heating cable is to be fixed to the pipe every 300 mm by means of fixing tape or SS tie wire. If plastic pipes are traced, the heating cable must, after having been fixed to the pipe, also be covered with aluminium tape. If the plastic pipes have a low temperature resistance, the pipe must be wrapped with aluminium foil before the heating cable is mounted.

Note:

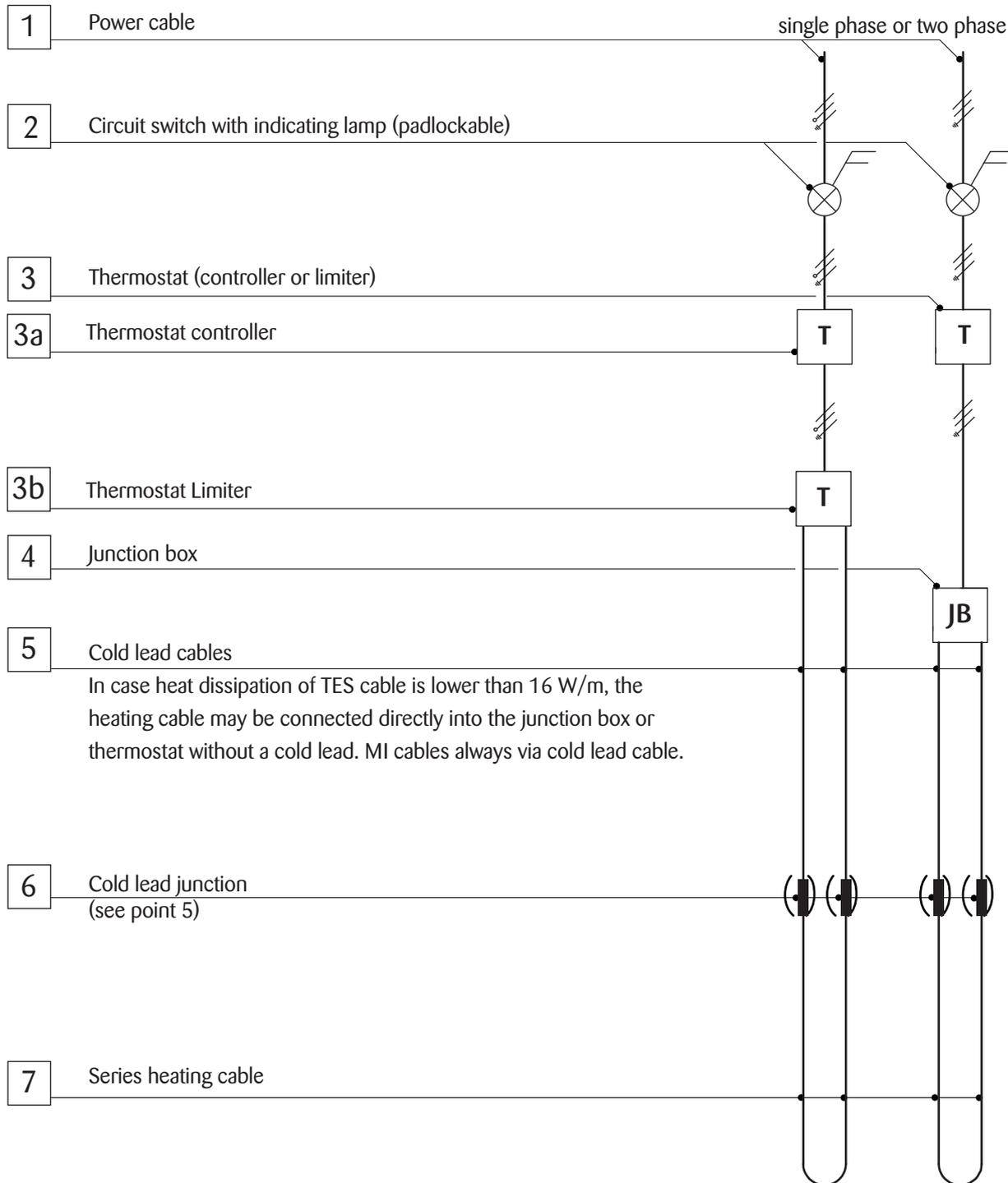
Do not overtighten the SS tie wires around the MI heating cables. The SS tie wires should be tightened in such way to permit hand movement of the cable between tie wire and the pipe, but not to allow the cable to move freely under its own weight. This is essential as it permits for movements of the cable during its heating cycle, when otherwise restricted movement can lead to cable failure due to fatigue.

11. Ensure the correct amount of cable is allowed on locations where additional heat losses can be expected (such as pipe supports, flanges, valves, instruments etc., see page 12 and further). **The heating cables may never touch or cross one another.**
12. In case the heating cable cannot be terminated at once, the heating cable's ends must be sealed off temporarily with for example some RTV-2 silicon sealant.
13. If applicable, connect a cold lead cable to each end of the heating cable.
14. Protect the heating cable against damage at those locations where damage could typically occur (at insulation end plates at valves, pumps etc, see page 21).
15. Inspect, megger and measure the loop resistance of the heating cable again before thermal insulation is installed (page 22) and note down the readings in the checklist (page 23).
16. Note down the actual installed length of heating cable in the checklist (page 23) and/or isometric.
17. Set the thermostat (if applicable) at the desired temperature and note down the setting in the checklist (page 23). We recommend, in case a thermostat controller/limiter is mounted to the pipe, to mark the controller knob with C and the limiter knob with L, by means of for example a permanent marker.
18. Make sure that all openings in the junction boxes and/or thermostats are closed so that no moisture can penetrate.
19. After the thermal insulation has been mounted, the heating cable must be inspected, meggered and the loop resistance must be measured again (page 22). Note down the readings in the checklist (page 23).
20. Apply caution labels to insulation weather barrier at 3 meter intervals.



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Typical heat tracing system switching in-line



Note:
For using thermostat limiters, see page 22-documentation



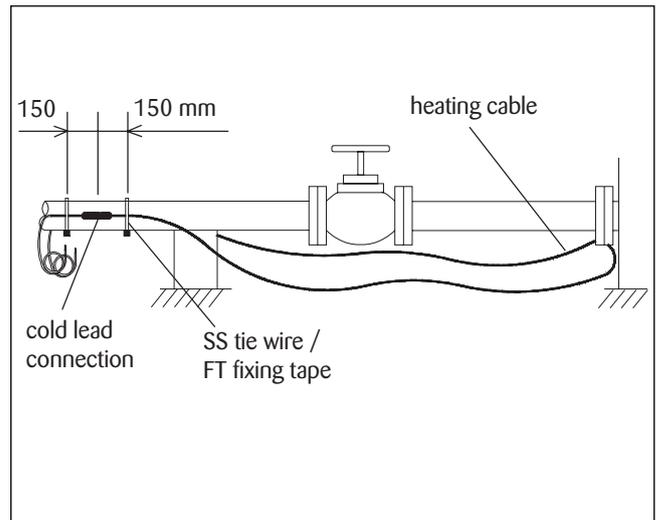
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Installation of TES and MI cable

- 1 With a single or two phase system: unroll the cable, loop it and lay it alongside the pipe section, so that both passes can be installed simultaneously.

Note:

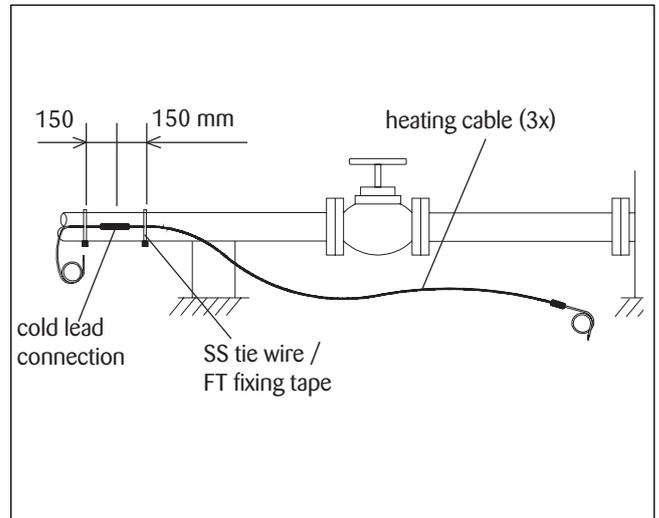
First attach the cold lead connection to the pipe before unrolling the heating cable.



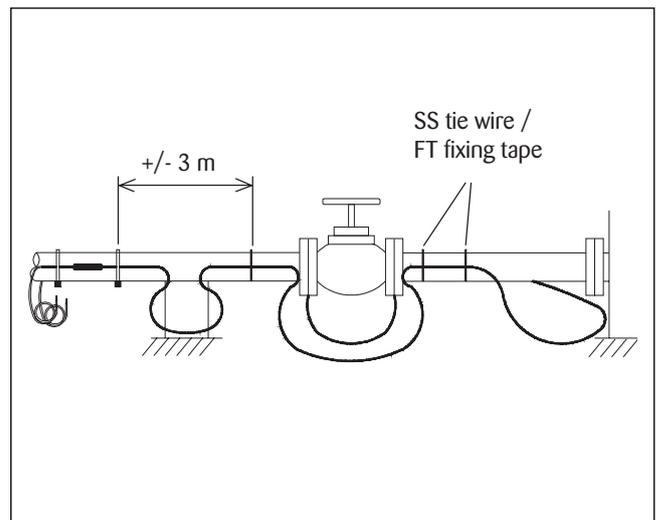
- 2 With a 3-phase system: unroll the cable and lay it alongside the pipe section. The cables can be installed separately or simultaneously.

Note:

First attach the cold lead connection to the pipe before unrolling the heating cable.



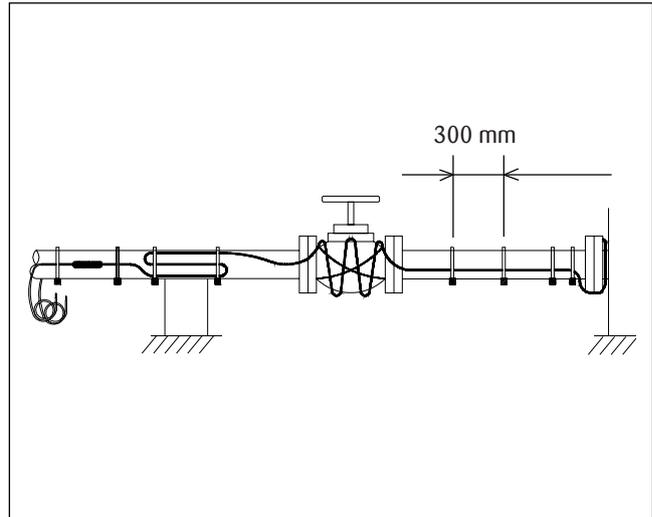
- 3 Temporarily secure the heating cable to the pipe at approx. 3 m. interval, using SS tie wire / FT fixing tape, starting with the cold lead section (power end) and working towards the end of the pipe. Loops of cable for the recommend allowance are to be left at each heat sink - valve, flange, pump, pipe support etc.- until final fixing of the cable. For installation on valve, pipe support etc. see page 12 and further.



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Installation of TES and MI cable

- 4 After possible re-adjustment, the cable can be secured at 300 mm interval using SS tie wire/FT fixing tape. The cable loops at heat sinks, valves, pipe supports, etc. can be formed into position.



- 5 On small flanges and joints, where it is impractical to bend the heating cable to achieve close contact across the surface, the heating cable and flange should be wrapped with aluminium foil.



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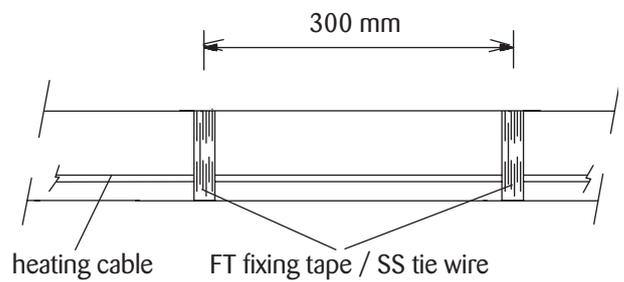
Installation on pipe work

In principle the heating cable is mounted parallel to the pipe and fixed by means of FT fixing tape or SS tie wire. Only if prescribed in the design, the cable must be covered with aluminium tape.

Description:

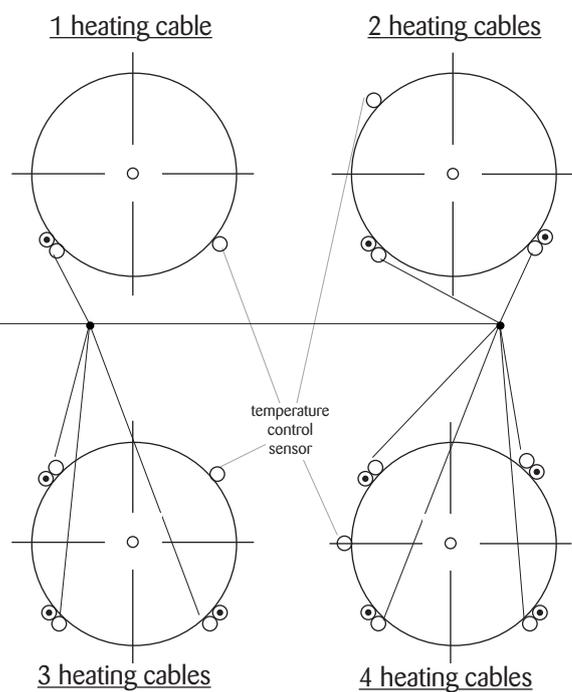
FT-1L tape for max. 85 °C
FT-1H tape for max. 260 °C

Stainless steel tie wire to be supplied by electrical contractor.



For multiple parallel passes refer to illustration alongside.

Temperature limiter sensor (if applicable)



Note:

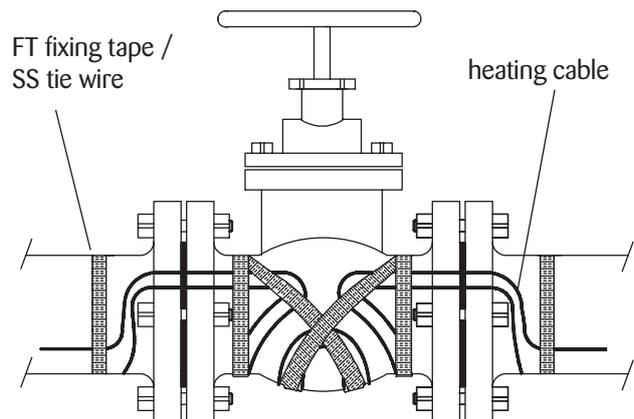
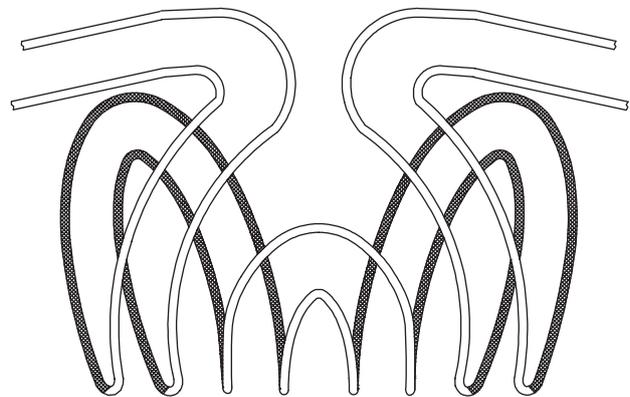
For using thermostat limiters, see page 22-documentation.



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Installation on valves

TYPICAL CABLE ALLOWANCES PER VALVE * (single pass) in mm					
N O M I N A L	P I P E S I Z E	DN	S C R E W E D	F L A N G E D	B U T T E R F L Y
NPS					
	1/2"	12	150	300	--
	3/4"	20	220	450	--
	1"	25	300	600	300
	1 1/2"	40	450	600	450
	2"	50	600	750	600
	2 1/2"	65		900	750
	3"	80		1050	750
	4"	100		1500	900
	6"	150		2400	1050
	8"	200		3300	1200
	10"	250		4200	1350
	12"	300		5000	1500
	14"	350		5900	1650
	16"	400		6900	1800
	18"	450		8100	1950
	20"	500		9000	2100



Note:

- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- Apply additional SS tie wire/fixing tape in such a way that heating cable makes close contact with the valve.

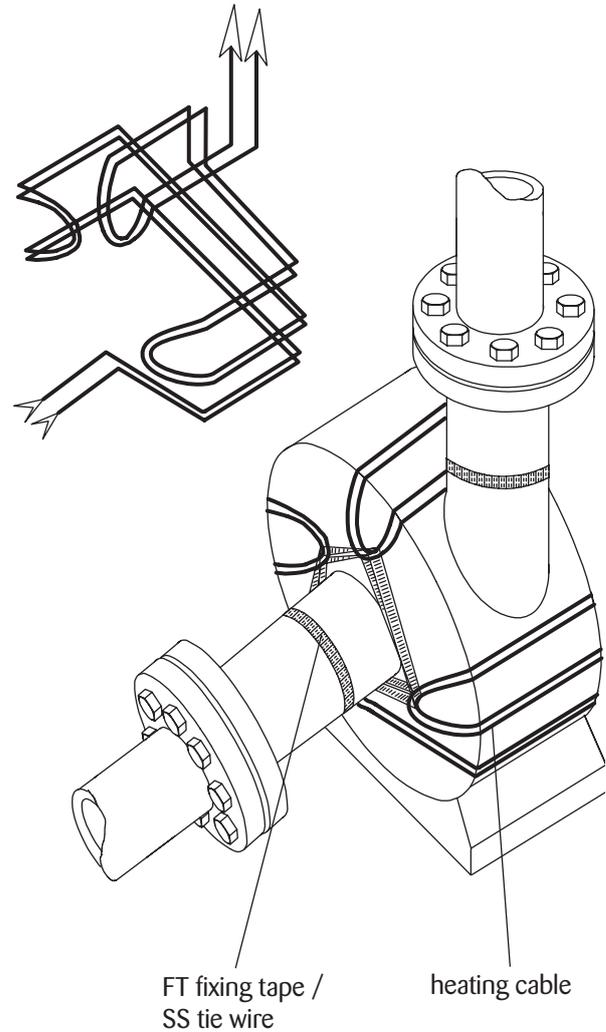
* Allowances for valves up to 600 Lbs and a single pass of heating cable



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Installation on pumps

TYPICAL CABLE ALLOWANCES PER PUMP (single pass) in mm		
N O M I N A L	P I P E S I Z E	P U M P
NPS	DN	
1/2"	12	600
3/4"	20	900
1"	25	1200
1 1/2"	40	1200
2"	50	1500
2 1/2"	65	1800
3"	80	2100
4"	100	3000
6"	150	4800
8"	200	6600
10"	250	8400
12"	300	10000
14"	350	11800
16"	400	13800
18"	450	16200
20"	500	18000



Note:

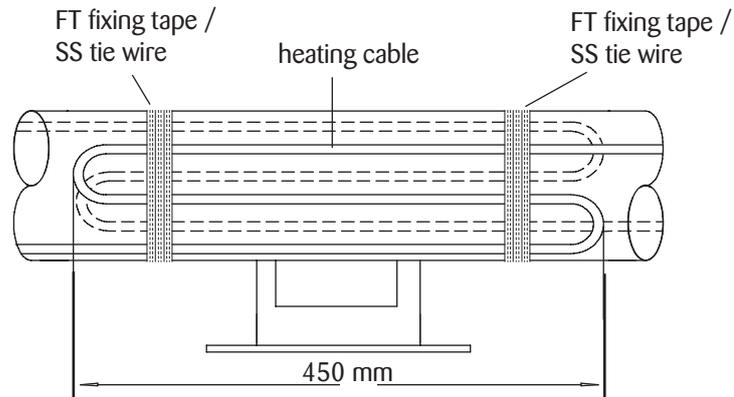
- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- Apply additional SS tie wire/fixing tape in such a way that heating cable makes close contact with the pump.



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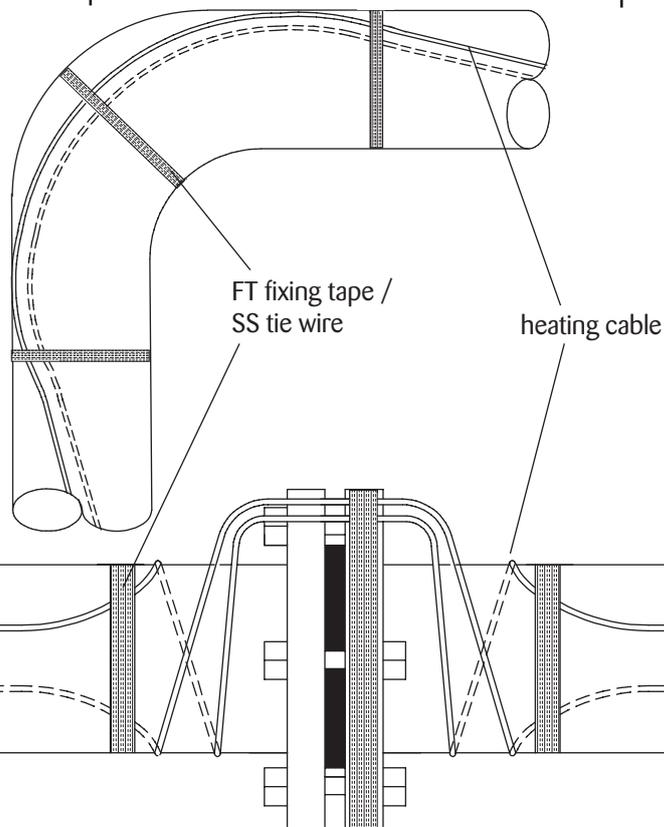
Installation on pipe supports, bends and flanges

For lines of 2" and larger



Note:

Install the cables on the outer side of the bend as shown



Note:

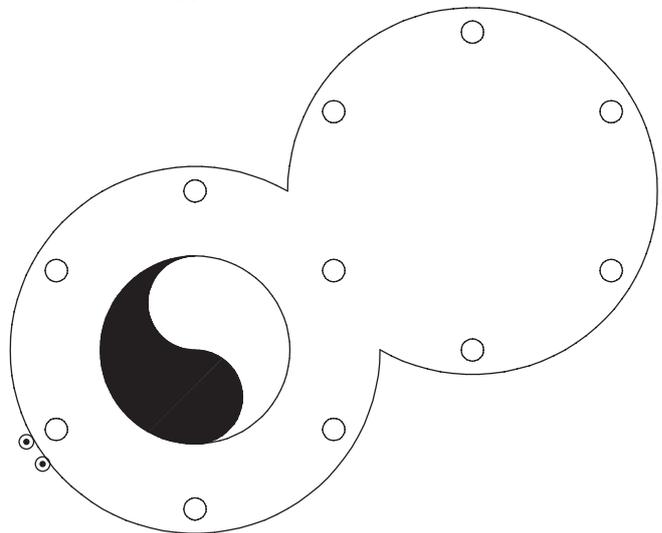
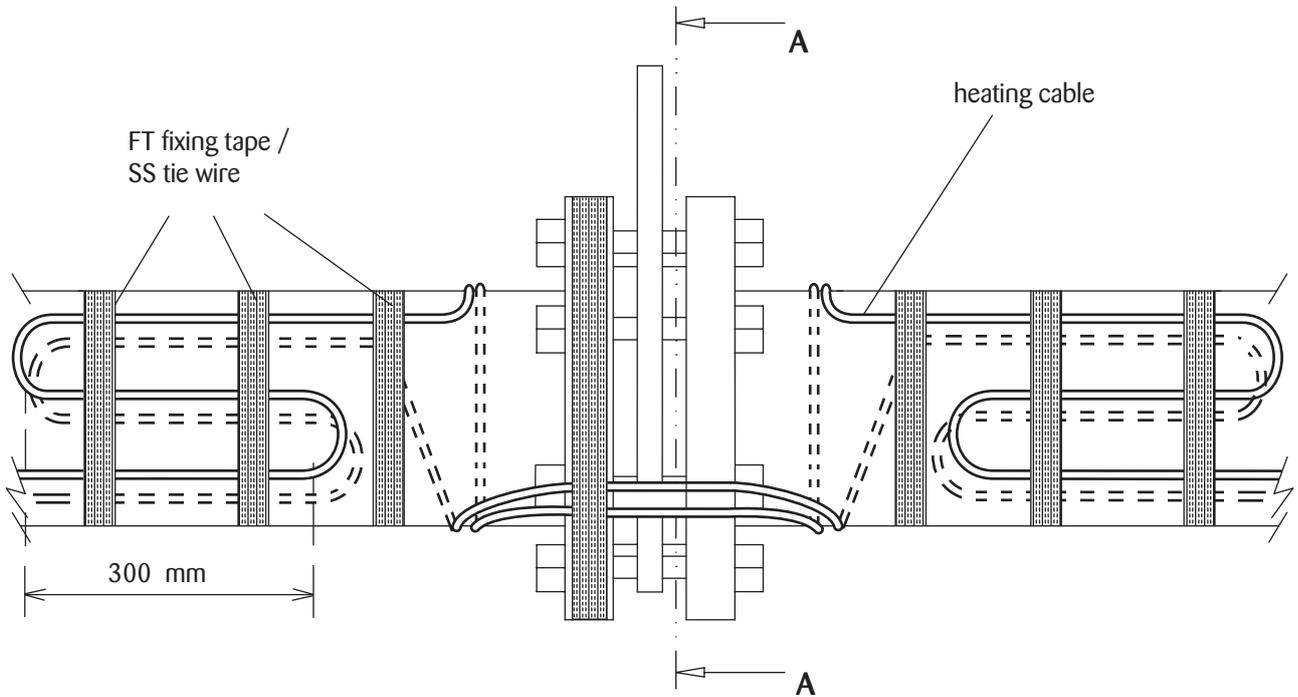
- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- In each heating cable a loop must be made on the flange if the pipe diameter allows for this.
- It is preferred to isolate the pipe support from the pipes.



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Installation on spectacle blinds

For uninsulated spectacle blinds for lines of 2" and larger



Section A-A

Note:

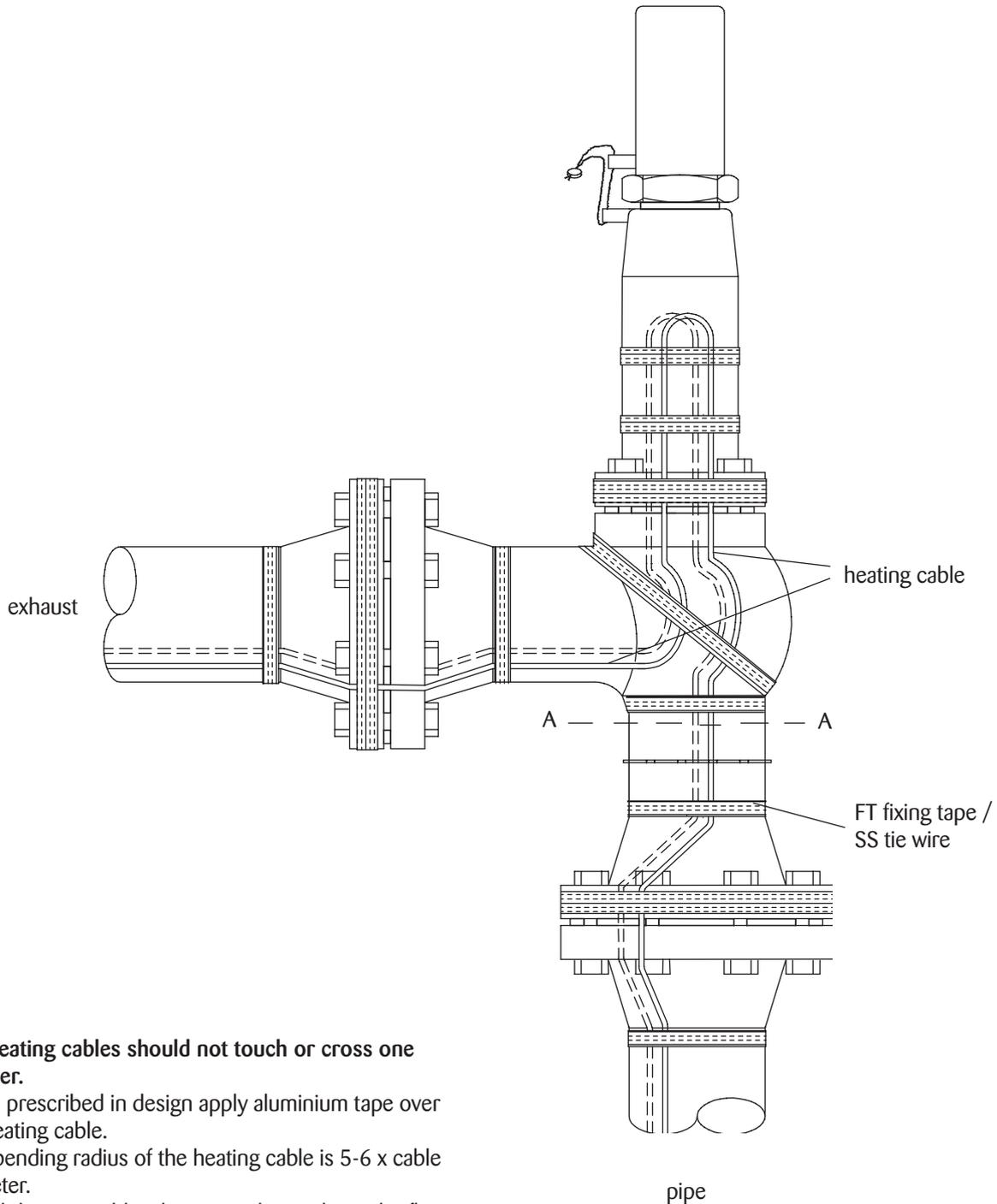
- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- In each heating cable a loop must be made on the flange if the pipe diameter allows it. Also extra loops before and after the flange must be made.



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Installation on safety valves

For lines of 6" and larger
(for cable length see valve allowances on page 12)



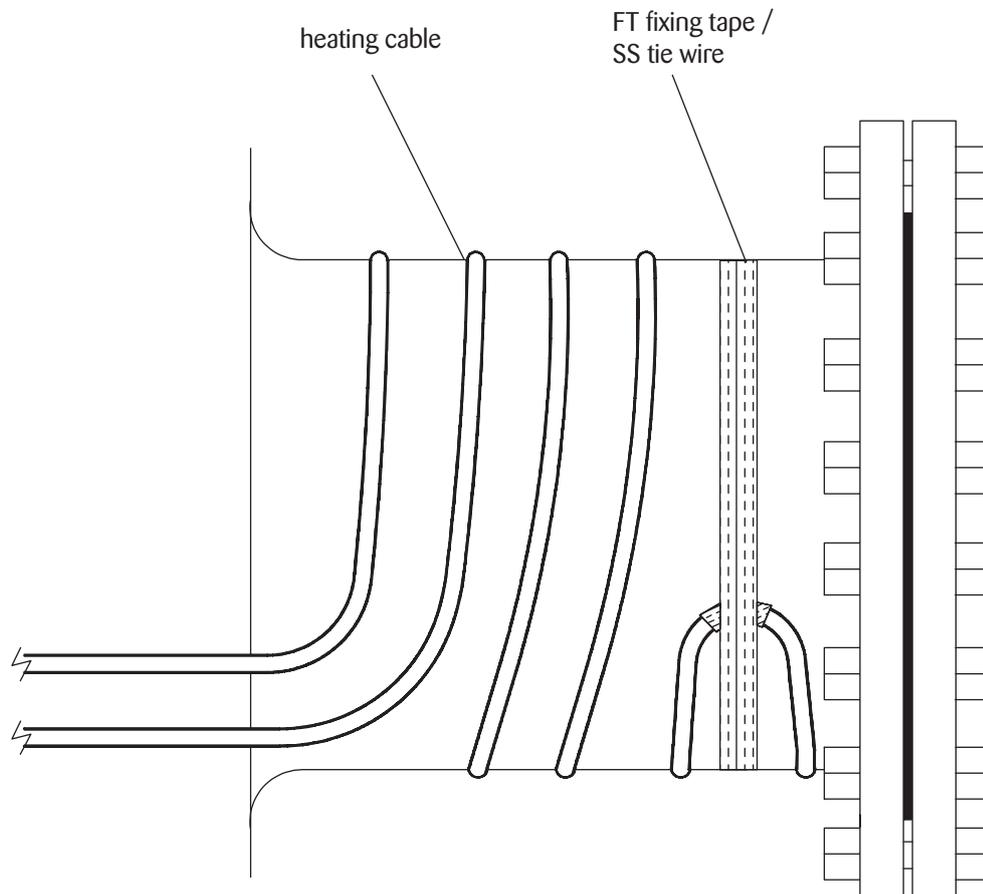
Note:

- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- In each heating cable a loop must be made on the flange if the pipe diameter allows for this. In case of process heating, the valve and the piping up to section A - A to be traced as an individual circuit.



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Installation on manholes



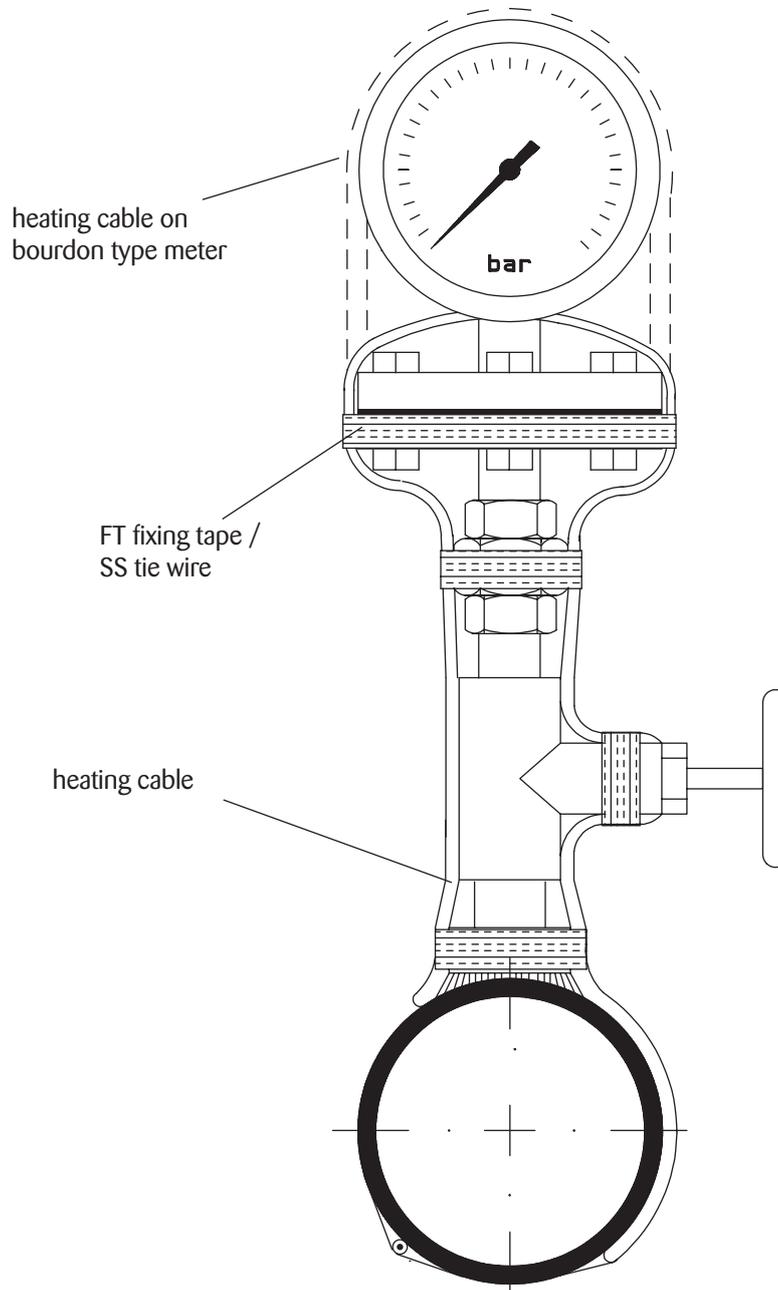
Note:

- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- First mount the loop in the heating cable by means of tie wire/fixing tape as shown.
- No heating cable to be installed on the manhole cover.



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Installation on pressure gauges



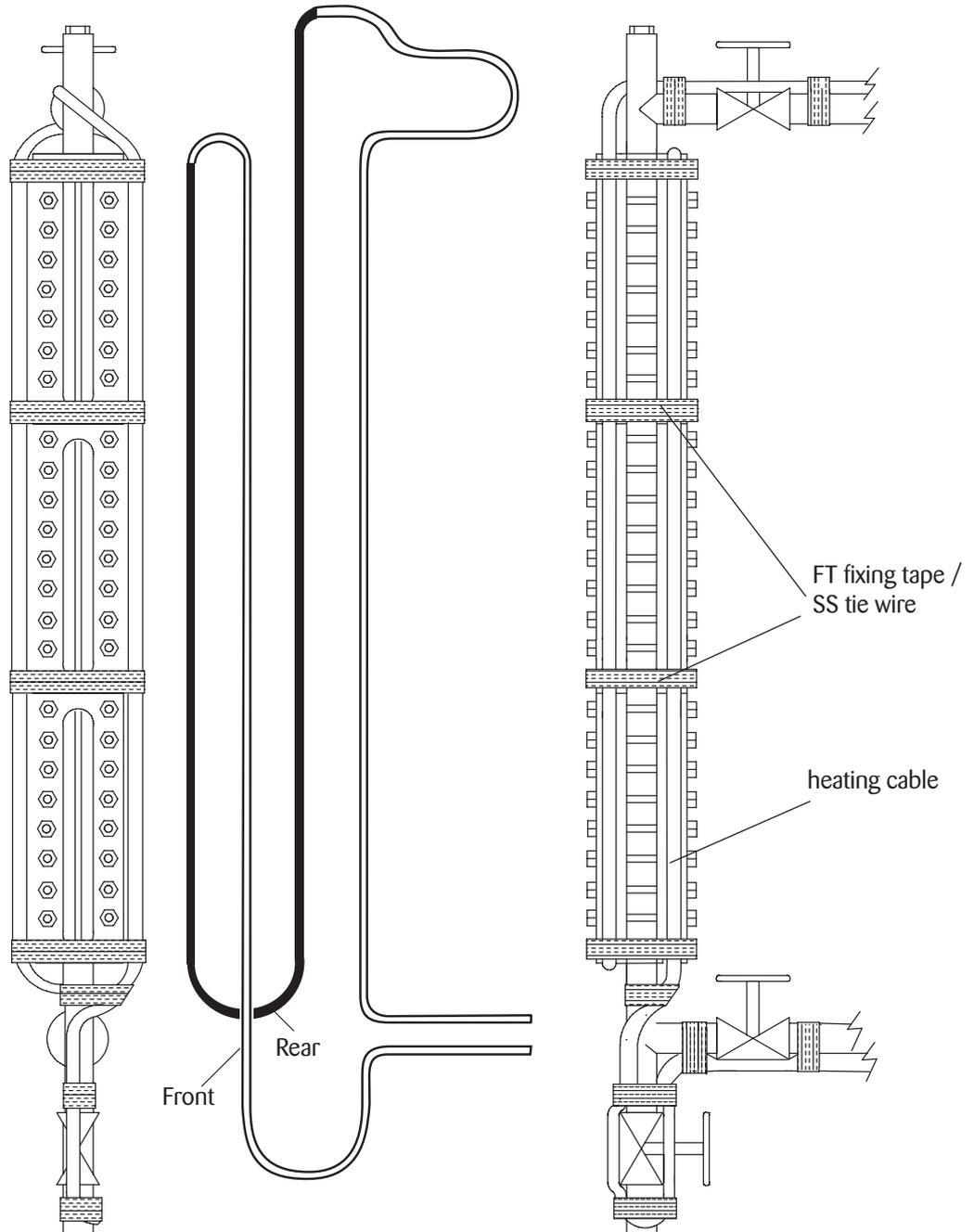
Note:

- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.
- One heating cable is installed over the gauge, the other heating cable(s) continue(s) straight on.



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Installation on level gauges



Note:

- The heating cables should not touch or cross one another.
- When prescribed in design apply aluminium tape over the heating cable.
- Min. bending radius of the heating cable is 5-6 x cable diameter.



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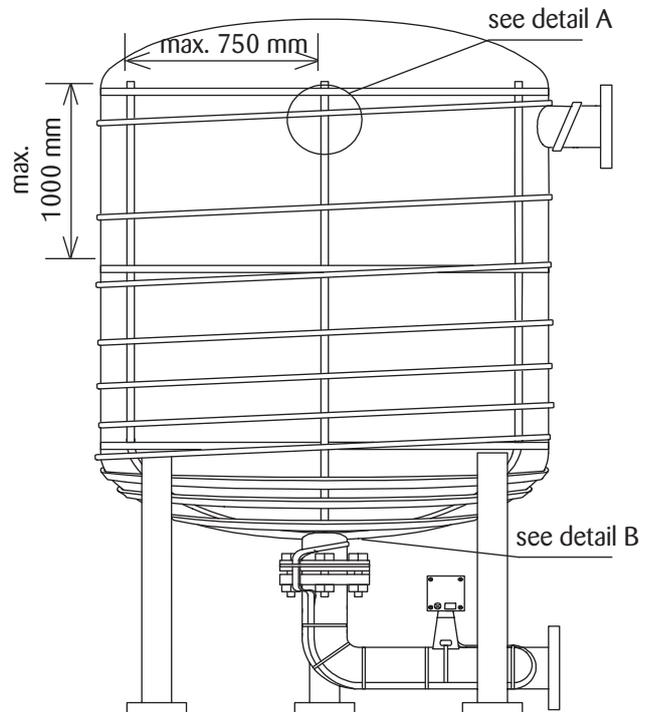
Installation on vessels or tanks

1. Mount banding (not too tight) at the upper side of the vessel or tank.
2. Push the required number of punch strips of sufficient length between the banding and the tank vessel wall. Hang up the punch strips to the banding. The open side of the lips in the punch strips must point downwards (see detail A). Space the punch strips equally over the circumference of the vessel/tank (max. spacing 750 mm).
3. Tighten the upper banding.
4. Bend the punch strips to the middle of the vessel/tank bottom. Put a tie wire through the last slot of the punch strips. Twist the ends of the tie wire until the punch strips are tight against the wall and bottom (see detail B).
5. First mount a banding at the lower side of the vessel/tank and the other banding at a distance from each other of max. 1000 mm.
6. Bend the lips of the punch strips upwards where heating cable will be installed.
7. Place the heating cable in the upwards bended lips **(the lips are a support only and should not be tightened over the heating cable!)**.
8. Connect the heating/cold lead cables into the power supply box.
9. With a single phase + neutral or a two phase system, the heating cable must be laid out along the vessel/tank wall as a loop (so two heating cables parallel to each other).
10. With a three phase system, the end of the three cables must be connected to the end box, where a star connection can be made.
11. Cover the heating cable over the total length with aluminium tape.

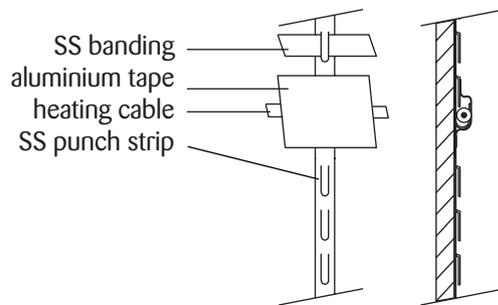
Description:

SS punch strip
 AL-20H aluminium tape
 AL-30H aluminium tape
 SS banding
 SS banding seal

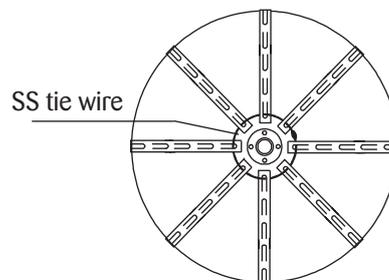
Stainless steel tie wire to be supplied
 by electrical contractor



Detail A

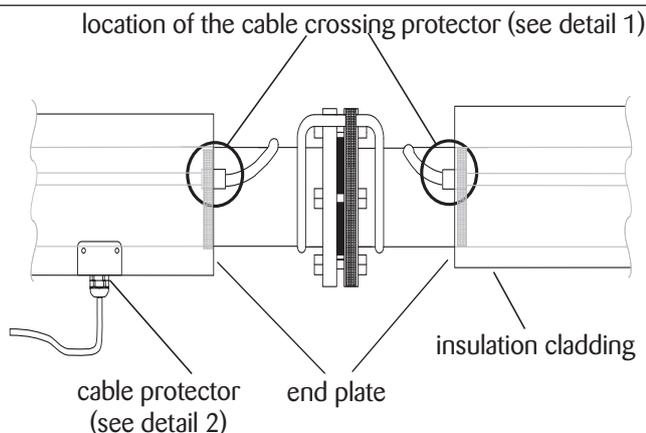


Detail B (without heating cable)

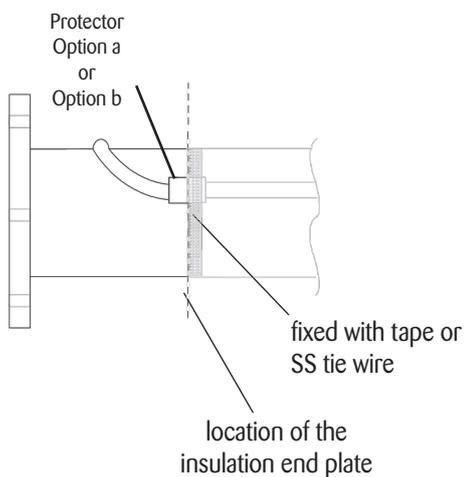


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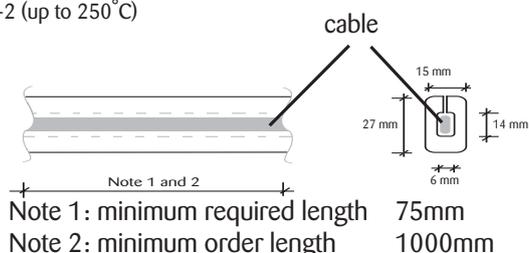
Installation of cable protectors



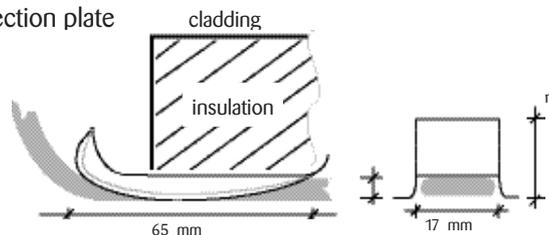
Detail 1:



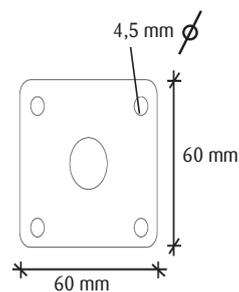
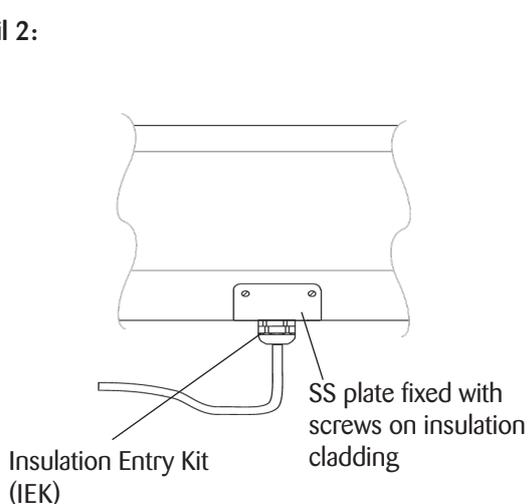
Option a:
Silicone protection sleeve
Type KS-2 (up to 250°C)



Option b:
SS protection plate
Type TEF



Detail 2:



Type:
IEK-TES-1 for one cable type TES
IEK-TES-2 for two cables type TES



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Inspection and testing of heating cable and documentation

Before thermal insulation is installed

1. Inspect the heating cable for possible damages along the length of the total circuit.
2. Megger the heating cable to ensure electrical resistance integrity. This will verify that the cable has not been damaged during installation of the heat trace circuit. The cable should be tested between heating cable bus wires and the heating cable metallic braid with a 500 - 2500 Vdc test voltage for TES and 1000 Vdc for MI conform the local electrical board. The measured insulation resistance shall not be less than 50 MΩ. Measure also the loop resistance. Note down the readings in the check list (page 23).

Caution:

In case electronic thermostats are used in the system, disconnect them before meggering the heat tracing system.

After thermal insulation is installed

1. Megger the heating cable to ensure electrical resistance integrity. This will verify that the cable has not been damaged during installation of thermal insulation of the heat trace circuit. The cable should be tested between heating cable bus wires and the heating cable metallic braid with a 500 - 2500 Vdc test voltage for TES and 1000 Vdc for MI conform the local electrical board. The measured insulation resistance shall not be less than 50 MΩ. Measure also the loop resistance. Note down the readings in the check list (page 23).

Caution:

In case electronic thermostats are used in the system, disconnect them before meggering the heat tracing system.

2. If applicable, inspect the heating cable at the entries in the insulation cladding and at insulation end covers.

Documentation

1. Stabilized design can be used for series heating cables to assign a lower T-class through the use of the Thermon CompuTrace software or Thermon Engineering.
2. If stabilized design is used, the end user must record the system parameters and the area T-class, and keep these records for the time the heating cable is in operation.
3. If stabilized design is used, no temperature limiting device has to be used.
4. In non-hazardous area's a limiter can be used when the product is the limiting factor.

Caution:

A limiter must always be installed on the heating cable.



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CHECKLIST

for installation of series heating cables

General information				Check on electr. components	Date	Initials			
Thermon project no.				Circuit switch					
Unit				Thermostat					
Customer ref. no.				Junction box					
Electrical contractor									
Ref. no.				End termination					
Inspector				Thermostat settings	Reading	Initials			
System information				Control point	°C				
Line no.				Limiter	°C				
Equipment no.				Earth protection	Date	Initials			
Circuit no.									
Circuit switch no.				Braid connected to earth					
Thermostat no.				Braid interconnected					
Junction box no.				Earthing of glands (metal)					
				Voltage check	Reading	Initials			
Reel no. 1				Junction box	V				
Reel no. 2				General check	Date	Initials			
Reel no. 3				Unused entries plugged off					
Circuit length (in meters)		length 1	length 2	All components closed					
		length 3							
Megger test* before mounting of insulation		Reading	Date	Initials	Megger test* after mounting of insulation		Reading	Date	Initials
		1 Phase or 2 Phase	L - Earth				M Ω		
3 phase	L ₁ - Earth	M Ω		3 phase	L ₁ - Earth	M Ω			
	L ₂ - Earth	M Ω			L ₂ - Earth	M Ω			
	L ₃ - Earth	M Ω			L ₃ - Earth	M Ω			
Resistance test before mounting of insulation		Reading	Date	Initials	Resistance test after mounting of insulation		Reading	Date	Initials
		1 Phase or 2 Phase	L _x -N / L _x -L _y				Ω		
3 phase **	L ₁ - L ₂	Ω		3 Phase **	L ₁ - L ₂	Ω			
	L ₂ - L ₃	Ω			L ₂ - L ₃	Ω			
	L ₁ - L ₃	Ω			L ₁ - L ₃	Ω			
Remarks				Copies to:					
* Minimum 50 M Ω				Checklist sequence no.					
** Reading = 2 x 1-phase resistance									



THERMON...The Heat Tracing Specialists®

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Tab

4

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Tab

Electric Heat Tracing

Maintenance and Troubleshooting Guide



The Heat Tracing Specialists®

Introduction

A complete electric heat tracing system will typically include the following components:

1. Electric heat tracing cable¹ (self-regulating, power-limiting, parallel constant watt or series resistance).
 2. Power connection kit.
 3. Control thermostat².
 4. In-line/T-splice kit (permits two or three cables to be spliced together).
 5. Cable end termination.
 6. Attachment tape (use on 12" intervals or as required by code or specification).
 7. "Electric Heat Tracing" label (peel-and-stick label attaches to insulation vapor barrier on 10' intervals or as required by code or specification).
 8. Thermal insulation³ and vapor barrier (by others).
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The absence of any of these items can cause a system to malfunction or represent a safety hazard.

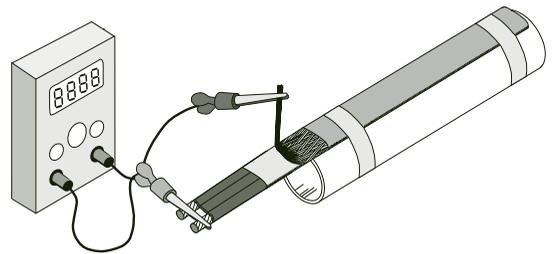
Notes . . .

1. Ground-fault maintenance equipment protection is required for all heat tracing circuits.
2. Thermostatic control is recommended for all freeze protection and temperature maintenance heat tracing applications.
3. All heat-traced lines must be thermally insulated.

Cable Testing

After a heat tracing circuit has been installed and fabricated and before the thermal insulation is installed, the heating cable should be tested to ensure electrical resistance integrity. The cable should be tested with at least a 500 Vdc megohmmeter (megger) between the heating cable bus wires and the heating cable metallic braid. It is recommended that the test voltage for polymer-insulated heating cables be 2500 Vdc or 1000 Vdc for MI cable.

After properly terminating the cable, connect the positive lead of the megger to the bus wires and the negative lead to the metallic braid as shown. The minimum acceptable level for the megger reading for any polymer-insulated heat tracing cable is **20 megohms**. This test should be repeated after the thermal insulation and weather barrier have been installed.



Connect the positive lead of the megger to the cable bus wires and the negative lead to the metallic braid.

Thermal Insulation

The value of properly installed and well-maintained thermal insulation cannot be overemphasized. Without the insulation, the heat loss is generally too high to be offset by a conventional heat tracing system.

Before the thermal insulation is installed on a heat-traced pipe, the tracing circuit should be tested for dielectric insulation resistance. This will ensure that the cable has not been damaged while exposed on the uninsulated pipe.

In addition to piping and in-line equipment such as pumps and valves, all heat sinks must be properly insulated. This includes pipe shoes, hangers, flanges and, in many cases, valve bonnets.

There are many different pipe insulation materials, each of which has advantages in particular applications. Regardless of the type or thickness of insulation used, a protective barrier should be installed. This protects the insulation from moisture intrusion and physical damage and helps ensure the proper performance of the heat tracing system.

Notes . . .

- When rigid (noncompressible) materials are used, the inside diameter of the insulation is usually oversized to accommodate the heating cable on the pipe.
- Insulating materials are very susceptible to water absorption, which dramatically increases the heat loss and should be replaced if the materials get wet.

Final Inspection

The heating circuit can now be tested for proper operation. This includes measuring and recording the connected voltage, steady-state current draw, length and type of cable, ambient temperature and temperature of the pipe. (See the Inspection Report Form on page 3.)

The complete system (especially the thermal insulation) should now be visually inspected. Additional insulation should be applied snugly around pipe shoes or other heat sinks and sealed from the weather. Expansion joints on high-temperature lines should be examined carefully. There may be exposed insulation where sections fit together or around flanges, valves, pipe hangers or connection kits; these locations should be sealed to prevent ingress of moisture.

“Electric Heat Tracing” caution labels should be applied to the outer surface of the weather barrier at regular intervals of 10 feet (or as required by code or specification). The location of splices and end terminations should also be marked with splice and end termination caution labels.

Maintenance

Once the heat tracing system has been installed, an ongoing preventive maintenance program should be implemented using qualified personnel. Support documentation providing general information and an operating history of the specific circuits in the system should be maintained.

The results of the operational testing described above form the testing “base line” or normal range. Subsequent measurements should be recorded periodically and compared to this base-line data to help identify potential malfunctions.



Inspection Report Form for Electric Heat Tracing (Typical)

Location		System		Reference Drawing(s)			
CIRCUIT INFORMATION							
Heater Cat. No.		Circuit Length			Bkr. Panel No.		
Power Connection		Design Voltage			Bkr. Pole(s) No.		
Tee Connection		Ground-Fault Protection (type)					
Splice Connection		Ground-Fault Trip Setting					
Heater Controller							
VISUAL							
Panel Number		Circuit #					
		Date					
		Initial					
Thermal Insulation							
Damaged Insulation/Lagging							
Water Seal Good							
Insulation/Lagging Missing							
Presence of Moisture							
Heating System Components							
Enclosures, Boxes Sealed							
Presence of Moisture							
Sign of Corrosion							
Heater Lead Discoloration							
Heating and/or High Limit Controller							
Operating Properly							
Controller Setpoint							
ELECTRICAL							
Dielectric Insulation Resistance Testing (bypass controller if applicable) Refer to IEEE 515-1997, Section 7.9							
Test Voltage							
Megger Value							
Heater Supply Voltage							
Value at Power Source							
Value at Field Connection							
Heater Circuit Current Reading							
Pipe Temperature							
Amps Reading at 2-5 min.							
Amps Reading After 15 min.							
Ground-Fault Current							
Comments and Actions							
Performed by		Company			Date		
Approved by		Company			Date		

Troubleshooting

The following information is intended to assist in troubleshooting electric heat tracing systems. The primary objective is to provide an enhanced understanding of the elements of a successful heat tracing installation. Of these elements, one of the most important is the **thermal insulation**.

Before calling the heat tracing vendor, make a visual inspection of the installation; perhaps the thermal insulation is wet, damaged or missing. Also consider the possibility that repairs or maintenance of in-line or nearby equipment may have resulted in damage to the heat tracing equipment. These are common causes of tracing problems which are often overlooked. Other possible causes are listed below with their symptoms and remedies.

If an electric heat tracing circuit is suspected to be damaged, a dielectric insulation resistance (megger) test should be performed using a 2500 Vdc megohmmeter for polymer-insulated heating cables or 1000 Vdc for MI cable. Periodic testing with accurate records will establish a "normal" range of operation (refer to the Inspection Report Form on page 3). Dielectric insulation resistance readings which deviate from the normal range can quickly reveal a damaged circuit.

Symptom	Possible Cause	Remedy
I. No heat/no current	A. Loss of power (voltage)	A. Restore power to tracing circuit (check circuit breaker and electrical connections). Poorly made terminations can cause EPD-type breakers to trip unexpectedly
	B. Controller setpoint too low	B. Adjust setpoint
	C. High temperature limit switch activated	C. May require manual reset to re-enable heat tracing circuit
	D. "Open" series heating circuit	D. Repair or replace circuit ¹
	E. Controller failure	E. Repair sensor or controller ²
II. Low system temperature	A. Controller setpoint too low	A. Adjust setpoint
	B. Temperature sensor located too close to heating cable or other heat source; may be accompanied by excessive cycling of control relays/ contacts	B. Relocate sensor
	C. Insulation material and/or thickness different than designed	C. Replace insulation; increase insulation thickness (if dry); consider increasing voltage for higher cable output ³
	D. Ambient temperature lower than designed	D. Install higher output heating cable; increase insulation thickness; raise voltage ³
	E. Low voltage (check at power connection point)	E. Adjust voltage to meet design requirements ³

Symptom	Possible Cause	Remedy
III. Low temperature in sections	A. Wet, damaged or missing insulation	A. Repair or replace insulation and jacket
	B. Parallel heating cable; open element or damaged matrix	B. Repair or replace; splice kits are available from cable manufacturer
	C. Heat sinks (valves, pumps, pipe supports, etc.)	C. Insulate heat sinks or increase amount of tracing on heat sinks
	D. Significant changes in elevation along length of the heat-traced pipe	D. Consider dividing heating circuit into separate, independently controlled segments
IV. High system temperature	A. Controller "on" continuously	A. Adjust setpoint or replace sensor ²
	B. Controller failed with contacts closed	B. Replace sensor or controller ²
	C. Sensor located on uninsulated pipe or too close to heat sink	C. Relocate sensor to an area representative of conditions along entire pipe length
	D. Backup heating circuit controller "on" continuously	D. Adjust setpoint or replace backup controller
V. Excessive cycling	A. Temperature sensor located too close to heating cable or other heat source; may be accompanied by low system temperature	A. Relocate sensor
	B. Ambient temperature near controller setpoint	B. Temporarily alter controller setpoint
	C. Connected voltage too high	C. Lower voltage
	D. Heating cable output too high (overdesign)	D. Install lower output heating cable or lower voltage
	E. Controller differential too narrow	E. Widen differential or replace controller to avoid premature contact failure
VI. Temperature variations from setpoint along pipeline	A. Unanticipated flow patterns or process operating temperatures	A. Redistribute heating circuits to accommodate existing flow patterns; confirm process conditions
	B. Inconsistent cable installation along pipeline	B. Check method of cable installation, especially at heat sinks
	C. Inconsistent cable performance	C. Compare calculated watts/foot [(volts x amps) ÷ length] for the measured pipe temperature with designed cable output for the same temperature; regional damage to parallel cable can cause partial failure

Notes . . .

1. Flexible, plastic-jacketed heating cables may be field-spliced; MI cables usually require replacement.
2. Mechanical thermostat sensors cannot be repaired or replaced; RTD or thermocouple sensors can be replaced. Some controllers have replaceable contacts/relays or may require a manual reset if a "trip-off" condition on the heating circuit was detected.
3. The operation of most electric heat tracing cables is dramatically affected by changes in the supply voltage. Before making any changes, consult the cable manufacturer with information on the alternate voltages available. Otherwise, cable failure and/or an electrical safety hazard may result in some situations.



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PETK

Power & End Termination Kit

INSTALLATION PROCEDURES

- PETK-1 for BSX, RSX, VSX
- PETK-2 for KSX, HTSX
- PETK-3 for HPT, FP
- PETK-3-ECM for HPT, FP
- PETK-3-ZT for HPT, FP

Order separately to be used in conjunction with Thermon connection kits



The Heat Tracing Specialists®

The following installation procedures are guidelines for the installation of the Power and End Termination Kit. For translations other than English and local language translation provided here, please contact Thermon. The English language installation procedure shall govern.

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

PETK Power and End Termination Kits (per cable)

PETK-1	for BSX, RSX, VSX
PETK-2	for KSX, HTSX
PETK-3	for HPT, FP
PETK-3-ECM	for HPT, FP
PETK-3-ZT	for HPT, FP

Kit Contents . . .



Item	Qty.	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	1	End Cap
4	1	Tape Strip (PETK-3 Only)
5	1	End Termination Caution Label
6	1	Grommet (For PETK-3 Terminator kits only)
7	1	Ground Sleeve

Note:

Wire pins may be required as per client/project specification (order separately).

Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

Tools Required . . .



PETK Certifications/Approvals¹ . . .

FMG 10.0022X Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C

 1725 II 2 GD Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C, FM 10ATEX0058X



Note:

1. These sets have been evaluated as components of Thermon's Approved connection kits, such that the area use ratings depend on the rating of the connection kits.



The Heat Tracing Specialists®

PETK

INSTALLATION PROCEDURES

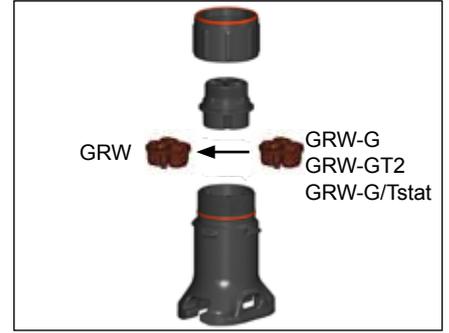
IMPORTANT!

Heating cable must be properly installed within expediter assembly and mounted to pipe prior to terminating with PETK kit.

See Terminator Installation Instructions for expediter mounting details.

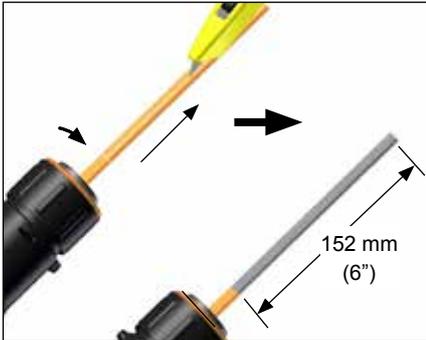


Terminator: Route cable through base entry and mount expediter to pipe using pipe band. Do not band over cable.



For HPT and FP cable exchange grommet supplied in Terminator kit with:
 GRW-G provided in PETK-3
 GRW-GT2 provided in PETK-3-ECM
 GRW-G/Tstat provided in PETK-3-ZT

Step 1: Remove Heating Cable Overjacket and Separate Metallic Braid to Form Pigtail



1a. Cut and remove heating cable overjacket.



Do not cut metallic braid.

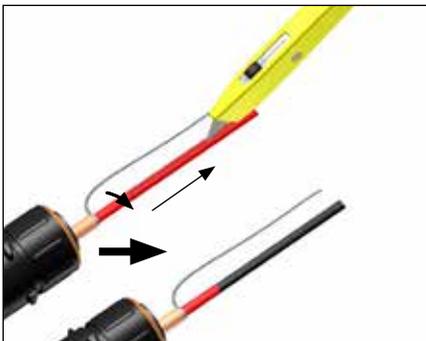


1b. Separate braid strands at edge of overjacket and pull cable through opening in braid.

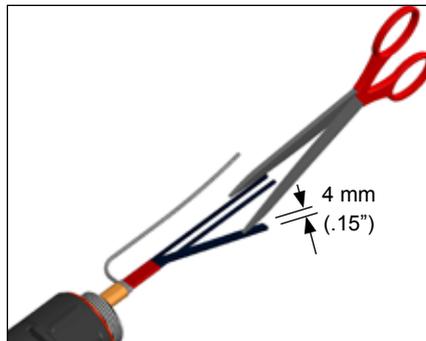


1c. Twist braid into a pigtail. Trim ends of braid.

Step 2: Matrix Removal for BSX, RSX, HTSX, KSX, and VSX Cables



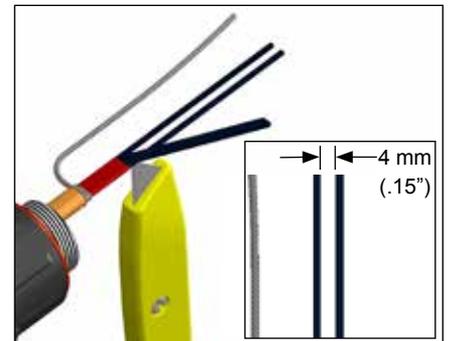
2a. Cut and remove primary insulation jacket (BSX and RSX cables only).



2b. Cut a 4mm strip of conductive matrix between the conductors.

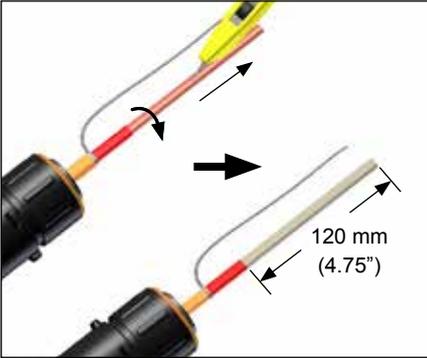


Do not cut bus wire strands.



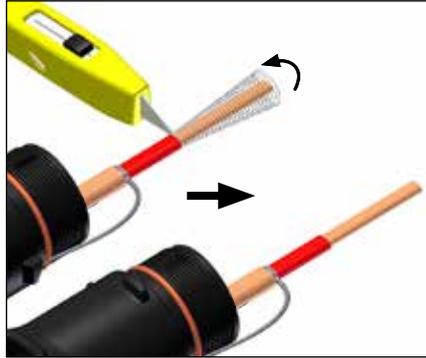
2c. Cut and remove the 4mm matrix strip.

Step 2: Heating Element Removal for HPT and FP Cables

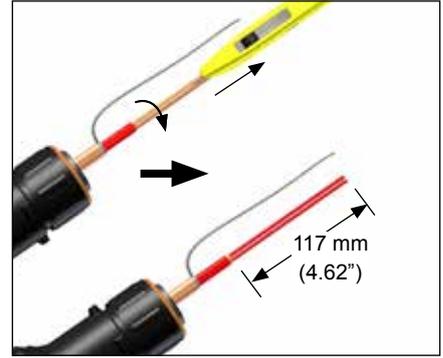


2a. Cut and remove primary insulation jacket.

NOTE: Bus connection must be no more than 50 mm (2") from pipe as addressed in connection kit instructions.



2b. Cut and remove fiberglass overlay and heating element. Push any remaining heating element wire under the primary insulation jacket.

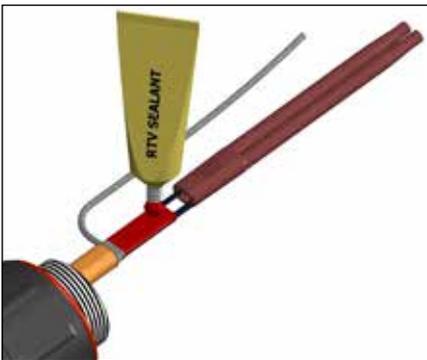


2c. Cut and remove pairing jacket.

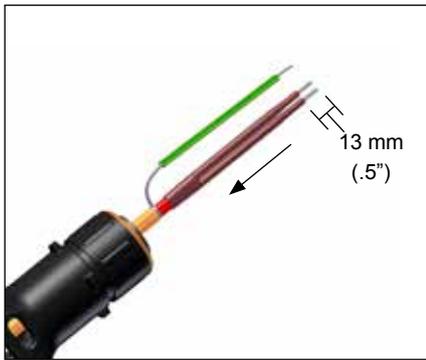


Do not cut bus wire insulation.

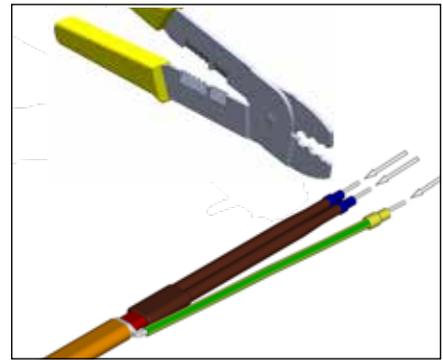
Step 3: Install Power Boot on Heating Cables



3a. Apply RTV sealant to cable to cover distance of at least 3mm and slide boot onto the end of the cable.



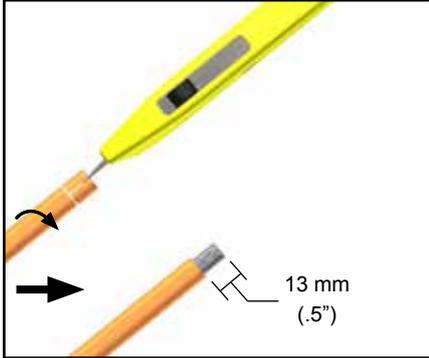
3b. Slide boot onto the end of the cable and green/yellow ground sleeve over twisted braid. Expose 13mm (0.5") of bus wire.



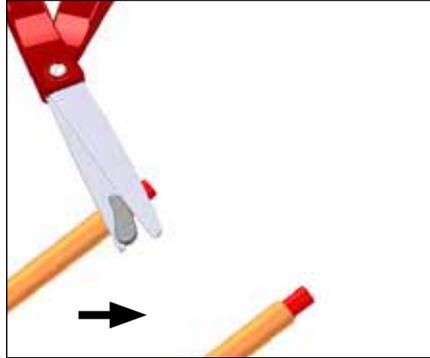
3c. Crimp conductor wire pins on each conductor and on twisted braid if required as per client/project specification (order separately).



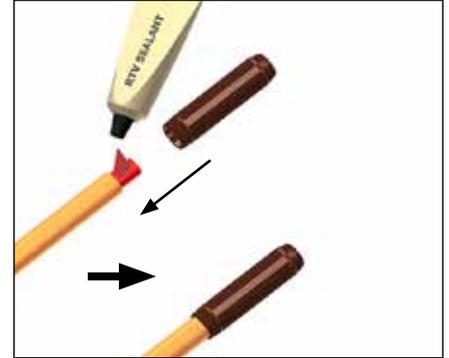
Step 4: End Termination for BSX, RSX, HTSX, KSX, and VSX Cables



4a. Cut and remove heating cable overjacket.

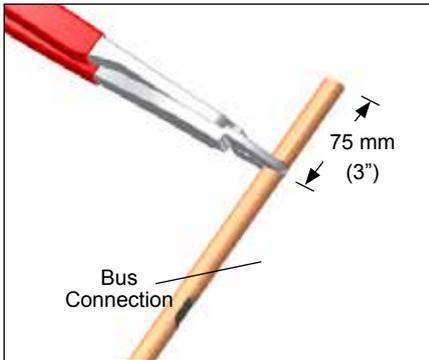


4b. Trim away exposed braid from cable.

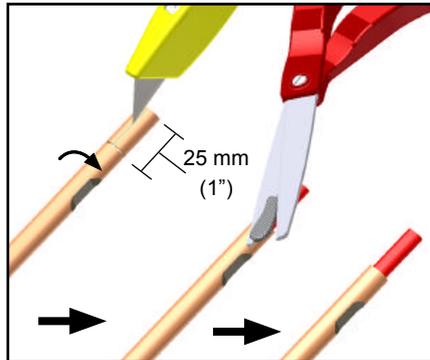


4c. Fill the end cap with RTV sealant and apply a circumferential bead to cable [minimum of 3 mm (0.12") wide]. Slide end cap onto end of cable.

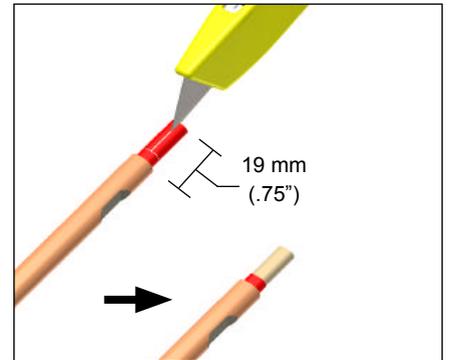
Step 4: End Termination for HPT and FP



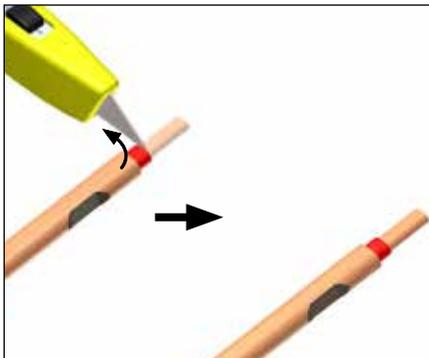
4a. Trim the cable 75 mm (3") from the bus connection.



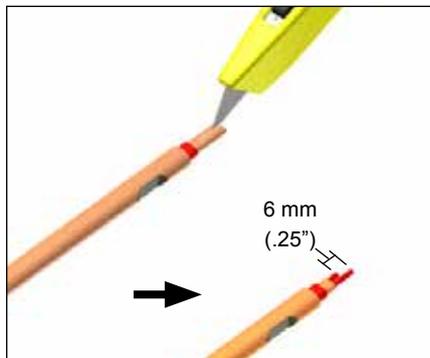
4b. Cut and remove overjacket and trim away exposed braid from cable.



4c. Cut and remove primary insulation jacket.



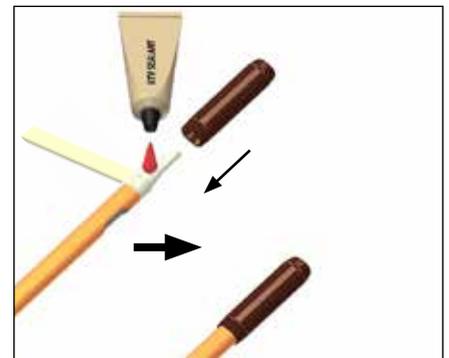
4d. Cut and remove fiberglass overlay and heating element. Push any remaining heating element wire under the primary insulation jacket.



4e. Cut and remove pairing jacket. Stagger cut one of the bus wires.

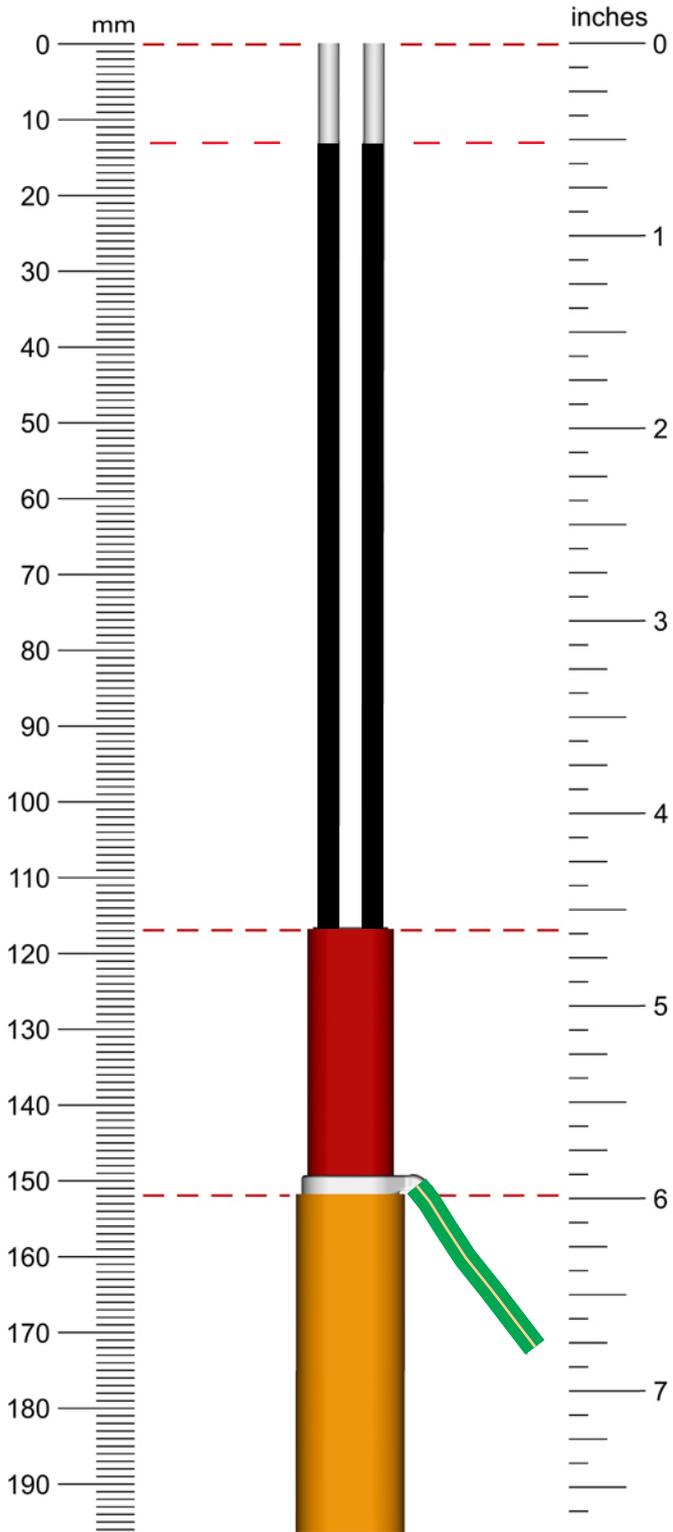


Do not cut bus wire strands.

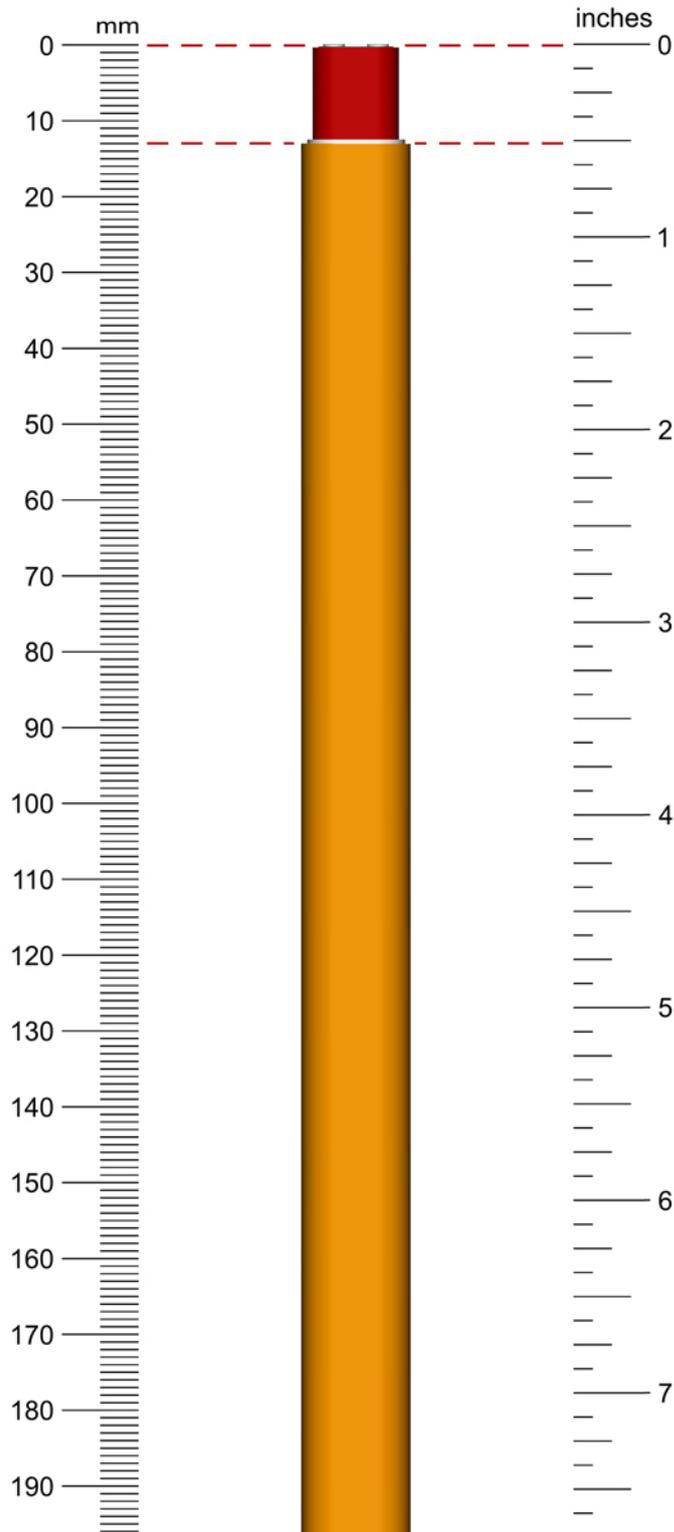


4f. Tape bus wires individually and then together. Continue taping to cover overjacket. Fill the end cap with RTV sealant and apply a circumferential bead to cable [minimum of 3 mm (0.12") wide]. Slide end cap onto end of cable.

Cable Take-off for BSX, RSX, HTSX, KSX and VSX



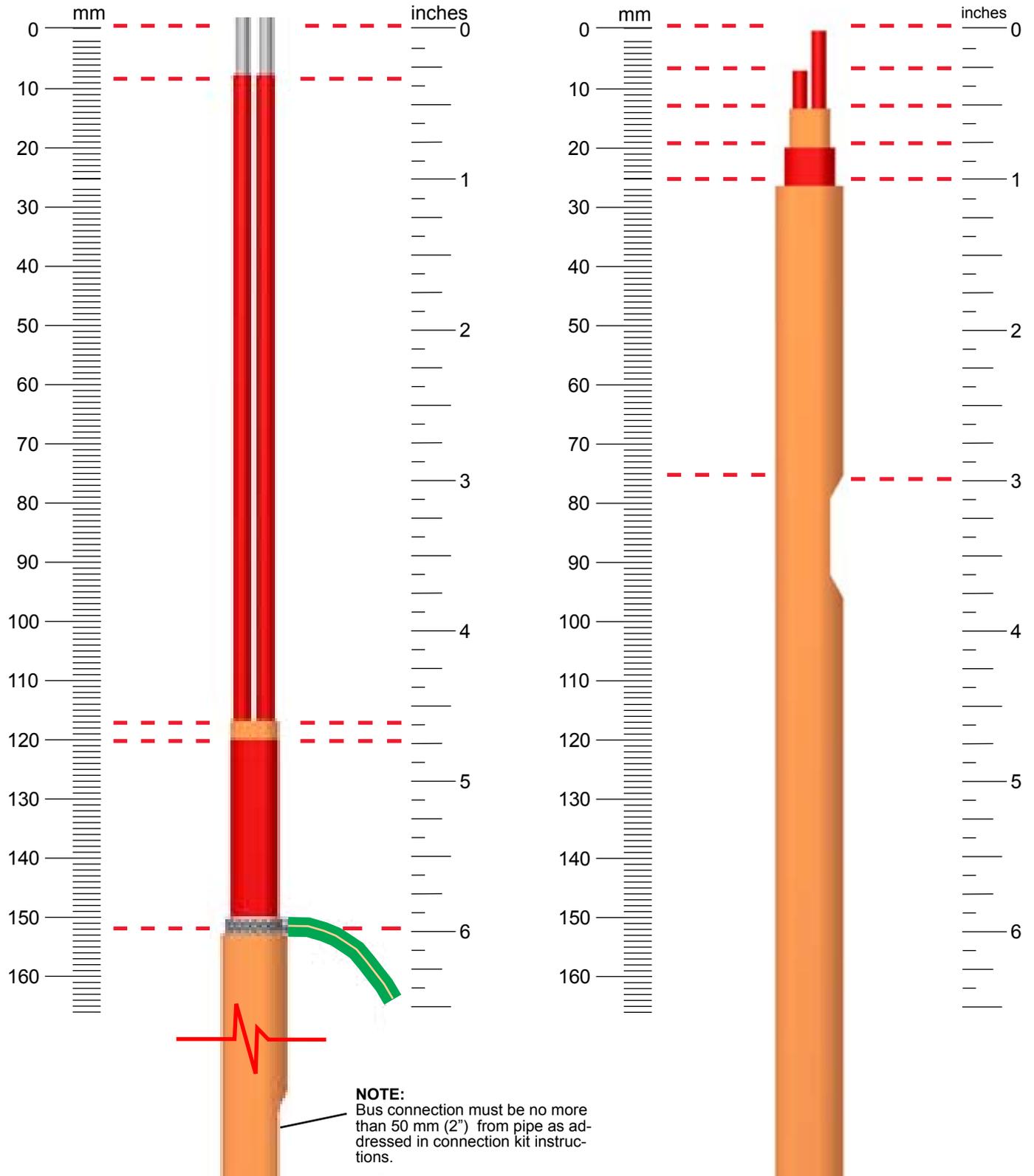
For Power Connector Boot Termination



For End Cap Termination

NOTE:
Images may not be printed to scale.

Cable Take-off for HPT and FP Heating Cables



For Power Connection Boot Termination

For End Cap Termination

NOTE:
Images may not be printed to scale.



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PETK-4

POWER AND END TERMINATION KIT

HPT POWER LIMITING CABLES (260° C)

HAZARDOUS AREAS:

FOR JB-K-0-M25-EX, ZP-S-WP,

TED/TS THERMOSTATS

NON-HAZARDOUS AREAS:

FOR JB-K-0-M25-IND, TC THERMOSTATS



ISO 9001
REGISTERED

ART. NO. 422.306.510

STORE AT OR BELOW 5° C

HPT-OJ

JB-K-0-M25, TED/TS

English

Power and End Termination Kit: PETK-4 for Thermon HPT-OJ Power Limiting Heating Cable in conjunction with Thermon Junction Box JB-K-0-M25-EX, ZP-S-WP or Thermostats TED or TS in hazardous areas. In non-hazardous areas with Junction Box JB-K-0-M25-IND or Thermostat TC. Use for pipe temperatures up to 260° C.

Caution: This product must be installed correctly. Water ingress must be avoided before, during and after installation, to prevent electrical shock, short circuit or arcing.
Avoid skin or eye contact with RTV sealant.

- Before installing the product read these instructions completely
- Thermon heat tracing systems must always be installed in combination with an electrical protection device and RCD (Residual Current Device)
- Connect the metallic braid to earth
- Use only ratchet controlled crimp pliers
- Installation must comply with local requirements for electric heat tracing systems
- See also installation instructions of the relevant heat tracing cable and junction/thermostat enclosure

Illustrations:

All dimensions shown in illustrations are in millimetres

- 1.-5. Power Termination
1. & 7. Establish zone connection (this can be located where the cable sheath is thinner/indented approximately every metre of the heating cable) and keep specified distance in order to cut the cable.
- 6.-13. End termination
13. Choose the threaded part as the bottom part
Braid must be connected to the shells

Nederlands

Bij opslag boven een temperatuur van 5° C wordt de houdbaarheid verkort.

Voedingsaansluiting (Power) en eind- (End) afsluit (Termination) set (Kit) PETK-4 voor Thermon HPT-OJ power limiting verwarmingskabel in combinatie met Thermon aansluitdoos JB-K-0-M25-EX, ZP-S-WP en TED of TS thermostaat in explosie gevaarlijk gebied en aansluitdoos JB-K-0-M25-IND en TC thermostaat voor industriële toepassingen. Te gebruiken op pijpen die maximaal 260° C worden.

LET OP: dit product moet correct geïnstalleerd worden. Inwatern moet worden vermeden voor en tijdens installatie om een elektrische schok, kortsluiting en vonkvorming te voorkomen.
Vermijd huid en oogcontact met RTV sealant.

- Lees deze instructie in zijn geheel voor de installatie van het product.
- Thermon verwarmingssystemen moeten altijd geïnstalleerd worden met de correcte elektrische beveiliging. Thermon adviseert een installatie automaat met aardlek beveiliging.
- Verbind de armering van de verwarmingskabel met aarde.
- Gebruik alleen pers krimptangen met moment ontgrenzdeling.
- De installatie moet in zijn geheel voldoen aan de lokale normen voor elektrische verwarmingskabel.
- Zie ook de installatie instructies van de betreffende verwarmingskabel en de accessoires (zoals thermostaat en klemmenkast).

Extra toelichting:

- Alle maten in deze instructie zijn in millimeters.
- Kies het plaatje met de schroefdraad busjes als bodemplaat, de armering moet aan de metalen plaatjes bevestigd zijn (zie plaatje 5).
- Bepaal de zone verbinding (is dunne gedeelte van de verwarmingskabel) en neem de gespecificeerde afstand in acht om de kabel af te snijden. (zie plaatjes 1. & 7.)

Voedingsaansluiting: plaatje 1-5

Eindafwerking: plaatje 6-13

Français

À conserver à une température inférieure à 5° C.

Kits d'alimentation et d'extrémité PETK-4 pour les câbles à puissance limitante HPT-OJ compatibles avec les boîtes de raccordement JB-K-0-M25-EX, ZP-S-WP ou les thermostats TED ou TS pour zones explosibles. En zone non explosive compatibles avec les boîtes de raccordement JB-K-0-M25-IND, ou les thermostats TC.
À utiliser pour des températures de tuyauteries pouvant atteindre 260° C.

ATTENTION: Ce produit doit être installé correctement. Éviter toute migration d'humidité, avant, pendant et après l'installation pour éliminer tout risque électrique (arc, court-circuit, choc).

Éviter les contacts directs entre la peau, les yeux et la colle silicone.

- Avant l'installation, lire ces instructions entièrement
- Les systèmes de traçage THERMON doivent être surveillés par des dispositifs de protection électriques différentiels.
- Relier correctement la tresse de protection à la terre.
- Utiliser les outils à sertir contrôlés (outils à crémaillère ou à rochet)
- L'installation doit être conforme aux normes électriques en vigueur.
- Vérifier également les instructions d'installation du câble chauffant, des boîtiers de raccordement et des thermostats.

Schémas:

Toutes les dimensions sont en millimètres

1. à 5. kit d'alimentation
1. & 7. Repérer la zone de connexion (partie plus fine) et respecter les longueurs spécifiées pour couper le câble.
- 6.-13. kit de terminaison
13. Utiliser la partie filetée comme partie inférieure.
La tresse doit être connectée aux demi-coquilles

Deutsch

Bei oder unter 5° C lagern.

Das Anschlussystem PETK-4 dient der Verbindung des leistungsbeschränkten Heizkabels HPT-OJ zusammen mit dem Thermon-Anschlusskasten JB-K-0-M25-Ex, ZP-S-WP oder dem Thermostaten TED/TS mit der Betriebsspannung innerhalb explosionsgefährdeter Bereiche. In nicht-explosionsgefährdeten Bereichen mit dem Anschlusskasten JB-K-0-M25-IND oder Thermostat TC. Höchstzulässige Oberflächentemperatur 260° C.

Achtung:

Bei der Installation des Produktes sind die Installations- und Verarbeitungshinweise zu beachten. Zwecks Vermeidung von Personenschäden durch elektrischen Schlag, Kurzschluss oder Lichtbögen, ist der direkte Kontakt mit Wasser zu vermeiden. Augenkontakt mit der Dichtmasse vermeiden!

- vor der Verarbeitung die Montageanleitung sorgfältig lesen
- Thermon Begleitheizungssysteme sind immer zusammen mit einer Übersichtsicherung und Fehlerstrom-Schutzschalter (FI) zu installieren
- die Metallumflechtung ist mit dem Schutzleiter-Anschluss zu verbinden
- bei Pressverbindungen immer Werkzeug mit Zwangsöffnung einsetzen
- die technischen Details der Installation müssen den regionalen Richtlinien und Vorschriften entsprechen
- neben dieser Montageanleitung sind die des selbstregulierenden Heizkabels und Regler/Thermostaten zu Rate zu ziehen

Hinweis zu den Darstellungen:

Alle Angaben in Millimeter

- 1.-5. Anschluß der Betriebsspannung
2. & 7. Beim Zuschnitt des Heizkabels auf die erforderliche Länge ausreichend Abstand zur Heizleiterverbindung (verjüngte Stelle im Heizkabel) halten!
- 6.-13. Endabschluss
13. Bauteil mit Gewinde als Unterteil verwenden. Die Metallumflechtung mit den beiden Endabschlusshälften verbinden.

Español

Kit terminación de conexión y final PETK-4 para utilizar en cable calefactor de limitación de potencia Thermon HPT-OJ junto con caja de conexión Thermon JB-K-0-M25-EX, ZP-S-WP o termostatos TED o TS en zonas clasificadas con riesgo de explosión. En zonas ordinarias con caja de conexión JB-K-0-M25-IND o termostato TC. Utilización en tuberías con temperaturas de hasta 260 °C.

Precaución: Este producto debe ser instalado de forma correcta. La entrada de agua debe impedirse antes, durante y después de la instalación para evitar descargas eléctricas, cortocircuitos o la formación de arcos. Impedir el contacto de la silicona selladora RTV con la piel y los ojos.

- Antes de instalar el producto lea estas instrucciones al completo
- Los sistemas de traseado eléctrico de Thermon deben ser instalados siempre en combinación con dispositivos de protección eléctrica y diferencial.
- Conectar la trenza metálica a tierra.
- Utilizar únicamente alicates de presión con trinquete para un prensado controlado
- La instalación debe cumplir los requisitos de reglamentos y normas para sistemas de traseado eléctrico
- Ver también las instrucciones de instalación para el correspondiente cable calefactor y la caja de conexión/termostato

Ilustraciones:

Todas las dimensiones mostradas están en milímetros

- 1.-5. Extremo de conexión
 1. y 7. Determinar la zona de conexión (puede localizarse en la cubierta del cable, en los puntos en que presenta una hendidura, y que se encuentran a una distancia aproximada de 1 m) y respetar la distancia especificada al cortar el cable.
 - 6.-13. Extremo final
 13. Utilizar la parte roscada como parte inferior
- La trenza debe conectarse a la envolvente metálica

Русский

Набор силовой и конечной заделки РЕТК-4 для кабеля предельной мощности HPT-OJ компании Термон в сочетании с клеммной коробкой JB-K-0-M25-EX, ZP-S-WP или термостатами TED или TS во взрывоопасной зоне. В невзрывоопасной зоне применяется с клеммной коробкой JB-K-0-M25-IND или термостатом TC. Набор предназначен для температуры трубопровода до 260 °С.

Осторожно: Продукция должна быть правильно смонтирована. Следует избегать попадания воды перед, во время и после монтажа с целью предотвращения электрошока, замыкания и искрения.

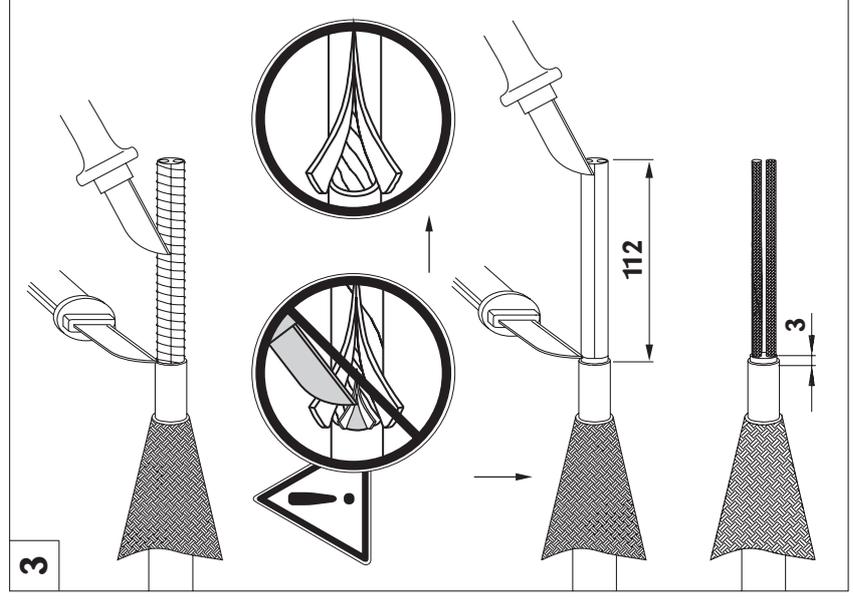
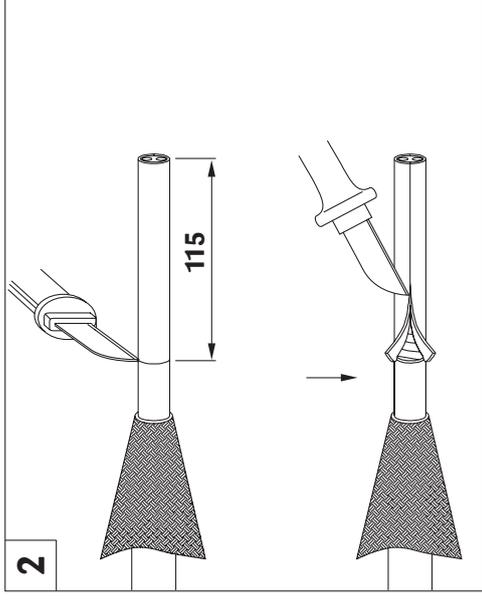
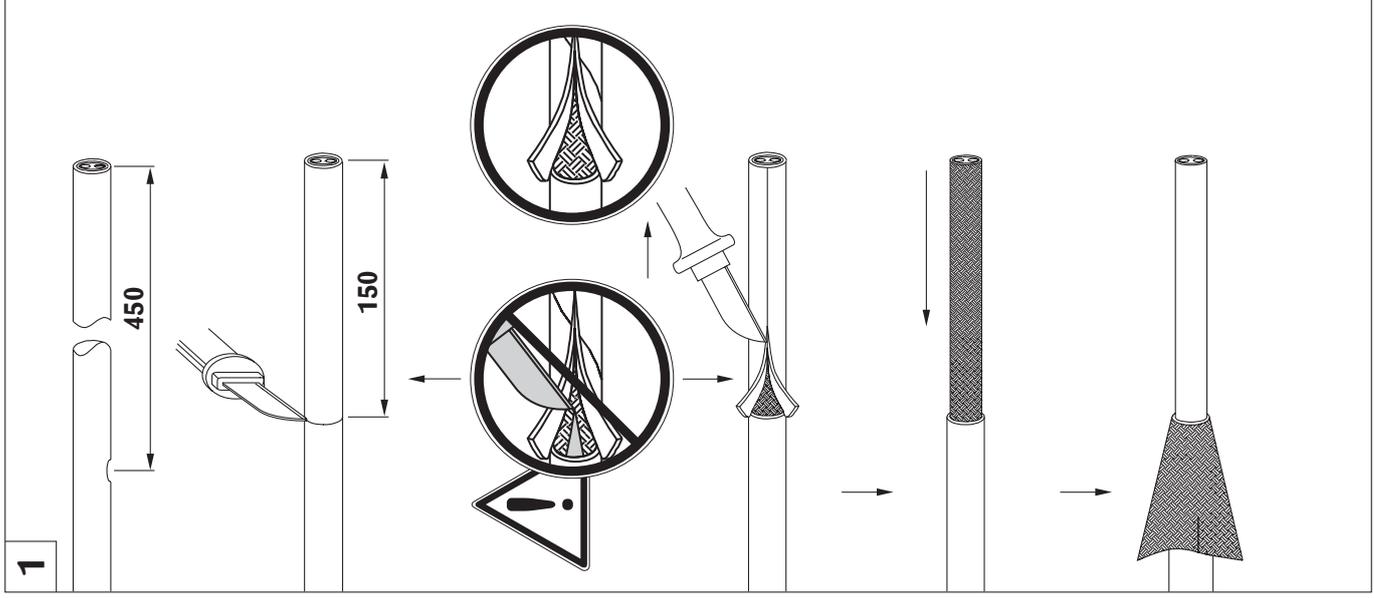
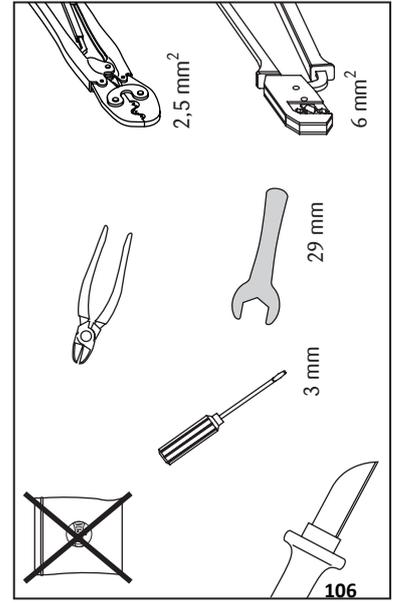
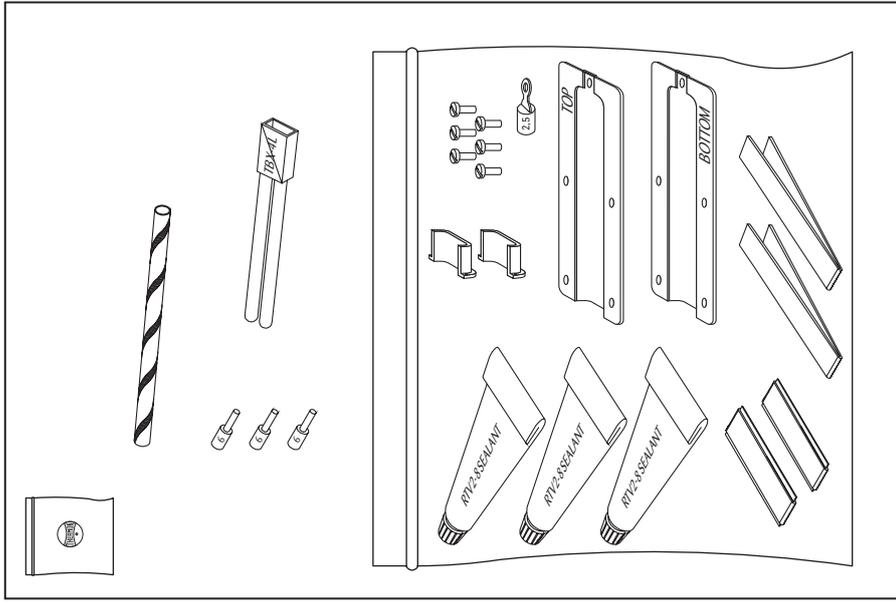
Избегайте попадания RTV клея на кожу или в глаза.

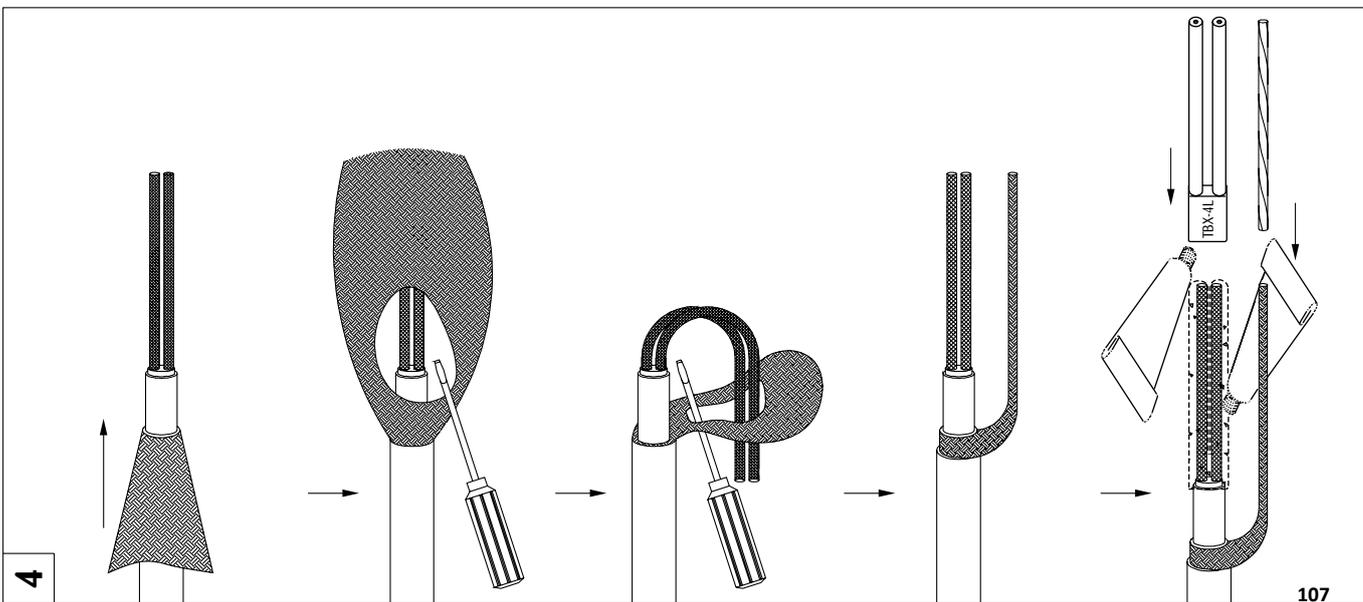
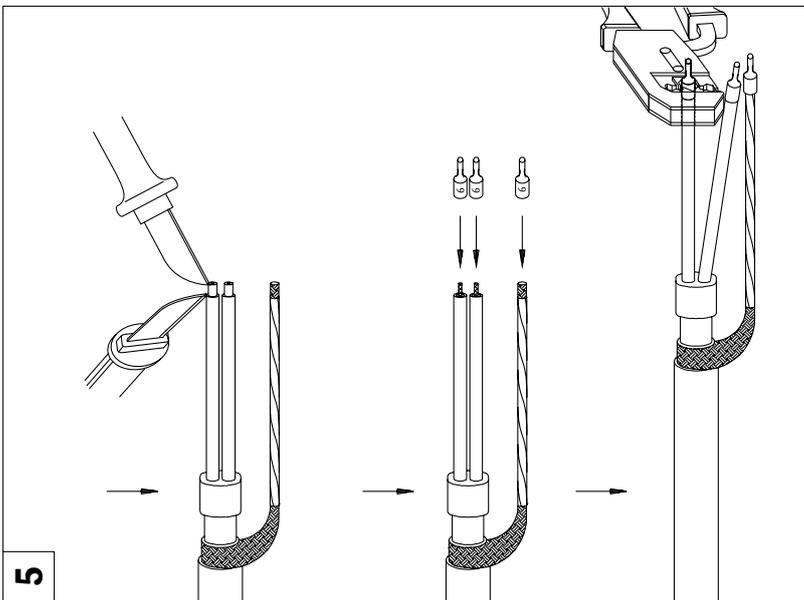
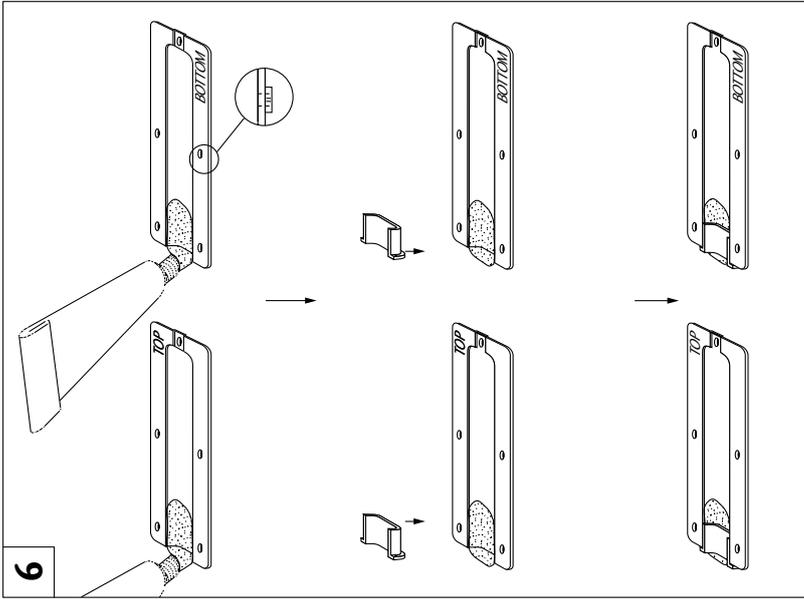
- Перед монтажом продукта полностью прочитайте это руководство
- Системы электрообогрева компании Термон всегда должны монтироваться в сочетании с прерывателем и УЗО
- Заземлите металлическую оплетку
- Используйте только обжимные щипцы с храповиком для наконечников
- Монтаж должен соответствовать местным требованиям по системам электрообогрева
- См. также руководство по монтажу для соответствующего нагревательного кабеля и брошюру по клеммным коробкам и термостатам

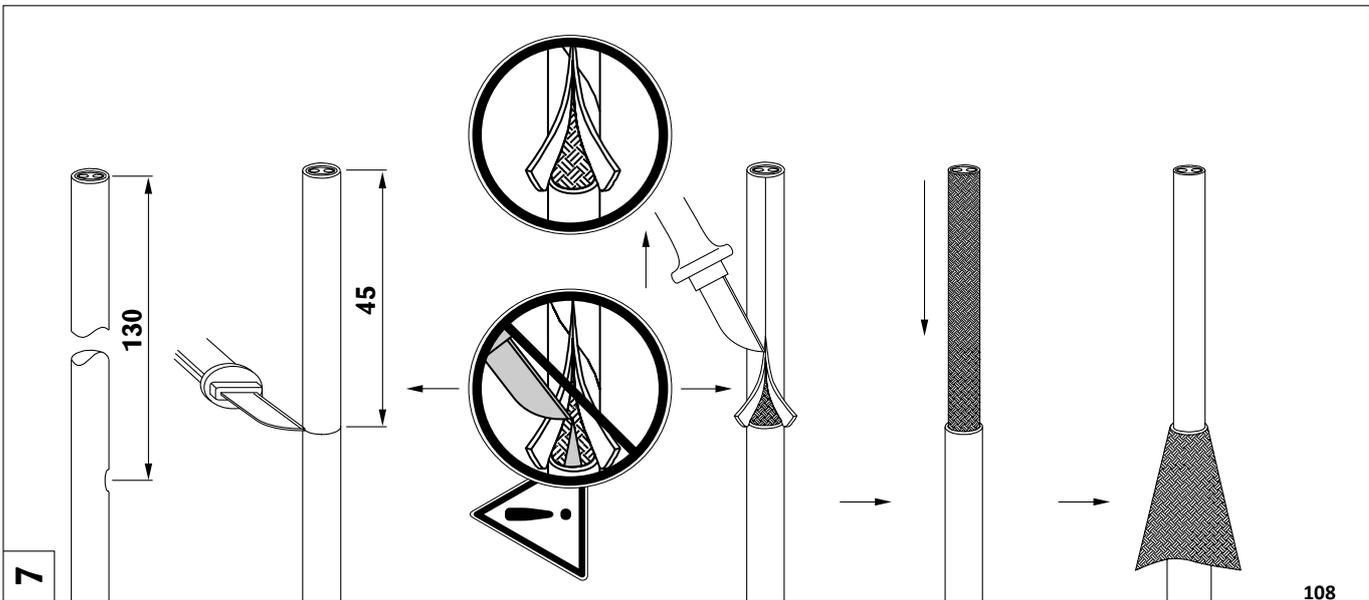
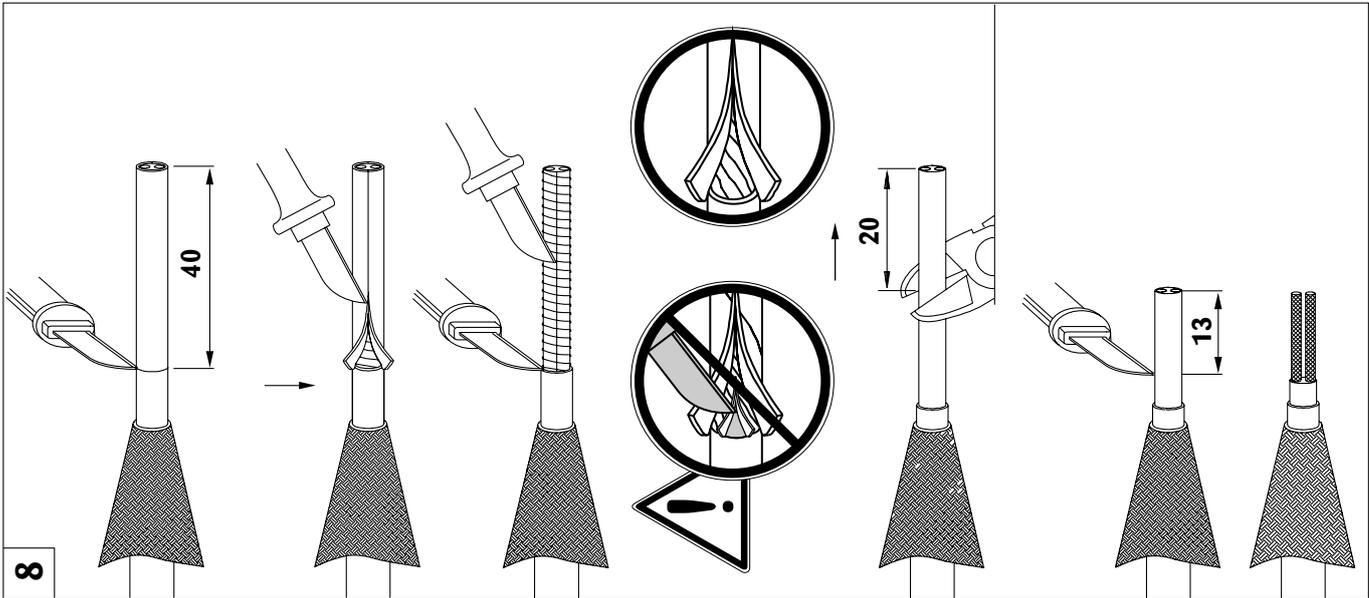
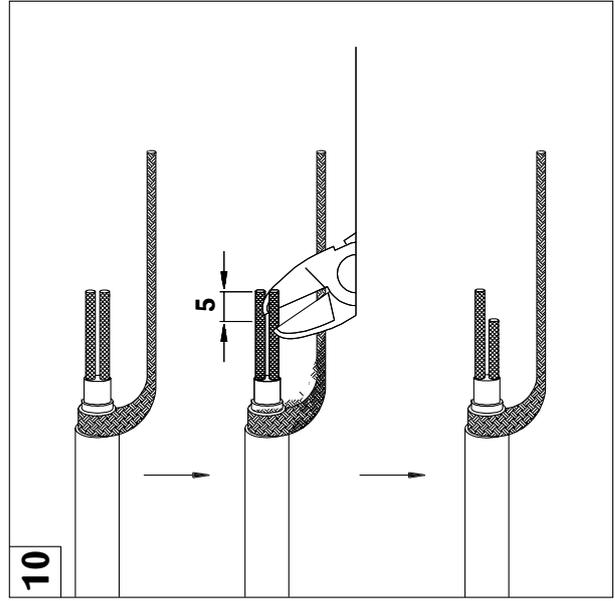
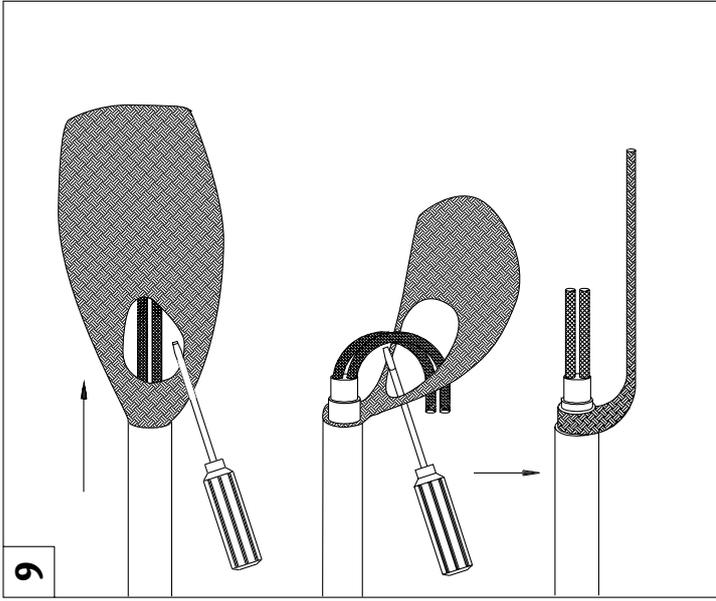
Иллюстрации:

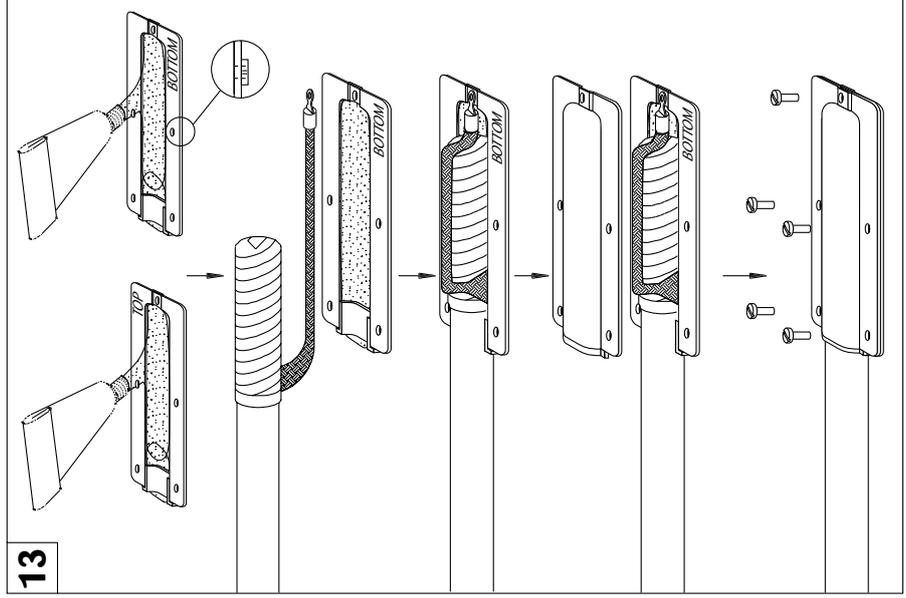
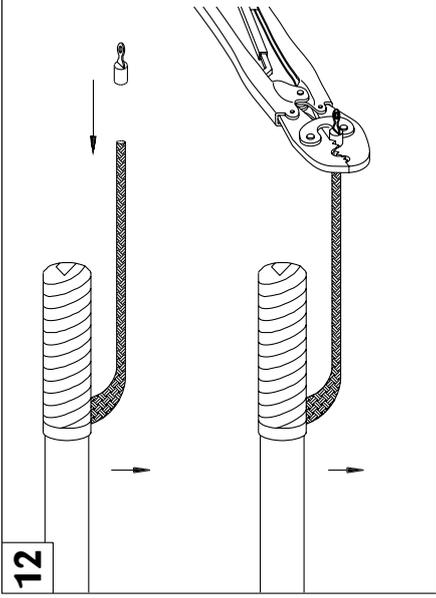
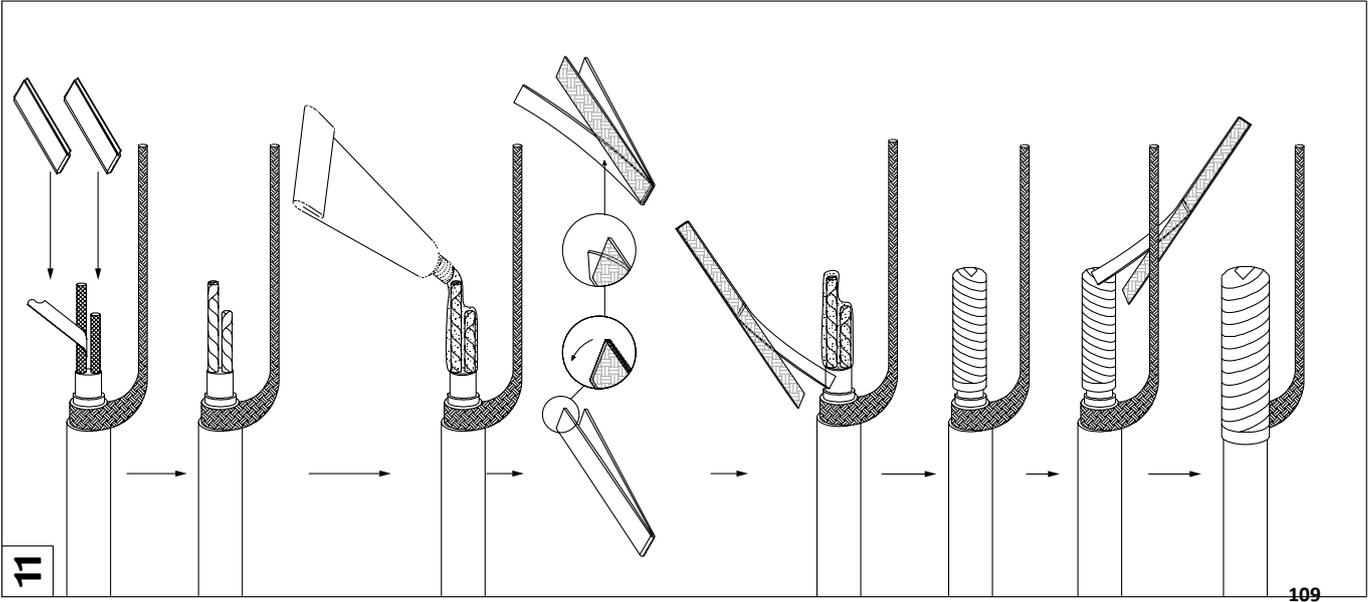
Все размеры, указанные на иллюстрациях, обозначены в мм.

- 1.-5. Силовая заделка
1. & 7. Определите контактную зону проводника (метод сужения кабеля), отступите заданное расстояние и отрежьте кабель.
- 6.-13. Конечная заделка
13. Поместите кожух с резьбовыми отверстиями









Installation Instructions

CKTES™

PETK-10 & PETK-11

Connection Kit

To be used with *Thermon Europe Series Cables



 Ex eb IIC T2 to T6
Ex tb IIIC T260°C to T85°C IP66
SIRA 10ATEX3368X IECEx SIR10.0195X

 1725

CKTES-1 ART.NO. 420.000.101
CKTES-2 ART.NO. 420.000.102
PETK-10 ART.NO. 422.301.631
PETK-11 ART.NO. 422.301.632

This equipment is tested and approved for hazardous areas zone 1 and zone 2, as well as safe areas and is compliant with the following standards: EN/IEC 60079-0 (2009), EN/IEC 60079-7 (2007), EN/IEC 60079-30-1 (2007), EN/IEC 60079-31 (2009).



*Thermon Europe Series Cables are in these installation guidelines denominated as TESH.

ISO 9001
REGISTERED

Connection kit CKTES (Connection Kit Thermon Series Cable) is designed to connect a cold lead cable to a series constant watt heating cable or to repair the Thermon Europe Series (TESH) constant watt heating cables. The CKTES consists of a non-metallic enclosure which does not need to be earthed. Crimp connectors are used to connect the braid and the conductor. They are separated by a non-metallic spacer. To make the CKTES watertight a silicone sealant is used to fill the non-metallic body. This body is sealed off on both sides with a grommet and a non-metallic screw cap.

After installation, the CKTES Termination and in-line splice kit shall be subjected to an insulation resistance test according to EN 60079-30-2, clause 8.3.4, using a test voltage of 500 - 2500 Vdc in accordance with local regulations, applied between the live conductors and the metallic braid of the power or heating cables. The measured insulation resistance must be higher than 20 MΩ. For other cold lead cables, contact Thermon.

Important Remarks And Warnings

- Before installing or replacing the product read these instructions completely.
- Thermon is unable to guarantee the performance of the joint when used in combination with non-Thermon products.
- Installation must comply with local requirements for electric heat tracing systems.
- Water and dust ingress must be avoided before, during and after installation, to prevent electrical shock, short circuit or arcing.
- Due to the risk of electric shock, short circuit, arcing and fire caused by product damage or improper usage, installation or maintenance, Thermon heat tracing systems must always be installed in combination with an overcurrent protection device and RCD (Residual Current Device).
- Always take into account the markings on the CKTES concerning the temperature classification and explosion group.
- Modifications to the CKTES are not allowed.
- Before installation or replacement of the CKTES, ensure that the power supply to the system is switched off.
- For crimping lugs, use standard ratchet action crimping tool. Use crimp connectors matching the conductor diameter. Use crimping tools associated with the crimp connectors.
- Avoid skin and eye contact with RTV sealant.
- When stored above 5°C, shelf life will be reduced.

For Hazardous Areas:

- Installation must comply with Thermon requirements and be installed in accordance with the regulation as per standard EN/IEC 60079-14 for hazardous areas (where applicable), and/or any other applicable national and local codes.
- This device is not suitable for zone 0. This device can be used in the following ATEX and IECEx zones: zone 1, zone 2, zone 21 and zone 22.
- For power termination, use only ATEX/IECEx approved glands, terminals and junction boxes.
- Installation or replacement of the CKTES in hazardous areas may only be undertaken by qualified personnel with adequate training for the area involved.

CKTES / PETK		
Item	Quantity	Description
1	4	PTFE Screw Caps
2	2	PTFE Housing
3	2	PTFE Spacer
4	4	Silicone Rubber Grommet
5	6-10	Crimp Connectors
6	2	Silicone Sealant Tube

Crimp Connectors CKTES-1		
Item	Quantity	Description
5	2	4 mm ² x 15 mm
5	4	6 mm ² x 15 mm
5	2	10 mm ² x 20 mm
5	2	16 mm ² x 20 mm

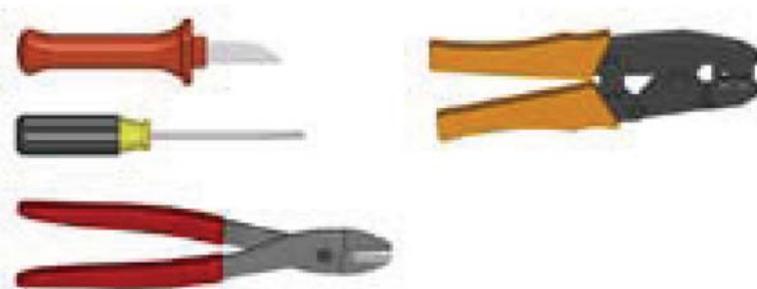
Crimp Connectors CKTES-2		
Item	Quantity	Description
5	2	2,5 mm ² x 15 mm
5	4	4 mm ² x 15 mm

PETK-10 (extra items)		
Item	Quantity	Description
7	1	3 m TESH CL-6
8	2	Ground Sleeve
9	4	Wire Pins for conductor & braiding



PETK-11 (extra items)		
Item	Quantity	Description
7	1	3 m TESH CL-2,5
8	2	Ground Sleeve
9	2	Wire Pins for braiding
10	2	Wire Pins for conductor

Tools Required



In-Line Connection			
CKTES Kit	Cable Type (Ohm/km)	Crimp Connector size conductor (mm ²)	Crimp Connector size braiding (mm ²)
CKTES-1	2,9	16	6
	4,4	10	6
	7	6	6
	10 - 15	4	6
CKTES-2	17,8 - 480	4	4
	600* - 8000*	2,5	4

* Double fold heating cable conductor

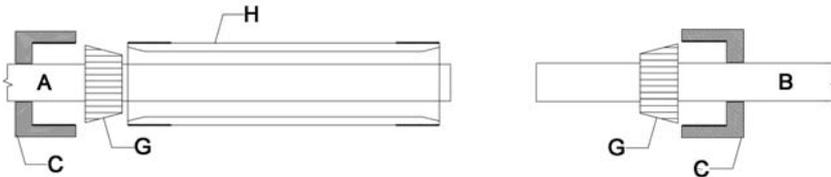
Cold-Lead Connection				
PETK Kits	Cable Type (Ohm/km)	Cold-Lead Type	Crimp Connector size conductor (mm ²)	Crimp Connector size braiding (mm ²)
PETK-10	2,9	CL Not required	-	-
	4,4 - 15	CL-6	10	6
PETK-11	17,8 - 480	CL-2,5	4	4
	600* - 8000*	CL-2,5	4	4

* Double fold heating cable conductor

Step 1

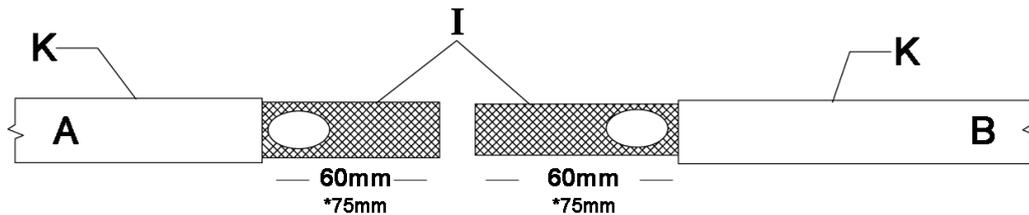
First determine the correct circuit length, then slide the screw cap and the rubber grommet over the heating cable and cold lead cable (in case of a power connection). Slide the housing over (one of) the heating cable(s).

Items drawings	
Item	Description
A	Heating Cable
B	Cold Lead/Heating Cable
C	Screw Cap
D	Spacer
E	Sealant
F	Crimp Connector
G	Grommet
H	Housing
I	Braiding
J	Conductor
K	Outerjacket
L	Primary Insulation



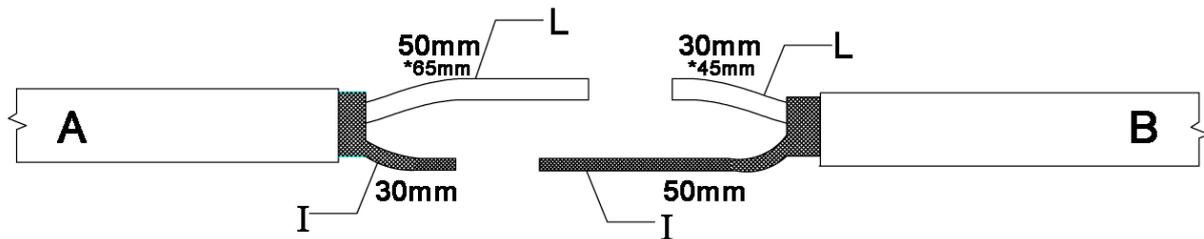
Step 2

Remove 60 mm* outer jacket from both cables (*for TESH 600 up to TESH 8000, 75 mm). Separate braid strands at the end of the outer jacket of the heating cable(s) and cold lead cable (PETK-10/11). Push back the braid away from the heating cable to form a pigtail. Remove glass ceramic/polyamide tape. Pull the insulated conductor through the opening in the braid of both cables.



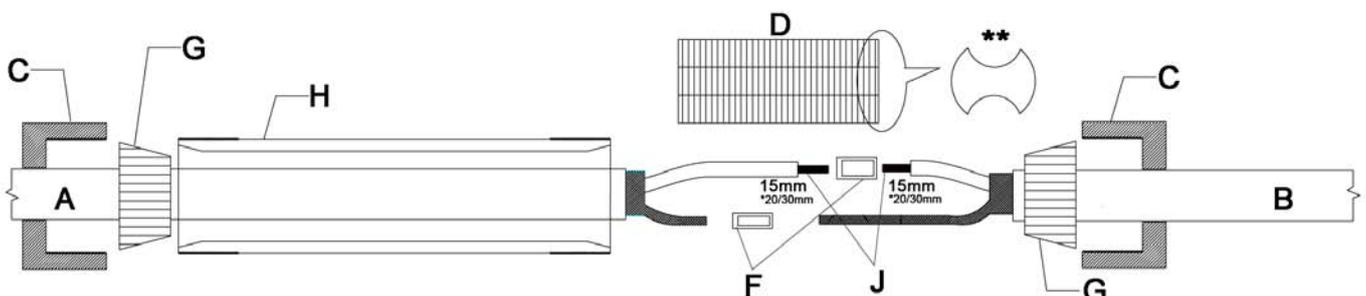
Step 3

Twist the braid into a pig tail and trim the ends. Cut the braid of the Heating Cable at approximately 30 mm and 50 mm for the Cold Lead / 2nd Heating cable. Cut the conductors at 50 mm* and 30 mm* (*for TESH 600 up to 8000, cut 65 and 45 mm).



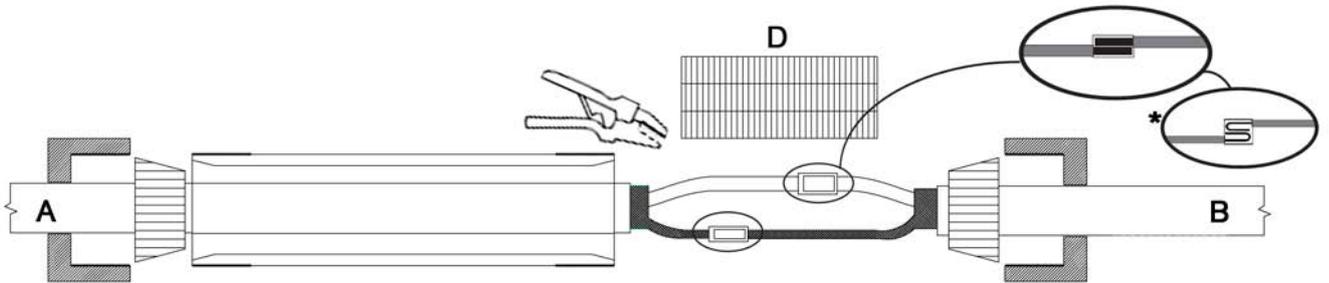
Step 4

Remove primary insulation of the heating conductor and cold lead over a length of 15 mm (*in case of Cold lead or TESH 2,9 and TESH 4,4 remove 20 mm, for TESH 600 up to 8000 remove 30 mm). **Side view of spacer in image.



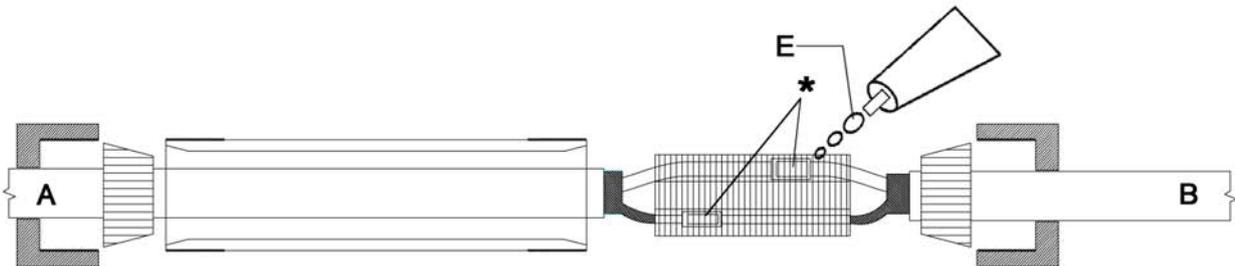
Step 5

Insert the bare conductor of both the Cold Lead/Heating Cable and Heating Cable into the crimp connector and ensure complete overlap of conductors inside the crimp connector. Crimp the crimp connector with matching crimping tool. Follow the same procedure for terminating the braid of the Cold Lead/Heating Cable and Heating Cable. For cable type TESH 600 up to TESH 8000, the heating cable conductor shall be folded double within the crimp*. For the correct Crimp Connector type, see table page 3.



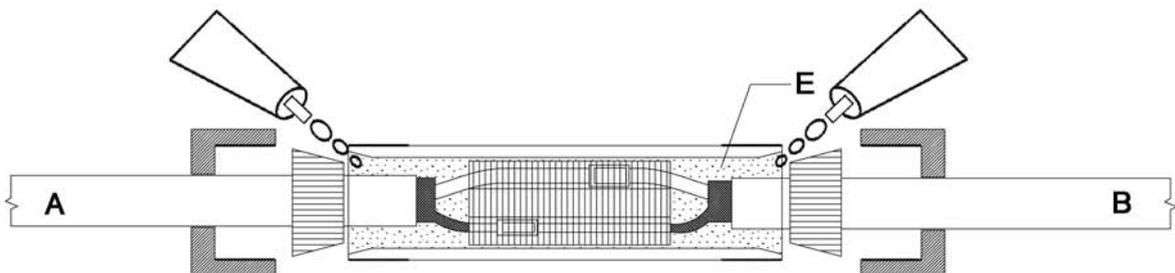
Step 6

Place the Spacer between both crimped connectors and ensure that both the leads and crimped connector are properly placed inside the slots. Put a rich amount of silicone sealant on the crimped connectors and in the slots. *Sealant on Crimp connectors.



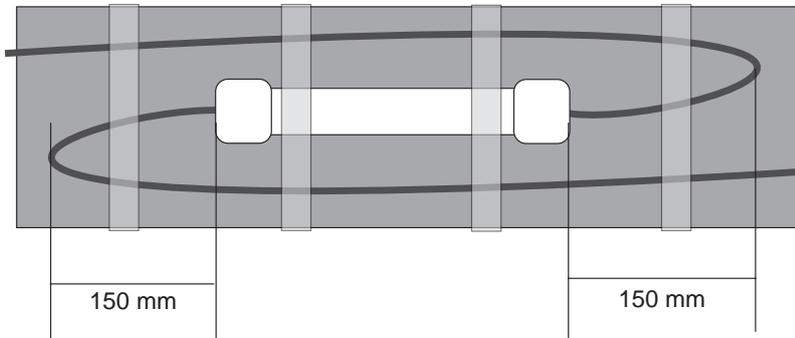
Step 7

Slide the Housing over the assembled connections. Ensure assembled connection is positioned in the centre of the Housing. Fill one end of the Housing with sealant ensuring that there are no air pockets and push the grommet into the Housing. Ensure the joint and cable ends are held in position. Tighten the screw cap, repeat the operation at the other end. Wipe off excessive sealant.



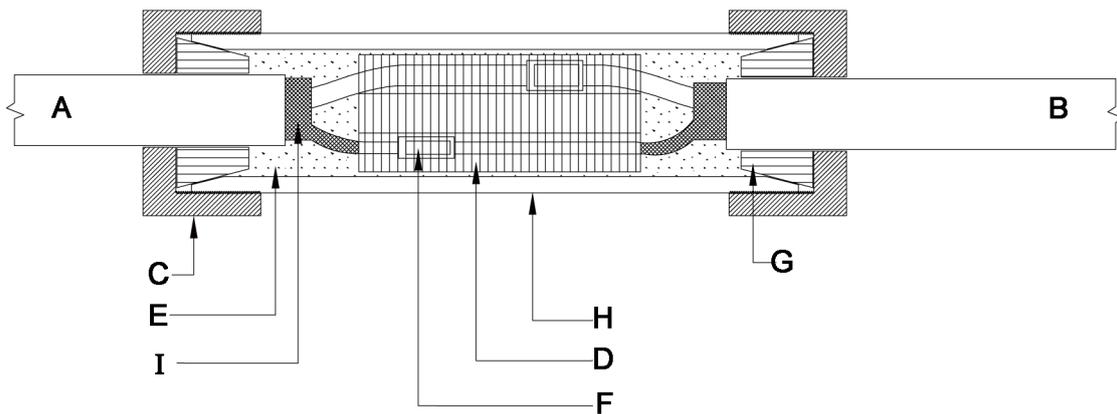
Step 8

Mount the CKTES/PETK on a flat surface, with expansion loop of 150 mm in the cables. Heating Cable/Cold Leads and joint secured in place using fibre fixing tape. Application of tape shall allow a small degree of movement at the joint and cables to cater for potential expansion and contraction of the pipeline. Do not over-tighten.



Step 9

Do not move the assembled CKTES/PETK for minimum 24 hours for complete curing.

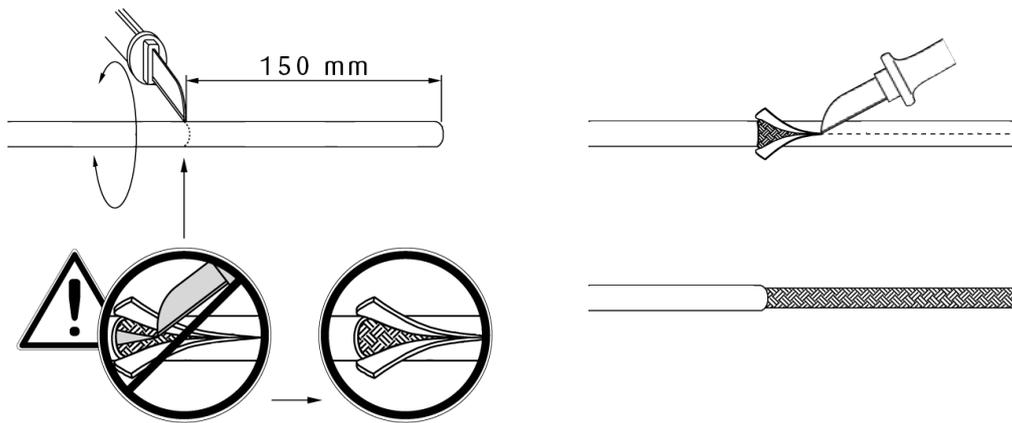


Description

Power and End Termination Kit PETK for Thermon TESH series constant watt heating cables in conjunction with Thermon JB-K-EX, TED, Terminator ZP-R, ZT-R in hazardous areas. In non-hazardous areas with expediter .../XP PLUS ...-IND. See also installation instructions of the relevant heat tracing cable and junction/thermostat enclosures.

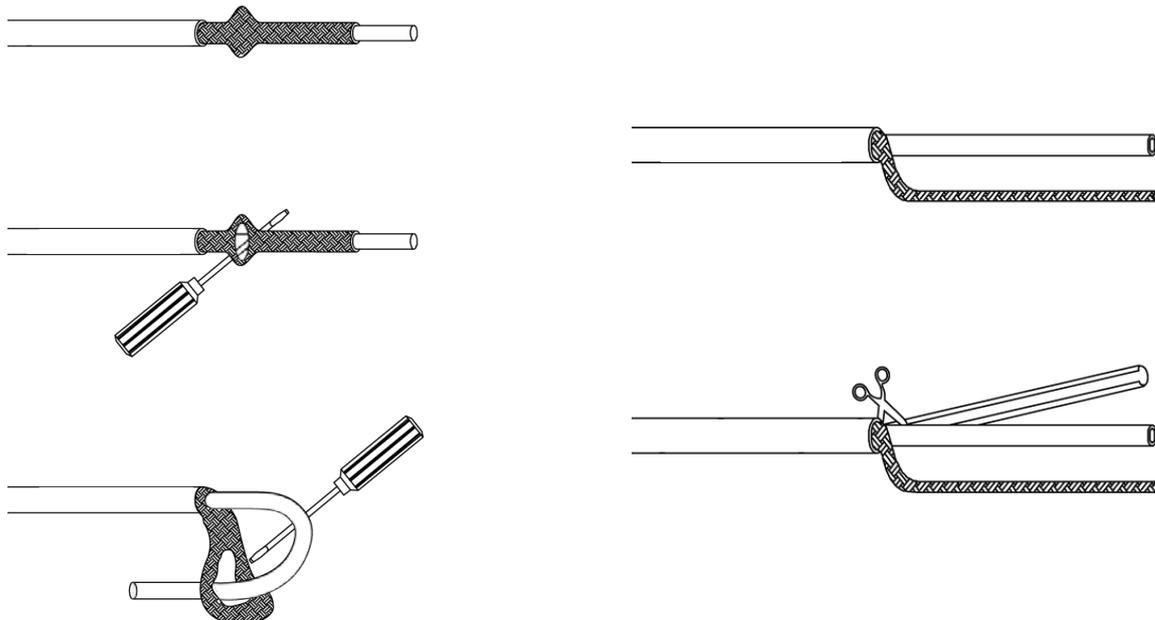
Step 1

Cut and remove cold lead cable overjacket (150 mm).



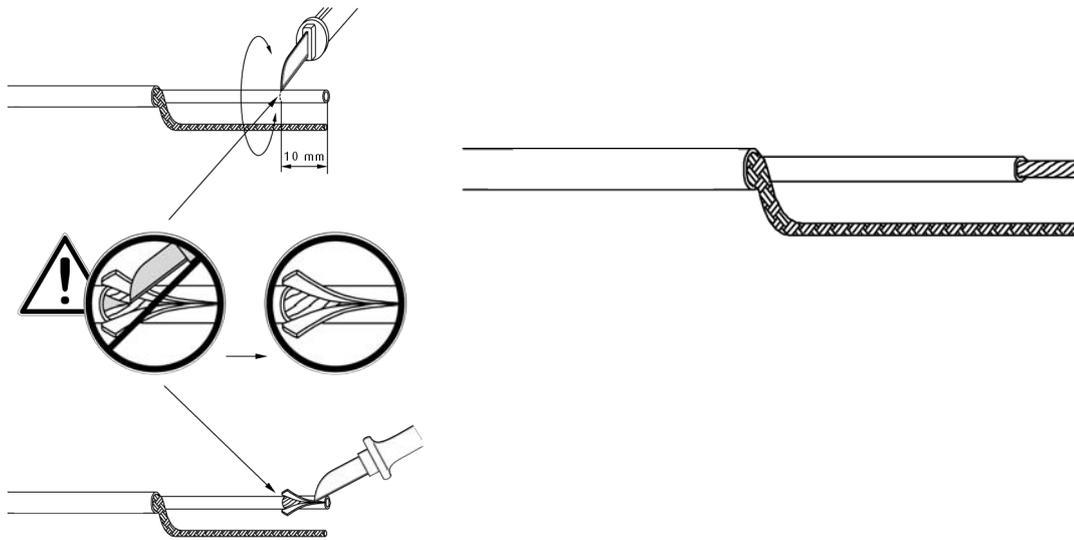
Step 2

Separate braid strands at edge of overjacket and pull cable through opening in braid. Twist braid into a pigtail. Trim ends of braid. Remove glass ceramic tape.



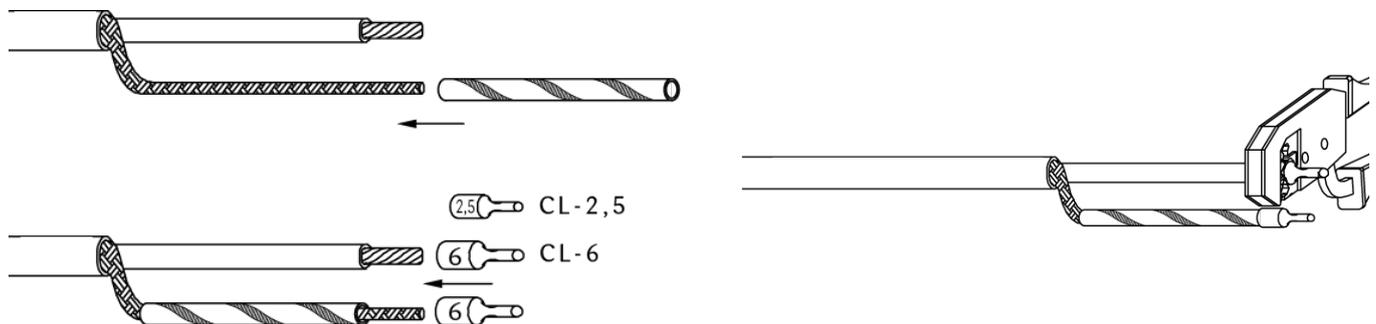
Step 3

Cut and remove (10 mm) primary insulation jacket to reveal the bare conductor.



Step 4

Slide green/yellow ground sleeve over twisted braid. Crimp conductor wire pins on each conductor. Crimp braid wire pin on twisted braid.



Addresses

European Headquarters
 Boezemweg 25 PO Box 205
 2640 AE Pijnacker The Netherlands
 Phone: +31(0)15-3615370

Corporate Headquarters
 100 Thermon Dr. PO Box 609
 San Marcos, TX 78667-0609
 USA

For the Thermon office near you, visit us at
WWW.THERMON.COM

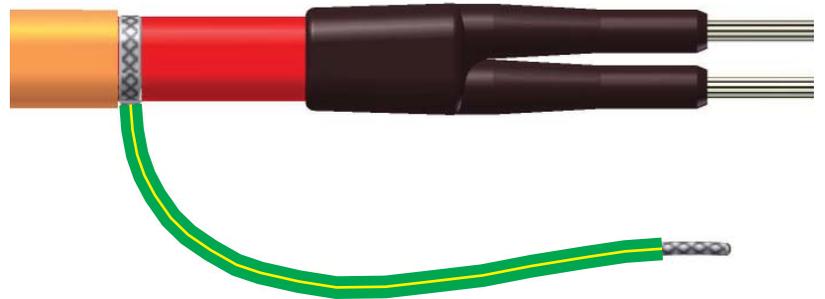
SCTK

Splice Connection Termination Kit

INSTALLATION PROCEDURES

- SCTK-1** for **BSX, RSX, VSX**
- SCTK-2** for **KSX, HTSX**
- SCTK-3** for **HPT, FP**

To be used in conjunction with
Thermon Connection kits



The Heat Tracing Specialists[®]

SCTK

INSTALLATION PROCEDURES

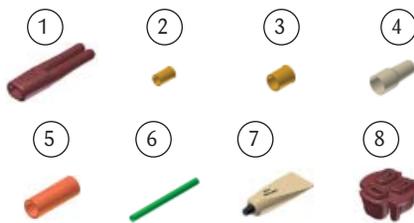
Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

Splice Connection Termination Kits (per cable)

SCTK-1	for BSX, RSX, VSX
SCTK-2	for KSX, HTSX
SCTK-3	for HPT, FP

Kit Contents . . .



Item	Quantity	Description
1	3	Splice Connection Boots
2	2	Small Crimps
3	1	Large Crimp
4	2	Small Crimp Insulators
5	2	Silicone Caps
6	3	Ground Sleeves (not used with ZE-B Kits)
7	1	RTV Tube
8	1	GRW-G (FP and HPT only)

Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

SCTK Certifications/Approvals¹ . . .

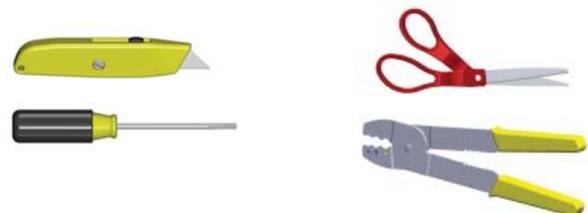
IEC, IECEx FMG 10.0022X Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C
 CE 1725 Ex II 2 GD Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C, FM 10ATEX0058X



Note:

1. These sets have been evaluated as components of Thermon's Approved connection kits, such that the area use ratings depend on the rating of the connection kits.

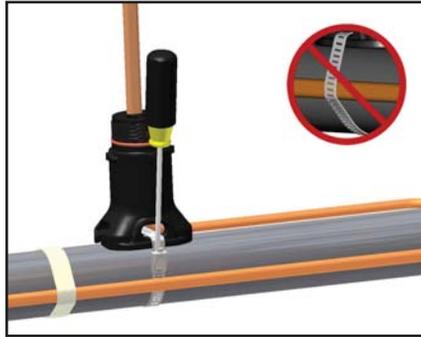
Tools Required . . .



IMPORTANT!

Heating cable must be properly installed within expediter assembly and mounted to pipe prior to terminating with SCTK kit.

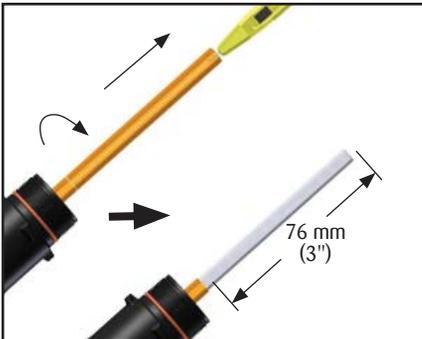
See Terminator Installation Instructions for expediter mounting details.



Terminator: Route cable through base entry and mount expediter to pipe using pipe band. **Do not band over cable.**

Note: For HPT and FP cable exchange grommet in Terminator with GRW-G provided in SCTK-3.

Step 1: Remove Heating Cable Overjacket and Separate Metallic Braid to Form Pigtail

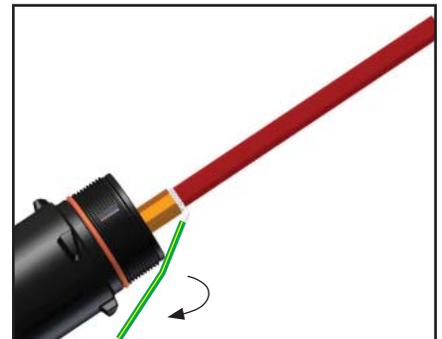


1a. Cut and remove heating cable overjacket.

Do not cut metallic braid.

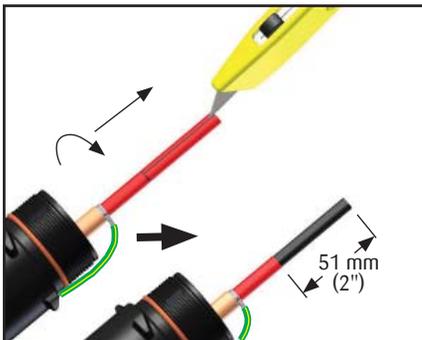


1b. Separate braid strands at edge of overjacket and pull cable through opening in braid.

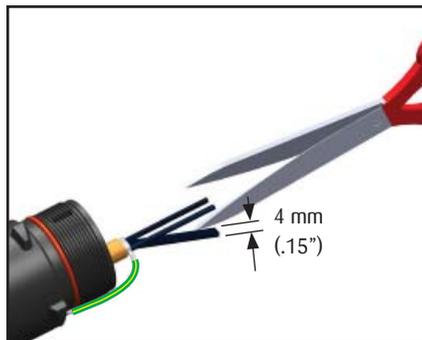


1c. Twist braid into a pigtail. Trim ends of braid and apply ground sleeve.

Step 2: Matrix Removal for BSX, RSX, HTSX, KSX, and VSX Cables

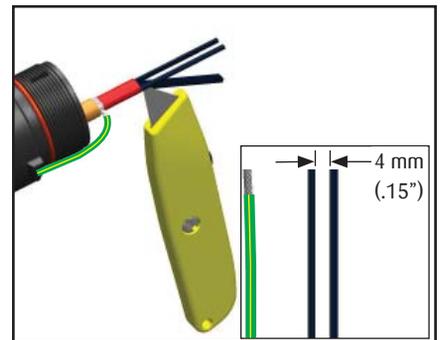


2a. Cut and remove primary insulation jacket (BSX and RSX cables only).



2b. Cut a 4mm strip of conductive matrix between the conductors.

Do not cut bus wire strands.

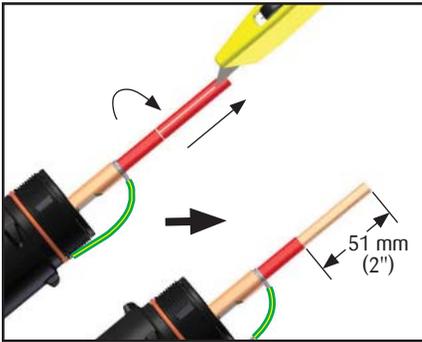


2c. Cut and remove the 4mm matrix strip.



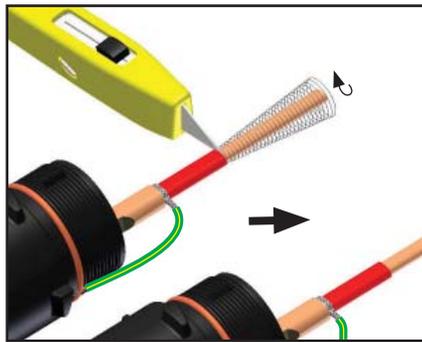
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Step 2: Heating Element Removal for HPT and FP Cables

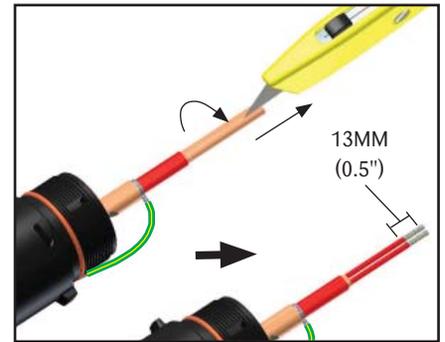


2a. Cut and remove primary insulation jacket.

NOTE: Bus connection must be no more than 50 mm (2") from pipe as addressed in connection kit instructions.



2b. Cut and remove fiberglass overlay and heating element. Push any remaining heating element wire under the primary insulation jacket.

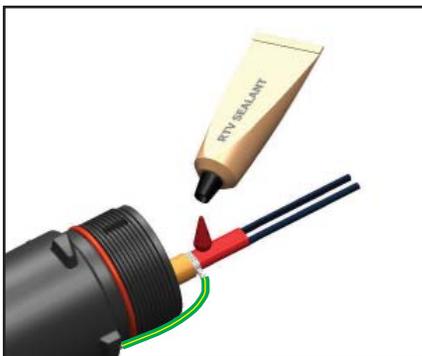


2c. Cut and remove pairing jacket. Remove insulation from ends of bus wires.

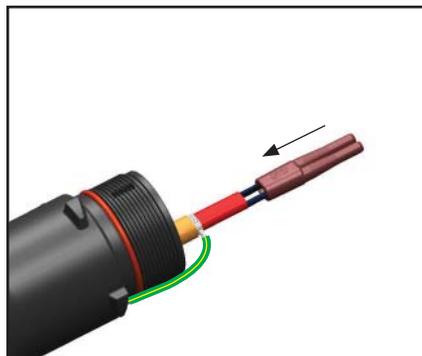


Do not cut bus wire insulation.

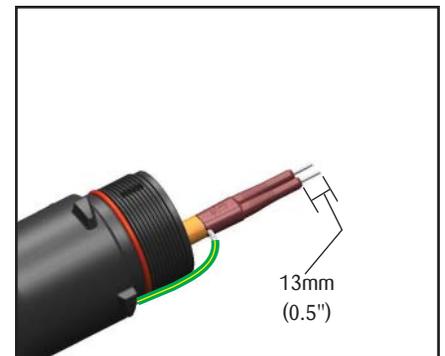
Step 3: Install Power Boot on Heating Cables



3a. Apply a liberal amount of RTV sealant to cable.

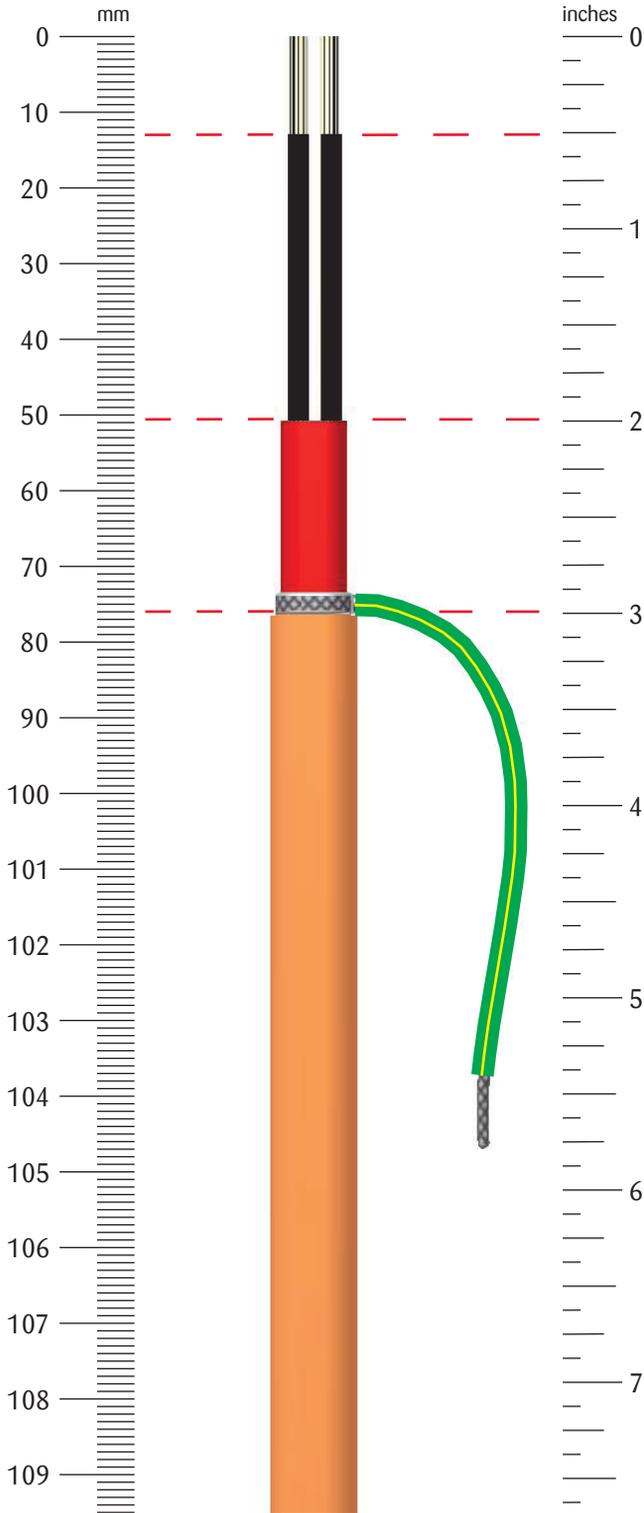


3b. Slide boot onto the end of the cable.



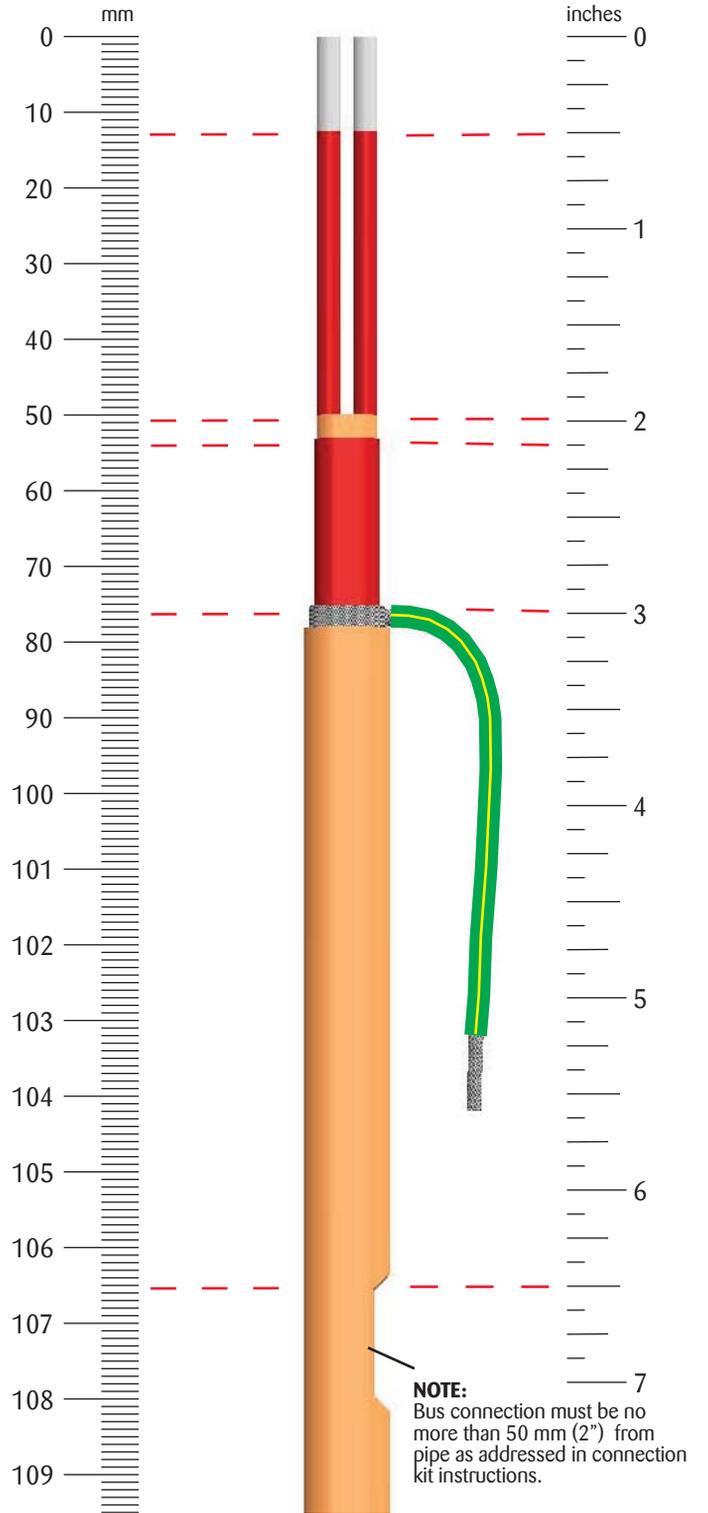
3c. Expose 13mm (0.5") of bus wire.

Cable Take-off for BSX, RSX, HTSX, KSX, and VSX



For Power Connection Boot Termination

Cable Take-off for HPT and FP



For Power Connection Boot Termination



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Specifications and information subject to change without notice. PN50135U-0312

Tab

6

6

Tab

Terminator™ ZP-XP Power Connection Kit INSTALLATION PROCEDURES



For Power Connection, In-Line Splice Connection,
T-Splice Connection or End Termination Applications



The Heat Tracing Specialists®

Terminator™ ZP-XP

INSTALLATION PROCEDURES

The following installation procedures are suggested guidelines for the installation of the Terminator ZP-XP Kit. For translations other than English and local language translation provided here, please contact Thermon. The English language installation procedure shall govern.

Kit Contents . . .



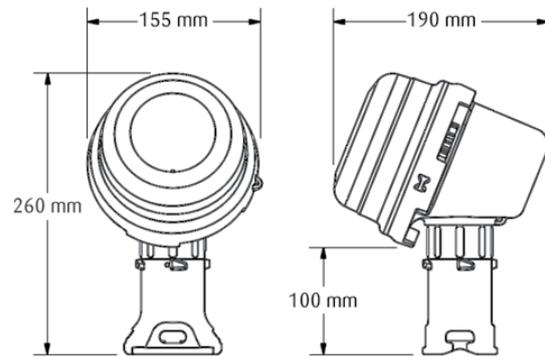
Item	Quantity	Description
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring
2	1	Junction Box Lid
3	1	Junction Box Base with O-Ring and M25 Dust Cap
4	1	Nut
5	1	Banding
6	1	Banding Guide
7	1	Terminal Blocks with DIN Rail (Refer to terminal specifications for maximum allowable wire size)
8	1	Junction Box Cord
9	1	Blind Plug

Order Separately . . .

PETK Power and End Termination Kits (per cable)

PETK-1	for RSX, VSX, BSX
PETK-2	for KSX, HTSX
PETK-3	for HPT, FP

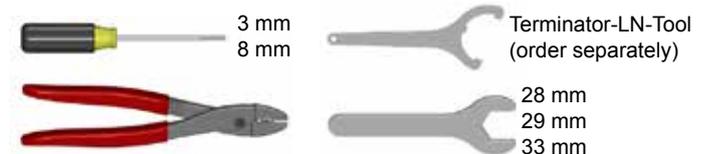
Dimensions . . .



Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

Tools Required . . .



Certifications/Approvals . . .

IP66 -60°C ≤ Ta ≤ +55°C

Ordinary & Hazardous Locations

FMG 10.0022X Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C

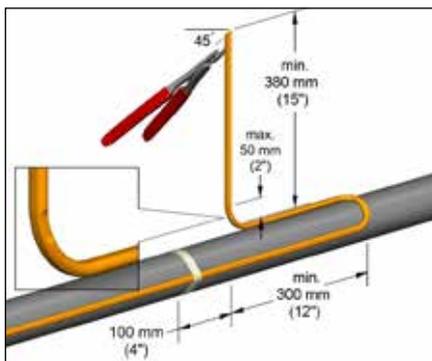
1725 II 2 GD Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C FM 10ATEX0058X

Thermon has additional hazardous area approvals including:

- GGTN • Kazakhstan



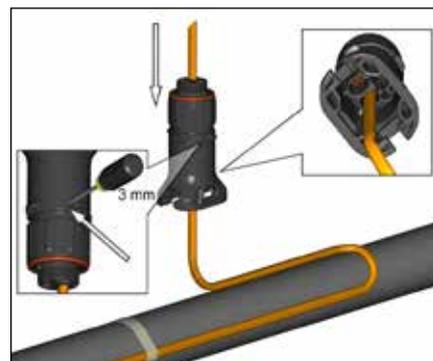
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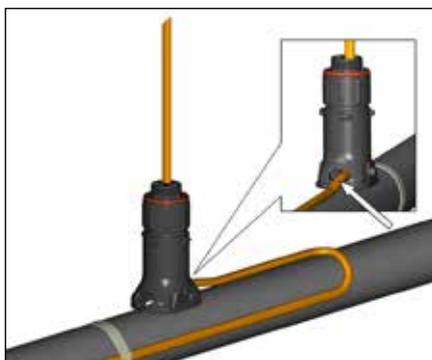
1. Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop. See page 5 for multiple cable installation tips.



2. For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.



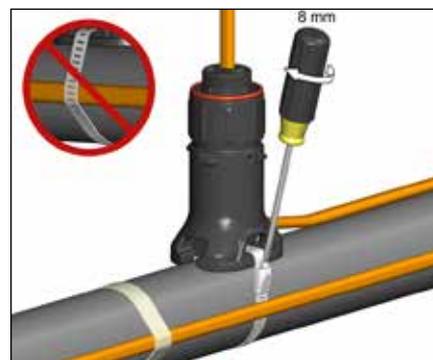
3. Insert cable into expediter. If mounted on bottom or side of pipe, punch out weep hole.



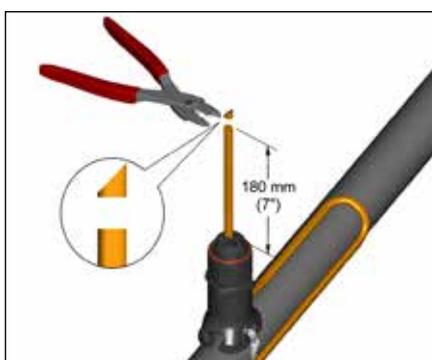
4. Slide expediter toward pipe and route cable through support base entry.



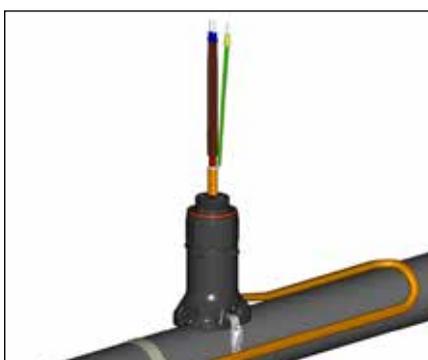
5. Insert banding guide into expediter and snap into place.



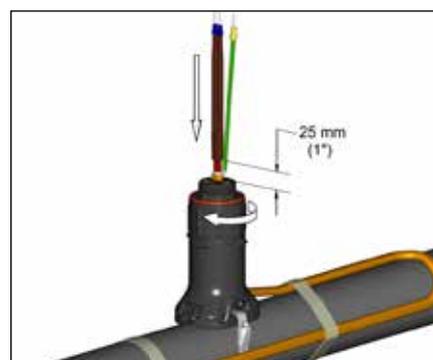
6. Mount expediter to pipe using pipe band. Do not band over cable.



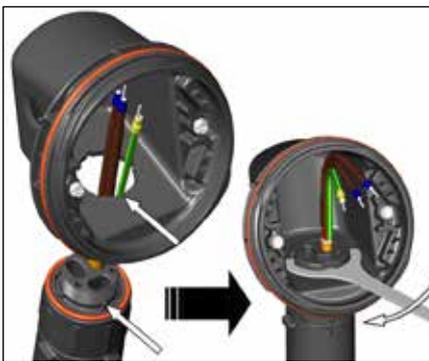
7. Cut off end of cable.



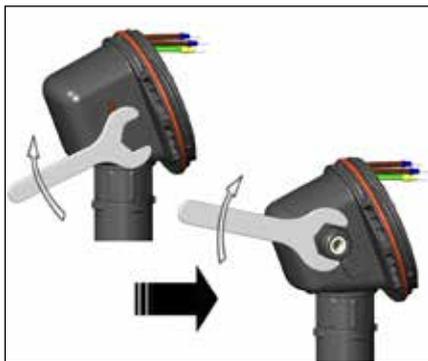
8. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions.



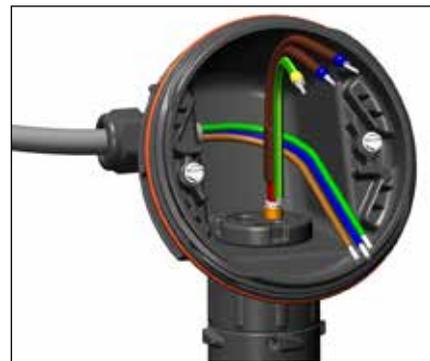
9. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.



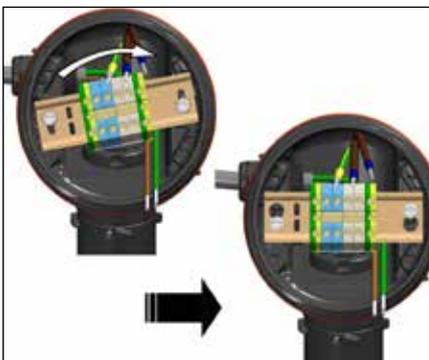
10. Mount junction box base on expediter. Make sure to align slots to properly orient junction box base. Tighten nut with Terminator-LN-Tool. If mounting horizontally, threaded gland holes must face downward.



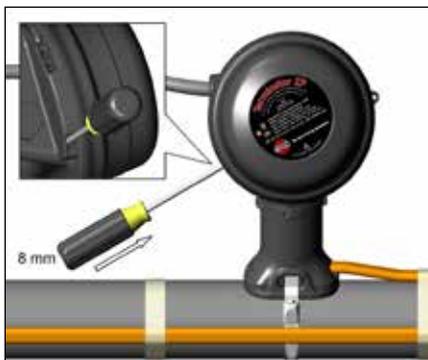
11. Remove M25 dust cap. Install M25 power gland (order separately) and M25 blind plug. For in-line splice, T-splice, or end termination, install additional M25 blind plug (order M25-B-EXE separately) instead of M25 power gland.



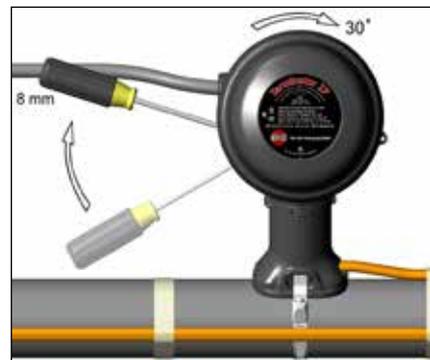
12. Install power cable (if necessary).



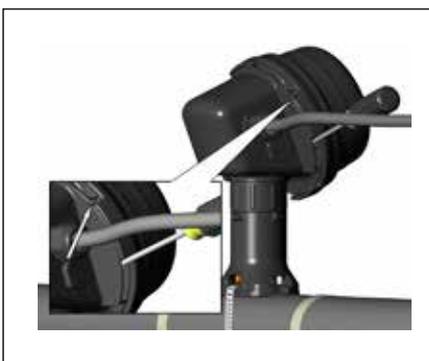
13. Install terminal block and complete system wiring. Terminal set screws shall be tightened to a torque value of 1.4 Nm (12.4 lb-in). See below for wiring details.



14. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base.

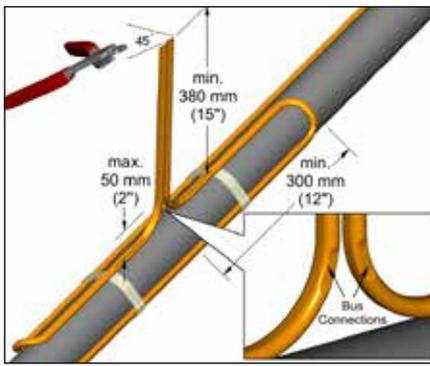


15. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees.

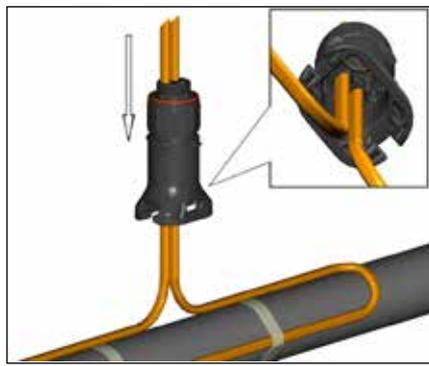


16. Lid latch mechanism fully engaged. To remove lid, repeat steps 14 and 15 but in the opposite direction.

Two Cable Layout Tips



Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.

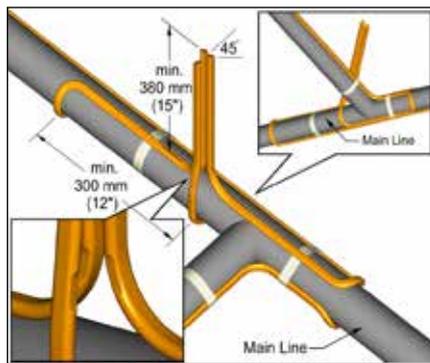


Insert two cables into expediter.
Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

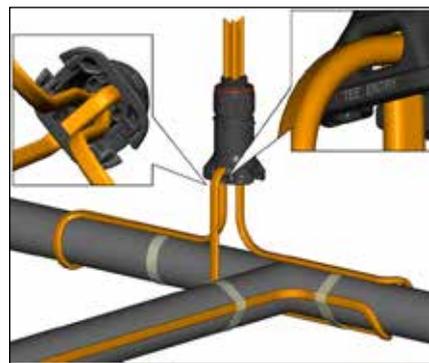


For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

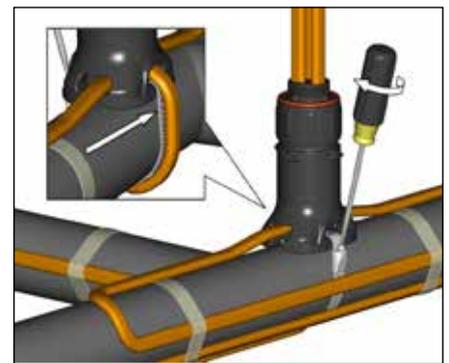
Three Cable Layout Tips



Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.

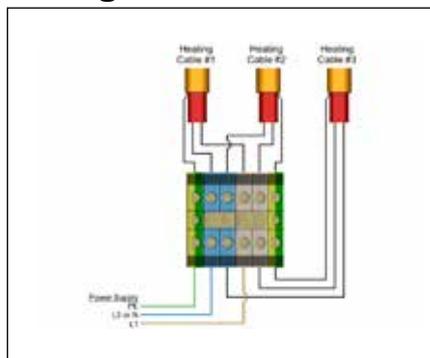


Insert three cables into expediter.
Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.

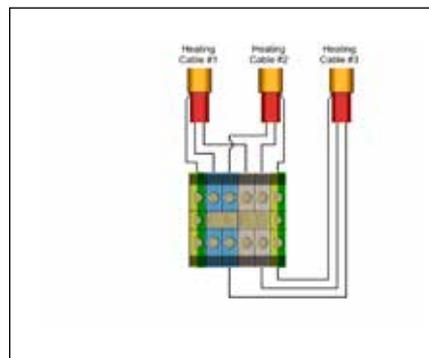


Mount expediter with three cables. Do not band over cable.

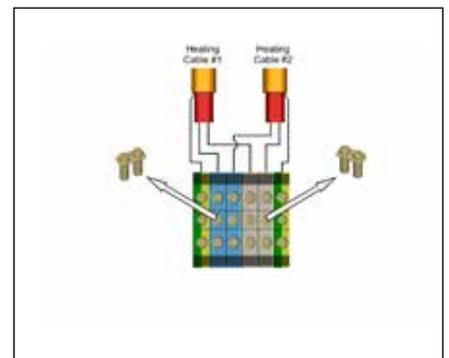
Wiring Details



Power Connection (1 to 3 Heating Cables)



In-Line Splice and T-Splice



End Termination (1 to 2 Heating Cables)
Remove jumpers for 2 cable terminations.



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Specifications and information are subject to change without notice. Form PN50845U-0114

Terminator™ ZP-WP Power Connection Kit INSTALLATION PROCEDURES



For Power Connection, In-Line Splice Connection,
T-Splice Connection or End Termination Applications



The Heat Tracing Specialists®

Terminator™ ZP-WP

The following installation procedures are suggested guidelines for the installation of the Terminator ZP-WP Kit. For translations other than English and local language translation provided here, please contact Thermon. The English language installation procedure shall govern.

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in dry location.

Kit Contents . . .



Item	Quantity	Description
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring
2	1	Junction Box Lid
3	1	Junction Box Base with O-Ring & M25 Dust Cap
4	1	Nut
5	1	Banding
6	1	Terminal Blocks with DIN Rail (Refer to terminal specifications for maximum allowable wire size)
7	1	Junction Box Cord
8	1	Blind Plug
9	1	Bracket
10	3	Screws
11	3	Washers

Order Separately . . .

PETK Power and End Termination Kits (per cable)

PETK-1	for RSX, VSX, BSX
PETK-2	for KSX, HTSX
PETK-3	for HPT, FP

INSTALLATION PROCEDURES

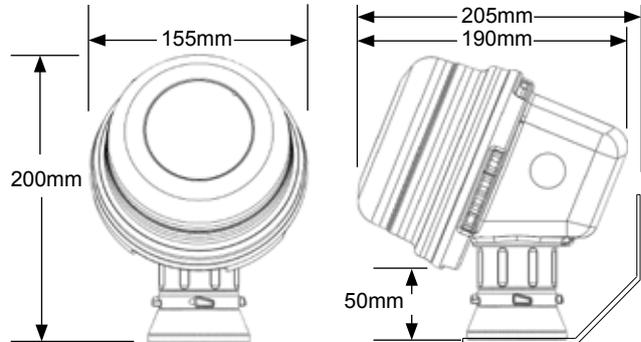
Order Separately . . .

IEK Insulation Entry Kit (per cable)

IEK-SXL	for RSX, VSX
IEK-SXM	for BSX
IEK-SXS	for KSX, HTSX
IEK-HPT	for HPT, FP



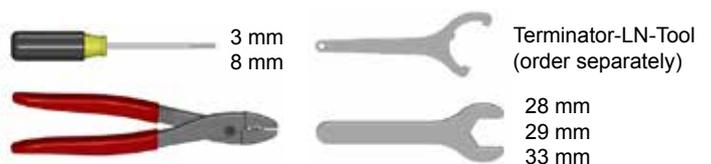
Dimensions . . .



Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

Tools Required . . .



Certifications/Approvals . . .

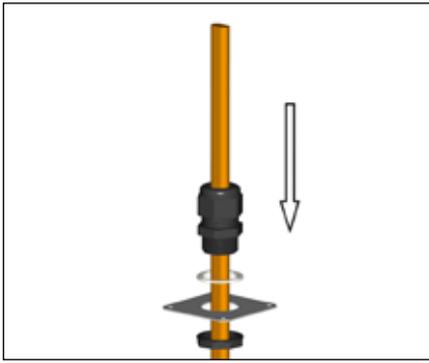
IP66 -60°C ≤ Ta ≤ +55°C
Ordinary & Hazardous Locations

FMG 10.0022X Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C

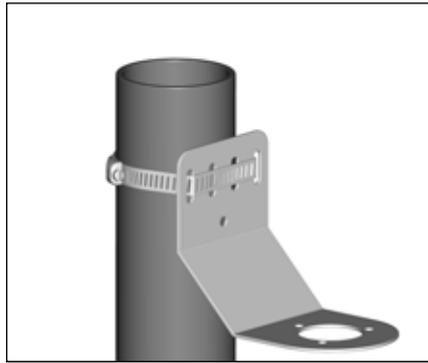
1725 Ex II 2 GD Ex eb IIC T4-T6, Ex tb IIIC T135°C-T85°C FM 10ATEX0058X



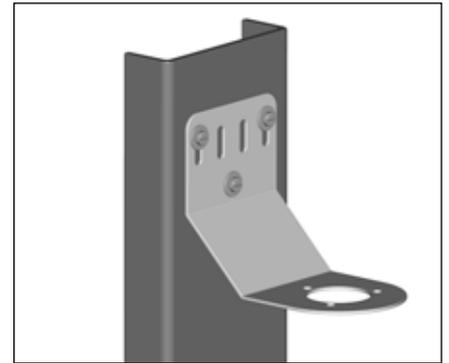
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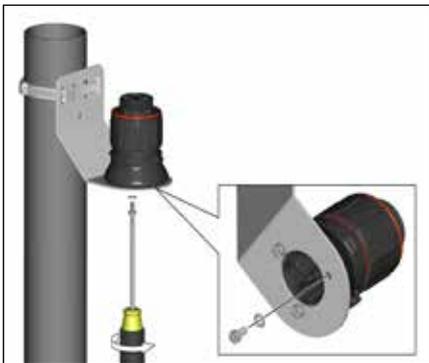
1. Slide appropriate IEK insulation entry kit components onto cable.



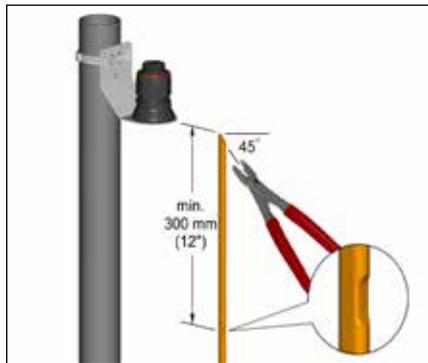
2a. Mounting Method 1: Secure wall mount bracket to mounting surface using pipe band provided with kits.



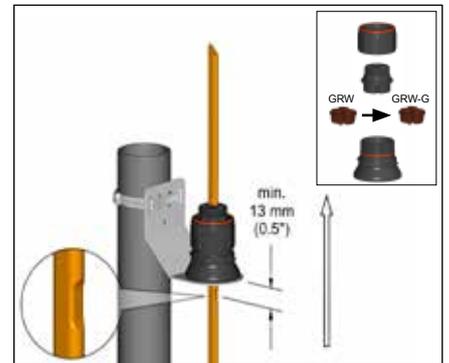
2b. Mounting Method 2: Secure wall mount bracket to mounting surface using customer supplied screws, flat washers, and nuts.



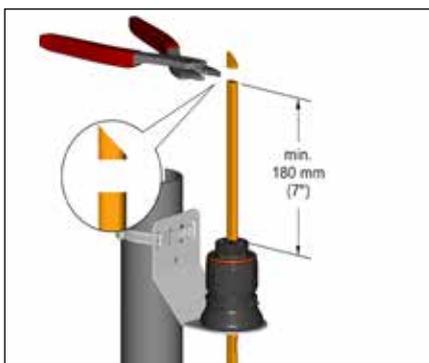
3. Mount expediter to bracket using M5 x 8 mm screws and M5 lock washers.



4. Locate bus connection (HPT and FP only) as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion as needed.



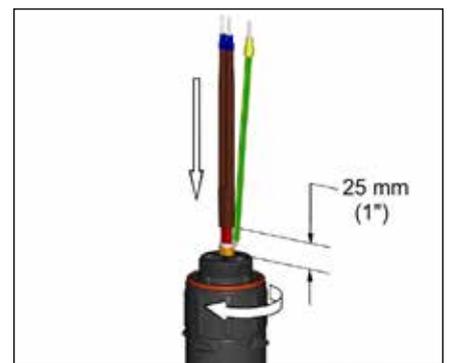
5. Insert cable into expediter. Make sure bus connection (HPT and FP only) remains outside of expediter.
Note: For HPT and FP cable, exchange grommet in Terminator with GRW-G provided in PETK-3.



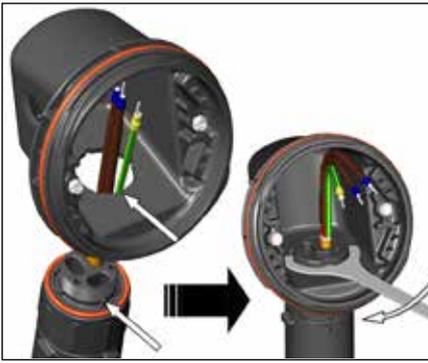
6. Cut off end of cable.



7. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions.



8. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.



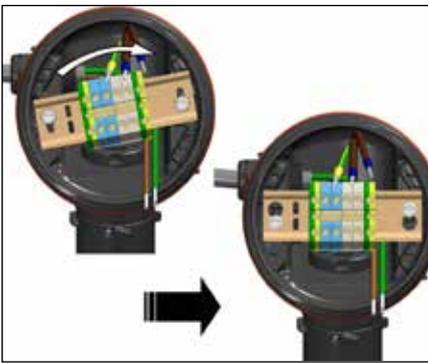
9. Mount junction box base on expediter. Make sure to align slots to properly orient junction box base. Tighten nut with Terminator-LN-Tool. If mounting horizontally, threaded gland holes must face downward.



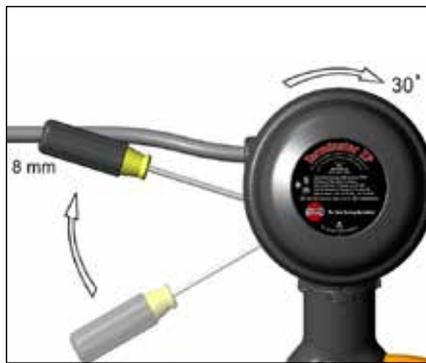
10. Remove M25 dust cap. Install M25 power gland (order separately) and M25 blind plug. For in-line splice, T-splice, or end termination, install additional M25 blind plug (order M25-B-EXE separately) instead of M25 power gland.



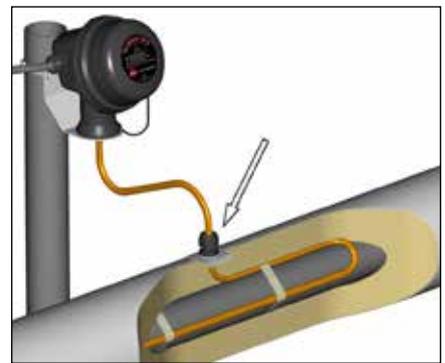
11. Install power cable.



12. Install terminal block and complete system wiring. Terminal set screws shall be tightened to a torque value of 1.4 Nm (12.4 lb-in). See below for wiring details.

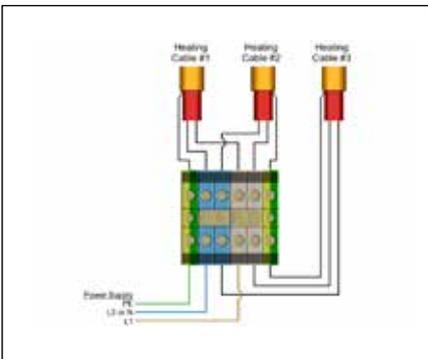


13. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees. To remove lid, repeat step 13 but in the opposite direction.

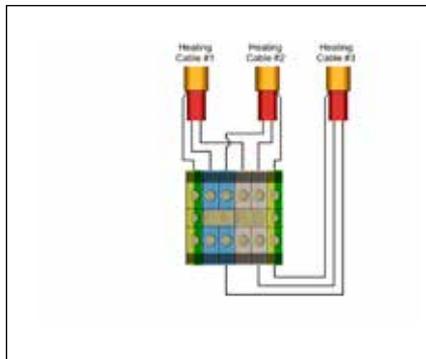


14. Install IEK insulation entry kit to seal heating cable penetration through insulation cladding.

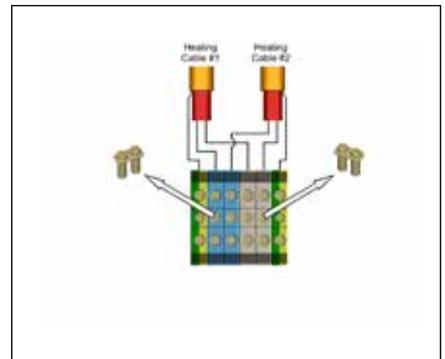
Wiring Details



Power Connection (1 to 3 Heating Cables)



In-Line Splice and T-Splice



End Termination (1 to 2 Heating Cables)
Remove jumpers for 2 cable terminations.



THERMON . . . The Heat Tracing Specialists®
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Specifications and information are subject to change without notice. Form PN50846U-0114

Tab

7

7

Tab

Terminator™ ZT-P-XP Thermostat Connection Kit INSTALLATION PROCEDURES



For Thermostat Connection (1-2 Heating Cables) Applications
For Use With Parallel Heating Cables



The Heat Tracing Specialists®

Terminator™ ZT-P-XP

INSTALLATION PROCEDURES

The following installation procedures are suggested guidelines for the installation of the Terminator ZT-P-XP Kit.

Kit Contents . . .



Item	Quantity	Description						
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring						
2	1	Junction Box Lid						
3	1	Junction Box Base with O-Ring and M25 Dust Cap						
4	1	Nut						
5	1	Banding						
6	1	Banding Guide						
7	1	Thermostat w/ Terminal Blocks <small>(Refer to terminal specifications for maximum allowable wire size)</small>						
		<table border="1"> <thead> <tr> <th>Thermostat Type</th> <th>Control Range</th> </tr> </thead> <tbody> <tr> <td>ZT-C-100</td> <td>0°C to +100°C</td> </tr> <tr> <td>ZT-C-200</td> <td>0°C to +200°C</td> </tr> </tbody> </table>	Thermostat Type	Control Range	ZT-C-100	0°C to +100°C	ZT-C-200	0°C to +200°C
Thermostat Type	Control Range							
ZT-C-100	0°C to +100°C							
ZT-C-200	0°C to +200°C							
8	1	Junction Box Cord						
9	2	Blind Plug						

Order Separately . . .

PETK Power and End Termination Kits (per cable)

PETK-1 for RSX, VSX, BSX

PETK-2 for KSX, HTSX

PETK-3-ZT for HPT, FP

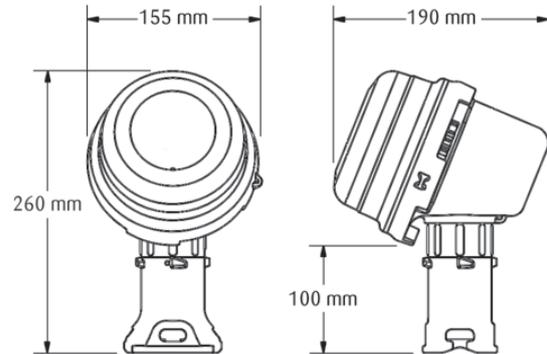


Item	Quantity	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	2	Conductor Wire Pins
4	1	Braid Wire Pin
5	1	Ground Sleeve
6	1	End Cap
7	1	Tape Strip (PETK-3-ZT only)
8	1	Grommet (PETK-3-ZT only)
9	1	End Termination Caution Label

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

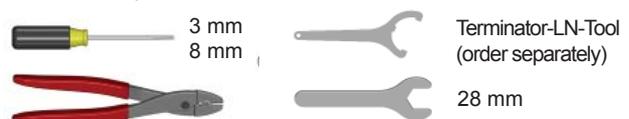
Dimensions . . .



Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.
- Consult the manufacturer for dimensional information on the flameproof joints for repair.

Tools Required . . .



Certifications/Approvals . . .

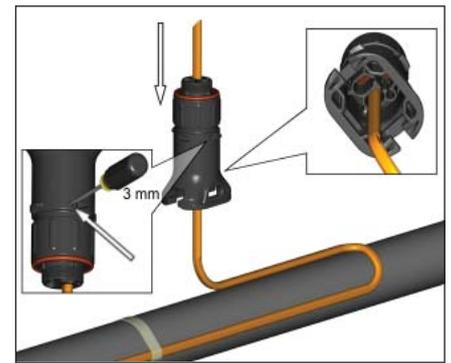
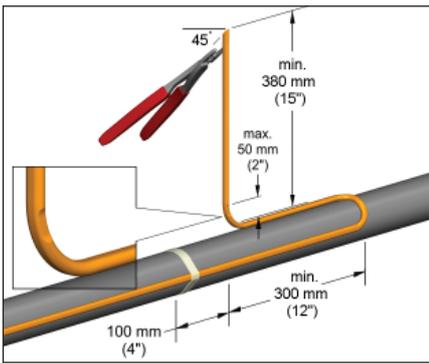
IP66; -60°C ≤ Ta ≤ +55°C T6, 85°C 16 Amps Max

-60°C ≤ Ta ≤ +50°C T5, 100°C 25 Amps Max

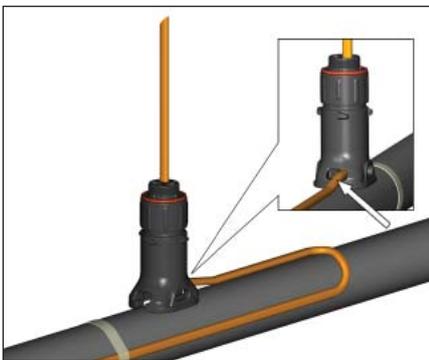
Ordinary & Hazardous Locations

IEC IECEx FMG 10.0022X Ex db eb IIC T5-T6, Ex tb IIIC T100°C-T85°C

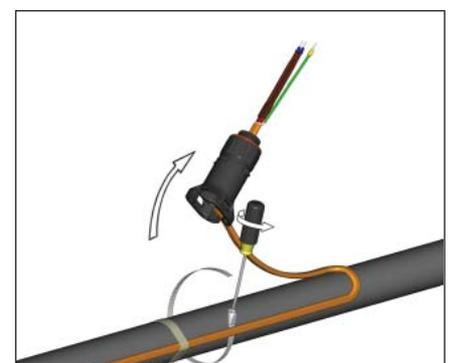
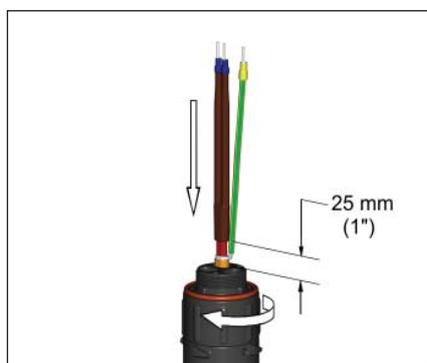
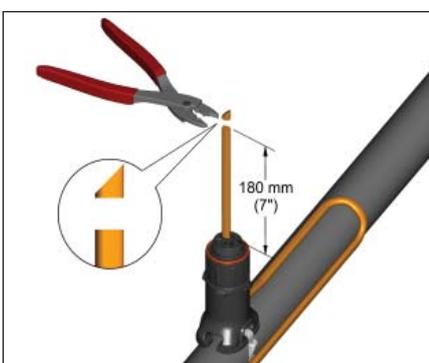
CE 1725 Ex II 2 GD Ex db eb IIC T5-T6, Ex tb IIIC T100°C-T85°C FM10ATEX0058X



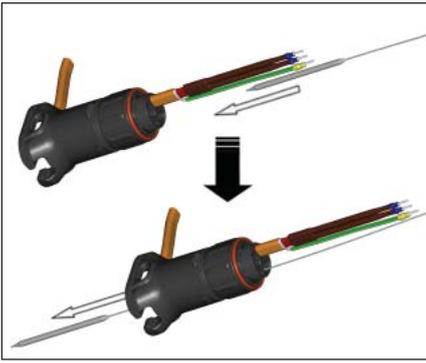
1. Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop. See page 5 for multiple cable installation tips.
2. For HPT and FP cable, exchange grommet in Terminator with grommet provided in PETK-3-ZT.
3. Insert cable into expediter. If mounted on bottom or side of pipe, punch out weep hole.



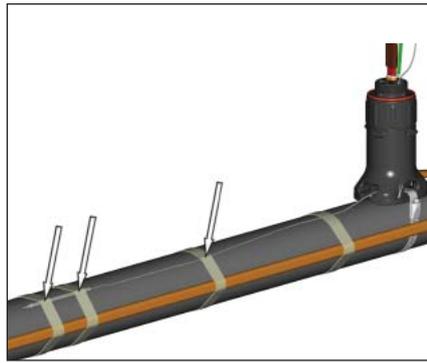
4. Slide expediter toward pipe and route cable through support base entry.
5. Insert banding guide into expediter and snap into place.
6. Mount expediter to pipe using pipe band. Do not band over cable.



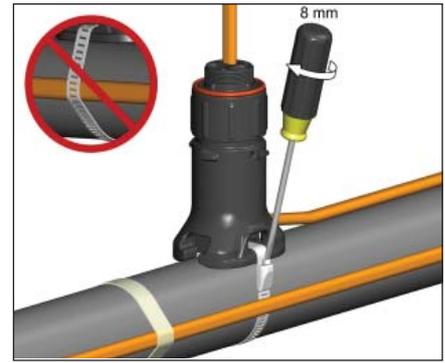
7. Cut off end of cable.
8. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.
9. Remove expediter from pipe by removing pipe band.



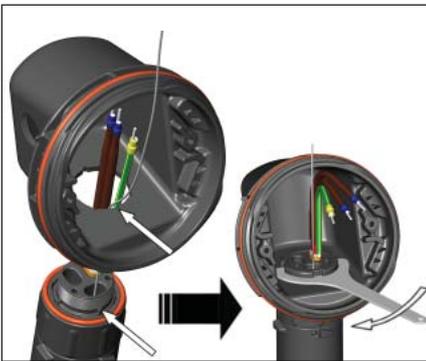
10. Route thermostat bulb through nut and expeditor opening in junction box base. If necessary, apply lubricant (user supplied) to end of thermostat bulb. Slide through conical grommet hole. Push excess capillary tube through expeditor.



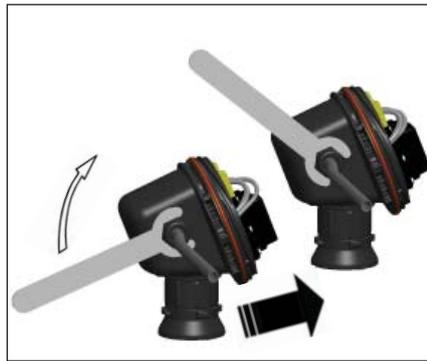
11. Fix thermostat bulb and capillary tube to pipe.



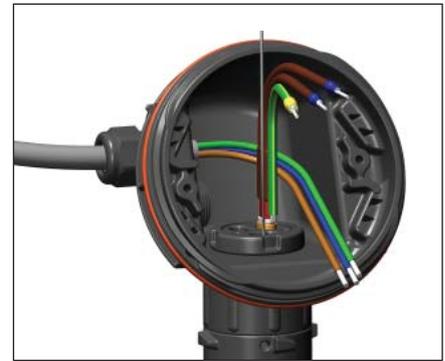
12. Mount expeditor to pipe using pipe band. Do not band over cable. Tape cable expansion loop to pipe.



13. Take out thermostat. Mount junction box base on expeditor. Make sure to align slots to properly orient junction box base. Tighten nut with Terminator-LN-Tool. If mounting horizontally, threaded gland holes must face downward.



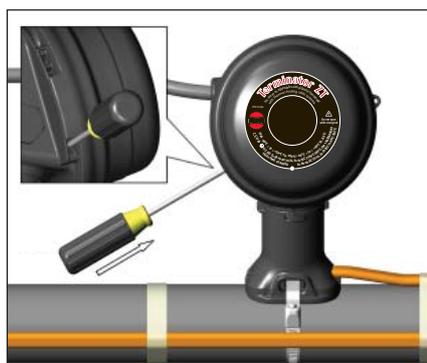
14. Remove M25 dust cap. Install M25 power gland (order separately) and M25 blind plugs.



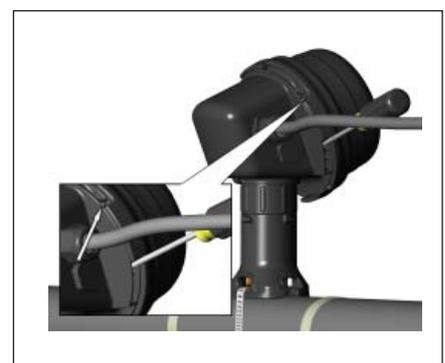
15. Install power cable (if necessary).



16. Install thermostat and complete system wiring. Terminal set screws shall be tightened to a torque value of 1.4 Nm (12.4 lb-in). See page 5 for wiring details. Set thermostat at desired setpoint.



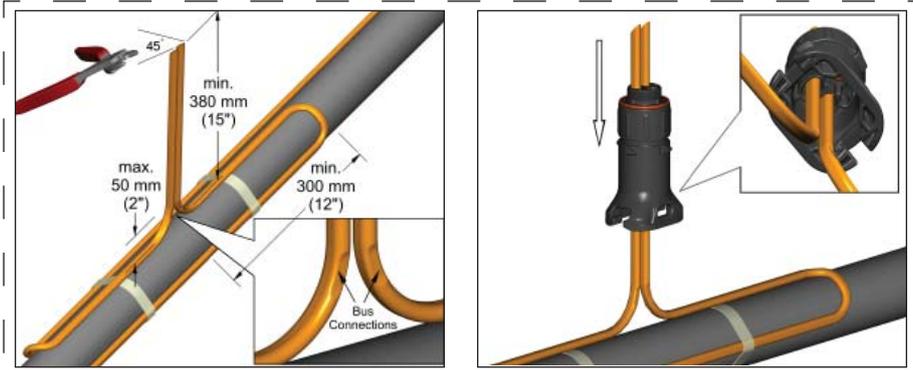
17. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees.



18. Lid latch mechanism fully engaged. To remove lid, repeat step 17 but in the opposite direction.



Two Cable Layout Tips

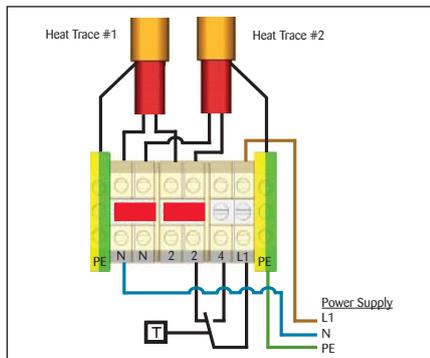


Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.

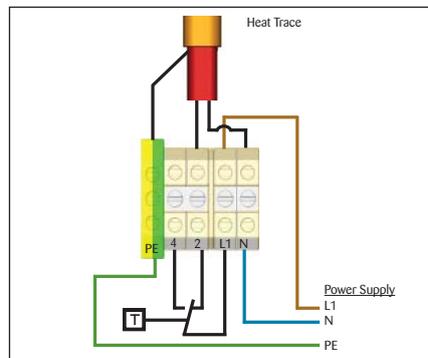
Insert two cables into expediter.

Note: For HPT and FP cable, exchange grommet in Terminator with grommet provided in PETK-3-ZT.

Wiring Details



Thermostat Connection (1 or 2 Heating Cables)



Thermostat Connection (1 Heating Cable Shown)
400 Vac Option.

Française

Terminator ZT-P-XP

Kit de connexion pour thermostat

Procédure d'installation

Pour connexion d'un thermostat (1 ou 2 câbles chauffants)

Avertissement...

- En raison du risque de choc électrique, d'arc électrique et d'incendie causés par des dommages au produit, à la mauvaise utilisation, ou à la mauvaise installation, un dispositif de protection à courant de défaut est nécessaire (disjoncteur différentiel).
- L'installation doit se conformer aux exigences Thermon (y compris la notice PN 50207U pour les installations Ex) et doit être réalisée en conformité avec les règlements, conformément à la norme EN CEI 60079-14 pour les zones dangereuses (le cas échéant), ou tout autre code national ou local.
- Les approbations des composants et les évaluations de performance sont basées uniquement sur l'utilisation des composants Thermon spécifiés.
- Couper l'alimentation de toutes les sources d'énergie avant d'ouvrir le boîtier.
- Pour éviter les charges électrostatiques. Nettoyez uniquement avec un chiffon humide.
- Garder les extrémités des câbles et les composants au sec avant et pendant l'installation.
- Le rayon de courbure minimum du câble de chauffage est de 32 mm (à l'exception des câbles HPT, rayon minimum 57 mm et des câbles FP rayon minimum 19 mm).
- Les personnes installant ces produits sont responsables pour la conformité avec toutes les normes applicables et les directives d'hygiène et de santé. Un équipement de protection individuelle (EPI) doivent être utilisés lors de l'installation. Contacter Thermon si vous avez des questions supplémentaires.

1. Localiser le bus de connexion (seulement pour câbles HPT et FP) comme indiqué. Coupez l'extrémité du câble en pointe pour aider à percer la bague d'étanchéité. Laisser une longueur de câble supplémentaire pour la lyre de dilatation. Voir page 5 les conseils d'installation pour la connexion de plusieurs câbles.
2. Pour les câbles HPT et FP, changer la bague garniture par la bague GRW-G/STAT prévue dans le PETK-3-ZT.

3. Insérer le câble dans l'EXPEDITER. Si il est monté en bas ou sur le côté, orienter correctement le boîtier.
4. Faites glisser l'EXPEDITER vers le tuyau et en faisant passer le câble par l'entrée de la base de soutien.
5. Insérer le guide de cerclage dans l'EXPEDITER et mettre en place.
6. Fixer l'EXPEDITER sur le tuyau à l'aide du collier de fixation. Ne pas coincer le câble chauffant avec le collier.
7. Coupez l'extrémité du câble.
8. Terminer le câble à l'aide des kits de terminaison PETK appropriés. Reportez-vous aux instructions d'installation des PETK. Repousser l'excédent de câble en arrière à travers l'EXPEDITER. Faire avec ce câble, une lyre d'expansion sur le tuyau. Serrer le couvercle.
9. Enlever l'EXPEDITER de la canalisation par enlèvement du collier de cerclage.
10. Faire passer le bulbe du thermostat à travers la base de l'EXPEDITER. Si nécessaire utiliser un lubrifiant (de votre fourniture). Passer à travers le trou conique de la bague. Pousser l'excès de tube capillaire au travers de l'EXPEDITER.
11. Fixer le tube capillaire et le bulbe du thermostat sur le tuyau.
12. Fixer l'EXPEDITER sur le tuyau à l'aide du collier de fixation. Ne pas coincer le câble chauffant avec le collier. Faire avec ce câble, une lyre d'expansion sur le tuyau.
13. Retirer le thermostat. Placer la base du coffret sur l'EXPEDITER. Veiller à aligner correctement les fentes de la base afin d'orienter le boîtier. Serrer l'écrou à l'aide de l'outil LN-TOOL. En cas de montage à l'horizontale les trous des presse-étoupe doivent être orientés vers le bas.
14. Installer le presse-étoupe M25 de puissance et le bouchon M25.
15. Installer le câble d'alimentation (si nécessaire).
16. Installer le thermostat avec le système complet de connexion. Les bornes seront à serrer à un couple de 1,4 Nm (12,4 lb-in). Voir page 5 pour plus de détails de câblage. Réglez le thermostat au point de consigne désiré.
17. Installez le couvercle du boîtier en le serrant à la main. Insérez un tournevis dans les fentes situées sur la périphérie de la base du boîtier. Utiliser un tournevis pour serrer le couvercle du boîtier. Le couvercle doit tourner de 30 degrés.
18. Mécanisme de verrouillage du couvercle pleinement engagé. Pour supprimer le verrouillage du couvercle, répéter les étapes 17, mais dans le sens opposé.

Deutsch

Terminator ZT-P-XP

Thermostat-Anschluss-Set

INSTALLATIONSANWEISUNG

Für Temperaturregelung/-anschluss (1 bis 2 Heizkabel)

Warnhinweise...

- Wegen der Risiken eines Stromschlags, eines Funkendurchschlags oder eines Feuers, die durch Produktbeschädigungen oder nicht sachgerechte Nutzung, Installation oder Wartung verursacht werden können, ist ein Fehlerstromschutzschalter erforderlich.
- Die Installation muss den Thermon-Vorgaben entsprechen (einschließlich der Richtlinie PN 50207U für Ex-Systeme) und muss in Übereinstimmung mit den Vorschriften gemäß der EN IEC 60079-14-Norm für Gefahrenbereiche (gegebenenfalls) sowie entsprechend aller anderen anwendbaren nationalen und regionalen Vorgaben eingebaut werden.
- Zulassungen und Angaben techn. Eigenschaften, beziehen sich ausschließlich auf die Verwendung von Thermonspezifizierten Teilen.
- Vor dem Öffnen der Abdeckung müssen sämtliche Stromquellen abgeschaltet werden.
- Vermeiden Sie elektrostatische Aufladungen. Verwenden Sie zur Reinigung einen feuchten Lappen.
- Vor und während der Installation müssen die Enden der Heizkabel und Bausatzkomponenten trocken sein.
- Der Minimumbiegeradius der Heizkabel beträgt 32 mm (Ausnahmen: HPT - 57 mm und FP - 19 mm).
- Jeder, der diese Produkte installiert, ist für die Einhaltung aller anwendbaren Sicherheits- und Gesundheitsrichtlinien verantwortlich. Während des Einbaus sollte eine geeignete persönliche Schutzausrüstung (PSA) getragen werden. Falls Sie weitere Fragen haben, wenden Sie sich bitte an Thermon.

1. Lokalisieren Sie die "Busverbindung" (nur HPT und FP) wie auf der Zeichnung gezeigt. Schneiden Sie das Ende des Kabels schräg ab, um die Dichtung leichter durchstoßen zu können. Lassen Sie zusätzliche Kabellänge für eine Ausdehnungsschleife.
2. Für HPT und FP-Kabel tauschen Sie die Dichtung im Terminator durch die GRW-G-Dichtung des PETK-3-ZT-Sets aus.
3. Führen Sie das Kabel in die Montagesäule ein. Stellen Sie sicher, dass die "Busverbindungen" (nur HPT und FP) außerhalb der Montagesäule sind.

4. Schieben Sie die Montagesäule in Richtung Rohr und führen Sie das Kabel durch die vorgesehene Öffnung in der Sockelstütze heraus.
5. Spannbandführung in Säule einsetzen und auf darauf achten das diese eingerastet ist.
6. Montagesäule mittels Spannband auf der Rohrleitung befestigen.
7. Kabelende abschneiden.
8. Kabelendabschluss mit den passenden PETK-Komponenten erstellen. Halten Sie sich an die PETK-Installationsanweisungen. Überschüssiges Kabel durch die Säule zurückschieben; Überwurfmutter fest anziehen; Heizkabelschleife am Rohr befestigen.
9. Montagesäule wieder vom Rohr lösen, indem das Spannband gelöst wird.
10. Temperatursensor durch entsprechende Öffnung in Montagesäule und Dichtung durchführen. Falls notwendig unter Zuhilfenahme von Schmiermittel (bauseits) am Ende des Sensors. Schieben Sie es durch das konische Dichtungsloch. Kapillarrohr in Säule hineindrücken.
11. Fixieren Sie den Temperatursensor und das Kapillarrohr an der Rohrleitung.
12. Montagesäule mittels Spannband auf der Rohrleitung befestigen. Heizkabelschleife am Rohr befestigen.
13. Thermostateinsatz entfernen und Unterteil des Klemmkasten auf Montagesäule befestigen. Dabei auf korrekte und richtige Ausrichtung der Rastung achten. Befestigungsmutter mit dem Terminator-LN-Schlüssel festziehen. Wenn die Einheit horizontal montiert werden sollen, so ist darauf zu achten das die Verschraubungsbohrungen nach unten zeigen.
14. Installieren Sie die M25-Stromanschlüsse (separat bestellen) und den M25-Blindverschluss.
15. Stromkabel einführen.
16. Thermostateinsatz einsetzen und Verkabelung vervollständigen. Die Schrauben sollten mit einem Drehmoment von 1,4 Nm (12,4 lb-in) angezogen werden. Verdrahtungsbeispiele auf Seite 5. Stellen Sie den Thermostat auf den gewünschten Sollwert ein.
17. Den Deckel der Anschlussdose aufsetzen hand-fest zudrehen. Führen Sie einen Schraubendreher in die Schlitz seitlichen der Anschlussdose ein. Verwenden Sie einen Schraubendreher, um den Deckel sicher zu verschliessen. Der Deckel wird sich um 30 Grad drehen.
18. Der Deckel ist nun vollständig verriegelt. Um den Deckel wieder zu entfernen, wiederholen Sie die Schritte 17 in umgekehrter Reihenfolge.

Русский

Термостат ZT-P-XP

Комплект для подключения термостата

ИНСТРУКЦИЯ ПО МОНТАЖУ

Для подключения (1-2 нагревательных кабелей)

Меры предосторожности...

- Во избежание риска поражения электрическим током, искрения и возгорания, вследствие повреждения или ненадлежащего применения, монтажа или эксплуатации продукта, требуется устройство защитного отключения (УЗО).
- Монтаж должен осуществляться в соответствии с требованиями компании Термон и нормами EN IEC 60079-14 для взрывоопасных областей (если имеют место), либо другими местными нормами и правилами.
- Технические характеристики и сертификат на оборудование действительны только при использовании комплектующих, произведенных компанией Термон.
- Отключите все источники питания перед тем, как открыть крышку.
- Избегайте образования статических зарядов. Вытирайте устройство только влажной тканью.
- Сохраняйте нагревательный кабель и другие компоненты сухими.
- Минимальный радиус изгиба кабеля составляет 32 мм (для HPT-57 мм и для FP -19мм).
- Специалисты, выполняющие монтаж данного продукта, являются ответственными за соблюдение техники безопасности. Персонал должен быть обеспечен средствами индивидуальной защиты во время монтажа. За дополнительной информацией обращайтесь в Термон.

1. Определите место соединения жилы кабеля и нити нагревательного элемента (только HPT и FP) как показано на рисунке. Отрежьте конец кабеля под углом, чтобы облегчить прокалывание уплотняющей прокладки. Оставьте некоторое количество кабеля для компенсационной петли. См. стр. 5 с информацией по различным способам монтажа кабеля.
2. Для кабелей HPT и FP, замените уплотняющую прокладку в Terminator на GRW-G/STAT, имеющуюся в PETK-3-ZT.
3. Закрепите кабель в монтажной колонке. Если монтаж производится на нижней части трубы, сделайте отверстие.

Spanish

Terminator ZT-P-XP

Kit de conexión a termostato

INSTRUCCIONES DE INSTALACIÓN

Para conexión a termostato (aplicaciones con 1 o 2 cables calefactores)

Advertencias...

- Debido al riesgo de descargas eléctricas, arcos eléctricos y fuego causados por daños en el producto o incorrecta manipulación, instalación o mantenimiento, se requiere proteger el circuito mediante un diferencial.
- La instalación debe cumplir con los requisitos de Thermon (incluyendo el estándar PN 50207U para sistemas Ex) y debe instalarse acorde a las regulaciones según la norma EN IEC 60079-14 para áreas clasificadas (cuando aplique), o cualquier otro código nacional o local aplicable.
- Las aprobaciones y rangos de rendimiento de los componentes se basan en el uso exclusivo de materiales Thermon.
- Desconecte todas las fuentes de alimentación antes de abrir la caja.
- Evite electricidad estática. Limpiar con un paño húmedo.
- Mantenga los extremos del cable calefactor y los componentes del kit secos antes y durante la instalación.
- El radio mínimo de curvatura del cable calefactor es 32 mm (excepto HPT que es 57 mm y FP que es 19 mm).
- El personal que instale estos productos es responsable de cumplir con todas las normas de seguridad e higiene. Equipos de Protección Individual (EPIs) deben usarse durante la instalación. Contacte con Thermon si tiene alguna duda.

1. Localice el nodo de conexión (solo para HPT y FP) y el cable como muestra la imagen. Corte el final del cable en ángulo para facilitar perforar el pasacables. Deje cable adicional para la coca de expansión. Vea página 5 para indicaciones de conexiones con varios cables.
2. Para cables HPT y FP cambie el pasacables suministrado con el Terminator por el GRW-G/STAT suministrado en el kit PETK-3-ZT.
3. Inserte el cable en el Expediter. Si está montado en la parte inferior o en lateral de la tubería, perforo el agujero de drenaje con un punzón.
4. Deslice el Expediter hacia la tubería guiando el cable a través de la base soporte.

4. Прикрепите монтажную колонку к трубе и протяните нагревательный кабель через проделанное отверстие.
5. Закрепите направляющую часть в ножке и установите на место.
6. Временно закрепите монтажную колонку на трубе при помощи бандаж. Не накладывайте бандаж поверх нагревательного кабеля.
7. Отрежьте конец кабеля.
8. Заделайте конец кабеля с помощью соответствующего монтажного набора PETK. См. инструкцию по монтажу PETK. Протяните лишний кабель. Плотнo затяните резьбовую втулку. Зафиксируйте компенсационную петлю на трубе.
9. Снимите колонку с трубопровода, ослабив бандаж.
10. Протяните датчик термостата через отверстие в основании колонки соединительной коробки. При необходимости используйте смазку для датчика термостата. Протяните сквозь коническое отверстие в прокладке. Протяните лишний конец капиллярной трубки через колонку
11. Закрепите датчик термостата и капиллярную трубку на трубе.
12. Временно закрепите монтажную колонку на трубе при помощи бандаж. Не накладывайте бандаж поверх нагревательного кабеля. Зафиксируйте компенсационную петлю на трубе.
13. Возьмите термостат. Установите соединительную коробку на колонку. Удостоверьтесь, что пазы расположены в соответствии с основанием соединительной коробки. Затяните гайку с помощью Terminator - LN - Tool. Если коробка монтируется горизонтально, сальники должны быть расположены по направлению к низу.
14. Установите сальник M25 и заглушку M25.
15. Протяните силовой кабель (если необходимо).
16. Установите термостат и закончите подсоединение проводов системы. Болты на клеммной колодке должны быть затянуты с усилием 1,4 Нм (12.4 фт.д.). Схему подсоединения проводов см. стр. 5. Выставьте новую уставку термостата.
17. Используйте набор для прохода через изоляцию IEK для герметизации. Установите крышку соединительной коробки и закрутите вручную. Вставьте отвертку в пазы храповика, расположенные на боковой стороне основания соединительной коробки.
18. Крышка коробки полностью закрыта. Для снятия крышки повторите шаги 17 обратном порядке.

5. Inserte la banda de fijación en el Expediter y colóquela en posición.
6. Fije el Expediter sobre la tubería mediante la banda de fijación. Tenga precaución de no poner la banda de fijación sobre el cable.
7. Corte el final del cable.
8. Realice la terminación del cable siguiendo las instrucciones del kit de terminación PETK correspondiente. Ver instrucciones de instalación del kit PETK. Empuje el exceso de cable hacia el interior del Expediter. Rosque el anillo hasta que quede asegurado. Fije la coca de expansión del cable a la tubería mediante cinta.
9. Retire el Expediter de la tubería soltando la banda de fijación.
10. Guíe el bulbo del termostato a través de la base de la caja del Expediter. Si fuese necesario, aplique lubricante (suministrado por el instalador) en el extremo del bulbo del termostato. Deslizar a través del agujero cónico del pasacables. Pase el exceso del tubo capilar por el Expediter.
11. Fije el bulbo del termostato y el tubo capilar a la tubería.
12. Fije el Expediter sobre la tubería mediante la banda de fijación. Tenga precaución de no poner la banda de fijación sobre el cable. Fije la coca de expansión del cable a la tubería mediante cinta.
13. Retire el termostato. Take out thermostat. Monte la base de la caja de conexión sobre el Expediter. Asegúrese de alinear correctamente las guías para orientar correctamente la base de la caja.. Apriete la tuerca mediante la herramienta Terminator-LN-Tool. Si se monta en horizontal, los agujeros perforados en la tuerca deben quedar mirando hacia el suelo.
14. Instale el prensa -estopas M25 (pedir por separado) y el tapón ciego M25.
15. Instalar el cable de alimentación (si aplica).
16. Instalar el termostato y el sistema completo de cableado. Los tornillos de apriete del terminal deben apretarse con un par de 1.4 Nm (12.4 lb-in). Ver página 5 para detalles de cableado. Sajuste el termostato al set-point deseado.
17. Instale la tapa de la caja de conexión y apriete con la mano. Inserte un destornillador plano en las muescas laterales de la caja de conexión. Use el destornillador, haciendo palanca ligeramente, para terminar de fijar la tapa de la caja de conexión. La tapa girará de este modo hasta 30 grados.
18. Con la tapa de la caja de conexión completamente fijada, para retirarla deberá seguir los pasos 17 pero en orden inverso, girando en la dirección contraria haciendo palanca ligeramente con un destornillador plano en la dirección opuesta.

Nederlands

Terminator ZT-P-XP

Thermostaat aansluitset

Installatie Richtlijnen

T.b.v. thermostaat aansluiting (1-2 verwarmingskabel)

Waarschuwingen...

- Thermon verwarmingssystemen moeten altijd geïnstalleerd worden met de correcte elektrische beveiligingen. Thermon adviseert altijd een installatie automaat/zekering met aardlekbeveiliging toe te passen.
- De installatie moet in zijn geheel voldoen aan de lokale voorschriften voor elektrische installaties (inclusief form PN 50207U voor Ex systemen) en aan de IEC 60079-14 bij gebruik in explosiegevaarlijke omgevingen.
- Component certificaten zijn gebaseerd op alleen gebruik van Thermon onderdelen.
- Schakel altijd eerst de spanning af, voordat de aansluitkast geopend wordt.
- Voorkom elektrostatische lading. Uitsluitend afnemen met behulp van een vochtige doek.
- Zorg dat zowel voor als tijdens de montage de open verwarmingskabel uiteinden en de set onderdelen droog zijn.
- De minimale buigradius van verwarmingskabel is 32 mm (behalve HPT deze is 57 mm en FP is 19mm).
- Personen die deze producten installeren zijn verantwoordelijk voor het in overeenstemming zijn met alle van veiligheids- en gezondheidsrichtlijnen die van toepassing zijn. De juiste persoonlijke beschermingsmiddelen (PPE) moeten tijdens het installatiewerk gedragen worden. Neem bij aanvullende vragen contact op met Thermon.

1. Bepaal het knooppunt in de verwarmingskabel (alleen voor HPT en FP) zoals aangegeven. Snij het einde van de kabel schuin af, om het doorsteken door het doorvoerrubber mogelijk te maken. Zorg dat er een extra lus in de kabel aanwezig is. Zie blad 5 voor tips met meerdere kabels.
2. Voor HPT en FP dient het doorvoerrubber te worden vervangen door de GRW-G/STAT meegeleverd in de PETK-3-ZT.
3. Steek de kabel door het rubber en de opvoersok heen. Zorg ervoor dat de knooppunt in de verwarmingskabel (betreffende HPT and FP) buiten de voet bevinden.

4. Schuif de opvoersok naar de leiding en voer de verwarmingskabel door de daartoe dienende opening van de opvoersok.
5. Klik het bevestiging steuntje in de opvoersok.
6. Monteer de opvoersok op de leiding m.b.v. montageband. Zorg dat de montageband niet over de tracing kabel loopt.
7. Knip de tracing kabel 180 mm boven de opvoersok recht af.
8. Gebruik de installatie instructies van de desbetreffende PETK-set voor het maken van een voedingaansluiting of eindafsluiting van de verwarmingskabel. Duw eventuele overlenge van de verwarmingskabel terug. Draai de moer vast aan. Monteer de lus in de verwarmingskabel vast op de pijp m.b.v. tape.
9. Verwijder opvoersok van de leiding door verwijdering van het leidingband.
10. Begeleidt de thermostaatvoeler door de opvoersok opening in de klemmenkast behuizing. Indien noodzakelijk, vet de thermostaatvoeler aan het eind in (zelf te verzorgen). Schuif deze door het conische grommet gat. Druk de capillair tube door de opvoersok.
11. Bevestig thermostaatvoeler en capillair tube tegen de leiding.
12. Monteer de opvoersok op de leiding m.b.v. montageband. Zorg dat de montageband niet over de tracing kabel loopt. Monteer de lus in de verwarmingskabel vast op de pijp m.b.v. tape.
13. Demonteer de thermostaat. Bevestig klemmenkast behuizing op de opvoersok. Controleer of de behuizing goed uitgelijnd is. Schroef de moer vast met de Terminator LN Sleutel. Bij horizontale bevestiging dienen de wartels naar beneden geplaatst te zijn.
14. Monteer de M25 voedingskabelwartel (apparte bestelbaar) en de M25 blindplug goed vast in het bodemdeel m.b.v. een steeksleutel.
15. Installeer voedingskabel (indien noodzakelijk).
16. Sluit alle draden op de desbetreffende aansluitklemmen aan, voor meer details zie blad 5. Draai de schroeven in de aansluitklemmen met een koppel van 1,4 Nm aan.
17. Breng het deksel op het bodemdeel van de aansluitkast aan, en draai het deksel handmatig vast. Steek een schroevendraaier aan de zijkant onder een deksellip in de opening van het bodemdeel. De deksel zal 30 graden verdraaien.
18. Om de deksel te verwijderen, moeten de stappen 17 in omgekeerde volgorde uitgevoerd worden.



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Specifications and information are subject to change without notice. Form PN50850U-1013

Terminator™ ZT-P-WP Thermostat Connection Kit INSTALLATION PROCEDURES



For Thermostat Connection (1-2 Heating Cables) Applications
For Use With Parallel Heating Cables



The Heat Tracing Specialists®

Terminator™ ZT-P-WP

The following installation procedures are suggested guidelines for the installation of the Terminator ZT-P-WP Kit.

Kit Contents . . .



Item	Quantity	Description										
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring										
2	1	Junction Box Lid										
3	1	Junction Box Base with O-Ring & M25 Dust Cap										
4	1	Nut										
5	1	Banding										
6	1	Thermostat w/ Terminal Blocks <small>(Refer to terminal specifications for maximum allowable wire size)</small>										
		<table border="1"> <thead> <tr> <th>Thermostat Type</th> <th>Control Range</th> </tr> </thead> <tbody> <tr> <td>ZT-C-100</td> <td>0°C to +100°C</td> </tr> <tr> <td>ZT-C-200</td> <td>0°C to +200°C</td> </tr> <tr> <td>ZT-C-300</td> <td>0°C to +300°C</td> </tr> <tr> <td>ZT-C-500</td> <td>20°C to +500°C</td> </tr> </tbody> </table>	Thermostat Type	Control Range	ZT-C-100	0°C to +100°C	ZT-C-200	0°C to +200°C	ZT-C-300	0°C to +300°C	ZT-C-500	20°C to +500°C
Thermostat Type	Control Range											
ZT-C-100	0°C to +100°C											
ZT-C-200	0°C to +200°C											
ZT-C-300	0°C to +300°C											
ZT-C-500	20°C to +500°C											
7	1	Capillary Armoring w/ Glands										
8	1	Junction Box Cord										
9	1	Blind Plug										
10	1	Bracket										
11	3	Screws										
12	3	Washers										

Order Separately . . .

PETK Power and End Termination Kits (per cable)

PETK-1 for RSX, VSX, BSX

PETK-2 for KSX, HTSX

PETK-3-ECM for HPT, FP



Item	Quantity	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	2	Conductor Wire Pins
4	1	Braid Wire Pin
5	1	Ground Sleeve
6	1	End Cap
7	1	Tape Strip (PETK-3-ZT only)
8	1	Grommet (PETK-3-ZT only)
9	1	End Termination Caution Label

INSTALLATION PROCEDURES

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

Order Separately . . .

IEK Insulation Entry Kit (per cable)

IEK-SXL for RSX, VSX,

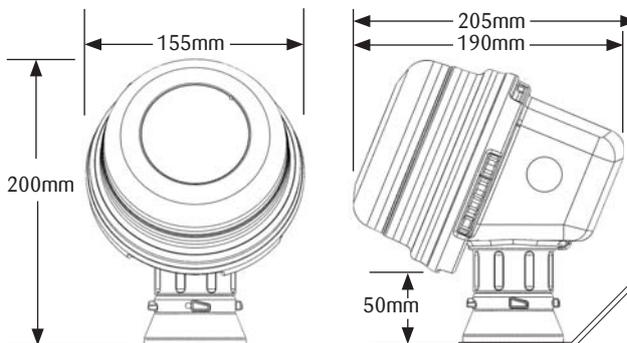
IEK-SXM for BSX

IEK-SXS for KSX, HTSX

IEK-HPT for HPT, FP



Dimensions . . .



Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.
- Consult the manufacturer for dimensional information on the flameproof joints for repair.

Tools Required . . .



Certifications/Approvals . . .

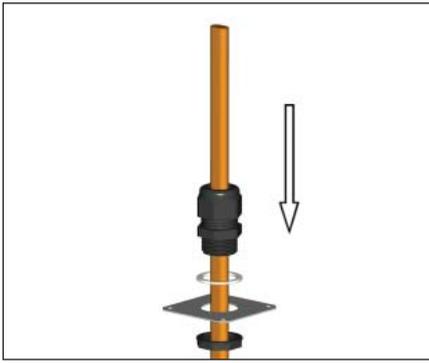
IP66; -60°C ≤ Ta ≤ +55°C T6, 85°C 16 Amps Max

-60°C ≤ Ta ≤ +50°C T5, 100°C 25 Amps Max

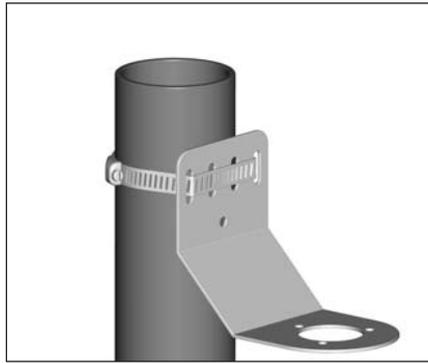
Ordinary & Hazardous Locations

FMG 10.0022X Ex db eb IIC T5-T6, Ex tb IIIC T100°C-T85°C

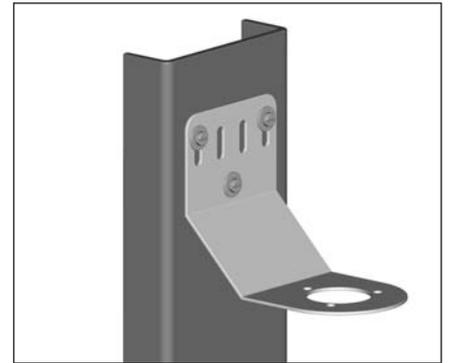
1725 II 2 GD Ex db eb IIC T5-T6, Ex tb IIIC T100°C-T85°C FM10ATEX0058X



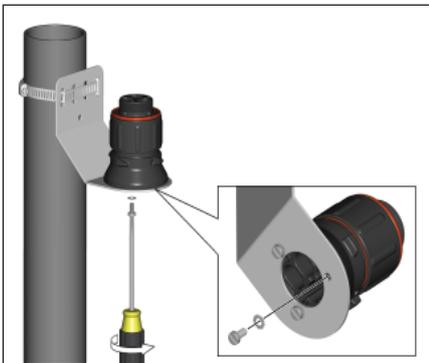
1. Slide appropriate IEK insulation entry kit components onto cable. (Order Separately)



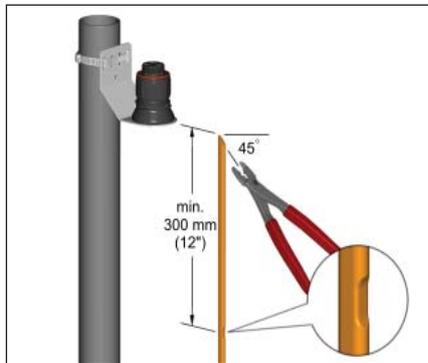
2a. Mounting Method 1: Secure wall mount bracket to mounting surface using pipe band provided with kits.



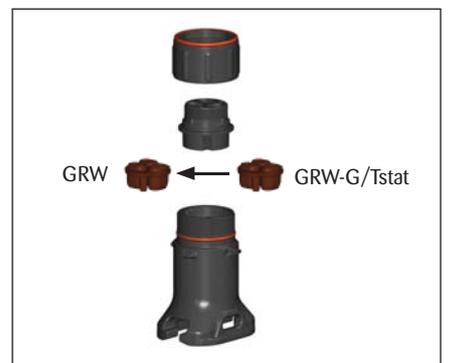
2b. Mounting Method 2: Secure wall mount bracket to mounting surface using customer-supplied screws, flat washers, and nuts.



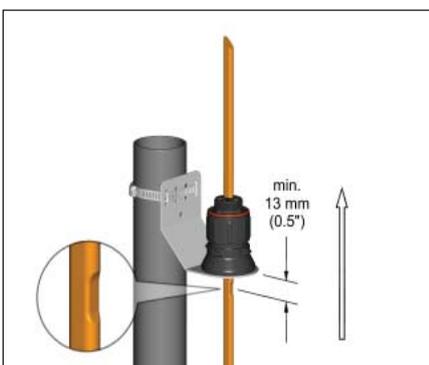
3. Mount expediter to bracket using M5 x 8 mm screws and M5 lock washers.



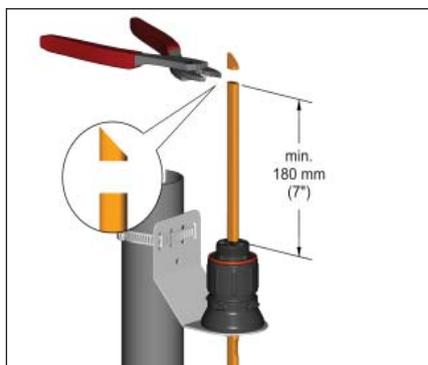
4. Locate bus connection (HPT and FP only) as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion as needed.



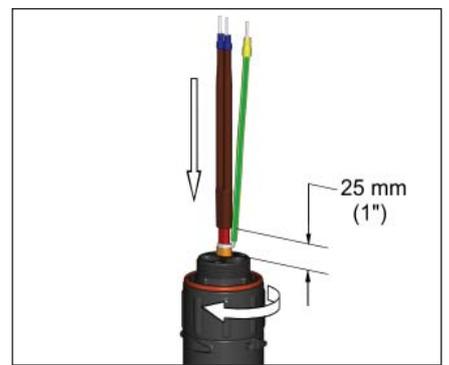
5. For HPT and FP cable, exchange grommet in Terminator with grommet provided in PETK-3-ZT.



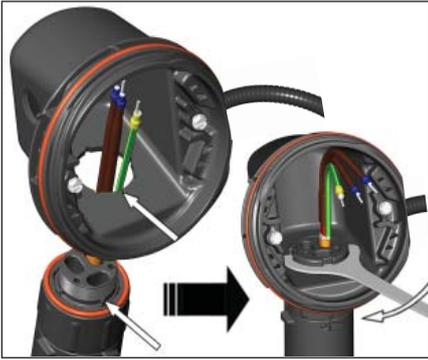
6. Insert cable into expediter. Make sure bus connection (HPT and FP only) remains outside of expediter.



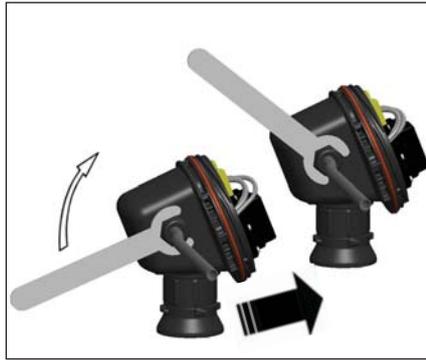
7. Cut off end of cable.



8. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.



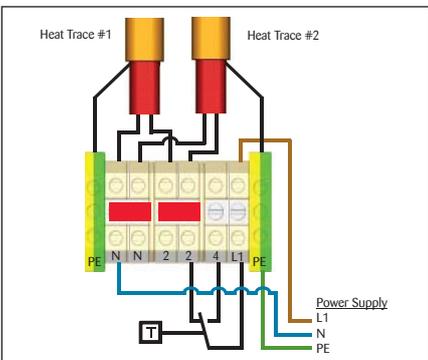
9. Mount junction box base on expediter. Make sure to align slots to properly orient junction box base. Tighten nut with Terminator-LN-Tool. If mounting horizontally, threaded gland holes must face downward.



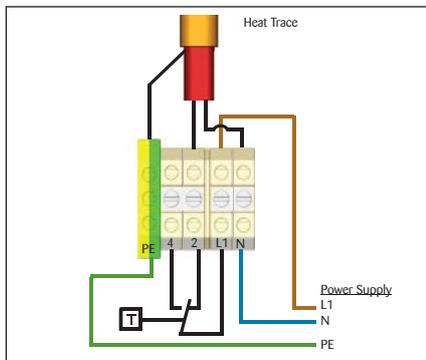
10. Remove M25 dust cap. Install M25 power gland (order separately) and M25 blind plug. Install power cable



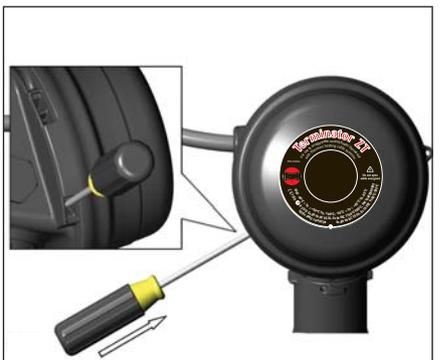
11. Install thermostat and complete system wiring. Terminal set screws shall be tightened to a torque value of 1.4 Nm (12.4 lb-in). See Step 13 for wiring details. Set thermostat at desired setpoint.



12. Wiring Details: Thermostat Connection (1 or 2 Heating Cables)



13. Thermostat Connection (1 Heating Cable Shown) 400 Vac Option.



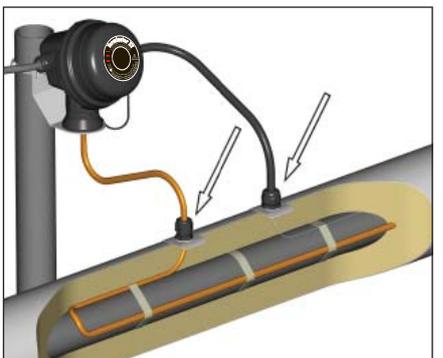
14. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base.



15. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees. To remove lid, repeat steps 14 and 15 but in the opposite direction.



16. Fix thermostat bulb and capillary tube to pipe.



17. Install IEK insulation entry kit to seal heating cable penetration through insulation cladding.

Française

Terminator ZT-P-WP

Kit de connexion pour thermostat

Procédure d'installation

Pour connexion d'un thermostat (1 ou 2 câbles chauffants)

Avertissement...

- En raison du risque de choc électrique, d'arc électrique et d'incendie causés par des dommages au produit, à la mauvaise utilisation, ou à la mauvaise installation, un dispositif de protection à courant de défaut est nécessaire (disjoncteur différentiel).
- L'installation doit se conformer aux exigences Thermon (y compris la notice PN 50207U pour les installations Ex) et doit être réalisée en conformité avec les règlements, conformément à la norme EN CEI 60079-14 pour les zones dangereuses (le cas échéant), ou tout autre code national ou local.
- Les approbations des composants et les évaluations de performance sont basées uniquement sur l'utilisation des composants Thermon spécifiés.
- Couper l'alimentation de toutes les sources d'énergie avant d'ouvrir le boîtier.
- Pour éviter les charges électrostatiques. Nettoyez uniquement avec un chiffon humide.
- Garder les extrémités des câbles et les composants au sec avant et pendant l'installation.
- Le rayon de courbure minimum du câble de chauffage est de 32 mm (à l'exception des câbles HPT, rayon minimum 57 mm et des câbles FP rayon minimum 19 mm).
- Les personnes installant ces produits sont responsables pour la conformité avec toutes les normes applicables et les directives d'hygiène et de santé. Un équipement de protection individuelle (EPI) doivent être utilisé lors de l'installation. Contacter Thermon si vous avez des questions supplémentaires.

1. Faire glisser le kit d'entrée de calorifuge IEK, approprié sur le câble chauffant.
- 2a. Méthode de montage 1: Fixer le support mural sur la surface de montage (tuyauterie) à l'aide des colliers fournis dans le kit.
- 2b. Méthode de montage 2: Fixer le support mural sur la surface de montage à l'aide de vis, écrous et rondelles plates de votre fourniture.

Deutsch

Terminator ZT-P-WP

Thermostat-Anschluss-Set

INSTALLATIONSANWEISUNG

Für Temperatursteuerung/-anschluss (1 bis 2 Heizkabel)

Warnhinweise...

- Wegen der Risiken eines Stromschlags, eines Funkendurchschlags oder eines Feuers, die durch Produktbeschädigungen oder nicht sachgerechte Nutzung, Installation oder Wartung verursacht werden können, ist ein Fehlerstromschutzschalter erforderlich.
- Die Installation muss den Thermon-Vorgaben entsprechen (einschließlich der Richtlinie PN 50207U für Ex-Systeme) und muss in Übereinstimmung mit den Vorschriften gemäß der EN IEC 60079-14-Norm für Gefahrenbereiche (gegebenenfalls) sowie entsprechend aller anderen anwendbaren nationalen und regionalen Vorgaben eingebaut werden.
- Zulassungen und Angaben techn. Eigenschaften, beziehen sich ausschließlich auf die Verwendung von Thermonspezifizierten Teilen.
- Vor dem Öffnen der Abdeckung müssen sämtliche Stromquellen abgeschaltet werden.
- Vermeiden Sie elektrostatische Aufladungen. Verwenden Sie zur Reinigung einen feuchten Lappen.
- Vor und während der Installation müssen die Enden der Heizkabel und Bausatzkomponenten trocken sein.
- Der Minimumbiegeradius der Heizkabel beträgt 32 mm (Ausnahmen: HPT - 57 mm und FP - 19 mm).
- Jeder, der diese Produkte installiert, ist für die Einhaltung aller anwendbaren Sicherheits- und Gesundheitsrichtlinien verantwortlich. Während des Einbaus sollte eine geeignete persönliche Schutzausrüstung (PSA) getragen werden. Falls Sie weitere Fragen haben, wenden Sie sich bitte an Thermon.

1. Schieben Sie die passenden Komponenten der IEK-Isolierdurchführung über das Kabel.
- 2a. Befestigungsmethode 1: Montieren Sie das Wandbefestigungsblech an geeigneter Stelle mit Hilfe des mitgelieferten Spannbandes.
- 2b. Méthode de montage 2: Fixer le support mural sur la surface de montage à l'aide de vis, écrous et rondelles plates de votre fourniture.
3. Befestigen Sie die Montagesäule mit M5 x 8 mm-Schrauben & Sicherungsfedern am Befestigungswinkel.

3. Monter le pieds EXPEDITER sur le support en utilisant des vis M5 x 8 mm et des rondelles autobloquantes M5.
4. Localiser le bus de connexion (seulement pour câbles HPT et FP) comme indiqué. Coupez l'extrémité du câble en pointe pour aider à percer la bague d'étanchéité. Laisser une longueur de câble supplémentaire pour la lyre de dilatation.
5. Pour les câbles HPT et FP, changer la bague garniture par la bague GRW-G/STAT prévue dans le PE. Insérer le câble dans Expediter. Assurez-vous que le bus connexion (HPT et FP seulement) reste dehors de Expediter.
6. Insérer le câble dans l' EXPEDITER. Assurez-vous que le bus de connexion (pour HPT et FP seulement) est situé à l'extérieur de l'EXPEDITER.
7. Coupez l'extrémité du câble.
8. Terminer le câble à l'aide des kits de terminaison PETK appropriés. Reportez-vous aux instructions d'installation des PETK. Repousser l'excédent de câble en arrière à travers l'EXPEDITER. Faire avec ce câble, une lyre d'expansion sur le tuyau. Serrer le couvercle.
9. Monter la base support sur l'EXPEDITER. Veiller à aligner correctement les guides d'orientation du boîtier. Serrer l'écrou à l'aide de l'outil LN-TOOL. Si le boîtier est monté horizontalement, placer les presse étoupe vers le bas.
10. Installer le presse-étoupe M25 de puissance et le bouchon M25.
11. Installer le câble d'alimentation (si nécessaire).
12. Installer le thermostat avec le système complet de connexion. Les bornes seront à serrer à un couple de 1,4 Nm (12,4 lb-in). Voir étape 13 pour plus de détails de câblage. Réglez le thermostat au point de consigne désiré.
13. Détails de câblage: Connexion Thermostat (1 ou 2 câbles chauffant)
14. Installez le couvercle du boîtier en le serrant à la main. Insérez un tournevis dans les fentes situées sur la périphérie de la base du boîtier.
15. Utiliser un tournevis pour serrer le couvercle du boîtier. Le couvercle doit tourner de 30 degrés. Pour supprimer le verrouillage du couvercle, répéter les étapes 14 et 15, mais dans le sens opposé.
16. Fixer le tube capillaire et le bulbe du thermostat sur le tuyau.
17. Installer le kit d'entrée de calorifuge IEK pour sceller la pénétration du câble chauffant à travers le revêtement extérieur de l'isolation.

4. Lokalisieren Sie die "Busverbindung" (nur HPT und FP) wie auf der Zeichnung gezeigt. Schneiden Sie das Ende des Kabels schräg ab, um die Dichtung leichter durchstossen zu können. Lassen Sie zusätzliche Kabellänge für eine Ausdehnungsschleife übrig.
5. Für HPT und FP-Kabel tauschen Sie die Dichtung im Terminator durch die GRW-G-Dichtung des PETK-3-Sets aus.
6. Führen Sie das Kabel in die Montagesäule ein. Stellen Sie sicher, dass die "Busverbindungen" (nur HPT und FP) außerhalb der Montagesäule sind.
7. Kabelende abschneiden.
8. Kabelendabschluss mit den passenden PETK-Komponenten erstellen. Halten Sie sich an die PETK-Installationsanweisungen. Überschüssiges Kabel durch die Säule zurückschieben; Überwurfmutter fest anziehen; Heizkabelschleife am Rohr befestigen.
9. Thermostateinsatz entfernen und Unterteil des Klemmkasten auf Montagesäule befestigen. Dabei auf korrekte und richtige Ausrichtung der Rastung achten. Befestigungsmutter mit dem Terminator-LN-Schlüssel festziehen. Wenn die Einheit horizontal montiert werden sollen, so ist darauf zu achten dass die Verschraubungsbohrungen nach unten zeigen.
10. Installieren Sie die M25-Stromanschlüsse (separat bestellen) und den M25-Blindstopfen.
11. Stromkabel einführen.
12. Thermostateinsatz einsetzen und Verkabelung vervollständigen. Die Schrauben sollten mit einem Drehmoment von 1,4 Nm (12,4 lb-in) angezogen werden. Vergleichen Sie Schritt 13 für weitere Einzelheiten zur Verkabelung. Stellen Sie den Thermostat auf den gewünschten Sollwert ein.
13. Einzelheiten zur Verkabelung: Thermostatanschluss (1 oder 2 Heizkabel)
14. Den Deckel der Anschlussdose aufsetzen hand-fest zudrehen. Führen Sie einen Schraubendreher in die Schlitzseite der Anschlussdose ein.
15. Verwenden Sie einen Schraubendreher, um den Deckel sicher zu verschliessen. Der Deckel wird sich um 30 Grad drehen. Zum entfernen des Deckels, wiederholen Sie die Schritte 14 und 15, allerdings in umgekehrter Reihenfolge.
16. Fixieren Sie den Temperatursensor und das Kapillarrohr an der Rohrleitung.
17. IEK-Isolierdurchführung auf dem Wetterschutz der Isolierung befestigen um mech. Beschädigungen des Heizbandes durch das Wetterschutzblech zu vermeiden.

Русский

Термостат ZT-P-WP

Комплект для подключения термостата

ИНСТРУКЦИЯ ПО МОНТАЖУ

Для подключения (1-2 нагревательных кабелей)

Меры предосторожности...

- Во избежание риска поражения электрическим током, искрения и возгорания, вследствие повреждения или ненадлежащего применения, монтажа или эксплуатации продукта, требуется устройство защитного отключения (УЗО).
- Монтаж должен осуществляться в соответствии с требованиями компании Термон и нормами EN IEC 60079-14 для взрывоопасных областей (если имеют место), либо другими местными нормами и правилами.
- Технические характеристики и сертификат на оборудование действительны только при использовании комплектующих, произведенных компанией Термон.
- Отключите все источники питания перед тем, как открыть крышку.
- Избегайте образования статических зарядов. Вытирайте устройство только влажной тканью.
- Сохраняйте нагревательный кабель и другие компоненты сухими.
- Минимальный радиус изгиба кабеля составляет 32 мм (для HPT-57 мм и для FP -19мм).
- Специалисты, выполняющие монтаж данного продукта, являются ответственными за соблюдение техники безопасности. Персонал должен быть обеспечен средствами индивидуальной защиты во время монтажа. За дополнительной информацией обращайтесь в Термон.

1. Используйте необходимый набор для прохода через теплоизоляцию.
- 2a. 1-й - способ монтажа. Закрепите настенный монтажный кронштейн на монтируемой поверхности при помощи банджа.
- 2b. 2-й - способ монтажа. Закрепите настенный монтажный кронштейн на монтируемой поверхности с помощью болтов, плоских шайб и гаек.

Spanish

Terminator ZT-P-WP

Kit de conexión a termostato

INSTRUCCIONES DE INSTALACIÓN

Para conexión a termostato (aplicaciones con 1 o 2 cables calefactores)

Advertencias...

- Debido al riesgo de descargas eléctricas, arcos eléctricos y fuego causados por daños en el producto o incorrecta manipulación, instalación o mantenimiento, se requiere proteger el circuito mediante un diferencial.
- La instalación debe cumplir con los requisitos de Thermon (incluyendo el estándar PN 50207U para sistemas Ex) y debe instalarse acorde a las regulaciones según la norma EN IEC 60079-14 para áreas clasificadas (cuando aplique), o cualquier otro código nacional o local aplicable.
- Las aprobaciones y rangos de rendimiento de los componentes se basan en el uso exclusivo de materiales Thermon.
- Desconecte todas las fuentes de alimentación antes de abrir la caja.
- Evite electricidad estática. Limpiar con un paño húmedo.
- Mantenga los extremos del cable calefactor y los componentes del kit secos antes y durante la instalación.
- El radio mínimo de curvatura del cable calefactor es 32 mm (excepto HPT que es 57 mm y FP que es 19 mm).
- El personal que instale estos productos es responsable de cumplir con todas las normas de seguridad e higiene. Equipos de Protección Individual (EPIs) deben usarse durante la instalación. Contacte con Thermon si tiene alguna duda.

1. Deslice el kit de entrada en calorifugado IEK apropiado por el cable.
- 2a. Modo de montaje 1: fije el soporte sobre la superficie empleando la banda de fijación suministrada con los kits.
- 2b. Modo de montaje 2: fije el soporte sobre la superficie utilizando los tornillos, arandelas y tuercas suministrados por el cliente.
3. Monte el Expediter sobre el soporte utilizando los tornillos M5x8 y las arandelas M5.
4. Localice el nodo de conexión (solo para HPT y FP) y el cable como muestra la imagen. Corte el final del cable en ángulo para facilitar perforar el pasacables. Deje cable adicional para la coca de expansión.

3. Закрепите колонку на кронштейне с помощью болтов M5 и стопорных шайб.
4. Определите место соединения жилы кабеля и нити нагревательного элемента (только HPT и FP) как показано на рисунке. Отрежьте конец кабеля под углом, чтобы облегчить прокалывание уплотняющей прокладки. Оставьте некоторое количество кабеля для компенсационной петли.
5. Для кабелей типа HPT и FP, замените втулку из комплекта Terminator на втулку из набора PETK-3.
6. Поместите кабель в колонку и проденьте его.
7. Отрежьте конец кабеля.
8. Заделайте конец кабеля с помощью монтажного набора PETK. См. инструкцию по монтажу PETK. Протяните лишний кабель обратно через колонку. Плотно затяните резьбовую втулку.
9. Установите соединительную коробку на колонку. Удостоверьтесь, что пазы расположены в соответствии с основанием соединительной коробки. Затяните гайку с помощью Terminator - LN - Tool. Если коробка монтируется горизонтально, сальники должны быть расположены по направлению к низу.
10. Установите сальник M25 (заказывается отдельно) и заглушку M25.
11. Протяните силовую кабель.
12. Установите термостат и закончите подсоединение проводов системы. Болты на клеммной колодке должны быть затянуты с усилием 1,4 Нм (12.4 фт.д.). Схему подсоединения проводов см. стр. 5. Выставьте новую уставку термостата.
13. Подключение: 1-2 нагревательных кабеля.
14. Установите крышку соединительной коробки и закрутите вручную. Вставьте отвертку в пазы храповика, расположенные на боковой стороне основания соединительной коробки.
15. При помощи отвертки затяните крышку соединительной коробки. Крышка должна повернуться на 30 градусов. Для снятия крышки повторите шаги 14-15, но в обратную сторону.
16. Зафиксируйте индикатор коробки и капиллярную трубку к трубе.
17. Используйте набор для прохода через изоляцию IEK для герметизации.

5. Para cables HPT y FP cambie el pasacables suministrado con el Terminator por el GRW-G/STAT suministrado en el kit PETK-3.
6. Inserte el cable en el Expediter. Asegúrese que el nodo de conexión queda fuera del Expediter (solo para cables HPT y FP).
7. Corte el final del cable.
8. Realice la terminación del cable siguiendo las instrucciones del kit de terminación PETK correspondiente. Ver instrucciones de instalación del kit PETK. Empuje el exceso de cable hacia el interior del Expediter. Rosque el anillo hasta que quede asegurado. Fije la coca de expansión del cable a la tubería mediante cinta.
9. Monte la base de la caja de conexión sobre el Expediter. Asegúrese de alinear correctamente las guías para orientar correctamente la base de la caja. Apriete la tuerca mediante la herramienta Terminator-LN-Tool. Si se monta en horizontal, los agujeros perforados en la tuerca deben quedar mirando hacia el suelo.
10. Instale el prensa -estopas M25 (pedir por separado) y el tapón ciego M25.
11. Instalar el cable de alimentación.
12. Instalar el termostato y el sistema completo de cableado. Los tornillos de apriete del terminal deben apretarse con un par de 1.4 Nm (12.4 lb-in). Ver página 5 para detalles de cableado. Sajuste el termostato al set-point deseado.
13. Detalles de cableado: conexiones del termostato (1 o 2 cables calefactores).
14. Instale la tapa de la caja de conexión y apriete con la mano. Inserte un destornillador plano en las muescas laterales de la caja de conexión.
15. Use el destornillador, haciendo palanca ligeramente, para terminar de fijar la tapa de la caja de conexión. La tapa girará de este modo hasta 30 grados. Para retirarla deberá seguir los pasos 14 y 15 pero en orden inverso, girando en la dirección contraria haciendo palanca ligeramente con un destornillador plano en la dirección opuesta.
16. Con la tapa de la caja de conexión completamente fijada.
17. Instalar el kit de calorifugado IEK conectándolo al sello del orificio de entrada sobre el calorifugado.

Nederlands

Terminator ZT-P-WP

Thermostaat aansluitset

Installatie Richtlijnen

T.b.v. thermostaat aansluiting (1-2 verwarmingskabel)

Waarschuwingen...

- Thermon verwarmingssystemen moeten altijd geïnstalleerd worden met de correcte elektrische beveiligingen. Thermon adviseert altijd een installatie automaat/zekering met aardlekbeveiliging toe te passen.
- De installatie moet in zijn geheel voldoen aan de lokale voorschriften voor elektrische installaties (inclusief form PN 50207U voor Ex systemen) en aan de IEC 60079-14 bij gebruik in explosiegevaarlijke omgevingen.
- Component certificaten zijn gebaseerd op alleen gebruik van Thermon onderdelen.
- Schakel altijd eerst de spanning af, voordat de aansluitkast geopend wordt.
- Voorkom elektrostatische lading. Uitsluitend afnemen met behulp van een vochtige doek.
- Zorg dat zowel voor als tijdens de montage de open verwarmingskabel uiteinden en de set onderdelen droog zijn.
- De minimale buigradius van verwarmingskabel is 32 mm (behalve HPT deze is 57 mm en FP is 19mm).
- Personen die deze producten installeren zijn verantwoordelijk voor het in overeenstemming zijn met alle van veiligheids- en gezondheidsrichtlijnen die van toepassing zijn. De juiste persoonlijke beschermingsmiddelen (PPE) moeten tijdens het installatiewerk gedragen worden. Neem bij aanvullende vragen contact op met Thermon.

1. Schuif de desbetreffende isolatie doorvoerset (IEK) onderdelen over de kabel.
- 2a. Montage methode 1: Monteer de aansluitdoossteun stevig op een ongeïsoleerde leiding of steun pijp m.b.v. de meegeleverde montageband.
- 2b. Montage methode 2: Monteer de aansluitdoossteun stevig tegen een vlak deel m.b.v. schroeven, ringen en moeren (niet in deze set aanwezig).

3. Monteer de opvoersok op de bovenzijde van de aansluitdoossteun m.b.v. M5 x 8 mm schroeven en veerringen.
4. Bepaal het knooppunt in de verwarmingskabel (alleen voor HPT en FP) zoals aangegeven. Snij het einde van de kabel schuin af, om het doorsteken door het doorvoerrubber mogelijk te maken. Zorg dat er een extra lus in de kabel aanwezig is.
5. Voor HPT en FP dient het doorvoerrubber te worden vervangen door de GRW-G/STAT meegeleverd in de PETK-3.
6. Steek de kabel door het rubber en de opvoersok heen. Zorg ervoor dat de knooppunt in de verwarmingskabel (betreffende HPT and FP) buiten de voet bevinden.
7. Knip het einde van de kabel af.
8. Duw eventuele overlengte van de verwarmingskabel terug. Draai de moer vast aan. Monteer de extra lus in de kabel op de pijp.
9. Monteer het bodemdeel van de aansluitkast op de opvoersok, zorg dat de O-ring op de opvoersok aanwezig is. De vergrendelknoppen en uitsparingen in de opvoersok en het bodemdeel moeten overeenkomen. Draai de moer op de nippel, en draai deze vast m.b.v. LN montage sleutel. Zorg dat de wartels niet inwaterend zijn.
10. Monteer de M25 voedingskabelwartel (apart te bestellen) en de M25 blindplug goed vast in het bodemdeel m.b.v. een steeksleutel.
11. Installeer voedingskabel.
12. Sluit alle draden op de desbetreffende aansluitklemmen aan, voor meer details zie stap 13. Draai de schroeven in de aansluitklemmen met een koppel van 1,4 Nm aan. Stel de gewenste regeltemperatuur in.
13. Voedingsaansluiting (1-2 verwarmingskabels)
14. Breng het deksel op het bodemdeel van de aansluitkast aan en draai het deksel handmatig vast. Steek een schroevendraaier aan de zijkant onder een deksellip in de opening van het bodemdeel.
15. Draai het deksel tot aan de aanslag dicht m.b.v. de schroevendraaier. De deksel zal 30 graden verdraaien. Om de deksel te verwijderen, moeten de stappen 14 en 15 in omgekeerde volgorde uitgevoerd worden.
16. Monteer de thermostaat voeler en het capillaire op de pijp.
17. Monteer de isolatie doorvoerset (IEK) vast op de isolatie beplating.



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Specifications and information are subject to change without notice. Form PN50851U-1013

Tab

8

8

Tab

Terminator™ ECM-P-XP Electronic Control Module INSTALLATION PROCEDURES

For Connection (1-2 Heating Cables) Applications



The Heat Tracing Specialists®

Terminator™ ECM-P-XP

INSTALLATION PROCEDURES

The following installation procedures are suggested guidelines for the installation of the Terminator ECM-P-XP Kit.

Kit Contents . . .



Item	Quantity	Description
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring
2	1	Junction Box Lid
3	1	Junction Box Base with O-Ring
4	1	Nut
5	1	Banding
6	1	Banding Guide
7	1	Electronic Control Module w/ Terminal Blocks <small>(Refer to terminal specifications for maximum allowable wire size)</small> ECM Type* C - Controller L - Limiter CL - Controller/Limiter <small>* The maximum pipe exposure temperature is limited to 232°C</small>
8	1	Junction Box Lid Cord
9	3	Blind Plug

Order Separately . . .

PETK Power and End Termination Kits (per cable)

PETK-1 for RSX, V SX, BSX

PETK-2 for KSX, HTSX

PETK-3-ECM for HPT, FP

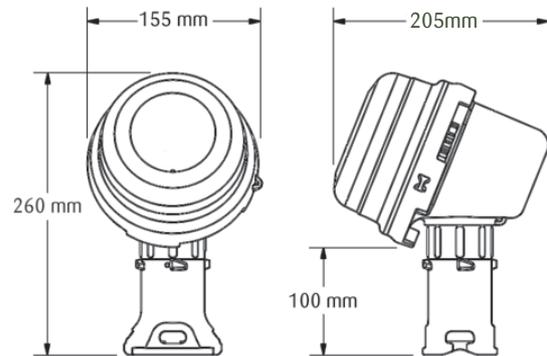


Item	Quantity	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	2	Conductor Wire Pins
4	1	Braid Wire Pin
5	1	Ground Sleeve
6	1	End Cap
7	1	Tape Strip (PETK-3-ECM only)
8	1	Grommet (PETK-3-ECM only)
9	1	End Termination Caution Label

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

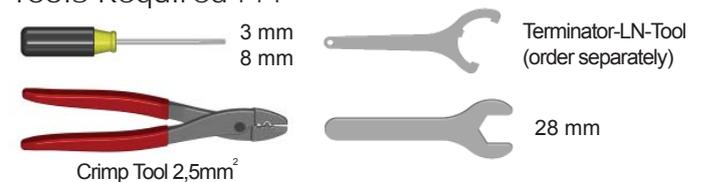
Dimensions . . .



Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50207U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

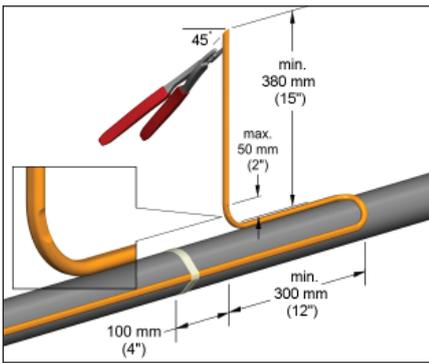
Tools Required . . .



Certifications/Approvals . . .

CE II 2 (2) G Ex eb mb [ib] IIC T4, Ex tb IIIC T135°C SIRA 12ATEX5239X
II 2 (2) D Ex tb IIIC T135°C IP66 Db

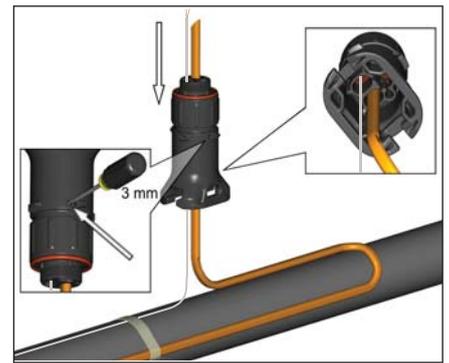
IEC IECEx International Electrotechnical Commission
IEC Certification Scheme for Explosive Atmospheres
SIR 12.0103X



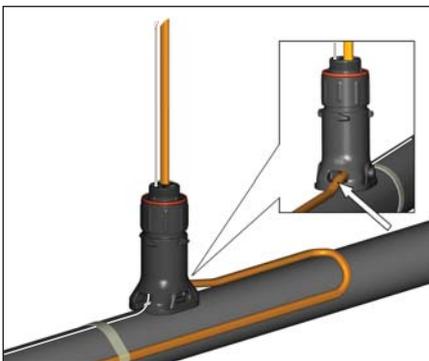
1. Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop. See page 5 for multiple cable installation tips.



2. Position RTD Sensor(s) in grommet (when applicable). Do not pull from the sensor end when routing through the expediter assembly. Pull sensor from the lead wire portion.



3. Insert cable into expediter. If mounted on bottom or side of pipe, punch out weep hole. Note: For HPT and FP cable, exchange grommet in Terminator with grommet provided in PETK-3-ECM.



4. Slide expediter toward pipe and route cable through support base entry.



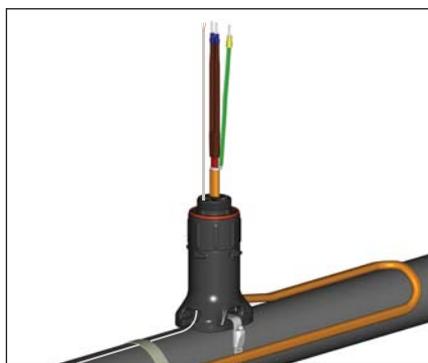
5. Insert banding guide into expediter and snap into place.



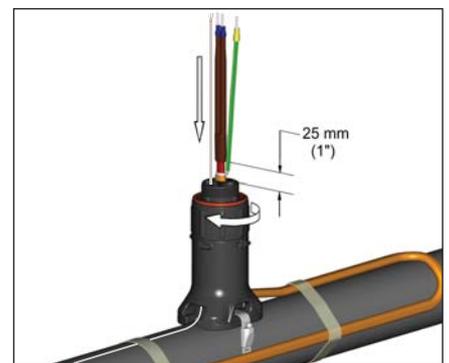
6. Mount expediter to pipe using pipe band. Do not band over cable.



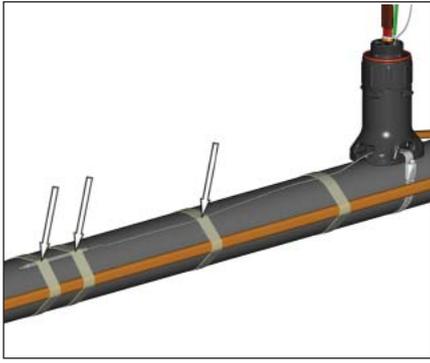
7. Cut off end of cable.



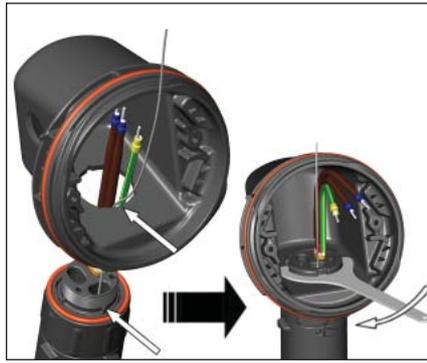
8. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions.



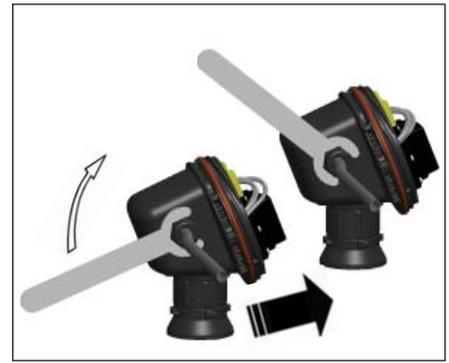
9. Push excess cable back through expediter. Tighten cap securely. Tape cable expansion loop to pipe.



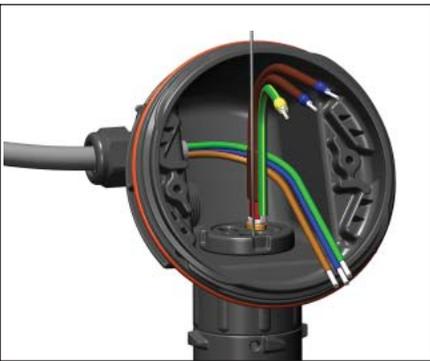
10. Fix expediter, RTD, and lead wire to pipe.



11. Mount junction box base on expediter. Make sure to align slots to properly orient junction box base. Tighten nut with Terminator-LN-Tool. If mounting horizontally, threaded gland holes must face downward.



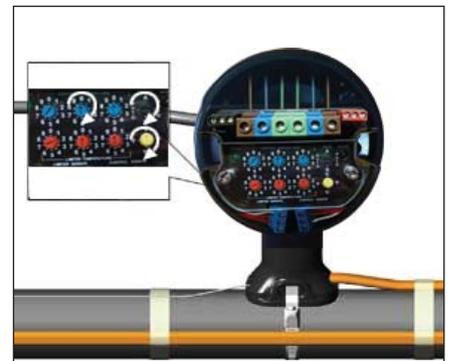
12. Install M25 power gland (order separately) and M25 blind plug.



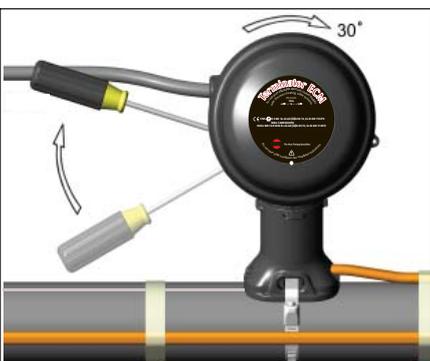
13. Install power cable.



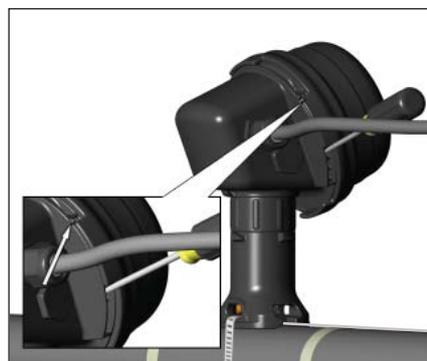
14. Install electronic control module and complete system wiring. Terminal set screws shall be tightened to a torque value of 1,4 Nm (12,4 lb-in). See page 5 for wiring details. Set modules electronic control and/or control limiter at desired setpoints.



15. Use the rotary switches for settling Control and Limit Temperature, Celsius or Fahrenheit and Auto or Manual reset (Control switches on Type "C", Limiter switches on Type "L" and both on Type "CL").



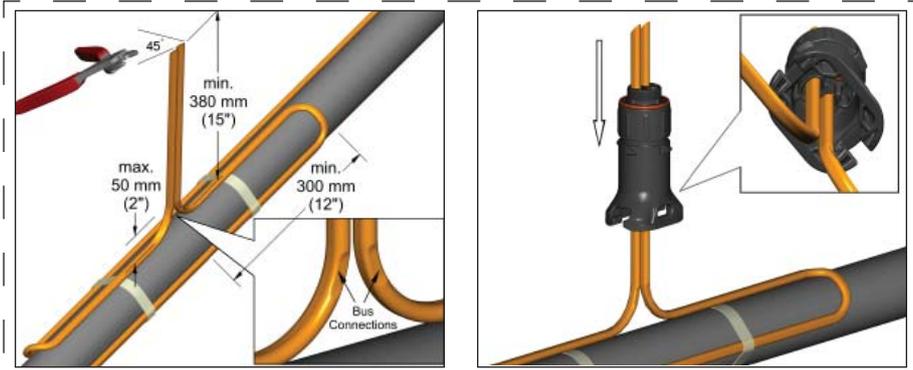
16. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base.



17. Lid latch mechanism fully engaged. To remove lid, repeat step 16 but in the opposite direction.



Two Cable Layout Tips

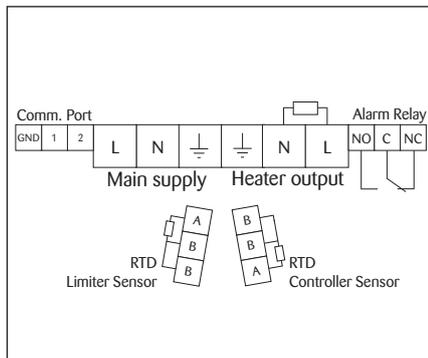


Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.

Insert two cables into expediter.

Note: For HPT and FP cable, exchange grommet in Terminator with grommet provided in PETK-3-ECM.

Wiring Details



Connection (1 or 2 Heating Cables)

Française

Terminator ECM-P-XP

Module de contrôle électronique

Procédure d'installation

Pour application de connexion (1 ou 2 câbles chauffants)

Avertissement...

- En raison du risque de choc électrique, d'arc électrique et d'incendie causés par des dommages au produit, à la mauvaise utilisation, ou à la mauvaise installation, un dispositif de protection à courant de défaut est nécessaire (disjoncteur différentiel).
- L'installation doit se conformer aux exigences Thermon (y compris la notice PN 50207U pour les installations Ex) et doit être réalisée en conformité avec les règlements, conformément à la norme EN CEI 60079-14 pour les zones dangereuses (le cas échéant), ou tout autre code national ou local.
- Les approbations des composants et les évaluations de performance sont basées uniquement sur l'utilisation des composants Thermon spécifiés.
- Couper l'alimentation de toutes les sources d'énergie avant d'ouvrir le boîtier.
- Pour éviter les charges électrostatiques. Nettoyez uniquement avec un chiffon humide.
- Garder les extrémités des câbles et les composants au sec avant et pendant l'installation.
- Le rayon de courbure minimum du câble de chauffage est de 32 mm (à l'exception des câbles HPT, rayon minimum 57 mm et des câbles FP rayon minimum 19 mm).
- Les personnes installant ces produits sont responsables pour la conformité avec toutes les normes applicables et les directives d'hygiène et de santé. Un équipement de protection individuelle (EPI) doivent être utilisés lors de l'installation. Contacter Thermon si vous avez des questions supplémentaires.

1. Localiser le bus de connexion (seulement pour câbles HPT et FP) comme indiqué. Coupez l'extrémité du câble en pointe pour aider à percer la bague d'étanchéité. Laisser une longueur de câble supplémentaire pour la lyre de dilatation. Voir page 5 les conseils d'installation pour la connexion de plusieurs câbles.
2. Passer la sonde du RTD par le joint (si applicable). Ne pas tirer depuis le côté de la sonde, pour passer l'ensemble dans le pied "expéditeur" de la boîte de jonction. Tirer la sonde depuis l'autre extrémité, soit la partie de câble.
3. Insérer le câble dans le pied "EXPEDITER" de la boîte de jonction. Si monté sur le bas ou sur le côté du tuyau, utiliser les trous pré formés de la boîte de jonction. Remarque: Pour les câbles HPT et FP, changer le joint par celui qui se trouve dans le kit du PETK-3.
4. Faites glisser le pied support vers le tuyau et passer le câble par la base du pied de la boîte de jonction.
5. Insérer le guide de cerclage dans le pied support et mettre en place.
6. Fixer le pied support sur le tuyau à l'aide du collier de fixation. Ne pas coincer le câble chauffant avec le collier.
7. Coupez l'extrémité du câble.
8. Terminer le câble à l'aide des kits de terminaison PETK appropriés. Reportez-vous aux instructions d'installation des PETK.
9. Repousser l'excédent de câble en arrière à travers le pied support. Faire avec ce câble, une lyre d'expansion sur le tuyau. Serrer le couvercle.
10. Fixer le pied support, la sonde RTD, et le câble au tuyau
11. Placer la base de la boîte de jonction sur le pied support. Veiller à aligner correctement les fentes de la base afin d'orienter le boîtier. Serrer l'écrou à l'aide de l'outil LN-TOOL. En cas de montage à l'horizontale les trous des presse étoupe doivent être orientés vers le bas.
12. Installer le presse étoupe M25 (commande séparée pour ce matériel) et le bouchon M25.
13. Installer le câble de puissance.
14. Installer le module de contrôle électronique, and tout le système de câbles associé. Les visser sur les borniers doivent être serrées suivant un couple de 1,4 Nm (12,4 lb-in). Voir page 5 pour le détail du câblage. Régler le module de contrôle et/ou le limiteur au point de consigne souhaité.
15. Utiliser les bouton tournant pour régler la température soit de contrôle soit du limiteur, Celsius ou Fahrenheit, auto ou manuel (Bouton de contrôle, position "C", Bouton limiteur position "L", "CL" pour les deux fonctions)
16. Positionner le couvercle sur la boîte et visser le manuellement. Glisser un tournevis dans les fentes situées sur la périphérie du boîtier pour effectuer une rotation de 30 degrés environ jusqu'au point de blocage
17. La sécurité de blocage est complètement engagée.. Pour ouvrir le boîtier répéter l'étape 16 mais dans l'autre sens de rotation.

Deutsch

Terminator ECM-P-XP

Elektronisches Regelmodul

INSTALLATIONSANWEISUNG

Für Temperatursteuerung/-anschluss (1 bis 2 Heizkabel)

Warnhinweise...

- Wegen der Risiken eines Stromschlags, eines Funkdurchschlags oder eines Feuers, die durch Produktbeschädigungen oder nicht sachgerechte Nutzung, Installation oder Wartung verursacht werden können, ist ein Fehlerstromschutzschalter erforderlich.
- Die Installation muss den Thermon-Vorgaben entsprechen (einschließlich der Richtlinie PN 50207U für Ex-Systeme) und muss in Übereinstimmung mit den Vorschriften gemäß der EN IEC 60079-14-Norm für Gefahrbereiche (gegebenenfalls) sowie entsprechend aller anderen anwendbaren nationalen und regionalen Vorgaben eingebaut werden.
- Zulassungen und Angaben techn. Eigenschaften, beziehen sich ausschließlich auf die Verwendung von Thermonspezifizierten Teilen.
- Vor dem Öffnen der Abdeckung müssen sämtliche Stromquellen abgeschaltet werden.
- Vermeiden Sie elektrostatische Aufladungen. Verwenden Sie zur Reinigung einen feuchten Lappen.
- Vor und während der Installation müssen die Enden der Heizkabel und Bausatzkomponenten trocken sein.
- Der Minimumbiegeradius der Heizkabel beträgt 32 mm (Ausnahmen: HPT - 57 mm und FP - 19 mm).
- Jeder, der diese Produkte installiert, ist für die Einhaltung aller anwendbaren Sicherheits- und Gesundheitsrichtlinien verantwortlich. Während des Einbaus sollte eine geeignete persönliche Schutzausrüstung (PSA) getragen werden. Falls Sie weitere Fragen haben, wenden Sie sich bitte an Thermon.

1. Lokalisieren Sie die "Busverbindung" (nur HPT und FP) wie auf der Zeichnung gezeigt. Schneiden Sie das Ende des Kabels schräg ab, um die Dichtung leichter durchstossen zu können. Lassen Sie zusätzliche Kabellänge für eine Ausdehnungsschleife.
2. Positionieren Sie den/die RTD-Sensor(en) (gegebenenfalls) in einer Dichtung. Ziehen Sie ihn nicht vom Sensorkopf wenn Sie ihn durch die Montagesäule schieben, ziehen Sie den Sensor am Anschlusskabel.
3. Führen Sie das Kabel in die Montagesäule ein. Stellen Sie sicher, dass die "Busverbindungen" (nur HPT und FP) außerhalb der Montagesäule sind. Hinweis: Für HPT und FP-Kabel tauschen Sie die Dichtung im Terminator durch die Dichtung des PETK-3-Sets aus.
4. Schieben Sie die Montagesäule in Richtung Rohr und führen Sie das Kabel durch die vorgesehene Öffnung im Unterteil heraus.
5. Spannbandführung in Säule einsetzen und darauf achten das diese eingerastet ist.
6. Montagesäule mittels Spannband auf der Rohrleitung befestigen.
7. Kabelende abschneiden.
8. Kabelendabschluss mit den passenden PETK-Komponenten erstellen. Halten Sie sich an die PETK-Installationsanweisungen.
9. Überschüssiges Kabel durch die Säule zurückschieben; Überwurfmutter fest anziehen; Heizkabelschleife am Rohr befestigen.
10. Befestigen Sie die Montagesäule, den RTD und das Kabel am Rohr.
11. Thermostateinsatz ausbauen und das Unterteil des Klemmkastens auf der Montagesäule befestigen. Dabei auf korrekte und richtige Ausrichtung der Rastung achten. Befestigungsmutter mit dem Terminator-LN-Schlüssel festziehen. Wenn die Einheit horizontal montiert werden soll, so ist darauf zu achten das die Verschraubungen nach unten zeigen.
12. Montieren Sie die M25 Verschraubung (separat zu bestellen) für das Netzkabel und die M25 Blindverschraubung.
13. Montieren Sie das Netzkabel.
14. Thermostateinsatz einsetzen und Verkabelung vervollständigen. Die Schrauben sollten mit einem Drehmoment von 1,4 Nm (12,4 lb-in) angezogen werden. Verdrahtungsbeispiele auf Seite 5. Regler/ Begrenzer auf gewünschte/erforderliche Temperaturen einstellen.
15. Verwenden Sie die Drehschalter, um die Regel- und Begrenzertemperatur einzustellen. Anzeige in Celsius oder Fahrenheit und automatische oder manuelle Rücksetzung (Kontrollschalter auf Typ "C", Begrenzungsschalter auf Typ "L" und für beide Optionen auf Typ "CL").
16. Verwenden Sie einen Schraubendreher, um den Deckel sicher zu verschliessen. Der Deckel wird sich um 30 Grad drehen. Den Deckel der Anschlussdose aufsetzen hand-fest zudrehen. Führen Sie einen Schraubendreher in die Schlitz seitlich der Anschlussdose ein.
17. Der Deckel ist nun vollständig verriegelt. Um den Deckel wieder zu entfernen, wiederholen Sie Schritt 16 in umgekehrter Reihenfolge.

Русский

Термостат ЕСМ-Р-ХР

Электронный модуль управления

ИНСТРУКЦИЯ ПО МОНТАЖУ

Для подключения (1-2 нагревательных кабелей)

Меры предосторожности...

- Во избежание риска поражения электрическим током, искрения и возгорания, вследствие повреждения или ненадлежащего применения, монтажа или эксплуатации продукта, требуется устройство защитного отключения (УЗО).
- Монтаж должен осуществляться в соответствии с требованиями компании Thermon и нормами EN IEC 60079-14 для взрывоопасных областей (если имеют место), либо другими местными нормами и правилами.
- Технические характеристики и сертификат на оборудование действительны только при использовании комплектующих, произведенных компанией Thermon.
- Отключите все источники питания перед тем, как открыть крышку.
- Избегайте образования статических зарядов. Вытирайте устройство только влажной тканью.
- Сохраняйте нагревательный кабель и другие компоненты сухими.
- Минимальный радиус изгиба кабеля составляет 32 мм (для HPT-57 мм и для FP -19мм).
- Специалисты, выполняющие монтаж данного продукта являются ответственными за соблюдение техники безопасности. Персонал должен быть обеспечен средствами индивидуальной защиты во время монтажа. За дополнительной информацией обращайтесь в Термон.

1. Определите место соединения жилы кабеля и нити нагревательного элемента (только HPT и FP) как показано на рисунке. Отрежьте конец кабеля под углом, чтобы облегчить прокладывание уплотняющей прокладки. Оставьте некоторое количество кабеля для компенсационной петли. См. стр. 5 с информацией по различным способам монтажа кабеля.
2. Расположите RTD Датчик(и) в изолирующей шайбе (если это возможно). Не тяните за конец датчика во время протягивания его через монтажную колонку начинается. Выньте датчик из свинцовой оболочки.
3. Закрепите кабель в монтажной колонке. Если монтаж производится на нижней части трубы, сделайте отверстие. Примечания: Для кабелей HPT и FP, замените уплотняющую прокладку в Terminator на имеющуюся в PEEK-3.
4. Прикрепите монтажную колонку к трубе и протяните нагревательный кабель через проделанное отверстие.
5. Закрепите направляющую часть в ножке и установите на место.
6. Временно закрепите монтажную колонку на трубе при помощи бандаж. Не накладывайте бандаж поверх нагревательного кабеля.
7. Отрежьте конец кабеля.
8. Заделайте конец кабеля с помощью соответствующего монтажного набора PEEK. См. инструкцию по монтажу PEEK.
9. Протяните лишний кабель. Плотно затяните резьбовую втулку. Зафиксируйте компенсационную петлю на трубе.
10. Зафиксируйте монтажную колонку, датчик RTD, и электропровод на трубе.
11. Установите соединительную коробку на колонку. Удостоверьтесь, что пазы расположены в соответствии с основанием соединительной коробки. Затяните гайку с помощью Terminator - LN - Tool. Если коробка монтируется горизонтально, сальники должны быть расположены по направлению к низу.
12. Установите сальник M25(заказывается отдельно) и заглушку M25.
13. Смонтируйте силовой кабель.
14. Установите термостат и закончите подсоединение проводов системы. Болты на клеммной колодке должны быть затянуты с усилием 1,4 Nm (12.4 фт.д.). Схему подсоединения проводов см. стр. 5. Установите модули электронного контроля и/или ограничителя контроля на желаемом значении.
15. Используйте поворотный переключатель для урегулирования контроля и ограничения температуры, Цельсиуса или Фаренгейта, и автоматического или ручного сброса. (Управляющий переключатель на типе "C", Ограничивающий переключатель на типах "L" и "CL")
16. При помощи отвертки затяните крышку соединительной коробки. Крышка должна повернуться на 30 градусов. Установите крышку соединительной коробки и закрутите вручную. Вставьте отвертку в пазы храповика, расположенные на боковой стороне основания соединительной коробки.
17. Крышка коробки полностью закрыта. Для снятия крышки повторите шаг 16 в обратном порядке.

Spanish

Terminator ECM-P-XP

Módulo Electrónico de Control

INSTRUCCIONES DE INSTALACIÓN

Para conexión a termostato (aplicaciones con 1 o 2 cables calefactores)

Advertencias...

- Debido al riesgo de descargas eléctricas, arcos eléctricos y fuego causados por daños en el producto o incorrecta manipulación, instalación o mantenimiento, se requiere proteger el circuito mediante un diferencial.
- La instalación debe cumplir con los requisitos de Thermon (incluyendo el estándar PN 50207U para sistemas Ex) y debe instalarse acorde a las regulaciones según la norma EN IEC 60079-14 para áreas clasificadas (cuando aplique), o cualquier otro código nacional o local aplicable.
- Las aprobaciones y rangos de rendimiento de los componentes se basan en el uso exclusivo de materiales Thermon.
- Desconecte todas las fuentes de alimentación antes de abrir la caja.
- Evite electricidad estática. Limpiar con un paño húmedo.
- Mantenga los extremos del cable calefactor y los componentes del kit secos antes y durante la instalación.
- El radio mínimo de curvatura del cable calefactor es 32 mm (excepto HPT que es 57 mm y FP que es 19 mm).
- El personal que instale estos productos es responsable de cumplir con todas las normas de seguridad e higiene. Equipos de Protección Individual (EPIs) deben usarse durante la instalación. Contacte con Thermon si tiene alguna duda.

1. Localice el nodo de conexión (solo para HPT y FP) y el cable como muestra la imagen. Corte el final del cable en ángulo para facilitar perforar el pasacables. Deje cable adicional para la coca de expansión. Vea página 5 para indicaciones de conexiones con varios cables.
2. Pase la(s) sonda(s) RTD en el pasacables (cuando aplique). Nunca tire del extremo de la sonda cuando la pase por el conjunto del Expediter; hágalo del extremo contrario, de los cables.
3. Inserte el cable en el Expediter. Si está montado en la parte inferior o en lateral de la tubería, perforo el agujero de drenaje con un punzón. Nota: para cables HPT y FP cambie el pasacables suministrado con el Terminator por el suministrado en el kit PETK-3.
4. Deslice el Expediter hacia la tubería guiando el cable a través de la base soporte.
5. Inserte la banda de fijación en el Expediter y colóquela en posición.
6. Fije el Expediter sobre la tubería mediante la banda de fijación. Tenga precaución de no poner la banda de fijación sobre el cable.
7. Corte el final del cable.
8. Realice la terminación del cable siguiendo las instrucciones del kit de terminación PETK correspondiente. Ver instrucciones de instalación del kit PETK.
9. Empuje el exceso de cable hacia el interior del Expediter. Rosque el anillo hasta que quede asegurado. Fije la coca de expansión del cable a la tubería mediante cinta.
10. Fije el Expediter, la sonda RTD y el cable a la tubería.
11. Monte la base de la caja de conexión sobre el Expediter. Asegúrese de alinear correctamente las guías para orientar correctamente la base de la caja.. Apriete la tuerca mediante la herramienta Terminator-LN-Tool. Si se monta en horizontal, los agujeros perforados en la tuerca deben quedar mirando hacia el suelo.
12. Instalar el prensaestopas M25 para cable de alimentación (pedir por separado) y el tapón ciego M25.
13. Conectar el cable de alimentación.
14. Instalar el termostato y el sistema completo de cableado. Los tornillos de apriete del terminal deben apretarse con un par de 1.4 Nm (12.4 lb-in). Ver página 5 para detalles de cableado. Ajuste los módulos de control y/o de control limitador al set point deseado.
15. Utilice los selectores rotativos para ajustar las temperaturas de control y limitador, grados Celsius o Fahrenheit, y reseteo automático o manual (interruptores de control en el Tipo "C", interruptores de limitador en el Tipo "L" y ambos en el Tipo "CL").
16. Use el destornillador, haciendo palanca ligeramente, para terminar de fijar la tapa de la caja de conexión. La tapa girará de este modo hasta 30 grados. Instale la tapa de la caja de conexión y apriete con la mano. Inserte un destornillador plano en las muescas laterales de la caja de conexión.
17. Con la tapa de la caja de conexión completamente fijada, para retirarla deberá seguir el paso 16 pero en orden inverso, girando en la dirección contraria haciendo palanca ligeramente con un destornillador plano en la dirección opuesta.

Nederlands

Terminator ECM-P-XP

Electronische Controle Module

Installatie Richtlijnen

Voor 1-2 parallel verwarmingskabels

Waarschuwingen...

- Thermon verwarmingssystemen moeten altijd geïnstalleerd worden met de correcte elektrische beveiligingen. Thermon adviseert altijd een installatie automaat/zekering met aardlekbeveiliging toe te passen.
- De installatie moet in zijn geheel voldoen aan de lokale voorschriften voor elektrische installaties (inclusief form PN 50207U voor Ex systemen) en aan de IEC 60079-14 bij gebruik in explosiegevaarlijke omgevingen.
- Component certificaten zijn gebaseerd op alleen gebruik van Thermon onderdelen.
- Schakel altijd eerst de spanning af, voordat de aansluitkast geopend wordt.
- Voorkom elektrostatische lading. Uitsluitend afnemen met behulp van een vochtige doek.
- Zorg dat zowel voor als tijdens de montage de open verwarmingskabel uiteinden en de set onderdelen droog zijn.
- De minimale buigradius van verwarmingskabel is 32 mm (behalve HPT deze is 57 mm en FP is 19mm).
- Personen die deze producten installeren zijn verantwoordelijk voor het in overeenstemming zijn met alle van veiligheids- en gezondheidsrichtlijnen die van toepassing zijn. De juiste persoonlijke beschermingsmiddelen (PPE) moeten tijdens het installatiewerk gedragen worden. Neem bij aanvullende vragen contact op met Thermon.

1. Bepaal het knooppunt in de verwarmingskabel (alleen voor HPT en FP) zoals aangegeven. Snij het einde van de kabel schuin af, om het doorsteken door het doorvoerrubber mogelijk te maken. Zorg dat er een extra lus in de kabel aanwezig is. Zie blad 5 voor tips met meerdere kabels.
2. Voer de RTD voeler(s) in het doorvoerrubber. Trek niet aan het uiteinde van de RTD voeler als deze door het doorvoerrubber in de opvoersok doorgevoerd wordt. Trek aan het draadgedeelte de voeler door.
3. Steek de kabel door het rubber en de opvoersok heen. Zorg ervoor dat de knooppunt in de verwarmingskabel (betreffende HPT and FP) zich buiten de voet bevinden. Let op: Voor HPT en FP dient het doorvoerrubber te worden vervangen door de grommet meegeleverd in de PETK-3.
4. Schuif de opvoersok naar de leiding en voer de verwarmingskabel door de daartoe dienende opening van de opvoersok.
5. Klik het bevestiging steuntje in de opvoersok.
6. Monteer de opvoersok op de leiding m.b.v. montageband. Zorg dat de montageband niet over de tracing kabel loopt.
7. Knip de tracing kabel 180 mm boven de opvoersok recht af.
8. Gebruik de installatie instructies van de desbetreffende PETK-set voor het maken van een voedingaansluiting of eindafsluiting van de verwarmingskabel.
9. Duw eventuele overlengte van de verwarmingskabel terug. Draai de moer vast aan. Monteer de lus in de verwarmingskabel vast op de pijp m.b.v. tape.
10. Monteer opvoersok, RTD en bedrading tegen de leiding.
11. Bevestig klemmenkast behuizing op de opvoersok. Controleer of de behuizing goed uitgelijnd is. Schroef de moer vast met de Terminator LN Sleutel. Bij horizontale bevestiging dienen de wartels zich aan de onderzijde te bevinden.
12. Installeer de M25 voedingswartel (separaat te bestellen) en M25 blindplug.
13. Installeer de voedingskabel.
14. Sluit alle draden op de desbetreffende aansluitklemmen aan, voor meer details zie blad 5. Draai de schroeven in de aansluitklemmen met een Moment van 1,4 Nm aan.
15. Gebruik de stelschroefjes om de regelaar en begrenzer temperatuur, Celcius of Fahrenheit en automatische of handmatige reset (regel stelschroefjes op Type "C", Begrenzer stelschroefjes Type "L" en beiden op Type "CL") in te stellen.
16. Steek een schroevendraaier aan de zijkant onder een deksellip in de opening van het bodemdeel. De deksel zal 30 graden verdraaien. Breng het deksel op het bodemdeel van de aansluitkast aan, en draai het deksel handmatig vast.
17. Om de deksel te verwijderen, moet stap 16 in omgekeerde volgorde uitgevoerd worden.



THERMON . . . The Heat Tracing Specialists®
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Specifications and information are subject to change without notice. Form PN50866U-1212

For Access To Installation Videos:



ISO 9001
REGISTERED

Terminator™ ECM-P-WP Electronic Control Module INSTALLATION PROCEDURES

For Connection (1-2 Heating Cables) Applications



The Heat Tracing Specialists®

Terminator™ ECM-P-WP

The following installation procedures are suggested guidelines for the installation of the Terminator ECM-P-WP Kit.

Kit Contents . . .



Item	Quantity	Description
1	1	Expediter Assembly Support Cap with O-Ring Threaded Grommet Compressor Grommet Support Base with O-Ring
2	1	Junction Box Lid
3	1	Junction Box Base with O-Ring
4	1	Nut
5	1	Banding
6	1	Electronic Control Module w/ Terminal Blocks (Refer to terminal specifications for maximum allowable wire size)
		ECM Type* C - Controller L - Limiter CL - Controller/Limiter * The maximum pipe exposure temperature is limited to 232°C
7	1	Junction Box Lid Cord
8	2	Blind Plug
9	1	Bracket
10	3	Screws
11	3	Washers

Order Separately . . .

PETK Power and End Termination Kits (per cable)

- PETK-1 for RSX, VSX, BSX
- PETK-2 for KSX, HTSX
- PETK-3-ECM for HPT, FP



Item	Quantity	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	2	Conductor Wire Pins
4	1	Braid Wire Pin
5	1	Ground Sleeve
6	1	End Cap
7	1	Tape Strip (PETK-3-ECM only)
8	1	Grommet (PETK-3-ECM only)
9	1	End Termination Caution Label

INSTALLATION PROCEDURES

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

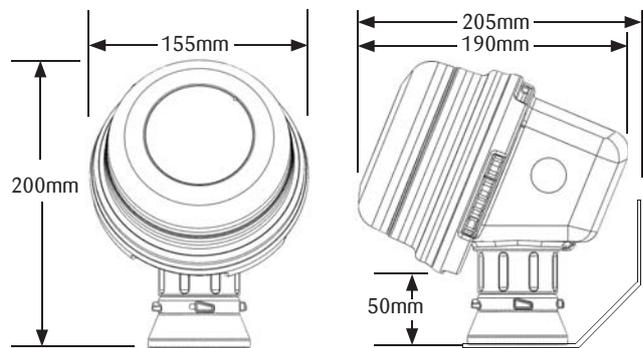
Order Separately . . .

IEK Insulation Entry Kit (per cable)

- IEK-SXL: for RSX, VSX,
- IEK-SXM for BSX
- IEK-SXS for KSX, HTSX
- IEK-HPT for HPT
- IEK-RTD for RTD Lead Wire



Dimensions . . .



Warnings . . .

- Due to the risk of electrical shock, arcing and fire caused by product damage or improper usage, installation or maintenance, a ground-fault protection device is required.
- Installation must comply with Thermon requirements (including form PN 50273U for Ex systems) and be installed in accordance with the regulations as per the norm EN IEC 60079-14 for hazardous areas (where applicable), or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.
- Minimum bending radius of heating cable is 32 mm (except HPT is 57 mm and FP is 19 mm).
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

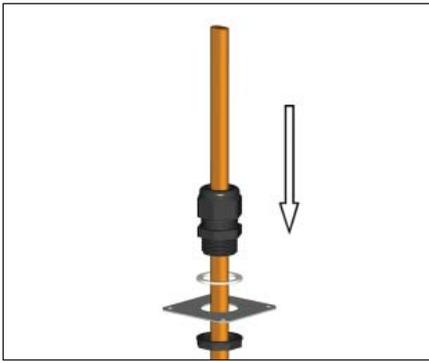
Tools Required . . .



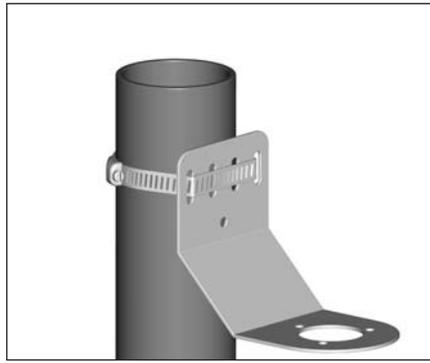
Certifications/Approvals . . .

CE Ex II 2 (2) G Ex eb mb [ib] IIC T4, Ex tb IIIC T135°C SIRA 12ATEX5239X
II 2 (2) D Ex tb IIIC T135°C IP66 Db

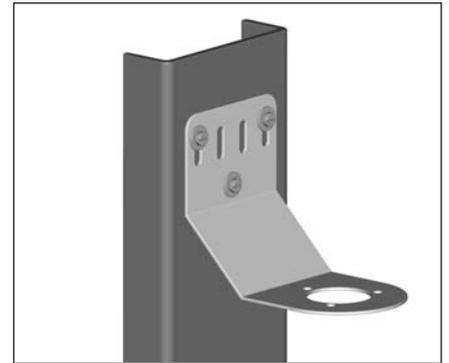
IEC TEGEx International Electrotechnical Commission
IEC Certification Scheme for Explosive Atmospheres
SIR 12.0103X



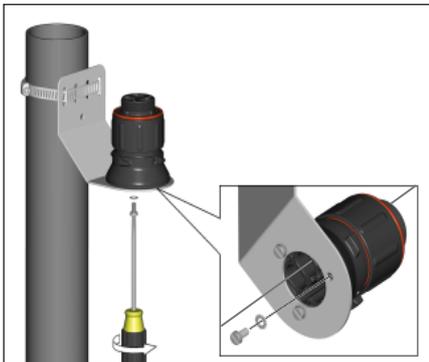
1. Slide appropriate IEK insulation entry kit components onto cable.



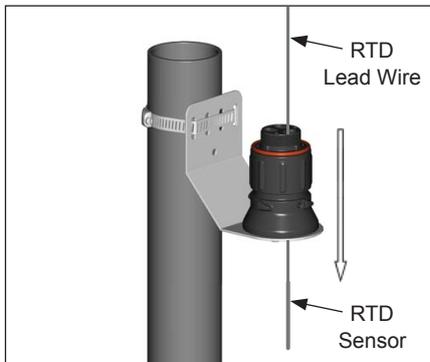
2a. Mounting Method 1: Secure wall mount bracket to mounting surface using pipe band provided with kits.



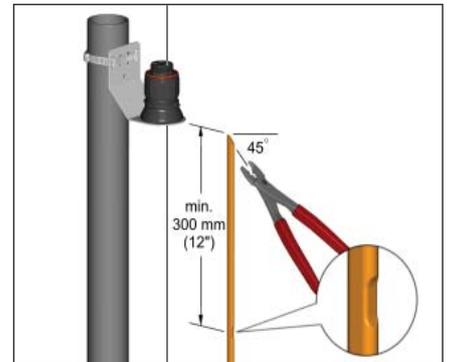
2b. Mounting Method 2: Secure wall mount bracket to mounting surface using customer supplied screws, flat washers, and nuts.



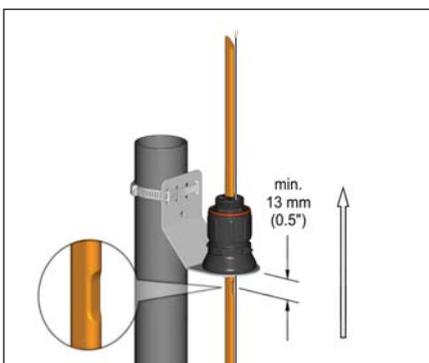
3. Mount expeditor to bracket using M5 x 8mm screws and M5 lock washers.



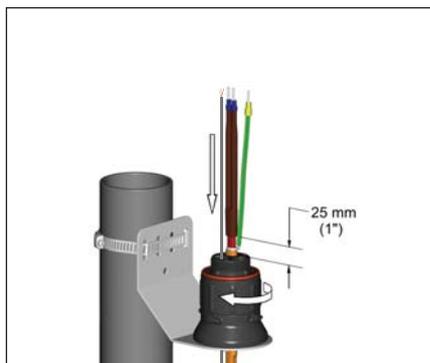
4. Position RTD Sensor(s) in grommet. Do not pull from the sensor end when routing through the expeditor assembly. Pull sensor from the lead wire portion.



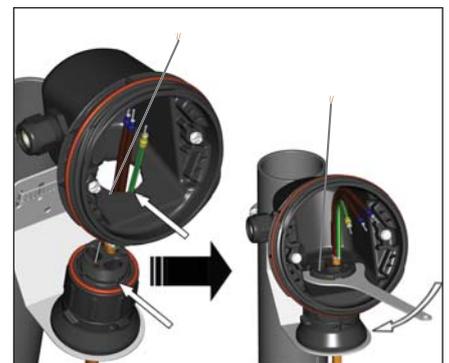
5. Locate bus connection (HPT and FP only) as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion as needed.



6. Insert cable into expeditor. Make sure bus connection (HPT and FP only) remains outside of expeditor.
Note: For HPT and FP cable, exchange grommet in Terminator with grommet provided in PETK-3-ECM.

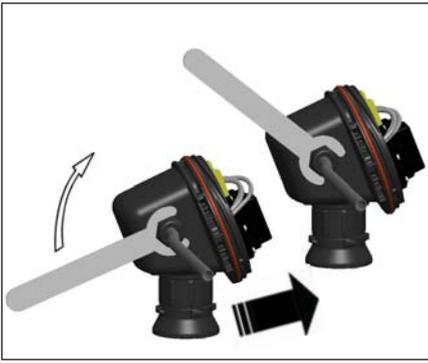


7. Terminate cable with appropriate PETK termination kit. Refer to PETK installation instructions. Push excess cable back through expeditor. Tighten cap securely. Tape cable expansion loop to pipe.

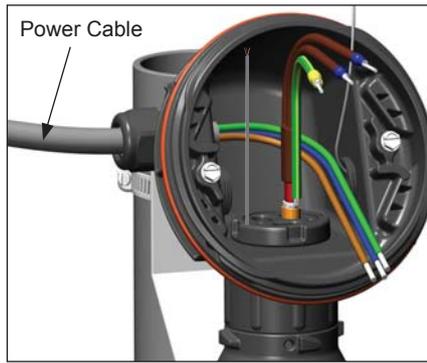


8. Mount junction box base on expeditor. Make sure to align slots to properly orient junction box base. Tighten nut with Terminator-LN-Tool. If mounting horizontally, threaded gland holes must face downward.





9. Install M25 power gland (order separately) and M25 blind plug.



10. Install power cable.



11. Install electronic control module and complete system wiring. Terminal set screws shall be tightened to a torque value of 1,4 Nm (12,4 lb-in). See wiring details. Set modules electronic control and/or control limiter at desired setpoints.



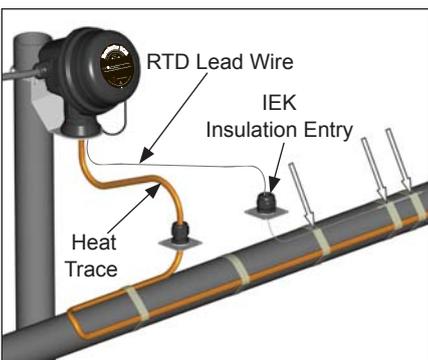
12. Use the rotary switches for settling Control and Limit Temperature, (Celsius or Fahrenheit) and Auto or Manual reset (Control switches on Type "C", Limiter switches on Type "L" and both on Type "CL").



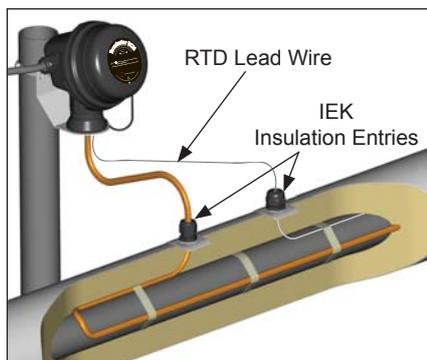
13. Install junction box lid and twist hand tight. Insert screwdriver into ratchet slots located on side of junction box base.



14. Use screwdriver to ratchet on junction box lid. Lid will rotate 30 degrees. To remove lid, repeat steps 13 and 14 but in the opposite direction.

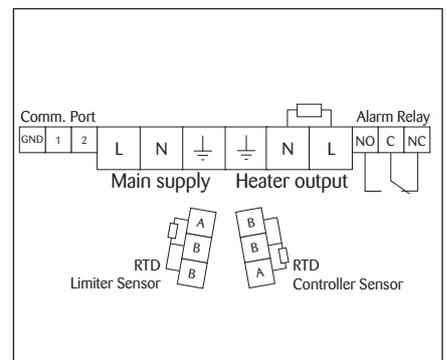


15. Slide IEK insulation entry kit onto RTD lead wire. Fix RTD lead wire and sensor to pipe.



16. Install IEK insulation entry kit to seal heating cable and RTD lead wire penetrations through insulation cladding.

Wiring Details



Connection (1 or 2 Heating Cables)

Française

Terminator ECM-P-WP

Module de contrôle électronique

Procédures d'installation

Pour application de connexion (1 ou 2 câbles chauffants)

Avertissement...

- En raison du risque de choc électrique, d'arc électrique et d'incendie causés par des dommages au produit, à la mauvaise utilisation, ou à la mauvaise installation, un dispositif de protection à courant de défaut est nécessaire (disjoncteur différentiel).
- L'installation doit se conformer aux exigences Thermon (y compris la notice PN 50207U pour les installations Ex) et doit être réalisée en conformité avec les règlements, conformément à la norme EN CEI 60079-14 pour les zones dangereuses (le cas échéant), ou tout autre code national ou local.
- Les approbations des composants et les évaluations de performance sont basées uniquement sur l'utilisation des composants Thermon spécifiés.
- Couper l'alimentation de toutes les sources d'énergie avant d'ouvrir le boîtier.
- Pour éviter les charges électrostatiques. Nettoyez uniquement avec un chiffon humide.
- Garder les extrémités des câbles et les composants au sec avant et pendant l'installation.
- Le rayon de courbure minimum du câble de chauffage est de 32 mm (à l'exception des câbles HPT, rayon minimum 57 mm et des câbles FP rayon minimum 19 mm).
- Les personnes installant ces produits sont responsables pour la conformité avec toutes les normes applicables et les directives d'hygiène et de santé. Un équipement de protection individuelle (EPI) doivent être utilisé lors de l'installation. Contacter Thermon si vous avez des questions supplémentaires.

1. Faire glisser le kit d'entrée de calorifuge IEK, approprié sur le câble chauffant.
- 2a. Méthode de montage 1: Fixer le support mural sur la surface de montage (tuyauterie) à l'aide des colliers fournis dans le kit.
- 2b. Méthode de montage 2: Fixez le support mural sur la surface de montage à l'aide de vis, écrous et rondelles plates de votre fourniture.
3. Montez le pied EXPEDITER sur le support en utilisant des vis M5 x 8 mm et des rondelles autobloquantes M5.
4. Passez la sonde du RTD par le joint (si applicable). Ne pas tirer depuis le côté de la sonde, pour passer l'ensemble dans le pied "expediter" de la boîte de jonction. Tirez la sonde depuis l'autre extrémité, soit la partie de câble.
5. Localisez le bus de connexion (seulement pour câbles HPT et FP) comme indiqué. Coupez l'extrémité du câble en pointe pour aider à percer la bague d'étanchéité. Laissez une longueur de câble supplémentaire pour la lyre de dilatation.
6. Insérez le câble dans l'EXPEDITER. Assurez-vous que le bus de connexion (pour HPT et FP seulement) est situé à l'extérieur de l'EXPEDITER Remarque: Pour les câbles HPT et FP, changez la bague garniture par la bague prévue dans le PE. Insérez le câble dans Expeditor. Assurez-vous que le bus connexion (HPT et FP seulement) reste en dehors de l' Expediter.
7. Terminez le câble à l'aide des kits de terminaison PETK appropriés. Reportez-vous aux instructions d'installation des PETK. Repoussez l'excédent de câble en arrière à travers l'EXPEDITER. Faire avec ce câble, une lyre d'expansion sur le tuyau. Serrez le couvercle.
8. Montez la base support sur l'EXPEDITER. Veillez à aligner correctement les guides d'orientation du boîtier. Serrez l'écrou à l'aide de l'outil LN-TOOL. Si le boîtier est monté horizontalement, placez les presses étoupe vers le bas.
9. Installez le presse-étoupe M25 (à commander séparément) et le bouchon M25. Installez le câble d'alimentation électrique
10. Installer le câble de puissance.
11. Installez le module de contrôle et les branchements électriques. Les bornes seront à serrer à un couple de 1,4 Nm (12,4 lb-in). Voir les schémas de câblage. Réglez les modules du contrôleur et/ou limiteur au point de consigne désiré.
12. Utilisez les boutons tournants pour régler la température soit de contrôlesoit du limiteur, Celsius ou Fahrenheit, auto ou manuel (Bouton de contrôle, position "C", Bouton limiteur position "L", "CL" pour les deux fonctions)
13. Installez le couvercle du boîtier en le serrant à la main. Insérez un tournevis dans les fentes situées sur la périphérie de la base du boîtier.
14. Utilisez un tournevis pour serrer le couvercle du boîtier. Le couvercle doit tourner de 30 degrés. Pour supprimer le verrouillage du couvercle, répétez les étapes 13 et 14, mais dans le sens opposé.
15. Passez le kit d'entrée de calorifuge IEK à travers le fil de connexion. Fixer les fils de connexion et la sonde sur le tuyau.
16. Installer le kit d'entrée de calorifuge IEK pour fixer le point de pénétration du ruban chauffant au niveau de la tôle de protection du calorifuge.

Deutsch

Terminator ECM-P-WP

Elektronisches Regelmodul

INSTALLATIONSANWEISUNG

Für Temperaturregelung/-anschluss (1 bis 2 Heizkabel)

Warnhinweise...

- Wegen der Risiken eines Stromschlags, eines Funkendurchschlags oder eines Feuers, die durch Produktbeschädigungen oder nicht sachgerechte Nutzung, Installation oder Wartung verursacht werden können, ist ein Fehlerstromschutzschalter erforderlich.
- Die Installation muss den Thermon-Vorgaben entsprechen (einschließlich der Richtlinie PN 50207U für Ex-Systeme) und muss in Übereinstimmung mit den Vorschriften gemäß der EN IEC 60079-14-Norm für Gefahrbereiche (gegebenenfalls) sowie entsprechend aller anderen anwendbaren nationalen und regionalen Vorgaben eingebaut werden.
- Zulassungen und Angaben techn. Eigenschaften, beziehen sich ausschließlich auf die Verwendung von Thermonspezifizierten Teilen.
- Vor dem Öffnen der Abdeckung müssen sämtliche Stromquellen abgeschaltet werden.
- Vermeiden Sie elektrostatische Aufladungen. Verwenden Sie zur Reinigung einen feuchten Lappen.
- Vor und während der Installation müssen die Enden der Heizkabel und Bausatzkomponenten trocken sein.
- Der Minimumbiegeradius der Heizkabel beträgt 32 mm (Ausnahmen: HPT - 57 mm und FP - 19 mm).
- Jeder, der diese Produkte installiert, ist für die Einhaltung aller anwendbaren Sicherheits- und Gesundheitsrichtlinien verantwortlich. Während des Einbaus sollte eine geeignete persönliche Schutzausrüstung (PSA) getragen werden. Falls Sie weitere Fragen haben, wenden Sie sich bitte an Thermon.

1. Schieben Sie die passenden Komponenten der IEK-Isolierdurchführung über das Kabel.
- 2a. Befestigungsmethode 1: Montieren Sie das Wandbefestigungsblech an geeigneter Stelle mit Hilfe des mitgelieferten Spannbandes.
- 2b. Befestigungsmethode 2: Montieren Sie das Wandbefestigungsblech an geeigneter Stelle unter Verwendung von Schrauben, Unterlegscheiben und Muttern (bauseits).
3. Befestigen Sie die Montagesäule mit M5 x 8 mm-Schrauben & Sicherungsfedern am Befestigungswinkel.
4. Positionieren Sie den/die RTD-Sensor(en) (gegebenenfalls) in der Dichtung. Ziehen Sie ihn nicht am Sensorkopf wenn Sie ihn durch die Montagesäule schieben, ziehen Sie den Sensor am Anschlusskabel.
5. Lokalisieren Sie die "Busverbindung" (nur HPT und FP) wie auf der Zeichnung gezeigt. Schneiden Sie das Ende des Kabels schräg ab, um die Dichtung leichter durchstossen zu können. Lassen Sie zusätzliche Kabellänge für eine Ausdehnungsschleife übrig.
6. Führen Sie das Kabel in die Montagesäule ein. Stellen Sie sicher, dass die "Busverbindungen" (nur HPT und FP) außerhalb der Montagesäule sind. Hinweis: Für HPT und FP-Kabel tauschen Sie die Dichtung im Terminator durch die Dichtung des PETK-3-Sets aus.
7. Kabelendabschluss mit den passenden PETK-Komponenten erstellen. Halten Sie sich an die PETK-Installationsanweisungen. Überschüssiges Kabel durch die Säule zurückschieben; Überwurfmutter fest anziehen; Heizkabelschleife am Rohr befestigen.
8. Thermostateinsatz entfernen und Unterteil des Klemmkasten auf Montagesäule befestigen. Dabei auf korrekte und richtige Ausrichtung der Rastung achten. Befestigungsmutter mit dem Terminator-LN-Schlüssel festziehen. Wenn die Einheit horizontal montiert werden sollen, so ist darauf zu achten das die Verschraubungsbohrungen nach unten zeigen.
9. Installieren Sie die M25-Stromanschlüsse (separat bestellen) und den M25-Blindstopfen.
10. Montieren Sie das Netzkabel.
11. Thermostateinsatz einsetzen und Verkabelung vervollständigen. Die Schrauben sollten mit einem Drehmoment von 1,4 Nm (12,4 lb-in) angezogen werden. Siehe Verdrahtungsbeispiel. Regler/Begrenzer auf gewünschte/erforderliche Temperaturen einstellen.
12. Verwenden Sie die Drehschalter, um die Regel- und Begrenzertemperatur einzustellen. Anzeige in Celsius oder Fahrenheit und automatische oder manuelle Rücksetzung (Kontrollschalter auf Typ "C", Begrenzungsschalter auf Typ "L" und für beide Optionen auf Typ "CL".
13. Den Deckel der Anschlussdose aufsetzen hand-fest zudrehen. Führen Sie einen Schraubendreher in die Schlitzseite der Anschlussdose ein.
14. Verwenden Sie einen Schraubendreher, um den Deckel sicher zu verschliessen. Der Deckel wird sich um 30 Grad drehen. Zum entfernen des Deckels, wiederholen Sie die Schritte 13 und 14, allerdings in umgekehrter Reihenfolge.
15. IEK Isolierdurchführung über Anschlussleitung RTD/RTD's schieben. Anschlussleitung und Sensor auf der Rohrleitung befestigen.
16. Montieren Sie das IEK Isolierkit um die Heizkabeldurchführung im Isolationsgehäuse abzudichten.

Русский

Термостат ECM-P-WP

Электронный модуль управления

ИНСТРУКЦИЯ ПО МОНТАЖУ

Для подключения (1-2 нагревательных кабелей)

Меры предосторожности...

- Во избежание риска поражения электрическим током, искрения и возгорания, вследствие повреждения или ненадлежащего применения, монтажа или эксплуатации продукта, требуется устройство защитного отключения (УЗО).
- Монтаж должен осуществляться в соответствии с требованиями компании Thermon и нормами EN IEC 60079-14 для взрывоопасных областей (если имеют место), либо другими местными нормами и правилами.
- Технические характеристики и сертификат на оборудование действительны только при использовании комплектующих, произведенных компанией Thermon.
- Отключите все источники питания перед тем, как открыть крышку.
- Избегайте образования статических зарядов. Вытирайте устройство только влажной тканью.
- Сохраняйте нагревательный кабель и другие компоненты сухими.
- Минимальный радиус изгиба кабеля составляет 32 мм (для HPT-57 мм и для FP -19мм).
- Специалисты, выполняющие монтаж данного продукта являются ответственными за соблюдение техники безопасности. Персонал должен быть обеспечен средствами индивидуальной защиты во время монтажа. За дополнительной информацией обращайтесь в Термон.

1. Используйте необходимый набор для прохода через теплоизоляцию.
- 2a. 1-й - способ монтажа. Закрепите настенный монтажный кронштейн на монтируемой поверхности при помощи банджа.
- 2b. 2-й - способ монтажа. Закрепите настенный монтажный кронштейн на монтируемой поверхности с помощью болтов, плоских шайб и гаек.
3. Закрепите колонку на кронштейне с помощью болтов M5 и стопорных шайб.
4. Протяните датчик RTD через уплотнительную втулку, не оказывая давления на датчик.
5. Определите место соединения жилы кабеля и нити нагревательного элемента (только HPT и FP) как показано на рисунке. Отрежьте конец кабеля под углом, чтобы облегчить прокалывание уплотняющей прокладки. Оставьте некоторое количество кабеля для компенсационной петли.
6. Поместите кабель в колонку и проденьте его. Примечание: Для кабелей типа HPT и FP, замените втулку из комплекта Terminator на втулку из набора PETK-3-ECM.
7. Заделайте конец кабеля с помощью монтажного набора PETK. См. инструкцию по монтажу PETK. Протяните лишний кабель обратно через колонку. Плотнo затяните резьбовую втулку.
8. Установите соединительную коробку на колонку. Удостоверьтесь, что пазы расположены в соответствии с основанием соединительной коробки. Затяните гайку с помощью Terminator - LN - Tool. Если коробка монтируется горизонтально, сальники должны быть расположены по направлению к низу.
9. Установите сальник M25 (заказывается отдельно) и заглушку. Установите силовой кабель.
10. Смонтируйте силовой кабель.
11. Установите электронный модуль управления и выполните систему подключения. Болты на клеммной колодке должны быть затянуты с усилием 1,4 Nm (12.4 фт.д.). Осмотрите детали проводки. Настройте электронный модуль управления/или ограничитель на заданные температурные уставки.
12. Используйте переключатели для настройки Контроля/ограничения температуры и выбора единиц измерения (Цельсий и Фаренгейт), для сброса настроек в режиме Авто, либо вручную.
13. Установите крышку соединительной коробки закрутите вручную. Вставьте отвертку в пазы храповика, расположенные на боковой стороне основания соединительной коробки.
14. При помощи отвертки затяните крышку соединительной коробки. Крышка должна повернуться на 30 градусов. Для снятия крышки повторите шаги 13-14, но в обратную сторону.
15. Используйте IEK набор для прохода через теплоизоляцию для провода датчика RTD .
16. Установите комплект для уплотнения прохода греющего кабеля через теплоизоляцию.

Spanish

Terminator ECM-P-WP

Módulo Electrónico de Control

INSTRUCCIONES DE INSTALACIÓN

Para conexión a termostato (aplicaciones con 1 o 2 cables calefactores)

Advertencias...

- Debido al riesgo de descargas eléctricas, arcos eléctricos y fuego causados por daños en el producto o incorrecta manipulación, instalación o mantenimiento, se requiere proteger el circuito mediante un diferencial.
- La instalación debe cumplir con los requisitos de Thermon (incluyendo el estándar PN 50207U para sistemas Ex) y debe instalarse acorde a las regulaciones según la norma EN IEC 60079-14 para áreas clasificadas (cuando aplique), o cualquier otro código nacional o local aplicable.
- Las aprobaciones y rangos de rendimiento de los componentes se basan en el uso exclusivo de materiales Thermon.
- Desconecte todas las fuentes de alimentación antes de abrir la caja.
- Evite electricidad estática. Limpiar con un paño húmedo.
- Mantenga los extremos del cable calefactor y los componentes del kit secos antes y durante la instalación.
- El radio mínimo de curvatura del cable calefactor es 32 mm (excepto HPT que es 57 mm y FP que es 19 mm).
- El personal que instale estos productos es responsable de cumplir con todas las normas de seguridad e higiene. Equipos de Protección Individual (EPIs) deben usarse durante la instalación. Contacte con Thermon si tiene alguna duda.

1. Deslice el kit de entrada en calorifugado IEK apropiado por el cable.
- 2a. Modo de montaje 1: fije el soporte sobre la superficie empleando la banda de fijación suministrada con los kits.
- 2b. Modo de montaje 2: fije el soporte sobre la superficie utilizando los tornillos, arandelas y tuercas suministrados por el cliente.
3. Monte el Expediter sobre el soporte utilizando los tornillos M5 x 8mm y las arandelas M5.
4. Pase la(s) sonda(s) RTD en el pasacables (cuando aplique). Nunca tire del extremo de la sonda cuando la pase por el conjunto del Expediter; hágalo del extremo contrario, de los cables.
5. Localice el nodo de conexión (solo para HPT y FP) y el cable como muestra la imagen. Corte el final del cable en ángulo para facilitar perforar el pasacables. Deje cable adicional para la coca de expansión.
6. Inserte el cable en el Expediter. Asegúrese que el nodo de conexión queda fuera del Expediter (solo para cables HPT y FP). Nota: para cables HPT y FP cambie el pasacables suministrado con el Terminator por el pasacables suministrado en el kit PETK-3.
7. Realice la terminación del cable siguiendo las instrucciones del kit de terminación PETK correspondiente. Ver instrucciones de instalación del kit PETK. 8. Empuje el exceso de cable hacia el interior del Expediter. Rosque el anillo hasta que quede asegurado. Fije la coca de expansión del cable a la tubería mediante cinta.
8. Monte la base de la caja de conexión sobre el Expediter. Asegúrese de alinear correctamente las guías para orientar correctamente la base de la caja.. Apriete la tuerca mediante la herramienta Terminator-LN-Tool. Si se monta en horizontal, los agujeros perforados en la tuerca deben quedar mirando hacia el suelo.
9. Instalar el prensaestopas M25 para cable de alimentación (pedir por separado) y el tapón ciego M25. Instalar el cable de alimentación.
10. Conectar el cable de alimentación.
11. Instale el módulo electrónico de control y el cableado completo del sistema. Los tornillos de apriete del terminal deben apretarse con un par de 1.4 Nm (12.4 lb-in). Ver detalles de cableado. Ajuste los set points deseados en el módulo de control y/o control limitador.
12. Utilice los selectores rotativos para ajustar las temperaturas de control y limitador, grados Celsius o Fahrenheit, y reseteo automático o manual (interruptores de control en el Tipo "C", interruptores de limitador en el Tipo "L" y ambos en el Tipo "CL").
13. Instale la tapa de la caja de conexión y apriete con la mano. Inserte un destornillador plano en las muescas laterales de la caja de conexión.
14. Use el destornillador, haciendo palanca ligeramente, para terminar de fijar la tapa de la caja de conexión. La tapa girará de este modo hasta 30 grados. Para retirarla deberá seguir los pasos 13 y 14 pero en orden inverso, girando en la dirección contraria haciendo palanca ligeramente con un destornillador plano en la dirección opuesta.
15. Deslice el kit de entrada a calorifugado IEK por el cable principal del sensor RTD. Fije el sensor RTD y su cable principal a la tubería.
16. Instalar el kit de entrada en calorifugado IEK para sellar la entrada del cable calefactor en el calorifugado.

Nederlands

Terminator ECM-P-WP

Electronische Controle Module

Installatie Richtlijnen

Voor 1-2 parallel verwarmingskabels

Waarschuwingen...

- Thermon verwarmingssystemen moeten altijd geïnstalleerd worden met de correcte elektrische beveiligingen. Thermon adviseert altijd een installatie automaat/zekering met aardlekbeveiliging toe te passen.
- De installatie moet in zijn geheel voldoen aan de lokale voorschriften voor elektrische installaties (inclusief form PN 50207U voor Ex systemen) en aan de IEC 60079-14 bij gebruik in explosiegevaarlijke omgevingen.
- Component certificaten zijn gebaseerd op alleen gebruik van Thermon onderdelen.
- Schakel altijd eerst de spanning af, voordat de aansluitkast geopend wordt.
- Voorkom elektrostatische lading. Uitsluitend afnemen met behulp van een vochtige doek.
- Zorg dat zowel voor als tijdens de montage de open verwarmingskabel uiteinden en de set onderdelen droog zijn.
- De minimale buigradius van verwarmingskabel is 32 mm (behalve HPT deze is 57 mm en FP is 19mm).
- Personen die deze producten installeren zijn verantwoordelijk voor het in overeenstemming zijn met alle van veiligheids- en gezondheidsrichtlijnen die van toepassing zijn. De juiste persoonlijke beschermingsmiddelen (PPE) moeten tijdens het installatiewerk gedragen worden. Neem bij aanvullende vragen contact op met Thermon.

1. Schuif de desbetreffende isolatie doorvoerset (IEK) onderdelen over de kabel.
- 2a. Montage methode 1: Monteer de montagesteun stevig op een ongeïsoleerde leiding of steun pijp m.b.v. de meegeleverde montageband.
- 2b. Montage methode 2: Monteer de montagesteun stevig tegen een vlak deel m.b.v. schroeven, ringen en moeren (niet in deze set aanwezig).
3. Monteer de opvoersok op de bovenzijde van de montagesteun m.b.v. M5 x 8 mm schroeven en veerringen.
4. Voer de RTD voeler(s) in de grommet. Trek niet aan het uiteinde van de RTD voeler als deze door de grommet in de opvoersok doorgevoerd wordt. Trek aan het draadgedeelte de voeler door.
5. Bepaal het knooppunt in de verwarmingskabel (alleen voor HPT en FP) zoals aangegeven. Snij het einde van de kabel schuin af om het doorsteken door het doorvoerrubber mogelijk te maken. Zorg dat er een extra lus in de kabel aanwezig is.
6. Steek de kabel door het rubber en de opvoersok heen. Zorg ervoor dat de knooppunt in de verwarmingskabel (betreffende HPT and FP) buiten de voet blijft. Let op: Voor HPT en FP dient het doorvoerrubber te worden vervangen door de meegeleverde grommet in de PETK-3.
7. Sluit de kabel aan met de correcte PETK aansluitset. Verwijzing naar PETK installatie instructies. Duw eventuele overlengte van de verwarmingskabel terug. Draai de moer vast aan. Monteer de extra lus in de kabel op de pijp.
8. Monteer het bodemdeel van de aansluitkast op de opvoersok, zorg dat de O-ring op de opvoersok aanwezig is. De vergrendelknoppen en uitsparingen in de opvoersok en het bodemdeel moeten overeenkomen. Draai de moer op de nippel, en draai deze vast m.b.v. LN montage sleutel. Zorg dat de wartels niet inwaterend zijn.
9. Monteer de M25 voedingswartel (apart te bestellen) en M25 blind plug. Monteer voedingskabel.
10. Installeer de voedingskabel.
11. Monteer electronische controle module en de bedrading van het systeem. Draai de schroeven in de aansluitklemmen met een Moment van 1,4 Nm aan. Zie bedradingsschema. Stel de electronische regelaar en/of regelaar begrenzer in op de gewenste temperatuur.
12. Gebruik de draaischakelaars om de regelaar en begrenzer temperatuur, Celcius of Fahrenheit en automatische of handmatige reset (regel schakelaars op Type "C", Begrenzer schakelaars Type "L" en beiden op Type "CL").
13. Breng het deksel op het bodemdeel van de aansluitkast aan en draai het deksel handmatig vast. Steek een schroevendraaier aan de zijkant onder een deksellip in de opening van het bodemdeel.
14. Draai het deksel tot aan de aanslag dicht m.b.v. de schroevendraaier. Het deksel zal 30 graden verdraaien. Om het deksel te verwijderen moeten de stappen 13 en 14 in omgekeerde volgorde uitgevoerd worden.
15. Schuif de IEK isolatie doorvoerset over de RTD draad. Bevestig RTD draad en voeler tegen de leiding.
16. Installeer de IEK isolatie doorvoerset om de verwarmingskabel door de isolatie beplating te kunnen doorvoeren.



ISO 9001
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For Access To Installation Videos:



Specifications and information are subject to change without notice. Form PN50867U-1212

Tab

9

9

Tab

Terminator™ ZE-B Beacon

LED End of Circuit Light Kit

INSTALLATION PROCEDURES



The Heat Tracing Specialists®

Terminator™ ZE-B Beacon

INSTALLATION PROCEDURES

Receiving, Storing and Handling . . .

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

Kit Contents . . .



Item	Quantity	Description
1	1	Expediter Assembly Grommet Compressor Grommet Support Base with O-Ring
2	1	Light Module Cover
3	1	Banding Guide
4	1	Banding
5	1	LED Light Module

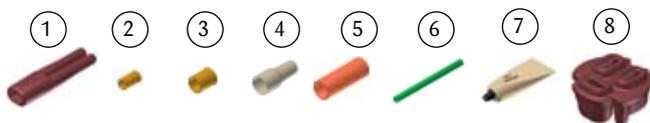
Order Separately . . .

SCTK Connection Termination Kits (per cable)

SCTK-1 for BSX, RSX, VSX

SCTK-2 for KSX, HTSX,

SCTK-3 for FP, HPT



Item	Quantity	Description
1	3	Splice Connection Boots
2	2	Small Crimps
3	1	Large Crimp
4	2	Small Crimp Insulators
5	2	Silicone Caps
6	3	Ground Sleeves (not used with ZE-B Kits)
7	1	RTV Tube
8	1	GRW-G (FP and HPT only)

Dimensions . . .



Installation Precautions . . .

- To minimize the potential for arcing and fire caused by product damage or improper installation use ground-fault protection.
- Installation must comply with Thermon requirements and be installed in accordance with the applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Avoid electrostatic charge. Clean only with a damp cloth.
- Keep ends of heating cable and kit components dry before and during installation.

Certifications/Approvals . . .

IP66 -60°C ≤ Ta ≤ +45°C

Ordinary & Hazardous Locations

IECEX FMG 10.0022X Ex eb mb IIC T6, Ex tb IIIC T85°C

CE 1725 Ex II 2 GD Ex eb mb IIC T6, Ex tb IIIC T85°C, FM 10ATEX0058X

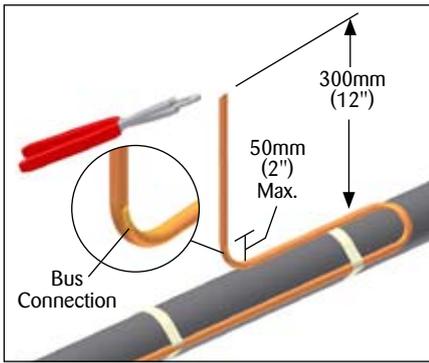
Tools Required . . .



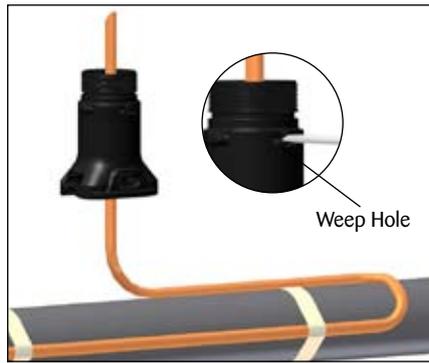
Note: Crimp Tool - Ideal 30-429 or factory approved alternate.



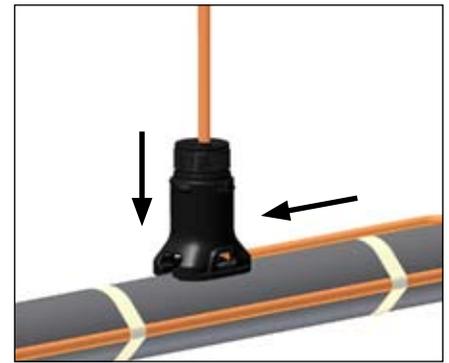
The Heat Tracing Specialists®



1. Locate bus connection (HPT and FP only) and cable as shown. Cut end of cable at angle to aid in piercing grommet. Leave additional cable for expansion loop.



2. Insert cable into expediter. If mounted on bottom of pipe, punch out weep hole.



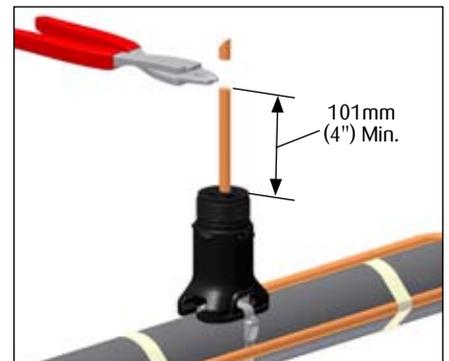
3. Slide expediter toward pipe and route cable through support base entry.



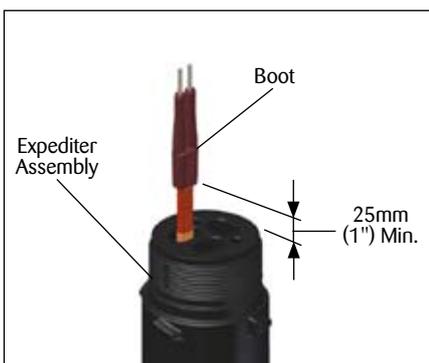
4. Insert banding guide into expediter and snap into place.



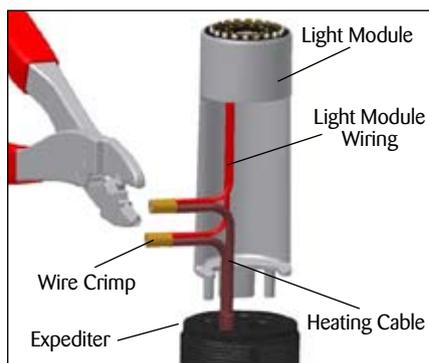
5. Mount expediter to pipe using pipe band. Do not band over cable.



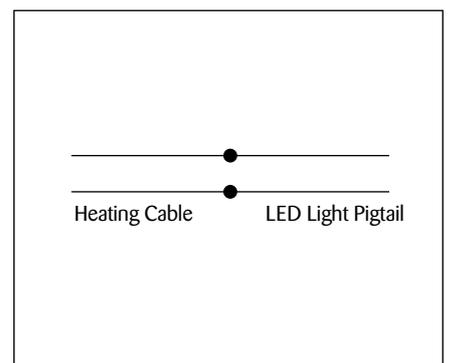
6. Cut off end of cable.



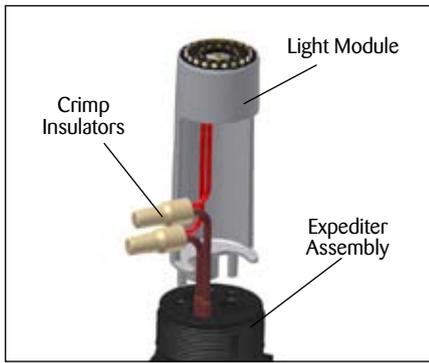
7. Terminate cable with appropriate SCKT termination kit. Refer to SCKT installation instructions. Push excess cable back through expediter. Remove braid pigtail. Tape cable expansion loop to pipe.



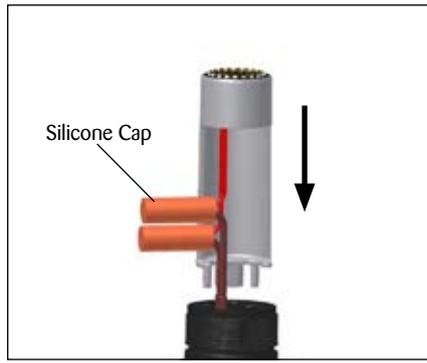
8. Connect heating cable to light module wires using small crimps. Discard large crimp. See wiring details.



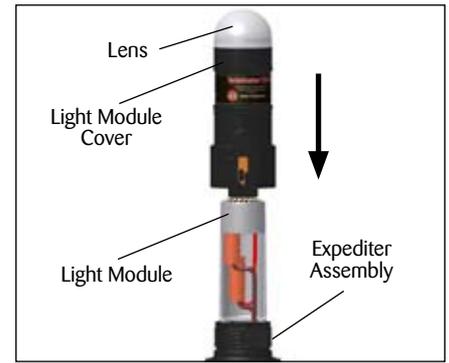
Wiring Details for LED Light



9. Snap on crimp insulators.



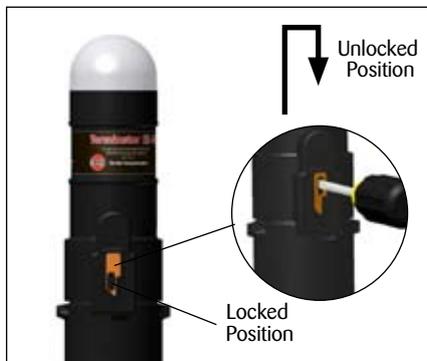
10. Slide silicone caps over crimp insulators. Install Light Module to Expediter.



11. Arrange crimped leads to fit inside light module base. Slide the light module cover over light module.



12. Engage threads. Rotate light module cover clockwise and tighten cap securely. Make sure latch mechanism is in the locked position.



13. To remove cap, de-energize circuit, lift latch mechanism, and unscrew cap.



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